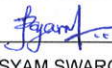





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**MATERIAL REQUISITION FOR LEVEL GAUGE**





Saipem S.p.A.  
 Project New GC - 16  
 Project Manager  
 (Enrico Sparaciani)

A	Issued for Approval	 SYAM SWAROOP	 K.S.S	 K PALANISWAMY	20/10/2011
Rev.	Description	Prepared	Checked	Approved	Date



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## 1 INTRODUCTION

### 1.1 Purpose

The purpose of this document is to define the minimum technical requirements for the design, materials, manufacture, inspection, testing, and supply of the Level Gauges for New GC-16 plant. The quantity of the same is as listed below. For tag number details refer Section: 2.1 of this MR.

ITEM	QTY	DESCRIPTION
1.	4	Reflex Type Level Gauge
2.	16	Magnetic Type Level Gauge
3.	1	Float & tape Type Level Gauge


### 1.2 Definitions

The definitions listed below apply.

<b>PROJECT</b>	:	New GC-16 in West Kuwait
<b>COMPANY</b>	:	Kuwait Oil Company (KSC)
<b>CONTRACTOR</b>	:	Al Khorayef Group Company (AGC)
<b>ENGINEERING SUB CONTRACTOR</b>	:	Saipem S.p.A

### 1.3 Acronyms

API	American Petroleum Institute.
ASME	American Society of Mechanical Engineers.
ASTM	American Society for Testing and Materials.
DP	Differential Pressure.
EEx	Certification for Electrical Equipment for Explosive Atmospheres
GC	Gathering Centre
HSE	Health , Safety and Environment
IEC	International Electro technical Commission
IP	Ingress Protection
ISA	International Society of Automation
ISO	International Organization for Standardization
LG	Level Gauge




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MOC	Material of Construction
MR	Material Requisition
NACE	National Association of Corrosion Engineers
O&M	Operating and Maintenance

#### 1.4 Codes and Standard

The latest edition in force as on 16th Nov 2008 of the following Standards, Codes & Specification shall apply.

INTERNATIONAL STANDARDS	
ASME B16.5	Pipe flanges and flanged fittings NPS ½ through NPS 24
IEC 60079	Electrical apparatus for explosive gas atmospheres- General requirements.
IEC 60529	Specification for degrees of protection provided by enclosures (IP).
ISA S84.00.01	Functional Safety: Safety Instrumented Systems
NACE-MR-0175 / ISO 15156	Sulphide Stress Cracking Resistant metallic materials for Oil field equipment
NACE TM 0177	Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in H <sub>2</sub> S Environments
NACE TM 0284	Evaluation of Pipeline and pressure vessel steels for Resistance to hydrogen induced cracking
KOC STANDARDS	
KOC-G-004	KOC Standard for Packing, Marking and Documentation
KOC-G-007	KOC Standard for Basic Design Data

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## 1.5 Environmental Condition




Temperature, Humidity, Atmosphere, Sandstorm and Wind Speed

1	Summer Maximum dry bulb temperature, shade	55°C
2	Summer Minimum wet bulb temperature	28°C
3	Summer Maximum average dry bulb temperature	50°C
4	Summer Maximum dry bulb temperature, solar	80°C
5	Soil temperature at 1.22m depth Max / Min (40°C shall be used for cable design calculations)	35 °C / 17 °C
6	For Electrical equipment design, ambient temperature for all indoor and outdoor equipments	-3°C to 50°C
7	The surface design temperature for equipment and installation except for as limited by coating on pipes	93°C
8	Direct sunlight – Exposed metal black body maximum temperature due to solar radiation	85°C
9	Shade temperature Max / Average / Min	55°C / 45° (1 day) / -3°C @100% RH
10	Exposed white body maximum temperature	63°C
11	Winter minimum dry bulb temperature	-3°C
12	Winter minimum average dry bulb temperature	7°C
13	Winter minimum average wet bulb temperature	3°C

The atmosphere is generally dusty and corrosive and in most areas may contain traces of hydrogen sulphide. Kuwait is subjected to sand storms particularly during the summer months. The maximum recorded wind speed is 38 m/s and the design maximum is 45 m/s.

## 1.6 Language

All correspondence, drawings, instructions, data sheets, design calculations and any other written information shall be in the English language.

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## 1.7 Units of Measurement

As per Instrument Design Basis – Doc. No.: 516-SA-E-50000, Table – 1.

## 1.8 General Requirements

Refer to Instrument Design Basis – Doc. No.: 516-SA-E-50000, for General Instrumentation requirements.

