TITLE									ITEM/TAG No.		DOCUMENT No.	
		ET- HYDRAULIC CNG B	OOSTER CO	OMPR	ESSOR PAC	KAGE (D	BS)		Refer Note	ə-17	16017-P-	DS-0109
	IECT DESCRIPT								PROJECT No.		SHEET	REVISION
	I CONSULTANT	ITY GAS STATION CUM CI	NG MOTHER	STAT	IONS & DAU		CONTRACT		KIP-160		1 OF 3 SPECIFICATION N	A
KAVI						CLIENT	-	NO		10.	SPECIFICATION	
			REV No.	BY	DATE	CKD	DATE	APP	DATE	DESCRI	PTION	
		ATE LIMITED(GGPL)		SS	16-Nov-16	NK/TKV	16-Nov-16		16-Nov-16		FOR REVIEW	
	NT'S REF:	. ,	\square									
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ORIG	INATOR	ORIG. DATE	\square									
SS		15-Nov-16	\sim									
1						DESI	GN BAS	SIS				
-	GENERAL:											
		s Private Limited (GG										
		propration Limited (Hi										
6 7		davari Districts. GGF different locations in						Booster Co	ompressor for	setting (up CNG Daughte	er Booster
8			Lastana	1100		Districts						
9	FEED GAS CON											
10	Feed gas pro	cess conditions are a	as follows,									
11 12	Pressure	30-210	kg/cm ² g									
-	Temperature		°C									
	Flowrate	250	SCMH									
15												
-	STANDARDS / 0 1. PNGRB sta											
	2. Published											
19	Indian star	ndards										
		afety Directorate (OIS										
-		Second edition, API 6 al standards : ANSI,		тм				=N etc				
23	o. internation		AOME, AC	J I IVI,	AI 1, OA, 1	NOL, R	50, DIN, I	, 0.0				
-	SCOPE OF S	SUPPLY FOR EACH	COMPRE	SSO	R PACKA	GE						
25	1 Fach com	pressor Package sha	II ha aama	loto	with							
26 27		backage shall be com				lectric m	otor, hvdr	aulic pum	p and piping, o	coolina s	system, suction a	and discharge
28		ntrol panel safety and										
29	, 0	system shall be of clo										
30 31		pressor package con p safely. The compre										
32		sure in all three banks				case mg	jii balik pi	essure in	uispensei iaii		TO Ky/cm y and	stop once
33		sor shall be suitable				suction	pressure	from 210 k	(a/cm ² a to 30	ka/cm²a	. supplied throug	ah LCV
34	mounted	CNG storage cascad	de.									-
35		ess of oil into CNG ac										
36 37		ply a proven, mainter system shall restrict t										e oil from
38		ring of natural gas, 1								0		
39	g). Instrume	nt Air Compressor as	s required	for o	peration c	of comple	ete packa	ge.			-	
40 41		Priority Fill System was specified in technic				cility incl	usive of re	egulating v	alves, by pass	s valve &	& liquid filled pre	ssure
41 42	0 0	as specified in technic ge and discharge gas				pers as r	equired					
43		trainers, valves, sigh						in/traps etc	c. as required	for varic	ous auxiliary syst	ems i.e.
44	lubricatio	n system, cooling wa	iter systen	ns et	с.							
45		coustic enclosure for										
46 47		nguishing system cor outlet manual isolatii			cymuers,	piping al	iu vaives.					
48	,		5									
49	o											
50 51	2. UTILITIES			nic	atorhad	م مائم جان			n/om²	/or al "		the version At
51		ressor along with 1.5 of 100 water liter cap										
53		ies. Air compressor,										
54	Manual c	Irains and automatic	moisture t	raps	shall be p	rovided	in the syst	tem. Air re	ceiver shall be	e provide	ed with SRV, pre	essure switch,
55 56		gauge and drains. P	ressure sv	witch	and press	ure gau	ge shall h	ave isolati	on valve. Air d	ryer sha	all be with bypas	s
56 57	arrangen	nent.										
58												
59												
60						\$						
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PROJECT DESCRIPTION PROJECT NO. SHEET REVISION CONSTRUCTION OF CITY GAS STATION CUM CNG MOTHER STATIONS & DAUGHTER BOOSTER STATIONS REPOR CONSULTANT CLIENT CONTRACT NO REQUISITION NO. SPECIFICATION No. EPCM CONSULTANT CLIENT CONTRACT NO REQUISITION NO. SPECIFICATION No. SPECIFICATION No. CLIENT NAME REV No. BY DATE CKD DATE APP DATE DESCRIPTION GODAVARI GAS PRIVATE LIMITED(GGPL) A SS 16-Nov-16 NK/TKV 16-Nov-16 MRM/BSK 16-Nov-16 ISSUED FOR REVIEW CLIENT'S REF: I I I I I I I I I ORIGI. DATE ORIG. DATE ORIG. DATE I <t< th=""><th></th><th></th><th></th><th></th><th>STER CO</th><th>VPRESS</th><th></th><th>E (DBS)</th><th></th><th></th><th>ITEM/TAG No. Refer Note</th><th>.17</th><th>DOCUMENT No 16017-P-</th><th></th></t<>					STER CO	VPRESS		E (DBS)			ITEM/TAG No. Refer Note	.17	DOCUMENT No 16017-P-	
Deck CONSULTON Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) CLENT NOME Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) CLENT NOME Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) CLENT NOME Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) CLENT NOME Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) State (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) State (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) State (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) State (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) State (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) State (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) Exclusion (NNE) State (NNE) Exclusion (NNE) Exclusion (NNE)	-					WF INESC		L (DD3)						
NVN Control Difference Control Difference	CONS	STRU	CTION OF	CITY GAS STATION CUM C	NG MOTH	ER STA	TIONS & DAU	GHTER BO	OSTER STATI	ONS	KIP-1601	7	2 OF 3	Α
CLENT-MOK EV DATE APP DATE Description CUENT'S REF. ISAN 12 ISAN 12<	-		SULTAN	Т				CLIENT CC	NTRACT NO		REQUISITION N	lo.	SPECIFICATION	No.
