

GP 06-04-01	Air-Cooled Heat Exchangers	December 2003
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Air-Cooled Heat Exchangers

GP 06-04-01

Scope

- 1) This Global Practice (GP) refers to API STD 661, 5th edition, ISO 13706, 2000, March 2002, which is part of this GP.
- 2) API STD 661, 5th Edition, ISO 13706, 2000, March 2002, as amended by this GP, defines the minimum requirements for air-cooled heat exchangers for general refinery services. This GP does not cover vacuum steam condensers or integral radiators for equipment such as packaged air compressors.
- 3) [I] An asterisk (*) indicates that a decision by Purchaser is required or that additional information shall be furnished by Purchaser in Appendix A of this Practice. The Appendix supplements API STD 661/ISO 13706, Annex B.
- 4) [I] Only the revised Sections are listed herein. For user convenience, the nature of the revision is noted at the beginning of each paragraph as follows:

Additions:

Denotes additions to the corresponding API/ISO Section.

Exception:

Denotes a replacement of the corresponding API/ISO Section.

New:

Denotes a new requirement that does not appear in API STD 661/ISO 13706.

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GP 06-04-01	Air-Cooled Heat Exchangers	December 2003
-------------	----------------------------	---------------

Table of Contents

1. Required References	3
1.1. Global Practices–ExxonMobil Engineering Practices	3
1.2. ANSI–American National Standards Institute	3
1.3. API/ISO–American Petroleum Institute/International Organization for Standardization	3
1.4. ASME–The American Society of Mechanical Engineers	3
1.5. CFR–Code of Federal Regulations	4
2. Additional Requirements	4
2.1. Global Practices–ExxonMobil Engineering Practices	4
2.2. ASME–The American Society of Mechanical Engineers	5
2.3. ASTM–American Society for Testing and Materials	5
3. Revisions to API Standard 661/ISO 13706	5
Revisions to Section 4: Scope	5
Revisions to Section 5: Proposals	5
Revisions to Section 6: Documentation	5
Revisions to Section 7: Design	6
Revisions to Section 8: Materials	12
Revisions to Section 9: Fabrication of Tube Bundle	12
Revisions to Section 10: Inspection, Examination, and Testing	14
Revisions to Section 11: Preparation for Shipment	14
Revisions to Section 12: Supplemental Requirements	15
Revisions to Appendix A	16
Record of Change	17
Attachment: Purpose Codes Definitions	19

DNST, CHEM, DIOL	For ExxonMobil Use Only	Version 2.1.0
Page 2 of 18	©ExxonMobil Development Company	



Documents

Document Sharing Hub

GP 06-04-01	Air-Cooled Heat Exchangers	December 2003
-------------	----------------------------	---------------

1. Required References

This Section lists Practices and Standards that are generically referenced and assumed to be a part of this document. Unless otherwise specified herein, use the latest edition.

1.1. Global Practices–ExxonMobil Engineering Practices

GP 02-01-01	Plant Noise Design Criteria
GP 04-01-03	Design Loads for Structures
GP 04-02-01	Auxiliary Structures for Operation and Maintenance
GP 05-01-01	Pressure Vessels
GP 05-03-01	Pressure Testing of Unfired Pressure Vessels
GP 16-01-01	Area Classification and Related Electrical Design for Flammable Liquids, Gases or Vapors
GP 16-09-01	Low Voltage AC Motors Up to 200 HP (150 kW)
GP 18-07-01	Welding Procedures
GP 18-10-01	Additional Requirements for Materials
GP 18-12-01	Positive Material Identification
GP 19-01-01	Paint and Protective Coatings
GP 20-01-01	Inspection of Equipment and Materials

1.2. ANSI–American National Standards Institute

ANSI A12.1	Safety Requirements For Floor And Wall Openings, Railings, And Toeboards
ANSI A14.3	Ladders - Fixed - Safety Requirements (Withdrawn)

1.3. API/ISO–American Petroleum Institute/International Organization for Standardization

API STD 661/ISO 13706	Air-Cooled Heat Exchangers for General Refinery Services
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1.4. ASME–The American Society of Mechanical Engineers

ASME B16.5	Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24
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Page 3 of 18	©ExxonMobil Development Company	



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Document Sharing Hub

GP 06-04-01	Air-Cooled Heat Exchangers	December 2003
-------------	----------------------------	---------------

1.5. CFR–Code of Federal Regulations

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910 Subpart D	Walking-Working Surfaces
29 CFR 1910.21	Definitions
29 CFR 1910.22	General Requirements
29 CFR 1910.23	Guarding Floor and Wall Openings and Holes
29 CFR 1910.27	Fixed Ladders
29 CFR 1910 Subpart O	Machinery and Machine Guarding
29 CFR 1910.211	Definitions
29 CFR 1910.212	General Requirements for All Machines
29 CFR 1910.219	Mechanical Power Transmission Apparatus

2. Additional Requirements

* [I] The following Practices and Standards shall be used with this GP as specified by Purchaser.

