# DESIGN DATA

| | | | |
|---|---|---|---|
| CODE OF CONSTRUCTION | ASME SEC. VIII DIV–1 1998 EDITION 1999–ADDENDA TEMA CL–R 1999 EDITION | | |
| | UNIT | SHELLSIDE | TUBE SIDE |
| DESIGN PRESSURE SEE NOTE -27 (1) | Psig | 2371.02 | 2905.82 |
| | $Kg/Cm^2g$ | 166.7 | 204.3 |
| DESIGN TEMPERATURE | °F | 649.4 | 649.4 |
| | °C | 343 | 343 |
| TEST PRESSURE (HYDRO) (SEE NOTE -28) (1) | Psig | (2)3269.5 | (2)3777.5 |
| | $Kg/Cm^2g$ | (2) 229.87 | (2)265.59 |
| MIN. HYDRO TEST TEMPERATURE | °F | 60.8 | 60.8 |
| | °C | 16 | 16 |
| OPERATING PRESSURE (IN / OUT) (3) | Psig | 2261.50/2228.79 | 2641.26/2611.39 |
| | $Kg/Cm^2g$ | 159/156.7 | 185.7/183.6 |
| OPERATING TEMPERATURE (IN / OUT) | °F | 415.4/372.2 | 201.2/365 |
| | °C | 213/189 | 94/185 |
| CORRN. ALLOWANCE | in/mm | (SEE NOTE- 29) | |
| MAWP (AT DESIGN TEMP.) (2) | 166.93 $Kg/Cm^2g$ AT 343°C SHELL SIDE | | |
| | 204.3 $Kg/Cm^2g$ AT 343°C TUBE SIDE | | |
| MAWP (AT AMBIENT TEMP.) (2) | 176.82 $Kg/Cm^2g$ AT 16°C SHELL SIDE | | |
| (2) | 204.3 $Kg/Cm^2g$ AT 16°C TUBE SIDE | | |
| MDMT | 0°C AT (2)166.93 $Kg/Cm^2g$ SHELL SIDE | | |
| | 0°C AT 204.3 $Kg/Cm^2g$ TUBE SIDE | | |
| INSIDE DIAMETER | in/mm | 37.13/943 | |
| No. OF PASSES | Nos. | ONE (3) | FOUR (3) |
| FLUID CIRCULATED | | REACTOR EFFL. | MU H2/GAS MIX |
| INSULATION | mm | (2) 85 | (2) 60 |

| | SHELL | CHANNEL |
|---|---|---|
| PWHT | YES | YES |
| RADIOGRAPHY | 100% (1) | 100% (1) |
| JOINT EFFICIENCY | 1.0 (1) | 1.0 (1) |
| INSPECTION BY | ENGINEERS INDIA LTD. | |
| POSITION | HORIZONTAL | TYPE: DEU |
| DUTY | MM Kcal/hr | 6.6 |
| EARTHQUAKE SPECIFICATION | | IS 1893 |
| WIND LOAD | | IS 875 PART–3 (3) |
| ADDITIONAL LOADING AS PER UG-22 | | NOZZLE LOAD (3) |
| CODE STAMPING REQUIRED | | NO |
| (1) | | |

## MECHANICAL DATA OF EXCHANGER

| | | | |
|---|---|---|---|
| EFFECTIVE SURFACE AREA | $m^2$ | (2) 167.8 | |
| EMPTY WEIGHT | Kg. | 22920(2) | |
| TUBE BUNDLE WEIGHT | Kg. | 5210(2) | |
| HYDRO TEST WEIGHT | Kg. | 26720(2) | |
| OPERATING WEIGHT | Kg. | 25560(2) | |
| No. OF 'U' TUBES | 359 | PITCH | 25.4 |
| OUTER DIA. | 19.05 | LAYOUT | RT. SQUARE |
| THK. (Min.) | 2.77 | | |
| TUBE EFF. LENGTH | 3905 | (2) | |

| NOZZ. No. | SERVICE | SIZE | SCH | THK | CLASS | TYPE | FACE | REMARK |
|---|---|---|---|---|---|---|---|---|
| | | | NOZZLE SCHEDULE | | ASME B16.5 FLANGES | | | |
| T2 | CHANNEL OUTLET | 8" | FORG. | 20.62 | – | – | BW | |
| T1 | CHANNEL INLET | 8" | FORG. | 20.62 | – | – | BW | |
| S2 | SHELL OUTLET | 16" | FORG. | 36.53 | – | – | BW | |
| S1 | SHELL INLET | 16" | FORG. | 40.49 | – | – | BW | |

(1) NOZZLE SCHEDULE

DRAWING CERTIFIED BY
Harry R. Bishop 02/17/03
HARRY R. BISHOP
CHIEF DESIGN ENGINEER

(4) **"AS BUILT DWG"**

| REV. | DATE | DESCRIPTION | DRWN | CHKD | APPD |
|---|---|---|---|---|---|
| 4 | 02/17/03 | AS BUILT DIMENSIONS ARE SHOWN IN BKT (–) & OTHER REVISED AS MKD.(4) THUS | DMF | WB | HRB |
| 3 | 04/19/02 | DWG IS REVISED AS MKD.(3) THUS | DMF | WB | HRB |
| 2 | 04/03/02 | DWG IS REVISED AS MKD.(2) THUS | DMF | WB | HRB |
| 1 | 03/13/02 | DWG IS REVISED AS MKD.(1) THUS | DMF | WB | HRB |
| 0 | 2/05/02 | SUBMITTAL FOR APPROVAL | DMF | WB | HRB |

PROJECT NAME : **CPCL REFINERY- III PROJECT**

MANUFACTURER : TEMA INDIA LTD
Factory: Achhad Village, Dist. Thane, & Kherdi, Silvassa Gram: CODEDVESEL Mumbai 88.

ENGINEERING : Struthers — **STRUTHERS INDUSTRIES, INC. GULFPORT, MISSISSIPPI**

CONSULTANT : **ENGINEERS INDIA LIMITED**

CLIENT : **CHENNAI PETROLEUM CORPORATION LIMITED**

TITLE : **DESIGN DATA & NOZZLE SCHEDULE FOR REACTOR EFFLUENT / RECYCLE GAS**

**EQPT. NO. 207-E7**

| | | | | |
|---|---|---|---|---|
| JOB NO. | SII | 3-02-04-41206E | P/O No. | 1027/PO/2138/4814 |
| | TEMA | T/E/02520 | | |
| SCALE | NTS | DWG. No. or Doc No. | VP-1027-E7-02520 | SHT. NO. 1 OF 19 |
| | | | | Rev. 1 2 3 4 |