КОМПЕНСАТОР

METALLIC EXPANSION JOINTS

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The document is subject to alterations and amendments without prior notice.
The comprehensive information on the enterprise and products is available on the official web site of the factory: www.kompensator.ru

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INTRODUCTION

“Kompensator” Scientific and Production Enterprise”, Joint-Stock Company is modern Russian integrated works. Since 1981, development, testing and production of expansion joints, flexible elements for pipeline systems, have been the main business areas of the enterprise. Presently, the enterprise comprises design-engineering departments, testing center and serial production.

Throughout its history, “Kompensator” has been best known for its scientific and technical potential, highly qualified personnel, strong development, testing and production facilities with a unique production equipment fleet, as well as advanced design techniques of new scientific products. With its inventions, the enterprise significantly contributes to the development and safe operation of facilities and pipeline systems of various industries:

- Chemical and oil refining industry;
- Oil and gas storage and transport;
- Iron and steel industry;
- Aerospace industry;
- Cryogenic machine building;
- Thermal and nuclear power plants;
- Shipbuilding industry;
- Heat supply.

“SPE “Kompensator”, JSC helps the partners to solve tasks of diverse complexity in the field of compensation of thermal distortion and other types of pipeline deformation, ensuring reliable and stable operation of both an individual pipeline and pipeline systems as a whole. The factory is ready for cooperation with partners at different life cycle stages of pipeline systems:

- design;
- installation;
- operation;
- modification.

We offer our customers solutions based on the factory’s serial products and, if necessary, based on customized product development. Being guided by production practices based on decades of experience in our competencies, as well as by modern standards and stringent requirements to work performance quality in designing andmanufacturing, we can guarantee the highest quality of products being manufactured and delivered to the customer.

FACTORY PRESENTATION

Over 35 years “SPE “Kompensator”, JSC has produced and supplied above six hundred thousand multilayered metallic expansion joints and bellows compensation devices for diverse industries. The production range of the factory has above 10000 production units of various type, diameter, pressure, and purpose of use. The development of products is performed under the R&D works and involves development of engineering documentation and technology, as well as manufacturing and testing of pilot samples. The key customers of the R&D are the enterprises of shipbuilding and nuclear industries: “Rubin” Central Design Bureau for Marine Engineering, “MALAKHIT” St. Petersburg Sea Bureau of Engineering, “Almaz” Central Maritime Design Bureau, Northern Design Bureau, “Krylov State Research Center” FSUE, Atomenergoproekt, Atomproekt, NIAEP, Rosenergoatom Concern.

The R&D for creation of expansion joints for main heating networks has been completed for fuel and energy complex enterprises. The work was performed in association with design companies, institutes and with direct involvement of industry non-profit organizations. The work output is as follows:

– A full range of items for heating networks: Expansion joints and bellows compensation devices;

– GOST 32935-2014 “Metallic expansion joints for heating networks. General specifications”;

– A set of guidance documents for design, installation, and operating companies under the joint name of РД-3-ВЭП.

The enterprise has developed and performs the series supply of expansion joints for various industrial facilities:

- Nuclear power plants;
- Oil and oil product storage tank farms;
- Main and submain heating networks throughout Russia, Kazakhstan, Belarus and the CIS countries;
- Thermal electric power stations and thermal power plants;
- Ships and vessels of various applications – all life-support systems;
- Cold and hot blast systems and gas treatment systems for iron and steel works;
- Pump and compressor equipment unloading systems for oil refineries and petrochemical plants, process pipelines;
- LNG transportation systems in the cryogenic industry;
- Exhaust line systems for various internal combustion engines.

ENTERPRISE TIMELINE

1950–1970

In Leningrad, on the base of the Shipyard named after A. A. Zhdanov (currently, "Severnaya Verf" Shipbuilding Company, PJCS), a section for production of expansion joints for the Soviet Navy was arranged

June, 1975

"Kompensator" Special Design and Technological Bureau (SKTB "Kompensator") of the Nevskoye Planning and Design Bureau was created

Development and production of multi-layer metallic expansion joints for diverse industries

Development of the license for Metallschlauch-Fabrik "Pforzheim" ("Hydra"), Germany (FRG)

The resolution of the Council of Ministers of the USSR and the CPSU Central Committee No. 510-511 dated 11.06.1975 "On the arrangement at the Leningrad shipyard named after A. A. Zhdanov of an integrated base for the design, standardization and production of expansion joints for the defence industry and national economy"

1976–1977

Divisions of the Nevskoye Planning and Design Bureau were combined under the joint name of the "Expansion Joints and Damping Devices (EJDD)"

1979

SKTB "Kompensator" was separated

Conversion of pilot production of bellows equipment to serial production

1981

The first pilot samples of expansion joints for heating networks were made

March, 1982

The first specifications for expansion joints for heating networks (TU 5.551-19702-82) were approved

First supplies of expansion joints for heating networks to the agencies in Leningrad and Moscow

1981–1983

Unique expansion joints for aerospace industry (for the "Energia-Buran" multipurpose rocket-and-space complex) were developed: various types of expansion joints for liquid oxygen and liquid hydrogen pipelines ("Energia" launch vehicle motors)

1983–1986

The R&D was completed for the development of expansion joints for charge piping of compressor plants of main gasline for a nominal pressure of 80 kgf/cm² at the exposure to significant vibratory loads

The specification ИНЯШ.300260.025ТУ "Expansion joints for main gasline heater piping" was approved

1985–1986

The R&D was completed for the creation of expansion joints for the "Buran" multipurpose rocket-and-space complex and the Mir Space Station (development of a universal expansion joint DN 1000)

1987–1991

The "Kompensator" Testing Center (Gatchina, the Leningrad region) was built and integrated into the enterprise

1989

The implementation of expansion joints at the modification of the centralized heat supply of Leningrad

1992–1994

The serial production of new design bellows compensation devices for mineral-wool insulated, poly-urethane (PU) foam insulated, and reinforced foam concrete insulated heat lines was commenced

1997–1998

1992–1994

The R&D was conducted in order to develop cardan type angular expansion joints to absorb thermal and mechanical movements of pipeline systems in tank farms of oil-loading terminals for a pressure of 10 kgf/cm² with 10,000 cycles in service. The specification ИЯНШ.300260.028ТУ "Metallic angular expansion joints for VST (vertical steel tank) steel tank pipelines" was approved

1999

SKTB "Kompensator" was transformed into "Kompensator" Federal State Unitary Enterprise ("Kompensator", FSUE)

2001

"Kompensator", FSUE was renamed to ***"Kompensator" Scientific and Production Enterprise***, FSUE ("SPE "Kompensator", FSUE)

2002

Several R&D projects on the development of expansion joints for nuclear power plants (NPP) were carried out

2004

The R&D was completed and the serial production of new design of bellows compensation devices СКУ.ППУ/ПЭ.I СКУ for industrial PU-foam insulated polyethylene-sheathed heating networks was commenced

2006

The R&D of new design of a thermally insulated waterproof bellows compensation device for heating networks was completed: СКУ.ТТИ.I (made PE-sheathed "Pyrogel" preinsulated)

2006

"SPE "Kompensator", JSC obtained a certificate of trademark

2009

The R&D was completed and the serial production of improved bellows compensation devices СКУ.ППУ/ПЭ.II for heating networks was commenced

2010

The serial production of bellows compensation devices for heating networks without waterproofing and without preinsulation of branch pipes (mineral wool insulated – poly-urethane (PU) foam insulated, and reinforced foam concrete insulated products)

2006

The licenses to design and to manufacture equipment for nuclear power plants were obtained

2007

The specifications (TU) for the production of serial products were agreed upon with "Rosenergoatom Concern", JSC

2012

A large-scale production improvement and machine-tool fleet renewal program is being implemented at the plant

2013 –2014

The R&D was completed and the serial production of improved bellows compensation devices СКУ.ТТИ.II ТТИ.II, thermally insulated waterproof compensation device with increased compensation capacity and more compact dimensions, for heating networks was commenced

2014 – 2015

With the close involvement of "SPE "Kompensator"", JSC specialists, interstate standard GOST 32935-2014 "Metallic expansion joints for heating networks. General specifications" was developed

2017

The factory was granted a product patent for heating networks

2016–2020

QUALITY MANAGEMENT SYSTEM
LICENSES AND CERTIFICATES

The quality management system based on the requirements of GOST R ISO 9001-2015 (ISO 9001:2015) is adopted at the enterprise. The first certificate was issued in 2005. The system covers development, production, control, testing, and supply of bellows equipment items and pipeline fittings.

The system is managed by the factory Quality Service, whose employees have the necessary qualifications confirmed by relevant certificates. The Quality Service covers all the production stages, which contain the minimum and necessary scope of product quality control in accordance with the current rules, customer's requirements, and well-recognized technical regulations. Determination of specific performance, testing procedure of products being manufactured, is performed according to the production programme of the enterprise and documented procedures during manufacture in order to ensure that the products put into operation have been properly checked and tested.

The products, which have passed all the inspections and testing, are granted with a certificate verified by the Quality Service; the products are labelled accordingly.

The enterprise has licenses, certificates and permits in order to perform the work:

- Certificate of compliance with industrial safety requirements;
- License to design equipment for nuclear plants;
- License to manufacture equipment for nuclear plants;
- Russian Maritime Register of Shipping, certificate of type approval;
- Russian River Register, certificate of generic product approval;
- Set of the Customs Union certificates.

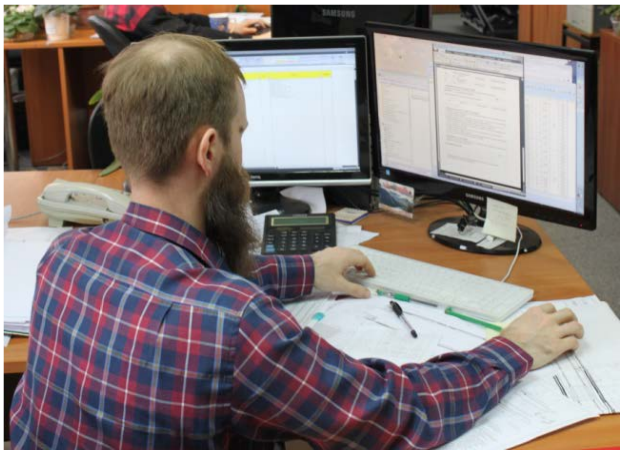






DESIGN-ENGINEERING DEPARTMENTS

The design-engineering departments of the company carry out R&D for the creation of technically sophisticated designs of expansion joints and a list of products for series production.



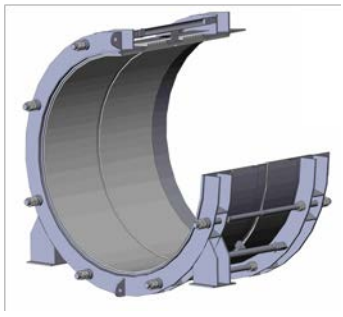
The scientific base allows designing and manufacturing products with the following parameters:

- Diameter, up to 5000 mm;
- Pressure, up to 20 MPa;
- Temperature of handled media, –200 °C to +900 °C;
- Handled liquid media velocity, up to 8 m/s;
- Handled gaseous media velocity, up to 120 m/s

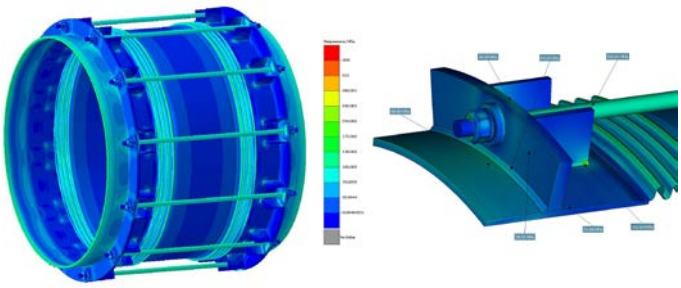
The accumulated performance potential and use of modern engineering and calculation methods for the structures being developed using computer-aided design systems make it possible to:

- Develop a design engineering documentation package for the manufacture of expansion joints with various parameters, both as related to pressure and diameter;
- Build 3D models of products and systems as a whole;
- Simulate stress-strain behavior of products, and individual nodes.

3D model of the DN3400 expansion joint



Stress-strain behavior visualization of the DN2340 expansion joint and an individual node



The high quality of expansion joints and bellows compensation devices is mandatory, but not sufficient for the long-term operation of pipeline systems. The design of the entire pipeline system operation, including compensating elements, is a critical part. The material assistance in this matter is provided by the specialists of the Technical Support Department and other departments of the factory.

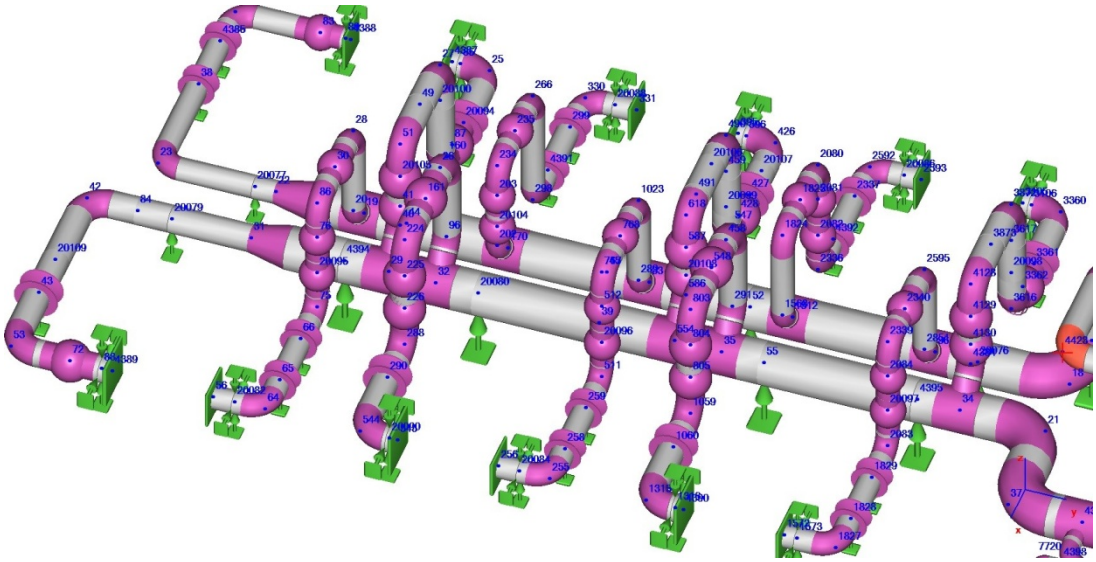
They provide engineering support and consulting in the following areas:

– Product range, technical characteristics, and applications The selection of an optimal expansion joint or bellows compensation device in order to solve certain tasks, depending on the region and specifics of a facility;

– The peculiarities of design of pipeline systems, pipeline compensation systems, equipment piping and compensation with the use of expansion joints in specialized software packages The strength and hardness calculation of pipelines of various applications, layout calculation (in particular, revised calculation) with the selection and review of arrangement of supports and hanger-support systems.

Example of calculations

No. 1



No. 2 (original application and offer by "SPE "Kompensator", JSC)

PRODUCTION

The equipment of “SPE “Kompensator”, JSC ensures complete production cycle of expansion joints.

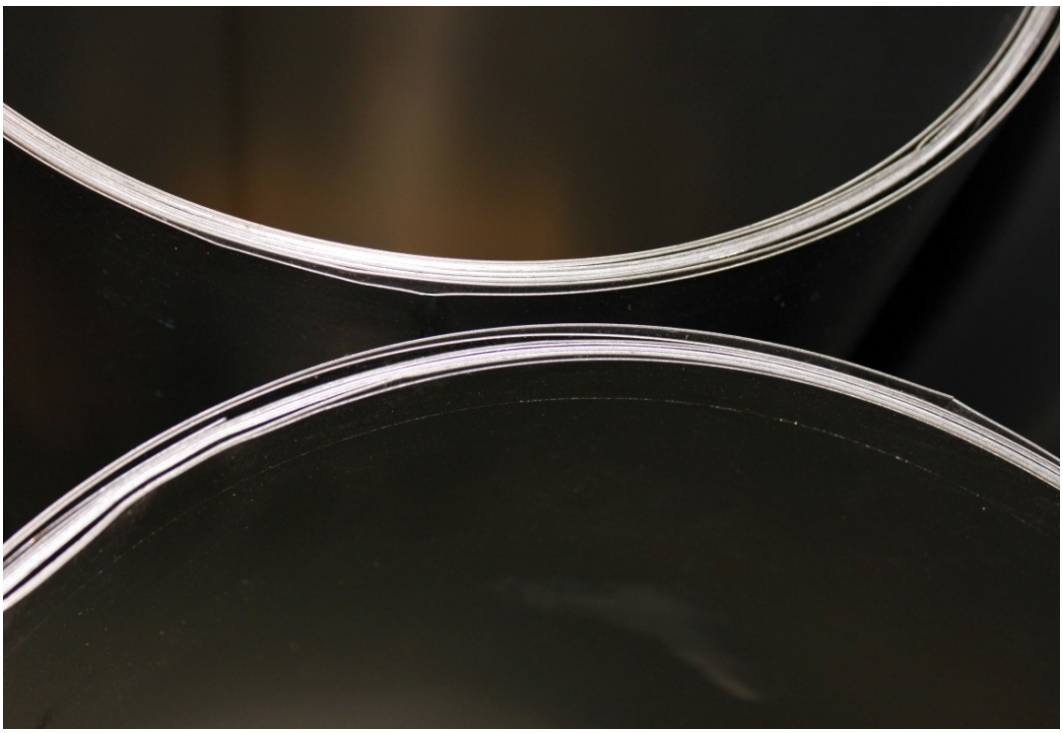
The basic principle of the production of metallic expansion joints conditionally consists of two parts: manufacture of bellows and connection thereof to terminal fittings and other parts enabling installation of an expansion joint in the pipeline system.

Specialized equipment is used for the manufacture of bellows, while manufacture of all the remaining parts, as well as their assembly with bellows can be performed using standard metalworking and welding equipment.

Sheet metal (usually, stainless steel) with characteristics that meet pressure, temperature, and corrosion resistance requirements is selected for the manufacture of bellows.

Then the sheet metal is cut, rolled up in the form of a pipe (shell) of the required diameter and is welded longitudinally. The weld quality is of critical significance for the durability of the bellows and of the expansion joint, accordingly. At the “Kompensator” factory, welds are performed using specialized automatic welding machines that make the seam as strong as the material being welded, without thickening it. The expansion joint quality, durability and flexibility improvement is achieved by using multilayered shells assembled from several layers of thin metal. In our production, the shells are packed from 0.3 mm, 0.5 mm and 1 mm thick metal.

The next step is the immediate manufacture of bellows, the manufacture of a wave-shaped or corrugated part using the assembled shells.



