



**KPO TECHNICAL WEBINAR ON INSTRUMENTATION
WITH THE PARTICIPATION OF THE IMB CENTER
KARACHAGANAK PETROLEUM OPERATING B.V**

07/10/2024

DISCLAIMER

The information contained in these slides is made available for consideration. It represents KPO's preliminary description of the company's demands as presently envisaged, but KPO reserves the right to change this information in the course of planning and implementing the projects, and KPO cannot be held responsible for any loss, damage or expense arising from reliance on this information. The information will not form part of any agreement between KPO and contractors participating in the workshop.

Today's engagement is one of many steps which KPO and its stakeholders are taking to develop local content.

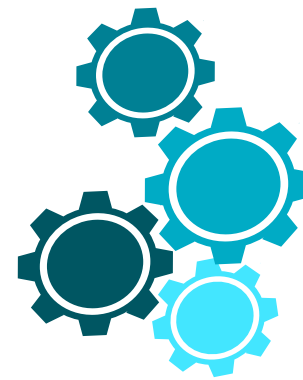
INSTRUMENTATION - AGENDA

A – Project Execution Department

- Overview
- Instrument Requirements
- Types
- Packaged Instrument
- KPO Previously Used Instruments and Forecasts

B - Operations Field Department

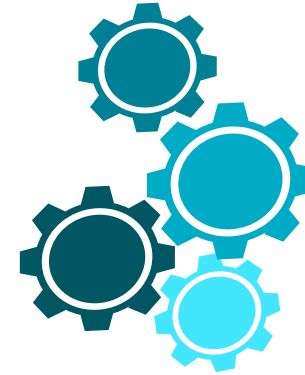
- Technical characteristics:
- Planned forecast for the consumption of Instrumentation materials



**Engineering and
Technical Authority**



Section A Instrumentation



1

Overview

Technical Workshop on Instrumentation
world class expertise – world class asset

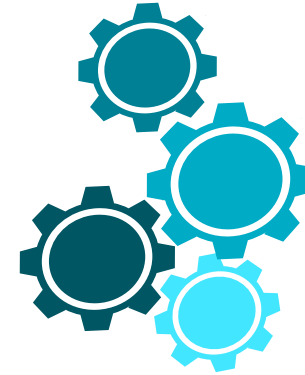
Instrumentation Overview

Objective:

The goal of this presentation is to provide a clear understanding of the instrument requirements used in KPO. We will explore instruments types, material requirements and the KPO specific and international standards of KPO.



Section A Instrumentation



2

Instrument Requirement

Technical Workshop on Instrumentation
world class expertise – world class asset

Specifications overview

All instrumentation shall be in accordance with the latest version of national (RoK) and international laws, legislation and regulations, and shall comply with KPO specifications and standards and applicable international codes and standards.

The following international standards ASME/ANSI, API, CUTR, IEC, ISA, ISO etc. are used by KPO.

S/N	Document Number	Title
1	KPO-00-INS-SPC-00009	General Instrumentation Specification
2	KPO-00-ENG-SPC-00033	Specification for Power and Control, Instrumentation and Telecommunication Cable
3	KPO-00-INS-STD-00012	Schedule of Standard Cable Types
4	KPO-00-INS-STD-00019	Schedule of standard cable Glands and accessories
5	KPO-00-INS-SPC-00018	Instrument Specification for Junction Boxes
6	KPO-00-INS-STD-00024	Instrument Installation – Standard Hook Ups

Instrument requirements

General Requirements

- Ambient Temperature: -40/+50 Deg C / +22-30 Deg C
- Mixture of intrinsically safe (Exi), explosion proof (Exd) and improved protection (Exe)
- Ingress protection: IP65/IP44
- Smart type 'HART'
- Accuracy
- 20 years lifecycle/ Spare parts support
- Min. flange rating 300#

Material Requirements:

In-line field instruments with wetted parts in contact with fluids containing H₂S shall align with KPO sour specifications and be NACE ISO 15156/MR0175 standards certified. **Wetted parts for sour service, shall be INC 625 or C276.**

- Measuring instrumentation housing/body (non contact items) is SS316 as a minimum.
- Items shall conform to the related instrument datasheets

Certification:

- All Measuring Instruments shall have Pattern approval Certificate - Metrology Certificate from the Committee of Technical Regulation of the Ministry of Industry and New Technologies of the Republic of Kazakhstan (be in RoK Metrology register).
- All field mounted instrument and control equipment shall be certified to comply with the technical regulations of the Eurasian Economic Union (EAC CU TR)
- SIL2 requirements for safety instruments



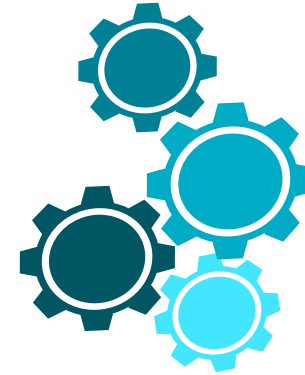
Installation details

All taper threads shall be in accordance with ANSI B1.20.1 (NPT). For connections to vessels or standpipes. Refer following table for guide to sizes and types of instrument connections.

Instrument Devices	Vessel or Tank min 300#	Piping Screw Spec	Piping Flange	First Block Valve	Instrument Connection	Vent & Drain Instrument Connection	Remark/Notes
Flow Instruments							
Flow DP Cells	-----	½" NPT	½"	½" to Pipe Spec	½" NPT	½" NPT	
DP Cells with remote chemical seals	2" Flange	2" Flange	2" Flange	2" Flange	-----	-----	May require 3" seals for low DP ranges
Variable Area Meter	-----	Line Size	Line Size	-----	-----	-----	To Piping Specification
Averaging Pitot	-----	3"	3"	3" see note	-----	-----	When hot tap is used, use full sized ball valve
Flow Glasses	-----	Line Size	Line Size	-----	-----	-----	To Piping Specification
Level Instruments							
Stand Pipes	2" Flanged	-----	-----	2" Flanged	See individual instrument	*	Standpipe vent and drain by piping
External Displacers	2" Flanged	-----	-----	2" Flanged	2" Flanged	*	
Internal Displacers	4" Flanged	-----	-----	-----	4" Flanged	-----	
External Ball Floats	2" Flanged	-----	-----	1" to Pipe Spec	1" Flanged	*	
Internal Ball Floats	4" Flanged	-----	-----	-----	4" Flanged	-----	
Gauge Glasses	2" Flanged	-----	-----	1" to Pipe Spec	1" Flanged	*	
Magnetic Follower Level Gauges	2" Flanged	-----	-----	2" Flanged	2" Flanged	*	
DP Cells for Level	3" Flange	-----	-----	¾" to Pipe Spec*	½" NPT	*	* Except where 1" to pipe specification
DP Cells with remote chemical Seals or Electronic Remote Sensors	3" Flange	-----	-----	3" Flange	3" Flange	-----	
Guided Wave Radar	4" Flange	-----	-----	-----	4" Flange	-----	
Pressure Instruments							
Pressure Gauges	2" Flange	½" NPT*	¾"	¾" to Pipe Spec*	½" NPT	½" NPT	* Except where 1" or 2" to Pipe Specification
Transmitters	2" Flange	½" NPT*	¾"	¾" to Pipe Spec*	½" NPT	½" NPT	* Except where 1" or 2" to Pipe Specification
DP Cells	2" Flange	½" NPT*	¾"	¾" to Pipe Spec*	½" NPT	½" NPT	* Except where 1" or 2" to Pipe Specification
Press Inst's with remote Chemical Seals	2" Flange	2" Flange	2" Flange	2" Flange	2" Flange	-----	
Miscellaneous Instruments							Not applicable for API
Thermowells	2" Flange	-	2" Flange	-----	Supplier Standard	-----	
Analysers	2" Flange	-	2" Flange	-----	Supplier Standard	Supplier Standard	



