

1/30/2019

Revision # 0

Attention:

Re: 60" OD x 20'-0" s/s 1440 psig Sour Separator Package

appreciates the opportunity to provide the following quotation for your client's 60" OD x 20' s/s 1440 psig Sour Separator Package. Please find our proposal below.

| 1.- SKID | | | 12'-0" Wide x 26'-0" Long |
|------------------|-----|--|----------------------------------|
| Tag | Qty | Description | |
| Main members | | W12 x 40 lbs/foot | |
| End members | | W12 x 40 lbs/foot | |
| Cross Members | | W12 x 40 lbs/foot | |
| Channel Supports | | C6 x 8.2 lbs/foot | |
| Flooring | | 3/16" checker plate | |
| Drip lip | | 3½" flat bar x 1/4" thick | |
| Drain Pan | | 18¼" x 17½" drain pan c/w grating | |
| Lift Lugs | | 11" x 10⅞" x 1" thick plate / SA-44W | |
| Door sill | | L4"x3"x¼", 3'-4" LG | |
| Ramp | | Checker plate 3/16" thk, 3'-4" x 1'-6" | |
| Ramp | | Side plate 1/4" thk, 1'-5 3/4" L x 3" | |

| 2.-BUILDING | | | 12'-0" Wide x 26'-0" Long x 13'-3" Low Eave |
|--------------------|-----|--|--|
| Tag | Qty | Description | |
| Size & type | 1 | 12'-0" W x 26'-0" L x 13'-3" low eave height, self framing shed style | |
| Exterior | | 22 gauge galvalume self framing panels | |
| Interior | | R12 wall and roof insulation c/w 6 mil vapour barrier and 24 gauge plain fluted aluminum lining | |
| Doors | | Two - 3'-0" x 7'-0" 20 gauge hollow core R3 steel door c/w panic hardware, locking cylinder, IWG windows, check chain, weather stripping | |

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|-------------|--|---|
| Windows | | One - 38" x 36" double glazed storm sliding window c/w 1/2 screen & latch |
| Ventilation | | Two - 12" x 12" aluminum wall louvers c/w slide and screens |
| Misc. | | Two - 12" x 12" aluminum wall louvers c/w slide and screens |

| 3.- BUILDING HEATERS | | Catadyne Electric Heaters |
|-----------------------------|-----|--|
| Tag | Qty | Description |
| BH-800 A/B | 2 | Catadyne Model MKII 24 x 24 20,000 Btu/h max. output, grill, safety shut off, regulator vent hood, thermostat, class1, Div 1, (natural gas), 12 VDC start-up cable |

