

THIS DOCUMENT OR DRAWING DEVELOPED BY TECHNIP INDIA LTD. IS THE PROPERTY OF INDIAN OIL CORPORATION LTD. AND SHALL NOT, UNDER ANY CIRCUMSTANCES, BE TOTALLY OR PARTIALLY, DIRECTLY OR INDIRECTLY, TRANSFERRED, REPRODUCED, COPIED, DISCLOSED OR USED WITHOUT INDIAN OIL CORPORATION LTD. PRIOR WRITTEN CONSENT.

A			B			C			D			E			F			G			H			I		
GENERAL NOTES–STRUCTURAL STEEL																										
UNLESS NOTED OTHERWISE:–																										
(A) GENERAL: –																										
1. THIS DOCUMENT COVERS THE GENERAL NOTES & ABBREVIATIONS USED IN STRUCTURAL DRAWINGS FOR STANDBY SRU & ADDITIONAL TANKS PROJECT AT PARADIP REFINERY OF IOCL. THIS DOCUMENT SHALL BE READ IN CONJUNCTION WITH ALL DRAWINGS ISSUED FOR CONSTRUCTION. IN CASE OF CONFLICT BETWEEN THIS DOCUMENT & THE IFC DRAWINGS, THE LATER SHALL GOVERN.																										
2. DRAWINGS SHALL NOT BE SCALED, ONLY DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE FOLLOWED.																										
3. THE DETAILS OF STAIRCASE, LADDER, HANDRAIL, LACING, GRATING AND CHEQUERED PLATE FLOORING SHALL BE AS PER CONSTRUCTION STANDARD FOR STEEL : 080557C–000–LD–1890–001.																										
4. ALL STEEL WORKS SHALL BE IN ACCORDANCE WITH SPECIFICATION NOS. 080557C–000–JSS–1800–001																										
5. ALL WELDING SHALL CONFORM TO IS:816, IS:819, IS:1024, IS:1261, IS:1323, IS:9595 AS APPROPRIATE.																										
6. ALL FABRICATION SHALL BE AS PER IS:800–2007 & IS:816.																										
7. ALL WORK, INSPECTION & MATERIAL SHALL CONFORM TO RELEVANT STANDARD SPECIFICATION & CODES.																										
8. ALL DIMENSIONS AND LEVELS SHALL BE PHYSICALLY VERIFIED AT SITE, ANY DISCREPANCY SHALL BE REPORTED TO ENGINEER–IN–CHARGE / DESIGN OFFICE PRIOR TO EXECUTION.																										
9. THE HANDRAIL APPROACH TO AND FROM EXIT AREAS SHALL BE SMOOTH AND CONTINUOUS KNEE RAILS AND KICK PLATE SHALL ALSO BE CONTINUOUS WITH THOSE OF ADJACENT WALKWAYS, PLATFORMS AND STAIRS.																										
(B) MATERIALS & FABRICATION: –																										
1. STRUCTURAL STEEL SHALL BE OF GRADE E250 (FE410W) BO/BR & STEEL TUBES MATERIAL SHALL BE AS PER IS:1161. FOR UNIVERSAL COLUMNS/BEAMS : BSEN 10025 S275JR/S275JO/S355JO.																										
2. UNLESS NOTED OTHERWISE, ALL CONNECTION SHALL BE SHOP WELDED & SITE BOLTED. ALL CONNECTION SHALL BE DESIGNED AS PER IS:800–2007																										
3. ALL WELDING SHALL BE DONE AS PER SPECIFICATIONS USING ELECTRODES OF APPROVED MANUFACTURER & CONFORMING TO IS:814 & IS:7280. ALL OTHER CONSUMABLE SHALL BE AS PER SPECIFICATIONS.																										
4. UNLESS SHOWN OTHERWISE ON DRAWINGS, ALL SHOP WELDS SHALL BE MINIMUM 6 mm THICK CONTINUOUS FILLET WELDS AND ALL FIELD WELDS SHALL BE MINIMUM 8 mm THICK CONTINUOUS FILLET WELD.																										