The bellows moulding is performed using special equipment and accessories ensuring the corresponding dimensions and shape of each corrugated tube.

Depending on the diameter and purpose of future bellows, as well as the materials used, the factory moulding of bellows can be performed in three ways:

- Hydroforming (main method);
- Elastomer (rubber) moulding;
- Mechanical paying-out (for diameters over 1400 mm)

In the course of manufacture, all bellows and expansion joints undergo a suite of testing, which, depending on the application of an expansion joint, include liquid penetrant examination, radiographic testing, hydrotesting or air pressure testing for strength and tightness. In addition, upon the customer's request, expansion joints can be subjected to testing simulating durability and cyclic life, stress-rupture and external force resistance testing, resonance and vibration testing.

The final manufacturing stage of expansion joints is the immediate finished product assembly: bellows welding to the terminal, restraining fittings or other structural elements.

TESTING CENTER

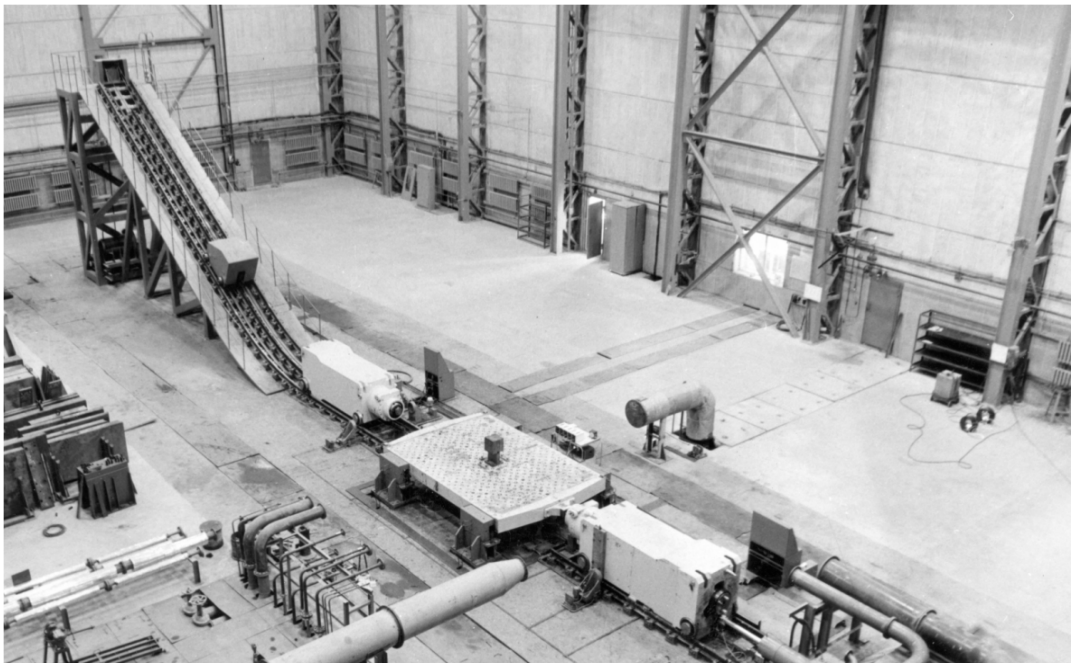
Since its establishment, the enterprise has been operating the “Kompensator” Testing Center (“Kompensator” TC), which possesses unique equipment that allows performing strength testing of various products with a hydraulic pressure up to 100 MPa, high-class tightness testing, alternate (cyclic) load testing (force, up to 360 kN), impact testing (product weight, up to 12 tons; acceleration, up to 5500 m/s^2; pulse width, up to 50 ms), vibration testing (product weight, up to 1 ton; pushing force, up to 160.1 kN; frequency range, from 5 to 2000 Hz), simulation of transportation bounce and seismic stability testing.

The impact, shock, vibration resistance, vibration, vibration-resistance and seismic-stability testing of products is performed in compliance with standards for weapons and military equipment, as well as the standards and requirements of the IAEA Std JEEE 382-85.

All test benches are equipped with metrological and computing instruments, which undergo the necessary maintenance and calibrations on a regular basis.

The accreditation scope of the “Kompensator” TC includes such products as metallic bellows, expansion joints and bellows seals, pipelines, pipeline connections, marine and industrial valves, heat exchangers, cylinders for compressed and liquefied gases, valves, cocks, pressure reducers for gas cylinders, hoses, branch pipes, shock absorbers and much more.

Since its origin, the “Kompensator” TC has performed impact and vibration resistance testing of more than 200 types of weapon and military equipment products as per the current industry and general military standards. Unique vibration testing of expansion joints for the “Energia” rocket-and-space complex has been performed with liquid nitrogen supply (t = –196 °C) into the body cavity of the expansion joint.



Lateral expansion joints at the Beloyarsk NPP

Expansion joints for nuclear power plants (NPP)

One of the strategic business areas of “SPE “Kompensator”, JSC is design and manufacture of products for the nuclear energy industry. Design, manufacture, testing, and inspection are performed in full accordance with the regulatory documents of the Russian Federation. The complete production cycle of expansion joints allows delivery of products of the highest quality and reliability to the customer.

“Kompensator” Research and Production Enterprise”, Joint-Stock Company has licenses for design and production of equipment for nuclear power plants:

- License for design of nuclear plant equipment;
- License for manufacture of nuclear plant equipment;


ЛИЦЕНЗИЯ


ЛИЦЕНЗИЯ

“SPE “Kompensator”, JSC develops specifications and products for NPPs in close cooperation with leading enterprises of the nuclear industry of the Russian Federation:

- “Atomenergoproekt”, JSC;
- Subsidiaries of “Rosenergoatom Concern”, JSC;
- “EDB “GIDROPRESS”, JSC;
- “CRISM “Prometey”, FSUE;
- “EMEDB “Afrikantov”, JSC;
- “NIKIET”, JSC;
- “Atomenergomash”, JSC;
- “Power machines”, PJSC.

During its operation, the factory has supplied its products to the majority of Russian and several foreign NPPs:

- Beloyarsk NPP (Russia);
- Leningrad NPP-2 (Russia);
- Novovoronezh NPP and NPP-2 (Russia);
- Rostov NPP (Russia);
- Kursk NPP (Russia);
- Smolensk NPP (Russia);
- Belarusian NPP (Belarus);
- Bushehr NPP (Iran);
- Kudankulam NPP (India);
- Tianwan NPP (China);
- “Akademik Lomonosov” Floating Nuclear Thermal Power Plant (FNTPP).

For more information on the products for NPPs, please contact the specialists of “SPE “Kompensator”, JSC.

Expansion joints for iron and steel works

Expansion joints for iron and steel industry

Currently, the company supplies expansion joints (EJ) for iron and steel industry pipelines under the ИЯНШ.300260.062ТУ specifications, which specify general requirements for the products supplied. The handled medium is hot blast (air), exhaust gases, gaseous or liquid medium.

The nominal diameter of EJ is DN200 to DN4000.

The specific design parameters of EJ are established in the general layout of an EJ, being developed based on a customer's request; it is agreed upon with the customer prior to detailed design documentation development.

The products are manufactured and supplied in compliance with the Customs Union Technical Regulations TR CU 032/2013 and with account of the main provisions of the European standard EN14917 "Metal bellows expansion joints for pressure applications" and the EJMA (Expansion Joint Manufacturers Association) Standards.

Being produced for the needs of iron and steel industry, EJs are characterized by an individual production in small quantities; their re-production is usually not performed.

For more information on the products, please contact the specialists of "SPE "Kompensator", JSC.

Products for shipbuilding and ship-repairing

Expansion joints and bellows seals for shipbuilding industry and marine facilities of various applications

Since the enterprise origin (in year 1981), manufacture of products for shipbuilding and marine facilities of various applications has been the core business. Industry-specific standards (OST) for shipbuilding expansion joints have been developed by “Kompensator”. Over more than 35 years of production history, the sophisticated technology has been mastered to the last detail. Necessary licenses and certificates are in place for manufacture of products.


РОССИЙСКИЙ МОРСКОЙ РЕГИСТР СУДОХОДСТВА
RUSSIAN MARITIME REGISTER OF SHIPPING

СВИДЕТЕЛЬСТВО О ТИПОВОМ ОДОБРЕНИИ
TYPE APPROVAL CERTIFICATE


РОССИЙСКИЙ РЕЧНОЙ РЕГИСТР

СВИДЕТЕЛЬСТВО
ОБ ОДОБРЕНИИ ТИПА

The products are manufactured and supplied according to the following documents:

- OST “ОСТ5.5350-78”;
- OST “ОСТВ5Р.5588-90”;
- State standard GOST “ГОСТ 27036-86”;
- Specification “НФКП.300260.311ТУ”;
- Specification “ТУ5.551-10150-83”;
- Specification “ТУ5.551-13008-75”;
- Specification “ИЯНШ.300260.031ТУ”.

“SPE “Kompensator”, JSC develops products in association with the leading design offices in the field of marine facility design:

- “RUBIN” Central Design Bureau for Marine Engineering”, Joint-Stock Company;
- “MALAKHIT” St. Petersburg Sea Bureau of Engineering”, Joint-Stock Company;
- “Northern Design Bureau”, Joint-Stock Company;
- “Zelenodolsk Design Bureau”, Joint-Stock Company;
- “Nevskoye Planning and Design Bureau”, Public Joint-Stock Company;
- “Central Design Bureau “USC-Iceberg”, Joint-Stock Company.

Acceptance of finished products can be performed by:

- Quality Control Department of “SPE “Kompensator”, JSC;
- Customer;
- Russian Maritime Register of Shipping;
- Russian River Register;
- Military Representative Office of Ministry of Defence of the Russian Federation.

For more information on the products, please contact the specialists of “SPE “Kompensator”, JSC.

Cardan type (dual-plane) expansion joints as part of the tank load compensation system

Expansion joints for petroleum products and oil storage tanks

In 1994, by order of “Giprotrubprovod”, the State institute for design of main pipelines, cardan type expansion joints were developed at the enterprise in order to absorb thermal and mechanical movements of pipeline systems in tank farms of oil-loading terminals. Eventually, with close involvement of the factory’s technical specialists, an integrated system for the compensation of pipe-header loads on a VST wall was developed as part of the R&D.

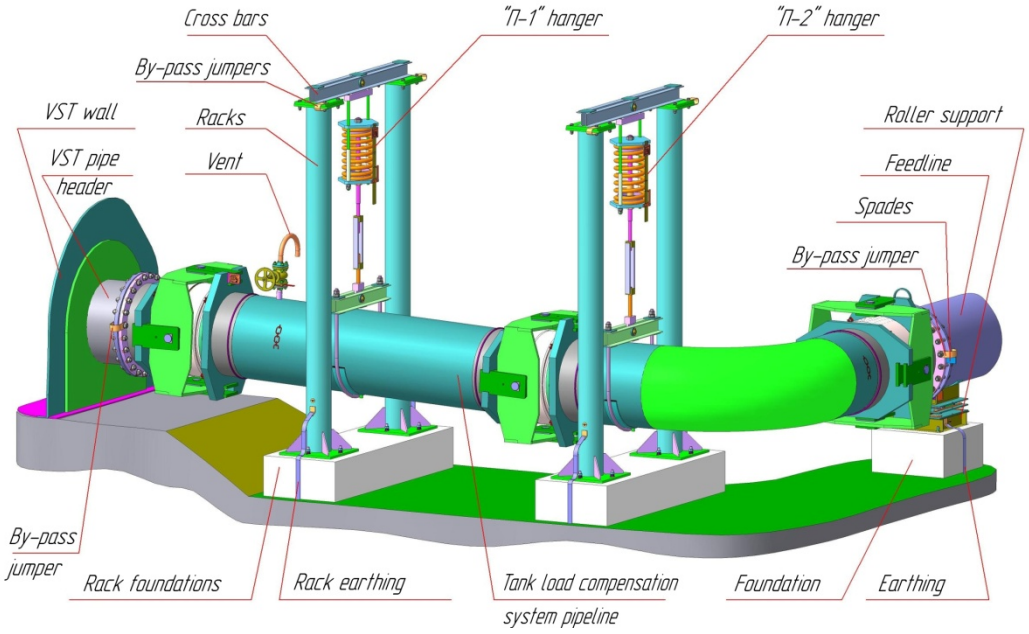
The tank load compensation system ensures reduced load on branch pipe headers of tanks, arising at:

– Settlement of tank basements and pipe hanger supports;

– deformation of tank wall and pipelines of the tank load compensation system, pipe headers and pipe hangers at a change in pressure, ambient air and pumped (stored) product temperature;

– Weight change of a tank load compensation system pipeline at its filling and emptying.

The tank load compensation system pipeline consists of three expansion joints interconnected by means of pipe spools and a branch.



A standard design of the tank load compensation system is a set consisting of field-mounted components (see the Figure and photos):

– Tank load compensation system pipeline – 1 pc.;

– Hangers – 2 standard sizes;

– Cross bars – 2 pc.;

– Racks – 4 pc.

For more information on the products for oil and oil product storage tanks, please contact the specialists of “SPE “Kompensator”, JSC.

At present, “SPE “Kompensator”, JSC is an accredited manufacturer and supplier of expansion joints to PJSC “Rosneft Oil Company” and its subsidiaries. The enterprise has been granted a statement of compliance of the “Metallic expansion joints” products within the integrated compliance system of the Transneft Research and Development Institute for Oil and Oil Products Transportation, Limited Liability Company (the specialized institute of “Transneft”, PJSC). The expansion joints meet the requirements of the Customs Union TR CU 032/2013, series production.

The products are manufactured according to the specially developed specifications ИЯНШ.300260.041ТУ. Since the first supply, the factory has manufactured and shipped over 10000 cardan type expansion joints for the major companies of the Russian Oil Sector and their subsidiaries:

- “Transneft”, PJSC;
- “Rosneft Oil Company”, PJSC;
- “Surgutneftegaz”, PJSC;
- “LUKOIL”, PJSC;
- “Gazpromneft”, PJSC;
- Joint-Stock Oil Company “Bashneft”, PJSC;
- “Slavneft” Oil and Gas Company”, PJSC.

Bellows compensation devices for heating networks

Characteristics:

Diameter: 50 to 1400 mm

For all types of pipeline laying and insulation

Operating temperature range: –40 to +150 °C

Operating pressure: 1.6 MPa or 2.5 MPa

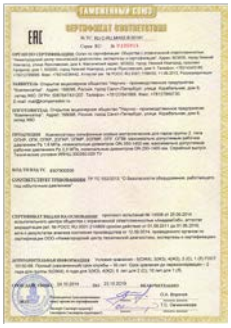
Developer and manufacturer, “SPE “Kompensator”, JSC

Expansion joints for heating networks, hot water supply systems and steam pipelines

In 1983, series production of expansion joints for heating networks was arranged at the factory. First supplies were provided to the heating network agencies in Leningrad and Moscow.

At present, the products are manufactured for all types of pipeline laying (trench, trenchless, above-ground) and pipeline insulation for all the Russian regions, as well as for Belarus and Kazakhstan. The factory's product range contains expansion joints and bellows compensation devices with a nominal diameter of 50 to 1400 mm and operating pressure of 1.6 MPa and 2.5 MPa.

The expansion joints and bellows compensation devices produced by "SPE "Kompensator", JSC have the necessary documentation, licenses, and certificates in place.

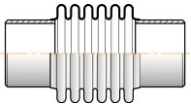
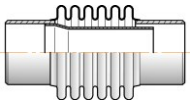
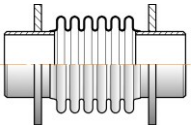
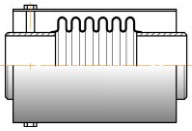
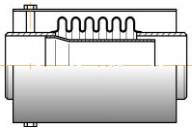
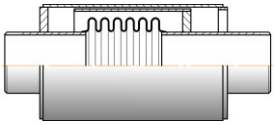
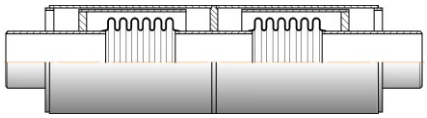
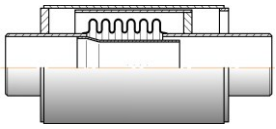
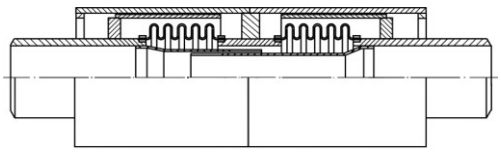
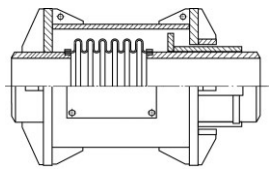
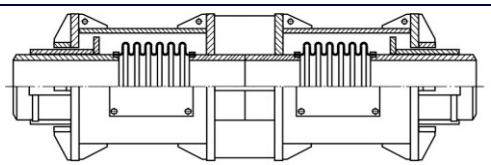
With close involvement of "SPE "Kompensator", JSC specialists, a Guidance Document for design, installation, and operating companies in the field of heating supply, "The use of axial expansion joints, bellows compensation devices, starter expansion joints at design, construction, and operation of heating network pipelines, hot-water supply systems, and steam lines" (РД-3-ВЭП), has been developed. The specialists of the enterprise have also participated in development of GOST 32935-2014 "Metallic expansion joints for heating networks. General specifications" international standard.

The products are manufactured and supplied according to the specification developed by "SPE "Kompensator", JSC:

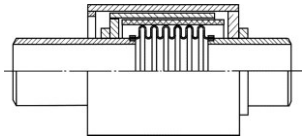
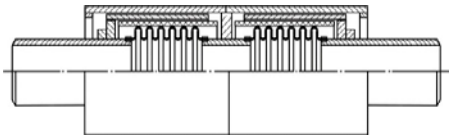
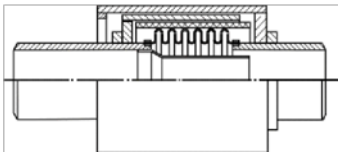
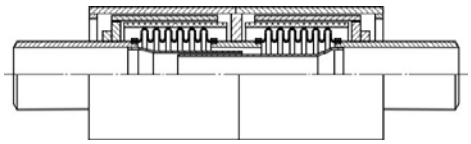
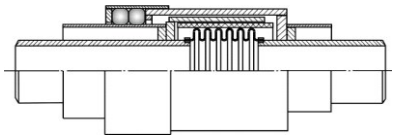
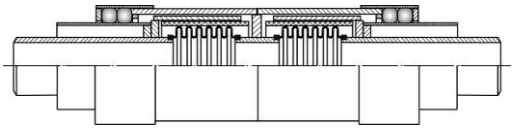
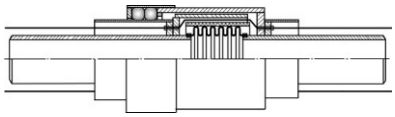
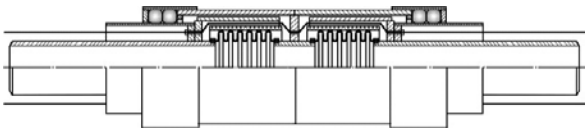
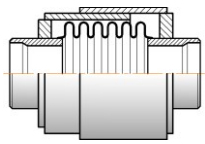
- ИЯНШ.300260.029ТУ;
- ИЯНШ.300260.033ТУ;
- ИЯНШ.300260.035ТУ.

