TCE-7547A-H-	TATA CONSULTING ENGINEERS LIMITED	SHEET 1 OF 1
OST-300	Corrigendum No. 3	

SI.	Section	Sheet no.	Spec No.	Clause No.	Modification / New Clause
Mecl	nanical				
1	Section II	Sheet No 1,2 of 36 & 19,20, 21 of 36	TCE. 7547A-300-PP- 1101	2.7.1.Piping Material Specification	steam and steam condensate line flange type / facing mentioned as SORF shall be read as steam and steam condensate line flange type / facing mentioned as WNRF





SL. No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
1	Commercial	GCC	GCC	8.0	TAXES – works contract tax deduction	Please confirm the rate at which Company would deduct 'Works Contract tax' against each invoice before making the payments to Contractor in the following cases –  1. If Contractor opts for Works Contract Composition scheme  2. If works contract composition scheme is not opted for.	Bidders are requested to check individually applicability of taxes, duties, benefits available with their expert personnel and quote accordingly.
2	Commercial	GCC	GCC	8.0	TAXES –BOCW Cess	Please confirm that Building and Other Construction Workers Welfare Cess is not applicable for the Project.	Bidders are requested to check individually applicability of taxes, duties, benefits available with their expert personnel and quote accordingly.
3	Commercial	GCC	GCC	9.7	DEEMED EXPORT BENEFITS	Bidder or its suppliers may import intermediate supplies & components under Advance Authorisation (License), for further manufacturing and	The provisions will apply under para 8.2 of FTP applicable for E&P Companies in India like OIL for availing NIL





SL. No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
						incorporation in the finished product. Please confirm if Company can provide necessary Recommendatory Letter or Project Authority Certificate for the same.	Customs Duty read with Notification No.21/2002- Customs dated 013.2002 as amended from time to time. Therefore OIL will provide necessary Recommendatory Letter or Project Authority Certificate as applicable
4	Commercial	Proforma-I	PARENT COMPANY GUARANTEE - DEED OF GUARANTEE	4	Parent Company	In Clause 4 of the Parent Company Guarantee form, please delete the last sentence "This will, however, be in addition to the forfeiture of the Performance Guarantee furnished by the Subsidiary."  Since the limitation of liability clause at GCC 23.0 with the stated exclusions is applicable to Guarantor also, the referred sentence may please be deleted.	Not Acceptable. Bidder to comply the tender conditions without any deviation.





CT	Trues of	Document	Document	Clause			
SL. No	Type of Query	No	Name	/Note No	Subject	Bidders Query	Company Response
110	Query	110	Tunic	Trote Ito			
5	Commercial	Proforma-E	FORM OF PERFORMAN CE BANK GUARANTEE	-	Bank's wording	Kindly note that Banks usually add their regulatory wording at the end of the Bank Guarantee. A sample of the standard wording is reproduced below for reference – "Notwithstanding anything contained herein above:  1. Our liability under this bank guarantee shall not exceed (guarantee value)  2. This bank guarantee shall be valid only upto (date of expiry)  3. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if we receive a written claim or demand on or before (expiry date)."	Not Acceptable. Bidder to comply the tender formats without any deviation.
6	Commercial	Proforma-	FORM OF BID SECURITY (BANK GUARANTEE)	-	Bank's wording	1, Kindly note that Banks usually add their regulatory wording at the end of the Bank Guarantee. (please refer to earlier query for	Not Acceptable. Bidder to comply the tender formats without any deviation.





SL. No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
						bank's standard wording)	
						2, In the 3 <sup>rd</sup> para beginning with "We undertake to", please delete the words "/fax/cable". Banks take objection to mode of communication other than letter, as the authenticity of a fax or cable cannot be ascertained.	
	Commercial	Forwarding Letter of IFB	Forwarding Letter of IFB	2, xvii	Duration of the Contract:	Bidder requests for clarity on OIL's requirement for 3 months trial run –  a) Is Mechanical Completion as defined under SPEC. NO.	(a) Refer clause no. 2.5 of GCC for the same which is self explanatory.
7		GCC	GCC	1.0, x	Completion of the Project	TCE.M4-912 to be achieved by end of 21 months? If yes, then pre-commissioning activities will be carried out after 21 months in the 3 month period leading to trial run. Please confirm if our understanding is correct.	





SL. No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
						b) Is there a specific requirement of minimum hours of operation for the 3 month trial run. How will interruptions be handled and counted. Please clarify.  c) As per SPEC. NO. TCE. M4-915 for Performance Tests, the plant and equipment shall be continuously operated at full	(b) Bidder to comply as per tender document  (c) 3 months of PGTR trial run should include full load continuous operation for at least seventy-two
						load for at least seventy-two (72) hours to prove its performance. Kindly confirm when will this Performance Guarantee Test Run (PGTR) be conducted? Will it be at the end of 3 month period?  Kindly confirm on the above for preparing our project schedule and resource loading?	(72) hours.





SL. No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
8						Total price shown in the cost break up –Annexure A , shall be equal to Sl. 5 of Schedule of Prices Form SP0. (Total EPC amount quoted in Schedule of Rates).  Total price in Form SP0 is the sum total of all prices for (1) Supply (2) Engineering (3) Services & (4) Service tax while cost break up statement (Annexure-A) does not have any provision for Design & Engineering & Service tax.  Please clarify.	Design & Engineering cost should be included in the cost of respective equipment / item specified in the cost break up format. i.e Column no. 04 (Four of present format). The cost should be EXCLUSIVE of service tax.





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SL.No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
CIVIL	& STRUCT	URE					
1			TCE 7547A-300-PP-1000	Tag No 112	ETP	For Effluent treatment plant of TCE 7547A-300-PP-1000 with Tag No 112, Please provide the Equipment layout/GA for Effluent treatment plant	Area Allocated for ETP in the Plot plan. Design, Engineering, development of Equipment Layout shall be carried out by successful bidder.
2			TCE 7547A-300-PP-1000	Tag No 106	Cooling Tower Package	For Cooling tower + Heat Ex-changer in document no. TCE 7547A- 300-PP-1000 with Tag No 106, Please provide the Equipment layout/GA for Cooling tower + Heat Ex-changer.	Cooling tower Capacity is made available in the tender document, Process Datasheets of Plate type Heat Exchangers made available in Tender document. Further detailing shall be done successful Bidder.
3			TCE 7547A-300-PP-1000	Tag No 124	Guard Pond	For Guard Pond for document No. TCE 7547A-300-PP-1000 with Tag No 124, Please provide the Equipment layout/GA for Guard pond and provide the height of pond/capacity of the tank.	Capacity of Guard pond shall be 3200 m3 as mentioned in Section 5.1 (Scope of Civil, Structural and Architectural works) of the tender document.
4					FGL	For Site grading, As per tender documents finished grade level (FGL) is EL+120.00 and High flood level (HFL) is EL+119.10. In general practice FGL has fixed by minimum 500mm above HFL. Hence we propose that FGL for the site will be EL+119.60 and its lead to minimize the height of earth filling for the site grading and depth of foundation. Also note that top 200mm soil shall be stripped as per geo investigation report. Please confirm.	FGL is decided based on the storm water disposal philosophy. Bidder to follow the tender document. Top soil stripping of 200 mm is confirmed.
5			TCE.7547A-HOST-300	Technical specification for civil and Structural works	Future tanks	Bidder understands foundations for future tanks and dyke wall around future tanks are not included in contractor scope. Request company to confirm	
6			TCE.7547A-HOST-300	Technical specification for civil and Structural works	Kerb wall	Bidder understands 600mm high masonry kerb walls to be provided around effluent water tanks, Company to confirm	Bidder Understanding is correct.
7			TCE.7547A-HOST-300	Engineering & Architectural Design Basis Report	Anti-termite treatment	As per Clause 9.11 of design basis report bidder understands Anti termite treatment shall be provided only for the Admin and Canteen Building and not required for other structures like dyke wall, ring wall etc.,	Bidder Understanding is correct
8						For designing the Civil foundation for different MS storage tanks we require Seismic moment & shear, and Wind movement and shear at the base of the tank.	





SL.No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
PIPIN	, ,						
1			TCE-5873A-590-PI-003-PO		Fuel Air & Fuel Gas System	P&ids line size and piping specification not shown. Please provide the details	Indicative Line sizes are shown in tender P&ID.(TCE.7547A-615-PI-1105). Actual Line size shall be arrived by successful bidder during detail engineering based on steam consumption to each distribution area.  Refer Piping material specificaiton for piping specification.
2			TCE-7547A-615-PI-1106		Steam Generation System	P&ids line size and piping specification not shown. Please provide the details	Indicative Line sizes are shown in tender P&ID.(TCE.7547A-615-PI-1105). Actual Line size shall be arrived by successful bidder during detail engineering based on steam consumption to each distribution area.  Refer Piping material specification for piping specification.
3			TCE-7547A-300-PI-8037		Oily Water Package	P&ids line size and piping specification not shown. Please provide the details	Refer Piping Material Specification for Piping specification. Line sizes shall be arrived by successful Bidder based on the philosophy & design followed for development of OWS network by successful Bidder.
4			TCE-7547A-300-PI-8033		Effluent Treatment Plant	P&ids line size and piping specification not shown. Please provide the details	Refer Piping Material Specification for Piping specification. Line sizes shall be arrived by successful Bidder with the help of ETP package vendor (being package item).
5			TCE-7547A-300-PI-8034		Effluent Treatment Plant	P&ids line size and piping specification not shown. Please provide the details	Refer reply to point no. 4 above
6			TCE-7547A-300-PI-8035		Chemical/Additives Dosing System	P&ids line size and piping specification not shown. Please provide the details	Refer Piping Material Specification for Piping specification. Line sizes shall be arrived by successful Bidder with the help of Additive dosing package vendor (being package item).
7			TCE-7547A-300-PI-8036		Flare Distribution System	P&ids line size and piping specification not shown. Please provide the details	Refer Piping Material Specification for Piping specification. Line sizes shall be arrived by successful Bidder based on the Fuel Gas (Natural Gas) flaring requirement values from respective vendor.
8			TCE-7547A-300-PI-8038		Sludge Treatment Plant	P&ids line size and piping specification not shown. Please provide the details	Refer Piping Material Specification for Piping specification. Line sizes shall be arrived by successful Bidder with the help of Sludge Treatment package vendor (being package item).





SL.No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
9	Type of Query		TCE-7547A-300-PI-8039		Ultrafiltration System),	P&ids line size and piping specification not shown. Please provide the details	Refer Piping Material Specification for Piping specification. Line sizes shall be arrived by successful Bidder with the help of ETP package vendor (being package item).
10			TCE-7547A-300-PI-8041		Sewage Treatment Plant	P&ids line size and piping specification not shown. Please provide the details	Piping specifications shall be developed by successful Bidder / Sewage Treatment Plant vendor & line sizes also shall be calculated by successful Bidder / Sewage Treatment Plant vendor being package item.
MECH	IANICAL & F	PROCESS	8				
1					General	Please clarify whether vendor scope are to be considered for taking Manual valve summary	Yes,Manual Valve summary under vendors scope.Successful bidder to do the details During Detail Engineering.
2					HVAC	HVAC layout (to determine the size of rooms requiring ACV).	Rooms / Building requiring HVAC are provided in sec 2.8.1.All the building layouts are enclosed along with the tender specification.Successful bidder to provide the HVAC details during detail engineering.
3					Demulsifier Dosing System	· ·	Shall be developed by successful Bidder / Additive dosing package (being package item).
4					WTP/ETP	plant (1947-M-RFQ-0509), we are in need of process details.	Process details for WTP & ETP are made available in the tender documents. Sludge Treatment is depended on the outlets from ETP, hence process details shall be furnished by ETP vendor. Oily Water package shall be suitable for operating for 100mm/hr rain fall & shall designed as per applicable rules & regulations.
5					Natural Knock Out Drum	Please provide Mechanical and Process Data sheets for Natural Gas Knock out Drum.	Dia: 1m, Height: 3m these dimension are tentative. Actual dimension shall be finalized by successful bidder based on the Natural Gas consumption values from respective vendor.
6					Wtarer Treatment Plant	Please provide the P&ID for Chemical (NaOCI) Dosing System for raw water treatment and datasheet for Chemical (NaOCI) Dosing Tank.	Shall be developed by successful Bidder / ETP package vendor (being package item).





SL.No	Type of Query	Document No	Document Name	Clause /Note No	- Subject	Bidders Query	Company Response
7	Type of quoty				Cooling Tower Package	Please provide P&ID for FRP Cooling tower.	Minimum requirements are mentioned in the tender specification.P&ID shall be made by successful bidder during detail engineering.
8			Section I, Process 4, TCE.M4-CH-T-PDS-436		PROCESS DATA SHEET FOR ELECTROSTATIC EMULSION TREATER	The viscosity of oil given in the datasheet is 3 to 75 cP is a very large variation and will have huge impact in the vessel sizing. Please confirm according to the given process condition.	Kindly Consider 20cP - 60 cP viscosity range.
9			Section I, Process 4, TCE.M4-CH-T-PDS-436		PROCESS DATA SHEET FOR INDIRECT BATH HEATER	Please confirm the burner required for Indirect bath heater is natural or forced draft.	Burner required for Indirect bath heater shall be preferabley forced draft. IBH Package vendor shall decide the same based on the duty required.
10			TCE.M4-CH-E-PDS-404		DATASHEET FOR PLATE TYPE HEAT EXCHANGER	As per the datasheet, the type of Heat Exchanger mentioned is Plate type. Please provide the Specification for the same.	Kindly refer Plate Type Heat Exchanger Process datasheets Doc. No. TCE-7547A-CH-E-PDS-8703, TCE-7547A-CH-E-PDS-8721 & TCE-7547A-CH-E-PDS 8722. Specification doc. No. TCE-M4-101-04, TCE.M4-185-70 & TCE.M4-186-15 made available in Part - II, Technical Section (Process -3)
11			Addendum_DocumentsPart-2 page no. 57 of 59			whether PDS or PDMS software to be used for preparing 3D model for STF facility.	Shall be PDMS. Please refer clause no.2.0 of section 2.7.28 , 3D MODEL DESIGN REVIEWS PROCEDURES.
12					Design of Heat Exchangers	Compostion of Crude oil	The Crude Oil analysis provided vide corrigendum 2 dated 16-05-2015 is GC analysis on Dry Basis (i.e. excluding BS &W), which is essentially done on the basis of area of peak of each component. This composition is provided for reference only. Bidder to design the Equipment to meet the specificatuion as per the tender document.
13			Corrigendum 2		Tank MOC of Shell	As per Corrigendum 2, Material of construction of shell is SA 537 CL.1 for 1st to 4th course for the spec nos. of TCE.7547A300MDS1003 –P1 & 1004 – P1. But the same attached and revised data sheet of tank in materials and specification, MOC of shell is mentioned as SA 537 CL.1 for 1st to 3rd course. Kindly confirm and revert back.	Bidder to follow as per revised MDS attached in Corrigendum 2
14			Pre - bid Queries Response	Corrigendum 2 Point NO 6 Sec 2.6; TCE.7574A- 300-MDS-1003	MDS	MOC for shell plate ASTM A 537 Cl 1 for 1st to 4th Course, where as in the drawing ithas specified that 1st to 3rd Course SA 537 Cl 1 Kindly review and confirm which one to follow.	Bidder to follow as per revised MDS attached in Corrigendum 2





SL.No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
15	Type of eacily	.iic	Pre - bid Queries Response	Corrigendum 2 Water Treatment	Specification No M4-110- 23	Data Sheet A Reverse Osmosis Plant; Design Data Point No 9 Design Permeate flow rate per stream: 1.0 M3/hr Specification Clause 3.0 Design Requirement: Max Capacity of each stream of RO plant shall not exceed 120 m3/hr Please clarify which stream capacity should need to be followed. 1.0 m3/hr or 120 m3/hr	Bidder to follow as per Data Sheet attached Corrigendum 2
16					Oily Water Treatment Plant	Please specify the design capacity.	The OWS system shall be designed by the successful bidder considering 100 mm/hr rain intensity.
17					Static Mixers		Technical datasheet shall be prepared by the Additive dossing package vendor / successful bidder, based on requirements of Additive dossing package (being package item / system)
18					Gas Conditioning Skid	We understand that Gas Conditioning skid is required for Gas Engines, Please clarifiy whether the Gas conditioning is required for Gas Engine Driven Pumps also. Specification missing	shall be decided by the package or equipment supply vendor / successful bidder, based on Natural Gas (quality) available & duty required from package or equipment.
19			Part-I: Process : Section-1 : Process equipment layout -plan note 4			Eye Wash & Safety Shower PFD required for estimation. Bidder request Company to provide the same.	Refer utility summary document no. TCE.7547A-300-US-8907 for quantity & flow requirement details. PFD & related documents shall be developed by successful bidder.
20		TCE.7547A-CH- 300-DB-01, Rev.1	Part-I: Process : Section-1 : Process equipment layout -plan note 15			Whether Drinking water required CCTV cameras ?. Bidder requests Company to confirm requirement.	Please refer tender document section 4.6.8.





