







	<p align="center">Toase-ehe Park Sanati Gohar Ofogh Petrochemical Co.</p> <p align="center">CONCEPTUAL, BASIC and DETAIL DESIGN ENGINEERING OF STYRENE PARK OFFSITE</p>	  
	<p align="center">Document Title: PFHT Procedure for Head Forming and U Bend Tubes</p>	
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STYRENE PARK OFFSITE

Document Title:









PFHT Procedure for Head Forming and U Bend Tubes

R0	01-07-2025	IFA	F.Baviye	N.Abnavi	N.Abnavi
Rev.	Issued Date	DESCRIPTION	PREPARED	CHECKED	APPROVED

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REVISION RECORD SHEET

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PFHT Procedure for Head

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1. GENERAL

1.1 Scope

This procedure covers the requirements of stress relieving & post-form heat treatment, which will be applied for heat exchangers of Toase-ehe Park Sanati Gohar Ofogh Petrochemical company.

1.2. Reference

This procedure shall be carried out in accordance with the following:

- ASME Code Sec. VIII, Div.1, 2019 Edition
- Project Specification

1.3. Heat Treatment Method

1.4. Local Resistance Heat Treatment

1.5. Furnace Heat Treatment

2. Preparation

2.1. Before heat treatment, oil, scale, weld spatter and dirt shall be removed and then the all parts shall be inspected for its cleanliness.

2.2. The equipment shall be supported to prevent distortion during heat treatment, if necessary.






2.3. Temperature in the furnace and band shall be checked and recorded by connected thermocouples and number of thermocouples shall be two or more for checking the deviation of temperature throughout heat treatment. The thermocouples shall be attached directly on the part.

2.4. temperature chart shall include chart speed, project name, item, and others.

3. Operation of Heat Treatment

3.1. Heating

- a) Above 425 degree °C (800 degree F), the rate of heating shall be not more 222 degree °C (400 degree F) per hour divided by the maximum metal thickness of the shell or head plate in inches, but in no case more than 222 degree °C (400 degree F) per hour and in no case need it be less than 55.6 degree °C (100 degree F) per hour.
- b) During the heating period the shall not be a greater variation in temperature throughout the portion of the item being heated than 138.8 degree °C (250 degree F) within any 15ft interval of length.

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3.2. Holding

- a) The heat-treated material or equipment shall be held at or above the temperature specified in Table UCS-56 or UCS-56.1 of ASME Code section VIII Division 1 for the period of time specification in the Tables.
- b) During the holding period, there shall not be a greater difference than 83.3-degree °C (150-degree F) between the highest and lowest temperature throughout the portion of the equipment being heated.
- c) During the heating and holding period, the furnace or band atmosphere shall be so controlled as to avoid excessive oxidation of the surface of the item.

3.3. Holding Time

The heat-treated materials or equipment shall be held at or above the temperature specified in table UCS-56. (ASME sec. VIII, Div.1)

P NO	Nominal holding temperature	Minimum holding time		
		Up to 2in	Over 2in to 5 in	Over 5in
1	625+25 °C	1 hr/ln 15 min minimum	2 hr pluse 15 min min for each additional inch over 2 in.	2 hr pluse 15 min min for each additional inch over 2 in.

3.4. Cooling






Above 425 degree °C (800 degree F), cooling shall be done in a closed furnace or cooling chamber at a rate not greater than 278 degree °C (500 degree F) per hour divided by the maximum metal thickness of the shell or head plate in inches, but in no case more than 278 degree °C (500 degree F) per hour.

3.5. Disassembly

The supports to prevent distortion during heat treatment shall be removed and welded areas shall be grind smoothly and carry out P.T after heat treatment.

3.6. Alternative heat treatment

When it is impractical for an equipment to be heat treatment at the temperature limitations stated in 4.4, it may be heat treatment at lower temperatures for longer periods of time upon approval.

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Decrease In Temperature Below Normal Holding Temperature	Minimum Time at Decreased Temperature (hr/in. of th'k)	Holding
27.7 deg.°C (50 deg.F)	2	
55.6 deg.°C (100 deg.F)	4	
83.3 deg.°C (150 deg.F)	10	(NOTE 2)
111.1 deg.°C (200 deg.F)	10	(NOTE 2)

NOTE (1): Minimum-holding time for 1 In. thickness or less. Add 15 minutes per inch of thickness for thickness greater than 2 in

NOTE (2): These lower post weld heat treatment temperatures permitted only for P-NO.1Gr. NO.1 and 2 materials.



4. Inspection

- 1.6. Inspection work shall be carried out in accordance with this procedure and instructions concerned.
- 1.7. QC manager shall review the heat treatment records with chart.






5. Records

The records of heat treatment shall include the follows.

- a) Location of thermocouple
- b) Heating rate
- c) Holding temperature and time
- d) Cooling rate
- e) Heating method
- f) Work Order No. & Item No.
- g) Applicable procedure and revision
- h) Material & Thickness
- i) Date
- j) Signature of QC manager

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PFHT Procedure for Tube Bending

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1. Scope

This procedure covers the requirements of stress relieving & post-form heat treatment, which will be applied for bended tubes of Toase-ehe Park Sanati Gohar Ofogh Petrochemical company.

2. Post-Bending Heat Treatment

After rotary draw bending, the tube shall receive a post-bending heat treatment as follows;

2.1 Preparation

1. Prior to any heat treatment, inspection shall be done for cleanliness, and oil, grease, paint & other foreign material shall be removed.
2. Thermocouples shall be attached with U-tube material.
3. The heating zone shall be covered sufficiently with thermal insulators.
4. U-tube shall be adequately supported so as to minimize distortion during heat treatment.

2.2 Heating Method

1. Post-bending heat treatment shall be performed by stress relief annealing.
2. Heat treatment shall be done by atmosphere temperature of electric resistance heating at the electric furnace.
3. The heat treatment shall be applied to the U-bend area plus approximately 150mm of each leg beyond the tangent point of the U-bend as fig 1.

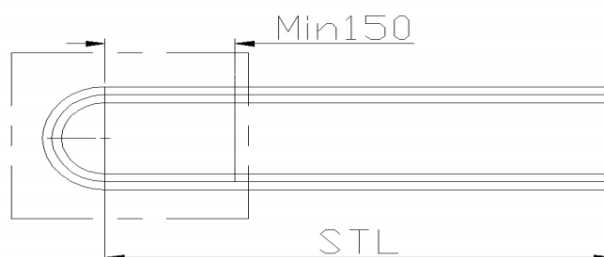


Fig.1 Heat Treatment Area

4. The post-bending heat treatment shall be in accordance with the following table 1, table2

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