For more information on the products, please contact the specialists of "SPE "Kompensator", JSC. The complete product catalogue for heating networks, the Guidance Document (РД-3-ВЭП) and other documents are sent upon request.

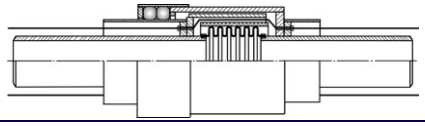
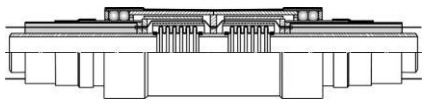
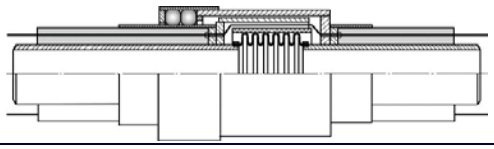
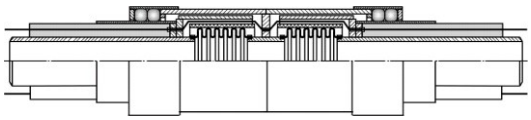
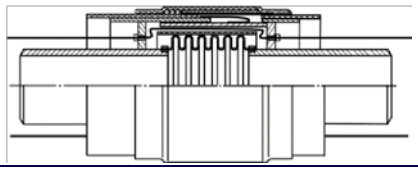
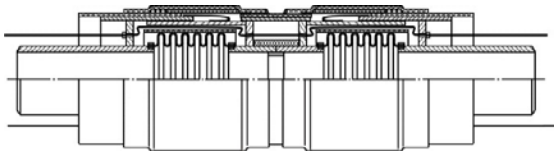
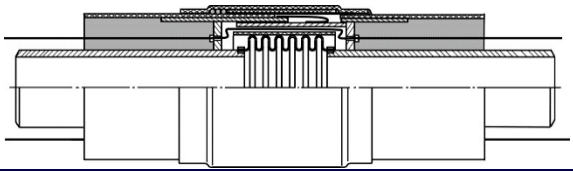
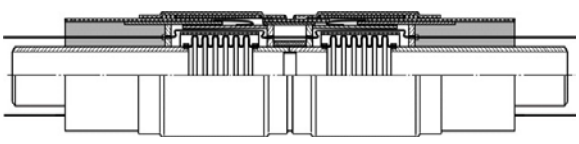
Axial expansion joint type indicator

Type	Appearance	Brief Description
ОПН (ОПНР)		An expansion joint consisting of a bellows and connection branch pipes further welded to a pipeline.
ОПГ		An expansion joint consisting of a bellows and connection branch pipes further welded to a pipeline, with a mounted internal guide pipe.
ОПФН		An expansion joint consisting of a bellows and connection branch pipes further welded to a pipeline, with mounted bearing flanges.
ОПК		An expansion joint consisting of a bellows and connection branch pipes further welded to a pipeline, with a mounted fixed non-load bearing casing.
ОПМ		An expansion joint consisting of a bellows and connection branch pipes further welded to a pipeline, with a mounted fixed non-load bearing casing and an internal guide pipe.
ОПКР	 	Single-bellows and double-bellows expansion joints consisting of one or two bellows and connection branch pipes further welded to a pipeline, with a forced double (extensible) casing. The design provides for protection from hyperadmissible bellows deformations (tensile-and-compression limiters). The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating.
ОПМР	 	Single-bellows and double-bellows expansion joints consisting of one or two bellows and connection branch pipes further welded to a pipeline, with a forced double (extensible) casing and an internal guide pipe. The design provides for protection from hyperadmissible bellows deformations (tensile-and-compression limiters). The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating.
КСО (КСОР)	 	Single-block and double-block expansion joints consisting of one or two bellows and connection branch pipes further welded to a pipeline, with a mounted forced double casing and outer guides. The design provides for protection from hyperadmissible bellows deformations (tensile-and-compression limiters), inspection windows in the casing and a rule for bellows condition monitoring in the course of operation. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating.

Uninsulated bellows compensation device and starter expansion joint type indicator

Type	Appearance	Brief Description
М	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with stroke limiters, a load-bearing casing and internal guide supports. The bellows is thermally insulated. The bellows waterproofing and thermal insulation of branch pipes is not provided for. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating.
МП	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with stroke limiters, a load-bearing casing and internal guide supports. The design provides for an internal guide pipe in order to reduce the hydraulic resistance at a high velocity of handled media. The bellows is thermally insulated. The bellows waterproofing and thermal insulation of branch pipes is not provided for. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating.
ППМ	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with stroke limiters, a load-bearing casing and internal guide supports. The bellows is thermally insulated. The inner surface of a bellows compensation device is waterproofed against ground waters by means of gland packing. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating. The preinsulation of branch pipes is not provided for; two alignment sleeves are available for application of foam-polymer-mineral insulation on branch pipes after installation of a bellows compensation device.
ППУ	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with stroke limiters, a load-bearing casing and internal guide supports and the Rapid remote control system conductors. The bellows is thermally insulated. The inner surface of a bellows compensation device is waterproofed against ground waters by means of gland packing. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating. The preinsulation of branch pipes is not provided for; two alignment sleeves are available for the installation therein PE or galvanized shells and further PU-foam insulation of pipes.
ССК		A starter expansion joint consisting of a bellows (compression-sensitive only), branch pipes further welded to a pipeline, and two thick walled outer casings welded to the pipes through bearing rings.

Preinsulated bellows compensation device type indicator

Type	Appearance	Brief Description
ППУ/ПЭ.I	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with stroke limiters, a load-bearing casing and internal guide supports and the Rapid remote control system conductors. The bellows is thermally insulated. The inner surface of a bellows compensation device is waterproofed against ground waters by means of gland packing. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating. The branch pipes of bellows compensation devices are PU-foam insulated and PE-sheathed. The bellows compensation device casing is covered with a PE heat shrink tape.
ППУ/ОЦ	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with stroke limiters, a load-bearing casing and internal guide supports and the Rapid remote control system conductors. The bellows is thermally insulated. The inner surface of a bellows compensation device is waterproofed against ground waters by means of gland packing. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating. The branch pipes of bellows compensation devices are PU-foam insulated and galvanized-steel sheathed.
ТГИ.II	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with internal guides, compression stroke limiters, and the rapid remote control system conductors. The bellows is thermally insulated. The inner surface of a bellows compensation device is protected against ground waters by means of a waterproof membrane and gland packing. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating. Heat shrink couplings are installed above the bellows compensation device branch pipes for the connection to the PE sheath of a preinsulated pipeline in the course of installation. A larger heat-shrink coupling serving as a casing is extruded-bead welded to one of the couplings; it can move (with a minimum gap) along the second coupling of the bellows compensation device branch pipe in case of deformations thereof. The PU-foam insulation of branch pipes at manufacturing of bellows compensation devices is not provided for; it is applied simultaneously with the thermal insulation of bellows compensation device to pipeline joints.
ППУ/ПЭ.II	 	Single-bellows and double-bellows compensation devices consisting of one or two bellows and connection branch pipes further welded to a pipeline, with internal guides, compression stroke limiters, and the rapid remote control system conductors. The bellows is thermally insulated. The inner surface of a bellows compensation device is protected against ground waters by means of a waterproof membrane and gland packing. The outer surface of bellows and branch pipes has a corrosion-resistant waterproof coating. Heat shrink couplings are installed above the bellows compensation device branch pipes for the connection to the PE sheath of a preinsulated pipeline in the course of installation. A larger heat-shrink coupling serving as a casing is extruded-bead welded to one of the couplings; it can move (with a minimum gap) along the second coupling of the bellows compensation device branch pipe in case of deformations thereof. The bellows compensation device branch pipes are PU-foam insulated.

Design features of expansion joints and starter expansion joints and conditions of their use on pipelines

	Design features of expansion joints and starter expansion joints and design conditions	Expansion joint type														
		ОПН	ОПНР	ОПФН	ОПК	ОПГ	ОПМ	ОПКР	2ОПКР	ОПМР	2ОПМР	КСО	КСОР	2КСО	2КСОР	СКК
Applicability	For bellows compensation device manufacturing at coating factories	•	•	•	•	•	•									
	For **steam pipelines**	•	•	•	•	•	•	•	•	•	•					
	For **above-ground** laying	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	For installation indoors, in **accessible trenches** and **conduits**	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	For installation in dry **trenches** and **heat** chambers				•		•	•	•	•	•	•	•	•	•	
	For installation in flooded **ducts** and **heat chambers**															
	For **trenchless** laying in dry soils															•
	For **trenchless** laying in moist soils															•
Design features	Light casing				•		•									
	Forced casing							•	•	•	•	•	•	•	•	•
	In-built reduced-weight guides							•	•	•	•	•	•	•	•	•
	Tensile limiters							•	•	•	•	•	•	•	•	
	Compression limiters							•	•	•	•					•
	Internal heat-carrier flow guide pipe					•	•			•	•					
	Bellows corrosion-protection coating						•	•	•	•	•	•	•	•	•	
	Outer corrosion-protection coating of the casing				•		•	•	•	•	•	•	•	•	•	
Installation and operation conditions	Anywhere in a span between fixed supports	•	•	•	•	•	•	•	•	•	•	•	•	•*	•*	•
	At midspan only													•*	•*	
	With two pairs of guide supports only	•	•	•	•	•	•									
	With a single pair of guide supports							•	•	•	•	•	•	•	•	
	Without guide supports															•
	In case of misalignment and nonlinearity of pipelines							•	•							

*) Double-block expansion joints, type 2КСО and 2КСОР, with no compression stroke limiters should be installed at a pipeline midspan.

Design features of bellows compensation devices and conditions of their use on pipelines

	Design features of bellows compensation devices and design conditions	Bellows compensation device type																
		СКУ.М	2СКУ.М	СКУ.МП	2СКУ.МП	СКУ.ППМ	2СКУ.ППМ	СКУ.ППУ	2СКУ.ППУ	СКУ.ППУ.1а	2СКУ.ППУ.1а	СКУ.ППУ/ПЭ.I	2СКУ.ППУ/ПЭ.I	СКУ.ППУ/ПЭ.II	2СКУ.ППУ/ПЭ.II	СКУ.ППУ/ОЦ	СКУ.ППУ/ОЦ	СКУ.ТТИ
Applicability	For bellows compensation device manufacturing at coating factories							●	●	●	●							
	For **steam pipelines**			●	●													
	For **above-ground** laying	●	●	●	●	●	●	●	●	●	●					●	●	
	For installation indoors, in **accessible trenches** and **conduits**	●	●	●	●	●	●	●	●	●	●					●	●	
	For installation in dry **trenches** and **heat** chambers	●	●	●	●	●	●	●	●	●	●	●	●	●	●			●
	For installation in flooded **ducts** and **heat chambers**													●	●			●
	For **trenchless** laying in dry soils					●	●	●	●			●	●	●	●			●
	For **trenchless** laying in moist soils													●	●			●
Design features	Forced casing	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	In-built load-bearing guides (can substitute external guide supports)	●	●	●	●	●	●	●	●	●	●	●	●			●	●	
	Tensile-and-compression limiters	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Bellows thermal insulation	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●
	Preinsulation of branch pipes					–*	–*					●	●	●	●	●	●	●
	Waterproofing against ground waters					●	●	●	●			●	●	●	●	●	●	●
	Full bellows protection against ground water contact													●	●			●
	Availability of signal rapid remote control system conductors							●	●	●	●	●	●	●	●	●	●	●
	Bellows compensation device waterproofing controllability by the rapid remote control system													●	●			●
Installation and operation conditions	Anywhere in a span between fixed supports	●	●	●	●	●	●**	●	●**	●	●**	●	●**	●	●**	●	●	●
	At midspan only at **trenchless** laying						●		●		●		●		●			
	With two pairs of guide supports only ***																	
	With a single pair of guide supports ***													●	●			●
	Without guide supports ***	●	●	●	●	●	●	●	●	●	●	●	●			●	●	
	In case of misalignment and nonlinearity of pipelines	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

*) The thermal insulation of СКУ.ППМ and 2СКУ.ППМ branch pipes shall be applied simultaneously with the thermal insulation of a bellows compensation device to pipeline joint.

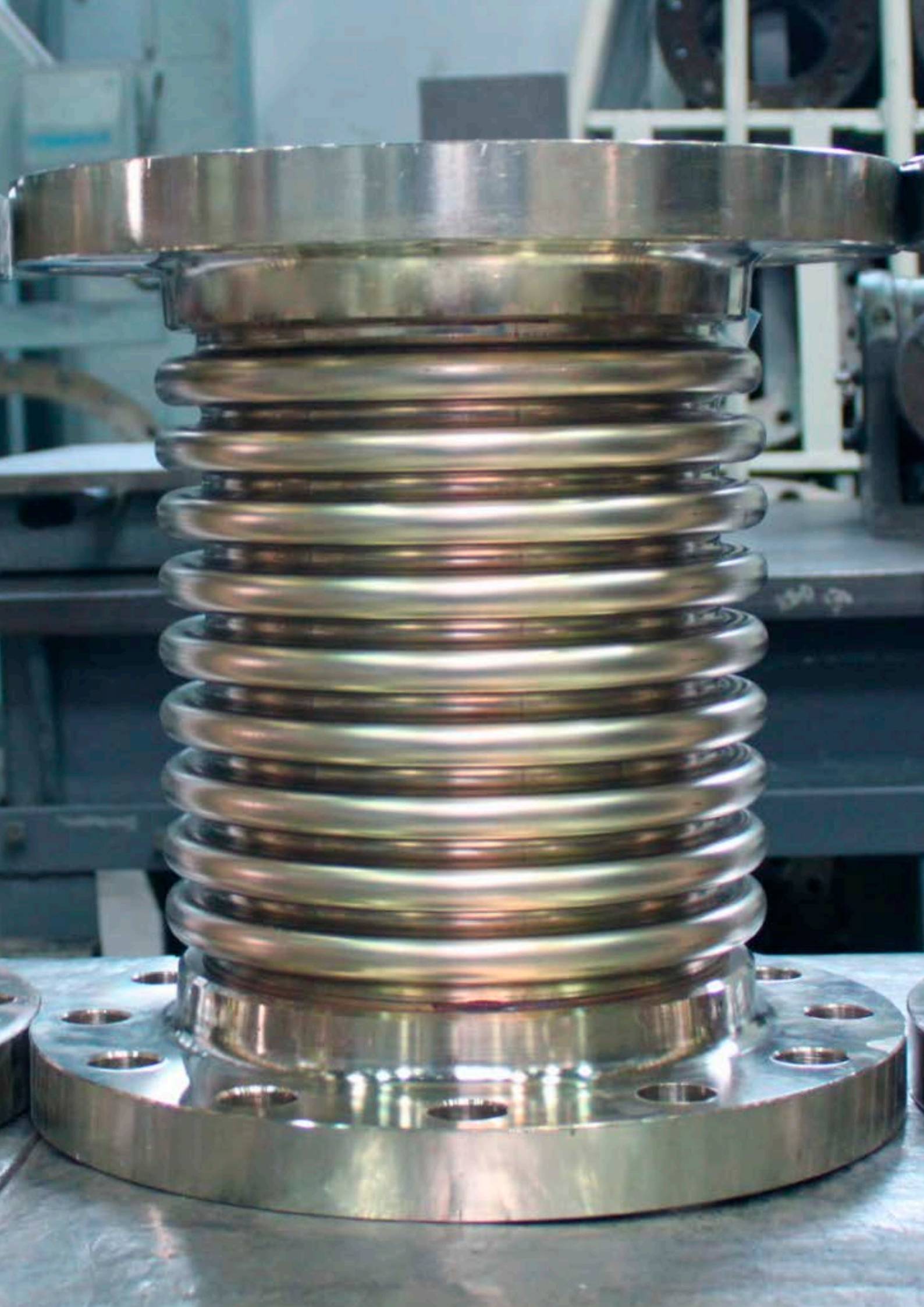
) Double-bellows **compensation devices can be installed anywhere in the pipeline at all laying methods, except for trenchless laying.

***) In case of **trenchless** laying of heat lines, all **bellows compensation devices** shall be used without guide supports.

Notes

Notes:

1. The data sheet for ordering metallic expansion joints is available at the end of the catalogue.
2. With any questions associated with selection, peculiarities of pipeline system design using expansion joints, as well as installation, please call, in St. Petersburg: +7 (812) 346-88-78, +7 (812) 346-88-98; fax: +7 (812) 784-97-30 or e-mail to: mail@kompensator.ru.



