شركة مياه الأردن – مياهنـا ذ.م.م.

JORDAN WATER COMPANY – MIYAHUNA LLC

C-T-21-0020 FARA 10

Supply and Install Static Water Flow for Large Water Consumers in Zarqa Governorate

توريد وتركيب عدادات إستاتيك لكبار مستهلكي المياه في محافظة الزرقاء

وثائق العطاء

Technical Specification

2021

VOLUME II

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ACRONYMS

Acronyms	
ANSI	American National Standards Institute
AWWA	American Water Works Association
BS	British Standards
BSP	British Standards Pipe
DAP	Delivered At Place
DI	Ductile Iron
DMA	District Meter Area
DN	Nominal Diameter
DZ	District Zone
EPDM	Ethylene Propylene Diene Methylene
GIS	Geographic Information System
ISO	International Organization for Standardization
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
MID	Measuring Instruments Directive
NBR	Nitrile Butadiene Rubber
NRW	Non-Revenue Water
NSF	National Science Foundation
OIML	The International Organization of Legal Metrology
PN	Nominal Pressure
QA	Quality Assurance
QC	Quality Control
RSS	Royal Scientific Society
SS	Stainless Steel
X7	PURCHASER Billing System
TRC	Telecommunication Regularity Commission
JSMO	Jordan Standard and Metrology Organization
Q1	Minimum flow rate, according to OIMLR 49
Q2	Transitional flow rate, according to OIMLR 49
Q3	Permanent flowrate, according to OIMLR 49
Q4	Overload flow rate, according to OIMLR 49

يجب على المناقص الالتزام بماجاءأدناه :

– ***Source and Nationality of Procurement(***

– Except as specified in this contract or as USAID may otherwise agree in writing, all goods financed under this contract shall have their "source," and the suppliers of all goods and services financed under this contract shall have their "nationality," in countries included in Geographic Code 935. Goods and services financed under this contract must be available for purchase in the applicable Geographic Code at the time of purchase. Geographic Code 935 includes: Jordan, the United States or a developing country (for a list of eligible developing countries, please see:

https://www.usaid.gov/sites/default/files/documents/1876/310maa.pdf.

– "Source" means the country from which a commodity is shipped to Jordan, or Jordan itself if the commodity is located in Jordan at the time of the purchase. Where, however, a commodity is shipped from a free port or bonded warehouse in the form in which received therein, ''source'' means the country from which the commodity was shipped to the free port or bonded warehouse.

– "Nationality" refers to the place of legal organization, ownership, citizenship, or lawful permanent residence (or equivalent immigration status to live and work on a continuing basis) of suppliers of commodities and services.

- الشحن البحري والجوي (Transportation)

The transportation of any shipments by ocean or air and related delivery services are requird to be transported by prevetlyowened United State vassel or air charter, other wise prior approval is required in writing from USAID through JWC-Miyahuna.

الاسعار المقدمة للعطاء غير شاملة الرسوم الجمركية والضريبة العامة على المبيعات ومعفى من الرسوم الجامعية والطوابع (حسب كتاب رئاسة الوزراء رقم 4455/6/10/56 بتاريخ 2009/3/4).

- Certificate of Conformity shall be submitted upon shipping.

INTRODUCTION

BACKGROUND

Miyahuna was established in 2007 as a limited liability company owned solely by the Water Authority of Jordan (WAJ). Miyahuna operates the water transmission networks in Amman and other cities around the Hashemite Kingdom of Jordan such as in Zarqa and Madaba governorates.

Miyahuna's responsibilities in Amman, Zarqa and Madaba include but are not limited to metering, billing, management of assets including primary, secondary and tertiary networks as well as water facilities such as reservoirs, water wells, pump stations … etc.

Miyahuna's customer metering is conducted using a variety of methodologies and technologies. Currently, Miyahuna uses multijet meters for domestic and commercial consumers. Meter readings are collected manually. Collected meter readings are entered into Miyahuna's X7 database which uses or supplies this data to other systems for billing and analysis, like its Customer Information System (CIS) and Geographic Information System (GIS). The issuing of system generated water bills to customers is conducted manually by Miyahuna staff, and these staff also collect payment from domestic users.

Miyahuna is looking to procure 112 Static meters for Zarqa's water large consumers at which will be connected to AMI in future. Also Miyahuna added 7 electromagnetic meters to be supplied to Miyahuna warehouse as per the BOQ. Moreover, The contractor will be responsible for installing the 111 static meters as per manufacturer technical specification.

All supplied meters; shall have all required accessories and data cables.

Moreover, the Bidder must be responsible for the installation of the water meters according to the manufacturer requirements and specifications; the Bidder may need to modify the installation of the existing meters and it is the Bidder responsibility for all related works and installation of any additional fittings, air release valves...etc if needed without any additional cost, all these fittings must be according to Miyahuna specifications and submittals to be provided to Miyahuna for approvals.

Before the implementation the Bidder must conduct a study, design and analysis phase, to revise the existing situation and supply conditions to come up with the optimum/ best installation conditions as well as meter sizing , in order to fit the site conditions and overcome any problems raised because of the intermittent supply. Miyahuna will provide the list of meter's locations after the tender award.

PROJECT OBJECTIVES

The process of collecting meter readings manually is time consuming and costly. In addition to the high costs, these legacy technologies and methodologies delay Miyahuna in collecting the

frequent and accurate information it needs to achieve its objectives in reducing Non-Revenue Water (NRW) and improving customer satisfaction.

To supply and install smart meters that supports AMI technology, Miyahuna has a series of related objectiveswhich are specific to AMIsystem activation in future for large water consumers:

- Reduce Cost – Reduce the effort required to read, transmit, store and archive meter readings and report on water consumption figures.
- Improve Frequency of Meter Readings – Get very frequent data to enhance the quality of management and billing information.
- Data Accuracy – Reduce human error associated with manual meter readings and the transmission, storage, archiving, and reporting of water consumption data.
- Increase Billing Accuracy and Reduce Complaints – Increase the ability to bill customers correctly due to improved quality of consumption data and therefore reduce the number of customer billing complaints due to incorrect meter readings and overcharging.
- Improved Management Information – Increase the capacity to generate information for proactive and reactive management to improve NRW reduction and predict water demand.
- Being Able to detect any change in the meter consumption behaviour because of a defected meter so Miyahuna can take the necessary action immediately, also to report the cases of Over and Under sized meters.

PROJECT OVERVIEW

The bidders will be responsible for delivering the Water Meters – Procurement and installation in accordance with meter manufacturer's specifications and AMI system requirements, and any required civil and electromechanical works.

In addition, the bidders are responsible for procuring electromagnetic flow meters to be supplied to Miyahuna Amman Warehouse.

PROJECT TIMELINE

The project will be divided into three phases. Details of the work including key outputs have been outlined in Table (1.1):

Table 1: Project Timeline and Key Outputs

No.	Phase	Details/Objectives/Activities	Timeline
1.	Pre-Project	Key procurement phases: i. RFP issued to bidders; ii. Supplier/Suppliers clarification phase; iii. Supplier/Suppliers submit bids; iv. Utility clarification phase; v. Contract award.	2month
2.	Supply meters	1. **112 static** meters for selected large water consumers in Zarqa governorate as per the technical specifications of the meters and Miyahuna selection criteria. The water flow meters shall be compatible with a two-way AMI system.	3months

No.	Phase	Details/Objectives/Activities	Timeline
		2. 7 electromagnetic flow meters with all required accessories, identification software and data cables to be supplied to Miyahuna Amman Warehouse.	
3.	Meter Installation	The supplier shall install the meters,in accordance with manufacturer's requirements and specifications	3months

Additional to the above mentioned activities this project includes:

- Provide training for 12 employees from Miyahuna Staff (Amman and Zarqa) to operate the meters.

Note:

- The Bidder must provide Miyahuna with all technical submittals along with all certificates required for valves, and fittings to be used and it is subjected to Miyhuna approval
-

PROJECT AREA DESCRIPTION

Miyahuna has decided to install an accurate metering system for 111 water large consumers in Zarqa as per the BOQ .

Miyahuna Zarqa will provide the supplier with a full set of data about the 111 water large consumers and location of the resources meters that will be replaced. The supplier will supply the proper static meters for these consumers and installing them. In addition to procure 7 electromagnetic water flow meters to be supplied to Miyahuna Amman warehouse with all accessories, identification software and data transfer cable.

METERING TECHNOLOGY AND BUSINESS OPERATIONS AT MIYAHUNA

Miyahuna Zarqa usually collects meter readings manually each month. However, Miyahuna is planning to bill large consumers each month and to read meters each day (daily reading) remotely in future.

TECHNICAL REQUIREMENTS AND SPECIFICATIONS

PROJECT REQUIREMENTS

No.	Subject	Requirement	Note
1.	Supply static for water large consumer and Electromagnetic meters	The Supplier shall supply 112 static for the designated water large consumers and 7 electromagnetic water flow meters to be supplied to Miyahuna Warehouse. All in accordance with the technical specifications of this tender.	
2.	Meter installation	The contractor will be responsible for the installation of the 111 static meters accordance with the manufacturer requirements and specifications.	
3.	Operations	The supplier following the completion of the works shall operate and maintain the meters.	

GENERAL REQUIREMENTS

No.	Subject	Requirement	Note
4.	Tools and Materials	The supplier shall be responsible for the supply of all fittings, equipment, tools and materials needed to install the meters.	

GENERAL TECHNICAL SPECIFICATIONS

All certificates (approval certificates, manufacturer experience certificate,…etc) must be submitted for the same place/factory where the meters to be manufactured, for all sizes required and for all flow ranges.

SCOPE OF APPLICATION

The water meter will be used for measuring and billing of residential and non-residential consumption of water subscribers. The supply of the water meters shall include all the necessary accessories for installation and operation. The water meters will be used for the measurement of cold water.

1.1.1 Water Supply Regime

Zarqa governorate is divided into 40 District Metered Area (called DMAs) fed by gravity from (5) main reservoirs located at the highest point of each zone, in areas where the difference in elevation is not enough to create the pressure needed for supply, elevated (tower) reservoirs are used.
Those DMAs are further divided into sub zones , two sub districts on average for each DMAs.
Water distribution has a special importance in Zarqa due to the scarcity of available water sources which doesn't make it possible to provide continuous water service for the city, thus, making us obligated to apply a strict program of water distribution to supply each zone with only 36-48 uninterrupted hours per week, because of this rationing provision of water, all households are designed with a storage roof tanks to store water during the day of supply and use it through the week, those storage tanks are of 3m3 capacity in average placed on roofs of the houses or buildings up to 25m high. Tanks are equipped with a float valve to prevent overflow.

1.1.2 Network Condition

• Oscillating pressure conditions, pressure of the network during water supply varies from 2 to 8 bars; pressure in some places might drop to less than 0.5 bars.
• Due to intermittent supply water can contain pressurized air bubbles especially at the beginning of the supply duration.
• Full pipe conditions at the meter inlet may not be guaranteed at all times.
• House connection pipes are of small diameters therefore increased flow speed; which causes particle transportation through the water meter and therefore increased deterioration.

1.1.3 Meter Installation Condition

- Theoretically as per our installation instruction meters must be installed in galvanized metal boxes, however in reality those conditions might not be met by the meter owner, some meters might be installed without a box or the box might be broken and the meter exposed.
- Meters are installed outside of the building within the premises of the building.
- Multiple meters serving multiple customers could be fitted on the same riser in parallel form.
- Water meters are usually not insulated against lower temperatures, frost conditions occasionally occur during the winter months
- For bulk meter it's mainly installed inside chamber or cabinet
- Installation as per manufacturer recommendations and approval of Purchaser

1.1.4 Water Quality

The meters will be used for the measurement of chlorinated potable water, within parameters assigned to the Jordanian drinking water specification No. 286/2015

ALL TYPES OF METERS OFFERED FOR THIS TENDER SHOULD BE FIT FOR ABOVE MENTIONED CONDITIONS AND ENVIRONMENT.

