

**CRUDE OIL, PETROLEUM
PRODUCTS & PETROCHEMICAL
TRADING GUIDE BOOK**

CONTENT

Topic	Page
Season 1: Overview of International Division of Iran's Oil Industry	
1-1. Introduction	1
1-2. Objective	1
1-3. Definition and abbreviation.....	1
1-4. Brief introduction of the international petroleum industry section	2
1-4-1. Public sector	2
1-4-2. Private sector	3
1-4-3. Process of considering embassies request in oil industry.....	3
1-5. Description of International Activities of Subsidiary Companies of Petroleum Ministry of I.R.I.....	3
1-5-1. Petroleum Ministry – Deputy Ministry of International Affairs and Commerce	3
1-5-2. National Iranian Oil Company- International Affairs	5
1-5-3. National Iranian Oil Refining and Distribution Company- International Affairs	6
1-5-4. National Petrochemical Company	6
1-5-5. National Iranian Gas Co. – National Iranian Gas Export Co. (NIGC – NIGEC).....	8
1-5-6. National Iranian Gas Company - Gas Trading Company	9
1-6. International activities of private sector in oil market	9
1-6-1. Iran Mercantile Exchange	9
1-6-2. Oil Gas Petrochemical Products Export Association	9
Season 2: Products which are produced in Petroleum Industry of Iran	10
2-1. Crude and Petroleum Products	10
2-1-2. Method of Purchasing Crude and Petroleum Products	10
2-1-3. Sale of Crude and Petroleum Products in Normal Condition	10
2-1-4. Purchasing of Crude and Petroleum Products	10
2-2. Petroleum Products:	10
2-3. Petrochemical Products:	11
2-4. Natural gas and Products from gas refinery:	11
2-5. Sale Bitumen and Petrochemical Products via Private Sector	11
2.5.1. Iran Mercantile Exchange (IME)	11
2.5.2 Sale Bitumen and petroleum products via (OPEX)	12
2-6. Brief list of oil products and suppliers	13

Attachment Content

Topic	page
Attachment 1: NIOC Export Crude Oil & Products.....	16
Attachment 1-1: light Export Crude Oil specification.....	17
Attachment 1-2: Heavy Export Crude Oil specification.....	18
Attachment 1-3: South Pars (1) Condensate Oil specification.....	19
Attachment 1-4: (LPG) propane & butane specification.....	20
•REFRIGERATED PROPANE (SPGC 6.7 & 8).....	20
•REFRIGERATED BUTANE (SPGC 6.7 &8).....	20
Attachment 1-5: 280 & 380 CST Fuel oil specification.....	21
•ABADAN 280 CST FUEL OIL GUARANTEED SPECIFICATION.....	21
•BANDAR ABBAS 380 CST FUEL OIL GUARANTEED SPECIFICATION.....	21
Attachment 2: Petroleum products types of NIORDC.....	22
Attachment 2-1: LPG specification.....	22
Attachment 2-2: Gasoline specification.....	22
•Attachment 2-2-1: Unleaded regular gasoline.....	22
•Attachment 2-2-2: Super unleaded gasoline.....	22
Attachment 2-3: Kerosene specification.....	23
Attachment 2-4: Gas oil specification.....	23
Attachment 2-5: Fuel oil specification produced by NIORPC.....	23
•Attachment 2-5-1: 180 & 230 CST fuel oil specification.....	23
•Attachment 2-5-2: 280 & 230 CST fuel oil specification.....	24
•Attachment 2-5-3: Heavy fuel oil specification.....	24
Attachment 2-6: Jet fuel oil specifications.....	24
•Attachment 2-6-1: Aviation turbine kerosene.....	24
•Attachment 2-6-2: Jet propulsion fuel.....	24
•Attachment 2-6-3: Aviation gasoline 11100.....	24
Attachment 2-7: solvent specifications.....	25
•Attachment 2-7-1: Solvents of 404,406,410.....	25
•Attachment 2-7-2: Solvents of 404 and 409 (light aromatic).....	25
•Attachment 2-7-3: Solvents of 402 & 403.....	26
Attachment 3: Bitumen specification.....	27
Attachment 3-1: 40/50 Bitumen.....	27
Attachment 3-2: 60/70 Bitumen.....	27
Attachment 3-3: 85/100 Bitumen.....	27
Attachment 3-4: 85/25 Bitumen.....	28
Attachment 3-5: MC/250 Bitumen.....	28
Attachment 3-6: 90/15 Bitumen.....	29
Attachment 3-7: New Bitumen specification.....	30
3-7-1. The modified polymer bitumen:.....	30
3-7-2. Emulsion bitumen.....	30
3-7-3. BituBale Bitumen.....	31
Attachment 4: Petrochemical products.....	32
Attachment 4-1: Aromatics.....	32
Attachment 4-2: Chemicals.....	33
Attachment 4-3: Fertilizers.....	35
Attachment 4-4: Liquid Gas and Feedstock.....	36
Attachment 4-5: Polymers.....	38
Attachment 5: Natural gas specification.....	39

SEASON 1

Overview of international Division of Iran's Oil Industry

1-1. Introduction

Integration and coordination in response to international (customer) applicants' needs is one of the critical principles in order to ensure satisfaction of clients. Familiarity with the main exporting crude oil and derivatives, gas and petrochemical plants of Islamic Republic of Iran can lead to correct applying procedure by (customer) applicants; moreover, it would be effective through reducing time and cost of correspondence.

1-2. Objective

- Integration to meet the requirements of overseas applicants.
- Reducing bureaucracy and streamlining responding procedure among embassies, international foreign affairs and Ministry of Petroleum of Islamic Republic of Iran.
- Creating data base in response of demands and using knowledge management in this regards.

1-3. Definition and abbreviation

LOI: Letter Of Intent

FOB: Free On Board

CIF: Cost, Insurance & Freight

FS: Feasibility Study

MOU: Memorandum of Understandings

MOM: Memorandum of Meetings

MOM: Minutes of Meeting

1-4. Brief introduction of the international petroleum industry section

1-4-1. Public sector

Row	Name	Department	Major responsibilities
1	Ministry of Petroleum	Deputy Ministry of International Affairs and Commerce	<ul style="list-style-type: none"> • Implementation of Sovereign Affairs and tracking the interactions between Islamic Republic of Iran and other nations. • Pursuing MOU and other international request through referencing them to executive body of oil industry
2	National Iranian Oil Company(NIOC)	NIOC International Affairs	Responsible for selling crude oil and exporting oil by-product (derivatives) of National Iranian Oil Company
3	National Iranian Oil Refining and Distribution Company (NIORDC)	NIOC International Affairs	<ul style="list-style-type: none"> • Exporting a surplus of oil by-product (derivatives) • Construction, renovation and revamp of refinery • Construction of mini refinery • Construction of storage tank and oil by-product pipeline • Participate and joint venture in refinery projects.
4	National Iranian Petrochemical Company (NIPC)	NIOC International Affairs	<ul style="list-style-type: none"> • Exporting petrochemical products • Construction and renovation of petrochemical plants
5	National Iranian Gas Company (NIGC)	NIOC International Affairs	SWAP, Barter and natural gas transportation Exporting a surplus of Gas LPG

1-4-2. Private sector

Row	Name	Major Responsibilities
1	Iran Mercantile exchange	<ul style="list-style-type: none">• Supplying bitumen and petrochemical products for internal and exporting consumption• Direct sale of bitumen and petrochemical products to international company providing that having stock exchange ID
2	Iranian oil, gas and petrochemical product exporters' association	Buying bitumen, petrochemical products and engine oil from stock exchange and exporting them to demanding countries

1-4-3. Process of considering embassies request in oil industry

Embassies of Islamic Republic of Iran and international consulate offices in Iran for project cooperation or propose of purchasing request from subsidiary of Petroleum Ministry, should - by informing Ministry of Foreign Affairs - send their requests (including specification) for Deputy Ministry of International Affairs and Commerce.

Deputy Ministry of International Affairs and Commerce will send received requests for subsidiary companies according to the subject of the aforementioned requests.