5. ALL BATTENS/LACINGS/BOX SECTIONS SHALL HAVE CONTINUOUS WELDING UNLESS SHOWN OTHERWISE ON IFC DRAWINGS. STITCH WELDING WILL NOT BE PERMITTED WITHOUT PRIOR APPROVAL OF ENGINEER–IN–CHARGE																										
6. ALL BOLTS HOLES SHALL BE DRILLED.																										
7. ALL BOLTS HOLES SHALL BE 2 mm LARGER THAN THE BOLT DIAMETER FOR BOLTS UPTO 24 mm DIA. & 3 mm LARGER THAN THE BOLT DIAMETER FOR BOLTS ABOVE 24 mm DIA. FOR STEEL–TO–STEEL CONNECTIONS, UNLESS NOTED OTHERWISE. SIZE OF THE BOLT HOLE FOR OVER SIZE & SLOTTED HOLES SHALL BE AS PER TABLE 19 IS:800–2007.																										
8. FOR ANCHOR BOLTS, THE DIAMETER OF HOLES IN THE BASE PLATES SHALL BE 2 mm LARGER THAN THE BOLT DIAMETER UPTO AND INCLUDING 24 mm DIAMETER BOLTS, & 3 mm LARGER FOR BOLTS ABOVE 24 mm DIAMETER.																										
9. CONNECTION BOLTS: –																										
(i) ORDINARY BOLTS (GRADE 4.6) SHALL BE OF 16mm DIAMETER (MAXIMUM) & MINIMUM 2 NOS. OF 16 mm DIAMETER TO BE USED FOR ERECTION PURPOSE.																										
(ii) FOR SHEAR & MOMENT CONNECTIONS, HIGH STRENGTH BOLTS OF GRADE 8.8 & 10.9 CONFORMING TO IS:3757 & IS:1367 SHALL BE USED, UNLESS NOTED OTHERWISE.																										
(iii) HIGH TENSILE BOLTS SHALL BE 20mm DIAMETER (MINIMUM).																										
(iv) ALL MAIN BOLTED CONNECTIONS SHALL BE PROVIDED WITH MINIMUM OF 2 NUMBERS OF 20mm DIAMETER BOLTS.																										
(v) ALL HIGH STRENGTH NUTS AND WASHER SHALL CONFORM TO IS:6623 & IS:6649.																										
(vi) ALL BOLTS OF GRADE 10.9 & BOLTS OF SEISMIC RESISTING FRAMES SHALL BE PRETENSIONED AS SPECIFIED IN IS:4000. ALL OTHER BOLTS CAN BE SNUG TIGHT. STEEL LAYOUT AND SHOP ERECTION DRAWING SHOULD CLEARLY SHOW THE BOLTS WHICH NEED TO BE PRETENSIONED.																										
(vii) ALL BOLTS OF GRADE 4.6 & 8.8 WITH CORRESPONDING NUTS & WASHERS SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH IS:1367 (PART 13) NUT SHALL BE HEXAGONAL HEADED.																										
10. ALL END PLATES, STIFFENERS AND CLEATS FOR THE BOLTED AND WELDED CONNECTIONS SHALL BE MINIMUM 8 mm THICK UNLESS NOTED OTHERWISE. MINIMUM GUSSET PLATE THICKNESS FOR TRUSSES & GIRDERS IS 8 MM FOR SPAN UPTO & INCLUDING 12 M ABOVE WHICH THICKNESS IS 10 mm.																										
11. SPACER PLATES BETWEEN B/B ANGLE SECTIONS OR STAR ANGLE SECTIONS SHALL BE OF THE SAME THICKNESS AS THE GUSSET PLATES.																										
12. THE PAINT SHALL BE REMOVED FOR A DISTANCE OF 50 mm ON EITHER SIDE OF THE JOINT BEFORE ANY WELDING IS CARRIED OUT. THE WELDED AREA SHALL BE THOROUGHLY CLEANED BEFORE TOUCH UP.																										
13. STEEL WORK REQUIRING FIRE PROOFING AND STEEL ENCASED IN CONCRETE OR MASONRY SHALL NOT BE PAINTED. FIREPROOFING SHALL BE DONE AS PER FIREPROOFING SPECIFICATION NO : 080557C–000–JSS–1800–003, AND PAINTED AS PER SPECIFICATION FOR PAINTING OF STEEL STRUCTURES : 080557C–000–JSD–2300–001, ALL STRUCTURAL MEMBERS INDICATED WITH FP IN DESIGN DRAWING SHALL BE FIRE PROOFED.																										
