



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

عمومی و مشترک



شماره پیمان:
053 - 073 - 9184

SPECIFICATION FOR PRESSURE SAFETY VALVES (PSV)

| نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادر کننده | بسته کاری | پروژه |
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| D03 | 0007 | SP | IN | 000 | PEDCO | GNRAL | BK |

شماره صفحه: 1 از 25

طرح نگهداشت و افزایش تولید 27 مخزن

SPECIFICATION FOR PRESSURE SAFETY VALVES (PSV)

نگهداشت و افزایش تولید میدان نفتی بینک

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IFC: Issued For Comment
IFA: Issued For Approval
AFD: Approved For Design
AFC: Approved For Construction
AFP: Approved For Purchase
AFQ: Approved For Quotation
IFI: Issued For Information
AB-R: As-Built for CLIENT Review
AB-A: As-Built -Approved



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REVISION RECORD SHEET



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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 CLINET (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.

| | |
|-------------------------------|--|
| CLINET: | National Iranian South Oilfields Company (NISOC) |
| PROJECT: | Binak Oilfield Development – General Facilities |
| EPD/EPCGENERALCONTRACTOR(GC): | Petro Iran Development Company (PEDCO) |
| EPD/EPC CONTRACTOR(GC): | 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 covers minimum necessary requirements for the design, selection, manufacture, inspection, testing and delivery of "Pressure Safety Valve/Thermal relief valve".

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It shall be used in conjunction with data/requisition sheets for present document subject.

3.0 NORMATIVE REFERENCES

3.1 LOCAL CODES AND STANDARDS

| | |
|--------------|---|
| IPS-C-IN-100 | Construction and Inspection Standard for General Instrument, Field Inspection and Calibration and testing of instrument and instrument system |
| IPS-G-ME-250 | General Standard For Pressure And Vacuum Relief Devices. |
| IPS-M-IN-280 | Material Standard for Miscellaneous Items |
| IPS-E-PR-450 | Engineering Standard for Process Design of Pressure Relieving Systems inclusive Safety Relief Valves |
| IPS-E-PI-221 | Engineering Standard for piping material selection |
| IPS-G-IN-160 | Petroleum industry-Safety valves, control valves and peripherals |
| IPS-E-GN-100 | Engineering Standard for Units |
| IPS-I-IN-100 | Inspection Standard for General Instrument Systems |

3.2 INTERNATIONAL CODES AND STANDARDS

- American Petroleum Institute (API):**



| | |
|------------|---|
| API-RP 520 | Sizing, Selection, And Installation Of Pressure-Relieving Devices In Refineries |
| API-RP 521 | Guide for Pressure Relief and De-pressuring Systems |
| API-RP 526 | Flanged Steel Safety Relief Valves |
| API-RP 527 | Seat Tightness of Pressure Relief Valves |
| API 598 | Valve Inspection and Tests |
| API 2000 | Venting Atmospheric and Low-Pressure Storage Tanks |

- ASME (American Society of Mechanical Engineers):**

| | |
|-------------------------------------|--|
| ASME, Sec. I | Boiler and Pressure Vessel Code entitled "Power Boiler". |
| ASME SECTION VIII DIV.1 | Unified Pressure Vessel |
| ASME SECTION VIII DIV.1,UG-12 | Pressure Relief Valves |
| ASME SECTION VIIDIV.1,UG-125 to 134 | Determination of Pressure Relieving Requirements |
| ASME B 16.5 | Pipe , Flanges and Flanged Fittings |

- National Association of Corrosion Engineers (NACE)**

| | |
|--------------|---|
| NACE MR-0175 | Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment |
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• **American Society for Testing and Materials (ASTM)**

| | |
|------------|--|
| ASTM A488 | Steel Casting, Welding Qualification of Personnel and Procedures |
| ASTM E 113 | Standard Recommended Practice for Ultrasonic Testing by the Resonance Method |
| ASTM E 142 | Standard Method for Controlling Quality of Radiographic Testing |
| ASTM E 165 | Standard Recommended Practice for Liquid Inspection Method |
| ASTM E 446 | Standard References Radiographic for Steel Casting |
| ASTM A435 | Ultrasonic testing |
| ASTM 1457 | Specification for PTFE moulding and extrusion materials |

Vendor shall state the additional Codes and Standards if necessary. The latest published issue or amendment shall apply unless otherwise stated.

