



**COAL GASIFICATION PLANT FOR GENERATING
SYNTHETIC NATURAL GAS (SNG) AT BARDHAMAN,
WEST BENGAL (INDIA)**

COAL GAS INDIA LIMITED (CGIL)



Date 25.09.2026

CORRIGENDUM-III

NIT NO.,: PNMM/PC-217/E/001 DATED 07.09.2026

**SUB. :COAL GASIFICATION PLANT FOR GENERATING SYNTHETIC NATURAL GAS
(SNG) AT BARDHAMAN, WEST BENGAL (INDIA)**

This is for information to all Bidders who are willing to participate in the subject NIT, that CORRIGENDUM-III date 25.09.2026 is being issued and shall be read in conjunction to the NIT and subsequent Amendments issued till date.

*All other terms & conditions of NIT shall be as per original NIT and subsequent Amendment(s).

For & on behalf of
COAL GAS INDIA LIMITED (CGIL)

Ritu Agarwal
25/9/26

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**COAL GASIFICATION PLANT FOR GENERATING SYNTHETIC NATURAL GAS (SNG) AT
BARDHAMAN, WEST BENGAL (INDIA)
(NIT NO : PNMM/PC-217/E/001 DATED 07.09.2026)
Corrigendum III: Technical (Process) dated 25.09.2026**



SL. NO.	REFERENCE OF BIDDING DOCUMENT				AMENDMENT TYPE M/D/A	MODIFICATION
	Part/Sec.	Page No.	Clause No.	Description as per NIT		
1.	SEC-4.0	4 of 19	2.2.7 (Gasifier Configuration)	The technical proposal from the bidders shall be based on following two design cases: 1. Plant Design case (PDC case) 2. Equipment Design Case (EDC case) EDC design case has been specified with 18.4%% overdesign margin on PDC case. Gasification Plant shall be designed for EDC case.....	M	The technical proposal from the bidders shall be based on following two design cases: 1. Plant Design case (PDC case) 2. Equipment Design Case (EDC case) EDC design case has been specified with 18.4 20% overdesign margin on PDC case. Gasification Plant shall be designed for EDC case.....
2.	Sec 5.1 (DESIGN PHILOSOPHY – PROCESS)	--	Sec 5.1	Sec 5.1 DESIGN PHILOSOPHY – PROCESS (Revised Corrigendum I)	A	Sec. 5.1 “DESIGN PHILOSOPHY – PROCESS” of NIT, Part-II (Technical) is missing, same is being attached and shall form part of the Tender document.

LEGEND:

M: MODIFICATION, A: ADDITION, D: DELETION.

Encls.: Sec 5.1 ‘DESIGN PHILOSOPHY – PROCESS’

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PART II: TECHNICAL

SECTION – 5.1

DESIGN PHILOSOPHY - PROCESS

PLANT: COAL GASIFICATION PLANT FOR GENERATING SYNTHETIC NATURAL GAS

PROJECT: SYNTHETIC NATURAL GAS PRODUCTION THROUGH COAL GASIFICATION ROUTE AT BARDAHMAN, WEST BENGAL (INDIA).

0	19/08/2026	16/09/2025	Issued for Tender Purpose	SK	TNN	MN
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD

	<u>COAL GASIFICATION PLANT FOR PROPOSED COAL TO SYNTHETIC NATURAL GAS</u> <u>OWNER: COAL GAS INDIA LIMITED</u> <u>DESIGN PHILOSOPHY - PROCESS</u>	PC217/E/001/P-II/SEC-5.1	0	
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1.0 GENERAL

The plants shall be designed to operate safely and satisfactorily at a capacity of 50% (turn down capacity) to 110 % (i.e. Design Capacity). Equipment and machinery shall be provided so that the plants can operate for at least two years without major overhaul or inspection. All design shall conform to the latest edition of the applicable sections of ASME, ASTM, IEEE, NFC, TEMA, AISI, NEMA, AISC, ACI, OSHA, UBE and other governing codes or standard practices. Any other equivalent and acceptable Code of Standard practice may be adopted with the approval of the Process Licensor. For Gasifier, Licensor's recommendations shall be followed. In addition, the following state/local Codes/laws shall supplement:

a)	Pressure Vessels/ Formed ends	ASME, Section VIII, DIV.I / Indian Standard IS 4049.
b)	Boilers	Indian Boiler Regulations Act
c)	Buildings & Structural	Relevant Indian Standard (BIS)
d)	Electricity	Indian Electricity Rules.
e)	Sanitary	Relevant Indian Standard (BIS)
f)	Safety	a) PESO b) NFPA
g)	Water Pollution	Relevant Indian Standard (BIS) / Central Pollution Control Board/ West Bengal State Pollution Control Board limits norms set by Ministry of Environment & Forest, MINAS

1.1 System of Measurements:

The system of measurement metric shall be as follows:

Parameter	Preferred Units	Alternative Units
Temperature	°C	
Pressure - absolute	kg/cm ² abs	
Pressure - gauge	kg/cm ² g	
Flow (liquid)	m ³ /hr	kg/hr
Flow (gas)	Nm ³ /hr	kg/hr
Flow (steam)	kg/hr	
Length, Level	mm	M
Time	hr	sec, min
Heat	kcal	Gcal

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Parameter	Preferred Units	Alternative Units
Power	kW	
Fouling resistance	m ² hr °C / kcal	
Pipe size / diameter	Inches (in)	Mm
Mass	kg	
Liquid relative density	sp gr T°C/15.6°C	
Liquid density	kg/m ³	
Vapor flowing density	kg/m ³	
Furnace draft	mm of WC	
Storage tank pressure	mm of WC	
Vacuum	mm of Hg, mm WC	
Standard vapor	Nm ³ /hr at 0°C & 1.033 kg/cm ² a	
Standard liquid	m ³ /hr at 15.6°C	
Thermal conductivity	kcal/hr-m-°C	
Heat Transfer coefficient	kcal/hr-m ² -°C	
Enthalpy, Entropy	kcal/kg	
Heat rate	10 ⁶ kcal/hr or MM kcal/hr	Gcal
Viscosity	cP	
Kinematic Viscosity	cSt	
Sound Pressure	dB(A)	
Sound Power	dB(A)	

2.0 DESIGN PRESSURE

2.1 General Rule:

Design pressure of Process Static Equipment shall be based on the maximum Operating Pressure. Malfunction and Equipment failure shall be taken into consideration by safety devices. Design pressure shall be selected from the list below. Alternatively LSTK Contractor shall select the design pressures as recommended by the process licensor.

- For max operating pressure below 2 kg/cm² g use 3.5 kg/cm² g
- For max operating pressure between 2 kg/cm²g and 15 kg/cm²g use Max. Operating Pressure + 1.5 kg/cm²
- For Max. Operating Pressure between 15 kg/cm² g and 100 kg/cm² g use Max. Operating pressure x 110 %
- For Max. Operating Pressure equal and above 100 kg/cm² g use the Maximum Operating Pressure + 10 kg/cm² g. Alternatively LSTK Contractor shall select the maximum operating pressure as recommended by the process licensor.

2.2 Equipment under Vacuum:

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Equipment normally operated under vacuum is designed for full vacuum and for the highest pressure it can experience in case of vacuum failure. Equipment containing a fluid with a vapour pressure at ambient temperature lower than atmospheric pressure which can be isolated shall be equipped with vacuum breaking device or else be designed for full vacuum. Equipment subject to vacuum due to mal-operation or failure shall be equipped with vacuum breaking devices or else be designed for full vacuum.

2.3 **Complete Systems:**

Several pieces of Equipment protected by the same relief valve shall have a design pressure of at least the set pressure of the relief valve.

2.4 **Equipment on the Discharge of a Pump:**

Equipment which may have to bear the shut-off pressure of a pump shall have a design pressure equal to or higher than the shut-off pressure. Pump shut-off pressure shall be estimated according to Clause 7.0.

2.5 **Reactor Loops and Similar Process Systems:**

For reactor loops and similar process systems the recommendations of API RP 521 Appendix F (latest edition) and API RP 520 Appendix B (latest edition) will be followed.

2.6 **Thin walled Tanks and Vessels:**

Atmospheric thin walled tanks and vessels shall have a design pressure equal to the highest pressure imposed upon discharge of the pressure relief device. The design pressure for vacuum shall be equal to the lowest pressure imposed upon suction of the vacuum relief device.

3.0 **DESIGN TEMPERATURE**

Design temperature for process equipment shall be whichever is higher:

- Maximum operating temperature + 15 °C
- Boiling temperature at design pressure of process medium inside, if applicable.
- Design temperature shall be rounded up to full 5°C steps.

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- d) Design minimum temperature shall be specified only if the minimum operating temperature is below 0 °C. Design minimum temperature shall be 5 °C less than the minimum operating temperature. Special attention shall be given to low boiling liquids.
- e) For piping, design temperature shall be determined according to ASME B 31.3.

Alternatively LSTK Contractor shall select the design temperature as recommended by the process licensor.

4.0 CORROSION ALLOWANCE

Materials of construction and corrosion allowance for all Equipment and machinery shall be for a design life of 25 years (except for heat exchanger tubes). However, minimum corrosion allowance for carbon steel (including 0.5 Mo alloy steels) shall be:

Pressure Vessels and other applicable Equipment	3 mm
Storage Tanks	1.5 mm
Piping	1.5 mm
Removable parts or internals (on each side in Contract with operating fluid)	0.75 mm
For stainless steel/titanium	0 mm
Carbon steel with epoxy resin coating	3 mm

5.0 HYDRAULIC RETENTION TIME

Hydraulic retention time (Hold-up Requirements) is defined between low level (LL) and high level (LH).