14. GRATINGS SHALL BE 25mm THICK AS PER SPECIFICATION NO. 080557C–000–JSS–1800–002.																										
15. STRUCTURAL CONNECTIONS SHALL BE CONCENTRIC EXCEPT AS FOLLOWS:–																										
(i) BOLTED ANGLE BRACING USE BOLT GAUGE LINE OR CENTER LINE OF BOLT GROUP																										
(ii) CHANNELS USE BACK OF CHANNEL																										
ALL CLEATS AND GUSSETS FOR VERTICAL BRACING SHALL BE POSITIONED CENTRAL ON THE MEMBER CENTER LINES UNLESS NOTED OTHERWISE.																										
16. ALL HOLLOW SECTIONS AND TUBES SHALL BE FULLY SEALED AT THE END WITH 6 mm PLATES WELDED ALL ROUND, UNLESS NOTED OTHERWISE ON THE DESIGN DRAWINGS.																										
17. STEEL STAIRS, LADDERS & HAND RAILS SHALL BE AS PER STANDARD DRAWINGS. ALL HANDRAIL WELD AND EXPOSED CUT EDGES AND CORNERS SHALL BE ROUNDED AND GROUND SMOOTH.																										
18. DIMENSIONS OF DIAGONAL MEMBERS & GUSSETS SHALL BE CONFIRMED BY SHOP LAYOUT BEFORE TAKING UP FABRICATION.																										
19. BEVEL WASHERS SHALL BE USED TO PROVIDE PROPER BOLTING CONNECTIONS FOR EQUIPMENTS & MONORAIL SUPPORTS.																										
20. COLUMN CAP PLATE SHALL BE MILLED TO ENSURE PROPER CONTACT BEARING SURFACE BETWEEN PLATES.																										
21. ALL GRATING (ELECTRO FORCED TYPE) PANELS, CHEQUERED PLATES, STAIR TREADS SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH IS:4759. THE MINIMUM THICKNESS OF GALVANIZING SHALL BE 120 MICRON.																										
22. (i) THE WIDTH OF GAP BETWEEN THE ENDS OF MEMBERS CONNECTED BY BOLTS SHALL BE MAXIMUM 1.5 mm FOR DEPTH OF SECTIONS UPTO 1000 mm.																										
(ii) THE PERMISSIBLE TOLERANCE ON THE LENGTH OF INDIVIDUAL COMPONENTS SHALL BE ± 3 mm FOR UPTO & INCLUDING 12 M LENGTH & ± 0.00025 L SUBJECT TO MAXIMUM OF ± 5 mm FOR OVER 12 M LENGTH MEMBER, HERE 'L' IS THE LENGTH OF MEMBER.																										
(iii) THE PERMISSIBLE DEVIATION OF THE AXES OF THE MEMBERS MEETING AT A JOINT FROM THEORETIC NODAL POINTS SHALL NOT BE GREATER THAN ±3 mm.																										
(iv) THE ERECTION CLEARANCE FOR STRUCTURAL MEMBERS AT EACH END SHALL NOT BE GREATER THAN THE FOLLOWING : a) 2 mm FOR MEMBERS WITH END CLEATS OR PLATES. b) 3 mm FOR BEAMS WITHOUT WET CLEATS AND END PLATES.																										
23. ALL CHEQUERED PLATE SHALL BE 6mm THK. (ON PLAIN), UNLESS NOTED OTHERWISE.																										
24. CHEQUERED PLATE & GRATING SHALL HAVE A MINIMUM BEARING OF 30 mm AT EACH SUPPORTS.																										
25. CHEQUERED PLATE SHALL BE TACK WELDED TO FLOOR BEAM.																										
26. A 10mm DIA DRAINAGE HOLE SHALL BE PROVIDED FOR EVERY 1.5M OF FLOOR PLATE WITH A MINIMUM OF ONE HOLE PER PANEL, SHOWN OTHERWISE ON DESIGN DRAWING.																										