Convex of PRVMTE LIMITEDGRP1 Is Investign NUTICE Investign					DEVIN		D.475	01/0	-		-	0500	-	
Outer Step: Other Step: OPEGAWTOR ONEs DTE Status 15 Mext8 Status 16 Minimum One No. Gas Detector IV/H (R type with here self-check function and transmitter, alam on detection of flame shall be provided. Timinum Tollowing Icalues: - 10 Minimum One No. Confording system shall conside 17 Mos. equally steaded CO, Cylinders, size of the cylinder shall be as per compressor enclosure size. One cylinder will act as main cylinder detectors. Status 10 Minimum One No. Confording system shall conside 17 Mos. equally steade ga automatical cylinder shall be moved educed to the cylinder shall be moved educed to the cylinder shall be reproved educed to the cylinder shall be moved educed to the cylinder shall be reprovided. Status <														
Construction Section 2.1 Section 2.2 Section				IVATE LIMITED(GGPL)		33	10-110-10		10-1100-10	IVIRIVI/DOR	10-110/-10	1330E		
88 15Mev18 2 0). Cooling water is not available as utility and the package shall be provided with self sufficient cooling water system for Compressor, as required, Mm makup tank However conting water for makup tank is available. At the electrical arguingments in this system shall be suitable for area classification of Hazardous area CLASS-1, DIVISION-1, GROUP-D of NFPA. 3 0. CO2 ELODING SYSTEM. 1 The package shall be protected by automatically operated CO2 floading system designed as per NFPA-12, which should have mininum following features: - 3 10. Minimum Oren No. Gas Detector (IV-IR pep with here-herek function to generate fault alarm and have 4 to 20 MA transmitter form on the log 100 for LLL. That this proteins 10. Minimum Oren No. Gas Detector (IV-IR pep with here-herek function and transmitter, alarm on detection of time shall be provided. Package shall be protector (IV-IR pep with here-herek function and transmitter, alarm on detection of time shall be provided. Package shall be protected to the system. The oplinder shall be and valves etc. for advanced acutability concerptopessor endocure as a prassure solutih ava at least anim cylinder a data the valves etc. for advanced acutability concerptopessor and package shall be provided. Package shall be protected to walves etc. for advanced acutability concerptopessor and package shall be provided. 17 10. CO, floading system shall concerptope and packing shall be manifolded and terminated at skid edge outside the enclosure and the submater and acutability. Concerptope shall be provided to operate state stopprevent at imprass in the system shall be manual ski	-	1101			\frown									
 b). Cooling water is not available as utility and the package shall be provided with self sufficient cooling water system for Compressor, as required, with makeup tank. However cooling water for makeup tank is available. All the electrical equipments in this system shall be suitable for area classification of Hazardous area CLASS-1, DIVISION-1, GROUP-D of NFPA. CO2 FLOCOING SYSTEM: The package shall be protected by automatically operated CO2 floating system designed as per NFPA-12, which should have minimum following features: - Minimum One No. Gas Detector IR type which have self check function to generate fault alarm and have 4 to 20 MA transmitter for 0 to 100%. ELE shall be provided 12 Nos. equility select Op. Qhinders, size of the cylinder shall be as per compressor enclosure size. One cylinder will act as main cylinder 8 other as stand by, which shall have identical arrangement and connected to the system. The cylinders shall be protected from weather and directally. For this the vendor shall provided table to the system shall be provided 12 Nos. equily select QD, Qhinders, size of the cylinder shall be as per compressor enclosure size. One cylinder table the protected from weather and directally. For this the vendor shall be provided to such as pressure switch to detect the failure of main cylinders failure. One manual operation of the system. The cylinders shall be provided. All vents (Le, Relef valve, distance piece and packing shall be table that with shall have identical as single point for customer interface duly flagod with isolation valve. All vents and discharge of control on package. Solario valves and packing shall be manifolded and terminated as single point for customer interface duly flagod with isolation valve. All vents and discharge of control on package. All vents alsal operated in discharge of control on partial be designed to proved at customa and packing shall be manifolded and term	ORIG	INAT	OR	ORIG. DATE	\frown									
 20. Cooling water is not available as utility and the package shall be provided with self sufficient cooling water synthem for Compressor, as required, with makep tank. However cooling water (or makew). It the electrical equipments in this system shall be suitable for area classification of Hazardous area CLASS-1, DIVISION-1, GROUP-D of NFPA. 30. CO2 FLCODING SYSTEM: The package shall be protected by automatically operated CO2 flooding system designed as per NFPA-12, which should have minimum following features: - Minimum One No. Gas Delector IR type which have self check function to generate fault alarm and have 4 to 20 MA transmitter for 0 to 100%. LEL shall be provided. (IVIR type) with self-check function and transmitter, alarm on detection of flame shall be provided. Package should have at load on to flame detector. Minimum One No. Gas Delector (IV-IR type) with self-check function and transmitter, alarm on detection of flame shall be provided in the salt of a main opinieer shall or amman opinieer shall be provided by which shall have identical arrangement and connected to the system. The opinders shall be provided from washer and dired summary as per Gas Cylinder shall be such that in case main opinieer shall and share submatically. For this the vendor shall be such that in case main opinieer shall verify of shall be randified and terminated. Call point shall be provided to the system witch to detect the Valves. Science intermatically, For this the vendor shall be such that in case final be provided. To man package on of with proper support. All vents (Lo, Relef valve, distance pice and packing) shall be manifolded and terminated as single point for customer interface durit funged with soletcher support. All vents (Lo, Relef valve, distance pice and packing shall be transition and shuddown. Necessary instrumentation shall be provided. All controls shall operate in fail-safe mode i.e. failure of any cont	ss			15-Nov-16	\sim									
