



Technical specification

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For modernization of the TMS centralized coolant supply and chip cleaning system of the cylinder block section.

N°: 9966

		CITY:	Yaroslavl	Date:	01.07.24
Project:	Expansion of production capacity of YaMZ-530 engines up to 40 thousand per year	Object	Cleaning and coolant supply system, chip disposal system		
		Type	Equipment, services		
Project description	Modernization of TMS centralized coolant cleaning and supply system	Machined parts:	Cylinder block 534/536.1002015, 534/536.1002011.		
Deadline for submission of the technical and commercial proposal		August 2024			
Required start-up date of the equipment		April 2025			
Destination		Production of Medium Inline Engines, PJSC Avtodizel (YaMZ-530) Yaroslavl. Yaroslavl, 81B Mashinostroiteley prospect.			
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Head of company

(Signature) _____

(Date) _____

(Full name) _____

Stamp

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1. GENERAL PART

1.1 Subject of delivery and boundary conditions.

Modernization of equipment of TMS centralized systems of cleaning and coolant supply for the cylinder block machining section.

1.2 Scope of work.

Provide a technical and commercial quotation for the following works:

- 1) Analysis of the existing unit in terms of the maximum possible number of connected consumers operating at the same time.
- 2) Design part for the substituted equipment (drawings, annotations, instructions, schemes, regulations, etc.).
- 3) Manufacture of equipment and pre-acceptance at the supplier's premises.
- 4) Packaging and delivery of equipment.
- 5) Equipment installation, integration with the TMS centralized system, adjustment, final acceptance and start of production.
- 6) Operator training.

1.3 Information about the installation location:

Temperature	18° - 40°C
Humidity:	50% - 85%
Low voltage:	220 V;
High voltage:	400 V (TN-C system according to the standard IEC 60364)
Air pressure:	6 Bar (0.6 MPa)
Height from floor to lowest point (light bulbs)	6900 mm
Space for equipment	88 m ²
Water source	potable water, chloride ion <100 ppm, ph 7,5

1.4 Warranty

The warranty on the proposed equipment should be at least 24 months after commissioning.

