***BoQ Mechanical Item No. (2)– Booster station Pump, Discharge= 250 m3/hr. Head=30m***

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| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Make: | Andritz Hydro, Granados, Pompa Zanni, wilo , or equivalent |  |  |
| 2 | Type: | End suction |  |  |
| 3 | Rated speed: | (1400-1500) rpm |  |  |
| 4 | Gland type : | Mechanical Seal. |  |  |
| 5 | Enclosure class: | (IEC 34-5) IP 55 |  |  |
| 6 | Insulation class: F | F |  |  |
| 7 | Pump liquid: | Water |  |  |
| 8 | Rated flow : | 250m3/h |  |  |
| 9 | Rated head : | 30 m |  |  |
| 10 | Material: | ENG-GJL-250 / En-JL-1040 |  |  |
| 11 | SHAFT: | Stainless steel |  |  |
| 12 | IMPELLER: | BRONZE |  |  |
| 13 | Bearing | shall be grease type lubrications |  |  |
| 14 | Rated voltage : | 380V-416V |  |  |
| 15 | No of phase: | 3PH |  |  |
| 16 | Frequency: | 50Hz |  |  |
| 17 | Power | (37-40) Kw |  |  |
| 18 | The shaft of the pump shall be with direct coupling to the motor |  |  |  |
| 19 | efficiency: | Not less than 75% |  |  |
| 20 | The motor shall have: | IEC standard dimensions |  |  |
| 21 | Type of control panel: | Star – Delta with all protection devices and metering |  |  |
| 22 | Submit Manufacturer certification and test reports by BV: | To be submitted |  |  |
| 23 | Submit Detail drawing brochure catalogue: | To be submitted |  |  |

**Mechanical work item (3) *Foot valves with anti-corrosion stainless steel strainer.***

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| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | ***Foot valves with anti-corrosion stainless steel strainer.*** | | |  |
| 2 | Manufacturer/Make: | Erhard, VAG or equivalent |  |  |
| 3 | Specification | Flanged, DN (200) mm dia. |  |  |
|  | Pressure rating | PN 10 |  |  |
| 4 | Drilling according | Drilling according to ISO 7005-2 PN10 |  |  |
| 5 | Body and bonnet | GGG-40 |  |  |
| 6 | Disk | GGG-40 |  |  |
| 7 | Shaft | Brass, SS 304, or equivalent |  |  |
| 8 | Sealing | EPDM / NBR |  |  |
| 9 | Standards | Flanges - DIN2510 (PN10) |  |  |
| 10 | Coating | Epoxy Blue Ral 5015, 250 microns as average |  |  |
| 11 | Strainer | SS 304 / SS 316 |  |  |
| 12 | Submit Manufacturer certification and test reports | To be submitted |  |  |
| 13 | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

**Mechanical work item (4) *Manual Gate valves.***

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| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | **Gate Valve** | | |  |
| 2 | Manufacturer/Make: | Erhard, VAG or equivalent |  |  |
| 3 | Specification | Flanged, DN (200) mm dia. |  |  |
| 4 | Drilling according | Drilling according to ISO 2531 PN10 |  |  |
| 5 | Body and bonnet | GGG-40 |  |  |
| 6 | Disk | GGG-40 |  |  |
| 7 | Shaft | X20 Cr13 (AISI-420) |  |  |
| 8 | Sealing | EPDM / NBR |  |  |
| 9 | Standards | Flanges - DIN2510 (PN10) |  |  |
| 10 | Coating | Epoxy Blue Ral 5015, 250 microns as average |  |  |
| 11 | Operation | Hand wheel operated |  |  |
| 12 | Submit Manufacturer certification and test reports | To be submitted |  |  |
| 13 | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

**Mechanical work item (5) *Manual Gate valves.***

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| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | **Gate Valve** | | |  |
| 2 | Manufacturer/Make: | Erhard, VAG or equivalent |  |  |
| 3 | Specification | Flanged, DN (150) mm dia. |  |  |
| 4 | Drilling according | Drilling according to ISO 2531 PN10 |  |  |
| 5 | Body and bonnet | GGG-40 |  |  |
| 6 | Disk | GGG-40 |  |  |
| 7 | Shaft | X20 Cr13 (AISI-420) |  |  |
| 8 | Sealing | EPDM / NBR |  |  |
| 9 | Standards | Flanges - DIN2510 (PN10) |  |  |
| 10 | Coating | Epoxy Blue Ral 5015, 250 microns as average |  |  |
| 11 | Operation | Hand wheel operated |  |  |
| 12 | Submit Manufacturer certification and test reports | To be submitted |  |  |
| 13 | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

