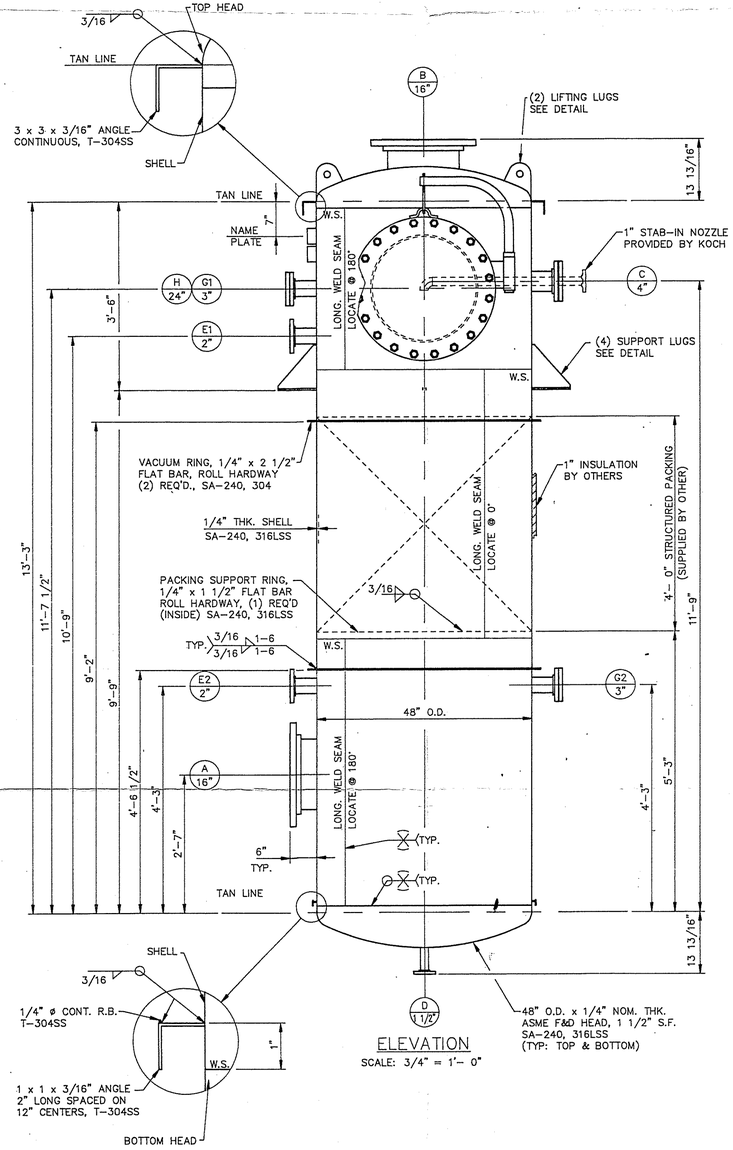
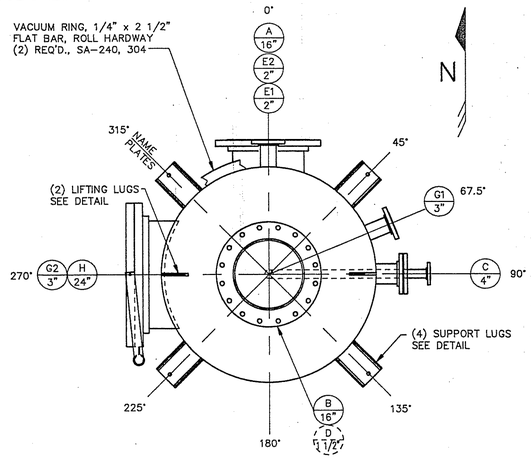


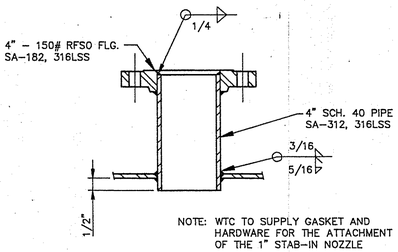

ELEVATION

SCALE: 3/4" = 1'- 0"




