

 ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)	PROJECT: BRAHMAPUTRA PETROCHEMICAL COMPLEX CLIENT: BCPL		
SCOPE OF WORK AND SUPPLY – PIPING (INSULATION TENDER)	DOCUMENT No. 6907-11-16-43-SOW-3070	Rev. 0	Page 1 of 5

SCOPE OF WORK & SUPPLY – PIPING

INSULATION/ WOODEN BLOCKS/ HIGH DENSITY PUF BLOCKS TENDER – LAKWA

0	06/10/2015	ISSUED FOR BIDS	RR	SK	MI
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

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1.0 SCOPE OF WORK FOR TENDERS

The scope of work shall include hot Insulation, cold insulation, safety insulation of equipments, vessels, exchangers, piping, valve & flange assemblies etc., wooden blocks and High Density PUF support for Cold lines as detailed in schedule of rates and as per specification 6-44-0002 / 6-44-0003. The work in brief shall include the following but not limited to this only:-

- (i) Supply of insulation and ancillary material like spacer-ring , stays, asbestos millboard, lacing and binding wires, screws, bands, asbestos felt, wooden blocks, studs, flats, support ring clips, sealant and mastic, cement, glass cloth, aluminum sheets/ GI sheets necessary drillings and fixing of bolts/nuts, washers etc., wherever specified and required. All insulation material shall be new and of approved quality with complete test certificates and in accordance with the specifications.
- (ii) Application of insulation with weather proofing on vessels, Process columns, Package Equipments, equipments like filters, Heat Exchangers and piping including valves, flanges etc. and instrumentation as per specifications and instructions of Engineer-in-charge.
- (iii) Application of hot insulation on heat traced instruments and level gauges as per specifications and instructions of Engineer-in-charge.
- (iv) Insulation of any other surface as per instruction of Engineer-in-charge.
- (v) Providing scaffolding for all heights, all other incidental/auxiliary /ancillary/accessories, labour, material, tools and tackles / consumables, supervision etc. or any enabling work not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.
- (v) Providing besides all materials and consumables labour and supervision required for carrying out the insulation work, all safety devices, equipments, apparatuses, instruments etc. necessary and incidental requirements to perform the work in workmanship and efficient manner within the stipulated time period.
- (vi) Supply of paint and Color coding identification of equipments, vessels, heat exchangers, process column, piping, instruments etc. after insulation as per relevant specification 6907-0642-PT-L07 and instruction of Engineer-in-charge.
- (vii) Proper storage and protection of insulation material and consumables brought to site by the contractor at all stages of work.
- (viii) Providing insulation plugs and windows at all locations as per drawings, specifications and instructions of Engineer-in-charge.
- (ix) Keeping the working area clean and tidy during course of execution and cleaning the work site to the full satisfaction of the engineer-in-charge after completion of work.

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- (x) Any other incidental/intermediate/ancillary or any enabling work/materials not specifically mentioned in the specifications but necessary for the execution and completion of work as envisaged in the tender document.
- (xi) Certain equipment and piping require chain guards, screens for personnel protection etc. because insulation cannot be provided directly on the equipment/ piping. Contractor shall provide the same as per approved drawings and instructions of Engineer-in-charge.
- (xii) Any lines requiring dismantling of the insulation for inspection / repair / maintenance, erection of any other equipment shall be done by contractor and again secured back in place after completion of the subject activity.
- (xiii) Any line which Owner feels requires insulation during the process of commissioning shall also be done by contractor.
- (xiv) Supply, shaping, positioning and fixing of Wooden Blocks/ High Density PUF support for cold line supports as per EIL support standard.
- (xv) Supply of Primer and Paint, preparation of surfaces/ Rubdown and application of primer and finish paint for touch-up work wherever identified for application by Engineer-in-Charge.

2.0 **BASIS FOR WORK**

The complete Insulation work shall be carried out in accordance with the following:

- a. 'Approved for construction' drawings and sketches issued by EIL to the contractor- Plot plan, layouts, and / or Isometrics / system isometrics.
- b. Drawing, sketches and documents prepared by Contractor duly approved by Engineer-in-charge.
- c. EIL specifications / Documents as below:
 - i) Piping and Instrumentation Diagram (P&ID).
 - ii) Piping support standards.
 - iii) Line list.
 - iv) Any other EIL or other specification attached elsewhere and special conditions of contract.
 - v) Insulation Specifications 6-44-0002 & 6-44-0003
 - vi) Painting Job Specification 6907-0642-PT-L07

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3.0 **SCOPE OF SUPPLY FOR INSULATION TENDER (PIPING)**

3.1 **OWNER'S SCOPE OF SUPPLY**

Insulation Material & PUF Blocks - Only wherever it is mentioned in Owner's Scope of Supply in SOR No. 6907-11-16-43-MH-SOR-3070-0-0M.

