

	Technical Proposal For <i>Pressure Vessels</i>		 
	<i>Binak Oilfield Development – Surface Facilities; New Gas Compressor Station</i>		
TAGHTIRAN KASHAN Co.	Our Reference: 401610-032-1215	Your reference: Email;26/06/1401	Date: 30/Sep/2022
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REVISION AND APPROVAL							
00	01/Oct/2022	A.M	A.V	M.Z			
REV.	DATE	PRE.	APP.	CHECK	APP.	APP.	DESCRIPTION
		VENDOR		CONTRACTOR		OWNER	







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1. INTRIDUCTION

Taghtiran Kashan is specialized in design and manufacturing various equipment including: pressure vessels, towers, mixers, reactors, variety of heat exchangers, bundles, convection coils, fermenters, air cooler, recuperate, etc.



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2. Proposal Description:

This proposal is prepared according to "***Material requisition for Pressure Vessels***" Related to the ***Binak Oilfield Development – Surface Facilities; New Gas Compressor Station*** issued by "**Hirgan Energy – Design & Inspection (D&I) Companies**" or "**BUYER**" above mentioned no. **Email.26/061401** and its attachments, for material procurement, manufacturing, quality control, testing & inspection, coating and painting for carbon steel equipment and pickling and passivation for stainless steel parts and equipment, certification, packing, documentation and guarantee, shipping and Delivery as Ex-work "**shop of Taghtiran company**" located in "**IRAN- Kashan**".

3. Definitions

- a. Owner: **National Iranian South Oilfields Company (NISOC)**
- b. Buyer: **Hirgan Energy – Design & Inspection (D&I) Companies**
- c. Vendor: **Taghtiran Kashan Company**



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4. Scope of work and supply:

Our scope of work and supply is in accordance with the "***Material requisition for Pressure Vessels" Related to the Binak Oilfield Development – Surface Facilities; New Gas Compressor Station***". Unless otherwise noted in "Clarification, Exception, deviation List "in Attachment.

These duties will be done for equipment which its specification including the name, material quantity, inside diameter and weight are mentioned in the following table.




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Table 1- SCOPE OF SUPPLY / WORK BY MANUFACTURER

Item	Description
Equipment ACC. to Item & Quantities	Included
Shop drawing	Included
Material Procurement	Includes
Manufacturing & Assembling	Includes
Cutting, Forming, Welding, Machinery	Includes
Inspection & Testing at Shop	Includes
Dimensional Control	Includes
VT (100%)	Includes
MT/ UT	Includes
RT ()	Includes
P.W.H.T	includes
Refractory (material & installation)	Not included
Hydrostatic Test	Includes
Sand Blast & Painting at Shop (Outside Surface)	Includes (Only Outside Surface)
Packing & Preparation for Shipment	Includes
Insulation & refractory	Not included
Spare parts for Two years Spare	Includes
Spare parts for pre-commissioning, commissioning	Includes
Special tools	Option
Documentation & Final Book	Includes
Transportation to Owner Site	Not included
Work site	Not included
Installation at the site	Not included
Internals	includes
Anchor bolts & Instrument	Not included
Mechanical Guarantee	Included







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Table 2- Specification

NO	ITEM NO.	DESCRIPTION	Layout	QTY (Set)
1	V-2101 A/B/C	1st Stage G.C. Suction Drums	Vertical	3
2	V-2102 A/B/C	2nd Stage G.C. Suction Drums	Vertical	3
3	V-2103	Discharge Gas K.O. Drum	Vertical	1
4	V-2104	Slug Catcher	Horizontal	1
5	V-2105	Inlet Gas K.O. Drum	Horizontal	1
6	V-2107	Glycol Sump Drum	Horizontal	1
7	V-2201	Flare K.O. Drum	Horizontal	1
8	V-2202	Close Drain Drum	Horizontal	1
9	V-2203	Instrument Air Receiver	Vertical	1
10	V-2204	Nitrogen Receiver	Vertical	1
11	V-2205	Fuel Gas K.O. Drum	Vertical	1
12	V-2206	Diesel Oil Drum	Horizontal	1
	Total			16

