UNION CARBIDE CORPORATION
OLEFINS DIVISION
ENGINEERING DEPARTMENT

CONSTRUCTION SPECIFICATIONS

FOR

HEATING, VENTILATING AND AIR CONDITIONING

Extension to Building 406
Project P-66-P-1
South Charleston, West Virginia Plant

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June 13, 1966

TECHNICAL CENTER
SOUTH CHARLESTON, WEST VIRGINIA

PLAINTIFF'S EXHIBIT
15999.00
UCASB00217833

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1. SCOPE OF WORK

A year-round heating, ventilating, and air conditioning system shall be provided for addition to Building 406 at the Owner's Plant at South Charleston, West Virginia. Design and installation shall be by the Contractor except as otherwise noted in accordance with these specifications and the following attached drawing 66044-53-1.

The Contractor shall furnish all equipment, controls, ductwork material, and labor necessary to complete the job as specified herein and as referenced to on drawings attached hereto and made a part of these specifications. All equipment, materials, and workmanship shall be warranted to be free from defect for a minimum of one year from the date of formal acceptance of the system.

The manufacturer shall further warrant that all systems (that he is responsible for the design of) shall be adequate to maintain the conditions described herein. Should the equipment or system fail to comply with these conditions of warranty, the Contractor shall, at his own expense, replace the defective or inadequate equipment.

Construction drawings showing equipment locations, size and routing of ductwork, and locations of system controls shall be submitted to Owner for review.

2. DEFINITIONS (As Applied in These Specifications)

A. "Contractor" designates the contractor who shall install the heating, ventilating, and air-conditioning systems.

B. "Engineer" designates the engineer of the Owner.

C. "Owner's Drawings" designates the Owner's construction drawings.

3. DESCRIPTION OF SYSTEM(S)

The system shall be designed for air conditioning and heating addition to Building 406 at South Charleston. The design of the system shall be based on the utilization of a conventional heating and air conditioning system using water cooled condenser and steam heat.

All air going through the air conditioning unit shall be filtered. The blower in the air conditioning unit shall be large enough to maintain a positive pressure of approximately 0.1 inch water gage in the building.

This system will operate continuously 24 hours per day.

Cooling load calculations by Owner's Engineer yields a cooling load of 60,000 Btu/hr (50,000 sensible, 10,000 latent) when bringing in 500 cfm of outside air. Heating load calculations by Owner's Engineer yields a heating load of 95,000 Btu/hr when bringing in 500 cfm of outside air.

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4. EQUIPMENT - GENERAL SPECIFICATIONS

All equipment and materials shall be new, and the latest standard products of manufacturers regularly engaged in the production of such materials and equipment. Control of the system will be completely automatic. This system will be operated continuously.

5. FILTERING SYSTEM

Air conditioning unit shall be equipped with throw away filters. Filter section shall be constructed in a manner that will allow replacement of filter with a minimum of effort.

6. AIR CONDITIONING UNIT

Unit shall be vertical, floor-standing air conditioning unit with cooling coil, non-freeze steam heating coil, and equipped with a water-cooled condenser and water regulating valve. Recommended unit is a Carrier Model No. 50 CA-006 rated at 59,000 Btu/hr cooling capacity, or Trane Model No. SUW-50 rated at 65,300 Btu/hr cooling capacity, or other approved equal.

7. DISTRIBUTION SYSTEM

Ductwork shall be utilized to supply air to the building. One central duct is desired running the length of the building, supplying air to a diffuser in each office and the hallway between buildings. Diffusers will be wall mounted equipped with directional and volume controls.

Ductwork will be Owens-Corning Fiberglas duct system with a vinyl liner or galvanized sheet metal with insulation on all cold air supply ducts. Supply air will be by ductwork down the center of the building. Recirculated return air will enter the unit through a grille on the unit. Outside air will be admitted into the unit through an opposed blade louver damper. The contractor shall size, furnish, and install this intake. The intake shall be furnished with louvers and a bird screen.

Fiberglas ductwork shall be fabricated and installed as per manufacturer's fabrication and installation guide. Sheet metal ducts shall be fabricated and installed in accordance with the latest edition of the Heating and Air Conditioning Guide, published by ASHRAE. Air velocity in the main ducts shall not exceed 1,400 feet per minute.

Turning vanes shall be installed in all miter elbows and at each take-off for supply registers. These shall be similar to "Ducturns", "Santrols", or may be shop fabricated. Ductwork shall be supported from roof purlins or trusses.