Afterward, subsidiaries of Petroleum Ministry will response to the requests and if it is needed, they will have meetings in this regards.

On the other hand, if individual or international companies tend to pursue their request through private sector, they should do it through stock exchange agencies or Iranian oil, gas and petrochemical product exporters' association.

1-5. Description of International Activities of Subsidiary Companies of Petroleum Ministry of I.R. of Iran.

1-5-1. Petroleum Ministry – Deputy Ministry of International Affairs and Commerce

1-5-1-1. Span of activities

Deputy Ministry of International Affairs and Commerce plays a role of creating and developing (bilateral) reciprocal and multilateral relationship between Petroleum ministry and other countries by considering objectives and responsibilities:

- Determining mission, objectives, procedure, macro policy making and national sovereignty of Petroleum Ministry in Foreign Affairs and Supervision of their accomplishment, in the best way.
- Supervision of international activities of main-subsidiaries and other subsidiaries according to the economic, technical and political statement of the nation.
- Determining required instruction for organizing of Petroleum Ministry's International activities and supervision of their accomplishment in the best way.
- Participation in joint commission with other countries and coordinating of petroleum ministry delegation activities in the above mentioned commission.
- Coordinating of main-subsidiaries and other deputies of Petroleum Ministry regarding having relationship with international foreign affairs and foreign agencies in other countries.
- Consideration and analysis of result and conclusion of bilateral and multilateral meeting, regional and international organization and presenting relevant reports.
- Providing background and infrastructure of conclusion of international contracts and supervision of their accomplishment in the best way.

This deputy with specialized investment committee and four administration offices (in economic zone and countries) follows aforementioned responsibilities.

1-5-1-2. How we you can have a contact with subsidiaries

- Deputy Ministry For International Affairs and Commerce
 - Tel: + 98 21 88945014 - + 98 21 61623374
 - Fax: + 98 21 88935922 - + 98 21 88940916
 - Site: <http://diac.mop.ir>
 - Address: Petroleum Ministry Building, Taleghani Avenue, Tehran, Iran
- Economic and Investment Administration Office
 - Tel: + 98 21 61622009 - + 98 21 88941585
 - Fax: + 98 21 88936943
 - Email: hashemian@mop.ir
- Europe, America and Khazar administration office
 - Tel: + 98 21 88945787- + 98 21 61622444
 - Fax: + 98 21 88937961
 - Email: h.esmaeili@mop.ir
- Asia-Pacific Administration Office
 - Tel : +98 21 88944386- +61623360
 - Fax: + 98 21 88944280

- Email: m.riahi@mop.ir
- Arabian, African and South American Administration Office
 - Tel: + 98 21 88944202 - + 98 21 61623180
 - Fax: + 98 21 88935869
 - Email: mashayekhi@mop.ir

1-5-2. National Iranian Oil Company- International Affairs

1-5-2-1. Activities scope

- Exporting of all exploiting products and by-products under supervision of NIOC
- Exporting of main-subsidiaries products in huge bulk (including Fuel Oil, LPG, and South Pars Sulphur. Naphtha and Heavy End)

1-5-2-2. Subsidiaries

- Director for International Affairs
 - Deputy Director For Oil- Marketing and Operation- International Affairs
 - Crude Oil Marketing Manager
 - Crude Oil Operative manager
 - Pricing
 - Deputy Director For Product- Marketing and Operation- International Affairs
 - Product Marketing Manager
 - product Operative Manager

1-5-2-3. Contact

- Crude oil
 - Tel: +98 21 88938237 - +98 21 61622247
 - Fax: +98 21 88940650
 - Site: www.nioc-intl.ir
 - Email: crude.marketing@nioc-intl.ir
- Product
 - Tel +98 21 61622238 - +98 21 61622460
 - Fax: +98 21 88940809
 - Site: www.nioc-intl.ir
 - Email: product-marketing@nioc-intl.ir

NIOC International Affairs Directorate has offices in England (London), China (Beijing), Singapore, India (Bombay), and Netherlands (Rotterdam) for

better relationship with its international customers. Applicants can send their requests through above-mentioned offices.

1-5-3. National Iranian Oil Refining and Distribution Company-International Affairs

1-5-3-1. Activity scope

Exporting a surplus of refinery products, participation in construction and renovation of refineries in foreign countries.

1-5-3-2. Subsidiaries

NIORDC International Affairs

- Export Supply Management
- Export Planning Management
- Export Business Management

1-5-3-3. Contact

- Tel: +98 21 88900589
- Fax: +98 21 22901558
- Site: www.niorde.ir
- Email: zeighami@niorde.ir

1-5-4. National Petrochemical Company

National Petrochemical Industry Company as a pioneer company in privatization of government companies which its companies operate in private sector and National Petrochemical Company as a holding company lead petrochemical industry in country with cooperation of main subsidiary companies.

1-5-4-1. International Affairs of National Petrochemical Industry Company

1-5-4-1-1. Activity Scope

International Affairs is a staff department of National Petrochemical Industry Company. This section with cooperation of other sections in petrochemical industry like production companies, service company lead duties in this section.

1-5-4-1-2. MANAGEMENT

Chief Manager of International Petrochemical Industry Company

1-5-4-1-3. Contact

- Tel: +98 21 88059754

- Fax: +98 21 88059755
- Site: www.nipc.ir

1-5-4-2. Petrochemical Commercial Company International

1-5-4-2-1. Scope of Activity

This company has responsibility in selling petrochemical products in petrochemical plants in country in internal and international markets and for facilitating of communication with international customers has established branches in London, Singapore, Shanghai, Hamburg, Istanbul and Seoul

1-5-4-2-2. Dependent Management

- Managing Director
 - Foreign Commercial Director
 - Deputy Foreign Commercial Director
 - Director of Commercial and Export of Chemical Products
 - Director of Commercial and Export of Fertilizer
 - Director of Commercial and Export of Liquid Gas and Aromatic
 - Director of Commercial and Export of Polymer Products, Thermoplastic And Engineer Polymers

1-5-4-2-3. Contact

❖ Central office – Tehran:

- Tel: +98 21 82851
- Fax: +98 21 88827312
- Site: www.petrochem-ir.net
- Email: pcc@petrochem-ir.com

❖ Interachem- German:

- Tel: +49 4022 722320
- Fax: +49 4022 700061
- Site: www.ict-ppc.com
- Email: ict@ict-ppc.com

❖ Singapore:

- Tel: +65 6223 5560
- Fax: +65 6223 5907
- Site: www.singnet.com.sg
- Email: pccsing@singnet.com.sg

❖ Peking:

- Tel: +86 10 65995439
- Fax: +86 10 65995438

❖ Shanghai:

- Tel: +86 21 58857385
- Fax: +86 21 58857386
- Site: www.pccchina.com
- Email: hosseuni@pccchina.com

❖ Mumbai:

- Tel: +91 22 22881402
- Fax: +91 22 22881405
- Site: www.mtnl.net.in
- Email: pccindia@mtnl.net.in

❖ Istanbul:

- Tel: +90 216 4697452
- Fax: +90 216 4697453
- Email: pecturkey@petrochem-ir.com

❖ Seoul:

- Tel: +82 224536366
- Fax: +82 234538133
- Site: www.pcckorea.co.kr
- Email: pcckorea@pcckorea.co.kr

1-5-4-3. Petrochemical Commercial Company International

1-5-4-3-1. Scope of Activity

Petrochemical Commercial Company International active in international trade of chemicals and investment in petrochemical projects in Middle East countries from activities of this company are:

- Import of petrochemical plant feedstock from Middle East and CIS countries
 - Providing of petroleum and petrochemical products for customer in the world from and Central Asia
 - Providing internal needs for petroleum and petrochemical products which NPC doesn't provide them
 - Purchase, swap and transit of petrochemical products in central Asia via Iran
- This company established branches in Turkmenistan, Dubai and Lebanon

1-5-3-2. Directorates

- General Manager
 - Directorate of commercial chemicals and aromatics
 - Directorate of liquid gas and fertiliser
 - Directorate of petroleum products and polymers

1-5-4-3-3. Contact

❖ Dubai

- Tel: +97 14 8857724
- Fax: +82 14 8857723

❖ Sahand naftiran as a broker in Tehran

- Tel: +98 21 88707398 - +98 21 88707462
- Fax: +98 21 88707397

❖ Lebanon

- Tel: +961 87 417577
- Fax: +961 87 423577

❖ Petrochemical Transportation co.

