

KLM Technology Group Project Engineering Standard	 www.klmtechgroup.com	Page : 1 of 17
		Rev: 01
		Feb 2011
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	

TABLE OF CONTENT

SCOPE	2
REFERENCES	2
DEFINITIONS AND TERMINOLOGY	2
SYMBOLS AND ABBREVIATIONS	3
UNITS	3
FORMAT	3
General	3
Covers and Size	3
Titles	4
Dividers	6
Size of Drawings	6
Document Revisions	6
CONTENTS OF THE MANUALS	6
Plant Technical Manuals	6
Plant Equipment Manuals	8
TIMING	9
APPENDIX A	10
APPENDIX B	13

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	Page 2 of 17
		Rev: 01
		Feb 2011

SCOPE

This Project Standards and Specification covers the minimum requirements of format and essential instructions for preparation of "Plant Technical and Equipment Manuals (Engineering Dossiers)" in OGP industries.

The purpose of this Manual is also to standardize the content and format of the plant technical and equipment manuals, which shall be prepared by the Contractor. Although the manuals differ to some extent from process to process, the basic philosophy and general aspects shall conform to the concepts of this Standard.

REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

DEFINITIONS AND TERMINOLOGY

Contractor - The persons, firm or company whose tender has been accepted by the "Employer", and includes the Contractor's personnel representative, successors and permitted assignees.

Licensor or Licensor - A company duly organized and existing under the laws of the said company's country and as referred to in the preamble to the contract.

Project - The equipment, machinery and materials to be procured by the "Contractor" and/or "company" and the works and/or all activities to be performed and rendered by the "Contractor" in accordance with the terms and conditions of the contract documents.

Unit or Units - One or all process, offsite and/or utility Units and facilities as applicable to form a complete operable refinery/ and or plant.

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	Page 3 of 17
		Rev: 01
		Feb 2011

SYMBOLS AND ABBREVIATIONS

<u>SYMBOL/ABBREVIATION</u>	<u>DESCRIPTION</u>
BEDD	Basic Engineering Design Data.
CDU	Crude Distillation Unit.
CS	Carbon Steel.
DCS	Distributed Control System.
HCU	Hydro-Cracker Unit.
HVAC&R	Heating, Ventilation, Air Conditioning, Cooling and Refrigeration.
PO	Purchase Order.
VDU	Vacuum Distillation Unit.
VOL	Volume.

UNITS

This Standard is based on International System of Units (SI) except where otherwise specified.

FORMAT

General

Separate Plant technical manuals shall be prepared for each process and/or utility Unit. All subjects common to the Refinery/ Plant process and/or utility Units shall be presented in separate plant technical manuals under Unit number "00". The common subjects covered in the manuals of Unit "00" shall not be repeated in the individual manuals of each Unit.

Plant equipment manuals including vendor dossiers shall be prepared in accordance with the equipment categories and Vendor information throughout the refinery/plant.

Covers and Size

The format of the manuals shall essentially conform to the following requirements:

1. Size of covers:

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	Page 4 of 17
		Rev: 01
		Feb 2011

225 mm (width) × 300 mm (length), bound on 300 mm side.

2. Size and type of bottom covers:
 - a. Size
Free thickness, up to 70 mm maximum.
 - b. Type
Integral types with covers.
3. Color of front and bottom covers:
Dark blue without window.
4. Color of title on front and bottom covers:
Golden.
5. Form of title character:
Helvetica light.
6. Printing of character:
Leaf stamping.
7. Size of papers shall be A4 size (210 mm × 297 mm).

Titles

1. The manuals shall be named as follows where applicable:
 - Plant Technical Manual, or;
 - Plant Equipment Manual (Engineering Dossiers).
2. The titles on the front cover shall include the following phrases or requirements in order of precedence:
 - a. Ministry of Petroleum.
 - b. Company's emblem.
 - c. Company's name
 - d. Name of Company relevant Organization, (if any), (e.g., Refineries Engineering and Construction).
 - e. Name of Refinery or plant.

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS)	Page 5 of 17
		Rev: 01
	(PROJECT STANDARDS AND SPECIFICATIONS)	Feb 2011

- f. Plant Technical Manual, or; Plant Equipment Manual (Engineering Dossiers).
 - g. Unit number and name (only for plant technical manuals).
 - h. Equipment category (see 6.3.4 below) for plant equipment manuals only.
 - i. Volume number.
 - j. Date; (it may be referred to the month and year of the plant commissioning date).
 - k. Contractor's name and logo.
 - l. Project No.
3. The titles on the bottom cover shall include all requirements as outlined above.
 4. Equipment category in order of precedence shall be as follows:
 - General (including basic design data, drawing's index, overall Refinery/Plant block flow diagrams and utilities consumption tables and all general items common to all Units throughout the refinery/plant).
 - Civil (including all civil works such as excavation and grading, concrete and structure).
 - Buildings.
 - Tanks.
 - Field fabricated vessels, towers and reactors.
 - Shop fabricated vessels, towers and reactors.
 - Fired heaters, boilers, incinerators and burn pits.
 - Heat exchanging equipment including air and water coolers, process/process heat exchangers, reboilers, chillers, condensers, tank heaters and heating/cooling coils.
 - Compressors and power generators.
 - Pumps, drivers and turbines.
 - Filtration units.
 - Mixers.
 - Dryers.
 - Refrigeration units.
 - Material handling equipment.

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	Page 6 of 17
		Rev: 01
		Feb 2011

- Miscellaneous equipment including package Units, filters, silencers, desuperheaters, etc.
- Instrumentation and control system.
- Electrical.
- Piping and miscellaneous piping components.
- Insulation and protective coatings.
- Miscellaneous items.