**Mechanical work item (7) Non-Return Valve (Nozzle / Seat tilting Disc) Specification**

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|  | **Description** | | **Required specifications** | **Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Manufacturer | | Erhard, VAG, Pratt or equivalent |  |  |
| **1** | | **Material** | | |  |
|  | Body | | Ductile iron / Cast Iron |  |  |
|  | Disc /Valve ring. | | Ductile iron EN-GJS-400-15 (GGG-40) / Zinc- free bronze / stainless steel 1.4404 / elastomer KTW/W270 |  |  |
|  | Valve sealing | | EPDM or equivalent |  |  |
|  | Check valve Shaft | | Stainless steel. |  |  |
|  | Valve size | | DN 200 mm |  |  |
|  | Pressure rating | | PN 10 |  |  |
| **2** | **Corrosion protection** | | | |  |
|  | Body | | Internally and externally epoxy coated according GSK guides or equivalent |  |  |
|  | Disc | | epoxy coated according GSK guides or equivalent |  |  |
| **3** | **Test and approvals** | | | |  |
|  | Final inspection test | | According to EN12266 or equivalent |  |  |
|  | Elastomers approval | | According to W270 or equivalent |  |  |
|  | Flanges ends on both sides | | According to EN1092-1 or equivalent |  |  |
| **4** | **Certificates and documents** | | | |  |
|  | Certificates | | ISO, DVGW, DAKKS or equivalent |  |  |
|  | Submit Manufacturer certification and test reports | | To be submitted |  |  |
|  | Submit Detail drawing brochure catalogue. | | To be submitted |  |  |

**Mechanical work item ( 9 ) Air release valve specification**

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|  | **Description** | | **Required specifications** | **Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
|  | Manufacturer | | Erhard, VAG, Pratt or equivalent |  |  |
| 1 | | Material | | |  |
|  | Body | | Ductile iron EN-GJS-400-15 (GGG-40) |  |  |
|  | Bonnet | | Stainless steel 1.4308 |  |  |
|  | Bonnet Bolts | | Stainless steel A2 (DIN EN ISO 3506) |  |  |
|  | Inner parts | | Stainless steel 1.4541 |  |  |
|  | Sealing | | EPDM |  |  |
|  | Float | | Plastic polypropylene |  |  |
| 2 | Corrosion protection | | | |  |
|  | Body | | Internal & External Epoxy coated |  |  |
|  | Internal | | Epoxy coated |  |  |
| 3 | Test and approvals | | | |  |
|  | Final inspection test | | According to EN12266 or equivalent |  |  |
| 4 | Product characteristics | | | |  |
|  | Shat off valve | | Same size of the air valve |  |  |
|  | Inlet Dia. DN, | | 50 mm |  |  |
|  | Flange | | Included bolt , Nut, washer and gasket. |  |  |
|  | Pressure rating. | | 10 bar |  |  |
| 5 | Certificates and documents | | | |  |
|  | Certificates | | ISO or equivalent |  |  |
|  | Submit Manufacturer certification and test reports | | Submit Manufacturer certification and test reports. |  |  |
|  | Submit Detail drawing brochure catalogue. | | Submit Detail drawing brochure catalogue. |  |  |

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| **Mechanical works Item ( 14) (Level Transmitter for water reservoirs )** | | | |  |
| ***#*** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type | Ultrasonic Water level Transducer |  |  |
| 2 | Brand name | (Endress Hauser , Youkogawa , APG or equivalent) |  |  |
| 3 | Reservoir deep | 5 m |  |  |
| 4 | Evaluation : | Level |  |  |
| 6 | Operation | Level + Pump control, alternating  Illuminated display + keypad, panel mounting front IP 65 |  |  |
| 7 | Power supply | 90-253 VAC |  |  |
| 8 | Output: | 1 X 0/4-20mA Hart |  |  |
| 9 | Range | 0.3 – 6 m |  |  |
| 10 | Temperature : | 5-40 C |  |  |
| 11 | Fluid | Water |  |  |
| 12 | Detail drawing brochure catalogue | To be submitted. |  |  |

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|  | ***BOQ Mechanical Item No. (16) Compliance data sheet for Folding Portable crane:*** | | |  |
| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Type | Folding Portable Crane |  |  |
| 2 | No of Movement | 4( Up-Down – Right – Left) |  |  |
| 3 | Lifting capacity | (250-1000) Kg. |  |  |
| 4 | Lifting high | (2000-2200) mm |  |  |
| 5 | lifting Span | (2-2.2) meter |  |  |
| 6 | Length of the crane | (1.20- 1.55) m |  |  |
| 7 | Hight of the crane | (1.20-1.45)m |  |  |
| 8 | Certification | CE/ISO9001, ISO9001:2008 |  |  |

***Boq Mechanical No. ( 26,27 ) Manual Butterfly valve with gear box & Dismantling joints***

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| **#** | **Description** | **Required Specifications** | **Bidders Offered specification** | **Remark/Comment on proposed deviations (clearly explain any proposed deviations from the equipment/items requested in the BOQ** |
| 1 | Valve |  |  |  |
| 2 | Manufacturer/Make: | Erhard, VAG, Pratt or equivalent |  |  |
| 3 | Specification | Flanged, DN (350) mm dia. |  |  |
| 4 | Type | Flanged |  |  |
| 5 | Body | GGG40 |  |  |
| 6 | Disk | AISI 304 Stainless Steel |  |  |
| 7 | Mill | AISI 316 Stainless Steel |  |  |
| 8 | Sealing | EPDM / NBR |  |  |
| 9 | Standards | Flanges - DIN2510 (PN10) |  |  |
| 10 | Certification of origin | To be submitted |  |  |
| 11 | Submit Manufacturer certification and test reports | To be submitted |  |  |
| 12 | Submit Detail drawing brochure catalogue. | To be submitted. |  |  |

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