



نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض و ابنیه تحت الارض

عمومی و مشترک



شماره پیمان:

۰۵۳ - ۰۷۳ - ۹۱۸۴

SPECIFICATION FOR FIRE WATER SYSTEM

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| نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه |
| D05 | 0003 | SP | SA | 000 | PEDCO | GNRAL | BK |

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طرح نگهداشت و افزایش تولید ۲۷ مخزن

SPECIFICATION FOR FIRE WATER SYSTEM

نگهداشت و افزایش تولید میدان نفتی بینک

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1.0 INTRODUCTION

Binak oilfield in Bushehr province is a part of the southern oilfields of Iran, is located 20 km northwest of Genaveh city.

With the aim of increasing production of oil from Binak oilfield, an EPC/EPD Project has been defined by NIOC/NISOC and awarded to Petro Iran Development Company (PEDCO). Also PEDCO (as General Contractor) has assigned the EPC-packages of the Project to "Hirgan Energy - Design and Inspection" JV.

GENERAL DEFINITION

The following terms shall be used in this document.

| | |
|------------------------------|--|
| CLIENT: | National Iranian South Oilfields Company (NISOC) |
| PROJECT: | Binak Oilfield Development – General Facilities |
| EPD/EPC CONTRACTOR (GC): | Petro Iran Development Company (PEDCO) |
| EPC CONTRACTOR: | Joint Venture of : Hirgan Energy – Design & Inspection(D&I) Companies |
| VENDOR: | The firm or person who will fabricate the equipment or material. |
| EXECUTOR: | Executor is the party which carries out all or part of construction and/or commissioning for the project. |
| THIRD PARTY INSPECTOR (TPI): | The firm appointed by EPD/EPC CONTRACTOR (GC) and approved by CLIENT (in writing) for the inspection of goods. |
| SHALL: | Is used where a provision is mandatory. |
| SHOULD: | Is used where a provision is advisory only. |
| WILL: | Is normally used in connection with the action by CLIENT rather than by an EPC/EPD CONTRACTOR, supplier or VENDOR. |
| MAY: | Is used where a provision is completely discretionary. |

2.0 SCOPE

This document defines the minimum technical and other requirements for the design and manufacture of fire water system for the Project.

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3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS

SI unit of measurements is used in the whole documents. Some exception units are given in below table.

- IPS-E-SF-200 Fire Fighting Sprinkler Systems
- IPS-E-SF-220 Fire Water Distribution and Storage Facilities
- IPS-G-SF-240 Fire Water Pump Systems and Trailers
- IPS-M-PM-125 Material and Equipment Standard for Centrifugal Firewater Pumps
- IPS-E-SF-340 Fire Fighting Hose Box and/or Shelter

3.2 INTERNATIONAL CODES AND STANDARDS

- BS 5306 System Design Water Supply
- BS 336 Hose Couplings and Ancillary Equipment
- NFPA 13 Standard for the Installation of Sprinkler Systems
- NFPA 15 Standard for Water Spray Fixed Systems for Fire Protection
- NFPA 20 Standard for Stationary Installation of Pumps for Fire Protection
- NFPA 22 Standard for Water Tanks for Private Fire Protection
- NFPA 24 Standard for the Installation of Private Fire Service Mains and their Appurtenances

3.3 THE PROJECT DOCUMENTS

- BK-GCS-PEDCO-120-SA-CN-0002 Calculation Note for Fire Water Demand

3.4 ENVIRONMENTAL DATA

Refer to "Process Basis of Design; Doc. No. BK-GNRAL-PEDCO-000-PR-DC-0001".

4.0 GENERAL

Water is the most commonly used agent for controlling and fighting a fire, by cooling adjacent equipment and for controlling and/or extinguishing the fire. It can also provide protection for firefighters and other personnel in the event of fire. Water shall therefore be readily available at all the appropriate locations, at the correct pressure and in the required quantity.

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Fire water should not be used for any other purpose.

In determining the quantity of fire water, i.e. "required fire water rate", protection of the following areas shall also be considered:

- a) General process;
- b) Storage (low pressure), including pump stations, manifolds and in line blenders, etc.; Loading.

Basically, the requirements consist of an independent fire grid main or ring main fed by permanently installed fire pumps taking suction from a suitable large capacity source of water such as storage tank, cooling tower basin, river, sea, etc.

