Name and range of application

* 1. This requirement specification establishes requirements and determines conditions of purchase of a centrifugal pump unit (single stage, spiral, with a horizontal casing split and the impeller of a bilateral inlet, complete with spare parts and technical documentation.

The unit pumps thermal clamping water in a heating system.

1. Technical requirements

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| Technical data | Parameter |
| Flow (not less), m3/h | 1250 |
| Head (not less), m | 70 |
| NPSH, m | 3.8 |
| Allowable differential pressure at pump inlet, (no more) MPa | 0.35 |

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| Physical properties | Parameter |
| Temperature, 0 C | 40-85 °C |
| Density, kg/m3 | 968 - 990 |
| Solids content, no more than, mg/l | 5 |
| Size of solids, no more than, mm. | 0.2 |

Water temperature fed to cool of bearing units: 14-21 °C.

Ambient temperature: -10/+40 °C.

Motor:

* 6000V. 50Hz
* Class insulation: F at least
* grease replenishment and removal system without stopping and disassembling the motor is required
* bearings on the drive side and on the opposite side - ball bearings
* the location of the input device is on top
* possibility of rearranging the input device - 2 x 180⁰
* start method - directly from the power line
* spare parts: spare bearing set
* metallic cooling fan

1. Scope of supply
   1. Scope of delivery must include:

* pump unit assembled (the pump with the coupling and the electric motor on a frame) - 1 set
* connecting counterflanges on suction and discharge lines with hardwarefixture - 1 set.
* spare parts: protective shaft sleeve - 2 pieces; sealings (cups, rubber rings) needed for technical maintenance and repair - 2 sets; elastic sleeves of coupling - 2 sets; a gasket of casing split and cover - 2 pieces.

1. Design requirements
   1. The unit is centrifugal, horizontal, spiral, with a horizontal casing split, singlestage with the impeller of a bilateral inlet.
   2. Direction of rotor rotation - clockwise if to look from the side of the electric motor.
   3. Rotor is supported by outer rolling bearings with oil-bath lubrication.
   4. Bearing housings of the pump must have a water cooling jacket of wet sump and nozzles for feed and withdrawal of a cooling water.
   5. Shaft seals with stuffing box.
   6. Coupling between pump and electric motor must be steel pin bush coupling type.
   7. Parts of flow channel of the pump must be cast iron, a shaft and the impeller - from chrome steel. Production of impeller bronze is allowed.
   8. The pump must be mounted on a single frame with the electric motor.
2. Requirements to an electrical equipment.
   1. Requirements for electrical equipment are listed below.
3. Requirements of reliability
   1. Reliability of the unit at operating conditions must be characterized by the following:

* the average time between failures must be 10000 hours at least.
* life cycle - not less than 20 years.
  1. Compliance of the unit to requirements for reliability is evaluated according to GOST 27.002-89, GOST 27.003-89, GOST 27.301-95, GOST 27.410-87.

1. Safety requirements and environmental protections
   1. The middle tier of sound pressure and middle tier of a sound, at nominal operating conditions must not exceed 105 dB.
2. Requirements of compatibility
   1. The unit must pump thermal clamping water with the properties stated above.
3. Requirements to technical documentation
   1. Technical documentation must include:

* the maintenance manual on the unit;
* the passport of the unit (or the form included in the maintenance manual);
* passport of the electric motor;
* the passport of each block, device, measuring instrument (in case of presence);
* measurement units, values (material grades) of the functional characteristics should be brought to the specified in the requirement specification.
  1. Maintenance manual must include additionally:
* required types of repairs;
* quantity and sequence of accomplishment of repairs of different types;
* specified life before repair of each type;
* ineffective time (in hours) of the unit during each repair type;
* typical failures, reasons, elimination methods;
* allowable value of a residual unbalance of a rotor;
* vibration frequencies by which it is possible to identify failures of the unit by means of the frequency analysis;
* assembly drawing. On assembly drawings of the pump and its separate blocks the dimensions, tolerances on dimensions, clearances and tensions, necessary and sufficient for high-quality repair of the pump and all its components during operation, must be indicated. Assembly drawings of bearing units;
* at consumption rates analogs of lubricants must be specified;
* instructions for installation, start-up, regulation and run-in;
* list of parts and assembly units;
* list of spare parts, tools, acclimations.
  1. In case of impossibility to include any of items mentioned above in the maintenance manual, please provide the separate document in which the required information is stated.
  2. The seller should provide:

- the letter of indemnity confirming providing copies of acts of incoming control of materials and components, submission of copies of test reports at the time of delivery of an equipment.

1. Order of monitoring and acceptance
   1. Incoming control of materials and components must be made on manufacturing plant in accordance with the established procedure with providing copies of the acts.
   2. Acceptance tests are made at the buyer plant.
   3. The unit must undergo standard testing at manufacturing plant with providing copies of the acts.