2. SUPPLY VOLUME

2.1 Concept of operation of a centralized coolant station.

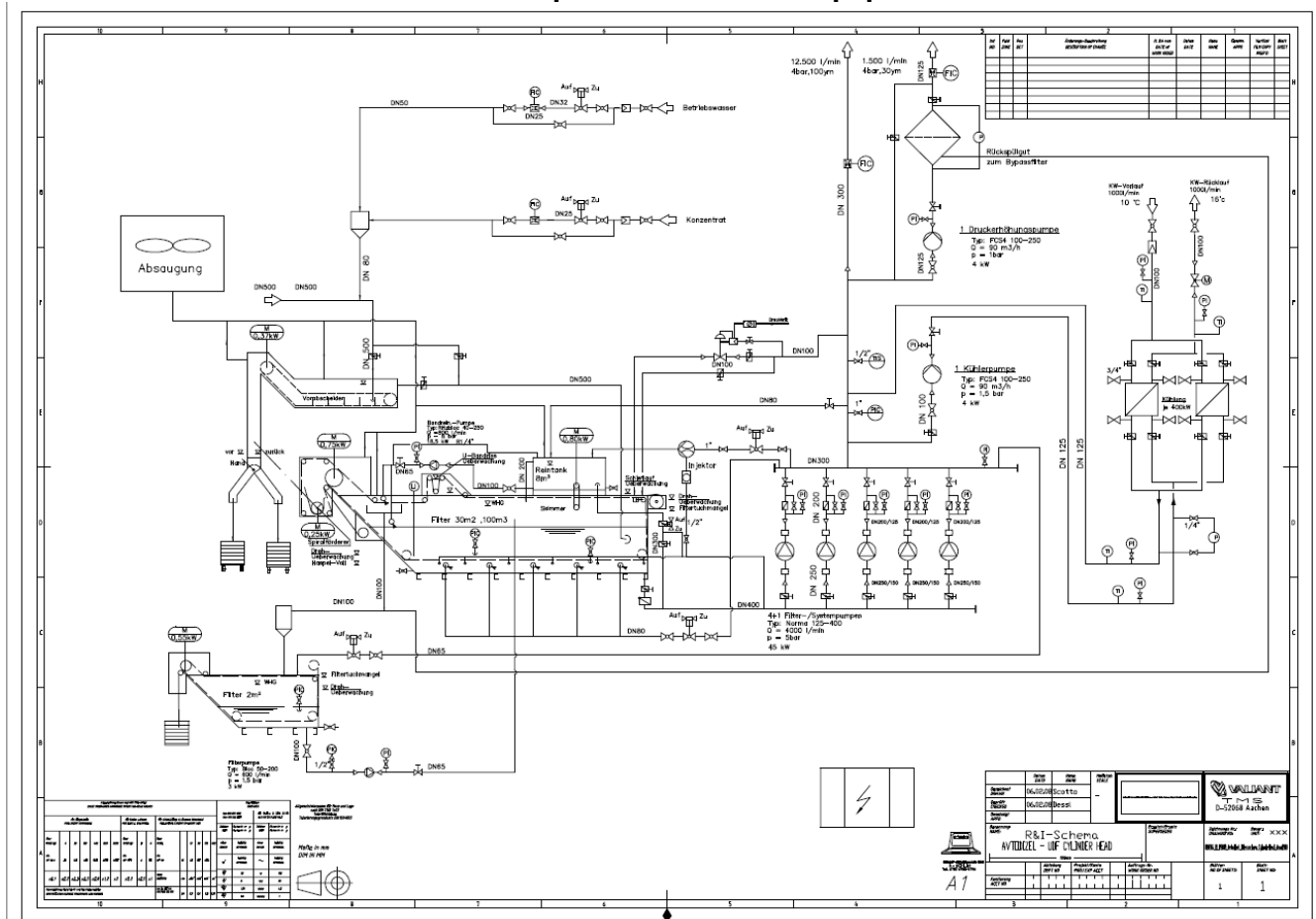
To supply and clean coolant (water, semi-synthetic emulsion 5...7%) from chips and other mechanical impurities, a centralized system of coolant preparation is used in the shop. The cylinder block machining section is connected to it - 16 machines.

Each coolant supply system has a regeneration tank with a capacity of 100 tons. During operation, after machining, the machines pump a mixture of coolant with cast iron segmental chips, molding sand and oil (obtained from the machine lubrication system and from the hydraulic systems in case of emergency breakdowns) through pipes to a centralized coolant cleaning system. Total daily oil supply to one system is up to 20 liters. Chips, separated from coolant by chip conveyor, go to the chip cleaning area, where they are disposed of in a container, emulsion undergoes a 2-stage filtration process from mechanical impurities using non-woven filter cloths. In the centralized system needle-punched nonwoven fabrics with filtration degree of 100 microns and 30 microns are used. Cleaning of coolant from oil is carried out by a special device Skimmer with magnetic tape, located in the pocket of the main vacuum tank. The finally cleaned coolant flows back to the machines through pipes. In one pipe from a vacuum filter with a fineness of 100 microns and in a second pipe from a fine filter with a fineness of 30 microns. The volume of emulsion in the main tank can vary from 60 to 80 tons, depending on the equipment schedule.

The operation mode of centralized coolant supply systems is 24 hours a day, without breaks and days off. Every two years the equipment is shut down for complete cleaning and replacement of cooling emulsion.

Necessary documentation on existing equipment, will be provided upon request.