The water will be used for direct application to fires and for the cooling of equipment.

A fire water system will be provided where a requirement is identified. The system will comprise a fire water ring main, hydrants supplied by fire water pumps. Fire water will be provided by fire water storage tanks. Detailed fire water hydraulic calculation will be performed in Calculation Note for Fire Water Demand and Hydraulic Calculation.

5.0 WATER SUPPLIES

One or more connections from a reliable water system of good pressure and adequate capacity furnish a satisfactory supply. No pressure regulating valve shall be used in water supply except by special permission of owner. Where meters are used they shall be of an approved type.

6.0 FIRE WATER TANK

The storage tank capacity should be adequate to meet the high-pressure water requirements for a minimum of 4-6 hours uninterrupted fire-fighting at the maximum required rate for plan firewater system. Storage tank is equipped with local and remote level control for automatic make-up with supplying raw water.

The tank is connected to the plant supplying water system for replenishment and continuous supply during emergency operation. This scenario will be studied to consider separate tanks or directly from neighbourhood water supply system. In case of consideration of separate tanks, two fire tanks shall be considered and the replenishment rate shall normally not be less than 60% of the total required fire-water pumping capacity.

Due to water quality, chemical inhibitor system may be provided so as to avoid corrosion problem. Corrosion inhibitor shall be injected at suction line of fire water storage tank and pumps suction.

The location chosen shall be such that the tank and structure will not be subject to fire exposure

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from adjacent units. If lack of yard room makes this impracticable, the exposed steel work shall be suitably fireproofed or protected by open sprinklers. Fireproofing, where required, shall have a fire resistance rating of not less than two hours.

All metal equipment, tanks, pumps, motors and etc. shall be completely connected to each other and also connected to the earthing system.

7.0 FIRE WATER NETWORK

A simple fire water ring main shall be installed to serve the plant. The size of the ring main shall be sufficient to provide a quantity of water sufficient for the single largest fire scenario identified.

The fire water network will be extended and gridded around the plant, from two tie-in connection (therefore damage in one area will not cause loss of all the fire water supply) which are transferred fire water via Fire water pumps from fire water storage tank.

- The maximum velocity in the network which pipes are full of water will be 3.5 m/s.
- Fire water pipeline in each process unit shall be installed at the place to avoid damages in case of accidents such as explosion and external forces, such as environment, falling loads. The depth of cover shall not be less than the local freezing line or 80 cm to prevent also mechanical damages.
- Piping should run alongside roads at some distance from hydrocarbon piping and 2m away from the edge of the road or 1m from sidewalk if any.
- Appropriately divided block valves on fire main shall be installed to isolate some section of the loop-piping and shall be installed in valve pits.
- Block valves which are kept normally open shall be provided so that no more than half of piping in each area containing equipment such as hydrants, monitors may be lost due to some line failure. Appropriately divided block valves on fire main will be installed to isolate each three hydrants. Fire water supply from the ring main to each fire zone will be through isolating valves. The closure of isolation valves shall not inhibit water supply to other fire zones. The ring main will be provided with a sufficient number of isolating valves to isolate a damaged section of the main without isolating other areas. No more than 3 hydrants will be located between the subjected valves generally.
- All isolating valves will be installed in valve pits and normally open with supervision.
- Isolation valves inside the pits should be post indicator type and capability to monitor the status of the valve (open/close).
- Minimum fire water supply pressure shall be about 10 BARG. Piping system will be designed

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so that fire water will be available within the plant at a minimum pressure of 10 BARG to all hydrants and monitors at the flow rates specified herein.

- Where the fire water main will be expected to extend in the future and end-blinded flange shall be provided.
- Drain valves shall be installed to the fire water main for the cleaning in pipes.
- The firewater distribution system shall be designed as a ring main system having a maximum length of run between crossovers of 300 m. Each loop protecting an area shall have two sources of supply from separate laterals of the firewater main.
- Connections for permanent use of water for other than for firefighting are not permitted.
- Every connection from main ring to a building shall be provided with a post indication valve.
- Firewater rings main with branch pipes are at all times filled with water.
- Fire-water mains shall normally be laid underground in order to provide a safe and secure system. When in exceptional circumstances, fire-water mains are installed above ground they shall be laid alongside roads and not in pipe tracks where they could be at risk from spill fires.
- The isolation valve distance from building and units shall not be less than 15 m.
- The maximum distance of isolation valve from each other shall not be more than 250 m.
- Undergrounds pipes shall be PE100 with safety factor 2.