## 2 SCOPE OF SUPPLY




### 2.1 Level Gauge List

#### 2.1.1 Reflex Type Level gauge

Sr.No.	Qty.	Item	Item Description	P&ID No.	Equipment No.
1.	1	016-LG-6040	Reflex Type Level Gauge	516-GD-B-86022	016-D-301
2.	1	016-LG-6072	Reflex Type Level Gauge	516-GD-B-86023	016-V-401
3.	1	016-LG-6084	Reflex Type Level Gauge	516-GD-B-86025	016-V-402
4.	1	016-LG-6391	Reflex Type Level Gauge	516-GD-B-86026	016-V-501

#### 2.1.2 Magnetic Type Level gauge

Sr.No.	Qty.	Item	Item Description	P&ID No.	Equipment No.
1.	1	016-LG-0206	Magnetic Level gauge	516-GD-B-08157	016-D-001
2.	1	016-LG-0210	Magnetic Level gauge	516-GD-B-08157	016-D-001
3.	1	016-LG-0235	Magnetic Level gauge	516-GD-B-08158	016-D-002
4.	1	016-LG-0239	Magnetic Level gauge	516-GD-B-08158	016-D-002
5.	1	016-LG-0342	Magnetic Level gauge	516-GD-B-08165-2/2	016-D-003
6.	1	016-LG-0508	Magnetic Level gauge	516-GD-B-08168	016-C-001
7.	1	016-LG-0538	Magnetic Level gauge	516-GD-B-08169	016-C-002
8.	1	016-LG-0639	Magnetic Level gauge	516-GD-B-08176	016-V-003
9.	1	016-LG-0655	Magnetic Level gauge	516-GD-B-08177	016-D-004
10.	1	016-LG-0808	Magnetic Level gauge	516-GD-B-08180	016-D-005
11.	1	016-LG-5007	Magnetic Level gauge	516-GD-B-08171	016-C-005
12.	1	016-LG-6840	Magnetic Level gauge	516-GD-B-86067	016-SU-952
13.	1	016-LG-6849	Magnetic Level gauge	516-GD-B-86066	016-V-951
14.	1	016-LG-6903	Magnetic Level gauge	516-GD-B-86066	016-V-952
15.	1	016-LG-6922	Magnetic Level gauge	516-GD-B-86064	016-V-601
16.	1	016-LG-6952	Magnetic Level gauge	516-GD-B-86065	016-V-602

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### 2.1.3 Float & Tape Type Level gauge

Sr.No.	Qty.	Item	Item Description	P&ID No.	Equipment No.
1.	1	016-LG-4004	Float & Tape type	516-GD-B-85551	016-D-303

## 2.2 Supply & Battery Limits

### Battery limits

The items to be supplied are listed in section 2.1

### Exclusions

Bolts/Nuts and Gaskets for mounting of Level gauges on equipments.

## 2.3 Name plate

The Level gauges shall be provided with standard manufacturer's stainless steel name plate attached to them.

## 2.4 Inspection and Testing

Inspection, testing and certification for Level gauges shall be in accordance with Section – 4 of this MR.

The Inspection level for Level gauges is Level 0. The definition of Level 0 shall read as: "Materials shall be delivered to site with manufacturing inspection reports".

Inspection, testing and certification for Level gauges shall be as per Vendor's standard Inspection and Test Plan.

## 2.5 Special Tools, Jigs and Template



The supply includes all the special tools, test equipment, jigs and templates necessary for installation and maintenance. The Vendor shall submit the relevant list with his bid.

## 2.6 Spare Parts

Vendor shall include in the supply all the spare parts necessary for operation, pre-commissioning and commissioning. The relevant list must be included in the Vendor's bid. Vendor shall provide the list of:

- 1) Recommended operational spare parts for 2 and 5 years operation.
- 2) Recommended Capital spares.



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## 2.7 Preservation

Refer KOC-G-004 Rev 1 for minimum preservation requirements.

## 2.8 Site Assistance

N/A

## 2.9 Vendor Documentation

The documents to be submitted by Vendor, as a minimum requirement, are indicated in the Section – 7: Table - 1.

Vendor shall follow the Contractor's Document Numbering System in all documents prepared and submitted for the Project.




The Contractor's Document / Drawing Numbering System will be provided to the successful bidder. The Vendor shall prepare the as-built revision for each individual document (drawing, specification, procedure, data sheet, etc.) modified during the field installation stage.

The Vendor shall provide an Operating & Maintenance Manual for the supplied equipment/materials. Within the set of manuals, documents shall be sorted by discipline.