Section A Instrumentation



3

Types

Technical Workshop on Instrumentation
world class expertise – world class asset

Instrument types

Flow Measurements

The method of flow metering for control and measurement shall be based on Magnetic, Coriolis, Ultrasonic and differential pressure measurement across orifice plates, in accordance with ISO 5167.

Pressure Measurements

- Pressure gauges for general applications shall be minimum 150mm in diameter
- All gauges shall be full safety pattern fitted with shatterproof safety glass.

Temperature Measurements

- Transmitters are RTDs /Thermocouples and Gauge is bi-metallic
- Sensing elements shall be installed in thermowells. Thermowells shall be solid drilled and tapered.
- The wake frequency, where calculated shall be to ASME Performance Test Code 19.3. Thermowells with helical strakes/Scruton shall be considered as the first choice for critical process conditions.

Level Measurements

- Magnetic Level gauges
- Guided Wave Radar/Radar
- Displacer
- Differential pressure
- Ultrasonic



Packaged Instruments and accessories

The manufacturing of packaged instrument equipment's i.e. Remote telemetry Units, Wellhead control panels, system panels etc. includes engineering and design, supply, installation/wiring, testing, certification, FAT/SAT.

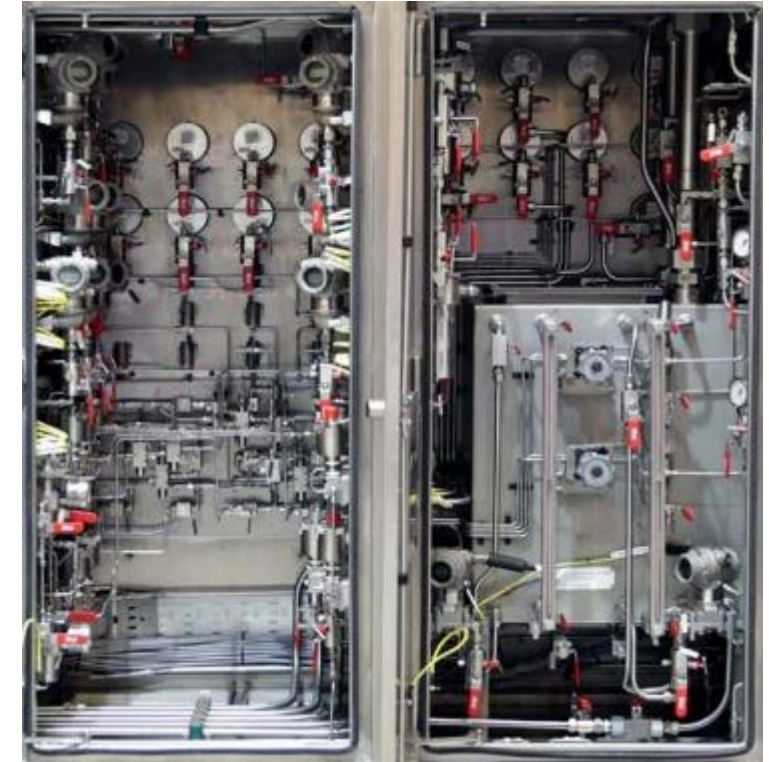
These type of packaged equipment's as example consist wiring, cabling, tubing, fittings, glands, terminal blocks, instruments, control logic, IO blocks etc.

Instruments accessories manufacture:

- Tubing/fittings: Parker A-lok metric
- Glands: CMP
- Cables/wiring: IEC standard
- Terminals: Weidmuller
- Panels: 'Rittal' and similiar
- Junction box: EAC certified
- Cable trays: hot dip galvanised/1.5 thickness etc.



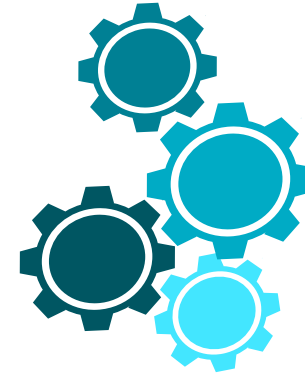
RTU/PLC



WHCP



Section A Instrumentation



4

Instrument Frequently Used and Forecast

Technical Workshop on Instrumentation
world class expertise – world class asset

Instrument – Documents TBE

Typical document requirement during the bid phase exchange between PED Eng. department and C&P department.

