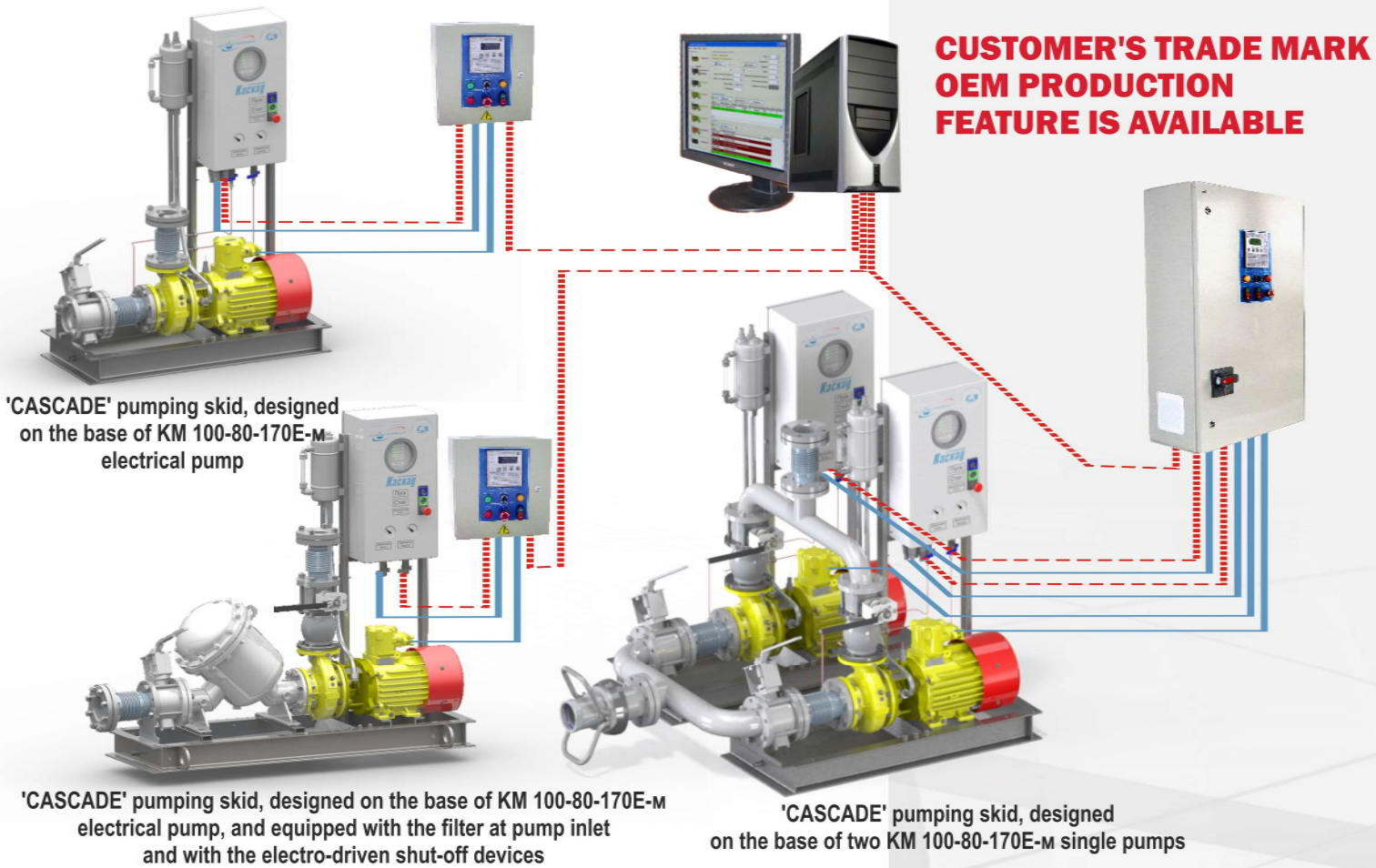


'CASCADE' PUMPING SKID



**CUSTOMER'S TRADE MARK
OEM PRODUCTION
FEATURE IS AVAILABLE**

'CASCADE' pumping skid, designed on the base of KM 100-80-170E-M electrical pump

'CASCADE' pumping skid, designed on the base of KM 100-80-170E-M electrical pump, and equipped with the filter at pump inlet and with the electro-driven shut-off devices

'CASCADE' pumping skid, designed on the base of two KM 100-80-170E-M single pumps

'Cascade' pumping skid, provided with the automated control system and with the feature of data transfer to the automation system's upper level, designed on the base of K type pumping unit or KM or KMC electrical pump types of JSC 'Prompribor' own production, is designated for pumping of up to 10^{-4} m²/s (100 cSt) viscosity clean petroleum products, which temperature is within (-40°C ÷ +50°C) range with the acceptable concentration of solid particles in fluid mass no more than 0.2% and these particles size must not exceed 0.2 mm.