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8. CONTROL SYSTEM

Contractor shall furnish and install all materials required in control system. Control system shall be completely automatic and adjustable. Upon completion of the work, the Contractor shall furnish to the Engineer five (5) certified prints of a diagrammatic layout for control system. Layout shall show all control equipment and the function of each shall be indicated.

9. UTILITIES FOR HEATING AND VENTILATING

Cooling Water:	30 psi, 85° F design condition
Steam:	35 psi saturated
Electrical Power:	440 volt, 3 phase, 60 cycle and 110 volt, 60 cycle
Instrument Air:	20 psig

The Contractor shall install a pressure reducing station for reducing the steam to 5 psi.

The Contractor shall make all connections for required utilities at points within five (5) feet outside of building wall.

The Contractor shall furnish and install strainers on cooling water and steam supply.

10. SAFETY REQUIREMENTS

Contractor shall ground to the building steel, when not in direct contact therewith, all electrically driven equipment and sheet metal ducts.

11. PIPING

The Contractor shall make all piping connections at tie-in points provided by the Owner. Steam supply and condensate piping shall be schedule 40 screwed steel pipe with 125 lb. cast iron fittings and 125 lb. bronze valves. Instrument air piping shall be 1/4-inch copper tubing returns, shall be installed in attic space. Service and instrument piping shall be in accordance with the best practice and the latest Edition of the American Society of Heating, Refrigeration and Air Conditioning Engineers' Guide.

12. INSULATION

The steam supply lines and condensate shall be insulated for their entire length. The insulation shall consist of one-inch nominal thickness bonded expanded silicate, in accordance with UCC Specification No. 22-H.

All cold air supply ducts shall be insulated by the Contractor.

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13. ELECTRICAL

The Owner shall furnish 440-volt, 3-phase, 60-cycle power to a junction box near the air conditioning equipment. The Owner shall approve the Contractor's wiring diagrams prior to installation. Power requirements and location for junction box required as soon as possible.

All motors, starters, fused disconnect switches, transformers, and controls as required shall be furnished by the Contractor.

Contractor shall furnish and install a 440/110-volt, single-phase transformer for control circuit which will be protected by circuit breakers.

All equipment shall be grounded if not connected to the building steel.

Electrical installations shall be furnished based upon the following regulations:

All motors installed inside the Office Building shall be open, drip-proof type, 40° C temperature rise. Other inside electrical control equipment shall have Standard NEMA-1 enclosure.

14. BUILDING CONSTRUCTION

The Owner shall approve all openings in walls or roof as specified by the Contractor on his construction drawings. The Owner shall approve the locations of all equipment and ductwork, and if necessary request relocation of these items.

15. TESTING

A. Piping

After completion of each system, all water, cooling water, steam, steam condensate, refrigerant, and air piping shall be pressure-tested for leaks. Steam, steam condensate, and water piping shall be tested with the service medium at service pressure. Plant air lines shall be tested with 100 psig of clean, dry air and instrument control lines with 30 psig of clean, dry air. These lines shall be proved tight by spraying all connections and joints with soapless lather. Refrigerant piping shall be tested, after charging, with a halide torch or a Halogen Leak Detector. All pipe undergoing testing will be considered satisfactory if no leaks appear within one hour after the start of the test. All leaks detected by the first test shall be stopped in a manner satisfactory to the Engineer. If necessary, the tests shall be repeated, and all further leaks stopped, until satisfactory results are obtained. Unless otherwise specified in an addendum to these specifications, all repairing of leaks shall be at no extra expense to the Owner.

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15. TESTING (CONTD)

B. Ducts

A direct-reading velocity instrument (furnished by the Contractor), which has been recently tested and calibrated, shall be used to adjust the air flow in the various ducts, so that they will deliver the required volume of air, in cfm, at each air supply and return opening respectively.

C. Performance Tests

After the above tests have been completed, general operating tests shall be conducted in the presence of the Engineer. The general operating tests shall cover a period of not less than 72 hours under normal operating conditions for each system, and shall demonstrate that all equipment is functioning in accordance with the specifications, and to the entire satisfaction of the Engineer.

16. INSPECTION BY OWNER

A. The work shall be subject to the surveillance of the Engineer at all times.

B. If the Engineer finds any deviations in the work from the Drawings or Specifications, and if he considers it necessary, he shall stop the work. Before the Contractor may continue the work, the Engineer shall submit, in writing, his decision concerning such deviations. The Engineer's decision shall be binding on the Contractor and the Owner.

C. The work performed by the Engineer shall not relieve the Contractor of any of the terms of the contract, or other responsibilities connected with the satisfactory completion of the work.

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