The O&M Manual shall contain the following information as minimum:

- 1) Installation & Pre-Commissioning Instructions
  - Erection Procedures and Sequence
  - Erection / Assembly Drawings
  - Pre-Commissioning Check List
- 2) Commissioning & Operation Instructions
  - Trouble Shooting
- 3) Maintenance Instructions
  - Maintenance Schedule and Procedures
  - Spare Parts
- 4) Project related Documents and Drawings

The Vendor shall prepare and submit a Manufacturer Record Book (MRB), which shall consist of a compilation of quality control documentation (by the Vendor and his Sub-Vendors) showing the test history of the as-supplied equipment. MRB shall contain as a minimum the following:

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- 1) Material Certification,
- 2) Sub-Vendor manufacturing records,
- 3) Quality plans for Inspection and Testing,
- 4) Non - conformance / corrective action reports
- 5) Procedures,
- 6) Qualification certificates,
- 7) Inspection and Test Reports
- 8) Calibration Certificates
- 9) Approved copy of Inspection & Test Plan
- 10) Inspection Release Notes
- 11) As-Built documents

The required copies of the Manufacturer Record Book shall be delivered with the materials.

### 3 TECHNICAL DETAILS

#### 3.1 Design Philosophy



The Design shall be carried out in accordance with the Codes and Standards as mentioned and any deviations must be approved by Contractor before implementation.

The Design shall meet all essential criteria for safe and reliable operation. Typically the design shall consider as a minimum:

- High reliability,
- Low maintenance requirements,
- Capable of installation in an area of given hazardous classification.

#### 3.2 Hazardous Area Classification

The Illuminator for Transparent level gauge shall be located in a Zone 1 area and shall be designed for Zone 1 Group IIA class T3. The Illuminator shall be EEx (d) certified.

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### 3.3 Material of Construction

The wetted parts material shall be SS316 as a minimum. The wetted parts material shall be selected for the individual service, meeting the NACE 0175/ISO 15156 as a minimum for all hydrocarbon services and as per the Data sheet Requirement.

### 3.4 Basic Design Requirements

#### 3.4.1 LEVEL GAUGE

In general, Magnetic type level gauges are preferred with SS 316 material.

The Flange rating shall be 300 # as minimum for all Level gauges.

The materials shall be selected for the individual service, meeting the NACE 0175 / ISO 15156 as a minimum for all hydrocarbon services and also as per the data sheet requirements.

Gauges on vaporizing service shall be manufactured with oversized chambers.

Reflex gauges shall be used on all clean services except liquid level interface.

Transparent gauges shall be used on acid, caustics, dirty fluids, coloured liquids and liquid interface where the interface is visually discernible.

In any case, the maximum visibility length shall not exceed 1500 mm for a single gauge. Multiple gauges with overlapping range shall be used for such cases.




For large vessels and tanks, a number of overlapping gauges shall be used. The overlap of the visible length shall not be less than 25 mm (1 in.).

The connection positions for the Gauge Glass and Magnetic Gauge shall be side – side connection.

External chamber is preferred for Gauge Mounting.

#### 3.4.2 General Requirements

- Process connection size for Level Gauge shall be as per the individual data sheets. The flange dimensions shall be as per ASME B 16.5.
- The Power supply for the illuminator of Transparent level gauge is 250 V AC,  $\pm 50$  Hz.
- Electrical cable entry shall be M20 X 1.5 for Transparent level gauge illuminator.

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- All spare cable entries shall be plugged with certified SS plug.

#### 4 TESTING & INSPECTION

The testing of the Level gauges shall comply with the relevant specifications, data sheets and codes & standards and shall be the responsibility of the Vendor. All equipment including sub vendor's equipment shall be subject to inspection. The Vendor will allow free access for the purposes of inspection.

The Level gauges shall be subjected to routine tests at the manufacturer's works. Any additional testing, if required, shall also be carried out as and where specified. No equipment shall be delivered until all applicable tests have been successfully completed.




#### 5 PACKING & SHIPMENT

Packing and shipment shall be as per KOC-G-004.

#### 6 INSTRUCTIONS TO THE BIDDER



All deviations from this MR shall be separately listed by the Vendor in his quotation and shall refer to the relevant paragraph numbers as per section: 9 - Annexure - B.

The Vendor shall be completely responsible for providing all details necessary for the satisfactory installation and operation of all equipment components provided, including sub-vendor items.

