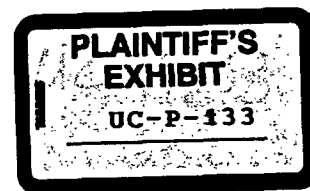


JOB CRITERIA
SECTION V



UNION CARBIDE CORPORATION
CHEMICALS AND PLASTICS OPERATIONS DIVISION
ENGINEERING DEPARTMENT

INSPECTION - TESTING CRITERIA

ETHYLENE OXIDE PLANT

SEADRIFT, TEXAS

REVISED
MAY 1, 1967

SOUTH CHARLESTON
WEST VIRGINIA

016882

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SEADRIFT, TEXAS

OCTOBER 30, 1964

D. L. Runyon
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REVISED MAY 1, 1967

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INSPECTION-TESTING CRITERIA

ETHYLENE OXIDE PLANT

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1.000 GENERAL

1.100 Except as otherwise specified, the Contractor shall be responsible for developing all inspection and testing criteria and procedures, and the performance thereof, for the Work. The Contractor shall provide:

- A. The sequence for hydrotesting, the volume of water required, and the rate of water usage.
- B. A list of all pipelines that must be temporarily supported for hydrotesting.
- C. A list of all pipelines that are to be pneumatically tested in lieu of hydrotesting.

1.200 In order that the Owner does not violate or circumvent any of the Contractor's warranties during initial operation, the Contractor may provide stand-by observer during these periods.

1.300 The Owner and the Contractor shall mutually agree on the need for vendor's representatives.

1.400 Complete test records shall be maintained.

2.000 ELECTRICAL

2.100 All electrical materials, equipment, and installed systems shall be inspected as necessary to assure:

- (a) Specified quantity and quality of materials
- (b) Proper identification of equipment and materials
- (c) Proper and undamaged electrical continuity
- (d) Proper installation, cleaning, connecting, grounding, and servicing including setting of all overloads and other relays.
- (e) Agreement of final installation with drawings, wiring diagrams and governing codes or laws.
- (f) Proper operation

3.000 EXPOSED PIPING

3.100 Steam Piping

Steam piping shall be tested in accordance with Section 1 of the American Standard Code for Pressure Piping, ASA B 31.1-1955, with the following additions:

3.000 EXPOSED PIPING - continued

3.100 Steam Piping - continued

- (a) Flanges shall not be insulated until testing, repairs, and hot bolting are completed.
- (b) Steam turbines shall not be subjected to hydrostatic tests. An operating test shall be made after erection.
- (c) If isolation of piping from a vessel prior to the post-erection hydrostatic test is impossible or impracticable, the piping and vessel shall be tested as a unit at the vessel's design pressure.

3.200 Process Piping

Process piping shall be tested in accordance with the American Standard Code for Pressure Piping, Petroleum Refining Piping, ASA B 31.1-1962, with the following additions:

- (a) Flanges shall not be insulated until testing and repairs are completed.
- (b) Machinery such as pumps and compressors shall not be subjected to hydrostatic tests.
- (c) The post-erection test of process piping shall be the pneumatic system test describer in Article 3.300, hereinafter.

3.300 System Testing

- (a) Weld leaks shall be repaired under the direction of the Inspector, by chipping and rewelding and ultrasonically inspected if possible. Leaks in flanged joints shall be repaired by dismantling the joint and reassembling it, tightening the bolts in the correct order. Leaks in screwed joints shall be repaired by dismantling the joint and reassembling it.
- (b) All leaks shall be repaired. Repairs shall be retested until satisfactory results are obtained.
- (c) Attempting to repair weld leaks by caulking or peening, and leaks in flanged or screwed joints by overtightening the bolts or fittings, is not permissible.
- (d) Any leaks that develop when piping is first heated-up during the initial operation of the facilities shall be repaired.

4.000 EQUIPMENT

4.100 Rotating Equipment

- (a) Rotating equipment other than standard pumps shall be run-in on a selective basis as further specified under Article 6.000 hereinafter.