Attachment 1									
ITT					Company Quote: XXXXX Rev: XXXXX Dated: XXXXX Delivery: XXXXX				
TE Performed By:									
C&P Buyer:									
Date:									
KPO Scope of Supply (Development, Instrumentation)									
PR	Q1	Stock number	Description	Proposal	Technical Certification Tender Clarification 01	Vendor Reply Tender Clarification 01	TE Result		
KPO-00-INS-SPC-00009 - "General Instrument Specification"									
General	1	EA	GAUGE, PRESSURE, CONNECTION SIZE 2 IN, FLANGED, FLANGE RATING 2500# CASE MATERIAL SS316, IP65, IN ACCORDANCE WITH DATA SHEET						
	1		Tag No.						
	2		P&ID No.						
	3		Line / Vessel Number						
	4		Line / Vessel Size / Schedule						
	5		Service						
	6		Piping Class						
	7		EMC Standard	IEC 61000 (Parts 1 to 6)					
	8		Area classification	Zone 1, Group I B, T1 min.					
	9		NACE Certification	MR0175 / ISO 15156					
Process	10		Fluid / State						
	11		Operating Temperature						
	12		Operating Pressure						
	13		Density @ Operating Temp.						
	14		Viscosity @ Operating Temp.						
	15		Design Pressure						
	16		Design Temperature						
	17		Instrument Type	Diaphragm Seal Pressure Gauge (Flange mounted)					
	18		Scale Range	0-160 barg					
	19		Range Interval	As per BS EN 837					
Gauge	20		Minor Graduation / Zero Adjustment	VTA / Required					
	21		Mounting / Bracket Material	Direct, integral diaphragm seal					
	22		Dial Size	100					
	23		Dial Color	White Dial with Black Numbers					
	24		Case Material / Case Protection	SS 316 / IP65					
	25		Ring Construction / Ring Material	Bayonet Type / AISI 316L SS					
	26		Blow-Out Protection	Required, Rear					
	27		Window Glass	Shatterproof Safety Glass / Tempered Glass / Glycerol					
	28		Pressure Element Type	Bourdon Type					
	29		Socket Material	SS316L					
Thermowell	30		Connection Size	2" NPT (150 mm)					
	31		Connection Location	Bottom					
	32		Movement Material	AISI 316L SS					
	33		Over Pressure Limit	1.3 x PSV					
	34		Nominal Accuracy	± 1% FSD					
	35		Process Connection	Flange 2"					
	36		Diaphragm Seal Type	Integral Flanged Diaphragm					
	37		Flange Rating / Flange Finishing	2500# RTJ, as per ASME B16.5 / 43 AARH					
	38		Welded Part Mtr. / Flange Material	Inconel 625					
	39		Capillary Material / Capillary Type	HA					
Options	40		Capillary Length	HA					
	41		Capillary Fill Fluid	VTA					
	42		Allowable Temperature for Fill Fluid	-45 to +150 °C					
	43		Flushing Ring / Flushing Connect.	1" NPT x 1/2" NPT with welded 1/2" NPT ball valve and outlet suitably plugged					
	44		Flushing Ring / Gasket Material	Inconel 625 / Oval Ring Soft Iron R26					
	45		Quantity	6					
	46		Manufacture	VTA					
	47		Model	VTA					
	1		AC01	Packing Export & Packing & Protection					
	7		AC06	Certification/Documentation The following Certificates and Documentation shall be supplied for the GOODS: MIL - Position / Document Schedule (EN)					
8		AC03	Testing To accommodate sample pressure testing at the KPO facilities, vendor shall provide						
9		AC02	Tagging & Marking SS Tag Plate with 6 mm letters fastened to						
10			Compliance All materials shall be supplied in full compliance with the latest edition of relevant international industry standards / specifications/ codes referenced per Request for						
11			Inspection						
12			Spare Parts List Spare Parts and Interchangeability List (SPIL) - 2 years' Operating Spares. (As per requirement of customer, Interchangeability List (SPIL) shall be provided for the						

KARACHAGANAK PETROLEUM OPERATING B.V

Instrument – Documents TBE

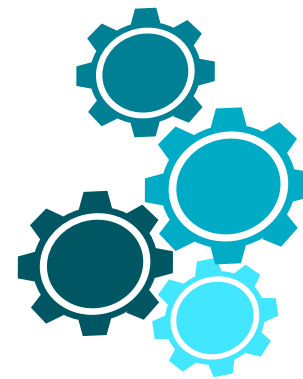
Typical document requirement during the bid phase exchange between PED Eng. department and C&P department.

With BID:

- Preliminary General Arrangement
- Sizing Calculations (WFC (thermowells stress analysis), Flow orifice etc)
- Marked manufacture catalogues and datasheets

For Manufacturing:

- Fabrication Schedule
- Instrument datasheet
- General Arrangement
- Sizing Calculations
- Instrument schedule (I/O list) - PKG
- Electrical Single line diagram/schematic – PKG
- PID - PKG



Operations Field



Instrumentation materials

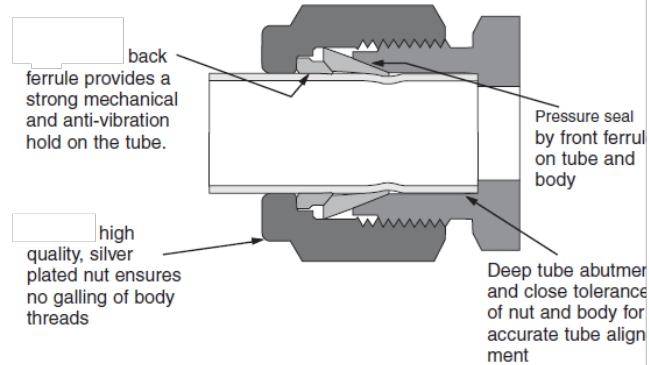
3

Review of Instrumentation materials

Instrumentation Fittings

Instrumentation fittings with the **A-Lok system** refer to a specific type of tube fittings designed for secure and leak-free connections in instrumentation, control, and process systems. These fittings provide high-quality sealing with minimal maintenance, ensuring reliable performance in critical systems like instrumentation, pneumatic, and hydraulic applications. A-Lok fittings are used in tubing systems for instrumentation, process control, and analytical applications, especially where high precision and safety are essential. This includes use in measuring devices, control systems, and fluid transmission lines.

Inch — A-LOK®



Tube End Dimensional Data

SIZE NO.	INCHES					
	TUBE O.D.	STRAIGHT THREAD	±C	H HEX	E DIA.	±D TUBE INS. DEPTH
1	1/16	10-32	.43	5/16	.052	.34
2	1/8	5/16-20	.60	7/16	.093	.50
3	3/16	3/8-20	.64	1/2	.125	.54
4	1/4	7/16-20	.70	9/16	.187	.60
5	5/16	1/2-20	.73	5/8	.250	.64
6	3/8	9/16-20	.76	11/16	.281	.67
8	1/2	3/4-20	.87	7/8	.406	.90
10	5/8	7/8-20	.87	1	.500	.96
12	3/4	1-20	.87	1-1/8	.625	.96
14	7/8	1-1/8-20	.87	1-1/4	.750	1.03
16	1	1-5/16-20	1.05	1-1/2	.875	1.24
20	1-1/4	1-5/8-20	1.52	1-7/8	1.09	1.61
24	1-1/2	1-15/16-20	1.77	2-1/4	1.34	1.96
32	2	2-5/8-20	2.47	2-3/4	1.81	2.65