КОМПЕНСАТОР

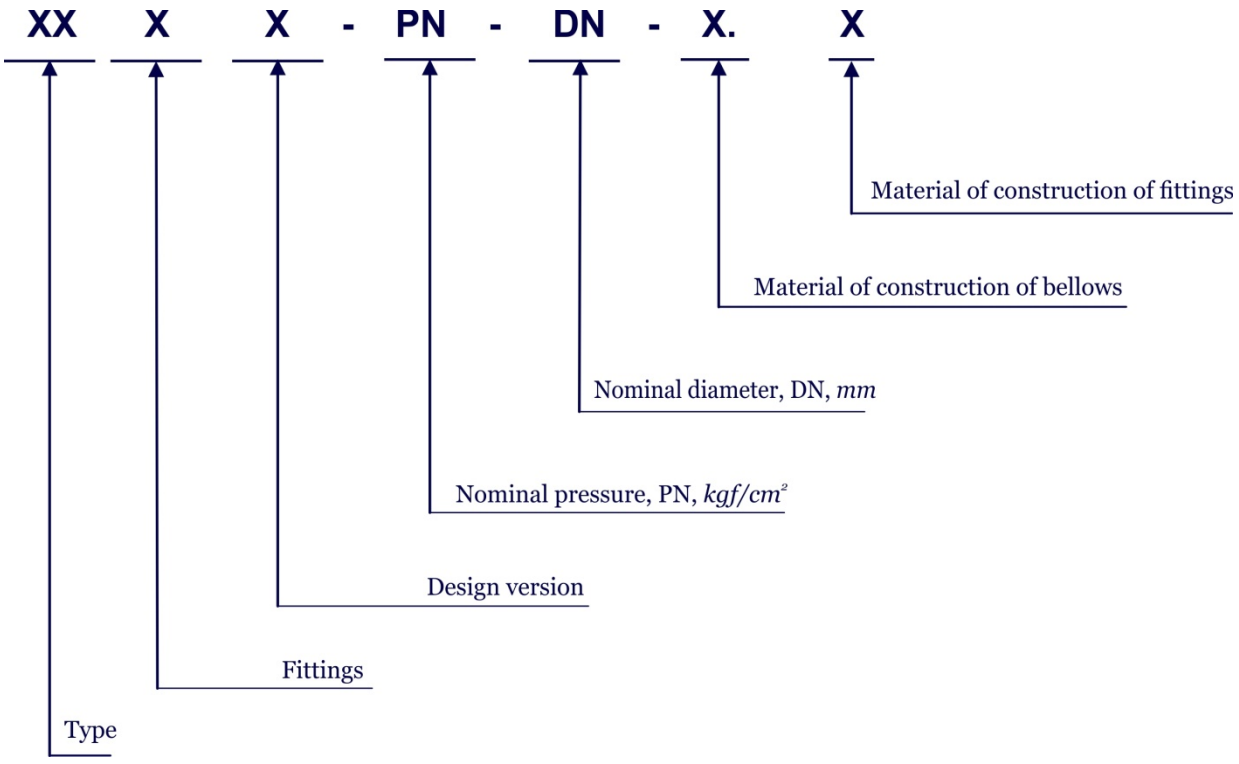
General purpose industrial grade axial expansion joints

Reference designation of unbalanced general purpose industrial grade axial expansion joints as per the ИЯНШ.300260.052ТУ specification

The reference designation of expansion joints consists of symbols and values of the main parameters:

Reference designation of expansion joint types and versions					
Type	**Symbol**	**Fitting**	**Symbol**	**Design version**	**Symbol**
Axial	**НО**	Weld branch pipe (on both sides)	**П**	Basic (bellows + 2 branch pipes or flanges)	**Н**
		Butt welded plate flange (on both sides)	**Ф**	With a guide branch pipe	**Г**
		Plate flange (on both sides)	**В**	Enclosed	**К**
				With a guide branch pipe and enclosed	**М**

Expansion joint reference designation diagram



Depending on the operating conditions, the material of construction of expansion joints shall be specified at order placement in accordance with the tables below:

Bellows		
Material of construction	**Material grade**	**Permissible operating temperature, K (°C)**
1	Steel 08Х18Н10Т (12Х18Н10Т) as per GOST 5632	20 to 773 (–253 to 500)
2	Steel 10Х17Н13М2Т as per GOST 5632	20 to 773 (–253 to 500)

Fittings		
Material of construction	**Material grade**	**Permissible operating temperature, K (°C)**
1	Steel 20 as per GOST 1050	253 to 698 (–20 to 425)
2	Steel 17ГС, 17Г1С as per GOST 19281	233 to 748 (–40 to 475)
3	Steel 09Г2С , 09Г2 as per GOST 19281	213 to 748 (–60 to 475)
4	Steel 08Х18Н10Т, 12Х18Н10Т as per GOST 5632	20 to 823 (–253 to 550)
5	Steel 10Х17Н13М2Т as per GOST 5632	20 to 823 (–253 to 550)
6	Steel 12МХ, 12Х1МФ as per GOST 20072	223 to 773 (–50 to 500)

Also, depending on the operating conditions of expansion joints, a heat-resistant corrosion-protection and waterproof coating can be applied onto outer surfaces of bellows and fittings.

Example of ordering information for:

1. An axial expansion joint for welded attachment to a pipeline made of 12Х18Н10Т steel; nominal pressure, PN, 1.6 MPa (16 kgf/cm^2); nominal diameter, DN, 250 mm; mounted casing; material of bellows construction, 08Х18Н10Т steel as per GOST 5632; material of construction of fittings, 12Х18Н10Т steel as per GOST 5632: **“Expansion joint НОПК-16-250-1.4 as per ИЯНШ.300260.052 ТУ”.**

2. An axial expansion joint for flanged attachment to a pipeline made of grade 20 steel; nominal pressure, PN, 2.5 MPa (25 kgf/cm^2); nominal diameter, DN, 250 mm; mounted casing and guide branch pipe; material of bellows construction, 08Х18Н10Т steel as per GOST 5632; material of construction of fittings, grade 20 steel as per GOST 1050: **“Expansion joint НОФМ-16-250-1.1 as per ИЯНШ.300260.052 ТУ”.**

Basic parameters and characteristics of handled media of the products as per ИЯНШ.300260.052 ТУ

Handled media	**Handled medium temperature, K (°C)**	**Handled medium velocity, m/s**	
		Without a guide branch pipe	**With a guide branch pipe**
Oil, oil products	723 (450)	up to 8	over 8
Fresh water	423 (150)		
Steam, natural gas, gaseous media not causing corrosion to expansion joint material	773 (500)	up to 20	above 20 to 80
Note: **1. The permissible content of chloride ions in fresh water, the handled medium for expansion joints to be installed in heating networks, shall not exceed 250 mg/l.** **2. The expansion joints may be used for other handled media not capable of causing sulphide stress corrosion cracking.** **3. The data provided in the table do not cover the expansion joints, dwg. ИЯНШ.302667.700-01.61, ИЯНШ.302667.701-01.61, ИЯНШ.302667.732-01.41.**			

Peak amplitude values of symmetrical cycles

For НОПН, НОПГ, НОПК, НОПМ, НОФН, НОФГ, НОФК, НОФМ type expansion joints, the peak amplitude values of symmetrical axial stroke λ_{-1}, lateral, δ_{-1} and angular movement cycles γ_{-1} at a preset operation time of expansion joints **N**, as well as the axial stroke C_λ, lateral C_δ, and angular movement stiffness C_γ are given in Table I.

Table I

Nominal diameter, DN, mm	Nominal pressure, PN, MPa (kgf/cm²)	Peak amplitudes at preset operation time N = 1000 cycles			Stiffness at		
		axial stroke, λ_{-1}, mm	lateral movement, δ_{-1}, mm	angular movement, γ_{-1}, degr.	axial stroke, C_λ, kN/m (kgf/cm)	lateral movement, C_δ, kN/m (kgf/cm)	angular movement, C_γ, N*m/degr (kgf*m/degr.)
65	0.25 (2.5)	20	8	10	71 (71)	56 (56)	1.0 (0.1)
80		22	8	10	67 (67)	70 (70)	1.0 (0.1)
100		25	9	10	54 (54)	61 (61)	1.0 (0.1)
125		28	9	10	48 (48)	72 (72)	2.0 (0.2)
150		35	12	10	70 (70)	88 (88)	4.0 (0.4)
200		45	12	10	84 (84)	180 (180)	8.0 (0.8)
250		50	12	10	94 (94)	270 (270)	15.0 (1.5)
300		60	12	10	88 (88)	300 (300)	20.0 (2.0)
350		65	12	10	121 (121)	570 (570)	38.0 (3.8)
400		60	10	10	145 (145)	780 (780)	58.0 (5.8)
500		75	10	10	113 (113)	890 (890)	71.0 (7.1)
600		80	8	8	123 (123)	1360 (1360)	109.0 (10.9)
700		85	8	8	127 (127)	1970 (1970)	144.0 (14.4)
800		90	8	8	174 (174)	1750 (1750)	261.0 (26.1)
900		95	8	8	193 (193)	3180 (3180)	364.0 (36.4)
1000		105	8	8	173 (173)	3480 (3480)	398.0 (39.8)
1200		105	8	8	207 (207)	5970 (5970)	684.0 (68.4)
1400		105	7	8	241 (241)	9390 (9390)	1080.0 (108.0)
65	0.63 (6.3)	20	8	10	107 (107)	84 (84)	1.0 (0.1)
80		22	8	10	134 (134)	139 (139)	2.0 (0.2)
100		25	9	10	134 (134)	154 (154)	4.0 (0.4)
125		28	9	10	145 (145)	217 (217)	6.0 (0.6)
150		35	12	10	188 (188)	234 (234)	11.0 (1.1)
200		45	12	10	167 (167)	355 (355)	17.0 (1.7)
250		40	9	10	261 (261)	750 (750)	43.0 (4.3)
300		45	9	10	244 (244)	820 (820)	56.0 (5.6)
350		50	9	10	240 (240)	1120 (1120)	76.0 (7.6)
400		60	9	10	217 (217)	1180 (1180)	87.0 (8.7)
500		75	9	10	225 (225)	1780 (1780)	142.0 (14.2)
600		80	9	8	245 (245)	2720 (2720)	217.0 (21.7)
700		85	8	8	317 (317)	4920 (4920)	361.0 (36.1)
800		90	8	8	348 (348)	3490 (3490)	523.0 (52.3)
900		95	8	8	385 (385)	6350 (6350)	728.0 (72.8)
1000		105	8	8	404 (404)	8110 (8110)	930.0 (93.0)
1200		105	8	8	484 (484)	13920 (13920)	1600.0 (160.0)
1400		105	6	8	563 (563)	21900 (21900)	2510.0 (251.0)
65	1.0 (10)	20	8	10	178 (178)	139 (139)	2.0 (0.2)
80		22	8	10	167 (167)	174 (174)	3.0 (0.3)
100		25	9	10	188 (188)	215 (215)	5.0 (0.5)
125		25	9	10	193 (193)	289 (289)	8.0 (0.8)
150		25	9	10	326 (326)	406 (406)	19.0 (1.9)
200		30	8	10	291 (291)	616 (616)	29.0 (2.9)
250		40	9	10	348 (348)	991 (991)	57.0 (5.7)
300		45	9	10	326 (326)	1090 (1090)	75.0 (7.5)
350		50	9	10	400 (400)	1860 (1860)	127.0 (12.7)
400		60	9	10	362 (362)	1950 (1950)	145.0 (14.5)
500		75	9	10	394 (394)	3100 (3100)	249.0 (24.9)
600		80	9	8	429 (429)	4750 (4750)	381.0 (38.1)
700		85	8	8	444 (444)	6880 (6880)	505.0 (50.5)
800		90	8	8	464 (464)	4650 (4650)	697.0 (69.7)
900		95	8	8	578 (578)	9520 (9520)	1090.0 (109.0)
1000		105	8	8	578 (578)	11580 (11580)	1330.0 (133.0)
1200		105	8	8	691 (691)	19880 (19880)	2280.0 (228.0)
1400		105	6	8	804 (804)	31280 (31280)	3580.0 (358.0)

Table I continued

Nominal diameter, DN, mm	Nominal pressure, PN, MPa (kgf/cm²)	Peak amplitudes at preset operation time N = 1000 cycles			Stiffness at		
		axial stroke, ±λ, mm	lateral movement, ±δ, mm	angular movement, ±γ, degr.	axial stroke, C_λ, kN/m (kgf/cm)	lateral movement, C_δ, kN/m (kgf/cm)	angular movement, C_γ, N*m/degr. (kgf*m/degr.)
65	1.6 (16)	20	8	10	285 (285)	223 (223)	4.0 (0.4)
80		22	8	10	267 (267)	278 (278)	5.0 (0.5)
100		18	7	10	373 (373)	427 (427)	10 (1.0)
125		22	7	10	335 (335)	502 (502)	13 (1.3)
150		25	8	10	435 (435)	542 (542)	26 (2.6)
200		30	8	10	484 (484)	1030 (1030)	49 (4.9)
250		40	9	10	522 (522)	1490 (1490)	85 (8.5)
300		45	9	10	489 (489)	1640 (1640)	112.0 (11.2)
350		50	9	10	560 (560)	2610 (2610)	178.0 (17.8)
400		60	9	10	579 (579)	3130 (3130)	231.0 (23.1)
500		75	9	10	563 (563)	4430 (4430)	355.0 (35.5)
600		80	9	8	674 (674)	7470 (7470)	598.0 (59.8)
700		85	8	8	698 (698)	10820 (10820)	794.0 (79.4)
800		90	8	8	753 (753)	7560 (7560)	1130.0 (113.0)
900		95	8	8	899 (899)	14810 (14810)	1700.0 (170.0)
1000		105	8	8	809 (809)	16220 (16220)	1860.0 (186.0)
1200		105	8	8	968 (968)	27840 (27840)	3190.0 (319.0)
1400		105	6	8	1120 (1120)	43800 (43800)	5020.0 (502.0)
65	2.5 (25)	12	5	10	495 (495)	387 (387)	7.0 (0.7)
80		15	6	10	464 (464)	483 (483)	8.0 (0.8)
100		18	6	10	498 (498)	569 (569)	13.0 (1.3)
125		22	7	10	446 (446)	669 (669)	18.0 (1.8)
150		25	8	10	544 (544)	677 (677)	32.0 (3.2)
200		30	8	10	581 (581)	1230 (1230)	58.0 (5.8)
250		40	9	10	522 (522)	1490 (1490)	85.0 (8.5)
300		45	9	10	570 (570)	1910 (1910)	130.0 (13.0)
350		50	9	10	640 (640)	2980 (2980)	204.0 (20.4)
400		60	9	10	723 (723)	3900 (3900)	289.0 (28.9)
500		75	9	10	676 (676)	5320 (5320)	426.0 (42.6)
600		80	9	8	797 (797)	8830 (8830)	707.0 (70.7)
700		85	8	8	889 (889)	13770 (13770)	1010.0 (101.0)
800		90	8	8	927 (927)	9310 (9310)	1390.0 (139.0)
900		95	8	8	1030 (1030)	16930 (16930)	1940.0 (194.0)
1000		105	8	8	1040(1040)	20850 (20850)	2390.0 (239.0)
1200		105	8	8	1240 (1240)	35790 (35790)	4100.0 (410.0)
1400		105	6	8	1450 (1450)	56320 (56320)	6460.0 (646.0)

For НОФК type expansion joints, the peak amplitude values of symmetrical axial stroke $\pm\lambda$ and lateral movement cycles $\pm\delta$ at a preset operation time of expansion joints **N**, as well as axial stroke C_λ and lateral movement stiffness C_δ are given in Table Ia.

Table Ia

Nominal diameter, DN, mm	Nominal pressure, PN, MPa (kgf/cm²)	Peak amplitudes at preset operation time N = 100 cycles		Stiffness at	
		axial stroke, ±λ, mm	lateral movement, ±δ, mm	axial stroke, C_λ, kgf/mm	lateral movement, C_δ, kgf/mm
1000	0.1 (1.0)	40	30	10	182

For НОВН, НОВГ, НОВМ type expansion joints, the peak amplitude values of symmetrical axial stroke λ_{-1}, lateral movement δ_{-1} and angular movement cycles γ_{-1}, at a preset operation time of expansion joints **N**, as well as axial stroke C_λ, lateral movement C_δ and angular movement stiffness C_γ are given in Table II.

Table II

Nominal diameter, DN, mm	Nominal pressure, PN, MPa (kgf/cm²)	Peak amplitudes at preset operation time N = 1000 cycles			Stiffness at		
		axial stroke, λ_{-1}, mm	lateral movement, δ_{-1}, mm	angular movement, γ_{-1}, degr.	axial stroke, C_λ, kN/m (kgf/cm)	lateral movement, C_δ, kN/m (kgf/cm)	angular movement, C_γ, N*m/degr. (kgf*m/degr.)
65	0.25 (2.5)	15	5	10	92 (92)	11.9 (11.9)	1.0 (0.1)
80		18	5	10	86 (86)	14.8 (14.8)	2.0 (0.2)
100		22	6	10	69 (69)	13.1 (13.1)	2.0 (0.2)
125		28	7	10	62 (62)	15.4 (15.4)	2.0 (0.2)
150		35	10	10	91 (91)	18.7 (18.7)	5.0 (0.5)
200		45	9	10	108 (108)	37.7 (37.7)	11 (1.1)
250		50	9	10	121 (121)	56.9 (56.9)	20 (2.0)
300		60	10	10	113 (113)	62.7 (62.7)	26 (2.6)
350		65	9	10	155 (155)	120 (120.0)	49 (4.9)
400		50	6	10	186 (186)	166 (166.0)	74 (7.4)
500		60	6	10	145 (145)	188 (188.0)	91 (9.1)
600		65	6	8	158 (158)	289 (289.0)	140 (14.0)
700		70	5	8	169 (169)	466 (466.0)	192 (19.2)
800		75	5	8	232 (232)	414 (414.0)	348 (34.8)
900		75	5	8	270 (270)	871 (871.0)	509 (50.9)
1000		80	5	8	243 (243)	954 (954)	5580 (55.8)
65	0.63 (6.3)	15	5	10	92 (92)	11.9 (11.9)	1.0 (0.1)
80		18	5	10	129 (129)	22.2 (22.2)	2.0 (0.2)
100		22	6	10	104 (104)	19.6 (19.6)	3.0 (0.3)
125		28	7	10	93 (93)	23.0 (23.0)	4.0 (0.4)
150		35	10	10	121 (121)	24.9 (24.9)	7.0 (0.7)
200		40	8	10	108 (108)	37.7 (37.7)	11.0 (1.1)
250		30	5	10	224 (224)	105 (105.0)	37.0 (3.7)
300		35	6	10	314 (314)	174 (174.0)	72.0 (7.2)
350		40	6	10	308 (308)	238 (238.0)	98.0 (9.8)
400		50	6	10	279 (279)	249 (249.0)	112.0 (11.2)
500		60	6	10	290 (290)	377 (377.0)	183.0 (18.3)
600		65	6	8	315 (315)	577 (577.0)	280.0 (28.0)
700		70	5	8	338 (338)	933 (933.0)	385.0 (38.5)
800		75	7	8	309 (309)	552 (552.0)	465.0 (46.5)
900		75	5	8	360 (360)	1161 (1161)	679.0 (67.9)
1000		80	5	8	323 (323)	1272 (1272)	744.0 (74.4)
65	1.0 (10)	15	5	10	137 (137)	17.8 (17.8)	2.0 (0.2)
80		18	5	10	129 (129)	22.2 (22.2)	2.0 (0.2)
100		22	6	10	138 (138)	26.1 (26.1)	4.0 (0.4)
125		28	7	10	155 (155)	38.4 (38.4)	6.0 (0.6)
150		20	5	10	280 (280)	57.6 (57.6)	16.0 (1.6)
200		25	5	10	249 (249)	87.3 (87.3)	25.0 (2.5)
250		30	5	10	335 (335)	158 (158.0)	55.0 (5.5)
300		35	6	10	314 (314)	174 (174.0)	72.0 (7.2)
350		40	6	10	411 (411)	317 (317.0)	131.0 (13.1)
400		50	6	10	372 (372)	332 (332.0)	149.0 (14.9)
500		60	6	10	290 (290)	377 (377.0)	183.0 (18.3)
600		65	6	8	315 (315)	577 (577.0)	280.0 (28.0)
700		70	5	8	338 (338)	933 (933.0)	385.0 (38.5)
800		75	5	8	386 (386)	690 (690.0)	581.0 (58.1)
900		75	5	8	450 (450)	1452 (1452)	849.0 (84.9)
1000		80	5	8	404 (404)	1590 (1590)	930.0 (93.0)

As agreed upon with the customer, working travel amplitudes can be recalculated, depending on the requirements for the preset operation time. These requirements shall be specified at order placement. The design values of the compensation capacity and preset operation time shall be indicated in a certificate of an expansion joint.