3.3 THE REFERENCE DOCUMENTS

| | |
|---|--------------------------------|
| Process Basis of Design | BK-GENRL-PEDCO-000-PR-BD-0001 |
| Specification For Instrumentation | BK- GENRL-PEDCO-000-IN-SP-0001 |
| Spec. For Hazardous Area Classification | BK- GENRL-PEDCO-000-SA-SP-0002 |
| Piping & Pipeline Material Specification | BK- GENRL-PEDCO-000-PL-SP-0001 |
| Instrument & Control System Design Criteria | BK-SSGRL-PEDCO-110-IN-DC-0002 |
| Instrument & Control System Design Criteria | BK-PPL-PEDCO-320-IN-DC-0002 |
| Instrument & Control System Design Criteria | BK-GCS-PEDCO-120-IN-DC-0002 |
| Symbol & Legend For PFD and P&ID | BK-SSGRL-PEDCO-110-PR-PI-0001 |
| P&ID - W018S | BK-W018S-PEDCO-110-PR-PI-0001 |
| P&ID - W028 | BK-W028-PEDCO-110-PR-PI-0001 |
| P&ID - W0046S | BK-W046S-PEDCO-110-PR-PI-0001 |
| P&ID for Diesel Oil Drum- W0046S | BK-W046S-PEDCO-110-PR-PI-0002 |
| P&ID for Potable Water Tank - W0046S | BK-W046S-PEDCO-110-PR-PI-0003 |
| P&ID - W035 | BK-W035-PEDCO-110-PR-PI-0001 |
| P&ID - W008N | BK-W008N-PEDCO-110-PR-PI-0001 |
| P&ID - Extension of Binak B/C Manifold | BK-W007S-PEDCO-110-PR-PI-0001 |
| P&ID - W007S | BK-W007S-PEDCO-110-PR-PI-0002 |
| P&ID for Diesel Oil Drum- W007S | BK-W007S-PEDCO-110-PR-PI-0003 |
| P&ID for Potable Water Tank - W007S | BK-W007S-PEDCO-110-PR-PI-0004 |
| P&ID for Diesel Oil Drum- BK14 | BK-BK14-PEDCO-110-PR-PI-0001 |
| P&ID for Potable Water Tank - BK14 | BK-BK14-PEDCO-110-PR-PI-0002 |
| P&ID for Diesel Oil Drum- BK12 | BK-BK12-PEDCO-110-PR-PI-0001 |
| P&ID for Potable Water Tank - BK12 | BK-BK12-PEDCO-110-PR-PI-0002 |
| P&ID for Diesel Oil Drum- BK15 | BK-BK15-PEDCO-110-PR-PI-0001 |
| P&ID for Potable Water Tank - BK15 | BK-BK15-PEDCO-110-PR-PI-0002 |
| P&ID for Diesel Oil Drum- BK05 | BK-BK05-PEDCO-110-PR-PI-0001 |

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| BK | GNRAL | PEDCO | 000 | IN | SP | 0007 | D03 | | | | | | | | | | | |

P&ID for Potable Water Tank - BK05
 Symbol & Legend For PFD and P&ID
 P&ID - Gas Pipeline (to Siahmakan G.I. Station)
 P&ID - Condensate Pipeline (to Binak PU)
 Symbol & Legend For PFD and P&ID
 P&ID- Gas Compression Inlet Gas Pipeline (Binak)
 P&ID- Gas Compression Inlet Gas Pipeline (Golkhari)
 P&ID - Slug Catcher System
 P&ID - Gas Compression Inlet Knock Out Drum
 P&ID - 1st Stage Gas Compression Suction Drums
 P&ID - 1st Stage Gas Compression Compressors
 P&ID - 1st Stage Gas Compression Air Coolers
 P&ID - 2nd Stage Gas Compression Suction Drums
 P&ID - 2nd Stage Gas Compression Compressors
 P&ID - 2nd Stage Gas Compression Air Coolers
 P&ID - 2nd Stage Gas Compression Discharge Drum
 P&ID - Gas Compression Dehydration Package
 P&ID - Lean Glycol Storage Tank
 P&ID - Instrument & Plant Air System
 P&ID - Nitrogen Generation System
 P&ID - Close Drain System
 P&ID - Corrosion Inhibitor Package
 P&ID - Methanol Injection Package
 P&ID - LP Flare System
 P&ID - Oily Water Sewer
 P&ID - Fuel Gas System
 P&ID - Diesel Oil System
 P&ID - Potable Water System
 P&ID - Glycol Sump Drum



BK-BK05-PEDCO-110-PR-PI-0002
 BK-PPL-PEDCO-320-PR-PI-0003
 BK-PPL-PEDCO-320-PR-PI-0001
 BK-PPL-PEDCO-320-PR-PI-0002
 BK-GCS-PEDCO-120-PR-PI-0001
 BK-GCS-PEDCO-120-PR-PI-0002
 BK-GCS-PEDCO-120-PR-PI-0003
 BK-GCS-PEDCO-120-PR-PI-0004
 BK-GCS-PEDCO-120-PR-PI-0005
 BK-GCS-PEDCO-120-PR-PI-0006
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 BK-GCS-PEDCO-120-PR-PI-0020
 BK-GCS-PEDCO-120-PR-PI-0021
 BK-GCS-PEDCO-120-PR-PI-0022
 BK-GCS-PEDCO-120-PR-PI-0023
 BK-GCS-PEDCO-120-PR-PI-0024
 BK-GCS-PEDCO-120-PR-PI-0025

3.4 ENVIRONMENTAL DATA

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

4.0 ABBREVIATIONS

| | |
|-----|--------------------------|
| FAT | Factory Acceptance Test |
| TRV | Temperature Relief Valve |
| PRV | Pressure Relief Valve |
| PSV | Pressure Safety Valve |
| QA | Quality Assurance |
| QC | Quality Control |
| SAT | Site Acceptance Test |
| °C | Centigrade |
| cP | centipoise |
| PR | process |

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| SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| BK | GNRAL | PEDCO | 000 | IN | SP | 0007 | D03 | | | | | | | | | | | | | | | | | | | |

| | |
|------|--|
| EPC | Engineering, Procurement, Construction |
| EPD | Engineering, Procurement, Drilling |
| NPT | National pipe thread |
| PTFE | Polytetrafluoroethylene |

5.0 ORDER OF PRECEDENCE

In case of any conflict between the contents of this document or any discrepancy between this document and other project documents or reference standards, this issue must be reported to the CLIENT. The final decision in this situation will be made by CLIENT.