Typical Raw Material Specifications

BASIC FITTING MATERIAL	BAR STOCK	FORGING	COMMON TUBING SPECIFICATION
Stainless Steel (Type 316) ⁽¹⁾	ASME-SA-479 Type 316-SS BS970 316-S31 DIN 4401 ASTM A276 Type 316	ASME-SA-182 316 BS970 316-S31 DIN 4401	ASME-SA-213 ASTM-A-213 ASTM-A-249 ASTM-A-269 ⁽³⁾ MIL T-8504 MIL T-8506
Hastelloy® C-276	ASTM-B-574 ASTMB575	ASTM-B-574	ASTM-B-622 ASTM-B-626
Inconel® Alloy 600	ASTM B-166 ASME-SB-166	ASTM-B-564	ASTM-B-163
Inconel® Alloy 625	BS3076 NA16 ASTMB425	BS3076 NA16 ASTMB425	ASTM-B-625 ASTM-B-444 ASTM-B-423 ASTM-B-829
Incoloy® Alloy 825			

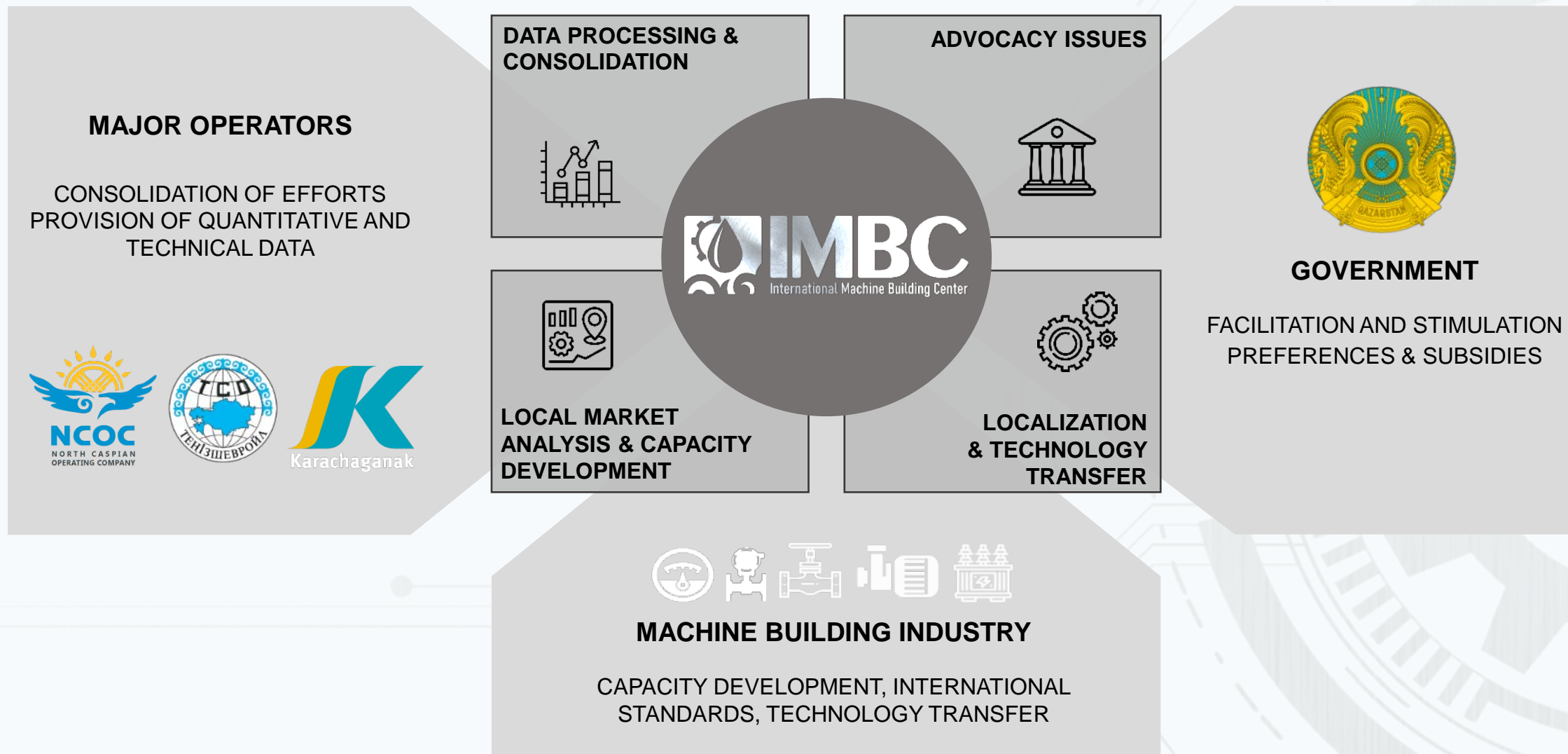




OVERVIEW OF IMB CENTER'S ACTIVITIES

KPO TECHNICAL WEBINAR ON INSTRUMENTATION





In our analyses of demands and identifying localization priorities, we utilize the FPAL coding system

FPAL Commodity Codes

1.01
Drilling Equipment

1.02
Material and Product Handling Equipment

2.99
Other Products / Equipment and Materials

Commodity Group A

1.09
Electrical Equipment and Materials

1.10
Instrumentation / Process Control Equipment / Materials

2.02
Valves and Accessories

Commodity Group B

1.04
Pumps and Seals

1.11
Process Filters

1.12
HVAC

2.01
Line pipe

Commodity Group C

1.02
Material and Product Handling Equipment

1.07
Heat Exchangers / Heat Transfer Equipment

1.16
Firefighting Equipment

2.07
Chemical / Oils / Paints

2.08
Insulation / Refractory Materials

Commodity Group D

1.03
Compressors / Expanders / Blowers and Accessories

1.05
Drivers and Accessories

2.03
Steel / Metal Materials

2.11
Workshop and Handtools

Procurement in above commodity groups accounts for **over 75% of all procurement of goods** by three Operators **



Commodity Group A



Commodity Group B



Commodity Group C



Commodity Group D

Demands analysis	35,000 items analysed	55,000 items analysed	7,000 items analysed	TBC
High demand goods identified	19 types of goods	18 types of goods	27 types of goods	TBC
Market analysis, longlist from available resources	more than 90 manufacturers identified	more than 100 manufacturers identified	more than 80 manufacturers identified	TBC
Site surveys, manufacturers who expressed interest	72 site surveys conducted	61 site surveys conducted	41 site surveys conducted	TBC
Shortlisting, manufacturers producing types of goods with high demands	23 manufacturers shortlisted	16 manufacturers shortlisted	In process	TBC
Capacity development	8 CDPs developed	3 CDPs developed	TBC	TBC
Implementation of capacity development	3 recommended manufacturers	2 recommended manufacturers	TBC	TBC