SL.No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
21	Type of squery	TCE.7547A-300- PDS-8701 Rev.2 & TCE.7547A-CH	Part-I: Process : Section-1 : Process equipment layout -plan note 16	Moto No		Hose station requirement near each facility (Steam, Air, Water) is not mentioned. Bidder requests Company to provide the same.	Refer utility summary document no. TCE.7547A-300 US-8907 for quantity & other details. Rest document shall be developed by successful bidder.
22		TCE.7547A-300- PI-8020 Rev.1	Part-I: Process : Section-1 : Process equipment layout -plan note 4			Tank pad height is also not given in FEED. Bidder Requests Company to provide the same.	Refer respective Civil drawings for the Tank pad height
23		Piping Material Spec.	Part-I: Process : Section-1 : Process Piping Material Spec. page 19 of 36			SO flange has been used for Steam and Steam Condensate service. Bidder shall use WN RF flange instead of SO RF flange for these service as above mentioned service are not Category D fluids.  Bidder requests Company to confirm.	Refer attached Piping Material Specification TCE.7547A-300-PP-1101
24		Piping Material Spec.	Part-I: Process : Section-1 : Process Piping Material Spec. General			Pipe thickness has been calculated as per line condition and NOT as per class condition as per the PMS provided in the FEED document. Bidder requests Company to confirm that during EPC stage same philosophy of calculating pipe thickness shall be followed i.e. pipe thickness shall be based on line design condition and not as per class condition	
25		300-DB-01 Rev.1 & TCE.7547A-H-	Part-II: Technical Section: Section II Mechanical -6 conceptual piping layout- plan & section			lines are always run on sleepers and culverts considering numb	Around the tank farm area pipes are routed in sleeper. Since pump house is in other side of the road. The subject line is routed in pipe bridge This is conceptual layout only, further detailing has to be done by successful bidder during detail engineering
26		1021751771500	Part-II: Technical Section: Section II Mechanical -6 conceptual piping layout- plan & section			There are lot of mismatches in the FEED layout-piping. E.g. line no.20-DCO-2209-CB1-ih is not shown in the section CC however the same is shown in the piping plan for dispatch pump house. Company to clarify the above discrepancy.	linis is concentiial lavoiit only fiirther detailing





SL.No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response
27		300-DB-01, Rev.1	Part-II: Technical Section: Section II Mechanical -6 conceptual piping layout- plan & section			Plant road below pipe bridge no 2, 3, 4 & 5 shall be considered as secondary road and major mobile equipment shall not pass through them as per the elevation shown in the respective section drawings.  Company to confirm the above discrepancy.	Fire brigade in anticipated to travel along the
28		TCE.7547A-H-OST- 300	Part-II: Technical Section: Section II Mechanical -6 conceptual piping layout- plan & section			For pipe bridge1, section J J, pipe BOP is shown as El 3000. Since this is crossing a plant road, as per piping design basis requirement it shall be minimum 5000 el.  Company to confirm the above discrepancy.	Bidder understanding is correct.
29		TCE.7547A-H-OST-	Part-II: Technical Section: Section II Mechanical -6 Equipment layout- plan			Πανουτ-nian (Doc No 1( Ε /54/Δ-300-(5Δ-X005)	No culvert is envisaged in this project. Pipe bridge is considered for all road crossings.
30		300	Part-II: Technical Section: Section II Mechanical -6 Equipment layout- plan			Extension of pipe sleeper is required in the "plot plan/equipment layout plan" in line with conceptual piping studies. Company to confirm the above.	Bidder understanding is correct.
31		TCE.7547A-CH- 300-DB-01, Rev.1	General			Flare stack and existing flare header is not shown in the piping layout and plot plan. Bidder requests Company to provide the location.	





SL.No	Type of Query	Document No	Document Name	Clause /Note No	Subject	Bidders Query	Company Response	
32		300-DB-01 Rev.1	Part-I: Process : Section-1 : Process equipment layout -plan note 4			FGL and RL/MSL not mentioned. Instead it is mentioned as XX.XX. Bidder requests Company to provide the same.	Refer Civil section for more clarity of FGL & MSL.	
ELEC	TRICAL							
1					Load List & Single Line Diagram	in Key Line Diagram)	Please refer Electrical Load List (TCE.7547A-715- LL-3041 ) and Single Line Diagram for STF (TCE.7547A-715-AU-3001) in Tender.	
2					Cable Schedule		Cable Schedule will be prepared by EPC Contractor after Award of Contract.	

TCE. 7547A-300-PP-1101

### TATA CONSULTING ENGINEERS LIMITED

PIPING MATERIAL SPECIFICATION

SECTION: TITLE

SHEET i OF iii



### Oil India Limited (A Govt. of India Enterprise) Duliajan, Dist. Dibrugarh, Assam, India

## CONSULTANCY FOR CONSTRUCTION OF SECONDARY TANKFARM (STF) AT MADHUBAN NEAR DULIAJAN, ASSAM

### **PIPING MATERIAL SPECIFICATION**

(DOCUMENT NO.: TCE.7547A-300-PP-1101)



#### **TATA CONSULTING ENGINEERS LIMITED**

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REV. NO.	Р	0	R0		Rí	R1			
	INITIALS	SIGN.	INITIALS	SIGN.	INITIALS	SIGN.	INITIALS	SIGN.	ISSUE
PPD. BY	MA	-Sd/-	MA/TS	-Sd/-	MA/TS				
CHD. BY	SS	-Sd/-	JSA	-Sd/-	JSA				R1
APD. BY	RVK	-Sd/-	KVK	-Sd/-	KVK				ΚI
DATE	08-08	-2014	16.10.	2014	03.06.	2015			

FILE NAME: 7547A300PP1101\_R1.DOC

TCE FORM NO. 020 R4

TCE.7547A-300-PP-1101	TATA CONSULTING ENGINEERS LIMITED	SECTION: REV STATUS
	PIPING MATERIAL SPECIFICATION	SHEET II OF III

### **REVISION STATUS**

REV. NO.	DESCRIPTION	DATE
P0	PRELIMINARY ISSUE	08-08-2014
R0	As per OIL India Comments Dt:13.10.2014	16-10-2014
R1	Flange details updated	03-06-2015

ISSUE R1

FILE NAME: 7547A300PP1101\_R1.DOC

TCE.7547A-300-PP-1101

# TATA CONSULTING ENGINEERS LIMITED SECTION: REV STATUS PIPING MATERIAL SPECIFICATION SHEET iii OF iii

### **CONTENTS**

SL.NO.	ITEMS	MATERIAL	RATING	REV.	PG. NO.
1.	PIPING SPECIFICATION INDEX	-	-	P0	1
2.	LEGEND	-	-	P0	3
3.	PMS FOR 'CF' GRADE	API 5L Gr. B	600	P0	4
4.	BRANCH CONN. CHART FOR 'CF' GRADE	-	-	P0	6
5.	PMS FOR 'CD1' GRADE	API 5L Gr. B	300	P0	7
6.	BRANCH CONN. CHART FOR 'CD1' GRADE	-	-	P0	9
7.	PMS FOR 'CD2' GRADE	API 5L Gr. B	300	P0	10
8.	BRANCH CONN. CHART FOR 'CD2' GRADE	-	-	P0	12
9.	PMS FOR 'CB1' GRADE	API 5L Gr. B	150	P0	13
10.	BRANCH CONN. CHART FOR 'CB1' GRADE	-		P0	15
11.	PMS FOR 'CB2' GRADE	API 5L Gr. B	150	P0	16
12.	BRANCH CONN. CHART FOR 'CB2' GRADE	-	-	P0	18
13.	PMS FOR 'CC' GRADE	ASTM A106 Gr. B	150	P0	19
14.	BRANCH CONN. CHART FOR 'CC' GRADE	-	-	P0	21
15.	PMS FOR 'CA' GRADE	IS: 1239/3589	150	P0	22
16.	BRANCH CONN. CHART FOR 'CA' GRADE	-	-	P0	24
17.	PMS FOR 'GA' GRADE	IS: 1239/3589 (GALVANISED)	150	P0	25
18.	BRANCH CONN. CHART FOR 'GA' GRADE	-	-	P0	27
19.	PMS FOR 'SA' GRADE	ASTM A312 Gr.TP 304	150	P0	28
20.	BRANCH CONN. CHART FOR 'SA' GRADE	-	-	P0	30
21.	PMS FOR 'SB' GRADE	ASTM A312 Gr.TP 316	150	P0	31
22.	BRANCH CONN. CHART FOR 'SB' GRADE	-	-	P0	33
23.	PMS FOR 'SD' GRADE	ASTM A312 Gr.TP 316	300	P0	34
24.	BRANCH CONN. CHART FOR 'SD' GRADE	-	-	P0	36

ISSUE R1

FILE NAME: 7547A300PP1101\_R1.DOC

TCE FORM NO. 020 R4

SPECIFICATION NO.

## TATA CONSULTING ENGINEERS LIMITED

SECTION: D

TCE.7547A-300-PP-1101

### PIPING SPECIFICATION INDEX

SHEET 1 OF 36

Z		SERVICE	ЭË		ATING		SIGN			- (W	١,			
MATERIAL SPECIFICATION CODE	FLUID IDENTIFICATION	TITLE	PIPE SIZE RANGE (INCH)	PRESSURE (Kg/CM²(g))	TEMPERATURE (°C)	PRESSURE (Kg/CM²(g))	TEMPERATURE ( <sup>O</sup> C)	PRESSURE RATING, #	FLANGE TYPE / FACING	CORROSION ALLOWANCE (MM)	PIPE MATERIAL			
CF	wco	WET CRUDE OIL	8	70	30	74	65	600	WN	3.0				
CF	wco	WET CRUDE OIL	12	80	30	84	65	600	RTJ	3.0				
CD1	DCO	DRY CRUDE OIL	6 - 16	30H	45	33	65	300	WNRF	3.0				
ODO	NG	NATURAL GAS	2	17	AMB	18.7	65	200	MAIDE	1.5				
CD2	TW	CLARIFIED WATER	4 - 10	30	35	33	65	300	WNRF	1.5				
	wco	WET CRUDE OIL (NOTE – 1 & 2)	1 - 20	8	60	9.7	90			3.0				
	DCO	DRY CRUDE OIL	3 - 20	8	90	9.7	120			3.0	API 5L Gr. B			
CB1	EW	FORMATION WATER	1 - 12	6.5	90	8.2	120	150	WNRF	3.0				
	AW	ACCUMULATED WATER	3 - 12	3.5	45	5.2	65			3.0				
	ows	OILY WATER SEWER	1/2-12	H 3.5	35	5.2	65			1.5				
	NG	NATURAL GAS	1 - 6	2.5	AMB	4.2	65			1.5				
	PV	PROCESS VENT	1/2-16 l	H 1	45	3.5	65			1.5				
CB2	GL	GLYCOL	1/2 - 21	H 2.5	60	4.2	90	150	WNRF	1.5				
	DR	DRAIN LIQUID	1/2 - 21	1 1	90	3.5	120			1.5				
	ОС	CONDENSATE OIL (NOTE – 3)	1 - 4	8H	30H	9.7	65			1.5				
	FL	FLARE GAS	1 – 8H	6.5	90	8.2	120			1.5				
	SL	STEAM	3/4 - 10	10.5	148	12.5	160			1.5				
CC	CL	STEAM CONDENSATE	3/4 - 10	3.5	148	5.2	160	150	WNRF	1.5	ASTM A106 Gr.B C	ARBON STEEL		
	CW	COOLING WATER	Н	4	37	5.7	65			1.5				
CA	FW	FIRE WATER	1/2 - 30	) 11	AMB	12.7	65	150	SO RF	1.5	IS:1239 / 3589 (or) A CARBON S			
	TW	CLARIFIED WATER	4 - 16	4	35	5.7	65			1.5				
	IA	INSTRUMENT AIR	1/2 - 4	H 7	AMB	8.7	65			1.5				
	PA	PLANT AIR	1/2 - 4	H 7	AMB	8.7	65		so	1.5	IS:1239 / 3589 (or) A	STM A 53 Gr B		
GA	PW	PROCESS WATER	1/2 -10	H 4	AMB	5.7	65	150	RF	1.5	CARBON STEEL			
	RW	RAW WATER	1/2 -10	H 4	AMB	5.7	65	1		1.5	-			
REV. NO		R1		PPD. B\	/: MA/	ΓS	J	OB N	Э.	CLIEN	IT: OIL INDIA ED	ISSUE		
DATE		03.06.2015		CHD. B	r: JSA			TCE.	ŀ	PROJ	-	R1		
REV. BY		KVK		DATE: (	03.06.2	015		7547	4	SECONDARY TAI FARM, DULIAJAN ASSAM				

SPECIFICATION NO.

