



BHARAT HEAVY ELECTRICALS LIMITED
PIPING CENTRE, MADRAS-600 017

Title : Hydraulic Test procedure for Pressure parts
Specification No : TIP:05:11
Project : All
Material : ..
Equipment : Testing

Concurred

QC

[Signature]

Date/Initial/Dept.

10-08-93

03-03-94

Orig. Issue

Rev. 1

Rev. 2

Rev. 3

Rev. 4

Rev. 5

Rev. 6

Revised by

Approved by

Distribution :

Piping Centre

Quality Assurance Department

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RECORD OF REVISIONS

Rev. No.	Present Clause	Description	Remarks
1	1.1	Modified.	
1	3.4.2	Clarification added.	
1	3.4.4	New class added.	
1	3.4.5	Old clause was 3.4.4. Clarification added.	
1	3.4.6	Old clause was 3.4.5.	
1	3.4.7	Old clause was 3.4.6.	
1	3.4.8	Old clause was 3.4.7.	
1	4.1	Modified.	
1	4.1.1	Sub clause formed from 4.1.	
1	4.1.2	Sub clause from 4.1. Clarification added.	
1	4.2	Old clause was 4.3.	
1	4.3	Old clause was 4.4.	
1	5.0	Modified.	

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1.0 SCOPE

- 1.1 This procedure covers the requirements of hydraulic testing of pipes and vessels.
- 1.2 The components which have to be hydraulically tested should be mentioned in the Engineering drawings along with the test pressure.

2.0 PREPARATION FOR HYDRAULIC TEST

- 2.1 Before hydraulic test, Inspection should ensure that the component is complete with regard to welding and assembly as envisaged in drawing. The component should have undergone the applicable non destructive examination and heat treatment before clearing for hydraulic testing.
- 2.2 Before hydraulic test, dummy welding of all openings shall be completed with specified dummies.
- 2.3 The component shall be supported carefully avoiding point contacts. As far as possible, the components should be kept in such a way to facilitate air venting.
- 2.4 Sufficient vents shall be provided at high points of the component to vent air pockets while the component is filled up with water.
- 2.5 The pressure indicating gauges selected should be atleast 6" in dia size, with dials graduated over a range of double the intended maximum test pressure, but in no case the range should be less than 1-1/2 times the test pressure.
- 2.6 At least two pressure gauges shall be used for conducting the hydraulic test. The gauges shall be away from each other as much as possible.
- 2.7 The pressure gauges must have been calibrated and the calibration report shall be available with the pressure gauge.
- 2.8 The pressurising equipment shall be examined before the test for water tightness.

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- 2.9 It shall be ensured that all low pressure filling lines and other items that should not be subjected to test pressure, are isolated.
- 2.10 The water used for hydraulic test should be at ambient temperature but in no case less than 21°C (70°F).
- 2.11 Sufficient safety devices are to be provided so that the pressure shall not shoot up beyond the limit of test pressure.
- 2.12 The area where hydraulic test is conducted should be cordoned off for security reasons and authorised persons only should be allowed.
- 3.0 **HYDRAULIC TEST**
- 3.1 The hydraulic test shall be conducted in the presence of Code Inspector / Authorised Inspector wherever applicable.
- 3.2 The pressure shall be raised after necessary venting and when the pressure is built up, vents should be closed.
- 3.3 Careful examination shall be done for possible leakages especially in dummy blanks before pressurising.
- 3.4 **Hydraulic Test Procedure:**
- 3.4.1 The hydraulic pressure shall be gradually raised to test pressure so that there will not be any chance for fast fracture.
- 3.4.2 For tubular products and pipes / pipe assemblies of dia 159mm and above, the pressure shall be raised in increments of 20 atmosphere whenever HTP is above 20 atmosphere.
- 3.4.3 The pressure shall be maintained at each step for a moment and inspection for any leaks shall be carried out.
- 3.4.4 After filling the vessel with water, the pressure shall be raised to test pressure directly without any intermediate stop-over.
- 3.4.5 The test pressure as specified in the engineering document shall be maintained for a specified period as given in the code [As per IBR and BS, the test pressure for piping and

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vessels shall be maintained for a period of 1/2 hour. For the tubular products, pipe/ pipe assemblies below dia 159mm, the test pressure shall be maintained for 5 minutes].

- 3.4.6 The pressure shall be under proper control at all times so that the required test pressure is never exceeded by more than 6%.
- 3.4.7 The pressure shall be gradually reduced to the working pressure.
- 3.4.8 A close visual examination shall be carried out for leaks, sweats especially in welds at the working pressure.
- 3.5 Where leaks are noticed, it shall be recorded, and the component shall be subjected to repair.
- 3.6 Repaired component shall be re-hydraulic tested only after heat treatment and other required NDT examinations.
- 3.7 After successful hydraulic test, the components shall be completely drained and dried.
- 4.0 **STAMPING**
- 4.1 After successful hydraulic testing, vessels and pipings of dia 159 and above shall be stamped as follows:

- 4.1.1 For IBR Items:

BHEL, Piping Centre - Madras

Year of Make :

Hyd. Tested to : kg/cm² (G)

On :

D.P. : kg/cm² (G)

W.O. :

D.U. :

Inspecting Officer's Seal

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4.1.2 For ASME and Non_IBR Items

Name of Manufacturer :

Max. Allowable working :
Pressure when built

Heating surface in sq.ft :

Manufacturer's Serial No.:

Year built :

Authorised Inspector's Seal

4.2 A facsimile of the stamping details shall be taken on a tracing and filed.

4.3 A hydraulic test report duly signed shall be prepared and filed.

5.0 REPORTS

Report as per the format shown in the annexure, duly signed by an authorised personnel shall be issued after completion of the Hydraulic Test.

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ANNEXURE

REPORT NO:
DATE :

1.0 GENERAL DETAILS

- 1.1 Customer Name :
1.2 Sub Contractor Name :
1.3 Work Order No :
1.4 Name of Part :
1.5 Part No. :
1.6 Drawing No. :
1.7 Material Specification :
1.8 Date of Test :

2.0 TESTING EQUIPMENT DETAILS

- 2.1 Name and Model of Pump :
2.2 Size of Pressure Gauge :
 used
2.3 Maximum Pressure :
 reading possible
2.4 Date of Last :
 Calibration of the
 Pressure Gauge
2.5 Due date for next :
 calibration

3.0 TEST DETAILS

- 3.1 Test No. :
3.2 Test Procedure :
 Reference

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- 3.3 Test Pressure :
3.4 Temperature of water :
used
3.5 No. of pressure gauges :
used
3.6 Test Duration :
3.7 Pressure Holding Time :
3.8 Air Vent Details :
3.9 Distance between :
Pressure Gauges
4.0 **HYDRAULIC TEST RESULTS**

[Add additional sheets and sketches if required]

Test witnessed by
Firm Representative

Test witnessed/
approved by BHEL/PC

Approved by
External Inspection
Agency