Recommendations to Operators

INSTRUMENTATION



Instrument
Tubing and
Fittings
34,793 ea,pk



Temperature
instruments
16,743 ea



Pressure
instruments
19,849 ea



Level
instruments
2,761 ea



technicalsupport@imbc.kz



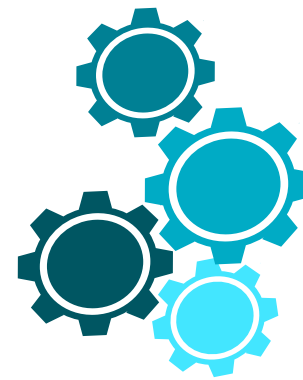
+ 7 (7172) 39-99-66



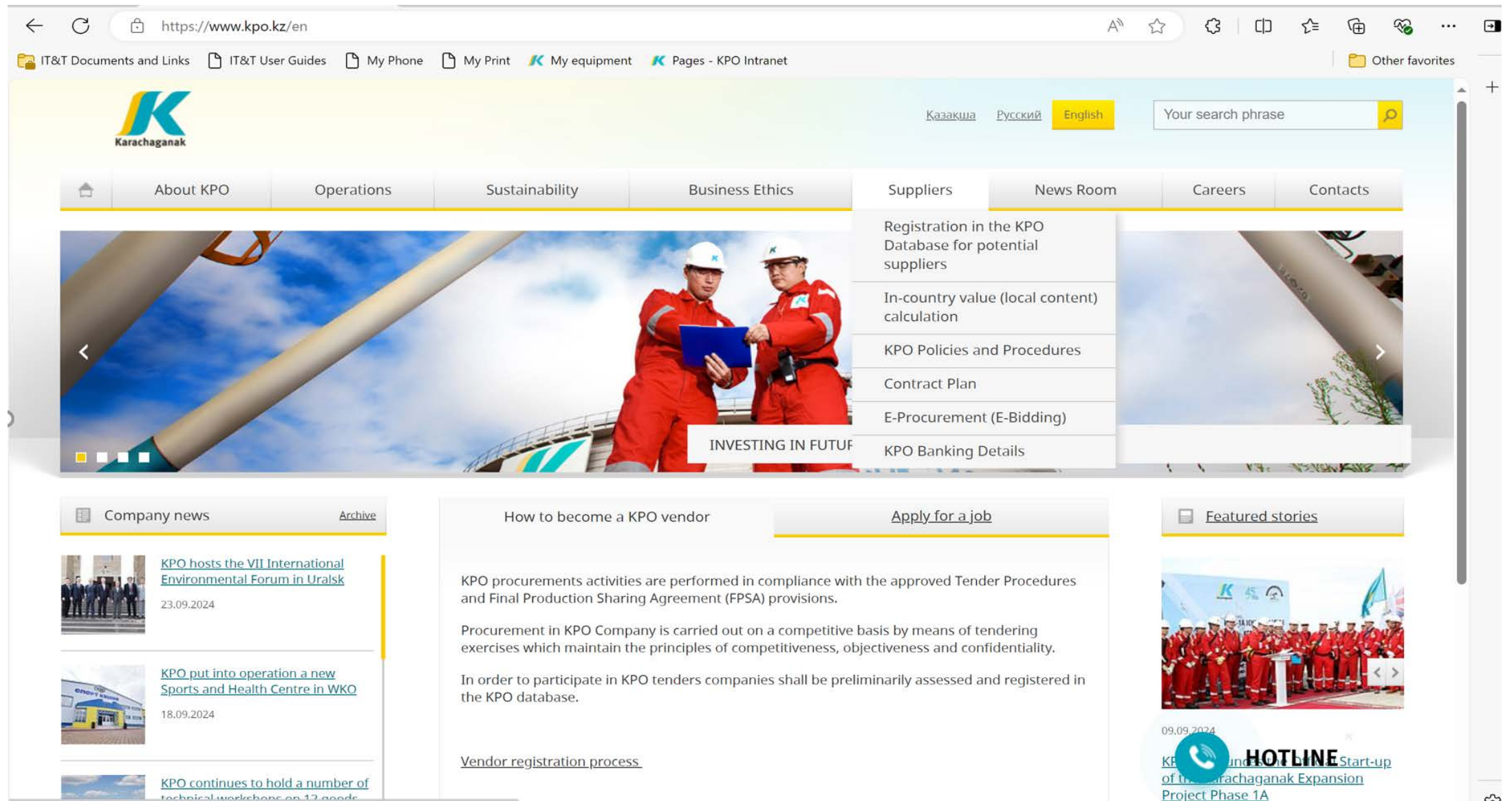
www.imbc.kz

The range and specificity of services for assistance in the development of the potential of manufacturers, offered by IMBC, are limited and are subject to provision on an individual basis, depending on the readiness of the manufacturer to supply their manufactured goods in line with the requirements of the Operators.

Assistance from IMBC does not oblige any retaliatory action from the potential manufacturer. The services of IMBC do not represent a guarantee of the successful participation and / or successful award of Contracts to the manufacturer in the procurement processes of the Operators.