8.0 FIRE WATER PUMPS

Fire-water shall be provided by two identical pumps, each pump shall be able to supply the maximum required capacity for a fire water ring main system. Fire water pumps shall be of the horizontal type when suction is taken from a storage tank.

The main fire-water pump shall be driven by an electric motor and the second pump, of 100% stand-by capacity, by some other power source, a diesel engine.

- The fire water pumps shall be designed and constructed in accordance with NFPA 20. Fire pumps shall have a stable characteristic curve, with a shut off pressure not exceeding the design pressure by more than 15%.
- Each Fire pump will have a dedicated controller. The power of the controller shall be supplied by UPS also battery back-up shall be provided for this controller. It shall be suitable for

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working in abnormal condition such as presence of gas. So the panel enclosure shall be EExd as a minimum. All the instruments needed for change-over of fire water pumps and activation of jokey pumps shall be provided by vendor. Also, all the logics shall be implemented in package controller.

- Each controller shall provide all status thru hardwired signals to F&G system. This shall include but not limited to pump failure, pump start, pump stop. The local control panels shall be supplied with enough indicators to help the operator for trouble shooting.
- The main and stand by fire pumps shall be capable of manual starting from either of the following:
 - a. Push button on the Matrix panel in the control room;
 - b. Push button on the controller adjacent to the pump;
- Fire pumps stop push buttons shall be provided only on the controller adjacent to the pumps.
- The fire water pump shall include pressure gauges at the inlet and at the outlet connections. The discharge line from the fire pump will include a non-return valve to prevent back flow and a normally locked open isolation valve to permit pump removal for maintenance.
- The Fire water pumps discharge pressure shall be not less than 10 BARG.
- Each diesel engine shall have a daily tank (as a package supplied by vendor) according to NFPA 20.
- 2 (two) electrical motor driven jockey pump with 100% stand by shall be furnished to maintain the fire main pressure at 6 to 8 Barg. with capacity of 15 M3/HR (greater capacity will be defined during design).
- Diesel engine drivers shall be provided with over speed trip protection. Supplied as a part of package.
- Fire water pump diesel engine shall be provided with two type starts, one electrical and other pneumatic (Manually).
- Fire water pumps shall be started manually for weekly test run at 150% of the rated pump capacity.
- These pumps shall be installed in a location which is considered to be safe from the effects of fire, clouds of combustible vapor and from collision damage by vehicles. The safe distance from process facilities shall be followed. They shall be accessible to facilitate maintenance, and be provided with hoisting facilities.

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- Automatic Start of main fire pumps shall be done:
 - a) When the pressure in the fire-water ring main system drops below the minimum required static pressure which is generally about 0.68 bar (10 psi) below the normal pressure. The pump shall be started automatically by the package control panel installed locally. All required instruments shall be supplied by vendor and installed on the skid.
 - b) command from F&G
 - c) Manual Command from control room received.

(Referred to IPS-E-SF-220, PART 8.1.4)
- The standby fire water pump shall be provided with automatic starting facility will function when:
 - a) The main fire water pump does not start or
 - b) The main fire water pump has started failed to build up the required pressure in the fire water ring main within 20 seconds (adjustable time). The pump shall be started automatically by the package control panel installed locally. All required instruments shall be supplied by vendor and installed on the skid.

(Referred to IPS-E-SF-220, PART 8.1.4)
- For diesel engines the following additional requirements shall also apply:
 - a) The capacity of the fuel tank shall be such that the engine can operate on full power for at least 24 hours.
 - b) The tank shall be installed at a safe distance from the engine, with the bottom at least 0.2 m above the suction valve of the fuel injection pump.
 - c) The tank shall be provided with a sump, an expansion dome, a level gage and a low level alarm which shall sound when the level of the fuel has reached the '2-hour fuel remaining' level.
 - d) The tank shall be provided with facilities and hose connections for refilling directly from drums.
 - e) A clutch shall not be installed between diesel engine and pump.

