
	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 1
Doc. No.: 24KOGO-ER-0471			Rev.: 0



**MATERIAL REQUISITION  
24KOGO-ER-0471**

for

**INSTRUMENTATION CABLES**



**24KOGO / KD-21024 GOHT Optimization**

0	For inquiry	MVAN	LMUS	PSTO	02.10.2025
Rev.	Description	Prepared	Checked	Approved	Date

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 2
Doc. No.: 24KOGO-ER-0471			Rev.: 0

## CONTENT

<b>1. IDENTIFYING DATA.....</b>	<b>3</b>
1.1 Information about the Construction .....	3
<b>2. DEFINITIONS.....</b>	<b>3</b>
<b>3. SCOPE OF SPECIFICATION .....</b>	<b>4</b>
<b>4. SITE ENVIRONMENTAL CONDITIONS .....</b>	<b>4</b>
<b>5. AREA CLASSIFICATION .....</b>	<b>4</b>
<b>6. GENERAL REQUIREMENTS.....</b>	<b>4</b>
6.1 Vendor Experience and Bid requirements .....	4
6.2 Codes, standards and regulations .....	5
6.2.1 General Specification .....	5
6.2.2 Standard Documentation.....	5
6.2.3 Project Specifications .....	5
6.2.4 International Codes .....	5
6.2.5 Order of Priority .....	5
<b>7. DESIGN REQUIREMENTS.....</b>	<b>6</b>
7.1 General.....	6
7.2 Instrumentation Cables Requirements.....	6
7.2.1 General.....	6
7.2.2 Outer sheath color coding .....	7
7.2.3 Instrumentation cables for IS and non-IS loops .....	7
7.2.4 Compensation cables for IS loops .....	7
7.2.5 Supply cables .....	7
7.2.6 General Electric features.....	7
7.2.7 Marking.....	7
7.2.8 Cable drums (reels).....	8
<b>8. SCOPE OF SUPPLY .....</b>	<b>8</b>
8.1 Material requirements.....	8
8.2 Non-material requirements.....	8
8.3 Exclusion .....	8
<b>9. INSPECTION AND TESTING .....</b>	<b>9</b>
9.1 Inspection .....	9
9.2 Testing.....	9
<b>10. DOCUMENTATION AND DRAWINGS .....</b>	<b>10</b>
<b>11. DOCUMENTATION REQUIREMENTS .....</b>	<b>10</b>
<b>12. PREPARATION FOR SHIPMENT .....</b>	<b>10</b>
<b>13. PAINTING .....</b>	<b>10</b>
<b>14. ASSISTANCE .....</b>	<b>10</b>
<b>15. GUARANTEES .....</b>	<b>10</b>
<b>16. TECHNICAL PROPOSAL .....</b>	<b>11</b>
16.1 General.....	11
16.2 List of Documents Included in the Proposal.....	11
<b>17. LIST OF ATTACHMENTS .....</b>	<b>11</b>

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 3
Doc. No.: 24KOGO-ER-0471			Rev.: 0

## 1. IDENTIFYING DATA

### 1.1 INFORMATION ABOUT THE CONSTRUCTION

Project name : KD 21024 GOHT Optimization  
 Site location : ORLEN Unipetrol RPA s.r.o., Refinery in Kralupy nad Vltavou, Czech Republic  
 Municipality : Kralupy nad Vltavou  
 Subject matter of the project : EPC Project

#### Customer identification information

Business name : ORLEN Unipetrol RPA s.r.o.  
 Registered office : Záluží 1, 436 70 Litvínov, Czech Republic  
 Company ID : 27597075  
 Tax ID : CZ27597075

#### Contractor identification information of the project

Business name : ORLEN Projekt Česká republika s.r.o.  
 Registered office : O. Wichterleho 809, Lobeček, 278 01 Kralupy nad Vltavou  
 Company ID : 19252013  
 Tax ID : CZ19252013

## 2. DEFINITIONS

For this specification and for all documents referred in this specification the following definitions are applicable.

#### **Licenser:**

is the party that issues the license. For reactor internals this is Shell Catalysts & Technologies.

#### **Contractor / Purchaser:**

the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Customer may undertake all or part of the duties of the Contractor.

#### **Vendor / Supplier / Manufacturer:**

the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor. The Manufacturer/Supplier is responsible for ensuring compliance to the applicable design code, to local statutory regulations, to the Specification and to requirements on this requisition and attached documents.