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## 7 TABLE-1 REQUIRED VENDOR DOCUMENTS

Pos	DESCRIPTION (AND SIZE)	WITH BID		TIME SCHEDULE		
		Copies No.	Initial issue and revisions		As supplied Copies No.	As built Copies No.
			Copies No.	Solar days ✧		
1	OUTLINE DIMENSION/ARRANGEMENT DRAWING		1P+1E		2 P+2E	3 P+2E
2	COMPLETED LEVEL GAUGE DATA SHEETS (Vendor to fill in the fields specified as "Vendor to provide" in the reference document "Instrument datasheet for Level Gauge")	1P+1E	1P+1E		2 P+2E	3 P+2E
3	ACCESSORIES DATASHEET & CATALOGS	1P+1E	1P+1E		2 P+2E	3 P+2E
4	INTERFACE CONNECTION DRAWINGS, MECHANICAL		1P+1E		2 P+2E	3 P+2E
5	CROSS-SECTIONAL DRAWING AND BILL OF MATERIALS	1P+1E	1P+1E		2 P+2E	3 P+2E
6	DETAIL ARRANGEMENT DRAWING (INCLUDING NAME PLATE DETAILS)		1P+1E		2 P+2E	3 P+2E
7	TERMINAL BOXES DRAWINGS (FOR ILLUMINATOR OF TRANSPARENT LEVEL GAUGE)		1P+1E		2 P+2E	3 P+2E
8	WIRING DIAGRAMS (if any)		1P+1E		2 P+2E	3 P+2E
9	LIST OF COMPLIANCE / DEVIATIONS FROM PURCHASE REQUISITION	1P+1E	1P+1E		2 P+2E	3 P+2E
10	EQUIPMENT PAINTING CYCLE		1P+1E		2 P+2E	
11	LIST OF RECOMMENDED SPARE PARTS FOR PRECOMMISSIONING, COMMISSIONING, START-UP	1P+1E			2 P+2E	
12	LIST OF RECOMMENDED SPARE PARTS FOR TWO YEARS/FIVE YEARS OPERATION	1P+1E			2 P+2E	
13	PRODUCTION AND TEST SCHEDULE	1P+1E	1P+1E		2 P+2E	3 P+2E
14	TEST PROCEDURES OF WITNESSED TESTS		1P+1E		2 P+2E	3 P+2E

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Pos	DESCRIPTION (AND SIZE)	WITH BID	TIME SCHEDULE				
			Initial issue and revisions		As supplied	As built	
			Copies No.	Copies No.	Solar days ✧	Copies No.	Copies No.
15	TEST REPORTS / CERTIFICATES		1P+1E			1 Original 1 copy +2E	3 P+2E
16	CALIBRATION CERTIFICATES		1P+1E			1 Original 1 copy +2E	
17	NON DESTRUCTIVE TESTING PROCEDURES		1P+1E			2 P+2E	3 P+2E
18	QUALITY PLAN INSPECTION AND TESTING PLAN		1P+1E			2 P+2E	3 P+2E
19	SHIPPING DETAILS		1P+1E			2 P+2E	3 P+2E
20	HAZARDOUS AREA EQUIPMENT CERTIFICATION		1P+1E			2 P+2E	3 P+2E
21	MANUFACTURING RECORD BOOK		1P+1E			2 P+2E	2P (only modified doc.s) 1E (complete)
22	O&M MANUAL		1P+1E			2 P+2E	2P (only modified doc.s) 1E (complete)
23	QC RECORD BOOK		1P+1E			2 P+2E	3 P+2E

TYPE OF SUPPORT: P - Paper print E – Electronic copy



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<b>KOC Contract No.</b> 44930 <b>SAIPEM PROJECT NO.</b> 032114	<b>Document Title:</b> <b>MATERIAL REQUISITION FOR LEVEL GAUGE</b>	<b>COMPANY DOC No.</b>

## 8 ANNEXURE – A: LIST OF TECHNICAL ATTACHMENTS

The supply / modifications shall fully comply with all the documents listed here below:

### Contractor Datasheets, Specifications and Standards.

No.	Document No.	Title/Description	Rev.
1.	516-GA-E-08319	PROCESS DATA SHEET - WET TANK	A
2.	516-GA-E-08320	PROCESS DATA SHEET - OFF-SPEC TANK	A
3.	516-SA-E-50000	INSTRUMENT DESIGN BASIS	C
4.	516-SA-E-50056	DATASHEET FOR LEVEL GAUGE	A
5.	516-GA-E-60002	PIPING MATERIAL SPECIFICATION FOR: a) C15A b) C15B c) G10A d) Q15B e) Q15C f) Q35B	A
6.	516-GA-E-60800	SPECIFICATION FOR PAINTING, COATING AND WRAPPING.	B

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**9 ANNEXURE – B: COMPLIANCE / DEVIATION LIST FORM – TECHNICAL**

DOCUMENT TITLE & IDENTIFICATION	PARAGRAPH / ITEM CONCERNED	PROJECT SPECIFICATION REQUIREMENTS	PROPOSED DEVIATION	REASONS FOR DEVIATION	CONTRACTOR COMMENTS	VENDOR RESPONSE