27. WORKING POINTS 'WP' FOR BRACINGS SHALL BE ON CENTERLINES OF BEAMS/COLUMNS, UNLESS NOTED OTHERWISE.																										
28. FOR PIPING AND OTHER PENETRATIONS THROUGH FLOORING, OPENINGS SMALLER THAN THAT LISTED IN THE FOLLOWING SHALL BE LOCATED AND CUT BY THE FIELD. 200 mm DIA. FOR CHEQUERED PLATE FLOORING, 300 mm DIA. FOR GRATING FLOORING. FIELD SHALL PROVIDE "GRATING PENETRATION COLLARS". WHEN FOR ANY REASON THE CLEAR SPACE BETWEEN THE PIPE / INSULATION AND THE EDGE OF FLOORING EXCEEDS 50 mm ON ANY SIDE, FIELD SHALL SUPPLY AND INSTALL A PENETRATION COVER PLATE IN ACCORDANCE WITH SPECIFICATION. IT MAY BE NECESSARY TO REMOVE TOE PLATE WHERE PROVIDED.																										
29. ALL BUTT WELDS SHALL BE FULL STRENGTH BUTT WELDS WITH REQUISITE EDGE PREPARATION FOR MEMBERS WITH THICKNESS MORE THAN 8 mm.																										
(C) DRAWING INTERPRETATION: –																										
1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS/ELEVATIONS IN METERS WITH REFERENCE TO THE HIGHEST POINT OF PAVEMENT (H.P.P.), CORRESPONDING TO RL AS INDICATED IN DRAWING.																										
2. PLATFORM ELEVATION IS DEFINED BY TOP OF STEEL(TOS) ELEVATION WHICH IS TO THE TOP OF BEAM (UNDERSIDE OF FLOORING) UNLESS OTHERWISE NOTED ON THE DESIGN DRAWING.																										
(D) ERECTION: –																										
1. PROPER SEATING CLEATS AND/OR ERECTION BOLTS SHALL BE PROVIDED WHEREVER FIELD WELDING IS ENVISAGED.																										
2. ADEQUATE TEMPORARY BRACINGS/SUPPORTS, AS APPROVED BY THE ENGINEER–IN–CHARGE, SHALL BE PROVIDED BY THE CONTRACTOR TO ENSURE SAFETY DURING ERECTION.																										
3. NO PART OF THE STRUCTURE SHALL BE USED FOR ERECTION PURPOSES WITHOUT PRIOR APPROVAL OF ENGINEER–IN–CHARGE.																										
4. MINOR HANDRAIL ADJUSTMENTS TO TOP RAIL, MID RAIL OR TOE PLATE AT LOCATIONS WHERE PIPING & SUPPORTS ARE REQUIRED SHALL BE MADE IN THE FIELD IF NECESSARY. HANDRAIL POST SHALL BE ADJUSTED OR ADDED FOR SUPPORTS AT DISCONTINUOUS RAIL THAT HAVE BEEN FIELD CUT.																										