#### **Customer / Owner / Principal:**



the party that initiates the project and ultimately pays for it. The Customer may also include an agent or consultant authorized to act for, and on behalf of, the Customer.

Wherever the word “**shall**” has been used, its meaning is to be understood as mandatory requirements.

Wherever the word “**should**” has been used, its meaning is to be understood as recommended or advised.

Wherever the word “**may be**” has been used, its meaning is to be understood as freedom of choice.

Specifications, Requisitions, Instructions, Specification Sheets, Standards, Drawings, and all other pertaining Documents are defined as “**Documents**”.

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 4
Doc. No.: 24KOGO-ER-0471			Rev.: 0

### 3. SCOPE OF SPECIFICATION

The scope of the present specification is to define the minimum requirements for the design, fabrication, inspection, testing, installation, commissioning and the limit of supply of

#### INSTRUMENTATION CABLES

to be installed in: ORLEN Unipetrol RPA s.r.o., Kralupy nad Vltavou refinery, Czech Republic

List of items – see Doc. No. **24KOGO-ER-0472**

This specification defines the minimum requirements for the supply and does not relieve the Vendor of his full responsibility for the design, completion of input data and the reliable operation of the equipment supplied.

### 4. SITE ENVIRONMENTAL CONDITIONS

Maximum ambient temperature	+38,6 °C
Minimum ambient temperature	–32 °C
Winterizing temperature	+5 °C
Design minimum temperature (MDMT)	–29 °C
Site Elevation above sea level	176 m a.s.l.
Relative humidity - Average	74 %
Seismicity – Earthquake load ( $a_{gR}$ - is not taken into account)	N.A.

### 5. AREA CLASSIFICATION

It is the Vendor's responsibility to ensure that all electrical equipment, materials and associated wiring within their supply conform to the requirements for the area in which the equipment is to operate. When operating in a "Hazardous Area" as per IEC 600 79 the Vendor shall ensure that certificates from nationally recognized testing authorities indicating suitability for that zone at the ambient temperature specified are available.

The "Area Classification" will be specified as "Zone 2 IIC T3".

### 6. GENERAL REQUIREMENTS

#### 6.1 VENDOR EXPERIENCE AND BID REQUIREMENTS

Design and construction shall be carried out in accordance with specifications, codes, standards and data sheets, listed in the following chapters. These shall be considered as integral part of this specification, as applicable.



Bidders shall clearly state in their proposal the acceptance of the responsibility for design, fabrication, assembly and testing procedures of the equipment and shall provide mechanical guarantee to cover the design.

Any comment and deviations from the specified design Codes for the components proposed according to Vendor's internal standards shall be clearly evidenced on the Deviation list Form and shall be submitted for the approval of the Purchaser.

Bidder is responsible to check and advise of any component, which he considers a necessary part of the system for proper operation, even if not indicated herein.

Bidder shall offer only equipment of a type similar to that, which has been proven in continuous successful operation in equivalent service conditions.

The equipment will be expected to operate for the life 25 years.

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 5
Doc. No.: 24KOGO-ER-0471			Rev.: 0

## 6.2 CODES, STANDARDS AND REGULATIONS

Materials, design and construction shall be in accordance with the listed codes, standards, specifications drawings and datasheets.

### 6.2.1 General Specification

See this document.

### 6.2.2 Standard Documentation

**24KOGO-ER-0473**

Schedule of required technical documentation

### 6.2.3 Project Specifications

**STD-S-201**

Instrumentation cable single and multi-pair or triad

**STD-S-205**

Instrumentation thermocouple cable

**STD-S-207**

Instrumentation cable 3-wire power low voltage cable

### 6.2.4 International Codes

Equipment and materials covered by this specification shall conform to the requirements of the following codes and standards (latest edition and Addenda), unless indicated otherwise.



[1]	EN 10204	Inspection documents for metallic products
[2]	ČSN EN 13501-6+A1	Fire classification of construction products and building elements - Part 6: Classification using data from reaction to fire tests on power, control and communication cables
[3]	EN 50288-7	Multi-element metallic cables used in analogue and digital communication and control
[4]	EN 50290-2	Communication cables, Insulation and sheathing materials
[5]	IEC 60079-14-2013	Explosive atmospheres — Part 14: Electrical installations design, selection and erection
[6]	IEC 60331	Tests for electric cables under fire conditions – Circuit integrity
[7]	IEC 60332	Tests on electric and optical fiber cables under fire conditions – ALL PARTS
[8]	IEC 60529	Classification of degree of protection provided by enclosures
[9]	IEC 60584-1...3	Thermocouples – All parts
[10]	IEC 60754 Part 1/2	Tests on gases evolved during combustion of material from cables
[11]	IEC 60811	Insulating and sheathing materials of electric cables – all parts
[12]	IEC 61000	Electromagnetic compatibility (EMC)
[13]	IEC 61034 Part 1/2	Measurement of smoke density of cables burning under defined conditions
[14]	UL 1581 Sec. 1200	Sunlight resistance
[15]	EN ISO 9001	Quality management systems – Requirements
[16]	98/79/EEC	CE Marking