6.0 VENDOR RESPONSIBILITY

VENDOR shall be responsible for the correct design and operation of all the provided equipment, the quality of all materials and workmanship, and in compliance with these specifications. Approval of the test by CONTRACTOR SHALL not relieve the VENDOR of responsibility for conforming with the provisions of this specification when the equipment is installed.

6.1 VENDOR'S COMPLIANCE

Vendor shall submit his bid(s) in full compliance with the requirements of the MR and relevant attachments.

Any exceptions or deviations to/from the MR SHALL be clearly stated and quoted in an optional part of the bid, as an alternative.

If no exceptions are specified, CONTRACTOR will intend that the bid is completely in accordance with the MR and relevant documents.

Vendor shall quote separately and comparatively, the alternatives requested in MR by contractor.



VENDOR is requested to include in his proposal the enclosed form "VENDOR'S CERTIFICATE" duly filled in & signed.

Compliance with this requisition in any instance SHALL not relieve the VENDOR of his responsibility to meet the specified conditions.

VENDOR SHALL include in the bid copies of technical forms that will allow, through the proposed model number, a check of technical characteristics of the instruments including the spare parts.

6.2 DATA SHEETS

It is mandatory that project required specification, specified by contractor on project documents, shall be confirmed /filled by the bidders and attached to the bids.

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| BK | GNRAL | PEDCO | 000 | IN | SP | 0007 | D03 | | | | | | | | | | | | | | | | | | | |

Bids without CONTRACTOR's required specifications, properly completed/ confirmed by vendor, will be considered technically incomplete and therefore, technically unacceptable.

Vendors are responsible to fill/complete project datasheet at bid stage as per requirements of this specification and other project references. The datasheet will be finalized during detail design after signing purchase order with that vendor.

7.0 TECHNICAL REQUIREMENTS

7.1 GENERAL

All equipment shall be designed and manufactured to last the lifetime of the plant and shall offer the flexibility of future upgrades and expansion.

Any deviation from the specification at any stage of the project shall be subject to CLINET approval.

Any omission in these requirements shall not relieve the Supplier of this obligation to provide fully functional and dependable equipment.

Fire case condition to be specified and note that The vendor shall size all safety and relief valves in worst case of "ASME Section VIII code API 520" and "Fire Case" methods.



7.2 VALVE SIZING

Sizing shall be carried out using the formula mentioned in the following standards whenever the sizing code mentioned in the EPC Contractor's datasheets refers to them.

Sizing code standards:

- IPS-E-PR-450 Engineering Standard for Process Design of Pressure Relieving Systems Inclusive Safety Relief Valves
- API RP 520 Part I Recommended Practice
- ASME, Sec VIII Boiler and Pressure Vessel Code entitled "Unfired Pressure Vessels".
- ASME, Sec. I Boiler and Pressure Vessel Code entitled "Power Boiler".

Effective discharge coefficient of pressure relief valves shall be 0.975 for gas and vapor and 0.62 for liquid services as a maximum. The valve size shall be based on size calculations for the worst of all cases that might cause the valve to blow. For flanged pressure relief valves the orifice letter designation and the corresponding relieving area indicated in the EPC Contractor's data sheet will be as per API-526. For a valve of given inlet and outlet sizes and letter designation, relieving area of the valves offered by Vendor, shall meet those in API-526 as a minimum.

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| BK | GNRAL | PEDCO | 000 | IN | SP | 0007 | D03 | | | | | | | | | | | | | | | | | | | |

| Table 1: Standard Sizes | |
|-------------------------|---------------------------|
| Inlet orifice outlet | Area (inch ²) |
| 1 D 2 | 0.11 |
| 1 E 2 | 0.196 |
| 1½ F 2 | 0.307 |
| 2 H 3 | 0.785 |
| 3 K 4 | 1.838 |
| 4 L 6 | 2.853 |
| 4 P 6 | 6.38 |
| 6 Q 8 | 11.05 |
| 6 R 8 | 16 |
| 6 R 10 | 16 |
| 8 T 10 | 26 |

The terminology used in EPC Contractor's data sheets will be as per API RP 520 part I. unless otherwise specified in the individual data sheets, the maximum overpressure, in percentage of the set pressure shall be as follows:

- 3% for steam service where ASME Power Boiler Code applies
- 10% for gas and vapour services and liquids except as noted below.
- 20% for fire exposure on unfired pressure vessels.
- 25% for liquid on thermal relief of pipelines and pump discharges.



For general safety relief purposes the above standard sizes will be used (table 1).

Size for thermal relief valves shall be generally ¾" ×1" NPT and shall have screwed type connection.

7.3 UNITS OF MEASUREMENT

Engineering units shall be generally based on the International System (SI). Specifically, the following units of measurement shall be used:

- | | |
|-------------------|-------------------------------|
| ○ Dimension | mm (inch) |
| ○ Mass flow | kg/hr |
| ○ Volumetric flow | m ³ /hr |
| ○ Pressure | bar, mbar, mmH ₂ O |

| | | | | | | | | | |
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According to the API 520 in a conventional PRV application, built-up backpressure should not exceed 10 % of the set pressure at 10 % allowable overpressure. A higher maximum allowable built-up backpressure may be used for allowable overpressures greater than 10 % provided the built-up backpressure does not exceed the allowable overpressure. When the superimposed backpressure is constant, the spring load may be reduced to compensate for the superimposed backpressure. When the downstream piping is designed within the above backpressure criteria, no backpressure capacity correction ($K_b = 1.0$) is required in the valve sizing equations, for gases at critical flow or for liquids. When the backpressure is expected to exceed these specified limits, a balanced or pilot-operated PRV should be specified.”