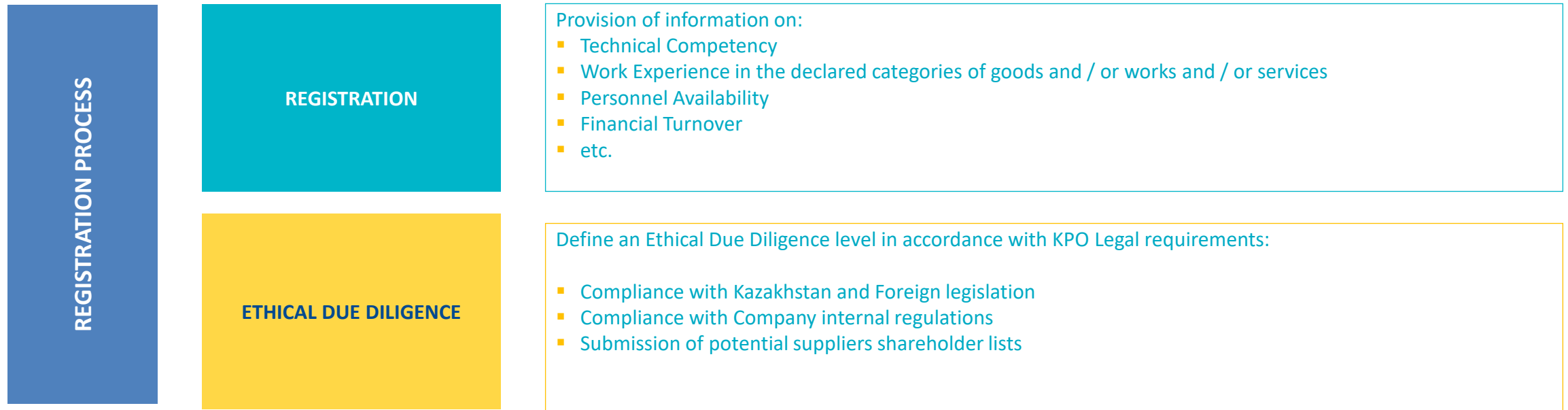
**KPO Supplier
Database**



The screenshot shows the KPO Suppliers Database website. The browser address bar displays <https://www.kpo.kz/en>. The website header includes the Karachaganak logo, language selection (Kazakh, Russian, English), and a search bar. The main navigation menu features links to About KPO, Operations, Sustainability, Business Ethics, Suppliers, News Room, Careers, and Contacts. The Suppliers dropdown menu lists: Registration in the KPO Database for potential suppliers, In-country value (local content) calculation, KPO Policies and Procedures, Contract Plan, E-Procurement (E-Bidding), and KPO Banking Details. The main banner image shows two workers in red uniforms and hard hats reviewing a tablet, with the text "INVESTING IN FUTURE". Below the banner, the "Company news" section lists three articles: "KPO hosts the VII International Environmental Forum in Uralsk" (23.09.2024), "KPO put into operation a new Sports and Health Centre in WKO" (18.09.2024), and "KPO continues to hold a number of technical workshops on 12 goods". The "How to become a KPO vendor" section explains the procurement process and provides a link to the "Vendor registration process". The "Apply for a job" section is also visible. The "Featured stories" section shows a group photo of workers and a "HOTLINE" for the start-up of the Karachaganak Expansion Project Phase 1A.

VENDOR REGISTRATION

All potential suppliers shall be registered in KPO Database



Vendor registration in KPO Vendor Database does not guarantee the participation in a tender or contract award, but suggests that a registered company may be considered as a market research participant for provision of goods, works and services for further pre-qualification process or tender as the need arises.

VENDOR REGISTRATION

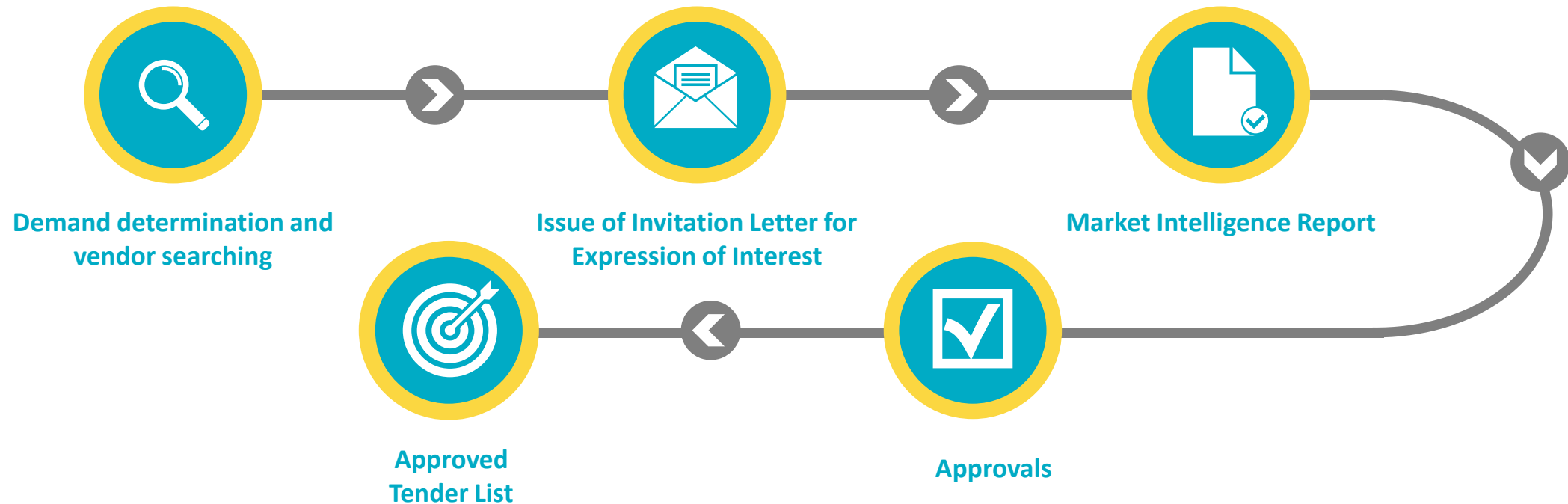
- To register in KPO Vendor Database, potential suppliers shall:
 - Download a questionnaire on KPO website – <https://kpo.kz/ru/postavshchikam/registracija-v-baze-dannykh-postavshchikov-kpo>
 - Fill in the questionnaire for the preliminary vendor assessment and indicate activity codes
 - Attach copies of required documents
 - Submit the completed pack of documents for vendor assessment and registration by e-mail at MIVQ@kpo.kz
 - Contact phone: +7 (711336) ext. 4943, 4946, 2192
- KPO encourages Suppliers to update registration data on an ongoing basis, related to:
 - Work Experience in the declared categories of goods, works, services
 - Certification, accreditation
 - Reorganization
 - Contact persons

