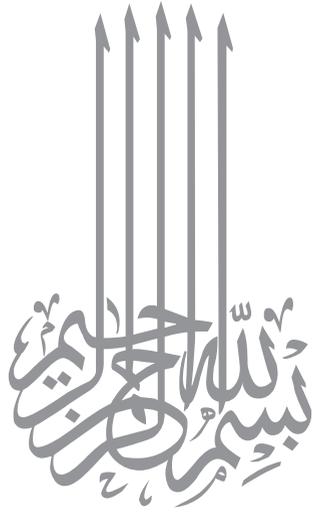




MACHINERY AND EQUIPMENT VALUATION

Manual

FEB 2022



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Table of Contents

PREFACE	10
INTRODUCTION	13
GLOSSARY	19
ABBREVIATIONS	47
CHAPTER 1 PRE-ENGAGEMENT	53
1.1 Client instructions	55
1.1.1 Introduction	55
1.1.2 Client interview	57
1.1.3 Client screening	58
1.2 Risk management:	61
1.2.1 Introduction	61
1.2.2 Risk management framework	62
1.2.3 Risks and safeguards in valuation	64
1.3 Scope of work	72
1.4 Valuation fees	79
1.5 Proposal	81
1.6 Letter of Engagement	83
CHAPTER 2 INTRODUCTION TO THE VALUATION PROCESS FOR MACHINERY AND EQUIPMENT	89
2.1 Introduction	90
2.2 Objective	90
2.3 Description	90
2.3.1 Request for valuation received	90
2.3.2 Determine the purpose of the valuation	91
2.3.3 Identify the M&E to be valued	91
2.3.4 Information typically captured	92
2.3.5 Obtain current new cost and market data	92
2.3.6 Obtain plans and drawings	93
2.3.7 Selection of valuation approach and methodology	93
2.3.8 Valuation reporting	93
2.3.9 Contents of the valuation report	94
CHAPTER 3 M&E SPECIFIC TERMS OF REFERENCE	97
3.1 Introduction	98
3.2 Objective	98

3.3 Scope of work	98
3.3.1 Agree scope of work	98
CHAPTER 4 OBJECTIVES AND PRINCIPLES OF M&E VALUATION	103
4.1 Introduction	104
4.2 Objective	104
4.3 Description	104
4.3.1 Request for M&E valuations	104
4.3.2 Valuations for financial reporting purposes	105
4.3.3 Valuations for tax reporting purposes	110
4.3.4 Valuations for litigation support purposes	112
4.3.5 Valuations for transaction support purposes	113
4.3.6 Valuations for loan security purposes	115
4.3.7 Valuations for insolvency purposes	118
4.3.8 M&E valuations under new KSA insolvency law	118
4.3.9 Valuations for insurance purposes	120
CHAPTER 5 INSPECTION OF MACHINERY AND EQUIPMENT	123
5.1 Introduction	124
5.2 Objective	124
5.3 Description	124
5.3.1 Site inspection	124
5.4 Step I - Preparation before the site inspection	125
5.4.1 Terms of reference	125
5.4.2 Information gathering	125
5.4.3 The equipment required	126
5.5 Step II - Preliminary site inspection	126
5.5.1 Site inspection	126
5.6 Step III - Procedures during the site inspection	127
5.6.1 Preparation of asset schedules	127
5.6.2 M&E data collection	129
5.6.3 Data sources for site inspection	130
5.7 Step IV - Procedures after the site inspection	131
5.8 Safety aspects	132
CHAPTER 6 DESCRIPTION OF MACHINERY AND EQUIPMENT	135

Table of Contents

6.1 Introduction	136
6.2 Objective	136
6.3 Description	136
6.3.1 M&E identification	136
6.3.2 Macro description	136
6.3.3 Micro description	138
6.4 Data collection and verification	139
CHAPTER 7 M&E SPECIFIC DATA COMPILATION CLASSIFICATION AND STORAGE	143
7.1 Introduction	144
7.2 Objective	144
7.3 Description	144
7.3.1 Data compilation	144
7.4 Classification of data	145
7.5 Data storage	149
CHAPTER 8 PREPARATION OF PLANS FOR MACHINERY AND EQUIPMENT VALUATION	151
8.1 Introduction	152
8.2 Objective	152
8.3 Description	152
8.3.1 Types of plans	152
CHAPTER 9 M&E VALUATION APPROACHES AND METHODOLOGIES	155
9.1 Introduction	156
9.2 Objective	156
9.3 Description	156
9.3.1 Market approach	156
9.3.2 Cost approach	167
9.3.3 Income approach	184
CHAPTER 10 VALUATION REPORTING	195
10.1 Introduction	196
10.2 Objective	196
10.3 Description	196
10.4 Any valuation report must reflect	196
10.5 Tips for an effective valuation report	196
10.6 Report information	197

10.7 Other points	198
CHAPTER 11 CLOSURE	201
11.1 Filing and archiving	202
11.1.1 Introduction	202
11.1.2 Minimum requirements	202
11.1.3 Storage period	203
11.1.4 Electronic filing	204
11.1.5 Physical filing	206
11.2 Closing letter	207
11.3 Handling client complaints	208
11.3.1 Introduction	208
11.3.2 Complain handling procedures guidelines	209
CHAPTER APPENDICES	213
Appendix A - Assignment Log Sample	214
Appendix B - Interview of Client	215
Appendix C - Risk Assessment Matrix	218
Appendix D - Independence and Conflict Check Flow Chart	219
Appendix E - Sample site visit information request/ checklist	222
Appendix F- Sample Fee Estimation	226
Appendix G – Sample Proposal Template	227
Appendix H – M&E related Sample Letter of Engagement	234
Appendix I- Sample M&E Depreciation/Life Tables	256
Appendix J – Site Inspection Checklist	260
Appendix K- Sample site plans	262
Appendix L - Sample Machinery process/work flow plan	264
Appendix M – Machinery and Equipment Useful Databases	265
Appendix N – Sample M&E Valuation Report	266
Appendix O - Electronic File Structure	274
Appendix R - Closing or Transmittal Letter	275
Appendix S- Machinery and Equipment Estimated Normal Useful Life Tables	276
Estimated Normal Useful Life Study	277
CHAPTER BIBLIOGRAPHY	395



PREFACE

The Saudi Machinery and Equipment (“M&E”) Valuation Manual is TAQEEM’s initiative to create guidance for valuation in the field of machinery and equipment. This guidance is intended to comply with the Accredited Valuers Law, TAQEEM’s Code of Ethics and Professional Conduct and the Implementing Regulation for Machinery and Equipment Sector as well as the International Valuation Standards (IVS). Due to the need for a localised reference for the valuation of machinery and equipment in the Saudi market and the scarcity of such references in both English and Arabic language, the production of this manual became a priority.

The manual’s main objective is to clearly explain the procedures and set standards for machinery and equipment valuation practice for valuation assignments from Pre-Engagement until Closure of the assignment. This eleven-chapter manual aims to harmonize machinery and equipment valuation procedures throughout the Kingdom of Saudi Arabia (herein referred to as “the Kingdom”). This is to ensure that valuation services across asset classes are homogeneous in terms of working procedures, quality of work, data analysis, timelines, and reporting of valuation opinion among practicing valuers.

This manual, originally, can be used as a reference book about procedures in machinery and equipment valuation. This guidance is not training material; however, it should be used in conjunction with TAQEEM’s accreditation program for machinery and equipment valuers. In addition, this guidance will standardize the usage of relevant technical definitions throughout the Kingdom. Moreover, the application of this manual can be used as a benchmark for classifying valuation firms and professionals.

It is the hope of TAQEEM that this guidance will be useful in helping our members conduct their machinery and equipment valuation exercises on par with best international practice and create uniformity of valuation services with other professions, end users, related stakeholders and the public at large. Ultimately, this will increase transparency, confidence and drive investment in the market of the Kingdom, in line with the Saudi Vision 2030.

Saudi Authority for Accredited Valuers (TAQEEM)







Introduction



Saudi Authority for Accredited Valuers (TAQEEM) is the pre-eminent valuation institution in the Kingdom of Saudi Arabia established by a Royal Decree to regulate and improve the standards of the valuation industry in the Kingdom. Since its inception in 2012, TAQEEM has put in place the requisite regulatory, licensing, standard-setting and academic framework aimed at advancing the valuation profession and raising public trust and confidence in the profession. Over the past few years TAQEEM has also rolled out a raft of initiatives in this regard, including adoption and promulgation of the International Valuation Standards (IVS) in Arabic, strategic partnerships with leading professional organizations from around the world and facilitation of several high-profile stakeholder forums on various topical issues.

As part of its continuing efforts to advance and align local valuation practice, and to raise public trust and confidence, TAQEEM is pleased to present this first edition of the Saudi Machinery & Equipment (M&E) Valuation Manual. The manual compiles best practice guidance across all aspects and stages of a valuation assignment, from client engagement through assignment planning, development and delivery of the valuation report and custody of work files. In developing the manual, TAQEEM has had regard to the latest edition of the IVS, leading professional practice in the valuation of M&E and standards in other parts of the world, local practice, laws and regulations and idiosyncrasies of the Saudi market. The vital role of the M&E valuer in the extensive industrial infrastructure of the Kingdom cannot be gainsaid. Lenders and investors rely on such valuation reports to help them determine asset quality and fair price, assess and mitigate risks, detect and prevent fraud, and generally make better informed transaction decisions. Such a role underpins the stability as well as efficient and transparent operation of the industrial and commercial sectors. The National Transformation Program (NTP) 2020 seeks public sector & fiscal reforms, economic diversification & enhancing the business environment aims, amongst other things.

The manual is aimed primarily at valuers operating in the Kingdom who have at least a basic working knowledge of valuation theory and techniques. It is not intended as a textbook on M&E valuation or a substitution for any of the qualifying course materials currently offered by TAQEEM. In as far as valuation approaches and techniques are concerned, the manual highlights best practice in their application considering both the provisions of IVS and the peculiarities of the KSA market. By carefully infusing international standards and leading international M&E valuation practice with local market custom, laws and regulations, the manual is primarily intended to complement the IVS and serve as a reference in operationalizing the international standards in the context of the intricacies of the local market, rather than change or replace any of their provisions.

TAQEEM recognizes the emergent nature of the professional valuation industry in the Kingdom. Hence the manual has been designed to cater to both mandatory and aspirational aspects of practice whilst weaving normative and descriptive writing styles. However, consistent with the style in the IVS, use of the words must and/or shall within the manual signify a requirement for valuer compliance with the specific instruction. In this regard, valuers operating or providing valuations in the Kingdom are expected to comply with the cited requirements of the manual in the same vein as the IVS and TAQEEM's Code of Ethics and Professional Conduct. Such compliance is enshrined in the Implementing Regulations of the Accredited Valuers Law Article (18)-1.

TAQEEM also advises valuer consideration of, and compliance with all other, non-prescriptive and best practice provisions of the manual, except where the valuer can reasonably justify that any alternative action taken by him was more appropriate or necessary given the circumstances of the case. This is only the first of several future editions of the manual developed to address emerging market needs. Valuers can expect that some of the current provisions will evolve into mandatory requirements in future and hence worth their while to begin shaping up to.



The manual is arranged in logical order matching the stages in a typical M&E valuation assignment, and each is made up of several more specific sections and subsections.

The Pre-engagement section discusses the basic, yet crucial requirements for the valuer to understand the client's needs at the outset (identify the problem), assess client and assignment risks as well as ascertain the valuer's independence, competence and capabilities prior to documenting, agreeing and committing to a scope of work with the client. Local statutory and regulatory requirements in this regard are highlighted alongside those of the IVS. Proposed tools and templates which assist compliance with such requirements are also provided.

The M&E site inspection section initially outlines the level of diligence expected of the M&E valuer in inspections and market analyses sufficient to determine the subject M&E asset's highest and best use and to support the application of the various valuation approaches and methods. A discussion of the most common valuation approaches and methods ensues with guidelines as to their suitability and practical application in line with leading international practice. Illustrations and examples are provided where appropriate.

The Reporting section outlines the permissible valuation report formats and the minimum disclosures they must convey in line with IVS. Finally, the Closing section concludes by guiding the valuer through the minimum requirements and leading practices for establishing and maintaining records, handling client complaints and closing engagements.





GLOSSARY



Some of the following terms apply to asset classes other than M&E. The intention is to encourage consistent valuation reporting across all asset classes covered by the IVS and TAQEEM standards, and discourage any misinterpretation of valuation standards to the disadvantage of our mutual clients. This is especially important where separate, TAQEEM accredited Real Estate, Business and M&E valuers may be reporting individually to a single KSA commercial enterprise, employing and reporting regarding all three respective asset classes.

Accounting policies

The specific principles, bases, conventions, rules and practices applied by an entity in preparing and presenting *financial* statements. (IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors).

Accredited valuer

A natural or corporate person licensed to practice the profession according to this Law (Accredited Valuers Law 1433H).

All risks yield (ARY)

Capitalisation rate that considers all the risks and rewards associated with ownership of an investment and reflected in the purchase *price* of that investment.

Assets

Items that might be subject to a valuation engagement. Unless otherwise specified in the standard, these terms can be considered to mean “asset, group of assets, liability, group of liabilities, or group of assets and liabilities” (International Valuation Standards 2022, Glossary, para 20.1).

Note: To assist in the readability of the manual and to avoid repetition, the words “asset” and “assets” refer generally to items that might be the subject of a valuation engagement. Unless otherwise specified in the manual, these terms can be considered to mean “asset, group of assets, liability, group of liabilities, or group of assets and liabilities.

Assignment

- 1) An agreement between a *valuer* and a *client* to provide by valuer, a *valuation* service;
- 2) The *valuation* service that is provided as a consequence of such an agreement with a client.

(Adapted from (Uniform Standards of Professional Appraisal Practice 2020-2021).

Assumption

A supposition taken to be true. It involves facts, conditions or situations affecting the subject of, or approach to, a *valuation* that, by agreement, do not need to be verified by the *valuer* as part of the *valuation* process. Typically, an *assumption* is made where specific investigation by the *valuer* is not required in order to prove that something is true (RICS Valuation – Global Standards 2022).

Auction realisable value

The estimated amount that one would expect to achieve through a properly conducted auction sale.

Basis of value

The fundamental premises on which the reported values are or will be based (International Valuation Standards 2022, Standard 105, para 10.1.

Note: “The Valuer must choose the relevant basis (or bases) of value according to the terms and purpose of the valuation assignment.” (IVS 2022, Standard 104, para 20.2).

Building services

Assets installed primarily to provide services to buildings or building occupants and which are generally valued as part of the property interest because they would normally be included as part of a sale of the property and or classified as part of real estate in a financial accounting balance sheet classification.



Note: Building services, including fixtures and specialist mechanical and electrical services may sometimes be valued in isolation as part of a wider property transaction, tax related purposes, internal management purposes or other special purpose. However, clarification of their valuation treatment must be expressly agreed at the time of engagement.

Book value

The written down, accounting value of assets as it appears in the books of account of the company. It usually represents historical or original cost (cost of acquisition) less accrued depreciation, unless revalued.

Net book value is usually considered synonymous with book value whereas 'gross book value' is generally the acquisition cost.

Business

A commercial, industrial, service, or investment entity (or a combination thereof) pursuing an economic activity.

Business valuation

The practice of determining the economic value of a company or *business* or ownership interest therein.

Note: M&E assets may be employed either within or discrete from a business.

Capitalisation

The conversion of income into a valuation indication through the application of an appropriate *capitalisation rate*.

Capitalisation rate

A ratio of one year's net operating income provided by an asset to the value of the asset; used to convert income into value in the application of the income *capitalisation* approach (The Dictionary of Real Estate Appraisal, 6th Ed.)

Carrying amount

The amount at which an asset is recognised after deducting any accumulated depreciation (amortisation) and accumulated impairment losses thereon. (IAS 16 Property, Plant and Equipment)

Carve-out

The partial sale/divestiture of a *business* unit or elements of a business unit to an external party.

Cash Generating Unit

The smallest identifiable group of *assets* that generates cash inflows that are largely independent of the cash inflows from other *asset* or groups of *assets*. (IAS 36 Impairment of Assets)

Chattel

An item of tangible *property* except *real estate* and things (such as buildings) connected with *real property*. The question whether a *chattel* has become a *fixture* depends upon whether it is fixed to land, and if so for what purpose.

Note: Legal recognition of chattels and assumptions regarding their corresponding valuation treatment can sometimes be a complex process, and other professionals (and sometimes courts) may be involved in their recognition and allocation between buildings and machinery and equipment.

Client

The person, persons, or entity for whom the *valuation* is performed. This may include external *clients* (i.e., when a valuer is engaged by a third-party client) as well as internal *clients* (i.e. valuations performed for an employer) (International Valuation Standards 2022, Glossary, para 20.2).

Cost

The amount of money needed to buy, do, or make something. *Cost* may be either an accomplished fact or a current estimate. Cost of an asset may be higher than, lower than, or equal to the subject asset's value.

Cost(s) (noun)

The consideration or expenditure required to acquire or create an asset.
(International Valuation Standards 2022, Glossary, para 20.4)



Cost approach

An approach that provides an indication of *value* using the economic principle that a buyer will pay no more for an asset than the *cost* to obtain an asset of equal utility, whether by purchase or by construction, unless undue time, inconvenience, risk or other factors are involved. (International Valuation Standards 2022, standard 105, para 60.1).

Cost analysis

Estimating what a product or item will *cost*.

Cost and freight

The cost of goods including transport charges.

Cost centre

A unit, such as a department of a company, to which costs may be allocated for *cost* accounting purposes.

Costs decreed

Expenses involved in court case as decreed by the court.

Cost, insurance and freight (CIF)

Cost of goods plus insurance plus freight.

Cost of inventories

All *costs* of purchase, *costs* of conversion and other costs incurred in bringing the inventories to their present location and condition. (IAS 2 Inventories)

Cost of sales

All the *costs* of a product sold including manufacturing *cost*, allocated overheads and staff costs. Such costs may be recognised differently under international and national accounting standards.

Cost plus

System of calculating price from actual cost of production including a percentage of that cost to cover overhead and profit.

Credible

Worthy of belief.

Comment: Credible valuation results require support, by relevant evidence and logic, to the degree necessary for the intended use (Uniform Standards of Professional Appraisal Practice, 2020-2021 Definitions lines 103-105).

Current asset

An entity shall classify an asset as current when:

- a) It expects to realise the asset or intends to sell or consume in its normal operating cycle;
- b) It holds the asset primarily for the purpose of trading;
- c) It expects to realise the asset within 12 months after the reporting period; or
- d) The asset is cash or a cash equivalent unless the asset is restricted from being exchanged or used to settle a liability for at least 12 months after the reporting period

An entity shall classify all other assets as non-current. (IAS 1 Presentation of Financial Statements)

Date of the report

The date on which the valuer signs the report (RICS Valuation – Global Standards 2022).

Depreciated Replacement Cost (DRC)

The current cost of replacing an asset with its modern equivalent asset less deductions for physical deterioration and all relevant forms of obsolescence and optimisation (RICS Valuation – Global Standards 2022).

Direct capitalisation

Method used to convert an estimate of a single year's income expectancy into an indication of value in one direct step, either by dividing the net income estimate by an appropriate capitalisation rate or by multiplying the income estimate by an appropriate factor. Direct capitalisation employs capitalisation rates and multipliers extracted or developed from market data. Only one year's income is used. Yield and value changes are implied, but not explicitly identified (The Dictionary of Real Estate Appraisal, 6th Ed.).



Direct cost

Expenditure for the labour and materials necessary to construct a new *asset*.

Note: Direct costs are also called hard costs. A contractor's overhead and profit are generally considered a direct cost.

Discount rate

A rate of return used to convert a monetary sum, payable or receivable in the future, into a present value. (International Valuation Standards 2022, Glossary, para 20.5)

Economic obsolescence

A loss of utility caused by factors external to the *asset*, especially factors related to changes in supply or demand for products produced by the asset that results in a loss of *value*.

Effective Date

The date to which a valuer's analyses, opinions, and conclusions apply; also referred to as date of valuation (Uniform Standards of Professional Appraisal Practice, 2020-2021 Definitions lines 106-107).

Engagement

An agreement between a *valuer* and a *client* to provide a valuation or *valuation review*.

Engagement letter

The contract that defines and affirms the service that the *valuer* will provide in the *assignment*, the responsibilities of both the *valuer* and the *client* in the *assignment* and conditions that will govern the use of the *valuation report*.

Enterprise value

The total *value* of a company, inclusive of both debt and equity less liquid assets such as cash and investments.

Note: By definition this will encompass tangible assets such as M&E.

Equipment

An all-encompassing term for *assets* such as *machinery*, tooling, fixtures, furniture and furnishings, trade fixtures and fittings, vehicles and loose tools that are used to assist the operation of an enterprise

or entity. It is also defined as ancillary *assets* that are used to assist in the function of the enterprise.

Note: "Equipment" is a broad commercial term, and there is no absolute definition of all or any assets that may fall under this term.

Equitable Value

This is the estimated price for the transfer of an asset or liability between identified knowledgeable and willing parties that reflects the respective interests of those parties. (International Valuation Standards 2022, Glossary, para 20.6)

Equivalent yield

The single *capitalisation rate* which when applied to both the term and reversion parts in a traditional *income capitalisation* technique would produce the same overall *value indication* as when different rates are used for the individual parts.

Exchange rate

The ratio of exchange for two currencies. (IAS 21 The Effects of Changes in Foreign Exchange Rates)

Exit price

The *price* that would be received to sell an *asset* or paid to transfer a liability.

Ex-situ

Valuation based on the *assumption* of subject assets being removed from their current location on basis of piecemeal (breakup) disposal (e.g. auction) or removal of entire *asset* base as single package.

External obsolescence

A loss of utility caused by economic or locational factors external to the *assets* that results in a loss of value.

Fair value (IFRS)

The *price* that would be received to sell an *asset* or paid to transfer a liability in an orderly transaction between market participants at the measurement date.



Note: As there are a number of general fair value definitions (e.g. as defined under shareholder agreements) valuers should always use the term: “IFRS 13 fair value” when reporting for IFRS accounting statements purposes (ideally referring to the particular IFRS standard.)

Fair value less costs to sell (FVLCS)

The amount obtainable from the sale of the **asset** in an arm’s length transaction between knowledgeable and willing parties, less the costs of disposal. (IAS 36 Impairment of Assets).

Fee simple interest

Also, Fee simple estate: Absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat (The Dictionary of Real Estate Appraisal, 6th ed.).

Financial instrument

Any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another equity. (IAS 32 Financial Instruments: Presentation)

Financial statements

A complete set of financial statements comprises:

- a) A statement of financial position as at the end of the period;
- b) A statement of comprehensive income for the period;
- c) A statement of changes in equity for the period;
- d) A statement of cash flows for the period;
- e) Notes, comprising a summary of significant accounting policies and other explanatory information; and
- f) A statement of financial position as at the beginning of the earliest comparative period when an entity applies an accounting policy retrospectively or makes a retrospective restatement of items in its financial statements, or when it reclassifies items in its financial statements. (IAS 1 Presentation of Financial Statements)

Firm

The **firm** or organisation for which the valuer works, or through which the valuer trades (Adapted from (RICS Valuation – Global Standards 2020)).

Fixed cost

The cost which remains fixed irrespective of consideration whether the quantity of product is increased or decreased.

Fixture

A thing once a *chattel* which has become, in law, land through having been fixed to land.

Note: Legal recognition of fixtures and assumptions regarding their corresponding valuation treatment can sometimes be a complex process, and other professionals (and sometimes courts) may be involved in their recognition and value allocation.

Forced liquidation or forced sale

Terms such as *forced sale* or *forced liquidation* are often used in circumstances where a seller is under compulsion to sell and that, as a consequence, a proper marketing period is not possible and buyers may not be able to undertake adequate due diligence. The *price* that could be obtained in these circumstances will depend on the nature and pressure on the seller and the reasons why proper marketing cannot be undertaken. (The International Valuation Standards (IVSs), 2022, standard 104, para 170.1)

Note: Care should be exercised when using such often subjective in nature terms. Ideally, the valuer should report under IVS/TAQEEM defined valuation bases. Terms such as Forced Sale should only be used if referring to a , defined commercial scenario and hence would not represent formal valuation advice under IVS and TAQEEM standards.

Freehold interest

Also, Freehold estate: An estate or possessory interest in land that lasts for an indeterminable length of time, such as for a lifetime or forever. Examples include fee simple (also called an indefeasible fee), defeasible fee, and life estates. The first two continue for an indefinite period and are inheritable by the heirs of the owner. The life estate terminates upon the death of the person on whose life it is based (The Dictionary of Real Estate Appraisal, 6th ed.).



Functional obsolescence

A loss of utility resulting from inefficiencies in the subject **asset** compared to its replacement that results in a loss of **value**.

Goodwill

Any future economic benefit arising from a **business**, an interest in a **business** or from the use of a group of **assets** which has not been separately recognised in another **asset**. (International Valuation Standards 2022, standard 210 para. 20.6).

Going concern

An accounting term for a company that will operate into the future without the threat of a liquidation for the near future or a business that is operating and making a profit.

Note: Whilst the term going concern may be quoted in accounting circles, it is not recommended as a valuation term for M&E due to the inherent subjectivity in such a term for an M&E valuer reporting only in respect discrete M&E assets.

Highest and best use

The use of an asset that maximises its potential and that is physically possible, legally permissible and financially feasible. **Highest and best use** is the use, from a participant perspective, that would produce the highest **value** for an **asset** (International Valuation Standards 2022, standard 104, para 140.1).

Note: This may involve the use of the asset in isolation, or in concert with other assets the intention being to optimise the asset's use.

Hive down

A transfer of part of a company's business to another company, normally a new company or other entity created for this purpose.

Impairment loss

The amount by which the **carrying amount** of an **asset** exceeds its recoverable amount. (IAS 16 Property, Plant and Equipment)

Income approach

An approach that provides an indication of *value* by converting future cash flows to a single current *value* (International Valuation Standards 2022, standard 105, para 40.1).

Indemnity value

The amount in monetary terms (at the date of the loss event) that a contract of insurance would pay in principle to replace or compensate for an item based on its pre-loss condition.

Independence confirmation

A statement confirming independence from conditions and relationships, in the context of an *engagement*, which would compromise the integrity or objectivity of the company or person involved.

Information requirement list

A list sent to the *client* in order to obtain relevant information regarding the *client's assets* for use in conducting a *valuation*.

Indirect cost

Expenditure for items other than labour and material. Indirect *costs* include administrative costs.

In-situ

Valuation based on *assumption* of subject *assets* being retained in their current location for contemplated future operation, but ignoring any associated commercial enterprise or and/or earnings potential.

Inspection

Personal observation of the exterior or interior of *M&E* that is the subject of an assignment performed to identify the assets' characteristics that are relevant to the assignment, such as make, model, type, capacity, year of manufacture, general physical condition, and functional utility.

Intangible asset

A non-monetary asset that manifests itself by its economic properties. It does not have physical substance but grants rights and/or economic benefits to its owner (International Valuation Standards 2022, standard 210, para 20.1).



Intended Use

The use(s) of a valuer's reported valuation or valuation review results, as identified by the valuer based on communication with the client (International Valuation Standards 2022, Glossary, para 20.9).

Intended User

The client and any other party as identified, by name or type, as users of the valuation or valuation review report by the valuer based on communication with the client (International Valuation Standards 2022, Glossary, para 20.10).

International Financial Reporting Standards (IFRS)

A set of international accounting standards stating how transactions and other events should be accounted for in the *financial statements* and to help investors and other users of financial information to make economic decisions.

International Valuation Standards (IVS)

Standards for undertaking valuation assignments using generally recognized concepts and principles that promote transparency and consistency in valuation practice.

Inventories

Assets:

- a) Held for sale in the ordinary course of the *business*;
- b) In the process of production for such sale; or
- c) In the form of materials or supplies to be consumed in the production process or in the rendering of services.

Inventories encompass goods purchased and held for resale including, for example, merchandise purchased by a retailer and held for resale, or land and other *property* held for resale. Inventories also encompass finished goods produced, or work in progress being produced, by the entity and include materials and supplies awaiting use in the production process. (IAS 2 Inventories)

Investment Value

The value of an asset to the owner or a prospective owner given individual investment or operational objectives (may also be known as worth) (International Valuation Standards 2022, Glossary, para 20.11).

Joint venture

A joint arrangement where two parties have joint control of the arrangement and rights to the net **assets** of the arrangement. It normally involves sharing of resources, which could include capital, personnel, physical **equipment**, facilities or intellectual **property** such as patents. (IFRS 11 – Joint Arrangements)

Jurisdiction

The legal and regulatory environment in which a valuation engagement is performed. This generally includes laws and regulations set by governments (e.g., country, state and municipal) and, depending on the purpose, rules set by certain regulators (e.g., banking authorities and securities regulators). The International Valuation Standards (IVS), 2022, Glossary, para 20.12

This includes TAQEEM's regulatory regime in the context of the Kingdom of Saudi Arabia.

Labour cost

The **cost** of paying workers employed to make a product.

Letter of engagement

See orderly Engagement letter

Liquidation Value

The amount that would be realised when an asset or group of assets are sold on a piecemeal basis. Liquidation value should take into account the costs of getting the assets into saleable condition as well as those of the disposal activity. Liquidation value can be determined under two different premises of value (see IVS 104 Bases of Value, section 80):

- (a) an orderly transaction with a typical marketing period; or
- (b) a forced transaction with a shortened marketing period

(International Valuation Standards 2022, Glossary, para 20.13).



Machinery

Individual, or a collection or a fleet of machines that may be employed, installed or remotely operated in connection with a user's industrial or commercial processes, trade or *business* sector (a machine is an apparatus used for a specific process).

Manufacturing cost

The *cost* of making a product. This sometimes includes overheads such as administration, rent, utilities, etc.

Marginal cost

Cost of making a single extra unit above the number already planned.

Market approach

A valuation approach which provides an indication of value by comparing the subject asset with identical or comparable (that is similar) assets for which price information is available. (International Valuation Standards 2022, standard 105, para 20.1).

Market value

The estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion (International Valuation Standards 2022, Glossary, para 20.14).

May

The word "may" describes actions and procedures that valuers have a responsibility to consider. Matters described in this fashion require the valuer's attention and understanding. How and whether the valuer implements these matters in the valuation engagement will depend on the exercise of professional judgement in the circumstances consistent with the objectives of the standards. (The International Valuation Standards (IVSC), 2022 Glossary, para 20.15.)

Misleading

Intentionally or unintentionally misrepresenting, misstating, or concealing relevant facts or conclusions (Uniform Standards of Professional Appraisal Practice, 2020-2021 Definitions line 139).

Most advantageous market

The market that maximises the amount that would be received to sell the asset or minimises the amount that would be paid to transfer the liability, after taking into account transaction costs and transport cost.

Net realisable value

The estimated selling *price* in the ordinary course of *business*, less the estimated cost of completion and the estimated costs necessary to make the sale. (IAS 2 Inventories)

Non-disclosure agreement (NDA)

A legal contract, which states the confidentiality terms, shared between at least two parties. It describes the information which could be shared between the parties and which should not be accessible for the public.

Non-recoverable taxes

Tax incurred on a purchase of goods and services that is not recoverable from the taxation authority and recognised as an expense. For example, whilst there may be a number of specific variations from an *M&E valuation* point of view there is a general *assumption* that the *asset's* owner/operator will be VAT registered and capable of recovering the same. The principal exception would be where VAT is not recoverable and hence might have to added to an *M&E valuation*, but as most market participants would be VAT registered, it would be an exception.

Obsolescence

A loss of utility of an *asset* caused by either physical deterioration, changes in technology, patterns of demand or environmental changes that results in a loss of *value*.



Operating costs/running costs

The expenses that are related to the operation of a *business*, or to the operation of a device, component, piece of *equipment* or facility.

Orderly liquidation value

The value of a group of assets that could be realised in a liquidation sale, given a reasonable period of time to find a purchaser (or purchasers), with the seller being compelled to sell on an as-is, where-is basis. (IVS 104 para 160.1)

Note: The inverse of orderly liquidation value in this regard would be forced liquidation value. Care must be recognised in the use of the term liquidation in the US. This is because in the US region, it is a formal Uniform Standards of Professional Appraisal Practice (USPAP) valuation basis which implies a sale or disposal with adequate time to conduct the sale process, but which may also in turn, be orderly, or forced. However, in most other world regions, the general term liquidation implies an enforced sale, most likely linked to some form of distress or foreclosure.

Overnight cost

In project financial terms, overnight cost is the estimated cost of an *asset/construction* project if no interest was incurred during construction, as if the project was completed «overnight.»

Overnight insurance reinstatement cost

This is the cost necessary to replace, repair, or rebuild the *asset* insured to a condition substantially the same as, but not better or more extensive than, its condition when new.

Participant

The relevant parties pursuant to the basis of value used in a valuation *engagement*. Different bases of value require *valuers* to consider different perspectives, such as those of market participants (e.g. market value, IFRS fair value) or a particular owner or prospective buyer (e.g. investment value).

Personal property

Assets (or liabilities) not permanently attached to land or buildings.

Note: The term, personal property in US GAAP accounting terms and also USPAP US valuation terms, is taken to mean all moveable assets (including M&E) not forming part of a real estate holding. However, in Europe and parts of MENA and APAC (and also in RICS red book valuation terms) the term, personal property usually signifies chattels such as jewellery, arts and antiques.

This dichotomy between IVS and USPAP is being addressed under a bridge mechanism, but in the interim, it should be sufficient for M&E valuers to be explicit in defining and naming the assets under valuation.

Physical obsolescence

A loss of utility due to the physical deterioration of the **asset** or its components resulting from its age and normal usage that results in a loss of **value**.

Plant

assets that are combined with others and that may include items that form part of industrial infrastructure, utilities, building services installations, specialised buildings, and machinery and equipment forming a dedicated assemblage (RICS Valuation – Global Standards 2020).

Plant, machinery and equipment (PME)

Tangible **assets** that are usually held by an entity for use in the manufacturing/production or supply of goods or services, for rental by others or for administrative purposes and that are expected to be used over a period of time (International Valuation Standards 2022, standard 300, para 20.1). The term PME is analogous to the term **M&E** (Machinery & *Equipment*.)



Note: Alternatively, assets that are combined with others and that may include items that form part of industrial infrastructure, utilities, building service installations, specialised buildings, and machinery and equipment forming a dedicated assemblage. It is helpful to note here that whilst PME as a sub, tangible asset class is not part of a real estate holding, PME can form part of the technical service infrastructure within a wider real estate holding which includes buildings annexed to the land. In addition, the term “PPE” (standing for property, Plant & Equipment” is specifically mentioned in M&E related IFRS standards such as IAS 16) Hence, valuers are advised to therefore carefully identify and describe the correct tangible asset class for PME assets subject to valuation.

Price (noun)

The monetary or other consideration asked, offered or paid for an asset, which may be different from the value (International Valuation Standards 2022, Glossary, para 20.18).

Profession

Valuation Profession (Accredited Valuers Law 1433H).

Profit centre

A branch or division of a company that is accounted for on a standalone basis for profit calculation.

Profit method

Method of *valuation* that provides an indication of *value* for a trade related *property* based on the potential turnover and profit that could be realised through the carrying out of a specified *business* in the *property*.

Property

Something tangible or intangible to which its owner has legal title (The Dictionary of Real Estate Appraisal, 6th Ed.).

Note: This definition encompasses M&E also. Hence, M&E valuers should be alive to the fact that terms like property and asset are all interchangeable as terms to also describe M&E.

Purpose

The reason(s) a valuation is performed. Common purposes include (but are not limited to) financial reporting, tax reporting, litigation support, transaction support, and to support secured lending decisions. (The International Valuation Standards (IVS), Glossary, 2022 section 20.19)

Quality and risk management (Q&RM)

The practice of identifying, quantifying, mitigating and managing a company's risk. It involves a team providing coordinated advice and assistance on independence, conflicts, compliance, regulatory, policy, security and risk management issues. Q&RM is synonymous with regulatory valuation regimes such as RICS and TAQEEM.

Real estate

Land and all things that are a natural part of the land, e.g. trees, minerals and things that have been attached to the land, e.g. buildings and site improvements and all permanent building attachments, e.g. mechanical and electrical plant providing services to a building, that are both below and above the ground (RICS Valuation – Global Standards 2022).

Note: As stated earlier under the M&E definition, please note that M&E as a technical asset class that provides building services (only) can fall under a wider Real Estate valuation.

Real property interest

Right of ownership, control, use or occupation of land and buildings (IVS 400 para 20.2).

Reinstatement insurance value

The monetary amount required to reproduce at one time, in like kind and new condition and materials, the **asset** or group of **assets**, in accordance with current market **prices** at the time of the loss, together with the addition of policy period and post loss reinstatement period inflationary provisions.



Replacement cost new

The current cost of a similar new *property* having the nearest equivalent utility as the *property* being appraised, as of a specific date.

Replacement insurance value

The monetary amount required to reproduce at one time, in like kind and new condition and materials, the *asset* or group of assets, in accordance with current market *prices* at the time of the loss.

Reproduction cost new

The cost of reproducing a new replica of a *property* based on current prices with the same or closely similar materials, as of a specific date.

Report

See valuation report.

Except where stated otherwise, “report” in the manual refers to valuation report.

Salvage value

An opinion of the amount, expressed in terms of money that may be expected for sale of the whole *asset* or a component of the whole asset that is retired from service for possible use elsewhere, as of a specific date.

Scrap value

An opinion of the amount, expressed in terms of money that could be realised for an asset if it were sold for its material content, not for a productive use, as of a specific date.

Scope of services or scope of engagement

The fundamental terms of the *valuation* services, which include *purpose* of valuation, *valuation subject* being valued, *valuation date*, and responsibilities of parties involved.

Scope of work

Sometimes referred to as terms of *engagement*, describes the fundamental terms of a *valuation* such as the asset(s) being valued, the *purpose* of the *valuation* and the responsibilities of parties involved in the *valuation* (International Valuation Standards 2022, standard 101, para 10.1).

Should

The word “should” indicates responsibilities that are presumptively mandatory. The *valuer* must comply with requirements of this type unless the valuer demonstrates that alternative actions, which were followed under the circumstances, were significant to achieve the objectives of the standards. In the rare circumstances in which the valuer believes the objectives of the standard can be met by alternative means, the *valuer* must document why the indicated action was not deemed necessary and/ or appropriate. If a standard provides that the *valuer* “should” consider an action or procedure, consideration of the action or procedure is presumptively mandatory, while the action or procedure is not. (The International Valuation Standards (IVSC), 2022 Glossary, para 20.20)

Signature

Personalised evidence indicating authentication of the work performed by the valuer and whether it is performed by the valuer and the acceptance of the responsibility for content, analyses, and the conclusions in the report (Uniform Standards of Professional Appraisal Practice, 2020-2021 Definitions lines 164-165).

Special assumption

Where assumed facts differ from those existing at the date of the *valuation*, it is referred to as a *special assumption*. Special assumptions are often used to illustrate the effect of possible changes on the *value* of an *asset*. They are designated as “special” so as to highlight to a *valuation* user that the *valuation* conclusion is contingent upon a change in the current circumstances or that it reflects a view that would not be taken by *participants* generally on the valuation date. Examples of such assumptions include, without limitation:

- a) An assumption that a property is freehold with vacant possession,
- b) An assumption that a proposed building had actually been completed on the valuation date
- c) An assumption that a specific contract was in existence on the valuation date which had not actually been completed, and



d) An assumption that a financial instrument is valued using a yield curve that is different from which would be used by a participant. (International Valuation Standards 2022, standard 104, para 200.4.)

Subject of interest or valuation subject

Refers to the company or *assets valued* in a particular valuation *engagement* or project.

Synergistic Value

The result of a combination of two or more assets or interests where the combined value is more than the sum of the separate values. If the synergies are only available to one specific buyer, then synergistic value will differ from market value, as the synergistic value will reflect particular attributes of an asset that are only of value to a specific purchaser. The added value above the aggregate of the respective interests is often referred to as marriage value (International Valuation Standards 2022, Glossary, para 20.23).

Trade related property

Any type of *real property* designed for a specific type of *business* where the *property* value reflects the trading potential for that *business* (RICS Valuation – Global Standards 2022).

Note: Although not falling under this asset class, M&E may often be closely associated with trade related properties (e.g. petrol filling station.)

Uniform Standards of Professional Appraisal Practice (USPAP)

The quality control standards applicable for *real property*, *personal property*, *intangible assets*, and *business valuation* appraisal analysis and reports in the United States and its territories.

Valuation

The act or process of determining an opinion or conclusion of value of an asset on a stated basis of value at a specified date in compliance with IVS (International Valuation Standards 2022, Glossary, para 20.24). An opinion of the value of an asset or liability on a stated basis, at a specified date (RICS Valuation – Global Standards 2022)

The act or process of developing an opinion of value (The Dictionary of Real Estate Appraisal, 6th Ed.).

Valuation approach

In general, a way of estimating value that employs one or more specific valuation methods (International Valuation Standards 2022, Glossary, para 20.25).

The fundamental process by which the *valuer* develops the opinion of *value* for the subject asset or liability based on its nature, *purpose* and intended use of valuation, *scope of work* and regulatory requirements. The three most common *valuation approaches* are: *market*, *cost*, and *income approaches*.

Valuation date (date of valuation)

The date on which the opinion of *value* applies. The *valuation* date shall also include the time at which it applies if the *value* of the type of *asset* can change materially in the course of a single day (RICS Valuation – Global Standards 2022).

Valuation method

Within valuation approaches, a specific way to estimate a value (International Valuation Standards 2022, Glossary, para 20.26). Also, the particular detailed procedure, based on one or more *valuation approaches*, used by the *valuer* to obtain the *value* of *M&E*.

Valuation purpose

See purpose.

The act or process of determining the value of real estate properties according to a specific purpose and basis of value. (Real Estate Implementing Regulations of the Accredited Valuer's Law, Article 1-13). However, from an M&E perspective, a broader meaning of Valuation is intended hence the following definition is adopted for the purpose of the manual:

1. An opinion of the value of an asset or liability on a stated basis, at a specified date (RICS Valuation – Global Standards 2022)
2. The act or process of developing an opinion of value (The Dictionary of Real Estate Appraisal, 6th ed.).



Valuation report

The document issued by the accredited valuer to its client, including the outcome of the valuation, and which complies with the valuer's obligations set out in the Accredited Valuers Law and Implementation Rules of the Accredited Valuers Law, and is consistent with the approved valuation standards (Accredited Valuers Law 1433H).

Valuation review

The act or process of assessing and reporting on a valuation undertaken by another party, which may or may not require the reviewer to provide their own valuation opinion.

Valuation Reviewer

A professional valuer engaged to review the work of another valuer. As part of a valuation review, that professional may perform certain valuation procedures and/or provide an opinion of value (International Valuation Standards 2022, Glossary, 20.28).

Valuation technique

A specific analytical process of data treatment, conducted within a *valuation method*.

Value (noun)

The opinion resulting from a valuation process that is compliant with IVS. It is an estimate of either the most probable monetary consideration for an interest in an asset or the economic benefits of holding an interest in an asset on a stated basis of value (International Valuation Standards 2022, Glossary, para 20.29).

Note: In appraisal practice, value must always be defined—for example, market value or liquidation value.

Value indication

A valuer's conclusion of value resulting from the application of a valuation approach, e.g., the value indication by the market approach.

Value in use (IAS 36 Impairment of Assets)

The present value of the future cash flows expected to be derived from an *asset* or cash-generating unit.

Valuer

An individual, group of individuals or individual within an entity, regardless of whether employed (internal) or engaged (contracted/external), who are accredited by TAQEEM and possessing ability and experience to execute a valuation in an objective, unbiased and competent manner. In Saudi Arabia, licensing from TAQEEM is required before one can act as a Valuer (International Valuation Standards 2022, Glossary, 20.30). See also *accredited valuer*, firm.

Variable costs

Production costs which increase with the quantity of the product made.

Work file

Data, information, and documentation necessary to support the valuer's opinions and conclusions and to show compliance with IVS and CEPC.

Worth

See investment value.





ABBREVIATIONS



AC	Air-Conditioning
ADR	Alternative Dispute Resolution
AI	The Appraisal Institute
ARY	All-Risks Yield
AVL	Accredited Valuers Law
BOD	Board of Directors
CAPM	Capital Asset Pricing Model
CEPC	TAQEEM's Code of Ethics and Professional Conduct
CEPPV	IVSC's Code of Ethical Principles for Professional Valuers
CGU	Cash Generating Unit
CH	Commonhold
CHP	Complaint Handling Procedures
CMA	Capital Market Authority
COD	Cash on Delivery
CPD	Continuing Professional Development
CPL	Commercial Pledge Law
CR	Commercial Registration
Cu.M.	Cubic Meters
DCF	Discounted Cash Flow
DRC	Depreciated Replacement Cost
EBITDA	Earnings Before Interest, Tax, Depreciation and Amortization
EDMS	Electronic Document Management Systems
FAR	Fixed Asset Register
FF&E	Furniture, Fixtures, and Equipment

FH	Freehold
FRC	Financial Reporting Council
FVLCS	Fair Value Less Cost to Sell
FX	Foreign Exchange
FY	Financial Year
GLA	Gross Leasable Area
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
HABU	Highest and Best Use
HVAC	Heating, Ventilation, and Air-Conditioning system
IPMS	International Property Measurement Standards
IR-ME	Implementation Regulations of Accredited Valuers Law – Machinery and Equipment Chapter
IRR	Internal Rate of Return
IR-RE	Implementing Regulations of Accredited Valuers Law- Real Estate Chapter
IVS	International Valuation Standards
IVSC	International Valuation Standards Council
KSA	Kingdom of Saudi Arabia
LH	Leasehold
LOE	Letter of Engagement
MEA	Modern Equivalent Asset
MOCI	Ministry of Commerce & Industry
MOU	Memorandum of Understanding
N.B.	Nota Bene 'note well'
NBV	Net Book Value



NDA	Non-Disclosure Agreement
NPV	Net Present Value
OEM	Original Equipment Manufacturer
PFD	Process Flow Diagram
PFI	Prospective Financial Information
P&IDs	Piping & Instrumentation Diagram
PII	Professional Indemnity Insurance
PME	Plant, Machinery & Equipment
PPA	Purchase Price Allocation
PPE	Property, Plant & Equipment
RFP	Request for Proposal
RCN	Replacement Cost New
RICS	The Royal Institution of Chartered Surveyors
SAMA	Saudi Arabian Monetary Authority
SAR	Saudi Riyals
SCCA	Saudi Center for Commercial Arbitration
SME	Small and Medium-sized Enterprise
SOCPA	Saudi Organisation for Certified Public Accountants
SoW	Scope of Work
Sq.M.	Square meters
SVP	Appraisal Institute's Standards of Valuation Practice
TBD	To be determined
UCLR	Unified Centre for Lien Registration
UL	Useful Life

UK	United Kingdom
US	United States
USGAAP	United States Generally Accepted Accounting Principles
USPAP	Uniform Standards of Professional Appraisal Practice
WACC	Weighted Average Cost of Capital
WARA	Weighted Average Return on Assets



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of large pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a corrugated metal wall and a staircase with a railing. The lighting is bright, with several overhead fixtures visible. A large, light green diagonal shape is overlaid on the right side of the image, containing the chapter title.

CHAPTER

1

PRE-ENGAGEMENT



Figure 1 below is a flowchart of the key stages of the Pre-Engagement phase discussed in this section:

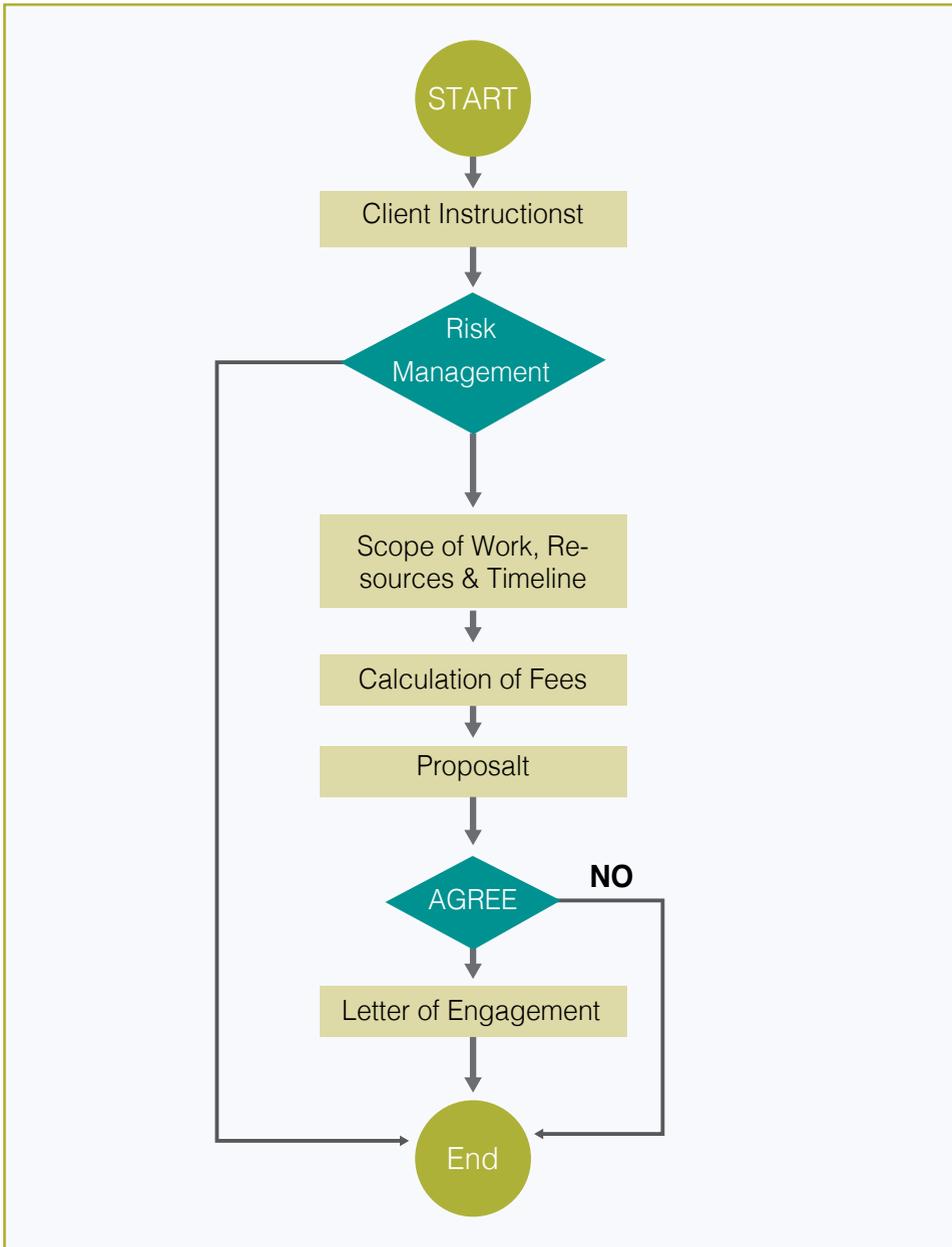


Figure 1: Pre-engagement Key Stages

1.1 Client instructions:

1.1.1 Introduction

When a client approaches a valuer for a potential valuation engagement, the valuer must at the outset obtain and evaluate certain information for the purposes of:

- a) Determining any conflict of interest relating to the client or the subject of the valuation (Accredited Valuers Law (AVL)- Article 20; Implementing Regulations of Accredited Valuers Law - Article 16; TAQEEM's Code of Ethics and Professional Conduct (CEPC) - Article 2-4);
- b) Determining the client's requirements (the valuation problem) and the valuer's scope of work to solve the problem (IVS 101; CEPC Article 4A-1); It is important to note that not all clients understand what they need, and it is the valuer's responsibility to extract enough information to define the problem and provide the right valuation solution and fee;
- c) Determining that the valuer is appropriately qualified to undertake the requested valuation in terms of his qualifications, experience and competency in the type, market and geography of the subject of valuation (CEPC Article 3-3);
- d) Determining the valuer's ability to undertake the valuation in a timely manner, and that he has adequate resources in terms of manpower and valuation tools, whether within the firm or through teaming up with others, to deliver a quality product and a credible opinion (CEPC Article 4A-6)

Client screening: Assessing commercial and legal risks, such as client's legal status and financial integrity, including ability to meet the cost of valuation, and that the relationship will be a good fit in line with the valuer's preferred clientele.



Identifying and obtaining necessary client consents regarding confidential information

Such information is captured through client interviews and the valuer's own due diligence.

Clients approach valuers through various means of communication including telephone, post, email and other commonly used internet-based applications such as Skype, Zoom, etc. A prudent valuer would make himself accessible to clients through most, if not all, of such means. Upon engagement, however both parties must select and formalize the means of communication that are both efficient and easily documentable.

Whatever the means of communication used, the valuer should have in place appropriate tools and systems that capture and facilitate efficient handling, generation, analysis and management of client and assignment information at various stages of an engagement and beyond. Depending on the scale and sophistication of the firm, these may be as simple as traditional but well-organized manual filing and paper trail and tracking systems or as complex as electronic document management systems (EDMS). But thanks to broader internet connectivity and more widely available and affordable computing solutions, the days when valuers had to spend much of their time and effort originating, receiving, sifting through and shuffling paper documents in and out of the office through a meshwork of paper trays, file registers, secretaries, clerks and fax machines are all but gone.

Progressive *firms* also maintain elaborate client receiving / response protocols designed and regularly reviewed to ensure that client instructions are coordinated and handled professionally and consistently. Frontline personnel are carefully picked, trained, equipped and imbued with a service culture to professionally interact with client calls and walk-ins, eliciting, matching and channelling through meaningful client enquiries to the right person in the firm whilst leaving a positive impression on the client. On-hold messaging, and call recording and review are also helpful in promoting the firm's image and offerings to the client, and allow the firm to retrieve client enquiries, monitor and improve the quality of the conversation.

A simple Assignments Log which captures, documents and tracks client's instructions and status is an important part of a valuation office information management system. It is also a vital first step in establishing the firm's database of projects which would subsequently be used in checking previous involvement or conflict with clients or subject assets. A simple example is provided in Appendix A.

1.1.2 Client interview

Client interview should be undertaken by a valuer or a trained assistant with a background in valuations.

The interview may be carried out over the phone, through email or ideally in a face to face meeting with the client. Depending on the scale of the engagement and client's location, a visit to the client's office for the sake of the initial interview is ideal and helps to corroborate the valuer's due diligence of the client (client ID, location, line of business, client's demeanour etc.).

Even in the case where initial contact with the valuer has been made by a representative of the client, the valuer should endeavour to have the meeting with the client directly to personally confirm his understanding of the client's requirements.

The template (Interview of Client) in Appendix B is provided as a guide to the information that the valuer should obtain from the client. Such information will ultimately be used to assess risks, define the valuation problem and prepare the Letter of Engagement (LoE) between the valuer and the client in the event that the valuer has ascertained both his independence from, and chooses to work for the client. These stages of the assignment are discussed in subsequent sections in this guide.



Except where the client's Non-Disclosure Agreement (NDA) is used, the client interview also offers an opportunity for the valuer to share or discuss with the client his own confidentiality policy. Gathering client information should in fact not proceed or should cease as soon as the valuer ascertains that he cannot fulfil the client's instructions for whatever reason, such as the subject asset being outside his sector or geographical focus or specialization. If on the other hand the valuer believes that he can fulfil the instructions, he should consider using:

1. Privacy notice- letting the client know how the valuer typically uses or intends to use and safeguard client information;
2. Opt-out notice- finding out from the client what information must be treated as confidential and cannot be shared, other than with regulatory authorities.

The valuer must always maintain an audit trail of his interactions with, and make note of any documents received from, the client. Before embarking on developing the scope of work, the valuer should also share the notes of his meeting or the completed interview form with the client to confirm his understanding of the client's instructions.

Not all the information the valuer requests the client may be available immediately, or at all, and some of it may not be necessary until the valuer has been engaged. The valuer should check with the client about obtaining such information from other identified sources and use his judgement to decide whether he has sufficient information at this stage to adequately define the client's problem and determine a suitable scope of work and associated fees and timelines (discussed separately in this guide). For some large or complex plants, it is advisable for the valuer to google and/or drive by the site to obtain a better understanding of the same before developing his scope of work.

1.1.3 Client screening

Client screening should ideally take place prior to the client meeting, subject to what information the valuer can gather independently about the client or subject of valuation. Prior screening also makes the subsequent meeting with the client more efficient by confirming or validating certain information not to mention affording the valuer an opportunity to convey a well thought out range of fees to the client.

If the valuer is somehow adequately familiar with the client and the subject of the valuation before the meeting, such as from a previous relationship, and the valuer does not want to take on the assignment for whatever reason, he must notify the client of his decision. Otherwise client screening can run in parallel or after the interview when the valuer has gathered enough information about the client and the subject of the valuation.

Client screening is an important process aimed at establishing that:

1. The relationship with the client will be a good fit for the firm;
2. The client is not a fraud or is unlikely to default on payment of fees;
3. The client is not taking on the wrong valuer or firm for his project;
4. There are no conflicts in undertaking the assignment for the client (further discussed in the next section);
5. There would be no undue delays in providing the valuation to the client;

If the valuer decides to take on the client, he should also confirm his decision to the client in writing, such as through acknowledgement and acceptance of instructions letter, and letting the client know of the next steps.

Some clients may be 'high maintenance', notoriously slow at providing promised information or incomplete one, creeping additional scope under the same contract, being difficult with payments or demanding unreasonable turnaround and effort for the fee. Other clients may constantly try to unduly influence the valuer's opinions. A valuer is under no obligation to accept any client and should be prudent in selecting his clients. Besides, ethically questionable assignments are not worthy any fee.



Article 1-3

A valuer must be content and abstain from self-desires and avoid doubtful matters, as he must «give up what is doubtful for that which is not doubtful». The valuer might hold for something permissible for fear of falling into that which is prohibited (Code of Ethics and Professional Conduct for Valuers 2015).

Valuers must also adhere to the requirements of the Anti-Money Laundering Law, including but not limited to:

1. Verifying the identity of clients. For corporate clients, that includes verifying official documents showing entity name, address, names of proprietors and authorized signatories;
2. Maintaining all records and documents of dealings with clients for a period of no less than 10 years;
3. Establishing precautionary measures and internal controls to discover and suppress crimes under the law;
4. Reporting transactions of a suspicious nature and purpose;

The valuer should carefully choose a wide variety of clients. It is risky in both a business sense and from a regulatory perspective to become too dependent on one or a few large-volume clients. The CEPC requires that:

Articles 2-15

A valuer must work with various clients and not depend totally on a limited number of clients which threatens his objectivity (CEPC).

Prior to proceeding with subsequent stages of the assignment, the valuer must also ensure that he has and can commit personnel that is best qualified to carry out the valuation upon appointment by the client.

This is a critical consideration that he will also have to revisit at the scoping stage when the nature and scale of the assignment becomes clearer. In particular:

The valuer assigned to the job as well as the superior that will be signing off on the valuation must have the necessary practical experience in the M&E sector or market;

The CEPC stipulates the following in this regard:

Article 3-3:

The valuer must be certain that he possesses the requisite professional knowledge, technical skills and experience required to deliver competent professional service (CEPC)

Article 3-8:

A valuer must know his limitations; if he lacks the necessary professional knowledge and experience to carry out a valuation, and does not have the ability to acquire such competence before completing the assignment, he must seek the assistance of someone who has the necessary experience in that type of assignment or decline the assignment (CEPC).

1.2 Risk management:

1.2.1 Introduction

Valuers are exposed to several risks at various stages of the engagement and beyond. The risks would vary across diverse types of valuation assignments and require different management techniques. Successful risk management is an ongoing process that spans all the stages of an assignment. Even then it is imperative that risks are identified or anticipated and evaluated early for every engagement and appropriate measures taken to avoid or mitigate them.



1.2.2 Risk management framework



Figure 2: Risk management framework

A risk management program or framework in a firm would include a systematic set of policies, protocols and tools focused on identifying and managing risks. The above diagram outlines the basic elements of a risk management program and the key steps entailed in a risk identification and management process. Some large businesses operate an automated an enterprise-wide Risk Management (ERP) software, which may additionally use artificial intelligence to observe trends and predict patterns of risk events for better decision making.

