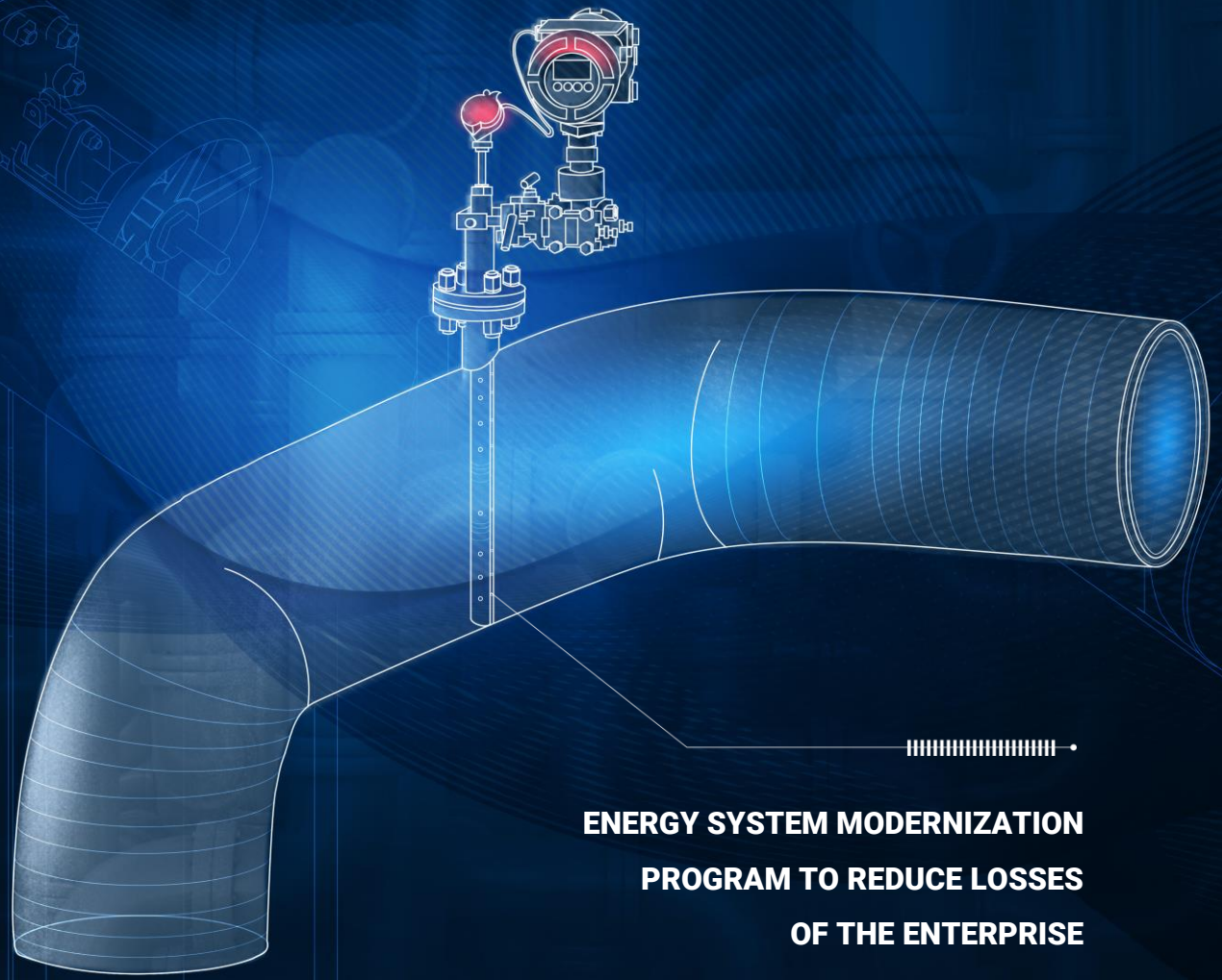
KTM®

KTM DELTAPASCAL

MIDDLE PRESSURE TUBE FOR LIQUIDS, GAS AND VAPOR METERING



ENERGY SYSTEM MODERNIZATION PROGRAM TO REDUCE LOSSES OF THE ENTERPRISE

In the Register of Industrial products of Russian Federation in accordance with the Decree of the Russian Government #719 «On the recognition of the products of Russian Federation».

Software KTM Smart Stream of our own development is included in the register of Russian software (Note in the registry 11574 from 24.09.2021).

Accredited as the manufacturer of instrumentation & controls by the Federal Service for Technical and Export Control on the ability to use software and hardware on Key Information Infrastructures of fuel and power enterprises.

VARIABLE PRESSURE DROP METER FOR ENERGY CARRIERS
KTM DELTAPASCAL™

KTM DELTAPASCAL

PURPOSE:

Projects to reduce the rate of electric power consumption and the life of pumping equipment. Metering of steam, hot fluids and ultra hot smoke emissions.

ADVANTAGES:

- Saving 5-15% on electricity bills when replacing constriction devices with a pito tube by reducing the pressure drop from 20-30% to 5-8%;
- Increasing the service life and lifetime of a steam turbine or pump by 20%, due to reduced inlet pressure;
- Reduction of expences by 4 times for the removal/installation of the flow meter, proving, transportation, replacement fund, and for repairing;
- Integrated computer in the explosion-proof casing, which is ready for volume calculations without additional equipment;
- Installation/dismounting without interruption of the process;
- Simulation proving method;
- Flow compensation by temperature and pressure;
- Metering on gas pipes of complex shape;
- Metering of high-temperature gases up to +710°C up to 25 MPa;
- Metering of air emissions from pipelines up to 15 m in diameter.