MARKET RESEARCH

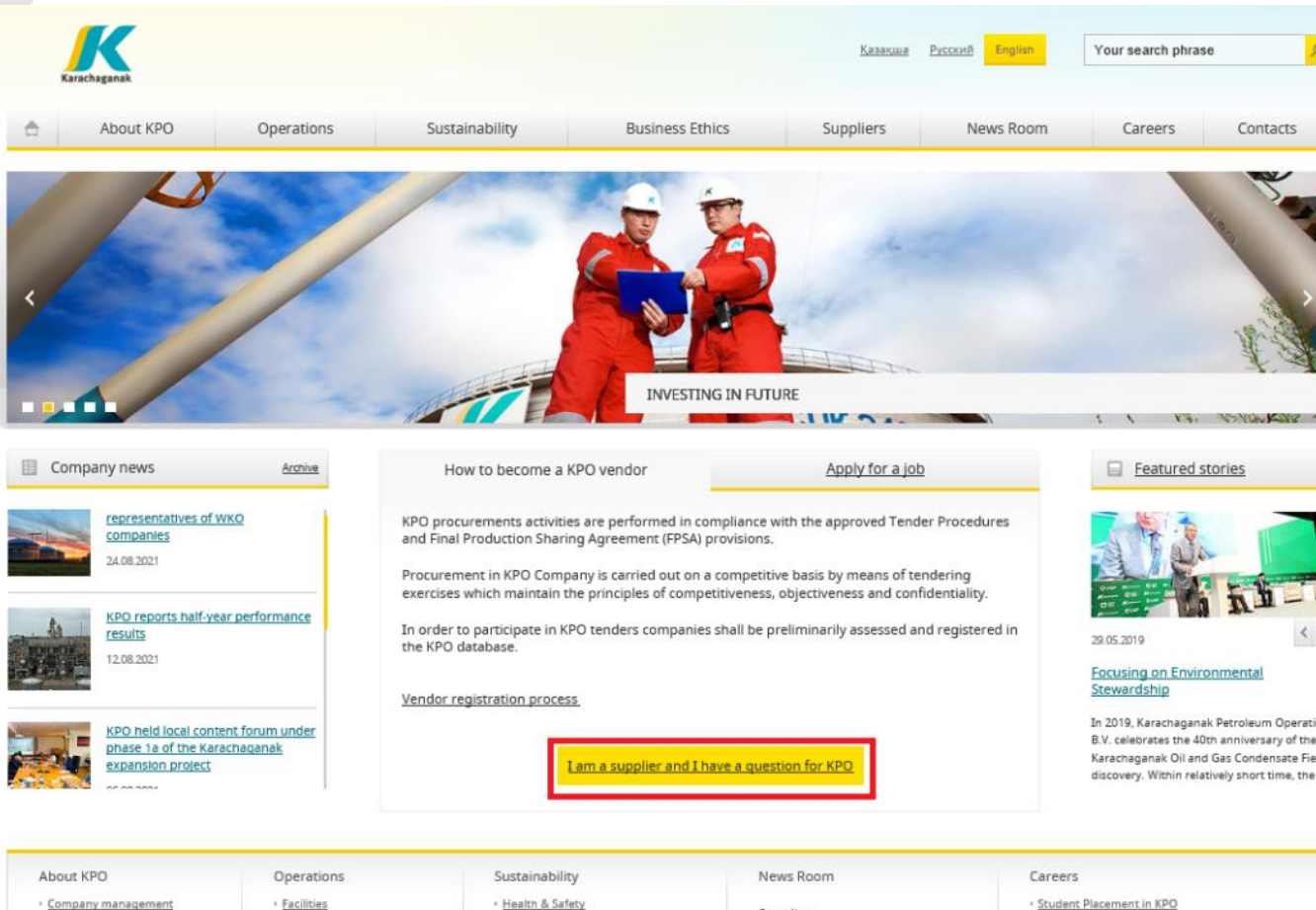
Purpose

- Define potential suppliers of goods, works, services who can perform as per KPO requirements
- Ensure free competition for KPO tenders