At the very least however, a risk-minded firm would define and articulate its risk tolerance level(s), appoint a risk manager to design and/or maintain a firm's risk program however sophisticated or rudimentary it may be, train staff, promote a risk culture, oversee the entire risk identification and assessment process, ensuring compliance, monitoring and communicating the occurrence of key risk indicators and their impacts. The program would also include a risk register which records the risks identified, assesses controls and tracks actions and outcomes.

Briefly, the risk management process would commence with the identification and categorization of a comprehensive list of enterprise-wide or project-specific risks in a progressive process involving the project manager and team members. The risks are then analysed, assessed and measured in terms of likelihood and impact or severity of occurrence of the underlying events. Care is also taken to distinguish the root causes of risks from the symptoms thereof such that the real risks are effectively managed. Such assessment may be both quantitative and qualitative and may consider possible interactions of risks which together pose the danger of magnifying associated loss. The assessment provides for subsequent evaluation of the risks through rating, ranking and prioritization of individual risks and/or combination of risks with reference to pre-set risk tolerance levels. Ultimately appropriate risk responses or controls are planned, matched with the various risks and actioned to either avoid, mitigate or accept them. Integral to the risk management process is documentation of all the steps and monitoring the implementation and outcome of the controls with a view to assessing their effectiveness and maintaining, reinforcing or replacing them if necessary.

A risk management program is only as good as the professionals working under it. Notwithstanding the firm's ultimate contractual liability to clients and its risk management program, risk identification and mitigation is the responsibility of each valuation project team member.



1.2.3 Risks and safeguards in valuation

Like most other professionals, valuers face the risks of undervaluing or overvaluing their expertise and either receiving inadequate compensation or pricing themselves out of the market; lack of business and downtime; business interruption due to illnesses, accidents or disasters; scope creep, cost overruns, project cancellation and/or client default; and professional indemnity claims. Some of the discussion elsewhere in this manual related but not limited to client screening, scope of work, and calculation of fees and terms of engagement would go some way in helping valuers mitigate some of these risks. The remainder of this section is focused on the last category of risks, namely professional liability.

The main risks facing valuers are related to their ability to comply with ethical and technical standards and to exercise reasonable skill and care, which may result in claims for breach of contract or duty of care by clients and/or third parties. Other risks revolve around compliance with various other laws and regulations including Anti-Money Laundering Law.

Broadly and in the context of the KSA, the main risks include threats to a valuer's ability to comply with the Accredited Valuers Law, Implementation Regulations and TAQEEM's Charter of Ethics and Professional Conduct (CEPC) with respect to amongst others valuer's independence and objectivity, and confidentiality.

IVSC's guidance on its Code of Ethical Principles for Professional Valuers, which has similar provisions to CEPC, identifies the following categories of threats to the valuer's ability to comply with ethical principles:

- a) **Self-interest threat** – also termed 'own interest conflict', this refers to the threat that a financial or other interest will inappropriately influence the valuer's judgement or behavior;
- b) **Self-review threat** – the threat that a valuer will not appropriately evaluate the results of a previous judgement made or service performed, or by another individual within the same firm, on which the valuer may rely when forming a judgement as part of providing a current service;

- c) **Client conflict threat** – the threat that two or more clients may have opposing or conflicting interests in the outcome of a valuation;
- d) **Advocacy threat** – the threat that a valuer will promote a client's or employer's position to the point that his objectivity is compromised;
- e) **Familiarity threat** – the threat that due to a long or close relationship with a client or employer, a valuer may be too sympathetic to their interests or too accepting of their work; and
- f) **Intimidation threat** – the threat that a valuer will be deterred from acting objectively

A wide range of actions or controls are available to safeguard against or mitigate some of the risks. Some of these operate at a higher level through regulation of the profession by the government or valuation professional organization, such as regulations on the corporate structure and governance of firms providing valuation services, statutory licensing of valuers for certain types of valuation, qualification and CPD requirements and monitoring of compliance with professional standards and disciplinary procedures.

On their part, valuation firms attempt to identify and deal with such risks through internal controls and procedures. The controls outlined below are normally used in combination and can vary between firms:

1. Maintenance of a register of the material personal interests of professional valuers: The firm would obtain, maintain and periodically update and review declarations of financial interests and employment relationships held by its valuers and their relatives (often to the third degree) with a view to identifying potential conflicts of interest related to any current or future client engagements.



2. Client screening and due diligence: As previously indicated, this entails enquiries and investigations into a client's reputation, integrity, financial standing and conflict of interest. Various sources of business information, credit rating agencies and data analytics such as Dun & Bradstreet, Zawya, Experian as well as the firm's internal databases are typically used to provide answers to much of the queries. Provided the client consents and no confidentiality obligations are breached, enquiries of previous valuers, solicitors and bankers may also be used for this purpose. Information obtained is evaluated to aid the firm's decision in accepting a new client or continuing with an existing client, often in accordance with a firm's pre-defined acceptance and continuance policies.

3. Vetting team members: Whether acquiring new talent for the firm or appointing a project team with the requisite knowledge, skills set and experience in the subject of an assignment, such an endeavour always involves assessing the qualifications, competencies, independence, conduct and attitudes of candidates and/or valuers in the firm.

4. Client notification and consent around potential sources of conflict:

5. CEPC (Article 2-2&3) requires valuers to obtain written consent from clients before acting for them in the same matter.

6. Information barriers ("Chinese walls") between service lines and/or project teams: Conflicted clients may consent to the firm using separate and distinct teams to advise on the same matter or asset at arm's length and strictly without communication or flow of confidential information between them on the matter.

7. Disclosure of potential sources of conflict in LoEs and reports, and what steps the valuer has taken to mitigate the risk of such conflict.

8. Internal peer review of valuations including panels, 'hot' and 'cold' reviews: Reviews are an important part of a firm's quality control program. In a 'hot' review, the report and working papers are examined by a more experienced valuer in the firm to ensure that all important professional matters and the firm's standard procedures have been complied with prior to report sign-off and submission;

By contrast, 'cold' reviews operate sometime after the valuation has been completed and involve subjecting a random sample of valuations to reviews by partners or senior valuers that were not involved in the original assignments. Findings would be discussed with the concerned valuers and used to develop remedial training. They may also trigger more frequent reviews and/or ultimately removal of incompetent valuers.

9. Valuer rotation for recurring valuation assignments, to reduce valuers' over indulgence with repeat clients and/or assets, aimed at preserving valuer objectivity and the public's perception thereof. Also refer to RICS Valuation Global Standards PS 2 Section 5.4 Rotation Policy.

10. Privacy policies, confidentiality policies and use of NDAs

11. Recruitment policies focused on certain professional designations

12. Use of standard terms and conditions of engagement, which are rarely negotiable

13. Use of Access letters and Reliance letters

14. Controls on the acceptance of gifts or hospitality from those commissioning valuations.

15. Complaints handling system- discussed separately in the manual.

16. Duty to report breaches

17. Supervision

18. Training

19. Use of industry certified models and software

20. Use of standard report templates and checklists

21. Focus/ specialization by sector, geography or client type

22. Professional Indemnity Insurance (PII)

23. Liability caps

The above list is by no means exhaustive or ranked, and apart from such standard controls as PII, not all the controls may be present in one firm. As also previously indicated, the application of some of the controls may vary with the circumstances of the situation at hand and the significance of the risk event.



Significance of a risk event is usually assessed through assessment of the likelihood of such an event occurring and the impact or consequences of its occurrence.

Various risk management tools are used to assess and match risks with mitigating actions. An example of such a tool is the Risk Assessment Matrix shown in Appendix C.

It is important to note that Saudi laws and regulations governing valuers are relatively stricter regarding the actions that valuers must take to deal with certain threats, particularly the self-interest threat. Article 16 of the Implementation Regulations of the Accredited Valuers Law requires valuers to decline any assignments in which they have a direct or indirect interest in the client or subject asset such as:

1. Valuing assets that the valuer own, co-own, have an interest in - directly or indirectly - as a broker, marketer, investor or a financier for their ownership.
2. Assets in which the valuer is a relative, to the fourth degree, of the founder or a member of the Board of Directors.
3. Assets of companies where the valuer provides services that conflict with one's valuation of either of the assets, either directly or indirectly.
4. Assets of companies in which the valuer has shares, or is a partner of one of its senior employees, one of the partners, one of its board members, or the overseer of one of its endowments.
5. Provide valuation services to more than one client on the same subject asset, except after obtaining written consent from all clients.

For all other less proximate interests in the client or subject of the valuation, and in light of various CEPC provisions, the valuer should carefully assess the threat to his objectivity and/or perception of possible bias from the users of his report. If reasonably convinced that his objectivity will not be compromised or there will be no appearance of bias to users, the valuer must disclose such interests in both the Letter of Engagement and report. Otherwise he must decline the assignment.

Hence the following CEPC requirement:

Article 2-4:

When valuing an asset, the valuer shall take all necessary precautions to ensure that there exists no direct or indirect interest to him or his company, relatives, friends or partners in the subject asset. Indirect interest includes all that is affected by the valuation of the subject asset. When such conflict exists, it shall be disclosed (CEPC).

For client conflict threat where the valuer is acting on behalf of different clients regarding the same matter such as the same asset, opportunity or transaction, the valuer must, in addition to the above considerations for less proximate interests, obtain written approvals from the clients before accepting the assignment. While doing so, the valuer must take care not to breach any duty of confidentiality to the conflicted clients. Acting for different clients in the same matter might mean having to use different teams and information barriers or Chinese walls between them. A compliance officer who is a senior person in the firm and not a member of either team must oversee such an arrangement.

The CEPC provides the following in this regard:

Article 2-2&3

The valuer shall not act for two or more parties in the same matter except with the written consent of all the parties.

The valuer shall take all necessary precautions to ensure that there does not arise any conflict between the interests of his clients (CEPC).

Article 4D-1&2

The valuer must handle client's affairs with precaution and confidentiality. He shall not disclose any sensitive factual data obtained from the client, or assignment outcomes reached in the client's favour to any person or third party.

The valuer must not use confidential information obtained as a result of professional relationships for personal purposes or for the benefit of a third party (CEPC).



Independence is at the heart of a professional valuer's ethos. Amongst the measures stipulated by the CEPC to safeguard the valuer's independence is the requirement that valuers must never agree to fees that are premised on a percentage of value, much less on a predetermined outcome. Valuers must also ensure that their fee income comes from a wide and diversified client base as opposed to just a few clients. However, what proportion of total valuation fee income from a single client is acceptable or material is not explicitly stated in the CEPC. Nevertheless, TAQEEM advises that for all valuations that may be relied upon by others besides the client, the report should disclose:

- i. Whether or not the proportion of the firm's income from the client exceeds 5% of the firm's total income during the last 12 months. Where a specific intended user of the report has been identified at the outset that disclosure must also be made in the proposal and the LoE, which would give the user the opportunity to object to the valuer's appointment if they perceive potential bias.
- ii. Payment of any referral fee by the valuer, in cash or in kind in connection with the procurement of the assignment.

An audit trail of the valuer's actions with regards to conflict of interest and independence checks and disclosures should be maintained in the valuation working papers for compliance and monitoring. A robust system of conflict checks that spots conflicts and documents the results of such checks through diligent recordkeeping goes a long way to demonstrate that the valuer acted properly.

Reliance on third parties

A valuer may be forced to use the technical expertise of a subcontractor specialised in a certain aspect of the valuation or hire the services of a peer, as well as rely on public information or data provided by third parties such as data vendors.

The valuer must agree with the client at the outset about his intention to employ the services of the subcontractor. The valuer would normally sign the valuation report and take full responsibility for the services provided by the subcontractor. It is thus crucial that the valuer carefully selects a reputable and appropriately qualified subcontractor, ensures the subcontractor is adequately covered, commits him to similar terms as those that the valuer has/would enter with the client and reviews the work of the subcontractor to ensure it has been completed competently and in compliance with IVS and any other applicable standards. An alternative arrangement, especially where the expert's role is outside the valuer's expertise, may be to transfer some of the risk involved by having the client sign up the expert directly and have the valuer and the expert either co-sign the valuation report, or incorporate the expert's findings in the valuer's report with appropriate references and disclaimers limiting the valuer's liability concerning such findings. The valuer should consult a legal expert to help him make the right decision regarding the cited options given the circumstances of each engagement.

As far as data from third-parties are concerned, the valuer must also agree with the client the extent to which such data may be verified and relied on. The valuer must use reasonable care and diligence to ensure that such data is accurate. In this regard, valuers are also reminded of the considerations required by IVS 102 Investigations and Compliance (para 20.5) when assessing credibility and reliability of information provided by others, particularly the significance of such information to the valuation conclusion, the expertise of the source and independence of the source in relation to the subject matter and subject asset, respectively. The source of third-party data used in the valuation and the extent to which it has been verified must also be stated in the report. Although the valuer is ultimately responsible for his decision to rely on such data, it is not uncommon for valuers to disclaim liability arising from the use of such data in both the letter of engagement and valuation report.

A flowchart mapping the major issues and decisions that the valuer or firm may have to consider in taking on a valuation client is provided in Appendix D.



1.3 Scope of work

IVS 101 requires valuers to determine and clearly communicate to the client a scope of work that is appropriate for the intended purpose. The scope of work must be communicated to the client before the assignment is completed. Ideally the scope of work should be determined and communicated prior to entering the engagement, except where the scope only becomes clearer or must be modified during the engagement as the valuer goes about his valuation investigations and enquiries.

TAQEEM's Charter of Ethics and Professional Conduct (CEPC) lays more emphasis to the above requirement and further stipulates that the scope of work must be agreed upfront and in writing between the valuer and the client.

Article 4A-4:

Prior to accepting any assignment or entering into an agreement to deliver such an assignment. The valuer must be in receipt of specific instructions or mandate from the client, which must be documented in writing and in detail in accordance with International Valuation Standards prior to commencement of work; to avoid any misinterpretation to the meanings or scope of the work.

Scope of work undertaken in a valuation assignment is of fundamental importance as it has a direct impact on the credibility of the conclusion or value opinion. Its adequacy is typically judged having regard to the purpose of the valuation. No matter how much other compliance with IVS is had or purported by a valuation, an inadequate or incorrect scope of work that impinges on the credibility of such a valuation will render it non-compliant with all IVS.

IVS drives this point home under the following statement regarding a situation where the original scope of work proves inadequate during the actual valuation process:

IVS 102-20.7

If, during the course of an *assignment*, it becomes clear that the investigations included in the *scope of work* will not result in a credible valuation, or information to be provided by third parties is either unavailable or inadequate, or limitations on investigations are so substantial that the valuer cannot sufficiently evaluate the inputs and assumptions, the *valuation assignment* will not comply with IVS.

Under IVS 102-20.7, it therefore follows that, irrespective of how it came about, in-situations where the scope of work is so limited, or the valuer lacks information to render a credible valuation, the valuer must, after consultation with the client:

1. Adjust or expand the scope to include the gathering of missing information; or
2. Complete the valuation on the basis of a special assumption if the appropriate Asset Standard permits; or
3. Withdraw from the assignment.

According to IVS 101, the valuer needs to identify and disclose the following as part of his scope of work:

- a) Identity of the valuer
- b) Identity of the client
- c) Identity of other intended users
- d) Asset being valued
- e) The valuation currency
- f) Purpose of the valuation
- g) Basis of value
- h) Valuation date
- i) The nature and extent of the valuer's work and any limitations thereon
- j) The nature and sources of information upon which the valuer relies
- k) Significant assumptions and/or special assumptions
- l) The type of report being prepared
- m) Restrictions on use, distribution and publication of the report
- n) That the valuation will be prepared in compliance with IVS and that the valuer will assess the appropriateness of all significant inputs



However, in line with CEPC and an interpretation of other statements in IVS, it helps to think of the above items as comprising both problem definition and scope formulation. In other words, some items in the list such as parties to the valuation, purpose and asset are essentially 'givens' and provided by the client at the outset. These givens essentially constitute 'the problem' that the rest of the items in the list, particularly (i) to (n) are needed to address, and therefore generated as part of the valuation (i.e. valuer's scope).

The above division can clearly be seen in CEPC:

Article 4A-1:

Prior to accepting any (valuation) assignment or entering into an agreement to deliver such an assignment, the valuer must understand the dimensions of the assignment to be performed, including identification of the parties to the assignment, the asset that is the subject of the assignment, assignment purpose, and the basis of the required value; so as to be in a position to agree with the client on the scope of the work.

This suggested categorization between problem identification and scope formulation is for the sake of aiding the valuer's understanding of the items in IVS 101 and facilitating the valuer's focus on the more variable and technical aspects of the engagement in developing his scope of work. These aspects revolve around the valuer's inspection, investigations and analyses. That said, all the items outlined in IVS 101 must still be confirmed in writing between the valuer and the client and disclosed in both the engagement agreement and the valuation report.

Putting CEPC 4-1 and IVS 101 together then permits further structuring and categorization of the list as follows:

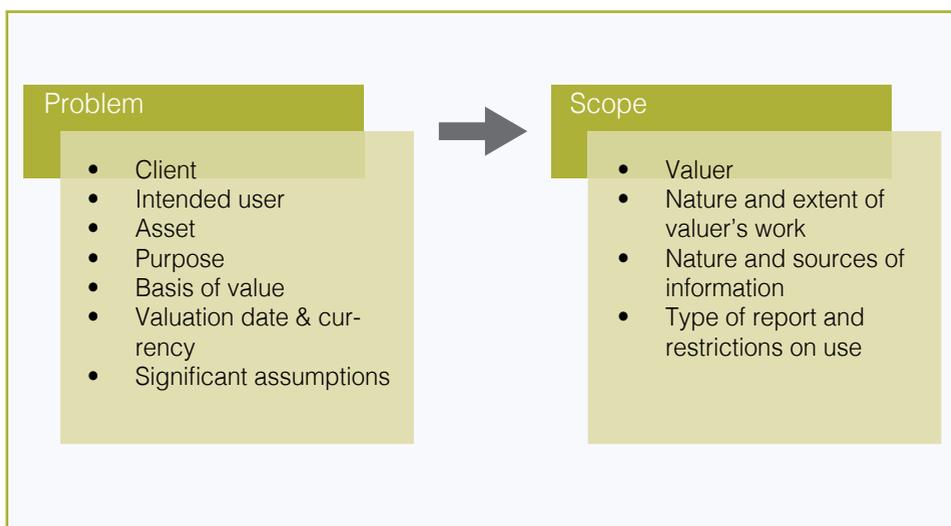


Figure 3: Scope of work

Below is a brief description of each item summarized from IVS 101 which the valuer must understand in his definition of the assignment problem:

1. Client - the person or entity engaging the external valuer or employing the internal valuer
2. Intended user - the person or entity that the valuer intends will use the valuation he provides. This may also be suggested by the client but ultimately the valuer decides who relies on his report.
3. Asset - item that is the subject of the valuation.
4. Purpose - the reason(s) the valuation is performed e.g. for financial reporting, transaction support etc.
5. Basis of value - the type, definition and fundamental assumptions of value
6. Valuation date - The date on which the opinion of value applies i.e. the effective date.
7. Valuation currency - The monetary currency for the valuation
8. Significant assumptions - All significant assumptions and special assumptions that are to be made in the conduct and reporting of the valuation



Recall that the first chapter sets out the framework for capture of all the preliminary information from the client which allows the valuer to define and understand the needs of the client, or the problem, to be solved.

The valuer can subsequently tailor the items under 'scope' in the diagram above to meet the client's needs. In other words, there is no one size scope of work that fits all valuations and the valuer has plenty of flexibility in choosing the right scope, which however he must do objectively, communicate to and agree with the client.

The right scope for any assignment is one that is appropriate for the purpose and results in a credible opinion of value.

IVS Framework - 40 (Objectivity)

The process of valuation requires the valuer to make impartial judgements as to the reliability of inputs and assumptions. For a valuation to be credible, it is important that those judgements are made in a way that promotes transparency and minimises the influence of any subjective factors on the process. Judgement used in a valuation must be applied objectively to avoid biased analyses, opinions and conclusions.

IVSC CEPPV - Discussion of Fundamental Principles (A2.8)

In considering whether a situation creates a threat to their objectivity, a professional valuer should recognise that it is often the perception of possible bias by others that creates the threat to the credibility of the valuation.

An appropriate scope may therefore be said to be one which is:

1. Determined objectively and is free from perception of possible bias by peers and users of the valuation;
2. Expected by parties who regularly are intended users of such valuations; and
3. Likely to be selected by the valuer's peers i.e. other appraisers who have expertise and competency in a similar type of assignment;

Identification of the valuer in the scope of work relates to a confirmation that the selected valuer is suitably qualified and competent to carry out the valuation objectively and discloses the nature and source of any material assistance that he intends to seek from others. This requirement is further stressed by CEPC thus:

Article 3-3:

The valuer must be certain that he has the knowledge, technical skills and experience necessary to carry out the valuation competently, with a high level of professionalism and competence and to a decent level of quality.

Article 3-8:

The valuer must know the limits of his abilities; if he lacks the necessary professional knowledge and experience to carry out a valuation, and does not have the capacity to acquire such competence before completing the assignment, he must seek the assistance of someone who has the necessary experience in that type of assignment or decline the assignment.

As 'valuation work' entails inspection, research and analysis undertaken by a valuer to estimate value, scope selection thus involves deciding the¹:

1. extent to which the asset is identified;
2. extent to which the asset is inspected;
3. type and extent of data researched;
4. type and extent of analysis carried out to arrive at opinions or conclusions.

Based on the above parameters, cost and market approach scope options may be presented as follows²:

¹ Adapted from The Appraisal Foundation, Uniform Standards of Professional Appraisal Practice, 2016-2017 ed. (Washington DC), 14.

² Stephanie Coleman, Scope of Work, (Chicago, Illinois: Appraisal Institute, 2016), 56 and 57.



<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 100%; border-left: 1px solid black; border-right: 1px solid black; margin: 0 5px;"></div> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 2em; font-weight: bold;">↓</div> </div>	Less intensive	Cost Approach	Market Comparison	Valuation output
		Not necessary; omitted	Not necessary; omitted	Not necessary; omitted
		<ul style="list-style-type: none"> • Comparable cost data from readily available sources 	<ul style="list-style-type: none"> • Comparable data from general market overview high level asset information 	<ul style="list-style-type: none"> • “Desktop” figures • Potential value range
		<ul style="list-style-type: none"> • Verified comparable cost data from manufacturers, suppliers, indices, currency data etc. 	<ul style="list-style-type: none"> • Direct market comparison by asset type Adjustments supportable 	<ul style="list-style-type: none"> • Calculation and modelling of values
	More intensive	<ul style="list-style-type: none"> • Individual asset valuation via sales comparison approach with complete verification of sales data. • Adjustments for capacity, obsolescence etc. 	<ul style="list-style-type: none"> • Site inspection • Confirmation of machine capacity, type, age etc. • Adjustments via paired sales analysis 	<ul style="list-style-type: none"> • Better supported valuation outputs Capable of review/audit

Table (1): Scope of work options

Note: The income approach is less commonly used than the market or cost approach for ME valuations. ME valuers who wish to use the income approach should ensure that such an approach is justified and that they have the correct income valuation expertise in this regard. They should refer to TAQEEM Business Valuation Manual, para 3.8.3 for further information.

With the scope now selected, a simple Assignment Plan/checklist may also be completed (Appendix E).

1.4 Valuation fees

The valuer has many options to base the calculation of his fees provided they are not directly related to the valuation estimate or outcome of the valuation. CEPC states the following in this regard:

Article 2-11

It is prohibited to base valuation fees on the outcome of valuation, such as expressing the fees as a percentage of the value of the asset, or making it contingent on the execution of a transaction, for example.

The level of fee that a valuer can charge is a matter between him and the client. Prior to quoting a fee, a valuer should take time at the outset to gather as much information as possible about the needs of the client, the asset, the requisite scope of work, the type of report and how it will be used and so forth.

For M&E valuers in the Kingdom, primary considerations in the calculation of valuation fees may include:

1. Hourly fee charge rate x number of hours to complete the assignment
2. Estimated time to complete an assignment based on past projects
3. Experience and expertise in the asset type
4. Risk/ liability issues including reliance by third parties
5. Fees charged by peers/ competitors and their rating in the market
6. Client perception of quality such as between a local and regional or global valuation firm
7. Current level or schedule of projects in the firm
8. Hiring other professionals such as engineers, surveyors, etc. if included in the scope of Work.
9. Hiring other valuers competent in a special M&E sector or a certain method of valuation.
10. The level of accessibility to fit-for-purpose M&E valuation related data
11. Location(s) of subject M&E, quality of asset data and ability to inspect assets



A sample fee estimation is detailed in Appendix F.

Similar to other professions, such as legal and accounting, valuers work within a general range of hourly rates. In general, the more experienced the valuer, the higher is his hourly rate. Alternatively, a valuer may work the rate backward from his typical or desired annual income after factoring business and staffing costs while taking into account the average number of assignments and time spent on such assignments.

For more risky assignments, where professional liability is relatively high, valuers tend to add a premium to their usual fees for the added responsibility, risk and stress. These assignments may involve assets that are large and complex; unusual or specialized; subject of litigation; or assets with environmental or structural issues. Clients that are perceived to be too demanding or 'high maintenance' would also attract a premium. They include clients that demand unusually short turnarounds or are given to scope creep.

Ultimately the fee that a valuer quotes is tempered by existing relationships and potential for future business from the same client, the level of fees charged by peers and what the market can bear.

The valuer should not forget to estimate and add to his fees any out of pocket expenses associated with the valuation at hand including travel, accommodation, translation, per diem etc.

There is no one standard way of presenting the fee estimate in the proposal or Letter of Engagement. Unless requested otherwise by the client, such as is usually the case by public clients, it is acceptable for the valuer to describe his basis for the calculation of the fee whilst showing an estimate of the total fee, with or without out of pocket expenses. However, it is more prudent for the valuer to provide a breakdown of the fees to permit a comparison with other quotes, and to avail a basis for charging for work done prior to cancellation or for extension of scope.

1.5 Proposal

Once a valuer has understood the client's requirements, figured out the client's problem and solution to it, and reasonably determined that he is well suited to take on the client and valuation, the next step would be to send a proposal to the client. The proposal would document the valuer's understanding of the client's requirements and his proposed scope of work, time, fee and information needed to fulfil such requirements.

As a persuasive selling document, the proposal would typically also present some colourful background about the valuation firm, its workforce, credentials and experience with similar valuations, and details of the team selected for delivery of the valuation. As such, a valuation proposal is unique to the firm issuing it. It is thus not uncommon for a firm to have a marketing department or dedicate practice teams that in some cases invest quite some time and effort generating proposals to differentiate the firm from its competition. Valuers must however have regard to the following provision of the CEPC:

Articles 1-6

It is prohibited for a valuer while advertising himself or marketing his work in order to win business, that he:(A) claims academic or professional qualifications or previous experience which he does not really possess, or refuses to correct information around them; (B) Uses incorrect information, misleading advertisements or exaggerated offers about his services; (C) Provides false allegations, flimsy comparisons or offensive references to the actions of other valuers.

Whilst there are no standards dedicated to proposals, the proposal should at a minimum clearly and honestly communicate much of the same terms upon which the valuer would endeavour to engage with the client once appointed. Unlike an offer, a proposal is not a promise or commitment but, if accepted by the client, the valuer is expected to follow through and negotiate for the creation of a binding contract.



It is therefore good practice to let clients know of your standard terms at the proposal stage rather than leave anything to assumption or to the subsequent draft letter of engagement. Besides facilitating a broader comparison of your proposition with that of your peers, inclusion of the terms in the proposal might also save the parties' time to negotiate the terms alongside any other aspect of the proposal before the opportunity is awarded. Failure to agree to some of the terms on a draft letter of engagement when all other bidders have been turned down can be very frustrating to clients.

The client's RFP may also dictate the structure and content of the proposal. It behoves the client to request a comprehensive proposal, and to share sufficient information himself for the valuers to submit such a proposal, otherwise, it is not uncommon for some valuers to be economical with their terms until the draft engagement stage to counter any surprises by the client.

Through inclusion of their business terms in the proposal, some firms are able to combine the proposal with a draft contract in order to save time. In such cases the proposal would have a section where, if the client accepts to abide by the terms of the proposal, he could sign it, date it, and remit the first fee instalment.

Much may also be said about strategies to develop winning proposals and convert opportunities but that is beyond the remit of this guidance.

Appendix G presents a proposal template in PowerPoint based on best practice for valuation proposal structure, content and logical flow. Some clients, particularly public and institutional ones, may stipulate that the proposal be submitted under 3 distinct covers, namely:

1. Submission Letter
2. Technical Proposal
3. Financial Proposal

The appended template clearly allows for such partition and illustrates the contents of each.

An outline of the proposal sections and contents can be found in Appendix H.

1.6 Letter of Engagement

Also referred to as variously as the Engagement Agreement and Agreement for Services, the Letter of Engagement (LoE) is essentially the contract that defines and affirms the service that the valuer will provide in the assignment, the responsibilities of both the valuer and the client in the assignment and conditions that will govern the use of the valuation report.

Although IVS does not require the LoE to be written, local regulations and the CEPC (Article 4-A4) do, and prior to commencement of the assignment:

CEPC- Article5 (4)-A4:

Receive precise instructions from the client and document them in writing in accordance with the International Valuation Standards before engagement to avoid any misinterpretation of meanings or scope of work. A written LoE serves to align expectations by clarifying the terms of the assignment and provides verifiable evidence of the parties' endorsement of those terms, thus mitigating disputes or facilitating their resolution.

The LoE must include at a minimum the terms set out in IVS 101 Scope of Work, plus the assignment duration and fee basis. It must also include identification of the governing law and jurisdiction and any alternative dispute resolution mechanism:

1. Identity and status of the valuer
2. Identity of the client
3. Identity of other intended users
4. Asset being valued, and specifically the interest
5. The valuation currency
6. Purpose of the valuation
7. Basis of value
8. Valuation date



9. The nature and extent of the valuer's work and any limitations thereon
10. The nature and sources of information upon which the valuer relies
11. Accessibility for site inspections
12. Valuation data in support of any restriction in access to assets
13. Significant assumptions and/or special assumptions
14. The type of report being prepared. It is important also to indicate format, number of copies and delivery method.
15. Restrictions on use, distribution and publication of the report, including confidentiality and third-party reliance.
16. That the valuation will be prepared in compliance with IVS and that the valuer will assess the appropriateness of all significant inputs
17. Assignment duration including schedule of any milestone deliverables, meetings and timeline for receiving and addressing client comments
18. Subcontract provisions
19. Valuer's fee basis
20. Valuer's complaints procedure, if any
21. Changes to agreement, cancellation
22. Governing law and jurisdiction

A description or specimen of each item is provided in the templates in the Appendix H.

Typically, the LoE would be drafted by the valuer, but client contract templates are acceptable as long as they cover all the terms above and are agreed to by the parties.

A valuer's LoE should be attached to the valuation report.

A LoE would consist of the following documents:

1. Standard Terms of Engagement
2. Acknowledgement Letter
3. Supplementary Letter, in cases of changes or variations to the contract terms during the course of the assignment

The **Standard Terms** would contain the valuer's general terms of business that are typically common to all engagements except where tailored to the current assignment. Although these documents are largely proformas or boilerplates, the valuer should review the terms and consider their appropriateness to each assignment.

The **Acknowledgement Letter** on the other hand is designed to serve as a cover letter acknowledging the client's instructions and introducing the terms of engagement through an appropriate reference to the accompanying Standard Terms document.

However, some valuers prefer to include the scope of work, which is variable across different assignments, in the Acknowledgement Letter instead of showing it in the standard terms document. That way also, the valuer may only need to change the terms in the Acknowledgement Letter whenever he responds to new instructions from the same client under a long-term contract. As such the Acknowledgement Letter would also include:

1. The basis of value;
2. The extent of the valuer's investigations;
3. The valuation date;
4. Assignment duration; and
5. Valuer's fees.

In this case, the Acknowledgement Letter will normally take precedence over the Standard Terms. Even then the valuer must ensure that there is no contradiction between the terms in either document.



It is important to include a clause on third party access to and reliance on the report so as to restrict the valuer's exposure to claims from third parties. The default position must always be that third parties are not authorized to receive or rely on the report except where expressly stated otherwise in both the LoE and the report, or with written consent from the valuer. Some firms would append specimens of their standard 'Access' or 'Hold Harmless' Letters to the LoE. A third party could receive a copy of the report only after the client's and valuer's consents and upon signing the valuer's Access Letter. The letter disclaims any liability by the valuer to the third party and puts the onus on the third party of indemnifying the valuer against any claims that might arise from the third party sharing the report with others.

Repeat instructions

Valuers typically have clients that come back regularly with new instructions for the valuation of the same assets or other assets. For such clients, it may be frustrating, if not impracticable, for both the valuer and the client to negotiate new terms and draw up or review long multi-page contracts for every valuation assignment.

It is customary practice for valuers to have in place a retainer agreement or standard instructions governing all valuations for repeat clients during a specified period, often a year. The retainer agreement would set forth all the terms and conditions outlined previously under the LoE section and specify the nature and number or frequency of valuations envisaged for the period, or a specific list of M&E requiring valuation over the same period. The fee structure in retainer agreements may be based on total hours envisaged, which are later reconciled with the time spent on the valuations, or expressed as fee per property.

Under a retainer, and provided the valuation problem (i.e. client, intended use, user and purpose of valuation) is the same as defined in the retainer, it is acceptable that subsequent instructions for the valuation of individual assets are formalized simply by email, a brief pro-forma letter or task order from the client providing details of the assets to be valued and invoking the terms of business already contained in the retainer. But for the avoidance of doubt, the retainer should state the format of subsequent instructions and that they would bind both parties to the terms and conditions set forth in the retainer.

Repeat clients such as lenders typically have large volumes of valuation instructions involving the same asset class throughout the year and require relatively quicker turn arounds. Therefore, form or summary valuation reports tend to be the preferred report format under retainer arrangements. Regardless of the report format, valuers must ensure that they meet the disclosure requirements of IVS 103.

Retainers offer valuers a safety net by guaranteeing a set amount of revenue over the year. Stable income, consistent work schedule, long-term client relationships, and great credentials are the major reasons why some valuation firms would focus their business on mainly retainer work. For clients, retainers on the other hand mean the valuer(s) retained can become more familiar with the client's business model; save client the time to scour the market for consultants as well as retrain and rebuild relationships and secure fee rebates in exchange for regular assignments.

Existing relationships notwithstanding, clients and their ownership, key personnel or needs change over time. It is therefore imperative that valuers regularly conduct client due diligence, including conflict checks, regardless of the long-standing nature of their relationship with clients.



A black and white photograph of an industrial facility, likely a power plant or manufacturing plant. The image shows a complex network of pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a large, corrugated metal structure, possibly a boiler or a large storage tank. The floor is polished and reflects the overhead lights. The image is partially obscured by a large, light green diagonal shape that contains the chapter title.

CHAPTER

2

INTRODUCTION TO THE VALUATION PROCESS FOR MACHINERY AND EQUIPMENT



2.1 Introduction

This chapter describes the principal steps to be taken in carrying out a valuation of M&E.

2.2 Objective

To provide an overview and appreciation regarding the valuation process for M&E.

At the end of this chapter readers will be able to appreciate the valuation process for M&E.

2.3 Description

2.3.1 Request for valuation received

When request for a valuation is received, the actions to be taken are as follows:

- a) Determine the purpose of the valuation.
- b) Identify the M&E to be valued.
- c) Determine the valuation date.
- d) Determine the basis or bases of value.

2.3.2 Determine the purpose of the valuation

The reason(s) a valuation is performed. Common purposes include (but are not limited to) financial reporting, tax reporting, litigation support, transaction support, and to support secured lending decisions. (The International Valuation Standards (IVS), 2022 section 20.7).

2.3.3 Identify the M&E to be valued

The initial step in carrying out a valuation of M&E is to identify the M&E to be valued. Fixed asset registers or other lists of the M&E should be obtained from the client. Ideally, a site inspection would be carried out, but this may not be possible for various reasons. If so, the valuer must satisfy himself that through the use of other data, a valuation may still be carried out in accordance with professional standards. In any event, the valuer should obtain sufficient information regarding the assets to carry out the valuation for the stated purpose. Any deficiency in access to assets and/or asset data which may affect the outcome of the valuation should be raised early in the engagement process.

In the event that there is an unavoidable deficiency in access and/or data regarding the subject assets which is material to compliance with valuation standards, the deficiency should be stated as a qualification to the valuation report. To this end, it is important to explicitly understand the difference between valuation assumptions (be they considered regular or special,) and a valuation which is deficient due to factors such as insufficient data.



2.3.4 Information typically captured

Information typically capture for each major asset may include (as appropriate):

- a) Brand/Manufacturer
- b) Model/Type
- c) Size
- d) Serial number
- e) Capacity
- f) Age
- g) Estimated useful life
- h) Cost of purchase/original cost
- i) Date of purchase/manufacture
- j) Name of supplier
- k) Country of origin
- l) Machinery specification
- m) Additional equipment attached to the machine.

2.3.5 Obtain current new cost and market data

Current new cost and market data can be obtained from a variety of sources, including:

- a) Manufacturers and suppliers (OEMs and other vendors)
- b) New and used machine agents and other suppliers
- c) Trade shows
- d) Guide price records
- e) Invoices provided by the client
- f) Valuers' own cost and market prices cost database
- g) Auctioneers and other dealers
- h) Internet
- i) Previous valuation reports
- j) Client financial records

2.3.6 Obtain plans and drawings

Depending on the nature and complexity of the subject assets, plans and drawings may be obtained, ideally prior to, or at the start of any site inspection. These plans and drawings may include:

- a) Location plan
- b) Site plan
- c) Locational plan/Construction of M&E
- d) Process flow diagram (PFDs)
- e) Piping & instrumentation diagrams (P&IDs)
- f) Machinery workflow plan
- g) Drawing plan

2.3.7 Selection of valuation approach and methodology

The selection of the appropriate valuation approach and methodology for M&E should consider the following:

- a) The purpose and basis or bases of value required
- b) The type of M&E being valued
- c) The information available

2.3.8 Valuation reporting

Dependent on the jurisdiction, purpose of the valuation and reporting terms, the valuer should follow International Valuation Standards (IVS) and TAQEEM professional standards, but also have regard to other reporting issues, including:

- National and/or international (e.g. IFRS/US GAAP) accounting standards
- Legal statutes
- Company law
- Regulatory issues
- Financial services regulations
- Other stakeholders

This guidance does not require any particular form or format of report: however, the report must be sufficiently comprehensive to communicate to the intended users the scope of the valuation assignment, the work performed and the conclusions reached.



2.3.9 Contents of the valuation report

TAQEEM and International Valuation Standards (IVS) require that a valuation report in respect of M&E must convey the following, at a minimum:

- The scope of work performed including:
 - The identity of the valuer
 - The identity of the client
 - The identity of other intended users of the report
 - The assets being valued
 - The valuation currency
 - The purpose of the valuation
 - The basis or bases of value
 - The valuation date
 - The nature and extent of the valuer's work and any limitations thereon
 - The nature and sources of information upon which the valuer has relied
 - Any significant assumptions and/or special assumptions
 - The type of report
 - Restrictions on the use, distribution and publication of the report
 - Disclosures with regard to compliance with IVS and TAQEEM

- The approach or approaches adopted
- The method or methods applied
- The key inputs used
- The assumptions made
- The conclusion(s) of value and principal reasons for any conclusions reached, and
- The date of the report (which may be different to the valuation date)

Other elements that may be included in a valuation report, include the following:

- Date and extent of any inspection and identity of the valuer completing the inspection
- Definitions or glossary of defined terms/abbreviations used
- Location of the M&E
- Macro and Micro description of the M&E
- Photographic record (if applicable)
- Plans and drawings (if applicable)
- Other relevant information (if applicable) M&E process workflow



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of large pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a high ceiling with various pipes and structural elements. The image is partially obscured by a large, light green diagonal shape that contains the chapter title.

CHAPTER

3

M&E SPECIFIC TERMS OF REFERENCE



3.1 Introduction

This chapter describes the terms of reference in undertaking valuations of M&E. It describes the scope of work to be performed which includes the valuation date, asset identification, assumptions and limitations that may be appropriate.

3.2 Objective

Determining the scope of work to be carried out in the valuation of M&E

At the end of this chapter the valuer will understand the terms of reference adopted for the valuation of M&E

3.3 Scope of work

3.3.1 Agree scope of work

Before commencing a valuation engagement, the valuer must agree the scope of work to be performed (or terms of reference) as follows:

- The identity of the valuer: The valuer must be a TAQEEM registered firm in accordance with TAQEEM regulations.
- The identity of the client: the identity of those for whom the valuation is being produced. This will typically be the entity that is receiving the valuation service from the valuer in return for payment.
- The identity of other intended users of the report: The identity of any intended users of the report other than the client. There may however be other stakeholders, such as auditors, shareholders, a lending bank, or regulatory authorities.
- The assets being valued: The subject assets of the valuation must be clearly identified from a valuation perspective.

- The valuation currency: The currency adopted for the valuation and valuation report must be established.
- The purpose of the valuation: The purpose for which the valuation is being prepared must be clearly identified as it is important that valuation advice is not used out of context or for purposes for which it was not intended.
- The basis or bases of value: The basis or bases of value must be appropriate for the purpose of the valuation.
- The valuation date: The valuation date must be stated. If the valuation date is different from the date on which the valuation report is issued or the date on which inspections or investigations are undertaken then, as appropriate, these dates should be clearly distinguished.
- The nature and extent of the valuer's work and any limitations thereon: Any important limitations or restrictions in the available valuation related data and/or inspection, enquiry and/or analysis in the valuation assignment must be identified as early as possible and documented in both engagement and reporting documents.
- The nature and sources of information upon which the valuer has relied: The nature and source of any information to be relied upon and the extent of any verification to be undertaken during the valuation must be identified.
- Any significant assumptions and/or special assumptions: Any significant and/or special assumptions that are to be made must be identified.
- The type of report: The format of the report must be described.
- Restrictions on the use, distribution and publication of the report: Where it is necessary, or desirable to restrict the use of the valuation or those relying on it, the intended users and restrictions must be clearly communicated.
- Disclosures with regard to compliance with IVS and TAQEEM. The nature and reasons for any departures from professional standards must be explained.



Other items that may need to be addressed in the scope of work to assist in the clear identification of the assets to be valued, include the following:

1. Assets may be subject to loan or legal charge security, or on operating or finance leases. These issues all require specific valuation, often based on their accounting treatment. This should be discussed and agreed early in the engagement. In particular, there are complex accounting rules regarding whether assets are considered to be “on balance sheet” (finance lease), or off balance sheet (operating lease.)
2. For insurance purposes, the valuer should obtain details of the particular insurance policy wording and policy conditions pertaining to the insurance valuation
3. The valuer should enquire regarding items that do not belong to the client, but are under the care of the client, as there may nonetheless be a responsibility to insure them.
4. The extent and nature of any product specific tooling, jigs, fixtures, patterns, dies, moulds, etc. that are to be included in the valuation should be agreed. Valuers should consider any crossover between these items and the valuation treatment of any related patents, copyrights, trademarks, franchise, goodwill and other intangible assets. This process may require close working with any corresponding business valuation.
5. Machinery and equipment that provide services to buildings will usually be valued as part of the real property and identified as building services. Enquiries should however also be made about the accounting classification in this regard in order to align the valuation with a client’s accounts. Machinery and equipment related specifically to the production process is usually valued as M&E or personal property, but again the accounting classification should be investigated, especially in the case of complex process facilities and the accounting jurisdiction(s).

Sample limitations that may be used in a valuation include:

1. The valuation is carried out on the assumption that all information and facts that affect the valuation have been provided by the client to the valuer. The valuer will not accept any liability or responsibility for issues arising due to relevant facts not being presented in good time during the valuation process.
2. The responsibility of the valuer is limited to the client and any other specifically identified intended users of the report. The valuer has no responsibility or liability to any party other than the client and pre-agreed, intended users identified in the report. Note: However, the valuer must be mindful of other direct or implied responsibilities to wider stakeholders such as regulators, auditors, lenders, etc.
3. The valuation report is made solely for the purpose identified in the report. The valuation may not be used for any other purpose.
4. No engineering inspection, technical assurance or warranty is implied by the valuer regarding the condition or technical or commercial suitability of the subject assets for any particular purpose.
5. No part or all the contents in the report can be referred to or included in any publications, circulars or official statements without the written permission of the valuer.



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of large pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a corrugated metal wall and a staircase with a railing. The lighting is bright, with several overhead fixtures visible. A large, light green diagonal shape is overlaid on the right side of the image, containing the chapter title and number.

CHAPTER

4

OBJECTIVES AND PRINCIPLES OF M&E VALUATION



4.1 Introduction

This chapter describes the purpose and basis of value.

4.2 Objective

The purpose of the valuation will determine the appropriate basis of value. With this guidance, the objective and basis of the valuation can be determined.

At the end of this chapter, the valuer will understand the relationship between the purpose of the valuation and the corresponding basis of value in the case of M&E. The valuer must comply with the IVS 104 Bases of Value, when selecting the appropriate basis of value coming from the IVS-defined bases of value or non-IVS-defined bases of value. Importantly, the ME valuer must ensure that the basis of value is appropriate and relevant to the terms and purpose of the valuation.

4.3 Description

4.3.1 Request for M&E valuations

Valuations of M&E can be requested for various purposes. Common purposes include (but are not limited to):

- financial reporting,
- tax reporting,
- litigation support,
- transaction support,
- loan security,
- insolvency and
- insurance.

4.3.2 Valuations for financial reporting purposes

Valuations for financial reporting purposes may be required to address a number of financial reporting requirements including (but not limited to):

- Acquisition accounting as a result of a business combination
- Impairment testing
- Preparation of internal management or special purpose financial statements or reports
- Preparation of a prospectus or offer document

Valuations for financial reporting purposes must be completed in accordance with the relevant national and/or international accounting/financial reporting standards, depending upon the particular facts and circumstances of the engagement. These standards are constantly evolving, and hence valuers should always seek to align their work with them through IVS, TAQEEM, auditors and regulators.

International Financial Reporting Standards (IFRS) will apply where the client (which is also the financial reporting entity), for whom the valuation is being completed, reports in a jurisdiction that has adopted IFRS. This jurisdiction may be different to the one in which the subject assets are located.

In many jurisdictions, IFRS have not been adopted, or has been adopted in a modified, localised form. In circumstances where the client (which is also the financial reporting entity) reports in a jurisdiction that has not adopted IFRS, the local financial reporting standards will apply.

Under IFRS, the most commonly used basis of value is IFRS fair value as described in the IFRS 13 fair value accounting standard, although other bases of value, including fair value less costs to sell (FVLCS) and value in use may be required depending on the facts and circumstances. Nonetheless, the IFRS fair value definition represents the principle and tone behind IFRS accounting related valuations.



To increase consistency and comparability in accounting related fair value measurements and related disclosures, the IFRS 13 fair value standard establishes a fair value hierarchy that categorises inputs into three levels for valuation techniques used to measure fair value based on the reliability of those inputs. The fair value hierarchy gives the highest priority to quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1 inputs) and the lower priority to unobservable inputs (Level 3 inputs). The standard requires that valuation techniques maximise the use of observable inputs and minimise the use of unobservable inputs.

ME valuers must consult upon and keep up to date with ever-evolving IFRS standards and judgement is required in assessing the relevance of observable market data to determine the priority of inputs, particularly in situations where there has been significant decrease in market activity for an asset or liability. As such, even in situations where the market for a particular asset is deemed inactive (e.g. due to liquidity issues), relevant prices or inputs from this market should still be considered in the measurement of fair value. It would not be appropriate for an entity to default solely to a model's value based on unobservable inputs (a Level 3 measurement), when Level 2 information is available. ME valuers must take care not to confuse observable market data for individual machines in isolation with the market for the composite process plant or installation that is the subject of an IFRS accounting related valuation. The exception to this would be if from a market sector or accounting impairment perspective, the subject assets were to be valued in a liquidation scenario.

It is also worth noting that, as an asset class, most individual ME assets would be fair valued using Level 3 inputs, and very occasionally, Level 2. Valuers generally consider that, under most circumstances, the valuation principle behind IFRS fair value and the market value definition as defined by the IVSC, are both consistent.

Where there is evidence of impairment of an asset, group of assets, cash generating unit or a business unit, then under the IFRS standard for impairment, IAS 36, the standard/premise of value to be used for impairment is Recoverable Amount (“RA”). Figure 4 below illustrates a sample process for measuring and recognising impairment loss under IAS 36.

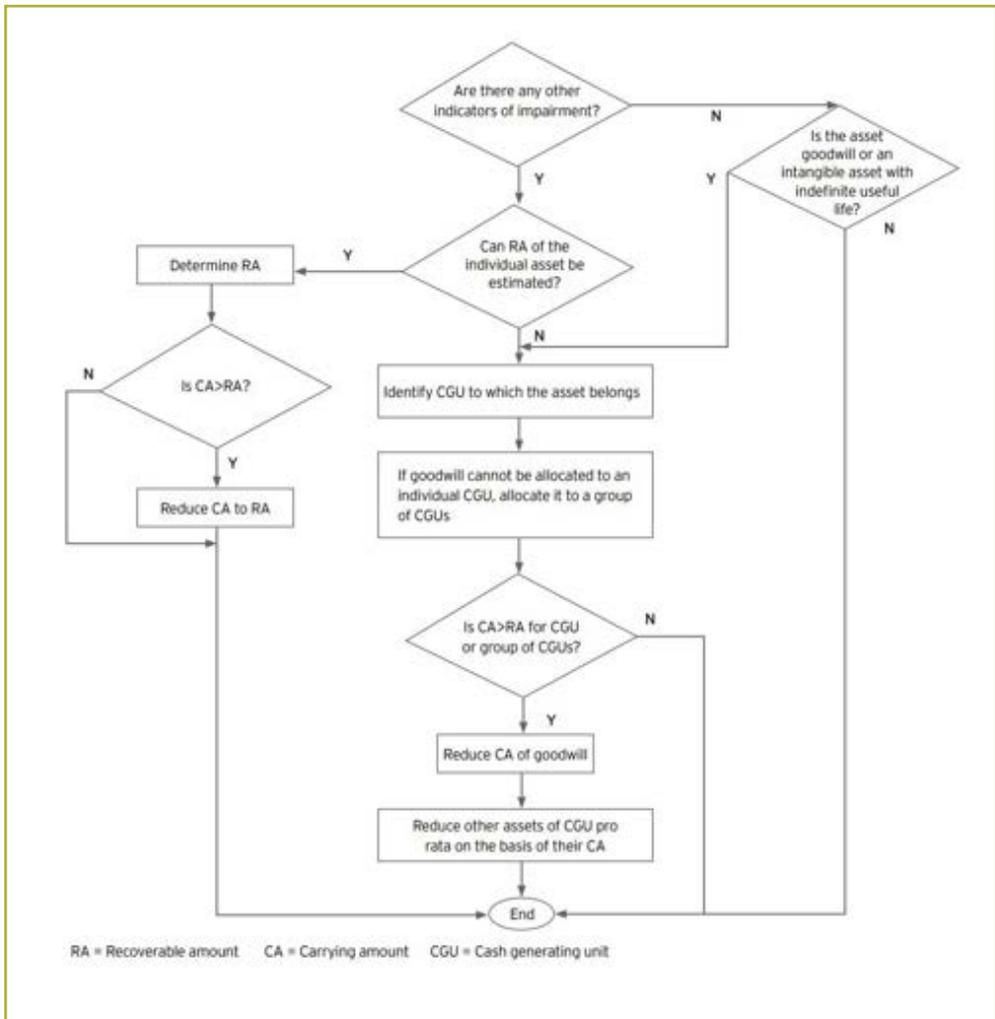


Figure 4: Determining and accounting for impairment



Recoverable Amount is defined as the higher of an asset's Fair Value Less Cost to Sell ("FVLCS") and its Value In Use ("VIU"). VIU is established based on an income approach (see chapter 9.4.3 onwards for plain examples of an income approach). However, the valuer must be mindful of the fact that many (if not most) M&E assets' VIU income based values are connected to the wider enterprise/intangible assets/CGU in which the M&E assets are already employed, and such an income based valuation may for part of a wider business valuation.

Thus, in instances where the VIU of an asset is too low or non-existent, M&E valuers may be asked to provide an opinion of the asset's FVLCS. This will be the optimum market value that the asset(s) could be sold for (collectively or individually for break-up, whichever produces an optimum realisation). The valuation methodology in this regard will be market value, in situ or for removal (as outlined in chapter 9.4.1), after deduction of the estimated costs of sale. Such sale costs are direct (e.g. marketing, handling) and not holding costs or other company overheads. Effective January 2018, by agreement between SOCPA (the Saudi Organization for Certified Public Accountants and de facto KSA accounting authority) and the regulatory authorities; all listed companies, financial institutions and SMEs in the KSA, became subject to IFRS accounting rules.

- The carrying amount of the CGU is SAR9,500 including allocated goodwill pertaining to synergetic cost savings arising from the parent's bulk purchasing power.
- The industry to which the CGU belongs is experiencing mid to high level growth (6% - 14%) and market participants are forecasting future capacity shortage in the medium term. In the long term, industry growth of 1% is expected.
- Management has no plan to expand the capacity of the CGU and believes a reorganisation may achieve cost savings, but has not yet committed to a plan.
- Management determines the recoverable amount of the CGU at 2015 FYE based on a VIU approach.
- The pre-tax discount rate is assumed at 12.5%

Based on the VIU determined below, the CGU has an impairment loss of SAR 468 (=9,032 - 9,500).

	2014	2015	2016	2017	2018
Revenue	3,500	3,710	3,933	4,169	4,419
Revenue growth per approved budget	6%	6%	6%	6%	6%
EBITDA*	1,050	1,113	1,180	1,251	1,326
EBITDA margin per approved budget	30%	30%	30%	30%	30%
Add: Change in net working capital	(12)	(11)	(11)	(12)	(13)
Less: Replacement capital expenditure	(175)	(195)	(270)	(325)	(250)
Pre-tax free cash flow	863	907	899	914	1063
Discount rate (pre-tax rate based on WACC)	12.5%				
Discount period (mid-year convention)	0.5	1.5	2.5	3.5	4.5
Discount factor	0.943	0.838	0.745	0.662	0.589
Present value of free cash flow	814	760	670	605	626
Present value of free cash flow (FY14 to FY18)	3,475				
Present value of terminal value	5,557				
Value in use	9,032				

*Earnings Before Interest, Tax, Depreciation and Amortization

Since the VIU is lower than the carrying amount for the CGU, one would calculate the FVLCS, and the higher of the two would be the recoverable amount of the CGU. If one calculated FVLCS using a DCF approach, the following differences could apply to the calculation.

- Market participants would estimate the fair value considering the effects of restructuring and increasing capacity. These activities will decrease the free cash flows in the short term, but will ultimately result in higher growth in revenues and increased cash flows.
- The estimated revenue margins in a FVLCS calculation would not include synergistic savings since these synergies would not be available to most market participants
- The discount rate applied to the calculation would be based on what a normal market participant would consider.



There are a small number of specific variations in accounting convention (not valuation) for small KSA companies and also for Saudi companies accounting under zakat accounting conventions. However, in the vast majority of cases, M&E valuers should follow IFRS, IVS and TAQEEM guidance when carrying out M&E valuations for accounting purposes in the Kingdom.

In the unlikely event that there was to be a variation, the pre-engagement process between the valuer and the client as required by TAQEEM regulations, should identify any specific variation that might be required.

The Saudi Capital Market Authority (CMA) did however issue a statement requiring that for the first three years after IFRS adoption, Saudi companies must continue to use the cost model when measuring property, plant, equipment and intangible assets. As this was an accounting regulatory order, valuers should establish whether this order may still apply to the subject owner of particular M&E assets, through early discussion with the client and its auditors.

4.3.3 Valuations for tax reporting purposes

Valuations for tax reporting purposes must be completed in accordance with the national and/ or international tax laws in the jurisdiction in which the assets and/ or client is located and the tax related transaction is completed. Many tax matters are cross border and the valuer must establish early, clear reporting lines regarding the subject client/ tax entity and the corresponding assets. In many cases, the valuation may be undertaken in conjunction with a client's tax advisors.

In many international jurisdictions, tax legislation refers to a diverse range of valuation bases with many of these being closely akin to the concept of market value. Hence, although the principle of market value runs through most tax legislation, the valuer will need to be familiar with a particular tax jurisdiction's valuation guidance.

In the context of the Kingdom, guidelines specifying the rules and procedures to be followed for the collection of Zakat are in accordance with Royal Decrees and are applied to Zakat payers effective from the date of issuance of ministerial resolution. Thus, although a note of sample tax/ age depreciation is included at Appendix-I. M&E valuers must take account of the most recent Tax repeals, resolutions, instructions, and circulars relating to the collection of Zakat, before making any final valuation conclusions.

In general, Tax depreciation is treated as follows:

1. The annual depreciation charge is deductible for the Zakat payers who maintain books and records according to the following rules:
 - a) The depreciation for fixed assets, and the fixed assets are not intended for resale, but rather intended for usage for company's purposes.
 - b) The assets should be of a depreciable nature with value declining due to use, damage, or obsolescence.
 - c) The asset should be owned by the Zakat payer unless there is a reason that prevents the transfer of ownership.

Fixed assets are depreciated based on the straight-line method as per the table at Appendix I.

In practice, the assessment of tax can be a complex process, and valuers are encouraged to consult tax specialists if in any doubt about regulations. This is especially the case in respect of buildings, land, and the nature and also the particular sector in which the subject commercial entity operates.

Import duties and tariffs

In view of the diverse nature of M&E and the fact that it can be manufactured and supplied from numerous jurisdictions, the exact customs duty rate depends on the classification of each particular product according to the current Saudi Integrated Customs Tariff. However, as a benchmark for M&E valuers, the average rate for the Kingdom is often between 12-15%.



M&E valuers must however be mindful of the fact that the tariffs on goods imported into the Kingdom are often dictated by the nature of the importer, e.g. smaller KSA enterprises may enjoy a better tariff regime on M&E than a multinational.

Because there is no “one size fits all” tariff for such a wide topic as M&E, valuers should check the ruling customs duty rate for the subject M&E according to the current Saudi Integrated Customs Tariff current at the then date of M&E valuation.

Value Added Tax (VAT)

The national general VAT rate is currently 5%. Whilst there may be a number of specific variations, from an M&E valuation point of view, there is the general assumption that the asset’s owner/operator will be VAT registered and capable of recovering same.

The principal exception would be where VAT is not recoverable and hence might have to be added to an M&E valuation, but as most market participants would be VAT registered, it would be the exception.

4.3.4 Valuations for litigation support purposes

Valuations for litigation support (often also referred to as expert witness) purposes may be completed using many different bases of value depending upon the facts and circumstances.

Valuations for litigation support purposes may be required to comply with the requirements of a specific legal document such as a lease, sale and purchase agreement, etc. where the basis of value is defined or described. This may, or may not, be consistent with a basis of bases of value defined in this manual.

Generally speaking, a valuer will be reporting under a particular jurisdiction’s laws, statutes and regulations, and ultimately may be responsible to a court. It follows that a valuer must therefore ensure that he follows a jurisdiction’s rules and guidelines when reporting values, and this protocol should be agreed prior to commencing work on the valuation.

The facts and circumstances giving rise to the dispute, and any legal directions should lead to a logical conclusion as to the appropriate basis of value. However, this may not be clear cut and in such circumstances legal interpretation and advice may be required.

In many, if not most jurisdictions, a valuer's ultimate duty may be to a court, and compliance with IVS and TAQEEM standards should support a valuer's objective reporting to a court.

4.3.5 Valuations for transaction support purposes

Valuations for transaction support purposes may be completed using a number of different bases of value depending upon the facts and circumstances.

The facts and circumstances in respect of the proposed, assumed or actual transaction, should lead to a logical conclusion as to the appropriate basis of value.

Where the proposed transaction involves the sale of an asset or assets as part of the sale of an operating business, the appropriate basis of value will most likely be market value assuming an existing use or in-situ valuation premise. Such a valuation will necessarily have regard to the degree of connection between the business enterprise value and the value of its underlying assets.

It follows that with regard to a valuation basis which assumes an in-situ or existing use valuation premise, the valuer must explicitly understand and agree whether the valuation is to be carried out on the assumption of ongoing profitability, or if any wider market, income/discounted cash flow or economic obsolescence test is also to be carried out and applied in respect of the calculated M&E value.