### 6.2.5 Order of Priority

The order of priority of the documentation is the following:

- 1 – Contract
- 2 – This specification and relevant attachments as per chapter
- 3 – Codes and standards
- 4 – The Vendor's Bid

In case of conflict between the requirements of this specification and data sheets or related standards and codes the most stringent shall be followed.

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 6
Doc. No.: 24KOGO-ER-0471			Rev.: 0

Any ambiguity, discrepancy or conflict among the applicable documents shall be anyway referred to the Purchaser and the approved solution shall apply.

Compliance of mechanical design, materials, fabrication and testing with laws and codes in force in the country of installation is complete and sole responsibility of the Vendor. Vendor shall obtain at his care and expenses all the necessary approval by local authorities and have the required testing carried out by legally qualified organization and inspection authority specified. Vendor shall check that there is no conflict between the local codes and the order attachments. Should any note of such documents be in conflict with local codes, then the most conservative one shall govern.

## 7. DESIGN REQUIREMENTS

### 7.1 GENERAL

It is the responsibility of the Vendor to ensure that the items meet all the requirements of this specification together with the related attachments and data sheets.

Prototypes shall not be allowed; only a proven design shall be acceptable.

The devices and their accessories shall therefore be suitable for the intended process duty and for the environment of the installed plant area.

The Vendor shall provide the following services:

- Completion of the attachments/accessories where requested;
- Confirmation of the requirements as per this specification and the attached data sheets;
- Inform the Buyer of any irregularities found in this specification and the attached data sheets.

All necessary devices to prevent damages from shipping and erection shall be included.

All electrical instruments and equipment shall comply with listed standards. In case of ambiguity, more rigorous requirement shall be followed.

All electrical equipment and material shall be certified for the applicable gas group and temperature class. Vendor must furnish a valid certificate of approval and any other applicable documentation for each item of hazardous area electrical equipment. These documents must be submitted with the bids.

### 7.2 INSTRUMENTATION CABLES REQUIREMENTS

#### 7.2.1 General

The characteristic features of all cables (materials of all insulations and cores and their properties, test results, colors etc.) should conform to IEC standards and shall be suitable for aboveground installation.

All cables shall be equipped with overall screen and steel-wire braiding (SWB).

Signal wires shall be twisted in pairs.

Multicore cabling should generally be restricted to 5, 10 or 20 pair/triplet size.

The outer sheet of all cables shall be UV resistant according to paragraph 6.2.4.



Where mentioned "FR", the cable shall be flame-retardant in accordance with IEC 60332-1-2 for single-pair (single-triad) cable or IEC 60332-3-24 (Cat C) for multi-pair (multi-triad) cable.

Where mentioned "LS", the cable shall be low-smoke in accordance with IEC 61034, parts 1 and 2.

Outer jacket water absorption should not be more than 1 mg/cm<sup>2</sup> in 10 days at 70 °C according to IEC-60811-402.

The cable profile (square cut) should be circular with maximum deviation from the ideal circle +/- 0,3 mm.

The minimal bending radius should be 8x cable diameter at any ambient temperature and for fixed position – if indicated in datasheet. If not indicated, minimal bend radius shall be 12x outer cable diameter.

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 7
Doc. No.: 24KOGO-ER-0471			Rev.: 0

The cables shall be supplied wound on reels; the ordered length should be in maximum length and always in one continuous piece on a reel. Both ends of any cable on the reel shall be properly sealed against moisture.

Before delivery, each cable shall be tested on reel according to IEC and abovementioned standards. Manufacturer shall provide the Test Protocol for each cable length that shall be supplied with documentation.

### 7.2.2 Outer sheath color coding

**Blue** means color type RAL 5015 and **Black** means color type RAL 9005.

Instrument single and multi-pair cables for IS loops:

**blue**

Instrument single and multi-pair cables for non-IS loops:

**black**

Single and multi-pair compensation cables (TC type Kx) for IS loops:

**green**

Supply cables:

**black**

### 7.2.3 Instrumentation cables for IS and non-IS loops

For technical requirements see project specification data sheet STD-S-201. Values of L, C, L/R for all instrumentation cables for IS loops shall be part of certification and should be verified at shop or final inspection.