 required, with makeup fank. However coling water for makeup fank is available. All the electrical equipments in this system shall be sublable for ana classification of Hazardous area CLASS-1, DIVISION-1, GROUP-D of NFPA. OC2 FLOCDING SYSTEM: The package shall be protected by automatically operated CO2 flooding system designed as per NFPA-12, which should have minimum following features: - Minimum One No. Flame Detector (RV) per which have self check function to generate fault alarm and have 4 to 20 MA transmitter for 0 to 10%. ELL shall be provided. Minimum One No. Flame Detector (IV/IR type) with self-check function and transmitter, alarm on detection of flame shall be provided. Package shall be as a set on an of sime detectors. DO, flooding system shall consist of 2 Nos. Aqualy sized CO, Cylinders, size of the cylinder shall be as per compressor encloser size. One cylinder vial data smain cylinder of share stand by, which shall have identical arrangement and connected by Cylinders, size of the cylinder shall be as per compressor such as main cylinder share sciencially. For this her words relations of the cylinder shall be table cylinder shall be as per compressor encloser size. One cylinder vial data data data status detectors. Coy flooding system shall be filled with actuated Valves. Solonoid valves of claratomatic actuation. Control philosophy shall be such as pressure switch to detect the failure of main cylinder shall be provided for manuel available device such as pressure switch to detect the failure of main cylinder shall be mainfolded and terminated at skid dego outside the enclosure and vented to sefe height of 2.5m at package rod with proper support. All vitem in distast mode is a failare of any control shall not lead to running of equipment in unsafe condition. Fail-safe or control shall be activate and packing shall be mainfolded and terminated at skid dego outside the enclosure secure many cont	1													
 suitable for area classification of Hazardous area CLASS-1, DIVISION-1, GROUP-D of NFPA. CO2 FLOODING SYSTEM: The package shall be protected by automatically operated CO2 flooding system designed as per NFPA-12, which should have minimum following features: Minimum One No. Gas Detector IX type which have self check function to generate fault alarm and have 4 to 20 MA transmitter for 0 to 100% LEL shall be provided. Minimum One No. Gas Detector (LV/R type) with self-check function and transmitter, alarm on detection of flame shall be provided. Minimum One No. Gas Detector (LV/R type) with self-check function and transmitter, alarm on detection of flame shall be provided. DOVided Package should have at trast one no. flame detector, which shall have bedenical arrangement and connected to the system. The cylinders shall be protected from weather and dired surrays as per Gas Cylinder flame. 2004 (Signates shall be protected Valves, Scelon druke set, Con emanal switch. Control philosophy shall be such that in case main cylinder shall be provided valves etc. Or ne manal switch. Coll privide suitable device such as pressure witch to detect the failur or flami cylinders failur. On manal switch. Coll privide suitable device such as pressure witch to detect or with program support. All vents (Le. Relief valve, distance piece and packing) shall be manifolded and terminated as single point for customer interface duly through shall be conside in software IPC LG is used for controling. All drains from different process equipment, distance piece and packing shall be manifolded and terminated as single point for customer interface duly through that/were for all trips and allo is notware IPC LG is used for controling. Procuse shall be paravided. Prokage enclosures shall have one IR-LE. L detectors and ne ultra Violet (UV/IR) fre detectors in each enclosure to isolate cascades storage from														
 9. CO2 FLOCDING SYSTEM: The package shall be protected by submatically operated CO2 flooding system designed as per NFPA-12, which should have minimum following features: - 1. Minimum One No. Gas Detector IR type which have self check function to generate fault alarm and have 4 to 20 MA transmitter for 0 to 100% LLs shall be protected. 11. Minimum One No. Finer Detector (UV-IR type) with self-check function and transmitter, alarm on detection of fiame shall be as per compressor and the optical Package should have at alar sam in cylinder 4 cher as start of the cylinder shall be as per compressor and constant of 2 Nos. August 2 Alarma and direct surrays as per Gas Cylinder skalle be as the cylinder shall be as per compressor and constant activation of the cylinder shall be as per compressor and constant activation of the cylinder shall be provided to the system. The cylinders shall be protected from weather and direct surrays as per Gas Cylinder skalles. 2004. Cylinders shall be provided viaves of the normanical submatical control philosophy shall be such that such as pressure surfach to deter the failure of main cylinders failure. One mininal witch / call point shall be provided to operate the Co. cylinder the distance piece and packing shall be manifolded and terminated as single point for coustomer interface duly flanged with isolation valve. 3. All vents from different process equiparment, distance piece and packing shall be manifolded and terminated as single point for coustomer interface duly flanged with isolation valve. 4. All drein distance piece and packing shall be manifolded and terminated as single point for coustomer interface duly flanged with isolation valve. 5. All controls shall be provided. 6. All controls shall be accident to rail and a control shall be cylinder shall be science duly flanged with isolation valve. 6												nts in 1	inis system sh	all be
 minimum following features: - Minimum One No. Gas Detector IR type which have self check function to generate fault aiarm and have 4 to 20 MA transmitter for 10 to 1005 LE hasht be provided. Minimum One No. Flame Detector (UV-IR type) with self-check function and transmitter, alarm on detection of flame shall be provided. Package should have at least one no. fittine detectors. Co. flooding system shall consist of 2 Nos. equally sized CO₂ Cylinders, size of the cylinder shall be as per compressor enclosure size. One cylinder will act as main cylinder and direct surrays as per Gas Cylinder Rules, 2004. Cylinders shall be fitted with accuted Valves. Solehold valves etc. for outomatic accutation. Control philosophy shall be such that in case main cylinder fails the standby cylinder shall discharge automatically. For this the vender by shall be such that in case main cylinder fails the standby cylinder shall discharge automatically. For this the vender physical be provided to operate the CO₂ cylinder from remote control room. Pull down lever Manual Valve shall be provided to manual operation of CO₂ System shall be provided. All vents (i.e. Relief valve, distance piece and packing) shall be smalfolded and terminated at skid edge outside the enclosure and vented to sale height of 25 mat package rod with proper support. All controls shall operate in fail-sale mode i.e. failure of any control shall not lead to running of equipment in unsafe condition. Fail-sale control shall operate in fail-sale mode i.e. failure of any control shall not lead to running of equipment in unsafe condition. Fail-sale control shall operate in fail-sale mode i.e. failure of any control shall not lead to running of equipment in unsafe condition. Fail-sale control shall be available to rovided at use on and short favors. Package enclosures shall have one IR-LEL detectors and one Ultra Volet (UV/IR) fire detectors in each enclosure to co					nnazaro	1003 01								