| 4.- VESSEL | | 60" OD x 20'-0" s/s Horizontal Pressure Vessel |
|-------------------|-----|--|
| Tag V-100 | Qty | Description |
| Shell | 1 | 60" OD x 240" long x 2¼" thick rolled plate / SA-516-70N |
| Heads | 2 | 60" OD x 2½" thk. 2:1 SE hot formed / SA-516-70N |
| Boot Shell | 1 | 24" OD x 29" x 2¼" Rolled Plate Trim As Needed, 3:1 Transition One End to 1¼" thk, SA-516-70N |
| Boot Head | 1 | 24" OD x 1¼" Nom. (1.14 MIN.) thk. 2:1 SE Hot Formed Plate C/W 2" SF, SA-516-70N |
| Boot Repad | 1 | 40" OD x 2" thk Rolled to 60" ID, SA-516-70N |
| Base Plate | 2 | FB10 X 55" W x 1" thk. Plate - Detail See Sht 2, 44W |
| Saddle | 2 | 54" W x 9" L x 74⅜" H x ⅜" thk. formed Channel Plate, 44W |
| Wear Plate | 2 | 10" W x 70" L x ⅜" thk. Rolled to 60" ID, SA-516-70N |
| Rib | 2 | FB8 x 58⅜ H x ⅜" thk, 44W |
| Lifting Lug | 2 | 11" W x 9" H x 1" thk w/ 3½" Hole. Plate, SA-516-70N |
| Name Plate | 1 | Nameplate c/w Bracket, 44W/304SS |
| Inlet Diverter | 1 | 20" x 23" x ⅜" thk (Bottom Plate), SA-36/44W |
| Side Plate | 2 | 9" H x 11" H x 23" W x ⅜" THK., SA-36/44W |
| Back Plate | 1 | 11" W x 20" L x ⅜" thk. (Shop to Suit to Shell ID), SA-36/44W |
| Mistpad | 1 | 24" OD x 6" x 9# / FT (Two Pieces) c/w Grids, 316SS |
| Mistpad Support | 1 | PL-¼" thk, 24"ID Rolled Plate, 1'-0" LG, 44W |
| Top Grid Support | 1 | 1 - FB1 x 23 7/8" x ¼" thk & 2 - FB1 x 18" x ¼" thk, 44W |
| Mechanical Bolts | 12 | 1/2" x 2" c/w 2 Nuts (SA-194-2HM) & 2 SS Washers, SA-193-B7M |
| Removable Grid | 3 | 1 - FB1 x 26 1/2" x 1/4" thk & 2 -FB1 x 20 3/8" x 1/4" thk, c/w (2) 5/8" holes, one on each end, 44W |
| Clips | 1 | FB 1 x 2" x ¼" thk, c/w (1) ⅜" hole, 44W |
| Baffle plate | 1 | 28" x 55¼" x ⅜" thick / SA-36/44W |

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| Clips | 1 | Clips, L2" x 2" x ¼" Angle Iron x 2" LG, 44W |
| Weir Plate | 1 | 3/8" thk. SA-36/44W |
| Poison Pad | 1 | 8" x 8" x ¾" thk. Rolled to 60" ID, SA-516-70N |
| Removable Vortex Breaker | 1 | FB 2 x ¼" x 8" 44W c/w One (1) 5/8" hole |
| Removable Vortex Breaker | 1 | FB 2 x ¼" x 4" 44W c/w One (1) 5/8" hole |
| Grab Handle | 1 | 5/8" Round Bar x 20" LG, FORMED U, 44W |
| Tubbing | 1 | SQ. Tubing 2 x 2 x ¼", 12" LG, 44W TBD |
| Flat Bar | 1 | FB 2 x ¼", 7"LG c/w (2) ¾" holes, 44W |
| Flange (N1,N2) | 2 | 8 NPS CL600 RFHB, 13"LG OAL., SA-350-LF2-CL1 |
| Flange (N3,N11) | 2 | 3 NPS CL600 RFHB, 11"LG OAL., SA-350-LF2-CL1 |
| Flange (N4) | 1 | 3 NPS CL600 RFWN Sch 160 Bore, SA-105N |
| Nozzle (N4) | 1 | 3 NPS Sch 160 x 4½" LG , SA-106B |
| Repad (N4) | 1 | 7" OD x 1/2" thk Dished to 24" OD Head, SA-516-70N |
| Flange (N5,N13) | 2 | 4 NPS CL600 RFHB, 10½" LG, SA-350-LF2-CL1 |
| Flange (N6~N10, N12) | 6 | 2 NPS CL600 RFWN Sch 160 Bore, SA-105N |
| Nozzle (N7,N8,N10,N12) | 4 | 2 NPS Sch 160 x 5 1/16" LG, SA-106B |
| Nozzle (N9) | 1 | 2 NPS Sch 160 x 6½" LG, SA-106B |
| Flange (N10) | 1 | 2 NPS CL600 RFBL Tap w/ ¾ NPT, SA-105N |
| Gasket (N10, N12) | 2 | 2" CL600, 1/8" thk. Spiral Wound, 316SS |
| (N13) | 16 | Studs, ¾" x 5¾" LG c/w 2 Nuts, SA-194-2HM/SA-193-B7M |
| (M1) | 1 | Blind Flange, 20 NPS CL600 RFBL, SA-105N |
| Gasket, (M1) | 1 | 20" CL600 1/8" thk, Spiral Wound, 316SS |
| Studs (M1) | 24 | Studs, ¾" x 11¼" LG c/w 2 Nuts, SA-194-2HM/SA-193-B7M |
| Manway Flange, (M1) | 1 | 20 NPS CL600 RFHB, 22" LG OAL., SA-350-LF2-CL1 |
| Blind Flange | 1 | 20 NPS CL600 RFBL, (M1) SA-105N |
| Studs (M1) | 24 | Studs, 1½" x 11¼" LG c/w 2 Nuts, SA-194-2HM/SA-193-B7M |
| Davit Assembly | 1 | 20 NPS CL600 MW- |
| Mechanical Bolts | 4 | 1¼" x 4½", GR8 |
| Blind Flange (N11) | 1 | 3 NPS CL600 RFBL, SA-105N |
| Gasket, (N11) | 1 | 3" CL600 1/8" thk, Spiral Wound, 316SS |
| Studs (N11) | | Studs, 3/4" x 5" LG c/w 2 Nuts, SA-194-2HM/SA-193-B7M |
| Flat Bar | | FB 2x1/4" x 2" c/w One (1) 5/8" hole for vortex, 44W |
| | 2 | ABSA Inspections |
| ABSA | 1 | ABSA registered and inspected |
| PWHT | 1 | Stress relieved for 135 minutes at 1150°F |
| Haul to R&R | | |
| Design Code | | ASME Sec VIII, Div 1 |
| Design Parameters | | 1440 psig @ -20/100°F c/w 1/8" C.A. |
| Efficiency | | 1.0 per UW-12d |
| Hydrotest | | 2160 psig |
| Radiography | | RT-1 |

