**Tehnički zadatak za nabavku opreme i pratećih usluga „Coker MOV ON/OFF Valves“**

**«** **Рафинерија нафте Панчево »**

RNP , Blok Prerada

04.07.2016.

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Tehnički zadatak (**Technical Requisition**) za:

Nabavka opreme i pratećih usluga „Coker MOV ON/OFF Valves„

NARUČILAC: NIS-Blok Prerada, Rafinerija Nafte Pančevo,

Direkcija za razvoj i investicije

PREDMET: Nabavka opreme i pratećih usluga

|  |  |  |
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|  | **Table of Contents** |  |
| **Contents** |  | **Page** |
|  |  |  |

[**1.0** **SCOPE 3**](#_Toc452737229)

[**2.0** **REFERENCES 3**](#_Toc452737230)

[**3.0** **DEFINITIONS 3**](#_Toc452737231)

[**4.0** **CODES AND STANDARDS 4**](#_Toc452737232)

[**4.1** **CE MARKING 5**](#_Toc452737233)

[**4.2** **SERBIAN AUTHORITY REQUIREMENTS 5**](#_Toc452737234)

[**4.3** **COMPLIANCE WITH SPECIFICATION 5**](#_Toc452737235)

[**5.0** **ENVIRONMENTAL CONDITIONS 6**](#_Toc452737236)

[**6.0** **GENERAL 6**](#_Toc452737237)

[**7.0** **MATERIALS 6**](#_Toc452737238)

[**8.0** **VALVE DESIGN 6**](#_Toc452737239)

[**8.1** **GENERAL 6**](#_Toc452737240)

[**8.2** **VALVE BODY 7**](#_Toc452737241)

[**8.3** **STUFFING BOX AND PACKING 7**](#_Toc452737242)

[**9.0** **VALVE ACTUATOR DESIGN 7**](#_Toc452737243)

[**10.0** **VALVE ACCESSORIES 8**](#_Toc452737244)

[**10.1** **LOCAL PANELS 8**](#_Toc452737245)

[**11.0** **Marking 9**](#_Toc452737246)

[**11.1** **MANUFACTURER'S IDENTIFICATION PLATE 9**](#_Toc452737247)

[**11.2** **TAG PLATE 9**](#_Toc452737248)

[**12.0** **PAINTING 9**](#_Toc452737249)

[**13.0** **SPECIAL REQUIREMENTS 9**](#_Toc452737250)

[**13.1** **TOXIC SERVICE 9**](#_Toc452737251)

[**13.2** **SOUR SERVICE 9**](#_Toc452737252)

[**13.3** **FIRE SAFE SERVICE 10**](#_Toc452737253)

[**13.4** **EMERGENCY SHUTDOWN (ESD) SERVICE 10**](#_Toc452737254)

[**14.0** **VALVE TESTING 10**](#_Toc452737255)

[**15.0** **FACTORY INSPECTION 10**](#_Toc452737256)

[**16.0** **PACKING 10**](#_Toc452737257)

[**17.0** **SPECIAL TOOLS 10**](#_Toc452737258)

[**18.0** **DOCUMENTS AND DRAWINGS 10**](#_Toc452737259)

[**19.0** **SPARE PARTS 11**](#_Toc452737260)

[**20.0** **SITE INSTALLATION 11**](#_Toc452737261)

[**21.0** **gurantees 11**](#_Toc452737261)

[**22.0** **delivery term 11**](file:///\\spa01fsc01.nis.local\RNP_DP\9-TechDoc\1_BoB\2_BDP-FEED\Long%20Lead%20Items\02_Inquiry%20Requisitions\IR%20for%20Coker%20MOV%20ON-OFF%20Valves%20including%20Switch%20Valve\190687-MR-2531-001.02.DOC#_Toc455041136)

[**23.0** **QUOTATION CONTENT 11**](file:///\\spa01fsc01.nis.local\RNP_DP\9-TechDoc\1_BoB\2_BDP-FEED\Long%20Lead%20Items\02_Inquiry%20Requisitions\IR%20for%20Coker%20MOV%20ON-OFF%20Valves%20including%20Switch%20Valve\190687-MR-2531-001.02.DOC#_Toc455041136)

1. **SCOPE**

This document covers the minimum requirements for supply, design, material selection, fabrication, testing, inspection, packing, shipment and documentation of Coker MOV ON/OFF Valves including accessories and Switch Valve (further referred as ON/OFF Valves).