1.1.5 Ambient Conditions

All the water meters and accessories shall be in every respect suitable for storage, installation, use and operation in the conditions of temperature, humidity, the pH and water quality appertaining in Jordan.
Atmospheric temperature in Jordan varies between -15˚C and 60 ˚C

IMPORTANT NOTE:
ALL TYPES OF METERS OFFERED FOR THIS TENDER SHOULD BE FIT FOR ABOVE MENTIONED CONDITIONS AND ENVIRONMENT.

GENERAL APPLICATIONS

- All water meters and accessories supplied under this Contract must be of first quality, free from scale, lamination, honeycombs and other defects, and shall be designed to withstand the stated pressures and temperatures.

The Contract shall include the supply, delivery to and unloading into the required warehouse, of all water meters and accessories. Delivery and unloading shall take place within the working hours of the Purchaser.
All water meters and accessories shall belong to a class, which can withstand the max. Pressure, they will attain in service including any surge pressure.
The ends of water meters to accommodate couplings shall be faced and sized to the tolerances recommended by the manufacturer of the coupling.
Couplings (tail pieces) shall be provided with gaskets to give a true angle of 180° to the centre line of the coupling or fitting.
Before being dispatched from the place of manufacture the ends of the water meters, shall be suitably capped and covered to prevent any accumulation of dirt or damage.

REFERENCE TO STANDARDS

All supplied water meters shall conform tool the latest version of (JORDAN STANDARD (JS11) OR OIML R49 Standard), AWWA* or equivalent.
*Meters manufactured according to AWWA C715 must achieve all required specifications in this document and it is requested to submit third party conformity test report to prove the compliance.

APPLICABLE MATERIALS

Only the best quality and type of materials shall be used, which shall be suitable for the purpose intended. Unless otherwise specified, materials shall be selected by the Supplier but subject to Purchaser's representative's approval.
The materials shall be approved both mechanically and chemically to the operating conditions. In connecting units they shall be mechanically,

chemically and electro- chemically compatible with one another and with the environment.
Materials shall be selected to have adequate resistance against abrasion and corrosion, where necessary protective coating and lining shall be applied.

Materials in contact with the water shall be non-toxic and shall not affect the quality of the water.

The Supplier shall provide an analysis of the materials of manufacturer when requested to do so by the Purchasers representative.

For certain items specific materials are required as nominated in these specifications in such case, no alternative material will be accepted.

4.8 MARKING

Each meter shall be marked on the casing or display with the following information:

- At least one arrow to indicate the direction of flow.
- Nominal thread size
- Permanent flow rate
- Working Pressure
- Model identification
- Year of manufacture
- Serial number
- Approval or registration number
- Manufacturer's name
- Initials of purchaser name permanently affixed on the meter case.
- Tender number.

In case not indicated differently the information shall be cast onto the body or engraved on the lid or painted onto the counter housing or otherwise suitably marked.

WARRANTY

*This clause should be embedded in the tender special conditions
The bidder shall submit:

1. Two (2) years defect liability for all items by bank guarantee equal to 5% (to be determined according to the utility conditions but not less than 5%) of the contract amount for each batch, and to be valid for two (2) years from accepted HANDED OVER date.

2. Life time professional liability warranty for the performance (covered by a commitment letter from the bidder/ supplier and manufacturer)(NOTARY PUBLIC) as per the following:
   a. 10 years for Ultrasonic & Electromagnetic water meters: Defected item/items, is/are to be replaced at a cost taking in account a depreciation of 10% of the defected item/items value per year, running from the handed over date.
   b. 10 years for the battery without taking in account any depreciation.

Defect item/items, is/are to be replaced free of any charge including cost of return delivery, customs, and taxes (if applicable)

DOCUMENTS TO BE PROVIDED AT TIME OF TENDER

- Type Approval Certificate (from related authority), or Certificate of Conformity to the relevant Standard from an accredited certified third party.
  In addition to that for meters manufactured according to AWWA C715 it is requested to submit third party conformity test report to prove compliance with the required specifications in this document
- Certificate (from related authority or accredited certified third party) to show that the product can be used safely for potable water.
- Manufacturer experience certificates; a certificate from the manufacturer (self declaration) that he has at least 5 years in the field of Ultrasonic/Electromagnetic water meters.
- The supplier shall supply full technical specifications and catalogues in addition to compliance sheet for the items to be supplied at the time of tender.
- Endurance (or durability, wear …) test certificate from accredited third party.
- Certificate and test results for number of samples to be assigned by a chosen accredited certified international laboratory. Certificates and test results (back dated not exceeding (3) Three months) to be submitted with the offers, and shall including the following tests:
  - Static pressure test according to ISO 4064
  - Error of indication according to ISO 4064

All above documents must be valid and in English.
All above mentioned certificates shall be verified by JSMO (Jordan Standard and Metrology Organization)(all expenses must be borne by the contractor/Supplier)

- No objection from TRC

DOCUMENTS TO BE PROVIDED UPON DELIVERY

The Supplier shall submit at least the following documents:

- Certificate of origin
- Packing list
- Third Party inspection certificates
- Any other documents requested by the Purchaser and the hand over committee
- Manufacturer Installation recommendations
- Manuals and any software required to configure and extract the data from the meters
- All above documents must be valid and in English.

SUPPLY & QUALITY OF MATERIALS

All materials supplied shall be subjected to the following:

- Approval of the "master list" provided by the Supplier for all supplies and certified by the Engineer prior to shipment
- Pre-shipment inspection and certified quality and quantity of the supplies must be approved including verification of all shipment documents. A pre-dispatch inspection by the third party shall be done in the factory prior to supply to the utility stores.
- Inspection and approval of all supplied materials on arrival on site, of quality and quantity by the Purchaser taking over committee. And these activities will not cancel any test deemed to be necessary to verify that the characteristics and performance of the goods comply with the technical specifications and standard under this contract. (2nd third party)

All information and specifications relating to products and materials proposed for this Contract, must accompany each tender submission.

HANDLING AND TRANSPORTATION

The handling and transportation shall be in accordance with the manufacturer's recommendations.
The cost shall be included for in the bidder rates.

THIRD PARTY INSPECTION

The supplier is requested to provide in his technical offer three options for accredited international third party companies; the purchaser will choose one of them to perform the needed inspections.
The supplier is requested to call the chosen company to attend and witness the tests to be done at the manufacturer's testing premises or any place the manufacturer chooses.
The call for Third Party Company must include the main task of this company to ensure 100% complete matching between the product and what is required in tender/contract documents in terms of standards, specifications and conditions.
The course of inspection must include the following tests:
1. Static pressure test according to ISO 4064, OIML R49 or equivalent AWWA Standard
2. Error of indication according to ISO 4064, OIML R49 or equivalent AWWA Standard
A sample (size specified in the table below) is to be randomly chosen by the owner or third party representatives for the above mentioned tests; those tests must be witnessedby the third party representative and attended by (3) three representatives of the purchaser.
Acceptance/rejection criteria for those tests:
Static pressure
Error of indication

Test Sample Size (For each DN requested in the BoQ)

The number of Samples depend on number of meters in the BoQ as indicated in the table below

Quantity as per BoQ	Number of Samples to be tested
Number of meters ≤5	1
5< Number of meters ≤20	2
20 < Number of meters ≤50	3
50 < Number of meters ≤100	4
Number of meters≥100	5% of meters number

The inspection will include visual inspection, testing the accuracy under rated operating conditions at zero and 45 degrees rolling angle in addition to the magnetic effect.
Failure to achieve these criteria will result in rejecting the whole batch with the same sequence of serial numbers will be rejected and the supplier to manufacture a new batch and all the above procedure will be repeated.
Purchaser's representatives have the right to object or reject at any stage of testing and inspection.

The supplier is requested to inform the purchaser in written of the production time schedule and of testing time, duration and location in advance allowing enough time (not less than 2 months) for travel arrangements.
The Supplier shall provide the Purchaser with full reports and results of all tests performed during this inspection, for the performance tests specified above the report format should be according to Test Report Format OIML R 49-3 or equivalent ANSI/AWWA Standard
The Purchaser may require the Supplier to carry out any test and/or inspection not required by this Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications and standards under this Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to this Contract Price. Further, if such test and/or inspection impede the progress of manufacturing and/or the Supplier's performance of its other obligations under this Contract, due allowance will be made in respect of the delivery dates and completion dates and the other obligations so affected.
The Supplier shall provide the Purchaser with full reports and results of all tests performed during this inspection, for the performance tests specified above the re-port format shall be according to Test Report Format OIML R 49-3 or equivalent ANSI/AWWA Standard.
The goods shall be inspected before each shipment; the supplier is requested to call the chosen Third Party Company and purchaser's representatives to attend and witness the inspection to verify quality, quantity, packing, marking and loading and delivery to Miyahuna warehouses
The supplier shall bear all costs of inspection including (fees of third party, all travelling and accommodation plus per diems for the purchaser's representatives, the cost should be included in the tender unit price.
The third party inspection tests certificates shall include the following stages:
• Testing at the factory
• Packing, And the kind of inspection:
• Review document
• Witness inspection at least (visual and tests) and the test certificates must show the results.
• Before dispatching the supplies another visual inspection shall be done in respect of proper packing and to certify the Bill of Lading for each shipment.
• Loading and proper delivery to Purchaser warehouses.
JISMO .

Acceptance and approval from JISMO is the supplier sole responsibility.

ULTRASONIC BULK WATER FLOW METER FOR LARGE CONSUMERS

Water meters shall be designed for use in Mediterranean climate. Meters shall have a static design with no moving parts and mostly unrestricted flow conditions. In addition following facts shall be met.

- Restricted to or hindered tampering
- Improved lime resistance
- Improved sand resistance or High resistance to impurities
- Register with protective cover
- Battery operated
- Unaffected by solids contained in fluids
- The water meter accuracy will not be affected by the effect of magnetic field or stray current.
- Suitable for outdoor use.
- Suitable for any position installation
- In-line meter, Compact version
- No measurement of air.
- Protection class IP 68.
- The meter must have the ability to store data up to 3 months.
- For meters with DN >= 50 mm meters must be Equipped with cellular modules supports the operation of LTE module / or separate data logger that support cellular modules supports the operation of LTE Communication for Automatic meter reading, and for meters with DN less than 50 mm the meter must be equipped with Radio module for Automatic meter reading. The communication module must be of open protocol with a possibility to cooperate with the equipment from various manufacturers, No objection from TRC should be provided for the offered water meter or any supplementarydevices if needed by TRC.
- separate battery for the Communication module is preferable
- The interface of water flow meter should be universal and not limited for certain provider according to TRC requirements.

DIMENSIONS

Diameter: as specified in the bill of quantity.
The water meter dimensions shall be preferably as per ISO 4064-1

CONFIGRATION

The water meter shall be compact version.

TOTALIZER

The Ultrasonic water meter shall be equipped with LED, LCD or comparable kind of display showing at least 5 + 4 readable digits.

The meter register shall have minimum 5 digits and maximum 9 digits + prompts and the unit of Cumulative flow measurement shall be in cubic meters, instantaneous flow shall be (m3/h)). There shall be minimum 3 decimals places 1/1000 cubic meter for verification and testing.

The display shall be equipped with flow direction, low battery alarm, output mode, and leak detection.

The meter shall incorporate devices for elimination of condensation, where there is a risk of condensation forming on the underside of the window of the register.

FLOW RATES

meter size(inch)	3/4"	1"	1.25"	1.5"	2"	3"	4"	6"	8"	10"
meter size(mm)	20	25	32	40	50	80	100	150	200	250
Nominal flow rate Q3 >=(m3/hr)	4.0	6.3	6.3	10	16	40	100	250	400	630

Provided that:

R>=250 ,where R = Q3/Q1

Q1, Q2, andQ4 shall be as follows

The ratio Q_2 / Q_1 shall be 1.6.

The ratio Q_4 / Q_3 shall be 1.25.

The water meter has to provide very high measuring accuracy, especially at low flow conditions. The volume measuring component must conform to the requirements OIML R49 or equivalent ANSI/AWWA C715 Standard

The accuracy of the water meter shall not be affected by variation of flow rates, air flow and rolling.