WHAT THE CUSTOMER USES NOW

Diaphragms, nozzles and Venturi tubes

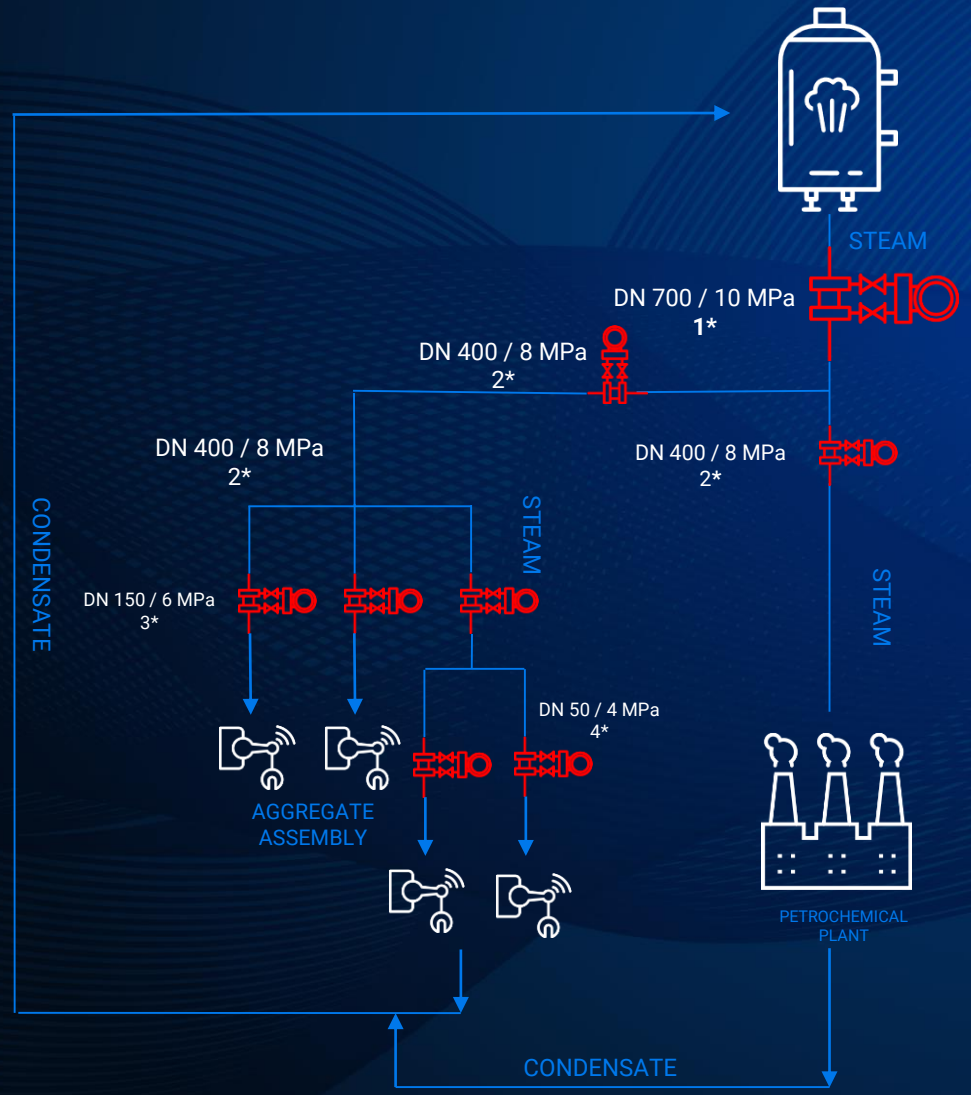
WHY:

- It always had been used and its easier to change nothing, because everything works already;
- There are no trained people;
- Same solutions from design institutes;
- Low price (in small diameters).

CONSEQUENCES:

- Significant pressure loss of the pressure of the fluid;
- Significant wear of pumping equipment;
- Complex and expensive tying system with bypass;
- Need to have an exchange fund of;
- High cost of ownership.