4.000 EQUIPMENT - continued

4.100 Rotating Equipment - continued

- (b) Pumps with mechanical seals shall not be given hydrostatic tests. Seals shall be protected from moisture damage until startup. These items shall receive an air test.
- (c) Lubrication system piping shall be cleaned to the satisfaction of the Vendor's Erector and the Operating Department.

4.200 Oxide Converters, Item MG-101 - 106 inc. and MG-201 - 203 inc.

Tube Side of Converters

- (a) Piping will be erected up to last valve, insulated, and tested in accordance with previous criteria.
- (b) Connecting piping will be trial fitted without disturbing moisture seals on converters. Converters shall remain sealed against moisture. The Owner will arrange for cleaning, testing, catalyst installation, and installation of the piping that was trial fitted.

Shell Side of Converters

- (a) The Owner will erect, connect and test the piping and equipment associated with the shell-side of the converter.
- (b) Moisture seals and desiccant shall be removed to suit the completion schedule.

5.000 UNDERGROUND PIPING

5.100 Pressure Piping

All underground pressure piping materials and installed systems shall be inspected and tested as necessary to assure:

- (a) Specified size, quantity, and quality of materials.
- (b) Proper alignment, bedding, jointing, joint restraint, and backfill.
- (c) Internally clean and/or disinfected consistent with nature of service.
- (d) Electrical isolation consistent with required control of galvanic corrosion.
- (e) Agreement with final underground drawings, and governing codes or laws.

Note: If flushing of lines is accomplished with other than clean water, the Contractor shall purge line of all silt, mud or other foreign matter prior to pressure testing.

5.000 UNDERGROUND PIPING - continued

5.200 Gravity Piping

All underground gravity piping materials and installed systems shall be inspected and tested as necessary to assure:

- (a) Specified size, quantity, and quality of materials.
- (b) Proper slope, alignment, bedding, jointing, and backfill.
- (c) Internally free from projections or foreign material.
- (d) Electrical isolation consistent with required control of galvanic corrosion.
- (d) Agreement with final underground drawings, and governing codes or laws.

6.000 DEFINITION OF JOB COMPLETION

The Owner will provide technical and operating personnel to aid and assist in performing the following portions of the Work. The Owner's chemical operators will also be available. Any such assistance by the Owner hereunder is for the convenience of the Contractor and in no way shall relieve the Contractor of his responsibilities for the proper performance of the Work in accordance with the terms and provisions of the Contract.

6.100 Instruments

Instrument connections shall be made and shall be free of leaks, shop calibrated, checked for action and integration with the complete instrument system with a power-on test.

6.200 Air Compressor System

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6.300 Centrifugal Compressor, Item MG-109

This system shall be run-in to the satisfaction of the Vendor and the Owner. Run-in is defined as operation of the steam turbine at temperature and pressure and operation of the gas compressor at essentially atmospheric pressure and recycling sufficient air to approximate design suction temperature. The process piping will allow this by disconnecting at suitable points. Hot-checks of the coupling alignment and piping stresses shall be made.

6.000 DEFINITION OF JOB COMPLETION - continued

6.400 Water Pump System, Item MG-403

This system shall be run-in to the satisfaction of the Vendor and the Owner. Run-in is defined as operation of the steam turbine at temperature and pressure and the pump system pumping hot water from the base of MG-404 through the discharge system and back through the hydraulic turbine. Hot-checks of the coupling alignment and the piping stresses shall be made.

6.500 Centrifugal Compressor, Item MG-407

This system shall be run-in to the satisfaction of the Vendor and the Owner. Run-in is defined as operation of the steam turbine at temperature and pressure and operation of the gas compressor with suction piping open to the air and throttling the discharge to the air to approximate the design, discharge temperature. Hot-checks of the coupling alignment and piping stresses shall be made.

6.600 Other Pumps and Other Rotating Equipment

This equipment shall be checked for normal rotation, electrical checks, and undue piping stresses. Pump seals that fail or leak during the initial operation shall be repaired, as specified in the Agreement, and the manufacturer will be back-charged on a material-labor basis unless such leaks are due to Owner's negligence.

6.700 Electric-Motor Operated Valves

Both the limit and torque switches shall be set to the satisfaction of the supplier.

6.800 Other Portions of the Work

All other portions of the Work shall be complete as defined in the Job Criteria.