

Instruments Works

Scope of Work

FIDIC RED BOOK

SPECIFICATION SECTION

1. INSTRUMENTS WORKS

1.1 General

This section covers the supply, installation, testing, calibration, loop checking, commissioning and documentation of Instruments as shown on the Drawings and as specified herein.

1.2 Scope

The Instruments Works comprise but are not limited to:

- Field Instruments
- Instrument Tubing and Fittings
- Instrument Support and Accessories
- Junction Boxes
- Instrument Cables
- Cable Glanding and Termination
- Loop Checking and Calibration
- Functional Testing and Commissioning

1.3 Standards

All materials and workmanship shall conform to the applicable Codes, Standards and Specifications as specified herein.

FIDIC RED BOOK (2017)

CONSTRUCTION CONTRACT

Scope of Work – Instrumentation Works

Document Title	Instrumentation Works – Scope of Work
Contract Type	FIDIC Conditions of Contract for Construction (Red Book, 2nd Edition 2017)
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1. Introduction

This Scope of Work ("SOW") defines the requirements for the supply, installation, testing, and commissioning of all Instrumentation Works forming part of the Contract. The Contract is executed under the FIDIC Conditions of Contract for Construction (Red Book, Second Edition 2017), hereinafter referred to as the "Conditions".

The Contractor shall be deemed to have read and understood this SOW in its entirety and shall be responsible for all work described herein, together with any work that is reasonably implied or necessarily incidental to the completion of the Works, even where not explicitly stated.

2. Definitions and Abbreviations

The following definitions and abbreviations apply throughout this document. Defined terms used in the Conditions of Contract retain the meaning given to them therein.

Term / Abbreviation	Definition
Conditions	FIDIC Conditions of Contract for Construction, Red Book, 2nd Edition 2017
Contractor	The entity executing the Works under the Contract
Employer	The party who has engaged the Contractor under the Contract
Engineer	The Engineer appointed pursuant to Clause 3 of the Conditions
Works	The Instrumentation Works as defined in this SOW and the Contract
SOW	This Scope of Work document
DCS	Distributed Control System
ESD	Emergency Shutdown System
FAT	Factory Acceptance Test
SAT	Site Acceptance Test
SIL	Safety Integrity Level

P&ID	Piping and Instrumentation Diagram
ITP	Inspection and Test Plan
MTO	Material Take-Off
WBS	Work Breakdown Structure
Hook-up	All field connections between instruments and process connections, including tubing, fittings and supports

3. Scope of Work Overview

The scope of work encompasses the complete provision of Instrumentation Works for the Project, comprising the following principal activities:

- Supply, delivery to Site, handling, storage, and preservation of all instruments and associated materials
- Installation of all instrument devices in accordance with approved drawings, P&IDs, and instrument index
- Installation of instrument air supply systems including headers, tubing, supports, and manifolds
- Instrument hook-up works including impulse tubing, tube supports, and fixing materials
- Loop checking, calibration, and pre-commissioning of all field instrumentation
- Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT) as required
- Preparation and submission of all as-built documentation and O&M manuals
- Performance of all works in accordance with applicable codes, standards, and Employer requirements

The WBS structure governing the Instrumentation Works is organised under the following principal codes, as set out in the Unit Rate Schedules:

- WBS 900 – Supply & Install Instrument Devices
- WBS 901 – Instrument Air to Valves Hook-up
- WBS 902 – Instrument Air Header to Manifold Hook-up
- WBS 903 – Instrument Hook-up

4. WBS 900 – Supply & Install Instrument Devices

4.1 General Requirements

The Contractor shall supply and install all instrument devices identified in the Instrument Index and Unit Rate Schedules. Unless otherwise specified, all instruments shall be supplied as complete assemblies inclusive of all mounting hardware, process connections, electrical connections, and nameplates.

