

BALUCHISTAN ENERGY COMPANY LIMITED

DEVELOPMENT OF LPG TESTING LABORATORY AT TAFTAN

SPECIFICATION FOR HYDROTESTING



Office Address:

Balochistan Energy Company Limited
67-A, Main Jinnah Town Quetta,
Balochistan, Pakistan

Phone: 9281-2863711, 2863712

E-mail: cfo@becl.com.pk

shayan.ali.siddiqui@gmail.com

Web: www.becl.com.pk



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SPECIFICATION FOR HYDROTESTING

1.0 SCOPE

This Specification covers minimum requirement for hydrotesting i.e. pressure testing, together with dewatering, line flushing and drying.

2.0 GENERAL

Contractor shall furnish all necessary equipments, materials and labor to successfully complete the hydrostatic leak test followed by cleaning and drying defined herein.

The hydrostatic leak test followed by cleaning and drying includes:

- Locating and procuring acceptable water for testing, subjected to approval by the Client.
- Preparing Piping profiles and test procedure for approval by the Client.
- Filling the test section with water including addition of required chemicals.
- Performing the leak test at the specified pressure for specified time period.
- Investigating for leaks or breaks, making any necessary repairs and retesting.
- Displacing and disposing off test water at a suitable location.
- Cleaning, flushing, drying, treating and capping the tested Piping.
- Recording of all test data.

Contractor shall assign and designate a construction crew, with necessary equipments, to the testing operations. The testing operations shall be conducted diligently, thoroughly and in a safe manner in accordance with accepted Piping Test Practices. Any work by Contractor or existing conditions, which in the opinion of Client are deemed to be unsafe shall be corrected. The testing operations shall be stopped until the unsafe conditions have been applied to the satisfaction of Client. Contractor will not receive additional compensation for time lost caused by unsafe conditions

Contractor shall depute his representative who shall be responsible for supervising all testing operations. The test shall be assumed complete only when Client will witness and accept all tests on site or otherwise unless stated.



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3.0 CODES & STANDARDS

Contractor shall conduct the testing operations in accordance with ASME B31.3, Section 345.4 “Hydrostatic Leak Test”.

If conflict between Code and these specifications arises, the Code shall govern over the portions or sections of these specifications, which contain the conflict. When a Code covers same requirements as these specifications, the most demanding requirements shall be complied with.

Contractor shall review & inform employees and abide by safety standards of Client. Also, best industry standards will apply to the work defined.

Contractor shall notify the Client as to the individual within his organization who is responsible for the safety practices of the Contractor.

4.0 PROCEDURE

At least four weeks prior to the start of testing, Contractor shall submit to Client a detailed hydrostatic tests procedure listing equipment, manpower and program for testing of all Piping. The Contractor must submit a profile of each Piping indicating the elevation of the Piping, the test pressure at the low and high points for each test section and the number of test sections required. This procedure shall include the safety measures to be taken, proposed water source, water analysis, proposed chemical additives, water disposal method and water disposal locations. Also the procedure shall include field preparations such as placement of pumps, laying of water supply lines, and connection to the water source, location and implementation of all equipment, and a detailed test procedure. Contractor shall not proceed with testing until Client approves the test procedure.

5.0 SAFETY

Contractor shall take all necessary precautions to ensure the safety measures and protection of all construction personnel and the construction supervisor and operational staff at LPG Testing laboratory at all times. Contractor shall furnish and place such



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guards, and install and maintain such facilities necessary to secure the safety of everyone involved in the construction and testing of the facilities.

6.0 MATERIALS AND EQUIPMENT

Contractor shall furnish and install all test-header pipes, valves, fittings, test instruments, water, chemicals, strainers and filters, filling and pressuring pumps, meters and all piping required for filling, sectionalizing, transferring and disposing off water. Contractor shall also furnish adequate materials for capping of both ends of completed test sections.

Contractor shall furnish an enclosed weatherproof, properly lighted, temporary shelter of sufficient size to house the pressure recorders, calibration equipment and test personnel at the data collection site of each test section during the testing operations. Contractor shall also furnish sufficient lighting in the pump and test header areas during periods of darkness when testing operations are in progress. Calibration of all test instruments shall be performed by the Contractor and witnessed by the Client.

The equipment furnished by the Contractor shall meet the following requirements:

- The filter shall be of a quality to remove 95 percent of all particles 40 microns in diameter and larger. The filter shall be provided with a means of cleaning either side without disconnecting the piping or interrupting the flow of testing media.
- The pumping system used for filling the test section shall be capable of filling the pipe test sections at the rates specified in this section.
- The pumping system used for pressurization of the sections shall be capable of attaining the test pressure required at a slow and steady rate of pressure increase.

7.0 FILLING THE PIPES

The Contractor supplied water shall be analyzed to determine its suitability for use in the testing operations. Contractor shall present recommendations as to the type of corrosion inhibitor, oxygen scavenger, and bactericide to be used in the test water.