At the present time 'Cascade' pumping skids of JSC 'Prompribor' production are the only complex pumping equipment in Russia that meets all regulatory documentation requirements, stated with regard to this type of equipment.

'Cascade' pumping skid main technical parameters

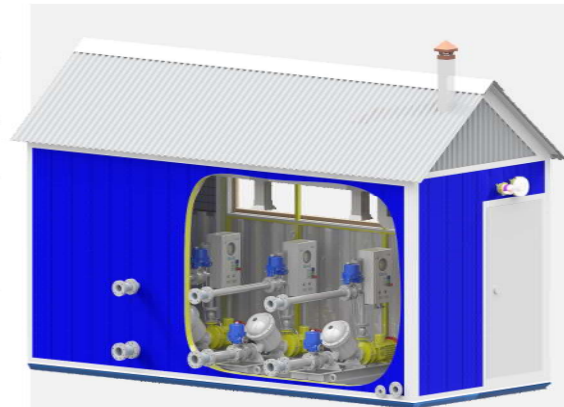
Electrical pump (pump assembly) nominal size	Pump delivery, m ³ /h	Pump suction head, m	Electrical engine power, kW	Rated current, A	Weight, kg (no more than)
KM 80-50-200E-M	50	50	15	31	350
KM 100-80-170E-M	100	25	11	23	350
KM 100-80-160E-M	100	32	15	31	350
K 150-100-200E	200	40	37	70	600
K 150-100-200E	150	50	30	62	540
KMC 100-80-180E	65	35	15	31	350
K 125-80-200E	150	40	37	70	650
K 200-150-250E	300	40/50	55/75	103/134	850/960
Ш 80-2.5-37,5/2,5	37.5	25	11	25	400
KM-STCL 80-65-180-200E	32	54	15	31	350
1SVN-80A	38	26	11	23	350
TCG 25/20K-3-2	25	20	3	6	290
TCG 100/35K-11-2	100	32	11	25	450

'CASCADE' BLOCK-MODULAR PUMPING SKID

Block-modular pumping skid is a loose container, inside of which it's created a microclimate to provide the necessary conditions for 'Cascade' pumping skid and associated equipment operation, as well as to provide the possibility of personnel short-term presence during maintenance and repair works. Block-modular pumping skid is a fully assembled, ready for operations and factory-tested container, fitted with the pumping and electrical equipment.

By means of «Cascade» pumping skid it's assured the following mainstream features:

- ✓ maximum safety oil products loading/discharge/transfer process; equipment power supply and control circuit protection;
- ✓ performance diagnostics of the pumping assembly and installed sensors;
- ✓ the pumping unit's electrical engine complete protection;
- ✓ the representation of text information on the controller's LCD-indicator concerning the pumping skid status, possible malfunctions etc.;
- ✓ manual operation mode - through the control cabinet's or the pumping unit console's 'Start', 'Stop' and 'Emergency Stop' buttons is available;
- ✓ it's also available remote operation mode - by external signal (from "dry running mode" sensor) or via RS-485 communication interface (Modbus RTU protocol) by means of operator's 'Automated workstation' software with any type of measuring skids, provided in the entire system configuration;
- ✓ current and alarm events computer archiving by time and date via the operator's workstation software;
- ✓ skid's operation by the external sensor signals: ('dry contact') - "dry running mode" sensor, coolant liquid top and bottom level sensors, max level sensor, 'Emergency(Alarm)' input signals;
- ✓ it's provided the feature of external sensor inputs inversion;
- ✓ operation modes: operation/standby; operation/advanced (in case of configuration with two pumps);
- ✓ pump protection feature through pressure and suction state control at pump inlet, and pressure value control –at pump outlet;
- ✓ 'dry running mode' sensor (identifies product availability in the pipeline) and pump's bearing temperature sensors;
- ✓ recovery bottle's minimum / maximum coolant liquid level control and pump vibration control by means of the suitable sensors;
- ✓ pump's and electrical engine's bearing temperature sensors and electrical engine winding temperature sensor (in case of availability) - option;
- ✓ electrical engine vibration sensor;
- ✓ through 'Cascade' pumping skid it's provided pump assembly joint operation to the transferred product measuring complexes (ASN 'Automated loading arms' with measuring system, UNM petroleum volume measuring complexes) and with KUP Universally programmable controller via RS-485 communication interface by means of operator's 'Automated workstation' software (via MODBUS RTU protocol at data transfer rate (9600 — 57600) baud).



Block-modular pumping skid