1. **REFERENCES**

The following documents are referenced herein and form part of the technical requirements. Additional documents are listed in the requisition. Current editions of the referenced documents including   
all mandatory addenda in effect at the time of the order shall apply unless otherwise indicated.

* 190687-60-53-0021 Local Panel – Switch Valve
* 190687-60-53-0022 Local Panel – Quench Valve
* 190687-60-53-0023 Local Panel – Backpressure Valve
* 190687-60-53-0024 Local Panel – Isolation Valve – Type 1
* 190687-60-53-0025 Local Panel – Isolation Valve – Type 2

1. **DEFINITIONS**

The following definitions shall apply throughout this document:

|  |  |
| --- | --- |
| **Term** | **Definition** |
| **Purchaser** | Means NIS a.d., Novi Sad, Serbia. |
| **Contractor** | Means any private or public entity engaged and nominated by the Purchaser to provide technical monitoring and supervision of procurement, design, manufacturing and supply of equipment subject to this Technical Requisition and or entity responsible for Engineering and design, Procurement, Construction and (Pre-) Commissioning of the Project |
| **Vendor** | Means the firm, company or other corporate entity contracted by Purchaser to supply Goods to the Purchaser. |
| **Manufacturer** | Means particular equipment (e.g. compressor, E-motor,…) manufacturer. |
| **Goods** | Means any and ancillary design and engineering services, warranty related services, technical assistance, all items, articles, materials, apparatus, equipment, spare parts, labour or other supplies including but not limited to manuals, operating instructions, reports and all other documents to be supplied or performed by Vendor, as specified, listed, mentioned, scheduled or implied in the Agreement or any revision thereof. |
| **Order** | Means the written Agreement between Vendor and Purchaser which refers to and incorporates these terms and conditions together with any appendices or attachments thereto for supply of the Goods. |
| **Shall** | Wherever the word "shall" has been used, its meaning is to be understood as mandatory. |
| **Should** | Wherever the word "should" has been used, its meaning is to be understood as strongly recommended or advised. |
| **May** | Wherever the wording "may be" has been used, its meaning is  to be understood as a freedom of choice. |
| **Requisition** | Means this document including all documents listed in the List of Attachments. |

1. **CODES AND STANDARDS**

All equipment covered by this requisition shall conform to the latest edition, unless indicated otherwise, for the following Codes and Standards:

|  |  |
| --- | --- |
| API Std 598 | Valve Inspection and Testing |
| API Std 607 | Fire Test for Quarter-turn Valves and Valves Equipped  with Nonmetallic Seats |
| API Spec 6FA | Fire Test for Valves |
| ASME B16.5 | Pipe Flanges and Flanged Fittings |
| ASME B16.34 | Valves – Flanged, Threaded and Welding End |
| ASME B31.3 | Process Piping |
| ASME B46.1 | Surface Texture (Surface Roughness, Waviness and Lay) |
| ASME B1.20.1 | Pipe Threads, General Purpose (Inch) |
| EN 10204 | Metallic Products - Types of Inspection Documents |
| IEC 60079 | Electrical Apparatus for Explosive Gas Atmospheres |
| IEC 60085 | Electrical Insulation – Thermal Evaluation and Designation |
| IEC 60423 | Conduits for Electrical Purposes - Outside Diameters of Conduits for Electrical Installations and Threads for Conduits and Fittings |
| IEC 60529 | Degrees of Protection Provided by Enclosures (IP Code) |
| IEC 61000 | Electromagnetic Compatibility for Industrial Process Measurement and Control |
| IEC 61508 | Functional Safety of Electrical / Electronic / Programmable Electronic Safety Related Systems |
| IEC 61511 | Safety Instrumented Systems for the Process Industry Sector |
| NACE MR 0103 | Standard Material Requirements – Materials Resistant to Sulfide Stress Cracking in Corrosive Petroleum Refining Environments |
| NACE MR 0175-2002 edition | Standard Material Requirements – Materials for Sulfide Stress Cracking and Stress Corrosion Cracking resistance in Sour Oilfield Environments |
| Directive 94/9/EC | Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (ATEX) – applicable to 19-Apr-2016 |
| Directive 2014/34/EU | Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (ATEX) – mandatory from 20-Apr-2016 |
| Directive 97/23/EC | Pressure Equipment Directive – applicable to 19-Jul-2016 |
| Directive 2014/68/EU | Pressure Equipment Directive – mandatory from 20-Jul-2016 |
| Directive 2006/95/EC | Low Voltage Electrical Equipment Directive – applicable  to 19-Apr-2016 |
| Directive 2014/35/EU | Low Voltage Electrical Equipment Directive - mandatory  from 20-Apr-2016 |
| Directive 2004/108/EC | Electromagnetic Compatibility Directive – applicable  to 19-Apr-2016 |
| Directive 2014/30/EU | Electromagnetic Compatibility Directive – mandatory  from 20-Apr-2016 |
| Directive 2006/42/EC | Machinery Directive |
| TA Luft | Technical Instructions on Air Quality Control |
| EN ISO 15848 | Industrial Valves – Measurement, Test and Qualification Procedures for Fugitive Emissions |