 Minimum One No. Gas Detector IR type which have self check function to generate fault aiarm and have 4 to 20 MA transmitter for 0 to 100% LEL shall be provided. Minimum One No. Gas Detector IR type which have self check function and transmitter, aiarm on detection of flame shall be provided. Package should have at least one no. flame detectors. O. Coloding system shall consider of 2 Nos. equally sized CO₂ (c)inders, size of the cylinder shall be as per compressor enclosure size. One cylinder will act as main cylinder 8 other as stand by, which shall have identical arrangement and connected to the system. The cylinder shall be protected from weather and direct sunnyas as per Gas Cylinder Skell carrangement and connected to the system. The cylinder shall be protected from weather and direct sunnyas as per Gas Cylinder Skell carrangement and connected to core shall provided to inscrimation and Valve shall be provided to operate the CO₂ cylinder shall be fitted with actuated Valves, Solenoid valves etc. for automatic actuation. Control shall be provided to operate the CO₂ cylinder shall be provided to operate the CO₂ cylinder flam the standard lice and packing shall be manifolded and terminated at skid edge outside the enclosure and vented to safe height of 2.5m at package roof with proper support. All vents from different process equipment, distance piece and packing shall be manifolded and terminated as single point for customer interface duly flanged with isolation valve. All vents shall be detined to prevent air ingress in the system fully operation and shutdown. Necessary instrumentation shall be provided. Package enclosures shall be detined to prevent air ingress in the system duing statiny, operation and shutdown. Necessary instrumentation shall be provided to repressor system duing statiny, operation and shutdown. Necessary instrumentation shall be provided to prevent air ingress in the system multing stating and shutdown.			•	0	d by auto	matica	lly operated	I CO2 floo	ding system	n designed as	per NFPA-12,	whick	n should have	
 Minimum One No. Gas Detector IR type which have self check function to generate fault alarm and have 4 to 20 MA transmitter for 10 100% LEI. Analt be provided. Minimum One No. Fiame Detector (UV-IR type) with self-check function and transmitter, alarm on detection of flame shall be provided. Package should have a least one no. Fiame detectors. CO. flooding system shall be care and no righter of allows and the system data of the system. The cylinders shall be protected from weather and direct surrays as per Gas Cylinder Rules, 2004. Cylinders shall be fitted with actuated Valves, Sciencial valves etc. For automatic actuation. Control philosophy shall be such that in case main cylinder shall be protected from weather and direct surrays as per Gas Cylinder Rules, 2004. Cylinder shall be protected from weather and direct surrays as per Gas Cylinder Shall provide suitable device such as pressure switch to detect the failure of man cylinder raise the CQ, cylinder from remote control room. Pull down lever Manual Valve shall be provided. All vents (i.e. Relief valve, distance piece and packing) shall be manifolded and terminated at skid edge outside the enclosure and vented to safe height of 2.5 mat package or dow thip rooper support. All orbits shall operate in fail-safe mode i.e. failure of any control shall not lead to running of equipment in unsafe condition. Fail-safe control shall operate in fail-safe mode i.e. failure of any control shall on system. Package enclosures shall have one IR-LEL detectors and one Ultra Violet (UV/IR) fire detectors in each enclosure to cover the enclosures effectively. Nead and the spread shall be provided. Mall valves shall be provided at user main effection interface duty through shall be suite provided at the common relief valve header. Motinum State and the low also also insoftware if less shall be fore also shall be rovided with compressor			minimu	m following features: -										
 for 0 to 100% LEL shall be provided. ii). Minimu One No. Fiame Detector (UV-IR type) with self-check function and transmitter, alarm on detection of flame shall be provided. Package should have at least one no. flame detectors. iii). Co.9, flooding system shall consist of 2 Nos. equally sized CO, Cylinders, size of the cylinder shall be as per compressor enclosure size. One cylinder will act as main cylinder & other as stand by, which shall have identical arrangement and connected to the system. The cylinder shall be provided from weather and direct survays as per Gas Cylinder Rules, 2004. Cylinders shall be fitted with actuated Valves, Solenoid valves etc. for automatical, For this the vendor shall provide suitable device such as pressure switch to detect the failure of main cylinders failure. One manual switch / call point shall be provided to operate the CO₂ cylinder from remote control room. Pull down lever Manual Valve shall be provided for operate the CO₂ cylinder from remote control room. Pull down lever Manual Valve shall be provided to operate the CO₂ cylinder in the network. distance place and packing shall be manifolded and terminated as single point for customer interface duly flanged with isolation valve. A. All virals from different process equipment. distance pice and packing shall ne lead to running of equipment in unsafe condition. Fail-safe control shall be perioded. The compressor system shall be degined to prevent air ingress in the system during starup, operation and shutdown. Necessary instrumentation shall be transmitter. Journal of the design and incorporated to isolate cascades shore and activation. Cruce Single and anso in a shutdown. Necessary instrumentation shall be provided. Package enclosures shall be degined to prevent air ingress in the system during starup, operation and shutdown. Necessary instrumentation shall be provided to common relier vinely he header. Package enc			i)	Minimum One No. Gas	Detecto	or IR tvi	oe which ha	ve self ch	eck function	to generate f	ault alarm and	have	4 to 20 MA tr	ansmitter