There is no absolute need for an M&E valuer to have the skills to carry out such tests. However, unless such tests have been completed the valuer should not express the valuation outcome as a definitive conclusion as to the subject assets' IFRS fair value or market value. This is because, without testing for economic obsolescence (through the use of discounted cash flow and other methods as appropriate), an M&E valuer will have only completed part of an IFRS/market related valuation relative to IFRS accounting standards.

The valuer must therefore discuss and obtain explicit agreement in this regard with the client(s) at the time of engagement scoping and drafting of the engagement letter. It will often be the case that the same valuer (if qualified accordingly with TAQEEM), and/or a business valuer will undertake a concurrent business valuation of the entity which operates the M&E assets, in which case, subject to due protocol, they may need to communicate regarding the alignment of the respective valuations for the benefit of their mutual client.

The principle underlying the IFRS fair value and the market value bases of value is the concept of the highest and best use (HABU) of the subject asset(s). The valuer must therefore explicitly understand and report regarding whether HABU is reflected in how the subject asset(s) are currently utilised, or if HABU would be achieved by other deployment, or even liquidation in the case of assets that are under-utilised or incapable of generating profit in their current configuration.

Where the proposed transaction involves the sale/acquisition of an asset or assets for removal from their present location, the appropriate basis of value will most likely be market value assuming an ex-situ valuation premise. Such market valuations will generally exclude any costs/benefits of installation. Potential purchasers will also most likely take into consideration any costs associated with removal, relocation (including tax/duties, etc.), installation and re-commissioning.

In the case of a piece of mobile plant or a motor vehicle, these costs may not be significant. In the case of a substantial piece of fixed plant, these costs may be very material and have a significant impact on the price a potential purchaser would be prepared to pay.

However, the valuer must also consider if the assets might sell for a greater realisation if sold as an assembled package, in-situ, even though they may no longer be required by the current operator, or are not generating any profit. In this context, consideration will also need to be given to issues such as site ownership, site holding costs, and the ability for a third party to take over and re-start operation of the assets.

4.3.6 Valuations for loan security purposes

Valuations for loan security purposes may be completed using a number of different bases of value depending upon the requirements of the lender, but the concept of market value is the prime basis that underpins most loan security related valuations. However, in every jurisdiction, the valuer must first observe the national law, regulatory and banking regulations that surround and dictate the rules behind lending secured on fixed assets.

The client may be the party seeking the loan, and/or also the bank/lending institution. The valuer must therefore engage and obtain explicit written agreement with all relevant parties regarding who is the client or clients; and who the valuer is responsible to. This must be formally completed before the valuation is started. It is also common to have a responsibility to a lender even though the borrower has paid the valuer's fee, and again this requires prior agreement. The valuer must also ensure that his valuation work and reporting meets the standard required by regulatory stakeholders like national banking authorities.

In addition to meeting banking regulators' lending rules, each lender will also most likely have its own requirements in respect of the basis or bases of value required and these may vary depending upon the lender's assessment of credit risk, loan structure and the lender's relationship with the proposed loan recipient. In any event, the valuer must fully understand these requirements from a valuation perspective and how they correspond with national valuation regulatory regimes such as TAQEEM.



Bases of value commonly required for loan security purposes include:

- Market value
- Orderly liquidation value
- Liquidation value
- Auction realisable value

Lenders may require that the valuations reflect ex-situ and or the concept of an accelerated sale process, often informally referred to as forced sale.

Valuations for financial institutions are usually required from the perspective of assessing whether the M&E collateral offered is commensurate with the loan funds being disbursed by the institution.

Depending on what point of the loan cycle the valuation is sought, the approach may need to be tailored in terms the purpose and basis of the valuation. For instance, if the valuation is sought after the company has defaulted on its loans, then a conservative view may be preferred, since the M&E assets may be incomplete or in have been ill maintained. In addition, in a foreclosure scenario, there may not be the funds or time to conduct a regular M&E marketing and disposal programme.

In 2018, the Saudi Arabian Monetary Authority (SAMA) issued new regulations regarding the conduct and incorporation of collateral (including valuations) in respect of lending by financial institutions in the Kingdom.

In addition, the Ministry of Commerce and Industry (MOCI) issued specific guidelines regarding assets pledged for loan security, entitled: the new “commercial pledge law “(CPL)

Whilst valuers may carry out loan security valuations on a general IVS principles market basis for loan security purposes, they must be aware that they must comply with new KSA CPL law which dictates the context for valuation reporting in this regard.

The value of the pledged assets will need to be determined or estimated at the outset and included in the pledge agreement. The parties will be able to agree on the valuation method but, in the absence of an agreement, it may be necessary for a professional valuation by an accredited valuer acting in accordance with the guidelines issued by the TAQEEM.

The principle behind taking security in Saudi Arabia is the pledge or “Rahn”. This is sometimes translated as “mortgage” or “lien” in banking English (depending on the context and often going with market usage in the English language) but the essence is pledge – that is possessory security based on the security holder (or a security agent) taking – and keeping – possession.

The Unified Center for Lien Registration (UCLR) allowing such pledges to be registered. However, the nature and protocols for the registration of M&E are still being debated by the regulators and therefore M&E valuers must keep abreast of the outcome in this regard.

This new UCLR will also include the option of taking a pledge over: “The entirety of an economic enterprise.” Whilst this refers to the legal ownership of an enterprise, it follows that the M&E within an overall enterprise may need to be recorded and valued.

However, in the interim, it therefore follows that M&E valuers must be strict in their descriptive recording of M&E pledged for security in order to seek to avoid any confusion through ambiguity in description, and in order to assist a court in the event that an order is required to enforce a pledge.

The valuation to commercial pledge process therefore requires early liaison with the client and/or bank and perhaps legal advisors.



4.3.7 Valuations for insolvency purposes

Valuations for insolvency purposes may be completed using a number of different bases of value depending upon the requirements of the insolvency related matter. The valuer may be reporting to the user of the subject assets, or a lending institution, restructuring officer, accountant, lawyer or a court. Insolvency legislation varies from country to country and valuers should be familiar with the legislation in the reporting jurisdiction.

Each insolvency matter will most likely have its own requirements in respect of the basis or bases of value required and these may vary depending upon their assessment of the potential to sell all or parts of the business for existing use or as a liquidation of assets.

Bases of value commonly required for insolvency purposes include:

- Market value
- Orderly liquidation value
- Liquidation value
- Auction realisable value

Insolvency clients may require that the valuations reflect ex-situ and or a commercial “forced sale” valuation premise. Care must however be exercised as it is possible that elements of a wider financially stressed business may be profitable in themselves, in which case the profitable elements may be subject to a “hive down” or “carve-out” of an informal or formal insolvency action. It follows that the valuation basis for these elements would be subject to an assumption of a degree of profitability.

4.3.8 M&E valuations under KSA insolvency law

The Insolvency and Bankruptcy Law (“The Law”) affects all commercial entities across Saudi Arabia.

The law is based on the principles of bankruptcy protection laws around the globe and replaces the existing KSA framework on bankruptcy which was part of the Commercial Court Law and the Bankruptcy Protective Settlement Law.

The Law is a very elaborate and detailed legislation, and there are numerous provisions of interest to creditors, lending institutions, real estate developers and many other parties in the market.

in the market.

The insolvency legislation established a Bankruptcy Registry, in which the provisions of the Law will be recorded. The Regulations, issued on 24/12/1439H, specify what is to be recorded in the Bankruptcy Register.

In the interim, from an M&E valuation perspective, the likely valuation related elements of the new legislation are its intention to: “Maximise the value and regular sale of assets in bankruptcy, as well as ensure fair distribution thereof to creditors upon liquidation.”

- Voluntary out-of-court liquidation
- Preventive composition
- Financial reorganization/restructuring
- Court approved financial restructuring
- Bankruptcy by way of sale of assets

TAQEEM registered valuers should keep monitor the enactment of the Law implementing regulations and the establishment of the Bankruptcy Committee, which will provide more detailed guidance regarding the new insolvency process.

The KSA now also has a register of pledged assets under loan security. In the context of an (usually insolvency related) enforcement is to be carried out by an enforcement judge, the Register will be required to issue a Pledge Execution Extract, which serves as an Execution Deed under the Enforcement Law. This will describe the subject assets for recovery and sale in principle.

Alternatively, the pledger and pledgee may agree that the pledgee will be entitled to carry out the enforcement procedure itself, in which case the Register will issue a Direct Pledge Execution Extract, which serves as an authorisation to the pledgee to carry out the relevant enforcement actions.



Where multiple pledgees benefit from security over the relevant asset, an execution agent must be appointed. The execution agent may need a licence from MOCI to carry out that business activity.

Hence, prior to acting on any insolvency related valuation and sale assignments, M&E valuers must ensure they are complying with the new pledge register regulations.

4.3.9 Valuations for insurance purposes

Valuations for insurance purposes should be completed in accordance with the actual, proposed or assumed insurance policy terms and conditions under which the insured (who is usually the client) proposes to insure its assets. This is because any loss settlement value will be based only on the commercial terms of the policy.

Valuations for insurance purposes may be required to:

- Assist the client in setting the sums insured
- Assist the client in preparing a claim following a loss under an insured peril

Under most industrial insurance policies the basis of settlement will be reinstatement on the assumption that the insured intends to replace the assets or facility subject to the loss. However, the valuer must be mindful of the fact that whilst all insurance policies are policies of indemnity, i.e. the value of the asset in the condition it was at the time of the loss, not all policies contain a reinstatement with new clause.

Thus, the valuer must always check if the policy contains such a reinstatement clause, before assuming the valuation should be on a reinstatement basis. Moreover, even though a policy may have a reinstatement clause, if the insured chooses not to reinstate the assets or facility, they may receive a cash settlement instead based on the indemnity value (not new replacement cost) of the assets.

Under a reinstatement policy, reinstatement costs should reflect an estimate of the costs necessary to replace or rebuild the insured property or asset to a condition substantially the same as, but not better or more extensive than, its condition when new.

The sums insured under a reinstatement insurance policy usually include the following elements of cost:

- Overnight reinstatement cost estimates
- Fees and contingencies
- Estimates in respect of cost increases during the policy period, lead time and reconstruction periods
- Demolition and debris removal
- Non-recoverable Taxes

However, it must be determined whether it is the valuer's responsibility or not to quantify these components of the value at risk. This will be dictated by the scope of work agreed between the valuer and the client. The valuation report should clearly state whether these items have been included or excluded.

If a valuer is instructed to carry out an indemnity valuation as an alternative or in addition to a reinstatement valuation, the indemnity value should reflect the value of the assets to the insured at the time of the loss.

Most indemnity valuations tend to be based on the estimated cost necessary to replace or rebuild the insured property or asset to a condition substantially the same as, but not better or more extensive than, its condition at the time that the damage occurred, taking into consideration age, condition, and remaining useful life. In practice, most valuers tend to adopt a depreciated replacement cost method to determine indemnity value.

It will therefore be appreciated that insurance valuations (and loss assessments) are often much more complex than originally envisaged, and no absolute assumptions can be made about the nature of a loss and the corresponding value at risk and the then corresponding reinstatement and indemnity values. If in any doubt, valuers should therefore consult other more qualified and experienced insurance valuers,



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a corrugated metal wall and a staircase with a railing. The lighting is bright, with several overhead fixtures visible. A large green diagonal shape is overlaid on the right side of the image, containing the chapter title.

CHAPTER

5

INSPECTION OF MACHINERY AND EQUIPMENT



5.1 Introduction

This chapter describes the steps to be taken when carrying out a site inspection of M&E.

5.2 Objective

The objective is to describe the procedures that should be taken to carry out a site inspection of M&E to ensure that the valuation can be completed to the required standard.

At the end of this chapter valuer will appreciate the inspection procedures for M&E. ME valuer must comply with IVS102 Investigations and Compliance when carrying out inspection and information gathering for valuation. Inspections and investigations must be adequate, appropriate and relevant for the purpose of the valuation.

5.3 Description

5.3.1 Site inspection

A site inspection is a process that allows the valuer to gather much of the information required to support a valuation of M&E. The valuer must ensure that the site inspection, when combined with other research and procedures, is sufficient to enable the completion of the valuation in compliance with the IVS.

Every ME valuation will usually require the valuer to consider the factors affecting the asset itself, its environment and physical, functional and economic potential. In terms of the IVS 300 Plant and Equipment section 20.5, all ME should usually inspect the asset to determine the condition of the asset and also establish if the information provided to them is usable and related to the asset being valued..

A methodical and ordered approach to data capture at site for each material item of M&E is an important element in the valuation of M&E. Site inspections will vary relative to the nature of the assets and valuation requirements, but a typical method may be divided into four (4) steps:

- Step I Preparation before the site inspection
- Step II Preliminary site inspection
- Step III Procedures during the site inspection
- Step IV Procedures after the site inspection

5.4 Step I - Preparation before the site inspection

5.4.1 Terms of reference

The scope of work agreed by the valuer with the client should outline the extent and nature of the proposed site inspections. Refer to Chapter 3 of the terms of reference.

5.4.2 Information gathering

Each manufacturing process has its own M&E terminology. Sometimes the valuer will be engaged to value M&E in an industry or sector in which the valuer has no prior experience. In this situation, it would be prudent for the valuer to complete some initial research into the industry, manufacturing process and corresponding M&E, before commencing the engagement.

Information can be obtained through:

- Reference books and flowcharts
- Trade Journals
- Technical Libraries
- Catalogues
- OEM Suppliers and agents
- Trade Advertisements
- Internet, e.g. Wikipedia, HowStuffWorks



The ability to understand business terms (including trade jargon), knowledge of the M&E as well as manufacturing processes will assist in engagement with the client, and not waste their time asking easily researched general technical questions that do not affect the valuation process. For example, if inspecting a steel works, one would ask all about the processes and assets employed there, but not: “how is steel made?”

5.4.3 The equipment required

- Writing materials
- Torch
- Tape measure/ruler
- Standard inspection forms/data capture sheets
- Authorisation card
- Camera (if prior authorisation obtained)
- Personal protective equipment (PPE) (note some of these may be supplied by the client)
- Safety shoes
- Safety helmet
- Eye protection
- Hearing protection
- Harness

5.5 Step II - Preliminary site inspection

5.5.1 Site inspection

Valuers often complete a preliminary site inspection aimed at providing a general overview of the M&E and manufacturing process employed on the site. During the initial site inspection, the valuer may:

- Acquire knowledge via briefing sessions with managers, production and engineering staff and other responsible client personnel in relation to the M&E, manufacturing process and process flow.
- Acquire site plans, layout drawings, PFDs, P&IDs, etc. in relation to the M&E. These may be provided in hard copy and/or soft copy format.

- Obtain lists and technical information in relation to the M&E. This documentation may be in the form of fixed asset registers, maintenance records, technical manuals, plans, drawings, etc.
- Devise a work plan to complete the site inspection in a co-ordinated and methodical manner.
- A golden rule for site inspections: never assume; always ask. Refer to Appendix J for Site Inspection Checklist

5.6 Step III - Procedures during the site inspection

- Many clients require visitors to complete site inductions, safety training or be accompanied by client personnel whilst on site. Valuers should comply with any such requirements.
- Site inspections can be conducted from building to building, following the process flow, and from room to room, to avoid possible omissions and/or duplications. Ideally, follow the site plan or process flow and hatch or tick off each area on the plan when inspected.
- The purpose of site inspections is to gather sufficient data in respect of the subject assets to be able to support the valuation. A disciplined approach to data collection for each material item of M&E is an important aspect in the valuation process.

5.6.1 Preparation of asset schedules

In many cases the asset schedule and site notes prepared by the valuer will provide a platform for the valuation work. A robust and comprehensive approach to data collection, completed in a manner designed to avoid any material omissions or duplications, will provide a solid basis for the valuation. The purpose of developing the asset schedule is to record the salient information required in order to enable the valuer to determine asset type, capacity and condition in order to undertake the valuation process.



The asset schedule compiled by the valuer may form the basis of an asset valuation register to be delivered to the client as part of the agreed scope of work. In such circumstances, additional information may also be required and recorded, especially if the valuation register is to be adopted for accounting purposes.

Fixed asset registers provided by the client may provide a basis for the valuation. However, the valuer should complete appropriate procedures to ensure that the client supplied information provides an appropriate platform for the valuation. The nature quality of asset registers varies greatly so the valuer should never assume it will be correct.

The assets recorded in the asset valuation schedule may be grouped into a number of different categories. The following is one example of how such categories might be organised:

a) Production or process M&E

This group of assets will often be the most material assets in the asset schedule. A good working knowledge of the subject M&E may be required to identify material accessories and attachments. The cost of such accessories and attachments can often be very material compared to the cost of the basic machine to which they are attached.

b) Ancillary M&E and general machinery

Ancillary M&E comprises assets that are not part of the manufacturing and production process, but often represent a material component of value in relation to the whole plant. Assets in this category may include maintenance equipment, plant services such as electrical, compressed air, water, etc.

General machinery may include small tools, test and inspection equipment, factory fixtures and fittings. The relative materiality of such assets may have some impact on the extent of procedures required to complete the valuation.

c) Office and laboratory equipment

This category includes office & IT equipment, laboratory equipment, furniture and furnishings. The relative materiality of such assets may have some impact on the extent of procedures required to complete the valuation.

d) Mobile plant & motor vehicles

- Internal transport vehicles such as fork lift trucks, cranes, etc.
- Road registered motor vehicles

The valuer should also enquire whether any assets, that should be included within the agreed scope of work, are located temporarily or permanently off-site. Similarly, the valuer should not assume that all assets observed on the site are the property of the client.

5.6.2 M&E data collection

The information gathered in the preparation of a valuation asset schedule may include:

a) Type of machinery

b) The model, serial number and name of manufacturer

It may be helpful to record the address of the manufacturer to assist in obtaining cost information. The serial number may be important as some manufacturers may require this to correctly identify the specifications of the subject asset in providing the current cost. The age of some equipment can be determined by referring to reference books listing serial numbers and dates of manufacture.

c) Client's reference number (this might be a plant number, asset number or maintenance number).

d) The size or capacity

e) Year of manufacture

f) Reference to any special foundation, connection services, attachment, etc.

g) Modifications, significant overhauls or improvements made after the original machine installation

h) Energy source

i) Environmental factors and legal restrictions, if any



- j) Machinery level of usage
- k) Production and maintenance record
- l) The cost of installation/original price
- m) Physical condition/level of obsolescence
- n) Whether purchased new or used

5.6.3 Data sources for site inspection

- a) Machinery and equipment

Data taken from the plate of machine such as machine type, brand, model, serial number, capacity, manufacturer name, country of origin, year of manufacture and others.

- b) Client records

Data that may be obtained includes the original price and date of purchase, maintenance and insurance records.

- c) Discussions with relevant client personnel

Useful information such as machine condition and usage can often be obtained through discussions with client personnel.

- d) Notes of site inspection

Notes gathered by the valuer during the site inspection

- e) Photographs

A photographic record (if authorised) of the subject assets can be helpful when completing research on-desk and communicating with third parties such as manufacturers and suppliers, but ask first!

- f) Description of M&E

The information captured in respect of the subject M&E should be sufficient to give an accurate picture regarding the items to be valued. Although there are no specific procedures on how or what information to gather, this may include the name of the manufacturer, the model, the type of machine, serial number, capacity, machinery extension, date of manufacture, country of origin and the state of the machine. This information will often be recorded in separate data fields in an electronic workbook or spreadsheet to facilitate sorting and comparison of data.

Figure 5 below details an example of how a valuer might record identification information:



Figure 5: Recording M&E identification information

5.7 Step IV - Procedures after the site inspection

After the site inspection has been completed, the valuer should review the site inspection notes to ensure that there is no missing information. If an asset register was provided, reconcile any major discrepancies that may affect the valuation, ideally before one leaves the site.

At this stage the valuer typically begins the process of gathering cost and market information with regard to the subject M&E.

Information may be obtained through the following sources:

- Manufacturers and suppliers (vendors)
- Suppliers of new and used machinery
- Trade fairs
- Recorded price guides
- Client invoices
- Client fixed asset registers
- Advertisements in newspapers
- Auctioneers
- Computer databases
- Previous valuation reports
- Client annual financial reports



5.8 Safety aspects

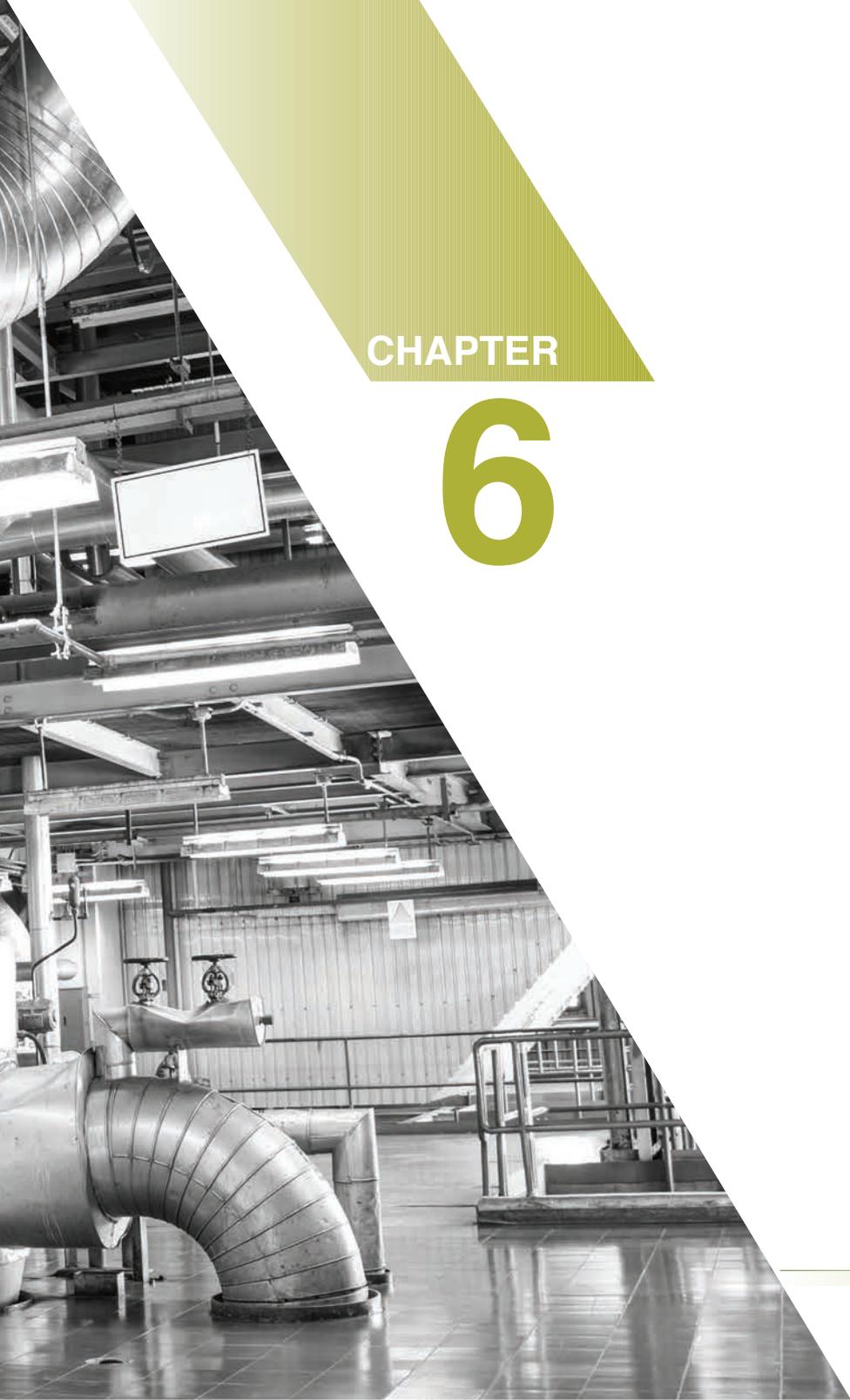
Equipment safety

- Safety helmet
- Safety shoe
- Ear plug
- Eye protector
- Others (if required)

Safety Precautions

- Ask site contact about safety requirements
- Dress appropriately
- Do not touch the machine in operation
- Ensure a safe position at all time
- Adhere to the safety rules of the site
- Get escorts for high risk areas such as a sub-station



A black and white photograph of an industrial facility, likely a power plant or manufacturing plant. The image shows a complex network of pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a high ceiling with various pipes and structural elements. The image is partially obscured by a large, light green diagonal shape that contains the chapter title.

CHAPTER

6

DESCRIPTION OF MACHINERY AND EQUIPMENT



6.1 Introduction

This chapter provides guidance and describes the procedures to be followed when providing descriptions of M&E from the perspective of valuation.

6.2 Objective

This chapter describes the procedures that should be followed when gathering information in respect of the subject M&E during the site inspection. This is to ensure that relevant information is recorded in a consistent manner.

At the end of this chapter, the valuer will be able to appreciate the importance of a comprehensive and systematic information gathering process for M&E. This process of information gathering must be applied in compliance with IVS 102 Investigation and Compliance, and IVS 300 Plant and Machinery.

6.3 Description

6.3.1 M&E identification

The identification of M&E can be addressed through:

- a) Macro description
- b) Micro description

6.3.2 Macro description

Macro identification describes the functions and roles of the subject M&E on an overall basis. It includes the key components that contribute to the design and capabilities of the facility as a whole.

In order to compile a macro description, the valuer needs to understand the following:

- a) The production processes
- b) The process used to produce the plant's output
- c) The plant's capacity to produce maximum output

The valuer may also need to obtain the following typical information, depending on the nature of the valuation:

- d) The production or manufacturing process used: research layouts etc. in advance
- e) Work process flow
- f) Information in relation to by-product(s) (if any) in addition to the main output of the facility
- g) The plant capacity, actual production quantities and supporting financial statements for the last 3 years
- h) Sources of raw material
- i) Production output quality and quantity
- j) The length of time the plant operates
- k) Maintenance histories.
- l) Optimum utilization compared with the latest plant technology
- m) Suitability of M&E at the site
- n) Comparison with other market participants

Additionally, consideration of obsolescence factors impacting on the value of the machinery such as technological, physical, functional and economic considerations,

Where modern equivalent assets exist, the following factors will typically need to be considered:

- i. Production capacity
- ii. Cost of new machinery
- iii. Operating and maintenance costs
- iv. Space management within the factory
- o) Compliance with relevant electrical standards/requirements
- p) Compliance with relevant environmental and safety standards and legislation
- q) Estimated useful life of the plant



6.3.3 Micro description

A micro description is a detailed description of each item of principal M&E inspected during the site inspection, and relevant to the valuation process. The valuer must make adequate disclosures regarding the extent and nature of the site inspections completed

The intention is to produce concise descriptions of the machinery, sufficient to support the valuation process, and allow any user of the valuation to readily identify the asset by its micro description. Avoid detail for its own sake, but focus on describing the machine's salient points from an identification and valuation point of view only.

Any limitations in the inspections that may materially affect or qualify the outcome of the valuation must be noted when reporting.

The following information is typically gathered for principal elements of M&E that are relevant to the valuation:

- Manufacturer
- Model/type
- Capacity
- Location/Footprint
- Serial number
- Supplier name (if not OEM)
- Description of the machine sufficient to differentiate it from other machines
- Description of any accessories or additions to the original machinery
- Notes regarding foundations, footings as well any special connections such as electrical controls, piping, etc.

Note: Whilst it is desirable from a valuation perspective to obtain the above micro description information, the valuer must not put himself in any danger through inspecting the machine. Do not approach or try to enter/measure any part of a machine without first asking your site contact or other authorized officer at the site location if, or when it is safe to inspect.

Bear in mind that machinery is usually automated and may be started up remotely without any warning. The provision of personal protective equipment (PPE) should not make a valuer overconfident in this regard. There will be locations where it is simply not safe for a valuer to obtain all the information listed above, in which case the valuer should obtain as much information as possible from records and site management. In most cases, through careful planning, the valuer should be able to work through such a limitation, but if despite best efforts, such a limitation is going to affect the reported value, the valuer must advise accordingly in the report.

6.4 Data collection and verification

To value M&E, sufficient information regarding the subject assets should be obtained.

Client supplied information in respect of M&E may not always be accurate, especially if fixed asset registers are incomplete or out of date. Therefore, information that has been provided by the client, that has a material impact on value, should be validated from a valuation perspective by the valuer during the site inspection or other data gathering process.

If a valuer is likely to be unable to obtain sufficient access to inspect or validate the assets from a valuation perspective, this issue should be discussed with the client, ideally during the scoping and engagement process. The valuer has a duty to explain the implications of poor/insufficient information regarding the assets to the prospective client.

Depending on the circumstances, the valuer may still be able to provide a valuation, but the report must advise regarding any limitation or qualification regarding the reported value due to insufficient information, or access to the assets. In addition, the report should advise if in the valuer's opinion, the valuation amount might change at a future date if access was granted to the assets, or further and better information was to be provided to the valuer regarding the assets.



The following procedures may be used by the valuer whilst on site to validate client supplied information:

a) Physical examination of the equipment. Verification from a valuation perspective of information in respect of the subject M&E at site compared to information provided by the client.

b) Comparative evaluation with the client's fixed asset records based on the following considerations:

i) Certain M&E is physically located at the plant site, but the information in the fixed asset records do not identify the assets. Situations that may give rise to these circumstances include:

- Equipment or plant that was built by using revenue rather than capital allocated funds allocated to the balance sheet.
- An existing asset has been modified or disaggregated into a number of smaller assets.
- Machinery and equipment which has been rented or leased.

ii) Information in the company's fixed asset records indicates certain M&E exists but cannot be located. Situations that may give rise to these circumstances include:

- Machinery and equipment classified as obsolete, non-operational or stored off-site for repair.
- Machinery and equipment that has been sold or otherwise disposed of but has not been removed from the client's fixed asset records.

iii) Technical specifications of the subject M&E can be cross checked in the following ways:

- Reviewing purchase orders, project close out reports, etc.
- Discussions with the client's technical staff who maintain the M&E.
- Discussions with technical staff who manage the operation of the M&E.
- Reviewing technical manuals.



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of large pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a high ceiling with various pipes and structural elements. The lighting is industrial, with several overhead fixtures. The overall scene is a detailed view of industrial infrastructure.

CHAPTER

7

M&E SPECIFIC DATA COMPILATION CLASSIFICATION AND STORAGE



7.1 Introduction

This chapter explains the steps to take in relation to the compilation, classification and storage of data and its use in the valuation of M&E.

7.2 Objective

To explain compilation techniques, classification and storage of data which should be taken into account in the valuation process.

At the end of this chapter, the valuer will be able to understand techniques in relation to the compilation, classification and storage of data to ensure that the valuation can be properly supported.

7.3 Description

7.3.1 **Data compilation**

In general, data compilation can be categorized into three (3) main sections:

a) Individual machines

Data regarding individual machines should be stored in a database with references made to the type of machine, manufacturer, model and other related information.

Refer to Chapter 5 for more information.

b) Process plant

For process M&E, reference should be made to the nature of the process, type, capacity and general nature of such process facilities.

c) Accessories

Accessories are general support equipment that can be used with individual machines or process plants.

7.4 Classification of data

Data related to M&E may be classified to facilitate an understanding of the components involved. The classifications listed below are provided a guide only and other alternative and additional classifications may be adopted.

a) Process and manufacturing plant

In many situations, the main focus is given to the process and manufacturing plant because it is the most material group of assets.

b) Support equipment

In order to sustain capacity and generate manufacturing output, many manufacturing processes require support equipment.

c) Electrical services

Electrical services can include transformers, inverters, power factor correction equipment, switch panels, motor control centres (MCCs) and sub-boards. Up to date, background information regarding the nature and type of electrical infrastructure can be easily obtained online.

d) Electrical cabling and wiring

Electrical cabling and wiring connects the M&E to the MCCs/switch panels.

e) Piping

Most M&E require a range of services including compressed air, steam, water, condensation, gas, refrigeration and other liquids as part of the manufacturing process. Up to date, background information regarding the nature and type of such plant services can be easily obtained online.



f) Structures and foundations

Valuers will typically need to consider the following items that impact the cost of installation of M&E:

- i. Foundations, footings and concrete supports;
- ii. Supporting structures such as:
 1. Steel structures
 2. Catwalks
 3. Steel ladders
 4. Platforms

Up to date, background information regarding structures and specialised buildings may be obtained from specialist publications such as various construction price guides. Valuers may also need to consult building surveyors and / or real estate valuation colleagues.

g) Materials handling equipment

Materials handling equipment includes the following equipment:

- i. Fork lift trucks
- ii. Loaders
- iii. Cranes
- iv. Hoists
- v. Pallet movers
- vi. Pneumatic tube delivery systems
- vii. Conveyors and elevators
- viii. Other related systems

h) Factory fixtures and fittings

Factory fixtures and fittings include:

- i. Furniture and industrial accessories
- ii. Benches
- iii. Shelves
- iv. Lockers
- v. Scales
- vi. Mobile stairs
- vii. Time recording and access systems
- viii. Fire extinguishers, etc.

i) Motor vehicles

Motor vehicles can be categorised as licensed, un-licensed, light vehicles, heavy vehicles, etc.

All types of motor vehicles can be researched online.

j) Laboratory and testing equipment

Laboratory and test equipment can include:

- i. Laboratory ovens and incubators
- ii. Microscopes
- iii. Electronic test equipment including chromatographs, spectrophotometers, etc.
- iv. Fume cabinets
- v. Glassware
- vi. Laboratory scales

k) Office furniture, fittings and equipment

Office furniture and equipment including:

- i. Chair
- ii. Table
- iii. File cabinet.
- iv. Calculator.
- v. Photocopiers.
- vi. Fax machine

l) Computers and software

The classification of computer equipment includes personal computers, laptops, network servers, monitors, printers, scanners, plotters, modems and other equipment. Other electronic assets such as fixed and mobile telecommunications, plant control services, retail control systems etc. may also fall under the same classification and valuers should keep abreast of current developments in technology in this context.

Software includes both operating and application software.

Software may be written in-house by a client or purchased from a software developer (e.g. Microsoft.) However, software is often licensed rather than purchased and a valuer must investigate its ownership and accounting classification in the first instance. Software may also be classified as an intangible asset and valuers may therefore need to liaise with business valuers in this regard.



m) Tools

Tools can be divided into two sub-types:

- i. Portable tools including portable electric and air tools, anvils, vices, gauges, chucks and others.
- ii. Consumable tooling including drill bits, chisels, reamers, taps, dies, etc.

n) Special purpose tooling

Special purpose tooling includes tools, dies, moulds, patterns, jigs, fixtures, etc. Such items typically produce a specific product and as a result the life of special purpose tooling is inextricably linked to the life of the product it produces. There may be an overlap with intangible assets such as designs, rights and patents in this regard and valuers may need to liaise with business valuers in this regard.

o) Separate classification

Many industries have a range of equipment that is unique or specialised to that industry. Separate classifications may be required to accommodate this situation.

p) Stock, and materials-in-trade, collectively “Inventory”

Machinery and equipment valuations typically do not include inventory, including stock and materials-in-trade. This is because, unlike Machinery and equipment which are classified as fixed assets, inventory is classified as a current asset. The value of inventory is often interrelated with business valuations due to accounting issues such as a company’s gross margin, allocation of overheads etc.

Hence, if the valuer does not have the requisite skills or knowledge to value such items then they should decline that aspect of the engagement, or undertake such work in tandem with business valuers. There are also inventory valuation specialists who focus on inventory being funded by banks and recovery values in the event of foreclosure. This is however a specialist area.

7.5 Data storage

All the data obtained and sources of information relied upon during a valuation must be stored correctly in case of a dispute and retained in accordance with TAQEEM laws and regulations.



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a high ceiling with various pipes and structural elements. The image is partially obscured by a large, light green diagonal shape that contains the chapter title.

CHAPTER

8

PREPARATION OF PLANS FOR MACHINERY AND EQUIPMENT VALUATION



8.1 Introduction

Machinery and equipment, and production site plans and drawings can provide an important source of information for the valuer. They can be provided in the form of technical drawings or pictorial illustrations. Their preparation can be made manually or with computer software.

8.2 Objective

To describe the types of site plans and drawings that may provide useful information for the M&E valuer.

At the end of this chapter, valuers will be able to identify the types and contents of site plans and drawings that can provide a useful source of information for the valuation process.

8.3 Description

8.3.1 **Types of plans**

The following plans and drawings may be used as a source of information in the valuation process or included in the valuation report as appropriate:

a. Location plan

A location plan shows the property's geographic location in general Google earth is also a useful site referencing tool.

b. Site plan

A site plan shows the site boundaries and location of buildings located on the site.

c. Plant layout plans.

Plant layout plans show the layout of the M&E, either inside the building and/or outdoors. They can be provided in 3D format, or as plan and elevation drawings. Refer to Appendix K for Site Plan and Plant Layout Plan.

d. Process flow diagrams

Process flow diagrams show the position and structure of the M&E, based on work process flow. Refer to Appendix L for process flow plan.



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of large, metallic pipes and machinery. In the foreground, a large, curved pipe is prominent. The background features a high ceiling with various pipes, ducts, and lighting fixtures. The overall scene is industrial and technical.

CHAPTER

9

M&E VALUATION APPROACHES AND METHODOLOGIES



9.1 Introduction

This chapter explains the approach and method of valuation used, namely market approach, cost approach and income approach during the valuation of M&E.

9.2 Objective

To describe the steps to be taken when a method is used in conducting M&E valuation.

At the end of this chapter the valuer can better understand and carry out the valuation by applying the approach and method of valuation correctly and accurately. The ME valuer must ensure the relevant and appropriate valuation approaches are adopted in order to arrive at the opinion of value in accordance with the basis of value. IVS 105 Valuation Approaches and Methods should be applied here.

9.3 Description

9.3.1 **Market approach**

The market approach requires a comparable which should be what the valuer considers to be a competitive substitute for the subject asset.

At its simplest, the market approach requires the valuer to make comparisons with other assets, directly or indirectly, to derive, extract or corroborate relevant inputs. The market approach relies on sales of comparable assets to provide an indication of value for the subject assets.

Care must be taken by M&E valuers when interpreting the market approach. This is because it is very easy in conversation to confuse the market for a particular machine or element of M&E, with the market approach in respect of the enterprise in which a machine may be utilised.

With M&E valuations related to wider commercial enterprises in which such M&E is employed, one might say that there are two concurrent streams of value regarding to:

- The value of the machine in isolation from a wider income stream, both in-situ, and if removed, and
- The value of the machine as a sub component of an enterprise's income stream.

In addition, once the machine and enterprise are separated, they will both have quite different value dynamics going forward.

The proper nomenclature and identification of brand, type, capacity, efficiency and age regarding the subject M&E not only affects a valuer's analysis and value conclusion, but also has a bearing on user's perception of the credibility of the valuer's opinion.

In addition to the principles and general methodology behind a market approach to any valuation, M&E valuers are required to be familiar with the forces that continually shape the new and used international M&E market in general. This applies in particular regarding the global industrial footprint and corresponding, downstream new and used M&E supply processes and price dynamics which surround each and every type of M&E asset that requires valuation.

It follows that whilst most M&E valuers may not have worked on valuations in each and every international M&E related sector over 4 or 5 decades, the core principles and methodology behind determining market remain the same, for all M&E assets.

In addition, unlike real estate in a national context such as across the Kingdom, M&E is unique in that whilst it is both national and international from both a new and used market point of view, the core market, is international.



With few exceptions, most M&E can be used in any jurisdiction, and may enjoy usage in a number of jurisdictions through the M&E assets' working life. Hence, whilst the general market principles are quite the same for real estate, financial securities, and M&E; the M&E valuer is required to carry out market value research using methods unique to the M&E sector.

The valuer should sufficiently explain and support the rationale for using the comparable M&E selected in the valuation report, the basis for adjustments and reconciliation, and any limitations. This is especially important in the Kingdom, as there will invariably be fewer OEMs, suppliers and resellers of M&E than in larger national markets such as the USA or EU.

In theory, the international, transactional "cost" and corresponding "market value, used" for an item of M&E should be broadly the same in all jurisdictions. However, in reality, regulatory and market dynamics such as the following will always skew easy, direct market comparison:

- Margin agreements for importers, agents and concessionaires
- Availability of service and spares
- Parallel and "Grey" markets for apparently the same make and type of M&E
- Local type approval (e.g. ISO, TUV, CE standards)
- Variations in import tariffs and duty
- VAT
- OEM dumping and flooding
- "Soft" pricing to encourage favoured markets
- Soft vendor financing, not reflective of a "cash" market
- Sanctions
- Varying Health and Safety regulations
- Environmental factors driving new and used M&E into secondary markets
- Undisclosed commercial relationships intended to create a market
- Variable, cross border OEM warranties
- Creation and/or support of values through "Buy-to-destroy" of used M&E assets

- Restrictions in supply of dedicated consumables for specialist M&E
- State export policies including export credits and other favoured markets support

A M&E market study (including the wider industrial sector in which the M&E operates) entails the identification, collection and analysis of the macro- and micro-level data characterizing such forces that generally influence the dynamics, technology, performance and HABU in the related sector the M&E operates and transacts in, and related dynamics for its usage, likely profitability in a given market, and any underlying market value indicators for value in isolation from the assets' current usage.

Thus, whilst a M&E inspection determines the nature, capacity and condition of the subject M&E assets, a market study ultimately determines the market's likely view of the assets' full potential i.e. its highest and best use, and the most probable price the market would pay for the property given such issues as operation in-situ as part of an enterprise, or sale in whole or part for subsequent operation in-situ, or at a remote site (ex-situ) or jurisdiction.

9.3.1.1 Comparison method

The comparison method is based on the concept of market replacement with a comparative asset. This concept explains that an investor will not buy M&E at a price that exceeds the offer price or purchase price paid for similar age and condition M&E.

This method is a process where M&E is valued by comparison to similar M&E that has been sold or offered in the market. Proof of sale or offers for similar M&E are analysed and adjustments made to address any differences between observed prices and the M&E being valued.

Adopt adjustments to address differences such as producers, quality, usage, accessories, model, capacity, size, age and so on should be taken into account.



After identifying the comparison to use, determine:

- a. The sources and facts of the data have been investigated and verified.
- b. Accurate calculation in analysis and selection of units according to suitability. Commonly used units for comparison include the area, volume, power rating, units of production, etc.
- c. The offer price or previous sale of the M&E has been specified, analysed and considered.
- d. The best comparisons are based on the prices obtained from M&E suppliers, brokers, auctioneers or other private treaty sellers of used M&E.

Example 1: The subject asset is a lathe having the same model, specification, age and condition as the comparison machine obtained in the market. Therefore, the pricing of the machine can be made by direct match.

Example 2: The subject asset is a 10 years old Mitsubishi 100 kW generator set without accessories. The comparison is the same machine but has additional accessories, is a different model and is in poor physical condition.

Therefore, adjustments need to be made to address these different factors. The valuer should ensure the suitability of the adjustment either in the form of percent (%) or monetary amount.

In addition, adjustments should also be made based on the type of valuation required. For example, if the valuation premise is market value on an ex-situ premise, then it is necessary to deduct the cost of relocation. On the other hand, if the valuation premise is market value on an in-situ premise then such costs should not be deducted, but the cost of installation should be considered.

An example valuation comparison method is detailed below:

A Japanese 2 Megawatt power plant was installed 5 years ago with a cost of SAR 3,500,000. The information obtained shows the cost for the same electric power plant now involves the cost of purchasing a machine of SAR 4,000,000, while the other costs involved are transportation costs SAR 150,000, insurance SAR 10,000, installation SAR 100,000, commissioning SAR 100,000, consulting fees SAR 100,000, and import tax of SAR 200,000.

9.3.1.2 Determine market value based on the use of CNRC

If direct comparable used asset sales data cannot easily be obtained due to a lack of an observable, regular liquid market for particular assets, it may be possible to compare the assets subject to valuation with similar assets that are more regularly traded in the market.

For example, all things being equal, the CNRC and related market value depreciation curve of a particular class of BMW motor car may be quite similar to the value curve for an equivalent Mercedes Benz motor car. This valuation curve will however be quite different to one for say a FIAT or Toyota motor car. In addition, the value curves for all such cars will vary country by country and will be dictated by tax, regulations etc.

It should therefore be apparent that the use of CNRC as a proxy for market data is often a difficult and complex exercise. It should only be carried out if a valuer can meticulously research the market and provide credible, observable market comparisons, adjusted for the subject assets.

Valuers should also exercise extreme care if proxy market evidence is to be used to determine a market value for bank lending purposes, especially if the asset pledged for security has no direct comparable market evidence within the lending jurisdiction.



The calculation using CNRC is as follows:

Current cost of ex-work	SAR
(-) Obsolescence (if any) (Technology, Capacity, Function)	SAR
(+) Transportation cost	SAR
(+) Installation cost (Accreditations & testing)	SAR
(+) Taxes and duties	SAR
NRC	SAR

Note:

- i. If no domestic supplier and plant, machinery and equipment are required to be booked from abroad, it will involve:
 - a. Foreign exchange
 - b. Freight charges
 - c. Excise duty, if any
 - d. Value Added Tax (VAT) or Sales Tax (if any)
- ii. Transportation insurance to a buyer's factory may be required.
- iii. Consultant fees are required if the installation requires a special foundation or special build.
- iv. If the price of the model with the closest specifications is used, adjustments should be made for the differences in technology, capacity and function.
- v. Consider inflation factors and waste cleaning costs (in calculations for insurance purposes). Based on the given examples, the CNRC for the machine is:

The cost of buying a new machine	SAR 4,000,000
----------------------------------	---------------

Plus (+)

Transportation SAR 150,000

Insurance SAR 10,000

Installation SAR 100,000

Accreditation SAR 200,000

Consultant fee SAR 100,000

Import tax SAR 200,000

SAR 760,000

NRC SAR 4,760,000

Plus (+)

Waste cleaning

5% on SAR 4,760,000 SAR 238,000

Inflation factor for 2 years @ 10% per annum

On SAR 4,998,000

0.21 x SAR4,998,000 SAR 1,049,580

SAR 6,047,580

Say SAR 6,050,000



9.3.1.3 Determine market value on an ex-situ valuation premise

The most fundamental mistake made when arriving at an opinion of market value on an ex-situ premise, is to determine the value based on some derivative of a replacement cost or a market value on an existing use valuation premise. These other values are a factor to be taken into account and can be very useful, but the principal determinant is observed, external market evidence for similar assets in similar markets.

When providing an opinion of market value, it is important to reflect on the factors that surround and determine market value of a particular asset, as defined in IVS. Market value as defined by the IVS may be quite separate from any particular person's view or commercial expression or view regarding price or worth. Whilst these issues may have worth in themselves and serve as useful evidence, a valuer must always report market value in accordance with IVS and national regulators such as TAQEEM.

Accordingly, having recorded the nature, brand, type, capacity, age, condition etc. of an asset(s), the valuer must research the relevant national and international market for similar assets and related prices quoted and achieved. Be wary of quoted or advertised prices as cash purchases may be at a lower level.

Define whether the market value is in respect of the asset in its current or its assumed future location for disposal (for example, in-situ, or transported to a central auction location). Where is the prime location to sell such assets?

Check if a dealer is providing a warranty, as under IVS market value, no warranties apply.

Check if a dealer is providing a warranty, as under IVS market value, no warranties apply.

Is the market and prices observed open, transparent and regular? If not, the limited number of transactions observed may not be sufficient to arrive at a reliable benchmark for value.

When valuing assets for bank lending or sale purposes, be mindful of the asset class you are dealing with. In almost every sector there will be proprietary ‹A list› manufacturers whose machines invariably sell well in the second-hand market. Other, similar machines from less well-regarded manufacturers may not sell as well. If providing advice in respect of a similar range of machines, be especially careful not to give the impression that ‹one size fits all› in value terms.

Is there a relationship between the percentages of new cost and the level at which an asset sells at a particular age, such that one could construct a reliable and consistent regression analysis?

Is it the case that the type of asset in question is not popular in the used market and thus prices are always low compared to others?

Is it the case that for the asset in question, they simply never are sold on the used market such that no data is available? If so, do not automatically adopt a depreciated replacement cost (DRC) model as an alternative method, as without comparable market evidence, the resultant valuation will be hypothetical to the extent that there is no evidence of transactions.

That is not to say that a DRC method is not relevant. If one can construct a DRC derived market regression model based on all available evidence, as a proxy, it may be possible to reasonably demonstrate by comparison and extrapolation with similar assets that if the subject asset(s) were marketed, they would enjoy a comparable level of sales realization value. This process would however place significant responsibility on the valuer to demonstrate that he complied with the IVS and TAQEEM national valuation standards and such an approach should not be taken lightly, especially in connection with bank lending.



Estimated market value ex-situ calculation is as follows:

Current used price

SAR

Minus (-)

(-) Cost of machine decomposition from site SAR

(-) Cost of moving machine to new site SAR

Market value ex-situ

SAR

Example of calculation

The current used price SAR 2,650,000

Minus (-)

Decomposition SAR 50,000

Transportation SAR 150,000 SAR 200,000

SAR 2,450,000

9.3.2 Cost approach

9.3.2.1 Depreciated replacement cost (DRC) method

The cost approach is based on the concept that an investor will pay no more for an asset than the cost to build a comparable asset and (if applicable) the cost of site acquisition. (The M&E cost approach should not be confused with a business valuation cost approach, which although conceptually similar, is a quite different exercise.)

The cost approach should capture all of the costs that would be incurred by a typical market participant seeking to create an asset providing equivalent utility. These costs will vary depending upon the precise basis of value and any associated assumptions.

For example, if the cost approach was being applied to M&E that was being valued in its working place as part of an operational unit, the cost of installation would be reflected. If the same machinery was being valued as individual items in isolation, the installation cost would be ignored.

The cost elements that need to be considered will differ for every type of M&E, but the following list includes common items to consider:

- materials;
- labour used in construction or installation;
- transport costs;
- installation costs;
- design, permit, architectural, legal and other professional costs;
- engineering, procurement and construction management costs;
- unrecoverable taxes;
- finance costs during the construction period.



Costs may be categorised as either direct or indirect. Direct costs are typically considered to be related to labour and materials. Indirect costs are all other costs. However, classification of costs between

- Finance costs should have regard to debt/equity ratios and the cost of debt that would be typical for market participants engaged in similar activities with comparable M&E.
- Interest during construction is calculated in respect of only that portion of the total construction cost that would be funded by debt.
- Typical construction periods for similar M&E projects. This will determine the maximum period over which interest costs will be incurred.
- Typical draw down schedules on debt facilities over the assumed construction period for similar M&E installations.

Because the entire portion of the debt incurred will not usually be drawn down at the commencement of a large and complex M&E project, it is necessary to reflect the approximate timing of debt draw-downs to calculate the total interest cost during the period.

Even in cases where debt would not normally be required to fund the creation of an equivalent asset, the opportunity cost to a market participant of using its own capital to finance the costs during the period that would be required to create the asset should be considered.

When the costs of creating an alternative M&E package are derived from actual, quoted or estimated prices by third party OEMs, suppliers or contractors, these prices will include the third parties' desired level of profit. Allowance may also need to be made for project management or coordination fees, particularly for complex industrial M&E infrastructure assets. Where an asset would be created by the owner for their own use, an addition may be appropriate to reflect either any opportunity costs incurred by the owner or any risks borne by the owner in undertaking the project.

If the M&E asset is one that would typically be created using equity rather than debt funding, it may also be appropriate to allow for a profit on the net costs that would be incurred in replacing the asset in order to provide an adequate return on that equity.

The actual costs incurred in creating the subject M&E (or a comparable reference asset) may be available and provide a relevant indicator of the replacement cost. However, care should be taken to make proper adjustments for:

- cost fluctuations between the date on which this cost was incurred and the valuation date;
- any atypical or exceptional costs, or savings, that are reflected in the cost data but that would not arise in creating an equivalent asset.

Care should be taken before using any capital expenditure incurred on refurbishing or otherwise improving an M&E asset as an indicator of the replacement cost of the whole asset because these will often include costs relating to the alteration or adaptation of the original asset that would not be incurred in a replacement of the whole. However, such expenditure can increase the expected useful life of an asset.

Costs appearing in an entity's financial records may not be a reliable guide to either the replacement or reproduction cost of M&E as these may include costs other than those attributable to the purchase, installation and commissioning of the subject asset. They may represent the costs attributed to the asset following a business merger or other earlier purchase rather than the cost of creating the asset originally.

Hence, M&E valuers must should always “have a nose” for what the rough replacement cost of a given M&E installation should be. This rough evidence will allow the valuer to rhetorically ask why the cost of the M&E was/should be different to that used by other market participants. M&E valuers can use a range of sources to gather information, Appendix M details such existing useful databases.



Unfortunately, the only way for a M&E valuer to obtain such rough indicators of costs for given M&E projects, installations and high value factories: is to research and understand the global market for the same M&E and/or products manufactured by the same M&E, and their corresponding capital costs.

This will require internet research, study of brokers' reports, published financial statements, trade articles etc. It is no different conceptually to any valuation:

- Facts
- Expert opinion
- Conclusion of value

This DRC method of the cost approach refers to the cost of building a facility, including the M&E and plant buildings located on the site (assuming they do not form part of a separate real estate valuation) adjusted (depreciated) to reflect the impact of age and all forms of obsolescence

In the DRC method, a valuation is based on the following steps:

a. Determine the current new replacement cost (CNRC)

CNRC describes the amount of money required to replace or acquire, install and commission new or similar plant and machinery.

The valuer needs to get the latest cost of the same new M&E from suppliers or other sources. For M&E that is no longer available, the valuer will need to get new cost estimates for assets having similar specifications. Adjustments need to be made to account for differences between the subject and reference asset.

Latest cost information can be obtained through:

- 1) OEMs and suppliers
- 2) Magazines
- 3) Brochures
- 4) Catalogues
- 5) Advertisements
- 6) Sales websites
- 7) Buyers
- 8) and others

b. Adjust the CNRC to reflect the impact of age/use and obsolescence

The DRC method determines the value of M&E by making adjustments to the CNRC to reflect the impact of age, condition and obsolescence on value. In its simplest form, the value is obtained by deducting a depreciation factor from the CNRC.

The principle behind the DRC method is as follows:

Current New Replacement Cost

Less

Depreciation (due to age and obsolescence)

= Value

M&E valuers must however be aware that there are business cultural differences between the precise definitions and associated application of physical, function and economic obsolescence, especially between the US and other world regions. Whilst it is not for TAQEEM to prescribe precisely how an M&E valuer to define and apply obsolescence, valuers should align their work in this regard with IVS principles and TAQEEM guidance. M&E valuers should then explicitly state their defined definitions and application of obsolescence such that risk of clients and stakeholders misinterpreting the valuation is reduced.

There are numerous spreadsheet software packages which include different depreciation methods. There is no single method that must be used in any valuation. It is up to the valuer to pick a depreciation method which best reflects the asset sector, useful life of the asset, the impact of all forms of obsolescence and the asset's residual value element at end of life.



Whilst included in the Appendices for general reference, M&E valuers should avoid the use of “stock” depreciation tables that are not reflective of the subject asset’s usage pattern, market and useful life. Research the assets, market, and useful life; then construct the appropriate valuation depreciation table – not the other way around!

However, if after fully researching the market for typical M&E asset economic lives relative to other market participants, a valuer wishes to compare such lives with other sources, the American Society of Appraisers (ASA) published an interesting table of such lives. This table is replicated in Appendix Q.

9.3.2.2 Cost-to-capacity method

This method can be used to address both functional and economic obsolescence depending on the cause of the lack of utility in a given selection of M&E. The cost-to-capacity method can be used as a method to:

- estimate the replacement cost for an asset with one capacity where the replacement costs of an asset or assets with a different capacity are known, or
- estimate the replacement cost for a modern equivalent asset with capacity that matches foreseeable demand where the subject asset has excess capacity (as a means of measuring the penalty for the lack of utility to be applied as part of an economic obsolescence adjustment).

Under the cost-to-capacity method the replacement cost of an asset with an actual or required capacity can be determined by reference to the cost of a similar asset with a different capacity. This method recognises that not all costs vary with size on a linear basis.

For example, if the cost of a 2,000 hp locomotive is X it does not necessarily mean that the cost of a 4,000 hp locomotive is X times 2 or the cost of a 1,000 hp locomotive X divided by 2. The exponent (or cost-to-capacity factor) can be determined by analysing published and historical costs of similar assets of different sizes and capacities.

Unit of valuation

The cost approach may be applied to a group of assets, a single asset or to separate components of an asset. Generally, a separate cost and depreciation calculation can be made where an individual asset or component of M&E could be replaced separately from other assets or components without major disruption to those assets.

The extent to which a group of assets or an individual asset is broken down into individual components for valuation purposes will be dictated by the purpose for which the valuation is required and the availability of data. Another consideration is the extent to which separate assets or components have remaining lives that are materially different from one another.

9.3.2.3 Physical obsolescence

Physical obsolescence is a loss in value due to the reduction in the usefulness of an asset caused by physical deterioration of the asset or its components resulting from age and use.

Some causes of physical obsolescence in M&E are curable, i.e. they can be corrected or ameliorated by maintenance and repair. Physical obsolescence is curable if the cost to cure the physical obsolescence results in a value increase equal to or greater than the cost, or if curing the physical obsolescence will allow other existing items to maintain their value. Curable physical obsolescence often arises as a result of deferred M&E maintenance. The measurement of curable physical obsolescence is the cost to cure it.

Some causes of physical obsolescence are incurable, i.e. deterioration in M&E condition and its restriction on operation and/or production output cannot be remedied either at all or cost effectively.

Incurable physical obsolescence can be measured by considering the asset's age, expected total and remaining life where the adjustment for physical obsolescence is equivalent to the proportion of the expected total life consumed. In some cases, it may be more convenient or appropriate to use an asset's effective age rather than its actual age.



Effective age reflects the asset's condition and utility. For example, if an asset is poorly maintained, its effective age may be more than its actual age or if a machine has been reconditioned, its effective age may be less than its actual age.

Useful life is the total period of time over which an asset is expected to generate economic benefits. Physical deterioration may occur at a constant rate or vary over the life of the asset. This can result from variations in the intensity of use to which the asset is subjected at different stages of its life.

Physical obsolescence is often measured by reference to the proportion of the expected total life that has been consumed at the valuation date. A machine may have an expected total life of fifteen years when new, but be five years old on the valuation date, meaning that the remaining life is ten years. A distinction can be made between the physical and the useful life of an asset.

The physical life of M&E is an estimate how long the asset could be used before it would be worn out or beyond economic repair, assuming routine maintenance but disregarding any potential for reconditioning, refurbishment or reconstruction. It will reflect the degree of physical obsolescence to which the asset is subject.

The useful life represents how long it is anticipated that the asset could generate financial returns, or provide a non-financial benefit in its current use. It will be influenced by the degree of functional or economic obsolescence to which the asset is subject.

The physical life will limit the useful life, i.e. the useful life in valuation terms cannot be longer than the physical life. However, there may be situations where the physical life exceeds the useful life. Where this is the case, the asset may have a residual value at the end of its useful life that reflects its potential for an alternative use, reconstruction or recycling.

Due to many elements of M&E having “a second life”, the value will not normally be below its value for an alternative use, including for scrap, salvage or recycling, less the costs of clearance, decommissioning and any decontamination required.

The bibliography at the end of the manual provides reference to sample M&E age/life reference tables and guidance from various international sources. It is important to emphasise that these are merely sample references – it is up to the M&E valuer to research and establish representative lives for the particular assets under valuation.

9.3.2.4 Functional obsolescence

Functional obsolescence is a loss in value resulting from inefficiencies in the subject asset compared to its replacement.

There are two forms of functional obsolescence namely:

- excess capital cost, which can be caused by changes in design, materials of construction, technology or manufacturing techniques resulting in the availability of modern equivalent assets with lower capital costs than the subject asset
- excess operating cost, which can be caused by improvements in design or excess capacity resulting in the availability of modern equivalent assets with lower operating costs than the subject asset

Functional obsolescence can therefore arise due to either:

- the design or specification of the asset no longer being the most appropriate for delivery of the service for which it was originally intended as it may be inadequate or over engineered in that it exceeds market norms,
- the technology used in the asset having been superseded, or
- a combination of both of the above factors.