PLAN

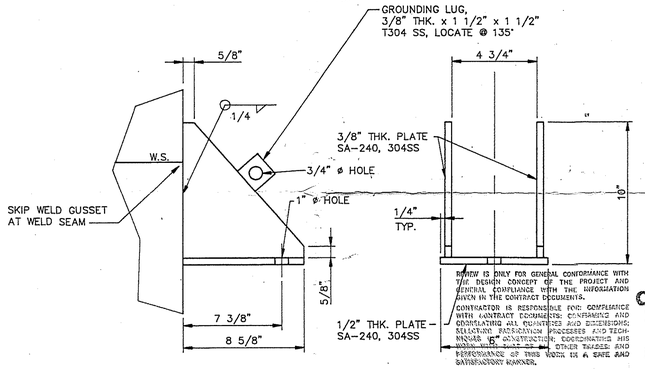
SCALE: 3/4" = 1'- 0"




NOTE: WTC TO SUPPLY GASKET AND HARDWARE FOR THE ATTACHMENT OF THE 1" STAB-IN NOZZLE

NOZZLE " C " DETAIL

SCALE : NONE




SUPPORT LUG DETAIL

SCALE : NONE

W.T.C. WELDING PROCEDURES:

| S.S. TO S.S. | S.S. TO C.S. | C.S. TO C.S. |
|---|---|---|
| GTAW #5 SMAW #8 | SMAW #9 | SMAW #1 |

NOTE: INTERNAL WELDS TO BE GROUND SMOOTH (60-80 Ra) BUT NOT NECESSARILY FLUSH TO 150 GRIT

FABRICATED BY
**WARD TANK CORPORATION**
CHARLOTTE N.C.

| | | | |
|---|---|---|---|
| SHELL | MAWP: F.V. & 14.5 PSI @ 392 °F | | |
| JKT./TUBE SIDE | MAWP: PSI @ °F | | |
| SHELL | Min. Design Metal Temp: -20 °F F.V. & 14.5 PSI | | |
| JKT./TUBE SIDE | Min. Design Metal Temp: °F @ PSI | | |
| TEST PRESS. | SHELL: 22 PSI | JKT./TUBE SIDE: PSI | |
| MFGR. S. N. | W-2427 | YR. BUILT: 1994 | |
| CUSTOMER | KOCH ENGINEERING CO. | | |
| P.O. NO. | 23182 | DATE: 1/11/94 | |
| NOMENCLATURE | DMAC SCRUBBER | | |
| EQUIP. NO. | | | |

CERTIFIED PRINT
WARD TANK CORPORATION
By: [signature]
Date: MAR 3 1994

| MARK | BY | CKD. | DATE | DESCRIPTION |
|---|---|---|---|---|
| | | | | REVISIONS |
| CUSTOMER ORDER NO. | | | FOR APPROVAL | CERTIFIED |
| 1542-0741 | | | DATE 1/26/94 | BY KSG/EGC 3-3-94 |
| SCALE AS SHOWN | | DATE | KOCH ENGINEERING COMPANY INC WICHITA, KANSAS 67200 316/828-5110 | |
| DR. J.G.W. | | 1/21/94 | WORLD LEADER IN MASS TRANSFER EQUIPMENT | |
| CKD | | | CONTRACT NO. 39160-02 | DRAWING NO. 39160-E-01-1 REV. 1 |
| APP. TWH | | 3-3-94 | | |

## MATERIALS OF CONSTRUCTION

| | VESSEL OR SHELL SIDE | JACKET OR TUBE SIDE |
|---|---|---|
| SHELL | SA-240/T316L SS | |
| HEADS | SA-240/T316LSS | |
| FLANGES | SA-182/F316L SS SA-105, F.S. | |
| NOZZLE NECKS | SA-312/TP316L SS | |
| VESSEL SUPPORTS | SA-240/304 SS | |
| EXTERNAL BOLTS NUTS | SA-193 B7 STUDS SA-194 2H | |
| INTERNAL BOLTS NUTS | | |
| GASKETS | 1/8" THK GARLOCK 3510 | |
| | | |