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Table 3- Material Specification

Pos.	ITEM NO.	Shell/ Head	Nozzles		Reinforcing plate	Stud Bolts/ Bolts	Support (Skirt) (Saddle)
			Flange/ Long Welding Flange/ Self- Reinforced Nozzles	Neck (Pipe)		Nuts	
				Neck (Plate)			
1	V-2101 A/B/C	SA 516 Gr.60 N	SA 105 N	SA 106 Gr.B	SA 516 Gr.60 N	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
2	V-2102 A/B/C	SA 516 Gr.70N + 3 mm Clad SS316L	SA 105 N + 3 mm Clad SS316L	SA 106 Gr.B + 3 mm Clad SS316L	SA 516 Gr.70N	SA- 193 B7 SA- 194 2H	SA 285 Gr.C
3	V-2103	SA 516 Gr.70N + 3 mm Clad SS316L	SA 105 N + 3 mm Clad SS316L	SA 106 Gr.B + 3 mm Clad SS316L	SA 516 Gr.70N	SA- 193 B7 SA- 194 2H	SA 285 Gr.C
4	V-2104	SA 516 Gr.60 N	SA 105 N	SA 106 Gr.B	SA 516 Gr.60 N	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
5	V-2105	SA 516 Gr.60 N	SA 105 N	SA 106 Gr.B	SA 516 Gr.60 N	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
6	V-2107	SA 516 Gr.70	SA 105	SA 106 Gr.B	SA 516 Gr.70	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
7	V-2201	SA 516 Gr.70 N	SA 105 N	SA 106 Gr.B	SA 516 Gr.70 N	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
8	V-2202	SA 516 Gr.70 N	SA 105 N	SA 106 Gr.B	SA 516 Gr.70 N	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
9	V-2203	SA 516 Gr.70	SA 105	SA 106 Gr.B	SA 516 Gr.70	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
10	V-2204	SA 516 Gr.70	SA 105	SA 106 Gr.B	SA 516 Gr.70	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
11	V-2205	SA 106 Gr.B	SA 105 N	SA 106 Gr.B	SA 516 Gr.60 N	SA- 193 B7 SA- 194 2H	SA 283 Gr.C
12	V-2206	SA 516 Gr.70	SA 105	SA 106 Gr.B	SA 516 Gr.60	SA- 193 B7 SA- 194 2H	SA 283 Gr.C







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Table 4- Dimensional Specification

Tag No.	ID (mm)	Shell length (TL/TL) (mm)	Shell Thk (mm)	Min. Head Thk (mm) B.F/A.F	PWHT	RT Shell/Head	Total Length (mm)	FABRICATED WEIGHT (KG)
V-2101 A/B/C	900	3,000	10	10/8	N	Spot/Full		2,000
V-2102 A/B/C	900	3,000	12	15/12	N	Spot/Full		2,100
V-2103	900	3,000	30	30/25	N	Full		5,000
V-2104	4,200	12,600	25	30/25	N	Full		52,500
V-2105	1,500	4,500	15	15/12	N	Full		4,800
V-2107	1,100	3,600	10	10/8	N	Spot/Full		3,200
V-2201	1,000	3,000	10	10/8	N	Spot/Full		2,800
V-2202	2,600	7,800	15	20/16	N	Spot/Full		13,000
V-2203	1,500	5,000	12	12/10	N	Spot/Full		4,300
V-2204	1,050	3,150	10	12/10	N	Spot/Full		2,500
V-2205	PIPE 18"	2,950	Sch.st	-	N	Spot/Full		1,200
V-2206	2,300	6,000	10	12/10	N	Spot/Full		4,500

- The weights of the equipment are based on the General drawing specification
- The prices in our commercial proposal are strictly depended on all specifications in MR documents. Any change in these specificatns due to change in the prices.