(Referred to IPS-E-SF-220, PART 8.1.5)
- In locations where freezing can occur, the fire-water pumps shall be installed in housing for

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protection; for other locations, a rain/sun cover only may be required. When the pump suction is taken from open water, a strainer system which is easy to clean, shall be provided. When the pump suction is taken from storage a strainer shall be included in the replenishment supply to the storage tank. The discharge line from each pump shall be fitted with a check valve, a test valve, a pressure gage and a block valve with a locking device; the test valves shall have a common return line with a flow metering unit. Each pump shall be connected separately to a common manifold. The pump common discharge manifold shall normally be connected to the fire-water ring main system by two separate pipelines each with a block valve and of the same size as the ring main.

- Owing to the heaviness of equipment, A mobile crane shall be installed on the roof of fire fighting pumps in order to do the preventive maintenance of firefighting pumps.

The fire pump system when started by pressure drop, set points on control system should be arranged as follows:

(a) The jockey pump start and stop point should be at 6 Barg and 8 Barg, respectively, via PSH located on pressure scencing lines.

(b) The second jockey pump start point should be at 5 Barg. via PSL located on pressure scencing lines.

(c) The electrical fire pump start point should be at 4 Barg. (via PSL located on fire water pump discharge header)

(d) If the discharge header pressure doesn't reach to 10 Barg. (via PSH located on fire water pump discharge header) after 20 seconds, the diesel fire pump should be started.

(e) In addition to set points on control system, set points for each low pressure switch located on pressure scencing lines shall be provided according to NFPA 20 as follow:

- First pump (electrical) PSL set point should equal to 4 Barg.
- Second pump (diesel) PSL set point should equal to 3 Barg.

(f) Where minimum run times are provided, the pump will continue to operate after attaining these pressures. The final pressures should not exceed the pressure rating of the system.

(g) Where the operating differential of pressure switches does not permit these settings, the settings should be as close as equipment will permit. The settings should be established by pressures observed on test gauges.

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9.0 HYDRANTS

Fire water hydrants with 2 outlets shall be located around processing units, loading facilities and storage facilities for flammable liquids, to provide a manual firefighting capability, taking into consideration accessibility and escape by fire fighters.

Fire water hydrants located in proximity to plant roads shall be protected against vehicular impact. They will be installed at 1 to 1.5 m from the edge of road and not less than 110cm above ceiling at following intervals:

- Every 45m around process units.
- Every 60m around buildings and along roads.

The distance between a hydrant and protected area should be at least 15m.

The horizontal range and coverage of hydrants with hose connection shall not exceed 30m.

Hydrants with instantaneous couplings shall be specified and operate at a pressure sufficient to allow safe operation by plant personnel. The maximum operating pressure shall be specified in relevant data sheet.

Firewater from hydrants will be applied by means of a hoses using jet, spray or fog nozzles, or by portable monitors.

The maximum distance of hydrant/ monitor from the closest fire shed shall be 50 meter.

The minimum distance of hydrant from fence shall be 1.5m and from buildings shall be 12m.

Hydrant shall be located in way that it shall extinguish fire with two connections of maximum twenty five meter hose.

The maximum distance of Hydrant Hand Wheels from earth shall be 110cm.

10.0 MONITORS

Water monitors will be in accordance with NFPA codes. Monitors shall be placed at strategic points throughout new gas compressor station and shall be fed from main ring.

They will be installed around the units so that each equipment is reached within a horizontal 50m jet throw.

Monitors will be located minimum 15m and maximum 30m away from the protected equipment.

Water Monitors nozzle movement shall be possible both vertically and horizontally.

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The monitors shall have vertical movement angle in range of -15° to $+75^{\circ}$ and horizontal movement angle of 360° .

In process utility area, portable monitors may be applied.

Monitors shall be so located to protect from possible accidental damages.

Fixed fire water monitors shall provide a minimum flow rate of 2000 l/min at 7.0 barg; the monitor nozzle shall be capable of jet/fog and have an on/off control.

The maximum distance of monitor Hand Wheels from earth shall be 130m.

The minimum jet throw shall be 45m and fog/spray shall be 30m.

