

BHEL

ANNEXURE-IV

Fuel Gas Composition

RLNG COMPOSITION & CONVERSION FACTOR (As per GTA)**APPENDIX 3 - QUALITY SPECIFICATIONS****GROSS HEATING VALUE OF GAS**

The Gas offered at the Delivery Point shall have a Gross Heating Value in a gaseous state in the range of one thousand and fifty (1050) BTU's per Standard Cubic Foot (approximately equal to 9,340 kilo calories per Standard Cubic Meter) to one thousand one hundred and seventy (1170) BTU's per Standard Cubic Foot (approximately equal to 10,420 kilo calories per Standard Cubic Meter).

COMPOSITION OF GAS

The Gas to be supplied by Seller to Buyer, shall have the following composition.

Composition Of Gas	
Component	Specifications
Methane (C1)	not less than 85 Mol %
Ethane (C2)	not more than 9.2 Mol %
Propane (C3)	not more than 3.00 Mol %
Butanes (C4) and heavier	not more than 2.00 Mol %
Pentanes (C5) and heavier	not more than 0.25 Mol %
Nitrogen (N2)	not more than 1.25 Mol %
Oxygen (O2)	not more than 0.5 Mol %
Total Non Hydrocarbons	not more than 2.0 Mol %
Total Sulphur including H2S	not more than 10 ppm by weight expected H2S content not more than 4ppm by volume.

RLNG Composition as received from GAIL	MW	Cal Value Kcal/kg (GCV)	Cal Value Kcal/kg (LCV)	Mol%	Normalized composition
CH4	16.043	13270	11952	>85	85.00
C2H6	30.07	12403	11348	<9.2	7.58
C3H8	44.097	12025	11066	<3.0	2.47
C4H10	58.124	11830	10920	<2.0	1.65
C5H12	72.151	11621	10741	<0.25	0.21
N2	28.013	0	0	<1.25	1.03
O2	31.999	0	0	<0.5	0.41
Non HC (Consider as CO2)	44.01	0	0	<2.0	1.65
TOTAL					100.00

Mol Wt	19.26	Kg/kg-mole	
Calorific Value (LCV)	11059	Kcal/kg	9502 Kcal/Nm3
Calorific Value (HCV)	12223	Kcal/kg	10503 Kcal/Nm3

Conversion Factor (LCV Basis)

Factor for GCV to LCV 0.9047

1 Kgs of RLNG	11059	Kcal
	43854	BTU
	0.04385447	MMBTU
1 MT of RLNG =	43.854	MMBTU

1 SRFT	10000000	Kcal
	39656668	BTU
	39.66	MMBTU
1 SRFT =	0.904	MT of RLNG

1 MT of RLNG	1164	Nm3 of RLNG
1MT of RLNG	1228	Sm3 of RLNG
1 MT/day of RLNG =	0.0012277	MMSCMD

1 MMSCMD of RLNG = 814.536 1 MT/Day

1 MMTA of RLNG	125000	Kgs/hr
	6490	Kg-moles/hr
	145473	Nm3/hr
	3491360	SCMD

1 MMTA of RLNG = 3.491 MMSCMD

Notes:

01. RLNG composition received from RHQ (GAS)

02. RLNG Composition normalized based on its quality specifications.

3.0 Carbon di-oxide (CO2) is considered as Non-hydrocarbons in RLNG compositional analysis

4.0 GTA: Gas Transportor Agreement

Signature
SAKUN KUMAR
STSM, IDCL - Barauni Refinery.

Signature
K SEW
DG MTS
B.N