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5. Applicable Code and Standard

Design, material procurement, inspection and tests and manufacturing of the above equipment will be done in accordance with:

Pressure vessels (acc. to data sheets) are designed in accordance with ASME Code Section VIII Division 1.

ASME Boiler and Pressure Vessel Code 2017:

Section II, Parts A, B, C & D

Section V

Section VIII, Div. 1 & Div.2

Section IX

Materials

Nondestructive Examination

Rules for Construction Of Pressure Vessels

Qualification Standard For Welding And Brazing Procedures, Welders, Brazers and Welding And Brazing Operators




NACE Standard (MR-0103)/(MR-0175)

ASME B16.5 (for nozzle up to 24")

ASME B16.47(for nozzle 26" to 60")

WRC 107/297

Applicable codes and standards defined in technical specification for pressure vessel be followed by vendor.

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6. ENGINEERING, DESIGN & DRAWING




7. Material procurement:

Material for pressure parts, including plates for shell and heads, reinforcement plates, pipes and flanges will be procured from **OWNER APPROVED VENDOR LIST**. Other parts such as carbon bolts & nuts, gaskets, plates for supports will be procured from well-known manufacturers in Iran.




However some of our sources (not only) for material are listed in following table:

Table 5- Material resources




Material	Origin	Companies
Carbon steel plate	Germany	Dillinger/ Salzgitter
	Belgium	DC
	South Korea	Posco
	South Korea	Dongkuk
	IRAN	FOOLAD MOBARAKEH/OXINSTEEL
Stainless steel plate	Spain	Acerinox
	South Africa	Columbus
	Taiwan	YC
	China	BAO Steel
	China	Tisco
	China	ESS(Eastern Special Steel)
	China	ZPSS(Zhangjiagang Posco)
Pipe	Spain	Tubacex
	South Korea	Cosmo Steel Co.
	South Korea	Summit Special Metal Co.
	China	Jiuli Co.
	China	Zhangjiagang Haohua Industry Pipe Co.
S.S Forge and flange	South Korea	HK Metal Co.

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Material	Origin	Companies
	South Korea	KJF Co.
	South Korea	Ju Chan Co.
	Iran	Mashin Sazi Arak
C.S Forge and flange	South Korea	HK Metal Co.
	South Korea	KJF Co.
	South Korea	Ju Chan Co.
	Iran	Mashin Sazi Arak
Tube	Spain	Tubos
	Germany	Intra Industrial Solutions
	South Korea	Cosmo Steel Co.
	South Korea	Summit Special Metal Co.
	South Korea	T-Tube
	China	Zhangjiagang Haohua Industry Pipe Co.
Gasket	Iran	Klingeran
		Mashhad Washer
		Petro Ideh Kooshesh
		Atbin Ista
		Kimia Faravar Sanat
		Kimia Tarab Pars
Bolt and nut	Iran	Iran Industrial Bolt & Nut Engineering & Trading Co.
		Poulad Pitch Kar
		Pars Pitch
		Part Sazi Mashhad
		Pich Sazan Aria Novin
		Kian Pich
		Tak Bolt
		Taghtiran Kashan

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Material	Origin	Companies
Head	South Korea	Nesco
	Japan	Hokkai
	U.A.E	Arabian Oasis
	South Korea	Hanil Head Co.
	China	Jiangyin Hongzhou Head & Expansion Joint Co.,Ltd
Paint	Iran	Ronas
		Pars Shamin
Electrode	Korea	Hyundai
	Sweden	Esab
	Iran	Yazd
	Iran	AMA
		Kavosh joosh

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8. List of Machineries & Facilities