| 5.- SCRUBBER | | 8 NPS x 30" s/s Sour Scrubber |
|---------------------|-----|---|
| Tag V-110 | Qty | Description |
| Fuel Gas Scrubber | 1 | 8 NPS x 30" s/s x 300 psig MAWP @ -20/200°F fuel gas scrubber, 1/8" C.A., PWHT, c/w HLSD float. AB, BC, SK registration |

| 6.- PACKAGE | | |
|--------------------|-----|--|
| Tag | Qty | Description |
| FE-300 | 1 | 6 NPS CL600 CANALTA Senior meter run, NACE, AGA/API 14.3, Part 2, 4 TH Edition 2000 |
| TI-100 | 1 | Pfortner model 25302 3" dual scale c/w 12" thermowell, 316SS |
| PSV-100 | 1 | Mercer 2 NPS CL600 x 3 NPS CL150 model 91-53F11P25N1 PSV, sour, set @ 1440 psig |
| PSV-110 | 1 | Mercer 1 NPT x 1 NPT PSV model 81-17151V09N11, sour, set @ 150 psig |
| HLSD-110 | 1 | Louvers & Gauges HLSD fuel gas shut off valve (scrubber) c/w float, model FGSO-2-11 |
| PI-100 | 1 | Wika 233.54 pressure indicator, 4" liquid filled, ½" NPT bottom connection, dual scale, 0-1500 psig, 316 SS |
| PI-110 | 1 | Wika 233.53 pressure indicator, 2-1/2" liquid filled, dual scale, 0-160 psig, 316 SS |
| LC-100/200 | 2 | Fisher L2 liquid level controller c/w 1-7/8" x 12" sour service displacer |
| LCV-100/200 | 2 | 2 NPS CL600 RF Norriseal 2220 control valve, 1/4" SST, & One (1) 1" SST Trim NACE |
| FE-100/200 | 2 | Turbines Inc. E Series Flow Indicator/Totalizer Model E110-P-AH-CX-HAA-1B-OT-PB-PX-XD-ZB-1TU EZ-IN turbine meter |
| FQI-100/200 | 2 | E Series Flow Indicator/ Totalizer Model E110-P-AH-CX-HAA-1B-OT-PB-PX-XD-ZB-1TU. |
| LG-100 | 1 | Penberthy model 1RM5 level gauge, reflex c/w 330J gage valves, sour |
| LG-200 | 1 | Penberthy model 1TM5 level gauge, transparent c/w 330J gage valves, sour |
| PRV-110 | 1 | CVS 627 pressure regulator, 1 NPT, WCC, 3/16 orifice, 70-150 psig |
| PRV-111/112 | 2 | CVS Type 67CFR, 1/4" NPT connection c/w vented bonnet, 0-125 psi adjustable spring range c/w internal relief, adj.screw with closing cap |