When local regulations prevail over this technical description and the codes and standards referred herein, the Manufacturer shall inform the Purchaser/Contractor in writing of any such deviation.

* 1. CE MARKING

All equipment, materials and components shall be CE certified, shall bear CE marking and shall be compliant to applicable EC directives, such as, but not limited to:

* ATEX Directive
* Pressure Equipment Directive (PED)
* Machinery Directive
* Low Voltage Electrical Equipment Directive
* Electromagnetic Compatibility Directive

Manufacturer shall provide EC Declaration of Conformity, which shall state full compliance to the applicable EC Directives and standards.

* 1. SERBIAN AUTHORITY REQUIREMENTS

All equipment shall be in compliance with Serbian legislation and law requirements. Equipment Manufacturer shall deliver all documentation requested by Serbian law to be able to put equipment   
in operation in Serbia.

Vendor shall obtain approval from the Serbian authority having jurisdiction at the location of installation. (Republic of Serbia received status of EU candidate for membership in 2012). And Serbia´s accession negotiation takes place now.

Serbian authority regulations that have to be adhered:

For electrical equipment placed in hazardous area:

1. “PRAVILNIK O OPREMI I ZAŠTITNIM SISTEMIMA NAMENJENIM ZA UPOTREBU U POTENCIALNO EKSPLOZIVNIM ATMOSFERAMA” (Sl. glasnik RS, br. 1/2013) - Serbian rulebook on equipment and protective systems intended for use in potentially explosive atmospheres

For electrical equipment placed outside of hazardous area:

1. “PRAVILNIK O ELEKTRIČNOJ OPREMI NAMENJENOJ ZA UPOTREBU U OKVIRU ODREDENIH GRANICA NAPONA” (Sl.Glasnik RS. br. 13/2010) - Serbian rulebook   
   on electrical equipment designed for use within certain voltage limits
2. “PRAVILNIK O ELEKTROMAGNETSKOJ KOMPATIBILNOSTI” (Sl. Glasnik RS,   
   br. 13/2010) - Serbian rulebook on electromagnetic compatibility

For pressure equipment:

1. “PRAVILNIK O TEHNIČKIM ZAHTEVIMA ZA PROJEKTOVANJE, IZRADU   
   I OCENJIVANJE USAGLAŠENOSTI OPREME POD PRITISKOM” (Sl. Glasnik RS,   
   br. 87/2011) - Serbian rulebook on technical requirements for the design, manufacture   
   and conformity assessment of pressure equipment
2. “PRAVILNIK O PREGLEDIMA OPREME POD PRITISKOM TOKOM VEKA UPOTREBE” (Sl. Glasnik RS, Br. 87/2011, 75/2013) - Serbian rulebook for inspections of pressurized equipment during the operating life

For machinery:

1. “PRAVILNIK O BEZBEDNOSTI MAŠINA” (Sl.Glasnik RS, br. 13/2010) - Serbian rulebook on machinery safety
   1. COMPLIANCE WITH SPECIFICATION

ON/OFF Valves shall be supplied in accordance with all the requirements of this requisition together with the related attachments.