### 7.2.4 Compensation cables for IS loops

For technical requirements see project specification data sheet STD-S-205. Values of L, C, L/R for all compensation cables for IS loops shall be part of certification and should be verified at shop or final inspection.

### 7.2.5 Supply cables

For technical requirements see project specification data sheet STD-S-207. Values of L, C, L/R for all supply cables shall be part of certification and should be verified at shop or final inspection.

### 7.2.6 General Electric features

Insulation resistance (20 °C, measured by 500 V DC for 1 min.):

- Of every core conductor towards remaining conductors: 5 GΩ/km as minimum;
- Of every core conductor towards screen: 5 GΩ/km as minimum;
- Of every screen towards screen: 5 GΩ as minimum.

Continuity (measuring method: measurement of electric resistance of conductors):

- It shall be checked that both cores and sheets are not interrupted along the whole length of the cable on reel.

Insulation failure (test voltage: core/core and core/screen at Urms = 2 kV for 1 min):

- No failure of insulation shall occur;
- No failure of outer jacket shall occur.



Cables pairs for intrinsic safety circuits shall have next maximum values for:

- Mutual capacitance 100 nF / km at 0,8 / 1,0 kHz;
- 0,9mH / km at frequency 100 kHz;
- L/R 40 μH/Ohm.

### 7.2.7 Marking

The outer jacket of instrumentation cable shall be embossed with minimum data:

- Name of the manufacturer;
- Cable type by abbreviation letters;
- Number of pairs (triads);
- Cores cross section.

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 8
Doc. No.: 24KOGO-ER-0471			Rev.: 0

Cable drums (reels) shall be marked by waterproof inscription:

- The Vendor's name;
- Year of production;
- Cable type;
- Cable length;
- Total weight of drum with cable;
- Direction of winding.

#### 7.2.8 Cable drums (reels)

Cables shall be supplied drummed in one continuous length.

Cables should be shipped in returnable reels.

Both ends of the cable shall be protected against any mid-European weather conditions.

The reels should be covered with suitable material to provide physical protection during transportation.

### 8. SCOPE OF SUPPLY

The scope of supply shall include but not necessarily be limited to the following items:

#### 8.1 MATERIAL REQUIREMENTS

The Vendor shall supply the cables in quantities as specified in the attachment to this Material Requisition (see chapter 17), including:

- 15% additional spare quantity shall be included for each item (see the attachment);
- Cable drums with marking as mentioned above;
- Preservation of cables with an easily removable prevention (durability for 24 months);
- Transportation packing.

#### 8.2 NON-MATERIAL REQUIREMENTS

The Vendor shall provide:



- Checking, testing and design;
- Manufacture;
- Testing, examination and inspection;
- Czech certificates for the Vendor and proposed production;
- Material certificate (if required);
- Guaranties for mechanical design, material and workmanship;
- Preparation for shipment. After the testing the equipment shall be dried, water residues shall not be tolerated.

#### 8.3 EXCLUSION

Following works and deliveries do not belong to the Vendor's scope of supply:

- Transportation to the site;
- Site erection;
- Insulation, fireproofing.



	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 9
Doc. No.: 24KOGO-ER-0471			Rev.: 0

## 9. INSPECTION AND TESTING

The equipment manufactured will meet normal industry quality standards and shall be free from defects in material or workmanship.

The Vendor will hand over for approval to the Purchaser the Quality Control Plan / Inspection and Test Program to be applied for the construction.

### Shop Inspection and Tests

Inspection and tests in compliance with the specified codes and other tests according to the Vendor's standards will be carried out in the Vendor's or his Sub-Supplier's workshops.

During the fabrication period the equipment can be subject to inspection by the Purchaser's, Owner's and/or Third-Party Inspectors.

The Vendor shall allow free access to inspectors to his factories and supply all information requested as well as make available all copies of internal orders to sub-suppliers.

All expenses for tests are included in the scope of supply.

Purchaser's and Principal's or Third Party inspectors or representative shall have the right to witness any test. Where the Purchaser's and/or Owner's involvement has been added on relevant Inspection Test Plan, Vendor shall give 20 calendar days written notice of every witness or hold point, and confirmation given 96 hours prior to the actual activity.

### 9.1 INSPECTION

The inspection and testing requirements are in addition to manufacturing and fabrication standards of the Vendor.