## TATA CONSULTING ENGINEERS LIMITED

SECTION: D

TCE.7547A-300-PP-1101

PIPING SPECIFICATION INDEX

SHEET 2 OF 36

Z		SERVICE	GE	OPER.		DES COND			/::	- (W	Ļ			
MATERIAL SPECIFICATION CODE	MATERIAL SPECIFICATIC CODE CODE FLUID IDENTIFICATION		FLUID IDENTIFICATION BILLING B		FLUID IDENTIFICATION SERVICE SIZE RANGE (INCH)		PRESSURE (Kg/CM <sup>2</sup> (g))	TEMPERATURE ( <sup>O</sup> C)	PRESSURE (Kg/CM²(g))	TEMPERATURE ( <sup>O</sup> C)	PPRESSURE RATING, #	FLANGE TYPE / FACING	CORROSION ALLOWANCE (MM)	PIPE MATERIAL
SA	DMW	DEMINERALIZED WATER	1/2 - 10H	4	AMB	5.7	65	150	150 LJ RF		ASTM A312 Gr.			
SA	AF			L3 KI	NIL	TP304 STAINLESS STEEL								
	ADD1	CORROSION INHIBITOR (WET CRUDE OIL)	1/2 – 2	9	AMB	10.7	65			NIL				
SB	ADD2	SULFATE REDUCING BACTERIA	1/2 – 2	9	AMB	10.7	65	150 LJ RF		NIL	ASTM A312 Gr.			
	ADD3	SCALE INHIBITOR	1/2 – 2	9	AMB	10.7	65							
	ADD4	DE EMULSIFIER	1/2 – 2	9	AMB	10.7	65			NIL	TP316 STAINLESS STEEL			
	ADD5	POUR POINT DEPRESSANT	1/2 – 2	30H	AMB	33	120			NIL				
SD	ADD6 CORROSION INHIBITOR (DRY CRUDE OIL)		1/2 – 2	30H	AMB	33 120		300	WNRF	NIL				

H - HOLD, AMB- AMBIENT

#### NOTES:

- 1. ALL RECOVERED CRUDE OIL LINES AND FEW WET CRUDE OIL LINES SHALL BE PROVIDED WITH STEAM TRACING. FOR DETAILS REFER P&ID.
- 2. ALL RECOVERED CRUDE OIL LINES ARE INCLUDED IN WET CRUDE OIL LINES FOR PIPING SPECIFICATION.
- 3. MINIMUM OPERATING PRESSURE AND TEMPERATURE OF CONDENSATE OIL (FROM CGGS) TO BE CONFIRMED BY OIL.
- 4. PIPING MATERIAL CODE CF HAS PRESSURE RATING 600 CLASS BASED ON OIL TENDER DOCUMENT.

REV. NO.	R1	PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.2015	CHD. BY: JSA	TCE.	PROJECT:	R1
REV. BY	KVK	DATE: 03.06.2015	7547A	SECONDARY TANK FARM, DULIAJAN, ASSAM	

TCE.7547A-300-PP-1101

# TATA CONSULTING ENGINEERS LIMITED SECTION: LEGEND PIPING MATERIAL SPECIFICATION SHEET 3 OF 36

### **LEGEND**

BW	BUTT WELDING
SW	SOCKET WELDING
CS	CARBON STEEL
SS	STAINLESS STEEL
CI	CAST IRON
CL	CLASS
ERW	ELECTRIC RESISTANT WELDED
EFW	ELECTRIC FUSION WELDED
SMLS	SEAMLESS
HVY	HEAVY
PE	PLAIN ENDS
BE	BEVELLED ENDS
TE	THREADED ENDS
SORF	SLIP-ON RAISED FACE
RTJ	RING TYPE JOINT
WN	WELDING NECK
LJ	LAP JOINT FLANGE
SCRW	SCREWED
RF	FLANGED RAISED FACE
FF	FLANGED FLAT FACE
SCH	SCHEDULE
GALV	GALVANISED
NPT	AMERICAN STD. PIPE THREAD (NATIONAL PIPE TAPER)
Gr	GRADE
POE	PLAIN ONE END
TOE	THREADED ONE END
PBE	PLAIN BOTH ENDS
TBE	THREADED BOTH ENDS
THK	THICKNESS

ISSUE R1

SPE	CIFICA	TION NO.	TA	TA C	ONS	JLTIN	IG E	NGINE	ERS	S LIMI	ΓED	SECT	ION:	
TCE.	7547A-3	00-PP-1101	PIPIN	NG MA	TERI	AL SP	ECIF	ICATIO	N G	RADE	CF	SHEE	T 4 (	OF 36
SERV	/ICE : W	ET CRUDE (	OIL (WCO)	)										
	1		1											
DESIGN	TEMP	. °F/°C	REFER	PIPING I	NDEX	CORR.	ALL.	<del>inch/</del> mm	3.0					
DES	PR. p	sig/kg/cm <sup>2</sup> g	REFER	PIPING I	NDEX	FLANG	E FAC	ING	RTJ					
NOM.	PIPE S	IZE inch mm	15	20	25	40	50	80	100	150	200	250	300	350
OUTS	SIDE DIA	۱. inch mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3	3 168.3	219.1	273	323.9	355.6
THIC	KNESS	inch mm	SCH XXS	SCH XXS	SCH 160	SCH 160	SCH 160	SCH 80	SCH 80	SCH 80	SCH 80	SCH 80	SCH 80	SCH 80
NOM.	PIPE S	IZE inch mm	400											
OUTS	SIDE DIA	i <del>nch</del> ۱. mm	406.4											
THIC	THICKNESS inch mm		SCH 80											
LINE	JOINT				ME B16.1									
					ME B16.2	25(NOTE-	1)							
ITEM			NOMINA SIZE R inch	ANGE		IATERIAL CIFICATI		DIMENSIO STANDA			F	REMARKS	3	
PIPES	S		≤ 4	40	Al	PI 5L Gr. E	3	ASME B	36.10	SMLS, PE				
			50 TC	400	Al	PI 5L Gr. E	3	ASME B	36.10	SMLS, BI				
PIPE	NIPPLE	S	15 T	O 40		PI 5L Gr. I		ASME B		POE-TOE	, TBE, PI	BE, SCH	TO MAT	CH PIPE
BW ITTINGS		WS, CAPS, CERS,	50 TC	0 400	ASTM	A 234 GR	WPB	ASME B	16.9	SMLS, SO	CH TO MA	ATCH PIP	'E	
正	STUB	ENDS												
SW F	ITTINGS	3	≤ 4	40	AS	STM A 10	5	ASME B	16.11	6000 CL				
BEND	os													
FABR	RICATED JCERS	)												
MITR	ES													
BRAN	ICH CO	NNECTION	AL	L		-		-		SEE BRA	NCH CO	NNECTIO	N CHAR	T
FLAN	GES		15 T	O 40	AS	STM A 10	5	ASME B	16.5	SW, 600	CL			
			50 TC	400	AS	STM A 10	5	ASME B	16.5	WN, 600	CL			
BLINE	O FLANC	GES	AL	.L	AS	STM A 10	5	ASME B	16.5	600 CL				
STUD	) BOLTS	i / NUTS	AL	_L	BOLT	: ASTM / Gr.B7	A193	ASME B1	8.2.1	THREAD CL.2A	ING SHAL	L BE AS	PER AS	ME B1.1
			AL	L	NUT	: ASTM A Gr.2H	194	ASME B1	8.2.2	THREAD CL.2B (N		L BE AS	PER AS	ME B1.1
REV	. NO.	R1			PPD	. BY: MA	4/TS	JOB NO.	CL	IENT: OIL	INDIA	IDIA LIMITED		ISSUE
DAT	E	03.06.15			CHD	. BY: JS	SA	TCE.	PR	OJECT: S	SECON	DARY T	ANK	R1
DE\/	BV	K\/K			DAT	E · 03 06	: 15	75/7/	LΛ		11 14 14	N ASS	۸۸۸	

SPECIFICATION	N NO.	TATA	<b>IITED</b>	SECTION:							
TCE.7547A-300-P	P-1101	PIPING	MATER	RIAL SPEC	IFICATION		GRAD	E CF	SHEET 5 OF 36		
ITEM	NOMINAL F SIZE RAN inch/mm	GE		ERIAL ICATION	DIMENSIONA STANDARD	L		REI	MARKS		
GASKETS	ALL	00		. RINF + SOFT ON	ASME B16.20	)	600 CL				
THREADED FITTINGS	≤ 40		ASTM A 105		ASME B 16.1	1	6000 CL, SCRW				
TYPE OF VALVE	SIZE RANGE inch./mm.	ВО	MATER	IAL TRIM	PRESSURE RATING ANSIAS	(	YPE OF NDS	SPECIFICATI OR TAG NUMBE	REMARKS		
GATE	≤ 40		A 105	13% Cr. STEEL	800	9	SW	G83			
GATE	≥ 50 TO 400		A 216 VCB	13% Cr. STEEL	600	F	RTJ	G63			
GLOBE	≤ 40	ASTM	A 105	13% Cr. STEEL	800	5	SW	T83			
GLOBE	≥ 50 TO 400		A 216 VCB	13% Cr. STEEL	600	F	RTJ	T63			
LIFT TYPE CHECK	≤ 40	ASTM	A 105	13% Cr. STEEL	800	5	SW	C83			
CHECK (DUAL PLATE)	≥ 50 TO 400		A 216 NCB	13% Cr. STEEL	600	F	RTJ	C63X1			
BALL	≥ 15 TO 400	_	A 216 VCB	SS 304	600	F	RTJ	B63	TWO PIECE, REGULAR PORT (NOTE-3)		
STRAINER (Y - TYPE)	≤ 40	ASTM	A 105	SS 304	800	5	SW	-			
STRAINER (Y - TYPE)	50 TO 150		A 216 VCB	SS 304	600	F	RTJ	-			
STRAINER (T - TYPE)	≥ 200 TO 400		A 216 VCB	SS 304	600	F	RTJ	-			

#### NOTES:

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.
- 3. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB & ABOVE.

REV. NO.	R1	PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15	CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK	DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO.

### TATA CONSULTING ENGINEERS LIMITED

SECTION:

TCE.7547A-300-PP-1101

PIPING MATERIAL SPECIFICATION | GRADE

CF

SHEET 6 OF 36

### **BRANCH CONNECTION CHART**

SIZE inch/mm								BRA	NCH						
RUN	15	20	25	40	50	80	100	150	200	250	300	350	400		
15	Т														
20	RT	Т													
25	RT	RT	Т												
40	RT	RT	RT	Т											
50	Н	Н	Н	RT	Т										
80	Н	Н	Н	Н	RT	Т									
100	Н	Н	Н	Н	SR	RT	Т								
150	Н	Н	Н	Н	SR	RT	RT	Т							
200	Н	Н	Н	Н	SR	SR	RT	RT	Т						
250	Н	Н	Н	Н	SR	SR	SR	RT	RT	Т					
300	Н	Н	Н	Н	SR	SR	SR	SR	RT	RT	Т				
350	Н	Н	Н	Н	SR	SR	SR	SR	SR	RT	RT	Т			
400	Н	Н	Н	Н	SR	SR	SR	SR	SR	SR	RT	RT	Т		
_															

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

SR - STUB-IN WITH R-PAD

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPE	CIFICAT	ION NO.	TA	TA C	ONS	JLTIN	IG EI	NGINE	SECTION:							
TCE.	7547A-30	0-PP-1101	PIPII	NG M	ATERI	AL SP	ECIFI	CATIO	N G	RADE	CD1	SHEE	T 7 C	OF 36		
SERV	/ICE : DR	Y CRUDE C	IL (DCO)													
	ı		1			1			1							
N 1	TEMP.	°F/°C	REFER	PIPING	INDEX	CORR.	ALL. ir	nch/mm	3.0							
DESIGN	PR. ps	ig/kg/cm <sup>2</sup> g	REFER	PIPING	INDEX	FLANG	E FACIN	NG	RF							
NOM.	PIPE SIZ	ZE inch mm	15	20	25	40	50	80	100	150	200	250	300	350		
OUTS	SIDE DIA.	inch mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3	168.3	219.1	273	323.9	355.6		
THIC	KNESS	inch mm	SCH 160	SCH 160	SCH 160	SCH 160	SCH 80	SCH 80	SCH 40	SCH 40	SCH 40	SCH 40	SCH STD	SCH STD		
NOM.	PIPE SIZ	ZE inch mm	400													
OUTS	SIDE DIA.	inch mm	406.4													
THIC	KNESS	<del>inch</del> mm	SCH STD													
LINE	JOINT		≤ 40 - S	W TO AS	SME B16.	11										
					SME B16.2	E B16.25(NOTE-1)				Π						
ITEM			SIZE F	AL PIPE RANGE I/mm		MATERIAL CIFICATI		DIMENSI STAND			F	REMARKS	5			
PIPE!	PIPES PIPE NIPPLES		≤	40	А	PI 5L Gr. I	В	ASME B	36.10	SMLS, PI						
	PIPES PIPE NIPPLES		50 TO	O 400	A	PI 5L Gr. I	В	ASME B	36.10	SMLS, BI	<u> </u>					
PIPE	NIPPLES	<b>S</b>	15 T	O 40	Α	PI 5L Gr. I	В	ASME B	36.10	POE-TOE	, TBE, PI	BE, SCH	ГО МАТС	CH PIPE		
BW ITTINGS	ELBOW REDUC TEES		50 TC	O 400	ASTM	A 234 GR	.WPB	ASME B	316.9	SMLS, SO	CH TO MA	ATCH PIP	E			
正	STUB E	ENDS														
SW E	ITTINGS		15 T	O 20	A	STM A 10	5	ASME B	16.11	6000 CL						
			25 T	O 40	A	STM A 10	5	ASME B	16.11	3000 CL						
BEND FABR	OS RICATED															
	JCERS															
MITR		INECTION	Δ	LL						SEE BRA	NCH COI	NNECTIO	N CHAR	т		
		INCOTION		O 40	A	STM A 10	5	ASME B	316.5	SW, 300		VIVLOTIO	IN CHAIR			
FLAN	GES		50 TO	O 400	A	STM A 10	5	ASME B	316.5	WN, 300	CL					
DI INI	D EL ANO	F0		LL		STM A 10		ASME B		300 CL						
BLINE	BLIND FLANGES															
STUD	) BOLTS	/ NUTS	Al	LL	BOLT	: ASTM / Gr.B7	A193	ASME B	18.2.1	THREAD CL.2A	ING SHAL	L BE AS	PER ASI	ME B1.1		
5102	, DOLIO		A	LL	NUT	: ASTM A Gr.2H	194	ASME B	18.2.2	THREAD CL.2B (N		L BE AS	PER AS	ME B1.1		
REV	. NO.	R1			PPI	D. BY: M	1A/TS	JOB NO. CI		D. CLIENT: OIL INDIA		DIA LIMITED		ISSUE		
DAT	E	03.06.15	1		CHI	D. BY: J	SA	TCE.	PF	ROJECT:	SECON	IDARY	TANK	R1		
REV	. BY	KVK			DA	ΓE: 03.0	6.15	7547 <i>A</i>	\   FA	RM AT D	DULIAJ <i>A</i>	N, ASS	SAM			