6.1. Machining shop




Pos.	Machine	Qty
1	2 controlled axes CNC turning machine	5
2	3 controlled axes CNC machine-center	2
3	3 and 4 controlled axes CNC tool milling machine	2
4	CNC Jig Grinding	1
5	CNC Drilling Machine	1
6	NC Drilling Machine	2
7	6.5 meters working length and 1 meter turning dia.⋅Lathe	1
8	2.7 meters working length and 46 cm turning dia.⋅Lathe	1
9	2.7 meters working length and 64 cm turning dia.⋅Lathe	1
10	4 meters working length and 44 cm turning dia.⋅Lathe	1
11	3 meters working length and 44 cm turning dia.⋅Lathe	1
12	2 meters working length and 26 cm turning dia.⋅Lathe	2
13	1.5 meters working length and 26 cm turning dia.⋅Lathe	1
14	470 cm working area×400× 1100⋅Universal milling machine	1
15	350 cm working area×230× 670⋅Universal milling machine	1
16	350 cm working area×300× 860⋅Milling machine	1
17	3 meter working length⋅Heavy duty Shaper machine	1
18	70cm working length⋅Shaper machine	1
19	50 cm working length⋅Shaper machine	1
20	profile & bars⋅Variable types of sawing machines for plate	5
21	Overhead crane (3 ton)	6
22	thickness 4mm⋅ max. dia. 1.5m⋅Plate circular shearing machine	1
23	Cutter pipes fining machine	1
24	working radius 1250mm⋅Radial Drill	4
25	Pillar Drills	3
26	Drill tool grinder	1

6.2. Sheet metal working shop

Pos.	Machine	Qty
1	15mm thickness⋅ max. capacity 3.5 m dia.⋅Flanging machine	1
2	40 mm thickness⋅ max. capacity 6 m dia.⋅Flanging machine	1
3	Maus tube to tubesheet automatic expanding machine	1
4	Maus tube to tubesheet automatic welding machine	1

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Pos.	Machine	Qty
5	Hyper term brand Automatic Sheet Metal Cutting controller (for plasma and Flame cutting Torch)	1
6	Migatronic and Esab brands Plasma Cutting machine•Kejleberg	5
7	CNC plasma & flame Cutting machine	1
8	Flame Cutting machines	5
9	Plasma & flame dished head edge preparation	1
10	GMAW welder	3
11	Migatronic automatic GTAW and plasma welding machine for sheet metals with up to 3 meters width	1
12	Migatronic automatic rotating Arc Welding machine	1
13	SMAW• GMAW• Plasma• Miller welding unit for GTAW• Kara•Migatronic	30
14	Spot welder	1
15	Plate rolling Machines in 4 sizes with 3 and 4 rollers and 2.5m working width For rolling up to 30mm thick plates	4
16	200 and 70 Tones Hydraulic Presses•1000	3
17	Pneumatic crankshaft press (40 and 25 Tones)	3
18	Acid washing and sandblast equipments•Polishing tools	3
19	Pipe band saw machine	1
20	Pipe beveller machine	1
21	Deburring machine	1
22	Overhead crane (5 ton + 2.5 ton)	4
23	Sheet bending machine	1
24	Pipe bending machine	1
25	Circular cutting machine	1
26	Tractor (20 ton)	1
27	Air-Compressor (Electric and Diesel)	4
28	Wood working machineries	Complete Set
29	Lift truck(10ton)	3
30	Tifor(Hand Crane) 3ton	7
31	Metabo Grinding machine	40
32	Tube bending machine	3
33	Rectifire630	15
34	Aluminium Welding machineW420	6
35	Bed & Boom (for Sub marge Welding)	2




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6.3.Quality control department

