MDC energia é valor			TECHNIC A	AL SPECIFI	CATION	^{Nº:} P210 :	5-PRC-001			_
								SHEET:	1 de 4	
		NÚMB	NÚMBER: 05.2021							
		LOCAL	L:		В	RAZIL				
		TITLE:	:							
			REQUEST FOR PROPOSAL							
	INDEX OF REVISION									
REV.					DES	CRIPTIO	N			
0	ISSUE	FOF	R QUOTAT	ION						
		1.0	DEV 4	DEV 0	DEV. 0	DEV 4	DEV. 5	DEV. 0	DEV 7	DEV.
DATE	01/12		REV. 1	REV. 2	REV. 3	REV. 4	REV. 5	REV. 6	REV. 7	REV. 8
EXECUTION										

VERIFICATION

APPROVAL

DW

THIS DOCUMENT IS CONFIDENTIAL.

TECHNICAL SPECIFICATION	[№] : P2105-PRC-001		REV: 0
PROJECT: 132 TPD LNG PLANT SHEET:			
TITLE:			



REQUEST FOR QUOTATION

1.SCOPE OF SUPPLY

The purpose of this specification is to establish the minimum requirements for the quotation and purchase of 01 (ONE) **LNG PLANT** to be installed in Brazil.

The PROPONENT is free to propose the solution that fits to the process conditions informed in Item 5. PROCESS DATA AND REQUIREMENT, considering the best cost/benefits among natural gas liquefaction technologies available in the market.

2.SYSTEM OF UNITS

The quotation must be addressed in International System of Units (SI) with exception to pressure that must be informed in bar / barg and temperature that must be informed in °C, where applicable.

3. LOCAL ENVIRONMENT CONDITIONS

	Design	Hot Day	Cold Day	Aver. Day	Units
Barometric Pressure	0.953	0.953	0.953	0.953	bar a
Dry Bulb	29.7	33.2	13.7	20.6	0C
Wet Bulb	24.7	25.4	7.7	15.6	0C
Relative Humidity	66.82	67.27	42.77	59.86	%
Wind Speed		5	5		km/h
Seismic Zone		-			
Power 440 V / 60 Hz / 3 phases					
Electrical Area Classification Greenfield				-	

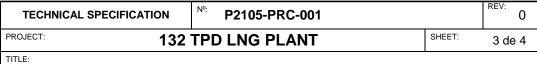
4. UTILITIES AND POWER

All utilities (cooling water, steam, nitrogen etc) and power consumption needed to operate the LNG plant must be listed and quantified in the quotation.

Local power supply is available, no cooling water or make-up available.

5. EFFLUENT AND EMISSIONS

All effluent and emissions shall be informed in the quotation with flow and composition.



REQUEST FOR QUOTATION

6. PROCESS DATA AND REQUIREMENT

Tag		UN-1000		
Technology	Natural Gas Lic	Natural Gas Liquefaction		
Operation	С	Continuous		
Service		LNO		
Product LNG Requirements				
Flow	5,500	kg/h		
Pressure Min.	1.0	barg		
Temperature Máx	-162	°C _		
Composition (ANP 16/2008)				
Methane Min	90.0	mole %		
Ethane Max	10.0	mole %		
Propane Max	1.0	mole %		
Butane+ Max	0.5	mole %		
Oxygen Max	0.5	mole %		
Nitrogen Max	3.0	mole %		
Carbon Dioxide Max	1.0	mole %		
Hydrogen Sulfide	0	mg/m ³		
Total Sulphur	0	mg/m ³		
High Heat Value	35,000 a 43,000	kJ/m ³		
Wobbe Index	46,500 a 53,500	kJ/m³		
Raw Natural Gas Conditions				
Flow max	(1)	kg/h		
Pressure Min.	(1)	barg		
Temperature Max	45	°C		
Composition ⁽²⁾				
Methane	89.3891	mole %		
Ethane	4.4092	mole %		
Propane	0.8963	mole %		
i-Butane	0.2369	mole %		
n-Butane	0.5151	mole %		
i-Pentane	0.2781	mole %		
n-Pentane	0.2678	mole %		
n-Hexane	1.5968	mole %		
Heptane+	0.0000	mole %		
Hydrogen Sulfide	0.01	mg/m ³		
Total Sulphur	2.44	mg/m ³		
Water	Saturated			

Notes:

- (1) To be defined and informed by Vendor.(2) To be confirmed in later stages.

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PROJECT: 132	TPD LNG PLANT	SHEET:	4 de 4
TITI C.			



REQUEST FOR QUOTATION

7. REQUIRED DOCUMENTS WITH QUOTATION

Proponents must issue technical-commercial proposal with the following documents as a minimum:

- I. Milestone schedule;
- II. Capex and Opex:
- III. Process description;
- IV. Block flow diagram with heat and material balance;
- V. General arrangement;
- VI. Equipment list;
- VII. List of utilities consumption;
- VIII. List of power consumption;
 - IX. Automation philosophy and communication protocol;
 - X. Catalogs.
- XI. List of previous projects with scope of supply

8. STANDARS AND CODES

Process and Mechanical

ASME BPVC VIII Div.1 Boiler and Pressure Vessel Code

ASME B16.5 Pipe Flanges and Flanged Fittings

ASME B16.9 Factory-Made Wrought Buttwelding Fittings

ASME B16.10 Face-to-Face and End-to-End Dimensions of Valves

ASME B16.11 Forged Fittings, Socket-Welding and Threaded

ASME B16.34 Valves - Flanged, Threaded and Welding End

ASME B18.2.2 Square and Hex Bolts and Screws (inch series)

ASME B31.3 Process Piping

ASME B36.19 Stainless Steel Pipe

ASME RTP-1 Reinforced Thermoset Plastic Corrosion-Resistant Equipment

API 520 Sizing, Selection, and Installation of Pressure-relieving Devices

API 521 Pressure-Relieving and Depressing Systems

API 526 Flanged Steel Pressure Relief Valves

Electrical

IEC 60079 Explosive Atmospheres

NFPA 70 National Electrical Code (NEC) - Installation of electrical wiring and equipment NFPA 497 Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in

Chemical Process Area