SPECIFICATION	N NO.	<b>TATA CON</b>	IMITED	SECTION:			
TCE.7547A-300-F	PP-1101	PIPING MATE	RIAL SPEC	IFICATION	GR	ADE CD1	SHEET 8 OF 36
ITEM	NOMINAL F SIZE RAN inch/mn	GE SPEC	TERIAL FICATION	DIMENSIONA STANDARD	L	RE	MARKS
GASKETS	ALL		DUND SS 316 + OIL FILLER	ASME B16.20	300	CL, 3.0 mm THK.	
THREADED FITTINGS	15 TO 2 25 TO 4		M A 105 M A 105	ASME B 16.11		0 CL, SCRW 0 CL, SCRW	
TYPE OF VALVE	SIZE RANGE inch./mm.	MATE	RIAL TRIM	PRESSURE RATING ANSI/IS	TYPE OF ENDS	OR	REMARKS
GATE	≤ 40	ASTM A 105	13% Cr. STEEL	800	SW	G83	
GATE	≥ 50 TO 400	ASTM A 216 Gr.WCB	13% Cr. STEEL	300	RF	G33	
GLOBE	≤ 40	ASTM A 105	13% Cr. STEEL	800	SW	T83	
GLOBE	≥ 50 TO 400	ASTM A 216 Gr.WCB	13% Cr. STEEL	300	RF	T33	
LIFT TYPE CHECK	≤ 40	ASTM A 105	13% Cr. STEEL	800	SW	C83	
CHECK (DUAL PLATE)	≥ 50 TO 400	ASTM A 216 GR.WCB	13% Cr. STEEL	300	RF	C33X1	
BALL	≥ 15 TO 400	ASTM A 216 Gr.WCB	SS 304	300	RF	B33	TWO PIECE, REGULAR PORT (NOTE-3)
STRAINER (Y - TYPE)	≤ 40	ASTM A 105	SS 304	800	SW	-	
STRAINER (Y - TYPE)	50 TO 150	ASTM A 216 Gr.WCB	SS 304	300	RF	-	
STRAINER (T - TYPE)	≥ 200 TO 400	ASTM A 216 Gr.WCB	SS 304	300	RF	-	
NOTES:							

#### NOTES:

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.
- 3. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB & ABOVE.

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO. TCE.7547A-300-PP-1101

### TATA CONSULTING ENGINEERS LIMITED

PIPING MATERIAL SPECIFICATION | GRADE

CD1

SECTION:

SHEET 9 OF 36

### **BRANCH CONNECTION CHART**

SIZE inch/mm								BRA	NCH						
RUN	15	20	25	40	50	80	100	150	200	250	300	350	400		
15	Т														
20	RT	Т													
25	RT	RT	Τ												
40	RT	RT	RT	Т											
50	Ι	Н	Η	RT	Т										
80	Ι	Н	Η	Н	RT	Т									
100	Н	Н	Н	Н	SR	RT	Т								
150	Ι	Н	Η	Н	SR	RT	RT	Т							
200	Н	Н	Н	Н	SR	SR	RT	RT	Т						
250	Η	Н	Η	Н	SR	SR	SR	RT	RT	Т					
300	Н	Н	Н	Н	SR	SR	SR	SR	RT	RT	Т				
350	Η	Н	Η	Н	SR	SR	SR	SR	SR	RT	RT	Т			
400	Ι	Н	Η	Н	SR	SR	SR	SR	SR	SR	RT	RT	Т		

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

SR - STUB-IN WITH R-PAD

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPE	CIFICAT	TON NO.	TA	TA C	ONS	JLTIN	IG E	NGINE	ERS	S LIMIT	ΓED	SECTI	ON:	
TCE.	7547A-30	00-PP-1101	PIPI	IG MA	TERI	AL SP	ECIF	CATION	<b>I</b> G	RADE	CD2	SHEE	T 10	OF 36
SER\	/ICE : NA	TURAL GAS	S (NG) & C	LARIFIE	D WATE	R (TW)								
DESIGN	TEMP.	°F/°C	REFER	PIPING II	NDEX	CORR.	ALL. i	nch/mm	1.5					
DES	PR. ps	sig/kg/cm <sup>2</sup> g	REFER	PIPING II	NDEX	FLANG	E FACII	NG	RF		_			
NOM	. PIPE SI	ZE inch mm	15	20	25	40	50	80	100	150	200	250	300	
OUTS	SIDE DIA	inch mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3	168.3	219.1	273	323.9	9
THIC	KNESS	inch mm	SCH 80	SCH 80	SCH 80	SCH 80	SCH 40	SCH 40	SCH 40	SCH 40	SCH 40	SCH 40	SCH STD	
NOM	. PIPE SI	ZE inch mm												
OUTS	SIDE DIA	inch mm												
THIC	KNESS	<del>inch</del> mm												
LINE	JOINT		≤ 40 - S\	N TO AS	ME B16.	11								
					ME B16.2	B16.25(NOTE-1)								
ITEM			NOMINA SIZE R inch	ANGE		IATERIAL CIFICATI		DIMENSIO STANDA			F	REMARKS	3	
PIPE	S		≤ <b>4</b>	10	Al	PI 5L Gr. I	3	ASME B	36.10	SMLS, PE				
			50 TC	300	Al	PI 5L Gr. I	3	ASME B 3	36.10	SMLS, BE				
PIPE	NIPPLES	3	15 T	O 40	Al	PI 5L Gr. I	3	ASME B 3	36.10	POE-TOE	, TBE, PI	BE, SCH	ГО МАТ	TCH PIPE
တ္သ		VS, CAPS,	50 TC	300	ASTM	A 234 GR	.WPB	ASME B	16.9	SMLS, SC	CH TO MA	ATCH PIP	E	
BW TTINGS	REDUC TEES	CERS,												
_ F	STUBI	ENDO												
	31061	ENDS	15 T	20	Δ.	STM A 10	5	ASME B1	611	6000 CL				
SW F	TITTINGS		25 T			STM A 10		ASME B1		3000 CL				
BENI	DS .													
	RICATED UCERS													
MITR	ES													
BRAN	NCH CON	NECTION	AL	.L		-		-		SEE BRA	NCH COI	NNECTIO	N CHA	RT
FLAN	IGES		15 T	O 40	AS	STM A 10	5	ASME B	16.5	SW, 300	CL			
			50 TC	300	AS	STM A 10	5	ASME B	16.5	WN, 300	CL			
BLIN	D FLANG	ES	AL	.L	AS	STM A 10	5	ASME B	16.5	300 CL				
OT: ::	2 001 70	/ NILITO	AL	L	BOLT	: ASTM / Gr.B7	A193	ASME B1	8.2.1	THREADI CL.2A	ING SHAL	L BE AS	PER A	SME B1.1
SIUL	) BOLTS	/ NU15	AL	.L	NUT	: ASTM A Gr.2H	194	ASME B1	8.2.2	THREAD		L BE AS	PER A	SME B1.1
REV	/. NO.	R1	•		PPD	. BY: M	4/TS	JOB NO	. CLI	ENT: OIL	INDIA	LIMITEI	<b>o</b>	ISSUE
DAT	Έ	03.06.15			CHD	. BY: JS	SA	TCE.	PR	OJECT: S	SECON	DARY T	ANK	R1
REV	/. BY	KVK			DAT	E: 03.06	5.15	7547A	FAF	RM AT D	ULIAJAI	N, ASSA	AM.	

SPECIFICATIO	N NO.	TATA CONSULTING ENGINEERS LIMITED									N:	
TCE.7547A-300-F	PP-1101	PIPII	NG MATER	RIAL SPEC	IFICATION		GRAD	DE CD2	SH	EET	11	OF 36
ITEM	NOMINA SIZE R	ANGE		ERIAL ICATION	DIMENSIONA STANDARD	L		RE	MARI	<s< td=""><td></td><td></td></s<>		
GASKETS	AL	L		JND SS 316 + DIL FILLER	ASME B16.20	)	300 CL	, 3.0 mm THK.				
	15 TC	0 20	ASTM	I A 105	ASME B 16.1	1	6000 C	L, SCRW				
THREADED FITTINGS	25 TC	0 40	ASTM	I A 105	ASME B 16.1	1		L, SCRW				
TYPE OF	SIZE RANGE		MATER	IAL	PRESSURE RATING		TYPE OF	SPECIFICATION OR		REMARKS		ARKS
VALVE	inch./mm	١.	BODY	TRIM	ANSI/IS	ı	ENDS	TAG NUMBER				
GATE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	G83				
GATE	≥ 50 TO 300	<i>P</i>	ASTM A 216 Gr.WCB	13% Cr. STEEL	300		RF	G33				
GLOBE	≤ 40	P	ASTM A 105	13% Cr. STEEL	800		SW	T83				
GLOBE	≥ 50 TO 300	P	ASTM A 216 Gr.WCB	13% Cr. STEEL	300		RF	T33				
LIFT TYPE CHECK	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	C83				
CHECK (DUAL PLATE)	≥ 50 TO 300	P	ASTM A 216 GR.WCB	13% Cr. STEEL	300		RF	C33X1				
BALL	≥ 15 TO 300	P	ASTM A 216 Gr.WCB	SS 304	300		RF	B33			) PIEC	CE, R PORT
STRAINER (Y - TYPE)	≤ 40	A	ASTM A 105	SS 304	800		SW	-				
STRAINER (Y - TYPE)	50 TO 15	0 6	ASTM A 216 Gr.WCB	SS 304	300		RF	-				
STRAINER (T - TYPE)	≥ 200 TO 400	) A	ASTM A 216 Gr.WCB	SS 304	300		RF	-				
NOTES:				1						Ц		

### NOTES:

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- $2. \quad {\rm NUT\ SHALL\ BE\ ALONG\ WITH\ WASHER}.$

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO.

### TATA CONSULTING ENGINEERS LIMITED

SECTION:

TCE.7547A-300-PP-1101

PIPING MATERIAL SPECIFICATION | GRADE

**CD2** | SHEET 12 OF 36

### **BRANCH CONNECTION CHART**

SIZE								BRA	NCH					
inch/mm														
RUN	15	20	25	40	50	80	100	150	200	250	300			
15	Т													
20	RT	Т												
25	RT	RT	Т											
40	RT	RT	RT	Т										
50	Н	Н	Н	RT	Т									
80	Н	Н	Н	Н	RT	Т								
100	Н	Н	Н	Н	SR	RT	Т							
150	Н	Н	Н	Н	SR	SR	RT	Т						
200	Н	Н	Н	Н	SR	SR	SR	RT	Т					
250	Н	Н	Н	Н	SR	SR	SR	SR	RT	Т				
300	Н	Н	Н	Н	SR	SR	SR	SR	SR	RT	Т			

#### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

SR - STUB-IN WITH R-PAD

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPEC	CIFICAT	ION NO.	TA	TA C	ONS	ULTIN	NG E	NGIN	EER	S LIMI	ΓED	SECT	ION:	
TCE.7	547A-30	0-PP-1101	PIF	ING N	IATER	IAL S	PECII	FICATION	NC	GRADE	CB1	SHEE	T 13	OF 36
SERV	ICE: \	WET CRUE	E OIL (WO	CO), DRY	CRUDE (	OIL (DCO	), FORM	IATION WA	ATER (E	EW) & ACCU	JMULATE	D WATE	R (AW)	
N	TEMP.	°F/°C	REFER	PIPING I	NDEX	CORR.	ALL. it	nch/mm	3.0					
DESIGN	PR. ps	sig/kg/cm² g	REFER	PIPING I	NDEX	FLANG	E FACII	NG	RF					
NOM.	PIPE SIZ	ZE inch mm	15	20	25	40	50	80	100	150	200	250	300	350
OUTS	IDE DIA.	inch mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3	3 168.3	219.1	273	323.9	355.6
THICK	(NESS	inch mm	SCH 160	SCH 160	SCH 160	SCH 80	SCH 80	SCH 40	SCH 40	SCH 40	SCH 20	SCH 20	SCH 20	SCH 10
NOM.	PIPE SIZ	ZE inch mm	400	450	500	600								
OUTS	IDE DIA.	inch mm	406.4	457	508	610								
THICK	(NESS	<del>inch</del> mm	SCH 10	SCH 10	SCH 10	SCH 10								
LINE	IOINT		≤ 40 - S	≤ 40 - SW TO ASME B16.11										
	701111		≥ 50 - B	W TO AS	ME B16.2	25(NOTE-	1)							
ITEM			≥ 50 - BW TO A NOMINAL PIPE SIZE RANGE inch/mm			MATERIAL SPECIFICATION			ONAL ARD		R	EMARKS	3	
PIPES			<b>S</b>	40				ASME B	36.10	SMLS, PE				
PIPES	)		50 T	O 600	APL 5L Gr. B			ASME B	36.10	SMLS, BE				
PIPE I	VIPPLES	3	15 T	O 40	AF	PL 5L Gr.	В	ASME B	36.10	POE-TOE	, TBE, PE	BE, SCH	ГО МАТС	H PIPE
BW	REDUC	VS, CAPS, CERS,	50 T	O 600	ASTM	A 234 GR	.WPB	ASME B16.9		SMLS, SC	CH TO MA	ATCH PIP	Έ	
FIT	TEES													
ш	STUB E	ENDS												
SW FI	TTINGS		≤	40	AS	STM A 10	5	ASME B	16.11	3000 CL				
BEND	S													
FABR	ICATED CERS													
MITRE														
BRAN	CH CON	NECTION	А	LL		-		-		SEE BRA	NCH COI	NECTIO	N CHAR	T
FLAN	GES.		15 T	O 40	AS	STM A 10	5	ASME E	316.5	SW 150 C	L			
, ., .,	020		50 TO	O 600	AS	STM A 10:	5	ASME E	316.5	WN, 150				
			+	50 TO 600 ASTM A 10  ALL ASTM A 10				ASME E		150 CL				
BLIND	FLANG	ES		ALL ASTMATOS										
etun	POLTS.	/ NILITO	ALL		BOLT	: ASTM / Gr.B7	A193	ASME B	18.2.1	THREADI CL.2A	NG SHAL	L BE AS	PER ASI	ME B1.1
3100	BOLTS	/ IUUI S	А	ALL N		: ASTM A Gr.2H	194	ASME B	18.2.2	THREADI CL.2B (No		L BE AS	PER ASI	ME B1.1
REV.	NO.	R1	ĺ		PPE	D. BY: N	1A/TS	TS JOB NO. CLIENT: OIL INDIA LIMITED IS				ISSUE		
DATI	Ξ	03.06.15			СН	D. BY: J	SA	TCE.	PI	PROJECT: SECONDARY TANK R1				R1