12 mprovided. Package should have at least one no. flame detectors. 14 Go, flooding system shall consist of 2 Nos. equally sized CQ, Cylinders, size of the cylinder shall be as per compressor enclosure size. One cylinder will act as main cylinder & other as stand by, which shall have identical arrangement and connected to the system. The cylinder shall be protected from weather and direct survays as per Gas Cylinder Rules, 2004. 16 Cylinder shall be fitted with actuated Valves, Solenoid valves etc. for automatical, For this the vendor shall provide suitable device such as pressure switch to detect the failure of main cylinders failure. One manual switch / cylinder form remote control room. Pull down lever Manual Valve shall be provided for operate the CO, cylinder from remote control room. Pull down lever Manual Valve shall be provided to operate the CO, cylinder in the reprocess equipment. distance proces and packing shall be manifolded and terminated as single point for customer interface duly flanged with isolation valve. 20 3. All vers (i.e. Relif valve). 6 and compressor system shall be designed of a system shall be designed on the cylinder shall be example to provided to a personal system in the system full rogs and also in software IPCL is used for controlling. 21 4. All drains from difference in fail-size mode to report and it rigs and also in software IPCL is used for controlling. 22 7. The compressor system in fail-size mode to common relief valve headac. 23 14. Bild rains fraindant. 24 14. Hald rains the provided to provent al ingress in the system during starup, operation and shuldown. Necessary instrum			.,.							r to gonorato i	aut alarm and		1 10 20 10/10	anomicon
 iii). Co, flooding system shall consist of 2 Nos. equally sized Co₂ Cylinders, size of the cylinder shall be as per compressor enclosure size, One cylinder will act as main cylinder 6 other as stand by, which shall be arrangement and connected to the system. The cylinders shall be protected from weather and direct survays as per Gas Cylinder Rules, 2004. Cylinders shall be fitted with actuated Valves, Schenol valves exc. for automatic actuation. Control philosophy shall be such that in case main cylinder fails the standby cylinder shall direct actuation. Control philosophy shall be provided to operate the CO₂ cylinder from remote control room. Pull down lever/ Manual Valve shall be provided to operate the CO₂ cylinder from remote control room. Pull down lever/ Manual Valve shall be provided to operate the CO₂ cylinder from remote control room. Pull down lever/ Manual Valve shall be provided to operate the CO₂ cylinder in process equipment. distance pice and packing shall be manifolded and terminated at skid edge outside the enclosure and vented to safe neight of 2.5m at package root with proper support. All orinis from different process equipment. distance pice and packing shall be manifolded and terminated as single point for customer interface duly flanged with isolation valve. All orinis shall be designed to prevent air ingress in the system during startup, operation and shutdown. Necessary instrumentation shall be provided. Package enclosures shall be designed to common relid valve header. Package enclosures shall be designed to common relid valve header. Modular type DCP fire extinguisher (10Kg Capacity) shall be provided with compressor suction and cult of power supply on activation of ESD system. Shall be designed and incorporated to isolate cascades storage from dispensers, stop compressor isolate the compressor suction and cult of power supply an activation of ESD system. Shall be gravided with compress	-		ii).							n and transmit	ter, alarm on o	detect	ion of flame sl	hall be
 enclosure size. One cylinder will act as main cylinder & other as stand by, which shall have identical arrangement and connected to the system. The cylinders shall be protected from weather and direct survays as per Gas Cylinder Rules. 2004. Cylinder shall be fitted with actuated Valves. Solenoid valves etc. for automatic actuation. Control philosophy shall be excised in that in case main cylinder fails the standby cylinder shall be have shall be provided. All vents (i.e. Relief valve, distance piece and packing) shall be manifolded and terminated at skid edge outside the enclosure and vented to safe height of 2.5m at package provided. All vents (i.e. Relief valve, distance piece and packing) shall be manifolded and terminated at skid edge outside the enclosure and vented to safe height of 2.5m at package provi hypoter support. All ortrols shall operate in fail-safe mode i.e. failure of any control shall no lead to running of equipment in unsafe condition. Fail-safe control shall be particulate through hardware for all trips and also in software if PLC is used for controlling. The compressor system shall be designed to prevent air ingress in the system during startup, operation and shutdown. Necessary instrumentation shall be provided. Nal material used in the package shall be flame retardant. Nal material used in the package shall be flame retardant. Redivage enclosures shall have on RN-LE.L detectors and one Ultra Violet (UV/IR) for detectors in each enclosure to cover the enclosures of compressor package. Sterregrory shut down (ESD) System is also in socpe of vendor. A fail-safe system shall be designed and incorporate to isolate cascades starture type OP fire extinguisher (UK) (Gapadot) shall be provided with compressor package. Modar shall awelate be manially reset to restart the compressor top-up facility inclusive of regulating valves, by pass valve & liquid fille			;;;)							s size of the c	wlinder chall h		or compress)r