In case of simultaneous action of axial loads, shear forces and bending moments on an expansion joint, calculation of permissible amplitudes of the axial stroke, lateral and angular movement of the expansion joint shall be made according to the formula:

$$\frac{[\lambda]}{\lambda} + \frac{[\delta]}{\delta} + \frac{[\gamma]}{\gamma} \leq 1$$

Where: $[\lambda]$, $[\delta]$, $[\gamma]$ – permissible axial stroke, lateral, and angular movement amplitudes, accordingly, at a simultaneous loading with all the types of travel;

λ, δ, γ – maximum travel amplitude of the axial stroke, lateral, and angular movement given in Tables I, Ia and II.

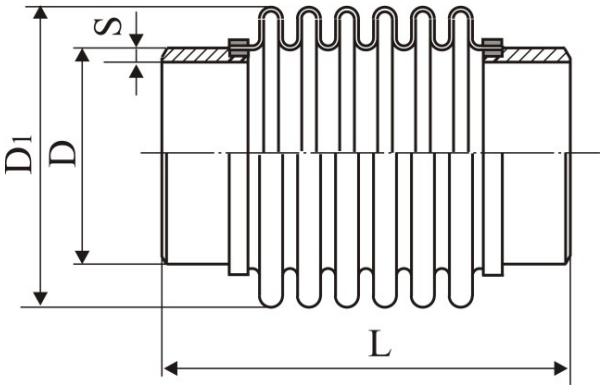
These operating conditions shall be discussed at order placement.

Notes

Notes:

1. The data sheet for ordering metallic expansion joints is available at the end of the catalogue;
2. With any questions associated with selection, peculiarities of pipeline system design using expansion joints, as well as installation, please call, in St. Petersburg: +7 (812) 346-88-78, +7 (812) 346-88-98; fax: +7 (812) 784-97-30 or e-mail to: mail@kompensator.ru.

Axial expansion joints, НОПН type



НОПН type

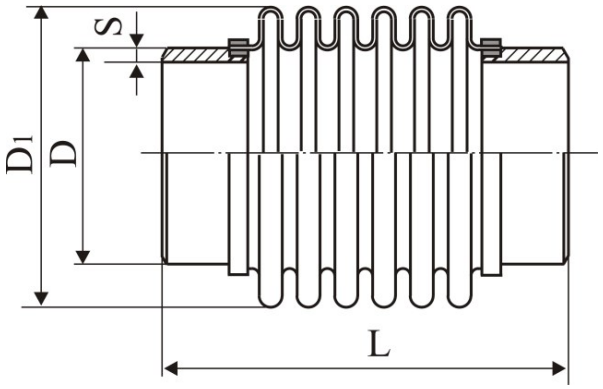
НОПН type axial expansion joints with welded neck branch pipesare basic products for more complexdesigns of expansion joints, but they can be installed directlyin pipelines transferring water with atemperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 1**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	D_1	L	
НОПН-2.5-65	0.25 (2.5)	65	76	3.5	104	340	2
НОПН-2.5-80		80	89	3.5	118	348	2
НОПН-2.5-100		100	108	4.0	142	358	4
НОПН-2.5-125		125	133	4.0	170	372	5
НОПН-2.5-150		150	159	4.5	203	384	6
НОПН-2.5-200		200	219	6.0	258	410	12
НОПН-2.5-250		250	273	7.0	318	588	26
НОПН-2.5-300		300	325	7.0	372	606	31
НОПН-2.5-350		350	377	7.0	431	612	37
НОПН-2.5-400		400	426	7.0	485	622	43
НОПН-2.5-500		500	530	8.0	600	626	54
НОПН-2.5-600		600	630	8.0	706	658	65
НОПН-2.5-700		700	720	8.0	797	634	74
НОПН-2.5-800		800	820	8.0	911	668	95
НОПН-2.5-900		900	920	10.0	1015	650	123
НОПН-2.5-1000		1000	1020	10.0	1117	664	138
НОПН-2.5-1200		1200	1220	12.0	1319	664	213
НОПН-2.5-1400		1400	1420	14.0	1522	664	249
НОПН-6.3-65	0.63 (6.3)	65	76	3.5	105	346	3
НОПН-6.3-80		80	89	3.5	120	358	3
НОПН-6.3-100		100	108	4.0	143	376	5
НОПН-6.3-125		125	133	4.0	172	396	7
НОПН-6.3-150		150	159	4.5	206	412	10
НОПН-6.3-200		200	219	6.0	261	432	16
НОПН-6.3-250		250	273	7.0	318	588	26
НОПН-6.3-300		300	325	7.0	372	606	32
НОПН-6.3-350		350	377	7.0	431	602	37
НОПН-6.3-400		400	426	7.0	485	632	43
НОПН-6.3-500		500	530	8.0	600	644	65
НОПН-6.3-600		600	630	8.0	706	678	80
НОПН-6.3-700		700	720	8.0	797	660	97
НОПН-6.3-800		800	820	8.0	911	694	124
НОПН-6.3-900		900	920	10.0	1015	674	153
НОПН-6.3-1000		1000	1020	10.0	1117	694	185
НОПН-6.3-1200		1200	1220	12.0	1319	694	269
НОПН-6.3-1400		1400	1420	14.0	1522	694	316
НОПН-10-65	1.0 (10)	65	76	3.5	106	358	3
НОПН-10-80		80	89	3.5	120	364	4
НОПН-10-100		100	108	4.0	145	386	6
НОПН-10-125		125	133	4.0	174	406	8
НОПН-10-150		150	159	4.5	204	396	8
НОПН-10-200		200	219	6.0	259	416	13
НОПН-10-250		250	273	7.0	319	600	28
НОПН-10-300		300	325	7.0	373	616	35
НОПН-10-350		350	377	7.0	431	620	44
НОПН-10-400		400	426	7.0	485	654	51
НОПН-10-500		500	530	8.0	600	676	82
НОПН-10-600		600	630	8.0	706	706	101
НОПН-10-700		700	720	8.0	797	678	113
НОПН-10-800		800	820	8.0	911	712	144
НОПН-10-900		900	920	10.0	1015	698	184
НОПН-10-1000		1000	1020	10.0	1117	716	220
НОПН-10-1200		1200	1220	12.0	1319	716	312
НОПН-10-1400		1400	1420	14.0	1522	716	368

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).



НОПН type

НОПН type axial expansion joints with welded neck branch pipes are basic products for more complex designs of expansion joints, but they can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

Table 1 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	D_1	L	
НОПН-16-65	1.6 (16)	65	76	3.5	108	374	4
НОПН-16-80		80	89	3.5	122	382	5
НОПН-16-100		100	108	4.0	143	376	5
НОПН-16-125		125	133	4.0	172	390	7
НОПН-16-150		150	159	4.5	205	406	10
НОПН-16-200		200	219	6.0	275	502	17
НОПН-16-250		250	273	7.0	320	632	33
НОПН-16-300		300	325	7.0	374	632	44
НОПН-16-350		350	377	7.0	431	640	58
НОПН-16-400		400	426	7.0	485	682	72
НОПН-16-500		500	530	8.0	600	702	99
НОПН-16-600		600	630	8.0	706	748	131
НОПН-16-700		700	720	8.0	797	712	145
НОПН-16-800		800	820	8.0	911	754	194
НОПН-16-900		900	920	10.0	1015	734	236
НОПН-16-1000		1000	1020	10.0	1117	748	270
НОПН-16-1200		1200	1220	12.0	1319	748	372
НОПН-16-1400		1400	1420	14.0	1522	748	438
НОПН-25-65	2.5 (25)	65	76	4.0	106	358	3
НОПН-25-80		80	89	4.0	120	364	3
НОПН-25-100		100	108	4.5	144	384	4
НОПН-25-125		125	133	5.0	173	398	5
НОПН-25-150		150	159	4.5	218	512	20
НОПН-25-200		200	219	6.0	277	514	25
НОПН-25-250		250	273	7.0	320	632	30
НОПН-25-300		300	325	8.0	374	642	45
НОПН-25-350		350	377	9.0	431	648	61
НОПН-25-400		400	426	9.0	485	702	80
НОПН-25-500		500	530	8.0	600	722	111
НОПН-25-600		600	630	8.0	706	766	146
НОПН-25-700		700	720	8.0	797	736	170
НОПН-25-800		800	820	8.0	911	780	227
НОПН-25-900		900	920	10.0	1015	748	256
НОПН-25-1000		1000	1020	12.0	1117	776	320
НОПН-25-1200		1200	1220	14.0	1319	776	430
НОПН-25-1400		1400	1420	14.0	1522	776	508

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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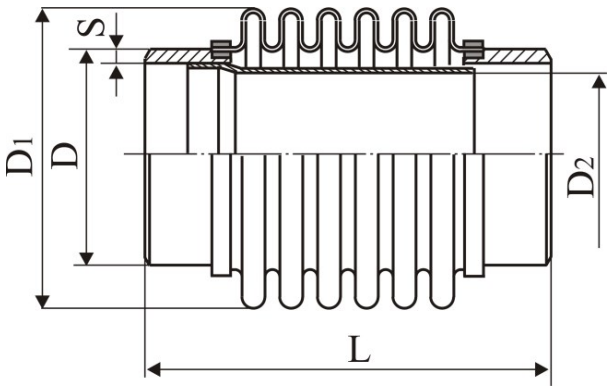
Axial expansion joints, НОПГ type



НОПГ type

НОПГ type axial expansion joints with welded neck branch pipes are basic products for more complex designs of expansion joints, but they can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 2**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	D_1	L	
НОПГ-2.5-65	0.25 (2.5)	65	76	3.5	104	340	2
НОПГ-2.5-80		80	89	3.5	118	348	3
НОПГ-2.5-100		100	108	4.0	142	358	4
НОПГ-2.5-125		125	133	4.0	170	372	6
НОПГ-2.5-150		150	159	4.5	203	384	8
НОПГ-2.5-200		200	219	6.0	258	410	15
НОПГ-2.5-250		250	273	7.0	318	588	30
НОПГ-2.5-300		300	325	7.0	372	606	36
НОПГ-2.5-350		350	377	7.0	431	612	43
НОПГ-2.5-400		400	426	7.0	485	622	51
НОПГ-2.5-500		500	530	8.0	600	626	64
НОПГ-2.5-600		600	630	8.0	706	658	77
НОПГ-2.5-700		700	720	8.0	797	634	87
НОПГ-2.5-800		800	820	8.0	911	668	111
НОПГ-2.5-900		900	920	10.0	1015	650	141
НОПГ-2.5-1000		1000	1020	10.0	1117	664	158
НОПГ-2.5-1200		1200	1220	12.0	1319	664	237
НОПГ-2.5-1400		1400	1420	14.0	1522	664	277
НОПГ-6.3-65	0.63 (6.3)	65	76	3.5	105	346	3
НОПГ-6.3-80		80	89	3.5	120	358	4
НОПГ-6.3-100		100	108	4.0	143	376	6
НОПГ-6.3-125		125	133	4.0	172	396	8
НОПГ-6.3-150		150	159	4.5	206	412	12
НОПГ-6.3-200		200	219	6.0	261	432	20
НОПГ-6.3-250		250	273	7.0	318	588	30
НОПГ-6.3-300		300	325	7.0	372	606	37
НОПГ-6.3-350		350	377	7.0	431	602	43
НОПГ-6.3-400		400	426	7.0	485	632	50
НОПГ-6.3-500		500	530	8.0	600	644	74
НОПГ-6.3-600		600	630	8.0	706	678	92
НОПГ-6.3-700		700	720	8.0	797	660	111
НОПГ-6.3-800		800	820	8.0	911	694	142
НОПГ-6.3-900		900	920	10.0	1015	674	171
НОПГ-6.3-1000		1000	1020	10.0	1117	694	205
НОПГ-6.3-1200		1200	1220	12.0	1319	694	294
НОПГ-6.3-1400		1400	1420	14.0	1522	694	345
НОПГ-10-65	1.0 (10)	65	76	3.5	106	358	4
НОПГ-10-80		80	89	3.5	120	364	4
НОПГ-10-100		100	108	4.0	145	386	7
НОПГ-10-125		125	133	4.0	174	406	9
НОПГ-10-150		150	159	4.5	204	396	10
НОПГ-10-200		200	219	6.0	259	416	16
НОПГ-10-250		250	273	7.0	319	600	33
НОПГ-10-300		300	325	7.0	373	616	40
НОПГ-10-350		350	377	7.0	431	620	50
НОПГ-10-400		400	426	7.0	485	654	59
НОПГ-10-500		500	530	8.0	600	676	92
НОПГ-10-600		600	630	8.0	706	706	115
НОПГ-10-700		700	720	8.0	797	678	128
НОПГ-10-800		800	820	8.0	911	712	162
НОПГ-10-900		900	920	10.0	1015	698	203
НОПГ-10-1000		1000	1020	10.0	1117	716	243
НОПГ-10-1200		1200	1220	12.0	1319	716	340
НОПГ-10-1400		1400	1420	14.0	1522	716	400

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;

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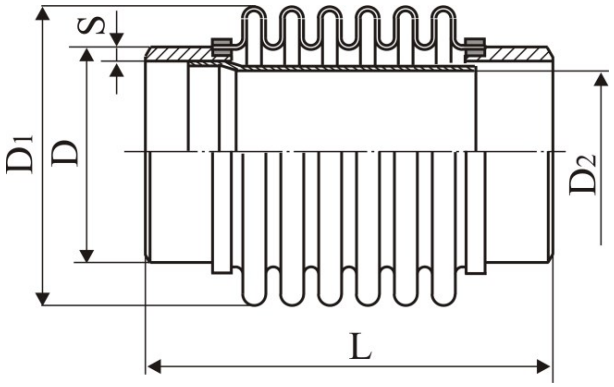

НОПГ type

НОПГ type axial expansion joints with welded neck branch pipes are basic products for more complex designs of expansion joints, but they can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

Table 2 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	D_1	L	
НОПГ-16-65	1.6 (16)	65	76	3.5	108	374	5
НОПГ-16-80		80	89	3.5	122	382	5
НОПГ-16-100		100	108	4.0	143	376	6
НОПГ-16-125		125	133	4.0	172	390	8
НОПГ-16-150		150	159	4.5	205	406	12
НОПГ-16-200		200	219	6.0	275	502	20
НОПГ-16-250		250	273	7.0	320	632	38
НОПГ-16-300		300	325	7.0	374	632	49
НОПГ-16-350		350	377	7.0	431	640	65
НОПГ-16-400		400	426	7.0	485	682	80
НОПГ-16-500		500	530	8.0	600	702	111
НОПГ-16-600		600	630	8.0	706	748	146
НОПГ-16-700		700	720	8.0	797	712	161
НОПГ-16-800		800	820	8.0	911	754	214
НОПГ-16-900		900	920	10.0	1015	734	258
НОПГ-16-1000		1000	1020	10.0	1117	748	294
НОПГ-16-1200		1200	1220	12.0	1319	748	400
НОПГ-16-1400		1400	1420	14.0	1522	748	471
НОПГ-25-65	2.5 (25)	65	76	4.0	106	358	4
НОПГ-25-80		80	89	4.0	120	364	4
НОПГ-25-100		100	108	4.0	144	384	6
НОПГ-25-125		125	133	4.0	173	398	9
НОПГ-25-150		150	159	4.5	218	512	13
НОПГ-25-200		200	219	6.0	277	514	21
НОПГ-25-250		250	273	7.0	320	632	37
НОПГ-25-300		300	325	8.0	374	642	51
НОПГ-25-350		350	377	9.0	431	648	68
НОПГ-25-400		400	426	9.0	485	702	90
НОПГ-25-500		500	530	8.0	600	722	124
НОПГ-25-600		600	630	8.0	706	766	162
НОПГ-25-700		700	720	8.0	797	736	187
НОПГ-25-800		800	820	8.0	911	780	249
НОПГ-25-900		900	920	10.0	1015	748	278
НОПГ-25-1000		1000	1020	12.0	1117	776	345
НОПГ-25-1200		1200	1220	14.0	1319	776	461
НОПГ-25-1400		1400	1420	14.0	1522	776	544

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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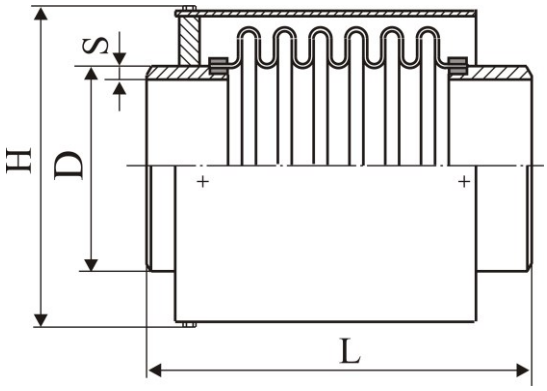
Axial expansion joints, НОПК type