Pic. 1 - Principal scheme of the equipment



2.2 Approximate scope of equipment supply.

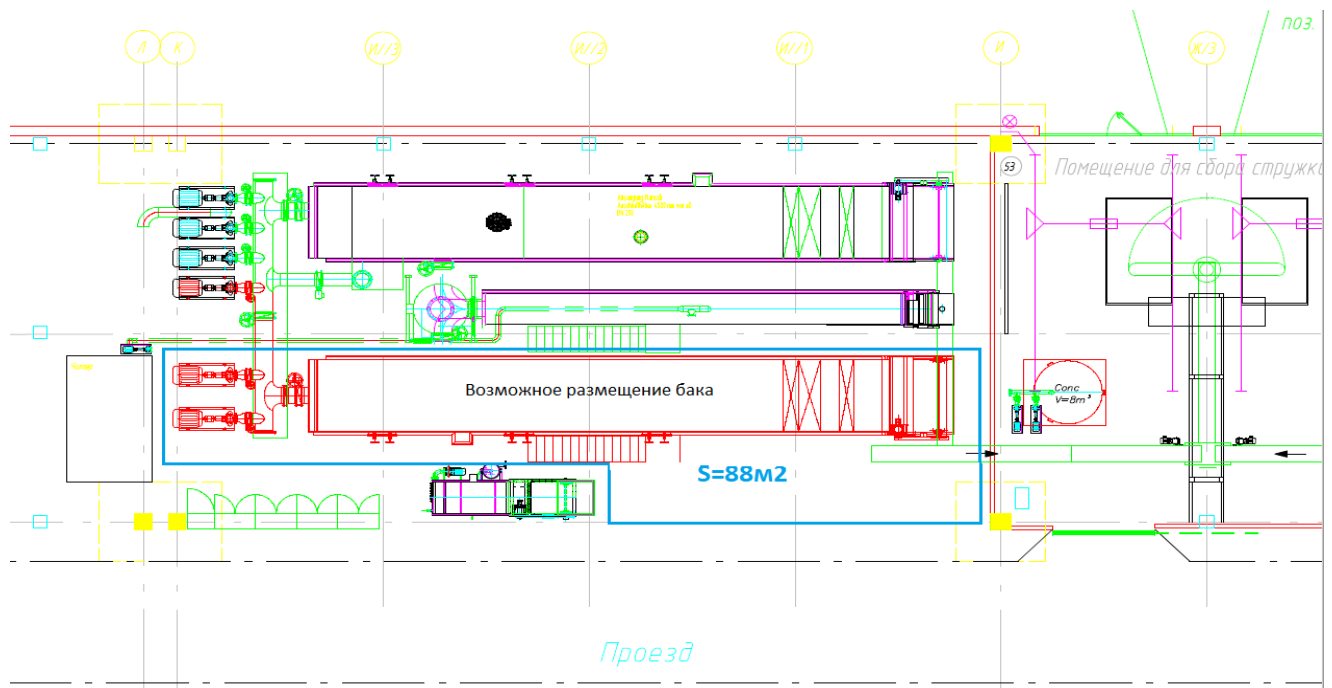
In connection with the increase in production capacity and the planned growth in output, it is planned to increase the number of equipment. 10 new machines will be purchased for the cylinder block section.

Centralized coolant supply system	Inventory number	Number of machines connected to "TMS", pcs		
		Current status	Planned new machines	Will be (maximum number)
«TMS» of cylinder block section	Nº 0-102960	16 pcs	11 pcs	27 pcs

Each machine includes an individual tank with a capacity of 50 to 200 liters, coolant consumption for workpiece machining at 3.5 bar from 400 to 1200 l/min.

Calculation flow diagram

Content	Information	Comment
Machine circulation flow	20,400 l/min	11 machines
Reserve flow 10%	2,040 l/min	
Gravity fluid return pipe flow rate	3,300 l/min	
Engineered system flow	25,740 l/min (1,544 m3/h)	



Pic.2 - possible location of the additional vacuum filter (blue color on the picture).

2.3 Boundary conditions

The capacity of the additional tank should be sufficient to provide coolant for 5 additional pieces of equipment and allow for the eventual installation of 5 additional machines.

- Vacuum filter must be equipped with a system for cleaning coolant from oil and have a rinsing (protective) filter and a tank with clean coolant.

