PLAINTIFF'S EXHIBIT

ASA-1097

REV. NO.	DATE	BY	APPROVAL	REASONS FOR ISSUE/REMARKS
---				PRELIMINARY ISSUE
-----				DRAVO APPROVAL
0	2-6-76	RD	EDT 2/6/76	CUSTOMER APPROVAL
				ISSUE FOR BID
				ISSUE FOR PURCHASE ORDER
1	02-20-76	LJS	EDT/BY LJS	ISSUE FOR CONSTRUCTION
2	03-08-76	RCD		

DRAVO CORPORATION, DENVER OPERATIONS OFFICE
One Park Central
Denver, Colorado 80202

Sheet 1 of 6

CONTRACT M-7119

COST CODE - N/A

ASARCO, INCORPORATED
ANTIMONY PLANT
El Paso, Texas 79999

SPECIFICATION NO. MSP-0411 GENERAL HVAC SYSTEM

1.0 SCOPE

1.1 This specification establishes the design criteria, the HVAC system functional requirements, and describes the type of HVAC hardware to be implemented in the system design.

1.2 The Contractor shall furnish all material, labor tools, equipment, and services required to fabricate and erect in place a complete and workable HVAC system in accordance with this specification and as indicated on the applicable drawings and specific equipment specifications subject to the terms of the contract.

1.3 The word "Engineer" means the engineer at ASARCO, INC.

2.0 CODES, STANDARDS, AND REGULATIONS

2.1 All materials, design, fabrication and erection procedures shall be in accordance with the applicable section or sections of all local, provincial and national codes, standards, or regulations having jurisdiction over the work.

2.2 The regulating agencies having jurisdiction include but are not limited to the following:

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
.2 American Society of Mechanical Engineers (ASME).
.3 American Standards Association (ASA).
.4 American Standard Safety Code for Building Construction.
.5 Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
.6 Underwriter's Laboratory (UL).
.7 Air Conditioning and Refrigeration Institute
.8 Air Diffusion Council (ADC).
.9 Air Filter Institute (AFI).
.10 Air Moving and Conditioning Association (AMCA).
.11 National Association of Fan Manufacturers (NAFM).
.12 Occupational Safety and Health Administration (OSHA).
.13 National Fire Protection Association (NFPA).
.14 Uniform Building Code (UBC).

2.3 Reference to any code, standard, or regulation shall mean the latest published edition including addenda, supplements, or revision thereto, in effect when the contract was awarded.

2.4 Where conflicts exist between agencies having jurisdiction, the more severe shall govern.

3.0 MATERIALS

3.1 All materials used in the fabrication and installation of the HVAC system shall be in accordance with the materials specified in the individual equipment specifications and callouts on HVAC drawings.

3.2 Where a manufacturer's name is used in specifying the material, it shall be implied to mean "or approved equal." Deviation from the materials so listed shall not be made without the prior approval of the Engineer.

4.0 DESIGN

4.1 Basic Design Criteria

.1 Altitude of Facility — 3914 Ft.

.2 Climatic Design Conditions:

Summer Outdoor Temperatures	98°FDB, 69°FWB
Winter Outdoor Temperature	25°FDB
Wind Velocity Winter	7 MPH

.3 Inside Design Conditions:

	SUMMER	WINTER
Main Plant	105°FDB	Uncontrolled
Rectifier Room	104°FDB	Uncontrolled
Office	75°FDB, 45% RH	75°FDB
Lunch Room	75°FDB, 45% RH	75°FDB
Electrical Substation	110°FDB	Uncontrolled

4.2 SYSTEMS DESCRIPTION

.1 Main Plant - Summer ventilation is accomplished by natural ventilation thru continuous gravity roof ventilator running along the ridge of the L-shaped building with fresh outside air drawn from fixed louvers located along the outside walls. Summer ventilation is at the rate of 9 air changes per hour and winter ventilation half this much. To control winter ventilation, 100 percent of the area of the gravity ventilators are provided with chain operated dampers to close or open as maybe required to conserve process equipment heat gain thus providing a comfortable working environment in the wintertime even without the use of heating equipment. (1)

.2 Rectifier Room - Due to very high internal equipment heat gain, this area shall be provided with a split-system air conditioning unit with the evaporator and fan unit suspended from the ceiling structure of the room and the air-cooled condensing unit located outdoors on grade. The fan shall run continuously year round to pressurize the room at .10" W.G. (2)

.3 Office and Lunchrooms - These areas shall be air conditioned year round with all electric cooling and heating units. The office shall be provided with an-over ceiling mounted self-contained air conditioning unit. The lunchroom shall be provided with a window type package air conditioning unit.