According to the API “A balanced PRV should be used where the built-up backpressure is too high for conventional PRVs or where the superimposed backpressure varies widely compared to the set pressure. Balanced valves can typically be applied where the total backpressure (superimposed plus built-up) does not exceed approximately 50 % of the set pressure. The specific manufacturer should be consulted concerning the backpressure limitation of a particular valve design. With a balanced valve, high backpressure will tend to produce a closing force on the unbalanced portion of the disc. This force may result in a reduction in lift and an associated reduction in flow capacity. Capacity correction factors, called backpressure correction factors, are provided by manufacturers to account for this reduction in flow. For compressible fluid service, however, the factor may vary depending on whether the allowable overpressure is 10 %, 16 %, or 21 %.”



According to the API 520 as for Pilot-operated PRVs, “for pilot-operated PRVs, the valve lift is not affected by backpressure. For compressible fluids at critical flow conditions, a backpressure correction factor of 1.0 should be used for pilot-operated PRVs.”

7.4.1 CONVENTIONAL TYPE

Safety and relief valves shall generally be full nozzle, spring loaded type with integral flanges and shall be of the enclosed spring type except for steam and air services.

On conventional type pressure relief valves, back pressure directly affects the valve relieving pressure and shall only be used where there is no back pressure or the back pressure is substantially constant or low. The valve which, following opening, reaches the degree of lift necessary for the mass flowrate to be discharged within a pressure rise of not more than 10%. (The valve is characterized by a pop type action and is sometimes known as high lift).

According to the IPS-E-PR-450, The permissible pressure drop in discharge piping from the safety valve in vapor service is 10% of the set pressure under normal relief where 10% accumulation is used and 20% of the set pressure under emergency fire condition where 20% accumulation is used.

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| شماره پیمان: | SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | شماره صفحه : 13 از 25 |
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| | BK | GNRAL | PEDCO | 000 | IN | SP | 0007 | D03 | |

For flammable or toxic services, bonnets shall be vented to the discharge side of the relief valve.

All conventional safety relief valves shall have bolted pressure tight bonnets. According to the IPS-E-PR-450, conventional safety relief valves for closed relief systems shall have a closed bonnet.

The type of valve shall not be used in these cases (IPS-E-PR-450):

- a) Such that the variable back pressure is greater than 10% where 10% accumulation is allowed or greater than 20% where 20% accumulation is allowed under fire conditions.
- b) Such that the differential pressure when the valve is relieving compared to the normal differential pressure across the protected equipment is less than 10%. This particularly applies when starting up a Unit where the initial back pressure on a valve is zero and the differential pressure across the valve may be below the intended operating pressure or closer than 10% above the normal operating pressure.

7.4.2 BALANCED BELLOWS TYPE

A balanced valve incorporates a means of minimizing the effect of backpressure on the operational characteristics of the valve. The type of valve is a direct loaded safety valve wherein sliding and (partially or fully) rotating elements and springs are protected against the effects of the fluids by a bellows. The bellows may be of such a design that it compensates for influences of backpressure.



Balanced bellows type shall be considered when one of the following conditions exists:

- Discharge into closed piping system, closed flare and blow down systems.
- Where the process fluid is corrosive or contains lethal or toxic substances and may attack the spring and bonnet assembly.
- Where the variable back pressure is more than 30% of set pressure.
- Not suitable where the liquid being discharged could accumulate and set up in the convolutions or bellows and make safety valve inoperative.

Balanced bellows valves shall have open bonnet construction.

In bellows type, bonnet shall be vented separately from discharge.

In valves with balancing bellow, the bonnet shall have a 1/2" threaded hole, NPT as per ANSI 1.20.1.

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| BK | GNRAL | PEDCO | 000 | IN | SP | 0007 | D03 | | | | | | | | | | | | | | | | | | | |

7.4.3 PILOT OPERATED TYPE

Pilot operated valves shall be considered

- Where low set pressure, accuracy or rapid opening and closing are required
- Where operating pressure is within 5% of set pressure
- Where maximum capacity with least overpressure is desired.
- Where the built-up back pressure and variable superimposed back pressure does not exceed 50% of the set pressure.
- When the pressure drop to the inlet of the safety relief valve is greater than 3% of the set pressure (in this case, the remote pressure pickup type should be used.)
- Where the valve size is so large that a direct loaded safety relief valve would be unsuitable.
- Where premium tightness is desired
- On spheres, spheroids and other low pressure storage vessels.
- In clean, non-corrosive services.

These valves are tight to set pressure wherever conventional valves are tight to 90-95% of set pressure. Therefore, for equipment that operates between 90 and 95% of the set pressure, utilization of pilot operated valves shall be considered.

Pilot operated safety relief valves are not to be used in the following cases



- In corrosive service.
- In coking or slurry service.
- In closed flare systems unless back pressure effects have been investigated and envisaged.
- In high temperature services.