All instrument devices shall be:

- Suitable for the process fluid, operating pressure, operating temperature, and area classification as defined in the relevant data sheets
- Supplied with relevant calibration certificates traceable to national standards
- Tagged in accordance with the Employer's tag numbering convention
- Installed in accordance with manufacturer's recommendations and the approved installation drawings
- Functional and loop-tested prior to commissioning handover

4.2 Flow Devices (WBS 900.001)

The Contractor shall supply and install all flow measurement and indication devices as detailed in the Instrument Index. The scope includes but is not limited to:

- Vortex Flow Transmitters (WBS 900.001.001): Supply and install complete with all process flanges, gaskets, bolts, and field junction boxes as required
- Coriolis Flow Transmitters (WBS 900.001.002): Supply and install inclusive of all support brackets, flow conditioner spools, and transmitter housings
- Differential Pressure (DP) Flow Transmitters (WBS 900.001.003): Supply and install with 5-valve manifolds, impulse tubing, and all associated hardware
- Flow Elements – Vortex (WBS 900.001.004) and Ultrasonic (WBS 900.001.005): Supply and install in accordance with approved flow element schedule
- Flow Indication (WBS 900.001.006): Supply and install local flow indicators with appropriate process connections
- Ultrasonic Flow Transmitters (WBS 900.001.007): Supply and install including ultrasonic transducers and signal cabling
- Weir Flow Level Transmitters (WBS 900.001.008): Supply and install with appropriate wetted materials for the process
- VA Meter Switch (WBS 900.001.009) and VA Meter (WBS 900.001.010): Supply and install in vertical pipe runs as indicated on P&IDs

4.3 Temperature Devices (WBS 900.002)

The Contractor shall supply and install all temperature measurement devices as detailed in the Instrument Index. The scope includes but is not limited to:

- Temperature Transmitters (WBS 900.002.001): Supply and install with thermowell assemblies, head-mounted or remote transmitters as specified
- Thermowells (WBS 900.002.002): Supply and install with appropriate insertion length, process connection, and material as specified in data sheets; all thermowells to be wake-frequency calculated
- Head Mounted Temperature Transmitters (WBS 900.002.003): Supply and install directly mounted to thermowell heads
- Rail Mounted Temperature Transmitters (WBS 900.002.004): Supply and install within local instrument enclosures on DIN rail
- Temperature Gauges (WBS 900.002.005): Supply and install bimetallic or gas-actuated gauges with appropriate dials and scale ranges

4.4 Pressure Devices (WBS 900.003)

The Contractor shall supply and install all pressure measurement and regulation devices as detailed in the Instrument Index. The scope includes but is not limited to:

- Pressure Gauges (WBS 900.003.001): Supply and install with stainless steel Bourdon tube, liquid-filled where required by vibration conditions, inclusive of isolation and blowdown valves
- Pressure Transmitters (WBS 900.003.002): Supply and install with 2-valve or 3-valve manifolds as appropriate, complete with all impulse tubing and fittings
- Pressure Regulators (WBS 900.003.003): Supply and install with appropriate upstream and downstream isolation, including strainer where specified
- Pressure Indication (WBS 900.003.004): Supply and install local pressure indicators at process-specified locations
- Differential Pressure Gauges (WBS 900.003.005): Supply and install with 5-valve manifolds and equal-leg impulse tubing
- Differential Pressure Transmitters (WBS 900.003.006): Supply and install with 5-valve manifolds, impulse tubing, and condensate pots where required

- Differential Pressure Regulators (WBS 900.003.007): Supply and install with all associated isolation and bypass valving

4.5 Level Devices (WBS 900.004)

The Contractor shall supply and install all level measurement and indication devices as detailed in the Instrument Index. The scope includes but is not limited to:

- Level Indication (WBS 900.004.001): Supply and install local level indicators, including magnetic level gauges and sight glasses where specified
- Level Transmitters (WBS 900.004.002): Supply and install general-purpose level transmitters with all process connections
- Radar Level Transmitters (WBS 900.004.003): Supply and install guided-wave or free-space radar as specified in data sheets, including nozzle extensions and antenna assemblies
- Magnetic Level Transmitters (WBS 900.004.004): Supply and install with float assemblies, external cages, and isolation valves
- Nuclear Level Transmitters (WBS 900.004.005): Supply and install in compliance with all applicable nuclear safety regulations; the Contractor shall obtain all required permits and coordinate with the relevant radiation safety authority
- Hydrostatic Pressure Level Gauges (WBS 900.004.006): Supply and install complete with appropriate diaphragm seals and capillary assemblies where required
- LO Pressure Switches (WBS 900.004.007): Supply and install with adjustable setpoints, test facilities, and appropriate process connections