- Tel: +98 21 88789695
- Site: www.inpctc.com
- Email: petc@inpctc.com

❖ Turkmenistan

- Tel: +99 31 2452196
- Fax: +99 31 2452188

1-5-5. National Iranian Gas Co. – National Iranian Gas Export Co. (NIGC – NIGEC)

1-5-5-1. Activity scope

1. Marketing and developing of Iranian natural gas export LNG
2. Cooperation, investment and finance of gas pipeline projects and LNG plants
3. Negotiation and finalization of agreements related to swap with other countries and transport of transit of gas from neighbour countries via I. R. of Iran

1-5-5-2. Directorates

- General Manager of National Iranian Gas Export Company
 - Director of Commercial, Sale and Export Operation
 - Director of Marketing and Sailing of LNG
 - Director of Marketing and Natural Gas Sale (pipe line)
 - Director of Market Research and Economic Review
 - Director of Export Operation Control

1-5-5-3. Contact

- Tel: +98 21 88518601

- Site: www.nigec.ir

1-5-6. National Iranian Gas Company - Gas Trading Company

1-5-6-1. Activity scope

Selling refined products from natural gas refineries (LPG-Sulfur Condensate-Naphtha) and coordination of all activities related to export of products

1-5-6-2. Directorates

- Director of Planning –National Iranian Gas Company
- General Manager of GAS TRADING COMPANY
 - Director of marketing of Gas Trading Company

1-5-6-3. Contact

- Tel: +98 21 84870
- Site: www.nigc-igcc.ir
- Email: Info@nigc-igcc.ir

1-6. International activities of private sector in oil market

1-6-1. Iran Mercantile Exchange

1-6-1-1. Scope of activity

Several types of petrochemical products, bitumen, and oil engine via Iran mercantile exchange and ... international customer with reception of bourse code from brokers (annex no 8) can participate in bourse transactions and directly supply their needs.

1-6-1-2. Contact

- Tel: +98 21 85641020
- Site: news.ime.co.ir
- Email: shahbazi@ime.co.ir

1-6-2. Oil, Gas & Petrochemical Products Export Association

1-6-2-1. Scope of activity

Members of the union mainly are exporters of oil, gas and petrochemical products (base oil, several types of oil engine, paraffin and bitumen...) which export products on the basis of trade law and third chapter of instruction of combating contraband and supply of products out of official networks

1-6-2-2. Contact

- Tel: +98 21 88511611
- Fax: +98 21 88508250
- Site: www.opex.ir

SEASON 2

Products which are produced in Petroleum Industry of Iran

2-1. Crude and Petroleum Products

2-1-1. Varieties of Iranian Crude Oil Export

Iran's major oil export:

- 1- Light crude
- 2- Heavy crude

Technical specifications of crudes are available in annex no 1 and 2

2-1-2. Method of Purchasing Crude and Petroleum Products

Customer should refer to International Affairs of National Iranian Oil Company www.nioc-intl.ir and then choose the type of crude in the next step should send letter of intent for making contract in the short term contract (spot) or in long term contracts

2-1-3. Sale of Crude and Petroleum Products in Normal Condition

Terms for sale of crude in normal condition is available in the site with address mentioned above and customer can send the letter of intent to site

2-1-4. Purchasing of Crude and Petroleum Products

Now in the sanction period the customer should:

- in spot cargo there is need for:
 - providing vessel for shipment of crude from khark island by customer
 - Possibility of cash payment or LC or certified bank guarantee that accepted by financial department of NIOC by requester
 - Determining destination for cargo (affected the cargo price)
- Long-term contracts will be proceed as normal circumstance.

2-2. Petroleum Products:

Exporting petroleum products consist of fuel oil, LNG, South Pars Sulphur, condensate and importing products such as gas oil and gasoline.

NIOC is responsible for exporting in large volume and National Iranian Oil Refining and Distribution Co. (NIORDC) handles small volume of some products. Exporting of other excluded oil products is possible if production capacity exceeds local consumption.

Foreign requesters of exporting oil products have to check products' specification via NIOC International Affairs site (www.nioc-intl.ir) or attachment no. 2 of this booklet, and then send following information to the mentioned addresses in chapter

Necessary Information for Exporting Petroleum Products

- Product specification such as type, API, sulphur content, ...
- Determination of quantity (per day/ month/ 3 month)
- Delivery period (start and finish date)
- Type of contract (spot, short term, long term/ direct, barter, swap ...)
- Delivery term (CIF, FOB ...)
- Loading port and destination
- Payment term with priority of cash on delivery

2-3. Petrochemical Products:

All correspondences and requests for buying petrochemical products shall arrange with Ministry of Petroleum and then proper answer will be given after expert study. Following information shall be mentioned in the LOI.

Necessary information for petrochemical products

- Products specification
- Determination of quantity (per day/ month or year)
- Delivery period (start and finish date)
- Type of contract (spot, short term, long term/ direct, barter, swap ...)
- Payment term
- Delivery term (CIF, FOB ...)
- Loading port and destination

2-4. Natural gas and Products from gas refinery:

Sulphur, LPG and condensate are produced from refinery processes and exported by NIGC.

Foreign requesters shall communicate with Deputy Ministry of International Affairs and Commerce or NIGC for sending any purchase request.

2-5. Sale of Bitumen and Petrochemical Products via Private Sector

2.5.1. Iran Mercantile Exchange (IME)

Foreign Applicants can buy bitumen and some petroleum products from IME directly. Following steps need to be taken:

1. Filling code Application form by requestor:
 - 1.1 Filling personal application for individuals
 - 1.2 Filling incorporation application for legal entities
 - 1.2.1 Legal entities also must attach one colourful copy of corporate license.

2. These forms must be sealed by Embassy of republic of Islamic of Iran or by Ministry of Foreign Affairs after completion.
3. This step is necessary to confirm the identity of requests
 - 3.1 Choosing broker for order registration
 - 3.2 Introducing their representative to broker for following actions
4. Determining the specification of bitumen or other products and filling application form for product purchase order.
5. Paying 5% of the estimated value of the contract to “awarded credit control account” available with the broker
6. Assessing the purchase order by broker and finding the final price in export ring trading and announcing the final price to the buyer representative.
7. Deposit the remaining amount to supplier account after purchasing the good by broker during 48 hours.
8. Sending the export certificate to supplier and introducing the requester to refinery on petrochemical complex.
9. Communicating by supplier for receiving the cargo in Persian Gulf according to FOB terms

2.5.2 Sale of Bitumen and petroleum products via (OPEX)¹

Foreign requesters can provide their request by communicating with OPEX (WWW.OPEX.IR)

¹ Iranian Oil, Gas & Petrochemical Products Exporters' Association

2-6. Brief list of oil products and suppliers

Following you can see the list of oil products. Specification have been mentioned in attachments No.1 to No.5

Product	Supplier	General term and Condition
Crude oil	International Affairs of NIOC	Providing Vessel and advanced payment
Condensate	International Affairs of NIOC	-
Petrochemical LPG	National Petrochemical Co. (NPC)	-
Oil field LPG	NIORDC	Small volume (less than 4,000 tons)
Gas refinery LPG	IGCC	Small volume (less than 3,000 tons)
Ammonia	NPC	-
Epichlorohydrin	NPC	-
Liquid Nitrogen	NPC	-
Styrene monomer	NPC	-
Acetone	NPC	-
Acetic acid	NPC	-
Sulphuric acid	NPC	-
Nitric Acids	NPC	-
Acryl nitride	NPC	-
Acid Benzene	NPC	-
Urea	NPC	-
Gasoline (Export)	NIORDC	-
Gasoline (Import)	International Affairs of NIOC	-
Propylene	NPC	-
polyethylene	NPC	-
polystyrene	NPC	-
Solvents	NIORDC	-
Jet fuel	NIORDC	-
Ammonia Sulphate	NPC	-
Engine oil and paraffin wax	Private Sector & Exchange	-
Base oil	Private Sector & Exchange	-
Phenol	NPC	-
Bitumen	Jey co.	-
Bitumen	Passargad co.	-
Crystal	NPC	-
Sulphur	NPC & IGCC	-
Xylene	NPC	-
Menu ethyl glycol	NPC	-