3.2 **CONTRACTOR'S SCOPE OF SUPPLY**

The procurement and supply in sequence and at appropriate time of all materials (except insulation material mentioned in clause No. 3.1 above) and consumables required for the completion of the works shall be the responsibility of the contractor and prices quoted shall be deemed to be inclusive of such materials.

The supply of these materials shall include but not limited to the following:

All items required to complete Insulation (Insulation material, attachment material, fixing materials, vapor barrier material, bolting, screws, inspection window, structural attachment etc.) as per EIL standards, specifications and instructions of Engineer-in-charge.

All consumables and equipments which are required for job completion at all elevation and any location.

All sealing and protecting materials required for protecting materials/equipments supplied by Owner/ Contractor

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4.0 LIST OF APPLICABLE JOB SPECIFICATIONS / STANDARD SPECIFICATIONS / STANDARDS / INSPECTION TEST PLANS / DRAWINGS.

S No.	Title	Spec/Std No.	Rev.
1	Overall Plot Plan – Brahmaputra Petrochemical Complex GSU/C2+ Recovery Unit, Lakwa, Assam	6907-11N-16-47-0002	9
2	Schedule of Rates	6907-11-16-43-MH-SOR-3070-0-0M	0
3	Painting Specification	6907-0642-PT-L07	0
4	Standard Specification for hot insulation of vessels, piping & equipments	6-44-0002	5
5	Standard Specification for cold insulation of vessels, piping & equipments	6-44-0003	1
6	Inspection & Test Plans for General Works (Item rate contracts)	6-82-3300	0
7	Standard Quality Assurance Plan - Construction Division (Item Rate Contracts)	6-82-6100	1
8	Specification for Quality Management System Requirements from Bidders	6-78-0001	0
9	Specification for Documentation Requirements from Contractors	6-78-0002	0
10	Specification for Documentation Requirements from Suppliers	6-78-0003	0

JOB SPECIFICATION FOR MODIFICATION OF INSULATION

PROJECT: BRAHMAPUTRA PETROCHEMICAL
COMPLEX, ASSAM

CLIENT : M/s. BCPL ASSAM

UNITS : C2+ RECOVERY, GAS SWEETENING &
OFFSITES OF LAKWA

A	9.10.2015	ISSUED WITH TENDER	SM	PVSS	PVSS
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1.0 SCOPE

This job specification covers the supply of all materials for removal of existing insulation and supply and installation of new insulation etc in strict compliance with the engineering datasheet, specifications and standards. All requirements of applicable design codes, drawings, standard specification, standards e.t.c. shall be complied with. These modifications are required for Demethaniser column (No.11-CC-001), H.P. Separator (Item no.11-VV-006) and L.P. Separator (Item no.11-VV-007) of C2+ Recovery unit of BCPL Lakwa.

2.0 REFERENCE DRAWING

EIL Drawing No. 6907-11N-16-46-3050, Rev.A for Column No. 11-CC-001.
BHEL As-built Drawing No. 0-PV-310-00-109, Rev.4 for Column No. 11-CC-001.
Existing Drawing No. 3030-00-16-46-3-008, Rev.A for Vessel No. 11-VV-006,
Existing Drawing No. 3030-00-16-46-3-009, Rev.A for Vessel No. 11-VV-007

3.0 CONTRACTOR'S SCOPE OF SUPPLY

The procurement and supply in sequence and at appropriate time of all materials and consumables required for completion of work shall be entirely contractor's responsibility and quoted rate for execution of work shall be inclusive of all such items. Contractor shall produce test and inspection certificates for all materials supplied by him. Contractor's scope of supply shall include but not be limited to:

- All materials and accessories required for insulation
- All items required for removal of insulation wherever required.
- All items covered in applicable EIL Standard.
- Any other metallic and non-metallic parts, consumables not covered above but required to complete the work including inspection and testing etc.

4.0 CONTRACTOR'S SCOPE OF WORK

Scope of work shall in general be but not limited to following :

- Removal of existing insulation of entire Demethaniser column (No.11-CC-001), H.P. Separator (Item no.11-VV-006) and L.P. Separator (Item no.11-VV-007)
- Providing scaffoldings (tubular structure), temporary platforms/ladders, supports, for the satisfactory completion of work.
- Installation of new insulation as per reference drawing and specification.