Type of Service	Retention Time
Feed Surge drum	30 minutes (*)
Reflux only	5 minutes (*)
Column Feed on flow control	15 minutes (*)
On cascade level/flow control	8 minutes (*)
Re boiling by Fired Heater	8 minutes (*) on feed to heater
Re boiling by Thermo siphon	10 to 30 seconds on circulation
PRODUCTS to storage	
Without Pump	5 minutes (*)
With Pump	7 minutes (*)
Feeds and Products feeding another Unit	
On flow control	15 minutes (*)
On cascade/level flow control	8 minutes (*)
Tanks capacities	LSTK Contractor to confirm
Steam drum (LHH – empty) Min	10 minutes
Deareator Min	30 minutes (*)

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In the case of pumps ensuring several services such as reflux and liquid distillate to storage, the residence time of the corresponding vessel will be whichever is greater from the above list.

(*) To be advised by LSTK Contractor.

6.0 HEAT EXCHANGERS

In general heat exchangers shall be designed to 110 % of their operating duty/flow.

Columns overhead coolers shall be designed to 120 % of their operating duty/flow.

Large heat exchangers shall be split into two or more shells for easy operation and maintenance. As far as possible AES type of exchangers shall not be used.

7.0 PUMPS

Normally pumps shall be designed to 110 % (else as defined in individual sections) of their maximum required flow rate in worst case of operation. Pumps for fractionation column reflux, pump round and re-boiler, flow rates shall be designed to 120% of their maximum required flow rates.

The shut-off pressure shall be estimated according to the following criteria whichever is higher:

- Differential head at rated flow x 120 % + LH (level high) suction static head + max operating pressure suction side.
- Differential head of pump at rated flow + LHH (level high high) suction static head + design pressure suction side x 120 %. No over design shall be applied to the rated pressure.

BFW pumps shall be designed for 120% of their maximum required flow rate in worst case of operation. Pump drives shall be preferably electric motor driven, wherever is applicable and Steam Turbines shall be preferably of Back-Pressure type.

8.0 COMPRESSORS

In general, compressors shall be designed to a minimum of 110 % (else as defined in the individual sections) of their maximum required flow. However, they are subject to special considerations according to the process. All vent valves and anti-surge valve shall be of leakage Class-V.

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9.0 PRESSURE RELIEF VALVES

All Pressure safety Valves (PSVs/ Pressure Relief Valves (PRVs) shall be supplied with Upstream/Downstream Isolation valves along with installed Spare and Bypass line wherever required for continuous operation, statutory compliance, requirement of applicable API/IBR/ASME/other international design guidelines, Process Licensor requirements or where isolation of relief valve or bypass line for maintenance/testing is envisaged without shutdown of the protected equipment/line. Also, PRV on fire case with Hydrocarbon service shall have installed spare. LSTK Contractor shall take care of any additional requirement as per guidelines of the process licensor. The set pressure of pressure relief valves shall be equal to the design pressure of the equipment. All Pressure relief blow out lines of process gas and Syn gas should be connected to Flare.

10.0 COLUMNS AND VESSELS

10.1 Nozzle:

- Minimum size 3/4" (for S.S shall be 1 inch).
- Nozzle rating according to one of connected piping, for instrument min. Class 300 ANSI rating.

10.2 Manhole:

- Manhole size 24" (*)
- Manhole installation for Tray Tower

For tray towers, manholes shall be provided at top, bottom, feed point and draw-off point of tower and after each 20 trays or after every 15 m elevation distance, whichever is lesser as minimum.

(*) In case there is restriction for diameter, minimum 20" may be used.

10.3 Hand hole or Inspection hole:

- Preferable Size 8 inches
- Minimum Size 6 inches

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10.4 **Vent and Drain:**

Vent and drain for vessels will normally be provided at the minimum length on overhead or bottom line in accordance with the following table:

Volume or diameter of vessel (m ³ or mm)	Vent diameter (inches)	Drain diameter (inches)
V < 75	2	2
75 < V ≤ 220	3	3
220 < V ≤ 420	4	4
V > 420	6	4

Note: Vent and drain connections are not necessarily located on vessels.

All Columns shall have high efficiency demister for removal of moisture and entrainment.

10.5 **Steam Out:**

Steam out nozzles shall be sized as follows:

Type of Application	Nozzle Size (inches)
Drums and heat exchangers (when applicable)	2
Column diameter (m), D	
a) D ≤ 4	2
b) 4 < D ≤ 5.5	3
c) D > 5.5	4

10.6 **Storage (Chemical/Catalyst/Additives):**

LSTK Contractor shall consider all facilities necessary for safe loading, unloading, storage, transportation of chemical/ catalyst/ additives within the plant Battery limit during Construction stage.