DATE: 03.06.15

7547A

REV. BY

KVK

FARM AT DULIAJAN, ASSAM

TCE.7547A-300-F				_				<b>IITED</b>	SECTION:
TGL.7347A-300-F	PP-1101	PIPI	NG MATER	IAL SPEC	IFICATION	(	GRAD	E CB1	SHEET 14 OF 36
ITEM	NOMINAL SIZE RA inch/m	NGE	MATE SPECIFI	ERIAL CATION	DIMENSIONAL STANDARD	-		REM	MARKS
GASKETS	ALL			IND SS 316 + IL FILLER	ASME B16.20		150 CL,	3.0 mm THK.	
THREADED FITTINGS	≤ 40		ASTM	A 105	ASME B 16.11	;	3000 CL	_, SCRW	
TYPE OF VALVE	SIZE RANGE inch./mm.		MATERI BODY	AL TRIM	PRESSURE RATING ANSI/IS	TYPE OF ENDS		SPECIFICATION OR TAG NUMBE	REMARKS
GATE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800	S	SW	G83	
GATE	≥ 50 TO 600	A	ASTM A 216 Gr.WCB	13% Cr. STEEL	150	F	RF	G23	
GLOBE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800	S	SW	T83	
GLOBE	≥ 50 TO 600	A	ASTM A 216 Gr.WCB	13% Cr. STEEL	150	F	RF	T23	
LIFT TYPE CHECK	≤ 40	A	ASTM A 105	13% Cr. STEEL	800	S	SW	C83	
CHECK (DUAL PLATE)	≥ 50 TO 600	A	ASTM A 216 GR.WCB	13% Cr. STEEL	150	F	RF	C23X1	
BALL	≥ 15 TO 600	A	ASTM A 216 Gr.WCB	SS 304	150	F	RF	B23	TWO PIECE, REGULAR PORT (NOTE-3)
STRAINER (Y - TYPE)	≤ 40	A	ASTM A 105	SS 304	800	S	SW	-	
STRAINER (Y - TYPE)	50 TO 150	)	ASTM A 216 Gr.WCB	SS 304	150	F	RF	-	
STRAINER (T - TYPE)	≥ 200 TO 600	A	ASTM A 216 Gr.WCB	SS 304	150	F	RF	-	

### NOTES:

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.
- 3. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB & ABOVE.

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO. TCE.7547A-300-PP-1101

### TATA CONSULTING ENGINEERS LIMITED

PIPING MATERIAL SPECIFICATION | GRADE

CB1

SECTION:

SHEET 15 OF 36

### **BRANCH CONNECTION CHART**

SIZE inch/mm								BRA	NCH							
RUN	15	20	25	40	50	80	100	150	200	250	300	350	400	500	600	
15	Т															
20	RT	Т														
25	RT	RT	Т													
40	RT	RT	RT	Т												
50	Н	Н	Н	RT	Т											
80	Н	Н	Н	Н	RT	Т										
100	Н	Н	Н	Н	S	RT	Т									
150	Н	Н	Н	Н	S	RT	RT	Т								
200	Н	Н	Н	Н	S	S	RT	RT	Т							
250	Н	Н	Н	Н	S	S	S	RT	RT	Т						
300	Н	Н	Н	Н	S	S	S	S	RT	RT	Т					
350	Н	Н	Н	Н	S	S	S	S	S	RT	RT	Т				
400	Н	Н	Н	Н	S	S	S	S	S	S	RT	RT	Т			
500	Н	Н	Н	Н	S	S	S	S	S	S	S	RT	RT	Т		
600	Н	Н	Н	Н	S	S	S	S	S	S	S	S	RT	RT	Т	

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

S - STUB -IN

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

			$\overline{}$	TATA CONSULTING ENGINEERS LIMITED SECTION:													
SPEC	CIFICAT	TON NO.	TA	TA C	ONSI	JLTIN	IG EI	NGINE	ERS	3 LIMI7	Γ <b>ED</b>	SECTI	ION:				
TCE.7	/547A-30	00-PP-1101	PIPI	NG M/	TERI	AL SP	ECIFI	CATIO	N G	RADE	CB2	SHEE	T 16	OF 36			
SERV	/ICE : DR	RAIN LIQUI	D (DR), OII	LY WATE	R SEWE	R (OWS),	NATUR/	AL GAS (NO	G), PRO	DCESS VEN	√T(PV), FL	ARE GA	S (FG),				
GLYC	OL (GL)	& CONDE	NSATE OIL	(OC)													
DESIGN	TEMP.	°F/°C	REFER	PIPING II	NDEX	CORR.	ALL. ir	<del>1ch/</del> mm	1.5								
DES	PR. ps	sig/kg/cm² g	REFER	PIPING II	NDEX	FLANG	E FACIN	1G	RF								
NOM.	. PIPE SIZ	ZE inch mm	15	20	25	40	50	80	100	150	200	250	300	350			
OUTS	SIDE DIA.	inch mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3	168.3	219.1	273	323.9	355.6			
THICK	KNESS	inch mm	00	SCH 80	SCH 80	SCH 80	SCH 40	SCH 40	SCH 40	SCH 40	SCH 20	SCH 20	SCH 20	SCH 10			
NOM.	. PIPE SIZ	ZE inch mm	400														
OUTS	SIDE DIA.	inch mm	406.4														
THICK	KNESS	inch mm	10														
LINE	JOINT		-	SW TO AS													
ITEM			SIZE F	IAL PIPE RANGE n/mm		MATERIAL ECIFICATI		DIMENSIO STANDA			R	REMARKS	3				
5:55	_		<u>≤</u>	40	А	PI 5L Gr. E	3	ASME B	36.10	SMLS, PE							
PIPES			50 T(	O 400	А	PI 5L Gr. E	3	ASME B	36.10	SMLS, BE							
PIPE	NIPPLES	3	15 T	ΓΟ 40	API 5L Gr. B			ASME B	36.10	POE-TOE	TBE, PE	3E, SCH	ГО МАТС	H PIPE			
S	ELBOV	VS, CAPS,	50 T(	O 400	ASTM	A 234 GR	.WPB	ASME B	316.9	SMLS, SC	CH TO MA	ATCH PIP	Έ				
BW ITINGS	REDUC TEES																
										ļ							
	STUB E	ENDS			ļ.,												
SW F	TITTINGS		<u>≤</u>	40	A	STM A 10	5	ASME B	16.11	3000 CL							
BEND	S				<del> </del>		1										
	RICATED JCERS																
MITRE	ES																
BRAN	ICH COV	NECTION	A	\LL		-				SEE BRA	NCH CON	NECTIO	N CHART	Г			
FLAN	GES		15 T	ΓΟ 40	A	STM A 10	5	ASME B	316.5	SW 150 C	L L			_			
			50 T	O 400	A	STM A 10	5	ASME B	316.5	WN, 150	CL						
RI INF	D FLANG	====	A	LL	A	STM A 10	5	ASME B	316.5	150 CL							
DLINE	) FLANC																
STUD	) BOLTS	/ NUTS	А	\LL	BOL	T : ASTM / Gr.B7	A193	ASME B1	18.2.1	THREADI CL.2A	NG SHAL	L BE AS	PER ASN	/IE B1.1			
			A	\LL	NUT	NUT : ASTM A194 Gr.2H			THREADING SHALL BE AS PER ASME E CL.2B (NOTE-2)				/IE B1.1				
REV	'. NO.	R1			PF	D. BY: I	MA/TS	JOB NO	O. CL	LIENT: OI	L INDIA	LIMITE	ĒD	ISSUE			
DATI	F	03.06.15	5		CH	HD. BY:	JSA	TCE.	CE. PROJECT: SECONDARY TANK R1					R1			

DATE: 03.06.15

REV. BY

KVK

7547A FARM AT DULIAJAN, ASSAM

SPECIFICATION	N NO.	TA	TA CONS	ULTING	<b>ENGINEE</b>	R	S LIN	<b>IITED</b>	SEC	CTION	<b>1</b> :		
TCE.7547A-300-P	P-1101	PIPII	NG MATER	IAL SPEC	IFICATION		GRAD	DE CB2	SHE	EET	17	OF	36
ITEM	NOMINA SIZE RA inch/r	ANGE		ERIAL ICATION	DIMENSIONA STANDARD	L		REM	MARK	S			
GASKETS	ALI	_		JND SS 316 + IL FILLER	ASME B16.20	)	150 CL	, 3.0 mm THK.					
THREADED FITTINGS	≤ 4	0	ASTM	A 105	ASME B 16.11	1	3000 C	L, SCRW					
TYPE OF VALVE	SIZE RANGE inch./mm		MATERI BODY	AL TRIM	PRESSURE RATING ANSIAS		TYPE SPECIFICAT OF OR ENDS TAG NUMB			F	REM	ARKS	3
GATE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	G83					
GATE	≥ 50 TO 400	A	ASTM A 216 Gr.WCB	13% Cr. STEEL	150		RF	G23					
GLOBE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	T83					
GLOBE	≥ 50 TO 400	A	ASTM A 216 Gr.WCB	13% Cr. STEEL	150		RF	T23					
LIFT TYPE CHECK	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	C83					
CHECK (DUAL PLATE)	≥ 50 TO 400	A	ASTM A 216 GR.WCB	13% Cr. STEEL	150		RF	C23X1					
BALL	≥ 15 TO 400	A	ASTM A 216 Gr.WCB	SS 304	150		RF	B23		TWO REGI (NOT	ULAF	R PO	RT
STRAINER (Y - TYPE)	≤ 40	A	ASTM A 105	SS 304	800		SW	-					
STRAINER (Y - TYPE)	50 TO 15	0	ASTM A 216 Gr.WCB	SS 304	150		RF	-					
STRAINER (T - TYPE)	≥ 200 TC 400	) A	ASTM A 216 Gr.WCB	SS 304	150		RF	-					
NOTES:													

#### NOTES:

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.
- 3. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB & ABOVE.

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO.

### TATA CONSULTING ENGINEERS LIMITED

SECTION:

TCE.7547A-300-PP-1101

PIPING MATERIAL SPECIFICATION | GRADE

CB2

SHEET 18 OF 36

### **BRANCH CONNECTION CHART**

SIZE inch/mm								BRA	NCH						
RUN	15	20	25	40	50	80	100	150	200	250	300	350	400		
15	Т														
20	RT	Т													
25	RT	RT	Т												
40	RT	RT	RT	Т											
50	Η	Н	Н	RT	Т										
80	Н	Н	Н	Н	RT	Т									
100	Н	Ι	Η	Η	S	RT	Т								
150	Н	Ι	Ι	Τ	S	RT	RT	Т							
200	Н	Η	Н	Н	S	S	RT	RT	Т						
250	Н	Н	Η	Η	S	S	S	RT	RT	Т					
300	Н	Н	Н	Н	S	S	S	S	RT	RT	Т				
350	Н	Н	Η	Η	S	S	S	S	S	RT	RT	Т			
400	Н	Η	Н	Н	S	S	S	S	S	S	RT	RT	Т		

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

S - STUB -IN

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPEC	CIFICAT	ION NO.	TAT	TA CC	NSU	JLTIN	G E	NGINE	ERS	LIMIT	ΓED	SECTION:		
TCE.7	547A-30	0-PP-1101	PIPIN	G MA	TERIA	AL SPE	ECIF	ICATION	l G	RADE	СС	SHEET 1	9 OF 36	
SERV	ICE : ST	EAM – IBR (	SL) (REFE	R NOTE-	4 & 5) &	STEAM C	CONDE	NSATE - NO	ON IBR	(CL)				
			ı			Т		1						
<u>I</u>	TEMP.	°F/°C	REFER	PIPING IN	IDEX	CORR.	ALL.	inch/mm	1.5					
DESIGN	PR. ps	ig/kg/cm² g	REFER I	PIPING IN	IDEX	FLANGI	E FAC	ING	RF					
NOM.	PIPE SI	ZE inch	15	20	25	40	50	80	100	150	200	250		
OUTS	IDE DIA.	<del>inch</del> mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3	168.3	219.1	273		
THICK	(NESS	<del>inch</del> mm	SCH 80	SCH 80	SCH 80	SCH 80	SCH 40	SCH 40	SCH 40	SCH 40	SCH 20	SCH 20		
NOM.	PIPE SI	ZE inch mm												
OUTS	IDE DIA	inch mm												
THICK	(NESS	<del>inch</del> mm												
LINE	JOINT			\( \leq 40 - \text{SW TO ASME B16.11} \)     \( \leq 50 - \text{BW TO ASME B16.25 (NOTE - 1)} \)										
			≥ 50 - BW TO ASME B16.25 (NOTE - 1)  NOMINAL											
ITEM			PIF SIZE R. inch/	E ANGE	MATERIAL SPECIFICATION			DIMENSIO STANDA			R	REMARKS		
PIPES	,		≤ 4	0	ASTM A 106 GR. B			ASME B 3	36.10	SMLS, PE				
111 LC	,		50 TO	250	ASTM A 106 GR. B			ASME B 3	36.10	SMLS, BE				
PIPE I	VIPPLES	<u> </u>	15 TC			1 A 106 G		ASME B 3		POE-TOE, TBE, PBE, SCH TO MATCH PIP SMLS, SCH TO MATCH PIPE				
W INGS	ELBOV REDUC	VS, CAPS,	50 TO	250	ASIM	A 234 GR	.WPB	ASME B	16.9	SMLS, SC	CH TO MA	ATCH PIPE		
BW ITTIN	TEES	JEKO,												
Ε	STUB E	ENDS												
0)4/ 5	TTIN 00		≤ 4	0	AS	STM A 10	5	ASME B1	6.11	3000 CL				
SW FI	TTINGS													
BEND	S													
	ICATED CERS													
MITRE	_													
BRAN	CH CON	INECTION	AL	L		-		-				NNECTION CH	ART	
			≤ 4	_		STM A105		ASME B		SW, 150				
FLAN	GES		≥ 50 T0	O 250	AS	STM A105	5	ASME B	16.5	WN, 150	CL			
			AL	1	Δς	STM A 10	<u> </u>	ASME B	16.5	150 CL, F	) F			
BLIND	FLANG	ES	AL			JIWIA 100		AGIVIL B	10.5	130 CL, 1	VI			
OT! ID	DOI TO	ALL			BOLT	: ASTM A	A 193	ASME B1	8.2.1	THREAD CL.2A	ING SHAL	L BE AS PER	ASME B1.1	
2100	BOLTS	/ NUIS	AL	L	NUT :	: ASTM A Gr.2H	194	ASME B1	8.2.2	THREAD CL.2B (N		SHALL BE AS PER ASME B1.1 2)		
REV	NO.	R1			PPD.	BY: MA	VTS	JOB NO.	CLIE	IENT: OIL INDIA LIMITED ISSUE			ISSUE	
DATI	Ξ	03.06.15			CHD	. BY: SS	3	TCE.	PRO	JECT: S	ECOND	ARY TANK	R1	
REV	BY	KVK			DATE: 03.06.15			7547A	FARI	ARM AT DULIAJAN, ASSAM				