Pos.	Device name	manufacturer	Purpose
1	Ultrasonic Test	Krautkramer (digital USN 50)	Thickness measurement and weld inspection.
2	Magnetic Particles Test	Karl deutsch	Ferritic welds inspection.
3	Viewer	KDE	Interpretation of radiography films.
4	Densitometer PDA-100	Konicaminolta	Specified of density radiography films
5	Surface Texture Measurement	Surtronic 3+	Roughness measurement.
6	Thickness Measurement	Elcometer	Paint layers thickness measurement.
7	Hardness Measurement	Koopa	Hardness of metal measurement.
8	Coating Thickness Meter	Elcometer	Measurement of dry film thickness
9	Dark Room	-	-
10	Penetrant Liquid Test	Magna flux	cleaner and developer for weld +Penetrant inspection.
11	Gauge Block	-	Calibration of caliper and micrometer.(0.5-500mm)
12	Thermal Pen	Tempil	Range from 125 to 700 degree centigrade
13	Digital Thermometer	Hunyoung	
14	Micrometers		0-2000 mm
15	Calipers		0-2000 mm
16	Vacuum Pump		-0.8 bar
17	Hydrotest Pump		Up to 200 bar
18	Multi meter	Hioli	-
19	Temperature Indicating Crayon	Tempstik	66°~427°

6.4.General facilities

Pos.	Facility	Qty
1	Computers	90
2	Printers	30
3	Plotter (size A0)	2
4	Phone line (factory)	15
5	Phone line (office)	6
6	Copier	4
7	Server	3
8	Scanner	8

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9. Manufacturing

Fabrication shall be in accordance with ASME Boiler and Pressure Vessel Code: Section VIII Division 1 - Rules for Construction of Pressure Vessels or ASME Boiler and Pressure Vessel Code: Section VIII Division 2 – Alternative Rules-Rules for Construction of Pressure Vessels as is indicated in the Data Sheet of equipment.

8.1.Pre-fabrication

- 8.1.1. Cutting and forming
- 8.1.2. Rolling of the shell plates
- 8.1.3. Preparation and welding the nozzles to the flanges;
- 8.1.4. Preparation of the supports

8.2.Fit up




- 8.2.1. Preparation of the main shell courses and fitting them up to each other
- 8.2.2. Fit up flanges to shell
- 8.2.3. Fitting up the supports
- 8.2.4. Fitting up the nozzles to the shell (after complete welding of the shell parts)



8.3.Welding

In this stage, preparation and welding of the parts are done by experienced personnel (holding certificates) and according to PQR and WPS which are verified by the employer. Each stage of welding is examined by the QC inspectors, who perform necessary tests such as PT or RT according to the standards.

The equipment is forwarded to the subsequent stages after it is verified and registered on the inspection forms.

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8.4.NDE and Inspection

8.5.Post Weld Heat Treatment, Post Forming Heat Treatment (Not required)

8.6.Sand blasting, painting and pickling

Carbon steel parts and equipment will be sand blasted and painted according to project painting specification.




Stainless steel parts and equipments will be pickled and passive according to vendor standard.

10.Quality assurance plan

All the tests and inspections according to ITP, including material inspection, non-destructive tests (PT, VT, UT, MT, and RT), as well as hydrostatic tests will be carried out in the presence of the purchaser's inspector; Also the results of each test will be registered in special forms and delivered to the purchaser in the form of inspection booklet at the end of the project.

Following tests be performed by vendor:

- Material inspection (VT, MT, PT, UT, ...)
- Visual inspection
- Dimensional inspection
- Welding inspection
- Hydrostatic test
- Pre-assemble inspection & test performed at shop
- Rust prevention and painting inspection
- Marking inspection for packing
- Final inspection prior to packing
- Packing inspection

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11.Reference list




Following table is included some of Taghtiran contracts which is related to this MR:

Table 6- Reference List




Pos.	Contract Subject	Purchaser	Owner
1	Mechanical design, material procurement and manufacturing of 45 pressure vessels and other equipment.	NARGAN	Lorestan Petrochemical Company
2	Mechanical design, material procurement and manufacturing of 45 pressure vessels and other equipment.	NARGAN	Mahabad Petrochemical Company
3	Mechanical design, material procurement and manufacturing of 15 pressure vessels.	NARGAN	Esfahan Petrochemical Company
4	Mechanical design, material procurement and manufacturing of 22 pressure vessels.	EIED	Ilam Petrochemical Company
5	Mechanical design, material procurement and manufacturing of 5 pressure vessels and 3 storage tank.	SAFF	POGC (phase 15)
6	Mechanical design, material procurement and manufacturing of 5 pressure vessels and 3 storage tank.	GIPCO	POGC (phase 16)
7	Mechanical design, material procurement and manufacturing of 12 pressure vessels.	SADRA	Tabriz Petrochemical Company

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Pos.	Contract Subject	Purchaser	Owner
8	Mechanical design, material procurement and manufacturing of 3 jacketed pressure vessels.	SADRA	Tabriz Petrochemical Company
9	Mechanical design, material procurement and manufacturing of 15 Tote tanks	SADRA	POGC
10	Mechanical design, material procurement and manufacturing of 1 reactor.	Owner	Urumieh Petrochemical Company
11	Mechanical design, material procurement and manufacturing of 24 sets process equipment for poly propylene plant.	Owner	Regal Petrochemical Company
12	Mechanical design, material procurement and manufacturing of 11 heat exchangers.	EIED	Fanavaran Petrochemical Company
13	Mechanical design, material procurement and manufacturing of 104 sets process equipment for hydrogen peroxide plant.	Owner	Pouyesh Petrochemical Company
14	Mechanical design, material procurement and manufacturing of 2 heat exchangers.	Owner	Kimia Bandar Imam Company
15	Manufacturing of 52 sets process equipment for alcohol and yeast plant.	Vogel Busch	Sugar cane and by-products Company
16	Manufacturing of 13 fermentors for alcohol and yeast plant.	Vogel Busch	Sugar cane and by-products Company
17	Manufacturing of 56 sets process equipment for citric acid plant.	Vogel Busch	Kimiya-ye Gharb Gostar Company
18	Manufacturing of 32 sets process equipment for Yeast plant.	Owner	Pak Mayeh Company

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Pos.	Contract Subject	Purchaser	Owner
19	Mechanical Design, Material Procurement And Manufacturing Of 2nd Urea & Ammonia Plant Pressure Vessels	NDEC	Kermanshah Petrochemical Industries Company
20	Material procurement and manufacturing of cryogenic shell and Tube Heat Exchangers	Owner	Marun Petrochemical Company
21	Material procurement and manufacturing of Tube Bundle for Heat Exchangers	Owner	Esfahan Oil Refinery Company
22	Mechanical Design, Material Procurement And Manufacturing of Shell and Tube Heat Exchangers AOGC-PPS-PT-PO-600	EIED	Arvandan Oil Gas Company West Karoon Oil Field Early Production Unit (Arvandan)
23	Mechanical Design, Material Procurement And Manufacturing of Shell and Tube Heat Exchangers for SADAF ESR PLANT	Nargan	SADAF Chemical Company
24	Manufacturing of Pressure Vessels and Tower for Methanol plant of Bushehr Petrochemical Company	Parsian Sazeh Iranian	Bushehr Petrochemical Company
25	Mechanical Design, Material Procurement And Manufacturing of Shell and Tube Heat Exchangers for Pentane II Production Plant	Owner	Tabriz Petrochemical Company
26	Mechanical Design, Material Procurement And Manufacturing of Drums for SRU Plant	EIED	ILAM PETROCHEMICAL COMPANY-SULFUR REMOVAL UNIT
27	Mechanical Design, Material Procurement And Manufacturing of Towers & Column for KERMANSHAH BIOETHANOL Plant.	Moshiran	KERMANSHAH BIOETHANOL