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 in case main cylinder fails the standby cylinder shall discharge automatically. For this the vendor shall provide suitable device such as pressure switch to detect the failure of main cylinder failure. One manual switch / all point shall be provided to operate the CO₂ System shall be provided. 3. All vents (i.e. Relief valve, distance piece and packing) shall be manifolded and terminated at skid edge outside the enclosure and vented to safe height of 2.5m at package root with proper support. 4. All drains from different process equipment, distance piece and packing shall be manifolded and terminated as single point for customer interface duly flanged with isolation valve. 5. All controls shall operate in fail-safe mode i.e. failure of any control shall not lead to running of equipment in unsafe condition. Fail-safe control shall be available through hardware for all trips and also in software if PLC is used for controlling. 7. The compressor system shall be designed to prevent air ingress in the system during startup, operation and shutdown. Necessary instrumentation shall be provided at suction and discharge of compressor with setting as per cl. 7.20.3 of API – 11P with R.V. venting as per Cl. 7.20.4 of API-11P. All vented to common relied valve header. 12. Modular type DCP free exting uisher (10%G Capacity) shall be provided with compressor package. 13. Emergency shut down (ESD) System is also in scope of vendor. A fail-safe system shall be designed and incorporated to isolate cascades structures all vendor shall supply a suitable priority fill system with compressor package. 14. Vendor shall supply a suitable priority fill system with compressor package again. To isolate dispensers actuators of dispensers may be used. 15. Marg appling/ tubing. valves, fitting set. from Suction of the 1st stage (right from interface) through final discharge from the compressor valves again. To isolate dispens														
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 13. Emergency shut down (ESD) System is also in scope of vendor. A fail-safe system shall be designed and incorporated to isolate cascades storage from dispensers, stop compressor isolate the compressor suction and cut off power supply on activation of ESD switch. This ESD switch shall have to be manually reset to restart the compressor package again. To isolate dispensers actuators of dispensers may be used. 14. Vendor shall supply a suitable priority fill system with compressor top-up facility inclusive of regulating valves, by pass valve & liquid filled pressure gauges all mounted in a stainless steel structural. The Priority fill system shall ensure that vehicle filling takes precedence over cascade filling. 15. All gas piping/ tubing, valves, fittings etc. from Suction of the 1st stage (right from interface) through final discharge from the compressor (upto interface) shall be SS-316 material with double compression ferule fittings. 16. Compressor package shall be provided with following instruments: a). All tripping shall be with lamp indication and annunciation. b). Temperature indicaton: 1st, 2nd stage discharge and fater after cooler. c). Pressure indication: 2nd stage discharge, high & medium bank; Pressure switch 2nd stage discharge, high & medium bank. d). Hydraulic oil tank: Level switch, temp indication & switch; Pump Pressure indication. e). Coolant: Temp & pr indication & switch and temp indication after cooler. f). Hour meter. g). One no. Pressure Switch/Transmitter shall be installed in the inlet line to compressor. h). One no. Coriolis mass flow meter with integral local display with transmitter shall be installed for metering of gas. f). Five (5) Hydraulic CNG Booster compressor package tag number shall be 1020, 2020, 3020, 4020 and 5020 accordingly. f). B. Tag sequence number shall be 1000-6000 for Five (5) Hydraulic CNG Booster compressor package. 			•							pressor packa	age.			
37 switch shall have to be manually reset to restart the compressor package again. To isolate dispensers actuators of dispensers may be used. 38 14. Vendor shall supply a suitable priority fill system with compressor top-up facility inclusive of regulating valves, by pass valve & liquid filled pressure gauges all mounted in a stainless steel structural. The Priority fill system shall ensure that vehicle filling takes precedence over cascade filling. 41 15. All gas piping/ tubing, valves, fittings etc. from Suction of the 1st stage (right from interface) through final discharge from the compressor (upto interface) shall be SS-316 material with double compression ferrule fittings. 42 16. Compressor package shall be provided with following instruments: a). All tripping shall be with lamp indication and annunciation. b). Temperature indication: 2nd stage discharge, high & medium bank; Pressure switch 2nd stage discharge, high & medium bank. d). Hydraulic oil tank: Level switch, temp indication & switch ; Pump Pressure indication. e). Colant: Temp & pr indication & switch and temp indication after cooler. f). Hour meter. g). One no. Pressure Switch/Transmitter shall be installed in the inlet line to compressor. h). One no. Coriolis mass flow meter with integral local display with transmitter shall be installed for metering of gas. 74. Five (5) Hydraulic CNG Booster compressor package tag number shall be 1020, 2020, 3020, 4020 and 5020 accordingly. 56 57 58 58 59	35	13.	Emerge	ency shut down (ESD) S	ystem is	also ir	scope of v	endor. A f	ail-safe syst	em shall be d	esigned and ir			
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 47 47 48 48 49 49 50 51 52 51 52 53 54 55 56 57 58 59 60 														
 48 d). Hydraulic oil tank: Level switch, temp indication & switch ; Pump Pressure indication. 49 e). Coolant: Temp & prindication & switch and temp indication after cooler. 50 f). Hour meter. g). One no. Pressure Switch/Transmitter shall be installed in the inlet line to compressor. h). One no. Coriolis mass flow meter with integral local display with transmitter shall be installed for metering of gas. 53 17. Five (5) Hydraulic CNG Booster compressor package tag number shall be 1020, 2020, 3020, 4020 and 5020 accordingly. 54 18. Tag sequence number shall be 1000-6000 for Five (5) Hydraulic CNG Booster compressor package . 55 56 57 58 59 60 			(stage dischar	ae hi	ah & medium	bank
 49 e). Coolant: Temp & pr indication & switch and temp indication after cooler. 50 f). Hour meter. g). One no. Pressure Switch/Transmitter shall be installed in the inlet line to compressor. h). One no. Coriolis mass flow meter with integral local display with transmitter shall be installed for metering of gas. 53 17. Five (5) Hydraulic CNG Booster compressor package tag number shall be 1020, 2020, 3020, 4020 and 5020 accordingly. 18. Tag sequence number shall be 1000-6000 for Five (5) Hydraulic CNG Booster compressor package . 55 56 57 58 59 60 												90, m	g. s moulum	~ ~ ~
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 17. Five (5) Hydraulic CNG Booster compressor package tag number shall be 1020, 2020, 3020, 4020 and 5020 accordingly. 18. Tag sequence number shall be 1000-6000 for Five (5) Hydraulic CNG Booster compressor package . 56 56 57 58 59 60 			•									etering	g of gas.	