## DESIGN CONDITIONS

| | | |
|---|---|---|
| DESIGN PRESS. | F.V. & 14.5 psig | |
| DESIGN TEMP. | 392° F. | |
| OPERATING PRESS. | -15" W.C. | |
| OPERATING TEMP. | 104° F. | |
| CORR. ALLOW. | 1/16" | |
| CODE | ASME SECT VIII DIV I '92 AD. | |
| CODE STAMP | NO | |
| STRESS RELIEF | N/A | |
| RADIOGRAPH | NONE | |
| JOINT EFF. | | |
| HYDRO TEST | | |
| SP. GR. CONTENTS | 1.0 | |

## CAPACITIES AND WEIGHTS

| | | | | |
|---|---|---|---|---|
| OPERATING CAP. | | GAL. | | CU. FT. |
| FULL CAPACITY | | GAL. | | CU. FT. |
| EMPTY WEIGHT | APPROX. 3,000 | LBS. | FULL HO | LBS. |
| OPERATING WT. | | LBS. | FULL PROD. | LBS. |

## GENERAL NOTES

1. BOLT HOLES TO STRADDLE SHOWN CENTERLINES.
2. FABRICATOR TO PROVIDE PROTECTIVE SHIELDS FOR ALL FLANGES AND OPENINGS.
3. FABRICATOR SHALL PROVIDE GASKETS, BOLTS AND HEX NUTS FOR ALL MATING PARTS INCLUDING BLIND FLANGES WHERE NOTED.
4. SPARE SET OF GASKETS IS NOT REQUIRED.
5. INDICATE MACHINE FINISHED SURFACES IN MICROINCHES WITH ANSI SYMBOL, e.g.; 125/ , 63/ , ETC.
6. INSULATION SUPPORTS ARE (NOT) REQUIRED.
7. SURFACE PREPARATION: STANDARD MILL FINISH INSIDE & OUT. FLUSH INSIDE OUT AND DRY. STARBLAST EXTERIOR.
8. PAINTING: C.S. ONLY: (1) COAT RED OXIDE PRIMER
9. LIST OF APPLICABLE MILES STANDARDS AND SPECS.

| MARK | No. | SIZE | RATING | TYPE | REMARKS |
|---|---|---|---|---|---|
| Z | | | | | |
| Y | | | | | |
| X | | | | | |
| W | | | | | |
| V | | | | | |
| U | | | | | |
| T | | | | | |
| S | | | | | |
| R | | | | | |
| P | | | | | |
| N | | | | | |
| M | | | | | |
| L | | | | | |
| K | | | | | |
| J | | | | | |
| H | 1 | 24" | 150# | RFSO | MANWAY |
| G1,G2 | 2 | 3" | 150# | RFSO | SPARE W/ BLIND FLANGE |
| F | | | | | |
| E1,E2 | 2 | 2" | 150# | RFSO | DIFFERENTIAL PRESSURE TRANSMITTER |
| D | 1 | 1 1/2" | 150# | RFSO | LIQUID OUTLET |
| C | 1 | 4" | 150# | RFSO | LIQUID INLET W/ INSERT PIPE |
| B | 1 | 16" | 150# | RFSO | GAS OUTLET |
| A | 1 | 16" | 150# | RFSO | GAS INLET |

## FITTING SCHEDULE

## MILES REFERENCE DATA

PURCH. ORDER No. 1542-0741 PURCH. ORDER DATE

| ITEM NUMBER | ASSET NUMBER | ITEM NUMBER | ASSET NUMBER |
|---|---|---|---|
| 230-521 | 0020200200 | | |

## MANUFACTURER DATA

MFR. NAME: WARD TANK CORPORATION
STREET / P.O. BOX: P.O. BOX 560066
CITY: CHARLOTTE STATE: N.C. ZIP: 28256-0066
TELEPHONE NO.: ( 704 ) 568-3001 FAX NO.: ( 704 ) 536-3259
ENGINEERING CONTACT: LEO BARGELT
MFR. SERIAL NO.: W-2427 SHOP ORDER NO.: W-2427
MFR. DWG. NO.: 94-W-2427 REV.: 0