.4 Electrical Substation - This room shall be ventilated and pressurized to .1" W.G. year round. Pressurizing outside air shall be introduced into the room by two roof mounted power ventilators with filter racks. Hot exhaust air shall be exhausted thru relief dampers located along the outside walls.

4.0 DESIGN (continued)

4.3 GENERAL AIR DISTRIBUTION SYSTEM

.1 Description:

All air distribution systems shall be low pressure systems consisting of galvanized sheet metal ductwork, insulation, registers, grilles, and diffusers to convey ventilation, exhaust or conditioned air to or from the conditioned space.

4.4 GENERAL TEMPERATURE CONTROL SYSTEM

.1 The temperature control system shall be basically electric comprising a complete system.

4.5 EQUIPMENT

.1 Split-System Air Conditioner

This unit shall be a complete package, shop assembled and wired, complete with temperature controls, condensing section, evaporator, fan and filter section. The following unit shall be furnished: (See MSP-0487 and MSP-0486).

2 One (1) unit for rectifier room, Trane Air Handler # 10, 4,500 CFM and Trane air cooled condensing unit RAUA 100, 10.5 tons nominal capacity.

.2 Ceiling Mounted Air-Conditioner

This unit shall be a complete package, shop assembled and wired, complete with temperature controls, evaporator, compressor, condenser, filter, fan, electric heating coil, and diffusers. The following unit shall be furnished (See MSP-0490). (This unit shall be mounted on the deck over the ceiling of the office.)

2 One (1) unit for office: Trane SAHA 30 1250 CFM, 25,320 BTUH 4.51 KW heating.

.3 Wall Mounted Air-Conditioner

This unit shall be a complete package, shop assembled and wired, complete with evaporator, compressor, filter, integral thermostat and electric heating coil. The following unit shall be furnished: (See MSP-0489)

2 One (1) unit for lunchroom Chrysler R18-UEG, 12,820 BTUH cooling 11,320 BTUH heating.

.4 Power Roof Ventilator (with filters) unit shall be suitable for roof mounting and furnished complete with V-belt drive components, motor enclosure, rooftop disconnect switch, roof curb, channel type filter racks, bird screen, access doors, and adjustable vane type diffusers. Housing shall be made of galvanized steel. The following unit shall be provided (See MSP-0495).

4.0 DESIGN (continued)

4.5 EQUIPMENT (continued)

.4 Two (2) units for electrical substation: Buffalo Style "H" filtered sky-vent size 24", 5057 CFM @ 1/4" W.G., 3/4 H.P.

.5 Ceiling Exhaust Fan

Unit shall be complete assembly with centrifugal wheel, inlet grille, motor terminal box with card, plug and receptacle inside the housing. The following unit shall be furnished (See MSP-0488).

Two (2) units, one (1) for each toilet

.6 Gravity Ventilators

Unit shall be welded structure for roof mounting and continuous throughout the length of the roof. The following units shall be furnished (See MSP-0491) 24" throat x 130 ft. long for electrowinning bldg., 24" throat by 110 ft. long for matte furnace building. Units shall be Burt Monovent Continuous Gravity Ventilator or approved equal.

.7 Counter-Balanced Louver

The louvers shall be factory assembled in a common frame. The following units shall be furnished. (See MSP-0493)

Three (3) - 2'x2' for Rectifier Room

Two (2) - 3'x4' for Substation Building

.8 Stationary Louver

The louvers shall be factory assembled in a common frame except as limited by shipping. The following units shall be provided. (See MSP-0492)

⚠1 Seven (7) 8'x6', three (3) 8'x4', four (4) 6'x4', and one (1) 4'-8"x2'-6" for the L-shaped main plant.

Rev. No.	Date	By	Approval	Reason for Issue/Remarks
-				Preliminary Issue
-				Dravo Approval
0	10-21-76	LJS	[illegible]	Customer Approval
1	11-30-76	LJS	LS	Issue for Construction

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CONTRACT M7119

COST CODE - 7100

ASARCO, INC.
ANTIMONY PLANT
El Paso, Texas 79999

SPECIFICATION NO. MSP-0421 GENERAL PAINTING & COLOR CODING

1.0 SCOPE OF EQUIPMENT AND SERVICES TO BE FURNISHED BY VENDOR

1.1 Refer to the following documents of latest issue which form a part of this specification:

.1 Piping Specification PSP-0414.

.2 Piping Flow Sheets 100-P08-138, 100-P08-139, 100-P08-140, 100-P08-141 and 100-P08-142.