- Cleaning and clearing of all debris to the satisfaction of Engineer-in-Charge.
- All the dismantled items shall be transported to the storage/dump yard located.
- Completing the work in all respects as per specification, standards and drawings and instructions of Engineer-in-Charge.

5.0 REMOVAL OF OLD INSULATION AND PROVIDING NEW INSULATION

- a. The existing insulation shall be removed completely from the entire column.
- b. The existing insulation cleats shall be reused for the installing of new insulation. The 'T' cleats as per EIL Std. 7-12-0025 already welded with the column shall be reused and 'FLAT' shall be replaced with new 'FLAT' of suitable size to accommodate the new insulation thickness. No new cleat shall be directly welded to the column shell/head. New aluminium sheeting with aluminium foil will be provided above the insulated surface.

SCOPE OF WORK/SUPPLY (ROTATING EQUIPMENT)

BALANCE INSULATION WORKS TENDER AT LAKWA

PROJECT : BRAHMAPUTRA PETROCHEMICAL COMPLEX
SITE : LAKWA
CLIENT : M/s. BCPL
JOB NO. : 6907

A	10.10.2015	Issued with BALANCE INSULATION WORKS TENDER	AP	NK	NK
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1.0 CONTRACTOR'S SCOPE OF WORK

1.1 SPECIFIC REQUIREMENTS

1.1.1 Pump items nos. 11-PA-008 A/B, 11-PA-010 A/B & 11-PA-011 A/B (After shutdown):

- (a) Pump items 11-PA-008 A/B, 11-PA-010 A/B & 11-PA-011 A/B are of Vertical Barrel type.
- (b) Scope of supply & work of "Balance Insulation Tender Contractor" shall be Supply, Installation and Application of Cold Insulation around the Suction Barrel/Cans of 11-PA-008 A/B, 11-PA-010 A/B & 11-PA-011 A/B as per instructions of Engineer-in-charge and also in accordance to EIL Std. Specification 6-44-0003.
- (c) Refer SOR Doc.# 6907-11-82-41-MH-SOR-3070-0 for further details.

Remark:

Dismantling of the existing pumps (11-PA-001 A/B and 11-PA-002 A/B) and erection of New Pump items (11-PA-008 A/B, 11-PA-010 A/B & 11-PA-011 A/B) at their designated locations will be carried out by a separate mechanical works contractor. Seal plan for these pump items shall be on a separate Skid/Baseplate and shall not be mounted on the Pump Skid/Baseplate. Hence, in addition to above, the mechanical works contractor shall also carry out erection of the Seal Plan Skid on the designated location as well as hooking-up of interconnecting piping between Seal Plan skid and Pump skid.

EQUIPMENT DETAILS FOR INSULATION

(PRESSURE VESSELS, COLUMNS & HEAT EXCHANGERS)

 ENGINEERS INDIA LIMITED NEW DELHI	CLIENT : BCPL PROJECT : BPCP UNIT : C2 + REC GSU, OFFSITES LAKWA						EQUIPMENT DETAILS FOR INSULATION	DOCUMENT NO.	REV
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DEPT.: STATIC EQUIPMENT

**EQUIPMENT DETAILS FOR INSULATION
TABLE-1 (VESSELS & COLUMNS)**

JOB NO. : 6907

A1. LIST OF NEW EQUIPMENTS FOR C2+RECOVERY UNIT

SL. NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUTSIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	OPER. TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL THK. (mm)	TOTAL INSULATION AREA (M ²) (FOR EACH ITEM) (10% EXTRA)				REMARK
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
1.	11-VV-006	HP SEPERATOR	1	1800	6000	SKIRT	V	-70	I _c	155	-	-	41	10	Note-8
2.	11-VV-007	LP SEPERATOR	1	1800	4200	SKIRT	V	-114	I _c	215	-	-	30	10	Note-8
3.	11-VV-013	FEED GAS MOISTURE SEPERATOR	1	1480	3500	PIPE LEG	V	50	-	-	-	-	-	-	
4.	11-VV-014	DEMETHANISER REFLUX DRUM	1	1232	4000	SADDLE	H	-103.2	I _c	215 (PUF)	-	-	17	4.5	
5.	11-VV-015	BLOW DOWN DRUM	1	3020	6000	SKIRT	V	-92 to -143	I _s	25	-	-	63	27	
6.	11-VV-016	LP CONDENSATE POT	1	457	1350	ANGLE LEG	V	147	I _H	45	2.2	0.7	-	-	

B1. LIST OF EXISTING EQUIPMENTS FOR C2+RECOVERY UNIT

6.	11-CC-001	DEMETHANISER COLUMN	1	1032 (TOP)	32300	SKIRT	V	-95.8 / -96.4	I _c	215 (PUF)	-	-	25	1.6	Note-5
				1400 (BOTTOM)				29.7 / 30.2	I _H	50	126	3	-	-	