DESIGN CONDITIONS

Water working temperature: 0.1°C up to 50°C.

The Maximum admissible pressure (MAP) is not less than 16 bars.

Pressure loss through the water meter shall not be greater than 0.63 bar

BATTERY

The Ultrasonic water meters shall be battery operated. The battery can be non- replaceable with a life time not less than ten years or replaceable with a life time not less than five years.

Replaceable battery: The manufacturer shall give precise rules for the replacement of the battery locally on site without affecting the protection class (IP 68).

The replacement of the battery shall be indicated on the meter and provide the possibility of indicating the next date of replacement after replacing the battery.

The properties and parameters of the meter shall not be affected by the interruption of the electrical supply when the battery is replaced.

The operation of replacing the battery may be carried out in a way that does not necessitate breaking the statutory metrological seal. When the battery can be removed without breaking the statutory seal, the battery compartment shall be protected by a tamper proof device, such as a seal authorized by the meter manufacturer or controlling authority.

Note: For water meter DN 50 and above battery should be replaceable

GROUNDING (EARTHING)

The Ultrasonic meters shall be capable to operate accurately without a need for grounding system.

CONNECTIONS

- -For DN>=2"
- The connection must be Flanged according to ISO 4064 standard
- -For DN<2"
    - The connection must be threaded end union and non-return valve must be supplied with the meter according to ISO 4064 standard and Install must be according to the manufacturer requirements.

Water Meter Body (Housing)

- For DN>=2":
- The water meter housing shall be epoxy coated cast iron, epoxy coated ductile iron, 304 Stainless Steel All external bolts and nuts are made of stainless steel.
- The reflectors if applicable shall be made of 316/316L Stainless Steel or better.
- For DN<2": The water meter housing shall be made of brass (preferred), composite material is allowed given that the measuring tube and threaded end connection must be of stainless steel, brass or bronze alloy.
- The reflectors if applicable shall be made of 316/316L Stainless Steel or better.

DELIVERY CONDITIONS

- All meters must be calibrated and sealed according to EEC regulation or equivalent.
- Meter must be supplied including:
- One set of Klinger seal gaskets, the gaskets for joints shall be of rubber, with a minimum thickness of one and a half (1.5) mm.
- Rubber ring gaskets shall be of vulcanized natural or synthetic rubber material. Reclaimed rubber must not be used.
- Internal non-return valve for DN <2" and Flanges for DN>=2"
- Any specific tools, equipment, software or materials needed for the programming, calibration, battery replacement and installation shall

be delivered within the package in sufficient quantities with a rate not less than 1/2000 meter, and included in the price of the meter.

PACKING, TRANSPORT AND STORAGE

- Each meter and its accessories should be supplied in separate individual box and packed in a captive form.
- All meters shall be adequately protected for the whole period of transport and storage against corrosion and accidental damage. The vendor/manufacturer shall be held responsible for the water meters and ensure that it reaches Purchaser store intact and undamaged. Meters shall be packed to withstand rough handling during transportation and all packages shall be suitable for storage.
- All packages shall have an indelible identification mark corresponding to the packing list.
- Meters shall be protected from exposure to sun light and against the effect of windblown sand and humidity from place of manufacture until delivery to Purchaser warehouse.

FACTORY WARRANTY

- Defect liability period and amount: refer to Warranty Section
- The battery life time shall be guaranteed by the manufacturer from the date of delivery, if the battery life expires before the provisioned life time the battery shall be replaced at no cost to the purchaser:
- Separate warranty documents should be submitted upon delivery.
- Warranty shall cover the total cost and the cost of proper replacement and commissioning.
- The accuracy of the meter shall be guaranteed by the manufacturer from the date of delivery for the whole provisioned life time, if the meter's accuracy degraded the meter shall be replaced at no cost to the purchaser, separate warranty documents shall be submitted upon delivery.
- The measuring element (reflector, mirrors, transducers, etc…) shall be guaranteed from the supplier and manufacturers that it will not be affected by the water passes through it and will not affect the durability and stability of the meter; the water meters shall be guaranteed against the water quality (solid particles, dirt's and

sedimentation) that no layer will be formed on the reflectors and it will not affect the accuracy or stability of the water meter during the period of meters warranty.

ELECTROMAGNETIC BULK WATER METERS FOR LARGE CONSUMERS

GENERAL

Water meters shall be designed for use in Mediterranean climate. Meters shall have a static design with no moving parts and mostly unrestricted flow conditions. In addition following facts shall be met.

- Restricted to or hindered tampering
- Improved lime resistance
- Improved sand resistance or High resistance to impurities
- Register with protective cover
- Battery operated
- Unaffected by solids contained in fluids
- The water meter accuracy will not be affected by the effect of magnetic field or stray current.
- Suitable for outdoor use.
- Suitable for any position installation
- In-line meter, Compact version
- No measurement of air.
- Protection class IP 68.
- Ability to store data up to 3 months.
- separate battery for the Communication module is preferable
- The interface of water flow meter should be universal and not limited for certain provider according to TRC requirements.

DIMENSIONS

- Diameter: as specified in the bill of quantity.
- The water meter dimensions shall be preferably as per ISO 4064-1

CONFIGURATION

The water meter shall be compact version or as required.

SPECIFICATION

Nominal Pressure	Not less than 16 bar
Medium Electrical Conductivity	≥20 us/cm
Lining Material	Rubber, Polyurethane or better
Electrode Material	316L SS, Hastelloy B, or better
Body Material	Measuring tube: stainless steel or better Housing: carbon steel or better
Fluid Temperature	0.1 ~ 50 °C
Protection Class	IP68

TOTALIZER

The Electromagnetic water meter shall be equipped with LED, LCD or comparable kind of display showing at least 5 + 4 readable digits.

The meter register shall have minimum 5 digits and maximum 9 digits + prompts and the unit of Cumulative flow measurement shall be in cubic meters, instantaneous flow shall be (m3/h)). There shall be minimum 3 decimals places 1/1000 cubic meter for verification and testing.

The display shall be equipped with flow direction, low battery alarm, output mode, and leak detection.

The meter shall incorporate devices for where there is a risk of condensation elimination of condensation, forming on the underside of the window of the register.

FLOW RATES

Meter size(inch)	2"	3"	4"	6"	8"	10"
meter size(mm)	50	80	100	150	200	250
Nominal flow rate Q3 >=(m3/hr)	63	100	160	400	800	1000

Provided that:

R>=250, where R = Q3/Q1

Q1, Q2, andQ4 shall be as follows

The ratio Q_2 / Q_1 shall be 1.6.

The ratio Q_4 / Q_3 shall be 1.25.

The water meter has to provide very high measuring accuracy, especially at low flow conditions. The volume measuring component must conform to the requirements OIML R49 or equivalent ANSI/AWWA C715 Standard

The accuracy of the water meter shall not be affected by variation of flow rates, air flow and rolling.

DESIGN CONDITIONS

Water working temperature: 0.1°C up to 50°C.

The Maximum admissible pressure (MAP) is not less than 16 bars.

Pressure loss through the water meter shall not be greater than 0.63 bar

BATTERY

The Electromagnetic water meters shall be battery operated. The battery can be non- replaceable with a life time not less than ten years or replaceable with a life time not less than five years.

Replaceable battery: The manufacturer shall give precise rules for the replacement of the battery locally on site without affecting the protection class (IP 68).

The replacement of the battery shall be indicated on the meter and provide the possibility of indicating the next date of replacement after replacing the battery.

The properties and parameters of the meter shall not be affected by the interruption of the electrical supply when the battery is replaced.

The operation of replacing the battery may be carried out in a way that does not necessitate breaking the statutory metrological seal. When the battery can be removed without breaking the statutory seal, the battery compartment shall be protected by a tamper proof device, such as a seal authorized by the meter manufacturer or controlling authority.

Note: For water meter DN 50 and above battery should be replaceable

GROUNDING (EARTHING)

If the metering unit required an electrical grounding/earthling system, the system should have an appropriate current carrying capability in order to serve as an adequate zero-voltage reference level in electrical circuit theory.
The price of grounding should be included with the total price of meter

CONNECTIONS

- -For DN>=2"
- The connection must be Flanged according to ISO 4064standard
- -For DN<2"
- The connection must be threaded end union and non-return valve must be supplied with the meter according to ISO 4064 standard.

Water Meter Body (Housing)

- For DN>=2":
- The water meter housing shall be epoxy coated cast iron, epoxy coated ductile iron, 304 Stainless Steel All external bolts and nuts are made of stainless steel.
- The reflectors if applicable shall be made of 316/316L Stainless Steel or better.
- For DN<2": The water meter housing shall be made of brass (preferred), composite material is allowed given that the measuring tube and threaded end connection must be of stainless steel, brass or bronze alloy.
- The reflectors if applicable shall be made of 316/316L Stainless Steel or better.

PACKING, TRANSPORT AND STORAGE

- Each meter and its accessories should be supplied in separate individual box and packed in a captive form.
- All meters shall be adequately protected for the whole period of transport and storage against corrosion and accidental damage. The vendor/manufacturer shall be held responsible for the water meters and ensure that it reaches Purchaser store intact and undamaged. Meters shall be packed to withstand rough handling during transportation and all packages shall be suitable for storage.
- All packages shall have an indelible identification mark corresponding to the packing list.
- Meters shall be protected from exposure to sun light and against the effect of windblown sand and humidity from place of manufacture until delivery to Purchaser warehouse.

FACTORY WARRANTY

- Defect liability period and amount: refer to Warranty Section
- The battery life time shall be guaranteed by the manufacturer from the date of delivery, if the battery life expires before the provisioned life time the battery shall be replaced at no cost to the purchaser:
- Separate warranty documents should be submitted upon delivery.
- Warranty shall cover the total cost and the cost of proper replacement and commissioning.
- The accuracy of the meter shall be guaranteed by the manufacturer from the date of delivery for the whole provisioned life time, if the meter's accuracy degraded the meter shall be replaced at no cost to the purchaser, separate warranty documents shall be submitted upon delivery.
- The measuring element shall be guaranteed from the supplier and manufacturers that it will not be affected by the water passes through it and will not affect the durability and stability of the meter; the water meters shall be guaranteed against the water quality (solid particles, dirt's and sedimentation) that no layer will be formed and it will not affect the accuracy or stability of the water meter during the period of meters warranty.

Although No objection and confirm compliance with TRC regulation for all meters and equipment related to communication for all parts of the system from TRC are required with the technical offer.

Gate Valve Specifications

Table of Contents

1. GENERAL

POTABLE WATER CERTIFICATION

All valves and its coating materials shall be certified for potable water use and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health, All material in contact with or likely to come into contact with water for public shall introduced with the requirements of Jordanian standard (JS 286) Whenever regulation changed it is the supplier /contractor responsibility to ensure conformity with any new requirements. Whenever potable water certificate is submitted for the coating material not the valve, the supplier shall furnish a document that relates this certificate with the valve itself.
All valves shall be certified as safe for transporting potable water by an independent testing laboratory.

TOXIC MATERIALS

All valves, coating, sealing and lining material shall be certified for potable water use and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health. The Contractor is prohibited to import or to use any of toxic or poisonous materials or sub materials used in piping, kinds of concrete or in soil in any kind of usage.

THIRD PARTY WITNESS

1.1.6 General

The supplier/contractor shall furnish an original certificate from the third party inspection agency showing all test results and analysis required by the applicable standard according to which the materials have been manufactured. The third party inspection agency shall under this contract, have witnessed the manufacture and testing operation to verify compliance with the technical specifications and the relevant standard. All certification should be from a certified third party from the applied standard (**American Standard)** and approved by Miyahuna, and the certification should be valid up to date and it should be written in English, and it must be shown in the certificate which batch is being tested to make sure that this certificate is for the right batch.

1.1.7 Valves

No valve shall be accepted unless all type and batch release tests have been passed. The contractor also is required to submit **quality assurance certificates, standard compliance and witness test certificate, from third party from the applied standard (American Standard) and approved by Miyahuna**,thatthe components of the network must not be of any way toxic to the water being conveyed. And can be fully used for the distribution of potable water to a temperature up to 50° C.