The clean liquid tank is located at the top of the filter tank

When the filtration system performs the re-fill process, the automatic valve connected to the clean liquid tank and vacuum filter will be opened to interrupt the vacuum action and also to supply coolant to the pumps.

Thus, the filter material can be moved easily and smoothly by the scraper and the regeneration process does not interrupt the coolant supply to the system.

The full regeneration time must be set between 15 and 30 seconds. The capacity of the clean liquid tank corresponds to at least 2 times the long regeneration period (2×30 seconds).



- The new vacuum filter must be connected to the existing coolant pre-cleaning tank. A flange with an electrically controlled shutter with manual operation option must be provided for this purpose.



Connection point

- The machine coolant pump unit for the new vacuum filter should be connected to the existing pump system. Pumps shall be equipped with vibration and noise dampers to reduce vibration and noise so that noise does not exceed 75 dB(A). By means of a frequency converter, the pump must maintain the pressure in the coolant supply system by regulating the flow rate at the outlet. At the inlet to the machine tools, the pressure must be guaranteed to be at least the requested pressure. Any of the pumps shall be selected as a "standby" pump and at least one pump shall be installed as a standby pump. In the event of a problem with one of the operating pumps, the standby pump should be started automatically.

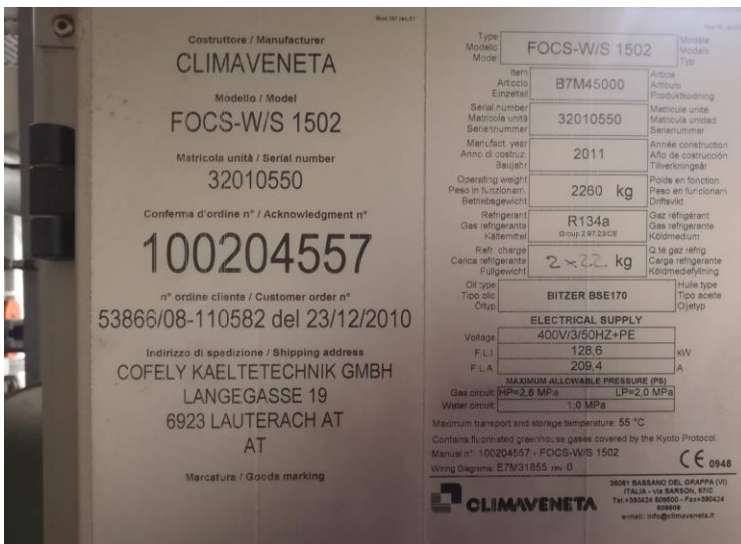
To ensure that all pumps in a pump unit are used evenly, the system program automatically prioritizes the pumps with shorter run times according to the run times of the pumps at each new system start-up.



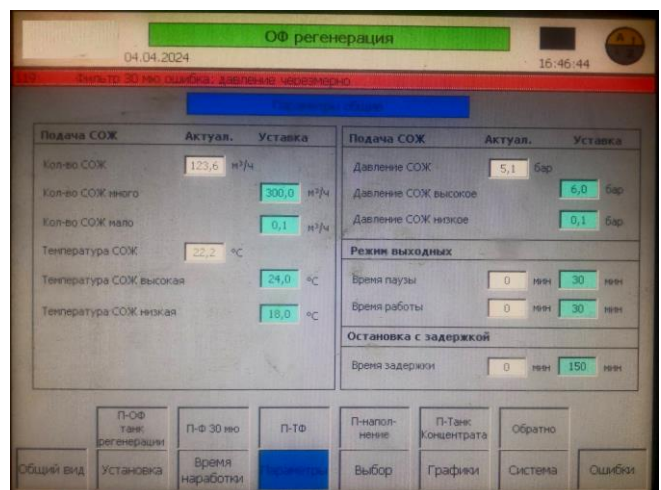
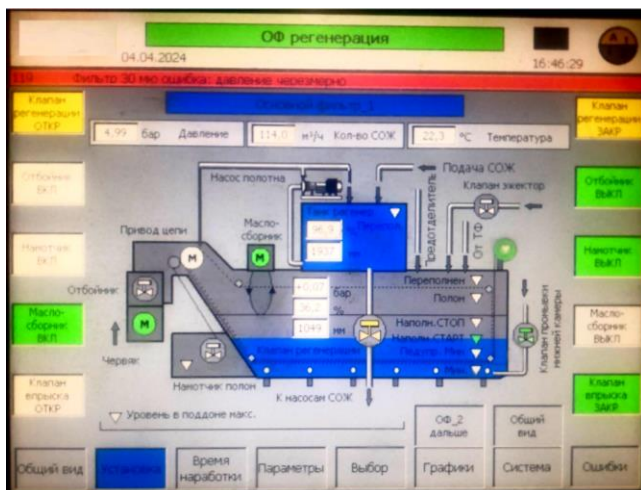
Connection point