Gas condensate	NIOC, International Affairs	-
Glycol ethyl mono	NPC	-
Normal Hexane	NIORDC	-
Kerosene	NIORDC	-
Fuel Oil	NIOC and NIORDC	-
Gas Oil	NIORDC	-
Naphtha	NPC & NIORDC & IGCC	-
Ammonia Nitrate	NPC	-
Natural Gas	NIGC	-

Specification of crude oil, gas, petroleum & petrochemical products

Attachment 1: NIOC Export Crude Oil & Products²

No	Name	Type
1	Iranian Light	General Data TBP Distillation Analysis
2	Iranian Heavy	General Data TBP Distillation Analysis
3	South Pars Condensate	General Data
4	Fuel oil	Abadan & Bandarabbas 380
5	LPG (Propane & Butane)	General Data
6	Condensate	South Pars Kangan Marun
7	Gasoil	General Data
8	Gasoline	92 & 95 RON
9	Granulate Sulfur	South Pars

² Specificity of the above products owe at 'Nioc-intl.ir' site.

Attachment 1-1: light Export Crude Oil specification.

NIOC. RIPI

TABLE: 1

GENERAL DATA			
SPECIFICATION		RESULT	TEST METHOD
SPECIFIC GRAVITY @ 15.56/15.56 °C		0.8579	ASTM D-4052
API		33.4	" D-1298
SULPHUR CONIENT (Total)	Wt%	1.36	" D-2622
** H2S CONTENT	PPM	50	RIPI
NITROGEN CONTENT (Total)		0.26	ASTM D-4629
BASE SEDIMENT & WATER		TRACE < 0.05	" D-1796
WATER CONTENT		TRACE < 0.05	" D-4006
SALT CONTENT		16.0	" D-3230
KINEMATIC VISCOSITY @ 10 °C		*mm ² /Sec	" D-445
KINEMATIC VISCOSITY @ 20 °C		*mm ² /Sec	" D-445
KINEMATIC VISCOSITY @ 40 °C		*mm ² /Sec	" D-445
POUR POINT		°C	" D-5853
** R.V.P		PSI	" D-323
ASPHALTENES		1.45	IP-143
WAX- CONTENT		5.7	BP-237
DROP MELTING POINT OF WAX		57	IP-133
CARBON RESIDUE CONRADSON		3.67	ASTM D-189
ACIDTY, TOTAL		0.11	UOP-565
NICKEL CONTENT		11.0	UOP-800
VANADIUM CONTENT		44.0	UOP-800
IRON CONTENT		< 2.0	UOP-800
LEAD CONTENT		< 1.0	UOP-391
SODIUM CONTENT		30.0	UOP-391

* Equal to c.St.

** Tested on site.

WORKED BY: CRUDE EVALUATION GROUP

APPROVED BY: H. TALACHI

Attachment 1-2: Heavy Export Crude Oil specification.

NIOC. RIPI

TABLE: 1

GENERAL DATA				
SPECIFICATION		RESULT	TEST METHOD	
SPECIFIC GRAVITY @ 5.56/15.56	°C	0.8789	ASTM	D-4052
API		29.5	"	D-1298
SULPHUR CONIENT (Total)	Wt%	1.99		D-2622
** H2S CONTENT	PPM	80	RIPI	
NITROGEN CONTENT (Total)	Wt%	0.25	ASTM	D-4629
BASE SEDIMENT & WATER	Vol%	TRACE < 0.05	"	D-1796
WATER CONTENT	Vol%	TRACE < 0.05	"	D-4006
SALT CONTENT	P.T.B	16.0	"	D-3230
KINEMATIC VISCOSITY @ 10 °C	*mm ² /Sec	29.42	"	D-445
KINEMATIC VISCOSITY @ 20 °C	*mm ² /Sec	21.50	"	D-445
KINEMATIC VISCOSITY @ 40 °C	*mm ² /Sec	16.56	"	D-445
POUR POINT	°C	-8	"	D-5853
** R.V.P	PSI	8.10	"	D-323
ASPHALTENES	Wt%	3.90	IP-143	
WAX- CONTENT	Wt%	6.0	BP-237	
DROP MELTING POINT OF WAX	°C	56	IP-133	
CARBON RESIDUE CONRADSON	Wt%	5.96	ASTM	D-189
ACIDTY, TOTAL	Mg KOH/gr	0.18	UOP-565	
NICKEL CONTENT	PPM	23.0	UOP-800	
VANADIUM CONTENT	PPM	90.0	UOP-800	
IRON CONTENT	PPM	5.4	UOP-800	
LEAD CONTENT	PPM	< 1.0	UOP-391	
SODIUM CONTENT	PPM	20.0	UOP-391	

* Equal to c.St.

** Tested on site.

WORKED BY: CRUDE EVALUATION GROUP

APPROVED BY: H. TALACHI

Attachment 1-3: South Pars (1) Condensate Oil specification.

NIOC. RIPI

GENERAL DATA			
SPECIFICATION		RESULT	TEST METHOD
SPECIFIC GRAVITY @ 15.56/15.56 °C		0.7454	ASTM D-4052
API		58.33	" D-4052
SULPHUR CONIENT	Wt%	0.21	IP-243
MERCAPTAN CONTENT	Wt%	0.18	UOP-163
WATER CONTENT	PPM	372	KARL FISCHER
PONA TEST:			ASTM D-1319
SATURATE CONTENT	Vol%	88.0	
OLEFIN CONTENT	Vol%	< 0.3	
AROMATIC CONTENT	Vol%	12.0	
KINEMATIC VISCOSITY @ 0 °C	e.St.	0.99	" D-445
KINEMATIC VISCOSITY @ 10 °C	e.St.	0.87	" D-445
KINEMATIC VISCOSITY @ 20 °C	e.St.	0.77	" D-445
NITROGEN CONTENT	PPM	11	" D-4629
POUR POINT	°C	< -35	" D-97
R.V.P	PSI	12.7	" D-323
GOLD FILTER PLUGGING POINT	°C	-20	IP-309
CARBON RESIDUE RAMS BOTTOM	Wt%	0.08	ASTM D-524
WAX- CONTENT	Wt%	0.97	BP-237
COPPER CORROSION, 3hrs, @ 100 °C		lb	ASTM D-130
ACIDITY	Mg KOH/gr	< 0.05	" D-664
ANILIN POINT	°C	59.3	" D-611
MOLECULAR WEIGHT		110	IP-86
COLOR Saybolt		+15	ASTM D-156
BROMINE NUMBER	gr Br/100gr	1.7	IP-130
LEAD	PPM	< 1.0	UOP-391

WORKED BY: CRUDE EVALUATION GROUP
APPROVED BY: H. TALACHI

Attachment 1-4: (LPG) propane & butane specification.

• REFRIGERATED PROPANE (SPGC 6.7 & 8)

Test Item	Test Method	Specification
Sp. Gr. @60°F	ASTM D 2598	To be reported
Vapor pressure @100°F (psig)	ASTM D 1267	Max 200
Propane content (vol.%)	ASTM D 2163	Min 96.0
Ethane content (vol.%)	ASTM D 2163	Max 2.0
Volatile residue C4 ⁺ (vol.%)	ASTM D 2163*	Max 2.5
Residue on Evap. Of 100ml (ml)	ASTM D 2158	Max 0.05
Oil stain observation (ml)	ASTM D 2158	Pass**
Corrosion Copper strip	ASTM D 1838	No. I strip
Sulphur content (PPM)	ASTM D 5453	Max 30
H2S Content	ASTM D 2420	Negative
Moisture content	ASTM D 1835 or D 2713	Pass

• REFRIGERATED BUTANE (SPGC 6.7 & 8)

Test Item	Test Method	Specification
Sp. Gr. @60°F	ASTM D 2598	To be reported
Vapor pressure @100°F (psig)	ASTM D 1267	Max 70
Butane content (vol.%)	ASTM D 2163	Min 95.0
Volatile residue C5 ⁺ (vol.%)	ASTM D 2163*	Max 2.0
Corrosion Copper strip	ASTM D 1838	No. I strip
Sulphur content (PPM)	ASTM D 5453	Max 30
H2S Content	ASTM D 2420	Negative
Free water	Visual	None

* When specifically requested in the nomination, results by D1837 will also be provided.