4.6 General Devices (WBS 900.005)

The Contractor shall supply and install all general and miscellaneous instrument devices as detailed in the Instrument Index. The scope includes but is not limited to:

- Analyser Sample Points (WBS 900.005.001): Supply and install complete with sample conditioning systems, fast-loop connections, and calibration gas connections as specified
- CO₂ Transmitters (WBS 900.005.002): Supply and install with appropriate sensor ranges, weatherproof enclosures, and calibration fittings
- Conductivity Cells (WBS 900.005.003): Supply and install with flow cells or inline sensors, complete with transmitters and temperature compensation
- DP Level Transmitters (WBS 900.005.004): Supply and install with 5-valve manifolds, equal-leg impulse tubing, and condensate chambers as required
- Moisture Analysers (WBS 900.005.005): Supply and install complete with sample systems, probes, and associated electronics
- Process Gas Detectors (WBS 900.005.006): Supply and install catalytic bead or infrared type detectors as specified; the Contractor shall comply with area classification requirements and maintain detection coverage as defined
- Level Gauges (WBS 900.005.007): Supply and install transparent or reflex type as specified, with isolation and drain valves
- Hand Switches (WBS 900.005.008): Supply and install in appropriate enclosures with correct IP rating for the hazardous area classification
- Limit Switches (WBS 900.005.009): Supply and install on all specified valve actuators and mechanical equipment
- Positioners (WBS 900.005.010): Supply and install digital valve positioners with HART communication capability unless otherwise specified
- Local Indicators (WBS 900.005.011): Supply and install loop-powered or panel-mounted indicators as detailed in the instrument schedule

5. WBS 901 – Instrument Air to Valves Hook-up

5.1 General Requirements

The Contractor shall supply and install all instrument air hook-up works from the instrument air sub-headers to individual pneumatically actuated valves and instruments. All tubing and fittings shall be of 316 stainless steel unless the specified area classification, process conditions, or Employer's requirements mandate an alternative material.

The Contractor's scope includes supply of all instrument tube supports and fixing accessories, 3/8" and 1/2" instrument tubing, compression fittings, isolation valves, and all associated materials necessary to complete the hook-up in accordance with the approved hook-up drawings and the applicable instrument installation standards.

5.2 Tube Support and Tubing Installation

Instrument tube supports shall be spaced in accordance with the applicable instrument installation standard and shall be fixed to structural steelwork, pipework, or dedicated instrument support structures. The following tubing lengths constitute the basis of payment under the Unit Rate Schedule:

- WBS 901.001.001 – 5m x 3/8" Tubing runs: including all supports, fittings, and accessories
- WBS 901.001.002 – 10m x 3/8" Tubing runs: including all supports, fittings, and accessories
- WBS 901.001.003 – 15m x 3/8" Tubing runs: including all supports, fittings, and accessories
- WBS 901.001.004 – 20m x 3/8" Tubing runs: including all supports, fittings, and accessories
- WBS 901.001.005 – 10m x 1/2" Tubing runs: including all supports, fittings, and accessories

The unit rates for the above items shall be deemed to include for all tube bending, tube cutting, installation, compression fitting assembly, pressure testing, and all other incidental works.

6. WBS 902 – Instrument Air Header to Manifold Hook-up

6.1 General Requirements

The Contractor shall supply and install all instrument air supply pipework from the instrument air supply source (as indicated on the P&IDs) to the instrument air manifolds and sub-distribution headers throughout the facility. All pipework shall be carbon steel or stainless steel as specified, and shall be fabricated and installed in accordance with ASME B31.3 Process Piping unless otherwise specified.

6.2 Piping Installation

The scope includes supply of all steelwork supports, 1" nominal bore instrument air piping, bends, fittings, isolation valves, pressure relief devices, and all necessary materials to provide a complete and commissioned instrument air distribution system. The following piping run lengths constitute the basis of payment:

- WBS 902.001.001 – 10m piping installation: including all supports, fittings, and accessories
- WBS 902.001.002 – 20m piping installation: including all supports, fittings, and accessories
- WBS 902.001.003 – 30m piping installation: including all supports, fittings, and accessories
- WBS 902.001.004 – 45m piping installation: including all supports, fittings, and accessories

All instrument air pipework shall be blown clean, pressure tested in accordance with the applicable code, and dried to a dew point of -40°C or better prior to connection to instruments. The Contractor shall prepare and submit a pressure test pack for each system prior to testing.