Changes or alternatives shall be only accepted if reviewed by the Purchaser/Contractor, in writing,   
prior to commencement of manufacturing.

Manufacturer shall complete the partially specified data sheets provided by the Purchaser/Contractor with all data related to the proposed / selected devices. Manufacturer shall inform the Purchaser/Contractor of any inconsistency or discrepancy found in this specification and attached data sheets.

1. **ENVIRONMENTAL CONDITIONS**

The supplied equipment shall be suitable for working in an environment as follows:

Temperature: -28 / +50 °C (-20 / +50 °C for electrical parts)

Humidity (relative): 30 / 95 %

Barometric pressure: 1031 mbar

Elevation above sea level: 75.6 m

Hazardous Area: Zone 2, IIA, T3

1. **GENERAL**

It is the responsibility of Manufacturer to ensure that the supplied ON/OFF Valves and accessories meet all requirements of this requisition together with the related attachments. The ON/OFF Valves   
and accessories shall therefore be suitable for the intended process duty and for the environmental   
and hazardous area classification of the installed plant area. ON/OFF Valves shall be designed   
for three (3) years of uninterrupted service.

1. **MATERIALS**

Materials used for the manufacture of pressure equipment must be suitable for such application during the scheduled lifetime, unless replacement is foreseen, as per EU Pressure Equipment Directive (PED 2014/68/EU), Annex I. Essential safety requirements, Section 4. Materials and Section 7. Specific quantitative requirements for certain pressure equipment referred in Section 7.5 Material characteristics.

The above requirements shall be suitable for the lowest scheduled operating temperature -28 °C.

Compliance with the above properties is required to document in Material certificates provided   
by Manufacturer.

EN 10204-3.1 Material certificates of the following valve parts shall be provided by Manufacturer   
as a minimum:

* Valve body / Flanges / Bonnet
* Ball / Stem
* Steam purges
* All pressure retaining bolts and nuts even if not exposed to process fluid

Further valve parts material certificates supply shall be agreed between the Manufacturer and Purchaser/Contractor during the bid clarification phase.

1. **VALVE DESIGN**
   1. GENERAL

The process fluids have the potential to deposit coke on the valve interior surfaces, interior cavities, dead spots and seating surfaces, which can affect both the sealing and operability of the valve.   
The preventative measure is to remove the heavy hydrocarbon from the valve cavity before it has   
the opportunity to change state therefore, valves shall be supplied with steam purge connections.   
The flange rating / material of these purges shall be the same as the valve. Manufacturer shall determine the size and number of such purges and advise Purchaser/Contractor of the steam rates required to keep valves free of coke. Such considerations shall be incorporated into the Manufacturer design/construction of the valves and motor sizing to accommodate requirements of extra torque to overcome any such coke build-ups.

Manufacturer’s specified purge steam rates shall be clearly indicated within the quotation.

Manufacturer’s design data shall contain as minimum the orifice pipe size, required orifice diameter   
and / or purge steam flow rate including requested pressure drop across the orifice. Restriction orifice plates for purge steam will be supplied by others in accordance with design data provided by ON/OFF Valves Manufacturer.

The switching valve has a special design whereby the inlet is the central section with three outlets:   
#1 to Drum A; # 2 to the Bypass; and # 3 to Drum B. The design is such that when switching   
from either position the valve never shuts off the inlet flow, so that the heater charge flow rate is never disturbed.

* 1. VALVE BODY

The body shall be designed in accordance with ASME B16.34 as a minimum.

The body type/size/rating/material shall be as specified in data sheets.

Wetted parts including bonnets, blind heads and extension bonnets, shall not be lower grade material than that of the valve body.

Flange connection (including steam purges) shall be in accordance with ASME B16.5.