IN ADDITION TO TOLERANCES SPECIFIED HERE THE FABRICATOR MUST COMPLY WITH ADDITIONAL TOLERANCES INCLUDED IN MILES ENGINEERING STANDARDS OR SPECIFICATIONS MADE A PART OF THIS ORDER, FAILURE TO COMPLY WITH ALL TOLERANCE SPECIFICATIONS WILL BE CAUSE FOR REJECTION. EQUIPMENT GENERALLY IS JOINED-UP WITH PREFABRICATED PIPING, REQUIRING ACCURATE NOZZLE LOCATIONS AND FACE ALIGNMENTS WITHIN THE SPECIFIED TOLERANCES.

## HORIZONTAL EQUIPMENT SUPPORT TOLERANCES

| TOLERANCE | DESCRIPTION OF TOLERANCE |
|---|---|
| +0 -1/8" | HORIZONTAL EQUIPMENT, CENTERLINE TO BOTTOM OF SUPPORT. |
| ±1/4" | HORIZONTAL EQUIPMENT, BASELINE TO CENTERLINE OF SUPPORT. |
| ±1/4" | CENTERLINE TO CENTERLINE OF HORIZONTAL EQUIPMENT SUPPORTS. |

## VERTICAL EQUIPMENT SUPPORT TOLERANCES

| EQUIPMENT DIAMETER | SUPPORT LOCATION BELOW BASELINE | SUPPORT LOCATION ABOVE BASELINE | SUPPORT OUT OF LEVEL ACROSS DIAMETER |
|---|---|---|---|
| 7'-0" AND UNDER | +0 -1/4" | -0 +1/4" | 1/8" |
| OVER 7'-0" TO 10'-0" | +0 -5/16" | -0 +5/16" | 3/16" |
| OVER 10'-0" TO 13'-0" | +0 -3/8" | -0 +3/8" | 1/4" |
| OVER 13'-0" TO 16'-0" | +0 -7/16" | -0 +7/16" | 5/16" |
| OVER 16'-0" | +0 -1/2" | -0 +1/2" | 3/8" |

## GENERAL FABRICATION TOLERANCES

| METAL EQUIPMENT: SHOP FABRICATED | METAL EQUIPMENT: FIELD ERECTED | FRP OR NON METAL EQUIPMENT | DESCRIPTION OF TOLERANCE |
|---|---|---|---|
| ±1/8" | ±1/8" | ±1/4" | FACE OF NOZZLE TO CENTERLINE OF EQUIPMENT. |
| ±1/4" | ±1/2" | ±1/4" | CENTERLINE OF NOZZLE TO BASELINE OR DATUM REFERENCE. |
| 1/2 | 1/2 | 1/2 | NOZZLE FLANGE FACE ALIGNMENT, CENTERLINE TO EDGE, IN DEGREES RISE. |
| ±1/8" | ±1/8" | ±1/4" | PLAN LOCATION OF NOZZLES OR SUPPORT LUGS FROM EQUIP. CENTERLINE OR DATUM REFERENCE. |
| ±1/4" OR 1/64"/FT. 3/4" MAXIMUM | ±1/4" OR 1/64"/FT. 3/4" MAXIMUM | ±1/4" UP TO 60" ±3/8" OVER 60" | HEIGHT OF NOZZLE, FROM BASELINE TO FACE OF TOP NOZZLE. (SET NOZZLE LAST TO HOLD TOLERANCE AND ALIGNMENT TO A MINIMUM). |
| ±1/4" | ±1/4" | ±1/4" | FACE OF BOTTOM NOZZLE TO BASELINE OR DATUM REFERENCE. |

## DRAWINGS AND REVISIONS

| No. | DATE | DESCRIPTION | NAME BY | INITIALS CHKD. | INITIALS APPD. |
|---|---|---|---|---|---|
| 0 | | ORIGINAL DRAWING | | | |
| 1 | 2/18/94 | REVISED PER APPROVAL PRINT | J.G.W. | | |