Before dispatching the supplies another visual inspection shall be done in respect of proper packing and to certify the Bill of Lading for each shipment.

TESTING AT PLACE OF MANUFACTURE

The Contractor shall submit a certificate from the manufacturer certifying that all the items have been mill tested (at the manufactory) and those they have successfully passed the relative tests prescribed by the relative standards specifications.

TESTING AFTER DELIVERY

Valves supplied shall be subjected to acceptance tests carried out by the Royal Scientific where Final inspection test must be done according to EN 12266-1/2

NOTE:

ALL COST TESTS BEFORE AND AFTER THIS ITEM AND WETHER LOCAL OR ABROAD SHALL BE BORNE BY THE CONTRACTOR AND THE COSTS SHALL BE INCLUDED IN THE TENDER UNIT RATES.

VALVES PACKAGING

- All valves must be packed in such a way to allow instant use on site without additional cleaning.
- All valves shall be securely packed in crates and boxes to prevent damage during delivery. The cost of packing shall be deemed to be included in the Contract Rates and crates will not be returned.
- Valves are normally supplied in separate cartons together with any associated small items, such as bolts and gaskets.

IDENTIFICATION

The supplier shall be responsible to ensure that each separate item, crate, or package has permanently attached to it, in a conspicuous position, an identification plate of weather - resistant material on which are engraved or stamped;

- **The Manufacturers Name**
- **Contents Description and Quantity**
- **Serial Number or Reference Number Identifiable on the Delivery Note and Cross Referenced to the Purchase Order Item References.**
- **Weight**

The shipment containers shall be marked with the following address;

Jordan Water Co. – MIYAHUNA L.L.C.

Tender Number – variable

In addition the container shall be marked with the following information;

- **Total gross weight**
- **Total net weight**
- **Packing list reference number**

DOCUMENTS TO BE PROVIDED AT TIME OF TENDER

1. **Conformity to Standard certificate from third party (Affidavit of Compliance) according to (ANSI/AWWA C509 or C515) or equivalent and compatible.**
    a. **This certificate must confirm the ability of the manufacturer to fulfill all required specifications and standard .**
    b. **The certificate should be certified from Jordan Institution for Standard and Metrology (JISM) with an official letter, the letter should be renewed annually**

2. Potable water certificate from Third Party NSF 61

3. The CONTRACTOR shall provide detailed repair manuals for the gate valves supplied;

4. Quality assurance certificate (ISO 9001).

5. Upon request, the Contractor has to provide test certificates from the manufacturer's internal quality control.

6. The supplier/ contractor shall supply full technical specifications and catalogues for the items to be supplied at the time of tender.

DOCUMENTS TO BE PROVIDED UPON DELIVERY

The contractor shall submit at least the following documents:

1. Certificate of origin.

2. Packing list

3. Third Party certificates (Affidavit of Compliance)

4. Warranty.

5- Installation and maintenance manual

6. Any other documents requested by the Engineer and the hand over committee

All above documents must be valid and in English.

MARKING

Markings shall include size, working pressure, name of manufacturer, and year of manufacture.

2. TECHNICAL SPECIFICATIONS

2.1 GENERAL

1. **Gate valves shall be Resilient seated**, non rising stem and shall be comply with all specifications and standards mentioned below or equivalent and compatible.
2. Valves must be according to ANSI/AWWA C509 or C515, conformity to standard certificate must be submitted at time of the tender.
3. All valves shall have flanged ends design. push-on jointsubmitted upon request.
4. The valve must be submitted with the following accessories :
   - Flanges
   - Gaskets
   - Bolts, nuts and washers

Part Name		Material
Body, wedge and bonnet (16-25 bar)or (250-300 PSI)		ductile iron shall conform to the requirements of ASTM A395 or ASTM A536..
Gaskets and O- rings		Gasket material shall be made of inorganic mineral fiber, rubber composition, or paper that is fee from corrosive ingredients. O-Rings or other suitable elastomeric seals may be used for gaskets.
Hand Wheel and Bonnet Cap		ductile iron shall conform to the requirements of ASTM A395 or ASTM A536..
seat	Resilient seat	Wedge full lining with EPDM for water system for pressure (16 – 25)bars or (250-300) PSI. According to AWWA C509 or C515.
Valve stem(shaft)		cast, forged or rolled bronze grade B, C, D or E Stem nuts shall be grade A,B,C,D or E bronze.

Stem nuts	low zinc bronze,SS304,SS316, nickel copper alloy
External nuts, ,washer and bolts	Stainless Steel . ASTM A240, UNS Designation S30400 or S31600, ASTM A276, UNS Designation S30400 or S31600, ASTM A743, grade CF8 or CF-8M, or ASTM A564, UNS Designation S17400

- Surface box
- Hand wheel

2.2 MATERIAL

2.3 DESIGN

- **Gate valve is face to face dimension sand shall be flanged design in accordance with EN1092-2 / ISO 7005 for pressure range (16, 25)bar. or equivalents,** in accordance with the details stated on the Drawings and in the Bill of Quantities.
- **ROTATION OF OPENING:**

  All valves shall open by turning to the left or counterclockwise, when viewed from the stem.All gate valves shall have closing, opening indicators and an arrow cast in the metal to indicate the direction to open.

2.4 COATING

All iron components of the valve shall becoated (internal and external)with a minimum 250μmfusion bonded epoxycoating in accordance withAWWA C550 and shall be ANSI/NSF 61 and NSF 372certified,the coating shall be non-toxicand impart no taste to water.

2.5 VALVE TESTING

Prior to shipment from the factory, 5% of each size and class should be tested with a minimum (one valve of each size and class), the tests should be applied in accordance with AWWAC509/C515Hydrostatic test,Torque test, Leakage test and Pressure Test, all reports should be in English, and it must be shown in the certificate it is for the right batch delivered to Miyahuna.

Ball Valve specifications

Contents

Ball Valve specifications
1. General

1.1 Ambient Conditions

All valves and their accessories shall be in every respect suitable for storage, installation, use and operation in the conditions of temperature, humidity and The PH and water quality appertaining in Jordan.

Where the valve must withstand the following conditions:

- Liquid : Chlorinated , 3-5 ppm, potable water
- Working Temperature: Reaches up to 40˚ C

Atmospheric temperature in Jordan varies between -10˚C and 50 ˚C.

1.2 POTABLE WATER CERTIFICATION

All valves shall be certified for potable water use, and all valves and their accessories should be certified as safe for being use for potable water by an independent testing laboratory.
All material in contact with or likely to come into contact with water for public supply shall be introduced with the requirements of BS 6920 (suitability for non metallic products for use in contact with drinking water) or any equivalent standard and the requirements of EN 15664 (influence of metallic materials on water intended for human consumption) or any equivalent standard as well as the Jordanian standard (JS 286/2008) and the World Health Organization standard (WHO), and whenever the regulation is changed it is the supplier responsibility to ensure conformity with any new requirements.

Potable water certificate submitted must be submitted at time of tender. Certificates must be in English. Offers without potable water certificates will be rejected.

1.3 TOXIC MATERIALS

Valves, their protective coatings and accessories, that will or may come into contact with potable water shall not constitute a toxic hazard, shall not support microbial growth, shall not cause taste or odour, cloudiness or discolouration of the water and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health .
Non toxicity certificate should be provided.

1.4 THIRD PARTY WITNESS

The supplier shall furnish an original certificate from third party inspection agency showing all test results and analysis required by the applicable standard (EN 12266-1/2), where test certificates is required. The third party inspection agency shall under this contract, have witnessed the manufacture and testing operation to verify compliance with the technical specifications and the relevant standard. The third party inspection agency shall verify that all materials used are eligible for the relevant standard productions requirements. All certification should be from a certified and approved third party, and the certificates must be related to the same batch delivered to Miyahuna, all certificates must be valid and written in English.

The supplier must submit at least 3 different international third party companies where Miyahuna will choose one of them.

1.5 TESTING AFTER DELIVERY

All valves supplied to the site in Jordan shall be subjected to acceptance tests carried out by the Royal Scientific Society. Or similar accredited authority. Final inspection tests must be done in accordance with the test requirements of EN 12266-1/2. If any of the tests mentioned in the standards cannot be performed by the Royal Scientific Society then the supplier should provide a third party certificate for those tests taking into considerations all the statements mentioned in "third party witness" section.

All testing costs should be borne by the supplier in all cases.

1.6 VALVES PACKING AND PROTECTION

- All valves must be packed in such a way to allow instant use on site without additional cleaning.
- All valves shall be securely packed in crates and boxes to prevent damage during delivery. The cost of packing shall be deemed to be included in the Contract Rates and crates will not be returned.
- Valves are normally supplied in separate cartons together with any associated small items, such as bolts and gaskets.

1.7 IDENTIFICATION

The supplier shall be responsible to ensure that each separate item, crate, or package has permanently attached to it, in a conspicuous position, an identification plate of weather - resistant material on which are engraved or stamped;

- **The Manufacturers Name**
- **Contents Description and Quantity**
- **Serial Number or Reference Number Identifiable on the Delivery Note and Cross Referenced to the Purchase Order Item References.**
- **Weight**

The shipment containers shall be marked with the following address;

Jordan Water Co. – MIYAHUNA L.L.C.

Tender Number – variable

In addition the container shall be marked with the following information;

- **Total gross weight**
- **Total net weight**

- **Packing list reference number**

1.8 TRANSPORT AND DELIVERIES

- The supplier shall send to the Purchasers, one-week advance notice of all consignments of materials. Every consignment shall be accompanied by a detailed delivery note.

- The supplier shall deliver to and off load the materials onto the storage area as directed by the Purchasers. All materials delivered will be examined and inspected by the Purchaser and taken over by him.

- The supplier shall provide necessary details to the shipping line on precautions to be taken during loading/unloading, handling & transport of the valves and other components. Supplier shall provide to the purchaser a set of recommendations of manufacturer for handling, loading, unloading, transporting and storing of valves.

- The Purchaser shall arrange reception and storage areas only. The supplier shall be responsible for off-loading all materials.

- The materials shall be delivered to the Purchaser at ***Miyahuna stores***, Amman or any other place chosen by the Purchaser.

- The supplier shall also be responsible for all handling and transport activities up to Miyahuna store-yard, Amman

- **The (DDP) price shall include all costs relating to above-mentioned requirements.**

1.9 HANDLING

Care shall be taken during loading, transporting, and unloading. Under no circumstances shall valves be dropped or rolled against one another. All valves shall be examined. Any damaged materials must be rejected by the Purchasers.

1.10 DETAILS TO BE PROVIDED AT THE TIME OF TENDER

1. The supplier shall supply full technical specifications and catalogues for the items to be supplied.

2. Dates of batches or consignment deliveries.

3. Any alternative standards proposed including demonstration of equivalency or superiority to the standard specified, if allowed.

4. Any alternative materials proposed including demonstration of equivalency or superiority to the standard specified, these alternative materials should be subjected to the clients approval.

5. ISO or EN certification for management and product.

2. Ball valve

2.1 TECHNICAL SPECIFICATIONS

- Working pressure: 16 bar or higher
- Nominal Diameter: 1/2" , 3/4" , 1" and 2"
- The design of the ball valve must ensure completely clear of the waterway when valve is full open, in such away permitting a "full flow" throw the valve equal to the nominal pipe diameter.

2.2 MATERIAL

The Material of each part of the ball valve is shown in table 2.1 below.

Table 2.1 Materials

NO	PART NAME	MATERIAL
1	BODY	Stainless Steel : EN 10088-3-2, EN 10213, EN 10272 Or CW617N according to EN 1240 , EN 12165:2011, EN 1982
2	BALL	CW617N according to EN 12165:2011 chromium plated Ball Or Stainless Steel : EN -10088-3-2
3	HANDLE	Steel or Aluminum

2.3 DESIGN OF VALVE

Valves shall be a manually operated ball rotates about an axis at right angle to the direction of flow and in the open position; the flow passes through the ball in the straight line with a normal operating position of either fully open or fully closed, Ball valves will be opened or closed by a single turn through 90°.