2.1. Global Practices–ExxonMobil Engineering Practices

GP 03-16-01	Flanged Joints, Gaskets, and Bolting
GP 05-01-02	Additional Requirements for Special Criteria Pressure Vessels
GP 06-01-01	TEMA Type Shell-and-Tube Heat Exchangers
GP 10-07-01	General Purpose Steam Turbines
GP 14-03-01	Fireproofing
GP 18-03-02	Statically Cast Steel and Alloy Pressure Containing Parts and Tube Supports for Fired Heaters
GP 18-04-01	Postweld Heat Treatment of Equipment Handling Alkaline Solutions
GP 20-01-03	Quality Programs

DNST, CHEM, DIOL	For ExxonMobil Use Only	Version 2.1.0
Page 4 of 18	©ExxonMobil Development Company	



GP 06-04-01	Air-Cooled Heat Exchangers	December 2003
-------------	----------------------------	---------------

2.2. ASME–The American Society of Mechanical Engineers

ASME SEC V	BPVC Section V - Nondestructive Examination
ASME SEC VIII D1	BPVC Section VIII - Rules for Construction of Pressure Vessels - Division 1
ASME B16.1	Cast Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250

2.3. ASTM–American Society for Testing and Materials

ASTM D 2000	Standard Classification System for Rubber Products in Automotive Applications SAE J200
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3. Revisions to API Standard 661/ISO 13706

[I] All headings contained herein correspond to paragraph numbering within API STD 661/ISO 13706 and reflect additions, substitutions, modifications, and deletions. All provisions not modified or deleted remain in force.

Revisions to Section 4: Scope

4.1.1. Addition: General

[I] When the tube bundles are constructed for use at a location where the ASME Code is not mandatory, it shall be noted on the Code forms that the bundle does not carry a code symbol.

Revisions to Section 5: Proposals

5.8. Exception

[I] The proposal shall include noise level data per [GP 02-01-01](#).

5.9. Exception

[I] The proposal shall include characteristic performance curves for fans and louvers.

Revisions to Section 6: Documentation

6.1.1. Addition: Approval Information

b) [I] Minimum test temperature.

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Page 5 of 18	©ExxonMobil Development Company	



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6.1.4. Exception: Approval Information

[R] All proposed welding procedures and qualifications shall be submitted for approval to Purchaser prior to the start of fabrication. This shall include a single drawing for strength welded tube-to-tubesheet joints showing a complete procedure for welding, expansion, inspection, and weld testing.

6.2.2. Exception: Final Records

[I] Within ten days after delivery, Vendor shall furnish Purchaser the following documentation that shall be arranged in complete sets, with one set for each exchanger. These shall show any changes made after approval.

- h) Certified noise data sheet for the air-cooled heat exchanger.
- j) Louver characteristic performance curve.

6.2.2. New: Final Records

- l) Certified outline and detail drawings stamped "As-Built." The drawings shall show the actual corrosion allowance of the header box plates and nozzles, the minimum nominal wall thickness of the nozzles, and the material impact requirements.
- m) All mechanical design calculations marked "As-Built."
- n) Manufacturer's nameplate rubbing.
- o) A certified record of any impact test performed.

Revisions to Section 7: Design

7.1.1.4. Addition: General

* [R] Intermediate spacers, coinciding with the tube supports, shall be provided between all adjacent rows of tubes to prevent sagging and meshing or deformation of fins. The tube supports and spacers shall be designed to accommodate the thermal expansion of the tubes. If Purchaser desires a particular type spacer, this preference can be indicated in Appendix A. Acceptable spacer types include the following:

- 1) Aluminum or zinc rings, 2 in. (50 mm) wide with outside diameter equal to tube spacing with a positive method of retaining the spacers.
- 2) Corrugated aluminum strips, 2 in. (50 mm) wide, with corrugations and thickness as required. Corrugated strips shall be permanently secured in place by crushing part of the fin and by welding restraining channels to the sides of the frames.

7.1.1.12. Addition: General Requirements

* [M] When the exchanger can operate below 120°F (49°C) including upsets and start-up conditions, the lowest possible tube metal temperature will be specified by Owner.

7.1.3.2. Exception: Tube Bundle Design Temperature

[R] The design temperature for pressure parts, as listed on the air cooled heat exchanger specification sheet, is not intended to apply in determining exposure metal temperatures of mechanical and instrumentation components. The design temperatures shall be used to govern fin type selection as detailed in API STD 661/ISO 13706, Section 7.1.11.

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Page 6 of 18	©ExxonMobil Development Company	