11.0 FIRE SHED

Fire Shed shall be considered for storing firefighting apparatus and it shall have the below characteristics:

- Metal body closed on three sides
- Sloped roof
- Dimensions of 3*3*2.5
- Red colored
- Concrete floor
- Equipped with shelves (three levels)
- Equipped with lighting system
- Equipment List Panel
- Entrance slope way

a) All Fire sheds should include the following:

- 10 No. 2 3/4" hoses (connections 2 1/2") 25 meters in length,(Based on BS336)
- 1 No. Foam Container Wrench,
- 2 No. pick up tube + in line inductor (450LPM)
- 2 No. Nozzles 10x ,(foam maker nozzle),
- 5 No. Concentrate Foam (FP 3%) containers -PVC (100 lit.)
- 2 No. Dry chemical powder wheeled extinguisher 75 kg
- 6 No. Dry chemical powder portable extinguisher 12 kg
- 2 No. CO2 wheeled extinguisher 5 kg
- 1 No. Foam Barrel Trailer
- 1 No. Portable fire water monitor(2000LPM)
- 2 No. Water nozzles with three status (fog/jet/stop)*

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* The gunmetal nozzle shall be twist operated to give jet/spray/on/off control.

12.0 FIRE HOSE

12.1 FIRE HOSE IN PROCESS AREA

The 2 3/4" hose with 2 1/2" connections, 25 meters length, shall be provided in process area with 25 BARG rated test pressure. It shall be high grade synthetic rubber lined and with an oil and abrasive resistant coating.

Coupling shall be instantaneous type, male and female and will be connected directly to hydrant. A pressure reducer shall maintain a suitable pressure at hose nozzle.

In order to provide fire coverage, fire-hose nozzles are provided which can be connected to the fire-hose. The nozzle shall be capable of a flow to match the hydrant discharge flow rate. The gunmetal nozzle shall be twist operated to give jet/spray/on/off control. The nozzle tip material shall be bronze or brass.

The Flow rate shall be 450 LPM at 7barg with an effective range of more than 15 meters.

Fire water hose shall be suitable for foam and water and resistant to abrasion, acids, oils and other chemicals. Hydrant hose-thread types shall be in accordance with BS336.

They will be stored inside the fire sheds in process areas.

12.2 HOSE REEL CABINETS

Hose reels shall be located indoors wall mounted, in general buildings (if any) except those including live electrical or electronic facilities (i.e. Control room, MCC & substation, telecommunication etc.).

Each hose reel cabinet shall be suitable of holding a 25m length of 1 1/2" nominal bore hose and be fitted with a gunmetal nozzle, with on/off valve/drain valve.

1 1/2" hose reels with 25 m length will be considered for Warehouse & Work shop without cabinet and shall be used by trained fire man.

The hose nozzle shall be twist operated to give jet/spray/on/off control, and be capable of supplying a minimum flow rate of 30 LPM when operating at 4barg.

It shall have the below characteristics for using in buildings:

- Installation of suitable Pressure Gauge before valve
- Installation of (fire box) label in Persian and English
- Using plate with minimum Thickness of 1.5 for body

|  <p>NISOC</p> | <p>نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض</p> <p>عمومی و مشترک</p> |  | | | | | | | | | | | | | | | | |
|--|--|---|-----------|-----------|----------|-------|----------|-------|------|----|-------|-------|-----|----|----|------|-----|------------------------------|
| <p>شماره پیمان: ۰۵۳ - ۰۷۳ - ۹۱۸۴</p> | <p>SPECIFICATION FOR FIRE WATER SYSTEM</p> <table border="1" data-bbox="431 363 1162 420"> <thead> <tr> <th>پروژه</th> <th>بسته کاری</th> <th>صادرکننده</th> <th>تسهیلات</th> <th>رشته</th> <th>نوع مدرک</th> <th>سریال</th> <th>نسخه</th> </tr> </thead> <tbody> <tr> <td>BK</td> <td>GNRAL</td> <td>PEDCO</td> <td>000</td> <td>SA</td> <td>SP</td> <td>0003</td> <td>D05</td> </tr> </tbody> </table> | پروژه | بسته کاری | صادرکننده | تسهیلات | رشته | نوع مدرک | سریال | نسخه | BK | GNRAL | PEDCO | 000 | SA | SP | 0003 | D05 | <p>شماره صفحه : ۱۵ از ۱۹</p> |
| پروژه | بسته کاری | صادرکننده | تسهیلات | رشته | نوع مدرک | سریال | نسخه | | | | | | | | | | | |
| BK | GNRAL | PEDCO | 000 | SA | SP | 0003 | D05 | | | | | | | | | | | |

- Using QUICK OPENING lock without a key
- Suitable resistance in connection of Hose reel base to body

13.0 FIRE WATER DEMAND

The quantity of water supplied to any Plant area/ section shall be at least sufficient to provide firefighting of the equipment within a fire area in one fire zone.