.3 Steel Structures Painting Council SSPC Publications

.1 Volume I - Good Painting Practices

.2 Volume II - Systems and Specifications

.4 US Federal Register - Occupational Safety and Health Standard (OSHA)

1.2 Materials, services and accessories that are required for the safe and satisfactory surface preparation (if specified), painting and the application of piping identification markers. These shall include, but not be limited to:

.1 Paint
.2 Thinners
.3 Solvents
.4 Paint Applicators
.5 Hand and Power Tools
.6 Surface Preparation Equipment
.7 Piping Identification Markers
.8 Safe Storage of Supplies and Equipment.

2.0 EQUIPMENT FURNISHED BY OTHERS

2.1 Completely installed piping system.

2.2 Completely installed and insulated dust and fume collection system.

2.3 Installed miscellaneous steel, steel supports and conveyor inlet and discharge chutes.

3.0 FUNCTIONAL REQUIREMENTS

3.1 All piping shall be painted with the exception of the following:

.1 Underground Piping
.2 Cast Iron Piping
.3 Galvanized Piping
.4 Plastic Piping
.5 Insulated Piping
.6 Instrumentation Tubing

3.2 All pipe hangers and supports shall be painted.

3.3 All uninsulated ductwork, except plastic and stainless steel shall be painted.

3.4 All unpainted steel conveyor chutes, support steel and miscellaneous steel shall be painted.

3.5 All aboveground piping, except instrument tubing shall be identified in accordance with the applicable provisions contained herein.

3.6 Pipe Painting Requirements

.1 All surfaces to be painted shall be thoroughly cleaned to remove any material that will be conducive to premature failure of the paint coat. The method(s) of surface preparation shall be compatible with the paint used. Mill scale, if any, shall be removed by hand brushing, sanding, scraping, chipping or a combination of these methods.

.2 Oils, greases, and cutting compounds shall be removed by solvent cleaning. Prior to solvent cleaning, soil, spatter, salts and foreign materials other than oils & greases shall be removed by brushing or scraping.

.3 The color of the finish coat shall match as closely as possible EC-103 (Shale Gray) as defined by DuPont Maintenance Finishes.

.4 The finish paint shall have an epoxy base similar to Rustoleum 9386.

.5 The finish paint shall be capable of withstanding a temperature range of $40^{o}F$ to $135^{o}F$.

.6 The dry thickness of the finish paint coat shall be not less than 2.5 mils.

.7 Paint shall be applied in strict accordance with the paint manufacturer's recommended procedures.

.8 Items explicity exempt from being painted shall be gaskets, instrument gages and sight glasses, factory finishes, equipment installed in the piping runs, valve stems or threads and electric or instrument control devices.

.9 Final inspection and acceptance shall be performed by ASARCO, Inc.

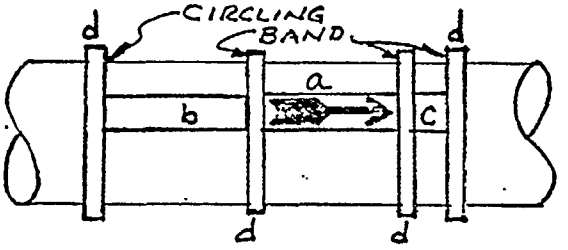
3.0 FUNCTIONAL REQUIREMENTS

3.7 Pipe Color Coding Requirements

.1 All aboveground piping, painted or insulated, shall be provided with markers that identify the type of service, direction of flow and identity of the pipe. The color of the marker shall be in accordance with OSHA standards.

.2 The markers shall be similar to the all-temperature perma-code pipe markers manufactured by W.H. Brady Company of Milwaukee, Wisconsin.

.3 Where a pipe is identified, it shall contain (a) a direction arrow; (b) service call-out; (c) line number; and (d) four circling color bands designating the degree of hazard. The direction arrow, service call-out and line number shall be as shown in the specification and on the piping flow sheets identified in 1.1.1 & 1.1.2 respectively herein. Each identification shall have the following configuration:



.4 The above identification marker shall be provided on all pipe lines at every terminal point, bend and valve, between floors on vertical runs at eye level and at a spacing not to exceed 50 ft. The style shall be determined by the size of the pipe and as indicated herein. Additional color code bands shall encircle the pipe at 10 foot intervals between identification markers spaced at 50 feet.

.5 Directional arrows shall be on colored backgrounds and shall be Brady Style 6 for piping with a total OD (pipe plus insulation) of 3 inches or less and style 2 for piping and insulation OD's greater than 3 inches. Arrows shall conform to Table MSP-0421-1, Pipe Identification Schedule.