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Pos.	Contract Subject	Purchaser	Owner
28	Mechanical Design, Material Procurement And Manufacturing MIS FERTILIZER PROJECT (Phase I)	WUHUAN ENGINEERING CO., LTD	MASJED SOLEYMAN PETROCHEMICAL INDUSTRIES COMPANY (LTD)
29	Material Procurement And Manufacturing of Tube Bundle (Recuperator, 5 Set)	Pars Steel Sabzevar Co.	Pars Steel Sabzevar Co.
32	Material Procurement And Manufacturing of Tube Bundle (Recuperator, 4 Set)	South Kaveh Steel Co.	South Kaveh Steel Co.
30	Material Procurement And Manufacturing of Tanks 400 Qty. (O-34, Aluminum Tank)	Diba Energy	Diba Energy
31	TRANSFER LINE 1&2 (Auto thermal Reformer to Waste Heat Boiler) (Waste Heat Boiler to Steam Superheater)	BUSHEHR Petrochemical Company (BUPC)	BUSHEHR Petrochemical Company (BUPC)
32	Material Procurement And Manufacturing of Tanks 500 Qty. (O-34, Aluminum Tank)	Diba Energy	Diba Energy
33	Reformer Tubes Accessories- RT-AA3901 540 Qty.	IRITEC company	MAKRAN CHABAHAR Steel Complex DR PLANT
34	Material Procurement And Manufacturing of Tube Bundle (Recuperator, 2 Set)- Natural Gas Type E4, Right & Left	Iranian Ghadir Iron and Steel Co.	Iranian Ghadir Iron and Steel Co.
35	Material Procurement And Manufacturing of Drums & Towers for PSA Project	Zagros Petrochemical Company	Zagros Petrochemical Company
36	Design, Material Procurement And Manufacturing of Heat Recovery (Recuperators & casing)	IRITEC company	MAKRAN CHABAHAR Steel Complex DR PLANT

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Pos.	Contract Subject	Purchaser	Owner
37	Design, Material Procurement And Manufacturing of Heat Recovery (Recuperators & casing)	Khatam-al Anbiya Construction Headquarters	Baft Steel Complex Co.
38	THE NEW NHT, BSU, CCR AND DEETHANIZER UNITS EPC PROJECT TEHRAN REFINERY	CHAGALESH consulting engineers private Co.	Tehran Oil Refinery Co.
39	Air Separation Unit- Air Receiver (Vertical)	FALAT PARS Company(EPC CONTRACT OR)	IRAN Alloy Steel Company
40	NGL3100 GAS POWER PLANT-BUFFER TANK	Oil Turbo Compressor Company (OTCC)	OIEC

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12. Time scheduling

After signing and advance payment receiving, design and documents such as shop drawings, WPS, PQR and other required documents will be prepared within 30 days and material procurement will be started. Main material will be supplied within 3 month, Manufacturing will be started at the start of 3th month and within 3 month the equipment will be ready for transport. Total time is 9 months.

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13.Delivery condition

The equipment will be delivered as "Ex-work" at shop of "Taghtiran kashan Company" located in "IRAN- Kashan".

14.Documents

All required documents will be delivered to contractor according to project specification.

15.Clarification, Exception & Deviation

- Anchor bolts, installation, Instruments, Insulation/ fireproofing, internals material, Process Guarantee are not in our scope of supply and work.

16.Spare Parts

a) Erection, commissioning & start-up spare parts	
Gaskets for manhole, girth flange, and nozzle with blind flange for each type	100%
Studs, bolts, nuts & washers for manhole, girth flange, nozzle with blind	10% (Min.2 Sets)
b) Two year operation spare parts	
Gasket for nozzle with blind flange, body & cover flange for each type	100%
Bolts and nuts for the above	10% (Min.2 Sets)

17.Guarantee

The equipment is mechanical guaranteed for 12 months from delivery or 6 months from the start up whichever occurs first. Should any defects be observed in the equipment during this time the cause of which happen to the vendor, the same should be removed by the vendor and on their own expense.