7. WBS 903 – Instrument Hook-up

7.1 General Requirements

The Contractor shall supply and install all instrument impulse tubing, tube supports, and all necessary fixing materials in accordance with the approved hook-up drawings, manufacturer's instructions, and Employer's standard installation details. Hook-up works shall be carried out for the following instrument categories:

7.2 Hook-up Categories

- WBS 903.001.001 – Flow Instrument Installation: All impulse tubing hook-up for flow transmitters, flow elements, and associated flow instruments including 5-valve manifold connections, condensate pots, and drain/vent provisions
- WBS 903.001.002 – Level Instrument Installation: All impulse tubing hook-up for level transmitters and differential pressure level instruments, including condensate chambers, equal-leg connections, and all isolating and equalising valves
- WBS 903.001.003 – Pressure Instrument Installation: All impulse tubing hook-up for pressure transmitters, pressure gauges, and pressure switches, including manifold valves, drain/vent valves, and pulsation dampeners where required
- WBS 903.001.004 – Control Valve Installation: All instrument air tubing hook-up from solenoid valves, positioners, and air lock-up systems to control valve actuators, including all accessories required for fail-safe operation
- WBS 903.001.005 – Temperature Installation: All electrical hook-up works from temperature sensors, thermocouples, and resistance temperature detectors (RTDs) to head-mounted transmitters or local junction boxes, including all extension wire and cable entries
- WBS 903.001.006 – Pneumatic Installation: All pneumatic tubing connections for pneumatically operated instruments, including I/P converters, pneumatic controllers, volume boosters, and trip amplifiers

The Contractor shall ensure that all impulse lines are installed with the correct gradient (minimum 1:10 towards the instrument or towards the process as appropriate to the application), are adequately supported, are free from pockets where condensation can accumulate, and are properly heat-traced and insulated where required by the process conditions.

8. General Technical Requirements

8.1 Codes and Standards

All Instrumentation Works shall be designed, supplied, and installed in compliance with the latest revision of the following codes, standards, and regulations (the list is indicative and not exhaustive):

- IEC 61511 – Functional Safety: Safety Instrumented Systems for the Process Industry Sector
- IEC 60079 – Explosive Atmospheres (all parts relevant to the area classification of the Site)
- ISA 5.1 – Instrumentation Symbols and Identification
- ISA 5.4 – Instrument Loop Diagrams
- ISA 20 – Specification Forms for Process Measurement and Control Instruments
- ASME B31.3 – Process Piping (for instrument air distribution pipework)
- IP 15 / EN 60079 – Classification of Hazardous Areas
- Applicable national and local regulations of the country of the Site
- Employer's Project Specifications and Engineering Standards as listed in Annex [X]

8.2 Material Requirements

All materials incorporated into the permanent Works shall be:

- New, unused, and sourced from manufacturers on the Employer's Approved Manufacturer/Vendor List (AMVL) or subject to prior written approval by the Engineer

- Suitable for the process fluids, operating temperatures, pressures, and ambient conditions applicable to their installed location
- Rated and certified for the area classification as determined by the Hazardous Area Classification drawings
- Supplied with material test certificates (MTCs) and relevant third-party certification (e.g. ATEX/IECEx for hazardous area equipment) traceable to the batch supplied

8.3 Installation Requirements

The Contractor shall carry out all installation works in accordance with the following requirements:

- Instruments shall be installed at locations shown on the P&IDs and installation drawings, and at accessible elevations for operation and maintenance
- All instruments shall be properly identified with stainless steel tag plates engraved or embossed with the instrument tag number
- Instrument enclosures and junction boxes shall be IP65 minimum or as required by the area classification
- All cable and conduit entries into instrument enclosures shall be appropriately sealed to maintain the stated IP rating
- Instrument stands and supports shall be fabricated from hot-dip galvanised or stainless steel and shall be grouted or bolted to concrete plinths, or welded/clamped to structural steelwork as appropriate
- The Contractor shall not drill or weld to process pipework or vessels without a Permit to Work and prior written approval from the Engineer