НОПК type

НОПК type axial expansion joints with a fixed casing mounted on one of the expansion joint's branch pipes using weldolets. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 3**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	H	L	
НОПК-2.5-65	0.25 (2.5)	65	76	3.5	196	340	4
НОПК-2.5-80		80	89	3.5	209	348	4
НОПК-2.5-100		100	108	4.0	233	358	5
НОПК-2.5-125		125	133	4.0	265	372	5
НОПК-2.5-150		150	159	4.5	307	384	7
НОПК-2.5-200		200	219	6.0	367	410	10
НОПК-2.5-250		250	273	7.0	425	588	15
НОПК-2.5-300		300	325	7.0	481	606	18
НОПК-2.5-350		350	377	7.0	541	612	27
НОПК-2.5-400		400	426	7.0	594	622	23
НОПК-2.5-500		500	530	8.0	700	626	28
НОПК-2.5-600		600	630	8.0	806	658	34
НОПК-2.5-700		700	720	8.0	912	634	38
НОПК-2.5-800		800	820	8.0	1016	668	55
НОПК-2.5-900		900	920	10.0	1120	650	58
НОПК-2.5-1000		1000	1020	10.0	1224	664	79
НОПК-2.5-1200		1200	1220	12.0	1432	664	93
НОПК-2.5-1400		1400	1420	14.0	1632	664	109
НОПК-6.3-65	0.63 (6.3)	65	76	3.5	196	346	4
НОПК-6.3-80		80	89	3.5	209	358	5
НОПК-6.3-100		100	108	4.0	233	376	6
НОПК-6.3-125		125	133	4.0	265	396	7
НОПК-6.3-150		150	159	4.5	307	412	11
НОПК-6.3-200		200	219	6.0	367	432	14
НОПК-6.3-250		250	273	7.0	425	588	15
НОПК-6.3-300		300	325	7.0	481	606	18
НОПК-6.3-350		350	377	7.0	541	602	23
НОПК-6.3-400		400	426	7.0	594	632	26
НОПК-6.3-500		500	530	8.0	710	644	38
НОПК-6.3-600		600	630	8.0	810	678	48
НОПК-6.3-700		700	720	8.0	912	660	61
НОПК-6.3-800		800	820	8.0	1016	694	84
НОПК-6.3-900		900	920	10.0	1120	674	88
НОПК-6.3-1000		1000	1020	10.0	1224	694	126
НОПК-6.3-12000		1200	1220	12.0	1432	694	149
НОПК-6.3-1400		1400	1420	14.0	1632	694	175
НОПК-10-65	1.0 (10)	65	76	3.5	196	358	4
НОПК-10-80		80	89	3.5	209	364	5
НОПК-10-100		100	108	4.0	233	386	7
НОПК-10-125		125	133	4.0	265	406	9
НОПК-10-150		150	159	4.5	307	396	8
НОПК-10-200		200	219	6.0	367	416	11
НОПК-10-250		250	273	7.0	425	600	18
НОПК-10-300		300	325	7.0	481	616	21
НОПК-10-350		350	377	7.0	541	620	29
НОПК-10-400		400	426	7.0	594	654	35
НОПК-10-500		500	530	8.0	714	676	55
НОПК-10-600		600	630	8.0	810	706	70
НОПК-10-700		700	720	8.0	912	678	77
НОПК-10-800		800	820	8.0	1016	712	104
НОПК-10-900		900	920	10.0	1120	698	119
НОПК-10-1000		1000	1020	10.0	1224	716	161
НОПК-10-1200		1200	1220	12.0	1342	716	192
НОПК-10-1400		1400	1420	14.0	1632	716	228

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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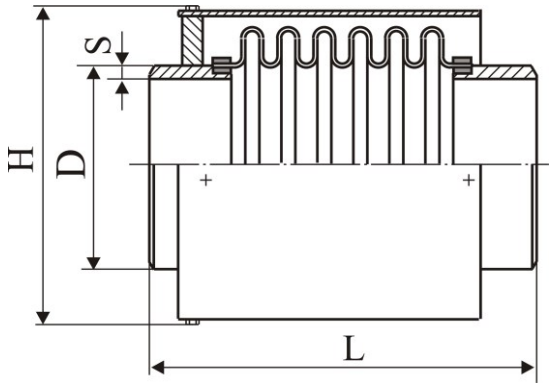


НОПК type

НОПК type axial expansion joints with a fixed casing mounted on one of the expansion joint's branch pipes using weldolets. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

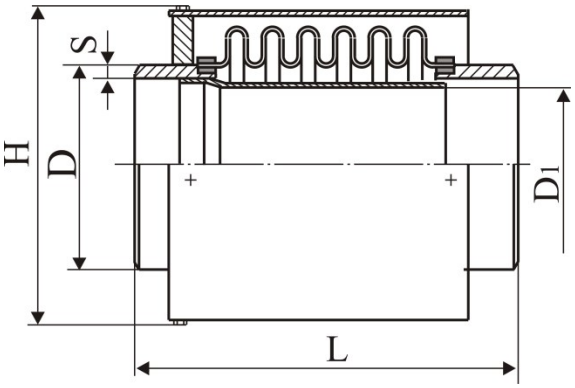
Table 3 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	H	L	
НОПК-16-65	1.6 (16)	65	76	3.5	196	374	5
НОПК-16-80		80	89	3.5	209	382	6
НОПК-16-100		100	108	4.0	233	376	6
НОПК-16-125		125	133	4.0	265	390	7
НОПК-16-150		150	159	4.5	307	406	10
НОПК-16-200		200	219	6.0	387	502	14
НОПК-16-250		250	273	7.0	425	632	22
НОПК-16-300		300	325	7.0	481	632	27
НОПК-16-350		350	377	7.0	541	640	36
НОПК-16-400		400	426	7.0	602	682	47
НОПК-16-500		500	530	8.0	718	702	73
НОПК-16-600		600	630	8.0	818	748	100
НОПК-16-700		700	720	8.0	912	712	109
НОПК-16-800		800	820	8.0	1024	754	154
НОПК-16-900		900	920	10.0	1124	734	172
НОПК-16-1000		1000	1020	10.0	1228	748	211
НОПК-16-1200		1200	1220	12.0	1342	748	252
НОПК-16-1400		1400	1420	14.0	1632	748	298
НОПК-25-65	2.5 (25)	65	76	4.0	196	358	5
НОПК-25-80		80	89	4.0	209	364	5
НОПК-25-100		100	108	4.0	233	384	7
НОПК-25-125		125	133	4.0	265	398	8
НОПК-25-150		150	159	4.5	327	512	11
НОПК-25-200		200	219	6.0	391	514	16
НОПК-25-250		250	273	7.0	425	632	22
НОПК-25-300		300	325	8.0	481	642	29
НОПК-25-350		350	377	9.0	541	648	40
НОПК-25-400		400	426	9.0	606	702	56
НОПК-25-500		500	530	8.0	722	722	86
НОПК-25-600		600	630	8.0	822	766	115
НОПК-25-700		700	720	8.0	912	736	134
НОПК-25-800		800	820	8.0	1028	780	188
НОПК-25-900		900	920	10.0	1128	748	192
НОПК-25-1000		1000	1020	10.0	1232	776	262
НОПК-25-1200		1200	1220	14.0	1432	776	312
НОПК-25-1400		1400	1420	14.0	1632	776	370

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Axial expansion joints, НОПМ type



НОПМ type

НОПМ type axial expansion joints with a fixed casing mounted on one of the expansion joint's branch pipes using weldolets and with an internal guide branch pipe. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 4**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	H	L	
НОПМ-2.5-65	0.25 (2.5)	65	76	3.5	196	340	5
НОПМ-2.5-80		80	89	3.5	209	348	5
НОПМ-2.5-100		100	108	4.0	233	358	6
НОПМ-2.5-125		125	133	4.0	265	372	7
НОПМ-2.5-150		150	159	4.5	307	384	9
НОПМ-2.5-200		200	219	6.0	367	410	13
НОПМ-2.5-250		250	273	7.0	425	588	19
НОПМ-2.5-300		300	325	7.0	481	606	24
НОПМ-2.5-350		350	377	7.0	541	612	34
НОПМ-2.5-400		400	426	7.0	594	622	31
НОПМ-2.5-500		500	530	8.0	700	626	38
НОПМ-2.5-600		600	630	8.0	806	658	47
НОПМ-2.5-700		700	720	8.0	912	634	52
НОПМ-2.5-800		800	820	8.0	1016	668	72
НОПМ-2.5-900-		900	920	10.0	1120	650	76
НОПМ-2.5-1000		1000	1020	10.0	1224	664	99
НОПМ-2.5-1200		1200	1220	12.0	1432	664	117
НОПМ-2.5-1400		1400	1420	14.0	1632	664	137
НОПМ-6.3-65	0.63 (6.3)	65	76	3.5	196	346	5
НОПМ-6.3-80		80	89	3.5	209	358	6
НОПМ-6.3-100		100	108	4.0	233	376	7
НОПМ-6.3-125		125	133	4.0	265	396	9
НОПМ-6.3-150		150	159	4.5	307	412	13
НОПМ-6.3-200		200	219	6.0	367	432	17
НОПМ-6.3-250		250	273	7.0	425	588	19
НОПМ-6.3-300		300	325	7.0	481	606	24
НОПМ-6.3-350		350	377	7.0	541	602	30
НОПМ-6.3-400		400	426	7.0	594	632	34
НОПМ-6.3-500		500	530	8.0	710	644	48
НОПМ-6.3-600		600	630	8.0	810	678	61
НОПМ-6.3-700		700	720	8.0	912	660	76
НОПМ-6.3-800		800	820	8.0	1016	694	102
НОПМ-6.3-900		900	920	10.0	1120	674	107
НОПМ-6.3-1000		1000	1020	10.0	1224	694	147
НОПМ-6.3-1200		1200	1220	12.0	1432	694	174
НОПМ-6.3-1400		1400	1420	14.0	1632	694	204
НОПМ-10-65	1.0 (10)	65	76	3.5	196	358	5
НОПМ-10-80		80	89	3.5	209	364	6
НОПМ-10-100		100	108	4.0	233	386	8
НОПМ-10-125		125	133	4.0	265	406	11
НОПМ-10-150		150	159	4.5	307	396	11
НОПМ-10-200		200	219	6.0	367	416	14
НОПМ-10-250		250	273	7.0	425	600	23
НОПМ-10-300		300	325	7.0	481	616	27
НОПМ-10-350		350	377	7.0	541	620	36
НОПМ-10-400		400	426	7.0	594	654	44
НОПМ-10-500		500	530	8.0	714	676	66
НОПМ-10-600		600	630	8.0	810	706	84
НОПМ-10-700		700	720	8.0	912	678	92
НОПМ-10-800		800	820	8.0	1016	712	123
НОПМ-10-900		900	920	10.0	1120	698	139
НОПМ-10-1000		1000	1020	10.0	1224	716	184
НОПМ-10-1200		1200	1220	12.0	1342	716	219
НОПМ-10-1400		1400	1420	14.0	1632	716	259

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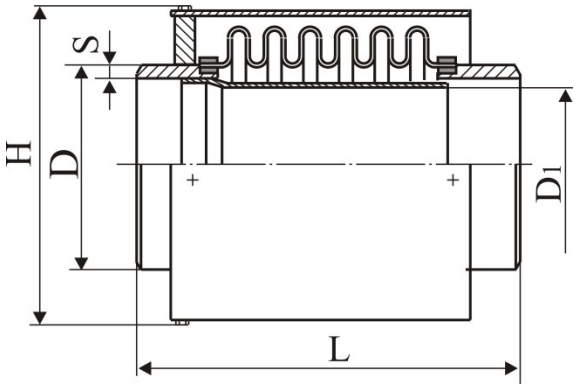

НОПМ type

НОПМ type axial expansion joints with a fixed casing mounted on one of the expansion joint's branch pipes using weldolets and with an internal guide branch pipe. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

Table 4 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Weight, kg
			D	S	H	L	
НОПМ-16-65	1.6 (16)	65	76	3.5	196	374	6
НОПМ-16-80		80	89	3.5	209	382	7
НОПМ-16-100		100	108	4.0	233	376	7
НОПМ-16-125		125	133	4.0	265	390	9
НОПМ-16-150		150	159	4.5	307	406	12
НОПМ-16-200		200	219	6.0	387	502	17
НОПМ-16-250		250	273	7.0	425	632	27
НОПМ-16-300		300	325	7.0	481	632	32
НОПМ-16-350		350	377	7.0	541	640	44
НОПМ-16-400		400	426	7.0	602	682	56
НОПМ-16-500		500	530	8.0	718	702	85
НОПМ-16-600		600	630	8.0	818	748	115
НОПМ-16-700		700	720	8.0	912	712	125
НОПМ-16-800		800	820	8.0	1024	754	174
НОПМ-16-900		900	920	10.0	1124	734	194
НОПМ-16-1000		1000	1020	10.0	1228	748	235
НОПМ-16-1200		1200	1220	12.0	1342	748	281
НОПМ-16-1400		1400	1420	14.0	1632	748	332
НОПМ-25-65	2.5 (25)	65	76	4.0	196	358	6
НОПМ-25-80		80	89	4.0	209	364	6
НОПМ-25-100		100	108	4.0	233	384	8
НОПМ-25-125		125	133	4.0	265	398	10
НОПМ-25-150		150	159	4.5	327	512	13
НОПМ-25-200		200	219	6.0	391	514	19
НОПМ-25-250		250	273	7.0	425	632	27
НОПМ-25-300		300	325	8.0	481	642	35
НОПМ-25-350		350	377	9.0	541	648	47
НОПМ-25-400		400	426	9.0	606	702	66
НОПМ-25-500		500	530	8.0	722	722	98
НОПМ-25-600		600	630	8.0	822	766	131
НОПМ-25-700		700	720	8.0	912	736	151
НОПМ-25-800		800	820	8.0	1028	780	209
НОПМ-25-900		900	920	10.0	1128	748	215
НОПМ-25-1000		1000	1020	10.0	1232	776	288
НОПМ-25-1200		1200	1220	14.0	1432	776	343
НОПМ-25-1400		1400	1420	14.0	1632	776	406

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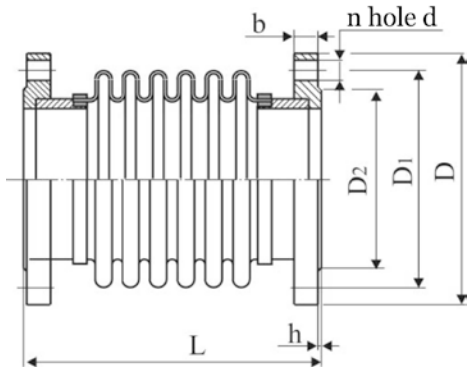
Axial expansion joints, НОФН type



НОФН type

НОФН type unbalanced axial expansion joints with flanges welded onto branch pipes can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 5**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm							n	Weight, kg
			D	D_1	D_2	L	b	h	d		
НОФН-2.5-65	0.25 (2.5)	65	160	130	110	258	11	3	14	4	5
НОФН-2.5-80		80	185	150	128	266	11	3	18	4	6
НОФН-2.5-100		100	205	170	148	286	11	3	18	4	7
НОФН-2.5-125		125	235	200	178	302	13	3	18	8	9
НОФН-2.5-150		150	260	225	202	314	13	3	18	8	12
НОФН-2.5-200		200	315	280	258	392	15	3	18	8	21
НОФН-2.5-250		250	370	335	312	416	18	3	18	12	32
НОФН-2.5-300		300	435	395	365	440	18	4	22	12	41
НОФН-2.5-350		350	485	445	415	446	18	4	22	12	47
НОФН-2.5-400		400	535	495	565	456	18	4	22	16	50
НОФН-2.5-500		500	640	600	570	484	20	4	22	16	71
НОФН-2.5-600		600	755	705	670	518	20	5	26	20	90
НОФН-2.5-700		700	860	810	775	506	21	5	26	24	114
НОФН-2.5-800		800	975	920	880	540	21	5	30	24	148
НОФН-2.5-900		900	1075	1020	980	536	23	5	30	24	185
НОФН-2.5-1000		1000	1175	1120	1080	554	25	5	30	28	215
НОФН-6.3-65	0.63 (6.3)	65	160	130	110	264	13	3	14	4	5
НОФН-6.3-80		80	185	150	128	280	15	3	18	4	8
НОФН-6.3-100		100	205	170	148	308	15	3	18	4	10
НОФН-6.3-125		125	235	200	178	332	17	3	18	8	14
НОФН-6.3-150		150	260	225	202	348	17	3	18	8	18
НОФН-6.3-200		200	315	280	258	422	19	3	18	8	28
НОФН-6.3-250		250	370	335	312	414	20	3	18	12	33
НОФН-6.3-300		300	435	395	365	444	20	4	22	12	43
НОФН-6.3-350		350	485	445	415	444	22	4	22	12	52
НОФН-6.3-400		400	535	495	465	470	24	4	22	16	61
НОФН-6.3-500		500	640	600	570	504	25	4	22	16	90
НОФН-6.3-600		600	755	705	670	540	25	5	26	20	115
НОФН-6.3-700		700	860	810	775	536	27	5	26	24	153
НОФН-6.3-800		800	975	920	880	570	27	5	30	24	197
НОФН-6.3-900		900	1075	1020	980	564	29	5	30	24	238
НОФН-6.3-1000		1000	1175	1120	1080	588	31	5	30	28	287
НОФН-10-65	1.0 (10)	65	180	145	122	278	17	3	18	4	8
НОФН-10-80		80	195	160	133	284	17	3	18	4	10
НОФН-10-100		100	215	180	158	318	19	3	18	8	13
НОФН-10-125		125	245	210	184	340	21	3	18	8	18
НОФН-10-150		150	280	240	212	330	21	3	22	8	20
НОФН-10-200		200	335	295	268	400	21	3	22	8	29
НОФН-10-250		250	390	350	320	426	23	3	22	12	41
НОФН-10-300		300	440	400	370	454	24	4	22	12	51
НОФН-10-350		350	500	460	430	458	24	4	22	16	65
НОФН-10-400		400	565	515	482	494	26	4	26	16	82
НОФН-10-500		500	670	620	585	538	28	4	26	20	123
НОФН-10-600		600	780	725	685	572	31	5	30	20	163
НОФН-10-700		700	895	840	800	558	34	5	30	24	215
НОФН-10-800		800	1010	950	905	596	37	5	33	24	284
НОФН-10-900		900	1110	1050	1005	594	40	5	33	28	349
НОФН-10-1000		1000	1220	1160	1110	616	43	5	33	28	433

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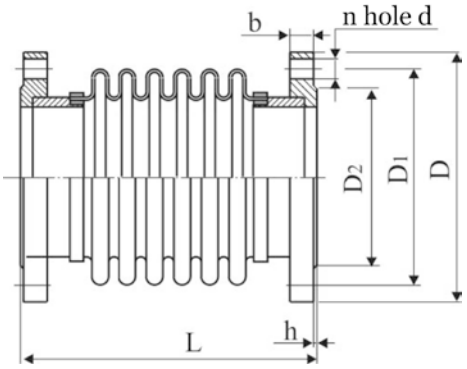

НОФН type

НОФН type unbalanced axial expansion joints with flanges welded onto branch pipes can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

Table 5 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm							n	Weight, kg
			D	D_1	D_2	L	b	h	d		
НОФН-16-65	1.6 (16)	65	180	145	122	298	21	3	18	4	10
НОФН-16-80		80	195	160	133	306	21	3	18	4	12
НОФН-16-100		100	215	180	158	312	23	3	18	8	14
НОФН-16-125		125	245	210	184	328	25	3	18	8	18
НОФН-16-150		150	280	240	212	344	25	3	22	8	24
НОФН-16-200		200	335	295	268	492	27	3	22	12	37
НОФН-16-250		250	405	355	320	462	28	3	26	12	54
НОФН-16-300		300	460	410	370	474	28	4	26	12	67
НОФН-16-350		350	520	470	430	484	30	4	26	16	86
НОФН-16-400		400	580	525	482	530	34	4	30	16	114
НОФН-16-500		500	710	650	585	580	44	4	33	20	201
НОФН-16-600		600	840	770	685	628	45	5	39	20	277
НОФН-16-700		700	910	840	800	604	47	5	39	24	299
НОФН-16-800		800	1020	950	905	648	49	5	39	24	387
НОФН-16-900		900	1120	1050	1005	646	54	5	39	28	475
НОФН-16-1000		1000	1255	1170	1110	666	58	5	45	28	610
НОФН-25-65	2.5 (25)	65	180	145	122	282	21	3	18	8	10
НОВН-25-80		80	195	160	133	290	23	3	18	8	12
НОФН-25-100		100	230	190	158	322	25	3	22	8	17
НОФН-25-125		125	270	220	184	338	27	3	26	8	24
НОФН-25-150		150	300	250	212	354	27	3	26	8	30
НОФН-25-200		200	360	310	278	436	29	3	26	12	46
НОФН-25-250		250	425	370	335	466	31	3	30	12	63
НОФН-25-300		300	485	430	390	488	32	4	30	16	84
НОФН-25-350		350	550	490	450	500	38	4	33	16	118
НОФН-25-400		400	610	550	505	556	40	4	33	16	156
НОФН-25-500		500	730	660	615	602	48	4	39	20	237
НОФН-25-600		600	840	770	720	648	49	5	39	20	317
НОФН-25-700		700	960	875	820	636	55	5	45	24	414
НОФН-25-800		800	1075	990	930	692	61	5	45	24	582