1. Straight pattern valves.
2. Full bore ball valves.
3. Two piece design.
4. Double female threaded in accordance with BS 21.

5. Lever handle operated. (end positions “open and closed” shall be identified and limited by fixed, non adjustable stops, a manual lever handle shall be designed so that it is
   - Perpendicular to the direction of the flow for “close” position.
   - Parallel to the direction of the flow foe “open” position.

2.4 COATING

Coating material if applicable must be suitable for potable water uses.

2.5 MARKING

Markings shall be in accordance with EN 19 and shall include the following:

- Nominal Size.
- Working pressure.
- name of manufacturer,
- Year of manufacture.
- “Miyahuna”.

APPENDIX 1

REFERENCE STANDARDS

Standard Number	Description
BS 6920	Testing of non-metallic components with regards to their effect of the quality of water
EN 15664	influence of metallic materials on water intended for human consumption
EN 12266-1	Industrial valves - Testing of metallic valves - Part 1: Pressure tests, test procedures and acceptance criteria - Mandatory requirements
EN 12266-2	Industrial valves - Testing of metallic valves - Part 2: Tests, test procedures and acceptance criteria - Supplementary requirements
EN 12165:2011	Copper and copper alloys. Wrought and unwrought forging stock
EN 10088-2	Stainless steels. Technical delivery conditions for sheet/plate and strip for general purposes
EN 10088-3	Stainless steels. Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes
EN 1982	Copper and copper alloys. Ingots and castings
EN 19	Marking of general purpose industrial valves
EN 13828 : 2003	Building valves – Manually operated copper alloy and stainless steel ball valves for potable water supply in buildings – Tests and requirements

AIR VALVES

1.1.1 General

This specification describes ½-in. (13 mm) through 6 in (150-mm) air-release valves and ½-in. (13-mm) through 20-in. (500-mm) and combination air valves. The valves are designed for use in water systems with maximum working pressures of 25 bar and water temperatures ranging from above freezing to a maximum of 125°F (52°C).

The working pressure of air valves shall be 250, 300 PSI or 16,25 bar as specified in the Bill of Quantities.

Air valves shall conform to the latest edition of AWWA C512 or BS EN 1074.

The air valve shall be tested and certified as a complete drinking water valve according to NSF 61, WRAS, or equivalent recognized standards.

Air Valves smaller than DN 50 mm shall be female thread inlet connection and larger air valves shall have Flanged inlet, the flange shall comply with (EN 1092-2 / ISO 7005)PN16 and PN25 or 250, 300 PSI as specified in the Bill of Quantities.

Single Air Release Valve

The air release valve shall be of the float operated, simple lever or compound lever design, and capable of automatically releasing accumulated air from a fluid system while the system is pressurized and operating.

The valve body and bonnet (cover) shall be of ductile iron ASTM A536 65-45-12 or EN-JS 1030 (GGG 40) according to EN 1563 or cast iron to Cast Iron ASTM A126 Class B or BS EN 1561 EN-GJL-250.

The cover shall be bolted to the body and all internal components shall be replaceable through the cover.

Valve internal and exteriors shall be coated with a minimum 250µm fusion bonded epoxy coating in accordance with AWWA C550 or EN 14901 Float balls shall be of stainless steel, all seals shall be of EPDM or Buna-N Rubber suitable and approved for potable water and all internal parts shall be of stainless steel.

All bolts and nuts shall be of stainless steel.

Combination Air Valve

Combination Air Valves shall be in two body style: large orifice air and vacuum valve and small orifice air release valve.

The valve shall be with a venting orifice no smaller than the nominal valve size.

All Internal parts and the float ball shall be spherical and made of stainless steel grade 316.

Body and bonnet (cover) shall be of ductile iron ASTM A536 65-45-12 or EN-JS 1030 (GGG 40) according to EN 1563 or cast iron to Cast Iron ASTM A126 Class B or BS EN 1561 EN-GJL-250.

The cover shall be bolted to the body and all internal components shall be replaceable through the cover.

Float balls shall be of stainless steel, all seals shall be of EPDM or Buna-N Rubber suitable and approved for potable water and all internal parts shall be of stainless steel.

Valve internal and exteriors shall be coated with a minimum 250μm fusion bonded epoxy coating in accordance with AWWA C550 or EN 14901

1.1.2 Marking

Each valve shall be marked by body markings or a corrosion-resistant nameplate, or both, that clearly indicate the manufacturer's name or trademark, size of the valve, and the designation of the maximum working pressure rating of the valve for water serviceand year of manufacture and model number.

1.1.3 Data to Be Provided by Manufacturer or Supplier at time of tender

The manufacturer or supplier shall provide the following information:

- Conformity to Standard certificate from third party (latest edition of AWWA C512 .)
- Catalog data. The catalog data shall include illustrations, valve performance data, a parts schedule that identifies the materials used for various parts, and the total net assembled weight for each valve size.
- Certified drawings, a set of certified drawings shall include principal dimensions, construction details, and materials used for all parts of the valve.
- Operating manual. An operating manual shall include the manufacturer's installation and operating instructions, a recommended list of spare parts, and the maintenance procedures. The contents shall be sufficiently detailed to direct the assembly and disassembly of the valve and for the ordering of parts.

1.1.4 Data to Be Provided by Manufacturer or Supplier upon delivery

1. Certificate of origin.
2. Packing list
3. **The supplier/contractor shall furnish a testing report from the internal quality assurance in the factory showing all test results and analysis required by the applicable standard (Shell test, Hydrostatic test and Operational test). All reports should be in English, and it must be shown in the certificate which batch is being tested to make sure that this certificate is for the right batch delivered to Miyahuna.**
4. **Warranty, installation and maintenance manual**
5. Any other documents requested by the Engineer and the hand over committee

All above documents must be valid and in English.

DESCRIPTION **DETAILS**

Manufacturer :

Country of Source (check Source definition (3.1.C/Volume 1)) :

Country of Nationality(check Nationality definition (3.1.C/Volume 1)) :

Type :

Pressure Nominal [PN] : bars

Hydrostatic test pressure : bars

Type of connection (threaded/flanged) :

De-aeration capacity [m³/h] :

Operating pressure (min – max) [bar] :

MATERIAL SPECIFICATIONS

Materials according to EN no. :

Body of valve to EN :

Valve chamber covers [material no.] :

Float ball [material no.] :

Float cage [material no.] :

Gaskets [material no.] :

CORROSION PROTECTION

1) internal protection of valves [material / thickness] :

2) external protection of valves [material / thickness] :

Weight [kg] :

NOTE:

1) If features are not applicable - enter N / A
2) Data have to be filled in „LEGIBLY“

The following technical documents shall be submitted together with this „Schedule of Particulars“:

a) a technical leaflet of air valve with specification

COMPINED AIR RLEASE VALVE

DESCRIPTION **DETAILS**

Manufacturer :

Country of Source (check Source definition (3.1.C/Volume 1)) :

Country of Nationality(check Nationality definition (3.1.C/Volume 1)) :

Type :

Pressure Nominal [PN] : bars

Hydrostatic test pressure : bars

Type of connection (threaded/flanged) :

De-aeration capacity [m³/h] :

Operating pressure (min – max) [bar] :

MATERIAL SPECIFICATIONS

Materials according to EN no. :

Body of valve to EN :

Valve chamber covers [material no.] :

Float ball [material no.] :

Float cage [material no.] :

Gaskets [material no.] :

CORROSION PROTECTION

1) internal protection of valves [material / thickness] :

2) external protection of valves [material / thickness] :

Weight [kg] :

NOTE:

1) If features are not applicable - enter N / A
2) Data have to be filled in „LEGIBLY“

The following technical documents shall be submitted together with this „Schedule of Particulars“:

a) a technical leaflet of air valve with specification

Table of Contents

1. GENERAL

1.1 POTABLE WATER CERTIFICATION

All fittings, gaskets and materials shall be certified for potable water use, and all pipes and materials should be certified as safe for transporting potable water by an independent testing laboratory. All material in contact with or likely to come into contact with water for public shall introduced with the requirements of BS 6920 (suitability for non metallic products for use in contact with drinking water) or any

equivalent standard as well as the Jordanian standard (JS 286/2008) and the requirements of EN 15664 (influence of metallic materials on water intended for human consumption) or any equivalent standard and the World Health Organization standard (WHO), and whenever the regulation is changed it is the supplier responsibility to ensure conformity with any new requirements.
Potable water certificate submitted must be for the same batch delivered to Miyahuna, certificates must be in Englishand from third party.

1.2 TOXIC MATERIALS

All fittings, coating, sealing and lining material shall be certified for potable water use and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health. Pipes and pipeline components, including their protective coatings and joint materials, that will or may come into contact with potable water shall not constitute a toxic hazard, shall not support microbial growth, shall not cause taste or odour, cloudiness or discolouration of the water and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health .
Non toxicity certificate should be provided in English.

1.3 THIRD PARTY WITNESS

The supplier/contractor shall furnish an original certificate from third party inspection agency showing all test results and analysis required by the applicable standard according to which the materials have been manufactured. Thethird party inspection agency shall under this contract, have witnessed the manufacture and testing operation to verify compliance with the technical specifications and the relevant standard. All certification should be from third party, and the certification should be valid and up to date, in English, and it must be shown in the certificate which batch is being tested to make sure that this certificate is for the right batch delivered to Miyahuna.
The third party inspection agency shall verify that all materials used are eligible for the relevant standard productions requirements. No fittings shall be accepted unless all type and batch release tests have been passed. The third party must clearly identify the fittings production date / code marked on the fittings, with each batch test performed.

The supplier must submit at least 3 different international third party companies where Miyahuna will choose one of them.

1.4 TESTING AFTER DELIVERY

All materials supplied shall be subjected to acceptance tests carried out by the Royal Scientific Society to confirm that the pipes are manufactured according to EN 545-2010.

In the case the delivery was made on more than one consignment, each consignment will be tested to confirm the compliance with above standard.

NOTE:

ALL COST TESTS BEFORE AND AFTER THIS ITEM AND WETHER LOCAL OR ABROAD SHALL BE BORNE BY THE CONTRACTOR AND THE COSTS SHALL BE INCLUDED IN THE TENDER UNIT RATES.

1.5 FITTINGS PACKAGING

- All fittings must be packed in such a way to allow instant use on site without additional cleaning.
- All fittings shall be securely packed in crates and boxes to prevent damage during delivery. The cost of packing shall be deemed to be included in the Contract Rates and crates will not be returned.
- Fittings are normally supplied in separate cartons together with any associated small items, such as bolts and gaskets.

1.6 IDENTIFICATION

The supplier shall be responsible to ensure that each separate item, crate, or package has permanently attached to it, in a conspicuous position, an identification plate of weather - resistant material on which are engraved or stamped;

- **The Manufacturers Name**
- **Contents Description and Quantity**
- **Serial Number or Reference Number Identifiable on the Delivery Note and Cross Referenced to the Purchase Order Item References.**
- **Weight**

The shipment containers shall be marked with the following address;

Jordan Water Co. – MIYAHUNA L.L.C.
Tender Number – variable

In addition the container shall be marked with the following information;

- **Total gross weight**
- **Total net weight**
- **Packing list reference number**

2. DUCTILE IRON FITTINGS

2.1 GENERAL

5. Ductile iron fittings shall comply with all specifications and standards mentioned below or equivalent and compatible.
6. Ductile iron fittings shall be sand cast in accordance with the European Standard EN 545:2010 or equivalent and compatible.
7. Each Socket joint shall be supplied with its EPDM gasket.
8. All fittings must confirm with the requirements of norms and standards, and should be suitable to be used in conjunction with pressure pipes to the appropriate

EN standards.

9. All fittings must have molded-in identification and appropriate product information
10. All fittings must be packed in such a way as to avoid surface oxidation and should only require cleaning before installation.
11. The joints of ductile iron (DI) fittings shall be according to the above mentioned standards, and all flanged for Tapers and T-Piece and for bends spigot-socket TYTON.