8.4 Calibration and Testing

The Contractor shall calibrate all instruments prior to installation in accordance with the Contractor's approved Calibration Procedure. Calibration shall be performed using UKAS-accredited or equivalent calibration equipment, with calibration certificates submitted to the Engineer. The Contractor shall also:

- Carry out a complete loop check for each instrument loop prior to commissioning
- Perform instrument air leak tests on all pneumatic tubing and pipework at 1.5 times maximum operating pressure
- Carry out and document SAT for all safety instrumented functions (SIF) in accordance with the approved SAT procedure
- Complete and sign all test records and submit to the Engineer for review and approval prior to commissioning handover

9. Labour Categories

The Unit Rate Schedule includes provision for the following labour grades. The Contractor shall ensure that all personnel assigned to the Works are suitably qualified, competent, and hold any necessary certifications or licences required by applicable regulations:

Code	Labour Grade	Typical Responsibilities
L1	Instrument Supervisor	Planning, supervision, and quality oversight of all instrument installation activities; interface with Engineer
L2	Senior Instrument Technician	Installation and testing of complex instrumentation; loop checking; calibration; FAT and SAT activities
L3	Instrument Technician	General instrument installation; hook-up; tubing; loop checking under supervision
L4	Instrument Fitter	Instrument air tubing and pipework installation; support fabrication and fixing

L5	Instrument Electrician	Electrical connections to instruments; cable termination; continuity testing; IR testing
L6	Instrument Helper / Labourer	Lifting and carrying; general assistance to technicians; housekeeping
L7	Document Controller / Administrator	Document management; preparation of as-built records; ITP records; calibration certificates

10. Contractor's Obligations

10.1 Employer's Requirements

The Contractor's obligations under this SOW shall include, but not be limited to:

1. Prepare and submit for Engineer's review a Contractor's Instrument Installation Procedure, Calibration Procedure, Hook-up Procedure, and Pressure Testing Procedure within [28] days of the Commencement Date
2. Prepare and submit an Inspection and Test Plan (ITP) for all Instrumentation Works for Engineer's approval prior to commencement of installation
3. Maintain a current and accurate Instrument Installation Status Register throughout the execution of the Works
4. Attend and participate in pre-installation, pre-FAT, and pre-commissioning coordination meetings as required by the Engineer
5. Provide the Engineer with minimum [48 hours] prior notice of all hold points and witness points identified in the approved ITP
6. Maintain Site in a clean and orderly condition and carry out regular housekeeping
7. Supply all tools, test equipment, consumables, and temporary materials necessary for the execution of the Works
8. Ensure all personnel hold the required safety induction certificates and are authorised to work on Site
9. Submit as-built documentation, including marked-up drawings, calibration records, loop test certificates, and pressure test records, within [30] days of Completion

10.2 Additional Items at Contractor's Discretion

Pursuant to Clause I01 of the Unit Rate Schedule, the Contractor shall identify in a separate table and appendix any additional work items, materials, or categories not explicitly listed in the WBS structure but which the Contractor considers necessary for the complete and proper execution of the Instrumentation Works. All additional proposed rates shall be clearly presented and coded in accordance with the WBS coding convention.

11. WBS Summary Schedule

The table below provides a structured summary of the complete Work Breakdown Structure for the Instrumentation Works scope. Quantities and unit rates shall be completed by the Contractor in the Unit Rate Schedule.

WBS Code	Description	Unit	Remarks
900	Supply & Install Instrument Devices		Group Header
900.001	Flow Devices		Group Header
900.001.001	Vortex Flow Transmitter	no	
900.001.002	Coriolis Flow Transmitter	no	