M&E valuation practice can vary regarding the application of functional obsolescence and technical obsolescence by treating them together and /or separately, and although the net effect may (should) be the same, there can be differences in the application.



For inadequate items of M&E, functional obsolescence is measured by considering the cost of correcting the inadequacy compared with the value gained. For over engineered or “super adequate” items, functional obsolescence is measured by the excess capital cost compared with the modern equivalent asset.

Excess capital cost is often addressed by using the machine’s replacement cost as the basis of the calculation. The modern equivalent asset should represent the most efficient, (i.e. cost effective) way of replacing the utility provided by the subject machine. Care should therefore be taken to avoid double counting if redundant features of the subject machine are already excluded from the replacement cost.

Examples of excess operating costs in respect of M&E include:

- the subject machine may require more operators compared to a modern equivalent asset;
- the subject machine may have a lower rate of productivity compared to a modern equivalent;
- the subject machine may produce more scrap or waste material compared to a modern equivalent.

In the case of a wider industrial process plant, excess operating costs that would not necessarily be reflected in the cost of the modern equivalent asset, but could include higher energy costs and loss of productivity due to an inefficient site layout or plant configuration, not capable of being cured through “de-bottlenecking.”

In each case the present value of the excess operating costs in terms of labour, inefficiency or consumption of raw materials can be used to arrive at a measure of the functional obsolescence.

In some cases, the subject machine’s performance may be limited by the performance of the wider factory or process plant (again not capable of being cured through “de-bottlenecking.”)

9.3.2.5 Economic obsolescence - M&E asset

Introduction

This simplified example illustrates how economic obsolescence for an item of M&E valued using the cost approach can be measured by reference to the specific cash flows it generates. For simplicity, market value and IFRS fair value are considered synonymous.

Scenario

In this scenario the valuer has been engaged to provide the market value/IFRS fair value for a specific self-contained machine that produces a completed product. The replacement cost of the machine has been determined to be SAR500,000 inclusive of all costs of procurement, installation and commissioning. Research indicates that the life of such machines is typically 10 years after which time they are typically scrapped for minimal value. The subject machine is 4 years old at the date of valuation. The pattern of use (and therefore consumption of service potential) is expected to remain constant over the remaining life of the asset.

The machine is of a current design and is considered to be the lowest cost asset available both in terms of capital and operating costs and as a result it is not considered that any functional obsolescence penalty should be applied.

However recent changes in government legislation mean that the products manufactured by this machine can no longer be used domestically. Due to the increased costs of transport, marketing and sales in overseas markets, the net income that can be generated by this machine is expected to be permanently reduced from SAR 80,000 per annum to SAR 55,000 per annum.



The present value of the expected net income at an appropriate discount rate (for illustrative purposes assumed to be 10%) is SAR 240,000. The economic obsolescence adjustment is therefore the difference between the depreciated replacement cost (pre- economic obsolescence) and the present value of the net income that the machine is expected to generate over its remaining life as follows:

Replacement cost installed	SAR 500,000
Physical obsolescence	= (SAR 500,000 x (4/10)) = 200,000
Functional obsolescence	0
DRC (before economic obsolescence)	SAR 300,000

Net income per annum	SAR 55,000
Remaining life	6 years
Discount rate	10%
Present value cumulative discount factor	= SAR 55,000 x 4.355
Present value of net income over remaining life of asset	SAR 239,539

DRC (before economic obsolescence)	SAR 300,000
Economic obsolescence	= (CU 300,000 - CU 239,539) = 60,461
Market value	SAR 239,539

Market value say	SAR 240,000
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The above example assumes that the income generated by this machine is not dependent on the existence of any other asset, and ignores wider issues for simplicity. In practice this situation is quite rare and typically income is generated by a number of assets (possibly both tangible and intangible) working in concert together.

9.3.2.6 Valuation depreciation

Valuation depreciation is defined as the depreciation in the value of M&E due to factors such as age, physical, functional and economic obsolescence.

Although they are often synonymous, depreciation for accounting, and valuation depreciation, are not the same thing. Valuation depreciation is allied to the subject assets only, while accounting depreciation will be based on much wider accounting conventions and the depreciation policy of the then owner of the subject assets, often with Profit & Loss Statement and/or tax implications,

Valuation depreciation can be determined using several techniques depending upon the nature of the asset(s). The more commonly used depreciation methods include:

a) Straight line depreciation

In this technique, the depreciation is determined by subtracting a fixed percentage of the CNRC for each year. Therefore, the estimated useful life of M&E needs to be determined first. The CNRC, after deducting the estimated residual/scrap value is then divided by the assumed estimated useful life. Usually the scrap value is taken as a minor percentage of the CNRC. However, the actual residual or scrap value depends on the type of M&E.

A conceptual, straight line depreciation computation formula for plant and machinery with a life of 10 years can be expressed as follows:

$$\text{Annual depreciation} = \frac{100\% - A}{\text{Useful life}}$$

Where;

A = residual/scrap value at the end of the asset's useful life expressed as a percentage of CNRC



Example (straight line depreciation):

To calculate the depreciation factor using this technique for a 5 years old machine with an estimated useful life of 10 years and an estimated residual/scrap value of say 5% of the CNRC, the calculation can be completed as follows:

$$\text{Depreciation} = 100\% - 5\% = 95\% = 9.5\% \text{ per annum}$$

$$\frac{\quad}{10 \text{ years}} \qquad \frac{\quad}{10 \text{ years}}$$

Therefore, the sum of the depreciation for 5 years is as follows:

$$9.5\% \text{ per annum} \times 5 \text{ years} = 47.5\%$$

To get the depreciation factor, the calculation can be completed as follows:

$$\text{Depreciation factor} = \frac{1 - 9.5\% \times 5 \text{ years}}{100\%}$$

$$= 1 - 0.475$$

$$= 0.525$$

To get the value, the CNRC is multiplied by the depreciation factor as follows:

$$10,000 \times 0.525 = 5,250$$

A straight-line depreciation concept can be illustrated as follows:

Age	CNRC	Accumulated Depreciation	Depreciation Percentage	Depreciation Factor	Value
0	10,000	-	-	-	-
1	10,000	950	9.5%	0.905	9,050
2	10,000	1,900	19.0%	0.810	8,100
3	10,000	2,850	28.5%	0.715	7,150
4	10,000	3,800	38.0%	0.620	6,200
5	10,000	4,750	47.5%	0.525	5,250
6	10,000	5,700	57.0%	0.430	4,300
7	10,000	6,650	66.5%	0.335	3,350
8	10,000	7,600	76.0%	0.240	2,400
9	10,000	8,550	85.5%	0.145	1,450
10	10,000	9,500	95.0%	0.050	500

Straight-line depreciation is normally used for assets that demonstrate a linear consumption of useful life or service potential, i.e. where there are no significant changes in the pattern of use over the asset's working life, and no other obsolescence factors impact on value. This is rarely the case for most modern M&E.

b) Reducing balance depreciation (also known as decimal or diminishing balance)

The calculation is based on the current year's balance being valued, therefore, the percentage of depreciation is not the same for the entire estimated useful life.

c) Saw-tooth depreciation

The saw-tooth depreciation profile follows that of straight-line depreciation, demonstrating a linear consumption of useful life or service potential curve until a maintenance event in which useful life or service potential may be partially restored. This is depreciation profile is presented in assets that undergo such maintenance cycles, such as an aircraft undergoing engine performance restoration. Appendix I details this depreciation method.

d) IOWA curve depreciation

The IOWA curve method is based on a study and research conducted by IOWA State University. This method uses an age-life concept which measures the physical loss in value attributed to a reduction in the quality of a given type of asset remaining in service or use over a given period of time. The period of time is measured from the point at which the unit is first put into use until it is removed from service. In addition, as a consequence of wear and tear, an asset is increasingly costlier to operate over time and accruing maintenance costs result in a decrease in the overall utility of a given asset. Appendix I details this depreciation method.



9.3.2.7 Example (diminishing balance depreciation)

To calculate the depreciation factor using this technique for a 5-year-old machine with an estimated useful life of 10 years and an estimated residual/scrap value of say 5% of the CNRC, the calculation can be completed as follows:

Depreciation factor for machine aged 5 years:

$$1 - (\text{scrap value} / \text{New Replacement Cost}) ^{\text{Age} / \text{useful life}}$$

$$= 1 - (\text{SAR}500 / \text{SAR}10,000) ^{5/10}$$

$$= 0.22$$

To get the value the CNRC is multiplied by the depreciation factor as follows:

$$10,000 \times 0.22 = 2,200$$

A reducing balance depreciation concept can be illustrated as follows:

Age	CNRC	Accumulated Depreciation	Depreciation Percentage	Depreciation factor	Value
0	10,000	-	0%	1.00	10,000
1	10,000	2,600	26%	0.74	7,400
2	10,000	4,500	45%	0.55	5,500
3	10,000	5,900	59%	0.41	4,100
4	10,000	7,000	70%	0.30	3,000
5	10,000	7,800	78%	0.22	2,200
6	10,000	8,300	83%	0.17	1,700
7	10,000	8,800	88%	0.12	1,200
8	10,000	9,100	91%	0.09	900
9	10,000	9,300	93%	0.07	700
10	10,000	9,500	95%	0.05	500

The reducing balance depreciation method is commonly used for assets that are impacted by a combination of different forms of obsolescence as the asset ages, which is usually the norm.

a. Useful life

No one can precisely predict what an asset's total useful life will be. However, from a valuation economics point of view, we must estimate a given useful life to represent the estimated total service period expected from the M&E when used by market participants.

The useful life of M&E is dependent on the type and usage of the subject assets. The useful life may be influenced by evolving technology factors, environmental issues, operating costs, and availability of spares, technical expertise and market factors. For example, computer equipment has very short useful life (say less than 5 years) due to the ever-expanding technological advances while a machine tool like a lathe has a longer useful life (say 25 years+). A public utility like a power station might have a useful life of 50 years, albeit it may require significant expenditure to sustain such a long life.

Detailed studies of the subject assets and the wider market should be carried out by the valuer to determine the likely duration of useful life of the subject plant and machinery, as it is so fundamental to the chosen valuation method and process.

b. Age of machinery and equipment

The headline age of the machine can often be obtained from the machine plate or from the owner's records. However, machines are often re-engineered or refurbished such that they have a life extension over the original predicted effective life. This can be accommodated by adopting a modified age (often called the effective age or valuation age).

c. Scrap or residual value

The scrap/residual value of an M&E depends on the type of M&E. If the machine cannot be put to any further use after its useful life has expired, then its value depends on the value of the parts or materials that can be sold after deducting the cost of dismantling.

The scrap value should not be misconstrued with salvage value.



d. Salvage value

An opinion of the amount, expressed in terms of money that may be expected for sale of the whole asset or a component of the whole asset that is retired from service for possible use elsewhere, as of a specific date.

Cars that have passed the useful life period are considered to have salvage value.

9.3.3 Income approach

9.3.3.1 Introduction to the income approach

The income approach provides an indication of value by converting future cash flows into a single current value. Under the income approach, the value of an asset is determined by reference to the value of income, cash flow or cost savings generated by the asset.

However, care must be exercised in adopting an income approach for M&E assets to properly demarcate between tangible and intangible assets, especially if intangible assets are identified and valued in respect of the wider business which utilises the M&E assets. Hence, valuers from both disciplines must cooperate in this regard for the mutual benefit of the client.

The income approach should be applied and afforded significant weight under the following circumstances:

- (1) The income-producing ability of the asset is the critical element affecting value from a market participant perspective, and/or
- (2) Reasonable projections of the amount and timing of future income are available for the subject asset, but there are few, if any, relevant market comparables.

Although the above circumstances would indicate that the income approach should be applied and afforded significant weight, the following are additional circumstances where the income approach may be applied and afforded significant weight. When using the income approach under the following circumstances, a valuer should consider whether any other approaches (such as market and cost) could be applied and weighted to corroborate the value indication from the income approach:

- (a) The income-producing ability of the subject asset is only one of several factors affecting value from a market participant perspective,
- (b) There is significant uncertainty regarding the amount and timing of future income-related to the subject asset,
- (c) There is a lack of access to information related to the subject asset (for example, a minority owner may have access to historical financial statements but not forecasts/budgets).
- (d) The subject asset has not yet begun generating income but is projected to do so, and/or
- (e) The cash flows are generated by a combination of tangible and intangible assets.

9.3.3.2 The concept and main principle for income approach

A fundamental basis for the income approach is that investors expect to receive a return on their investments and that such a return should reflect the perceived level of risk in the investment.

Generally, investors can only expect to be compensated for systematic (also known as “market risk” or “undiversifiable risk”).

The main principle behind this approach is that an informed buyer would pay no more for a property or asset than an amount equal to the present worth of anticipated future benefits (income) from the same or equivalent property with similar risk.



Whilst the following income valuation methods are often utilised for M&E valuations, when M&E valuers are working in tandem with business valuers on the same client/valuation assignment, they both should discuss and agree regarding their respective approaches to income based valuations.

This is to avoid double counting or omissions in how such income valuations are constructed, and in the case of valuations for accounting statements, should better align the valuation treatment of tangible and intangible assets to the benefit of the client and stakeholders.

9.3.3.3 Discounted cash flow method

The most convenient and applicable method in this approach is discounted cash flow. This method applies to investment and general-use properties where there is an established and identifiable rental market or where a specific measurable stream of benefits may be attributed to the subject.

In applying this method to M&E, consideration is given to either the income-generating or the cost-savings potential of the item and the associated risks and uncertainties. The income approach is suitable to be used if the M&E useful life can be determined or the terminal value at the end of useful life is known. The benefit/income capitalisation method presents several obstacles. Some notable obstacles are as follows:

- i. For the clear majority of M&E assets, the potential earnings (benefits) cannot be reasonably separated from those of the overall business and often the information regarding their respective operating costs is unavailable.
- ii. It is difficult to develop one of the most critical factors: The discount rate.
- iii. The risks of specialised items or those involving unique technologies are typically higher than for unit's alternative uses because M&E is not as liquid as current assets and lacks comparable market data. Therefore, the risks and returns associated with M&E are higher than those for current assets. This issue is often better debated within a wider business valuation of the entity operating the assets.

Ideally, the best source of required returns comes from investors who directly participate in various markets. However, this information is usually confidential. Therefore, indirect methods may be applied to determine supportable rates of return. Below are some suggested indirect methods that can be applied:

a. Market price method

Under this method, the selling prices of comparable investments are compared to anticipated future benefits to derive an indication of the implicit rates of return. However, this must be allied to market-based data.

b. Comparison of quality attributes method

The desirability of the subject is compared to those alternatives having known rates of return.

c. Build-up method

Starts from a known risk-free rate to which factors are added for additional risks, the burdens of management and the lack of liquidity, to derive a suitable rate of return.

d. The Weighted Average Return on Assets (WARA) method

This method is based on the assumption that a business is a portfolio of financial, physical and intangible assets. The fair value of the long-term debt plus that of the equity is equal to the sum of the fair values of net working capital and fixed and intangible assets. WARA is the rate of return of each category weighted by its fair value.

9.3.3.4 Profit method

The profit method is based on the concept that the market value of an M&E is dependent on the profit that can be derived from the business carried on the M&E. It is based on the concept of value to the operator and it is suitable to apply in valuing M&E whose value depends on:

- Volume of trade, or
- The existence of a monopoly.



The theory of this approach is that a tenant is willing to pay part of the profits from his business as a rent to the proprietors of the M&E. In summary, the Profit Method format is as follows:

Gross Income

Less: Purchase

Less: Expenditure

Less: Net Profit (Divisible Balance)

Less: Tenant's Share

a) Interest on capital of lessee

b) Return to entrepreneur

Rent

Multiplier: Year's Purchase

Capital Value

VALUATION OF FERRY
(Value using profit method)

	(SAR)	(SAR)	(SAR)
Average revenue (Revenue)			5,525,036
Year 2014		6,475,985.00	
Year 2013		5,463,645.00	
Year 2012		4,635,479.00	
Less: Average cost of sales			2,398,149
Year 2014		3,204,069.00	
Customs duty and port charges	246,980.00		
Oil and lubricants	1,180,252.00		
Additional ferry rentals	266,486.00		
Salaries and wages	653,903.00		
Repair	849,448.00		
Transport charges	7,000.00		
Year 2013		1,849,372.00	
Customs duty and port charges	180,984.00		
Oil and lubricants	518,453.00		
Additional ferry rentals	306,719.00		
Salaries and wages	731,216.00		
Repair	100,000.00		
Transport charge	12,000.00		



Year 2012		2,141,006.00
Customs duty and port charges	132,453.00	
Oil and lubricants	356,144.00	
Additional ferry rentals	316,144.00	
Salaries and wages	716,659.00	
Repair	608,215.00	
Transport charges	11,391.00	
Gross profit		3,126,887
Less: Average operation		432,318
Year 2014		495,899.00
Allowance	55,608.00	
Advertisement	6,020.00	
Bank charge	1,583.00	
Company directors' allowance	133,200.00	
Electricity and water bills	33,633.00	
EPF contribution	42,721.00	
Insurance	144,809.00	
License fees	1,116.00	
Medical	4,945.00	
Newspapers and magazines	522.00	
Miscellaneous expenses	18,884.00	
SOCSSO contribution	9,950.00	
Training cost	27,390.00	
Uniforms	4,156.00	
Vehicle maintenance	11,362.00	
Year 2013		408,516.00
Allowance	57,295.00	
Advertisement	3,080.00	

Bank charge	2,211.00	
Company director's allowance	84,640.00	
Electricity and water bills	28,032.00	
EPF contributions	40,801.00	
Insurance	141,849.00	
License fees	1,014.00	
Medical	6,812.00	
Newspapers and magazines	661.00	
Miscellaneous expenses	13,479.00	
SOCSSO Contribution	11,039.00	
Training costs	8,800.00	
Uniforms	600.00	
Vehicle maintenance	8,203.00	
Year 2012		392,538.00
Allowance	63,077.00	
Allowance	63,077.00	
Advertising	22,484.00	
Bank charge	3,000.00	
Company director's allowance	59,287.00	
Electricity and water bills	46,016.00	
Contribution of EPF	46,713.00	
Insurance	26,587.00	
License fee	30,825.00	
Medical	1,035.00	
Newspapers and magazines	6,476.00	
Miscellaneous expenses	16,670.00	
SOCSSO contribution	9,478.00	
Training cost	45,150.00	
Uniforms	5,938.00	
Vehicle maintenance	9,802.00	



Net profit

2,694,569

Less: Interest on capital @ 8%	17,293	
Tenants share 40% of net profit	1,077,828	<u>1,095,121</u>
Estimated annual net rental	1,599,448 YP	
25 years @ 8%		10.6748
		17,073,767

a. Gross income

Gross income may be estimated based on audited, historical company accounts over a representative number of years. In the event that accounts do not exist, e.g. if a new business is initiated, then a reasonable gross income estimate (based on market norm) should be made. Income received not related to this business shall be excluded.

b. Expenses

Expenditure information should be analysed to separate expenses for managing the business from expenditure for other purposes. Expenses not related to the business should be deducted. Capital expenditure is not to be taken into account. Maintenance of plant and machinery should however be accounted for in the calculation.

c. Net profit

Gross revenue minus all purchases should determine the rate of gross profit, which less operating expenditure provides net profit or divisible balance.

d. Rent

To obtain a rental value, a principal method is to deduct the tenant's share from the divisible balance. The tenant's share usually includes interest on capital and returns to the operator as well as reflecting the risks involved in the business. This number should in principle be commercially attractive enough taking into account the risks and other mode of investment's return.

e. Tenant capital

- i. The capital necessary to manage the business.
- ii. Includes items such plant and machinery including chattels belong to tenants required for business operations.
- iii. The value of plant and machinery and movable assets represents the existing use/ in-situ present value rather than an acquisition value.
- iv. It should include 'stock-in-trade'.
- v. It should also include working capital for the payment of staff salaries and so on.

f. Capital value

One method of determining the value of the capital concerned is to establish the appropriate rate of return. The Year Purchase figure obtained can be used to determine the value of the capital, if approaching the value from a property perspective. However, a discounted cash flow method should also be considered if more reflective of the business and its associated capital value.



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of large pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a corrugated metal wall and a staircase with a railing. The lighting is bright, with several overhead fixtures visible. A large, light green diagonal shape is overlaid on the right side of the image, containing the chapter title.

CHAPTER

10

VALUATION REPORTING



10.1 Introduction

This chapter describes the format of reporting the valuation to the client.

10.2 Objective

Ensuring the value submitted to the client is accurate and professional.

At the end of this chapter, valuers will be aware of the need to report the valuation accurately and consistently.

10.3 Description

This is the final step in the valuation process. It connects the valuer with the client for the valuation opinion.

The valuer should comply with IVS and TAQEEM and if appropriate, other national valuation standards when reporting to ensure a good quality report.

10.4 Any valuation report must reflect

- The engagement terms and conditions
- Any special assumptions, reporting limitations or qualifications
- Adherence to IVS and/or national valuation standards

10.5 Tips for an effective valuation report

Report in draft until final approval received from the client

- Each paragraph must be clear, concise, and compact and make sure that each word is accurate. Use simple sentences.
- Sentences must contain correct grammar and punctuation. Avoid jargon and hard-to-understand terms and repetition.
- All reports must contain the full names of the authorised signatories, including valuation registration, including TAQEEM and other professional bodies as may be appropriate.

10.6 Report information

The information in a report varies according to the type of plant and machinery being valued and the purpose of the valuation. A sample M&E valuation report is included in Appendix N. Examples of evidence commonly found in an M&E valuation report are as follows:

1. Valuation overview

The valuation report introduction must clearly state the client, the interest to be valued, the valuation purpose, conclusions and basis of valuation and date.

2. Specific assumptions and limitations

The valuer must explicitly state all factors which define and/or limit the valuation process and conclusions.

3. Principal equipment / assets

The subject assets must be adequately described from a valuation perspective, irrespective of the degree of data provided and extent of site inspections.

4. Valuation methodology and analysis

The report must demonstrate how the concluded values were established

5. Data Appendices

Should contain asset source data and any limitations.

6. Valuation Appendices

Detailed valuation workings.



7. Asset age analysis

Asset age profiles supporting concluded values.

8. Valuation application

A description of how the chosen valuation approach or approaches has/have been applied, the key assumptions made and rationale for the valuation conclusion

9. Valuation amount

The statement of value should be clear.

10. Signature(s) of authorised valuer(s)

11. Attachments

The following type of attachments are potentially found in the valuation report depending on what degree of detail was agreed at the time of engagement:

- Fixed asset valuation listing
- Edited fixed asset register
- Location Plan
- Site plan
- Machinery description
- Workflow plan
- Photographs
- Detailed valuation workings
- Other information

10.7 Other points

The requirement of the IVS and the TAQEEM Implementation Laws must be documented in the text of all reporting documents and similarly, complied with from inception to acceptance of final report.



A black and white photograph of an industrial facility, likely a power plant or refinery. The image shows a complex network of large pipes, valves, and machinery. In the foreground, a large, curved pipe is prominent. The background features a high ceiling with various pipes and structural elements. The lighting is bright, and the floor is highly reflective. A large, light-colored diagonal shape is overlaid on the right side of the image, partially obscuring the photograph.

CHAPTER

11

CLOSURE



11.1 Filing and archiving

11.1.1 Introduction

IVS 102-30 and Article 4 (f) (iv-vii) of the CEPC lay down the requirements for valuers to create and maintain valuation records or work files for assignments they undertake. A work file can be manual or electronic, or both, provided it meets the primary purpose of the work file as stated in the CEPC, namely:

The work file must be prepared in such a manner that a person with no previous involvement with the assignment can review the work file and reasonably determine and understand all the stages of work that the valuer went through to arrive at the (valuation) conclusions.

Based on the above and other provisions in the CEPC, a work file must be completed by the time the report is issued and have all the necessary components regardless of whether a summary or comprehensive valuation report is issued.

11.1.2 Minimum requirements

Below is a list of the minimum components of a work file outlined in the CEPC:

1. Hard copy or electronic copy of the written valuation report
2. Correspondence, memos and supporting documents
3. Record of conflict checks, outcomes and actions thereof
4. Sufficient information, data and procedures necessary to support the valuer's opinion such as, but not limited to:
 - a. Outcomes of enquiries,
 - b. Sources of data
 - c. Methods used, analysis, and calculations

Consequently, the contents of the work file, besides the valuation report, may encompass a wide variety of data and documents including contracts and agreements; fixed asset registers, new M&E cost data; market sales data points for comparable M&E assets; valuation models; drawings and plans; financial and operating statements; photographs and video recordings; email and voicemail messages; letters and other correspondence; memos; transcripts of meetings and presentations; profiles of comparables and electronic files of valuation software used.

of comparables and electronic files of valuation software used. With little local case law evidence establishing or sanctifying valuer-client privilege, a valuer must consider that their work file may in future be required in court where either the valuation itself is the subject of litigation or the suit relates to the M&E or related commercial entity that is the subject of the valuation. As such the valuer must exercise care about what documents, notes or statements go into the work file and how the file is organized. Not only must the work file demonstrate the valuer's exercise of due care and skill in his valuation, the valuer should also consider not including other information that unnecessarily extends his exposure. In other words, the work file should include all the information that the valuer has carefully considered and supports his valuation conclusion. The valuer must document his rationale for excluding in his analysis any other information, such as additional comparables, that may be contained in his work file.

11.1.3 Storage period

CEPC further requires that the work file must be maintained for a minimum period of 10 years. This is also the period stipulated by various other laws and regulations in KSA including the Anti-Money Laundering Law.



11.1.4 Electronic filing

In modern times where email predominates official communication, the use of electronic filing systems by valuation firms is more the rule than the exception. Such a system may still exist alongside a paper-based system which it ultimately aims to replace, but it is increasingly part of a fully digitized electronic document management system (EDMS). EDMS essentially involves the use of computer and software technology to create, capture, organize, store, retrieve, manipulate and circulate data electronically.

EDMS confers users with significant benefits over paper-based filing including physical space savings, quicker and easier access to internal and external information, faster retrieval and response to client queries, use of multi-media, enhanced tracking of workflow documents for reviews and approvals, and remote or flexible working possibilities. Firms would also have guidelines and policies in place governing the use of such systems and the output thereof to ensure data verification and integrity and mitigate fraud, theft and breaches of confidentiality.

Efficient file organization is another important aspect of a valuer's recordkeeping, regardless of whether a firm uses paper-based or digital systems. Research has shown that office users can spend more time looking for information than reading it.

Below are some guidelines for efficient electronic file organization with reference to a valuation practice setting:

1. Establish a logical folder structure by creating separate main folders for each valuation project. Within the main or project folder, create subfolders for related items and nest them into a hierarchy.
2. Use the M&E's operator name or M&E property location as the main folder name for each valuation project. Property addresses are also unique and their use as folder names (or secondary folder names in the case of portfolio folders) facilitates easier and quicker search for relevant project folders.
3. Maintain a consistent nomenclature for the subfolders and avoid overlap in what gets stored in each subfolder. The names used for the subfolders should be clear and understandable to those who will use the files.

4. Create a pre-set or template of the folder directory with a clear and standard outline of main and sub-folders to be replicated for every new valuation assignment.
5. Names for files stored within the subfolders should be sufficiently descriptive and independent of the folder in which they are stored.
6. Embed:
 - a. the file's version in the file name, such as v.01, v.02 etc. for better version control. The last official version may be marked 'FINAL' for easier identification.
 - b. the file's date of creation or revision in the file name, since dates stored automatically by the operating system change with re-saving or movement of files among folders and users. The international standard date notation is YYYY_MM_DD, which allows for files to be sorted chronologically.
7. Draft and final versions of files or reports should be stored in separate sub-folders labelled accordingly. In other words, there should be two subfolders: 'Draft' and 'Final'. Aborted, outdated or incomplete versions or any other versions that do not fit into 'Draft' or 'Final' folders could be stored in a third sub-folder labelled 'Archive'.
8. Review-ready files or reports may be labelled further as 'draft', with appropriate status extensions 'to review', 'from review' as the case may be.
9. Work files should be maintained on a shared drive where they can also be backed up and access restricted as necessary. Access to 'confidential' and personal files must be restricted.
10. Maintain a 'master' or 'original' version of each project folder to ensure integrity and reliability of records. Future rework, edits or updates such as for repeat assignments should be on copied files.
11. Allocate a member of the project team to be responsible for project-specific filing. At the firm level, a coordinator familiar with valuation should be designated to oversee filing, regularly reviewing and tracking files to ensure completeness and orderly organization of valuation files.

An illustrative screenshot of a folder structure is shown overleaf.



11.1.5 Physical filing

Much of the same principles and procedures for efficient organization of electronic files apply to physical filing. These include maintenance of a logical structure of folders, moving from general to specific sorting of documents into broad categories and subcategories, clear and unique labelling of files and so on. However, given the physical nature of the files and the fact that only a single file set is typically maintained, other important considerations need to be made with regards file management and location, layout, access and control of the files room or files cabinet, as the case may be (depending on the size of the firm).

The files room or cabinet should be in a secure and central location within the firm's premises that can be conveniently accessed by all that have the right of access. In a large firm, ideally a designated file coordinator should design the filing system, and oversee its implementation including access and file tracking.

Given its versatility and capacity for high-density storage, open shelving in the files room would make for more efficient and economical storage than say, vertical or lateral file cabinets. Moveable open shelves offer even more convenience and space savings but are typically more expensive than fixed ones.

Files within the filing room or cabinet should be arranged in a way that is most suitable for rapid retrieval. It is more practical to arrange valuation files primarily by either geography and/or land reference numbers especially where the land referencing system is predominantly uniform or sequential throughout the area.

Files used should be of sturdy material, such as cardboard files, which are also large enough to accommodate most if not all the contents of a typical valuation work file. The files should have clearly labelled tabs and dividers to facilitate organization and retrieval of documents within the file. A checklist of the file contents, including summary details of the assignment should be kept at the beginning of the file on top of all other documents. To save space and reduce redundancy, documents that are common to more than one work file may be held in a separate file and a cross-reference made within the relevant work files.

Depending on the timing of repeat instructions, and changes in market and sector conditions and in the subject M&E itself, revaluations may use much of the information in the existing work file, warranting only an extension of the file to accommodate latest report and any additional information, but with appropriate cross-references to relevant existing documents.

A files inventory, listing files and their location within the files room or cabinet, should be developed and maintained to facilitate access and retrieval. Separate folios should be considered for more sensitive files.

Similarly, a retention schedule should be maintained, clearly indicating how long a file must be kept, whether the file is archival or purgeable and the guidelines for moving or disposing of the same. Confidential files must be shredded.

Outcards should be used to monitor removal of files or folders from files. Outcards should contain file or folder title, borrower name, and the dates the file was charged out and returned. Whenever it is returned, the file or folder should be checked to see that it is complete, and the outcard removed and replaced with the file or folder. See example of electronic file or folder structure as Appendix O.

11.2 Closing letter

Upon completion of the valuation assignment, it is best practice to send a transmittal letter to notify the client of the fact. The transmittal letter may be part of the final valuation report or it may be a separate document and should be on the firm's letterhead.

Besides asserting that the valuer has completed his contractual obligation, the transmittal letter typically also serves to:

- Recall:
 - o the client, intended use, users, and purpose of valuation and valuation date



o the client's business relationship with the valuer and the general terms governing that relationship exclusive of any unintended users;

- Disclose the scope of work completed for the valuation whilst pointing to any special assumptions or unusual limiting conditions. It is uncommon to restate the value opinion on the transmittal letter particularly if it is issued separately from the final valuation report, otherwise it may be misconstrued as a valuation report. A sample transmission letter is provided in Appendix P.

11.3 Handling client complaints

11.3.1 Introduction

Valuation is a people business which is driven by client trust and confidence in the integrity and quality of the valuer's opinion. Good client service, continual improvement, potential for repeat business and the need to minimize the risk of both reputational damage and financial loss all dictate that valuers welcome and handle client complaints with caution, care and empathy.

CEPC also requires diligent and judicious handling of client complaints:

Article 4-(iii) (4):

The valuer must act responsibly and courteously in all dealings with clients and the public, and respond promptly and effectively to all reasonable instructions and complaints

Client complaints come in many shapes and forms. They may relate to dissatisfaction with any or all of timeliness, quality, scope or outcome of the valuation. The complaints may also be directed to the project leader, senior management or regulatory authorities such as TAQEEM.

No valuer or firm is completely immune to client dissatisfaction. Displeased clients may also share their experience with other existing or potential clients. It is therefore imperative that the valuer or firm has a structured approach to handling complaints directed internally by clients. Clients should be made aware of the existence of such a mechanism at the outset of the assignment. Upon receipt of a client complaint, the valuer should share the approach with the aggrieved client and demonstrate commitment to the approach with a view to resolving client concerns and retaining clients. In fact, diligent handling of complaints may impress some clients more than an error-free valuation.

11.3.2 Complain handling procedures guidelines

The following guidelines represent just some of best practice in valuers' approach to handling client complaints:

1. The complaint handling procedures (CHP) should be commensurate to the size and structure of the firm. Designate senior staff or department to oversee the CHP.
2. Consider the CHP as not just a means to resolving client complaints but also as a tool for learning and continuous improvement. The firm's CHP may also influence future PII costs and cover.
3. The CHP should be agreed with the PII provider so as not to compromise the PII cover.
4. The CHP should be reviewed regularly by senior management and such reviews logged accordingly.
5. All staff should be trained on and have access to the CHP.
6. Disclose the existence of the CHP to clients and especially at the outset of the engagement.
7. Provide and publish more than one means of receiving client complaints e.g. toll-free customer service number, email or through the firm's website.
8. Maintain a complaints' log that allocates and tracks all complaints received and documents how, when and by whom they were handled and resolved.



9. Acknowledge client complaints promptly and appropriately, taking care not to agitate the client or compound the problem in your response. Share the CHP with the client and indicate the person who will be the client's single point of reference and when the client can expect his or her response.

10. Listen very carefully, patiently and objectively to the client's complaint if made on call or in person and establish the basis and motivation of the complaint first. Verify that the caller is a client. Educe specific problems and relevant details from the client. Do not admit any liability at this stage but show empathy and reassure the client of the firm's resolve to investigate and address the root cause of the complaint. If the complaint is likely to give rise to a legal claim, the PII provider should be notified of the complaint.

11. Upon investigation of the complaint, establish the background and specifics of the complaint. Alert, consult and share any written complaint with the valuer(s) whose work is the subject of the complaint with a view that every issue in the complaint is considered and the merits and course of action therefor determined.

a. Evaluate the basis and gravity of the complaint

12. The client must be informed of the outcome of the investigations:

a. Any refutation of the complaint must be reasonably, but tactfully, justified with reference to the terms of engagement, the client's role in the issue if any or to specific circumstances of the relevant valuation task (inspection, research, analysis etc.).

b. If a reasonable basis of the client's complaint is established, and the need to repeat any of the valuation tasks becomes necessary and practicable, such action should be acknowledged and agreed with the client, subject to the provisions of the PII policy.

c. It may as well be that the issue (e.g. client misunderstanding) requires no more than an acknowledgment of the valuer's or firm's flaws, an apology and a resolve to undertake certain stated actions to prevent its future recurrence.

13. If a complaint remains unresolved, the client may escalate it to either Alternative Dispute Resolution (ADR) providers or a court of law, depending on what the CHP stipulates. Most valuers prefer the ADR route. It is thus important that the CHP should provide for alternative dispute resolution to the extent that it is agreed with the PII provider and does not compromise PII cover, and that both parties commit to the CHP at the time of engagement. ADR mechanisms recognized in the KSA are currently limited to arbitration and mediation which are administered under the rules set by the Saudi Center for Commercial Arbitration (SCCA).





APPENDICES



Appendix A - Assignment Log Sample

Appendix B - Interview of Client

INTERVIEW OF CLIENT

Initial interview by: _____ Date of interview _____
(Name of Office personnel conducting interview)

Name of interviewee _____ Referred by: _____

Client name: _____

Mailing address for client ordering report: _____

Phone: _____ Fax: _____

Email Address: _____

Other intended users: _____

Type of Asset:

Buildings and Improvements Land

Fixtures and Fittings IT and Office Equipment

Plant and machinery

Other: _____

Brief physical description: _____

Subject address: _____



Type of Opinion

Valuation

Review

Review with value opinion

Purpose of Valuation:

	Refinance <input type="checkbox"/>	Fin.Reporting <input type="checkbox"/>		Sale <input type="checkbox"/>
Acquisition <input type="checkbox"/>	Litigation <input type="checkbox"/>	Relocation <input type="checkbox"/>	Eminent Domain <input type="checkbox"/>	Bankruptcy <input type="checkbox"/>
		Insurance <input type="checkbox"/>	Accounting	

Other/explain: _____

Date of Valuation: _____

Have we valued the asset before: Y N Date of our valuation:

Items Available for Valuer:

Legal Description/ Title	Y <input type="checkbox"/>	N <input type="checkbox"/>
Source: Floor Plan/Blue Print	Y <input type="checkbox"/>	N <input type="checkbox"/>
Specification	Y <input type="checkbox"/>	N <input type="checkbox"/>
Old Valuation Report	Y <input type="checkbox"/>	N <input type="checkbox"/>
Fixed Asset Register	Y <input type="checkbox"/>	N <input type="checkbox"/>
Insurance Policy	Y <input type="checkbox"/>	N <input type="checkbox"/>
Client's CR ³ certificate	Y <input type="checkbox"/>	N <input type="checkbox"/>
Client's BOD list	Y <input type="checkbox"/>	N <input type="checkbox"/>
Client's Management team	Y <input type="checkbox"/>	N <input type="checkbox"/>
Intended user's CR certificate	Y <input type="checkbox"/>	N <input type="checkbox"/>
Intended user's BOD list	Y <input type="checkbox"/>	N <input type="checkbox"/>
Intended user's Management	Y <input type="checkbox"/>	N <input type="checkbox"/>

Details needed to carry out checks for valuer independence/ conflict of interest as per the Saudi Accredited Valuers' Law, as well as verifications under Saudi Anti-Money Laundering Law

Type of Valuation Report: (check one)

Narrative Form Summary

No. of copies required _____(if report is not to be emailed)

Delivery of Report:

Express Mail: Email to: _____

Pick up by: _____

Courier using: _____ Acct #: _____

Fee Quoted for Valuation: _____

Method of payment for valuation

1. COD Name of person responsible for payment: _____

2. Check will be mailed prior to inspection?

3. Invoice person ordering report?

Approved by Management Y N

If overnight is required please include your account # and preferred company

UPS ARAMEX FEDEX DHL

ACCOUNT # _____

Special instructions:

Client ordered report Y N Date of order

Order followed up with a letter and contract: Y N



Appendix C - Risk Assessment Matrix

RISK ASSESSMENT MATRIX

Ulikelihood	1	2	3	4	5	Impact	Legal/Regulatory	Reputation	Financial	Operational
Unlikely to occur or occur with negligible frequency	Unlikely to occur or occur with low frequency	Could occur or occur with moderate frequency	Likely to occur or occur with a high frequency	Highly likely to occur or occur with a very high frequency	80-100%	1	Breach of internal policy only	Local and short-lived impact	<0.01%	Occasional minor loss and management time
Probability of occurrence within X years	0-20%	20-40%	40-60%	60-80%	80-100%	2	Significant breach of internal policy only	Moderate, regional impact	0.01-0.1%	Frequent minor loss, minimal management time
	Negligible	Low	Medium	Medium	Medium	3	Admonishment	Moderate, national impact	0.1-1.0%	Occasional major loss, moderate management effort
	Low	Medium	Medium	Medium	Medium	4	Reprimand or Censure	Significant, national reputational damage	1.0-10%	Frequent major loss, major management effort
	Medium	Medium	High	High	High	5	Suspension or Expulsion	Major, long-lasting, national damage	>10%	Significant loss and management effort
	Medium	High	High	High	High	5	Breach that could lead to disciplinary action, fines, or revocation of license	Damage to the image of the firm or valuer	Financial loss for the firm (% of average revenues p.a.)	Loss/reduction in business, increased management effort

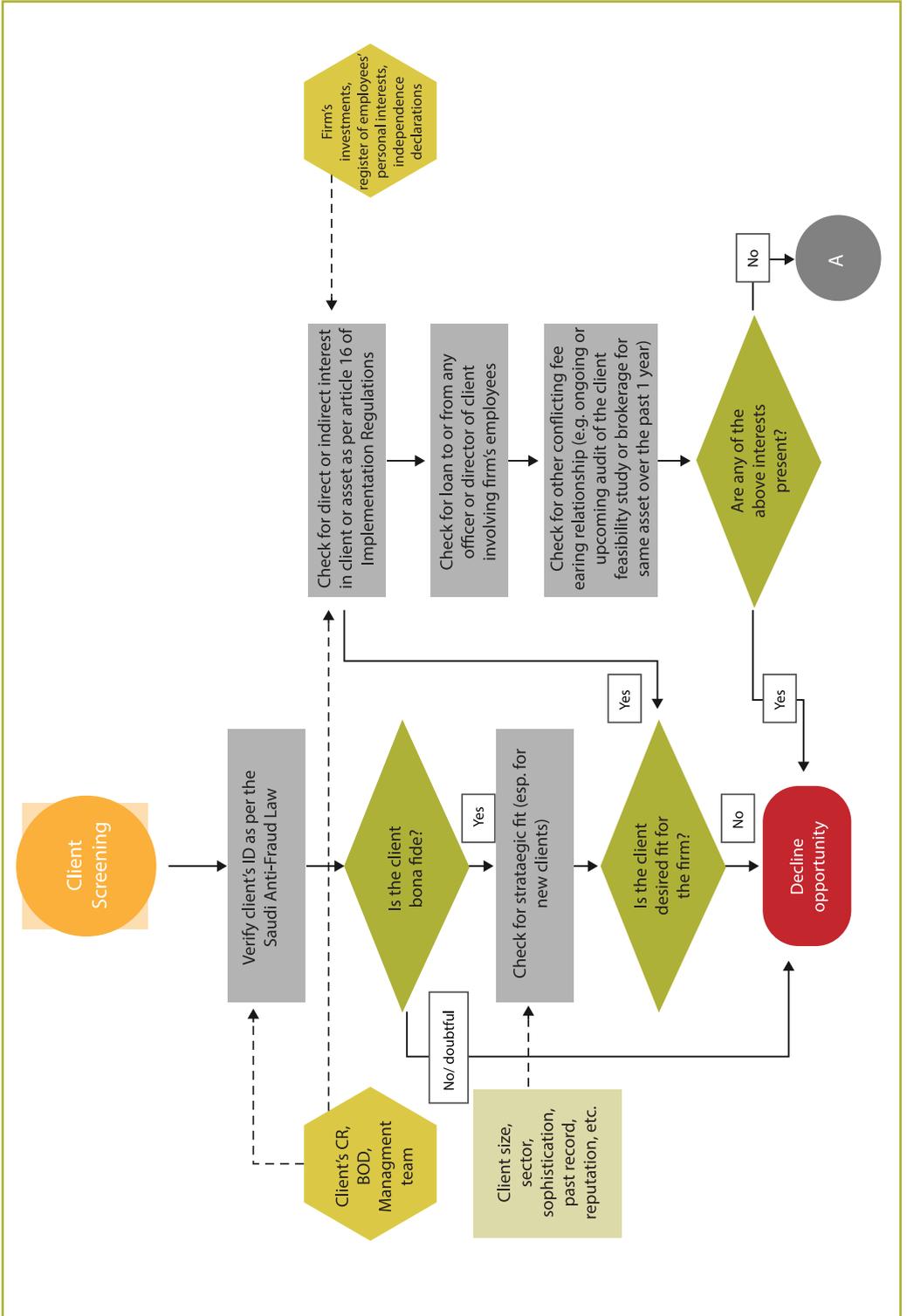
RISK MANAGEMENT TOOLKIT

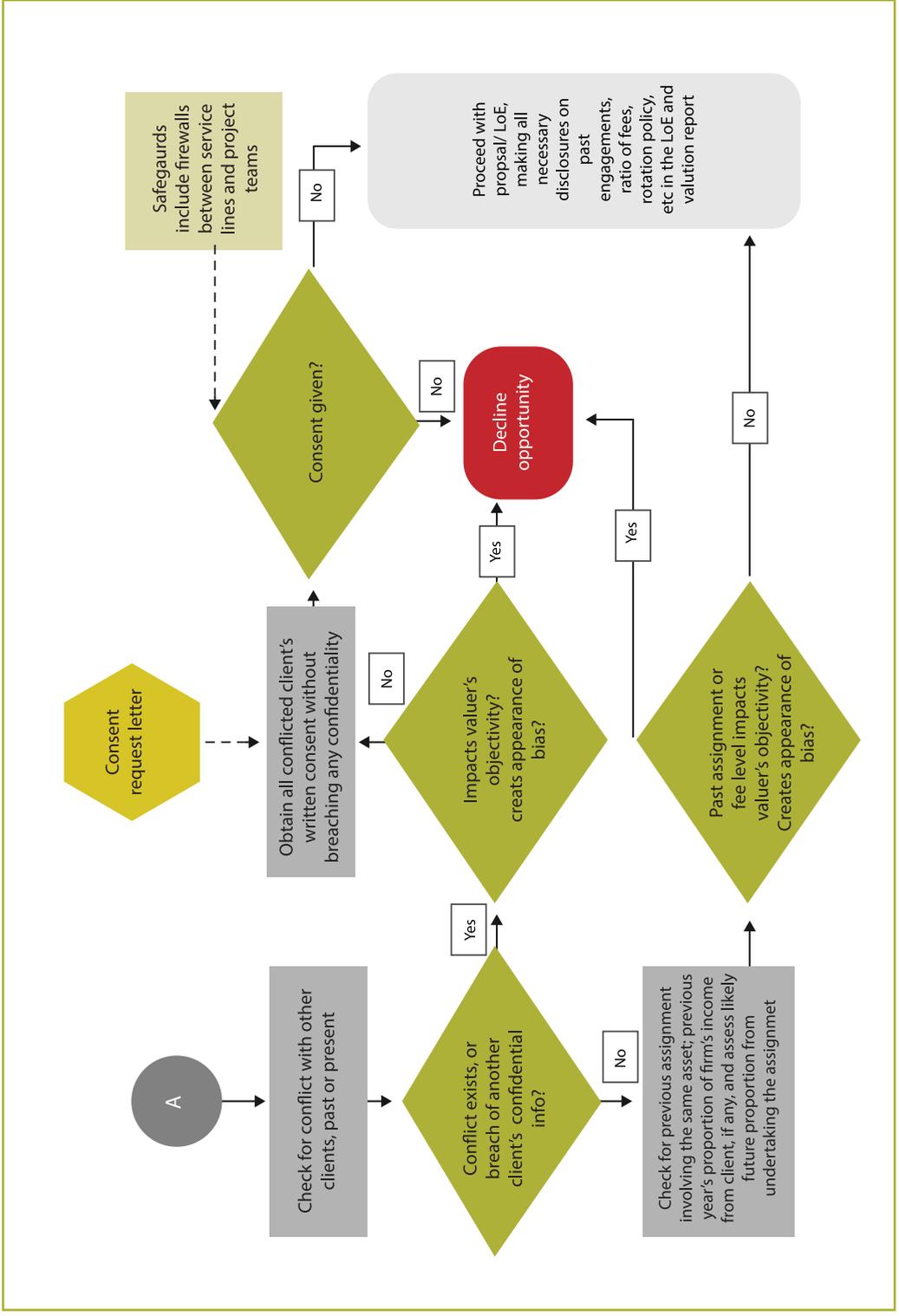
Assignment Name: Delta

CONTROLS LIST

Control	Scope	Crisp	Leakage	Self-interest	Self-review	Client-conflict	Advocacy	Familiarity	Intimidation	Negligence	Confidentiality
Standard terms and conditions	1	1	1	1	1	1	1	1	1	1	2
Client notification and consent	1	1	1	1	1	1	1	1	1	1	2
Disclosure of potential sources of conflict	1	1	1	1	1	1	1	1	1	1	2
Vetting team members	1	1	1	1	1	1	1	1	1	1	2
Chinese walls/ info barriers between service lines	1	1	1	1	1	1	1	1	1	1	2
Internal peer review of valuations	1	1	1	1	1	1	1	1	1	1	2
Periodic (cold) reviews	1	1	1	1	1	1	1	1	1	1	2
Valuer rotation	1	1	1	1	1	1	1	1	1	1	2
NDA letter	1	1	1	1	1	1	1	1	1	1	2
Reference letters	1	1	1	1	1	1	1	1	1	1	2
Training	1	1	1	1	1	1	1	1	1	1	2

Appendix D - Independence and Conflict Check Flow Chart







Appendix E - Sample site visit information request/ checklist

XXX Corporation - Project X **Valuation of certain tangible fixed assets of XXX Limited** **Property, plant & equipment** **Information Request**

We have set out below areas we would like to discuss and information necessary to obtain to facilitate the provision of valuation advice. We recognise that some information may not be readily available, if this is the case, please let us know, so that we can work together to obtain sufficient information for the completion of our analysis.

General information

1. History and ownership of the facilities
 2. Legal entities that apply to the facility
- Financial information
3. Fixed asset registers for each facility, in Excel format including the following information:
 - a) Asset number
 - b) Location
 - c) Asset class / accounting classification
 - d) Quantity
 - e) Asset description
 - f) Manufacturer, model, serial number (where available)
 - g) Historical / original cost (to the original owner)
 - h) Historical acquisition date
 - i) Net book value and / or accumulated depreciation
 - j) Accounting lives per asset category
 4. Reconciliation of the cost and net book value of the fixed asset listings to the consolidated balance sheet / financial records as possible to the valuation date.

5. Details of projects and equipment held in construction in progress account and the balance of the account as at or near as possible to the valuation date.
6. Confirmation that all assets are stated at their historical acquisition cost and date, or identification of assets that have been adjusted following purchase accounting.
7. Identification of assets acquired in used condition, or transferred from alternative facilities, and the corresponding accounting treatment regarding capitalisation of cost.
8. How are asset useful lives determined – engineering input? Are they consistent across entities?
9. Is there one set of accounting lives per asset class or does each entity have their own reflecting respective asset facilities?
10. How often are lives reviewed?
11. Is past experience of asset retirement reflected in determining and updating asset lives?
12. Are equipment vendor estimates and practices used in determining asset lives?
13. When was the last FAR verification exercise conducted for each entity and what's the frequency on verification exercises?
14. Average transfer time of assets under construction (work in progress) into fixed assets – X months?

Technical information

15. Identification & description of different manufacturing processes or facilities.
16. Facility layout / process flow diagram / equipment layout on a product class basis
17. Technical / inventory listing of principal production assets including:
 - Manufacturer
 - Model
 - Capacity / specification
 - Description
 - Serial number (where available)
 - Year of manufacture/installation
 - Estimated useful life
 - Estimated remaining useful life



18. Rated production design capacity by product class for the facility or process:

- Actual production volumes for 2013, 2014, and 2015 year to valuation date
- Future planned projected volumes (if available)
- Facility utilisation metrics

19. Operations - shifts per day / days per week

20. Major equipment/process bottlenecks and/or over capacity issues.

21. Classification of machinery & equipment

- Process equipment by product class – solids, liquids, topical solutions, sprays
- Storage tanks / vessels
- Filling equipment
- Packaging equipment
- Laboratory instrumentation
- Utilities
- Logistics – warehouse / vehicles

22. Recent history & anticipated major process/equipment changes:

- New equipment
- Major overhauls, refurbishments, repairs, re-builds, facility re-engineering / re-configuration
- Recent & planned equipment retirements or disposals
- Future projects including details of budgeted capital expenditure, equipment to be installed
- Recent transfers from and anticipated transfers to other facilities
- Identification of idle processes or equipment

23. Discussion of any potential environmental liabilities / issues.

Real Estate

Below is a list of information required in order to assist us with providing our valuation advice for real estate valuation, especially if concurrent with an M&E valuation exercise:

24. Land

- Identification of properties
- Location details
- Identification of land parcels and area (sq. ft or sq. m)
- Ownership & title (leasehold & freehold)

25. Buildings

- Identification & name of buildings
- Construction types of buildings if applicable e.g. light industrial, heavy industrial etc.
- Fit out (fire suppression, heating, ventilation, air conditioning security features, pressurised areas, cleanrooms)
- Purpose of building areas (administration, production, warehouse)
- Floor plan / construction plan / legal title plans for both site and buildings
- Building areas (sq. m or sq.)
- Number of storeys & storey height
- Eave heights
- Year of construction or estimated age of buildings & extensions

26. Modern Equivalent Asset – size (sq. m or sq.ft) & location

- Bespoke facility by layout and location – costs to replicate in empty shell greater than cost to construct a new facility?
- Land & Buildings which are surplus to requirements – are these disposable in isolation?

27. Site improvements

- Construction type
 - Car parking, lighting, barriers, landscaping
- Number or area (sq. m or sq.ft) of site improvements
- Estimated year of construction

28. Environmental liabilities and associated assets

Previous real estate valuation reports or insurance assessment



Appendix F– Sample Fee Estimation

Appendix G – Sample Proposal Template

Insert particular assignment subject asset(s)

Slide 1

Proposal Title

Date

Slide 2

Submission Letter

- Draft on firm's official letterhead complete with address and commercial registration number
- Address to the Client (to the attention of the contact person or the recipient stipulated in the RFP)
- May contain unique reference number of the subject proposal
- Acknowledge and reference the Client's RFP or email/ call/ meeting by subject, date and ref number where given
- Highlight the firm's preparedness and competitive edge to address the Client's requirements as explained in the ensuing proposal
- State whether the technical and financial proposals are provided as one document or separately
- Affirm the firm's willingness to engage with the Client on the latter's business terms as may be contained in the RFP, the firm's terms as provided in the proposal or suggest negotiation of some of either party's terms
- State the name, title and contact of the consultant who would provide clarification/ follow up Client feedback about the proposal
- Signature, name and title of the person who would typically be also the one signing off the engagement once the firm is appointed such as the firm's CEO, managing partner or service line leader

2



Slide 3

Table of Contents

Section	Page #	Suggested length
Technical Proposal		
Executive Summary	4	1-2 pages
Firm Profile	5	1-3 pages
Defining the Problem	6	1-2 pages
Approach and Methodology	7	2-3 pages
Project Team	8	1-2 pages
Project Calendar / Timeline	9	1-2 pages
Credentials	10	1-3 pages
Financial Proposal	11	1-2 pages
Appendices	12	2-4 pages
Disclaimer	13	1-2 pages

Confidential- All Rights Reserved- Firm name

Proposal Title

3

Slide 4

Executive Summary

- Project background
 - Brief description of the client, subject and purpose of valuation and any other intended users
- State the purpose of the proposal
- Provide a summary of valuer's proposed approach including outline of the scope, methodology and project duration
- Brief profile of the firm, designated team, experience (with particular reference to similar engagements), quality standards and USPs
- Explain the organization of the proposal
- The Executive Summary provides an overview of the proposal and should be the last section to be drafted

Confidential- All Rights Reserved- Firm name

Proposal Title

4

Slide 5

Firm Profile

- State ownership of the firm in terms of company, partnership, proprietorship
- Describe firm's major business activities and state its locations
- Provide a brief history of the firm, past relevant accomplishments and major clients (subject to any confidentiality restrictions)
- Identify the firm's professional affiliations, values, ethical standards, quality program, industry awards and thought leadership

Slide 6

Defining the Problem

- State the valuer's understanding of the Client's problem by identifying the:
 - Client
 - Intended user(s)
 - Asset and interest to be valued
 - Purpose of valuation
 - Basis of value
 - Valuation date and currency
 - Significant assumptions
- Subject to information at hand or specifically researched for the proposal, contextualize the problem in terms of market highlights and trends, statistics, regulation (e.g. move to IFRS, mortgage law, White Land Tax and timelines) etc.



Slide 7

Approach and Methodology

- Discuss (or at a minimum, state) the following:
 - The extent to which the subject property will be inspected and measured
 - Nature and extent of investigations to be undertaken including planning enquiries, title search, macro-economic data, market study and comparable data (listings and/or sales/ rentals)
 - Nature and sources of information (primary versus secondary, verification or limitations thereof)
 - Valuation methods to be applied
 - Standards to be complied with
 - Type and number of reports to be delivered
- Indicate the Client's role, if any, in facilitating the above scope of work including when and what information would be required from the Client

Slide 8

Project Team

- State and profile the valuer(s) and analyst(s) proposed for the assignment in terms of their role in the firm and in the assignment, designations, qualifications and experience
- Provide the team structure including a highlight of those team members responsible for Client contact, report review and sign-off
- Provide contacts of key team members for follow up of proposal and those expected to drive the project

Slide 9

Project Calendar / Timeline

- Outline the time expected (in days, weeks or months) to complete the various aspects of the scope of work (milestones) and to submit both the draft and final valuations (including planned meetings and reviews)
- Provide any caveats (e.g. exclusions of public holidays, Client delays in availing documents or comments, unforeseen events etc)
- Depending on the complexity of the assignment (such as one involving a portfolio with diversified assets, plant and equipment, multiple work streams etc) it may be prudent, if not necessary, to propose a detailed project management and governance process and plan

Slide 10

Credentials

- Provide case studies or brief descriptions of relevant project experience (without compromising clients confidentiality)
- Provide Client references (subject to consent from referees)



Slide 11

Financial Proposal

- Depending on the provisions of the RFP, outline the proposed:
 - Professional fees:
 - As a total lumpsum/ flat fee (most common)
 - On a uniform hourly rate basis
 - On a variable hourly rate based on the seniority of team members or pegged to specific tasks
 - 'Out-of-pocket' expenses to be billed at cost to Client but capped to a certain amount to cover travel, accommodation, courier, translation etc
 - Payment schedule and terms
 - Provisions for:
 - Out-of-scope services
 - Assignment cancellation, expense reimbursement and prorating of fees

Slide 12

Appendices

- Appendices containing lists of tables and detailed information, exhibits (e.g. CRE, PII certificate, Zakat certificate), firm's standard terms and conditions of business and other important references made in the proposal

Slide 13

Disclaimer

- Indicate:
 - A list of exceptions, or what the proposal does not include, especially with reference to the RFP, and reasons for such exclusions
 - Proposal's validity period
 - Proposal access restrictions
 - Copy right restrictions
 - Limitations on accuracy, completeness or correctness of any private or public information used in the proposal



Appendix H – M&E related Sample Letter of Engagement

Private and confidential

[INSERT DATE]

[company name]

Your ref: [INSERT]

Attention: [Insert name of individual and title]

Our ref: [INSERT]

[Insert client address]

Modify to include / exclude intangibles if part of wider PPA valuation etc.

Direct Line: xxxx:

Email: xxx

Dear []

[Client / target / project name, as most appropriate for circumstances]

Accounting for acquisition in accordance with IFRS3

Thank you for choosing XXX (“we”) to perform certain professional services (the “Services”) for [Legal name of Client] (“you” or “Client”), relating to the valuation of certain identifiable [intangible and tangible] assets in relation to the acquisition of [Subject] effective as of [Valuation Date] (the “Valuation Date”). The valuation has been requested in connection with accounting for the acquisition in accordance with International Financial Reporting Standard number 3 (“IFRS 3”), Business Combinations. We appreciate the opportunity to assist you and look forward to working with you.

This cover letter, together with all of its appendices, exhibits, schedules and other attachments (collectively, this “Agreement”), describes and documents the arrangements between us, including our respective obligations. The scope of the Services is set out in the Statement of Work at Appendix A, together with details of our fees and billing arrangements. Any additional terms and conditions specific to the Services are set out in Appendix B, including restrictions on the disclosure and use of our advice and reports.

Please sign and return the enclosed copy of this Agreement to confirm your agreement with these arrangements and return it to me at your earliest convenience. If you have any questions about these arrangements, please contact [insert contact person’s name and telephone number].

[Yours sincerely/faithfully]

[Name]

[Director / Partner]

AGREED

[Legal name of Client entity]

By (Authorised Representative):

Signature: _____

By: [Name and Title] _____

Date _____



Appendix A – Statement of work

Appendix B – General terms and conditions

Appendix C – Initial request for information

Scope of work

Scope of the Services

You have instructed us to consider the valuation of certain identifiable [intangible and tangible] assets in relation to the acquisition of [Subject] effective as of [Valuation Date] (the “Valuation Date”). The valuation is required in connection with accounting for the acquisition in accordance with International Financial Reporting Standard number 3 (“IFRS 3”), Business Combinations

We will: [delete any points that are not relevant]

- [Assist management in the identification of significant intangible assets and appropriate valuation approaches;]
- [Value the identified intangible and tangible assets;]
- [Assist management in determining appropriate useful economic lives for the relevant intangible assets for financial reporting purposes;]
- [Advise management with regard to the identification of Cash Generating Units (“CGUs”) and allocating the relevant values to the appropriate basis.]