55 56 57 58 59 60			Five (5)	Hydraulic CNG Booster	compre	ssor pa	ackage tag i	number sh	nall be 1020	, 2020, 3020,	4020 and 502			
56 57 58 59 60	-	18.	Tag seq	uence number shall be	1000-60	00 for	Five (5) Hyd	draulic CN	G Booster o	compressor pa	ackage.			
57 58 59 60	-													
58 59 60														
60	58													
AA														
KAVIN	60								_					
								M KAVIN [™]						

TITLE												<u>^</u>
PROC		T- HYDRAULIC CNG B	DOSTER C	OMPRESS	OR PACKAGE	(DBS)			ITEM/TAG No. Refer Note-17		DOCUMENT No. 16017-P-DS-0109	
	OJECT DESCRIPTION								PROJECT No.		SHEET REVISIO	
CONS	TRUCTION OF C	ITY GAS STATION CUN		TIONS & DAUG	SHTER BOOS	TER STATIONS	5	KIP-16017		3 OF 3	Α	
PCN	I CONSULTANT					CLIENT CON	ITRACT NO	-	REQUISITION	No.	SPECIFICATIC	N No.
(AVIN	N								-			-
	IT NAME		REV No.	BY	DATE	CKD	DATE	APP	DATE	DESC	RIPTION	
SOD/	AVARI GAS PRIVA	TE LIMITED(GGPL)	A	SS	16-Nov-16	NK/TKV	16-Nov-16	MRM/BSK	16-Nov-16	ISSUE	ED FOR REVIEV	V
	IT'S REF:			b								
	INATOR	ORIG. DATE										
SS		15-Nov-16	\sim	•								
	Service	:	GAS					Equipment Tag	No ·	-		
	Configuration		1 x100%					Running		1	Spare :	
	Compressor Type		Hydraulic	:				ic Motor Driven -	Hvdraulic			
	Design Margin : -						Capacity Cont				natic (VTA)	1
5	Process Data : For One Compressor							No of Stages	:	VTA		
	Design Cases : -							No Required : 5		5		
7	Gas Handled	I Gas (CNG)			Design Code	:	API-1	1P, API 618				
8	CASE-1											
9	Parameters			Units Hydraulic Booster Compres				sor Package			Rem	narks
10	Volume Flow			SCMH		250.0						
11	Mass Flow			kg/hr		182.0	182.0				Note-12	
12	Inlet Conditions											
	Suction Pressure			kg/cm²g		30-210						
	Suction Temperate	ure		°C		39.0						
	Molecular Weight			kg/kmol		17.25					Note-12	
16	Mass Density			kg/m ³			33.04				Note-12	
18 19	Specific heat ratio			<u> </u>		1.429					Note-12 Note-12	
	Compressibility fac			ļ		0.9121	0.9121					
	Discharge Condi Discharge Pressu			kg/cm²g		255.00					Note-2,4,5	
	Discharge Temper			°C		55.00					Note-2,4,5 Note-1,6	
23	Mass Density			kg/m ³		181.7 (VTC)					Note-12	
24	Compressibility fac	ctor				0.8719 (VTC))		Note-12			
	Polytropic Efficient			%		Note-7						
26	Duty			kW		22 (VTC)		Note-8,9				
27	Total Power			kW		VTA	VTA					
28	Compositions in	Mole %										
29		Compor	ents			•	Case - Gas	Nor	mal Case			
30						Composi	ition Range					
	Methane						- 99.0		95.21			
	Ethane					7.5 – 0.9 3.5 – 0.0			1.82 0.57			
32						0.75 - 0.0			0.20			
32 33	Propane		i-Butane						5.20			
32 33 34	Propane i-Butane					0.75	5 – 0.0		0.13			
32 33 34 35	Propane						5 – 0.0 5 – 0.0		0.13			
32 33 34 35 36	Propane i-Butane n-Butane					0.15						
32 33 34 35 36 37 38	Propane i-Butane n-Butane i-Pentane n-Pentane Hexane					0.15 0.15	5 – 0.0		0.06			
32 33 34 35 36 37 38 39	Propane i-Butane n-Butane i-Pentane n-Pentane Hexane Carbondioxide					0.15 0.15 0.25 4.9	5 - 0.0 5 - 0.0 5 - 0.0 1 - 0.0		0.06 0.05 0.21 1.46			
32 33 34 35 36 37 38 39 40	Propane i-Butane n-Butane i-Pentane n-Pentane Hexane Carbondioxide Nitrogen					0.15 0.15 0.25 4.9 0.08	5 - 0.0 5 - 0.0 5 - 0.0 9 - 0.0 3 - 0.0		0.06 0.05 0.21 1.46 0.29			
32 33 34 35 36 37 38 39 40 41	Propane i-Butane n-Butane i-Pentane n-Pentane Hexane Carbondioxide					0.15 0.15 0.25 4.9 0.08	5 - 0.0 5 - 0.0 5 - 0.0 1 - 0.0		0.06 0.05 0.21 1.46			
32 33 34 35 36 37 38 39 40 41 42	Propane i-Butane n-Butane i-Pentane n-Pentane Hexane Carbondioxide Nitrogen H2S					0.15 0.15 0.25 4.9 0.08	5 - 0.0 5 - 0.0 5 - 0.0 9 - 0.0 3 - 0.0		0.06 0.05 0.21 1.46 0.29			
32 33 34 35 36 37 38 39 40 41 42 43	Propane i-Butane n-Butane i-Pentane n-Pentane Hexane Carbondioxide Nitrogen					0.15 0.15 0.25 4.9 0.08	5 - 0.0 5 - 0.0 5 - 0.0 9 - 0.0 3 - 0.0		0.06 0.05 0.21 1.46 0.29			
32 33 34 35 36 37 38 39 40 41 42	Propane i-Butane n-Butane i-Pentane n-Pentane Hexane Carbondioxide Nitrogen H2S NOTE :	temperature is hvd	raulic boo	ster com	pressor pac	0.15 0.15 0.25 4.9 0.06	5 - 0.0 5 - 0.0 5 - 0.0 - 0.0 3 - 0.0 ppm		0.06 0.05 0.21 1.46 0.29 10 ppm	charge	e temperature	will be
32 33 34 35 36 37 38 39 40 41 42 43 44 45	Propane i-Butane n-Butane i-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given	temperature is hydred by vendor in the				0.15 0.15 0.25 4.9 0.06	5 - 0.0 5 - 0.0 5 - 0.0 - 0.0 3 - 0.0 ppm		0.06 0.05 0.21 1.46 0.29 10 ppm	charge	e temperature	e will be