Face finish of the RF flanges shall be smooth 125-250 µinch (3.2-6.3 Ra) in accordance   
with ASME B46.1.

The valve leakage class shall be equal or better than indicated in data sheets, metal to metal shut off design shall be used.

Flow direction shall be clearly and permanently indicated on the valve body.

* 1. STUFFING BOX AND PACKING

Packing materials should preferably be graphite-based, metal-reinforced, maximum allowable emissions leakage shall be 500 ppm.

1. **VALVE ACTUATOR DESIGN**

All ON/OFF Valves shall be electrically operated.

For standardization purposes the motor operated actuator should be preferably ROTORK   
and shall be suitable for installation in hazardous area to be installed in.

Manufacturer shall provide the valve and the actuator assembly as a complete working unit.

The actuator shall be equipped with integral electronic logic controls and monitoring facilities unit including position and torque limit switches. Starter should be of solid state, thyristor controlled reversing type. The type of wiring diagram shall be specified by Manufacturer.

Remote operation (monitoring, non-intrusive setting, status, configuration, etc.) should be   
via PROFIBUS-DP/DP-V1 (metallic cable), Manufacturer to advise availability depending on wiring diagram.   
Redundant communication with plant control system is required.

The actuator shall be sized to open or close the valve trough its full stroke at maximum pressure drop as specified in the data sheet.

The limit and torque switches shall be properly adjusted by the Manufacturer.

Actuator enclosure shall be IP 65 or better.

The valve shall be equipped with a permanently attached hand wheel of the automatic declutching type.

Unless otherwise required in valve data sheet, the Actuator shall be equipped as minimum with two independent dry contacts (to make) for indication valve open, two independent dry contacts (to make)   
for indication valve closed, common failure, Remote-Off-Local Switch including local status contact   
and Open-Stop-Close pushbuttons for local operation. The Actuator shall be equipped with terminals for commands valve open, valve close and valve stop. 24 V DC shall be included (inside actuator terminal strips).

Remote-Off-Local Switch shall be pad lockable in any position.

ON/OFF valves shall have an actuator selected with a safety factor with respect to start friction,   
as the friction increases if the valve has remained in one position for a long time.

Actuators shall be equipped with an adjustable travel or position indicator for local status indication. The position shall be indicated by a permanent mark on a reversible scale with the words 'open'   
and 'shut' at the travel limits, or by unambiguous symbols.

Stroking time is the time required to move the valve over the full operational range in response   
to the command signal. For on-off command, which includes safeguarding actions, the stroking time should be taken as the time to travel from 100% (fully open) to 0% (fully closed) valve travel or vice versa.

The stroking time shall be valid for the on-off valve (including its accessories) under all the process conditions. Unless otherwise noted in the data sheet, the maximum stroking time for both directions shall be between 45 to 90 seconds for Switch valve and valves of body size equal or bigger than 16”.

Electrical power supply shall be 3+N+PE 400 V ±5%, 50 Hz, TN-S

1. **VALVE ACCESSORIES**
   1. LOCAL PANELS

Where requested in the data sheets, valve (or valve groups) shall be supplied together with stainless steel panel containing all necessary controls (local switches and indicating lights, etc.) in accordance with attached local panels’ type drawings – see Section 2.0 References. Valve Manufacturer shall verify   
and complete proposed layout details with respect to wiring diagrams depending on each valve function.

The interconnection cabling between the ON/OFF Valves and local panels will be supplied by Others   
in accordance with ON/OFF Valve Manufacturer wiring requirements.

The amount of controls / indicators shall be minimized as far as practicable. Each panel layout shall be agreed between the Manufacturer and Purchaser/Contractor during the bid clarification phase.

The local panels shall be loose supplied.

The local panels shall be of stainless steel design, explosion protection Ex edm in accordance   
with ATEX Directive 2014/34/EU. The panel shall be suitable for wall mounting and shall be fitted   
with external earth screw M8 and breather. Enclosures for electrical components shall be rated IP 65 corrosion resistant in accordance with IEC 60529 as a minimum.

Bolts, nuts and other fittings shall be made of corrosion-resistant material.