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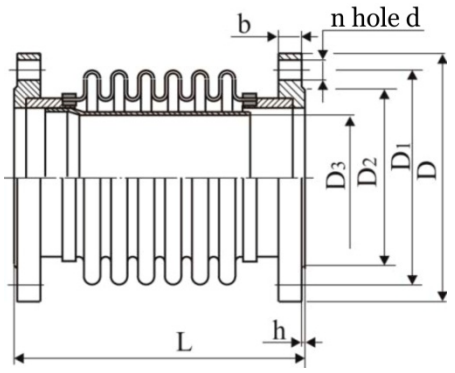
Axial expansion joints, НОФГ type



НОФГ type

НОФГ type unbalanced expansion joints with flanges welded onto branch pipes have an internal guide branch pipe welded to one of the connection branch pipes. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 6**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm							n	Weight, kg
			D	D_1	D_2	L	b	h	d		
НОФГ-2.5-65	0.25 (2.5)	65	160	130	110	258	11	3	14	4	6
НОФГ-2.5-80		80	185	150	128	266	11	3	18	4	7
НОФГ-2.5-100		100	205	170	148	286	11	3	18	4	8
НОФГ-2.5-125		125	235	200	178	302	13	3	18	8	11
НОФГ-2.5-150		150	260	225	202	314	13	3	18	8	14
НОФГ-2.5-200		200	315	280	258	392	15	3	18	8	24
НОФГ-2.5-250		250	370	335	312	416	18	3	18	12	36
НОФГ-2.5-300		300	435	395	365	440	18	4	22	12	47
НОФГ-2.5-350		350	485	445	415	446	18	4	22	12	54
НОФГ-2.5-400		400	535	495	565	456	18	4	22	16	58
НОФГ-2.5-500		500	640	600	570	484	20	4	22	16	81
НОФГ-2.5-600		600	755	705	670	518	20	5	26	20	103
НОФГ-2.5-700		700	860	810	775	506	21	5	26	24	128
НОФГ-2.5-800		800	975	920	880	540	21	5	30	24	165
НОФГ-2.5-900		900	1075	1020	980	536	23	5	30	24	203
НОФГ-2.5-1000		1000	1175	1120	1080	554	25	5	30	28	235
НОФГ-6.3-65	0.63 (6.3)	65	160	130	110	264	13	3	14	4	6
НОФГ-6.3-80		80	185	150	128	280	15	3	18	4	9
НОФГ-6.3-100		100	205	170	148	308	15	3	18	4	11
НОФГ-6.3-125		125	235	200	178	332	17	3	18	8	16
НОФГ-6.3-150		150	260	225	202	348	17	3	18	8	20
НОФГ-6.3-200		200	315	280	258	422	19	3	18	8	31
НОФГ-6.3-250		250	370	335	312	414	20	3	18	12	37
НОФГ-6.3-300		300	435	395	365	444	20	4	22	12	49
НОФГ-6.3-350		350	485	445	415	444	22	4	22	12	59
НОФГ-6.3-400		400	535	495	465	470	24	4	22	16	69
НОФГ-6.3-500		500	640	600	570	504	25	4	22	16	100
НОФГ-6.3-600		600	755	705	670	540	25	5	26	20	128
НОФГ-6.3-700		700	860	810	775	536	27	5	26	24	168
НОФГ-6.3-800		800	975	920	880	570	27	5	30	24	215
НОФГ-6.3-900		900	1075	1020	980	564	29	5	30	24	257
НОФГ-6.3-1000		1000	1175	1120	1080	588	31	5	30	28	308
НОФГ-10-65	1.0 (10)	65	180	145	122	278	17	3	18	4	9
НОФГ-10-80		80	195	160	133	284	17	3	18	4	11
НОФГ-10-100		100	215	180	158	318	19	3	18	8	14
НОФГ-10-125		125	245	210	184	340	21	3	18	8	20
НОФГ-10-150		150	280	240	212	330	21	3	22	8	23
НОФГ-10-200		200	335	295	268	400	21	3	22	8	32
НОФГ-10-250		250	390	350	320	426	23	3	22	12	46
НОФГ-10-300		300	440	400	370	454	24	4	22	12	57
НОФГ-10-350		350	500	460	430	458	24	4	22	16	72
НОФГ-10-400		400	565	515	482	494	26	4	26	16	91
НОФГ-10-500		500	670	620	585	538	28	4	26	20	134
НОФГ-10-600		600	780	725	685	572	31	5	30	20	177
НОФГ-10-700		700	895	840	800	558	34	5	30	24	230
НОФГ-10-800		800	1010	950	905	596	37	5	33	24	303
НОФГ-10-900		900	1110	1050	1005	594	40	5	33	28	369
НОФГ-10-1000		1000	1220	1160	1110	616	43	5	33	28	456

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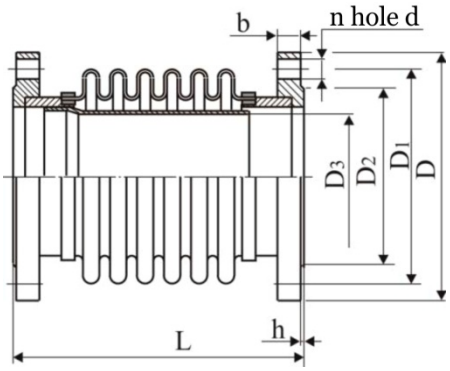

НОФГ type

НОФГ type unbalanced expansion joints with flanges welded onto branch pipes have an internal guide branch pipe welded to one of the connection branch pipes.They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

Table 6 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm							n	Weight, kg
			D	D_1	D_2	L	b	h	d		
НОФГ-16-65	1.6 (16)	65	180	145	122	298	21	3	18	4	11
НОФГ-16-80		80	195	160	133	306	21	3	18	4	13
НОФГ-16-100		100	215	180	158	312	23	3	18	8	15
НОФГ-16-125		125	245	210	184	328	25	3	18	8	20
НОФГ-16-150		150	280	240	212	344	25	3	22	8	26
НОФГ-16-200		200	335	295	268	492	27	3	22	12	40
НОФГ-16-250		250	405	355	320	462	28	3	26	12	59
НОФГ-16-300		300	460	410	370	474	28	4	26	12	72
НОФГ-16-350		350	520	470	430	484	30	4	26	16	94
НОФГ-16-400		400	580	525	482	530	34	4	30	16	123
НОФГ-16-500		500	710	650	585	580	44	4	33	20	213
НОФГ-16-600		600	840	770	685	628	45	5	39	20	292
НОФГ-16-700		700	910	840	800	604	47	5	39	24	315
НОФГ-16-800		800	1020	950	905	648	49	5	39	24	407
НОФГ-16-900		900	1120	1050	1005	646	54	5	39	28	497
НОФГ-16-1000		1000	1255	1170	1110	666	58	5	45	28	634
НОФГ-25-65	2.5 (25)	65	180	145	122	282	21	3	18	8	11
НОФГ-25-80		80	195	160	133	290	23	3	18	8	13
НОФГ-25-100		100	230	190	158	322	25	3	22	8	18
НОФГ-25-125		125	270	220	184	338	27	3	26	8	26
НОФГ-25-150		150	300	250	212	354	27	3	26	8	32
НОФГ-25-200		200	360	310	278	436	29	3	26	12	49
НОФГ-25-250		250	425	370	335	466	31	3	30	12	68
НОФГ-25-300		300	485	430	390	488	32	4	30	16	90
НОФГ-25-350		350	550	490	450	500	38	4	33	16	125
НОФГ-25-400		400	610	550	505	556	40	4	33	16	166
НОФГ-25-500		500	730	660	615	602	48	4	39	20	249
НОФГ-25-600		600	840	770	720	648	49	5	39	20	333
НОФГ-25-700		700	960	875	820	636	55	5	45	24	431
НОФГ-25-800		800	1075	990	930	692	63	5	45	24	603

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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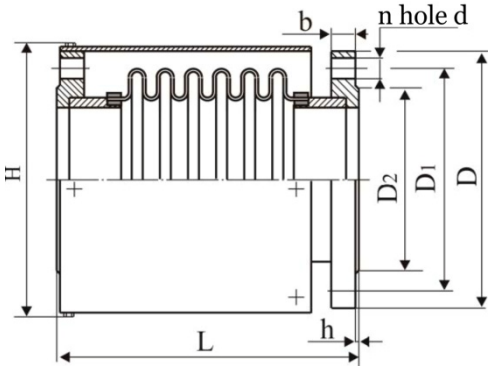
Axial expansion joints, НОФК type



НОФК type

НОФК type unbalanced axial expansion joints with flanges welded onto branch pipes, with a fixed casing. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosionto the expansion joint material, with a temperature up to 500 °C andat a velocity up to 20 m/s.

*Table 7**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm								n	Weight, kg
			D	D_1	D_2	L	H	b	h	d		
НОФК-2.5-65	0.25 (2.5)	65	160	130	110	258	178	11	3	14	4	6
НОФК-2.5-80		80	185	150	128	266	203	11	3	18	4	7
НОФК-2.5-100		100	205	170	148	286	223	11	3	18	4	9
НОФК-2.5-125		125	235	200	178	302	253	13	3	18	8	11
НОФК-2.5-150		150	260	225	202	314	278	13	3	18	8	15
НОФК-2.5-200		200	315	280	258	392	333	15	3	18	8	25
НОФК-2.5-250		250	370	335	312	416	388	18	3	18	12	37
НОФК-2.5-300		300	435	395	365	440	453	18	4	22	12	47
НОФК-2.5-350		350	485	445	415	446	504	18	4	22	12	55
НОФК-2.5-400		400	535	495	565	456	554	18	4	22	16	59
НОФК-2.5-500		500	640	600	570	484	659	20	4	22	16	83
НОФК-2.5-600		600	755	705	670	518	774	20	5	26	20	106
НОФК-2.5-700		700	860	810	775	506	879	21	5	26	24	131
НОФК-2.5-800		800	975	920	880	540	994	21	5	30	24	168
НОФК-2.5-900		900	1075	1020	980	536	1094	23	5	30	24	207
НОФК-2.5-1000		1000	1175	1120	1080	554	1196	25	5	30	28	251
НОФК-6.3-65	0.63 (6.3)	65	160	130	110	264	178	13	3	14	4	7
НОФК-6.3-80		80	185	150	128	280	203	15	3	18	4	10
НОФК-6.3-100		100	205	170	148	308	223	15	3	18	4	12
НОФК-6.3-125		125	235	200	178	332	253	17	3	18	8	17
НОФК-6.3-150		150	260	225	202	348	278	17	3	18	8	21
НОФК-6.3-200		200	315	280	258	422	333	19	3	18	8	32
НОФК-6.3-250		250	370	335	312	414	388	20	3	18	12	38
НОФК-6.3-300		300	435	395	365	444	453	20	4	22	12	49
НОФК-6.3-350		350	485	445	415	444	504	22	4	22	12	61
НОФК-6.3-400		400	535	495	465	470	554	24	4	22	16	71
НОФК-6.3-500		500	640	600	570	504	659	25	4	22	16	102
НОФК-6.3-600		600	755	705	670	540	774	25	5	26	20	131
НОФК-6.3-700		700	860	810	775	536	879	27	5	26	24	170
НОФК-6.3-800		800	975	920	880	570	994	27	5	30	24	218
НОФК-6.3-900		900	1075	1020	980	564	1094	29	5	30	24	261
НОФК-6.3-1000		1000	1175	1120	1080	588	1196	31	5	30	28	326
НОФК-10-65	1.0 (10)	65	180	145	122	278	198	17	3	18	4	10
НОФК-10-80		80	195	160	133	284	213	17	3	18	4	12
НОФК-10-100		100	215	180	158	318	233	19	3	18	8	16
НОФК-10-125		125	245	210	184	340	263	21	3	18	8	21
НОФК-10-150		150	280	240	212	330	298	21	3	22	8	23
НОФК-10-200		200	335	295	268	400	353	21	3	22	8	34
НОФК-10-250		250	390	350	320	426	408	23	3	22	12	47
НОФК-10-300		300	440	400	370	454	458	24	4	22	12	57
НОФК-10-350		350	500	460	430	458	519	24	4	22	16	75
НОФК-10-400		400	565	515	482	494	584	26	4	26	16	94
НОФК-10-500		500	670	620	585	538	689	28	4	26	20	137
НОФК-10-600		600	780	725	685	572	799	31	5	30	20	181
НОФК-10-700		700	895	840	800	558	914	34	5	30	24	234
НОФК-10-800		800	1010	950	905	596	1029	37	5	33	24	307
НОФК-10-900		900	1110	1050	1005	594	1129	40	5	33	28	373
НОФК-10-1000		1000	1220	1160	1110	616	1241	43		33	28	474

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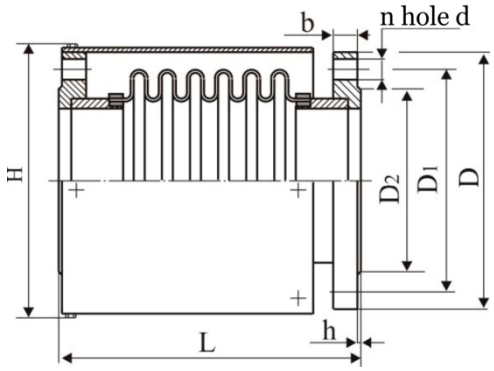

НОФК type

НОФК type unbalanced axial expansion joints with flanges welded onto branch pipes, with a fixed casing. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

Table 7 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm								n	Weight, kg
			D	D_1	D_2	L	H	b	h	d		
НОФК-16-65	1.6 (16)	65	180	145	122	298	198	21	3	18	4	12
НОФК-16-80		80	195	160	133	306	213	21	3	18	4	14
НОФК-16-100		100	215	180	158	312	233	23	3	18	8	16
НОФК-16-125		125	245	210	184	328	263	25	3	18	8	21
НОФК-16-150		150	280	240	212	344	298	25	3	22	8	27
НОФК-16-200		200	335	295	268	492	353	27	3	22	12	42
НОФК-16-250		250	405	355	320	462	423	28	3	26	12	60
НОФК-16-300		300	460	410	370	474	478	28	4	26	12	74
НОФК-16-350		350	520	470	430	484	539	30	4	26	16	97
НОФК-16-400		400	580	525	482	530	599	34	4	30	16	127
НОФВ-16-500		500	710	650	585	580	729	44	4	33	20	217
НОФК-16-600		600	840	770	685	628	859	45	5	39	20	297
НОФК-16-700		700	910	840	800	604	929	47	5	39	24	320
НОФК-16-800		800	1020	950	905	648	1039	49	5	39	24	412
НОФК-16-900		900	1120	1050	1005	646	1139	54	5	39	28	501
НОФК-16-1000		1000	1255	1170	1110	666	1276	58	5	45	28	655
НОФК-25-65	2.5 (25)	65	180	145	122	282	198	21	3	18	8	11
НОФК-25-80		80	195	160	133	290	213	23	3	18	8	14
НОФК-25-100		100	230	190	158	322	248	25	3	22	8	20
НОФК-25-125		125	270	220	184	338	288	27	3	26	8	27
НОФК-25-150		150	300	250	212	354	318	27	3	26	8	33
НОФК-25-200		200	360	310	278	436	378	29	3	26	12	51
НОФК-25-250		250	425	370	335	466	443	31	3	30	12	70
НОФК-25-300		300	485	430	390	488	503	32	4	30	16	92
НОФК-25-350		350	550	490	450	500	569	38	4	33	16	130
НОФК-25-400		400	610	550	505	556	629	40	4	33	16	170
НОФК-25-500		500	730	660	615	602	749	48	4	39	20	254
НОФК-25-600		600	840	770	720	648	859	49	5	39	20	338
НОФК-25-700		700	960	875	820	636	979	55	5	45	24	438
НОФК-25-800		800	1075	990	930	692	1094	63	5	45	24	610

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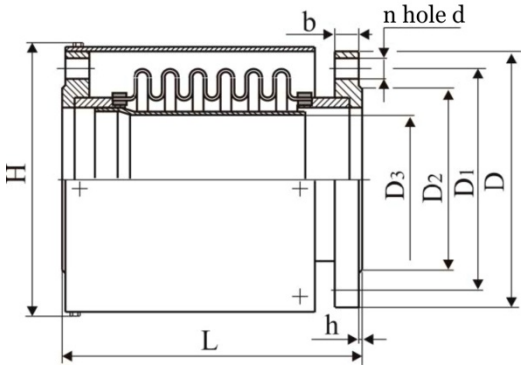
Axial expansion joints, НОФМ type