.6 Service call-outs and line numbers shall be Brady custom printed or stock printed letters and numbers on colored backgrounds, style 4,6 or 8 for piping (p insulation) OD 3 inches less than styles 1, 2 and 3 for larger size piping service call-outs and line number shall conform to Table MSP-0421-1.

.7 Circling color bands shall be Brady perma-code pipe banding Tape No. B-550 2¼ inches wide. The colors shall conform to Table MSP-0421-1.

.8 The material for all markers shall be compatible with 50% caustic soda such as Brady B-350 perma code.

3.0 FUNCTIONAL REQUIREMENTS

3.7 Pipe Color Coding Requirements - (continued)

.9 All markers shall be installed in strict accordance with the manfacturer's recommended procedures. All markers shall be readily visible from working areas, platforms and walkways.

.10 The colors shown in Table MSP-0421-1 shall conform to the following federal standards

Yellow	F.S. 944
Orgnge	F.S. 956
Green	F.S. 983

.11 Final inspection and acceptance shall be performed by ASARCO, Inc.

TABLE MSP-0421-1

PIPE IDENTIFICATION SCHEDULE

SERVICE SYMBOL	SERVICE	SERVICE CALLOUT	PIPE BAND COLOR	ARROW BACKGROUND COLOR	SERVICE AND LINE NUMBER. BACKGROUND' COLOR	ARROW OR LETTERING COLOR
CA	COMBUSTION AIR	COMBUSTION AIR	GREEN	GREEN	GREEN	BLACK
CS	CAUSTIC SODA	CAUSTIC	YELLOW	YELLOW	YELLOW	BLACK
CWR	COOLING WATER RETURN	COOL WATER RET	GREEN	GREEN	GREEN	BLACK
CWS	COOLING WATER SUPPLY	COOL WATER SUP	GREEN	GREEN	GREEN	BLACK
FG	FUEL GAS	FUEL GAS	YELLOW	YELLOW	YELLOW	BLACK
FO	FUEL OIL	FUEL OIL	YELLOW	YELLOW	YELLOW	BLACK
FT	FILTRATE	FILTRATE	ORANGE	YELLOW	YELLOW	BLACK
HSW	HOT SPRAY WATER	HOT SPRAY WATER	YELLOW	YELLOW	YELLOW	BLACK
HW	HOT WATER	HOT WATER	YELLOW	YELLOW	YELLOW	BLACK
IA	INSTRUMENT AIR	INSTRUMENT AIR	YELLOW	YELLOW	YELLOW	BLACK
JW	JACKET WATER	JACKET WATER	GREEN	GREEN	GREEN	BLACK
PA	PLANT AIR	PLANT AIR	YELLOW	YELLOW	YELLOW	BLACK
PLA	PROCESS WATER	PROCESS WATER	GREEN	GREEN	GREEN	BLACK
PS	PREGNANT SOLUTION	PREG. SOLUTION	ORANGE	YELLOW	YELLOW	BLACK
PWA	POTABLE WATER	POTABLE WATER	GREEN	GREEN	GREEN	BLACK
SE	STRIPPED ELECTROLYTE	STRIP ELECTR	ORANGE	YELLOW	YELLOW	BLACK
SL	SLURRY	SLURRY	ORANGE	YELLOW	YELLOW	BLACK

1

ASARCO ELP 0007265

3.0 FUNCTIONAL REQUIREMENTS

3.8 Ductwork, Conveyor Chutes and Miscellaneous Steel Painting Requirements

.1 All surfaces to be painted shall first have their primer coat touched-up to remove any nicks or scrapes incurred during shipping, storage and erection. Touch-up paint shall have an epoxy base and shall be the equivalent of Rustoleum 9373.

.2 Prior to applying the finish coat, any oil, grease or foreign organic matter adhering to the ductwork due to shipping, storage or erecting activities shall be removed by solvent cleaning.

.3 The color of the finish coat shall match as closely as possible EC-103 (Shale Gray) as defined by Dupont Maintenance Finishes.

.4 The finish paint shall have an epoxy base similar to Rustoleum 9386.

.5 The finish paint shall be capable of withstanding a temperature range of $40^{o}F$ to $135^{o}F$.

.6 The dry thickness of the finish coat shall be not less than 2.5 mils.

.7 The paint shall be applied in strict accordance with the paint manufacturer's recommended procedures.