** An acceptable product shall not yield a persistent oil ring when 0.3 ml of solvent residue mixture is added to a filter in 0.1 ml increments and examined in daylight after 2 minutes as described in ASTM D2158

Attachment 1-5: 280 & 380 CST Fuel oil specification.

• ABADAN 280 CST FUEL OIL GUARANTEED SPECIFICATION

TEST	UNIT	SPECIFICATION	TEST METHOD
Density @15 DC	KG/M ³	MAX 970	D – 1298
Kinematic viscosity @50 DC	CST	MAX 280	D – 445
Visco. Redwookl @37.7 DC	SECS.	MAX 2500	Calculated
Pour point	DC	MAX 24	D – 97
Flash points	DC	MAX 65	D – 93
Sulphur total	Wt%	MAX 3.5	D – 1552
Carbon residue (conradson)	Wt%	MAX 15	D – 189
ASH	Wt%	MAX 0.05	D – 482
Water and Sediment	Vol%	MAX 0.5	D – 1796
Calorific value (higher)	MJ/KG	MIN 41.8	Calculated

• BANDAR ABBAS 380 CST FUEL OIL GUARANTEED SPECIFICATION

TEST	UNIT	SPECIFICATION	TEST METHOD
Density @15 DC	KG/M ³	MAX 990	D – 1298
Kinematic viscosity @50 DC	CST	MAX 280	D – 445
Pour point	DC	MAX 32	D – 97
Flash point	DC	MAX 65	D – 93
Sulphur total	Wt%	MAX 3.5	D – 1552
Carbon residue (conradson)	Wt%	MAX 15	D – 189
ASH	Wt%	MAX 0.15	D – 482
Water & Sediment	Vol%	MAX 1.0	D – 1796
Calorific value (higher)	MJ/KG	MIN 41.7	Calculated

“THIS SPECIFICATION IS THE SAME AS BUNER FUEL OIL”

Attachment 2: Petroleum products types of NIORDC

Attachment 2-1: LPG specification.

C2 hydrocarbon	% vol	Nil
C3 hydrocarbon	% vol	
C4 hydrocarbon	% vol	
C5 hydrocarbon	% vol	2
Hydrogen sulphide	-	Negative
Mercaptan sulphur (max)	g/ m3	0.23
Odorizing Agent	g/ m3	12

Note: According to the consumption sea son, rang of volume percent propane is between 15-60, and butane is between 40-85.

Attachment 2-2: Gasoline specification

- Attachment 2-2-1: Unleaded regular gasoline.

Vapour Pressure	kpa	
Sulphur Total (max)	Mass %	0.1
Induction period @100 c	minute	480
Metallic lead (mix)	g/L	0.013
(Octane number (Research) (min)	-	90
Mercaptan content	Mass %	0.0005
Color	-	red

- Attachment 2-2-2: Super unleaded gasoline

Distillation 10% Evaporated (max) @	° C	60
50% Evaporated (max) @	° C	115
90% Evaporated (max) @	° C	180
F.B.P (MAX)	° C	205
Residue (max)	% vol	1.5
Loss (max)	% vol	1.0
Vapour Pressure	kpa	
Sulphur Total (max)	Mass %	0.1
Induction period @100 c	minute	480
Metallic lead (mix)	g/L	0.013
(Octane number (Research) (min)	-	95
Mercaptan content	Mass %	0.0005
Color	-	Green

Attachment 2-3: Kerosene specification.

Recovered @ 185°C (max)	%vol	50
Recovered @ 200°C (max)	%vol	20
Recovered @ 210°C (max)	%vol	90
Recovered @ 235°C (max)	%vol	95
F.B.P	° C	275
Residue (max)	%vol	2.0
Loss (max)	%vol	1.5
Density @ 15°C (max)	Kg/L	0.820
Color (min)	-	25
Odour	-	merchantable
Flash point (min)	° C	43
Smoke point (min)	mm	25
SulphurTotal (max)	Mass%	0.15
Mercaptan sulphur (max)	Mass%	0.0010

Attachment 2-4: Gas oil specification.

Recovered @ 150°C	%VOL	T.B.R.
Recovered @ 300°C	%VOL	T.B.R.
Recovered @357°C	%VOL	90
F.B.P. (max)	° C	385
Density @ 150 ° C	Kg/L	0.820-0.860
Color (max)	-	3
Flash point (min)	° C	54
Sulphur Total (max)	Mass%	1.0
Viscosity kinematic @ 37.8 ° C	mm ² /s	2.0-5.5
Cloud point (max)	° C	1.5
Pour point (max)	° C	-4
Carbon residue (max)	Mass%	0.10
Ash (max)	Mass%	0.01
Water & sediment	%vol	0.05
Cetan index (min)	-	50

Attachment 2-5: Fuel oil specification produced by NIORPC

- Attachment 2-5-1: 180 & 230 CST fuel oil specification.

	180	230
Viscosity kinematic @ 50 ° C (max)	180	230
Pour point (max) ° C	5.0	15.0
Flash point (min) ° C	63	63
SulphurTotal (max)%mass	3.0	3.0
Carbon Residue Conradson (max)%mass	13	13
Ash (max) %mass	0.05	0.05
Water & sediment (max) % vol	0.5	0.5
Colorific value higher (min) MJ/kg	42.2	42.2

- **Attachment 2-5-2: 280 & 230 CST fuel oil specification**

	280	380
Density @ 15 ° C (max) kg /L	0.97	0.99
Viscosity kinematic @ 50 ° C (max) mm2/s	280	380
Pour point (max)	24	32
Flash point (min) ° C	65	65
SulphurTotal max)%mass	3.5	3.5
Carbon Residue Conradson (max)%mass	15	20
Ash (max) %mass	0.15	0.15
Water & sediment (max) % vol	1.0	1.0
Colorific value higher (min) MJ/kg	41.7	41.7

- **Attachment 2-5-3: Heavy fuel oil specification.**

	280	380
Density @ 15 ° C (max) kg /L	0.97	0.99
Viscosity kinematic @ 50 ° C (max) mm2/s	280	380
Pour point (max)	24	32
Flash point (min) ° C	65	65
SulphurTotal max)%mass	3.5	3.5
Carbon Residue Conradson (max)%mass	15	20
Ash (max) %mass	0.15	0.15
Water & sediment (max) % vol	1.0	1.0
Colorific value higher (min) MJ/kg	41.7	41.7

Attachment 2-6: Jet fuel oil specifications

- **Attachment 2-6-1: Aviation turbine kerosene.**

This fuel standard is DERD 2494. The fuel for use in all air craft turbine engines as well as some combat is appropriate. ‘Jet A-I’ is another name of the product.

- **Attachment 2-6-2: Jet propulsion fuel.**

These fuel standards are MIL-T5624K and DERD 2454. The fuel is suitable for turbine engine fighter aircraft and helicopter types.

- **Attachment 2-6-3: Aviation gasoline 11100.**

These fuel standards are DERD 2485 and ASTM D 920-89. These fuels are used in aircraft piston engine (internal combustion).

Attachment 2-7: solvent specifications

- **Attachment 2-7-1: Solvents of 404,406,410**

Structure: Solvents are composed of paraffinic hydrocarbons with multiple.