HOW DO YOU LOSE MONEY

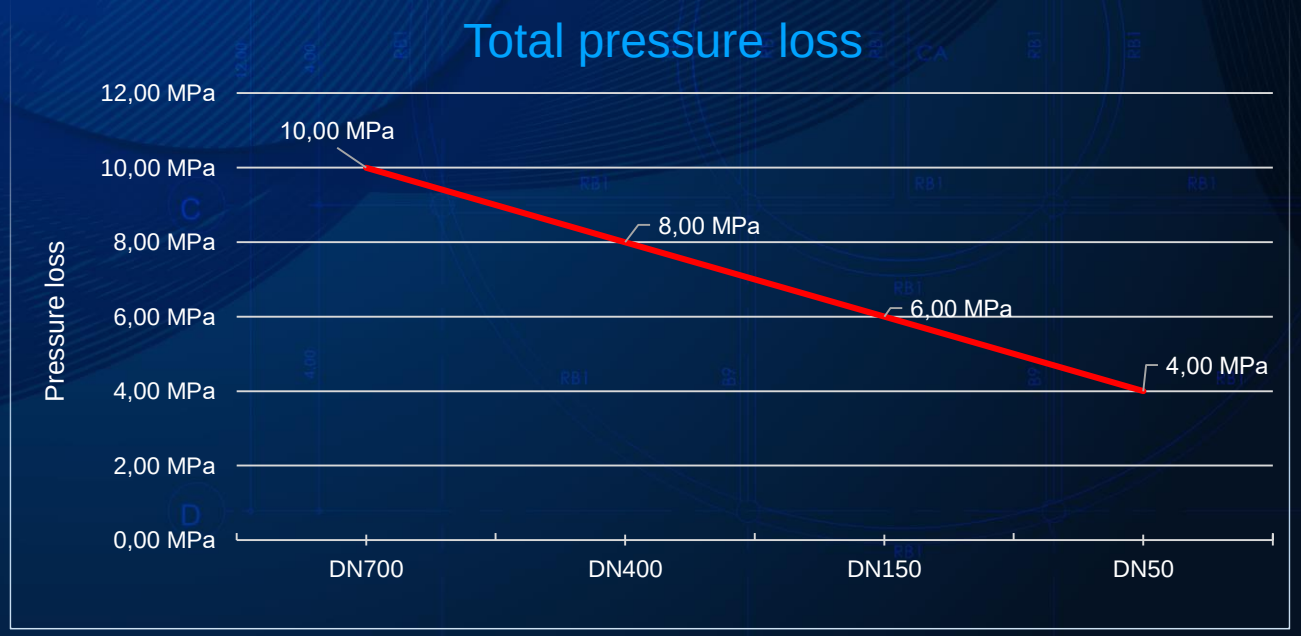


ENERGY MANAGEMENT SCHEME
INDICATING THE LOCATION OF THE FLOW METER
AND PRESSURE LOSS

Constriction device

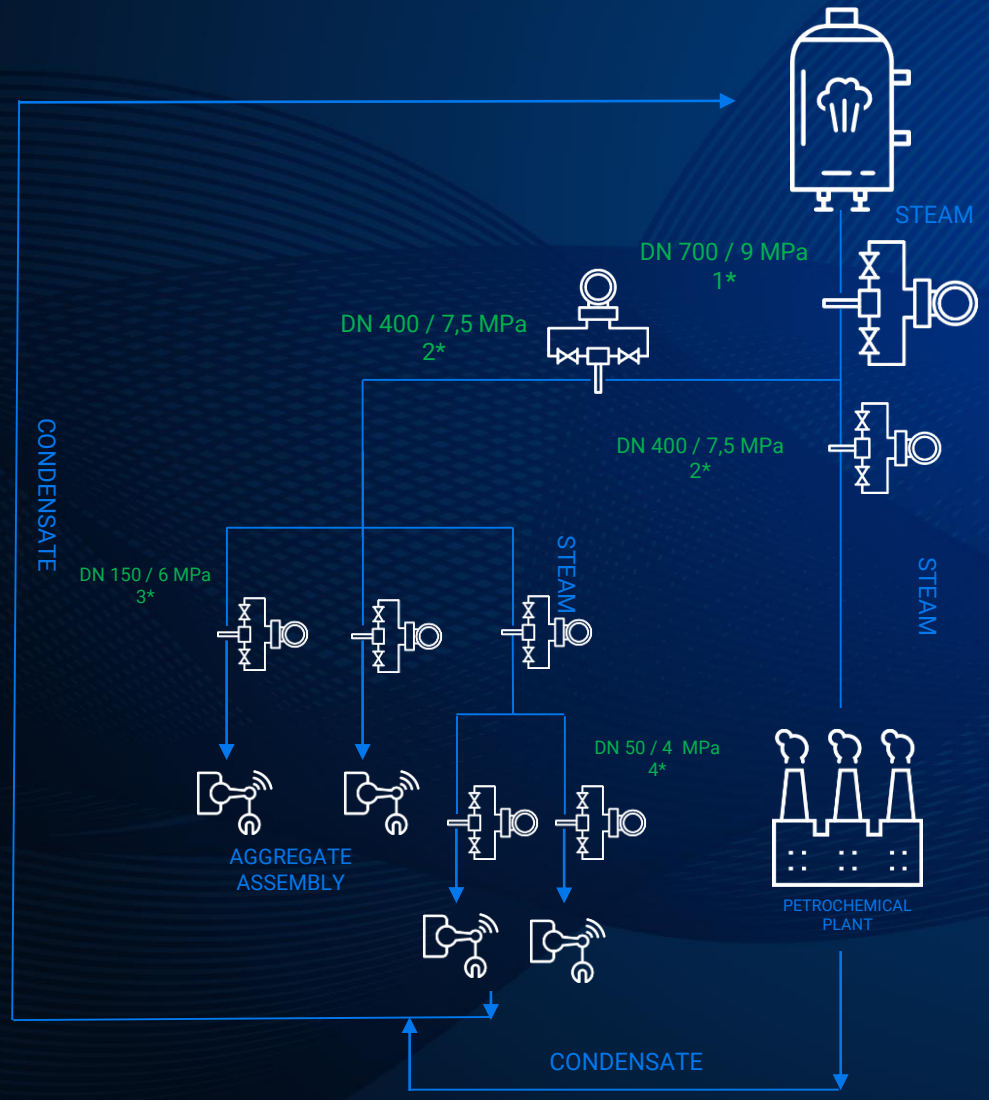
1* DN 700 / 10 MPa
2* DN 400 / 8 MPa
3* DN 150 / 6 MPa
4* DN 50 / 4 МПа

On average, the enterprise has at least 25 metering skids total



* With taking into account losses on the line with turns, valves etc.

HOW TO REDUCE ENTERPRISE LOSSES

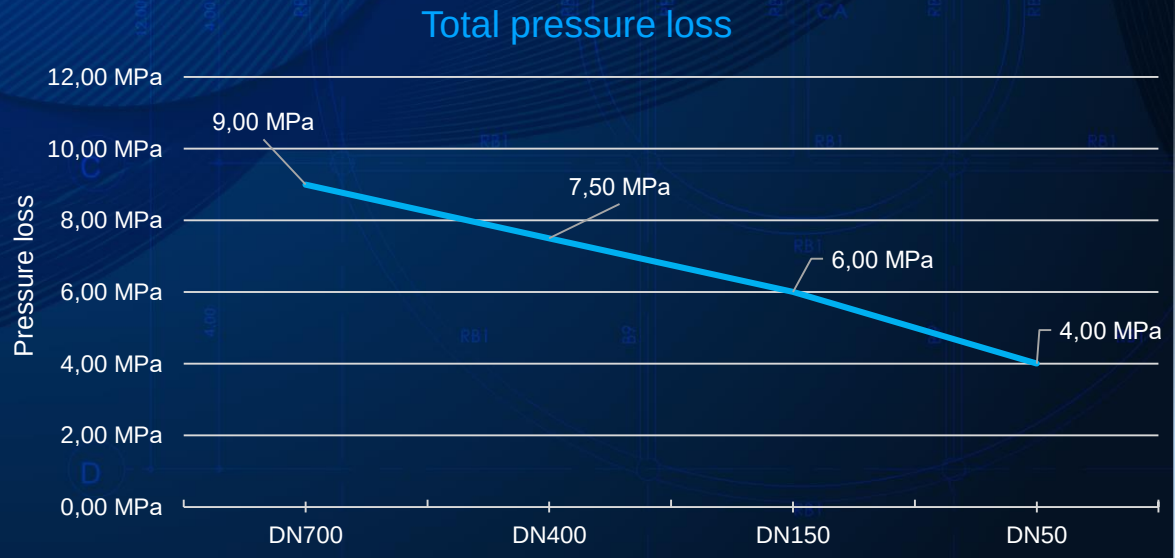


ENERGY MANAGEMENT SCHEME
INDICATING THE LOCATIONS OF THE FLOW METERS
KTM DELTAPASCAL

KTM DELTAPASCAL

1* DN 700 / 9 MPa
2* DN 400 / 7,5 MPa
3* DN 150 / 6 MPa
4* DN 50 / 4 MPa

On average, the enterprise has at least 25 metering skids total



* With taking into account losses on the line with turns, valves etc.

REDUCTION OF PRESSURE LOSS AND , AS A RESULT, REDUCTION OF ELECTRICITY RATES

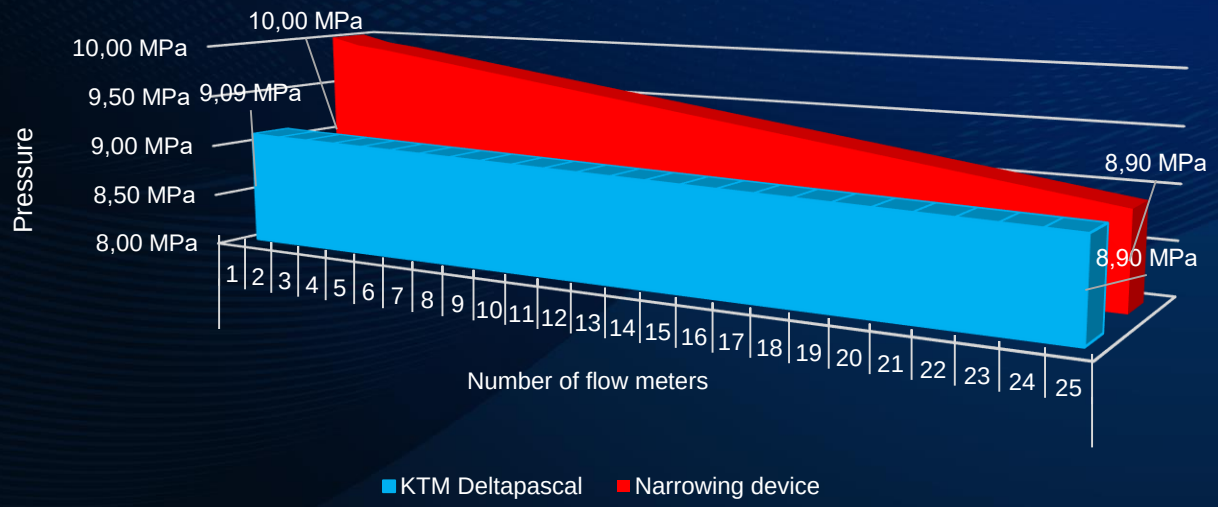
PRESSURE LOSSES

Pipeline diameter	KTM DELTAPASCAL	Narrowing device	%
DN300	**8,09 кПа**	**45,2 кПа**	**458**
DN700	**5,54 кПа**	**35,9 кПа**	**548**