.8 Items explicitly exempt from painting are plastic ductwork, gaskets, factory finished equipment, rubber boots, stainless steel, copper and aluminum.

.9 Items explicitly to be painted include ductwork, ductwork supports and hangers, boiler stack, conveyor chutes and supports, miscellaneous steel and non-gray painted or unclad insulation on ductwork and the equipment connected by the ductwork.

.10 Final inspection and acceptance shall be performed by ASARCO, Inc.

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CONTRACT M-7119
COST CODE - 3410

ASARCO, INCORPORATED
ANTIMONY PLANT
El Paso, Texas 79999

SPECIFICATION MSP-0487 — AIR HANDLING UNIT

1.0 SCOPE OF EQUIPMENT AND SERVICES TO BE FURNISHED BY VENDOR

1.1 Refer to:

.1 General Mechanical Specificaton MSP-0401
.2 General HVAC System Specification MSP-0411
.3 General Electrical Specification ESP-4001

1.2 Vendor shall design, fabricate, furnish, and deliver all materials and accessories required for the safe and satisfactory operation of an Air Handling Unit. These shall include but not necessarily be limited to:

.1 Casing, including mixing box with return and outside air dampers.

.2 Fan and Motor Section, including magnetic starter.

⚠1 .3 Direct Expansion Cooling Coil, Two Separate Refrigerant Circuits

.4 Insulated drain pan

.5 Medium capacity filters.

.6 Rigging Brackets and vibration isolators.

⚠1 .7 Mixed Air Temperature Control which includes Damper Operators and Mixed Air Temperature Controller.

2.0 EQUIPMENT AND SERVICES TO BE FURNISHED BY OTHERS

2.1 All external electrical wiring including disconnect switch, and relays.

2.2 All external refrigerant piping, valves, strainers, fittings and insulation.

2.3 All external ductwork, insulation, and grilles or diffusers.

2.4 Installation of unit and its accessories.

2.5 Structural supports

3.0 FUNCTIONAL REQUIREMENTS

3.1	Quantity Required	One (1)
3.2	Equipment Number	58.3412
3.3	Service	Continuous, 24 Hr. Day
3.4	Location	Indoors
3.5	Air Volume	4,530 ACFM
3.6	External Static Pressure	0.5 Inch WG
1 3.7	Minimum Cooling Capacity (Sensible Heat)	126.4 MBH
3.8	DX Cooling Coil Entry Air Temp	98°F (DB)
3.9	DX Cooling Coil Leaving Air Temp	74°F (DB)
3.10	Cooling Coil Air Pressure Drop	0.5 inch W.G. (Maximum)
1 3.11	Number of Refrigerant Circuit	Two (2)
1 3.12	Mixing Box Required	Yes
1 3.13	Outside and Return Air Damper Required	Yes
1 3.14	Damper Operator Required	Yes
1 3.15	Mixed Air Temperature Controller Required	Yes
1 3.16	Mounting Position	Horizontal
1 3.17	Electrical Power Available	460/3/60

4.0 DETAILS OF CONSTRUCTION

4.1 The Air Handling Unit shall be a low pressure draw thru type suitable for indoor installation. The unit shall be complete with rigid casing, fan and motor section, and direct expansion coils, medium capacity filter-mixing box and with return and outside air dampers and rigging brackets.

4.2 The unit casing shall be fabricated of heavy gauge galvanized steel panels, reinforced and braced with steel angle framework for maximum rigidity.

4.3 The unit shall have three large galvanized steel gasketed, hinged and latched doors for access to fan, coil, and inlet sections.

4.4 The fan and coil section shall be insulated with 1" thick, 3/4 pound density fiberglass. All exterior surfaces shall have a primer coating for additional corrosion protection. The unit shall have an insulated drain pan beneath the fan and coil section with drain connections on both sides.

4.5 The fan shall be centrifugal multi-blade, forward curved, double width, double inlet, statically and dynamically balanced as an assembly on solid steel shaft and rated in accordance with Air Moving and Conditioning Association, Inc. (AMCA). Fan first critical speed shall be at least 125% of fan operating speed.

4.6 The fan pulley shall be adjustable.

4.7 Fan bearings shall be heavy duty, self-aligning and shall be lubricated by means of grease fittings extending outside the blower casing.

4.8 Fan and motor assembly shall be isolated from the unit casing with rubber in shear vibration isolators.

4.9 The direct expansion cooling coil shall be of copper tubes with aluminum plate fins. The fins shall be firmly bonded to the tubes by means of mechanical expansion of the tubes. The coil shall be mounted in the coil casing to be accessible for service. The coil shall be rated for 425 psig working pressure.