Calculation Note for Water demand (BK-12-HD-120-SA-CN-0002) will be performed during Detail Design stage.

In each section, fire in two separate fire zones at the same time shall not be considered.

- 1000 L/Min for Hydrant.
- 2000 L/Min for Monitors

14.0 INSPECTIONS

VENDOR shall also guarantee to replace without charge to Owner any or all parts defective due to faulty material, design or poor workmanship for a period of 12 months from the date of commissioning. Also after-sales services of equipment for ten years after successful operation will be done by Vendor/Manufacturer

Attachment

Hydrant and monitor schematic drawing



نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض و ابنیه تحت الارض

عمومی و مشترک



شماره پیمان:

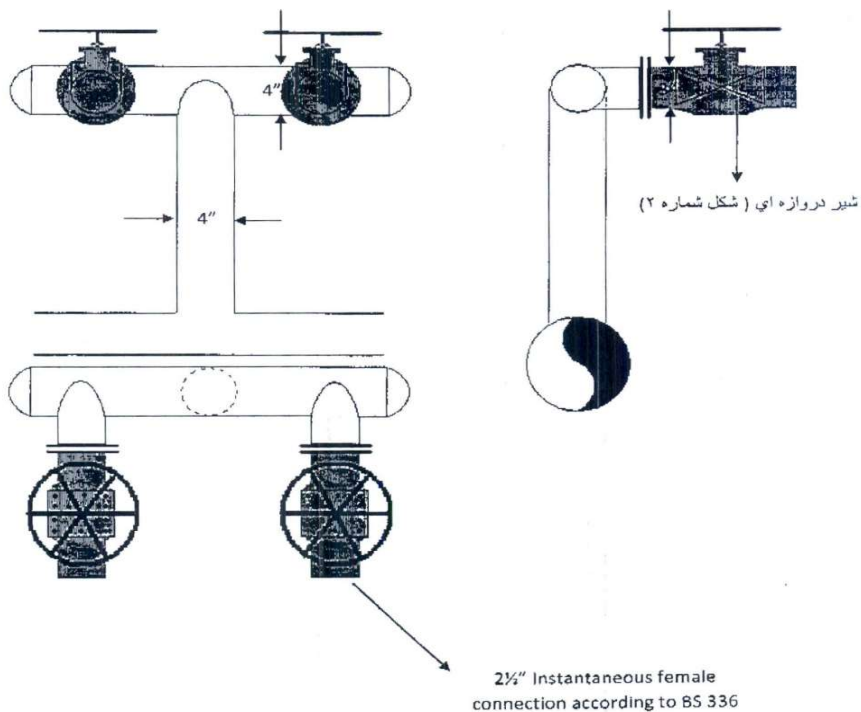
۰۵۳ - ۰۷۳ - ۹۱۸۴

SPECIFICATION FOR FIRE WATER SYSTEM

| پروژه | بسته کاری | صادرکننده | تسهیلات | رشته | نوع مدرک | سریال | نسخه |
|-------|-----------|-----------|---------|------|----------|-------|------|
| BK | GNRAL | PEDCO | 000 | SA | SP | 0003 | D05 |

شماره صفحه: ۱۶ از ۱۹

شکل شماره ۱) شماتیک لوله ایستاده (standpipe) و هیدرانت مورد تایید ایمنی، بهداشت و محیط زیست (شرکت ملی مناطق نفتخیز جنوب)



ارتفاع wheel هیدرانت‌های نصب شده تا کف تمام شده (زمین) بایستی حداکثر ۱۱۰ سانتی متر باشد.



نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض و ابنیه تحت الارض

عمومی و مشترک



شماره پیمان:

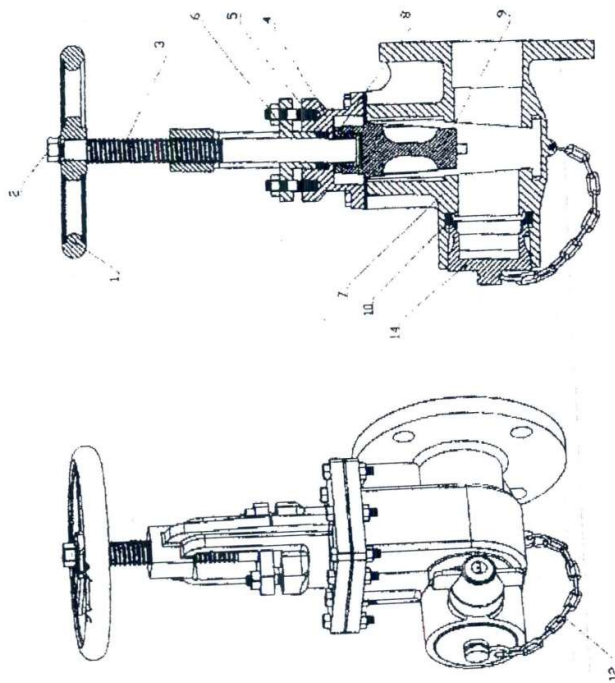
۰۵۳ - ۰۷۳ - ۹۱۸۴

SPECIFICATION FOR FIRE WATER SYSTEM

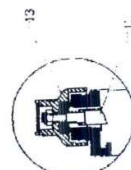
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|------|-------|----------|------|---------|-----------|-----------|-------|
| نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه |
| D05 | 0003 | SP | SA | 000 | PEDCO | GNRAL | BK |

شماره صفحه: ۱۷ از ۱۹

| No. | PART NAME | MATERIAL |
|-----|-----------------------|------------------|
| 1 | HANDWHEEL | CAST IRON |
| 2 | HANDWHEEL NUT | GALVANIZED STEEL |
| 3 | STEM | STEEL |
| 4 | TUNE | BRONZE |
| 5 | PACKING | GRAPHITIC |
| 6 | GLAND | BRONZE |
| 7 | BODY | BRONZE |
| 8 | END OF STEM NUT BRASS | BRASS |
| 9 | WEDGE | BRONZE |
| 10 | C-V WASHER | NBR |
| 11 | PLUNGER | BRASS |
| 12 | CHAIN | GALVANIZED STEEL |
| 13 | RELEASE PLUNGER BRASS | BRASS |
| 14 | CAP | PLASTIC |



شکل شماره ۲) نمونه شیردروازه ای مورد تایید جهت نصب روی لوله بستاده (stand pipe)





نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض و ابنیه تحت الارض

عمومی و مشترک



شماره پیمان:

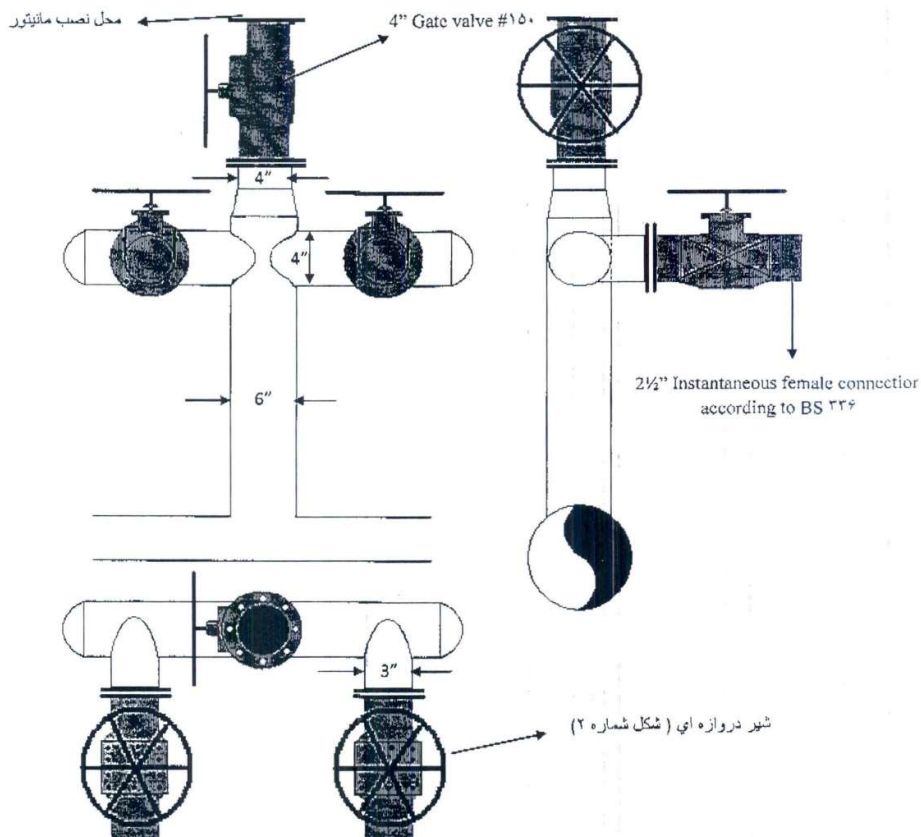
۰۵۳ - ۰۷۳ - ۹۱۸۴

SPECIFICATION FOR FIRE WATER SYSTEM

| پروژه | بسته کاری | صادرکننده | تسهیلات | رشته | نوع مدرک | سریال | نسخه |
|-------|-----------|-----------|---------|------|----------|-------|------|
| BK | GNRAL | PEDCO | 000 | SA | SP | 0003 | D05 |

شماره صفحه: ۱۸ از ۱۹

شکل شماره ۳) شماتیک هیدرانت، مانیتور مورد تایید ایمنی، بهداشت و محیط زیست



ارتفاع wheel مانیتور مورد نظر، از کف تمام شده (زمین) بایستی حداکثر ۱۳۰ سانتی متر باشد



نگهداشت و افزایش تولید میدان نفتی بینک
سطح الارض و ابنیه تحت الارض

عمومی و مشترک



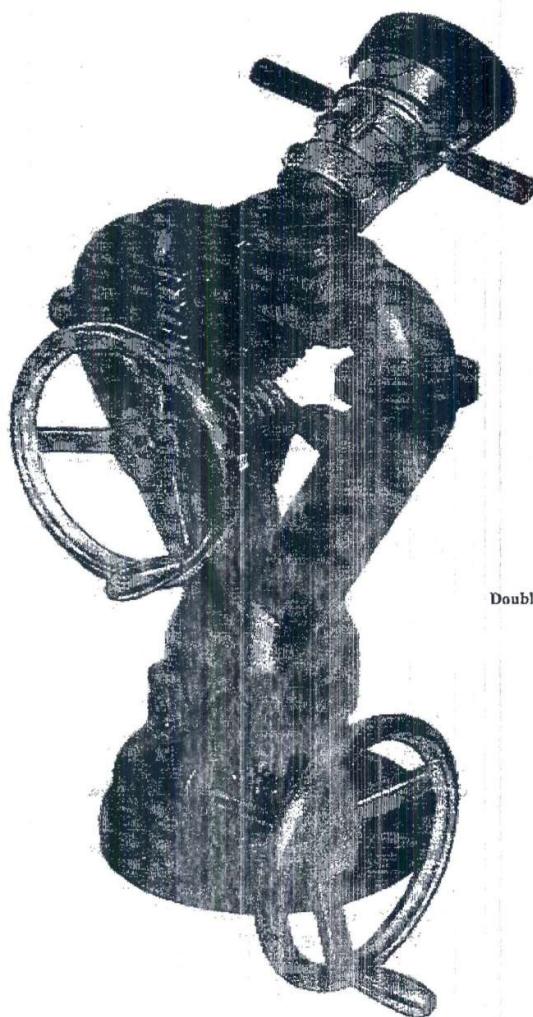
شماره پیمان:

۰۵۳ - ۰۷۳ - ۹۱۸۴

SPECIFICATION FOR FIRE WATER SYSTEM

| نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادرکننده | بسته کاری | پروژه |
|------|-------|----------|------|---------|-----------|-----------|-------|
| D05 | 0003 | SP | SA | 000 | PEDCO | GNRAL | BK |

شماره صفحه : ۱۹ از ۱۹



Double wheel operated monitor

شکل شماره ۴) نمونه مانیتور مورد تایید ایمنی، بهداشت و محیط زیست