## REFERENCE DRAWINGS OR SPECIFICATIONS

| DOCUMENT No. | TITLE |
|---|---|
| KOCH DWG. NO. 39160-E-01 | ARRANGEMENT OF INTERNALS IN 3'-11 1/2" ID DMAC SCRUBBER |

VESSEL — MILES Inc. PITTSBURG, PA — NATIONAL BOARD No. N/A

EQUIP. MFR.: WARD TANK CORPORATION — MFR. S/N: W-2427
MILES P.O. No.: 1542-0741 — P.O. ORDER DATE: 12 24 93 — YEAR BUILT: 1994
MILES ASSET No.: 0020200200
MILES INSP. STAMP:

| | ORIG. NOM. THKS. | MIN. ALLOW. THKS. |
|---|---|---|
| SHELL | 1/4" | |
| TOP HEAD | 1/4" | |
| BTM. HEAD | 1/4" | |

| MAX. DESIGN (PSI & °F.) | VESSEL PRESS. | VESSEL TEMP. | JACKET/COIL PRESS. | JACKET/COIL TEMP. |
|---|---|---|---|---|
| | F.V. & 14.5 | 392° | | |

MAT'L'S OF CONST.: T316L SS
TOTAL CAPACITY:
SPECIAL NOTES:
INS. Co.:

PROJECT NO. 32460 LOCKWOOD GREENE ENGINEERS RECEIVED MAR 4 1994
FILE NO. KCK 1542-741-05

MILES

# DMAC SCRUBBER

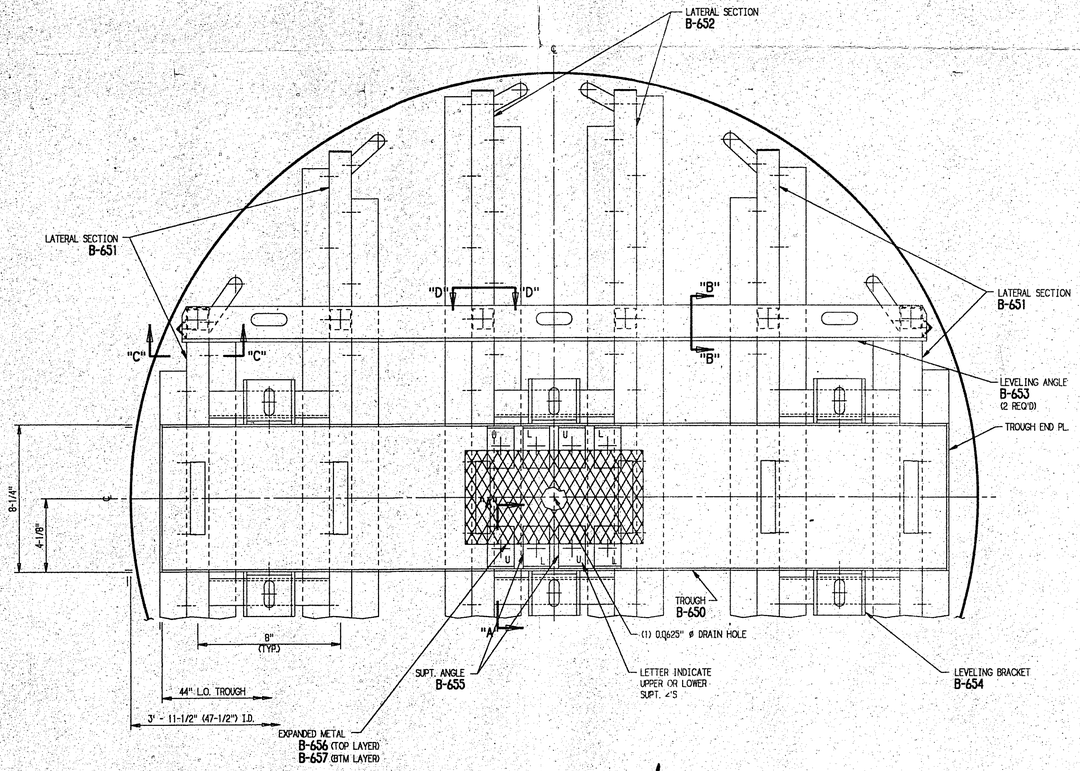
PROJ. LOC. BUSHY PARK, S.C. | PROJ. No. 456 | AREA 230
SCALE AS SHOWN | D 83-230-M521-A | REV. 1