SPECIFICATIO	N NO.	TA	TA CONS	ULTING	ENGINE	ER	S LIN	<b>IITED</b>	SECT	ΓIΟI	N:			
TCE.7547A-300-F	PP-1101	PIPII	NG MATER	IAL SPEC	IFICATION		GRAI	DE CC	SHE	ΕT	20	OF 36		
ITEM	NOMINAL SIZE RAI inch/m	NGE		ERIAL ICATION	DIMENSIONA STANDARD			REI	MARKS	ARKS				
GASKETS	ALL			JND SS 316 + IL FILLER	ASME B16.20	0	150 CL	, 3.0 mm THK.						
THREADED	≤ 40		ASTM	A 105	ASME B 16.1	1	3000 C	L, SCRW						
FITTINGS														
TYPE OF VALVE	SIZE RANGE		MATERI	T	PRESSURE RATING		TYPE OF ENDS	SPECIFICATION OR TAG NUMBE		F	REMAI	RKS		
GATE	inch./mm. ≤ 40	1	BODY ASTM A 105	TRIM 13% Cr.	ANSI/ <del>IS</del> 800		SW	G83I	.IX					
	≥ 50 TO		ASTM A 216	STEEL 13% Cr.	000			0031						
GATE	250		Gr.WCB	STEEL	150		RF	G23						
LIFT TYPE CHECK	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	C83I						
CHECK (DUAL PLATE)	≥ 50 TO 250	A	ASTM A 216 Gr.WCB	13% Cr. STEEL	150		RF	C23X1I						
GLOBE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	T83I						
GLOBE	≥ 50 TO 250	F	ASTM A 216 GR.WCB	13% Cr. STEEL	150		RF	T23I						
BALL	≥ 15 TO 250	A	ASTM A 216 Gr.WCB	SS 304	150		RF	B23I	R			E, PORT		
STRAINER (Y - TYPE)	≤ 40	A	ASTM A 105	SS 304	800		SW	-						
STRAINER (Y - TYPE)	50 TO 150	A	ASTM A 216 Gr.WCB	SS 304	150		RF	-						
STRAINER (T - TYPE)	≥ 200 TO 250	A	ASTM A 216 Gr.WCB	SS 304	150		RF	-						
PISTON VALVES	≤ 50	A	ASTM A 216 Gr.WCB	13% Cr STEEL	150		RF	P23I			NOTE	≣-6		
STEAM TRAP	≤ 25		ASTM A 743 CA 40/AISI 420	ASTM A 240 (SCREEN)	MFR'S STD		SW	-		THERMODYNAMIO FOR LINE DRAINS				

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.
- 3. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB & ABOVE.
- 4. PIPES, FITTINGS, FLANGES, VALVES AND SPECIALITIES SHALL BE IBR APPROVED.
- $5. \quad \text{ALL PIPES, FITTINGS, FLANGES, FLANGED AND WELDED END VALVES SHALL HAVE CARBON CONTENT LESS THAN } \\ 0.25\%. \\ \text{MOREOVER FOR FLANGES THE SULPHUR AND PHOSPHURUS SHALL BE LIMITED TO } \\ 0.05\% \, .$
- 6. VALVE SHALL BE GLANDLESS PISTON VALVE.

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: SS	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO.

# TATA CONSULTING ENGINEERS LIMITED

CC

TCE.7547A-300-PP-1101

PIPING MATERIAL SPECIFICATION | GRADE

SHEET 21 OF 36

SECTION:

# **BRANCH CONNECTION CHART**

							BRA	NCH							
15	20	25	40	50	80	100	150	200	250						
Т															
RT	Т														
RT	RT	Т													
RT	RT	RT	Т												
Η	Н	Ι	RT	Τ											
Τ	Н	Ι	Н	RT	Т										
Η	Н	Ι	Н	S	RT	Т									
Τ	Н	Н	Н	S	RT	RT	Т								
Η	Н	Η	Н	S	S	RT	RT	Т							
Η	Н	Н	Н	S	S	S	RT	RT	Т						
	T RT RT RT H H	T	T	T	T	T	T	15       20       25       40       50       80       100       150         T       T       I       I       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	T	15       20       25       40       50       80       100       150       200       250         T       T       I	15       20       25       40       50       80       100       150       200       250         T       T       I	15       20       25       40       50       80       100       150       200       250         T       T       I	15       20       25       40       50       80       100       150       200       250         T       T       I	15	15

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: SS	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

TATA CONSULTING ENGINEERS LIMITED SECTION: SPECIFICATION NO. PIPING MATERIAL SPECIFICATION **GRADE** TCE.7547A-300-PP-1101 CA SHEET 22 OF 36 SERVICE: COOLING WATER(CW), FIRE WATER(FW) & CLARIFIED WATER(TW) TEMP. °F/°C REFER PIPING INDEX CORR. ALL. inch/mm 1.5 S REFER PIPING INDEX FLANGE FACING RF PR. psig/kg/cm<sup>2</sup> g inch NOM. PIPE SIZE 15 20 40 50 80 100 150 200 250 300 350 25 mm inch OUTSIDE DIA. 323.9 21.8 27.3 34.2 48.8 60.8 89.5 115 166.5 219.1 273 355.6 mm inch 4.5 5.0 5.6 5.6 **THICKNESS** HVY HVY HVY HVY HVY HVY HVY HVY THK THK THK THK  $\,mm\,$ inch NOM. PIPE SIZE 400 450 500 600  $\mathsf{mm}$ inch OUTSIDE DIA. 508 610 406.4 457 mm inch 6.3 6.3 6.3 6.3 **THICKNESS** THK THK THK THK mm ≤ 40 - SW TO ASME B16.11 LINE JOINT ≥ 50 - BW TO ASME B16.25 (NOTE -1) **NOMINAL** PIPE DIMENSIONAL MATERIAL **ITFM** RFMARKS SIZE RANGE **SPECIFICATION STANDARD** inch/mm CS, IS 1239 IS 1239 PT-1 ERW, BLACK, PE ≤ 40 ≥ 50 TO 150 IS 1239 PT-1 ERW. BLACK. BE CS. IS 1239 **PIPES** CS, IS 3589 Gr. FE ≥ 200 TO 600 IS 3589 ERW, BLACK, BE 410 CS, IS 1239 PIPE NIPPLES ≥ 15 T0 40 IS 1239 PT-1 POE-TOE, PBE, TBE, SCH TO MATCH PIPE ≥ 50 TO 150 ASTM A234 Gr. WPB **ASME B16.9** SMLS, SCH TO MATCH PIPE ELBOWS, CAPS, BW REDUCERS, ASTM A234 Gr. WPB ≥ 200 TO 600 **ASME B16.9** WELDED, SCH TO MATCH PIPE (NOTE -2) **TEES** STUB ENDS ASTM A 105 **ASME B16.11** 3000 CL ≤ 40 SW FITTINGS BENDS **FABRICATED** REDUCERS **MITRES BRANCH CONNECTION** ALL SEE BRANCH CONNECTION CHART 15 TO 40 ASTM A105 **ASME B16.5** SW, 150 CL **FLANGES** 50 TO 150 ASTM A105 **ASME B16.5** SO, 150 CL ≥ 200 TO 600 IS 2062 Gr. A **ASME B16.5** SO, 150 CL **ASME B16.5** ≤ 150 ASTM A105 150 CL BLIND FLANGES  $\geq$  200 TO 600 IS 2062 Gr. A **ASME B16.5** 150 CL BOLT: ASTM A 307 THREADING SHALL BE AS PER ASME B1.1 ALL **ASME B18.2.1** MACHINE Gr.B **BOLTS/NUTS** THREADING SHALL BE AS PER ASME B1.1 NUT: ASTM A 563 ALL **ASME B18.2.2** CL.2B (NOTE-3) Gr.B REV. NO. PPD. BY: MA/TS JOB NO. CLIENT: OIL INDIA LIMITED **ISSUE** R1 PROJECT: SECONDARY TANK 03.06.15 CHD. BY: JSA TCE. DATE R1 REV. BY **KVK** DATE: 03.06.15 7547A FARM AT DULIAJAN, ASSAM

SPECIFICATION	NO.	TA	TA CONS	ULTING	ENGINEE	ER	S LIN	MITED	SEC	CTION:			
TCE.7547A-300-P	P-1101	PIPII	NG MATER	IAL SPEC	IFICATION		GRAD	DE CA	SHE	ET 23 OF 36			
ITEM	NOMINAL SIZE RAI inch/m	NGE		ERIAL CATION	DIMENSIONA STANDARD			RE	MARK	KS			
STUD	ALL		BOLT : ASTN	Л А193 Gr.B7	ASME B18.2.	1	THREA CL.2A	ADING SHALL B	E AS F	PER ASME B1.1			
BOLTS/NUTS	ALL		NUT : ASTM	A194 Gr.2H	ASME B18.2.:	2		ADING SHALL B (NOTE-3)	E AS F	PER ASME B1.1			
GASKETS	ALL		EP	DM	ASME B16.2	1	SELF-0	CENTERING RIN	NG, 15	0 CL, 2 mm THK.			
	_												
THREADED	≤ 40		ASTM	A 105	ASME B 16.1	1	3000 C	L, SCRW					
FITTINGS													
TYPE OF VALVE	SIZE RANGE		MATERI	AL	PRESSURE RATING		TYPE OF	SPECIFICATI OR		REMARKS			
	inch./mm.		BODY	TRIM	ANSI/IS	E	ENDS	TAG NUMBE	ĒR				
GATE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	G83					
GATE	≥ 50 TO 600	A	ASTM A 216 Gr.WCB	13% Cr. STEEL	150		RF	G23					
LIFT TYPE CHECK	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	C83					
CHECK (DUAL PLATE)	≥ 50 TO 600	P	ASTM A 216 GR.WCB	EPDM	150		RF	C23X1		NOTE-6			
GLOBE	≤ 40	A	ASTM A 105	13% Cr. STEEL	800		SW	T83					
GLOBE	≥ 50 TO 600	4	ASTM A 216 Gr.WCB	13% Cr. STEEL	150		RF	T23					
BALL	≥ 15 TO 600	A	ASTM A 216 Gr.WCB	SS 304	150		RF	B23		TWO PIECE, REGULAR PORT (NOTE-4)			
BUTTERFLY (WAFER)	50 TO 500	A	ASTM A 216 Gr.WCB	EPDM	150		RF	U23	NOTE-5 & 6				
STRAINER (Y - TYPE)	≤ 40	P	ASTM A 105	SS 304	800		SW	-					
STRAINER (Y - TYPE)	50 TO 150	A	ASTM A 216 Gr.WCB	SS 304	150		RF	-					
STRAINER (T - TYPE)	≥ 200 TO 600	P	ASTM A 216 Gr.WCB	SS 304	150		RF	-					

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. USE FLAT END COVERS INSTEAD OF CAPS FOR SIZE ≥ 200 mm.
- 3. NUT SHALL BE ALONG WITH WASHER.
- 4. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB & ABOVE.
- 5. BUTTERFLY VALVES SHALL BE GEAR OPERATED FOR 150 NB & ABOVE.
- 6. STUD BOLTS TO BE USED FOR BUTTERFLY & DUAL PLATE CHECK VALVE.

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO. TATA CONSULTING ENGINEERS LIMITED SECTION:

TCE.7547A-300-PP-1101 PIPING MATERIAL SPECIFICATION GRADE CA SHEET 24 OF 36

## **BRANCH CONNECTION CHART**

SIZE inch/mm								BRA	ANCH							
RUN	15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
15	Т															
20	RT	Т														
25	RT	RT	Т													
40	RT	RT	RT	Т												
50	Н	Н	Н	RT	Т											
80	Н	Η	Η	Η	RT	Т										
100	Н	Η	Η	Ι	RT	RT	Т									
150	Н	Η	Η	Η	S	RT	RT	Т								
200	Н	Η	Η	Ι	S	S	RT	RT	Т							
250	Н	Η	Η	Ι	S	S	S	RT	RT	Т						
300	Н	Н	Н	Н	S	S	S	S	RT	RT	Т					
350	Н	Η	Η	Ι	S	S	S	S	S	RT	RT	Т				
400	Н	Н	Н	Н	S	S	S	S	S	S	RT	RT	Т			
450	Н	Н	Н	Н	S	S	S	S	S	S	S	RT	RT	Т		
500	Н	Н	Н	Н	S	S	S	S	S	S	S	S	RT	RT	Т	
600	Н	Н	Н	Н	S	S	S	S	S	S	S	S	S	RT	RT	Т

### **LEGEND**:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPEC	CIFICAT	ION NO.	TATA CONSULTING ENGINEERS LIMITED  SECTION  PIPING MATERIAL SPECIFICATION GRADE GA SHEET  SHEET				ON:								
TCE.7	547A-30	0-PP-1101	PIPIN	IG MA	TERI	AL SPI	ECIFI	CATION	1 G	RADE	GA	SHEE	T 25	OF 36	
SERV	ICE : INS	TRUMENT	IT AIR(IA), PLANT AIR(PA), PROCESS WATER(PW) & RAW WATER(RW)												
Z	TEMP.	°F/°C	REFER	PIPING II	NDEX	CORR.	ALL. ir	nch/mm	1.5						
DESIGN		ig/kg/cm <sup>2</sup> g		PIPING II			E FACIN	NG	RF						
	PIPE SIZ	inch	15	20	25	40	50	80	100	150	200	250	300		
		mm inch													
0015	IDE DIA.	mm inch	21.3	26.7	33.4	48.3	60.3	88.9	114.3	168.3	219.1	273	323.8		
THICK	NESS	mm	HVY	HVY	HVY	HVY	HVY	HVY	HVY	HVY	4.5 THK	5.0 THK	5.6 THK		
NOM.	PIPE SIZ	ZE inch mm													
OUTS	IDE DIA.	<del>inch</del> mm													
THICK	KNESS	<del>inch</del> mm													
LINE	JOINT		≤ 40 - SW TO ASME B16.11												
				0 - BW TO ASME B16.25(NOTE-1)  NOMINAL											
ITEM			NOM PIF SIZE R	Έ		IATERIAL CIFICATI	REMARK.						REMARKS		
			inch/	mm		S, IS 1239	2								
			≤ ∠	10	(GA	LVANISE	D)	IS 1239 I	PT-1	ERW, PE					
PIPES	5		≥ 50 T	O 150	(GA	S, IS 1239 LVANISE	D)	IS 1239 I	PT-1	ERW, BE					
			200 T	O 300		3589 Gr. I LVANISE		IS 358	89	ERW, BL	ACK, BE				
PIPE I	VIPPLES	;	≥ 15 7	0 40		S, IS 1239 LVANISE		IS 1239 I	PT-1	POE-TOE	, PBE, TI	BE, SCH	ГО МАТС	CH PIPE	
BW FITTINGS	ELBOV REDUC TEES	/S, CAPS, CERS,	≥ 50 T	O 300		A234 Gr. LVANISE		ASME B	16.9	SMLS, S0	CH TO MA	ATCH PIP	E		
FIT	STUB E	ENDS													
SW FI	TTINGS		≤ ∠	10		STM A105 LVANISE		ASME B1	6.11	3000 CL,	SW				
BEND	S														
	ICATED CERS														
MITRE	S														
BRAN	CH CON	NECTION	AL	L	Δ.	-	_	-		SEE BRA	NCH COI	NNECTIO	N CHAR	Т	
			(GALVANISED)						SW, 150	CL					
FLAN	GES		≥ 50 TO 150 ASTM A105 (GALVANISED)					ASME B	16.5	SO,150 C	:L				
			≥ 200 IS 2062 Gr. A (GALVANISED)					ASME B	16.5	SO, 150 (	CL				
DI INIT	LELANG	SANGES SEE STANDARD SEE STANDA													
BLIND FLANGES  ≥ 200  IS 2062 Gr. A (GALVANISED)					ASME B16.5 150 CL										
REV.	NO.	R1			PPD	. ВҮ: М	A/TS	JOB NO	D. CI	LIENT: O	IL INDIA	LIMITE	ED	ISSUE	
DATI		03.06.15	-		CHD	BY: JS	SA	TCE.	TCE. PROJECT: SECONDARY TANK R1				R1		
REV.	BY	KR	CHD. BY: JSA TCE. PROJECT: SECONDARY TANK DATE: 03.06.15 7547A FARM AT DULIAJAN, ASSAM												