Further explanation is provided below. Our role is to provide you with advice and recommendations for your consideration. We will not perform any management functions or make any management decisions.

As the engagement progresses, you may decide that you wish to vary the scope of work. We will discuss such matters with you and any changes to the scope of work will be agreed between us in writing.

Limitations to Scope

We will not, except to such extent as you request and we agree in writing, seek to verify the accuracy of the data, information and explanations provided by yourselves, and you are solely responsible for this data, information and explanations. We will therefore rely on the information provided by you to be accurate and complete in all material respects.

The valuation will be provided to you for the above purpose only and should not be used or relied upon for any other purpose, nor should it be disclosed to, or discussed with, any other party without our prior consent in writing, save as set out in Section 12 of the attached terms of business.

Purpose

The results of our work will be used solely for the purposes of assisting [Client]'s management in its allocation of the total purchase price of [Subject] for financial statement reporting purposes according to IFRS 3.

Basis of valuation

According to IFRS 3, the standard/premise of value to be used in the application of purchase accounting rules is Fair Value. The Standard defines Fair Value as:

“The amount for which an asset could be exchanged or a liability settled, between knowledgeable, willing parties in an arm’s length transaction.”

With effect from 1 January 2013 paragraph 9 of IFRS13 defines Fair Value as: “the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date”.

at the measurement date”.

[TAKE CARE TO USE THE CORRECT DEFINITION OF FAIR VALUE.]

This will be the definition of value that we will apply in the provision of the Services.



Identification of intangible assets

IFRS 3 provides examples of intangible assets that meet the criteria for recognition of an intangible asset that is legal, contractual and/or separable from goodwill. It should be noted that assets listed therein are examples of assets that may meet the criteria for asset recognition as set forth in IFRS 3, and the identification of intangible assets in each individual business combination should be based on the facts and circumstances prevailing as of the Valuation Date.

We will read the due diligence report prepared by [] and [other documents e.g. press announcement, investment committee papers, board papers] and discuss the transaction with you in order to identify intangible assets which may meet the valuation criteria. However, ultimately the identification of the intangible assets will be decided by [Client] and its auditors.

The significant intangible assets likely to arise from the acquisition of [Subject] have been discussed with [Client]'s management as listed below:

Identified intangible assets

[Modify as appropriate] [Based on our preliminary discussion with [Client] management we understand that the potential intangible assets of [Subject] that may be recognised for IFRS reporting purposes include:

- [list]]

However it is possible that further intangible assets may be identified once we commence our work. In this instance will inform management and agree any additional work required.

Valuation

In the context of the valuation of an asset there are, broadly speaking, three different approaches, which are:

- Income-based approaches;
- Market-based approaches; and
- Cost-based approaches.

While each of these approaches is usually considered in the initial valuation of an asset, the nature and characteristics of the asset will determine the most applicable approach/approaches in a particular set of circumstances.

For each of the assets identified above we will provide our views on the most appropriate valuation approach in the form of a paper and agree with you which assets are to be valued, on what basis and what information will be required to perform the valuation.

We do not intend to assess the fair value of any [assets] and liabilities (including pensions and contingent liabilities not identified above).

The excess of the cost of [Subject] over the net of the amounts assigned to assets acquired and liabilities assumed should be recognised as goodwill.

Remaining useful lives analyses

In order to determine the remaining useful lives (“RUL”) of the assets identified, we will consider the factors presented in IAS 38 paragraphs 88 to 96. We will consider the facts pertinent to each asset that we estimate the fair value of and assist management with their determination of the RUL for each intangible asset category identified.

Cash generating units [select appropriate paragraph]

IAS 36 (paragraph 80) requires that “for the purpose of impairment testing, goodwill acquired in a business combination shall, from the acquisition date, be allocated to each of the acquirer’s cash-generating units (“CGUs”), or groups of cash-generating units, that are expected to benefit from the synergies of the combination, irrespective of whether other assets or liabilities of the acquiree are assigned to those CGUs or groups of CGUs. Each CGU to which the goodwill is so allocated shall:

- (a) represent the lowest level within the entity at which the goodwill is monitored for internal management purposes; and
- (b) not be larger than an operating segment as defined by paragraph 5 of IFRS 8 Operating Segments before aggregation.”

[We understand that [Client] intends to treat [Subject] as [number] separate cash generating units, and that the allocation of the purchase price, fair values of the intangible assets and goodwill shall reflect this.]



[We understand that [Client] intends to allocate all of the acquired assets and goodwill to one single cash generating unit. Consequently, our valuations will be presented for the Transaction as a whole and will not be broken down into, for example, separate legal entities or countries.]

Conduct of the Services

Assignment team

This assignment will be conducted under the direction of [Name of Engagement Partner] as a Partner in the XXX team at XXX. They will be assisted by [Name of Engagement Manager] who is an [rank] in the XXX team at XXX, who will have day-to-day responsibility for the intangible asset valuation work.

[Name of Review Partner], a Partner in the XXX team at XXX, will be Review Partner on this assignment

Timetable

We will commence work [immediately / immediately on confirmation from you that the terms of the assignment as set out in this letter are accepted / or on [Insert Date]] and we will aim to report our opinion of value no later than [X weeks from the receipt of all pertinent information or on [Insert Date]]. In order to meet this timetable we will need timely access to management and the receipt from you of the necessary information. Receipt of information is expected within [14] days of acceptance of this letter. As you will appreciate, however, any such timetable is based on the assumption that we will receive the appropriate co-operation and assistance. If we do not, however, then we cannot be held responsible for any delays.

We will notify you as soon as practicable if it appears likely that there will be any significant delays in the above timetable.

Fees

[EITHER (where fees are on the normal time basis): I would refer you to the section 1 of the Fees – additional terms and conditions below for an explanation of our basis of charging and other matters related to our fees and invoicing arrangements. If appropriate, include details of any fee estimates, fee caps (e.g., where we need to contact the client and agree the way forward if the fee reaches a set figure) etc. If an estimate is supplied, include the following wording: As this is an estimate, however, our fees may be more or less than this amount.]

[OR (where there is an agreed basis of billing): As agreed we will bill you on the following basis for the work set out above under “Scope of services”. Provide details of agreed fee basis (e.g., time spent at annually agreed rates, cost per unit of output), amounts and timings of bills. Any fees for additional work will be calculated on a time basis in accordance with section 1 of the Fees – additional terms and conditions below, unless otherwise agreed.]

[OR (where there is an agreed fixed fee): As agreed our fee for the work set out above under “Scope of services” will be [provide details of the fee agreed with the client including a provision for a payment up front where appropriate. Make sure that you define precisely what is included and what is not included in the fixed fee]. Please refer to Invoicing Arrangements below for details of the billing schedule. Any fees for additional work will be calculated on a time basis in accordance with section 1 of the Fees – additional terms and conditions below, unless otherwise agreed.]

[IF APPROPRIATE, include the following wording. We have assumed in this regard that historical and forward looking financial information to be supplied to us will not require any substantial processing in the form of, for example consolidation, de-consolidation or reconciliation; and that prospective information can be easily bridged against historical data. If that is not the case, we will initiate a discussion regarding whether you will perform the required processing of the information or whether you would like us to perform such analysis. We would discuss the consequent impact on the fee estimate with you if such a situation arises.]



Fees – additional terms and conditions

Our fees are subject to the provisions set out in the General Terms and Conditions contained in Appendix B and to the following additional terms and conditions.

1. Except to the extent that more specific fee arrangements are stated above, our fees will be based on:
 - The number and seniority of staff required
 - The degree of skill and responsibility involved
 - The resources required to complete the Services
 - The fee rates for the appropriate personnel
2. Any fee estimate agreed with you is necessarily based on the assumption that the information required for the Services is made available in accordance with agreed timetables and we have access to you and your key staff as required. If delays or other unanticipated problems which are beyond our control occur this may result in additional fees for which invoices will be raised, including where we need to carry out substantial further work due to changes in law or tax authority practice.
3. If at any point you decide to terminate this engagement, we will be entitled to charge you for any unbilled work that we have undertaken up to the date of termination, in accordance with the General Terms and Conditions.

Invoicing arrangements

[Unless invoices are for pre-agreed amounts or timing is subject to completion of activities, insert the following]

We will issue an invoice every 30 days with our first invoice being issued [as we commence work/ after the first 30 days' work] and our final invoice being issued on completion of the Services. Expenses and any applicable taxes will be added to each invoice as incurred.

[In all cases, insert the following]

Invoice amounts will be based on [pre agreed amounts as set out below/ our best estimate of work undertaken in the next [30] days adjusted for variances in the previous month/ work completed in the last [30] days.]

[If invoices are for pre-agreed amounts or timing is subject to completion of activities, insert the following]

Invoices will be issued in accordance with the following schedule:

	[Invoice date/ Activity date]	Invoice value (for time costs only) <i>[Delete column if invoicing amounts not known]</i>	Activity description <i>[Delete column if invoicing on agreed dates]</i>
Invoice 1	Work commencement date	SAR[x]	E.g. Report issued to third party
Invoices 2 – [x]*	[X]th of each month (mmm/yy – mmm/yy)	SAR[x] per invoice	
Final invoice	[Completion date]	SAR [x]	E.g. Transaction completion

* [Add more lines for each invoice as required]

Payment

Invoices are payable immediately upon presentation.

Information requirements

All information (which we reasonably request given our scope of work) will be provided to us within a mutually agreeable period of time. We attach as Appendix C an initial information list and suggested timetable. As we become aware of the need for further information we will discuss this with you.

In respect of all our work we will be reliant on the accuracy and completeness of the underlying information that you supply to us. We will not be auditing or otherwise verifying this information and therefore will not check the accuracy of the information or any explanations provided, which your auditors may seek to subsequently do. We will not express any opinion on the information provided to us including any profit forecasts or views of future prospects, and responsibility for these matters remains entirely the responsibility of the management of [Client and/or Subject].



If you are not able to provide us with any of the information we have requested, this may affect our ability to conclude our valuation in the terms indicated above or at all. We will inform you of any restrictions to our valuation or the reliance which may be placed on it as a result of incomplete information. [OR ...Alternatively, if we are required to undertake additional work to source information from other sources or to undertake additional analysis not envisaged in our original scope of work, we may have to revise our estimate of fees. We will discuss additional fees with you, if such a situation arises].

In addition to the evidence supplied, our valuation will be based on discussions with management and our own research into the market and industry within which [Subject] operates.

Presentation of results

The results of our work will be documented in a single narrative report (“Report”) outlining the valuation methodologies and conclusions. The report will also detail appropriate RULs for the [intangible and tangible] assets identified.

The valuation and our recommendations will be provided to you for the Purpose only and must not be used or relied upon for any other purpose, and the Report must not be disclosed to, or discussed with, any other party without our prior written consent.

We will meet with you to discuss our draft report before finalising the Report.

Any summary of, or reference to, the Report or any oral presentation in relation to the Report, any submission of the Report, in whole or in part, to anyone who is not the authorised representative of [Client] [and only where we are engaging with the Group, then] [or its subsidiaries] [if include “or its subsidiaries” they should be specifically identified in an appendix. However, for each engagement we should consider whether to include reference to such subsidiaries and if so, to specify them] will be subject to our prior review and written approval. Our recommendations and the Report cannot be used other than for the Purpose.

Informal oral comments made in discussions with you or presentations to you about any Report will not have any greater significance than explanations or other material contained in the Report and reliance should only be placed on information and comments set out in the final Report.

During the course of this assignment, we may provide status reports or show drafts of our Reports to you. This is done on the basis that they are provided to inform you of progress and significant findings identified to date, and draft Reports are subject to revision and alteration as further work is performed or further information received.

By its very nature valuation work cannot be regarded as an exact science and the conclusions arrived at in many cases will necessarily be subjective and dependent on the exercise of individual judgment. There is therefore no indisputable single value and we normally express our assessment of value as falling within a likely range. [However, for the purpose of this assignment, we will report a single value for [XXX] that fall[s] within our recommended value range[s]]. Although the recommendations expressed in our Report will be based on methods and techniques that we consider appropriate under the circumstances, we cannot guarantee that such values or ranges of value will be accepted by other parties.

Use of name

Notwithstanding section [48] of the General terms and conditions, XXX and other XXX entities may use your name as reasonably necessary to perform the Services and in correspondence, including proposals, from XXX or other XXX entities to you. [In addition, they may disclose to present or prospective clients, or otherwise in marketing materials, that they have performed the Services for you, and may use your name solely for that purpose, in accordance with applicable professional obligations



Appendix B

General terms and conditions

Our Relationship with You

1. We will perform the Services using reasonable skill and care.
2. We are a member of the (“XXX Firms”), each of which is a separate legal entity.
3. We will provide the Services to you as an independent contractor and not as your employee, agent, partner or joint venturer. Neither you nor we have any right, power or authority to bind the other.
4. We may subcontract portions of the Services to other XXX Firms, who may deal with you directly. Nevertheless, we alone will be responsible to you for the Reports (as defined in Section 11), the performance of the Services, and our other obligations under this Agreement.
5. We will not assume any management responsibilities in connection with the Services.

Your Responsibilities

6. You shall assign a qualified person to oversee the Services. You are responsible for all management decisions relating to the Services.
7. You shall provide (or cause others to provide) to us, promptly, the information, resources and assistance (including access to records, systems, premises and people) that we reasonably require to perform the Services.
8. To the best of your knowledge, all information provided by you or on your behalf (“Client Information”) will be accurate and complete in all material respects. The provision of Client Information to us will not infringe any copyright or other third-party rights.

9. We will rely on Client Information made available to us and, unless we expressly agree otherwise, will have no responsibility to evaluate or verify it. We shall not be treated as having notice of information which may have been provided to XXX Firms or XXX Persons (as defined in Section 21) who are not involved in this engagement.

10. You shall be responsible for your personnel's compliance with your obligations under this Agreement.

Our Reports

11. Any information, advice, recommendations or other content of any reports, presentations or other communications we provide under this Agreement ("Reports"), other than Client Information, are for your internal use only (consistent with the purpose of the particular Services).

12. You may not disclose a Report (or any portion or summary of a Report), or refer to us or to any other XXX Firm in connection with the Services, except:

- (a) to your lawyers (subject to these disclosure restrictions), who may review it only in connection with advice relating to the Services,
- (b) to the extent, and for the purposes, required by law (and you will promptly notify us of such legal requirement to the extent you are permitted to do so),
- (c) to other persons (including your affiliates) with our prior written consent, who may use it only as we have specified in our consent, or
- (d) to the extent it contains Tax Advice, as set forth in Section 13.

If you are permitted to disclose a Report (or a portion thereof), you shall not alter, edit or modify it from the form we provided.

An "affiliate" of an entity (for the purpose of this Agreement) shall mean an entity or individual that controls, is controlled by, or is under common control with, the first entity, and "control" means the ability to direct the policies or operations of an entity, whether by contract, ownership of equity interests, or otherwise.



13. You may disclose to anyone a Report (or any portion thereof) solely to the extent that it relates to tax matters, including tax advice, tax opinions, tax returns, or the tax treatment or tax structure of any transaction to which the Services relate (“**Tax Advice**”). With the exception of tax authorities, you shall inform those to whom you disclose Tax Advice that they may not rely on it for any purpose without our prior written consent.

14. You may incorporate into your documents our summaries, calculations or tables based on Client Information contained in a Report, but not our recommendations, conclusions or findings. You must assume sole responsibility for the contents of those documents and you must not externally refer to us or any other XXX Firm in connection with them.

15. You may not rely on any draft Report. We shall not be required to update any final Report for circumstances of which we become aware, or events occurring, after its delivery.

Limitations

16. You (and any others for whom Services are provided) may not recover from us, in contract or tort, under statute or otherwise, any amount with respect to loss of profit, loss of data or damage to goodwill, or any consequential, incidental, indirect or special loss in connection with claims arising out of this Agreement or otherwise relating to the Services, whether or not the likelihood of such loss or damage was contemplated.

17. Our liability to you in respect of breach of contract or breach of duty or fault or negligence or otherwise whatsoever arising out of or in connection with this Agreement and the Services shall be limited in total to our fee or SAR[or **if other amount**] or in connection with this Agreement and the Services.

Where there is more than one party to this Agreement (other than us), the limit of liability will have to be allocated among you. It is agreed that, save where an allocation is expressly agreed between you and stated in the Statement of Work, the limit of liability will be allocated such that you will each have an equal share of it. You shall not dispute the validity, enforceability or operation of the limit of liability on the ground that no allocation was expressly stated in the Statement of Work.

18. If we are liable to you (or to any others for whom Services are provided) under this Agreement or otherwise in connection with the Services, for loss or damage to which any other persons have also contributed, our liability to you shall be several, and not joint, with such others, and shall be limited to our fair share of that total loss or damage, based on our contribution to the loss and damage relative to the others' contributions. No exclusion or limitation on the liability of other responsible persons imposed or agreed at any time shall affect any assessment of our proportionate liability hereunder, nor shall settlement of or difficulty enforcing any claim, or the death, dissolution or insolvency of any such other responsible persons or their ceasing to be liable for the loss or damage or any portion thereof, affect any such assessment.

19. You shall make any claim relating to the Services or otherwise under this Agreement no later than 3 years after the act or omission alleged to have given rise to the claim.

20. The limitations in Sections 16 to 19 will not apply to any liability (including vicarious liability) for death or personal injury or arising as a result of fraud on our part nor to any liability which cannot lawfully be excluded or limited.

21. You may not make a claim or bring proceedings under this Agreement or otherwise relating to the Services against any other XXX Firm or our or its subcontractors, members, shareholders, directors, officers, partners, principals or employees ("XXX Persons"). You shall make any claim or bring proceedings only against us.

Indemnity

22. To the fullest extent permitted by applicable law and professional regulations, you shall indemnify us, the other XXX Firms and the XXX Persons against all claims by third parties (including your affiliates) and resulting liabilities, losses, damages, costs and expenses (including reasonable external and internal legal costs) arising out of a third party's use of or reliance on any Report (including Tax Advice) disclosed to it by or through you or at your request. You shall have no obligation hereunder to the extent that we have specifically authorized, in writing, the third party's reliance on the Report.



Intellectual Property Rights

23. We may use data, software, designs, utilities, tools, models, systems and other methodologies and know-how (“**Materials**”) that we own in performing the Services. Notwithstanding the delivery of any Reports, we retain all intellectual property rights in the Materials (including any improvements or knowledge developed while performing the Services), and in any working papers compiled in connection with the Services (but not Client Information reflected in them).

24. Upon payment for the Services, you may use any Materials included in the Reports, as well as the Reports themselves as permitted by this Agreement.

Confidentiality

25. Except as otherwise permitted by this Agreement, neither of us may disclose to third parties the contents of this Agreement or any information (other than Tax Advice) provided by or on behalf of the other that ought reasonably to be treated as confidential and/or proprietary. Either of us may, however, disclose such information to the extent that it:

(a) is or becomes public other than through a breach of this Agreement,

(b) is subsequently received by the recipient from a third party who, to the recipient’s knowledge, owes no obligation of confidentiality to the disclosing party with respect to that information,

(c) was known to the recipient at the time of disclosure or is thereafter created independently,

(d) is disclosed as necessary to enforce the recipient’s rights under this Agreement, or

(e) must be disclosed under applicable law, legal process or professional regulations. You agree that if you receive any request under government statutory powers (as you are subject to them) for disclosure of information provided by us, you will promptly notify us of such request prior to any disclosure.

If circumstances arise such that we disclose information to government security agencies, we shall have no liability to you as a result of any suspension or termination of the Services.

26. Either of us may use electronic media to correspond or transmit information and such use will not in itself constitute a breach of any confidentiality obligations under this Agreement.²⁷ Subject to applicable law, we may provide Client Information to other XXX Firms, XXX Persons and external service providers of XXX, other XXX Firms, or XXX Persons (“**Service Providers**”) who may collect, use, transfer, store or otherwise process it (collectively “**Process**”) in various jurisdictions in which they operate for purposes related to:

- 1) the provision of the Services;
- 2) complying with regulatory, and legal obligations to which we are subject;
- 3) conflict checking;
- 4) risk management and quality reviews; and
- 5) our internal financial accounting, information technology and other administrative support services (collectively “**Processing Purposes**”). We shall be responsible for maintaining the confidentiality of Client Information regardless of by whom such Information is Processed on our behalf.

28. With respect to any Services, if U.S. Securities and Exchange Commission auditor independence regulations apply to the relationship between you or any of your associated entities and any XXX Firm, you represent, to the best of your knowledge, as of the date of this Agreement, that neither you nor any of your affiliates has agreed, either orally or in writing, with any other advisor to restrict your ability to disclose to anyone the tax treatment or tax structure of any transaction to which the Services relate. An agreement of this kind could impair an XXX Firm’s independence as to your audit or that of any of your affiliates, or require specific tax disclosures as to those restrictions. Accordingly, you agree that the impact of any such agreement is your responsibility.



Data Protection

29. For the Processing Purposes referred to in Section 27 above, we and other XXX Firms, XXX Persons and Service Providers may Process Client Information relating to identified or identifiable natural persons (“Personal Data”) in the KSA and/or various other jurisdictions in which they operate

30. You warrant that you have the authority to provide Personal Data to us in connection with the performance of the Services and that any Personal Data provided to us has been processed in accordance with applicable law.

Fees and Expenses Generally

31. You shall pay our professional fees and specific expenses in connection with the Services as detailed in the [Cover Letter] [applicable Statement of Work]. You shall also reimburse us for other reasonable expenses incurred in performing the Services. Our fees are exclusive of taxes or similar charges, as well as customs, duties or tariffs imposed in respect of the Services, all of which you shall pay (other than taxes imposed on our income generally). Unless otherwise set forth in the applicable Statement of Work, payment is due upon presentation of each of our invoices.

32. We may charge additional professional fees if events beyond our control (including your acts or omissions) affect our ability to perform the Services as originally planned or if you ask us to perform additional tasks.

33. If we are required by applicable law, legal process or government action to produce information or personnel as witnesses with respect to the Services or this Agreement, you shall reimburse us for any professional time and expenses (including reasonable external and internal legal costs) incurred to respond to the request, unless we are a party to the proceeding or the subject of the investigation.

Force Majeure

33. If we are required by applicable law, legal process or government action to produce information or personnel as witnesses with respect to the Services or this Agreement, you shall reimburse us for any professional time and expenses (including reasonable external and internal legal costs) incurred to respond to the request, unless we are a party to the proceeding or the subject of the investigation.

Force Majeure

34. Neither you nor we shall be liable for breach of this Agreement (other than payment obligations) caused by circumstances beyond your or our reasonable control.

Term and Termination

35. This Agreement applies to the Services whenever performed (including before the date of this Agreement).

36. This Agreement shall terminate on the completion of the Services. Either of us may terminate it, or any particular Services, earlier upon immediate written notice to the other.

37. You shall pay us for all work-in-progress, Services already performed, and expenses incurred by us up to and including the effective date of the termination of this Agreement.

38. Our respective confidentiality obligations under this Agreement shall continue for a period of three years following the termination of this Agreement. The other provisions of this Agreement that give either of us rights or obligations beyond its termination shall continue indefinitely following the termination of this Agreement.

Governing Law and Dispute Resolution

39. This Agreement, and any non-contractual matters or obligations arising out of this Agreement or the Services, shall be governed by, and construed in accordance with, the laws of the Kingdom of Saudi Arabia and/or **[insert other jurisdictions as applicable]**.



40. If at any time you would like to discuss with us how our service to you could be improved, or if you are dissatisfied with the service you are receiving, you may take the issue up with your usual partner or director contact. If you prefer an alternative route, please contact XXX. We undertake to look into any complaint carefully and promptly and to do all we can to explain the position to you. Should you remain dissatisfied with any aspect of our service in the KSA, you may of course take matters up with TAQEEM.

Any dispute relating to this Agreement or the Services within the KSA shall be subject to the exclusive jurisdiction of the KSA courts, to which each of us agrees to submit for these purposes.

Miscellaneous

41. This Agreement constitutes the entire agreement between us as to the Services and the other matters it covers, and supersedes all prior agreements and understandings with respect thereto, including any confidentiality agreements previously delivered. Save in respect of any fraudulent misrepresentation, in entering this Agreement you and we agree that neither of us have relied on statements other than those included in the Agreement and both of us give up any claims arising out of statements other than those included in the Agreement.

42. Both of us may execute this Agreement (including Statements of Work), as well as any modifications to it by electronic means and each of us may sign a different copy of the same document. Both of us must agree in writing to modify this Agreement or any Statement of Work hereunder.

43. Each of us represents that the person signing this Agreement and any Statement of Work hereunder on its behalf is expressly authorized to execute them and to bind each of us to their terms.

You represent that your affiliates and any others for whom Services are performed shall be bound by the terms of this Agreement and the applicable Statement of Work.

44. You agree that we and the other XXX Firms may, subject to professional obligations, act for other clients, including your competitors.

45. Neither of us may assign any of our rights, obligations or claims under this Agreement.

46. If any provision of this Agreement (in whole or part) is held to be illegal, invalid or otherwise unenforceable, the other provisions shall remain in full force and effect.

47. If there is any inconsistency between provisions in different parts of this Agreement, those parts shall have precedence as follows (unless expressly agreed otherwise): (a) the Cover Letter, (b) the applicable Statement of Work and any annexes thereto, (c) these General Terms and Conditions, and (d) other annexes to this Agreement.

48. Neither of us may use or reference the other's name, logos or trademarks without its prior written consent, save that we may use your name publicly to identify you as a client in connection with specific Services or otherwise.

49. The limitations in Sections 16 to 22 and the provisions of Sections 27, 29, and 44 are intended to benefit the other XXX Firms and all XXX Persons, who shall be entitled to enforce them. Otherwise a person who is not a party to this Agreement may not enforce any of its terms.

In order to carry out the valuation we will need you to provide us with the following information: [INSERT AS APPLICABLE]

1. [info1]
2. [info2]
3. [info3]
4. [info4]
5. [info5]



Appendix I- Sample M&E Depreciation/Life Tables

Many factors, including the following samples should be considered when valuing assets:

- Usage & operating environment
 - Usage based assets, e.g.:
 - Cars and commercial vehicles – kms
 - Construction/material handling – hours of use
 - Aircraft and turbines/power plants – cycles /engine hours
- Utilisation
- Current and projected capital expenditure - whole or part re-builds & refurbishments
- Maintenance
- Asset transfers / relocations
- Certification / re-certification
- Life limitations (e.g. contracts / product life expectations)
 - a) Straight line (Sample KSA tax depreciation)

Tax
Depreciation

Buildings

Machinery,
factories and
equipment &
other means of
transport

All other fixed
assets (ships,
aircraft, trains,
furniture etc.)

Years	5SL	10SL	25SL
NUL	5	10	25
Profile	SL	SL	SL
0	100.0%	100.0%	100.0%
1	80.0%	90.0%	96.0%
2	60.0%	80.0%	92.0%
3	40.0%	70.0%	88.0%
4	20.0%	60.0%	84.0%
5	0.0%	50.0%	80.0%
6	0.0%	40.0%	76.0%
7	0.0%	30.0%	72.0%
8	0.0%	20.0%	68.0%

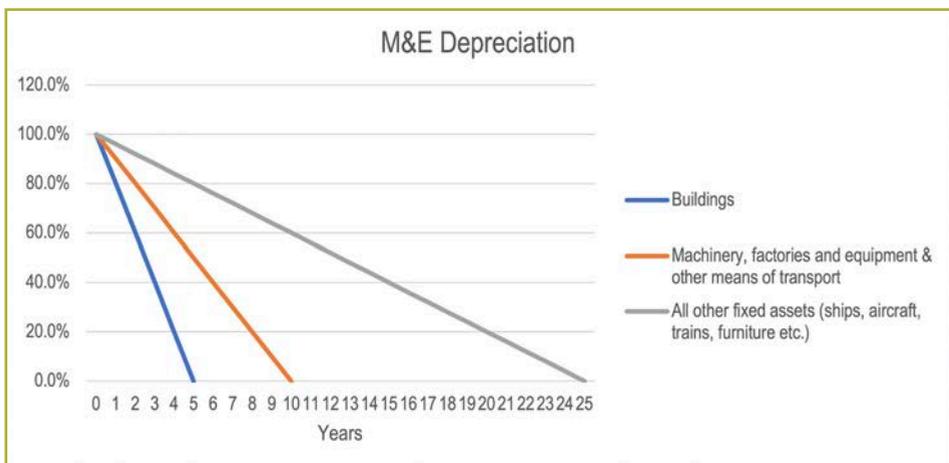
Tax
Depreciation

Buildings

Machinery,
factories and
equipment &
other means of
transport

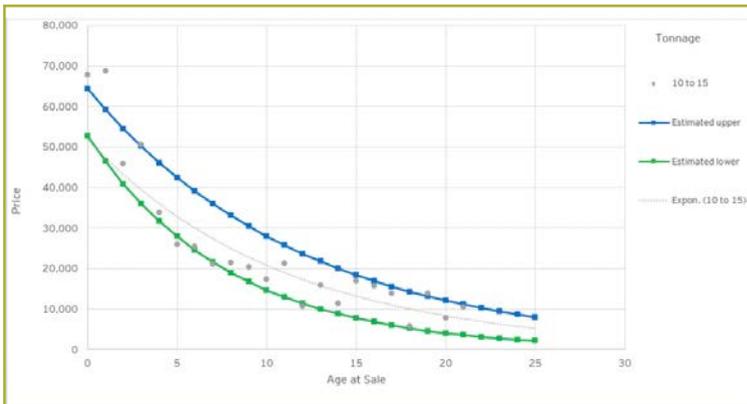
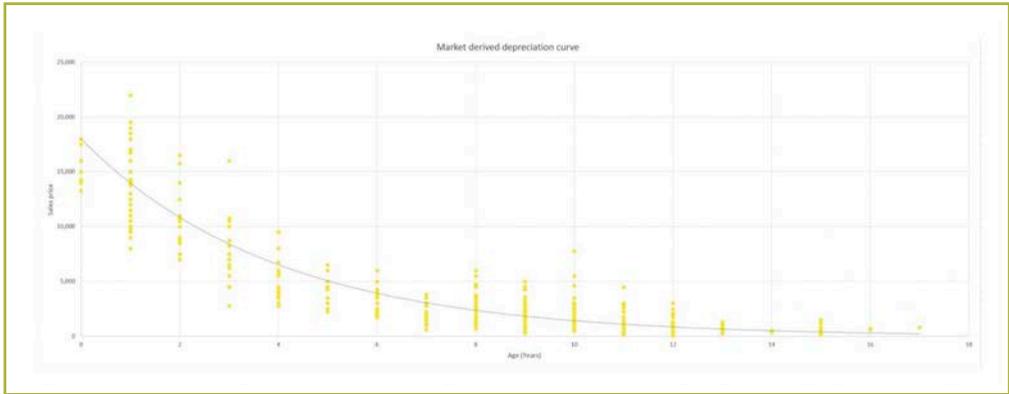
All other fixed
assets (ships,
aircraft, trains,
furniture etc.)

Years	5SL	10SL	25SL
NUL	5	10	25
Profile	SL	SL	SL
9	0.0%	0.010%	64.0%
10	0.0%	0.0%	60.0%
11	0.0%	0.0%	56.0%
12	0.0%	0.0%	52.0%
13	0.0%	0.0%	48.0%
14	0.0%	0.0%	44.0%
15	0.0%	0.0%	40.0%
16	0.0%	0.0%	36.0%
17	0.0%	0.0%	32.0%
18	0.0%	0.0%	28.0%
19	0.0%	0.0%	24.0%
20	0.0%	0.0%	20.0%
21	0.0%	0.0%	16.0%
22	0.0%	0.0%	12.0%
23	0.0%	0.0%	8.0%
24	0.0%	0.0%	4.0%
25	0.0%	0.0%	0.0%

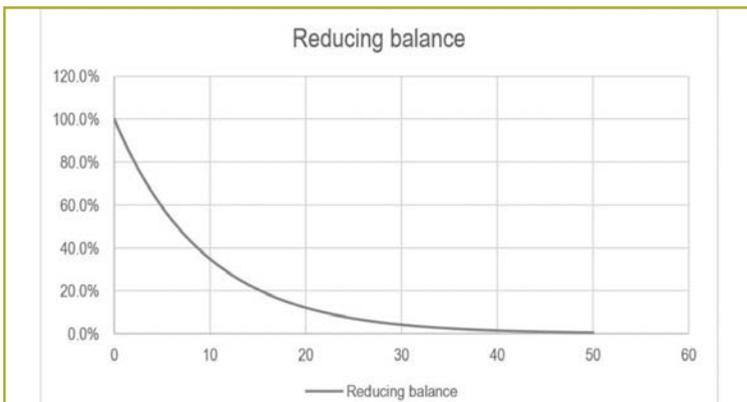




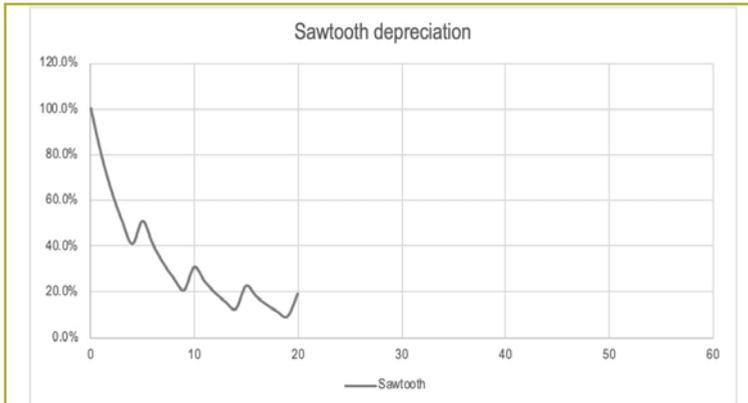
b) Sample market derived depreciation curve: power plants and excavators respectively



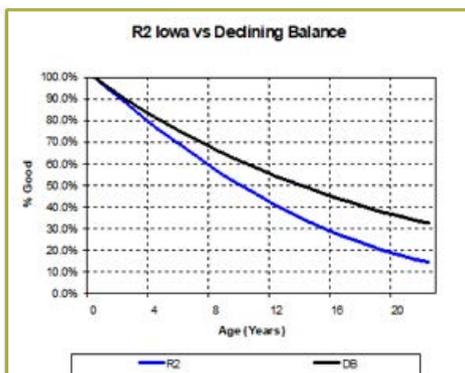
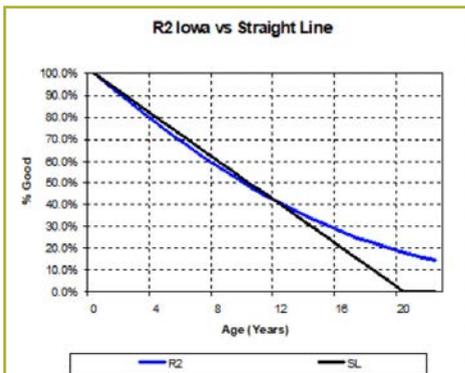
c) Sample reducing balance



d) Sample saw tooth



e) Typical Iowa





Appendix J – Site Inspection Checklist

Field Checklist Form

I. Engagement Identification

Name of Client:

Name of Project:

Engagement Number:

Property Location:

Date of Field Visit:

Valuation Principal:

Project Manager:

Project Consultants:

II. Checklist

Yes N/A

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Toured the facility/site |
| <input type="checkbox"/> | <input type="checkbox"/> | Asked how many employees there are on-site |
| <input type="checkbox"/> | <input type="checkbox"/> | Discussed the history and ownership of the plant |
| <input type="checkbox"/> | <input type="checkbox"/> | Discussed the market and operating environment in which the assets operate |
| <input type="checkbox"/> | <input type="checkbox"/> | Discussed the overall business, SWOT, and historical financial and operating trends. |
| <input type="checkbox"/> | <input type="checkbox"/> | Asked how many shifts the plant operates |
| <input type="checkbox"/> | <input type="checkbox"/> | Noted the overall condition, cleanliness and layout of the facility |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtained a mobile equipment list |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtained a list of leased equipment |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtained detail of Construction in Progress as at the valuation date |
| <input type="checkbox"/> | <input type="checkbox"/> | Performed a detailed inventory of major assets |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtained detailed information related to the products |
| <input type="checkbox"/> | <input type="checkbox"/> | Discussed equipment acquired used and/or assets that have allocated costs |
| <input type="checkbox"/> | <input type="checkbox"/> | Identified equipment that is idle and/or to be sold |

- | Yes | N/A | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | Discussed process bottlenecks, Functional Obsolescence. And/or over capacity issues |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtained a projected operating capacity schedule, OEE and prior year's |
| <input type="checkbox"/> | <input type="checkbox"/> | Discussed company maintenance policies |
| <input type="checkbox"/> | <input type="checkbox"/> | Considered capital equipment and real estate demarcation issues |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtained a layout of major process machinery |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtained a site plan of the facility |
| <input type="checkbox"/> | <input type="checkbox"/> | Reviewed the fixed asset listing with knowledgeable plant personnel |
| <input type="checkbox"/> | <input type="checkbox"/> | Asked about assets located off-site |
| <input type="checkbox"/> | <input type="checkbox"/> | Gathered information related to in-house or custom-built equipment |
| <input type="checkbox"/> | <input type="checkbox"/> | Asked about items not on the fixed asset listing |
| <input type="checkbox"/> | <input type="checkbox"/> | Asked about recent retirements that are still on the fixed asset listing |
| <input type="checkbox"/> | <input type="checkbox"/> | Reviewed the FAL for facility service items and product tooling |
| <input type="checkbox"/> | <input type="checkbox"/> | Taken photographs of major process machines and idle equipment |
| <input type="checkbox"/> | <input type="checkbox"/> | Obtain product brochures from the client |

III. Other Items Not Listed Above

IV. Sign-Off

I have reviewed the checklist for requested and obtained items, and have discussed my comments with the engagement team. I am satisfied that the team has performed its due diligence related to requesting and obtaining information necessary to complete the valuation project.

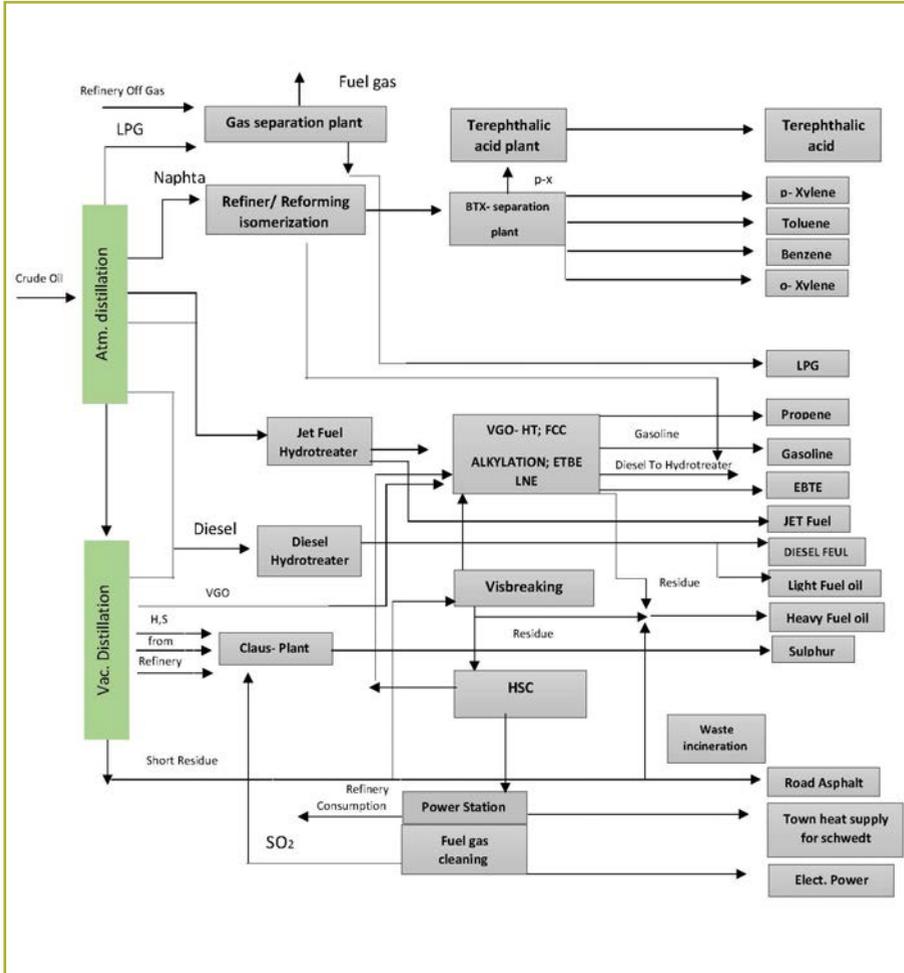
Project Manager or Senior Consultant

Date

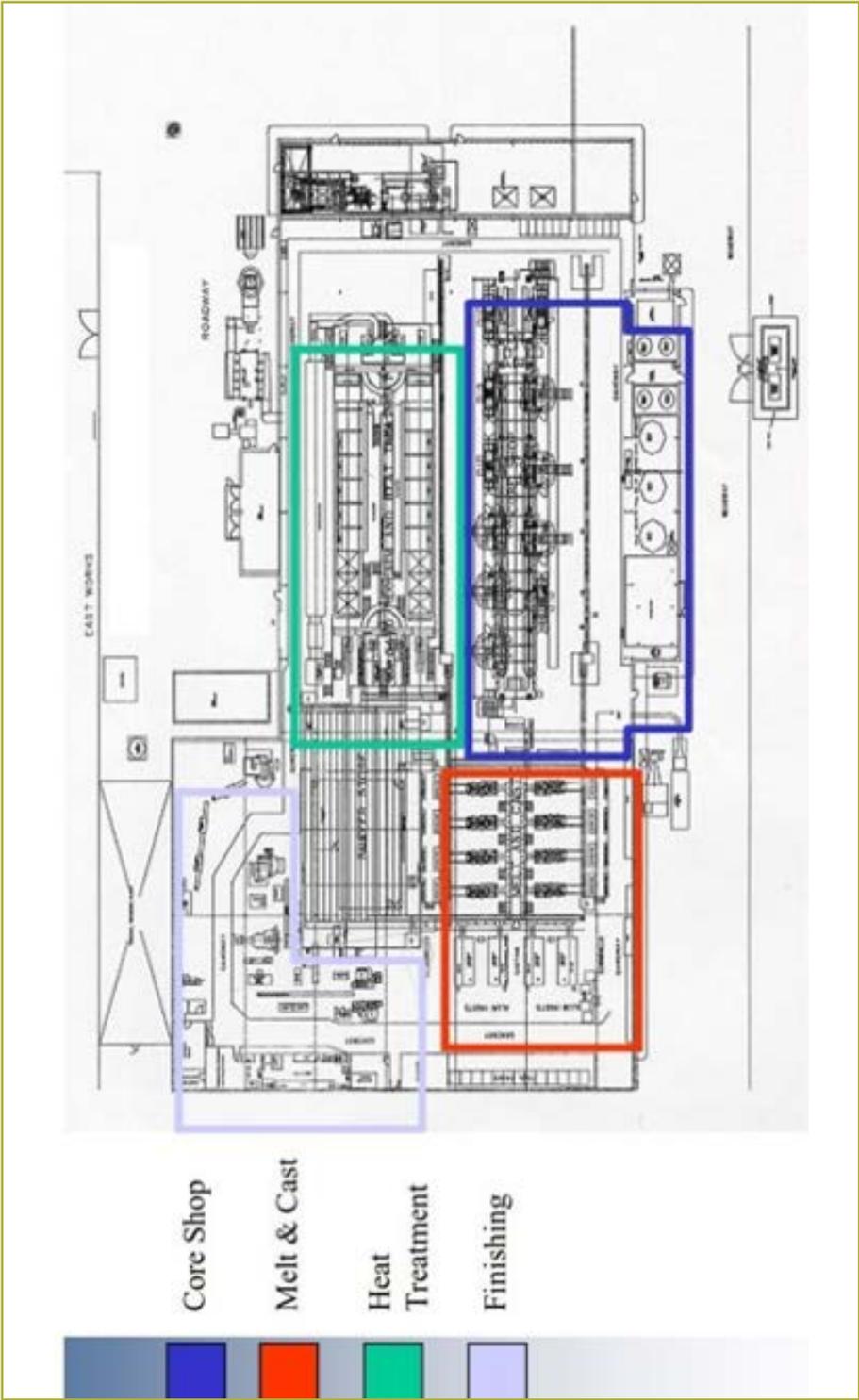


Appendix K- Sample site plans

Sample site configuration for petrochemical product manufacture

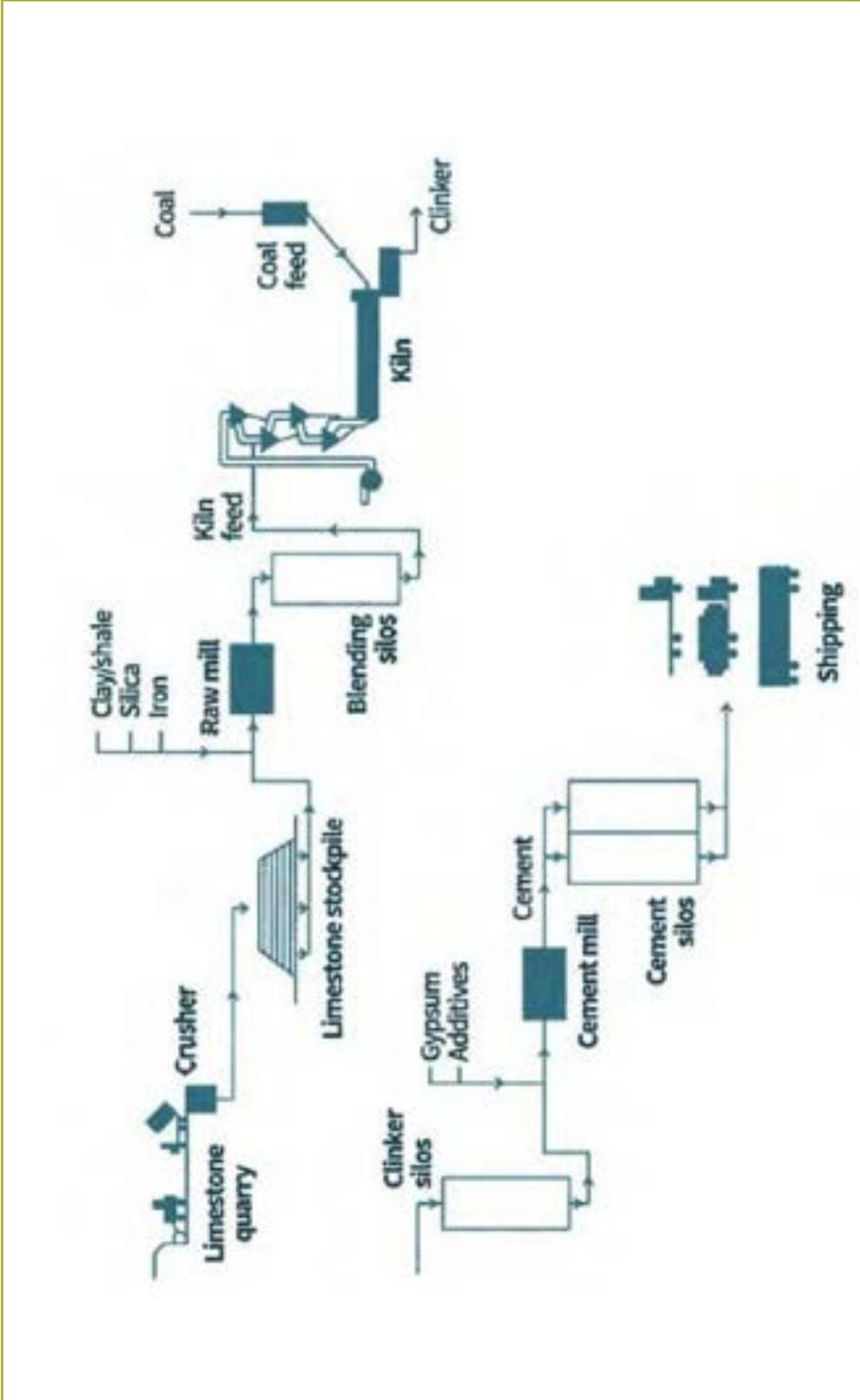


Sample low pressure sand casting plant layout





Appendix L - Sample Machinery process/work flow plan



Appendix M – Machinery and Equipment Useful Databases

The following databases can be used for guidance and reference for M&E valuers:

- a) Machine Auctions:
<https://www.bidspotter.co>
- b) Ritchie Brothers: Construction and Yellow Iron:
<https://www.rbauction.com/>
- c) Rock and Dirt: Mining:
<https://www.rockanddirt.com>
- d) Marshall & Swift Core Logics; Building Cost database:
<https://www.corelogic.com/products/marshall-swift-valuation-service.aspx>
- e) Aircraft Bluebook; Corporate Jet Database:
<https://www.aircraftbluebook.com/>
- f) V-ref; Corporate Jet Database:
<https://www.vref.com/>
- g) Heli-values; Helicopter Database:
<https://www.helis.com/database/>
- h) Jet-net; Corporate Jet Database:
<https://www.jetnet.com/products/jetnet-values.html>
- i) AMSTAT; Corporate Jet Data Base:
<http://atwonline.com/data-financials>
- j) Aircraft Pricing Guide; Commercial Aircraft:
<https://airlinerpriceguide.com/Products.aspx>



Appendix N – Sample M&E Valuation Report

(Introduction letter re) Valuation Report

Valuation of certain identifiable tangible assets in relation to the acquisition of XXX location, XXX [modify if combined intangibles assets valuation also]

Dear Sirs

In accordance with your instructions, we have commenced the work set out in our engagement agreement with XXX (“XXX”, “you” or “Client”) dated XXX (the “Engagement Agreement”). We are pleased to present the following initial report (“Report”) in connection with the valuation of certain identifiable tangible fixed assets in relation to the acquisition of XXX location, XXX, (“Target” or “XXX”) tentatively to be completed on XXX. A valuation date of XXX (“Valuation Date”) has been used as instructed by you on the basis of IFRS Fair Value, in accordance with XXX.

Purpose of our initial report and usage;

This initial information Report has been prepared on the specific instructions of and solely for use by XXX (“Management.”)

This report has been prepared in compliance with IVS guidance and TAQEEM regulations.

This initial information Report and its contents may not be quoted, referred to or shown to any other parties except as provided in the Engagement Agreement. We accept no responsibility or liability to any person other than to XXX.

Notwithstanding anything contained herein to the contrary, XXX and its officers, directors, employees, representatives, agents and advisers may freely disclose to any and all persons (without limitation) any tax advice, including the tax treatment and tax structure of any transaction, provided to XXX by XXX, together with all facts that may be relevant to understanding the proposed tax treatment of any transaction and any materials provided by XXX related to such tax treatment and tax structure

Based on our initial valuation analysis, assumptions and methodologies employed as described, our opinion of fair value is in the range of SAR XXX.

We appreciate the opportunity to provide our services to XXX. Please contact us regarding any questions.

Yours faithfully,
XXX

Signature of TAQEEM authorised valuer

Conclusion and Overview

Tangible Assets

- As outlined in the scope of work, we have reviewed the technical list of assets supplied by XXX from the XXX data room and the PME information in the XXX presentation dated XXX (the “Subject Assets”), as well as supplementary data supplied by XXX Management.
- We have also carried out a one day, site inspection of the subject Machinery and Equipment (M&E) assets at...
- We made calculations in order to determine current IFRS related fair value ranges for the subject assets, based upon IVS and TAQEEM valuation principles and guidance. We have indicated a likely value range relative to underlying cost and market value data obtained through our research and discussions with market sector parties(insofar as is possible.)
- The primary valuation approach was the cost approach, utilising the Depreciated Replacement Cost method. For the xxx element we adopted a market approach.
- Intangible assets, real estate and wider business valuation considerations were excluded from this valuation.
- The following sections of the draft interim report provides an overview of the plant as well as the assumptions.
- Key assumptions and limitations are documented in the Appendices.



	Net book value	Fair Value	
Currency: SARm		Lower limit	Upper Limit
Machinery & Equipment:			
Fixtures and Fittings			
IT and Office Equipment			
Vehicles and loading equipment			
Sub Total:			
Valuation Amount			

Specific assumptions and limitations:

- • We understand that XXX is purchasing the plant in an asset deal in the range of SAR XXX m. The transaction will include the subject M&E. Based on the list of assets provided by Management we understand the transaction is an asset deal only, and we have not considered any intangibles assets.
- • The analysis is based on the Asset List as at XXX and supplementary information obtained from a one day site inspection and our own research.

The fixed asset register provided does not include the cost of capitalisation / historical costs of each asset and we have necessarily made assumptions about asset ages and lives based on our site inspection.

- • We have not been provided with details of ancillary support equipment, services or details on fixtures and fittings, and as agreed, values for these items are excluded.
- • Our summary key assumptions are documented in the Appendices

	Net book value	Fair Value	
Asset class	Count	Lower limit	Upper limit
Grand Total			

Principal Equipment

- The major equipment on site includes XXX
- Market Analysis

Analysis

- We were provided with a list of the assets on site and we have contacted dealers in the US and Europe on a discreet basis, performed internet research and utilised our sector knowledge.
- A potential value range for the equipment can be seen in the adjacent table. These figures currently exclude considerations for installation costs and do not include any services or power.

	Fair Value Range (SARm)	
Asset Class	Lower limit	Upper Limit
XXX		
Total		

Valuation Methodology and Application

Given the size and specialised nature of the M&E we believe the Depreciated Replacement Cost (DRC) and market method in part, provide an appropriate valuation methodology on the express assumption (as agreed) that the assets are or can be used as part of a wider, profitable commercial undertaking. Key inputs to the valuation are outlined as below.

Modern Equivalent Asset (MEA)

We understand that the site is fully operational and fully utilised. Our valuation is therefore based on the express assumption that the MEA would comprise a facility of the same size as the current plant.

Gross Replacement Cost

On the basis of the assumptions made above our Gross Replacement Cost reflects an amount of SAR XXXm – SAR XXXm (SAR XXXm – SAR XXXm)



Obsolescence (Functional and Physical)

Our obsolescence adjustment is based purely on physical obsolescence. As previously referenced we have not yet been provided with sufficient detail to assess the utilisation of the current assets and therefore no functional adjustment was made.

Physical depreciation is allowed for on a straight line basis assuming a target life of 50 years for xxx, and a shorter life of 20 years for the yyy assets. Given the specialised nature of these assets a shorter life span may however be expected.

Our lower value GRC provides for a DRC value of SAR XXXm (SAR XXXm) representative of XX% of GRC.

The upper value DRC increases the remaining lives to XXX years on the XXX areas. Applying this to our higher value GRC provides for a DRC value of SAR XXXm (SAR XXXm) representative of XX% of GRC.

Asset Class Description	Useful Life	Depreciation Curve	Depreciation Hold Factor
Plant Structures	50 years	Straight line	5%
Tools	20 years	Market data	5%
IT and Office Equipment	5 years	Straight line	5%
Furniture, Fixtures, Fittings	7 years	lowa curve	5%
Vehicles and loading equipment	5 years	Straight line	5%
Construction in Progress	10 years	Straight line	5%

Key assumptions:

- Our brief did not extend to any business valuation or economic obsolescence study. We have therefore made the express assumption that the Subject Assets will continue in operation as part of an ongoing, profitable business.
- Assumptions have been about asset ages based on other relevant asset data dated XXX.
- Given the specialised nature of the particular xxx assets, there is not a readily available market for these assets, and therefore we

have adopted the Depreciated Replacement Cost method of valuation.

- We did not, except to such extent as you requested and we agreed in writing, seek to verify the accuracy of the data, information and explanations provided by yourselves, and you are solely responsible for this data, information and explanations. We therefore relied on the information provided by you to be accurate and complete in all material respects.
- For the valuation we have considered the associated installation, construction, delivery and taxes (where applicable).
- We have assumed that where date information is available, this is a proxy for the historical capitalisation dates for the Subject Assets and also a reasonable approximation for their Year of Manufacture (“YOM”).

Appendix B: Valuation approaches – tangible assets

Three approaches should be considered when determining the value of tangible assets:

The market approach;

The income approach; and

The cost approach.

The nature and characteristics of the asset indicates which approach (or approaches) is most applicable for valuation purposes. These approaches are detailed below.

Market approach

The market comparison approach seeks to determine the current value of an asset by reference to recent comparable transactions involving the sale of similar assets. Adjustments may need to be made to those recorded transactions to take account of differences in the context, usage, timing, location, background and subject matter of the recorded transactions as compared to the assets being appraised.



Income approach

The income approach seeks to determine the current (present) value of anticipated future economic benefits associated with the asset. The net cash flows projected over the appropriate period are discounted back to a net present value using an appropriate discount rate that reflects cost of capital, risk and required return. This process can only be adopted where core assets generate significant and separately identifiable cash flows. If it is not considered possible to accurately determine cash in-flows and out-flows that apply to individual assets then accordingly it is not considered appropriate to apply an income approach to determine the value of individual assets.

Cost approach

The cost approach is an accepted method of valuation used to estimate a value for specialised assets, where lack of suitable market evidence exists. The adoption of a cost estimate assumes the subject entity has adequate potential profitability, but subject to agreement may have to be adjusted for economic obsolescence.

Application of the market approach

The value of an asset is estimated by comparing it to similar assets that have recently been sold or are being offered for sale in the open market, to the extent that such evidence is relevant to the subject assets' usage and to extent such data is available. The process is essentially that of comparison and correlation to the subject assets with adjustments being made for imperfect comparability.

Application of the cost approach

The first step in the cost approach is to determine the Replacement Cost New or Current Replacement New (collectively referred to as "RCN") of a modern equivalent asset of similar capacity/utility. The RCN generally includes the base cost of the asset and certain contributory costs such as sales tax, freight and handling charges, installation, general contractor's costs, and engineering and design costs.

The RCN is then adjusted to reflect the anticipated effective working life of the asset from new, the age of the asset and the estimated residual value at the end of the asset’s working life, based on the following:

Physical depreciation - a reduction in value caused by wear and tear, decay, deterioration due to age, and loss not prevented by current maintenance.

Functional obsolescence - the loss in value or usefulness of a property caused by inefficiencies or inadequacies of the property itself when compared to a more efficient or less costly replacement property. This can be due to new technologies that result in the specified asset suffering from excess operating costs, excess construction costs, over-capacity, inadequacy, or lack of utility.

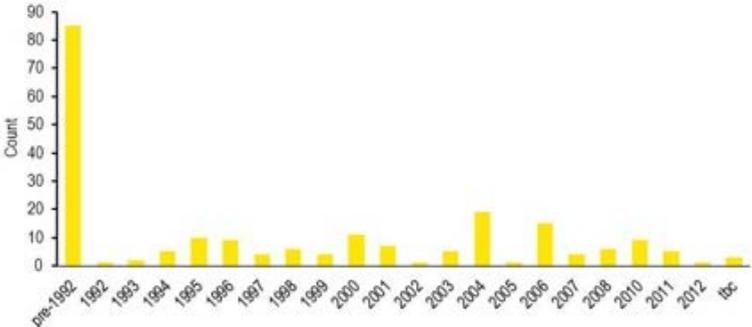
Economic obsolescence - the loss in value caused by adverse conditions external to the property, such as poor market demand for the product, industrial reorientation, unavailability of transportation, and excessive governmental regulations.