7.4.4 TANK VENT

Tank vents shall only be used for low pressure applications. Vents and flame arrestors shall be sized as a matched pair in accordance with API 2000. Cold settings of vents shall take into account the effects of normal operating and relief conditions.

Pressure containing parts shall be selected on the basis of vessel or line design pressures and temperatures. Relieving temperatures in excess of design as in a fire case shall be regarded as short duration.

Specific process conditions, materials, rating and design basis shall be stated in individual datasheets for each valve and flame arrestor. Flame arrestors will, in general, be used on liquid storage tanks to safely prevent a flame from flashing back in the tank during venting

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| BK | GNRAL | PEDCO | 000 | IN | SP | 0007 | D03 | | | | | | | | | | | | | | | | | | | |

of the vapor space. Vacuum break or inlets shall be vertically upwards and shall be protected by a weatherproof cover or screen.

7.5 SOUND LEVEL

Emission shall be less than 85 dBA at 1 m distance from the valve.

7.6 ACCESSORIES

Lifting lever shall be provided whenever the fluid to be relieved, is steam, air, or hot water (60°C and above) or whenever it is specified in the EPC Contractor's datasheets. A test gag shall be provided when specified on the datasheets. Relief valves shall normally be furnished with screwed caps.

7.7 VALVE CONSTRUCTION

7.7.1. BODY

Flanged connections shall be used in accordance with API 526, except for thermal relief valves, which will be threaded.

In valve body design, consideration shall be given to minimizing the effects of the deposits.

Valves having screwed inlet and outlet connections shall be provided with wrenching surfaces to allow for normal installation without damaging operating parts.



Where flanged inlet and outlet connections have been specified, the flange dimensions shall be in accordance with ANSI B 16.34, unless otherwise specified. This standard is only applicable only to end connection dimensions and tolerances. The flange face finish shall be as stated in the datasheets.

Where threaded inlet and outlet connections have been specified, they shall be in accordance with ANSI B 1.20.1 (NPT), unless otherwise noted.

Flange facings shall be in accordance with IPS-E-PI-221 unless otherwise specified. However, the inlet flange may be modified to increase the height of the raised face.

For flanged valves, inlet and outlet sizes and ratings and center to flange face dimensions shall be in accordance with API-526. Dimensional tolerances shall be as mentioned there.

If the design of pressure relief valve is such that liquid can collect on the discharge side of the disk, the valve shall be equipped with a drain at the lowest point where liquid can collect.

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Pressure relief valves that can not be equipped with a drain as required above because of the design or application may be used provided:

The pressure relief valve are used on gas service only where there is neither liquid discharged from the valve nor liquid formed by condensation on the discharge side of the valve,

The pressure relief valve is provided with a cover or discharge piping to prevent liquid or other contaminant from entering the discharge side of the valve.

The pressure relief valve is marked FOR GAS SERVICE ONLY in addition to the other markings.

7.7.2. TRIM

The term "trim" covers all the parts of the valve exposed to and in contact with the process fluid except for the body and bonnet assembly.

Valves shall, in general, be of the direct spring loaded full nozzle with minimum inlet flange rating of 300#, unless otherwise specified.

Nozzles of the forged type are preferable.

7.7.3. BONNET

All valves shall be provided with a cap over the adjusting bolt.



7.7.4. SPRING

Valve spring design shall not permit an adjustment of more than 5% above or 5% below that for which the valve is marked; unless the setting is within the spring design range established by the manufacturer or is determined to be acceptable to the manufacturer. The allowable tolerances in set pressures are as below:

- ± 0.14 bar for set pressures up to and including 4.8 barg.
- $\pm 3\%$ for set pressures above 4.8 barg.

7.8 INSTRUMENT LABELS AND NAMEPLATES

Each item of equipment shall be provided with a manufacturer's nameplate detailing model and serial number, range, materials of construction, certification code and relevant equipment details. In addition, a securely attached engraved stainless steel label shall show the individual instrument tag number. Information on labels shall be in English. Name plates shall include following data as minimum:

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| SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| پروژه | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدرک | سریال | نسخه | | | | | | | | | | | | | | | | | | | |
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- Valve tag number as per EPC Contractor's datasheets.
- Manufacturer's serial no. and model no.
- Manufacturer's name / trademark.
- Nominal pipe size in inches and flange rating in pounds for both inlet and outlet.
- The inlet nominal size
- The material designation of the body
- An arrow showing the direction of flow, where the inlet and outlet connections have the same dimensions or the same nominal pressure rating
- Ring joint number (where applicable) to be marked on the flange
- Limiting operating temperature for which the valve has been designed,(where applicable).
- Cold differential test pressure.
- Flow area in square millimeters
- Manufacturer's type reference
- Pressure range of spring or manufacturer's serial No
- If required the phrase "sour service" is stamped
- Orifice letter designation
- Valve set pressure.
- Cold bench test set pressure.
- Certified discharge capacities
- Back pressure
- Any other information required by the CLINET

The nameplate shall be permanently attached to the body or bonnet of the valve



All the pressure safety valves shall be ASME certified including UV stamp.

7.9 MATERIALS

Materials of construction shall be suitable for the environmental conditions and the process conditions identified in the relevant instrument datasheets.