| 7.- MANUAL VALVES | | |
|--------------------------|-----|--|
| Tag | Qty | Description |
| BV1 | 19 | 1/2 NPT CL2000 JAG ball valves, NACE |
| BV2 | 4 | 3/4 NPT CL2000 JAG ball valves, NACE |
| BV3 | 3 | 1 NPT CL2000 JAG ball valves, NACE |
| BV4A | 16 | 2 NPS CL600 RF RP JAG ball valve, NACE |
| BV4B | 1 | 2 NPT CL2000 JAG ball valve (skid drain) |
| NV1 | 2 | 1/2 MNPT x 1/2 FNPT CL6000 - AGCO H7VIS-44Q hard seated hand valve, 316 SS |
| CV1 | 1 | 1/2 NPT CL800 Velan piston check valve, NACE |
| STR4 | 2 | 2 NPS CL600 RF Alta-Strainer Y-Strainers, NACE |

| 8.- SANDBLAST,PRIME AND PAINT | | |
|--------------------------------------|-----|--|
| Tag | Qty | Description |
| Skid | 1 | Blast with commercial SSPC SP6 apply one coat of primer, top coat with two coats of warm grey enamel |
| Vessel, Piping | 1 | Blast with commercial SSPC SP6 apply one coat of primer, top coat with two coats of warm grey enamel |

| 9.- PIPING AND FITTINGS | | |
|--------------------------------|-----|---|
| Tag | Qty | Description |
| Welded piping | | 2" to be Sch 160, 3" - 8" to be Sch 80 / SA-106B |
| Welded fittings | | 2" to be Sch 160, 3" to 8" Sch 80 / SA-234-WPB or SA-105N |
| Flanges | | 2" to be CL600 Sch 160, 3" to 8" to be CL600 RFWN / SA-105N |
| Thread Piping | | 1" and under to be Sch XXH, fittings to be CL6000# |
| Tubing | | Pneumatic instrument tubing 316 SS & fittings to be Swagelok 316 SS |
| Studs | | Studs to be A-193 B7M & Nuts A-194 2HM Gaskets to be 316 SS Flexitallic |
| Radiography | | Radiography to be 100% on all Butt welds |

| 10.- PRICE | | |
|-------------------|-----|---|
| Tag | Qty | Description |
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| | | |
| | | Options: |
| | | BPCV 4" Control Valve CL600 RF, CAD \$4311.00 |
| | | Pressure Controller CVS 4150, CAD \$850.00 |

| 11.- TERMS AND CONDITIONS | | |
|----------------------------------|-----|--|
| Tag | Qty | Description |
| Ex-works: | | |
| G.S.T.: | | Extra @ 5% |
| Terms: | | |
| Delivery | | |
| Validity | | Quote is valid for 30 days |
| Warranty | | Warranty offered is for 12 months from the start-up or 18 months after date of completion, whichever occurs first |
| NOTES | | Any post order changes in the design/piping/instrumentation will be captured by change order and will be an extra cost |
| | | |

Trusting you find the above quotation in order and to your satisfaction.

Sincerely,