Basis of valuation

Our advice has been provided on the basis of IFRS related Fair Value defined in IFRS 13 (ASC 820): Fair Value Measurement as: “The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date”

- Attachments:
- Asset Register
- Asset Age analysis

Age profile:





Appendix O - Electronic File Structure

0. STANDARD PROCEDURE DOCUMENTS	31/07/2018 08:25	File folder
★ 1. EL & contractual arrangements	06/03/2018 15:04	File folder
2. Engagement acceptance	16/07/2018 11:55	File folder
★ 3. Budgeting and fees	06/03/2018 15:04	File folder
4. Assignment planning	06/03/2018 15:04	File folder
5. Info gathering	06/03/2018 15:04	File folder
6. Notes of meetings	06/03/2018 15:04	File folder
7. QRM review & checks	06/03/2018 15:04	File folder
8. Work product	06/03/2018 15:04	File folder
9. Other letters	06/03/2018 15:04	File folder
10. Post completion	12/07/2012 11:54	File folder

Appendix R - Closing or Transmittal Letter

21 February 2XXXv

ABC
Guroosh Street

Riyadh, Saudi Arabia

RE: The XXX, Dakakeen Street, Riyadh

Dear [Mr. Client]:

Further to our letter of engagement dated 30 January 2XXX, we are pleased to submit the attached final report of our valuation of the machinery and equipment, as of 31 December 2XXX. The report presents our opinion of market value along with supporting data and analyses which form the basis of our opinion, in accordance with IVS and TAQEEM guidance and regulations.

The value opinion reported is qualified by certain definitions, limiting conditions, and certifications which are set forth on pages 6 through 8 of the report. We particularly draw your attention to the special assumption disclosed on page 8 of the report, dealing with the deficiencies in data regarding the assets as discussed...

The report was prepared for and our professional fee billed to XXX. The report is intended only for use by your internal management, your auditor, and relevant regulatory authorities. It may not be distributed to or relied upon by other persons or entities without our written consent.

The machinery and equipment was inspected by Insan Ihsan, AR TAQEEM, and the valuation was developed by Mr. Ihsan and Mshari Hashi, FR TAQEEM.

If you have any questions concerning the report, please contact Mr. Hashi at [Tel].

Sincerely,

Mshari Hashi, FR TAQEEM
Managing Partner



Appendix S- Machinery and Equipment Estimated Normal Useful Life Tables

The below tables include an estimated normal useful life study published by the American Society of Appraisers (ASA) – Machinery & Technical Specialities Committee.

NB: the below Estimated Normal Useful Life tables are used only for guidance to M&E valuers in determining the age/life span of machinery. The M&E valuers should not depend on Estimated Normal Useful Life Study published tables in carrying out M&E valuation but use it as a cross check. The estimation of life spans of machinery should be based on market participants, M&E assets as observed, on a live, and evolving basis with the information needed such as; the origin of machinery manufacturing, maintenance schedule, production usage and others.

The bibliography at the end of the manual provides reference to sample M&E age/life reference tables and guidance in the USA, Australia and New Zealand. It is important to emphasise that these are merely sample references – it is up to the M&E valuer to research and establish representative lives for the particular assets under valuation.



Estimated Normal Useful Life Study

American Society of Appraisers – Machinery & Technical Specialties
Committee

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Society of Appraisers, Herndon,
VA

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TAQEEM had been granted ASA's permission to use the content for publishing considerations.





Estimated Normal Useful Life Study

American Society of Appraisers – Machinery & Technical Specialties
Committee

Introduction

The Machinery & Technical Specialties (M&TS) Committee has recognized that, as a result of the rapid technological changes that have occurred over the last 50 years, there is an overwhelming need to revisit and update the standards under which we conduct our specialties. Accordingly, we have developed a study of normal useful lives (NULs) for various types of assets commonly found in manufacturing and industrial facilities in the United States. The purpose of this study is to assist appraisers in estimating NULs for the assets most commonly appraised. This study is intended to be utilized when developing opinions of total depreciation, in cases where additional elements of function and economic obsolescence should also be considered. “It should be noted that the NULs provided in this study are not intended to be used for rate making purposes in a regulated utility.”

Many years have passed since any official or widely available guideline regarding the procedures and definitions of physical and economic lives has been published. Consequently, much of the current information is linked to “Bulletin F,” IRS Publication 173, which dates back to 1942. Other information frequently is derived from asset depreciation ranges (ADRs) and other forms of published data that have little to no supporting documentation. The M&TS Committee has developed this study to enhance and modernize, not replace these publications.

Many factors must be considered when concluding a value for an asset. It is imperative that an appraiser use careful research, best judgment, and experience, as well as a personal inspection of the subject asset(s), as appropriate, to form an opinion of value. When forming an opinion of value, an appraiser should use the data provided within this study as a guide, making adjustments based on his/her own data and experience, as necessary.

- Dimension of value study
- Opinions from measurements of the information gathered, either verbal or written
- Research books that indicate change over time, including but not limited to
 - o *Aircraft Blue Book*
 - o Green Guides
 - o Computer value books
 - o Electronic catalogs such as Tucker Electronics
 - o Other information located in libraries at committee members' facilities

The Committee typically used several sources and concluded a NUL for each asset category.

The conclusions reached by the Committee's study are the result of qualitative research. The reader is advised that no individual quantitative research, such as lifing studies or statistical analyses, has been performed. However, appropriate due diligence was exercised to confirm these lives with other users, manufacturers, and dealers whenever possible. It should be noted, and is hereby acknowledged, that an extensive analysis focused on one classification of an item could result in differing ranges of lives, depending upon the type of item and its use.

Understanding and Using the Normal Useful Life Tables

The NUL tables have been arranged in alphabetical order by industry sector and ascribed a number. The summary page indicates an average physical life for each classification as a whole, as well as average minimum and maximum lives. Within each industry sector, individual asset classes have been arranged alphabetically. A NUL and minimum and maximum lives are indicated for each asset class. For most asset classes, the NULs are shown in terms of years; however, for a few asset classes, the NULs are presented in hours, as it is more appropriate to measure NUL in terms of hours of service than years.



The NUL tables comprise a best effort to indicate a physical useful life. The word “range” has been used to indicate that life starts at the beginning, or “0,” and ends at the indicated average shown.

In developing the various NUL tables, the Committee recognized that certain categories may be more specific and others more general. It is not possible to cover each and every item, nor all brands or categories of asset; the closest match should be used when an exact match is not available. In some cases, there may be a variation of NUL within the same category. Some examples of why this variation would occur are as follows:

1. A machine may have more damage due to abnormal use, less preventable maintenance than expected, adaptations, or the like, creating a different effective age than is reflected by the tables. Thus, in order to use the tables properly, a well-estimated effective age is an absolute necessity.
2. A machine may be much older than the average estimated NUL provided in the tables and, therefore, would have a different effective age. This is usually the result of an overhaul/adaptation, in which case both curable physical and functional factors could allow a lower effective age. In many such cases, the machine would still have the same NUL but would have a lower effective age.

The NUL tables are intended to be used as a starting point; additional adjustments may be required in order to establish value. Note that value does not always reduce or increase in a linear fashion with age.

Age/Life Formula

A useful tool in the derivation of physical depreciation or total depreciation and obsolescence is the age/life formula. An opinion of physical depreciation can be derived using the NUL of an asset in conjunction with the effective age of an asset in the age/life formula. This is represented mathematically by the following accepted formula:

Age/Life Formulae

Physical Depreciation = Effective Age ÷ NUL Remaining

Useful Life = NUL - Effective Age

When the effective age is divided by the NUL, the result is an analytical or objective calculation of depreciation. Effective age is the composite age considering normal construction, expansions, replacements, maintenance, and modifications. It reflects the age-related condition (or level of deterioration) of the asset in service and its capability to meet the operating demand for which it was intended and designed. Further, effective age is the age indicated by the current condition of the asset and, therefore, recognizes the partial renewal due to maintenance, rebuilds, and replacements to the original asset.

Consider the following example. The effective age of an asset is 10 years and its NUL is 40 years; using the age/life formula, physical depreciation would be estimated as follows:

$$\begin{aligned} & \textit{Physical Depreciation Estimate} \\ & \textit{Physical Depreciation} \quad = \textit{Effective Age} \div \textit{NUL} \\ & = 10 \textit{ years} \div 40 \textit{ years} \\ & = 25\% \end{aligned}$$

For a comprehensive explanation of the age/life technique, see American Society of Appraisers' Valuing Machinery and Equipment: The Fundamentals of Appraising Machinery and Technical Assets, Second Edition (pages 72-86).

Conclusion

The opinions of NUL reflected in these tables are not intended to be precise. The user is cautioned to review the reasonableness and applicability of any definition, formula, or calculation and to utilize them in an appropriate manner in the valuation process. Deviation from the provided NULs may be appropriate based on the atmosphere in which the subject asset is utilized, the maintenance it has received during its life, and its reasonably anticipated future use. As always, ethics, appraisal judgment, and generally accepted valuation theory must guide the reader in the use of this data.



The assignment of various asset classes to various industry sectors was based solely on the judgment of the ASA M&TS Committee. The NULs were based upon the understanding that the manufacturers' suggested maintenance practices and usage were employed during the period of use of the subject assets. We assume no responsibility for errors, omissions, or differences of opinion.

Definitions

Note: The terms and definitions provided below are those currently accepted by the M&TS Committee of the American Society of Appraisers and published in the glossary of terms of Valuing Machinery and Equipment: The Fundamentals of Appraising Machinery and Technical Assets, Second Edition, American Society of Appraisers.

Accelerated Cost Recovery Schedule (ACRS) - That portion of the Internal Revenue Code that sets forth tax depreciation deductions.

Accrued Depreciation - The total value loss from all causes, including value loss from physical deterioration, functional obsolescence, and economic (external) obsolescence.

Accumulated Depreciation (Book Depreciation) - An accounting term that represents the total depreciation taken against the cost of an asset as of a given date.

Age - The period that reflects the elapsed time from the date of installation to the date of observation on an asset.

Age/Life Analysis - An arithmetic process used to calculate a property's remaining useful life.

Chronological Age - The number of years elapsed since an item or property was originally built or placed in service for the first time.

Curable Depreciation - A form of deterioration or depreciation that is economically feasible to remedy because the resulting increases in utility and value are equal to, or greater than, the expenditure.

Depreciation (Appraisal) - The actual loss in value or worth of a property from all causes including those resulting from physical deterioration, functional obsolescence, and economic obsolescence.

Economic Obsolescence - A form of depreciation or loss in value or usefulness of a property caused by factors external to the property. These may include such things as the economics of the industry; availability of financing; loss of material and/or labor sources; passage of new legislation; changes in ordinances; increased cost of raw materials, labor or utilities (without an offsetting increase in product price); reduced demand for the product; increased competition; inflation or high interest rates; or similar factors.

Economic Useful Life - The estimated period of time that a new property may be profitably used for the purpose for which it was intended. Stated another way, economic life is the estimated number of years that a new property can be used before it would pay the owner to replace it with the most economical replacement property that could perform an equivalent service. Functional or economic factors may limit a property's economic life. An asset's economic life will often be less than its normal useful life.

Effective Age - The apparent age of a property in comparison with a new property of like kind; that is, the age indicated by the actual condition of a property. (May be calculated by deducting the remaining useful life of an asset from the normal useful life)

ASA Machinery & Technical Specialties Committee Page 5

Estimated Remaining Life - The period in years over which an item or groups of items are estimated to remain usable.

Functional Obsolescence - The loss in value or usefulness of a property caused by inefficiencies or inadequacies of the property itself, when compared to a more efficient or less costly replacement property that new technology has developed. Symptoms suggesting the presence of functional obsolescence are excess operating cost, excess construction (excess capital cost), over-capacity, inadequacy, lack of utility, or similar conditions.



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Normal Useful Life (NUL) - The physical life, usually in terms of years, that a new property will actually be used before it is retired from service. A property's NUL relates to how long similar properties actually tend to be used, as opposed to the more theoretical economic life calculation of how long a property can profitably be used. See Economic Life.

Physical Deterioration - A form of depreciation where the loss in value or usefulness of a property is due to the using up or expiration of its useful life caused by wear and tear, deterioration, exposure to various elements, physical stresses, and similar factors.

Physical Life - The number of years an asset will physically endure before it deteriorates or fatigues to unusable condition purely from physical causes, without considering functional and economic obsolescence.

Remaining Economic Life - Estimated period during which a property of a certain effective age is expected to continue to be profitably used for the purpose for which it was intended.

Remaining Useful Life (RUL) - The estimated period during which a property of a certain effective age is expected to actually be used before it is retired from service.

Total Life - Total life may have three definitions depending on the age and use of an asset: 1) For a new asset, it is the life in years that can be expected; 2) For a used asset, it is the sum of the effective age plus the expected remaining life; and 3) For an asset that has been removed from service, it is the actual number of years the asset was in service.

Useful Life - The period of time over which property may reasonably be expected to perform the function for which it was designed

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Useful Life - The period of time over which property may reasonably be expected to perform the function for which it was designed.





American Society of Appraisers
Machinery & Technical Specialties Committee Estimated Normal Useful
Lives

Industry Number	Industry Sector Name	Average of Life (Years)	Mini-mum Life (Years)	Maxi-mum Life (Years)
1	Aerospace and Defense	13	11	14
2	Agricultural	14	13	15
3	Assembly and Manufacturing	11	10	12
4	Automobile Production	10	9	11
5	Banking and Financial Services	20	17	24
6	Chemical Process	14	13	15
7	Computer Equipment	4	4	6
8	Construction Equipment and Materials	12	11	14
9	Electrical and Steam Production and Distribution	29	26	31
10	Food, Beverage and Agricultural Processing	17	15	19
11	Furniture-Office/Other	13	12	14
12	Gaming and Entertainment	6	4	7
13	General Plant Equipment	14	12	15
14	Glass Manufacturing	18	16	19
15	Hi-Tech Manufacturing	11	9	12
16	Hospitality, Food Service and Institutional	12	11	13
17	Iron and Steel Production	20	18	21
18	Laboratory, Science and Engineering	17	15	18
19	Leather Goods Production	16	14	17
20	Linoleum Manufacturing	19	17	21
21	Marine	25	20	30
22	Material Handling Equipment	17	15	19

23	Medical and Health Sciences	10	9	11
24	Metal Working and Forming	18	17	20
25	Mining and Extractive Resources	20	18	22
26	Miscellaneous	26	23	28
27	Office Equipment	11	10	12
28	Oil and Gas Production and Distribution	23	21	25
29	Paint and Varnish Production	20	18	21
30	Photography	12	11	13
31	Plastics Production	13	12	14
32	Printing and Publishing	14	13	16
33	Railroad Equipment	24	22	28
34	Refrigeration	18	16	19
35	Rubber Production	15	13	16
36	Soap Manufacturing	17	15	18
37	Tankage	21	19	23
38	Telecommunications Equipment	11	10	13
39	Telecommunications-Wireless	9	8	11
40	Telecommunications-Wireline	11	9	14
41	Textile and Clothing Manufacturing	19	17	21
42	Vehicles	8	7	9
43	Wastewater Treatment	20	18	22
44	Water Filtration Plant	20	18	22
45	Wood, Paper and Paper Products	18	16	20



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
1	AEROSPACE INDUSTRY EQUIPMENT	8	7	9
1	AEROSPACE PRODUCTS MFG EQUIPMENT, HEAVY EQUIP	12	11	13
1	AEROSPACE PRODUCTS MFG EQUIPMENT, LIGHT EQUIP	8	7	9
1	AIR TRANSPORT EQUIPMENT, PASSENGER & COMMERCIAL	10	9	10
1	AIR TRANSPORTATION	15	14	16
1	AIRCRAFT COMMUNICATION EQUIPMENT	4	4	6
1	AIRCRAFT ENGINES	6000 FLY HRS	6000 FLY HRS	6000 FLY HRS
1	AIRCRAFT, COMMERCIAL	30	27	33
1	AIRCRAFT, CORPORATE	30	27	33
1	AIRPORT & AIRWAY LIGHTING EQUIPMENT	15	14	16
1	AIRWAY COMMUNICATION EQUIPMENT	6	5	7
1	FUEL STORAGE & DISTRIBUTION EQUIPMENT	10	9	11
1	FURNITURE, FIXTURES & OFFICE EQUIPMENT	15	14	16
1	HANGAR EQUIPMENT	10	9	11
1	HELICOPTERS, GENERAL AVIATION	25	20	30
1	MACHINERY & EQUIPMENT, MAINTENANCE RELATED	15	14	16
1	MISCELLANEOUS FLYING EQUIPMENT	5	5	6
1	MISCELLANEOUS GROUND EQUIPMENT	10	9	11
1	MOTOR VEHICLES & EQUIPMENT	5	5	6
1	PROPELLERS, FULL FEATHERING	4000 FLY HRS	4000 FLY HRS	4000 FLY HRS
1	PROPELLERS, REGULAR	2000 FLY HRS	2000 FLY HRS	2000 FLY HRS
1	SHOP EQUIPMENT	10	9	11
1	SMALL TOOLS	10	9	11
2	AGRICULTURE PRODUCTION MACHINERY & EQUIPMENT	15	14	16
2	AGRICULTURAL EQUIPMENT	8	7	9
2	BARRELS, DIP	6	5	7
2	BEEHIVES	10	9	11

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
2	BENCHES	15	14	16
2	BINDERS, CORN	12	11	13
2	BINDERS, GRAIN	14	13	15
2	BINS, METAL	20	18	22
2	BOILERS	20	18	22
2	BUNCHERS, CLOVER	15	14	16
2	BURNERS, OIL	15	14	16
2	CABLES, STEEL	8	7	9
2	CANALS; WOOD SIPHON	25	23	27
2	CANNING MACHINES	15	14	16
2	CARRIERS, FEED	15	14	16
2	CARRIERS, HAY	20	18	22
2	CARRIERS, LITTER	5	5	6
2	CARTS, DUMP & FARM	8	7	9
2	CARTS, HANDv	5	5	6
2	CLEANING & GRADING EQUIPMENT	15	14	16
2	CLIPPERS, HORSE	8	7	9
2	CONVEYORS & ELEVATORS	15	14	16
2	COVERS, CANVAS	8	7	9
2	CRIBS, CORN, STEEL	15	14	16
2	CRIBS, CORN, WOOD	30	27	33
2	CRUSHERS, CORN & COB	15	14	16
2	CULTIVATORS	15	14	16
2	CULVERTS, GALVANIZED, CORRUGATED IRON	25	23	27
2	CULVERTS, RIVETED STEEL	33	30	36
2	CUPS, TURPENTINE	5	5	6
2	CUTTERS, FEED	12	11	13
2	CUTTERS, ROTARY STAMP	20	18	22
2	DIGGERS, POTATO	15	14	16
2	DISTRIBUTORS, FERTILIZER	12	11	13
2	DRILLS, GRAIN	15	14	16
2	DRILLS, WELL	10	9	11
2	DROSS PLANTS	10	9	11



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
2	ELEVATORS & WAGON DUMPS, GRAIN	15	14	16
2	ENGINES, DIESEL	15	14	16
2	ENGINES, GASOLINE	10	9	11
2	FEEDERS	8	7	9
2	FENCE MACHINES	5	5	6
2	FENCE POSTS, STEEL	30	27	33
2	FENCES, SNOW	8	7	9
2	FENCES, WOOD	15	14	16
2	FENCING, WOVEN WIRE	15	14	16
2	FISHING EQUIPMENT, EXCLUDING BOATS	4	4	4
2	FLUMES	25	23	27
2	FORGES, PORTABLE	12	11	13
2	FUMIGATORS	10	9	11
2	FURNACES, EVAPORATOR, DRY	15	14	16
2	FURNACES, HEATING	25	23	27
2	FURROW OPENERS, DISK	15	14	16
2	GATES, FARM	15	14	16
2	GENERATORS, GAS, ACETYLENE	12	11	13
2	GRINDERS, GRAIN & FEED	15	14	16
2	HARROWS	12	11	13
2	HARVESTERS, GRAIN	15	14	16
2	HEADERS	15	14	16
2	HOISTS & FORKS, HAY	12	11	13
2	HULLERS, CLOVER & ALFALFA	15	14	16
2	HUSKERS	15	14	16
2	ICE BOXES	12	11	13
2	INCUBATORS & BROODERS	15	14	16
2	LABORATORY EQUIPMENT	8	7	9
2	LISTERS	15	14	16
2	LOADERS, HAY & SEED	10	9	11
2	LOGGING EQUIPMENT	5	5	6
2	MILKING MACHINES	15	14	16
2	MILLS & PRESSES, CIDER	15	14	16
2	MILLS, CORN, PORTABLE	12	11	13
2	MILLS, FEED	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
2	MOWERS, ELECTRIC TRIMMERS	3	3	3
2	MOWERS, FARM	10	9	11
2	MOWERS, GANG	5	5	6
2	MOWERS, HAND	5	5	6
2	MOWERS, LAWN	5	5	6
2	NETS, GILL	4	4	4
2	NETS, TRAP	5	5	6
2	ORCHARD TOOLS	5	5	6
2	PACKING TOOLS	10	9	11
2	PENS, LIVESTOCK	20	18	22
2	PICKING MACHINES	5	5	6
2	PLANTERS	15	14	16
2	PLOWS	15	14	16
2	PRESSES, HAY, BALING	12	11	13
2	PULLERS & GRUBBERS, STUMP	20	18	22
2	PULLERS, BEET	15	14	16
2	PULVERIZERS, LIMESTONE	10	9	11
2	PUMPS, BUCKET	15	14	16
2	PUMPS, CENTRIFUGAL OR ROTARY	15	14	16
2	PUMPS, PLUNGER	15	14	16
2	RACKS, FEED	10	9	11
2	RACKS, HAY & STACK	15	14	16
2	RAKES, HAY	15	14	16
2	REFRIGERATORS, ELECTRIC	12	11	13
2	SADDLES	10	9	11
2	SAWS, CIRCULAR	5	5	6
2	SCALES, PORTABLE	15	14	16
2	SCALES, TRUCK OR WAGON	25	23	27
2	SEEDERS, ALL TYPES	15	14	16
2	SEINES, GEARS, ETC.	4	4	4
2	SEPARATORS, CREAM OR GRAIN	15	14	16
2	SETTERS, PLANT	12	11	13
2	SHEARING MACHINES, HAND & POWER	10	9	11
2	SHELLERS, CORN	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
2	SHREDDERS	15	14	16
2	SILOS, CONCRETE	50	45	55
2	SILOS, METAL & GLASS	25	23	27
2	SILOS, WOODEN	20	18	22
2	SLEDS & SLEIGHS	15	14	16
2	SMUDGE POTS	10	9	11
2	SORTERS, POTATO	15	14	16
2	SOWERS, GRAIN, BROADCAST	15	14	16
2	SOWERS, LIME	8	7	9
2	SPRAYERS	15	14	16
2	SPREADERS, MANURE	15	14	16
2	STACKERS, HAY	15	14	16
2	SUBSOILERS	15	14	16
2	TANKS, GRAIN, CONCRETE	50	45	55
2	TANKS, GRAIN, METAL	25	23	27
2	TANKS, TURPENTINE	5	5	6
2	TANKS, WAGON	10	9	11
2	TANKS, WATER, STEEL	40	36	44
2	TANKS, WATER, WOOD	20	18	22
2	TANKS, WATERING	20	18	22
2	TARPAULINS	8	7	9
2	TRACTORS	12	11	13
2	TRAPS & LEADERS	6	5	7
2	TROUGHS, IRON & STEEL	15	14	16
2	VATS, DIPPING	10	9	11
2	WAGON BEDS & RACKS	6	5	7
2	WAGON GEAR--WOOD WHEELS	12	11	13
2	WAGONS, LIGHT	12	11	13
2	WAGONS, TRUCKING, HEAVY DUTY	10	9	11
2	WEIGHERS & BAGGING, GRAIN	20	18	22
2	WIND-MILLS	20	18	22
3	ALUMINUM WARE PRODUCTION EQUIP- MENT	20	18	22
3	BLACKSMITH SHOP EQUIPMENT	20	18	22
3	BLACKSMITH SHOP EQUIPMENT	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
3	BLACKSMITH SHOP OUTFITS, PORTABLE	4	4	4
3	CLOCKS & WATCHES MANUFACTURING EQUIPMENT	8	7	9
3	COMPRESSORS, AIR	20	18	22
3	CONVEYORS, MATERIAL HANDLING	20	18	22
3	ELECTRICAL & NONELECTRICAL MACHINERY MFG EQUIP	8	7	9
3	ELECTRICAL EQUIPMENT MANUFACTURING EQUIPMENT	8	7	9
3	FILM & TAPE MANUFACTURING EQUIPMENT	10	9	10
3	FOUNDRY PRODUCTS MANUFACTURING EQUIPMENT	11	10	12
3	FURNACES & OVENS	20	18	22
3	JEWELRY MANUFACTURING EQUIPMENT	10	9	10
3	MUSICAL INSTRUMENT MANUFACTURING EQUIPMENT	10	9	10
3	OFFICE & ART SUPPLY MANUFACTURING EQUIPMENT	10	9	10
3	ROBOTS-INDUSTRIAL ALL TYPES	8	7	9
3	SPORTING GOODS MANUFACTURING EQUIPMENT	10	9	10
3	TOY MANUFACTURING EQUIPMENT	10	9	10
3	TRANSMISSION & DISTRIBUTION FACILITIES EQUIPMENT	24	22	26
3	WASTE REDUCTION & RESOURCE RECOVERY PLANT EQUIP	8	7	9
4	ACCESSORY EQUIPMENT, AUTOMOTIVE	8	7	9
4	AUTOMOBILE REPAIR SHOP EQUIPMENT	8	7	9
4	INTERNAL COMBUSTION ENGINES (DIESEL TYPE)	25	23	27
4	MANUFACTURING, EQUIPMENT	15	14	16
4	MOTOR VEHICLE MANUFACTURING EQUIPMENT, LIGHT	10	9	10
4	MOTOR VEHICLE SPECIAL TOOLING	3	3	5
4	MOTOR VEHICLES MANUFACTURING EQUIPMENT, HEAVY	15	14	16
4	REPAIR SHOP, GENERAL EQUIPMENT	10	9	11
5	BANK ALARM SYSTEMS	10	9	12



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
5	BANK VAULT DOORS	30	25	35
5	SAFETY DEPOSIT BOXES	30	25	35
5	TELLER MACHINES-AUTOMATIC (ATM)	10	8	12
6	ABSORBERS, GAS	16	14	18
6	ABSORBERS, GENERAL	10	9	11
6	ABSORBERS, SPECIAL	20	18	22
6	ACETIC, BLOW CASES, CAST IRON & COPPER	3	3	3
6	ACETIC, COLUMNS, FRACTIONATING	3	3	3
6	ACETIC, CONDENSERS, COPPER	10	9	11
6	ACETIC, CONDENSERS, DURIRON	10	9	11
6	ACETIC, CONDENSERS, LEAD	6	5	7
6	ACETIC, MOTORS	10	9	11
6	ACETIC, PIPES, ACID, COPPER	10	9	11
6	ACETIC, PIPES, ACID, RUBBER	8	7	9
6	ACETIC, PIPES, ALUMINUM	3	3	3
6	ACETIC, PIPES, GLASS	5	5	6
6	ACETIC, PIPES, WATER	10	9	11
6	ACETIC, POTS	10	9	11
6	ACETIC, PUMPS, VACUUM	7	6	8
6	ACETIC, RECEIVERS, ACID (STONEWARE)	10	9	11
6	ACETIC, RECEIVERS, ACID, FOR PRODUCT-STONEWARE	20	18	22
6	ACETIC, SCRUBBERS (STONEWARE)	10	9	11
6	ACETIC, STILLS, CAST IRON	12	11	13
6	ACETIC, STILLS, REFINING, COPPER	20	18	22
6	ACETIC, STILLS, REFINING, HEATING COIL	3	3	3
6	ACETIC, TANKS, STORAGE, STEEL	25	23	27
6	ACETIC, TANKS, STORAGE, WOOD	25	23	27
6	AIR WASHERS	20	18	22
6	AUTOCLAVES	10	9	11
6	BAGGING MACHINES	15	14	16
6	BARRELS, TILTING & TUMBLING	8	7	9
6	BINS, CHARGING	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	BINS, STORAGE	25	23	27
6	BLOWERS, NONCORROSIVE FUMES	25	23	27
6	BREAKERS, MATERIALS	12	11	13
6	BRIQUETTING MACHINES	13	12	14
6	BUCKETS, CHARGING	8	7	9
6	BURNERS, PHOSPHORUS	10	9	11
6	CELLS, CHLORINE	6	5	7
6	BINS, STORAGE	25	23	27
6	BLOWERS, NONCORROSIVE FUMES	25	23	27
6	BREAKERS, MATERIALS	12	11	13
6	BRIQUETTING MACHINES	13	12	14
6	BUCKETS, CHARGING	8	7	9
6	BURNERS, PHOSPHORUS	10	9	11
6	CELLS, CHLORINE	6	5	7
6	CELLS, ELECTROLYTIC	15	14	16
6	CENTRIFUGALS	20	18	22
6	CHARGING MACHINES	12	11	13
6	CHEMICAL & ALLIED PRODUCTION EQUIPMENT	8	7	8
6	CHEMICAL MANUFACTURING EQUIP- MENT	15	14	16
6	CHLORINATORS	12	11	13
6	CLASSIFIERS	20	18	22
6	COKE QUENCHERS	15	14	16
6	COLUMNS, AMMONIA	6	5	7
6	COLUMNS, OTHERS	10	9	11
6	COLUMNS, OXYGEN	8	7	9
6	COMPRESSORS, AIR	15	14	16
6	COMPRESSORS, AIR	15	14	16
6	COMPRESSORS, AIR	15	14	16
6	COMPRESSORS, CARBONIC DRY ICE	6	5	7
6	COMPRESSORS, CHLORINE DRY GAS	20	18	22
6	COMPRESSORS, FOR CARBON DIOXIDE	20	18	22
6	COMPRESSORS, GAS PUMPS	15	14	16
6	COMPRESSORS, NITROGEN	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	COMPRESSORS, OXYGEN	15	14	16
6	CONCENTRATE & EVAPORATE UNITS, POTASSIUM CARBONATE	20	18	22
6	CONCENTRATING UNITS (AMMONIUM CHLORIDE)	12	11	13
6	CONCENTRATORS, HYDRAULIC TYPE	12	11	13
6	CONDENSERS (CLOSED TYPE)	20	18	22
6	CONDENSERS, CONCRETE CONSTRUCTION	25	23	27
6	CONDENSERS, STEEL, WITH TUBES	20	18	22
6	CONTAINERS, COPPER	9	8	10
6	CONVEYORS-BELT	20	18	22
6	COOLERS	10	9	11
6	COOLERS, AFTER, FORE & INTER	17	15	19
6	COOLERS, BRINE	20	18	22
6	COOLERS, GAS	15	14	16
6	COOLERS, LEAD-LINED	15	14	16
6	COOLERS, ROTARY	20	18	22
6	CRUSHERS, GYRATORY, JAW & ROLL	15	14	16
6	CRYSTALLIZERS	15	14	16
6	CYLINDER DRYING CHAMBERS	18	16	20
6	CYLINDER TESTING APPARATUS	10	9	11
6	CYLINDERS	25	23	27
6	DIGESTERS	10	9	11
6	DIGESTERS, LEAD-LINED	15	14	16
6	DISHES, SILICA	10	9	11
6	DISSOLVERS, LEAD-LINED	15	14	16
6	DRAINERS, LEAD-LINED	15	14	16
6	DRYERS, OXYGEN	14	13	15
6	DRYERS, ROTARY & TUNNEL TYPES	20	18	22
6	DRYERS, ROTARY TUBE	10	9	11
6	DRYERS, SALT (CALCIUM CHLORIDE)	16	14	18
6	DRYERS, STEAM (BICARBONATE OF SODA)	20	18	22
6	DRYERS, VACUUM	20	18	22
6	DRYING PANS, LEAD-LINED	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	DUST COLLECTORS	15	14	16
6	EGGS, LEAD-LINED	20	18	22
6	ELEVATORS, BUCKET & BELT	15	14	16
6	ELEVATORS, SCREW CONVEYORS	15	14	16
6	ENGINES, EXPANSION	25	23	27
6	EVAPORATING PANS, STEAM JACKETED KETTLES	15	14	16
6	EVAPORATORS	17	15	19
6	EVAPORATORS, CAUSTIC SODA-CAST IRON	17	15	19
6	EVAPORATORS, LEAD-LINED	15	14	16
6	EVAPORATORS, STEAM	15	14	16
6	FANS	15	14	16
6	FEEDERS, LIME	19	17	21
6	FILLERS, BAG	14	13	15
6	FILTER PRESSES, CAST-IRON PLATES	15	14	16
6	FILTER PRESSES, STEEL LEAVES	20	18	22
6	FILTER WHEELS FOR CAUSTICIZER	20	18	22
6	FLAKER WHEELS WITH SPEED REDUCER	15	14	16
6	FURNACES, CALCINING BICARBONATE OF SODA TO SODA ASH	6	5	7
6	FURNACES, ELECTRIC	15	14	16
6	FURNACES, ELECTRIC, CARBIDE & MET- ALLURGICAL	20	18	22
6	FURNACES, GAS FOR HEAT TREATING, TORCHING & BRANDING	8	7	9
6	FURNACES, PRE-HEATING & WELDING	12	11	13
6	GENERATORS, ACETYLENE	12	11	13
6	GRINDERS	12	11	13
6	HEATERS, ELECTRIC, HOT PLATE	15	14	16
6	HEATERS, ELECTRIC, HOT WATER	12	11	13
6	HOLDERS, GAS	25	23	27
6	HOLDERS, OXYGEN	25	23	27
6	HOPPERS, SHEET METAL	15	14	16
6	HYDRATORS	12	11	13
6	HYDROLYZERS	7	6	8



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	INCINERATORS	22	20	24
6	INTERCHARGERS, HEAT	15	14	16
6	KETTLES, MELTING	6	5	7
6	KETTLES, NITRATING	6	5	7
6	KETTLES, REDUCING	6	5	7
6	KETTLES, SALT	6	5	7
6	KETTLES, STEAM JACKETED	15	14	17
6	KILNS, CALCINATING	20	18	22
6	KILNS, LIME	20	18	22
6	KILNS, ROTARY	15	14	16
6	KILNS, ROTARY	20	18	22
6	KILNS, VERTICAL	20	18	22
6	LIQUEFIERS	14	13	15
6	METERING EQUIPMENT, ELECTRIC	12	11	13
6	METERS, LIQUID MEASURING	10	9	11
6	MILLS	12	11	13
6	MILLS, GRINDING	20	18	22
6	MILLS, STAMP	12	11	13
6	MIXERS, HEAVY	20	18	22
6	MIXERS, LIGHT	12	11	13
6	MOTOR GENERATOR SETS	20	18	22
6	MOTORS	20	18	22
6	MURIATIC, AIR LIFTS (HARD RUBBER)	10	9	11
6	MURIATIC, CARS, TANK	10	9	11
6	MURIATIC, COOLERS	10	9	11
6	MURIATIC, ELEVATORS, BUCKET	10	9	11
6	MURIATIC, EXHAUSTERS, RUBBER-LINED	8	7	9
6	MURIATIC, FLUES, EARTHENWARE	10	9	11
6	MURIATIC, FURNACES, MANHEIM	8	7	9
6	MURIATIC, FURNACES, POT & MUFFLE	10	9	11
6	MURIATIC, FURNACES, RETORT	8	7	9
6	MURIATIC, GRINDERS & COOLERS, SALT CAKE	12	11	13
6	MURIATIC, MOTORS	14	13	15

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	MURIATIC, PIPES, ACID-HARD RUBBER	7	6	8
6	MURIATIC, PIPES, CHEMICAL WARE	2	2	2
6	MURIATIC, PIPES, OIL	20	18	22
6	MURIATIC, PIPES, WATER	4	4	4
6	MURIATIC, POTS, CONDENSING-EARTH- ENWARE	7	6	8
6	MURIATIC, PUMPS & BLOWCASES, CHEM- ICAL WARE-LINED	3	3	3
6	MURIATIC, PUMPS & BLOWCASES, RUB- BER-LINED BLOWCASE	5	5	6
6	MURIATIC, STORAGE TANKS-WOODEN, RUBBER-LINED	14	13	15
6	MURIATIC, TANKS, SULPHURIC-ACID STORAGE-STEEL	20	18	22
6	MURIATIC, TOURILLES, SILICA	10	9	11
6	MURIATIC, TOWERS, ABSORBING	10	9	11
6	NITRIC, BLOWCASES-EARTHENWARE	2	2	2
6	NITRIC, BLOWERS-STONEWARE	5	5	6
6	NITRIC, CONDENSERS, S BEND-STONE- WARE	2	2	2
6	NITRIC, CONDENSERS-DURIRON	12	11	13
6	NITRIC, ELEVATORS & CONVEY- ORS-SCREW	10	9	11
6	NITRIC, FLUES, GAS-DURIRON	8	7	9
6	NITRIC, PANS, NITER CAKE-STEEL	10	9	11
6	NITRIC, PIPES & FITTINGS-EARTHEN- WARE, DURIRON, LEAD	2	2	2
6	NITRIC, PUMPS, SULPHURIC (IRON), CEN- TRIFUGAL	5	5	6
6	NITRIC, RECEIVERS-STONEWARE	5	5	6
6	NITRIC, RETORTS, 24-HOUR SERVICE	3	3	3
6	NITRIC, TANKS-STEEL	10	9	11
6	NITRIC, TOWERS, CONDENSING	9	8	10
6	OXYGEN FILLING MANIFOLDS	12	11	13
6	OXYGEN MANIFOLDS	20	18	22
6	PANS, MELTING	6	5	7
6	PANS, NITRATING	6	5	7
6	PANS, REDUCING	6	5	7



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	PANS, SETTLER	20	18	22
6	PANS, STEAM JACKETED	6	5	7
6	PIPE, SILICA	4	4	4
6	PIPING, AIR, GAS, STEAM, WATER	20	18	22
6	PIPING, CORROSIVE MATTER	15	14	16
6	POTS, CAST IRON	12	11	13
6	POTS, CAUSTIC	18	16	20
6	POTS, CERAMICS	15	14	16
6	POTS, FURNACE (CAST-IRON)	20	18	22
6	POTS, MELTING (CAST-IRON)	15	14	16
6	PRECIPITATORS	18	16	20
6	PRE-HEATERS	9	8	10
6	PRESSES, FILTER	17	15	19
6	PULVERIZERS	12	11	13
6	PUMPS, CAUSTIC SODA, CENTRIFUGAL TYPE	18	16	20
6	PUMPS, CHLORINE DRY GAS	18	16	20
6	PUMPS, CORROSIVE LIQUOR	10	9	11
6	PUMPS, WATER	15	14	16
6	PURIFIERS	18	16	20
6	REACTORS, ELECTRICAL	20	18	22
6	RECEIVERS, COPPER	9	8	10
6	RECEIVERS, VACUUM	20	18	22
6	RECOVERY UNITS	7	6	8
6	REGULATORS, TEMPERATURE	10	9	11
6	RETORTS	25	23	27
6	RETORTS, CAST IRON	20	18	22
6	ROTARY CONVERTERS	25	23	27
6	SATURATORS	12	11	13
6	SCALES	15	14	16
6	SCOOPERS, BUCKET TYPE	10	9	11
6	SCREENS	12	11	13
6	SCRUBBERS	20	18	22
6	SCRUBBERS, GAS	15	14	16
6	SCRUBBERS, VACUUM	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	SEPARATORS	20	18	22
6	SETTLING UNITS-CALCIUM CHLORIDE	15	14	16
6	SIFTERS	12	11	13
6	SLAKERS	21	19	23
6	SPEED REDUCERS	15	14	16
6	STILLS (CLOSED TYPE)	17	15	19
6	STILLS, LEAD	10	9	11
6	STOKERS, TO KILN	15	14	16
6	SULPHURIC (CONTACT), PIPES, ACID	10	9	11
6	SULPHURIC (CHAMBER), AIR LIFTS, ACID	10	9	11
6	SULPHURIC (CHAMBER), BLOWCASES	10	9	11
6	SULPHURIC (CHAMBER), BLOWERS, GAS (LEAD)	15	14	16
6	SULPHURIC (CHAMBER), CHAMBERS	15	14	16
6	SULPHURIC (CHAMBER), COOLERS, ACID (LEAD COIL)	10	9	11
6	SULPHURIC (CHAMBER), FANS (CAST IRON)	10	9	11
6	SULPHURIC (CHAMBER), PIPES (LEAD)	10	9	11
6	SULPHURIC (CHAMBER), POTS, NITER	20	18	22
6	SULPHURIC (CHAMBER), PUMPS, ACID	5	5	6
6	SULPHURIC (CHAMBER), TANKS (STEEL), ACID STORAGE	20	18	22
6	SULPHURIC (CHAMBER), TANKS, TOWER, ACID, DISTRIBUTING	8	7	9
6	SULPHURIC (CONTACT) PUMPS, ACID (LEAD)	8	7	9
6	SULPHURIC (CONTACT) SEPARATORS	14	13	15
6	SULPHURIC (CONTACT) SUBLIMERS, BRIMSTONE	10	9	11
6	SULPHURIC (CONTACT), AIR LIFTS	14	13	15
6	SULPHURIC (CONTACT), BLOWCASES (CAST IRON & STEEL)	5	5	6
6	SULPHURIC (CONTACT), BLOWERS	20	18	22
6	SULPHURIC (CONTACT), BURNERS, BRIMSTONE	10	9	11
6	SULPHURIC (CONTACT), BURNERS, OTHER	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	SULPHURIC (CONTACT), COKE BOXES	17	15	19
6	SULPHURIC (CONTACT), COMBUSTION CHAMBERS, BRIMSTONE	10	9	11
6	SULPHURIC (CONTACT), COMPRESSORS, AIR	15	14	16
6	SULPHURIC (CONTACT), CONTACT MASS, (PLATES & SUPPORTS)	17	15	19
6	SULPHURIC (CONTACT), CONVERTERS	14	13	15
6	SULPHURIC (CONTACT), CONVEYORS & ELEVATORS	10	9	11
6	SULPHURIC (CONTACT), COOLERS, DRY-ING ACID	10	9	11
6	SULPHURIC (CONTACT), COOLERS, GAS	14	13	15
6	SULPHURIC (CONTACT), COOLERS, GAS, TOWER	10	9	11
6	SULPHURIC (CONTACT), DUST CHAMBERS (BRICK)	14	13	15
6	SULPHURIC (CONTACT), FILTERS, PRE-LIMINARY	11	10	12
6	SULPHURIC (CONTACT), FLUES (IRON)	13	12	14
6	SULPHURIC (CONTACT), GAUGES, METERS, PYROMETERS	14	13	15
6	SULPHURIC (CONTACT), HEATERS, PRE-LIMINARY	14	13	15
6	SULPHURIC (CONTACT), MELTERS, BRIMSTONE	10	9	11
6	SULPHURIC (CONTACT), MOTORS	17	15	19
6	SULPHURIC (CONTACT), PLATINUM, IN CATALYST	20	18	22
6	SULPHURIC (CONTACT), PUMPS, ACID (IRON)	7	6	8
6	SULPHURIC (CONTACT), TANK CARS (STEEL)	12	11	13
6	SULPHURIC (CONTACT), TANKS, ROASTED ORE STG (STEEL)	20	18	22
6	SULPHURIC (CONTACT), TANKS, STORAGE (LEAD)	20	18	22
6	SULPHURIC (CONTACT), TANKS, STORAGE (STEEL)	17	15	19

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	SULPHURIC (CONTACT), TOWERS, ABSORBING	9	8	10
6	SULPHURIC (CONTACT), TOWERS, COOLER, COLD SCRUB	12	11	13
6	SULPHURIC (CONTACT), TOWERS, DRY	10	9	11
6	SULPHURIC (CONTACT), TOWERS, OLEUM	10	9	11
6	SULPHURIC (CONTACT), TOWERS, SCRUB	10	9	11
6	SULPHURIC (CONTACT), TRANSFERS	9	8	10
6	SULPHURIC (CONTACT), BURNERS, GLENS FALLS	10	9	11
6	SULPHURIC, (CHAMBER), TOWERS	20	18	22
6	TANKS, ALUMINUM	15	14	16
6	TANKS, ASH STORAGE	20	18	22
6	TANKS, BOTTOM DISSOLVER (CAUSTIC PLANT)	20	18	22
6	TANKS, CAST-IRON	25	23	27
6	TANKS, DISSOLVER & MIXER	20	18	22
6	TANKS, FEEDER, STEEL	20	18	22
6	TANKS, FILTER WHEEL CAUSTICIZER	20	18	22
6	TANKS, GALVANIZED-IRON	15	14	16
6	TANKS, HOT WATER STORAGE	15	14	16
6	TANKS, LEAD-LINED	15	14	16
6	TANKS, LIME	20	18	22
6	TANKS, MIXING	20	18	22
6	TANKS, MUD	20	18	22
6	TANKS, MUD STORAGE	20	18	22
6	TANKS, SALT SETTLING	20	18	22
6	TANKS, SETTLING	20	18	22
6	TANKS, STEEL OR CONCRETE LINED	15	14	16
6	TANKS, STORAGE	20	18	22
6	TANKS, STORAGE (WEAK CAUSTIC SODA SOLUTION)	20	18	22
6	TANKS, THICKENER	20	18	22
6	TANKS, TOWERS	20	18	22
6	TANKS, WOODEN, LEAD LINED	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
6	THICKENERS	17	15	19
6	TOWERS, ACID & REACTION	5	5	6
6	TOWERS, CARBONATING & PRECIPITATING	20	18	22
6	TOWERS, COOLING	7	6	8
6	TOWERS, COOLING	20	18	22
6	TOWERS, DECARBONIZING (STEEL DRUM TYPE)	10	9	11
6	TOWERS, DISTILLATION	20	18	22
6	TOWERS, PURIFIER	15	14	16
6	TOWERS, STEEL	20	18	22
6	TOWERS, WASHING (FOR CHLORINE GAS), CAST IRON	20	18	22
6	TOWERS, WASHING (FOR CHLORINE GAS), STONE	20	18	22
6	TRANSFORMERS	25	23	27
6	TROUGHES, SILICA	4	4	4
6	WASHERS	20	18	22
7	COMPUTER PERIPHERALS	5	5	7
7	COMPUTERS, DESK TOP	3	3	3
7	COMPUTERS, LAPTOP	3	3	5
7	COMPUTERS, MAINFRAME	5	5	8
7	DATA HANDLING EQUIPMENT, COMPUTERS & TERMINALS	3	3	5
7	DATA HANDLING EQUIPMENT, EXCEPT COMPUTERS	5	4	6
7	INFORMATION SYSTEMS, COMPUTER & PERIPHERAL EQUIP	5	5	8
8	AGITATORS	15	14	16
8	AGITATORS, HEAVY DUTY	25	23	27
8	AUGERS	14	13	15
8	BACKFILLERS, POWER, HEAVY	15	14	16
8	BACKFILLERS, POWER, MEDIUM	5	5	6
8	BACKFILLERS, POWER, TRACTOR	8	7	9
8	BAGGERS	15	14	16
8	BATCH PLANTS, ALL STEEL, DEMOUNTABLE	10	9	11

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	BATCH PLANTS, STATIONARY	14	13	15
8	BATCH PLANTS, STEEL FRAME, WOOD BIN	10	9	11
8	BATCH, MEASURING DEVICES	4	4	4
8	BEATERS, TUB	15	14	16
8	BENDERS, BAR	10	9	11
8	BENDERS, WIRE	18	16	20
8	BENDING BLOCKS	10	9	11
8	BENDING MACHINES, ANGLE	15	14	16
8	BENDING MACHINES, PIPE	15	14	16
8	BENDING MACHINES, RAIL	15	14	16
8	BIN FRAMES, STEEL	6	5	7
8	BINS, PLASTIC	10	9	12
8	BINS, STEEL	12	11	13
8	BINS, STEEL, CONCRETE	6	5	7
8	BINS, WOOD	8	7	9
8	BLOCK MACHINES	18	16	20
8	BLOCKS, PULLEY, DIFFERENTIAL	6	5	7
8	BLOWERS	15	14	16
8	BLOWERS, MECHANICAL	10	9	11
8	BOILERS	25	23	27
8	BOILERS, STATIONARY	20	18	22
8	BOILERS, UPRIGHT	7	6	8
8	BORERS (WOOD), PORTABLE	3	3	3
8	BORING APPARATUS, TEST	10	9	11
8	BOXES, MORTAR & BATCH	3	3	3
8	BREAKERS, PAVEMENT, PNEUMATIC	3	3	3
8	BRICK MAKING MACHINES	15	14	16
8	BUCKETS, BALL, PIVOT TURNOVER	5	5	6
8	BUCKETS, CABLEWAY	6	5	7
8	BUCKETS, CLAMSHELL	6	5	7
8	BUCKETS, CONCRETE	5	5	6
8	BUCKETS, ELEVATOR	5	5	6
8	BUCKETS, ORANGE PEEL	6	5	7
8	BUCKETS, SCRAPER OR DRAG LINE	6	5	7



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	BUGGLES	10	9	11
8	BUGGLES, CONCRETE	3	3	3
8	BUGGLES, TIMBER	3	3	3
8	BULLDOZERS, TRACTOR	15	14	16
8	BUNDLING MACHINES	18	16	20
8	BUNKERS, STONE PORTABLE, WITH SCREENS	10	9	11
8	BURNER EQUIPMENT, GAS & OIL	12	11	13
8	BURNERS	15	14	16
8	CABLES, WIRE	4	4	4
8	CABLEWAY CARRIAGES	5	5	6
8	CABLEWAYS	15	14	16
8	CABLEWAYS, CABLE ONLY	3	3	3
8	CALCINERS, CONTINUOUS	15	14	16
8	CAMPING EQUIPMENT	3	3	3
8	CAPSTANS, ELECTRIC	10	9	11
8	CARS, BALLAST SPREADER	30	27	33
8	CARS, BATCH	12	11	13
8	CARS, BATCH BOX, STEEL	30	27	33
8	CARS, BOARDING & TOOL	20	18	22
8	CARS, CONCRETE	12	11	13
8	CARS, DERRICK, BRIDGE	10	9	11
8	CARS, DRYER OR KILN	15	14	16
8	CARS, DUMP, STEEL	12	11	13
8	CARS, DUMP, WOOD	6	5	7
8	CARS, FLAT, STEEL	30	27	33
8	CARS, FLAT, WOOD	30	27	33
8	CARS, HAND	10	9	11
8	CARS, HOPPER	30	27	33
8	CARS, MINE, STEEL	12	11	13
8	CARS, MINE, WOOD	10	9	11
8	CARS, QUARRY	16	14	18
8	CARS, SCALE	10	9	11
8	CARS, TANK	25	23	27
8	CARTS, CONCRETE	3	3	3

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	CARTS, TOOL (STEEL)	4	4	4
8	CATERPILLAR TRACTORS, AG OR CON- STRUCTION	12	11	13
8	CEMENT GUN MACHINES	4	4	4
8	CEMENT MANUFACTURING EQUIPMENT	15	14	16
8	CEMENT MANUFACTURING EQUIPMENT, LIGHT	15	14	16
8	CEMENT PRODUCTION EQUIPMENT	25	23	27
8	CHAINS, HAWSERS & LINES	6	5	7
8	CHAINS, POWER, TRANSMISSION	5	5	6
8	CHANNELERS, ROCK	6	5	7
8	CHIPPING & CAULKING TOOLS, PNEU- MATIC	3	3	3
8	CHUTES, CONCRETE, GRAVITY	2	2	2
8	CLAMPS, COLUMN FORM	5	5	6
8	CLAY PRODUCTS MANUFACTURING EQUIPMENT	12	11	13
8	CLEANING MACHINES FOR EXTERIOR OF BUILDING	15	14	16
8	COLLECTORS, DUST	20	18	22
8	COMPRESSORS, BELT DRIVEN	15	14	16
8	COMPRESSORS, ELECTRIC, PORTABLE	10	9	11
8	COMPRESSORS, GASOLINE, PORTABLE	10	9	11
8	COMPRESSORS, MOTOR-TRUCK UNIT	15	14	16
8	COMPRESSORS, STEAM PORTABLE	10	9	11
8	CONCRETE MIXERS, ELECTRIC	10	9	11
8	CONCRETE MIXERS, GASOLINE, 10S, 14S	10	9	11
8	CONCRETE MIXERS, GASOLINE, 21S, 28S	10	9	11
8	CONCRETE MIXERS, GASOLINE, 3 1/2S, 5S, 7S	8	7	9
8	CONCRETE MIXERS, PAVING, GAS	10	9	11
8	CONCRETE MIXERS, PAVING, STEAM	10	9	11
8	CONCRETE MIXERS, STEAM	10	9	11
8	CONCRETE MIXERS, TRUCK MOUNTED	5	5	6
8	CONDENSERS	20	18	22
8	CONSTRUCTION EQUIPMENT, LIGHT	5	5	6
8	CONTROLLERS, MOTOR	12	11	13



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	CONTROLLERS, TEMPERATURE, AUTO-MATIC	10	9	11
8	CONVEYORS, BELT, ELEVATING, PORTABLE	15	14	16
8	CONVEYORS, BELT, ELEVATING, STATIONARY	15	14	16
8	CONVEYORS, BUCKET	15	14	16
8	CONVEYORS, CABLE, DRAG	15	14	16
8	CONVEYORS, CABLE, MONORAIL	15	14	16
8	CONVEYORS, CHAIN, PORTABLE	15	14	16
8	CONVEYORS, PORTABLE	5	5	6
8	CONVEYORS, SCRAPER	6	5	7
8	CONVEYORS-BELT	15	14	16
8	COOLERS (CLINKER)	20	18	22
8	CRANES, CONSTRUCTION	12	11	13
8	CRANES, CRAWLER, ELECTRIC, 10, 15, TONS	10	12	15
8	CRANES, CRAWLER, ELECTRIC, 2 1/2, 5 TONS	8	7	9
8	CRANES, CRAWLER, ELECTRIC, 20 TONS & OVER	14	13	15
8	CRANES, CRAWLER, GAS, 10, 15 TONS	10	9	11
8	CRANES, CRAWLER, GAS, 2 1/2, 5 TONS	10	9	11
8	CRANES, CRAWLER, GAS, 20 TONS & OVER	15	14	16
8	CRANES, CRAWLER, GAS, LOCOMOTIVE GAS	15	14	16
8	CRANES, CRAWLER, STEAM, 10, 15 TONS	15	14	16
8	CRANES, CRAWLER, STEAM, 2 1/2 TONS, 5 TONS	15	14	16
8	CRANES, CRAWLER, STEAM, 20 TONS & OVER	15	14	16
8	CRANES, CRAWLER, STEAM, LOCOMOTIVE	15	14	16
8	CRANES, DOCK OR WHARF TRAVELING	25	23	27
8	CRANES, DRAG LINE	20	18	22
8	CRANES, TOWER	30	27	33
8	CRAWLERS, CONSTRUCTION TRACTOR	12	11	13

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	CRUSHERS	20	18	22
8	CRUSHERS, ROCK, PORTABLE	10	9	11
8	CRUSHERS, ROCK, STATIONARY	10	9	11
8	CUT-OFF MACHINES	14	13	15
8	CUTTERS, BAR, POWER	5	5	6
8	CUTTERS, CORRUGATED IRON, HAND	5	5	6
8	CUTTING & WELDING OUTFITS, PORTABLE	8	7	9
8	CUTTING MACHINES	14	13	15
8	DAVITS	15	14	16
8	DERRICKS, BOAT	30	25	35
8	DERRICKS, CIRCLE SWING HAND	12	11	13
8	DERRICKS, CRAB, HAND	16	14	18
8	DERRICKS, CRAB, POWER	10	9	11
8	DERRICKS, GUY, STEEL	12	11	13
8	DERRICKS, GUY, WOOD	8	7	9
8	DERRICKS, STIFFLEG	15	14	16
8	DERRICKS, STIFFLEG, STEEL	12	11	13
8	DERRICKS, STIFFLEG, WOOD	8	7	9
8	DIGGERS, CLAY, PNEUMATIC	3	3	3
8	DISINTEGRATORS	8	7	9
8	DRAG LINES, ELECTRIC, 1, 1 1/4, & 1 1/2 CUBIC YARDS	12	11	13
8	DRAG LINES, ELECTRIC, 1/2, 3/4 CUBIC YARD	12	11	13
8	DRAG LINES, ELECTRIC, 2 CUBIC YARDS & OVER	15	14	16
8	DRAG LINES, GASOLINE, 1, 1 1/4, & 1 1/2 CUBIC YARDS	12	11	13
8	DRAG LINES, GASOLINE, 1/2, 1/4 CUBIC YARD	12	11	13
8	DRAG LINES, GASOLINE, 2 CUBIC YARDS & OVER	15	14	16
8	DRAG LINES, STEAM, 1, 1 1/4 & 1 1/2 CUBIC YARDS	12	11	13
8	DRAG LINES, STEAM, 1/2, 3/4 CUBIC YARD	12	11	13



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	DRAG LINES, STEAM, 2 CUBIC YARDS & OVER	15	14	16
8	DRAGLINES, HEAVY	20	18	22
8	DRAGLINES, LIGHT	10	9	11
8	DRAGLINES, MEDIUM	15	14	16
8	DREDGES, CLAMSHELL	30	25	35
8	DREDGES, DIPPER	30	25	35
8	DREDGES, HYDRAULIC-PORTABLE U.S.	20	18	22
8	DREDGES, HYDRAULIC-NON-PORTABLE U.S.	35	30	40
8	DREDGES, HYDRAULIC-PORTABLE FOREIGN	15	12	20
8	DREDGES, HYDRAULIC-NON-PORTABLE FOREIGN	25	20	30
8	DREDGES, PIPE	10	9	11
8	DRILL BOATS	15	14	16
8	DRILL POINTS, WELL	5	5	6
8	DRILLS, AIRDRIFTER	3	3	3
8	DRILLS, ELECTRIC OR PNEUMATIC HAND	5	5	6
8	DRILLS, HAND, ELECTRIC	3	3	3
8	DRILLS, JACKHAMMER	3	3	3
8	DRILLS, ROCK	8	7	9
8	DRILLS, ROCK, ELECTRIC	3	3	3
8	DRILLS, STEAM	5	5	6
8	DRILLS, TRACTION, WELL	7	6	8
8	DRILLS, TRIPOD	7	6	8
8	DRILLS, TRIPOD	10	9	11
8	DRILLS, TUNNELL CARRIAGE	5	5	6
8	DRILLS, WELL	10	9	11
8	DRUMS FOR OIL (STEEL)	10	9	11
8	DRYERS	20	18	22
8	DRYERS	15	14	16
8	DRYERS, ROTARY	18	16	20
8	DUST COLLECTORS	20	18	22
8	DUSTER MACHINES, BAG	15	14	16
8	ELECTRIC GENERATORS & MOTORS	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	ELEVATORS, BUCKET	15	14	16
8	ELEVATORS, BUCKET, STATIONARY	15	14	16
8	ELEVATORS, CAGE (STEEL TOWER)	15	14	16
8	ELEVATORS, SCREW	15	14	16
8	ENGINES, BLOWING	12	11	13
8	ENGINES, FIRE	15	14	16
8	ENGINES, GAS	10	9	11
8	ENGINES, GENERAL	12	11	13
8	ENGINES, INTERNAL COMBUSTION	8	7	9
8	ENGINES, MARINE	15	14	16
8	ENGINES, PLUMBING	14	13	15
8	EXCAVATORS, CABLEWAY, COMPLETE	8	7	9
8	EXCAVATORS, TRENCH, GASOLINE, 12-FOOT DEPTH	10	9	11
8	EXCAVATORS, TRENCH, GASOLINE, 18-FOOT DEPTH	10	9	11
8	EXCAVATORS, TRENCH, GASOLINE, 7-FOOT DEPTH	10	9	11
8	EXCAVATORS, TRENCH, STEAM, 12-FOOT DEPTH	10	9	11
8	EXCAVATORS, TRENCH, STEAM, 18-FOOT DEPTH	10	9	11
8	EXCAVATORS, TRENCH, STEAM, 7-FOOT DEPTH	10	9	11
8	EXCAVATORS, TRENCH, VERTICAL BOOM	10	9	11
8	EXCAVATORS, WHEEL OR CRAWLER TYPE	10	9	11
8	EXPLORATION EQUIPMENT	15	14	16
8	EXTINGUISHERS, FIRE	10	9	11
8	FANS, EXHAUST	15	14	16
8	FEEDERS	17	15	19
8	FILTERS, WHEEL	12	11	13
8	FINISHING MACHINES	4	4	4
8	FLOATS, BRIDGE (STEEL)	5	5	6
8	FORGES, GAS OR OIL BURNING	15	14	16
8	FORMS	10	9	11
8	FORMS, CONCRETE (METAL PANS)	5	5	6