Mechanical items to be checked against the following:

- Compliance with design drawings and materials used to be in compliance with approved bill of material.
- Check conformity to data sheets, specifications and manufacturer's specifications and vendor drawings.
- Visual inspection for quality of workmanship.

Test and/or material certificates shall be available prior to inspection.

Alloy verification to be provided by means of material certificates.

Inspection on products part of this requisition, resides under the responsibility of the Vendor.

The Contractor inspection shall be limited to monitoring the Vendor by means of random inspection and auditing of the QA/QC system. In case the inspection of the Vendor is deemed not sufficiently, the Contractor will impose corrective actions. In this case the Contractor reserves the right to perform inspections at the production facilities.



### 9.2 TESTING

The cable shall be fully pre-tested prior to shipment to demonstrate that the equipment performs as specified.

The Vendor's test documentation is required for review.

The following certification is required:

- Factory test certificates;
- Certificate of conformance.

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 10
Doc. No.: 24KOGO-ER-0471			Rev.: 0

## 10. DOCUMENTATION AND DRAWINGS

The Vendor shall provide complete set of the documentation as minimum specified in the document:

- 24KOGO-ER-0473 – Schedule of required technical documentation.

**Final set of the documents must be sorted and numbered according to the Client's standard – see commercial part of the inquiry.**

## 11. DOCUMENTATION REQUIREMENTS

Official language – English language.

Operating and maintenance manual – Czech language.

Number of final paper copies – 2x.

Number of electronic copies – 2x USB (editable + PDF version for project documentation, PDF version for the manufacturer documentation). Content shall exactly correspond to printed form.

Editable documents:

Text:	*.doc(x) – MS Word
Table:	*.xls(x) – MS Excel
2D Drawing:	*.dwg / *.dxf – AutoCAD
Photo documentation:	*.jpg

Document format according to ISO 5457 standard. Standard format for text document A4 size, for drawing max A0 size Binder A4, white, 4-“D ring” mechanism.

Final documents must be sorted and numbered according to Client standard – see commercial part of the inquiry.

## 12. PREPARATION FOR SHIPMENT

For packing and shipping requirements see commercial part of the inquiry.

## 13. PAINTING



Manufacturing painting standard suitable for specified conditions and long term corrosion protection (20 years) will be applied, if painting is applicable.

## 14. ASSISTANCE

The Vendor shall confirm as an OPTION his availability of possible assistance for equipment erection, commissioning and start-up. The Vendor shall provide site supervision for construction, commissioning and start-up according to agreed per-day rates – IF ASKED. The Vendor's supervisor shall bring with him to the site its own printed copy of the documentation.

## 15. GUARANTEES

The Supplier shall provide performance and mechanical guarantees for supplied goods. Guarantee period shall be 24 months after equipment hot commissioning and 36 months after the shipment maximum.

	Job No. <b>24KOGO</b>	Customer <b>ORLEN Unipetrol RPA s.r.o.</b>	
	Project Name <b>KD-21024_Optimalizace GOHT</b>		
Plant Location <b>Kralupy nad Vltavou, Česká republika</b>			Page 11
Doc. No.: 24KOGO-ER-0471			Rev.: 0

## 16. TECHNICAL PROPOSAL

### 16.1 GENERAL

The bid shall be prepared in accordance with this Material Requisition documents and sent/distributed as required by the Purchaser.

### 16.2 LIST OF DOCUMENTS INCLUDED IN THE PROPOSAL

The Vendor's / Bidder's quotation shall contain as minimum:

- Short technical description;
- Specification of goods and services;
- Specification of OPTIONS (if any);
- General arrangement drawings (typical);
- Specification catalogue (or internet links);
- List of recommended pre-commissioning spares;
- List of the Vendor's documentation to be provided with the delivery;
- Deviation list (if any deviation provided);
- Guarantee of completeness spare parts in scope of the delivery.
- 

## 17. LIST OF ATTACHMENTS

Document Number	Description	Pages
1. 24KOGO-EL-0471	List of documents – Revision list	1
2. 24KOGO-ER-0472	List of items – Instrumentation cables	1
3. 24KOGO-ER-0473	Schedule of required technical documentation	1
4. STD-S-201	Instrumentation cable single and multi-pair or triad	1
5. STD-S-205	Instrumentation thermocouple cable	1
6. STD-S-207	Instrumentation cable 3-wire power low voltage cable	1
7. 24KOGO-ER-0474	Deviation list	1