WARD TANK DWG. NO. 93-W-2427 REV. 1
SHEET 1 OF 2

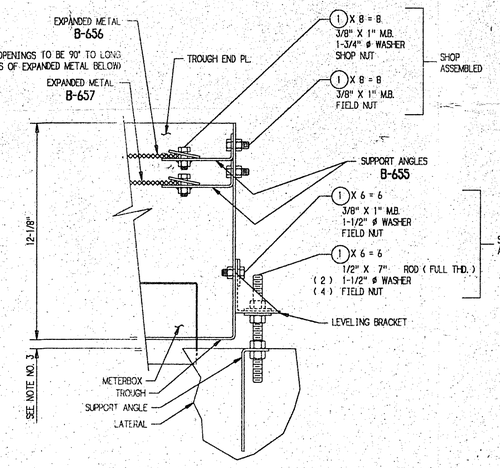
VESSEL FORM



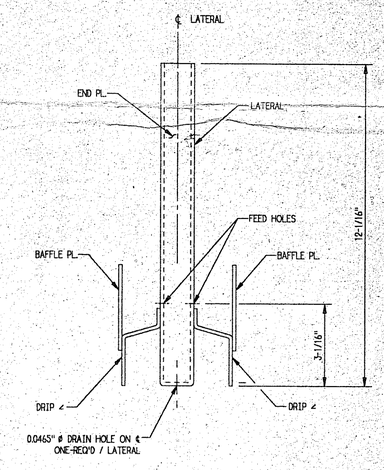
#102544



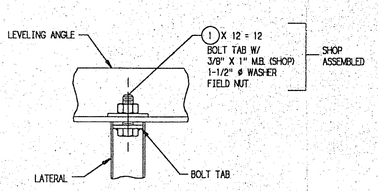

PARTIAL PLAN OF TROUGH DISTRIBUTOR
ONE REQ'D MK'D "B" W/ (118) 0.0625" ø FEED HOLES



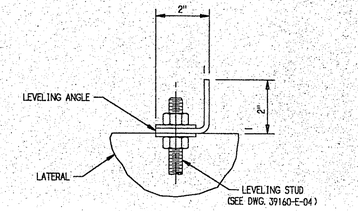

SECTION "A-A"



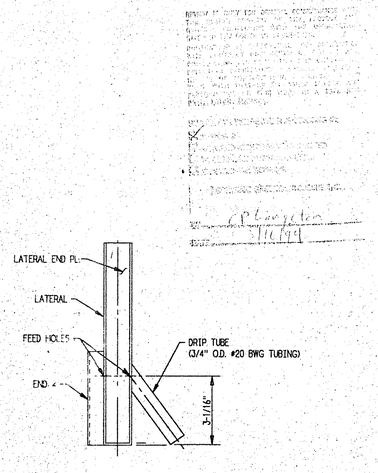

TYPICAL LATERAL DETAIL




SECTION "D-D"
(TYP. @ EACH LEVELING ANGLE & LATERAL INTERSECTION)




SECTION "B-B"




SECTION "C-C"

DUE TO THE CUSTOMER SPECIFIED MINIMUM FEED HOLE DIAMETER, KOCH RECOMMENDS A MINIMUM LIQUID RATE OF 2 GPM.

KOCH SHOP NOTE:

1. ALL FEED HOLES TO BE DEBURRED.
2. DISTRIBUTOR TO BE SHOP ASSEMBLED WITH ITS MATING DISTRIBUTOR SUPPORT GRID (DWG. # 39160-E-04) AND SHIPPED ASSEMBLED.

NOTES:

1. ALL PARTS MUST PASS THRU 23" I.D. MANWAY.
2. ALL DISTRIBUTOR PARTS AND HARDWARE BY KOCH.
3. DISTRIBUTOR TROUGH AND LATERALS TO BE INSTALLED LEVEL TO WITHIN 1/8" FROM HIGH POINT TO LOW POINT. THE DISTRIBUTOR TROUGH IS TO BE INSTALLED WITH A 1/2-INCH MINIMUM CLEARANCE ABOVE THE HIGHEST LATERAL AND THE METER BOX EXTENSIONS ARE TO BE PLACED WITHIN ALL LATERALS.