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	FORMS, CONCRETE, SUPPORTS, ADJUST-ABLE	4	4	4
8	FORMS, STEEL FOR TUNNELS & CON- DUITS	4	4	4
8	FORMS, STEEL FOR WALLS	5	5	6
8	FORMS, STEEL, FOR PAVEMENTS	4	4	4
8	FORMS, STEEL, FOR PIPES	3	3	3
8	FORMS, STEEL, FOR ROADS	4	4	4
8	FURNACES, METAL MELTING, COAL FIRED	15	14	16
8	FURNACES, METAL MELTING, ELECTRIC	15	14	16
8	FURNACES, METAL MELTING, GAS OR OIL	15	14	16
8	GEARS, REDUCTION	15	14	16
8	GENERATOR SETS, STEAM ENGINE	15	14	16
8	GENERATOR SETS, TURBINE, HEADLIGHT OR FLOODLIGHT	4	4	4
8	GIN POLES (STEEL)	10	9	11
8	GRADEBUILDERS (BULLDOZERS)	8	7	9
8	GRADERS, BLADE, ROAD, 7, 8 FOOT BLADE	12	11	13
8	GRADERS, BLADE, ROAD, 9, 10 FOOT BLADE	12	11	13
8	GRADERS, BLADE, ROAD, OVER 10-FOOT BLADE	12	11	13
8	GRADERS, CONSTRUCTION	15	14	16
8	GRADERS, ELEVATING	18	16	20
8	GRADERS, FORM, SUBGRADE PLANERS	6	5	7
8	GRADERS, ROOTERS, WHEEL	5	5	6
8	GRINDERS, METAL SURFACE	15	14	16
8	GRINDERS, SAW FILERS & SETTERS	15	14	16
8	GRINDERS, SURFACE, CONCRETE	4	4	4
8	GRINDING MACHINERY, TUBE MILLS	20	18	22
8	HAMMERS, AIR	15	14	16
8	HAMMERS, ELECTRIC	3	3	3
8	HAMMERS, PNEUMATIC RIVETING	3	3	3
8	HEATERS, ASPHALT, TAR & PITCH KET- TLES	4	4	4

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	HEATERS, FEED WATER	20	18	22
8	HELMETS, GAS & DIVING SUITS & EQUIP- MENT	10	9	11
8	HOISTS, AIR, ELECTRIC OR STEAM	8	7	9
8	HOISTS, CHAIN	6	5	7
8	HOISTS, DRUM	20	18	22
8	HOISTS, ELECTRIC MONORAIL OR POST	5	5	6
8	HOISTS, GAS	6	5	7
8	HOISTS, HAND POWER	8	7	9
8	HOISTS, SLEW, ELECTRIC	8	7	9
8	HOISTS, SLEW, STEAM	12	11	13
8	HOLDERS, ON PNEUMATIC EQUIPMENT	4	4	4
8	HOPPERS (STEEL)	30	27	33
8	HOSE, FIRE, LINEN OR RUBBER LINED COTTON	5	5	6
8	HOSE, METAL, FLEXIBLE	10	9	11
8	HOSE, OIL	5	5	6
8	HOSE, REEL OR CART	10	9	11
8	HOSE, RUBBER, AIR, STEAM OR WATER	10	9	11
8	INLAND CRAFT, GRADERS, HYDRAULIC	7	6	8
8	INLAND-QUARTERS	30	20	35
8	INUNDATORS, BATCH	4	4	4
8	JACKS, HYDRAULIC	8	7	9
8	JACKS, RACHET	8	7	9
8	JACKS, RAIL	20	18	22
8	JACKS, SCREW	5	5	6
8	JACKS, STEAMBOAT, PUSH & PULL	3	3	3
8	JIBS, STEAM	17	15	19
8	JOINTERS, BENCH, ELECTRIC, STEAM OR GAS	10	9	11
8	KILNS	25	23	30
8	KILNS	30	27	33
8	KOMIMETERS	20	18	22
8	LADDERS, ROPE, WOOD RUNGS	3	3	5
8	LAUNCHES, GASOLINE	5	2	7



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	LEVEE CONSTRUCTION EQUIPMENT, DRAG LINES	15	14	16
8	LEVEE CONSTRUCTION EQUIPMENT, SHOVELS	15	14	16
8	LEVEE CONSTRUCTION EQUIPMENT, TOWER EXCAVATORS	15	14	16
8	LIFE-SAVING EQUIPMENT	10	9	11
8	LIGHT PLANTS	5	5	6
8	LIGHTERS	22	20	24
8	LOADERS, BUCKET, CRAWLER	15	14	16
8	LOADERS, BUCKET, PORTABLE	15	14	16
8	LOADERS, BUCKET, STATIONARY	15	14	16
8	LOADERS, FRONT END	12	11	13
8	LOADING EQUIPMENT FOR VESSELS	15	14	16
8	LOADING MACHINES	15	14	16
8	LOCOMOTIVE BATTERIES	4	4	4
8	LOCOMOTIVES, GAS, 10 TO 20 TONS	20	18	22
8	LOCOMOTIVES, GAS, OVER 20 TONS	30	27	33
8	LOCOMOTIVES, GAS, UP TO 10 TONS	20	18	22
8	LOCOMOTIVES, GASOLINE	35	32	39
8	LOCOMOTIVES, INDUSTRIAL, DIESEL	30	27	33
8	LOCOMOTIVES, INDUSTRIAL, ELECTRIC	30	27	33
8	LOCOMOTIVES, QUARRY	30	27	33
8	LOCOMOTIVES, STANDARD GAUGE	30	27	33
8	LOCOMOTIVES, STEAM	25	23	27
8	LOCOMOTIVES, STEAM, 10 TO 20 TONS	30	27	33
8	LOCOMOTIVES, STEAM, OVER 20 TONS	30	27	33
8	LOCOMOTIVES, STEAM, UP TO 10 TONS	20	18	22
8	MAGNETS, LIFTING	15	14	16
8	MARINE CONSTRUCTION EQUIPMENT	5	5	6
8	MIXERS	10	9	11
8	MIXERS, PORTABLE MORTAR	10	9	11
8	MIXERS, PORTABLE MORTAR, CATER- PILLAR	10	9	11
8	MIXERS, PORTABLE MORTAR, LESS THAN 1/3 CUBIC YD	10	9	11

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	MIXERS, PORTABLE MORTAR, OVER 1/3 CUBIC YD	10	9	11
8	MOLDS	8	5	12
8	MOLDS, HYDRAULIC	10	9	11
8	MOTORS, AC & DC, LARGE	15	14	16
8	MOTORS, AC & DC, MEDIUM	15	14	16
8	MOTORS, AC & DC, SMALL	15	14	16
8	MOTORS, HYDRAULIC	20	18	22
8	MOTORS, PNEUMATIC	20	18	22
8	MOWERS, RIGHT OF WAY	10	9	11
8	MUD MACHINES	15	14	16
8	PACKERS	15	14	16
8	PALLETS	5	5	6
8	PANS, DRY	15	14	16
8	PILE DRIVERS, BARGE	15	14	16
8	PILE DRIVERS, RAILROAD OUTFITS	10	9	11
8	PILE DRIVERS, STEAM, ON SKIDS	10	9	11
8	PILE DRIVERS, TRACK	12	11	13
8	PILE HAMMERS, STEAM OR AIR, HEAVY	10	9	11
8	PILE HAMMERS, STEAM OR AIR, LIGHT	4	4	4
8	PILE HAMMERS, STEAM OR AIR, MEDIUM	5	5	6
8	PIPE LINES & FITTINGS, FOR FLOATING DREDGES	20	18	22
8	PIPE LINES (WATER)	25	23	27
8	PIPE, BLACK OR GALVANIZED	4	4	4
8	PIPE, WOOD	5	5	6
8	PIPE, WOOD & STEEL COMBINATION	6	5	7
8	PITS & QUARRY PLANTS	10	9	11
8	PLOWS, FURROW	3	3	3
8	PLOWS, ROOTER	6	5	7
8	PLUNGERS	10	9	11
8	POIDOMETERS	15	14	16
8	PONTOONS	20	12	22
8	PRESSES, FILTER	15	14	16
8	PRESSES, PUNCH	20	18	22



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	PRESSES, STAMPING	20	18	22
8	PULLERS, CAR	20	18	22
8	PULVERIZERS	20	18	22
8	PUMPING UNITS, ELECTRIC, CENTRIFUGAL	15	14	16
8	PUMPING UNITS, ELECTRIC, DIAPHRAGM	15	14	16
8	PUMPING UNITS, ELECTRIC, PISTON	15	14	16
8	PUMPING UNITS, GAS, CENTRIFUGAL	15	14	16
8	PUMPING UNITS, GAS, DIAPHRAGM	15	14	16
8	PUMPING UNITS, GAS, PISTON	15	14	16
8	PUMPING UNITS, STEAM, CENTRIFUGAL	15	14	16
8	PUMPS	15	14	16
8	PUMPS, AIR LIFT	15	14	16
8	PUMPS, CENTRIFUGAL	15	14	16
8	PUMPS, CENTRIFUGAL, HUMDINGER	15	14	16
8	PUMPS, CLAY	10	9	11
8	PUMPS, HYDRAULIC	15	14	16
8	PUMPS, IMPULSE	15	14	16
8	PUMPS, LARGE	15	14	16
8	PUMPS, OIL	15	14	16
8	PUMPS, SMALL	15	14	16
8	PUMPS, STEAM PISTON UNIT	15	14	16
8	PUMPS, TESTING FOR PIPE LINES	15	14	16
8	PUNCHES FOR STEEL, POWER	15	14	16
8	PUNCHES, HYDRAULIC	20	18	22
8	RACKS, STORAGE, FOR PIPE & STEEL, STEEL	20	18	22
8	RACKS, STORAGE, FOR PIPE & STEEL, WOOD	20	18	22
8	RAILS, STEEL	10	9	11
8	REAMERS, ELECTRIC	3	3	3
8	REAMERS, PNEUMATIC	3	3	3
8	RIDDLES, GYRATORY	10	9	11
8	RIVETERS, PNEUMATIC	5	5	6
8	ROLLERS, CONCRETE FINISHING (STEEL)	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	ROLLERS, ROAD, GAS	15	14	16
8	ROLLERS, ROAD, STEAM	15	14	16
8	ROLLS, RIDGE	10	9	11
8	SACK-HANDLING MACHINES	12	11	13
8	SAND-BLAST OUTFITS	10	9	11
8	SAWMILLS, PORTABLE	10	9	11
8	SCALES, LARGE, TRACK & WAGON	15	14	16
8	SCALES, PLATFORM	15	14	16
8	SCALES, PORTABLE	15	14	16
8	SCARIFIERS, ATTACHMENTS	4	4	4
8	SCARIFIERS, BLOCKS, STEERABLE	5	5	6
8	SCARIFIERS, DRAG, ALL STEEL	4	4	4
8	SCARIFIERS, GRADER TYPE	4	4	4
8	SCOWS	30	25	32
8	SCOWS, DUMP	20	15	25
8	SCRAPERS, BLADE, CARRYALL	6	5	7
8	SCRAPERS, FRESNO OR MORMAN	2	2	2
8	SCRAPERS, ROTARY	4	4	4
8	SCRAPERS, SLIP	2	2	2
8	SCRAPERS, WHEEL	5	5	6
8	SCREENS	15	14	16
8	SCREENS	20	18	22
8	SCREENS & BUNKERS, FOR GRAVEL PITS ONLY	10	9	11
8	SCREENS (REVOLVING, CONICAL, SPIDER)	18	16	20
8	SCREENS, REVOLVING	15	14	16
8	SEWING MACHINES	15	14	16
8	SHORES, ADJUSTABLE	4	4	4
8	SHOVEL ATTACHMENTS, FOR CRANES	6	5	7
8	SHOVELS, CONSTRUCTION	15	14	16
8	SHOVELS, ELECTRIC	25	23	27
8	SHOVELS, ELECTRIC OR GASOLINE, CRAWLER OR WHEEL, ALL SIZES	15	14	16
8	SHOVELS, ELECTRIC OR STEAM	20	18	22
8	SHOVELS, RAILROAD, STEAM	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	SHOVELS, STEAM	25	23	27
8	SHOVELS, STEAM, CRAWLER OR WHEEL, 1/2, 1/4 CUBIC YARD	15	14	16
8	SHOVELS, STEAM, CRAWLER OR WHEEL, 2 CUBIC YARDS+	15	14	16
8	SHOVELS, TUNNEL	15	14	16
8	SIEVES	8	7	9
8	SIFTERS, REVOLVING	10	9	11
8	SILO EQUIPMENT	25	23	27
8	SPOUTING PLANTS, COMPLETE, CONCRETE	4	4	4
8	SPRAYING EQUIPMENT, PAINT	12	11	13
8	SPREADERS, STONE, HOPPER WAGON	10	9	11
8	SPREADERS, STONE, STEEL BOX	10	9	11
8	STEAMERS, PADDLE WHEEL	10	9	11
8	STONE & CLAY PRODUCTS MANUFACTURING EQUIPMENT	12	11	13
8	STONE PRODUCTS MANUFACTURING EQUIPMENT	12	11	13
8	SWITCHES, PORTABLE	4	4	4
8	SWITCHES, STATIONARY	5	5	6
8	TAMPERS, BACKFILL, PNEUMATIC	3	3	3
8	TAMPING MACHINES	10	9	11
8	TANKS, GASOLINE, STORAGE	20	18	22
8	TANKS, OIL	30	27	33
8	TANKS, RELAY	6	5	7
8	TANKS, SLURRY	25	23	27
8	TANKS, SLURRY	15	14	16
8	TANKS, STORAGE, CONCRETE	50	45	55
8	TANKS, STORAGE, WATER TOWER	25	23	27
8	TANKS, STORAGE, WOOD	20	18	22
8	TANKS, WATER OR AIR, STORAGE (STEEL)	20	18	22
8	TANKS, WATER STORAGE (WOOD)	20	18	22

Industry #	Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	TARPAULINS & TENTS	3	3	3
8	TESTING MACHINES	15	14	16
8	THREADING & CUTTING MACHINES, PIPE	10	9	11
8	TIES, STEEL	12	11	13
8	TIES, WOOD	12	11	13
8	TILE MACHINES	17	15	19
8	TIPPLES, STEEL	40	36	44
8	TIPPLES, WOOD	30	27	33
8	TONGS, CHAIN	4	4	4
8	TOWERS, CABLEWAY, STEEL	6	5	7
8	TOWERS, CABLEWAY, STEEL BOOM WITH COUNTERWEIGHTS	5	5	6
8	TOWERS, CABLEWAY, WOOD	3	3	3
8	TRACKS, INDUSTRIAL, PORTABLE	6	5	7
8	TRACKS, QUARRY	15	14	16
8	TRACTORS	6	5	7
8	TRACTORS, ELECTRIC, 10-TON	10	9	11
8	TRACTORS, ELECTRIC, 20-TON	10	9	11
8	TRACTORS, ELECTRIC, 3-TON	8	7	9
8	TRACTORS, ELECTRIC, 5-TON	8	7	9
8	TRACTORS, GAS, 10-TON	10	9	11
8	TRACTORS, GAS, 20-TON	10	9	11
8	TRACTORS, GAS, 3-TON	8	7	9
8	TRACTORS, GAS, 5-TON	8	7	9
8	TRAILERS, DROP PLATFORM, HEAVY DUTY	14	13	15
8	TRAILERS, DUMP, STEEL	14	13	15
8	TRAILERS, DUMP, WOOD	14	13	15
8	TRAILERS, PLATFORM, WOOD	10	9	11
8	TRAMWAYS, AERIAL	20	18	22
8	TRANSFORMERS, CAR	10	9	11
8	TRANSMISSION LINES (ELECTRIC)	25	23	27
8	TRAYS	10	9	11
8	TRENCHING MACHINES (SEE: ELEVATORS)	0	0	0



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
8	TRUCKS	10	9	11
8	TRUCKS, AUTO, GEN PURPOSE OR DUMP, 1 - 1 2/3 CUBIC YRD	10	9	11
8	TRUCKS, AUTO, GEN PURPOSE OR DUMP, 2 CUBIC YRD+	10	9	11
8	TUGS, SCREW-PROPELLED, STEAM OR GAS	25	23	27
8	TURBO GENERATOR & EQUIPMENT	20	18	22
8	TURNTABLES	15	14	16
8	TURNTABLES, INDUSTRIAL RAILWAY	15	14	16
8	TYING MACHINES, BAG	15	14	16
8	VICES	5	5	6
8	WAGONS	7	6	8
8	WAGONS, DUMP, STEEL	6	5	7
8	WAGONS, DUMP, WOOD	6	5	7
8	WAGONS, FARM, HEAVY	10	9	11
8	WAGONS, FARM, LIGHT	10	9	11
8	WAGONS, ROAD OILERS, TANK, STEEL	10	9	11
8	WAGONS, TANK OR SPRINKLER, STEEL	10	9	11
8	WAGONS, TANK OR SPRINKLER, WOOD	8	7	9
8	WASHERS	15	14	16
8	WASHERS, GRAVEL	3	3	3
8	WASTE HEAT BOILER EQUIPMENT	25	23	27
8	WEIGHTOMETERS	20	18	22
8	WELDING OUTFITS, ACETYLENE OR ELECTRIC	10	9	11
8	WINCHES, ELECTRIC & PNEUMATIC	10	9	11
8	WIRE & CABLES, ELECTRIC	6	5	7
8	WIRE & CABLES, FLEXIBLE, STEEL ARMORED	8	7	9
9	ACCESSORY ELECTRICAL EQUIP- MENT	35	32	39

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
9	AMMETERS, RECORDING	15	14	16
9	ASH & COAL HANDLING EQUIPMENT	20	18	22
9	BATTERIES, HEAVY TYPE	5	5	7
9	BATTERIES, LIGHT TYPE	5	5	6
9	BENCHES (DOES NOT INCLUDE LIN- ING)	33	30	36
9	BLOWERS & FANS	15	14	16
9	BOILER PLANT EQUIPMENT	28	25	31
9	BOILERS, FITTINGS	18	16	20
9	BOILERS, 50 HP+, WATER TUBE, BE- LOW 225 LBS PRESSURE	22	20	24
9	BOILERS, 50 HP+, WATER TUBE, OVER 225 LBS PRESSURE	22	20	24
9	BOILERS, OVER 50 HP, FIRE, TUBE, HORIZONTAL	20	18	22
9	BOILERS, UNDER 50 HP, FIRE TUBE, VERTICAL	14	13	15
9	BOILERS, UNDER 50 HP, FIRE, TUBE, HORIZONTAL	17	15	19
9	BOILERS, UNDER 50 HP, FIRE, TUBE, PORTABLE, ALL TYPES	10	9	11
9	BOILERS, UNDER 50 HP, WATER TUBE, BELOW 225 LBS	20	18	22
9	BOOMS, LOG	15	14	16
9	BREECHING & FLUES	22	20	24
9	CENTRAL STEAM UTILITY PROD & DIS- TRIBUTION EQUIPMENT	20	18	22
9	CHIMNEYS, BRICK, CONCRETE OR STONE	50	45	55
9	CHIMNEYS, STEEL, SELF-SUPPORT- ING, LINED	35	32	39
9	CHIMNEYS, STEEL, SELF-SUPPORT- ING, UNLINED	30	27	33
9	COMMUNICATION EQUIPMENT	20	18	22



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
9	COMPENSATORS, STARTING	15	14	16
9	COMPRESSORS, PORTABLE	10	9	12
9	COMPRESSORS, STATIONARY, ALL TYPES	15	14	16
9	CONDENSERS, GAS PLANT	30	27	33
9	CONDENSERS, STEAM, ATMOSPHER- IC	25	23	27
9	CONDENSERS, STEAM, SURFACE	20	18	22
9	CONTROLLERS, ELECTRIC	15	14	16
9	CONVERTERS	18	16	20
9	CONVEYORS, ASH & COAL	15	14	16
9	CRANES, LOCOMOTIVE	25	23	27
9	ECONOMIZERS	15	14	16
9	ELECTRIC UTILITIES, HYDRAULIC PRODUCTION EQUIPMENT	40	36	44
9	ELECTRIC UTILITY COMBUSTION TUR- BINE PROD PLANT EQUIP	16	14	18
9	ELECTRIC UTILITY HYDRAULIC PROD PLANT EQUIP	40	36	44
9	ELECTRIC UTILITY NUCLEAR FUEL ASSEMBLY EQUIPMENT	4	4	4
9	ELECTRIC UTILITY NUCLEAR PRO- DUCTION PLANT EQUIPMENT	16	14	18
9	ELECTRIC UTILITY STEAM PRODUC- TION PLANT EQUIPMENT	23	20	25
9	ELECTRIC UTILITY TRANSMISSION & DIST PLANT EQUIP	24	22	26
9	ELECTRICAL MACHINERY	25	23	27
9	ENGINES & ENGINE DRIVEN GENERA- TORS	30	27	33
9	ENGINES, DIESEL & SEMI-DIESEL TYPE	22	20	24
9	ENGINES, GASOLINE	17	15	19

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
9	ENGINES, STEAM, HIGH SPEED	20	18	22
9	ENGINES, STEAM, LOW SPEED	25	23	27
9	EXCITERS	25	23	27
9	EXTRACTORS, TAR	33	30	36
9	FILTERS, OIL	20	18	22
9	FLUMES, CONCRETE OR MASONRY	75	68	83
9	FLUMES, STEEL	50	45	55
9	FLUMES, WOOD	25	23	27
9	FUEL SYSTEM, PULVERIZED COAL	20	18	22
9	GAUGES, RECORDING	25	23	27
9	GENERATORS	20	18	22
9	GENERATORS, ALTERNATORS, MOTORS/DYNAMOS, 1000 TO 3000 KVA	25	23	27
9	GENERATORS, ALTERNATORS, MOTORS/DYNAMOS, 50 HP-1000 KVA	25	23	27
9	GENERATORS, ALTERNATORS, MOTORS/DYNAMOS, 50 HP-1000 KVA	25	23	27
9	GENERATORS, ALTERNATORS, MOTORS/DYNAMOS, 50 HP-1000 KVA	17	15	19
9	GENERATORS, ALTERNATORS, MOTORS/DYNAMOS, ABOVE 3000 KVA	28	25	31
9	GENERATORS, ALTERNATORS, MOTORS/DYNAMOS, UP TO 50 HP	17	15	20
9	HEATERS, FEED WATER, CLOSED TYPE	25	23	27
9	HEATERS, FEED WATER, OPEN TYPE	22	20	24
9	HEATERS, OTHER THAN FEED WATER	22	20	24
9	INDUSTRIAL STEAM & ELECTRICAL GENERATION EQUIPMENT	18	16	20
9	INSTALLATIONS ON CUSTOMERS' PREMISES	25	23	27
9	LABORATORY EQUIPMENT	25	23	27
9	LIGHTNING ARRESTERS, STATION TYPE	20	18	22
9	LINE TRANSFORMERS	28	25	31



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
9	METERS, RECORDING, STEAM OR WATER	25	23	27
9	METERS, REGULATING	28	25	31
9	MISCELLANEOUS POWER PLANT EQUIPMENT	28	25	31
9	NUCLEAR/COMBUSTION TURBINE PRODUCTION EQUIPMENT	16	14	18
9	OFFICE FURNITURE & EQUIPMENT	19	17	21
9	OVERHEAD CONDUCTORS & DEVICES	33	30	36
9	PENSTOCKS	50	45	55
9	PIPES, CAST-IRON, 12 INCHES & OVER	100	90	110
9	PIPES, CAST-IRON, 2 TO 4 INCHES	50	45	55
9	PIPES, CAST-IRON, 4 TO 6 INCHES	65	59	72
9	PIPES, CAST-IRON, 8 TO 10 INCHES	75	68	83
9	PIPES, CONCRETE OR MASONRY	20	18	22
9	PIPES, STEEL, OVER 4 INCHES	40	36	44
9	PIPES, STEEL, UNDER 4 INCHES	30	27	33
9	PIPES, TRANSITE, 6 INCHES	50	45	55
9	PIPES, WOOD STAVE, 14 INCHES & LARGER	33	30	36
9	PIPES, WOOD STAVE, 3 TO 12 INCHES	20	18	22
9	PIPES, WROUGHT IRON, 6 INCHES & LARGER	75	68	83
9	PIPES, WROUGHT IRON, LESS THAN 6 INCHES	50	45	55
9	POLES & FIXTURES	33	30	36
9	POLES, TOWERS & FIXTURES	35	32	39
9	PRODUCERS, GAS	30	27	33
9	PUMPS, AUXILIARY	18	16	20
9	PUMPS, CENTRIFUGAL & ROTARY	20	18	22
9	PUMPS, DIRECT ACTING	25	23	27
9	PUMPS, GAS	20	18	22
9	PUMPS, GEAR DRIVEN	22	20	24
9	PURIFICATION EQUIPMENT FOR BOILER FEED WATER	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
9	PURIFIERS, GAS	30	27	33
9	REGENERATORS, GAS	30	27	33
9	RESERVOIRS, CONNECTED WITH BOILER PLANT	50	45	55
9	RETORTS (SEE ALSO: BENCHES)	33	30	36
9	SCRUBBERS, GAS	30	27	33
9	SEPARATORS, STEAM	25	23	27
9	SERVICE EQUIPMENT	15	14	17
9	SHOP EQUIPMENT	15	14	17
9	STATION EQUIPMENT	28	25	31
9	STATION EQUIPMENT	28	25	31
9	STATION METER CASES, CAST-IRON	50	45	55
9	STATION METER CASES, STEEL	33	30	36
9	STATION METER DRUMS	33	30	36
9	STEAM PRODUCTION & DISTRIBUTION EQUIPMENT	23	20	25
9	STEAM PRODUCTION EQUIPMENT	23	20	25
9	STORAGE BATTERY EQUIPMENT	10	9	11
9	STORES EQUIPMENT	25	23	27
9	SWITCHBOARDS & WIRING	20	18	22
9	TANKS OR HOLDERS, GAS	40	36	44
9	TANKS, CONCRETE	50	45	55
9	TANKS, STEEL	40	36	44
9	TANKS, WOOD	20	18	22
9	TANKS, WROUGHT IRON & STEEL, AMMONIA STORAGE	25	23	27
9	TOOLS & WORK EQUIPMENT	10	9	11
9	TOWERS & FIXTURES	50	45	55
9	TOWERS, COOLING (FRAME)	15	14	16
9	TOWERS, GATE	50	45	55
9	TRANSFORMERS	25	23	27
9	TRANSPORTATION EQUIPMENT	10	9	11
9	TRAPS, STEAM	20	18	22
9	TURBINE-GENERATOR, STEAM	35	32	39
9	TURBINE-GENERATOR, STEAM	35	32	39



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
9	TURBINES, HYDRAULIC	35	32	39
9	TURBINES, STEAM	22	20	24
9	TURBO-GENERATORS UNITS	30	27	33
9	TYPICAL SYSTEM, HYDRO-ELECTRIC POWER	40	36	44
9	TYPICAL SYSTEM, STEAM GENERAT- ED POWER	31	28	34
9	UNDERGROUND CONDUCTORS & DEVICES	40	36	44
9	UNDERGROUND CONDUIT	60	54	66
9	VAPORIZERS	20	18	22
9	WASHERS, GAS, CAST IRON	33	30	36
9	WATER WHEELS	40	36	44
9	WATER-GAS MACHINES	30	27	33
9	WATERWHEELS, TURBINES & GENER- ATORS	35	32	39
9	WELLS, DRILLED & DRIVEN	40	36	44
9	WELLS, OPEN, MASONRY LINED	50	45	55
9	WELLS, TAR & AMMONIA	40	36	44
10	ACCUMULATORS, AMMONIA	20	18	22
10	AGITATORS	15	14	16
10	AGITATORS (PORTABLE)	15	14	16
10	AMMONIA SYSTEMS, COMPRESSED	15	14	16
10	ASPIRATORS	15	14	16
10	AUTOCLAVES, LARGE SIZE	10	9	11
10	AUTOCLAVES, SMALL SIZE	10	9	11
10	BAGGING MACHINES	15	14	16
10	BAGGING MACHINES & AUTOMATIC WEIGHERS	20	18	22
10	BAG-MACHINES, SQUARE	15	14	16
10	BAKERIES & CONFECTIONERY PRO- DUCTION EQUIPMENT	10	9	10
10	BAKERY EQUIPMENT, GENERAL	15	14	16
10	BALLERS, DOUGH	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	BANDING MACHINES, CIGAR	10	9	11
10	BAR SUGAR MACHINES	25	23	27
10	BARREL COPPERING MACHINES OR DRILLERS	15	14	16
10	BASINS, CATCH (METAL)	20	18	22
10	BASKETS, CHINA, BLANCHING	10	9	11
10	BASKETS, WIRE, COOKING	10	9	11
10	BEATERS, HEAVY	15	14	16
10	BEATERS, LIGHT	15	14	16
10	BEATERS, MARSHMALLOW	15	14	16
10	BENCHES, PACKING	20	18	22
10	BINS, BRICK	30	27	33
10	BINS, DRIED GRAIN	20	18	22
10	BINS, FLOUR STORAGE, STEEL	35	32	39
10	BINS, FLOUR STORAGE, WOOD	25	23	27
10	BINS, GRAIN, WOOD	20	18	22
10	BINS, SUGAR (CONCRETE & STEEL)	40	36	44
10	BINS, WOOD	8	7	9
10	BLANCHERS	15	14	16
10	BLANCHERS, PEANUT	10	9	11
10	BLENDERS FOR COMPOUNDS	15	14	16
10	BLOWER SYSTEMS	15	14	16
10	BLOWERS	15	14	16
10	BLOWERS, LIGHT	10	9	11
10	BORERS, BUNG	20	18	22
10	BOTTLE CLEANING UNITS	15	14	16
10	BOTTLES & CASES (INVENTORY)	5	5	6
10	BOTTLING EQUIPMENT	13	12	14
10	BOTTLING EQUIPMENT	15	14	16
10	BOTTLING EQUIPMENT	18	16	20
10	BOX MACHINES	15	14	16
10	BOX MACHINES	20	18	22
10	BOXES, COOKING	10	9	11
10	BOXES, CUTTING	5	5	6
10	BOXES, DRY ICE	3	3	3



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	BOXES, SKIMMING (CONCRETE)	20	18	22
10	BOX-MAKING MACHINES	15	14	16
10	BRAKES-DOUGH	15	14	16
10	BRANCH MACHINERY	20	18	22
10	BREAKERS (ICE)	12	11	13
10	BREAKERS, GLUE	15	14	16
10	BREWERY EQUIPMENT	10	9	10
10	BREWERY, DISTILLERY, WINERIES	20	18	22
10	BRINE SYSTEMS	15	14	16
10	BUCKS, STARCH	12	11	13
10	BUNCH MACHINES	13	12	14
10	BURNERS, GAS OR OIL	15	14	16
10	BURNERS, SULPHUR	28	25	31
10	CABINETS, ICE & SALT (PREFERABLY INVENTORY)	4	4	4
10	CABINETS, ICELESS (MECHANICAL)	10	9	11
10	CAKE MACHINE, OPEN SADDLE	15	14	16
10	CALDRON (COPPER; NICKEL-PLATED)	20	18	22
10	CAN DUMPS	17	15	19
10	CANDY & CONFECTIONARY MAKING EQUIPMENT	20	18	22
10	CAN-MAKING MACHINES	20	18	22
10	CANNERIES & FROZEN FOOD EQUIP- MENT	15	14	16
10	CANNERY, FISH	20	18	22
10	CANNERY, FRUIT & VEGETABLE	18	16	20
10	CANNERY, FRUIT	20	18	22
10	CANS, ICE MAKING	10	9	11
10	CANS, MILK (PREFERABLY INVENTO- RY)	4	4	4
10	CAPPERS	15	14	16
10	CAPPERS, AUTOMATIC	15	14	16
10	CAPPERS, BOTTLE	12	11	13
10	CAPPERS, BOTTLE	15	14	16
10	CAPPERS, BOTTLE, AUTOMATIC	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	CAPPERS, BOTTLE, FOOT POWER	15	14	16
10	CARBONATORS	15	14	16
10	CARPENTER & MACHINE SHOP EQUIPMENT	15	14	16
10	CARRIERS	10	9	11
10	CARTON MACHINES	15	14	16
10	CARTON-FILLING MACHINES, LARD	15	14	16
10	CASES & BOTTLES	4	4	4
10	CASES FOR SHIPPING BREAD (INVEN- TORY)	5	5	6
10	CASING MACHINES	15	14	16
10	CASING MACHINES, BOX	15	14	16
10	CASKS, CHIP	30	27	33
10	CASKS, GAS	30	27	33
10	CATCHERS, TRASH	10	9	11
10	CENTRIFUGAL SUGAR CUTTING MA- CHINES	15	14	16
10	CENTRIFUGAL WATER PUMPS	20	18	22
10	CENTRIFUGALS	15	14	16
10	CENTRIFUGES	15	14	16
10	CHAIN BLOCKS	20	18	22
10	CHARGING UNITS (FOR MECHANICAL CABINETS)	10	9	11
10	CHIPPERS, SOAP	20	18	22
10	CHOPPERS, NUT	15	14	16
10	CHURNS, BARREL TYPE	12	11	13
10	CHURNS, EMULSION	15	14	16
10	CHURNS, SINGLE ROLL	15	14	16
10	CHUTES, SUGAR	25	23	27
10	CIGARETTE MAKING MACHINES	15	14	16
10	CIGAR-MAKING MACHINES	15	14	16
10	CLARIFIERS	15	14	16
10	CLARIFIERS	20	18	22
10	CLASSIFIERS	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	CLEANERS	15	14	16
10	CLEANERS, VEGTABLES	15	14	16
10	CLEANERS, CAN	15	14	16
10	CLEANERS, SACK	15	14	16
10	CLEANING UNITS, BOTTLE (WASHERS & SOAKERS)	15	14	16
10	CLOSING MACHINES, CAN	15	14	16
10	COATING MACHINES	15	14	16
10	COILS, COPPER COOKING	15	14	16
10	COLLECTORS, MILK POWDER STOR- AGE	20	18	22
10	COMPRESSORS, AIR	15	14	16
10	COMPRESSORS, AMMONIA	15	14	16
10	COMPRESSORS, AMMONIA, STEAM DRIVEN	15	14	16
10	COMPRESSORS, GAS	15	14	16
10	COMPRESSORS, VACUUM	15	14	16
10	CONDENSERS, AMMONIA	15	14	16
10	CONDENSERS, AMMONIA, ATMOS- PHERIC	20	18	22
10	CONDENSERS, SURFACE	15	14	16
10	CONDIMENTS MANUFACTURING & PROCESSING EQUIPMENT	10	9	11
10	CONTROLS, ELECTRIC	15	14	16
10	CONVERTERS, COPPER	15	14	16
10	CONVEYORS & HOPPERS, CE CREAM	15	14	16
10	CONVEYORS, BELT	20	18	22
10	CONVEYORS, ROLLER	12	11	13
10	CONVEYORS, BUCKET	15	14	16
10	CONVEYORS, CHAIN	15	14	16
10	CONVEYORS, CHAIN & FLIGHT, CAKE	15	14	16
10	CONVEYORS, COSSETT	40	36	44
10	CONVEYORS, GRAIN & MEAL	15	14	16
10	CONVEYORS, ICE LIFT	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	CONVEYORS, PANNING	15	14	16
10	CONVEYORS, RICE	15	14	16
10	CONVEYORS, SLAT APRON BREAD	15	14	16
10	CONVEYORS, SPIRAL SCREW	15	14	16
10	CONVEYORS, WET GRAIN	5	5	6
10	CONVEYORS, WORM	15	14	16
10	CONVEYORS-BELT	15	14	16
10	COOKERS, MASH	15	14	16
10	COOKERS	15	14	16
10	COOKERS, CEREAL	10	9	11
10	COOKERS, CHEESE	20	18	22
10	COOKERS, CRYSTAL OR VACUUM	15	14	16
10	COOKERS, DOUGHNUT	15	14	16
10	COOKERS, RICE	20	18	22
10	COOKIE MACHINES, WIRE CUT	15	14	16
10	COOLERS & PACKERS	15	14	16
10	COOLERS, MASH	15	14	16
10	COOLERS, STRAINED SLOP	15	14	16
10	COOLERS	20	18	22
10	COOLERS, BEER	20	18	22
10	COOLERS, BRINE	20	18	22
10	COOLERS, BRINE (COPPER TUBING)	15	14	16
10	COOLERS, CREAM	15	14	16
10	COOLERS, GAS	20	18	22
10	COOLERS, MILK, FLOATING TUBULAR	14	13	15
10	COOLERS, MILK, INTERNAL TUBE	22	20	24
10	COOLERS, MILK, SECTIONAL	14	13	15
10	COOLERS, PAN	15	14	16
10	COOLERS, SACCHARATE OF LIME	35	32	39
10	COOLERS, SURFACE	12	11	13
10	COOLERS, SURFACE	18	16	20
10	COOLERS, WATER	20	18	22
10	COOLING EQUIPMENT	12	11	13
10	COOLING EQUIPMENT	15	14	16
10	COOLING SYSTEMS, SPRAY	20	18	22



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	CORERS	20	18	22
10	CORKING MACHINES	15	14	16
10	CRACKER CUTTING MACHINES	15	14	16
10	CRACKER PEELING MACHINES	15	14	16
10	CRACKERS	20	18	22
10	CRANES, ICE	17	15	19
10	CRATES, PROCESS	10	9	11
10	CREAMERY & DAIRY EQUIPMENT	20	18	22
10	CRIMPERS	20	18	22
10	CRIMPING MACHINES	20	18	22
10	CROWNING MACHINES	13	12	14
10	CRUSHER MILLS, FOR FILTERCEL RE- GENERATION	20	18	22
10	CRUSHERS	15	14	16
10	CRUSHERS, RAW SUGAR	25	23	27
10	CRUSHERS, CANE, 2-ROLL	30	27	33
10	CRUSHERS, ICE	15	14	16
10	CRUSHERS, LIME	35	32	39
10	CRUSHERS, OATS	20	18	22
10	CRYSTALLIZERS	15	14	16
10	CULTURE CONTROLLERS	20	18	22
10	CURLING MACHINES, HAIR	15	14	16
10	CUTTERS, WAFER	15	14	16
10	CUTTERS	15	14	16
10	CUTTERS & SIZERS	15	14	16
10	CUTTERS, CHEESE	15	14	16
10	CUTTERS, PAPER	15	14	16
10	CUTTERS, TEA	12	11	13
10	CUTTING & PANNING MACHINES	15	14	16
10	CUTTING & SPLITTING MACHINES	20	18	22
10	CUTTING MACHINES, STENCIL	17	15	19
10	CUTTING MACHINES	15	14	16
10	CUTTING MACHINES, BUTTER	15	14	16
10	CUTTING TABLES & SEATS	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	DAIRY PRODUCTS MANUFACTURING EQUIPMENT	10	9	10
10	DECAPPING MACHINES	15	14	16
10	DEHAIRERS, HOT	20	18	22
10	DEHYDRATORS	20	18	22
10	DEPOSITORS	15	14	16
10	DEPOSITORS, CAKE	15	14	16
10	DICING & CUBING MACHINES	10	9	11
10	DIES & CUTTERS	10	9	11
10	DIFFUSION BATTERIES	45	41	50
10	DISSOLVERS, LICORICE & SUGAR GUMS	13	12	14
10	DISTILLED WATER EQUIPMENT	20	18	22
10	DISTILLING EQUIPMENT	10	9	10
10	DIVIDERS, DOUGH, HAND	5	5	6
10	DIVIDERS, DOUGH, POWER	12	11	13
10	DOUGHNUT MACHINES, AUTOMATIC	15	14	16
10	DRESSING MACHINES	12	11	13
10	DRIERS, GRAIN	12	11	13
10	DRIVING MACHINES, HOOP	10	9	11
10	DROPPERS, BEEF	20	18	22
10	DROPPERS, CAKE	15	14	16
10	DROPPERS, COOKIE	15	14	16
10	DRUMS, MALTING	20	18	22
10	DRYERS, AIR (GREEN FUEL ECONOM- IZER TYPE	20	18	22
10	DRYERS, FURNACE, GAS OR STEAM TYPE	20	18	22
10	DRYERS, LARGE	30	27	33
10	DRYERS, MEDIUM	20	18	22
10	DRYERS, SMALL	15	14	16
10	DRYERS, SPECIAL COOKIE	15	14	16
10	DRYERS, SPENT GRAIN	10	9	11
10	DRYING CHAMBERS, MILK	15	14	16
10	DRYING EQUIPMENT	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	CORERS	20	18	22
10	CORKING MACHINES	15	14	16
10	CRACKER CUTTING MACHINES	15	14	16
10	CRACKER PEELING MACHINES	15	14	16
10	CRACKERS	20	18	22
10	CRANES, ICE	17	15	19
10	CRATES, PROCESS	10	9	11
10	CREAMERY & DAIRY EQUIPMENT	20	18	22
10	CRIMPERS	20	18	22
10	CRIMPING MACHINES	20	18	22
10	CROWNING MACHINES	13	12	14
10	CRUSHER MILLS, FOR FILTERCEL RE- GENERATION	20	18	22
10	CRUSHERS	15	14	16
10	CRUSHERS, RAW SUGAR	25	23	27
10	CRUSHERS, CANE, 2-ROLL	30	27	33
10	CRUSHERS, ICE	15	14	16
10	CRUSHERS, LIME	35	32	39
10	CRUSHERS, OATS	20	18	22
10	CRYSTALLIZERS	15	14	16
10	CULTURE CONTROLLERS	20	18	22
10	CURLING MACHINES, HAIR	15	14	16
10	CUTTERS, WAFER	15	14	16
10	CUTTERS	15	14	16
10	CUTTERS & SIZERS	15	14	16
10	CUTTERS, CHEESE	15	14	16
10	CUTTERS, PAPER	15	14	16
10	CUTTERS, TEA	12	11	13
10	CUTTING & PANNING MACHINES	15	14	16
10	CUTTING & SPLITTING MACHINES	20	18	22
10	CUTTING MACHINES, STENCIL	17	15	19
10	CUTTING MACHINES	15	14	16
10	CUTTING MACHINES, BUTTER	15	14	16
10	CUTTING TABLES & SEATS	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	DAIRY PRODUCTS MANUFACTURING EQUIPMENT	10	9	10
10	DECAPPING MACHINES	15	14	16
10	DEHAIRERS, HOT	20	18	22
10	DEHYDRATORS	20	18	22
10	DEPOSITORS	15	14	16
10	DEPOSITORS, CAKE	15	14	16
10	DICING & CUBING MACHINES	10	9	11
10	DIES & CUTTERS	10	9	11
10	DIFFUSION BATTERIES	45	41	50
10	DISSOLVERS, LICORICE & SUGAR GUMS	13	12	14
10	DISTILLED WATER EQUIPMENT	20	18	22
10	DISTILLING EQUIPMENT	10	9	10
10	DIVIDERS, DOUGH, HAND	5	5	6
10	DIVIDERS, DOUGH, POWER	12	11	13
10	DOUGHNUT MACHINES, AUTOMATIC	15	14	16
10	DRESSING MACHINES	12	11	13
10	DRIERS, GRAIN	12	11	13
10	DRIVING MACHINES, HOOP	10	9	11
10	DROPPERS, BEEF	20	18	22
10	DROPPERS, CAKE	15	14	16
10	DROPPERS, COOKIE	15	14	16
10	DRUMS, MALTING	20	18	22
10	DRYERS, AIR (GREEN FUEL ECONOM- IZER TYPE	20	18	22
10	DRYERS, FURNACE, GAS OR STEAM TYPE	20	18	22
10	DRYERS, LARGE	30	27	33
10	DRYERS, MEDIUM	20	18	22
10	DRYERS, SMALL	15	14	16
10	DRYERS, SPECIAL COOKIE	15	14	16
10	DRYERS, SPENT GRAIN	10	9	11
10	DRYING CHAMBERS, MILK	15	14	16
10	DRYING EQUIPMENT	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	DRYING EQUIPMENT, STEAM JACKET-ED	15	14	16
10	DUCT LINES (SHEET METAL, WROUGHT IRON OR STEEL PLATE)	15	14	16
10	DUMP TANKS	17	15	19
10	DUST COLLECTING SYSTEM	20	18	22
10	DUST COLLECTORS	20	18	22
10	DUST COLLECTORS, DRY TYPE	25	23	27
10	DUST COLLECTORS, WET TYPE	18	16	20
10	EGG BEATERS & MIXERS	15	14	16
10	ELEVATORS & CONVEYORS, PRODUCTS	15	14	16
10	ELEVATORS, BEET	40	36	44
10	ELEVATORS, BOOT, BUCKET OR CHAIN	15	14	16
10	ELEVATORS, BUCKET	15	14	16
10	ELEVATORS, BUCKET	20	18	22
10	ELEVATORS, CAN	15	14	16
10	ELEVATORS, FEED OR BUCKET	15	14	16
10	ELEVATORS, FLOUR BUCKET OR PAN & TRAY	15	14	16
10	ELEVATORS, TEA	15	14	16
10	ELONGATORS	15	14	16
10	EMBOSSING MACHINES, BISCUIT	12	11	13
10	ENROBERS	15	14	16
10	EVAPORATORS	12	11	13
10	EVAPORATORS, FOR TANK WATER	20	18	22
10	EVAPORATORS, MULTIPLE EFFECT	15	14	16
10	EXHAUST BOXES	10	9	11
10	EXTRACTORS, BUNG	15	14	16
10	EXTRACTORS, FRUIT JUICE	15	14	16
10	FANS	12	11	13
10	FANS, BLOWER OR EXHAUST	15	14	16
10	FANS, COOLING	15	14	16
10	FANS, EXHAUST	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	FANS, VENTILATING ELECTRIC	15	14	16
10	FEEDERS	15	14	16
10	FEEDERS, BAGASSE	25	23	27
10	FEEDERS, CAN, AUTOMATIC	12	11	13
10	FILLERS & CAPPERS (BOTTLE)	15	14	16
10	FILLERS, BOTTLE	15	14	16
10	FILLERS, BOTTLE, ROTARY, AUTO- MATIC	15	14	16
10	FILLERS, CAN	15	14	16
10	FILLERS, CHEESE	15	14	16
10	FILLERS, FINISHERS	15	14	16
10	FILLERS, FLAKING MACHINE	15	14	16
10	FILLERS, HIGH PRESSURE	5	5	6
10	FILLERS, ICE CREAM CAN	12	11	13
10	FILLERS, LOW PRESSURE	10	9	11
10	FILLING MACHINES	15	14	16
10	FILLING MACHINES, HOPPER	15	14	16
10	FILLING MACHINES, PHILADELPHIA TYPE	15	14	16
10	FILLING MACHINES, PUMP TYPE	15	14	16
10	FILLING MACHINES, ROTARY (CAN)	15	14	16
10	FILLING MACHINES, SWISS TYPE	15	14	16
10	FILLING MACHINES, UPRIGHT TYPE	15	14	16
10	FILLING, THAWING & DUMPING UNITS (CAN)	17	15	19
10	FILLING, WEIGHING & SEALING MA- CHINES	15	14	16
10	FILTERS	12	11	13
10	FILTERS, BEER	12	11	13
10	FILTERS	15	14	16
10	FILTERS, CREAM	15	14	16
10	FILTERS, DRUM	35	32	39
10	FILTERS, MIXING	15	14	16
10	FILTERS, THICK JUICE	40	36	44
10	FILTERS, TUBULAR	12	11	13



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	FILTERS, WATER	10	9	11
10	FINISHERS	15	14	16
10	FLAKE ICE MACHINES	10	9	11
10	FLAKERS	12	11	13
10	FLATTENERS, STEM	20	18	22
10	FLUME TO TRASH CATCHER	50	45	55
10	FOLDING & CLOSING MACHINES	12	11	13
10	FOLDING MACHINES, BOX	20	18	22
10	FOOD & BEVERAGE MANUFACTURING EQUIPMENT	10	9	10
10	FOOD & BEVERAGE PRODUCTION EQUIPMENT	10	9	10
10	FOOD PROCESSING EQUIPMENT (S/S)	25	23	27
10	FOREMASHERS	10	9	11
10	FOREWARMERS	12	11	13
10	FORMING & LINING MACHINES	12	11	13
10	FORMING & STITCHING MACHINES, CARTON	15	14	16
10	FREEZERS, ICE CREAM	15	14	16
10	FRUITANA MACHINES	15	14	16
10	FURNACES, FILTERCEL REGENERA- TION	25	23	27
10	GENERAL MACHINERY	15	14	16
10	GLUERS & COMPRESSORS, AUTO- MATIC	15	14	16
10	GLUING MACHINES	15	14	16
10	GLUING MACHINE, BOX OR CARTON, AUTOMATIC	15	14	16
10	GRADERS, BARLEY	20	18	22
10	GRADERS	20	18	22
10	GRADING & SIFTING MACHINES, TO- BACCO	12	11	13
10	GRAIN & GRAIN MILL PRODUCTS	20	18	22
10	GRAIN & GRAIN MILL PRODUCTS MANUFACTURING EQUIPMENT	14	12	15

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	GRANULATORS	15	14	16
10	GRINDERS, MEAL ROLLER	15	14	16
10	GRINDERS	15	14	16
10	GRINDERS, CHEESE	20	18	22
10	GRINDERS, SAUSAGE	15	14	16
10	GRINDING MACHINES	15	14	16
10	HANGERS, TRAVELERS, ETC., TRACK EQUIPMENT	10	9	11
10	HASHERS & CUTTERS	20	18	22
10	HEATERS, GAS	20	18	22
10	HEATERS, WATER	20	18	22
10	HEATERS, MILK	15	14	16
10	HEATERS, MILK, COIL TYPE	20	18	22
10	HEATERS, RAW JUICE	35	32	39
10	HEATERS, SUGAR	25	23	27
10	HIGH LINES (SEE: TRESTLES & TROUGHS)	0	0	0
10	HOISTS, CHAIN & ELECTRIC	20	18	22
10	HOISTS, FOR LIME	38	34	42
10	HOISTS, ICE	17	15	19
10	HOISTS, ICE, HYDRAULIC	20	18	22
10	HOMOGENIZERS	20	18	22
10	HOOP DRIVERS	15	14	16
10	HOP TEARING MACHINES	15	14	16
10	HOPPERS, STEEL	20	18	22
10	HOPPERS, WET	50	45	55
10	HULLERS	15	14	16
10	HUMIDIFIERS	15	14	16
10	HUMIDIFIERS (TYCOS TYPE)	15	14	16
10	HUSKERS	15	14	16
10	HYDROMETERS, CONTINUOUS, PAN TYPE	20	18	22
10	ICE BOXES	15	14	16
10	ICE CREAM CABINETS	12	11	13
10	ICE CREAM CANS & JACKETS	4	4	4



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	ICE CREAM FOUNTAINS	10	9	11
10	ICE CREAM TUBS	4	4	4
10	ICING UNITS	15	14	16
10	INCUBATORS, COPPER	12	11	13
10	INCUBATORS, YEAST	15	14	16
10	INTERCHANGERS	20	18	22
10	JIGGERS, STONE	40	36	44
10	KEGS, BEER	10	9	11
10	KEGS, PITCHING MACHINE	15	14	16
10	KEGS	10	9	11
10	KEGS, WOODEN	10	9	11
10	KETTLES, BREW	30	27	33
10	KETTLES, BUTTER & CHOCOLATE MELTING (CAST IRON)	20	18	22
10	KETTLES, CHEESE	20	18	22
10	KETTLES, CHEESE-MIXING, MOTOR DRIVEN	20	18	22
10	KETTLES, CHOCOLATE-MELTING, COPPER-JACKETED	20	18	22
10	KETTLES, COOKING & PROCESS	20	18	22
10	KETTLES, COPPER	20	18	22
10	KETTLES, COPPER JACKETED, CHOC- OLATE MELTING	20	18	22
10	KETTLES, FLAVORING, CAST-IRON	20	18	22
10	KETTLES, MELTING	20	18	22
10	KETTLES, OPEN	20	18	22
10	KETTLES, OPEN, JACKETED, FOR LARD	15	14	16
10	KETTLES, REMELTING	20	18	22
10	KETTLES, STEAM	20	18	22
10	KETTLES, STEAM JACKETED	20	18	22
10	KILNS, DRY	20	18	22
10	KILNS, LIME	45	41	50
10	KNEADERS	10	9	11
10	LABELERS	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	LABELERS, BOTTLE	12	11	13
10	LABELING MACHINES	15	14	16
10	LABELING MACHINES, CIGARETTE OR CIGAR PACKAGES	15	14	16
10	LABORATORY EQUIPMENT	10	9	11
10	LACQUERING MACHINES, CAN	10	9	11
10	LAQUERING MACHINES	12	11	13
10	LINING & CLOSING MACHINES, ICE CREAM	14	13	15
10	LINING MACHINES, CARTON	14	13	15
10	LINING MACHINES	15	14	16
10	LOADING MACHINES	10	9	11
10	MACHINE & CARPENTER SHOP EQUIPMENT	20	18	22
10	MALT GRINDING MILLS, COMPLETE	20	18	22
10	MALT MILLS	20	18	22
10	MALT TURNING MACHINES	20	18	22
10	MEATPACKING EQUIPMENT	10	9	10
10	MELTERS, SUGAR	35	32	39
10	METERS, MILK	10	9	11
10	MILK BOTTLE CASES	4	4	4
10	MILK CABINETS	6	5	7
10	MILK CANS, CAN JACKETS	4	4	4
10	MILK PRODUCTS, DRY MILK POWDER	20	18	22
10	MILK PRODUCTS, BUTTER & PAS- TEURIZED CREAM	20	18	22
10	MILK PRODUCTS, CONDENSED &EVAPORATED	20	18	22
10	MILK PRODUCTS, FLUID MILK & ICE CREAM	15	14	16
10	MILLS, RICE	20	18	22
10	MILLS	20	18	22
10	MILLS, ATTRITION	15	14	16
10	MILLS, CURD	10	9	11
10	MILLS, LIME GRINDERS	35	32	39



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	MILLS, PEANUT BUTTER	7	6	8
10	MILLS, ROLLER	20	18	22
10	MILLS, SNUFF	20	18	22
10	MIXERS	20	18	22
10	MIXERS, CHEESE (DOUBLE ARM NEW ERA TYPE	15	14	16
10	MIXERS, COOKIE & CAKE, THREE SPINDLE	15	14	16
10	MIXERS, DOUGH, FIRE BARREL, HIGH SPEED	15	14	16
10	MIXERS, DOUGH, FIRE BARREL, SLOW SPEED	15	14	16
10	MIXERS, MILK OF LIME	40	36	44
10	MIXERS, SUGAR	40	36	44
10	MIXERS, VERTICAL DOUGH, 3 & 4 SPEED, HEAVY	15	14	16
10	MIXERS, VERTICAL DOUGH, 3 & 4 SPEED, LIGHT	15	14	16
10	MIXING MACHINES	20	18	22
10	MIXING MACHINES (BATCH)	15	14	16
10	MOGULS	12	11	13
10	MOLDERS, DOUGH	15	14	16
10	MOLDERS, ROLL	15	14	16
10	MOLDING MACHINES	15	14	16
10	MOLDS, BUTTER	10	9	11
10	MOLDS, CHEESE	15	14	16
10	MOLDS, ICE CREAM	5	5	6
10	NAILING MACHINES	15	14	16
10	NAILING MACHINES, BOX	20	18	22
10	ORDERING MACHINES	20	18	22
10	OVENS, BAKERY	15	14	16
10	OVENS, AUTOMATIC OR TRAVELING	15	14	16
10	OVENS, BAND TYPE	15	14	16
10	OVENS, BRICK PEEL	15	14	16
10	OVENS, FOR MEAT LOAF, ETC.	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	OVENS, PORTABLE PEEL	15	14	16
10	OVENS, REEL	15	14	16
10	OVENS, ROTARY	15	14	16
10	OVENS, STATIONARY	15	14	16
10	OVENS, TEST	15	14	16
10	PACKAGE MACHINE, ICE CREAM	14	13	15
10	PACKERS	15	14	16
10	PACKERS, TOBACCO	15	14	16
10	PACKING MACHINES, FRUIT	20	18	22
10	PACKING HOUSE MACHINERY	20	18	22
10	PACKING HOUSE, MOVABLE EQUIP- MENT	10	9	11
10	PACKING MACHINES	10	9	11
10	PACKING MACHINES, CIGARETTE	15	14	16
10	PACKING MACHINES, FEED	10	9	11
10	PAILS, MILK SETTLING, STEEL	10	9	11
10	PAN GREASERS & CLEANERS	10	9	11
10	PANS, BAKING	5	5	6
10	PANS, FINISHING	15	14	16
10	PANS, ROASTING	15	14	16
10	PANS, VACUUM	15	14	16
10	PANS, VACUUM, CRYSTALLIZATION PROCESS	40	36	44
10	PARERS, FRUIT & VEGETABLE	10	9	11
10	PARING MACHINES	12	11	13
10	PASTE MIXERS	15	14	16
10	PASTEURIZERS	15	14	16
10	PASTEURIZERS & RIPENERS	15	14	16
10	PASTEURIZING & BOTTLING EQUIP- MENT	20	18	22
10	PEANUT CLUSTER MACHINES	15	14	16
10	PEELING MACHINES	15	14	16
10	PENS, KNOCKING, FOR CATTLE	12	11	13
10	PERCOLATORS	15	14	16
10	PERCOLATORS, COPPER	25	23	27



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	PERCOLATORS, FLAVORING	15	14	16
10	PERCOLATORS, RECEIVERS, LARD	10	9	11
10	PERFORATING MACHINES	15	14	16
10	PERFORATORS, LABEL	12	11	13
10	PIE CRIMPERS & TRIMMERS	15	14	16
10	PIE ROLLING MACHINES	15	14	16
10	PILERS	28	25	31
10	PIPING	20	18	22
10	PIPING & FITTING, SANITARY	20	18	22
10	PIPING, AMMONIA	20	18	22
10	PIPING, COLD WATER STANDARD	25	23	27
10	PIPING, CONDENSATE & HOT WATER	25	23	27
10	PIPING, DISTILLATION PROCESS	20	18	22
10	PIPING, PROCESS EQUIPMENT	20	18	22
10	PIPING, RUBBER HOSE	4	4	4
10	PIPING, STEAM	15	14	16
10	PITTERS	20	18	22
10	PLASTIC MACHINES	15	14	16
10	PLATFORMS	20	18	22
10	PLODDERS, SOAP	15	14	16
10	POLISHERS, BEAN	17	15	19
10	POLISHERS, CAN	12	11	13
10	POLISHERS, MOLD	17	15	19
10	POWDERING UNITS, MILK SPRAY PROCESS	20	18	22
10	PRESSES, GRAIN FILTER	12	11	13
10	PRESSES, WET GRAIN	15	14	16
10	PRESSERS, CHEESE, AUTOMATIC AD- JUSTABLE (4)	20	18	22
10	PRESSES	20	18	22
10	PRESSES (PLATE FOR CARBONATION PROCESS)	45	41	50
10	PRESSES, FILTER	20	18	22
10	PRESSES, HYDRAULIC	25	23	27