Specification:

	404	406	410
Distillation range°C	143-60	80-62	113-55
Density@ 15°C Kg/L	TBR	TBR	TBR
Color, saybolt	25 (min)	25 (min)	25 (min)
Copper strip, 3brs@100°C	-	-	1
Copper strip, 3brs@50°C	1	1	-
Doctor test	Neg.	Neg.	Neg.
SulphurTotal (max) %mass	0.05	0.05	0.05
Aromatic content %vol	TBR	7 (max)	TBR

Application: Diluents of lacquers, colours, polishers and printing inks, tire and resin solvents, and glues; chemical, cosmetic and food solvents in industries; material composition of tire.

- **Attachment 2-7-2: Solvents of 404 and 409 (light aromatic)**

Structure: The 409 solvent is composed of aromatic hydrocarbons especially toluene. The 400 solvent are composed of paraffinic hydrocarbons and cyclotron paraffin.

Specification:

	400	409
Distillation range °C	45-150	106-123
Color, saybolt	25 (min)	25 (min)
Copper strip, 3brs@100°C	1	1
Doctor test	Neg.	Neg.
SulphurTotal (max) %mass	0.01	0.05
Aromatic content %vol	30 (min)	75 (min)

Application:

- Diluents of lacquers, colours, polishers and printing inks.
- Diluents in construction adhesives.
- Use as a component of thinner.

- **Attachment 2-7-3: Solvents of 402 & 403**

Structure: The white spirits are composed of aromatic and paraffinic hydrocarbons. These solvents are transparent liquids. In terms of chemically are stable and don't cause corrosion.

Specification:

	402	403	403 (light)
Distillation range °C	142-198	152-198	125-175
Density@ 15°C Kg/L	0.775	TBR	0.0775
Flash point, tag°C (min)	38	38	-
Flash point, Abel°C (min)	-	34	21
Color, saybolt	25 (min)	21 (min)	10 (min)
Doctor test	Neg.	Neg.	Neg.
Sulphur Total %mass (max)	0.05	0.2	0.05
Aromatic content %vol	20 (max)	45 (min)	45 (min)

Application: Use as solvent in colour thinner, lacquer, drying paints, cloth printing, fat retention from metal surfaces, flooring and furniture polish, shiner and dry- cleaning.

Attachment 3: Bitumen specification

Attachment 3-1:40/50 Bitumen

Definition: It is a kind of bitumen, which is provided during the process of oxidation of vacuum bottom (the bitumen production feedstock that derives from distillation tower residue in vacuum oil refineries) at bitumen production units. In a manner that its penetration point (kind of test to indicate the hardness of bitumen) becomes between 40-50.

Characteristics:

Bitumen 40/50		
	Specification	Test method
Specific gravity @25/25 C	1.01-1.06	D-70
Penetration @25 C	40/50	D-5
Softening point C	52/60	D-36
Ductility @25 C	100 min	D-113
Loss on heating (wt)%	0.2 max	D-6
Drop in penetration after heating %	20 max	D-6 & D-5
Flash point C	250min	D-92
Solubility in CS2 (wt)%	99.5 min	D-4
Spot test	negative	*A.A.S.H.O.T.102

Usage: The main common usage of this product is to use in road making at tropical regions.

Refinery manufacturers: Bandar Abbas, Tehran, Arak, Tabriz, Abadan

Attachment 3-2: 60/70 Bitumen

Definition: It is a kind of bitumen, which is provided during the process of oxidation of vacuum bottom (the bitumen production feedstock that derives from distillation tower residue in vacuum oil refineries) at bitumen production units. In a manner that its penetration point (kind of test to indicate the hardness of bitumen) becomes between 60-70.

Characteristics:

Bitumen 60/70		
	Specification	Test method
Specific gravity @25/25 C	1.01-1.06	D-70
Penetration @25 C	60/70	D-5
Softening point C	49/56	D-36
Ductility @25 C	100 min	D-113
Loss on heating (wt)%	0.2 max	D-6
Drop in penetration after heating %	20 max	D-6 & D-5
Flash point C	250min	D-92
Solubility in CS2 (wt)%	99.5 min	D-4
Spot test	negative	*A.A.S.H.O.T.102

Usage: The main common usage of this product is in road making at temperate regions.

Refinery manufacturers: Bandar Abbas, Tehran, Arak, Tabriz, Abadan

Attachment 3-3:85/100 Bitumen

Definition: It's kind of bitumen which is provided during the process of oxidation of vacuum bottom (the bitumen production feedstock that derives from distillation tower residue in vacuum oil refineries) at bitumen production units. In which its penetration point (kind of test to indicate the hardness of bitumen) becomes between 85-100.

Characteristics:

Bitumen 85/100		
	Specification	Test method
Specific gravity @25/25 C	1.01-1.05	D-70
Penetration @25 C	85/100	D-5
Softening point C	45/52	D-36
Ductility @25 C	100 min	D-113
Loss on heating (wt)%	0.5 max	D-6
Drop in penetration after heating %	20 max	D-6 & D-5
Flash point C	232 max	D-92
Solubility in CS2 (wt)%	99.5 min	D-4
Organic matter insoluble in CS2 (wt)%	0.2 max	D-4
Spot test	negative	*A.A.S.H.O.T.102
Flash Point C	232min	D-92
	232min	

Usage: The main common usage of this product is in road making at cold regions.

Refinery manufacturers: Tabriz, Tehran, Abadan, Shiraz, Arak, Bandar Abbas

Attachment 3-4:85/25 Bitumen

Definition: at the bitumen production reactor, during the air acting, the mixture of the two Vacuum Bottom (VB) and Vacuum Silabes (VS) feedstock is put under a special degree of pressure and temperature between 200-300°C of which the hydrogen atoms content in bitumen molecular oxidize to oxygen of air, and obtains with higher hydrocarbons polymerization reaction that has lower penetration and higher softening points than the primary pure bitumen. This kind of bitumen has the softening point of 85 and permeability of 25.

Characteristics:

Bitumen R85/25		
	Specification	Test method
Specific gravity @25/25 C	1.05 approx	D-70
Penetration @25 C	20/30	D-5
Softening point C	80/90	D-36
Ductility @25 C	3 min	D-113
Loss on heating (wt)%	0.2 max	D-6
Flash point C	225 max	D-92
Solubility in CS2 (wt)%	99 min	D-4

Usage: Floor covering water channels- the concrete surface cracking- to sew up the concrete surface- for other construction works- producing moisture insulation types

Refinery manufacturers: Tehran- Shiraz

Attachment 3-5: MC/250 Bitumen

Definition: mc250 bitumen is a type of dissolved bitumen. To produce this type, solvent oils such as Kerosene are used in order to change bitumen into dissolved bitumen or liquid pitch, so that, during consumption process, the solvent oil evaporates and the bitumen residue to obtain the desirable adhesion.

Characteristics:

Bitumen MC-250		
	Specification	Test method
Kin.vis.@60 C	Cst.250-500	D-2170
Flash point (tag open-cup) C	66 min	D-3143
Distillation test		D-402
Distillate, vol%of total distillate to 360C		
To 225 C	(vol)% 10 max	
To 260 C	(vol)% 15-55	
To 316 C	(vol)% 60-87	
Residue from distillation		
To 360 C	(vol)% 67 min	
Test on residue from distillation:		
ductility@25 C	Cms. 100 min	D-113
Penetration @25 C	120-250	D-5
Solubility in trichloroethylene	(Wt)% 99.0 min	D-2042
Water content	(vol)% 0.2.max	D-95
Water content	(vol)% 0.2.max	D-95

Usage: This type of bitumen is most commonly used as an adhesive material between road foundation and asphalt coating, in road construction industries, which include superstructure and foundation. (Nowadays the usage of this type declines because of its replacement with the water base bitumen like bitumen emulsion, which performs better, while eliminating the dangerous environmental impacts.)

Refinery manufacturers: Abadan- Shiraz- Tehran

Attachment 3-6: 90/15 Bitumen

Definition: at the bitumen production reactor, during the air acting, the mixture of the two Vacuum Bottom (VB) and Vacuum Silabes (VS) feedstock pressed under a special and temperature pressure between 200-300°C of which the hydrogen atoms content in bitumen molecular oxidize to oxygen of air, and obtains with higher hydrocarbons polymerization reaction that has lower penetration and bigger softening points rather than the primary pure bitumen. This kind of bitumen has the softening point of 90 and permeability of 15.