32 33 34 35 36 37 38 39 40 41 42 43 44	Propane i-Butane n-Butane i-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given providu 2. Compl	ed by vendor in the ressor vendor to co	ir compre nfirm the	ssor data compres	asheet. sor ratio.	0.15 0.25 4.9 0.08 10	5 - 0.0 5 - 0.0 5 - 0.0 9 - 0.0 3 - 0.0 ppm	However cor	0.06 0.05 0.21 1.46 0.29 10 ppm			will be
32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48	Propane i-Butane n-Butane i-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given provide 2. Compl 3. Comple	ed by vendor in the ressor vendor to co ressor vendor shall	ir compre nfirm the ensure th	ssor data compres le suitabi	asheet. sor ratio. lity of the ma	0.15 0.25 4.9 0.06 10 kage outlet	5 - 0.0 5 - 0.0 5 - 0.0 9 - 0.0 3 - 0.0 ppm	However cor	0.06 0.05 0.21 1.46 0.29 10 ppm			will be
32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49	Propane i-Butane n-Butane i-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given provide 2. Compl 3. Compl tempe	ed by vendor in the ressor vendor to co ressor vendor shall ratures & correspor	ir compre nfirm the ensure th nding disc	ssor data compres le suitabi harge te	asheet. sor ratio. lity of the ma mperature(s	0.15 0.25 4.9 0.06 10 kage outlet	5 - 0.0 5 - 0.0 5 - 0.0 3 - 0.0 9 ppm temperature.	However cor	0.06 0.05 0.21 1.46 0.29 10 ppm			will be
32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50	Propane i-Butane n-Butane i-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given provide 2. Compl 3. Compl tempe 4. The di	ed by vendor in the ressor vendor to co ressor vendor shall ratures & correspor scharge pressure p	ir compre nfirm the ensure th nding disc rovided is	ssor data compres le suitabi harge te s the disc	asheet. sor ratio. lity of the ma mperature(s charge press	0.15 0.25 4.9 0.06 10 kage outlet aterial of con). ure at the e	5 - 0.0 5 - 0.0 5 - 0.0 - 0.0 3 - 0.0 ppm temperature. nsturction for nd of three si	However cor	0.06 0.05 0.21 1.46 0.29 10 ppm			will be
32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	Propane i-Butane n-Butane n-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given provide 2. Compr 3. Compr tempe 4. The dia 5. The dia	ed by vendor in the ressor vendor to co ressor vendor shall ratures & correspor scharge pressure p scharge pressure a	ir compre nfirm the ensure th nding disc rovided is t each sta	ssor data compres le suitabi charge te s the disc age has t	asheet. sor ratio. lity of the ma mperature(s harge press o be provide	0.15 0.25 4.9 0.06 10 kage outlet aterial of con). ure at the e	5 - 0.0 5 - 0.0 5 - 0.0 - 0.0 3 - 0.0 ppm temperature. nsturction for nd of three si r.	However cor	0.06 0.05 0.21 1.46 0.29 10 ppm npressor disc			will be
32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52	Propane i-Butane n-Butane n-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given providu 2. Compr 3. Compr tempe 4. The dii 5. The dii 6. The dii	ed by vendor in the ressor vendor to co ressor vendor shall ratures & correspor scharge pressure p scharge pressure a charge temperature	r compre nfirm the ensure th nding disc rovided is t each sta at each	ssor data compres le suitabi harge te the disc age has t stage has t	asheet. sor ratio. lity of the ma mperature(s harge press o be provide s to be provi	0.15 0.25 4.9 0.06 10 kage outlet aterial of con). ure at the e ed by vendo ded by vendo	5 - 0.0 5 - 0.0 5 - 0.0 - 0.0 3 - 0.0 ppm temperature. nsturction for nd of three si r.	However cor	0.06 0.05 0.21 1.46 0.29 10 ppm npressor disc			will be
32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53	Propane i-Butane n-Butane n-Pentane Hexane Carbondioxide Nitrogen H2S NOTE : 1. Given provide 2. Compl 3. Compl tempe 4. The dii 5. The dii 6. The dii 7. Polytro	ed by vendor in the ressor vendor to co ressor vendor shall ratures & correspor scharge pressure p scharge pressure a charge temperature opic efficiency will b	ir compre- nfirm the ensure the nding disc rovided is t each state at each e provide	ssor data compres le suitabi harge te s the disc age has t stage has d by com	asheet. sor ratio. lity of the ma mperature(s harge press o be provide s to be provi pressor ven	0.15 0.25 0.25 0.06 0.06 10 10 10 kage outlet aterial of con). ure at the e d by vendo ded by vendo dor.	5 - 0.0 5 - 0.0 5 - 0.0 9 - 0.0 9 - 0.0 9 - 0.0 1 -	However cor the Booster of tages of comp	0.06 0.05 0.21 1.46 0.29 10 ppm npressor disc	or 39 °	°C suction	will be
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