4.10 The mixing box shall include opposed blade return and outside air dampers. The dampers shall rotate on rust proof nylon bushings.

⚠1 4.11 The unit shall include a mixed air temperature controller set at 60°F.

⚠1 4.12 The damper operator shall be controlled by the mixed-air temperature controller to maintain 60°F mixed-air temperature by modulating the outside and return air dampers.

⚠1 4.13 The outside air dampers shall be subjected to a minimum position of 32% outside air.

⚠1 4.14 The v-belt and pulley drive shall be enclosed in a solid sheet metal, removable belt guard. The rigging brackets shall be heavy gauge formed steel brackets with steel eye-bolts for lifting the unit.

⚠1 4.15 The unit shall be provided with rubber-in-shear type vibration isolators. The filters shall be of the throw-away type.

⚠1 4.16 The color of the external surface shall match EC 103 (Shale Gray) as defined by DuPont maintenance finishes.

5.0 QUESTIONNAIRE - See Specification M-7119 MSP-0401 - GENERAL MECHANICAL SPECIFICATION for instrucitons on how to complete this questionnaire.

5.1 Item Identification _____

5.2 Date Questionnaire Filled In _____

5.3 Manufacturer and Model No. _____

5.4 Fan Data

.1 Capacity @ site Altitude _____ ACFM

.2 External Static Pressure _____ IN. W.G.

.3 Total Static Pressure _____ IN. W.G.

.4 Motor Nameplate Data _____ HP _____ RPM

.5 Type of Enclosure _____

.6 Required Electric Power _____ VOLT _____ PHASE ____ HERTZ

5.5 Direct Expansion Coil Data

.1 Minimum Capacity _____ MBH

.2 Entering Air Temperature _____ ^{o}FWB _____ ^{o}FDB

.3 Leaving Air Temperature _____ ^{o}FWB _____ ^{o}FDB

.4 Suction Temperature _____ ^{o}F

.5 Face Area _____ SQ. Ft.

.6 Face Velocity _____ FPM

.7 Air Pressure Drop _____ IN. W.G.

.8 Coil Connection Sizes _____ IN.

5.6 Type & Number of Air Filters _____

.1 Air Filter Pressure Drop _____ IN. W.G.

5.7 Total Unit Shipping Weight _____ LBS.

5.8 Origin of Vendor's Services After Purchase of Equipment _____

_____

5.9 Exceptions taken to this specification _____

_____

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CONTRACT M-7119

COST CODE - 3410

ASARCO, INCORPORATED
ANTIMONY PLANT
El Paso, Texas 79999

SPECIFICATION NO. MSP-0489 WALL MOUNTED AIR CONDITIONER

1.0 SCOPE OF EQUIPMENT AND SERVICES TO BE FURNISHED BY VENDOR

1.1 Refer to:

.1 General Mechanical Specification MSP-0401

.2 General HVAC Systems Specification MSP-0411

.3 General Electrical Specification ESP-4001

1.2 Design, fabrication, and delivery of the Wall Mounted Air Conditioner Unit as normally supplied as part of a complete unit for the safe and satisfactory operation of the stated equipment. These shall include, but not necessarily be limited to:

.1 Compressor

.2 Evaporator and condenser coil

.3 Evaporator and condenser fans

.4 Air deflection grille

.5 Casing

.6 Controls

.7 Electric Heater

.8 Motors and magnetic starters

2.0 EQUIPMENT AND SERVICES TO BE FURNISHED BY OTHERS

2.1 All external electrical power wiring including main disconnect switch.

2.2 Structural support and wall opening.

2.3 Installation of the unit and its accessories.

3.0 FUNCTIONAL REQUIREMENTS

3.1	Item	Wall Mounted Air Conditioner
3.2	Quantity	One (1)
⚠1 3.3	Nom. Cooling Capacity, BTUH (Sensible Heat)	12,815
⚠1 3.4	Nom. Heating Capacity, BTUH	11,312
3.5	Air Volume ACFM	465
3.6	Where Required	Lunch Room
3.7	Equipment No.	58.3414
⚠1 3.8	Wall Sleeve Required	Yes
⚠1 3.9	Electric Power Available	240/1/60

4.0 DETAILS OF CONSTRUCTION

4.1 The unit shall be a package type complete with compressor, evaporator and condenser coils and fans, air deflection grille, casing, controls, air filter, and electric heater.

4.2 The compresssor shall be rubber shock mounted and internally spring mounted for quiet operation and vibration isolation. The compressor shall be in a hermetically sealed steel case and sprayed with black epoxy paint.