TCE.7547A-300-PF	P-1101 PII NOMINAL PIF SIZE RANGI inch/mm	I MATE	IAL SPEC	IFICATION	G	ADE CA						
ITEM	SIZE RANGI	I MATE			_	RADE GA	N SH	SECTION: SHEET 26 OF 36				
		=	ERIAL ICATION	DIMENSIONA STANDARD	L		REMAF	RKS				
MACHINE	ALL		M A307 Gr.B NISED)	ASME B18.2.	1 1	READING SHAL 2A	L BE AS	S PER ASME B1.1				
BOLTS / NUTS	ALL		M A563 Gr.B NISED)	ASME B18.2.2		READING SHAL 2B (NOTE-2)	L BE AS	S PER ASME B1.1				
STUD BOLTS /	ALL		M A193 Gr.B7 ANISED)	ASME B18.2.	1 1	READING SHAL 2A	L BE AS	S PER ASME B1.1				
NUTS	ALL		l A194 Gr.2H NISED)	ASME B18.2.2	, ,	READING SHAL 2B (NOTE-2)	L BE AS	S PER ASME B1.1				
GASKETS	ALL	EP	DM	ASME B16.21	I SE	LF-CENTERING	RING,	150 CL, 2 mm THK.				
THREADED	≤ 40	ASTM A 105 (	GALVANISED)	ASME B 16.1	1 30	00 CL, SCRW						
FITTINGS												
TYPE OF VALVE	SIZE RANGE	MATER	RIAL	PRESSURE RATING	TYP OF	SPECIFIC		REMARKS				
-	inch./mm.	BODY	TRIM	ANSI/ <del>IS</del>	END	5 TAG NUM	ИBER					
GATE	≤ 40	ASTM A 105	13% Cr. STEEL	800	SW	G83	}					
LIFT TYPE CHECK	≤ 40	ASTM A 105	13% Cr. STEEL	800	SW	C83	1					
CHECK (DUAL PLATE)	≥ 50 TO 300	ASTM A 216 GR.WCB	EPDM	150	RF	C23X	(1	NOTE-4				
GLOBE	≤ 40	ASTM A 105	13% Cr. STEEL	800	SW	Т83	1					
GLOBE	≥ 50 TO 300	ASTM A 216 Gr.WCB	13% Cr. STEEL	150	RF	T23						
BALL	≥ 15 TO 300	ASTM A 216 Gr.WCB	SS 304	150	RF	B23	1	TWO PIECE, REGULAR PORT (NOTE-3)				
BALL	≤ 40	ASTM A 105	13% Cr. STEEL	800	SCR'	V B23	Γ	NOTE-6				
BUTTERFLY (WAFER)	50 TO 300	ASTM A 216 Gr.WCB	EPDM	150	RF	U23	ļ	NOTE-4&5				
STRAINER (Y - TYPE)	≤ 40	ASTM A 105	SS 304	800	SW	-	-					
STRAINER (Y - TYPE)	50 TO 150	ASTM A 216 Gr.WCB	SS 304	150	RF	-						
STRAINER (T - TYPE)	200 TO 300	ASTM A 216 Gr.WCB	SS 304	150	RF	-						
NOTES												

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.
- 3. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB.
- 4. STUD BOLTS TO BE USED FOR WAFER TYPE BUTTERFLY AND CHECK (DUAL PLATE) VALVES.
- 5. BUTTERFLY VALVES SHALL BE GEAR OPERATED FOR 150 NB.
- 6. SCREWED BALL VALVE TO BE USED FOR INSTRUMENT AIR SERVICE.

REV. NO.	R1		PPD. BY: MA/T	S JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KR		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO. TCE.7547A-300-PP-1101

## TATA CONSULTING ENGINEERS LIMITED

PIPING MATERIAL SPECIFICATION | GRADE

G۸

SECTION:

SHEET 27 OF 36

# **BRANCH CONNECTION CHART**

							BRA	ANCH							
15	20	25	40	50	80	100	150	200	250	300					
Т															
RT	Т														
RT	RT	Т													
RT	RT	RT	Т												
Н	Н	Н	RT	Т											
Н	Н	Н	Н	RT	Т										
Н	Н	Н	Н	RT	RT	Т									
Н	Н	Н	Н	S	RT	RT	Т								
Н	Н	Н	Н	S	S	RT	RT	Т							
Н	Н	Н	Н	S	S	S	RT	RT	Т						
Н	Н	Н	Н	S	S	S	S	RT	RT	Т					
<u> </u>															
	T RT RT H H H H	T T T T T T T T T T T T T T T T T T T	T T T T T T T T T T T T T T T T T T T	T T T T T T T T T T T T T T T T T T T	T	T       I	T	15       20       25       40       50       80       100       150         T       T       I       I       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	T       I	15         20         25         40         50         80         100         150         200         250           T         I <td>15       20       25       40       50       80       100       150       200       250       300         T       I</td> <td>15     20     25     40     50     80     100     150     200     250     300       T     T     I     I     I     I     I     I     I       RT     T     I     I     I     I     I     I     I       RT     RT     RT     T     I     I     I     I     I     I       H     H     H     H     RT     T     I     <t< td=""><td>15         20         25         40         50         80         100         150         200         250         300           RT         T         I</td><td>15     20     25     40     50     80     100     150     200     250     300       RT     T     I     I     I     I     I     I     I       RT     RT     T     I     I     I     I     I     I       RT     RT     RT     T     I     I     I     I     I     I       H     H     H     H     RT     T     I     I     I     I     I     I     I       H     H     H     H     RT     RT     T     I</td><td>15     20     25     40     50     80     100     150     200     250     300        RT     T                RT     RT     T                RT     RT     RT     T  </td></t<></td>	15       20       25       40       50       80       100       150       200       250       300         T       I	15     20     25     40     50     80     100     150     200     250     300       T     T     I     I     I     I     I     I     I       RT     T     I     I     I     I     I     I     I       RT     RT     RT     T     I     I     I     I     I     I       H     H     H     H     RT     T     I <t< td=""><td>15         20         25         40         50         80         100         150         200         250         300           RT         T         I</td><td>15     20     25     40     50     80     100     150     200     250     300       RT     T     I     I     I     I     I     I     I       RT     RT     T     I     I     I     I     I     I       RT     RT     RT     T     I     I     I     I     I     I       H     H     H     H     RT     T     I     I     I     I     I     I     I       H     H     H     H     RT     RT     T     I</td><td>15     20     25     40     50     80     100     150     200     250     300        RT     T                RT     RT     T                RT     RT     RT     T  </td></t<>	15         20         25         40         50         80         100         150         200         250         300           RT         T         I	15     20     25     40     50     80     100     150     200     250     300       RT     T     I     I     I     I     I     I     I       RT     RT     T     I     I     I     I     I     I       RT     RT     RT     T     I     I     I     I     I     I       H     H     H     H     RT     T     I     I     I     I     I     I     I       H     H     H     H     RT     RT     T     I	15     20     25     40     50     80     100     150     200     250     300        RT     T                RT     RT     T                RT     RT     RT     T

## LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KR		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPE	CIFICAT	ION NO.	TA	TA C	ONS	JLTIN	IG E	NGINE	ERS	S LIMIT	ΓED	SA SHEET 28			
TCE.	7547A-30	0-PP-1101	PIPIN	IG MA	TERI	AL SP	ECIF	CATION	l G	RADE	SA	SHEET	28	OF 36	
SERV	/ICE : DM	I WATER (D	MW) & AC	UEOUS	FOAM (A	vF)									
IGN	TEMP.	ºF/ºC	REFER	PIPING I	NDEX	CORR.	ALL.	inch/mm	NIL						
DESIGN	PR. ps	<del>ig/</del> kg/cm² g	REFER	PIPING I	NDEX	FLANG	E FAC	NG	RF						
NOM.	PIPE SIZ	ZE inch mm	15	20	25	40	50	80	100	150	200	250			
OUTS	SIDE DIA	inch mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3	168.3	219.1	273			
THIC	KNESS	inch mm	SCH 40S	SCH 40S	SCH 40S	SCH 40S	SCH 10S	SCH 10S	SCH 10S	SCH 10S	SCH 10S	SCH 10S			
NOM.	PIPE SI	ZE inch mm													
OUTS	SIDE DIA.	<del>inch</del> mm													
THIC	KNESS	<del>inch</del> mm													
LINE	JOINT		≤ 40 - S	W TO AS	ME B16.	11									
			≥ 50 - B	W TO AS	ME B16.	25 (NOTE	-1)	<u> </u>		ı					
ITEM	ЕМ		NOM PII SIZE R inch	PE ANGE		MATERIAL CIFICATI		DIMENSIO STANDA			R	EMARKS			
חוחבי	`		15 T	O 40	ASTM	A312 Gr.T	P 304	ASME B 3	36.19	SMLS, PE					
PIPES	>		≥ 50 T	O 250	ASTM	A312 Gr.T	P 304	ASME B 3	36.19	SMLS, BI					
PIPE	NIPPLES	<u> </u>	≤ 4	40	_	A312 Gr.T		ASME B 3	36.19	POE-TOE	, TBE, PE	BE, SCH TO	MAT	CH PIPE	
BW TINGS	ELBOV REDUC TEES	VS, CAPS, CERS,	≥ 50 T	O 250		STM A403 3r. WP 304		ASME B	16.9	SMLS, SO	CH TO MA	ATCH PIPE			
BW FITTING	STUB	ENDS	≥ 50 T	O 250	ASTM	1 A403 Gr 304	. WP	MSS-SF	9 43	SMLS, S0	CH TO MA	ATCH PIPE	PIPE		
0)4/ 5	ITTINGO		≤ <b>4</b>	40	ASTM	A 182 Gr.	F304	ASME B1	6.11	3000 CL					
SWF	ITTINGS														
BEND	S														
REDU	ICATED JCERS														
MITR		INECTION	Δ.							CEE DDA	NCH CO	VINIECTIONI (	· LIAF		
DRAI	NCH CON	INECTION	Al s		ASTM	- A 182 Gr.	F304	ASME B	16.5	SW, 150		NNECTION C	, MAR	.1	
FLAN	GES		≥ 50 T		_	STM A 10		ASME B		LJ, 150 C					
			A 400 O	F00.4	A OME D	40.5	450.01								
BLINI	ALL ASTM A 182 ND FLANGES		A 182 Gr.	F304	ASME B	16.5	150 CL								
STUE	ALL STUD BOLTS / NUTS		L		: ASTM / Gr.B7		ASME B1	8.2.1	CL.2A		L BE AS PE				
			Al	L	NUT	: ASTM A Gr.2H	194	ASME B1	8.2.2	THREAD CL.2B (N		L BE AS PE	R AS	ME B1.1	
REV	. NO.	R1			PPD.	BY: MA	NTS	JOB NO.	CLI	ENT: OIL	INDIA	LIMITED		ISSUE	
DAT	E	03.06.15			CHD	. BY: JS	A	TCE.	PRO	OJECT: S	SECON	DARY TAN	IK	R1	
REV	. BY	KVK	_		DATI	E: 03.06	.15	7547A	FAF	RM AT DI	JLIAJAN	N, ASSAM			

SPECIFICATION	NO.	TAT	TA CONS	SULTING	<b>ENGINEE</b>	ER	S LIN	<b>/IITED</b>	SE	SECTION: SHEET 29 OF 3			
TCE.7547A-300-PF	P-1101	PIPIN	IG MATER	RIAL SPEC	IFICATION		GRAD	DE SA	SHI	EET	29	OF 36	
ITEM	NOMINAL SIZE RAN inch/mr	IGE		ERIAL ICATION	DIMENSIONA STANDARD			RE	MARK	S			
GASKETS	ALL		EP	DM	ASME B16.20	0	150 CL	, 3.0 mm THK.					
THREADED FITTINGS	≤ 40		ASTM A 18	32 GR. F304	ASME B 16.1	1	3000 C	L, SCRW					
TYPE OF VALVE	SIZE RANGE inch./mm.		MATERI	IAL TRIM	PRESSURE RATING ANSI/4S		TYPE OF ENDS	SPECIFICATION OR TAG NUMBER		F	REMA	RKS	
GATE	≤ 40		STM A182 Gr.F304	STELLITED	800		SW	G87					
GLOBE	≤ 40		STM A182 Gr.F304	STELLITED	800		SW	T87					
LIFT TYPE CHECK	≤ 40		STM A182 Gr.F304	STELLITED	800		SW	C87					
GATE	≥ 50 TO 250	AS	STM A 351 Gr.CF8	SS 304	150		RF	G27					
GLOBE	≥ 50 TO 250	AS	STM A 351 Gr.CF8	SS 304	150		RF	T27					
CHECK (DUAL PLATE)	≥ 50 TO 250	AS	STM A 351 Gr.CF8	SS 304	150		RF	C27X1					
BALL	15 TO 250	ACTM A 254		SS 304	150		RF	B27		REG	PIEC ULAR ΓE-3)	E, PORT	
STRAINER (Y - TYPE)	≤ 40	ASTM A 351 Gr.CF8		SS 304	800		SW	-					
STRAINER (T - TYPE)	≥ 50 TO 250	AS	STM A 351 Gr.CF8	SS 304	150		RF	-					

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.
- 3. BALL VALVES SHALL BE GEAR OPERATED FOR 150 NB.