Characteristics:

Bitumen R90/15		
	Specification	Test method
Specific gravity @25/25 C	1.05 approx	D-70
Penetration @25 C	10/20	D-5
Softening point C	85/95	D-36
Ductility @25 C	1.5 min	D-113
Loss on heating (wt)%	0.2 max	D-6
Flash point C	225 max	D-92
Solubility in CS2 (wt)%	99 min	D-4

Usage: Covering of the floor of water channels- the concrete surface cracks- to cover the cracks in the concrete surface- for other construction works- producing different types of moisture insulation

Refinery manufacturer: Bandar abbas

Attachment 3-7: New Bitumen specification

3-7-1. The modified polymer bitumen:

The bitumen has never had any of the perfect physical and mechanical characteristics per se thus; researchers are always trying to modify the bitumen characteristic. Modifying its characteristics will result in its higher quality and longevity; therefore, maintenance cost and the reparation will highly reduce. The main disadvantages of the bitumen are: high sensitivity, low extension, limited range of services of temperature, tension resistance characteristics and so forth. The most important bitumen modifiers are polymers especially rubbers like SBS and ext. The polymer bitumen advantages include: excellent adhesion characteristic, best performance in all too high and low temperature range, high elastic properties, better resistance against flowing and high temperature deformation, reduced temperature sensitivity, improve tensile strength and increased modulus of rigidity in high temperatures.

Characteristics: It has different grades according to its usage and the region used.

Usage: Protection asphalt- recycling- asphalt surface- sealing the cracks- Geotextiles

Refinery manufacturer: Tehran

3-7-2. Emulsion bitumen

Definition:

Emulsion bitumen is a mixture of modified microscopic particulates and bitumen by the mechanical energy resulted from a colloid mill in water phase and using the emulsifier materials as a superficial activator; these materials surround the bitumen particulates and prevent them from connecting together and bitumen clot. The quality of emulsion bitumen depends on agents sort as chemical properties of the bitumen used, type of the emulsifier, other chemical material used in product formulation and its distribution method.

When emulsion bitumen used because of the temperature difference between spread surface and emulsion bitumen the disintegration occurs and water emulsion separated and will evaporates, and ultimately, emulsifier residues with bitumen at the road surface.

Types of emulsion bitumen:

Emulsions mainly divide into three groups:

- 1- anionic
- 2- cationic
- 3- non-ionic

The first and second types are mostly used in road construction industries. The Cationic type is mostly used due to its diversity types of materials in road construction industries. The cationic emulsion bitumen according to their refraction speed and its application type is divided into three categories:

- 1- emulsion bitumen CRS
- 2- emulsion bitumen CMS
- 3- emulsion bitumen CSS

Now the first one has the most common usage in country.

Usage:

Thin coating- removing spots- sealing lined with sand- slurry sealing- no aggregate slurry sealing- very thin protective asphalt

Refinery manufacturers: Tehran- Shiraz

3-7-3. BituBale Bitumen

Definition:

BituBale is a new technology, which has not harmful impacts on environment, and can provide the ability to packing different grade of bitumen to transport and easier use of product.

Characteristics:

- Dual covering film of polyethylene, which during the solvent (melt) has dissolved in bitumen and improve the packing bitumen quality.
- The weight of every shit of BituBale is 25 Kg. And every 16 shits are grouped into one SBS bag and placed into a jumbo lifting bag. The weight of every jumbo bag is around 400 kg.

The advantages of BituBail for the customer

1. Reduction of packaging costs
2. Reduction of the residue-waste caused by heat process at the time of replacement of containers and bitumen`s conveyance, and it`s economical pattern compared to other traditional packing.
3. An efficient use of transportation space and the reduction of costs of replacement rather than barrel conveyance of bitumen.
4. Reduced insurance costs regarding the lower packing risk of bitumen than other methods of packing for the costumers.
5. Reduction of costs of product`s heating process.
6. Elimination of the recycle costs and repelling the barrel, and the other residues resulting from bitumen transportation.
7. The BituBale technology uses a performed polymer film in between the heating process of the product as an adaptable ingredient, which can be effective in increasing the quality of bitumen.
8. The easy transportation to the ultimate consumption place considering the low weight and the flexible packing.
9. Usage of the high developed distribution for distributors of construction materials.

Usage:

The common performances of this product are in building and road construction and also to product different insulators.

Refinery manufacturer: Abadan

Attachment 4: Petrochemical products.

Attachment 4-1: Aromatics³

Aromatics are types of hydrocarbons derived from petroleum, characterized by one or more six-carbon rings (benzene rings) molecular structure and 'sweet' or aromatic odor.

Benzene, toluene, and xylenes are the most common aromatics, and are extensively used in the chemical industry as chemical feed stocks, solvents, and as additives to gasoline to raise its octane rating.

Benzene		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Buali Sina Petrochemical Co.	SPEC	MSDS
Borzouyeh Petrochemical Co.	SPEC	MSDS
Ortho-Xylene		
Buali Sina Petrochemical Co.	SPEC	MSDS
Borzouyeh Petrochemical Co.	SPEC	MSDS
Para Xylene		
Borzouyeh Petrochemical Co.	SPEC	MSDS
Bandar Imam Petrochemical Co.	SPEC	MSDS
Buali Sina Petrochemical Co.	SPEC	MSDS
Mixed-Xylene		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Toluene		
Tabriz Petrochemical Co.	SPEC	MSDS

Material Safety Data Sheet (MSDS)

Specifications (SPEC)

See these specification at: <http://www.petrochem-ir.net/en/product/aromatics>³

Attachment 4-2: Chemicals⁴

Chemicals are substances formed by chemical union of two or more elements or ingredients in definite proportion by weight. They are produced by or used in a reaction involving changes in atoms or molecules. Generally, "chemicals" refers to a much wider class of substances that includes many mixtures of chemical substances that often find application in many vocations.

There are two major types of chemicals:

Inorganic Chemicals are compounds that do not contain hydrocarbon groups.

Organic Chemicals are compounds containing hydrocarbon groups.

Chemicals are used to make a wide variety of consumer goods, as well as thousands inputs to agriculture, manufacturing, construction, and service industries

Methanol

Fanavaran Petrochemical Co.	SPEC	MSDS
Zagros Petrochemical Co.		

Di Ethylene Glycol (DEG)

Maroun Petrochemical Co.	SPEC	MSDS
--------------------------	------	------

Mono Ethylene Glycol (MEG)

Maroun Petrochemical Co.	SPEC	MSDS
--------------------------	------	------

Linear Alkyl Benzene (LAB)

Bandar Imam Petrochemical Co.	SPEC	MSDS
Bistoon Petrochemical Co.	SPEC	

HAB

Bistoon Petrochemical Co.	SPEC	MSDS
---------------------------	------	------

Crystal Melamine

Khorasan Petrochemical Co.	DATA SHEET	MSDS
Uromieh Petrochemical Co.	DATA SHEET	MSDS

Epoxy Resins

Khouzestan Petrochemical Co.	List of DATA SHEET	
------------------------------	--------------------	--

Acetic Acid

Fanavaran Petrochemical Co.	SPEC	MSDS
-----------------------------	------	------