Provision of corrosion resistant materials shall be considered for conventional valves for corrosive fluid. Materials to be used shall be in accordance with project piping material specification and relevant datasheets

In general, unless specifically identified otherwise in this specification and attachments, process wetted materials which are in contact with Corrosive Services (H₂S,CO₂,H₂O), shall comply with the requirements of .. NACE MR0175/ISO 15156 . The Supplier shall be responsible for the selection of the equipment and materials of construction based on the information supplied in this specification and in the relevant datasheets.

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| SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| پروژه | بسته کاری | صادر کننده | تسهیلات | رشته | نوع مدرک | سریال | نسخه | | | | | | | | | | | | | | | | | | | |
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Body material shall normally be carbon steel and generally adhered to and consistent with project document "Piping Material Specification". Higher grades shall be used if dictated by the process requirements as indicated in individual datasheets. Materials other than those Mentioned, providing they comply with a standard or specification that ensures control of chemical and physical properties and quality, appropriate to the end use. Trim material shall be AISI 316 SS as a minimum. Higher grades shall be used if dictated by the process requirements as indicated in individual datasheets. Unless otherwise required in individual data sheets, the spring material shall be as follows:

- Austenitic stainless steel for discharge temperature from -260°C to -600°C .
- Cadmium plated carbon steel from -50 to 2300°C .
- Nickel plated tungsten steel For above 230°C

In accordance with manufacturer's standard and approved by the CLIENT and EPC Contractor, for discharge temperatures other than those mentioned above.

Valve bonnet or spring housing material shall be the same as the valve body material.

For spring material reference shall be in accordance with tables of API STD 526

Bolts and nuts material shall be in accordance with project document "Piping Material Specification" and process conditions as indicated in each datasheet. For sure services, the material of bolt and nuts shall be complied the process conditions.



Material for Disk, Nozzle shall be capable of withstanding the corrosive and erosive effects of the particular service conditions. These materials will be selected in accordance with the related standards (A105/A216). Nozzle material shall be compatible with the process fluid and shall be stainless steel 316 unless otherwise specified. Disc shall be manufactured from same material as the nozzle, as minimum requirement. Disc shall be easily replaceable.

Gasket material shall be suitable for the application. It shall be selected in accordance with the related standards.

7.10 PAINTING

Painting procedures, for all equipment, shall reflect the harsh environment in which the equipment shall be installed. All parts and accessories which are not corrosion resistant by choice of material shall be prepared and painted. Painting shall be in accordance with project painting specification BK-GNRAL-PEDCO-000-PI-SP-0006.

Alternatively, the Supplier may offer his standard painting specification with his Proposal, for approval by the CLIENT and EPC Contractor.

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| | نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادر کننده | بسته کاری | |
| | D03 | 0007 | SP | IN | 000 | PEDCO | GNRAL | BK |

In addition, any damaged parts of ready painted instruments and components shall be prepared and painted, before assembly, in accordance with the above project specification for painting.

8.0 RUPTURE DISC TYPES (IF ANY)

The set pressure for rupture disc is determined the same as for pressure safety valves but the differential between the normal operating pressure and the set pressure of the rupture disc depends on whether a single component rupture disc alone is used, whether a multiple component disc with plastic or metallic seal is used and whether the normal operating pressure is constant or pulsating. The following types shall be used for all applications:

- Insert type rupture disc preassemblies for installation inside bolt circle of two flanges.
- Multiple component discs with plastic or metallic seal and vacuum or back pressure support.

8.1 RUPTURE DISC (SINGLE COMPONENT)

Where the pressure is fluctuating or pulsating, the burst pressure of the single component rupture disc shall not be closer than 33% above the normal operating pressure for a metallic disc and 25% for a non-metallic disc.

8.2 MULTIPLE COMPONENT RUPTURE DISCS



- Multiple component rupture discs with plastic pressure seal and vacuum or back pressure support shall be used where the pressure is constant or fluctuating. The burst pressure of the disc shall be no closer than 20% above the normal operating pressure.
- A similar rupture disc with metallic pressure seal and vacuum or back pressure support shall have a bursting pressure not closer than 10% above the normal operating pressure.

9.0 INSPECTION AND TESTING

Instruments shall be fully inspected and tested at the VENDOR's works to ensure satisfactory operation before packing and shipping. A schedule for testing and inspection shall be detailed in the manufacturing quality plan. The tests will be witnessed by the CONTRACTOR and COMPANY.

9.1 INSPECTION AND TESTING PROCEDURES

The VENDOR shall submit detailed procedures and test sheets for COMPANY and CONTRACTOR approval which cover the Factory Acceptance Testing 8 weeks before FAT. These procedures shall adequately cover both the VENDOR's own equipment/design and that of any sub-vendors.

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| SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Where sub-supplied equipment/design is not explicitly covered by the VENDOR's procedures, then this must be covered by documentation provided with the sub-supply. The VENDOR is responsible for the inspection, co-ordination and retention of the documentation.

9.2 INSPECTION AND TESTING DOCUMENTATION

The VENDOR shall maintain up to date documentation at all times reflecting the inspection/testing status of the equipment. The VENDOR will be required to formally submit certain parts of the documentation as defined in the CONTRACTOR's order. However, the submitted documentation shall not be regarded as the total requirements.

The CONTRACTOR and COMPANY will wish to inspect retained documentation such as internal test results, equipment logs and fault correction records. The original signed test procedures and test sheets shall be supplied to the CONTRACTOR and COMPANY at the completion of the tests.