900.001.003	DP Flow Transmitter	no	
900.001.004	Flow Element – Vortex	no	
900.001.005	Flow Element – Ultrasonic	no	
900.001.006	Flow Indication	no	
900.001.007	Ultrasonic Flow Transmitter	no	
900.001.008	Weir Flow Level Transmitter	no	
900.001.009	VA Meter Switch	no	
900.001.010	VA Meter	no	
900.002	Temperature Devices		Group Header
900.002.001	Temperature Transmitter	no	
900.002.002	Thermowell	no	
900.002.003	Head Mounted Temperature Transmitter	no	
900.002.004	Rail Mounted Temperature Transmitter	no	
900.002.005	Temperature Gauge	no	
900.003	Pressure Devices		Group Header
900.003.001	Pressure Gauge	no	
900.003.002	Pressure Transmitter	no	
900.003.003	Pressure Regulator	no	
900.003.004	Pressure Indication	no	
900.003.005	Differential Pressure Gauge	no	
900.003.006	Differential Pressure Transmitter	no	
900.003.007	Differential Pressure Regulator	no	
900.004	Level Devices		Group Header
900.004.001	Level Indication	no	
900.004.002	Level Transmitter	no	
900.004.003	Level Transmitter – Radar	no	
900.004.004	Level Transmitter – Magnetic	no	
900.004.005	Level Transmitter – Nuclear	no	
900.004.006	Hydrostatic Pressure Level Gauge	no	
900.004.007	LO Pressure Switch	no	
900.005	General Devices		Group Header
900.005.001	Analyser Sample Point	no	
900.005.002	CO2 Transmitter	no	
900.005.003	Conductivity Cell	no	
900.005.004	DP Level Transmitter	no	
900.005.005	Moisture Analyser	no	

900.005.006	Process Gas Detector	no	
900.005.007	Level Gauge	no	
900.005.008	Hand Switch	no	
900.005.009	Limit Switch	no	
900.005.010	Positioner	no	
900.005.011	Local Indicator	no	
901	Instrument Air to Valves Hook-up		Group Header
901.001	Supply & Install Instrument Tube Supports incl. accessories, 3/8" tubing and tube fittings		Group Header
901.001.001	5m x 3/8" Tubing	no	
901.001.002	10m x 3/8" Tubing	no	
901.001.003	15m x 3/8" Tubing	no	
901.001.004	20m x 3/8" Tubing	no	
901.001.005	10m x 1/2" Tubing	no	
902	Instrument Air Header to Manifold Hook-up		Group Header
902.001	Supply & Install all steelwork supports, 1" piping, bends and all necessary fittings		Group Header
902.001.001	10m piping installation	no	
902.001.002	20m piping installation	no	
902.001.003	30m piping installation	no	
902.001.004	45m piping installation	no	
903	Instrument Hook-up		Group Header
903.001	Supply & Install Instrument Impulse Tubing incl. tube supports and all necessary fixing materials		Group Header
903.001.001	Flow Instrument Installation	no	
903.001.002	Level Instrument Installation	no	
903.001.003	Pressure Instrument Installation	no	
903.001.004	Control Valve Installation	no	
903.001.005	Temperature Installation	no	
903.001.006	Pneumatic Installation	no	

12. Exclusions

Unless explicitly stated otherwise in the Contract, the following items are excluded from the Contractor's scope:

- Supply and installation of DCS/PLC/ESD control system hardware and software
- Supply and installation of electrical power distribution boards, MCCs, and MV/HV equipment
- Civil and structural works including instrument support foundations, concrete plinths, and building penetrations
- HVAC works to instrument rooms and control rooms
- Supply of process fluids, utilities, and chemicals required for commissioning

- Procurement of long-lead equipment items specifically designated as Employer-supplied items in the Contract
- Third-party regulatory inspections and statutory fees (unless specifically included)

13. Interfaces with Other Works

The Contractor shall coordinate with other contractors and suppliers engaged on the Project in respect of the following interface points:

- Mechanical Contractor: Provision of instrument nozzles on vessels, columns, and tanks; positioning of thermowell bosses; access for flow element installation in pipework; provision of instrument stanchion base plates
- Piping Contractor: Location and orientation of instrument connections; access for pressure tapping installation; hydrostatic testing schedule to ensure impulse lines are not connected during pipe pressure tests
- Electrical Contractor: Segregation of instrument cables from power cables; provision of cable trays, conduit, and cable entries as required by the instrument installation design
- DCS/ESD Vendor: Marshalling cabinet layout; field junction box assignments; signal list verification; loop diagram approval; SAT support
- Commissioning Team: Loop check schedule; instrument pre-commissioning and commissioning handover sequence

14. Health, Safety & Environmental Requirements

The Contractor shall comply with all applicable health, safety, and environmental legislation and the Employer's Site safety rules, which shall take precedence. The Contractor shall prepare and submit a Project-specific Health, Safety & Environmental (HSE) Plan for the Instrumentation Works for the Engineer's approval prior to commencement of Works.