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C1. LIST OF NEW EQUIPMENTS FOR GAS SWEETENING UNIT (GSU)

SL. NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUTSIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	OPER. TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL THK. (mm)	TOTAL INSULATION AREA (M²) (FOR EACH ITEM)				REMARK
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
1.	051-CC-101	ABSORBER	1	1384	16500	SKIRT	V	TOP: 59.4 BOTT: 58	I _S	25	78	5.6			
2.	051-CC-102	REGENERATOR	1	924	21350	SKIRT	V	TOP: 108 BOTT: 122	I _H	25	68	2.5			
3.	051-CC-103	SWEET GAS WATER WASH COLUMN	1	1164	8610	SKIRT	V	TOP: 58.9 BOTT: 59	-	-	-	-	-	-	
4.	051-VV-101	RICH AMINE FLASH DRUM	1	1616	4800	SKIRT	H	59.2 to 60.3	-	-	-	-	-	-	
5.	051-VV-102	REFLUX DRUM	1	813	2115	ANGLE LEG	V	47	-	-	-	-	-	-	
6.	051-VV-103	CONDENSATE DRUM	1	406	1710	ANGLE LEG	V	147.5	I _H	30	2.4	0.5	-	-	
7.	051-VV-104	AMINE SUMP DRUM	1	1424	4200	PADS	H	Amb. to 121	-	-	-	-	-	-	U/G
8.	051-VV-105	REGENERATOR HYDROCARBON SKIM OF POT	1	472	1000	ANGLE LEG	V	121.4 to 124	I _S	25	1.65	0.65	-	-	
9.	051-TT-101	AMINE STORAGE TANK	1	4012	4800	-	H	52.3	-	-	-	-	-	-	
10.	051-GN-101 A/B	CATRIDGE FILTERS #1	2	168	1400	ANGLE LEG	V	52.3	-	-	-	-	-	-	
11.	051-GN-102 A/B	CATRIDGE FILTERS #2	2	168	1400	ANGLE LEG	V	52.3	-	-	-	-	-	-	
12.	051-GN-103 A/B	FILTRATION CHARCOAL FILTERS	2	640	6400	PIPE LEG	V	52.3	-	-	-	-	-	-	
13.	051-GN-104	FEED GAS FILTER COALESCER	1	1057	3700	SADDLE	H	50	-	-	-	-	-	-	Sump Φ219mm x2000mm

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D1. LIST OF NEW EQUIPMENTS FOR OFFSITES

SL. NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUTSIDE DIA. (mm)	LENGTH TL TO TL (mm)	SUPPORT TYPE	POSITION (See note 2)	OPER. TEMP. °C	TYPE OF INSULATION (See note 3)	INSUL THK. (mm)	TOTAL INSULATION AREA (M ²) (FOR EACH ITEM)				REMARK
											HOT		COLD		
											SHELL	HEAD	SHELL	HEAD	
1.	44-TB-01 A/B	C2+ BULLETS	2	4088	25000	SADDLE	H	28 to 33	t _e	85 (cellulose or glass)	-	-	353	58	Note-4
2.	28-VV-006	N2 RECEIVER	1	2328	5750	SKIRT	V	50	-	-	-	-	-	-	
3.	052-GN-101 A/B	C2+LIQ. BASKET FILTER	2	273	800	ANGLE LEG	V	30	-	-	-	-	-	-	

TABLE-2 (HEAT EXCHANGER)

A2. LIST OF NEW EQUIPMENTS FOR C2+RECOVERY UNIT

SL. NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUTSIDE DIA. (mm)	OVERALL LENGTH (mm)	SUPPORT TYPE	POSITION (See note 2)	OPER. TEMP. SHELL SIDE °C	OPER. TEMP. TUBE SIDE °C	TYPE OF INSULATION SHELL SIDE (See note 3)	TYPE OF INSULATION TUBE SIDE (See note 3)	INSUL THK. SHELL SIDE (mm)	INSUL THK. TUBE SIDE (mm)	REMARK
1	11-EP-012	FEED GAS/LEAN GAS EXCHANGER	1	900x943	2400	-	V	-	-	-	-	-	-	Note-6
2	11-EP-014	FEED GAS CHILLER	1	900x936	2400	-	V	-	-	-	-	-	-	Note-6
3	11-EP-015	DEMETHANISER CONDENSER	1	750x720	2500	BRACKET	V	-	-	-	-	-	-	Note-7