THERMAL ENERGY LOSSES

Pipeline diameter	KTM DELTAPASCAL	Narrowing device	%
DN300	**0,026 Gcal/h** (by methodology MI 2714-2002)	**0,256 Gcal/h** (by methodology MI 2714-2002)	**884**
DN700	**0,018 Gcal/h** (by methodology MI 2714-2002)	**0,203 Gcal/h** (by methodology MI 2714-2002)	**1027**

Total flow meters pressure loss



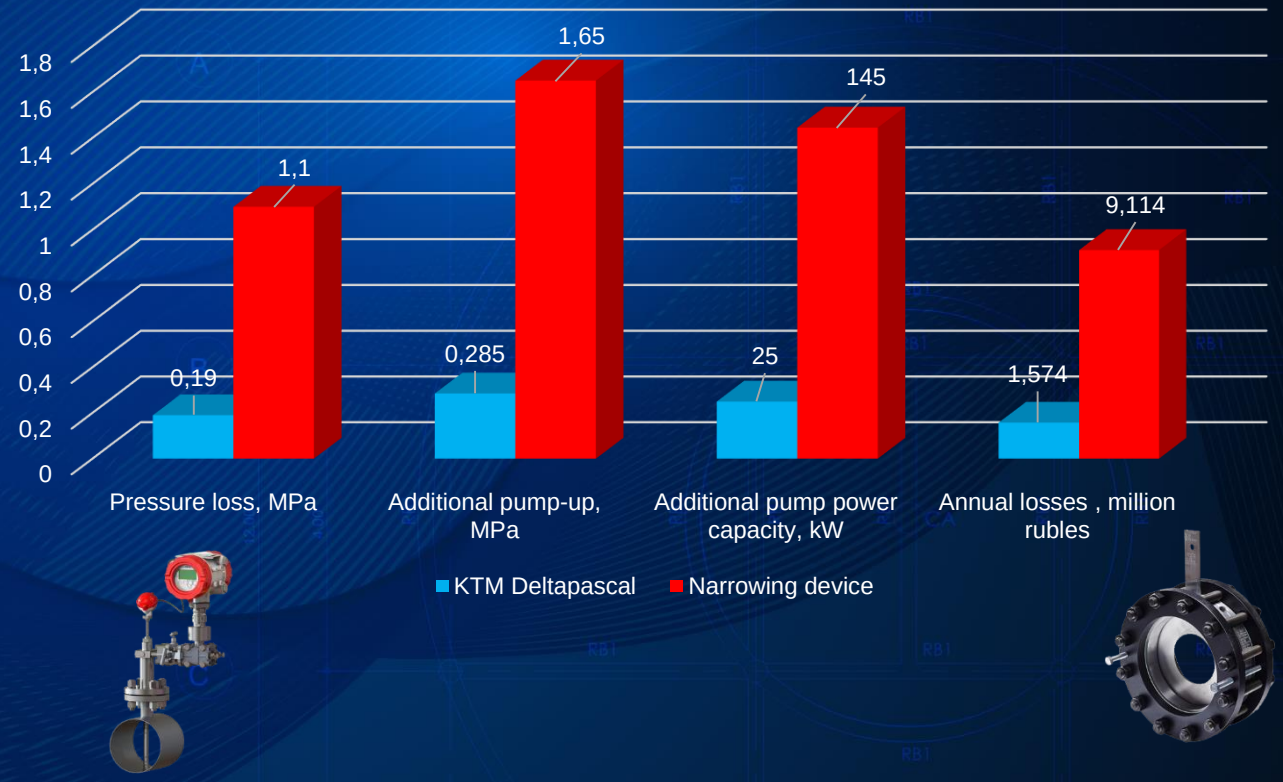
CONCLUSION 1:
The steam boiler requires 1 MPa less pressure at the outlet to ensure the required pressure at the consumer, if pressure loss in the pipeline is equal

THE COST OF OWNERSHIP

PUMP FOR HOT WATER INJECTION INTO A STEAM BOILER

- Pump PE 250-180
- Power: 1445 kW
- Pressure: 1,650 m (16.5 MPa)

annual losses on electricity bills at the rate 9 rubles / kWh



$$A = \Delta W \cdot S \cdot n \cdot k$$

- where ΔW is the additional power required by the pump to overcome the pressure loss of the flow meter (the additional pump-up must be 1.5 times more than the pressure loss):
- S=9 RUB/kWh - electricity rate for industrial enterprises: n=24 x 365=8760 - number of hours per year:
- k=0.8 - factor of taking into account the idle time and repair of steam boiler.

CONCLUSION №2:

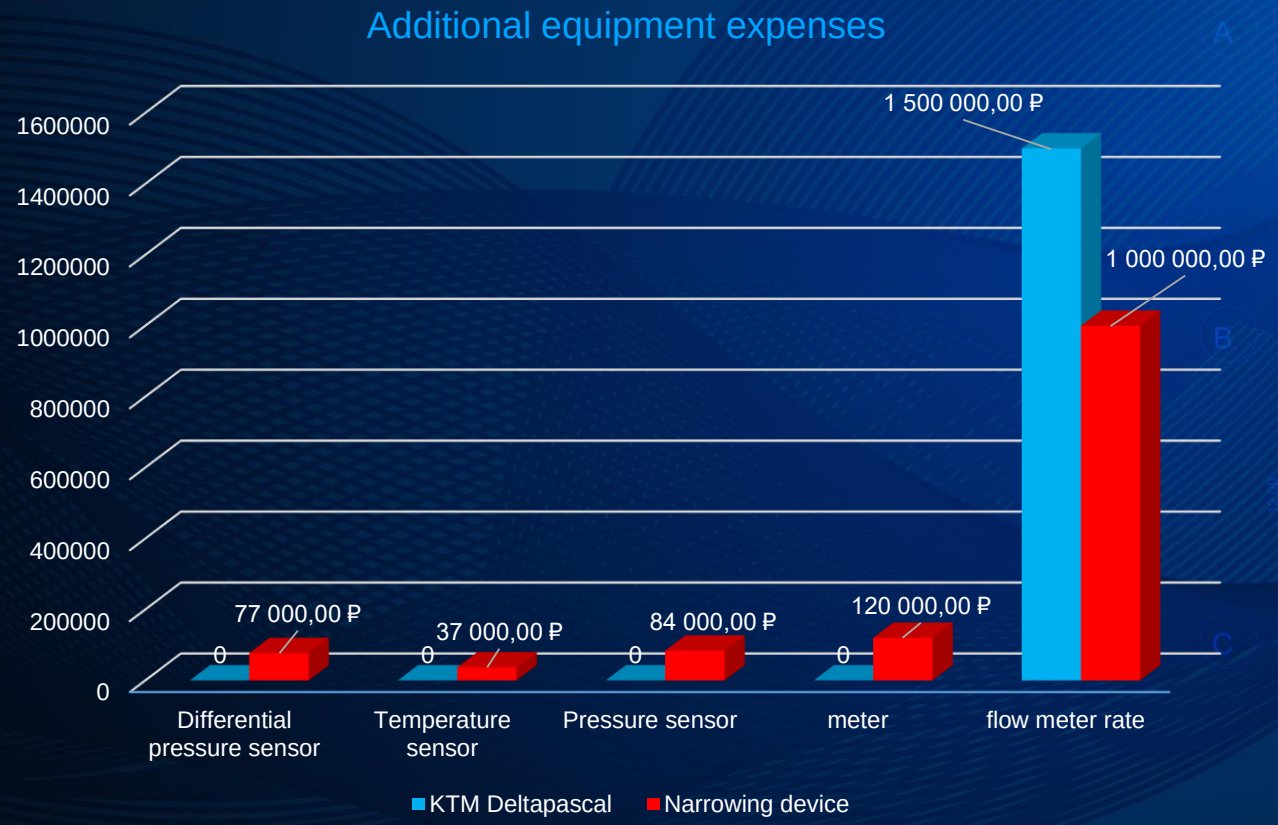
You are saving -

In one year on the steam operation line

7 536 684 rubles

per 10 years - **75 366 840 rubles**

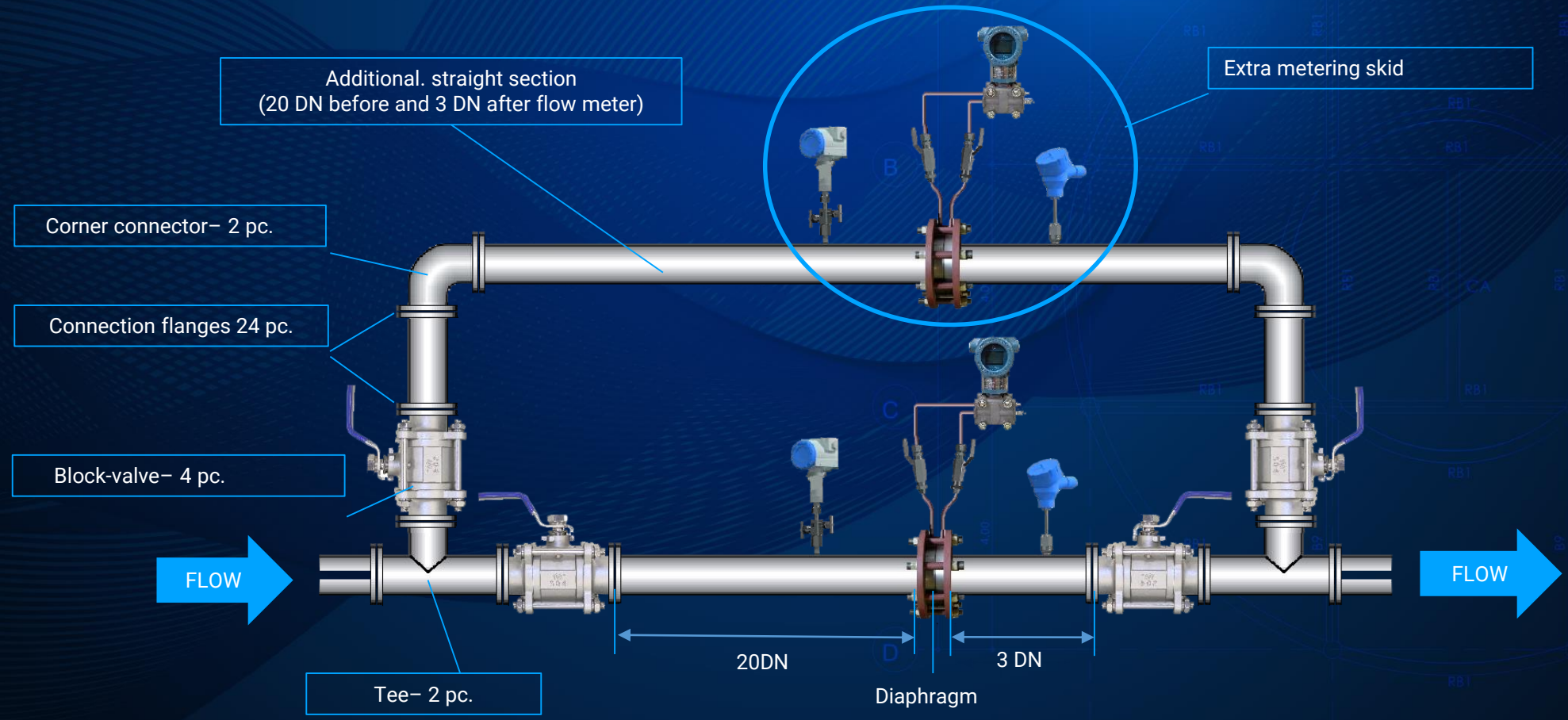
EXPENSES OF EQUIPPING THE METERING SKID. COMPONENTS.