Connection point

- For cooling the coolant, the supplier must calculate the need to supply his own chiller plant or use an existing one. We use a FOCS-W/S1502 chiller unit; information on it is given below.



- The control system can be integrated into the existing software or work with its own control system, the operation should be automatic, without the operator's participation.



- The main electrical control cabinet shall consist of an air-conditioned cabinet, inside with insulated metal partitions. The operator panel shall be integrated into the electrical cabinet. For wiring использовать защитные коробки.

- The new coolant supply system should be powered from the existing concentrate storage tank, with automatic dosing of concentrate and water directly into the tank, the vacuum filter should be provided with a flange with an electrically controlled flap for connection.
- Coarse chips shall be discharged into an existing conveyor. The equipment shall be equipped with catchers to prevent chips from spilling past the conveyor belt.
- A ramp system between the equipment must be installed, and a ladder must be provided outside and inside the tank for tank maintenance.
- The vacuum filter must be equipped with a maximum level sensor and a leakage sensor, with output to a signal lamp and with the formation of a message on the operator panel.
- Tank of the system must be installed in a pan preventing coolant spillage in case of an accident. The tank must also have a flange and the possibility of emergency drainage of coolant into an existing emergency tank in case of an accident.
- The tank must have a fence around the perimeter of the tank, the tank must have inspection hatches and ladders on the outer and inner contour of the tank.
- The operator panel should reflect data on the operation of all system components, in case of malfunction it should signalize the breakdown and provide alarm messages. Stop of system filling should be activated automatically according to the parameters set on the operator panel.
- Filter fabric winding should be carried out in an automatic cycle under two conditions: after a preset time interval or according to the vacuum sensor. The system should also allow manual (by buttons from the operator panel) control of the filter cloth winding. The width of the filter cloth should be 2280 mm.
- All changes made to the equipment control menu must be in Russian and intuitive to use.
- Provide an effective system for cleaning the emulsion from oil as required by item 2.5.
- The machining process produces not only metal chips but also fine particles. The supplier shall investigate the need to supply a deep filtration system with a filtration rate of approximately 30 microns or provide a solution to utilize an existing deep filtration system.



- The connection/disconnection and routing of the coolant lines is the responsibility of the customer. The supplier must provide information on the location and type of flanges for the pipe connection.
- Provide all isolation valves, electrically operated if necessary. -

Filter type ----- Vacuum filter
 Type of coolant ----- Semi-synthetic water-soluble coolant 6-7%
 Machining material ----- gray cast iron
 Chip quantity ----- 200 kg/h
 Filtration rate ----- 90% impurity particles $\leq 50 \mu\text{m}$, 99% $\leq 80 \mu\text{m}$
 Contamination content ----- $\leq 100 \text{ mg/l}$
 Supply temperature ----- 20°C-24°C at the machine inlet
 Feed pressure ----- 0.3-0.5 MPa at the machine inlet

Preliminary acceptance is carried out on the territory of the seller or the equipment manufacturer (not more than 3 days), the completeness of the delivery is checked in accordance with the specification to the contract and, if possible, the functionality is verified.

