

Changes shown by

**THE FOLLOWING PARAGRAPH NUMBERS REFER TO API STANDARD 662, FIRST EDITION,
DECEMBER 1995, WHICH IS PART OF THIS PRACTICE**

SECTION 1 - SCOPE

- I 1.1 (Exception) This practice covers the design, materials, fabrication, inspection, testing and preparation for shipment of **gasketed plate heat exchangers**, sometimes referred to as plate-and-frame heat exchangers. All paragraphs in this Practice amend those in API 662, Plate Heat Exchangers For General Refinery Services, unless specifically noted. For user convenience, the beginning of each paragraph in this IP is noted as follows:
- (Addition) - This means that the paragraph specifies additions to the corresponding API paragraph.
- (Exception) - This means that the paragraph completely replaces the corresponding API paragraph.
- (New) - This means that the paragraph is new and does not appear in API 662.
- I 1.3 (New) **An asterisk (*)** indicates that a decision by the purchaser is required or that additional information shall be furnished by the Purchaser in **Attachment 1** of this practice. The attachment supplements API 662, Appendix B.

SECTION 2 - GENERAL

- I 2.2 (Exception) Vendor shall comply with all local rules and regulations.
- I * 2.3 (Exception) Registration requirements shall be specified by the Purchaser.

SECTION 3 - REFERENCES

- I 3.1 (Addition) **Table 1** lists the practices which shall be used with this practice in addition to those listed in API 662.

TABLE 1

PRACTICES			
IP 3-16-1	Flanged Joints, Gaskets, and Bolting	IP 18-10-1	Additional Requirements for Materials
IP 5-1-1	Pressure Vessels	IP 18-12-1	Positive Material Identification
IP 5-3-1	Pressure Testing of Unfired Pressure Vessels	IP 19-1-1	Paint and Protective Coatings
IP 18-7-1	Welding Procedures	IP 20-1-1	Inspection of Equipment and Materials
CODE / STANDARD			
ASME Code		API Standard	
Section VIII Pressure Vessels, Division 1		662 Plate Heat Exchangers For General Refinery Services	

- I * 3.2 (Addition) **Table 2** lists the practices which shall be used with this practice if so specified by the Purchaser.

TABLE 2

PRACTICES			
IP 18-4-1	Postweld Heat Treatment of Equipment	IP 19-7-1	Protection of Stainless Steel During Fabrication, Shipping, Storage and Field Construction
IP 19-2-1	Weld Overlay and Integrally Bonded Cladding	IP 20-1-2	Administrative Procedures for Obtaining Inspection

SECTION 6 - PROPOSAL INFORMATION REQUIRED

- S 6.9 (New) If a fireproof shroud is specified, the **Vendor shall submit proof that the proposed shroud design passed a fire test** as follows:
- The exchanger that is used in the test had no less than 100 plates.
 - Both sides of the exchanger were filled with kerosene, under pressure, with no flow.
 - The pressure of kerosene was no less than 150 psig (10 barg).



IP 6-5-1	Plate and Frame Heat Exchangers	
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(This practice is appropriate for attachment to Inquiry or Purchase Document)

SECTION 6 - PROPOSAL INFORMATION REQUIRED (Cont)

- d. The exchanger was placed in a pan of kerosene large enough to expose the entire PHE exterior to flames.
- e. The exchanger, with the shroud on it, was engulfed by the pan fire for a minimum of one hour.
- f. The maximum observed leakage was 1 gpm (0.23 m³/hr).

SECTION 7 - DRAWINGS AND OTHER DATA REQUIREMENTS

7.1 DRAWINGS

- I 7.1.1 (Addition) The **drawings submitted for review** shall include all details, dimensions, and materials, sufficient for stress calculations for each part.
 - b. (Addition) Maximum Allowable Working Pressure (MAWP) at "new & cold" and "hot & corroded" conditions, corrosion allowance, and Critical Exposure Temperature (CET).
 - o. (New) A separate "Gasket Drawing" showing the proposed gaskets, their inspection procedure, and anticipated replacement interval.
 - p. (New) Impact test requirements for the base metal, weldments and heat-affected zones.
 - q. (New) Post-Weld Heat Treatment (PWHT) requirements.
- I 7.1.2 (Addition) The procedure shall specify the **final dimension of the compressed plate pack**.
- I 7.1.4 (Addition) The **drawings shall include** the following:
 - a. A Plate-Pack Drawing showing the plate material and type and the location of the different plate types within the pack. This drawing shall also show the recommended final dimension of the compressed plate pack with the statement that the plates shall not be tightened to a dimension smaller than the minimum.
 - b. A **Gasket Drawing** showing the gasket type, material, and location of the gasket in the plate pack.
 - c. A **Nozzle Drawing** showing the design of each nozzle, liners, and welds including the weld procedure.

SECTION 8 - DESIGN

8.1 GENERAL

- R * 8.1.4 (New) Purchaser shall **specify the Critical Exposure Temperature (CET)** in **Attachment 1**.
- S 8.1.5 (New) Each exchanger shall have provisions for static grounding.
- R * 8.1.6 (New) **Both sides shall be designed for full vacuum** if so specified in **Attachment 1**.
- S * 8.1.8 (New) Purchaser shall specify (in **Attachment 1**) if fireproofing is required. A fireproof shroud shall be specified when the following two conditions exist simultaneously:
 - a. The exchanger contains a flammable liquid in contact with elastomeric gaskets.
 - b. The exchanger is located within 20 ft (6 m) of equipment with a high fire potential.
- S 8.1.9 (New) The **fireproof shroud shall have a vent**.
- M * 8.1.10 (New) The **preferred design** is a true counter-current, **single-pass design** with all nozzles on the fixed cover plate. However, when a multi-pass design requires the location of nozzles on the movable cover plate, Purchaser shall specify whether the vendor shall supply the piping spools which will allow both the retraction of the end plate and the future addition of plates.
- M 8.1.11 (New) **Exchangers of three or more passes** shall not be used in hydrocarbon services .

8.5 COMPONENTS

- R 8.5.1 **Plates shall conform** to the following:
 - a. (Exception) The **minimum thickness** of plates shall be the greater of 0.6 mm (0.024-in. nominal), or that required to withstand the full hydrostatic test pressure on one side with no pressure on the other side.
 - b. (Addition) **Support slots** shall be integral with the plate and reinforced if necessary.
 - f. (New) The **heat transfer area** of the plates shall be stamped (or pressed) in a single operation.
 - g. (New) The **plate material** shall be selected based on zero **corrosion allowance**.
 - h. (New) All plates shall have permanently stamped **numbers for assembly** sequence.