4.3 The evaporator and condenser coils shall have copper tubing as the primary surface and aluminum fins for the secondary surface. A capillary restrictor shall be the metering device for the refrigeration system.

4.4 The evaporator and condenser fans shall be direct driven with a common motor. The evaporator fan shall be centrifugal type and condenser fan shall be propeller type with a slinger ring for condensate removal.

4.5 The front discharge grille shall be capable of adjustment from horizontal to 70 degrees vertical.

4.6 The casing shall be a one-piece sleeve, U-channel reinforced for added strength, for wa installations. It shall be fabricated from 18-gauge zinc clad steel and shall include an outside grille. The finish on grille and casing shall be two coats of baked on epox resin enamel. The grille and casing shall be shipped with a closure panel at both the front and rear casing and with installation instructions on front panel.

4.7 The controls shall be factory wired and completely enclosed within the unit. An adjustable thermostat shall automatically cycle compressor to maintain space conditions The thermostat shall be of the cross-ambient type to permit cold weather starting and operation at 45°F outdoor temperature when unit is on cooling cycle and shall have its sensing bulb encased in a plastic sleeve to prevent coil icing. The fan control shall be a 3-position switch for high, medium and low fan speeds for cooling and heating. The exhaust-fan control shall be a 3-position control to close the vent, exhaust air from room, or introduce fresh air to the room.

4.8 The unit shall include a removable and cleanable air filter.

4.9 The unit shall be provided with electric resistance heaters for space heating.

SPECIFICATION NO. MSP-0489 — WALL MOUNTED AIR CONDITIONER

5.0 QUESTIONNAIRE - See Specification MSP-0401 - GENERAL MECHANICAL SPECIFICATION for instructions on how to complete this questionnaire.

5.1	Item Identification	_____
5.2	Date Questionnaire Filled In	_____
5.3	Number Required	_____
5.4	Manufacturer and Model No.	_____
5.5	Total Cooling Capacity	_____ BTU
5.6	Total Heating Capacity	_____ KW
5.7	Supply Air Flow	_____ CFM
5.8	Outlet Velocity	_____ FPM
5.9	Air Throw	_____ FT.
5.10	Dehumidification	_____ Pints/Hr
5.11	Electrical Nameplate Data	
	.1 Electric Power Supply	_____ V _____ PH _____ HER
	.2 Nameplate Watts (Cooling)	_____ WAT
	.3 Nameplate Watts (Heating)	_____ WAT
	.4 Wire Size	_____ AWG
5.12	Required Wall Opening	_____ INC
5.13	Unit Shipping Weight	_____ LBS
5.14	Physical Dimensions	ATTACH DRAWING
5.15	Origin of Vendor's Services After Purchase of Equipment	_____
		_____
5.16	Exception to Dravo's Specification	_____
		_____
		_____
		_____

REV. NO.	DATE	BY	APPROVAL	REASONS FOR ISSUE/REMARKS
---				PRELIMINARY ISSUE
-----				DRAVO APPROVAL
0	2-6-76	CB		CUSTOMER APPROVAL
				ISSUE FOR BID
				ISSUE FOR PURCHASE ORDER
	02-20-76	LJS		ISSUE FOR CONSTRUCTION
1	03-08-76	PCD		

DRAVO CORPORATION, DENVER OPERATIONS OFFICE
One Park Central
Denver, Colorado 80202

CONTRACT M-7119

COST CODE - 3410

ASARCO, INC,
ANTIMONY PLANT
El Paso, Texas 79999

SPECIFICATION MSP-0490 CEILING MOUNTED AIR CONDITIONE

1.0 SCOPE OF EQUIPMENT AND SERVICES TO BE FURNISHED BY VENDOR

1.1 Refer to:

.1 General Mechanical Specification MSP-0401
.2 General HVAC System Specification MSP-0411
.3 General Electrical Specification ESP-4001
.4 AC Squirrel Cage Induction Motors ESP-4002 (1/2 HP to and including 200 HP)

1.2 Design, fabrication, and delivery of all meterials and accessories required for the safe and satisfactory operation of a Ceiling Mounted Air Conditioner. These shall include but not necessarily be limited to:

.1 Hermetic Compressor
.2 Condensing Section, Coils and fan(s)
.3 Evaporator Section, coils and fan(s)
⚠1 .4 Remote Temperature Control Center
.5 Refrigerant
.6 Casing
.7 Filters
.8 Motors and magnetic starters
⚠1 .9 Electric Heating Coils