The push-buttons shall have hermetically sealed dual contacts (make and break contact sensing). The contact rating shall be 24 V /0.5 A.

All signal lamps shall be LED type. The power supply shall be 24 V DC.

Where specified, all ESD switches shall be of mushroom type, stay-put action, and red colour. The ESD switches shall be equipped with protective covers to prevent accidental initiation.

The required colour of indicators / controls shall be as follows:

Open light - green

Closed light - red

Alarm light - yellow

Trip light - red

Permissive light - blue

Open button - green

Close button - red

Unspecified button/switch - black

Unspecified signal light - white

ESD button - red

The field local panel key switches shall not be used.

The local panel controls shall be completely pre-wired to the terminal row by the Manufacturer. Terminal rows shall be arranged horizontally. The panel shall be fitted with 10% of the spare terminals   
as minimum. All terminals shall be numbered on both sides. The panels shall be fitted with insulated bar for shield drain wire connections. The panel internal wiring shall be bundled and routed   
to ensure smooth panel opening.

All panels shall be equipped with cable glands, intended for the interconnecting cables (cables   
by Others). The cable glands shall be of double compression type, nickel coated brass, and suitable for steel wire braid (SWB) signal cables. Cable glands shall be equipped with shroud. Cable glands shall be selected such that they suit the selected interconnecting cable and are suitable for the area classification concerned, as minimum Ex de / e protection shall be used.

Thread of cable glands shall be ISO metric in accordance with IEC 60423.

All cable entries shall be located on the box bottom. All unused cable entries shall be plugged   
by certified plugs.

The cable glands for Contractor’s control room multi core cables shall be included within the Manufacturer’s scope. The appropriate cable size (inner and outer sheath diameter, SWB diameter) will be specified   
in later design stage by DEC. Manufacturer shall indicate within the quotation latest date of obtaining this information after purchase order requisition effective date.

The local panel shall be equipped with plastic laminated engraved nameplates. The nameplate descriptions shall be bilingual in English and Serbian language, Latin letters. Manufacturer shall manage   
the translations accordingly. The nameplate shall be of black letters / white background, minimum character size 5 mm. Final local panel nameplate descriptions will be specified in later design stage   
by DEC. Manufacturer shall indicate within the quotation latest date of obtaining this information   
after purchase order requisition effective date.

1. **Marking**
   1. MANUFACTURER'S IDENTIFICATION PLATE

The ON/OFF Valves and all accessories shall be provided with permanently fixed 316 SS manufacturer's identification plate showing manufacturer’s standard data and Instrument Tag number and information in accordance with ATEX directive 2014/34/EU.

Valve bodies and flanges shall be marked in accordance with the applicable design code.

* 1. TAG PLATE

In addition to manufacturer’s plate, each ON/OFF valve and accessory shall be provided with stainless steel tag plate showing the instrument tag number, securely attached to the instrument by means   
of a stainless steel wire.

1. **PAINTING**

All carbon-steel or low/intermediate alloy-steel parts not in contact with the medium shall be painted.

Paint shall be in accordance with manufacturer's standard. Paints shall not contain sulphur, lead, zinc, chloride or any harmful metal which causes corrosive attack.

The paint shall be suitable to withstand the design temperature including alternate design conditions   
as indicated in the data sheets.

1. **SPECIAL REQUIREMENTS**

The following special requirements shall apply:

* 1. TOXIC SERVICE

All ON/OFF valves in toxic service shall be considered for special packing or special environmental packing, maximum allowable emissions leakage shall be 500 ppm.

* 1. SOUR SERVICE

If sour service is specified in the data sheet, NACE MR0103 and/or MR0175-2002 edition shall apply   
to the ON/OFF valve. Pressure-retaining bolting (even if not directly exposed to the process fluid) shall comply with NACE standard.

* 1. FIRE SAFE SERVICE

The valve bodies shall be tested in accordance with API 607, 4th edition requirements. Actuator fireproofing is required and shall be applied by Actuator Manufacturer (e.g. Rotork K-Mass   
or equivalent)

* 1. EMERGENCY SHUTDOWN (ESD) SERVICE

Where specified in the data sheet, instruments used in ESD loops shall be certified acc. to IEC 61508 to the specified Safety Integrity Level (SIL).