9.3 FACTORY ACCEPTANCE TEST (FAT)

Prior to advising the CONTRACTOR and COMPANY that the equipment is ready for the Factory Acceptance Test (FAT), the VENDOR shall have completed his own 100% in-house test of each cabinet/panel. On successful completion of this, the VENDOR shall then undertake the FAT.



The CONTRACTOR and COMPANY will wish to witness the FAT prior to releasing the equipment for shipment. The VENDOR shall be responsible for conducting the test and providing all necessary facilities, test equipment and personnel.

Factory acceptance test (FAT) shall be performed to demonstrate that the valves perform as per specification, including any site specific configuration.

Each different type of input (e.g. fire/gas detectors) shall be tested through use of an actual field/interface device, where practicable. Simulators may be used by the agreement of the Principal.

Each output shall be demonstrated through the simulation of inputs, thus proving logic and outputs.

FAT will be performed against a procedure, provided by Vendor, and subject to Principal approval. Test results shall be accurately recorded, including any simulators used and any ad hoc tests performed.

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| SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | | | | | | | | | | | | | | | | | | | |
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9.4 COMMISSIONING SUPPORT

VENDOR specialist services will be required during commissioning of the equipment. A comprehensive proposal to provide the required specialists for commissioning support shall form part of VENDOR's scope. Proposal shall include details of the skill and the hourly rates offered.

9.5 SITE SUPERVISION

When specified in the Purchase Order, the VENDOR shall provide representatives to assist the COMPANY during installation, commissioning and initial start-up for all aspects of the equipment.

9.6 PRESSURE TEST

The manufacturer prior to any painting shall carry out pressure testing, which may be required.

The testing shall be in accordance with IPS-G-ME-250 standard.

All pressure measuring devices fitted to test equipment shall be tested and calibrated to ensure the required accuracy during testing.

Each pressure relief valve shall consecutively be subjected to the following tests, as minimum.

Unspecified details shall be in accordance with the manufacturer's test procedures, approved by the CLINET.

The bodies of all safety valves, relief valves and safety relief valves shall be subjected to pressure test to ensure the integrity of the part.



All closed bonnets and caps shall be pressure tested at a pressure not less than the specified for the body.

The testing and adjustment of cold set pressure using air or other gas as the test medium shall not be carried out unless the safety valve components have previously been pressure tested.

Unless specified otherwise, all safety valves shall be set and adjusted in accordance with the manufacturer's standard practice. The test medium shall be gas for valves, which are to be used with gas, but it shall be permissible to use liquid or gas as the test medium for liquid service.

Type test certificate for each type of pilot operated safety/ relief valves shall be provided by the manufacturer.

Body and other pressure parts subject to inlet pressure (primary pressure zone) shall be hydrostatically tested at a pressure of at least 1.5 times the design pressure of the parts.

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| SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | | | | | | | | | | | | | | | | | | | |
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These tests shall be conducted after all machining operations on the parts have been completed and prior to any painting which may be applied.

There shall be no visible sign of leakage.

A test shall be applied to the discharge side of those pressure relief valves fitted with bellows to test the pressure tightness of the bellows and its joints. The bonnet vent which shall be open, shall have a soapy water film placed across it and there shall be no visible leakage. The test shall be carried out using air or nitrogen at a pressure not less than the maximum specified back pressure. The duration of the test shall be as for the seat tightness test.

For closed bonnet pressure relief valves, secondary pressure zone (parts subjected to outlet or discharge pressure) shall be tested according to the applicable clause of ASME Section I or ASME Section VIII.

Each pressure relief valve shall be tested to demonstrate its popping or set pressure in accordance with applicable clause of ASME Section I or ASME Section VIII.

Test medium for valves on gas or vapor services shall be air, unless otherwise specified by the CLINET.

The set pressure tolerances shall be in accordance with ASME, as appropriate.

Blow down shall be adjusted according to ASME Section I, where applicable.

Each valve shall be subjected to a seat tightness test, according to API Standard 527.

One sample from each group of rupture disks of the same size and material should be tested in a holder of the same form and dimensions as that with which the disk is to be used.



9.7 SEAT LEAKAGE TEST

Safety relief valves shall be subject to a seat leakage test in accordance with API standard 527 as applicable, or as agreed upon by the manufacturer and the CLINET.

The seat leakage tests shall be carried out subsequent to the cold set pressure adjustment test.

10.0 PRESERVATION, STORAGE AND SHIPMENT

All equipment shall be provided with a unique identification name, traceable to the documentation. This identification name shall be engraved in a laminated plastic plate, white surface with black letters and permanently fixed to each item by means of adhesive, screws or rivets.

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The Vendor shall provide a certificate of compliance, in which the Vendor certifies that the goods supplied are in compliance with the Order and Contractor's data sheets. In addition, Vendor shall provide specific certificates for the test results.

Package shall be shipped to sites to the location(s), which will be specified by Contractor.

Valves shall be adequately protected, suitable for shipment and storage at site, prior to dispatch from the Supplier's works. All instrument items shall be protected from vibrations and shocks normally expected during handling, loading/unloading and shipment.

The packing shall also be suitable for storage of the instrumentation for up to 6 months in the harsh outdoor environment .The packing shall be adequate to resist the humidity, temperature extremes and corrosion conditions to be expected in the various site locations.