2.0 EQUIPMENT AND SERVICES TO BE FURNISHED BY OTHERS

2.1 External wiring

2.2 Installation of unit and its accessories in the field

2.3 Structural supports

2.4 Balancing of system air distribution

2.5 Outside air provisions

2.6 Return air duct system

SPECIFICATION MSP-0490 — CEILING MOUNTED AIR CONDITIONER

3.0	FUNCTIONAL REQUIREMENTS		
3.1	Quantity Required		One (1)
3.2	Equipment Number		58.3415
3.3	Location		OFFICE
3.4	Condenser Entering Air Temperature (^{O}F)		105
⚠1 3.5	Cooling Capacity (Sensible Heat)		25,318 BTUH
⚠1 3.6	Heating Capacity		15,400 BTUH
⚠1 3.7	Evaporator		
	.1	Air Flow (ACFM)	1250
	.2	Static Pressure (in. wg), external	0.6
	.3	Entering Air Temp (^{O}F)	75°DB; 61°WB
	.4	Leaving Air Temp. (^{O}F)	53°DB, 51°WB
⚠1 3.8	Compressor		
	.1	Type	HERMETIC WELDED SHELL
	.2	Refrigerant	R-22 (FREON)
	.3	RPM	3600
⚠1 3.9	Room Thermostat Auxiliary Selections		"FAN," "AUTO," "OFF"
⚠1 3.10	Electrical power available		460/3/60

4.0 DETAILS OF CONSTRUCTION

4.1 The compressor shall be internally spring isolated, have sound muffling and shall be complete with crank case heaters, service valves, suction line accumulator and full refrigerant charge.

4.2 All controls shall be factory wired and tested.

4.3 The evaporator coil shall be factory tested at 300 PSI and shall have a capillary expansion tube.

4.4 The condenser coil shall be factory tested at 425 PSI.

4.5 The air conditioner shall have low ambient temperature protection and shall be suitable for operation at an ambient temperature of 40°F.

4.6 The cabinet shall be insulated and contain filter racks.

4.7 The air conditioner shall be ducted using outside air as a fixed percentage of total return air.

4.8 The air conditioner shall be provided with drain pans for both the evaporator and condenser. The condenser pan shall have a drain opening. The evaporator pan shall be insulated and internally sealed with a 3/4 inch IPS drain pipe connection.

4.9 The condenser and evaporator primary surfaces shall be 3/8" OD seamless copper tubing. The secondary surfaces shall have mechanically bonded aluminum fins.

⚠ 4.10 The unit shall be provided with slip-in electric heater equipped with all safety controls.

⚠ 4.11 The unit shall be furnished with remote control center located in the conditioned space for selection of heating, cooling and continuous fan operation.

SPECIFICATION MSP-0490 — CEILING MOUNTED AIR CONDITIONER

5.0 QUESTIONNAIRE: See Specification MSP-0401 - GENERAL MECHANICAL SPECIFICATION for instructions on how to complete this questionnaire.

5.1	Vendor's Name	_____
5.2	Questionnaire Date	_____
5.3	Item Identification, Manufacturer and/or Model Number	_____
5.4	Quantity	_____
5.5	Delivery	_____ WEEKS
5.6	F.O.B. Point	_____
5.7	Origin of Vendor's Services after Purchase of Equipment	_____
		_____
5.8	Physical Dimensions	
	.1 Overall Size	(Submit Drawings)
	.2 Clearance Required for Maintenance and Repair	(Describe)
5.9	Weight	_____ LBS.
⚠ 5.10	Cooling Capacity (Sensible Heat)	_____ BTUH
⚠ 5.11	Heating Capacity	_____ BTUH
⚠ 5.12	Evaporator Air Flow	_____ ACFM
⚠ 5.13	Evaporator Static Pressure	_____ INCW W
⚠ 5.14	Evaporator Fan Type	_____
	HP	_____ HP
	RPM	_____ RPM
⚠ 5.15	Evaporator Face Area	_____ SQ. F
⚠ 5.16	Condenser Air Flow	_____ ACFM
⚠ 5.17	Condenser Fan Type	_____
	HP	_____ HP
	RPM	_____ RPM

SPECIFICATION MSP-0490 CEILING MOUNTED AIR CONDITIONE

⚠ 5.18 Condenser Face Area _____ SQ. FT.

⚠ 5.19 Compressor Type _____

HP _____ HP

RPM _____ RPM

⚠ 5.20 Filter Size, Type _____

AREA _____ SQ. IN.

⚠ 5.21 Exceptions to this specification _____

_____

_____

_____