2.2 MATERIALS

1. of ductile iron EN-GJS-400-18 acc. to EN 1563 (GGG 400 - DIN 1693) or equivalent and compatible.

2. All gaskets shall be of EPDM rubber according to EN681-1:2006or equivalent and compatible.

3. Flat gaskets shall be fiber reinforced for PN16, or Flat gaskets of NBR rubber, according to EN681-1:2006or equivalent and compatible.

2.3 DESIGN

1. Dimension Range: above DN 100
2. Working pressure: PN 16, PN25 or PN40 (based on BOQ)
3. Fittings unless otherwise specified shall be of flanged type compatible with the pipe system
4. Flange dimensions and drilling according to EN 1092-2.
5. Flanged fittings shall be supplied with flat gasket, galvanized 8.8 bolts & nuts & washers according to required length and size M16, M20, M24, M27.
6. The DI bends shallbe designed and manufactured as automatic push-on joint type installed along and with DI pipes of type socket-spigot, fittings such as T-pieces and tapers shall be of flanged type drilled to required PN.
7. Bolts shall be according to ISO 4016 and nuts to EN 24034 inclusive washers.

2.4 COATING

Epoxy powder coated inside and outside:

All fittings, accessories and pipes not centrifugally cast shall be delivered externally and internally coated either by a paint coating in conformity with 4.6.2 or by an epoxy coating in conformity with **EN 14901**

in accordance with quality and test requirements of RAL-GZ 662, RAL 5015 or RAL 5005.

- coating thickness: min. 250 µm

- The epoxy coating adhesion shall achieve an average value of at least 8 MPa and a minimum single value of 6 MPa

2.5 DOCUMENTS TO BE PROVIDED AT TIME OF TENDER

1. **Conformity to Standard certificate from third party. (EN 545:2010) or equivalent and compatible.**
    a. This certificate must confirm the ability of the manufacturer to fulfill all required specifications and standard .
    c. The certificate should be certified from Jordan Institution for Standard and Metrology (JISM) with an official letter, the letter should be renewed annually

2. Potable water certificate
3. Quality assurance certificate (ISO 9001).
4. Internal Quality System
5. Upon request, the Contractor has to provide test certificates from the manufacturer's internal quality control.
6. The supplier/ contractor shall supply full technical specifications and catalogues for the items to be supplied at the time of tender.
7. Detailed manufacturer's proposals for pipes and fittings manufacture, coating and lining etc
All above documents must be valid and in English.

2.6 DOCUMENTS TO BE PROVIDED UPON DELIVERY

The contractor shall submit at least the following documents:
1. Certificate of origin.
2. Packing list
3. Third Party inspection reports from third party (inspection including all the tests required in the standard)
4. Any other documents requested by the Engineer and the hand over committee
All above documents must be valid and in English.

2.7 MARKINGS OF FITTINGS

All fittings shall be legibly and durably marked and shall bear at least the following information:

The marking shall show at least the following information:

- The manufacturer 's name or mark
- The identification of the year of manufacture
- The identification as ductile iron
- The DN
- The PN rating of flanges when applicable
- The reference top this standard
- The class designation of centrifugally cast pipes when other than K9

- Third party
- MIYAHUNA tender No
- Production period ((YEAR))
- Water , ” to indicate that pipes or fittings are intended for potable water”

Galvanized Iron Fittings specifications

Galvanized Iron Fittings specifications

1. General

1.1 AMBIENT CONDITIONS

All Fittings, materials and equipments shall be in every respect suitable for storage, installation, use and operation in the conditions of temperature, humidity and The PH and water quality appertaining in Jordan.

Atmospheric temperature in Jordan varies between -10˚C and 50 ˚C.

1.2 POTABLE WATER CERTIFICATION

All Fittings and materials shall be certified for potable water use, and all fittings and materials should be certified as safe for transporting potable water by an independent testing laboratory. All material in contact with or likely to come into contact with water for public shall introduced with the requirements of BS 6920 (suitability for non metallic products for use in contact with drinking water) or any equivalent standard as well as the Jordanian standard (JS 286/2008) and the requirements of EN 15664 (influence of metallic materials on water intended for human consumption) or any equivalent standard and the World Health Organization standard (WHO), and whenever the regulation is changed it is the supplier responsibility to ensure conformity with any new requirements.
Potable water certificate submitted must be for the same batch delivered to Miyahuna, certificates must be in Englishfrom third party.

1.3 TOXIC MATERIALS

Fittings and components, including their protective coatings and joint materials, that will or may come into contact with potable water shall not constitute a toxic hazard, shall not support microbial growth, shall not cause taste or odour, cloudiness or discolouration of the water and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health .
Non toxicity certificate should be provided.

1.4 THIRD PARTY WITNESS

The supplier must submit at least 3 different international third party companies where Miyahuna will choose one of them.
The supplier shall furnish an original certificate from a third party inspection agency showing all test results and analysis required by the applicable standard (EN 10255/ BS 143) according to which the materials have been manufactured. The third party inspection agency shall under this contract. The third party inspection agency shall verify that all materials used are eligible for the relevant standard productions requirements. All certification should be from a certified and approved third party, and the certificates must be related to the same batch delivered to Miyahuna, all certificates must be valid and written in English.

1.5 TESTING AFTER DELIVERY

All materials supplied to the site in Jordan shall be subjected to acceptance tests carried out by the Royal Scientific Society. Or similar accredited authority. The test should confirm that the materials and fittingsare manufactured according to EN 10255 or BS 143 or equivalent; all Tests required in this standard must be performed. If any of the tests mentioned in the standards cannot be performed by the Royal Scientific Society then the supplier should provide a third party certificate for those tests taking into considerations all the statements mentioned in “third party witness” section.

All testing costs should be borne by the supplier in all cases.

1.6 FITTINGS PACKING AND PROTECTION

- All fittings must be packed in such a way to allow instant use on site without additional cleaning.
- All fittings shall be securely packed in crates and boxes to prevent damage during delivery. The cost of packing shall be deemed to be included in the Contract Rates and crates will not be returned.
- Fittings are normally supplied in separate cartons together with any associated small items, such as bolts and gaskets.

1.7 TRANSPORT AND DELIVERIES

- The supplier shall send to the Purchasers, one-week advance notice of all consignments of materials. Every consignment shall be accompanied by a detailed delivery note.

- The supplier shall deliver to and off load the materials onto the storage area as directed by the Purchasers. All materials delivered will be examined and inspected by the Purchaser and taken over by him.

- The Supplier shall provide necessary details to the shipping line on precautions to be taken during loading/unloading, handling & transport of the fittings& fittings and other components. Supplier shall provide to the purchaser a set of recommendations of manufacturer for handling, loading, unloading, transporting and storing of polyethylene fittings

- The Purchaser shall arrange reception and storage areas only. The supplier shall be responsible for off-loading all materials.

- The materials shall be delivered to the Purchaser at Miyahuna stores, Amman or any other place chosen by the Purchaser.

- The supplier shall also be responsible for all handling and transport activities up to Miyahuna store-yard, Amman

- **The (DDP) price shall include all costs relating to above-mentioned requirements.**

1.8 HANDLING

Care shall be taken during loading, transporting, and unloading to prevent damage to the fittings. Under no circumstances shall fittings or fittings be dropped or rolled against one another. All fittings and fittings shall be examined. Any damaged materials must be rejected by the Purchasers.

1.9 DETAILS TO BE PROVIDED AT THE TIME OF TENDER

6. Conformity to standard certificate from third party.
7. Potable water certificate.
8. ISO 9001.
9. Manuals and technical catalogues
10. Dates of batches or consignment deliveries.
11. The supplier shall state which of the sections of the schedule of requirements he proposes to price and supply.
12. Any alternative standards proposed including demonstration of equivalency or superiority to the standard specified, if allowed.
13. Where the supplier offers alternative standards, materials to those specified, the supplier shall provide prices for those specified and the alternatives proposed.
14. The supplier shall provide full details of his materials tests and procedures.

1.10 DOCUMENTS TO BE PROVIDED UPON DELIVERY

The contractor shall submit at least the following documents:

1. Certificate of origin.
2. Packing list

3. Third Party inspection reports (inspection including all the tests required in the standard)

4. Any other documents requested by the Engineer and the hand over committee

5. All above documents must be valid and in English.

1.11 MANUALS AND TECHNICAL SPECIFICATIONS

The supplier shall supply full technical specifications for the items to be supplied at the time of tender. In addition he shall provide full instruction manuals, which describe the correct methods and procedures necessary to construct the pipeline system in accordance with best practice. Conformity to standard certificate must be supplied at time of tender where this certificate must be issued from a certified third party and valid up to date.

2. Galvanized Steel fittings

1. Scope of use
The fitting must be according to EN 10255 or BS 143 or equivalentand shall be used with heavy series of pipes according to BS EN 10255.
It must also be suitable for potable water use.
2- Designation
The fittings shall be Malleable Cast-Iron Screw down pipe fittings in accordance with BS EN 10242-1995 or approved equal.
3- Threading
Threads must be in accordance with EN 102266-1 and EN 10226-2 and EN 10226-3
4- Working pressure
Working pressure shall not be less than 16 bar with 24 bar hydrostatic pressure test.

5- Galvanization

The fittings shall be (EE, GF, CRANE or equivalent in quality) , andhave an adequate corrosion protection of internal and external surfaces by mean of hot dip galvanization according BS EN ISO 1461:1999 galvanization test is required .

6- Marking

Each fitting shall bear the mark of the year of manufacturer, nominal diameter, and the letter GS on the body of fitting. The marks maybe cast on, painted or cold stamped.

Polyethylene Fittings specifications

العطاءات

Polyethylene Fittings specifications

مصدر محلي، أوروبي، أمريكي، تركي أو ياباني.

1. General

1.1 AMBIENT CONDITIONS

All fittings, materials and equipment shall be in every respect suitable for storage, installation, use and operation in the conditions of temperature, humidity and The PH of water appertaining in Jordan.

Atmospheric temperature in Jordan varies between varies between -10˚C and 50 ˚C.

1.2 POTABLE WATER CERTIFICATION

All fittings and materials shall be certified for potable water use, and all fittings and materials should be certified as safe for transporting potable water by an independent testing laboratory.
All material in contact with or likely to come into contact with water for public supply shall be introduced with the requirements of BS 6920 (suitability for non metallic products for use in contact with drinking water) or any equivalent standard as well as the Jordanian standard (JS 286/2008) and the requirements of EN 15664 (influence of metallic materials on water intended for human consumption) or any equivalent standard and the World Health Organization standard (WHO), and whenever the regulation is changed it is the supplier responsibility to ensure conformity with any new requirements.

Potable water certificate submitted must be for the same batch delivered to Miyahuna, certificates must be in English

1.3 TOXIC MATERIALS

fittings and pipeline components, including their protective coatings and joint materials, that will or may come into contact with potable water shall not constitute a toxic hazard, shall not support microbial growth, shall not cause taste or odour, cloudiness or discolouration of the water and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health .
Non toxicity certificate should be provided.

1.4 THIRD PARTY WITNESS

1.4.1 GENERAL

The supplier must submit at least 3 different international third party companies where Miyahuna will choose one of them.
The supplier shall furnish an original certificate from the third party inspection agency showing all test results and analysis required by the applicable standard (ISO 4427 /2007) according to which the materials have been manufactured. The third party inspection agency shall under this contract, have witnessed the manufacture and testing operation to verify compliance with the technical specifications and the

relevant standard. The third party inspection agency shall verify that all materials used are eligible for the relevant standard productions requirements. All certification should be from a certified and approved third party, and the certificates must be related to the same batch delivered to miyahuna, all certificates must be valid and written in English.