The pressure relief valves and its accessories shall be supplied pre-assembled. Valves shall be supplied as a whole, complete with all the accessories like cap, lifting lever, test gag, etc. All threaded and flanged openings shall be suitably covered to prevent entry of foreign material.

11.0 DOCUMENTATION



The Supplier shall supply documents and drawings in accordance with the dates and quantities identified in the Requisition. Documents shall be provided in hard copy and on CD-ROM. Drawings shall be in AutoCAD format and documents in Microsoft Word, Excel or Access, as appropriate. The Supplier shall identify all deviations and exceptions to the above within his Proposal.

The Supplier shall provide, with his Proposal, adequate documentation to demonstrate that the proposed design satisfies the requirements of this specification and other documentation referred to herein.

Following Order placement, the Supplier shall provide documentation in accordance with the requirements identified in the Requisition.

Following documentation shall be provided by vendor as minimum:

- Technical catalogue. (Model no. of valve and accessories shall be specified in the technical catalogue)
- Sizing calculation sheet and curves
- GA and section drawing
- Instruction maintenance and operation manuals
- Data sheets completer by vendor

|  NISOC | <p>نگهداشت و افزایش تولید میدان نفتی بینک</p> <p>سطح الارض و ابنیه تحت الارض</p> <p>عمومی و مشترک</p> |  | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|------|---------|------------|-----------|-------|--|--|------|-------|----------|------|---------|------------|-----------|-------|-----|------|----|----|-----|-------|-------|----|-----------------------|
| شماره پیمان: 053 - 073 – 9184 | <table><tr><th colspan="8">SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV)</th></tr><tr><th>نسخه</th><th>سریال</th><th>نوع مدرک</th><th>رشته</th><th>تسهیلات</th><th>صادر کننده</th><th>بسته کاری</th><th>پروژه</th></tr><tr><td>D03</td><td>0007</td><td>SP</td><td>IN</td><td>000</td><td>PEDCO</td><td>GNRAL</td><td>BK</td></tr></table> | SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادر کننده | بسته کاری | پروژه | D03 | 0007 | SP | IN | 000 | PEDCO | GNRAL | BK | شماره صفحه : 24 از 25 |
| SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادر کننده | بسته کاری | پروژه | | | | | | | | | | | | | | | | | | | |
| D03 | 0007 | SP | IN | 000 | PEDCO | GNRAL | BK | | | | | | | | | | | | | | | | | | | |

- Test Procedure
- Inspection, test and calibration report
- Required certificates
- QC/QP plan of the manufacturers
- Commissioning and 2-years spare part, etc.



Vendor's drawings shall include following as minimum:

- Flange face to center dimension of the valve.
- Height of the completely assembled valve.
- Weight of the completely assembled valve.
- Cold bench set pressure for the valve to be tested at ambient temperature and atmospheric back pressure.
- The cold test medium to be used for bench test in case it is different from air.
- Horizontal reaction force at center line of valve outlet.
- Relieving capacity of the valve under the same operating conditions.
- Location of external support for vibration in case they are required.
- Any other special mounting requirement.
- Complete valve manufacturer model number.
- EPC Contractor tag number.
- EPC Contractor complete name.
- Purchase order number.
- Valve connection specification including size, ANSI class (rating), facing.
- All dimension tolerances to be specially indicated.
- Orifice size and designation.
- On full nozzle valves whose inlet flange is thicker than that required by ANSI, shall be clearly specified for bolting length purpose.
- Certified Sizing Calculations

12.0 SPARE PARTS AND SPECIAL TOOLS

The VENDOR shall provide lists of recommended spare parts, which shall include the original part numbers with prices for commissioning, start-up and two years operation. All spare parts shall be identified individually.

Spare parts for commissioning and start-up; a qualified and complete list based on PROJECT SPARE PART SUPPLY PROCEDURE (Doc. No. E&D-QC-SP-1).

| | | | | | | | | |
|--|--|-------|----------|------|---------|------------|-----------|---|
|  NISOC | نگهداشت و افزایش تولید میدان نفتی بینک سطح الارض و ابنیه تحت الارض عمومی و مشترک | | | | | | |  |
| شماره پیمان: 053 - 073 – 9184 | SPECIFICATION FOR PRESSURE SAFETY VALVES(PSV) | | | | | | | شماره صفحه : 25 از 25 |
| | نسخه | سریال | نوع مدرک | رشته | تسهیلات | صادر کننده | بسته کاری | |
| | D03 | 0007 | SP | IN | 000 | PEDCO | GNRAL | BK |

Spare parts for two years operation; a qualified and complete list based on PROJECT SPARE PART SUPPLY PROCEDURE (Doc. No. E&D-QC-SP-1).

The VENDOR shall be able to provide spares back up and support for the plant life of at least 20 years.

SPIR form shall be approved by CLINET prior to procurement.

12.1 SPECIAL TOOLS

The Vendor shall provide any special tools required for the satisfactory operation and maintenance of his equipment. A complete list of special tools shall be provided by the Vendor at enquiry stage.

Vendor shall guarantee that he is able to support and supply spare parts for the supplied hardware, software and firmware for at least 15 years from the date of shipment. If the Vendor believes that parts of the system will be withdrawn from sale after 15 years, he shall provide a statement detailing the equipment to be withdrawn, the timing and how updated parts can replace the withdrawn parts.