1. **VALVE TESTING**

All ON/OFF Valves together with associated accessories shall be subject to the following factory checks/tests as a minimum, Inspection certificate shall be provided by the Manufacturer as part   
of the manufacturing documentation:

* Dimensional check
* Hydrostatic test
* Seat leakage test
* Performance and mechanical operation test

Hydrostatic testing is required for all valves in accordance with manufacturer’s standard, but in no case less than that specified in API 598.

Seat leakage class shall be per API 598.

1. **FACTORY INSPECTION**

The factory inspection, by Purchaser/Contractor, is required for all ON/OFF Valves together with all accessories.

Prior to the factory inspection, Manufacturer shall, as a minimum, carry out the factory tests listed in section 14.0 VALVE TESTING to ensure that all equipment fulfills the requirements as stated in this specification.

The inspection shall be carried out as per attached “Scope of Inspection”, document   
no. 190687-MR-2531-001.06.

Functional Test (FAT) by Purchaser/Contractor is required for Switch valve (53HBV-3001), Backpressure control ring valve (53HBV-3003), 3-way HCGO Quench valve (53HBV-3004) and randomly selected two (2) Isolation valves.

1. **PACKING**

Each ON/OFF Valve and related accessories shall be supplied in a suitable packing case(s),   
in accordance with the project “Packing, Marking & Shipping Instructions”, document   
no. 190687-00-PT-LS-00003.

The Purchase Order Number and Tag Number shall be clearly identified on each box, using indestructible labels.

All open connections shall be covered or closed with caps or plugs that will not deteriorate in outdoor storage. Adhesive tapes shall not be used.

1. **SPECIAL TOOLS**

Special tools (if any) needed for start-up and servicing all equipment shall be integral part of delivery.   
If no such tools are needed an appropriate statement shall be included by Manufacturer.

1. **DOCUMENTS AND DRAWINGS**

For each ON/OFF Valve and its accessories the documents and drawings as requested   
in the “SDR – Instrumentation – Coker MOV ON/OFF Valves including Switch Valve”, document   
no. 190687-MR-2531-001.05, shall be supplied.

1. **SPARE PARTS**

The Manufacturer shall propose the minimum extent of ON/OFF Valves and accessories spare parts   
for the installation, pre-commissioning and commissioning.

The Manufacturer shall propose within the quotation as an OPTION list of recommended spare parts for two (2) years operation.

1. **SITE INSTALLATION**

Unless otherwise required by Manufacturer, ON/OFF Valves and loose supplied accessories will be installed by Contractor in accordance with Manufacturer’s project documentation.

**21.0 GUARANTEES**

The Vendor shall guarantee performance of the on/off valves for operation within the specified design conditions for the period stated in purchase order, in accordance with following:

­ Vendor shall repair / replace any defective part or found within the guarantee period 36/48 months (from the unit start up/from the latest delivery date)

**22.0 DELIVERY TERM**

Delivery term for last delivery is required not later than 60 weeks. Vendor shall specify minimal possible date.

23.0 QUOTATION CONTENT

Vendor shall specify in technical part of quotation as a minimum:

* Fully defined scope of supply
* Technical data/specifications and catalogue information
* Filled in Purchaser’s data sheet where required
* Vendor data sheets
* General arrangement drawings
* Sizing calculations
* Utilities consumption (purge steam rates, power consumption)
* ATEX certificates
* SIL certificates
* List of spare parts for the installation, pre-commissioning and commissioning
* List of spare for two (2) years operation (OPTION)
* List of special tools and devices for installation, commissioning and maintenance
* Latest date of obtaining cable size (inner and outer sheath diameter, SWB diameter) after purchase order requisition effective date to specify cable glands for Purchaser’s control room multi core cables
* Latest date of obtaining final local panel nameplate descriptions after purchase order requisition effective date
* Estimated shipping weights and dimensions
* Information about possibilities of regular service for equipment, service centers, field services and response time
* List of Technical exclusions and deviations