Dividers

Dividers should be provided to separate each chapter or section with appropriate designations of the concerned subject.

Size of Drawings

Drawings larger than A4 size, which is supposed to be inserted in the manuals, shall preferably be reduced size with 297 mm from top to bottom for folding in one direction only. The reduced drawings must be of sufficiently high quality to maintain legibility.

Document Revisions

All engineering dossiers to be included in the plant technical and equipment manuals shall be latest revision corresponding to the equipment installed in the plant.

CONTENTS OF THE MANUALS

Plant Technical Manuals

1. In order to standardize the quality of the manuals, the contents shall include but not be limited to the following information:
 - Utility summary tables based on operation and design conditions for the alternate operations, and utility balance drawings.
 - Basic Engineering Design Data (BEDD)
 - Plant/complex block flow diagram.

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	Page 7 of 17
		Rev: 01
		Feb 2011

- Unit process flow diagrams.
- Piping and instrumentation diagrams.
- Utilities distribution diagrams including: steam, condensate, water, power, fuel, air, nitrogen, etc.
- Plot plans and general arrangement diagrams showing location of all equipment and extent and type of structure, where required.
- Earth work such as rough-grading, surface preparation, landscaping, etc.
- Unit process description.
- Flare load summary tables.
- Power system single line diagrams.
- Electrical power load diagrams.
- Equipment specifications, data sheets and curves (where required) containing design information for vessels and tanks, compressors, pumps, heaters, heat exchangers (including water and air coolers, condensers, reboilers, chillers, tank heaters, etc.), motors, turbines, generators, piping, instrumentation, packaged units and other miscellaneous equipment and/or devices.
- Job specifications including all project technical specifications for excavation and grading, concrete, steel structure, buildings, tanks, vessels, fired heaters, boilers, heat exchanging equipment, compressors and generators, pumps and turbines, motors, mixers, miscellaneous equipment (such as filters, silencers, desuperheaters, etc.), electrical, instrumentation and control system, piping, insulation, painting, welding, inspection, etc.
- Analyzers specification and data sheets.
- Electrical hazardous area classification.
- Pipeline lists and line schedules for all piping including piping specialty items.
- Fire fighting facilities drawings and data sheets.
- Pump and compressor performance curves stamped by the Manufacturer including head, capacity, efficiency, net positive suction head and brake horse power in kilowatts (kW). The curves shall include the information for the diameter of the impeller furnished and the maximum size impeller that can be used.
- Index of Contractor's drawings.
- Index of Manufacturer's drawings.

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	Page 8 of 17
		Rev: 01
		Feb 2011

- Lubricating oil schedule and specification.
2. All general data/specifications applicable to all Units throughout the refinery/complex shall be presented as common technical information in the separate volumes apart from the individual items for each Unit. The common subjects shall not be repeated in the manuals prepared for each individual process, offsite or utility Unit.
 3. A typical contents of plant technical manual for Unit "00" : common and Unit "01": "crude and vacuum Unit" of a refinery has been presented in Sections A.1 and A.2 of Appendix A. Some of the items specified in Appendix A may be modified and/or changed depending upon the particular process or utility Unit.

Plant Equipment Manuals

1. Plant equipment manuals shall contain all specifications, data sheets, drawings and equipment operation, maintenance and safety instructions and all other engineering documents necessary for safe operation of the equipment produced by the equipment Manufacturer.
2. The manuals shall contain all engineering documents prepared by the manufacturers/vendors in accordance with the equipment purchased order numbers.
3. A general index should be provided for all plant equipment manuals containing of purchase order number, description, Vendor or manufacturer name and volume number. (For typical general index see Appendix B).
4. Contents of the manuals shall include the subjects according to the following categories in order of precedence:
 - Civil including structure, concrete and buildings.
 - Tanks.
 - Vessels, towers and reactors (including all vessel internals such as trays, packing, etc.).
 - Fired heaters and boilers.
 - Heat exchangers (including water and air coolers, chillers, reboilers, condensers, tank heaters, coils, etc.).
 - Compressors and power generators.
 - Pumps drivers and turbines.

KLM Technology Group Project Engineering Standard	PLANT TECHNICAL AND EQUIPMENT MANUALS (ENGINEERING DOSSIERS) (PROJECT STANDARDS AND SPECIFICATIONS)	Page 9 of 17
		Rev: 01
		Feb 2011

- Filtration units.
- Mixers.
- Dryers.
- Refrigeration units
- Package equipment.
- Other miscellaneous equipment (if any).
- Instrumentation.
- Control system.
- Electrical.
- Piping and miscellaneous piping items.
- Insulation.

TIMING

Plant equipment and plant technical manuals shall be furnished by the Contractor to the employer/Company before the works are taken over. The manuals should be provided together with drawings (other than shop drawings) of the project as completed, in sufficient detail to enable the Company to operate, maintain, dismantle, reassemble and adjust all parts of the works. The project shall not be considered as completed for the purpose of taking over under the conditions as required in the contract for test and acceptance until such requirements are follows:

- a. At least ninety (90) days before commencement of performance test, the Contractor shall prepare in draft and deliver to the Company for approval two copies of complete plant technical manuals and two copies of plant equipment manuals.
- b. The Contractor shall carry out all corrections; amendments and additions to such manuals as may be instructed by the Company. Within 15 days after the Company's approval, the Contractor shall deliver to the Company, the required numbers of copies of approved plant technical and plant equipment manuals.