Final acceptance may be carried out either by the Customer or by a third party to whom the Customer may delegate the authority to accept the equipment.

In order to install and start up the supplied equipment, the supplier is obliged to send specialists with all the necessary tools for this task.

The program of installation, commissioning and final acceptance of the equipment must be agreed with the customer.

All assembly, installation and customization work in the supplier's area of responsibility.

The signing of the acceptance certificate is contingent upon the positive results of the performance test performed at the customer's premises and upon receipt of all technical documentation. If the inspection does not show positive results, the supplier shall carry out corrective actions to eliminate the remarks and resubmit to the customer.

4. DOCUMENTATION

This section defines the content and composition of the documentation to be transmitted by the supplier to the buyer at the proposal, approval and final decision stage.

Formalization of the provided documentation for the equipment must comply with European norms EN 20216.

The documentation to be provided to the customer shall include:

1. Drawings of equipment, drawings of wearing parts.
2. Complete equipment specification, including item codes for ordering in case of breakdown during operation.

Drawings must be supplied in pdf format;

Formats for wiring diagrams, hydraulic diagrams, pneumatic diagrams, etc., shall be A3, A4; formats for equipment drawings, equipment parts, fixture drawings, adjustment diagrams shall be A0, A1, A2, A3, A4; in case of other different formats, the supplier shall coordinate them with the customer.

Paper documentation should be placed in A4 size folders.

Electronic format must be provided on CD (CAD, Word, Excel, PowerPoint, etc.)

The documentation shall be provided in Russian. It is allowed to supply the documentation of sub-suppliers in the original language.

5. REQUIREMENT FOR THE COMMERCIAL PART OF THE PROPOSAL

5.1 Price quotation

The price quotation shall reflect the required delivery volume in accordance with clause 2 of this Technical Specification.

5.2 Payment terms:

We offer the following payment terms:

- The first payment - without advance payment or advance payment not more than 30% - (based on the invoice). The Supplier shall provide a bank guarantee for the advance payment on a mandatory basis.
- The second payment - 60% before shipment (pre-acceptance certificate and invoice) with bank guarantee or 60% after delivery to the Customer's warehouse.
- Final payment - after final acceptance in Yaroslavl (final acceptance certificate, invoice).

Deferral of payments, generally not less than 30 days.

5.3 Delivery period

- Delivery time of equipment - not more than 8 months.
- Installation, commissioning and final acceptance - no more than 1 month after delivery.

5.4 Terms of delivery

Delivery terms DAP or DDP Yaroslavl (according to Incoterms 2020)

5.5 Offer validity period

The offer must be valid for at least 6 months.

Head of company

Stamp

(Signature)

(Date)

(Full name)

Telephone numbers of the Company Helpline:

- Phone: +7 (916) 992-7639;
- Fax: +7 (495) 720-5016;
- Email: kbedoverie@mail.ru.
- Postal address: 30 Rochdelskaya Street, Moscow, 123022, Moscow

Telephone numbers of the PJSC Avtodizel (YaMZ) Helpline Service:

- Phone: 27-45-09 (24 hours a day); 27-46-73 (8:30 to 16:50);
- Email: Doverie@gaz.ru

SPECIFICATION OF EQUIPMENT AND SERVICES

Supplier company "..."

Proposal No. ... dated ...

No.	Scope of supply	Model or type	Qty.	Price per unit (excluding VAT)	Cost (excluding VAT)	Comments
1. BASIC EQUIPMENT						
1						
1.1						
1.2						
TOTAL for base equipment						
2. ADDITIONAL EQUIPMENT						
1						
2						
...						
TOTAL for additional equipment						
3. SERVICES						
1	Engineering					
2	Preliminary acceptance					
3	Installation					
4	Final acceptance					
5	Training					
6	Startup support					
TOTAL services:						
4. OTHER						
1	Packaging					
2	Documentation					
3	Customs declaration or GOST-R					
4	Transportation to the buyer's warehouse					
TOTAL other:						
TOTAL PROPOSAL SUM:						