1.4.2 Fittings

For fittings third Party shall verify that fittings are produced in compliance with ISO 4427-3/ 2003, EN12201 or equivalent, all batch release tests shall be witnessed and certified by an approved third party, and No fitting shall be accepted unless all type and batch release tests have been passed. The third party must clearly identify the fittings production date / code marked on the fittings, with each batch test performed

1.5 TESTING AFTER DELIVERY

All materials supplied to the site in Jordan shall be subjected to acceptance tests carried out by the Royal Scientific Society. Or similar accredited authority. The test should confirm that the materials and fittings are manufactured according to ISO 4427, EN12201 or equivalent; all Tests required for polyethylene fittings must be performed according to the above standards. If any of the tests mentioned in the standards cannot be performed by the Royal Scientific Society then the supplier should provide a third party certificate for those tests taking into considerations all the statements mentioned in "third party witness" section.
All testing costs should be borne by the supplier in all cases.

1.6 FITTINGS PACKING AND PROTECTION

- All fittings must be packed in such a way to allow instant use on site without additional cleaning.
- All electro-fusion fittings must be packed in transparent protective bags. The electro-fusion fittings must then be packed in carton boxes.
- All fittings shall be securely packed in crates and boxes to prevent damage during delivery. The cost of packing shall be deemed to be included in the Contract Rates and crates will not be returned.
- Fittings are normally supplied in separate cartons together with any associated small items, such as bolts and gaskets.

1.7 IDENTIFICATION

The supplier shall be responsible to ensure that each separate item, crate, or package has permanently attached to it, in a conspicuous position, an identification plate of weather - resistant material on which are engraved or stamped;

- **The Manufacturers Name**
- **Contents Description and Quantity**
- **Serial Number or Reference Number Identifiable on the Delivery Note and Cross Referenced to the Purchase Order Item References.**
- **Weight**

The shipment containers shall be marked with the following address;

Jordan Water Co. – MIYAHUNA L.L.C.
Tender Number – variable

In addition the container shall be marked with the following information;

- **Total gross weight**
- **Total net weight**
- **Packing list reference number**

1.8 TRANSPORT AND DELIVERIES

- The supplier shall send to the Purchasers, one-week advance notice of all consignments of materials. Every consignment shall be accompanied by a detailed delivery note.

- The supplier shall deliver to and off load the materials onto the storage area as directed by the Purchasers. All materials delivered will be examined and inspected by the Purchaser and taken over by him.

- The Supplier shall provide necessary details to the shipping line on precautions to be taken during loading/unloading, handling & transport of the pipes & fittings and other components. Supplier shall provide to the purchaser a set of recommendations of manufacturer for handling, loading, unloading, transporting and storing of polyethylene pipes and fittings

- The Purchaser shall arrange reception and storage areas only. The supplier shall be responsible for off-loading all materials.

- The materials shall be delivered to the Purchaser at ***Miyahuna stores***, Amman or any other place chosen by the Purchaser.

- The supplier shall also be responsible for all handling and transport activities up to Miyahuna store-yard, Amman

- **The (DDP) price shall include all costs relating to above-mentioned requirements.**

1.9 HANDLING

Care shall be taken during loading, transporting, and unloading to prevent damage to the pipes, or fittings. Under no circumstances shall pipes or fittings be dropped or rolled against one another. All pipes and fittings shall be examined. Any damaged materials must be rejected by the Purchasers.

1.10 DETAILS TO BE PROVIDED AT THE TIME OF TENDER

15. Dates of batches or consignment deliveries.

16. The supplier shall state which of the sections of the schedule of requirements he proposes to price and supply.

17. Any alternative standards proposed including demonstration of equivalency or superiority to the standard specified, if allowed.

18. Any alternative materials proposed including demonstration of equivalency or superiority to the standard specified, these alternative materials should be subjected to the clients approval.

19. Where the supplier offers alternative standards, materials to those specified, the supplier shall provide prices for those specified and the alternatives proposed.

20. The supplier shall include in his price for the training elements related to the materials he proposes to supply and shall list the elements of training offered, if needed or requested.

21. The supplier shall provide prices for the equipment applicable to the sections of the schedule of requirements he intends to price.

22. The supplier shall provide full details of his materials tests and procedures.

23. Any alternative proposed specification for combined tracer and marker tape.

24. ISO or EN certification for management and product.

25. CV's of proposed training staff, if necessary.

26. Costs of Trainers expenses, if requested.

27. Training program, if requested.

1.11 DOCUMENTS TO BE PROVIDED UPON DELIVERY

The contractor shall submit at least the following documents:

1. Certificate of origin.
2. Packing list
3. Third Party inspection reports (inspection including all the tests required in the standard)
4. Any other documents requested by the Engineer and the hand over committee
5. All above documents must be valid and in English.

1.12 MANUALS AND TECHNICAL SPECIFICATIONS

The supplier shall supply full technical specifications for the items to be supplied at the time of tender. In addition he shall provide full instruction manuals, which describe the correct methods and procedures necessary to construct the pipeline system in accordance with best practice.

1.13 ADDITIONAL SERVICES

The supplier shall provide details of additional services, which he can provide e.g. technical advice and support and, in particular, shall state his capability for supporting the project in the Amman location at the time of tender.

2. Polyethylene Fittings

2.1 FITTINGS USED FOR EXISTING NETWORKS

Fittings used for polyethylene pipes must be manufactured and tested according to the standards shown in the following tables. As shown, table 2.1is standards for fittings for Miyahuna uses, such as maintenance purposes and storing in warehouses.

2.2 FITTINGS USED FOR NEW INSTALLATIONS

For the new projects, Miyahuna recommends that all fittings should be installed using electro-fusion technology, table 3.2 shows the standards for the fittings used in the new projects.

2.3 CONNECTION TYPE

Table 2.3 Connection Type

Diameter of pipe(mm)	Connection Type	Standard
25-125	Mechanical or Electro-fusion	According to tables: 3.1.a , 3.1.b and 3.2
125 and above	Butt welding or Electro-fusion	Machine : ISO 12176 ISO 13953, ISO 11414

2.4 Design Requirements:

- The design of fittings must ensure that the wires which coiled around the inner part of electro fusion fittings are built in the body of fittings not separated from it.
- The cutter of PE EF Tapping shall be certified for potable water use.

Table 2.1 Polyethylene fittings on Polyethylene pipes:

No.	Description	Installation /Type	Standard No	Testing method
1.	PE Connector (25mm,32 mm, 63 mm)	Compression	ISO 14236:2000	ISO 3501,ISO 3503, ISO 3458,ISO 3459
2.	PE EF Collar (125mm , 180 mm,250 mm,25 mm,32 mm, 63 mm)	Electro Fusion	ISO 4427:2004 or Equivalent: EN 12201-3 :2003	ISO 13955,ISO 13954, ISO 11413
3.	PE Reducer (32mmX25mm , 63mmX25mm,63X32)	Compression	ISO 14236:2000	ISO 3501,ISO 3503, ISO 3458,ISO 3459
4.	PE Adaptor (2" (63mm) Male, 1" (32mm) Male, 3/4" (25mm) Male) [a]	Compression		
5.	PE Flange Adaptor (125mm , 180 mm, 250 mm)	Electro Fusion	ISO 4427:2004 or Equivalent: EN 12201-3 : 2003	ISO 13955, ISO 13954, ISO 11413
6.	PE Tee (63X63X63mm, 32X32X32mm, 25X25X25mm, 63X63X32 ,63X63X25,32X32X25) [b]	Compression	ISO 14236:2000	ISO 3501,ISO 3503, ISO 3458,ISO 3459

7.	PE EF Tee 180X125(socket)	Electro Fusion	ISO 4427:2004 or Equivalent: EN 12201-3 : 2003	ISO 13955, ISO 13954, ISO 11413
8.	PE End Cap (63mm, 32 mm, 25 mm,.....)	Compression	ISO 14236:2000	ISO 3501,ISO 3503, ISO 3458,ISO 3459
9.	PE Elbow 63mm, 32mm ,25 mm	Compression		
10.	PE EF Elbow 90^0 (180(socket), 125 mm, 250 mm , ...)	Electro Fusion	ISO 4427:2004 or Equivalent: EN 12201-3 : 2003	ISO 13955, ISO 13954, ISO 11413
11.	Electro fusion end cap (125 mm , 180 mm)	Electro Fusion		
12.	PE EF Tapping (125*25 , 180*25 , 125*63 , 125*32,63*32 ,63*25,)	Electro Fusion		
13.	PE EF Elbow 45^0 (180, 125 mm, 250 mm , ...)	Electro Fusion	ISO 4427:2004 or Equivalent: EN 12201-3 : 2003	ISO 13955, ISO 13954, ISO 11413

Table 2.2: Fittings for new installation Tenders

No.	Description	Installation/ Type	Standard No	Testing method
1.	PE Connector (25mm,32 mm, 63 mm)	Electro Fusion	ISO 4427:2004 or Equivalent: EN 12201-3: 2003	ISO 13955, ISO 13954, ISO 11413
2.	PE EF Collar (125mm , 180 mm,250mm,25 mm,32mm, 63mm)	Electro Fusion		
3.	PE Reducer	Electro Fusion		
4.	PE Adaptor (2" (63mm), 1" (32mm), 3/4" (25mm))	Electro Fusion		
5.	PE Flange Adaptor (125mm , 180 mm, 250 mm)	Electro Fusion		
6.	PE Tee [b] PE Tee (63X63X63mm, 32X32X32mm, 25X25X25mm, 63X63X32 ,63X63X25,32X32X25) [b]	Electro Fusion		
7.	PE EF Tee (socket) or saddle branch (line to line) (180X125, 180X180,.....)	Electro Fusion		
8.	PE End Cap (63mm, 32 mm, 25 mm, ...)	Electro Fusion		

9.	PE Elbow 63mm	Electro Fusion		
10.	PE EF Elbow (socket) (180 mm, 125 mm,250mm .....)	Electro Fusion		
11.	Electro fusion end cap (125 mm , 180 mm)	Electro Fusion		
12.	PE EF Tapping (125*25 , 180*25 , 125*63 , 125*32,63*32 ,63*25,)	Electro Fusion		
13.	Connector (25 mm, 32 mm) [c]	Compression	ISO 14236:2000	ISO 3501,ISO 3503, ISO 3458,ISO 3459

[a] Adapter is used to connect Polyethylene pipes to pipe made from another material, and it should be compression from one side and male threaded from the other side

[b] It is not allowed to use the weldable outlet Kit

[c] when the installation is near to the customer cabinet ,whether the connection was straight connection or using elbow , compression fittings should be used

ANNEX 1

REFERENCE STANDARDS

Standard Number	Description
ISO 4427-1 :2007	Plastics piping systems -- Polyethylene (PE) pipes and fittings for water supply Part 1 - General
ISO 4427-2 :2007	Part 2 – pipes
ISO 4427-3 :2004	Part 3 - Fittings
EN12201-1 :2010	Plastic piping System for Water Supply – polyethylene (PE) Part 1-General.
EN12201-2 :2003	Part 2 – pipes
EN12201-3 :2003	Part 3 - Fittings
BS 6920	Testing of non-metallic components with regards to their effect of the quality of water
EN 15664	influence of metallic materials on water intended for human consumption
ISO 14236 :2000	Plastics pipes and fittings – Mechanical joint compression fittings for use with polyethylene pressure pipes in water supply system
ISO 11413: 1996	Plastics pipes and fittings – preparation of test piece assemblies between a polyethylene (PE) pipe and electro fusion fittings
ISO 13954: 1997	Plastics pipes and fittings – peel decohesion test for polyethylene (PE)electro fusion assemblies of nominal outside diameter greater than or equal to 90 mm
ISO 13955	Plastics pipes and fittings – Crushing decohesion for polyethylene (PE) electro fusion assemblies
ISO 3458: 1976	Assembled joints between fittings and polyethylene (PE) pressure pipes –Test of leakproofness under internal pressure
ISO 3459: 1976	Polyethylene (PE) pressure pipes – Joints assembled with mechanical fittings – Internal under pressure test method and requirements.
ISO 3501 : 1976	Assembled joints between fittings and polyethylene (PE) pressure pipes –Test of resistance to pull out
ISO 3503 :1976	Assembled joints between fittings and polyethylene (PE) pressure pipes – Test of leakproofness under internal pressure when subjected to bending.