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SL. NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUTSIDE DIA. (mm)	OVERALL LENGTH (mm)	SUPPORT TYPE	POSITION (See note 2)	OPER. TEMP. SHELL SIDE °C	OPER. TEMP. TUBE SIDE °C	TYPE OF INSULATION SHELL SIDE (See note 3)	TYPE OF INSULATION TUBE SIDE (See note 3)	INSUL THK. SHELL SIDE (mm)	INSUL THK. TUBE SIDE (mm)	REMARK
4	11-EE-016	DEMETHANISER REBOILER	1	451	5428	BRACKET	V	IN : 132.3 OUT : 100	IN : 29.7 OUT : 40.9	I _H	I _H	125 (PUF)	90 (PUF)	
5	11-EE-017 A	BLOWDOWN VAPORISER	1	2900	7320	SADDLE	H	IN : 102.7 OUT : 102.7	IN : -143.6 OUT : -141.7	I _H	I _C	25	180	Refer MDS
6	11-EE-017 B	BLOWDOWN VAPORISER							IN : 147.5 OUT : 145.4		I _H		25	
7	11-EE-018	BLOWDOWN SUPERHEATER	1	840	6088	SADDLE	H	IN : 102.7 OUT : 100.4	IN : -142.8 OUT : 5	I _H	I _C	25	180	

B2. LIST OF NEW EQUIPMENTS FOR GAS SWEETENING UNIT (GSU)

SL. NO.	ITEM NO.	DESCRIPTION	QTY. (Nos.)	OUTSIDE DIA. (mm)	OVERALL LENGTH (mm)	SUPPORT TYPE	POSITION (See note 2)	OPER. TEMP. SHELL SIDE °C	OPER. TEMP. TUBE SIDE °C	TYPE OF INSULATION SHELL SIDE (See note 3)	TYPE OF INSULATION TUBE SIDE (See note 3)	INSUL THK. SHELL SIDE (mm)	INSUL THK. TUBE SIDE (mm)	REMARK
1.	051-EE-102 A/B	REGENERATOR REBOILER	2	774	6420	SADDLE	H	IN : 119.9 OUT : 121.4	IN : 147.2 OUT : 147.2	I _H	I _H	25	30	
2.	051-EA-103	REGENERATOR OVERHEAD CONDENSOR	1	2478 X 650	6500	ISM BEAMS	H	-	IN : 107.4 OUT : 47	-	-	NIL	NIL	
3.	051-EA-104	LEAN AMINE COOLER	1	2478 X 640	6500	ISM BEAMS	H	-	IN:68.2 OUT:53.4	-	-	NIL	NIL	
4.	051-EA-105	SWEET GAS COOLER	1	1838 X 870	5000	ISM BEAMS	H	-	IN:57.7 OUT:50	-	-	NIL	NIL	
5.	051-EA-106 A/B	CONDENSATE COOLER	1	766 X 660	3000	ISM BEAMS	H	-	IN:147.5 OUT:45	-	-	NIL	NIL	

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NOTES:

1. For elevation of equipment from grade, refer to equipment layout enclosed elsewhere in the tender document.
2. **H - Horizontal; V – Vertical**
3. I_H - Hot Insulation; I_C - Cold Insulation; I_p - Personnel Protection; I_t - Insulation for Heat traced vessel; I_{Et} - Insulation for electrically Heat traced vessels; I_S - Safety Insulation
4. ~~After Insulation, fire proofing should be carried as per 6907-0643-SP-FP-03 Rev. A.~~
5. Contractor scope includes the removal of the existing insulation (Insulation thickness 80mm of Cold PUF) for the entire column, after that nozzle modification to be carried out as per 6907-11N-16-46-SP-0004 Rev. A. and installation of new insulation as per the given details.
6. For Brazed Plate Fin type Heat Exchangers 11-EP-012 & 11-EP-014 will be supplied together inside a cold box. The insulation material is Perlite (Weight ~50KN). The insulation material will be supplied by vendor (M/s. Hangzhou Zhongtai Process Equipment Co. Ltd, China). Contractor's scope includes the installation of this insulation inside the cold box as per the instructions of the vendor / engineer in charge.
7. For individually insulated Brazed Plate Fin type Heat Exchangers 11-EP-015, Contractor scope includes the supply and installation of the insulation material as per the specification details given by vendor (M/s. Hangzhou Zhongtai Process Equipment Co. Ltd, China).
8. Contractor's scope includes the removal of the existing insulation and installation of new insulation as per the given details. (Existing insulation for 11-VV-006 is 95mm thk, I_C & for 11-VV-007 is 165 mm thk, I_C.)

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