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	PRESSES, WET GRAIN	12	11	13
10	PRESSING MACHINES, CIGAR	12	11	13
10	PRETZEL COOKING MACHINES	15	14	16
10	PRINTERS, LABELING	10	9	11
10	PRINTERS, BUTTER	10	9	11
10	PRINTING MACHINES	20	18	22
10	PRINTING MACHINES, BOX	18	16	20
10	PRINTING MACHINES, COMPLETE	15	14	16
10	PROOFERS	15	14	16
10	PULLERS, CAR	20	18	22
10	PULLING MACHINES	20	18	22
10	PULP DRYING PLANTS	40	36	44
10	PULP MACHINES	15	14	16
10	PULP SILOS	37	33	41
10	PULVERIZERS	15	14	16
10	PULVERIZERS, SUGAR	15	14	16
10	PULVERIZERS, SUGAR	20	18	22
10	PUMPS, AMMONIA	20	18	22
10	PUMPS	15	14	16
10	PUMPS, ACID	15	14	16
10	PUMPS, AIR SUPPLY	15	14	16
10	PUMPS, AMMONIA, PRESSURE	15	14	16
10	PUMPS, BRINE	15	14	16
10	PUMPS, BRINE, TURBO	15	14	16
10	PUMPS, CARBONATION	35	32	39
10	PUMPS, CENTRIFUGAL, CIRCULATING HOT WATER	15	14	16
10	PUMPS, CORN SYRUP	15	14	16
10	PUMPS, CREAM, ROTARY	15	14	16
10	PUMPS, CREAM, STEAM DRIVEN	15	14	16
10	PUMPS, DISTILLED WATER	15	14	16
10	PUMPS, FILTER, ROTARY	15	14	16
10	PUMPS, LIQUOR	15	14	16
10	PUMPS, MASH	15	14	16
10	PUMPS, MILK, CENTRIFUGAL	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	PUMPS, MILK, CIRCULATING	15	14	16
10	PUMPS, MILK, PISTON TYPE	15	14	16
10	PUMPS, MILK, STEAM DRIVEN	15	14	16
10	PUMPS, MILK, TRIPLEX	15	14	16
10	PUMPS, MILK, VERTICAL PLUNGER TYPE	15	14	16
10	PUMPS, PRESS	15	14	16
10	PUMPS, RAW JUICE	35	32	39
10	PUMPS, SATURATION	35	32	39
10	PUMPS, SLOP	15	14	16
10	PUMPS, SLOP FEED	15	14	16
10	PUMPS, SYRUP	15	14	16
10	PUMPS, THICK JUICE	30	27	33
10	PUMPS, VACUUM	35	32	39
10	PUMPS, VACUUM	15	14	16
10	PUMPS, VACUUM & WATER	15	14	16
10	PUMPS, VALVELESS	15	14	16
10	PUMPS, WELL	15	14	16
10	QUARTERING MACHINES	10	9	11
10	RACKERS	15	14	16
10	RACKS, HAM TREES, CAGES	20	18	22
10	RACKS, WAREHOUSES	15	14	16
10	RAILROAD TANK CARS	25	23	27
10	RECEIVERS, AMMONIA	25	23	27
10	RECEIVING STATION EQUIPMENT	15	14	16
10	RECEIVING STATION, WAGON	30	27	33
10	RECORDERS, TEMPERATURE	10	9	11
10	REELS	15	14	16
10	REELS, BOLTING	15	14	16
10	REELS, BOLTING SNUFF	17	15	19
10	REFINING MACHINES, CHOCOLATE	20	18	22
10	REFRIGERATING EQUIPMENT	15	14	16
10	REFRIGERATING EQUIPMENT	10	9	11
10	REFRIGERATING MACHINES	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	REFRIGERATION EQUIPMENT	15	14	16
10	REFRIGERATION SYSTEMS	20	18	22
10	REFRIGERATORS	15	14	16
10	REFRIGERATORS, ELECTRIC	15	14	16
10	REHEATERS, RAW JUICE	35	32	39
10	RETORT CARS, STEEL	20	18	22
10	RETORT TRAYS, STEEL	20	18	22
10	RETORTS	20	18	22
10	RINSERS, ROTARY	20	18	22
10	RIPENERS (CREAM)	15	14	16
10	RIPENERS, CREAM	10	9	11
10	ROASTERS	15	14	16
10	ROASTERS	16	14	18
10	ROASTING MACHINES	15	14	16
10	ROCK PICKERS	10	9	11
10	ROLLERS, PIE CRUST	15	14	16
10	ROLLS	20	18	22
10	ROUNDING MACHINES, DOUGH	15	14	16
10	ROUNDING MACHINES	12	11	13
10	RUBBING & CREAMING MACHINES	10	9	11
10	RUNS, CAN--LARGE SIZES	15	14	16
10	RUNS, CAN--SMALL SIZES	15	14	16
10	RUNWAYS FOR STOCK, BRICK	40	36	44
10	RUNWAYS FOR STOCK, FIREPROOF	50	45	55
10	RUNWAYS FOR STOCK, FRAME	30	27	33
10	SACCHARATE MIXING TANKS	40	36	44
10	SACK CLEANERS	15	14	16
10	SALES, DIAL, OLEDO TYPE	20	18	22
10	SANDING MACHINES	15	14	16
10	SANDWICH MACHINES	12	11	13
10	SATURATORS	28	25	31
10	SAWS, POWER	15	14	16
10	SCALDERS, FRUIT & VEGETABLE	12	11	13
10	SCALERS, FISH	15	14	16
10	SCALES FOR LIVE STOCK	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	SCALES, AUTOMATIC	15	14	16
10	SCALES, AUTOMATIC WEIGHING	20	18	22
10	SCALES, AUTOMATIC, FLOUR OR WATER	15	14	16
10	SCALES, FOR OVERHEAD TRACKS	15	14	16
10	SCALES, HOPPER & PLATFORM	20	18	22
10	SCALES, MILK	18	16	20
10	SCALES, PENDULUM	15	14	16
10	SCALES, PLATFORM & DORMANT TYPE	20	18	22
10	SCALES, PLATFORM, PORTABLE	15	14	16
10	SCALES, PORTABLE	15	14	16
10	SCALES, SMALL, PORTABLE	15	14	16
10	SCALES, TANK TYPE, MILK WEIGHING	18	16	20
10	SCALING MACHINES	10	9	11
10	SCOURER, GAS	20	18	22
10	SCREENS	15	14	16
10	SCREENS, FERTILIZER	6	5	7
10	SCREENS, OSCILLATING	15	14	16
10	SCREENS, REVOLVING	15	14	16
10	SCREENS, SLOP FILTERING	10	9	11
10	SCRUBBERS & CONDENSERS, CARBON DIOXIDE	12	11	13
10	SCRUBBERS, BARREL	15	14	16
10	SEALERS	15	14	16
10	SEALERS, BOX	15	14	16
10	SEALERS, CAN	20	18	22
10	SEALERS, SILICATE	15	14	16
10	SEALING MACHINES	15	14	16
10	SEALING MACHINES (PAPER)	15	14	16
10	SEALING MACHINES FOR CASES	20	18	22
10	SEAMERS	12	11	13
10	SEPARATORS, CENTRIFUGAL	15	14	16
10	SEPARATORS, MASH	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	SEPARATORS	15	14	16
10	SEPARATORS OR CLEANERS	15	14	16
10	SEPARATORS OR CLEANERS, MAGNETIC	10	9	11
10	SEPARATORS, CREAM	15	14	16
10	SEPARATORS, GAS	20	18	22
10	SEPARATORS, GRAIN	15	14	16
10	SEPARATORS, MILK	20	18	22
10	SEPARATORS, MILK POWDER	20	18	22
10	SEPARATORS, WHEY	20	18	22
10	SEWING MACHINES	15	14	16
10	SHAKERS	15	14	16
10	SHAKERS, FRUIT & VEGETABLES	15	14	16
10	SHAKERS, BARREL	30	27	33
10	SHEETERS	15	14	16
10	SHELLERS, PEANUT	15	14	16
10	SHREDDERS	15	14	16
10	SIFTERS	15	14	16
10	SIFTERS, COFFEE	10	9	11
10	SIFTERS, FLOUR, SUGAR, STARCH, ETC.	15	14	16
10	SIFTERS, ROTEX (BARREL TYPE) (2)	15	14	16
10	SIFTERS, SPICES	15	14	16
10	SILKERS, CORN, ROTARY	10	9	11
10	SINGERS, HOG	15	14	16
10	SIZERS	15	14	16
10	SKINNERS, BACK FAT	15	14	16
10	SLABBERS, SOAP	20	18	22
10	SLABS, COOLING	20	18	22
10	SLAKERS, LIME	20	18	22
10	SLICERS	15	14	16
10	SLICERS, BEET	40	36	44
10	SLICERS, BREAD	15	14	16
10	SLICING MACHINES	15	14	16
10	SOAKER UNITS (BOTTLE)	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	SOFT DRINK MANUFACTURING & BOTTLING EQUIPMENT	12	10	15
10	SORTERS	17	15	19
10	SORTERS, CAP	30	27	33
10	SPLITTERS, HEAD	18	16	20
10	SPREADER, SUGAR WAFER	15	14	16
10	SQUEEZERS (ORANGE)	15	14	16
10	STACKS & DAMPER, VENT	10	9	11
10	STACKER & LOWERATORS, BARREL	10	9	11
10	STAMPERS, CAN	20	18	22
10	STANDARDS, BARREL (CYPRESS)	20	18	22
10	STARTER CANS	20	18	22
10	STARTER CANS (TRUNNIONED)	16	14	18
10	STARTER CANS, CLASS LINED	20	18	22
10	STATIONS, CARBONATING	40	36	44
10	STEMMERS	10	9	11
10	STEMMING MACHINES	15	14	16
10	STENCIL MACHINES	12	11	13
10	STERILIZERS, STANDARD	15	14	16
10	STERILIZERS, AUTOCLAVE PRESSURE TYPE	15	14	16
10	STERILIZERS, HOT AIR	15	14	16
10	STILLS, BEER, REBOILER	20	18	22
10	STILLS	15	14	16
10	STILLS, CHARGE	20	18	22
10	STILLS, CONTINUOUS	20	18	22
10	STILLS, COPPER	20	18	22
10	STILLS, GIN	20	18	22
10	STILLS, WATER	20	18	22
10	STITCHERS, BOX	15	14	16
10	STONER EQUIPMENT	15	14	16
10	STORAGE BOXS (DRY ICE)	15	14	16
10	STRAINERS	18	16	20
10	STRAINERS, MASH	15	14	16
10	STRAPPING MACHINES	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	STRIPPING & BOOKING MACHINES	20	18	22
10	STRIPPING MACHINES, CASING	12	11	13
10	STUFFING MACHINES	20	18	22
10	SUGAR & SUGAR PRODUCTS MANU- FACTURING EQUIPMENT	15	13	16
10	SUGAR BAG STACKING MACHINES (WAREHOUSE)	20	18	22
10	SUGAR MACHINES, CUBE	25	23	27
10	SYRUP MACHINES	12	11	13
10	TABLES	20	18	22
10	TABLES, PACKING	15	14	16
10	TABLES, SORTING	20	18	22
10	TABLES, WOOD	15	14	16
10	TABLET MACHINES, INDIVIDUAL WRAPPED	18	16	20
10	TANKS, FABRICATED STEEL	20	18	22
10	TANKS, STAINLESS STEEL	30	27	33
10	TANKS, BATCH, AGITATOR	12	11	13
10	TANKS, BRINE	16	14	18
10	TANKS, BRINE (SHELL & TUBE)	18	16	20
10	TANKS, BRINE STORAGE	16	14	18
10	TANKS, CAKE ICE, WITH APPARATUS	20	18	22
10	TANKS, CAUSTIC SODA	10	9	11
10	TANKS, CHEESE, AUXILIARY	20	18	22
10	TANKS, CHIP	20	18	22
10	TANKS, COPPER	30	27	33
10	TANKS, COPPER	20	18	22
10	TANKS, CORN SYRUP	25	23	27
10	TANKS, CYPRESS OR REDWOOD	20	18	22
10	TANKS, DRAW-DOWN	20	18	22
10	TANKS, DUMP	20	18	22
10	TANKS, FERMENTER	20	18	22
10	TANKS, FILTER	20	18	22
10	TANKS, FLUID MILK	20	18	22
10	TANKS, FOREWARMING, TINNED IRON	20	18	22
10	TANKS, GALVANIZED IRON	20	18	22
10	TANKS, GLASS LINED	20	18	22



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	TANKS, GALVANIZED IRON	20	18	22
10	TANKS, GLASS LINED	20	18	22
10	TANKS, GLASS, ENAMELED LINED	20	18	22
10	TANKS, HOLDING (MILK; GLASS LINED)	20	18	22
10	TANKS, HOT WATER	20	18	22
10	TANKS, ICE	20	18	22
10	TANKS, ICE--FREEZING EQUIPMENT	20	18	22
10	TANKS, LACTIC ACID	15	14	16
10	TANKS, MEASURING	40	36	44
10	TANKS, MILK, ENAMEL LINED	20	18	22
10	TANKS, MIXING, GLASS LINED	20	18	22
10	TANKS, MOLASSES	40	36	44
10	TANKS, PARAFFIN	20	18	22
10	TANKS, PROCESS	20	18	22
10	TANKS, RECEIVING & STORAGE (GLASS LINED)	20	18	22
10	TANKS, SATURATION	40	36	44
10	TANKS, SETTLING	20	18	22
10	TANKS, STAINLESS STEEL	30	27	33
10	TANKS, STEEL, GLASS LINED	25	23	27
10	TANKS, TEMPERING & MEASURING	20	18	22
10	TANKS, WASH	20	18	22
10	TANKS, WASH, ENAMEL LINED	20	18	22
10	TANKS, WATER	20	18	22
10	TANKS, WATER, STEEL	40	36	44
10	TANKS, WEIGHING	25	23	27
10	TANKS, WET GRAIN, COPPER	25	23	27
10	TANKS, WET GRAIN, STEEL	10	9	11
10	TANKS, WOOD BARREL	7	6	8
10	TANKS, WOOD	20	18	22
10	TANKS, YEAST	15	14	16
10	TAPE MOISTENING MACHINES	15	14	16
10	TEA-BALL MACHINES	10	9	11
10	TEMPERATURE CONTROLLERS	14	13	15

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	TESTERS	10	9	11
10	TESTERS, BOTTLE	18	16	20
10	TESTERS, CONTAMO	14	13	15
10	TESTERS, OVER-RUN	19	17	21
10	TESTERS, SEDIMENT	20	18	22
10	THERMOMETERS	5	5	6
10	THERMOMETERS	10	9	11
10	THERMOMETERS, MERCURY COLUMN	5	5	6
10	THERMOMETERS, RECORDING	10	9	11
10	THICKENERS	35	32	39
10	TOBACCO & TOBACCO PRODUCTS MANUFACTURING EQUIPMENT	12	11	13
10	TOPPERS	15	14	16
10	TOPPING MACHINES	15	14	16
10	TOWERS, GAS ABSORPTION	20	18	22
10	TOWERS, COOLING	18	16	20
10	TRESTLES & TROUGHS (HIGH LINE)	40	36	44
10	TRIMMING MACHINES	20	18	22
10	TROUGHS	25	23	27
10	TROUGHS, DOUGH	20	18	22
10	TRUCKS	10	9	11
10	TRUCKS & DELIVERY WAGONS, GAS- OLINE & ELECTRIC	10	9	11
10	TRUCKS & HAND TRUCKS	15	14	16
10	TRUCKS, BOWL, BREAD OR PAN	20	18	22
10	TRUCKS, HAND	15	14	16
10	TRUCKS, HAND OR PLATFORM	20	18	22
10	TRUCKS, HOPPER	20	18	22
10	TUBS, FERMENTING	30	27	33
10	TUBS, MASH	25	23	27
10	TUBS, MASH, STEEL	25	23	27
10	UNLOADERS, CANE	20	18	22
10	VATS	20	18	22
10	VATS, CASEIN, TINNED COPPER	17	15	19



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	VATS, CHEESE, TINNED IRON	20	18	22
10	VATS, COIL	20	18	22
10	VATS, COOKING	15	14	16
10	VATS, COOKING	15	14	16
10	VATS, CYPRESS	20	18	22
10	VATS, MILK RECEIVING, COPPER LINED	20	18	22
10	VATS, MILK STORAGE (COIL TYPE)	20	18	22
10	VATS, PASTEURIZING	20	18	22
10	VATS, STEAMING & RINSING	20	18	22
10	VATS, STERILIZING, TINNED COPPER	20	18	22
10	VATS, WASH	20	18	22
10	VEGETABLE OIL & OIL PRODUCTS MANUFACTURING EQUIPMENT	15	13	16
10	VEGETABLE OIL PRODUCTS EQUIP- MENT	15	13	16
10	VEGETABLE OILS & VEGETABLE OIL PRODUCTS	23	20	25
10	VINERS	17	15	19
10	VISCOLIZERS	15	14	16
10	VISCOSITY MACHINES	15	14	16
10	VISCOSITY REGULATORS	10	9	11
10	WAFER MACHINES, AUTOMATIC	20	18	22
10	WASHERS, KEG	15	14	16
10	WASHERS	15	14	16
10	WASHERS	20	18	22
10	WASHERS & SOAKERS, BOTTLE	15	14	16
10	WASHERS, BEET	40	36	44
10	WASHERS, BOTTLE	15	14	16
10	WASHERS, BOTTLE, FOR TEST BOT- TLES	15	14	16
10	WASHERS, CAN	15	14	16
10	WASHERS, CAN (ROTARY; HYDRAU- LIC)	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
10	WASHERS, CASE	12	11	13
10	WASHERS, CLOTHES	15	14	16
10	WASHERS, GAS	40	36	44
10	WASHERS, GRAIN	10	9	11
10	WASHERS, WASHING & DRYING MA- CHINES (MILK CAN)	14	13	15
10	WASHING MACHINES	25	23	27
10	WASTE WATER TANKS	35	32	39
10	WAXERS, PAPER	10	9	11
10	WEIGH CANS	12	11	13
10	WEIGHING & FEEDING MACHINES, AUTOMATIC	10	9	11
10	WELLS, HOT, ENAMEL LINED	20	18	22
10	WELLS, WATER SUPPLY	20	18	22
10	WHIPPING MACHINES, CREAM	15	14	16
10	WINNOWNERS, HAIR	12	11	13
10	WRAPPERS, CAN	15	14	16
10	WRAPPING MACHINES, CARTON	15	14	16
10	WRAPPING MACHINES	15	14	16
10	WRINGERS, CLOTHES, CENTRIFUGAL	17	15	19
	YEAST CULTURE MACHINES	15	14	16
	BASSINETS, HEATED	10	9	11
11	BASSINETS, UNHEATED	15	14	16
11	BEDS, BIRTHING	10	9	11
11	BEDS, ELECTRIC	15	14	16
11	BEDS, MANUAL	15	14	16
11	BENCHES, WOOD/METAL	15	14	16
11	BINS-STORAGE	20	18	16
11	BOOKCASES, METAL/WOOD	15	14	16
11	CABINETS & FILES	15	14	16
11	CABINETS, VARIOUS	15	14	16
11	CASES, BOOK	15	14	16
11	CASES, DISPLAY	15	14	16
11	CHAIRS, HYDRAULIC, SURGERY	15	14	16
11	CHAIRS, BATH	10	9	11



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
11	CHAIRS, BENTWOOD	15	14	16
11	CHAIRS, BLOOD	10	9	11
11	CHAIRS, DENTAL	15	14	16
11	CHAIRS, FOLDING	10	9	11
11	CHAIRS, GERIATRIC	10	9	11
11	CHAIRS, HEAVY	15	14	16
11	CHAIRS, KNETRON	15	14	16
11	CHAIRS, PODIATRY	15	14	16
11	CHART RACKS	20	18	22
11	CHART RECORDERS	10	9	11
11	CREDENZAS	15	14	16
11	CROUPETTES	15	14	16
11	DESKS, METAL/WOOD	15	14	16
11	DISPLAY CASES	15	14	16
11	DRESSERS	15	14	16
11	FILES, ROTARY ELECTRIC	15	14	16
11	FURNITURE & FIXTURES	20	18	22
11	FURNITURE, FIXTURES, & FILING CASES	15	14	16
11	FURNITURE, GENERAL OFFICE	15	14	16
11	FURNITURE, OUTDOOR	3	3	3
11	FURNITURE-RESIDENTIAL	7	6	8
11	LIBRARY FURNITURE	20	18	22
11	LIGHT TABLES	15	14	16
11	LIGHTS, OPERATING	15	14	16
11	LOCKERS	15	14	16
11	LOCKERS, METAL	15	14	16
11	LOCKERS, WOOD	15	14	16
11	OFFICE FURNITURE & EQUIPMENT	15	14	16
11	PARTITIONS, OFFICE	10	9	11
11	PATIO FURNITURE	5	5	6
11	RACKS & STANDS	15	14	16
11	RUGS, CARPETS & MATS	10	9	11
11	SETTEES	12	11	13
11	SHELVING, METAL	15	14	16
11	SOFAS	12	11	13

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
11	TABLES, ANESTHETIC	15	14	16
11	TABLES, AUTOPSY	20	18	22
11	TABLES, EXAM	15	14	16
11	TABLES, FOLDING	10	9	11
11	TABLES, FOOD PREP	15	14	16
11	TABLES, HYDRAULIC	10	9	11
11	TABLES, METAL	20	18	22
11	TABLES, OPERATING	15	14	16
11	TABLES, ORTHOPEDIC	10	9	11
	WHOLESALE TRADE FIXTURES & EQUIP- MENT	7	6	8
	CASINO & GAMING EQUIPMENT	5	4	6
12	CASINO FURNISHINGS	8	5	10
12	VIDEO GAMING MACHINES	5	4	6
	FERRIS WHEELS	15	14	20
	GARAGE EQUIPMENT	10	9	11
13	GENERAL SHOP EQUIPMENT	15	14	16
13	GENERAL STORE EQUIPMENT	15	14	16
13	HAND TOOLS	5	3	6
13	PLANT EQUIPMENT, GENERAL	15	14	16
13	PUMPS, SUMP & WELL EQUIPMENT	8	7	9
13	TOOLING, SPECIAL	5	3	8
	WELDING EQUIPMENT (MIG/AR/OXY-AC- CET)	15	14	16
	AGITATORS	20	18	22
14	AUTOCLAVES	15	14	16
14	BEDS, RUBBING	10	9	11
14	BINS, BATCH	15	14	16
14	BINS, CULLET	15	14	16
14	BINS, PLASTIC	15	14	16
14	BOTTLE MACHINES	15	14	16
14	BOXES, CHIP	10	9	11
14	BRUSH MACHINES	15	14	16
14	BUGGLES, GLASS	15	14	16
14	CARS, BATCH	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
14	CARS, BATCH, SCALE	20	18	22
14	CARS, DRYER, POT	15	14	16
14	CHARGERS, BATCH, FURNACE	15	14	16
14	CHARGING MACHINES	12	11	13
14	CHIPPING MACHINES	15	14	16
14	CHUTES, CULLET	15	14	16
14	CLASSIFIER	15	14	16
14	CLEANING MACHINES, GLASS	12	11	13
14	COMPRESSORS, GAS, GAS ENGINE	20	18	22
14	COOLERS	13	12	14
14	CRACKERS, POT	18	16	20
14	CRUSHERS, COAL	15	14	16
14	CRUSHERS, CULLET	20	18	22
14	CRUSHERS, POT HOUSE	20	18	22
14	CRUSHERS, SALT CAKE	15	14	16
14	CRUSHERS, SWING JAW, WITH FEED HOPPER	20	18	22
14	CUT-OFF MACHINES	15	14	16
14	CUTTERS, GRINDER, METAL	20	18	22
14	CUTTERS, LENS	10	9	11
14	CUTTERS, SAND, GRINDING & POLISHING	20	18	22
14	CUTTING, LEHRS	15	14	16
14	DRAWING MACHINES, GLASS	20	18	22
14	DRESSING MACHINES	20	18	22
14	DRILLING MACHINES, GLASS	12	11	13
14	DRYERS	20	18	22
14	EDGING MACHINES	15	14	16
14	EMERY MILLS	15	14	16
14	EMERY SYSTEM FOR GRINDING & POL- ISHING UNITS	15	14	16
14	FURNACES, ELECTRIC	15	14	16
14	FURNACES, OPTICAL	15	14	16
14	FURNACES	15	14	16
14	FURNACES, POT	15	14	16
14	GLASS & GLASS PRODUCTS EQUIPMENT	11	10	12

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
14	GLASS INDUSTRY EQUIPMENT-GENERAL	20	18	22
14	GLASS PRODUCTS MANUFACTURING EQUIPMENT	15	14	16
14	GRADING CONES, SAND	15	14	16
14	GRINDER MACHINES	15	14	16
14	GRINDERS, RUNNER	15	14	16
14	GRINDERS	20	18	22
14	GRINDING & POLISHING RUNNER GRINDING SYSTEM	15	14	16
14	GRINDING MILLS, POT HOUSE	30	27	33
14	GUARDS, SAFETY & SPLASH	25	23	27
14	KILNS, BURNING, FLOATER, ROUGE OR SOAKING	20	18	22
14	KILNS, CERAMIC OR TUNNEL			
14	KILNS	15	14	16
14	LEHRS	15	14	16
14	LEHRS, PLATE GLASS, ANNEALING OR EXPERIMENTAL	15	14	16
14	LEHRS, PLATE GLASS, LAMINATING	8	7	9
14	LEHRS, PLATE GLASS, OPTICAL	14	13	15
14	LEHRS, PLATE GLASS, POT	20	18	22
14	LIFTERS, RUNNER, GRINDER & POLISHER	20	18	22
14	MILLS, GRINDING OR PUG--POT HOUSE	20	18	22
14	MIXERS, BATCH	15	14	16
14	MIXERS, MUD, VERTICAL	20	18	22
14	MIXERS, SLIDE, WITH FEED HOPPER	15	14	16
14	MIXERS, SMITH	20	18	22
14	MIXERS	14	13	15
14	MOLDS	5	5	6
14	OVENS, ANNEALING	20	18	22
14	OVENS, CORE	20	18	22
14	OVENS, LOW PRESSURE	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
14	OVENS POT	20	18	22
14	OVENS, SOAKING	12	11	13
14	OVENS, THIMBLE	20	18	22
14	OVENS, FLATTENING	12	11	13
14	PANS, DRY	20	18	22
14	PITS, CULLET	20	18	22
14	POLISHER MACHINES, LAMINATED GLASS, CIRCLE	7	6	8
14	POLISHER MACHINES, LAMINATED GLASS, EDGE, FLAT TOP, ETC.	15	14	16
14	POT BRUSH MACHINES	15	14	16
14	PRESSES & CORE PULLER	20	18	22
14	PRODUCERS, GAS	20	18	22
14	PUSHER, BATCH TANKS	20	18	22
14	RACKS	20	18	22
14	REPOLISHING MACHINES	15	14	16
14	ROLLING MACHINES	15	14	16
14	ROLLING MACHINES, RING	20	18	22
14	ROUGE FEED SYSTEM FOR GRINDER & POLISHER UNIT	15	14	16
14	ROUGHING MACHINES	15	14	16
14	ROUNDING MACHINES, EDGE	15	14	16
14	SAND BLASTING EQUIPMENT	15	14	16
14	SAWS, CARBORUNDUM	20	18	22
14	SAWS, CUTTING, GLASS	8	7	9
14	SCALES, HOPPER, BATCH BIN	20	18	22
14	SCREENS, REVOLVING SAND	15	14	16
14	SEPARATORS, AIR	10	9	11
14	SEPARATORS, MAGNETIC	15	14	16
14	SMOOTHING MACHINES, MITER EDGE	15	14	16
14	STACKS, BRICK	40	36	44
14	STACKS, STEEL, FURNACE	35	32	39
14	STACKS, STEEL, KILN	25	23	27
14	STACKS, STEEL, LEHR	25	23	27
14	STACKS, STEEL, RING ROLLING	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
14	STACKS, STEEL, SOAKING KILN	35	32	39
14	TABLES, CASTING	12	11	13
14	TABLES, CUTTING & TRIMMING, HAND	20	18	22
14	TABLES, DRAWING, GRINDING & POLISH- ING	25	23	27
14	TABLES, EXTENSION, LEHR	25	23	27
14	TABLES, SLIP	25	23	27
14	TABLES, SNAPPING	25	23	27
14	TABLES, TEST	20	18	22
14	TABLES, TRANSFER	25	23	27
14	TANKS	15	14	16
14	TANKS, ACID	20	18	22
14	TANKS, BATCH	25	23	27
14	TANKS, CYPRESS	15	14	16
14	TANKS, DIPPING, ACID	15	14	16
14	TANKS, EMERY, WOOD	15	14	16
14	TANKS, GLASS, CONTINUOUS	25	23	27
14	TANKS, MELTING, GLASS	20	18	22
14	TANKS, ROUGE, WOOD	20	18	22
14	TANKS, WATER, STEEL	40	36	44
14	TONGS, POT	25	23	27
14	TRACKS, LEVELING, TABLE	25	23	27
14	TRACKS, TABLE, GRINDING & POLISHING	25	23	27
14	TRIPPERS, AUTOMATIC	10	9	11
14	TRUCKS, CHARGING, BATCH	25	23	27
14	TRUCKS, GLASS CARRYING	25	23	27
14	TURN TABLES	15	14	16
14	TURN-OVER MACHINE, GLASS	25	23	27
14	WASHERS, ROTARY	20	18	22
	WASHERS	20	18	22
	ELECTRONIC COMPONENTS & PROD MANU- FACTURING EQUIP	8	6	9
15	ELECTRONIC EQUIPMENT, MANUFACTUR- ING EQUIPMENT	8	6	9



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
15	ELECTRONIC PRODUCTS MANUFACTURING	18	16	20
	SEMICONDUCTOR MANUFACTURING EQUIPMENT-BASIC	8	7	10
	AIR CONDITIONING SYSTEMS, 5 TO 15 TONS	15	14	16
16	AIR CONDITIONING SYSTEMS, OVER 15 TONS	15	14	16
16	AMUSEMENT & THEME PARKS EQUIPMENT	10	9	11
16	AUTOMATIC DOORS	15	14	16
16	BAGGING MACHINES	15	14	16
16	BARBECUE MACHINES	5	5	6
16	BARBER & BEAUTY SHOP EQUIPMENT	10	9	11
16	BINS, METAL	10	9	11
16	BINS, WOOD/PLASTIC	5	5	6
16	BLANKETS & SPREADS	6	5	7
16	BLOCKING MACHINES, HAT	15	14	16
16	BLOWERS	15	14	16
16	BOOTHES, MARKING (METAL)	15	14	16
16	BOXES, STORAGE, FILM	10	9	11
16	BROILERS	10	9	11
16	BRUSHING MACHINES, BLANKET	15	14	16
16	BUFFERS, FLOOR	5	5	6
16	BURNERS, GAS OR OIL	15	14	16
16	BURNISHERS	15	14	16
16	CABINETS, HOT FOOD	10	9	11
16	CABINETS, RECORD AND FILM	15	14	16
16	CABINETS, TOWEL	10	9	11
16	CAMERAS, MOTION PICTURE	10	9	11
16	CAN OPENERS	10	9	11
16	CARBONATORS	10	9	11
16	CARDING MACHINES	15	14	16
16	CARPETS & RUGS	6	5	7
16	CARROUSELS	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
16	CARTS, VARIOUS	10	9	11
16	CASES, CAMERA-CARRYING (LEATHER)	10	9	11
16	CASH REGISTERS	8	7	9
16	CASH REGISTERS	15	14	16
16	CHAIRS, BARBER	15	14	16
16	CHAIRS, BOBBING	15	14	16
16	CHAIRS, WAITING	12	11	13
16	CHECKOUT COUNTERS	15	14	16
16	CHOPPERS, FOOD	10	9	11
16	CHOPPERS, MEAT	10	9	11
16	CHOPPERS, TICKET	10	9	11
16	CHUTES, METAL	20	18	22
16	CLARIFIERS	10	9	11
16	CLEANERS, ULTRASONIC	10	9	11
16	CLEANING MACHINES, DRY-CLEANING SOLVENT	10	9	11
16	CLEANING MACHINES, RUG	10	9	11
16	CLIPPERS, ELECTRIC	3	3	3
16	COASTER DIPS	15	14	16
16	COMPACTORS, WASTE	15	14	16
16	COMPRESSORS FOR AUTOMATIC DOORS	10	9	11
16	CONDITIONING SYSTEMS, AIR	15	14	16
16	CONVEYOR SYSTEMS	10	9	11
16	CONVEYORS-BELT	15	14	16
16	COOKERS, PRESSURE	10	9	11
16	COOKERS, STARCH	15	14	16
16	COOLERS, FREESTANDING	15	14	16
16	COOLERS, WALK-IN	15	14	16
16	COOLERS, WALK-IN	20	18	22
16	COUNTERWEIGHT SYSTEMS	20	18	22
16	COUNTING MACHINES	10	9	11
16	CURTAINS, ASBESTOS OR STEEL	33	30	36



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
16	CURTAINS, DRAPERIES, & SCARVES	10	9	11
16	CURTAINS, MACHINE AUTOMATIC	20	18	22
16	CURTAINS, STAGE	8	7	9
16	CUTTERS, FOOD	10	9	11
16	CURTAINS, DRAPERIES, & SCARVES	10	9	11
16	CURTAINS, MACHINE AUTOMATIC	20	18	22
16	CURTAINS, STAGE	8	7	9
16	CUTTERS, FOOD	10	9	11
16	DAMPENERS	10	9	11
16	DECORATIONS, PAINTED MURAL, ETC	12	11	13
16	DECORATIONS, SUNDRY	5	5	6
16	DERBIES, GREAT AMERICAN	15	14	16
16	DEVELOPING MACHINES	10	9	11
16	DIMMERS	10	9	11
16	DIMMERS, STAGE & STUDIO	8	7	9
16	DIPPERS, LARGE	15	14	16
16	DISH STERILIZERS	10	9	11
16	DISHWASHERS	10	9	11
16	DISINFECTORS	10	9	11
16	DISPENSERS	10	9	11
16	DISPLAY (REFRIGERATED) CASES	15	14	16
16	DISPLAY CARTS	5	5	6
16	DISPLAY SHELVING, GLASS	10	9	11
16	DISPLAY SHELVING, METAL	15	14	16
16	DISPLAY SHELVING, WOOD	20	18	22
16	DISPLAY STANDS, END	5	5	6
16	DISPOSALS, GARBAGE	5	5	6
16	DRIERS, BLANKET	15	14	16
16	DRIERS, CLOTHES	10	9	11
16	DRYERS	10	9	11
16	DRYERS	10	9	11
16	DRYERS, HAIR	5	5	6
16	DRYROOMS, CONVEYOR TYPE	15	14	16
16	DUMP BASKETS	3	3	3
16	ELEVATORS, ORCHESTRA PIT	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
16	EXAMINATION MACHINES, WITH LENSES	20	18	22
16	EXTRACTORS, LAUNDRY	10	9	11
16	EXTRACTORS, ELECTRIC, FRUIT JUICE	8	7	9
16	FANS, EXHAUST & VENTILATING	15	14	16
16	FILTERS, PHOTOGRAPHIC	10	9	11
16	FIRE-ALARM & FIRE-PREVENTION EQUIPMENT	20	18	22
16	FIXTURES, LIGHT (PORTABLE)	8	7	9
16	FLUTERS, ELECTRIC	8	7	9
16	FOLDERS, FLATWORK	5	5	6
16	FOOD WASTE DISPOSAL	10	9	11
16	FREEZERS	10	9	11
16	FREEZERS, ICE CREAM	15	14	16
16	FREEZERS, WALK-IN	20	18	22
16	FRYERS	10	9	11
16	FURNITURE, DINING ROOM	10	9	11
16	FURNITURE, GUEST ROOM	10	9	11
16	FURNITURE, LOBBY & FOYER	10	9	12
16	GLOVE MACHINES	14	13	15
16	GRAND STANDS, CONCRETE OR STEEL	30	27	33
16	GRAND STANDS, WOOD	15	14	16
16	GRIDDLES	10	9	11
16	GRINDERS, FOOD	10	9	11
16	GRINDERS	10	9	11
16	HAND IRONS, ELECTRIC	6	5	7
16	HAND IRONS, GAS	10	9	11
16	HAND TRUCKS	15	14	16
16	HEATERS, HOT WATER	10	9	11
16	HOSPITAL & FIRST-AID EQUIPMENT	10	9	11
16	ICE CREAM MACHINES	15	14	16
16	ICE STATIONS	10	9	11
16	INCINERATORS	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
16	MILLS, OLD	15	14	16
16	MIRRORS	20	18	22
16	MIXERS, COMMERCIAL	15	14	16
16	MIXERS, SODA, LIGHT	7	6	8
16	MOLDERS, COLLAR	15	14	16
16	MOTION PICTURE & TELEVISION PRO- DUCTION EQUIPMENT	10	9	10
16	NEON SIGNS, OUTSIDE	20	18	22
16	NETS, TENNIS COURT	1	1	1
16	ORCHESTRA STANDS & CHAIRS	15	14	16
16	OVENS	10	9	11
16	PEELERS, ELECTRIC	10	9	11
16	PERFORATORS, FILM	15	14	16
16	PERGOLASES	15	14	16
16	PIERS, AMUSEMENT	33	30	36
16	PLEATING MACHINES			
16	POLISHERS, FILM	10	9	11
16	POOLS, SWIMMING	20	18	22
16	POPCORN MACHINES	8	7	9
16	PRESSES, LAUNDRY	15	14	16
16	PRESSES	15	14	16
16	PRINTING MACHINES	15	14	16
16	PROJECTORS, MOTION PICTURE	10	9	11
16	PROPS & COSTUMES	5	5	6
16	PUMPS, STEAM	20	18	22
16	PURIFIERS	14	13	15
16	RACKS, FILM	10	9	11
16	RANGES, DOMESTIC	15	14	16
16	RECORD PLAYERS, BROADCAST SYS- TEM	12	11	13
16	RECREATION & ENTERTAINMENT	12	11	13
16	REELS, FILM (METAL)	5	5	6
16	REFLECTORS, TILTING	20	18	22
16	REFRIGERATION SYSTEMS	12	11	13
16	REFRIGERATION, NEW TYPE	15	14	16



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
16	REFRIGERATOR, VARIOUS	15	14	16
16	REGISTERS, TICKET	10	9	11
16	RENOVATORS, FILM	10	9	11
16	RESTAURANT & BAR EQUIPMENT	7	6	8
16	RESTAURANT & CAFE EQUIPMENT	10	9	11
16	RESTAURANT EQUIPMENT (FREEZER/DIS- PLAY/SHELVES)	12	11	13
16	REWINDERS, FILM	10	9	11
16	SANITIZERS	15	14	16
16	SAWS, MEAT	15	14	16
16	SAWS, POWER	15	14	16
16	SCALES, LAUNDRY	10	9	11
16	SCALES	15	14	16
16	SCALES, PLATFORM	15	14	16
16	SCATS	20	18	22
16	SCENERY, STAGE	3	3	3
16	SCOOTERS	10	9	11
16	SCREENS, SOLID	10	9	11
16	SCRUBBERS, FLOOR	5	5	6
16	SEALING IRONS	5	5	6
16	SEALING MACHINES	10	9	11
16	SERVING BARS	12	11	13
16	SEWING MACHINES	15	14	16
16	SHADES & SCREENS	10	9	11
16	SHELVING, METAL	15	14	16
16	SHELVING, STOCK ROOM, METAL	15	14	16
16	SHELVING, STOCK ROOM, WOOD	10	9	11
16	SHOPPING CARTS	8	7	9
16	SIGNAL SYSTEMS	15	14	16
16	SILVER POLISHING & CLEANING EQUIP- MENT	10	9	11
16	SILVER POLISHING & PLATING EQUIPMENT	10	9	11
16	SLICERS	15	14	16
16	SLICERS, POWER	10	9	11
16	SLIDES, KIDDY	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
16	SOFTENERS, WATER	15	14	16
16	SPLICERS, FILM	15	14	16
16	SPOTTING UNITS	10	9	11
16	SPRINGS, MATTRESSES, & PILLOWS	9	8	10
16	STARCHERS	10	9	11
16	STEAMERS	10	9	11
16	STEREOPTICONS	15	14	16
16	STERILIZERS & WASHING TANKS	10	9	11
16	STRETCHERS, CURTAIN	20	18	22
16	SWINGS, AERO	15	14	16
16	TABLES	15	14	16
16	TABLES, MANICURE	10	9	11
16	TANKS, DEVELOPING	10	9	11
16	TANKS, DRY, COPPER	30	27	33
16	TANKS, HOT WATER	25	23	27
16	TANKS, SOAP	14	13	15
16	TANKS, STEEL	20	18	22
16	TANKS, WOOD	15	14	16
16	THEATER EQUIPMENT	10	9	11
16	THEME & AMUSEMENT PARKS EQUIP	15	14	16
16	TOASTERS, COMMERCIAL, ELECTRIC	10	9	11
16	TRANSVERTERS	15	14	16
16	TRAYS	10	9	11
16	TRAYS, IDENTIFICATION	10	9	11
16	TRUCKS, CANVAS, FIBER OR WOOD	5	5	6
16	TRUCKS, GALVANIZED	10	9	11
16	TRUCKS, MONEL METAL	10	9	11
16	TUBS, GRANITE	14	13	15
16	TUBS, WOOD	8	7	9
16	TUMBLER, LAUNDRY	15	14	16
16	TUMBLERS	15	14	16
16	URNS, COFFEE	15	14	16
16	VACUUM MACHINES	15	14	16
16	VENDING MACHINES	10	9	11
16	VIBRATORS	4	4	4



#	Industry Asset Description	Normal Useful	Range	
		Life-Years	Minimum	Maximum
16	WAFFLE IRONS, ELECTRIC	5	5	6
16	WARMER, BLANKETS	15	14	16
16	WARMERS, DISH	10	9	11
16	WASHERS, BEDPAN	15	14	16
16	WASHERS, BOTTLE	10	9	11
16	WASHERS, CIDEMATIC	10	9	11
16	WASHERS, COMMERCIAL	10	9	11
16	WASHERS, DOMESTIC	8	7	9
16	WASHERS, GLASSWARE	10	9	11
16	WASHERS, BRASS	12	11	13
16	WASHERS, MONEL METAL	15	14	16
16	WASHERS, WOOD	8	7	9
16	WAVING MACHINES, PERMANENT	5	5	6
16	WAXERS, FLOOR	5	5	6
16	WAXERS & RENOVATORS, FILM	10	9	11
16	WAXERS, FILM	10	9	11
16	WHIPS	8	7	9
16	WIND MACHINES	15	14	16
16	WRAPPING MACHINES, BAKERY	12	11	13
16	WRAPPING MACHINES, MEAT	10	9	11
16	WRAPPING MACHINES, PRODUCE	10	9	11
17	ACCUMULATORS, HYDRAULIC	25	23	27
17	ANNEALING FURNACES	22	20	24
17	BARRELS, TUMBLING	20	18	22
17	BARROWS, CUPOLA CHARGING	5	5	6
17	BASINS, SETTLING	20	18	22
17	BEDS, COOLING	30	27	33
17	BEDS, HOT	25	23	27
17	BENCHES, CHIPPING & FINISHING	6	5	7
17	BENCHES, COKE	10	9	11
17	BENCHES, WORK (WOOD)	15	14	16
17	BINS & HOPPERS, CONCRETE	30	27	33
17	BINS & HOPPERS, STEEL	30	27	33
17	BINS & HOPPERS, WOOD	25	23	27
17	BLAST EQUIPMENT, SAND	15	14	16

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
17	BLAST EQUIPMENT, SHOT	15	14	16
17	BLAST FURNACE PLANTS	25	23	27
17	BLOOMING MILLS	25	23	27
17	BLOWERS	25	23	27
17	BOXES, CHARGING (OPEN HEARTH)	5	5	6
17	BOXES, CINDER (STEEL)	3	3	3
17	BREECHING (STEEL, LINED)	22	20	24
17	BRIDGES, SKIP	30	27	33
17	BUCKETS, GRAB	15	14	16
17	BURNING EQUIPMENT, GAS, TAR OR OIL	15	14	16
17	BURNING EQUIPMENT, PULVERIZED COAL	20	18	22
17	BY-PRODUCT COKE PLANTS, COMPLETE	25	23	27
17	CALCINING PLANTS	15	14	16
17	CAR HAULAGE SYSTEMS	20	18	22
17	CARPENTER & PATTERN SHOP EQUIP- MENT	25	23	27
17	CARRIERS, CLAY	10	9	11
17	CARS, CHARGING, COKE OVEN	25	23	27
17	CARS, CHARGING, GAS PRODUCERS	25	23	27
17	CARS, CHARGING, OPEN HEARTH	15	14	16
17	CARS, DUMP, STEEL	20	18	22
17	CARS, INGOT MOLD	20	18	22
17	CARS, LADLE	20	18	22
17	CARS, MOLD DRYING, OVEN	20	18	22
17	CARS, NARROW & STANDARD GAUGE (STEEL)	20	18	22
17	CARS, QUENCHING	10	9	11
17	CARS, ROLL-OVER MACHINES, FOR	10	9	11
17	CARS, SCALE, ELECTRIC	18	16	20
17	CARS, TRANSFER, ELECTRIC	20	18	22
17	CASTING MACHINES, DIE	15	14	16
17	CASTING MACHINES, PIG	25	23	27
17	CHARGING MACHINES	20	18	22
17	CHARLOTS, INGOT	22	20	24



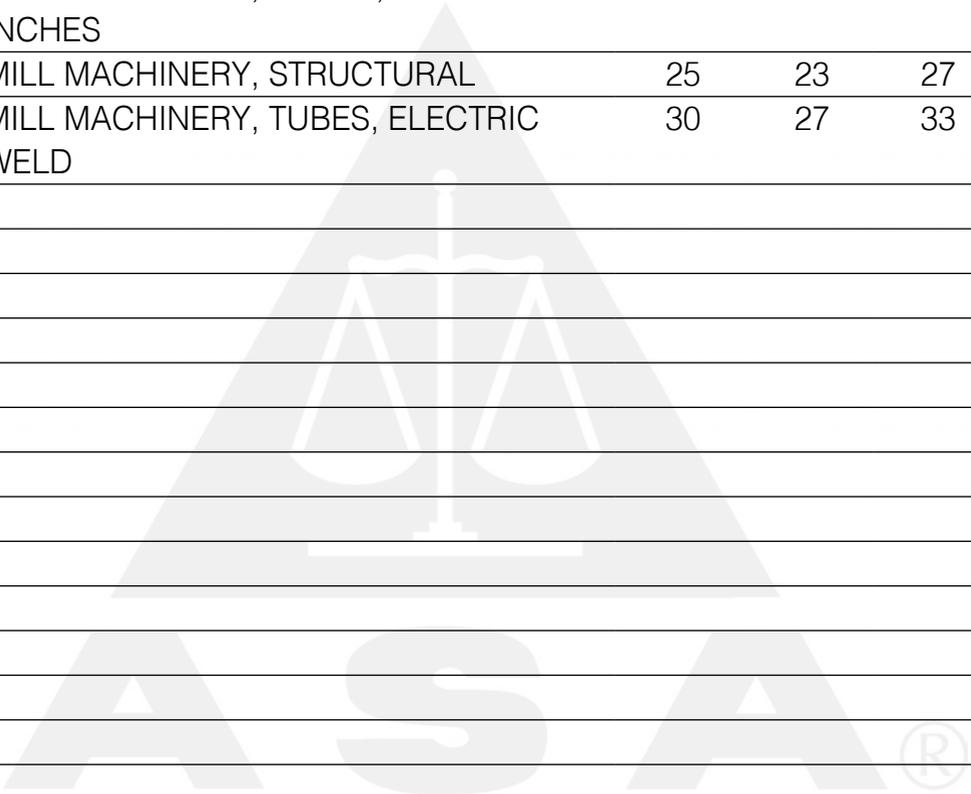
#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
17	COAL, COKE & ASH HANDLING EQUIPMENT	40	36	44
17	COKE OVENS	35	32	39
17	CONCENTRATORS, AMMONIA	15	14	16
17	CONVERTERS, STEEL	25	23	27
17	CONVEYING & COAL-HANDLING EQUIPMENT	20	18	22
17	CONVEYING SYSTEMS, SAND HANDLING	20	18	22
17	CONVEYORS, BELT	15	14	16
17	COOLERS, BRONZE	9	8	10
17	CORE MACHINES	20	18	22
17	COUPLINGS, FLANGED	25	23	27
17	COUPLINGS, FLEXIBLE	22	20	24
17	COUPLINGS, MUFF	20	18	22
17	CRACKERS, SKULL	25	23	27
17	CRANES, LADLE	20	18	22
17	CRANES, LOCOMOTIVE	20	18	22
17	CUPOLAS	25	23	27
17	CUTTING & THREADING MACHINES, PIPE	20	18	22
17	CUTTING & WELDING EQUIPMENT, ELECTRIC	20	18	22
17	CUTTING & WELDING EQUIPMENT, OXY-ACETYLENE	20	18	22
17	DERRICKS, SCRAP BREAKER	20	18	22
17	DOORS, OVEN CHARGING HOLE COVERS	13	12	14
17	DRAG OFFS & ONS	18	16	20
17	DRAWING EQUIPMENT, COLD	20	18	22
17	DRAWING FRAMES, WIRE	20	18	22
17	DRILLS, ELECTRIC & PNEUMATIC, PORTABLE	15	14	16
17	DROP TEST MACHINES	15	14	16
17	DROPS, SCRAP	25	23	27
17	DRYERS, SAND	20	18	22
17	DRYING EQUIPMENT, LADLE, GAS OR OIL	15	14	16
17	DRYING MACHINES, CENTRIFUGAL	20	18	22
17	DUMPERS, CAR	30	27	33

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
17	DUST-COLLECTORS	25	23	27
17	ELECTRIC WELD TUBE MILLS	15	14	16
17	ELEVATORS, BUCKET	15	14	16
17	ELEVATORS, ELECTRIC OR STEAM	25	23	27
17	ELEVATORS, HYDRAULIC	20	18	22
17	EXHAUST SYSTEMS	20	18	22
17	EXHAUSTERS, GAS	20	18	22
17	FENCE MACHINES (WIRE)	30	27	33
17	FORGES, PORTABLE	15	14	16
17	FORGES, STATIONARY	22	20	24
17	FOUNDRIES, BASIC EQUIPMENT	25	23	27
17	FURNACE SHELLS, BLAST & ELECTRIC	15	14	16
17	FURNACES, ANNEALING	15	14	16
17	FURNACES, ANNEALING, TUNNEL TYPE	15	14	16
17	FURNACES, BLAST	20	18	22
17	FURNACES, CONTINUOUS, HEATING	20	18	22
17	FURNACES, ELECTRIC, FOR MELTING	15	14	16
17	FURNACES, FORGE, ELECTRIC	15	14	16
17	FURNACES, HARDENING, DRAWING, ELECTRIC	15	14	16
17	FURNACES, OPEN HEARTH	15	14	16
17	FURNACES, PUDDLING	15	14	16
17	FURNACES, REHEATING	15	14	16
17	FURNACES, WELDING	15	14	16
17	GASOMETERS	15	14	16
17	GRINDERS, STATIONARY & SWING FRAME	15	14	16
17	GRINDERS, TOOL OR SAW	20	18	22
17	GUIDES, COKE	10	9	11
17	GUIDES, ROLL	15	14	16
17	GUNS, MUD	15	14	16
17	HAMMERS, DROP	20	18	22
17	HAMMERS, PNEUMATIC	20	18	22
17	HAMMERS, STEAM	20	18	22
17	HEATING FURNACES & EQUIPMENT	20	18	22



#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
17	HOISTS, AIR, CHAIN OR ELECTRIC (SMALL UNITS)	15	14	16
17	HOISTS, SKIP, STEAM, OR ELECTRIC	20	18	22
17	HOLDERS, ELECTRODE	10	9	11
17	HOLDERS, GAS	30	27	33
17	HOODS, STEEL, OVER FURNACES	5	5	6
17	INGOT MOLDS, STOOLS, ANNEALING BOXES & ROLLS	6	5	7
17	INTENSIFIERS, HYDRAULIC	25	23	27
17	JOLT MACHINES	15	14	16
17	LABORATORY EQUIPMENT, CHEMICAL & METALLURGICAL	15	14	16
17	LADLES, CINDER	5	5	6
17	LADLES, HOT METAL	25	23	27
17	LADLES, STEEL	20	18	22
17	LAP & BUTT WELD PIPE MILLS	20	18	22
17	LATHES, ENGINE	25	23	27
17	LATHES, ROLL	20	18	22
17	LIFTING DEVICES, DOOR	15	14	16
17	LININGS, FURNACE	4	4	4
17	LININGS, STOVE	20	18	22
17	LOADERS, RAIL	25	23	27
17	LOCKERS, STEEL	15	14	16
17	LOCKERS, WOOD	15	14	16
17	LOCOMOTIVES, FIRELESS	25	23	27
17	LOCOMOTIVES, STEAM OR ELECTRIC, ALL GAUGES	25	23	27
17	MAGNETS, LIFTING	20	18	22
17	MAINS, GAS COLLECTING	30	27	33
17	MANIPULATORS, HYDRAULIC, ELECTRIC	25	23	27
17	MERCHANT BAR MILLS	20	18	22
17	MILL MACHINERY, BILLETS	20	18	22
17	MILL MACHINERY, BLOOMING	20	18	22
17	MILL MACHINERY, MERCHANT BARS	20	18	22
17	MILL MACHINERY, PLATES	20	18	22

#	Industry Asset Description	Normal Useful Life-Years	Range	
			Minimum	Maximum
17	MILL MACHINERY, PUDDLES	20	18	22
17	MILL MACHINERY, RAILS	20	18	22
17	MILL MACHINERY, RODS & WIRES	20	18	22
17	MILL MACHINERY, SHEETS	20	18	22
17	MILL MACHINERY, STRIPS, OVER 36 INCHES	20	18	22
17	MILL MACHINERY, STRIPS, UNDER 36 INCHES	20	18	22
17	MILL MACHINERY, STRUCTURAL	25	23	27
17	MILL MACHINERY, TUBES, ELECTRIC WELD	30	27	33





Industry

Normal Useful

Range

#

Asset Description

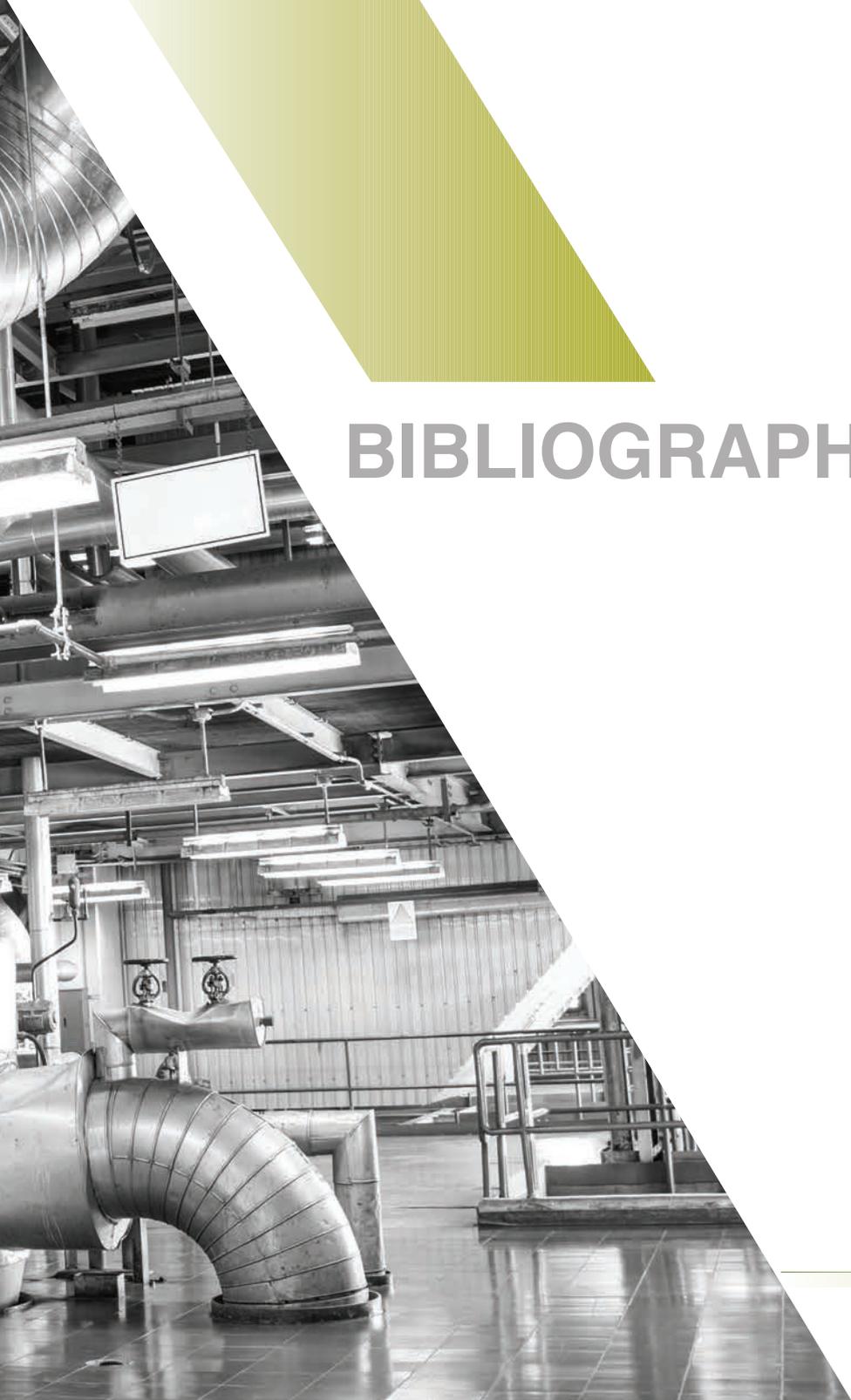
Life-Years

Minimum

Maximum







BIBLIOGRAPHY



American Society of Appraisers. Valuing Machinery and Equipment: The Fundamentals of Appraising

Australia. Tax asset life tables. Link to:

<https://www.ato.gov.au/law/view/document?DocID=TXR%2FTR20184%2FNAT%2FATO%2F00003>

Appraisal Institute. 2013. The Appraisal of Real Estate. Chicago.

<http://www.appraisers.org/>

—. 2015. The Dictionary of Real Estate Appraisal, 6th ed. Chicago.

Baum, Andrew and Crosby, Neil. 2008. Property Investment Appraisal. 3rd ed. Oxford: Blackwell Publishing.

Baum, Andrew, Mackmin, David and Nunnington, Nick. 2018. The Income Approach to Property Valuation. 7th ed. Oxon: Routledge.

Bowes, E. Nelson. 2011. In defense of the cost approach : a journey into commercial depreciation. Chicago: Appraisal Institute.

Bulletin F, IRS Publication 173, Tables of Useful Lives of Depreciable Property

Coleman, Stephanie. 2016. Scope of Work. 2nd ed. Chicago: Appraisal Institute.

International Valuation Standards Council. 2011. Code of Ethical Principles for Professional Valuers. London.

—. 2013. International Valuation Standards. London.

—. 2020. International Valuation Standards. London.

—. 2022. International Valuation Standards. London.

Kingdom of Saudi Arabia. 1433H. "Accredited Valuers Law 1433H." Bureau of Experts at the Council of Ministers. 22 Ramadan. Accessed September 29, 2018. <https://www.boe.gov.sa/printsystem.aspx?lang=en&systemid=307&versionid=285#search1>.

Marshall and Swift/Boeckh, Marshall Valuation Service, Life Expectancy Guidelines

—. 1433H. "Anti-Money Laundering Law." Bureau of Experts at the Council of Ministers. 2 Sha'ban. Accessed 9 29, 2018. <https://www.boe.gov.sa/printsystem.aspx?lang=en&systemid=29&versionid=280>.

New Zealand tax life tables. <https://www.ird.govt.nz/resources/3/0/303acb9b-f2df-4267-bdb9-b22e3f983889/ir265.pdf>

Rattermann, Mark R. 2007. Valuation by comparison : residential analysis & logic. Chicago: Appraisal Institute.

Royal Institution of Chartered Surveyors (RICS). 2016. "Complaints handling." RICS guidance note, UK (1st ed.).

Royal Institution of Chartered Surveyors (RICS). 2017. "Conflicts of interest." RICS professional statement, global (1st ed.).

- . 2020. RICS Valuation – Global Standards. London.
- Royal Institution of Chartered Surveyors (RICS). 2013. “Risk, Liability and Insurance in Valuation Work.” RICS Guidance.
- Saudi Authority for Accredited Valuers (TAQEEM). 2015. “Code of Ethics and Professional Conduct for Valuers.” 30 6. Accessed 9 29, 2018. <http://taqeem.gov.sa/en/Ebook/code%20of%20ethics.pdf>.
- Schafer, Scott M. 2011. Exceeding expectations : producing appraisal reports and services that delight clients. Chicago: Appraisal Institute.
- Simpson, John A. 1997. Property Inspection: An Appraiser’s Guide. Chicago: Appraisal Institute.
- The Appraisal Foundation. 2014. “APB Valuation Advisory #4 - Identifying Comparable Properties.” Washington, DC.
- The Appraisal Foundation. 2016-2017. Uniform Standards of Professional Appraisal Practice. Washington, DC.