ISO 3506	Mechanical properties of corrosion-resistant stainless steel fasteners - Part 1: Bolts, screws and studs
EN 681-1	Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Part 1: Vulcanized rubber
EN 681-2	Elastomeric seals - Material requirements for pipe joint seals used in water and drainage applications - Part 2: Thermoplastic elastomers
EN 601	Aluminium and aluminium alloys - Castings - Chemical composition of castings for use in contact with foodstuff
ISO 12176	Plastics pipes and fittings -- Equipment for fusion jointing polyethylene systems -- Part 1: Butt fusion
ISO 13953	Determination of the tensile strength and failure mode of test pieces from a butt-fused joint
ISO 11414	Preparation of polyethylene (PE) pipe/pipe or pipe/fitting test piece assemblies by butt fusion

Specifications for Black Steel Fittings

Table of Contents

1. GENERAL

1.1 POTABLE WATER CERTIFICATION

All pipe, fittings and coating materials shall be certified for potable water use and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health, All material in contact with or likely to come into contact with water for public shall introduced with the requirements of Jordanian standard (JS 286) Whenever regulation changed it is the supplier /contractor responsibility to ensure conformity with any new requirements
All pipes shall be certified as safe for transporting potable water by an independent testing laboratory.
Potable water certificate submitted must in English and from third party.

1.2 TOXIC MATERIALS

All fittings, coating, sealing and lining material shall be certified for potable water use and shall contain no ingredients that may migrate into water in amounts that are considered to be toxic or otherwise dangerous for health. The Contractor is prohibited to import or to use any of toxic or poisonous materials or sub materials used in piping, kinds of concrete or in soil in any kind of usage.

1.3 MANUALS AND TECHNICAL SPECIFICATIONS

1. The supplier/ contractor shall supply full technical specifications and catalogues for the items to be supplied at the time of tender. In addition he shall provide full instruction manuals, which describe the correct methods and procedures necessary to construct the pipeline system in accordance with best practice.

2. The supplier/ contractor shall provide, at the time of tender, details of the of the equipment necessary to correctly install the pipeline system including welding machines, pipe cutters, chamfering (beveling) tools, joint making equipment, lubrication materials and loose tools.

1.4 INTERNAL QUALITY SYSTEM

On request of the Engineer, the Contractor has to provide test certificates from the manufacturer's internal quality control.

Quality certified ISO 9001, which have continues quality control protocols and which are certified by third party quality control which is efficient for prove of quality of a particular supply or manufacturer's batch to be shipped to Jordan

1.5 TESTS AND MANUFACTURE CERTIFICATION

The supplier shall submitted the certificates from the manufacture that all pipe and fittings that all pipe and fitting which supplied under this contract are comply in all respects with the requirement and the standards.

A test certificate that all pipe and fitting have tested in according the requirement and the standards.

1.6 THIRD PARTY WITNESS

The supplier/contractor shall furnish an original certificate from third party inspection agency showing all test results and analysis required by the applicable standard according to which the materials have been manufactured. The third party inspection agency shall under this contract, have witnessed the manufacture and testing operation to verify compliance with the technical specifications and the relevant standard. All certification should be from a third party, and the certification should be valid and up to date, in English, and it must be

shown in the certificate which batch is being tested to make sure that this certificate is for the right batch delivered to Miyahuna.

The third party inspection agency shall verify that all materials used are eligible for the relevant standard productions requirements. No fittings shall be accepted unless all type and batch release tests have been passed. The third party must clearly identify the fittings production date / code marked on the fittings, with each batch test performed.

The supplier must submit at least 3 different international third party companies where Miyahuna will choose one of them.

1.7 INSPECTIONS AND TESTING AFTER DELIVERY

The supplier shall submit a certificate, prior to any delivery, certifying that all items have been mill tested and that they have successfully passed the relative tests prescribed by the relative standard specifications

Any or all materials and manufactured articles supplied for use in any of the works, shall if so required by the engineer, shall be tested in advance at the supplier expense in accordance with the tests specified in EN, BS or ISO or other approved equal standards.

The quality of all materials, the process of manufacture, and the finished materials shall be subject to inspection and approval by the Purchasers. Such inspection may be made at the site after delivery, and the materials shall be subject to rejection at any time on account of failure to meet any of the specification requirements. All the expenses involved in inspection and testing material shall be borne by the supplier.

1.8 TESTS AND MANUFACTURE CERTIFICATION

The supplier shall submitted the certificates from the manufacture that all pipe and fittings that all pipe and fitting which supplied under this contract are comply in all respects with the requirement and the standards. A test certificate that all pipe and fitting have tested in according the requirement and the standards. All pipe and fitting shall be tested hydraulically before coating, all pipe and fitting shall be capable of withstanding a hydraulic test pressure of 1.5 the nominal pressure. Holiday test and adhesion test should be also to be done.

1. 9 HANDLING AND TRANSPORTATION

- The cost of packing shall be included for in the contractor rates.
- Protection of coated and lined pipes against damages during storage, transport and handling is required either by using straw or wood wool pads.

1.10 DOCUMENTS TO BE PROVIDED AT TIME OF TENDER

1. Conformity to Standard certificate from third party.
2. Potable water certificate
3. Manufacturer experience certificates
4. Quality assurance certificate (ISO 9001).
5. Internal Quality System
6. Upon request, the Contractor has to provide test certificates from the manufacturer's internal quality control.
7. The supplier/ contractor shall supply full technical specifications and catalogues for the items to be supplied at the time of tender.
8. Detailed manufacturer's proposals for pipes and fittings manufacture, coating and lining etc

All above documents must be valid and in English.

1.11 DOCUMENTS TO BE PROVIDED UPON DELIVERY

The contractor shall submit at least the following documents:

1. Certificate of origin.
2. Packing list
3. Third Party inspection reports (inspection including all the tests required in the standard)
4. Any other documents requested by the Engineer and the hand over committee

All above documents must be valid and in English.

2. TECHNICAL SPECIFICATIONS

2.1 SCOPE OF USE

The fittings must be made of seamless pipes and shall be in accordance with ANST (B.16.9). The fittings shall be welded to black steel pipes type (API. 5L - X 42).

2.2 FABRICATION OF FITTINGS

The fabrications of fittings shall be as follows:

1. Elbows must be fabricated by forging or by hot or cold forming of seamless pipes.
2. Reducers must be fabricated by hot or cold forming and annealing of seamless pipes.
3. Tees must be fabricated by forming of seamless pipe or by cold or hot forming and annealing of seamless pipes.
4. Caps must be fabricated by hot or cold stamping or forging of plates heat treated.

- Fabrication fittings by welding pieces of pipes is not accepted.

2.3 MATERIALS OF FITTINGS

Elbows, Tees, Reducers etc ... must be made of seamless pipe grade WPB. (ASTM. A 234) or approved equivalent.

2.4 FITTINGS THICKNESS & PRESSURE

The minimum thickness of the black steel fittings shall be sufficient to withstand the pressure rating of their respective pipelines.

2.5 ELBOWS BENDS

The Elbows must be of long radius type, but short radius elbows can be offered as an alternative.

2.6 REDUCERS

The reducers must be concentric. Thickness of each side shall be equal to thickness of related nominal diameter, if thickness of reduced size equal to the thickness of the bigger size, higher thickness will be accepted.

2.7 STRAIGHT EQUAL TEES

The straight equal tees, in which the run and branch (out let) is equal in nominal diameter, thickness must be equal to the thickness of its related nominal diameter.

2.8 TEES REDUCING

Tees Reducing, in which the Run is bigger than branch (out let) in nominal diameter thickness of the run, must be equal to the thickness of its related diameter, thickness of the branch (outlet) must equal to its related nominal diameter.

2.9 COATING AND LINING

All fittings must be lined by corrosion proof materials and must be suitable for potable water.

Coating and lining must stop at the beveled ends for the purpose of welding.

2.10 MARKING

Every fitting must be marked with:
- Trade mark.
- Nominal Diameter.
- Thickness.
- Standard.

2.11 CERTIFICATE OF COMPLIANCE

Certificates of compliance of required standards must submit.

Radio Technical Requirements for Radio Smart Meeting equipment's operating in 868 MHz

Operational Frequency Band		Maximum effective radiated power, e.r.p.	Channel access and occupation rules (e.g. Duty cycle or LBT + AFA)	Maximum occupied bandwidth	Other usage restrictions
K	863 MHz to 865 MHz	25 mW e.r.p.	≤ 0,1 % duty cycle or polite spectrum access	The whole band except for audio & video applications limited to 300 kHz	
L	865 MHz to 868 MHz	25 mW e.r.p.	≤ 1% duty cycle or polite spectrum access	The whole band	
M	868,000 MHz to 868,600 MHz	25 mW e.r.p.	≤ 1% duty cycle or polite spectrum access	The whole band	
N	868,700 MHz to 869,200 MHz	25 mW e.r.p.	≤ 0.1% duty cycle or polite spectrum access	The whole sub-band	
P	869,400 MHz to 869,650 MHz	500 mW e.r.p.	≤ 10 % duty cycle or polite spectrum access	The whole band	
P	869,700 MHz to 870,000 MHz	5 mW e.r.p.	No requirement	The whole band	Audio and video applications are excluded.
Q	869,700 MHz to 870,000 MHz	25 mW e.r.p.	≤ 0.1% duty cycle or polite spectrum access	The whole band	Analogue audio applications are excluded. Analogue video applications are excluded.

ANNEX 1: REMOTE AUTOMATIC METER READING SYSTEM

1.1 GENERAL

Objective: Utility can monitor and read the big customers meters from a Central Station that will be installed in utility Offices

The communication protocol shall be an open protocol with a possibility to cooperate with the equipment from various manufacturers.

The bidder shall visit the site, make the necessary investigation, coordinate with all concerned authorities to get their requirements and collect all data needed for the design and successful implementation of the meters.

The bidder must submit detailed design for the remote reading system to be installed in future and the methods of connection, data sending procedure and the detailed technical specifications for all the equipment to be used.

The reading (output) of the meters and communication kit should not change according to the quality of the water.

Note: All equipment to be used must be IP68

1.2 DOCUMENTS TO BE PROVIDED UPON DELIVERY

The contractor shall submit at least the following documents:

- Detailed design with all catalogues and operational manuals.
- Any other documents requested by the Purchaser and the hand over committee
- All above documents must be valid in English.
- Detailed and full Documentation describing the operation and maintenance of the system and its components, including data management and back-up, for use by utility employees

1.3 HANDLING AND TRANSPORTATION

The handling and transportation shall be in accordance with the manufacturer's recommendations.
The cost of packing shall be included for in the bidder rates.

1.4 TRAINING

- The supplier shall train up to 10 (ten) persons from utility staff in Jordan for a period of two weeks about the operation and maintenance.

1.5 SYSTEM ARCHITECTURE AND FREQUENCY OF READING

1.5.1 Architecture

The goal of the network is to automate the data collection using existing Jordanian cellular networks in future.

- All devices in the remote reading system should not be sensitive to electromagnetic fields.

1.5.2 on Demand Read

- The system provide reads on demand

1.6 THE MDM SOFTWARE

The central meter management system shall run specialized software (MDM software) for storing, analysis, viewing, alarming and reporting of meter data.

Requirements for the MDM software package:

1.7 COMPLIANCE SHEET

no	Item	compliance	Reference in proposal	comments
1-	Meter shall be able to store data in internal storage for 90 days in case of communication failure			
2	The meters shall have the capability to analyze the transferred meter reading data, to separate valid data from suspect data, and to report exceptions			
3	The solution system shall have built-in and ad-hoc reporting capabilities. Report formats must be user-customizable, using a built-in report writer or a third-party commercially available report. Reports must be able to be directed to a printer, screen or data file. Reports shall be in Arabic and English			
4	In future ,meters should send data to our server using FTP protocol and utilizing cellular modules supports the operation of LTEnetwork			
5	The water meters shall be battery operated. The battery can be replaceable with life time not less than 10 years			
6	The properties and parameters of the meter shall not be affected by the interruption of the electrical supply when the battery is replaced			
7	The replacement of the battery shall be indicated on the meter and provide the possibility of indicating the next date of replacement after replacing the battery			