Key HSE requirements applicable to the Instrumentation Works include:

- All works in classified hazardous areas shall be carried out under a valid Hot Work or Cold Work Permit to Work as applicable
- Nuclear devices (WBS 900.004.005) shall be handled only by personnel holding the required radiation worker certification; all regulatory requirements relating to transport, installation, and commissioning of nuclear sources shall be strictly adhered to
- Instrument air pressure testing shall be carried out in accordance with a risk assessment and method statement approved by the Engineer; appropriate exclusion zones shall be established
- All temporary openings in process connections shall be blinded and tagged pending instrument installation
- Working at Height activities shall be carried out under a risk assessment and method statement with appropriate access equipment and fall protection

15. Documentation Requirements

The Contractor shall prepare and submit the following documentation in accordance with the Contract Document Submission Schedule:

Document	Stage	Copies / Format
Instrument Installation Procedure	Pre-construction	2 hard + 1 electronic
Calibration Procedure	Pre-construction	2 hard + 1 electronic
Hook-up Procedure	Pre-construction	2 hard + 1 electronic

Instrument Air Pressure Test Procedure	Pre-construction	2 hard + 1 electronic
Inspection and Test Plan (ITP)	Pre-construction	2 hard + 1 electronic
HSE Plan – Instrumentation Works	Pre-construction	2 hard + 1 electronic
Material Submittals / Data Sheets	Prior to procurement	2 hard + 1 electronic per item
Approved Vendor List	Prior to procurement	1 electronic
Instrument Installation Status Register	Monthly during construction	1 electronic (updated)
FAT Reports	Post-FAT	2 hard + 1 electronic
Loop Test Certificates	Post loop check	1 electronic register + originals
Calibration Certificates	Post calibration	1 electronic register + originals
Pressure Test Records	Post pressure test	1 electronic register + originals
SAT Reports	Post SAT	2 hard + 1 electronic
As-Built Drawings (marked-up)	Post-completion	2 hard + 1 electronic (DWG/PDF)
Operation & Maintenance Manuals	Post-completion	2 hard + 1 electronic

16. Measurement and Payment

The Works shall be measured and paid in accordance with the Unit Rate Schedule forming part of the Contract. The following principles shall apply:

- Payment shall be made on the basis of the actual quantities of work executed and accepted by the Engineer, measured in the units stated in the Unit Rate Schedule
- Unit rates shall be deemed to include for all labour, materials, plant, tools, consumables, supervision, temporary works, testing, and any other activity necessary for the proper completion of the item of work, unless explicitly stated as a separate item
- The Contractor shall not be entitled to additional payment for work items that are reasonably implied by or necessarily incidental to the scope described in this SOW, whether or not those items appear explicitly in the Unit Rate Schedule
- Any additional work items proposed by the Contractor under Clause I01 shall be subject to Engineer's review and approval prior to execution; no payment shall be made for additional items not approved in advance
- Measurement shall be carried out jointly by the Contractor's and Engineer's representatives; the Contractor shall give adequate notice and provide all assistance required for measurement

17. Variations

Any Variation to the scope of the Instrumentation Works shall be managed in accordance with Clause 13 (Variations and Adjustments) of the FIDIC Conditions of Contract for Construction, Second Edition 2017. The Contractor shall not execute any Variation without prior written instruction from the Engineer. Claims for additional payment or time arising from Variations shall be submitted in accordance with the applicable requirements of the Conditions.

18. Annex – Project-Specific Data (To Be Completed)

The following project-specific information shall be inserted by the Employer prior to issue of the Tender Documents:

- Annex A – Instrument Index (to be provided as a separate Excel document)
- Annex B – Approved Manufacturer/Vendor List (AMVL)
- Annex C – Employer's Engineering Standards and Specifications
- Annex D – Hazardous Area Classification Drawings
- Annex E – P&IDs (latest revision)
- Annex F – Instrument Installation Standard Details
- Annex G – Document Submission Schedule
- Annex H – Project HSE Requirements

— End of Scope of Work —

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