Suspended matter in the filled water shall be removed before injection into the Piping by the use of a filter of the quality as stated earlier in this section. Water shall be pumped



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in sufficient quantities at the minimum filling rate until the test water is cleaned and free of suspended matter.

Before the pressurization commences, each valve capacity shall be filled with water by partially closing and opening each valve. Valves shall be tested in the full open position. Discs shall be removed from check valves prior to any testing operations if the testing operations require reverse flow. Contractor shall carefully replace discs after drying operations are complete.

8.0 TEST PRESSURE

After filling the test section and removing any entrapped air, the pressure in the test section may be increased to the test pressure. The minimum and maximum test pressures are to be specified by Contractor for Client approval. The test pressure must remain within the range of pressure (between minimum and maximum) during the test period, which may vary from half ($\frac{1}{2}$) hour – four (4) hours, depending on size and length of the section to be used at all points within a given test section.

Each test section shall be pressurized to the specified test pressure by maintaining a constant pumping rate and continuously observing the line pressure. After the minimum test pressure has been reached, the pump shall be stopped, disconnected and the pressure allowed to stabilize. The Contractor shall then adjust the pressure within the test segment, if necessary, and begin the test period. The pressure and temperature recorders shall then be started using charts in real time orientation.

During the test period, pressures shall be recorded every 5 minutes and when asked to be unchecked with deadweight taken. The deadweight gauge shall be read to the nearest psi. If a drop in pressure occurs during the test period, which cannot be attributed to changes in temperature or if the pressure in the test section falls below the minimum test pressure, the test will be unsuccessful and the leak must be located by the Contractor or the piping pressure increased to an acceptable level. In case of leaks, the repairs shall be made, and then pressure test shall be repeated until it has been determined to be successful by the Client at the contractor's expense and no extra charges will be made for the repair and repeated hydrotest.



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If the test pressure increases due to a change in the ambient temperature: the Contractor shall reduce the pressure in the test section to keep the pressure below the maximum test pressure.

Client shall witness and certify hydrostatic testing. Authority for acceptance/rejection of all hydrostatic test operations ties with the approval of Client.

9.0 FAILURES

Failures in the piping disclosed by the loss of pressure not attributable to temperature changes shall be located and repaired by Contractor. If the failure is found in the seam of the pipe, the entire joint in which the seam failure exists shall be removed. A minimum of one pipe diameter from each side of the failure position shall be removed on all other failures. The piece(s) removed shall be marked for orientation with respect to the position in the Piping and with the approximate location of the failure. Contractor' shall not cut or damage the failed edge of the pipe during removal, transit or unloading at the storage location. All portions are to be retained. The failure shall be photographed prior to and after removal from the Piping, if possible.

Care must be taken to ensure that external coating and backfilling at repair sites is carried out in accordance with these specifications.

All welds in pipe repairs shall be 100 percent inspected by radiography. Upon completion of a pipe repair.

Contractor shall at his expense, repair all defects found resulting from inferior workmanship or defective materials furnished by the Contractor.

10.0 TEST RECORDS

The Piping pressure and temperature for the test period shall be continuously recorded with recording instruments. The pressure recording shall serve only as information data and may not be used to determine pressure drop for piping leakage. Test sections will not be accepted until a predetermined test period can be recorded without pressure loss unless the loss can be attributed to temperature change. All data and charts shall be clearly marked with the following information:

- Client name and authorized representative.
- Testing Contractor's name and authorized representative.



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- Description of facilities tested.
- Date and time of test.
- Test: pressure and duration.
- Test medium used.
- Explanation of any pressure discontinuities that appear on any chart.
- Signature of Client's and Testing Contractor's authorized representatives

All permanent records shall become property of the Client.

Fabricated assemblies and piping for tie-ins to existing Piping shall be tested in accordance with this Specification. All data and charts shall be clearly marked in the same manner the Piping test records are marked.

11.0 DEWATERING

After acceptance of the hydrostatic leak test, the pressure shall be released to the atmospheric pressure. Reduction of pressure shall be conducted in a manner to prevent severe vibration. Contractor shall then purge the water from the line by using compressed air. Contractor shall continue to run the injections to the piping until all free water is removed.

Water should be drained from any low point drains, block valve body bleeds, etc. during the dewatering operation.

Contractor shall be responsible for the, proper disposal of test water at locations and at a time satisfactory to Client. Damage to the Piping, or adjacent piping, equipment or any property or personnel other than Contractor's own caused by the improper disposal procedure shall be compensated by the Contractor. Contractor shall abide by any Governmental or local jurisdiction regulations governing the method and location of the disposal of test water.

12.0 DRYING

The Contractor will be asked to completely dry the sections of piping after completion of hydrotesting activity.



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The Contractor shall supply all equipment, labor and materials. Drying shall be performed immediately after acceptance of the dewatering operation.

The Contractor shall prepare a procedure and schedule for Piping Drying. These shall be submitted to the Client for approval at least one (1) week prior to the scheduled start of drying.

13.0 TREATING

Depending on the schedule for commissioning the Piping, the Client may require the Contractor to fill the Piping with Inert Gas after drying is complete.