MATERIAL:

| | |
|---|---|
| TROUGH | 316L (12 GA.) |
| TROUGH END PL. | 316L (12 GA.) |
| METERBOX | 316L (14 GA.) |
| LATERALS | 316L (14 GA.) |
| LATERAL END PL. | 316L (14 GA.) |
| BAFFLE PL. | 316L (14 GA.) |
| DRIP ∠ | 316L (14 GA.) |
| BOLT TABS | 316L (12 GA.) |
| END ∠ | 316L (14 GA.) |
| SUPT ∠ | 316L (12 GA.) |
| DRIP TUBES | 316L |
| LEVELING BRACKET ∠ | 316L (7 GA.) |
| LEVELING BRACKET GUSSET | 316L (7 GA.) |
| LEVELING ∠ | 316L (7 GA.) |
| EXPANDED METAL | 316 (1/2" #13) |
| BOLTS & NUTS | 316L |
| WASHERS | 316L |

REF. DWG'S.:

| | |
|---|---|
| ARRANGEMENT OF INTERNALS | 39160-E-01 |
| ASSEMBLY OF DISTRIBUTOR SUPPORT GRID | 39160-E-04 |

THE DISTRIBUTOR FEED HOLE SIZE IS SHOWN IN THE PLAN. THE CUSTOMER SHOULD TAKE CORRECTIVE ACTION TO ELIMINATE SOLIDS ACCUMULATION IN THE PROCESS. INTERNAL FILTER SCREENS HAVE NOT BEEN INCLUDED. PARALLEL FILTERS ARE RECOMMENDED IN EXTERNAL FEED/REFLUX LINES TO PROTECT AGAINST DISTRIBUTOR BLOCKAGE. KOCH SUGGESTS THAT 0.012-INCH MAXIMUM OPENINGS BE USED FOR FILTER MESH, BUT ASSUMES NO RESPONSIBILITY FOR RECOMMENDING OR DESIGNING FILTERS. SHOULD SOLIDS ACCUMULATION IMPAIR THE PERFORMANCE OF THE DISTRIBUTOR(S), KOCH'S PERFORMANCE WARRANTY WILL BE VOIDED. REFER TO KOCH'S TERMS AND CONDITIONS CONCERNING RESPONSIBILITY FOR PROCESS CLEANLINESS.

PROJECT NO. 39460
LOCKWOOD GREENE ENGINEERS
RECEIVED
MAR 4 1994
FILE NO. 1542-741-04
ACK

| MARK | BY | CKD. | DATE | DESCRIPTION |
|---|---|---|---|---|
| A | BLE | DBP | 2-28-94 | REV'D. EXPANDED METAL TYPE FROM 316L TO 316 |

REVISIONS

ASSEMBLY OF TROUGH DISTRIBUTOR
IN 3' - 11-1/2" I.D. DMAC SCRUBBER
(ABOVE BED)

SUITT CONSTRUCTION CO.
GOOSE CREEK, SC

MILES INC.
GOOSE CREEK, SC

PC. MK. "B"
KOCH ITEM NO. 02
ISSUE DATE
FOR APPROVAL 2/7/94
APPROVED FOR CONSTRUCTION 3/1/94
BY DBP
CERTIFIED 3/1/94
BY DBP

SHOP NO. REF. ICAD
CUSTOMER ORDER NO. 1542-0741
REQ. NO.

SCALE 1/4 | DATE
DR. DDD | 1-28-94
CKD. MLW | 2-3-94
APP. [illegible] | 3/1/94

KOCH. ENGINEERING COMPANY INC.
WICHITA, KANS. 67208 316/832-5110
WORLD LEADER IN MASS TRANSFER EQUIPMENT

CONT. NO. NS39160-00
DRAWING NO. 39160-E-03
REV. A

#102544