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO. TCE.7547A-300-PP-1101

# TATA CONSULTING ENGINEERS LIMITED

PIPING MATERIAL SPECIFICATION

**GRADE** 

SA

SHEET 30 OF 36

SECTION:

# **BRANCH CONNECTION CHART**

SIZE inch/mm								BRA	NCH				
RUN	15	20	25	40	50	80	100	150	200	250			
15	Т												
20	RT	Т											
25	RT	RT	Т										
40	RT	RT	RT	Т									
50	Η	Н	Н	Ι	Т								
80	Н	Н	Н	Н	S	Т							
100	Η	Н	Н	Ι	S	S	Т						
150	Н	Н	Н	Н	S	S	S	Т					
200	Н	Н	Н	Н	S	S	S	S	Т				
250	Н	Н	Н	Н	S	S	S	S	S	Т			

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO. TATA CONSULTING ENGINEERS LIMITED SECTION: TCE.7547A-300-PP-1101 PIPING MATERIAL SPECIFICATION | GRADE SB **SHEET 31 OF 36** SERVICE :CORROSION INHIBITOR - WET CRUDE OIL (ADD1), SULPHATE REDUCING BACTERIA (ADD2), SCALE INHIBITOR(ADD3) & DE EMULSIFIER (ADD4) TEMP. <del>°F/</del>°C REFER PIPING INDEX CORR. ALL. inch/mm NIL REFER PIPING INDEX FLANGE FACING RF PR. psig/kg/cm<sup>2</sup> g inch NOM. PIPE SIZE 15 20 25 40 50 80 100 mm inch OUTSIDE DIA. 26.7 48.3 60.3 88.9 21.3 33.4 114.3 mm inch SCH SCH SCH SCH SCH SCH SCH **THICKNESS** 10S 40S 40S 40S 40S 10S 10S mm inch NOM. PIPE SIZE mm inch OUTSIDE DIA. mm inch **THICKNESS** mm  $\leq$  40 - SW TO ASME B16.11 LINE JOINT ≥ 50 - BW TO ASME B16.25 (NOTE-1)

ITEM			NOMIN PIPE SIZE RA <del>inch/</del> m	NGE	MATERIAL SPECIFICATION	DIMENSIO STANDA		REMARKS		
PIPES			15 TO	40	ASTM A312 Gr.TP 316	ASME B 3	6.19	SMLS, PE		
PIPES	)		≥ 50 TO	100	ASTM A312 Gr.TP 316	ASME B 3	6.19	SMLS, BE		
PIPE I	VIPPLES	3	≤ 40	)	ASTM A312 Gr.TP 316	ASME B 3	6.19	POE-TOE, TBE, PBE, SCH TO MA	TCH PIPE	
BW FITTINGS	ELBOV REDUC TEES	VS, CAPS, CERS,	≥ 50 TO	100	ASTM A403 Gr. WP 316	ASME B1	6.9	SMLS, SCH TO MATCH PIPE		
BW	TEES									
Ŀ	STUB	ENDS	≥ 50 TO	100	ASTM A403 Gr. WP 316	MSS-SP	43	SMLS, SCH TO MATCH PIPE		
SW FI	TTINGS		≤ 40	)	ASTM A 182 Gr. F316	ASME B16	6.11	3000 CL		
BEND										
	ICATED CERS									
MITRE	ES .							OFF DRANGU CONNECTION OF ART		
BRAN	CH CON	INECTION	ALL		-	-		SEE BRANCH CONNECTION CHART		
			≤ 40	)	ASTM A 182 Gr. F316	ASME B1	6.5	SW, 150 CL		
FLAN	GES		≥ 50 TO	100	ASTM A 105	ASME B1	6.5	LJ, 150 CL		
			ALL		ASTM A 182 Gr. F316	ASME B1	6.5	150 CL		
BLINE	FLANG	ES								
CTUD	BOLTS	/ NII ITO	ALL		BOLT : ASTM A193 Gr.B7	ASME B18	3.2.1	THREADING SHALL BE AS PER A CL.2A	ASME B1.1	
3100	DOL13	/ NUTS	ALL		NUT : ASTM A194 Gr.2H	ASME B18	3.2.2	THREADING SHALL BE AS PER ASME B1. CL.2B (NOTE-2)		
REV.	NO.	R1			PPD. BY: MA/TS	JOB NO.	CLI	LIENT: OIL INDIA LIMITED ISSUE		
DATI	E	03.06.15			CHD. BY: JSA	TCE.	PR	PROJECT: SECONDARY TANK R1		
REV	BY	KVK			DATE: 03.06.15	7547A	FAF	FARM AT DULIAJAN, ASSAM		
									<u> </u>	

SPECIFICATION	N NO.	T	ATA CONS	ULTING	<b>ENGINE</b>	ERS	LIM	IITED	SEC	CTIO	N:	
TCE.7547A-300-F	PP-1101	PIP	ING MATER	IAL SPEC	IFICATION	GI	RAD	E SB	SHE	EET	32 OI	F 36
ITEM	SIZE	NAL PIPE RANGE h/mm	MATE	ERIAL ICATION	DIMENSIONA STANDARD			RE	MARK:	S		
GASKETS	F	ALL	EP	DM	ASME B16.20	0 15	O CL,	3.0 mm THK.				
THREADED FITTINGS	<u> </u>	£ 40	ASTM A 18	22 GR. F316	ASME B 16.1	1 30	3000 CL, SCRW					
TYPE OF	SIZ RAN		MATER	RIAL	PRESSURE RATING		YPE SPECIFICAT		-		DEMA DI	<b></b>
VALVE	inch./	_	BODY	TRIM	ANSI/IS	OF END		TAG NUMB	ER	r	REMARK	.0
GATE	≤ 4	.0	ASTM A182 Gr.F316	STELLITED	800	SW		G88				
GLOBE	≤ 4	-0	ASTM A182 Gr.F316	STELLITED	800	SW		T88				
LIFT TYPE CHECK	≤ 4	.0	ASTM A182 Gr.F316	STELLITED	800	SW		C88				
GATE	≥ 50 T0	O 100	ASTM A 351 Gr.CF8M	SS 316	150	RF		G28				
GLOBE	≥ 50 TC	O 100	ASTM A 351 Gr.CF8M	SS 316	150	RF		T28				
CHECK (DUAL PLATE)	≥ 50 T0	O 100	ASTM A 351 Gr.CF8M	SS 316	150	RF		C28X1				
BALL	≥ 15 T0	O 100	ASTM A 351 Gr.CF8M	SS 316	150	RF		B28			PIECE, ULAR P	
STRAINER (Y - TYPE)	≤ 4	-0	ASTM A182 Gr.F316	SS 316	800	SW		-				
STRAINER (T - TYPE)	50 TO	100	ASTM A 351 Gr.CF8M	SS 316	150	RF		-				
	<u> </u>											

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.

FILE NAME: F-087-Rev-R5.docx

REV. NO.	R1	PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15	CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK	DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO.

## TATA CONSULTING ENGINEERS LIMITED

TCE.7547A-300-PP-1101

PIPING MATERIAL SPECIFICATION | GRADE

ADE SB

SECTION:

SHEET 33 OF 36

# **BRANCH CONNECTION CHART**

SIZE inch/mm								BRA	NCH				
RUN	15	20	25	40	50	80	100						
15	Т												
20	RT	Т											
25	RT	RT	Т										
40	RT	RT	RT	Т									
50	Н	Н	Н	Н	Т								
80	Η	Н	Н	Н	S	Т							
100	Τ	Н	Н	Н	S	S	Т						

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

REV. NO.	R1	PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15	CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK	DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO.			TATA CONSULTING ENGINEERS LIMITED SECTION:												
TCE.7	7547A-30	0-PP-1101	PIPING MATERIAL SPECIFICATION GRADE SD									SHEET 34 OF 36			
SERV	ICE : CO	RROSION I	NHIBITOR	HIBITOR - DRY CRUDE OIL (ADD5) & CORROSION INHIBITOR - DRY CRUDE OIL (ADD6)											
						( -/						( -/			
DESIGN	TEMP.	ºF/ºC	REFER	PIPING I	NDEX	CORR.	ALL. i	nch/mm	NIL						
DES	PR. <del>ps</del>	<del>ig/</del> kg/cm² g	REFER	PIPING I	NDEX	FLANG	E FACI	NG	RF						
NOM.	PIPE SIZ	ZE inch mm	15	20	25	40	50	80	100						
OUTS	SIDE DIA.	<del>inch</del> mm	21.3	26.7	33.4	48.3	60.3	88.9	114.3						
THIC	KNESS	<del>inch</del> mm	SCH 40S	SCH 40S	SCH 40S	SCH 40S	SCH 10S	SCH 10S	SCH 10S						
NOM.	PIPE SIZ	ZE inch mm													
OUTS	SIDE DIA.	<del>inch</del> mm													
THIC	KNESS	<del>inch</del> mm													
LINE	JOINT		≤ 40 - SW TO ASME B16.11 ≥ 50 - BW TO ASME B16.25 (NOTE-1)												
			NOMINAL NOMINAL												
ITEM			PIPE		MATERIAL			DIMENSIONAL			DI	EMARKS			
I I LIVI			SIZE RANGE		SPECIFICATION			STANDA	ARD		K	LIVIANNO			
			inch/mm												
PIPES	3		15 T		ASTM A312 Gr.TP 316			ASME B 3	36.19	SMLS, P					
			≥ 50 TO 100		ASTM A312 Gr.TP 316			ASME B 3		SMLS, BE					
PIPE	NIPPLES	<u> </u>	≤ 40		ASTM A312 Gr.TP 316			ASME B 3	36.19	POE-TOE, TBE, PBE, SCH TO MATCH PIPE					
NGS	ELBOWS, CAPS, REDUCERS, TEES		≥ 50 TO 100		ASTM A403 Gr. WP 316			ASME B	16.9	SMLS, SCH TO MATCH PIPE					
BW FITTINGS	ILLS				A CTM A 402 C = \A/D										
Ш	STUB E	ENDS	≥ 50 T		ASTM A403 Gr. WP 316 ASTM A 182 Gr. F316			MSS-SF		SMLS, SCH TO MATCH PIPE					
SW F	ITTINGS		≤ 4	40	ASIM	A 182 Gr.	F316	ASME B1	6.11	3000 CL					
BEND	S														
	ICATED														
MITRI	JCERS ES														
		NECTION	ΑI	1	_			_		SEE BRA	NCH CON	NNECTION C	HART		
510 (1)		112011011	ALL ≤ 40		ASTM A 182 Gr. F316			ASME B16.5		SW, 300					
FLAN	GES		≥ 50 T	O 100	ASTM A 105			ASME B16.5		WN, 300 CL					
			AL	L	ASTM	A 182 Gr.	F316	ASME B	16.5	300 CL					
BLIND FLANGES															
STUD BOLTS / NUTS		AL	L	BOLT : ASTM A193 Gr.B7			ASME B1	8.2.1	5.2.1 THREADING SHALL BE AS PER ASME B1.1 CL.2A						
		AL	L	NUT	: ASTM A Gr.2H	194	ASME B1	8.2.2	THREADING SHALL BE AS PER ASME B1.1 CL.2B (NOTE-2)						
REV	. NO.	R1	•		PPD.	BY: MA	V/TS	JOB NO.	CLI	ENT: OIL	- INDIA L	IMITED	ISSUE		
DAT	E	03.06.15			CHD.	BY: JS	Α	TCE.	PRO	DJECT: S	SECONE	DARY TAN	K R1		

DATE: 03.06.15

7547A

 $\mathsf{KVK}$ 

REV. BY

FARM AT DULIAJAN, ASSAM

SPECIFICATION	N NO.	TA	TA CONS	ERS	S LIMITED			SE	SECTION:				
TCE.7547A-300-P	PP-1101	PIP	PIPING MATERIAL SPECIFICATION						SD	SHI	EET	35 OF	36
ITEM	NAL PIPE RANGE h/mm		ERIAL ICATION	DIMENSIONAL STANDARD		REMAI		MARK	RKS				
GASKETS	A	ALL EPDM			ASME B16.20		300 CL, 3.0 mm THK.						
THREADED FITTINGS	<u> </u>	<u>40</u>	ASTM A 18	ASME B 16.11 3000			00 CL, SCRW						
TYPE OF VALVE	SIZ RAN inch./	GE	MATER	MATERIAL BODY TRIM		(	YPE OF NDS	SPECIFICATION OR TAG NUMBER			REMARKS		s
GATE	± 4		ASTM A182 Gr.F316	STELLITED	ANSI/IS 800		SW	G88		-11			
GLOBE	≤ 4	10	ASTM A182 Gr.F316	STELLITED	800	5	SW		T88				
LIFT TYPE CHECK	≤ 4	10	ASTM A182 Gr.F316	STELLITED	800	5	SW		C88				
GATE	≥ 50 T0	O 100	ASTM A 351 Gr.CF8M	SS 316	300	ı	RF		G38				
GLOBE	≥ 50 T0	O 100	ASTM A 351 Gr.CF8M	SS 316	300	ı	RF		T38				
CHECK (DUAL PLATE)	≥ 50 T0	O 100	ASTM A 351 Gr.CF8M	SS 316	300	I	RF	C38X1					
BALL	≥ 15 T0	O 100	ASTM A 351 Gr.CF8M	SS 316	300	ı	RF	B38				PIECE, JLAR PC	ORT
STRAINER (Y - TYPE)	≤ 4	10	ASTM A182 Gr.F316	SS 316	800	5	SW		-				
STRAINER (T - TYPE)	50 TO	100	ASTM A 351 Gr.CF8M	SS 316	300	ı	RF		-				

- 1. EDGE PREPARATION FOR BUTT WELDING TO BE DONE AT SITE.
- 2. NUT SHALL BE ALONG WITH WASHER.

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	

SPECIFICATION NO.

## TATA CONSULTING ENGINEERS LIMITED

TCE.7547A-300-PP-1101

PIPING MATERIAL SPECIFICATION | GRADE

SD

SHEET 36 OF 36

SECTION:

# **BRANCH CONNECTION CHART**

0.75																
SIZE	BRANCH															
inch/mm															•	
RUN	15	20	25	40	50	80	100									
15	Т															
20	RT	Т														
25	RT	RT	Т													
40	RT	RT	RT	Т												
50	Н	Н	Н	Н	Т											
80	Н	Н	Н	Н	S	Т										
100	Н	Н	Н	Н	S	S	Т									

### LEGEND:

T - STRAIGHT TEE

RT - REDUCING TEE

H - HALF COUPLING

REV. NO.	R1		PPD. BY: MA/TS	JOB NO.	CLIENT: OIL INDIA LIMITED	ISSUE
DATE	03.06.15		CHD. BY: JSA	TCE.	PROJECT: SECONDARY TANK	R1
REV. BY	KVK		DATE: 03.06.15	7547A	FARM AT DULIAJAN, ASSAM	