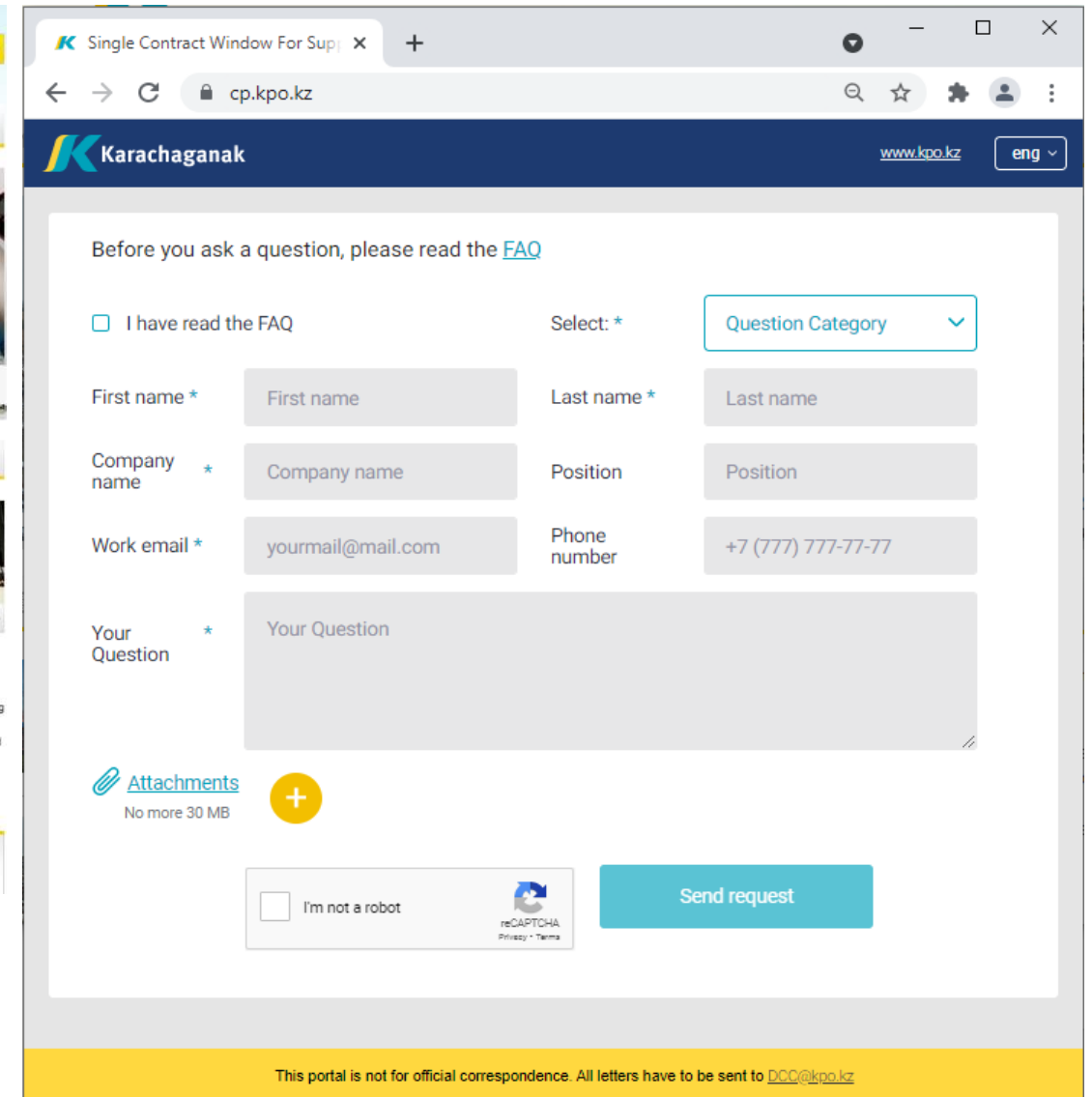
PROCESS



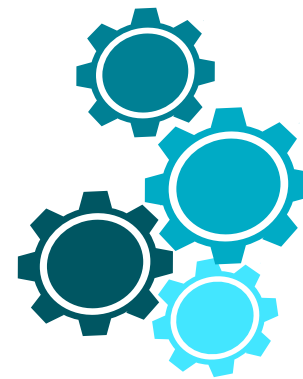
"SINGLE WINDOW" SYSTEM



The screenshot shows the Karachaganak website homepage. At the top, there is a navigation bar with the Karachaganak logo, language options (Kazakh, Russian, English), and a search bar. Below the navigation bar is a large banner image of two workers in red uniforms. The main content area is divided into three columns. The left column contains a 'Company news' section with three articles. The middle column contains a 'How to become a KPO vendor' section with a link to 'Apply for a job' and a highlighted button that says 'I am a supplier and I have a question for KPO'. The right column contains a 'Featured stories' section with a link to 'Focusing on Environmental Stewardship'. At the bottom, there is a footer with links to 'About KPO', 'Operations', 'Sustainability', 'News Room', and 'Careers'.



The screenshot shows the 'Single Contract Window For Suppliers' portal. The browser address bar shows 'cp.kpo.kz'. The portal header includes the Karachaganak logo and a language dropdown set to 'eng'. The main content area is titled 'Before you ask a question, please read the [FAQ](#)'. Below this is a form with several fields: a checkbox for 'I have read the FAQ', a 'Select' dropdown for 'Question Category', and input fields for 'First name', 'Last name', 'Company name', 'Position', 'Work email', and 'Phone number'. There is also a large text area for 'Your Question'. At the bottom of the form, there is an 'Attachments' section with a plus icon and a note 'No more 30 MB'. Below the attachments section is a reCAPTCHA checkbox labeled 'I'm not a robot' and a 'Send request' button. A footer note at the bottom of the portal states: 'This portal is not for official correspondence. All letters have to be sent to DCC@kpo.kz'.

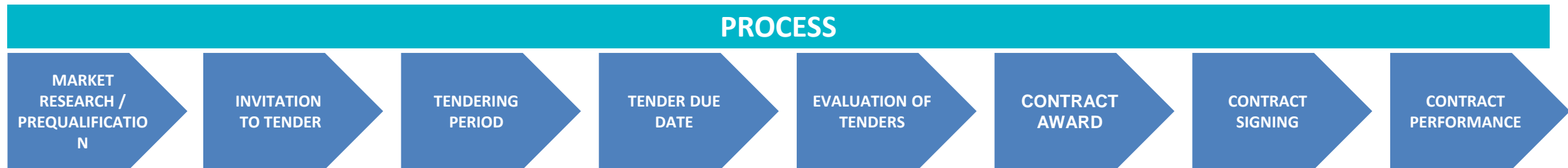


Procurement Process

PROCUREMENT PROCESS

KPO shall perform the procurement activities in accordance with:

- the Final Production Sharing Agreement (confidential and intended only for the use of KPO, its Shareholders and the Republic) and the Joint Operating Committee's Tender Procedures (JOC)
- current legislation
- approved budget and work program



MAXIMUM ATTENTION SHALL BE PAID TO



**TENDER PACKAGES
SUBMISSION
REQUIREMENTS**



**TENDER PACKAGES
SUBMISSION
REQUIREMENTS THROUGH E-
BIDDING SYSTEM**
([Link to the instructions](#))



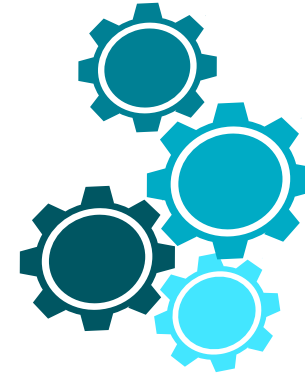
**INSTRUCTIONS
TO TENDERERS**



TENDER DUE DATE / TIME

TENDER DOCUMENTATION CONTENTS

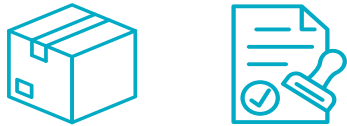
1. Cover letter
2. Forms, that shall be mandatorily signed, stamped and provided within timeframe specified:
 - Tender Acknowledgement and Confidentiality Agreement
 - Form of Tender
 - Certificate of Corporate Ownership and Declaration of Compliance
3. A package of documents related directly to the tender subject itself
4. Instructions to Tenderers
 - Form of Contract includes:
 - Form of Agreement
 - Schedule A – General Terms and Conditions
 - Schedule B – Scope of Goods/Services to be Supplied and Specifications
 - Schedule C – Compensation and Payment
 - Schedule D – Health, Safety and Environment (HSE) requirements
 - Schedule E – Special Conditions
 - Schedule F – Statement of Local Content
 - Schedule H – Industrial Relations
 - Questionnaire for Tender Participants
 - List of goods and technical delivery conditions (if applicable)
5. Instructions for preparing a tender proposal:
 - Instructions to Tender Participants
 - Bid marking template



Local Content Mechanisms

SUPPORTING MECHANISMS FOR LOCAL COMPANIES

TRIAL ORDER



Tenders for testing a trial batch of GOODS from Kazakhstani suppliers

EARLY TENDER



Contract is concluded for the supply of GOODS with a suspensive condition or with a long-term delivery schedule

KAZAKH TENDER



Tenders exclusively among Kazakhstani Suppliers. The goal is to award contracts to Kazakhstani suppliers of GWS

CONTRACT IN **EXCHANGE** FOR INVESTMENTS (UNDER REVISION)



A contract in exchange for investment is a long-term contract concluded on a Single source basis, under which the supplier undertakes to produce goods of local origin that are the subject of a procurement contract in the territory of the Republic of Kazakhstan





Thank you!