CONCLUSION №3:
Saving funds on equipping of a metering skid -
318 000 rubles

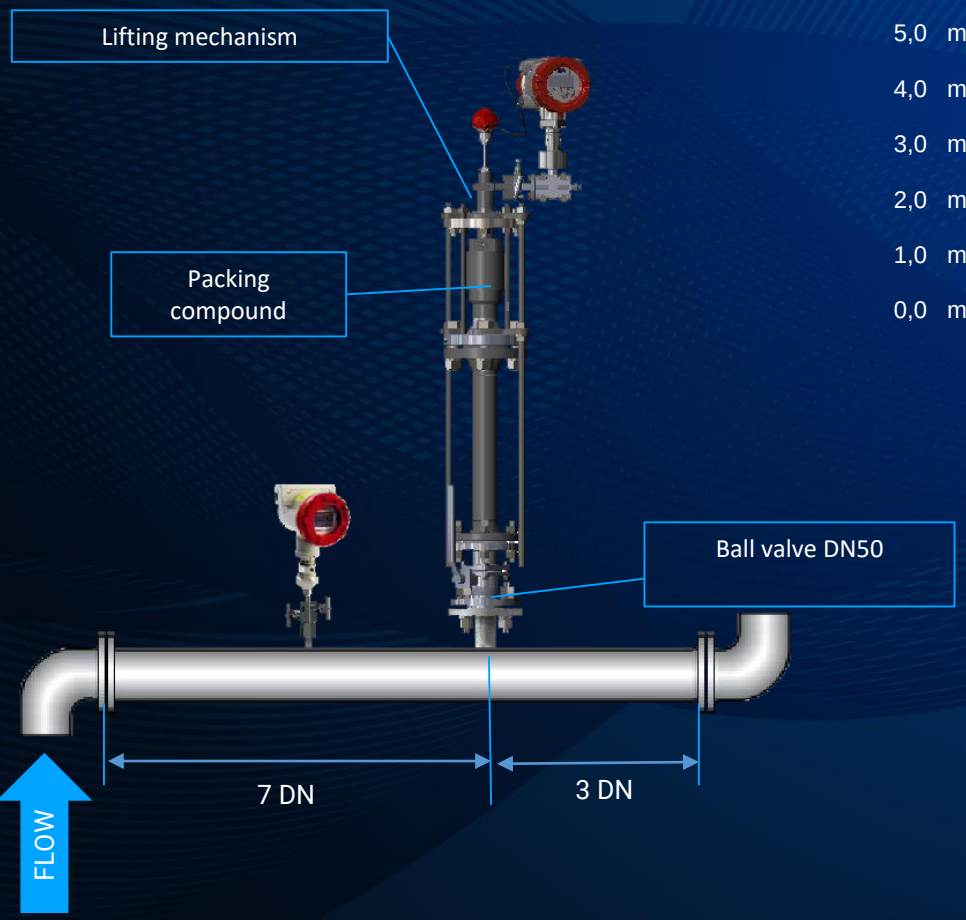
NO BYPASS REQUIREMENT

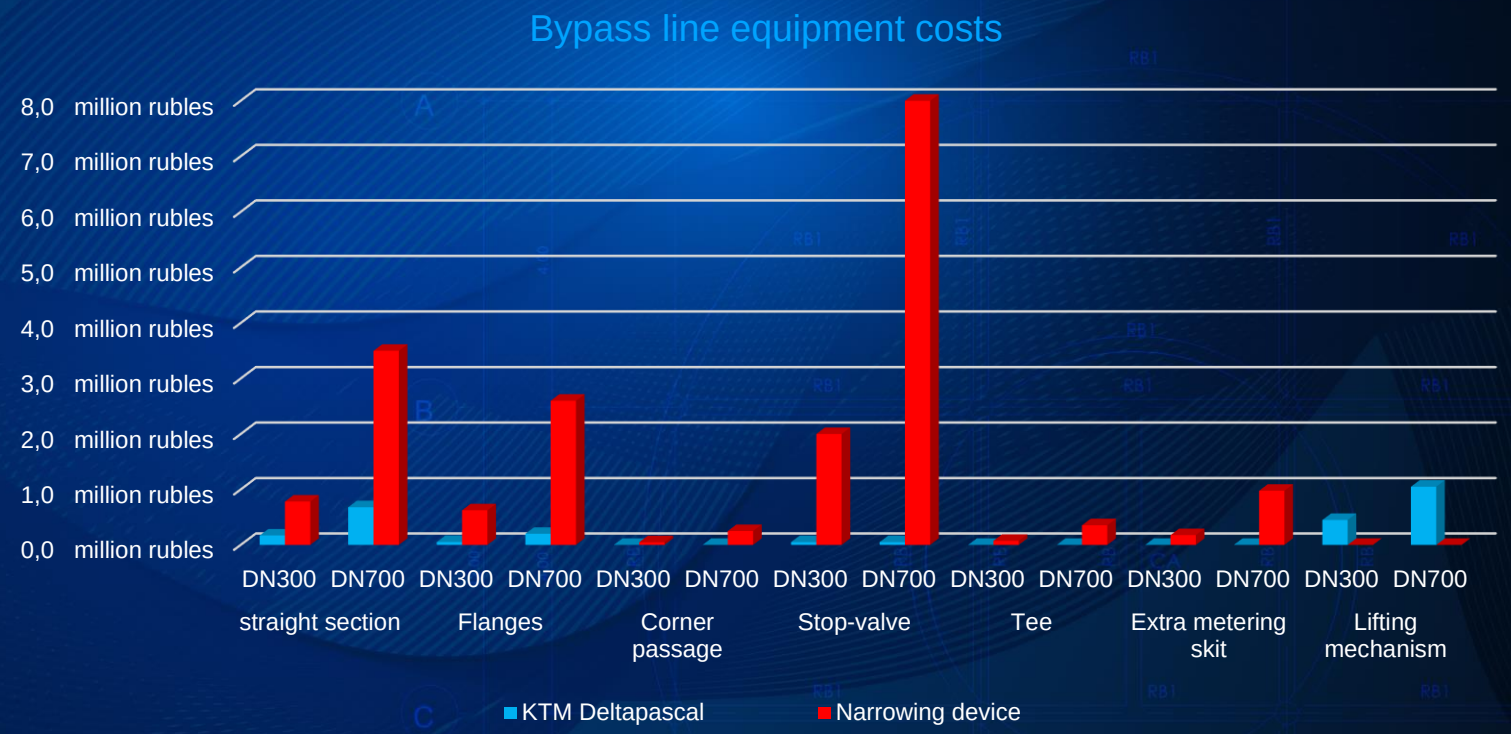
NARROWING DEVICE REQUIRES



NO BYPASS REQUIREMENT

KTM DELTAPASCAL

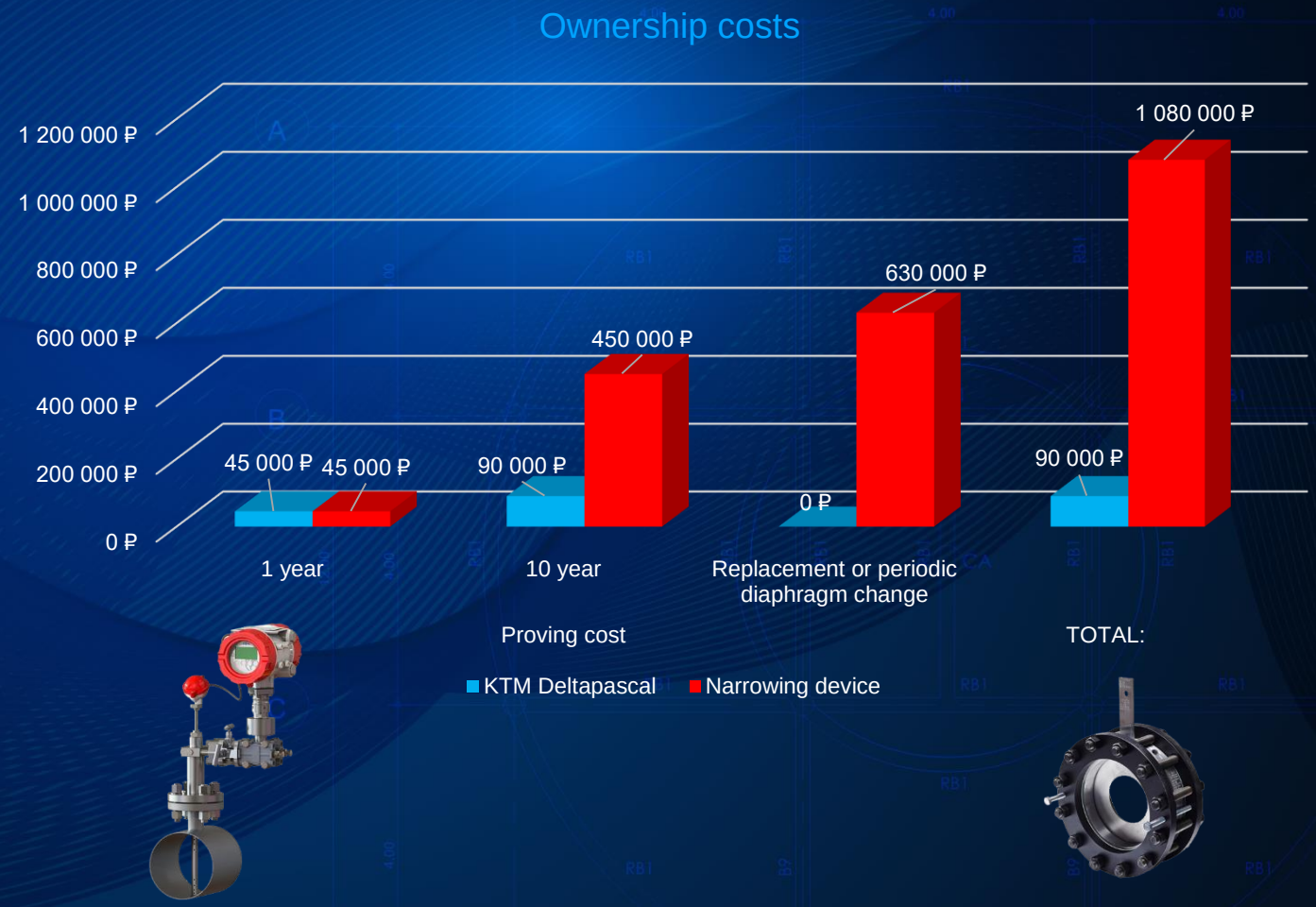




CONCLUSION №4:
Save requirement to bypass line of a metering skid
2 982 000 rubles FOR DN300
13 702 000 rubles FOR DN700

THE COST OF OWNERSHIP

	NARROWING DEVICE	KTM DELTAPASCAL
Proving expenses		
Proving cost	45 000 rubles	45 000 rubles
Interval between provings	1 year	4 years
Subtotal: 10-year proving costs	450 000 rubles	90 000 rubles
Repair and maintenance costs per 10 years		
Repair and replacement of consumables	Replacement or periodic diaphragm change 630 000 rubles	No need 0 rubles
TOTAL:	1 080 000 rubles	90 000 rubles



CONCLUSION №5:
Your savings on the cost of ownership on a single metering skid - **990 000 rubles**

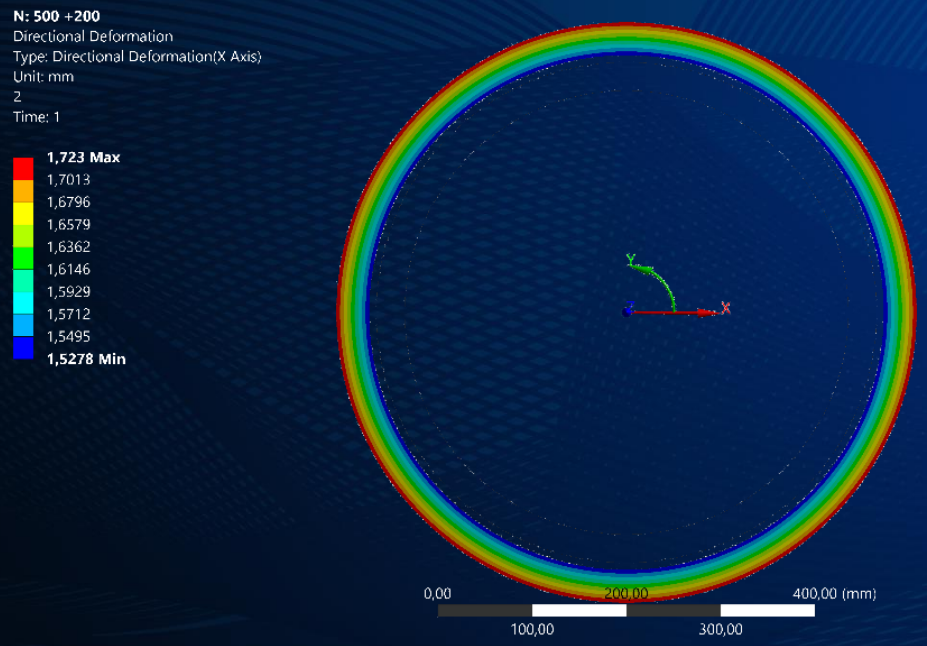
TOTAL SAVINGS ON ONE STEAM OPERATION LINE

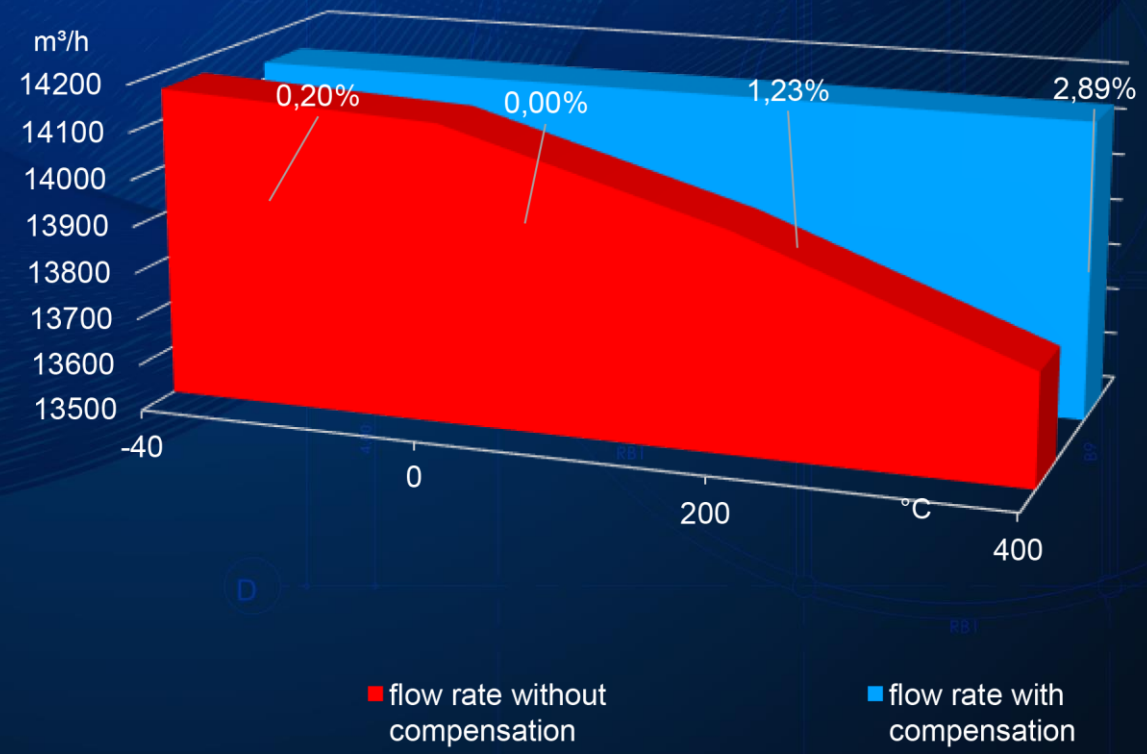
EXPENSES	NARROWING DEVICE (10 years expenses)	KTM DELTAPASCAL (10 years expenses)	ANNUAL SAVINGS	10 YEARS SAVINGS
Spare parts	7,95 millions rubles	0,00 rubles	0,8 millions rubles	7,95 millions rubles
Bypass line	23,09 millions rubles	3,42 millions rubles	1,97 millions rubles	19,67 millions rubles
The cost of ownership	27,0 millions rubles	2,25 millions rubles	2,48 millions rubles	24,75 millions rubles
Extra expenses on electricity	91,14 millions rubles	15,74 millions rubles	7,54 millions rubles	75,36 millions rubles
Pump depreciation	1,19 millions rubles	0,99 millions rubles	0,02 millions rubles	0,2 millions rubles
TOTAL:	149,86 rubles	21,42 rubles	12,79 millions rubles	127,96 millions rubles