SYMBOLS MARKED AS: –																										
MOMENT CONNECTION (MC)																										
SPANING DIRECTION																										
GRATING FLOOR																										
CHEQUERED PLATE																										
OPENING IN FLOOR																										
LEVEL MARK IN PLAN																										
LEVEL MARK IN ELEVATION																										
PERMANENT BOLTS																										
ERECTION BOLTS																										
HANDRAIL																										
TOE PLATE																										
WELDING SYMBOLS																										
INDICATION OF FIELD/SITE FILLET WELD																										
INDICATION OF SHOP FILLET WELD ON ARROW SIDE																										
ALL AROUND OF SHOP FILLET WELD OF (F.S) OTHER SIDE OF ARROW																										
ARROW SIDE & OTHER SIDE FILLET WELD																										
ALL AROUND OF SHOP FILLET WELD ON ARROW SIDE																										
ALL AROUND SITE FILLET ON ARROW SIDE																										
DOUBLE – V – BUTT WELD																										
ALL AROUND GRIND FINISH BEVEL WELD																										
FILLET WELD STAGGERED INTERMITTENT ON ARROW AND OTHER SIDE																										
ABBREVIATIONS																										
AB ANCHOR BOLT																										
@ AT THE RATE																										
BM BEAM																										
BCD BOLT CIRCLE DIAMETER																										
BKT BRACKET																										
BOS BOTTOM OF STEEL																										
B/B BACK TO BACK																										
B/S BOTH SIDES																										
BOB PLT BOTTOM OF BASE PLATE																										
BP BASE PLATE																										
CL CENTER LINE																										
CS CARBON STEEL																										
CLR CLEAR																										
COL COLUMN																										
c/c CENTER TO CENTER																										
CONN CONNECTION																										
CHQD PL CHEQUERED PLATE																										
DET DETAIL																										
DWG DRAWING																										
'd' OR 'dia' OR 'ø' DIAMETER																										
EL ELEVATION																										
EQ EQUAL																										
EF EACH FACE																										
FS FAR SIDE																										
(FP) FIRE PROOFING WITH TOP FLG EXPOSED																										
[FE] FULLY ENCASED FIRE PROOFING																										
FGL FINISHED GRADE LEVEL																										
FLG FLANGE																										
FFL FINISHED FLOOR LEVEL																										
F/F FACE TO FACE																										
FB FACE BAR																										
GALV GALVANIZED																										
HR HANDRAIL																										
HS HIGH STRENGTH																										
HOR HORIZONTAL																										
HPP HIGHEST PAVING POINT																										
ID INSIDE DIAMETER																										
IP INSERT PLATE																										
IL INVERT LEVEL																										
JT JOINT																										
LG LONG																										
LLH LONG LEG HORIZONTAL																										
LLV LONG LEG VERTICAL																										
L STRUCTURAL ANGLE																										
M METER																										
MC MOMENT CONNECTION																										
mm MILLIMETER																										
MS MILD STEEL																										
MKD MARKED																										
ML MATCH LINE																										
NB NOMINAL BORE																										
NS NEAR SIDE																										
NTS NOT TO SCALE																										
NF NEAR FACE																										
NGL NATURAL GROUND LEVEL																										
OD OUTER DIAMETER																										
PLT PLATE																										
PCD PITCH CIRCLE DIA																										
QTY QUANTITY																										
R RADIUS																										
REV REVISION OR REVISED																										
RL REDUCED LEVEL																										
SQ SQUARE																										
SS SLIDING SUPPORT																										
SCH SCHEDULE																										
STIFF STIFFENER																										
SUPP SUPPORT																										
STD STANDARD																										
STRUC STRUCTURE																										
SYM. SYMMETRICAL																										
THK THICK																										
TOP TOP OF PLATE																										
TOR TOP OF ROD																										
TOS TOP OF STEEL																										
TYP TYPICAL																										
TOG TOP OF GRATING																										
TOCHPLT TOP OF CHEQUERED PLATE																										
T&B TOP & BOTTOM																										
TM TEMPORARY MEMBER																										
U/S UNDER SIDE																										
UNO UNLESS NOTED OTHERWISE																										
VERT VERTICAL																										
WP WORKING POINT																										
REFERENCE DRAWING																										
TITLE																										
DRAWING NO.																										
ABBREVIATIONS, LEGENDS AND SYMBOLS FOR GENERAL CIVIL WORKS																										
080557C–000–STC–1490–001																										
GENERAL NOTES FOR CONCRETE WORKS																										
080557C–000–DW–1702–001																										
PROJECT																										
STANDBY SRU & ADDITIONAL TANKS																										
IOCL PARADIP REFINERY, ODISHA, INDIA																										
OWNER																										
IndianOil																										
INDIAN OIL CORPORATION LTD.																										
PMC																										
TechnipFMC																										
CONFIDENTIAL, NOT TO DISCLOSE WITHOUT AUTHORISATION																										
TITLE																										
GENERAL NOTES FOR STRUCTURAL STEEL WORKS																										
DRAWING NO.																										
PAGE																										
REV.																										
SCALE																										
080557C																										
000																										
DW																										
1802																										
001																										
1 OF 1																										
B																										
PROJECT																										
UNIT																										
DOC. TYPE																										
MAT. CODE																										
SER. NO.																										
H																										
I																										