See these specification at: <http://www.petrochem-ir.net/en/product/chemical>^f

TDI		
Karoon Petrochemical Co.	SPEC	MSDS
Soda Ash		
	SPEC	MSDS
Sodium Bicarbonate		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Sodium Hypochlorite		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Shiraz Petrochemical Co.	SPEC	
Perchlorine		
Shiraz Petrochemical Co.	SPEC	MSDS
Chlorine		
Shiraz Petrochemical Co.	SPEC	MSDS
Tri Ethylene Glycol (TEG)		
Marun Petrochemical Co.	SPEC	MSDS
Sodium Carbonate Heavy		
Shiraz Petrochemical Co.	SPEC	MSDS
Sodium Carbonate Light		
Shiraz Petrochemical Co.	SPEC	MSDS
Caustic Soda		
Shiraz Petrochemical Co.	SPEC	MSDS
Bandar Imam Petrochemical Co.	SPEC	
Arvand Petrochemical Co.	SPEC	
Nitrogen		
Tabriz Petrochemical Co.	SPEC	MSDS
Fajr Petrochemical Co.	SPEC	
Heptane		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Nitric Acid		
Shiraz Petrochemical Co.	SPEC	MSDS
Hydrogen Chloride		
	SPEC	MSDS
MTBE		
	SPEC	MSDS
Ethyl Benzene		
	SPEC	MSDS
Vinyl Chloride Monomer (VCM)		
	SPEC	MSDS
Hexane		
	SPEC	MSDS
Bandar Imam Petrochemical Co.		
Argone		
Shiraz Petrochemical Co.	SPEC	MSDS
Fajr Petrochemical Co.	SPEC	

Attachment 4-3: Fertilizers⁵

Fertilizers are a large number of organic and synthetic materials, spread on or worked into soil to increase its capacity to support plant growth. Fertilizers are divided into two broad groups: organic and inorganic, or chemical. Organic fertilizers are derived from living plants or animal sources. Chemical fertilizers are usually manufactured and have the advantage of low cost. The commonly used synthetic fertilizers consist almost entirely of nitrogen, potassium and phosphorus in forms that are readily utilized by plants.

Anhydrous Liquid Ammonia

Razi Petrochemical Co.	SPEC	MSDS
Pardis Petrochemical Co.	SPEC	MSDS

Granular Sulphur

Razi Petrochemical Co.	SPEC	MSDS
Shahid Hashemi nejad	SPEC	MSDS

Crushed Lump Sulphur

SPEC MSDS

Sulphuric Acid

SPEC MSDS

Granulated Urea

Pardis Petrochemical Co.	SPEC	MSDS
Khorasan Petrochemical co.	SPEC	

Ammonium Sulphate

Uromieh Petrochemical Co. SPEC MSDS

Ammonium Carbonate

SPEC MSDS

Ammonium Nitrate

SPEC MSDS

Explosive Ammonium Nitrate

Shiraz Petrochemical Co. SPEC MSDS

Ammonia Solution

Shiraz Petrochemical Co. SPEC MSDS

Agriculture Ammonium Nitrate

Shiraz Petrochemical Co. SPEC MSDS

Di Ammonium Phosphate (DAP)

Razi Petrochemical Co. SPEC MSDS

Hydrogen

Amir Kabir Petrochemical Co. SPEC MSDS

See these specification at: <http://www.petrochem-ir.net/en/product/fertilizer>^Δ

Attachment 4-4: Liquid Gas and Feedstock⁶

Liquefied gases and feed stocks are substances used especially as fuels or as raw materials supplied to processing plant for chemical synthesis. Some hydrocarbons such as ethylene, 1, 3-butadiene, propane and butane are classified in this category.

Propane	SPEC	MSDS
Heavy End		
Buali Sina Petrochemical Co.	SPEC	MSDS
Butane		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Ethylene		
Amir Kabir Petrochemical Co.	SPEC	MSDS
Bandar Imam Petrochemical Co.	SPEC	
Pentane Plus (C5+)		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Kharg Petrochemical Co.	SPEC	
Raffinate (C6-Non Aromatic)		
Tabriz Petrochemical Co.	SPEC	MSDS
Dry Pyrolysis Gasoline (DPG)		
Arak Petrochemical Co.	SPEC	MSDS
Bandar Imam Petrochemical Co.	SPEC	
Gas Condensate	SPEC	MSDS
1,3 Butadiene		
Tabriz Petrochemical Co.	SPEC	MSDS
C9- Aromatic	SPEC	MSDS
C.F.O		
Tabriz Petrochemical Co.	SPEC	MSDS
C4-Raffinate		
Bandar Imam Petrochemical Co.	SPEC	MSDS
Butene - 1	SPEC	MSDS

See these specification at: <http://www.petrochem-ir.net/en/product/gasandfeedstock>⁶

LPG			
		Butane	Propane
Buali Sina Petrochemical Co.	SPEC	MSDS	
Bandar Imam Petrochemical Co.	SPEC	MSDS	MSDS
Kharg Petrochemical Co.	SPEC	MSDS	MSDS MSDS
C4 CUT			
Tabriz Petrochemical Co.	SPEC		MSDS
Heavy Alkylate			
	SPEC		MSDS
Propylene			
Amir Kabir Petrochemical Co.	SPEC		MSDS
Crude Fuel			
	SPEC		MSDS
Polypropylene - PI 080			
Bandar Imam Petrochemical Co.	SPEC		MSDS
Raffinate			
Buali Sina Petrochemical Co.	SPEC		MSDS
C6- Non Aromatic			
Tabriz Petrochemical Co.	SPEC		MSDS
Ethane			
	SPEC		MSDS
Pentane			
	SPEC		MSDS
C6 Raffinate			
	SPEC		MSDS
Ethylene Dichloride			
Shiraz Petrochemical Co.	SPEC		MSDS
Fuel Oil			
Shiraz Petrochemical Co.	SPEC		MSDS
Propylene (Polymer Grade)			
Bandar Imam Petrochemical Co.	SPEC		MSDS
Light End			
Buali Sina Petrochemical Co.	SPEC		MSDS

Material Safety Data Sheet (MSDS)

Specifications (SPEC)

Attachment 4-5: Polymers⁷

Polymers are substances containing a large number of smaller, identical molecules (called monomers) linked together. These substances often form into a chain-like structure. Polymers have extremely high molecular weights and the chains may differ from one another in their molecular weights.

Today, the polymer industry has grown to be larger than the aluminium, copper and steel industries combined.

Polymers already have a wide range of applications that far exceeds that of any other class of material available. Current applications extend from adhesives, coatings, foams, and packaging materials to textile and industrial fibers, composites, electronic devices, biomedical devices, optical devices, and precursors for many newly developed high-tech ceramics.

Polyethylene (PE)

High Density Polyethylene (HDPE)

Low Density Polyethylene (LDPE)

Linear Low Density Polyethylene (LLDPE)

Polypropylene

HomoPolymers

Random Copolymers

Heterophasic Copolymers

PVC AND PET

Polyvinyl Chloride

Polyethylene Terephthalate (Bottle Grade PET)

Polyethylene Terephthalate (Textile Grade PET)

Polystyrene (PS)

High Impact Polystyrene (HIPS)

General Purpose Polystyrene (GPPS)

Expandable Polystyrene (EPS)

Acrylonitrile Butadiene Styrene (ABS)

Styrene Butadiene Rubber (SBR)

Polycarbonate

Crystal Melamine

Epoxy Resins

See these specification at: <http://www.petrochem-ir.net/en/product/polymers>^Y

Attachment 5: Iran's Natural Gas & Gas products

5-1- Technical Specifications of Iran's Natural Gas for Export

Given the country's gas resources, specifications of the gas depends on many parameters such as, location of gas supply for export, distance from delivery point to the related gas processing plant, number of gas compressor stations up to the point where the gas is exported,....

The specifications of natural gas in the gas export contracts are as follows:

Item	Natural Gas Specification	Unit	Limitation	Value
1	Hydrogen Sulphide (H ₂ S)	Mg/SCM	Not more than	5
2	Total Sulphur	Mg/SCM	Not more than	45
3	Carbon Dioxide (CO ₂)	Mol%	Not more than	2
4	Total of Nitrogen (N ₂) and Carbon Dioxide (CO ₂)	Mol%	Not more than	7
5	Water Content	Mg/SCM	Not more than	112
6	Hydrocarbon Dew Point (at line delivery pressure)	C°	Not more than	-10
7	Gross Heating Value	Mg/SCM	Not less than	8300
8	Wobbe Index	Mg/SCM	Not less than	10715

It is worth nothing that the pour point for water and hydrocarbons for gas produced from country's processing plants, is less than -10 centigrade.