CONCLUSION:
Total savings
12 796 085 rubles per each year of service
127 960 850 rubles per 10 years

COMPENSATION OF HOUSING GEOMETRY CHANGES CAUSED BY THE TEMPERATURE AND PRESSURE

When the temperature of the flow changes by 200 °C, the geometric dimensions of the housing change, resulting in a discrepancy between the actual and the calculated flow.
Without the compensation function, this change results in additional measurement accuracy.
The compensation corrects the measured data in the flow meter and ensures a stable accuracy in the flow measurements.

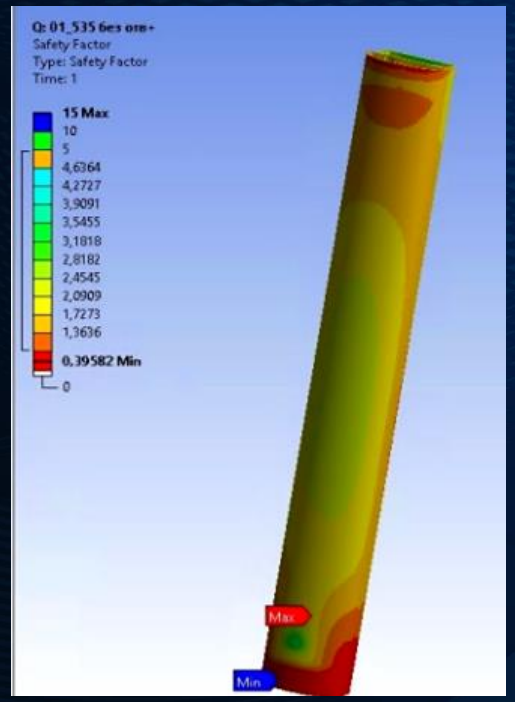


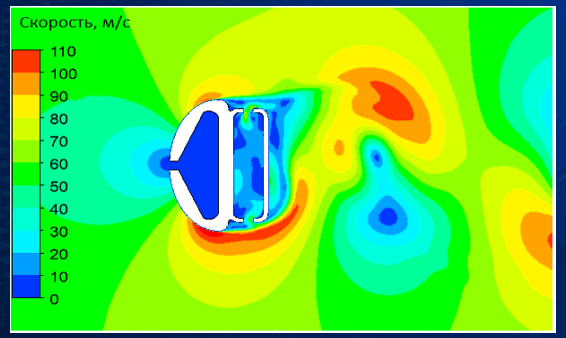


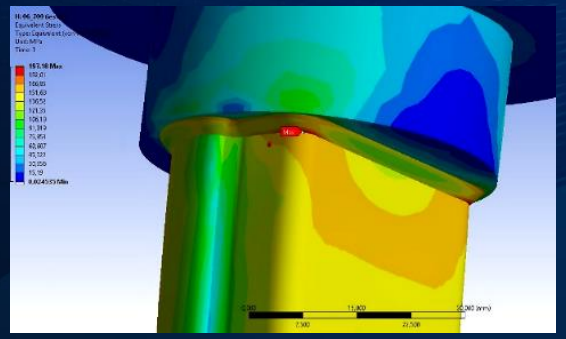
OUR OWN PROBE PROFILE

Patented D-shape probe profile, providing high metrological characteristics of flow meter. Patent on model №207837

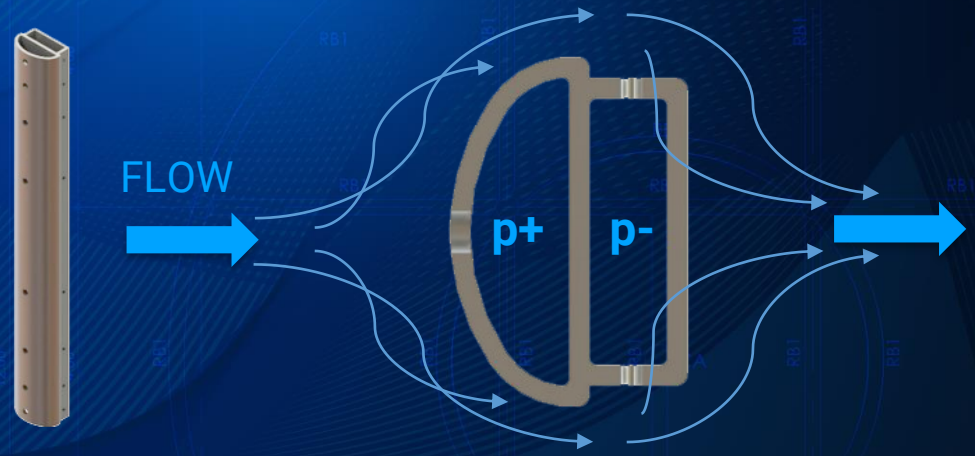
PROFILE FORM OPTIMIZED IN ANSYS FLUENT AND ANSYS MECHANICAL SOFTWARE







Profile characteristics confirmed by high-precision gas stand tests



ADVANTAGES OF D-SHAPE PROFILE IN COMPARISON WITH COMPETITORS:

- Low differential pressure fluctuations in a wide range of operations;
- Low dependence on the profile positioning in the pipe;
- Possibility of measuring at low flow rates;
- Stability of measurement of «ragged» flow;
- Resistance to vibrations.

THANK YOU FOR YOUR ATTENTION!

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