НОФМ type

НОФМ type unbalanced axial expansion joints with flanges welded onto branch pipes, with a fixed casing and an internal guide branch pipe. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 8**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm								n	Weight, kg
			D	D_1	D_2	L	H	b	h	d		
НОФМ-2.5-65	0.25 (2.5)	65	160	130	110	258	178	11	3	14	4	7
НОФМ-2.5-80		80	185	150	128	266	203	11	3	18	4	8
НОФМ-2.5-100		100	205	170	148	286	223	11	3	18	4	10
НОФМ-2.5-125		125	235	200	178	302	253	13	3	18	8	13
НОФМ-2.5-150		150	260	225	202	314	278	13	3	18	8	17
НОФМ-2.5-200		200	315	280	258	392	333	15	3	18	8	28
НОФМ-2.5-250		250	370	335	312	416	388	18	3	18	12	41
НОФМ-2.5-300		300	435	395	365	440	453	18	4	22	12	52
НОФМ-2.5-350		350	485	445	415	446	504	18	4	22	12	62
НОФМ-2.5-400		400	535	495	565	456	554	18	4	22	16	68
НОФМ-2.5-500		500	640	600	570	484	659	20	4	22	16	93
НОФМ-2.5-600		600	755	705	670	518	774	20	5	26	20	118
НОФМ-2.5-700		700	860	810	775	506	879	21	5	26	24	144
НОФМ-2.5-800		800	975	920	880	540	994	21	5	30	24	185
НОФМ-2.5-900		900	1075	1020	980	536	1094	23	5	30	24	225
НОФМ-2.5-1000		1000	1175	1120	1080	554	1196	25	5	30	28	271
НОФМ-6.3-65	0.63 (6.3)	65	160	130	110	264	178	13	3	14	4	8
НОФМ-6.3-80		80	185	150	128	280	203	15	3	18	4	10
НОФМ-6.3-100		100	205	170	148	308	223	15	3	18	4	13
НОФМ-6.3-125		125	235	200	178	332	253	17	3	18	8	18
НОФМ-6.3-150		150	260	225	202	348	278	17	3	18	8	23
НОФМ-6.3-200		200	315	280	258	422	333	19	3	18	8	36
НОФМ-6.3-250		250	370	335	312	414	388	20	3	18	12	42
НОФМ-6.3-300		300	435	395	365	444	453	20	4	22	12	55
НОФМ-6.3-350		350	485	445	415	444	504	22	4	22	12	67
НОФМ-6.3-400		400	535	495	465	470	554	24	4	22	16	79
НОФМ-6.3-500		500	640	600	570	504	659	25	4	22	16	112
НОФМ-6.3-600		600	755	705	670	540	774	25	5	26	20	144
НОФМ-6.3-700		700	860	810	775	536	879	27	5	26	24	185
НОФМ-6.3-800		800	975	920	880	570	994	27	5	30	24	236
НОФМ-6.3-900		900	1075	1020	980	564	1094	29	5	30	24	280
НОФМ-6.3-1000		1000	1175	1120	1080	588	1196	31	5	30	28	347
НОФМ-10-65	1.0 (10)	65	180	145	122	278	198	17	3	18	4	11
НОФМ-10-80		80	195	160	133	284	213	17	3	18	4	12
НОФМ-10-100		100	215	180	158	318	233	19	3	18	8	16
НОФМ-10-125		125	245	210	184	340	263	21	3	18	8	22
НОФМ-10-150		150	280	240	212	330	298	21	3	22	8	25
НОФМ-10-200		200	335	295	268	400	353	21	3	22	8	37
НОФМ-10-250		250	390	350	320	426	408	23	3	22	12	52
НОФМ-10-300		300	440	400	370	454	458	24	4	22	12	63
НОФМ-10-350		350	500	460	430	458	519	24	4	22	16	81
НОФМ-10-400		400	565	515	482	494	584	26	4	26	16	102
НОФМ-10-500		500	670	620	585	538	689	28	4	26	20	148
НОФМ-10-600		600	780	725	685	572	799	31	5	30	20	195
НОФМ-10-700		700	895	840	800	558	914	34	5	30	24	249
НОФМ-10-800		800	1010	950	905	596	1029	37	5	33	24	325
НОФМ-10-900		900	1110	1050	1005	594	1129	40	5	33	28	393
НОФМ-10-1000		1000	1220	1160	1110	616	1241	43	5	33	28	497

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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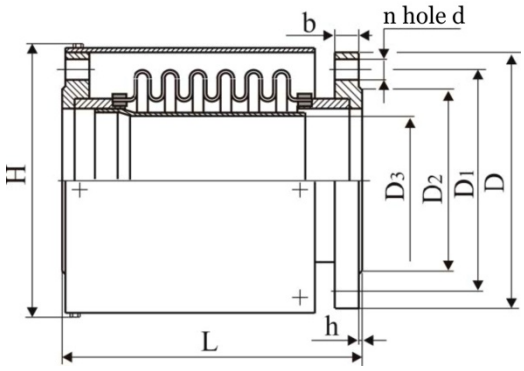


НОФМ type

НОФМ type unbalanced axial expansion joints with flanges welded onto branch pipes, with a fixed casing and an internal guide branch pipe. They can be installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

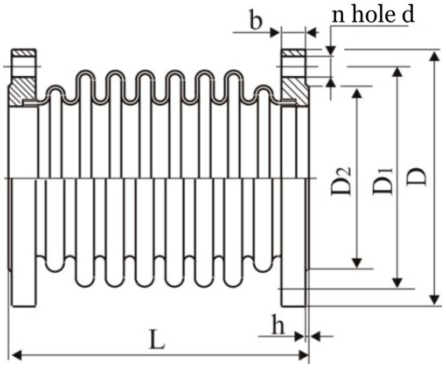
Table 8 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm								n	Weight, kg
			D	D_1	D_2	L	H	b	h	d		
НОФМ-16-65	1.6 (16)	65	180	145	122	298	198	21	3	18	4	13
НОФМ-16-80		80	195	160	133	306	213	21	3	18	4	15
НОФМ-16-10		100	215	180	158	312	233	23	3	18	8	17
НОФМ-16-125		125	245	210	184	328	263	25	3	18	8	23
НОФМ-16-150		150	280	240	212	344	298	25	3	22	8	29
НОФМ-16-200		200	335	295	268	492	353	27	3	22	12	45
НОФМ-16-250		250	405	355	320	462	423	28	3	26	12	65
НОФМ-16-300		300	460	410	370	474	478	28	4	26	12	79
НОФМ-16-350		350	520	470	430	484	539	30	4	26	16	104
НОФМ-16-400		400	580	525	482	530	599	34	4	30	16	136
НОФМ-16-500		500	710	650	585	580	729	44	4	33	20	228
НОФМ-16-600		600	840	770	685	628	859	45	5	39	20	312
НОФМ-16-700		700	910	840	800	604	929	47	5	39	24	336
НОФМ-16-800		800	1020	950	905	648	1039	49	5	39	24	432
НОФМ-16-900		900	1120	1050	1005	646	1139	54	5	39	28	523
НОФМ-16-1000		1000	1255	1170	1110	666	1276	58	5	45	28	679
НОФМ-25-65	2.5 (25)	65	180	145	122	282	198	21	3	18	8	12
НОФМ-25-80		80	195	160	133	290	213	23	3	18	8	14
НОФМ-25-100		100	230	190	158	322	248	25	3	22	8	21
НОФМ-25-125		125	270	220	184	338	288	27	3	26	8	28
НОФМ-25-150		150	300	250	212	354	318	27	3	26	8	35
НОФМ-25-200		200	360	310	278	436	378	29	3	26	12	54
НОФМ-25-250		250	425	370	335	466	443	31	3	30	12	74
НОФМ-25-300		300	485	430	390	488	503	32	4	30	16	97
НОФМ-25-350		350	550	490	450	500	569	38	4	33	16	136
НОФМ-25-400		400	610	550	505	556	629	40	4	33	16	179
НОФМ-25-500		500	730	660	615	602	749	48	4	39	20	266
НОФМ-25-600		600	840	770	720	648	859	49	5	39	20	354
НОФМ-25-700		700	960	875	820	636	979	55	5	45	24	455
НОФМ-25-800		800	1075	990	930	692	1094	63	5	45	24	631

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Axial expansion joints, HOBH type



HOBH type

HOBH type unbalanced axial expansion joints with flanges. They are installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

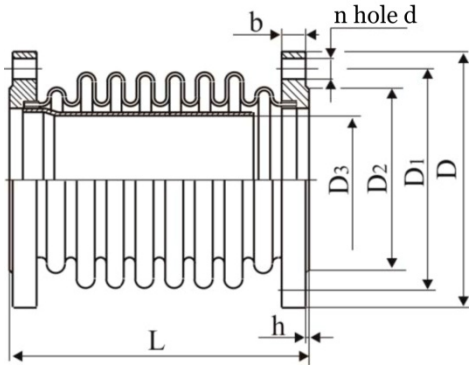
*Table 9**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm							n	Weight, kg
			D	D_1	D_2	L	b	h	d		
HOBH-2.5-65	0.25 (2.5)	65	160	130	110	140	11	3	14	4	4
HOBH-2.5-80		80	185	150	128	148	11	3	18	4	5
HOBH-2.5-100		100	205	170	148	158	11	3	18	4	5
HOBH-2.5-125		125	235	200	178	176	13	3	18	8	7
HOBH-2.5-150		150	260	225	202	188	13	3	18	8	9
HOBH-2.5-200		200	315	280	258	214	15	3	18	8	15
HOBH-2.5-250		250	370	335	312	230	18	3	18	12	22
HOBH-2.5-300		300	435	395	365	250	18	4	22	12	29
HOBH-2.5-350		350	485	445	415	258	18	4	22	12	36
HOBH-2.5-400		400	535	495	565	266	18	4	22	16	33
HOBH-2.5-500		500	640	600	570	274	20	4	22	16	43
HOBH-2.5-600		600	755	705	670	308	20	5	26	20	57
HOBH-2.5-700		700	860	810	775	286	21	5	26	24	77
HOBH-2.5-800		800	975	920	880	322	21	5	30	24	101
HOBH-2.5-900		900	1075	1020	980	308	23	5	30	24	117
HOBH-2.5-1000		1000	1175	1120	1080	328	25	5	30	28	142
HOBH-6.3-65	0.63 (6.3)	65	160	130	110	140	13	3	14	4	4
HOBH-6.3-80		80	185	150	128	158	15	3	18	4	6
HOBH-6.3-100		100	205	170	148	168	15	3	18	4	6
HOBH-6.3-125		125	235	200	178	178	17	3	18	8	10
HOBH-6.3-150		150	260	225	202	192	17	3	18	8	12
HOBH-6.3-200		200	315	280	258	216	19	3	18	8	17
HOBH-6.3-250		250	370	335	312	226	20	3	18	12	21
HOBH-6.3-300		300	435	395	365	254	20	4	22	12	31
HOBH-6.3-350		350	485	445	415	254	22	4	22	12	37
HOBH-6.3-400		400	535	495	465	288	24	4	22	16	45
HOBH-6.3-500		500	640	600	570	302	25	4	22	16	64
HOBH-6.3-600		600	755	705	670	338	25	5	26	20	84
HOBH-6.3-700		700	860	810	775	316	27	5	26	24	109
HOBH-6.3-800		800	975	920	880	342	27	5	30	24	134
HOBH-6.3-900		900	1075	1020	980	328	29	5	30	24	155
HOBH-6.3-1000		1000	1175	1120	1080	346	31	5	30	28	183
HOBH-10-65	1.0 (10)	65	180	145	122	146	17	3	18	4	7
HOBH-10-80		80	195	160	133	154	17	3	18	4	8
HOBH-10-100		100	215	180	158	174	19	3	18	8	10
HOBH-10-125		125	245	210	184	198	21	3	18	8	14
HOBH-10-150		150	280	240	212	194	21	3	22	8	16
HOBH-10-200		200	335	295	268	214	21	3	22	8	21
HOBH-10-250		250	390	350	320	240	23	3	22	12	30
HOBH-10-300		300	440	400	370	262	24	4	22	12	36
HOBH-10-350		350	500	460	430	268	24	4	22	16	47
HOBH-10-400		400	565	515	482	304	26	4	26	16	62
HOBH-10-500		500	670	620	585	308	28	4	26	20	79
HOBH-10-600		600	780	725	685	350	31	5	30	20	110
HOBH-10-700		700	895	840	800	330	34	5	30	24	156
HOBH-10-800		800	1010	950	905	370	37	5	33	24	209
HOBH-10-900		900	1110	1050	1005	358	40	5	33	28	242
HOBH-10-1000		1000	1220	1160	1110	378	43	5	33	28	302

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Axial expansion joints, НОВГ type



НОВГ type

НОВГ type unbalanced axial expansion joints with flanges. They are installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 10**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm							n	Weight, kg
			D	D_1	D_2	L	b	h	d		
НОВГ-2.5-65	0.25 (2.5)	65	160	130	110	140	11	3	14	4	5
НОВГ-2.5-80		80	185	150	128	148	11	3	18	4	6
НОВГ-2.5-100		100	205	170	148	158	11	3	18	4	6
НОВГ-2.5-125		125	235	200	178	176	13	3	18	8	9
НОВГ-2.5-150		150	260	225	202	188	13	3	18	8	11
НОВГ-2.5-200		200	315	280	258	214	15	3	18	8	18
НОВГ-2.5-250		250	370	335	312	230	18	3	18	12	26
НОВГ-2.5-300		300	435	395	365	250	18	4	22	12	35
НОВГ-2.5-350		350	485	445	415	258	18	4	22	12	43
НОВГ-2.5-400		400	535	495	565	266	18	4	22	16	41
НОВГ-2.5-500		500	640	600	570	274	20	4	22	16	53
НОВГ-2.5-600		600	755	705	670	308	20	5	26	20	70
НОВГ-2.5-700		700	860	810	775	286	21	5	26	24	91
НОВГ-2.5-800		800	975	920	880	322	21	5	30	24	118
НОВГ-2.5-900		900	1075	1020	980	308	23	5	30	24	135
НОВГ-2.5-1000		1000	1175	1120	1080	328	25	5	30	28	162
НОВГ-6.3-65	0.63 (6.3)	65	160	130	110	140	13	3	14	4	5
НОВГ-6.3-80		80	185	150	128	158	15	3	18	4	7
НОВГ-6.3-100		100	205	170	148	168	15	3	18	4	7
НОВГ-6.3-125		125	235	200	178	178	17	3	18	8	12
НОВГ-6.3-150		150	260	225	202	192	17	3	18	8	14
НОВГ-6.3-200		200	315	280	258	216	19	3	18	8	20
НОВГ-6.3-250		250	370	335	312	226	20	3	18	12	25
НОВГ-6.3-300		300	435	395	365	254	20	4	22	12	37
НОВГ-6.3-350		350	485	445	415	254	22	4	22	12	44
НОВГ-6.3-400		400	535	495	465	288	24	4	22	16	53
НОВГ-6.3-500		500	640	600	570	302	25	4	22	16	74
НОВГ-6.3-600		600	755	705	670	338	25	5	26	20	97
НОВГ-6.3-700		700	860	810	775	316	27	5	26	24	124
НОВГ-6.3-800		800	975	920	880	342	27	5	30	24	152
НОВГ-6.3-900		900	1075	1020	980	328	29	5	30	24	174
НОВГ-6.3-1000		1000	1175	1120	1080	346	31	5	30	28	204
НОВГ-10-65	1.0 (10)	65	180	145	122	146	17	3	18	4	8
НОВГ-10-80		80	195	160	133	154	17	3	18	4	9
НОВГ-10-100		100	215	180	158	174	19	3	18	8	11
НОВГ-10-125		125	245	210	184	198	21	3	18	8	16
НОВГ-10-150		150	280	240	212	194	21	3	22	8	19
НОВГ-10-200		200	335	295	268	214	21	3	22	8	24
НОВГ-10-250		250	390	350	320	240	23	3	22	12	35
НОВГ-10-300		300	440	400	370	262	24	4	22	12	42
НОВГ-10-350		350	500	460	430	268	24	4	22	16	54
НОВГ-10-400		400	565	515	482	304	26	4	26	16	71
НОВГ-10-500		500	670	620	585	308	28	4	26	20	90
НОВГ-10-600		600	780	725	685	350	31	5	30	20	124
НОВГ-10-700		700	895	840	800	330	34	5	30	24	171
НОВГ-10-800		800	1010	950	905	370	37	5	33	24	228
НОВГ-10-900		900	1110	1050	1005	358	40	5	33	28	262
НОВГ-10-1000		1000	1220	1160	1110	378	43	5	33	28	325

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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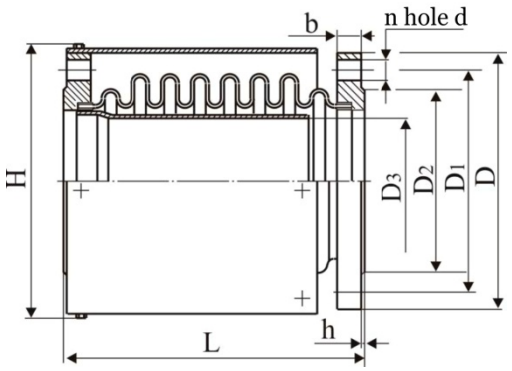
Axial expansion joints, HOBM type



HOBM type

HOBM type unbalanced axial expansion joints with flanges, an internal guide branch pipe and an outer casing. They are installed directly in pipelines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 11**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm							n	Weight, kg
			D	D_1	D_2	L	b	h	d		
HOBH-2.5-65	0.25 (2.5)	65	160	130	110	140	11	3	14	4	4
HOBH-2.5-80		80	185	150	128	148	11	3	18	4	5
HOBH-2.5-100		100	205	170	148	158	11	3	18	4	5
HOBH-2.5-125		125	235	200	178	176	13	3	18	8	7
HOBH-2.5-150		150	260	225	202	188	13	3	18	8	9
HOBH-2.5-200		200	315	280	258	214	15	3	18	8	15
HOBH-2.5-250		250	370	335	312	230	18	3	18	12	22
HOBH-2.5-300		300	435	395	365	250	18	4	22	12	29
HOBH-2.5-350		350	485	445	415	258	18	4	22	12	36
HOBH-2.5-400		400	535	495	565	266	18	4	22	16	33
HOBH-2.5-500		500	640	600	570	274	20	4	22	16	43
HOBH-2.5-600		600	755	705	670	308	20	5	26	20	57
HOBH-2.5-700		700	860	810	775	286	21	5	26	24	77
HOBH-2.5-800		800	975	920	880	322	21	5	30	24	101
HOBH-2.5-900		900	1075	1020	980	308	23	5	30	24	117
HOBH-2.5-1000		1000	1175	1120	1080	328	25	5	30	28	142
HOBH-6.3-65	0.63 (6.3)	65	160	130	110	140	13	3	14	4	4
HOBH-6.3-80		80	185	150	128	158	15	3	18	4	6
HOBH-6.3-100		100	205	170	148	168	15	3	18	4	6
HOBH-6.3-125		125	235	200	178	178	17	3	18	8	10
HOBH-6.3-150		150	260	225	202	192	17	3	18	8	12
HOBH-6.3-200		200	315	280	258	216	19	3	18	8	17
HOBH-6.3-250		250	370	335	312	226	20	3	18	12	21
HOBH-6.3-300		300	435	395	365	254	20	4	22	12	31
HOBH-6.3-350		350	485	445	415	254	22	4	22	12	37
HOBH-6.3-400		400	535	495	465	288	24	4	22	16	45
HOBH-6.3-500		500	640	600	570	302	25	4	22	16	64
HOBH-6.3-600		600	755	705	670	338	25	5	26	20	84
HOBH-6.3-700		700	860	810	775	316	27	5	26	24	109
HOBH-6.3-800		800	975	920	880	342	27	5	30	24	134
HOBH-6.3-900		900	1075	1020	980	328	29	5	30	24	155
HOBH-6.3-1000		1000	1175	1120	1080	346	31	5	30	28	183
HOBH-10-65	1.0 (10)	65	180	145	122	146	17	3	18	4	7
HOBH-10-80		80	195	160	133	154	17	3	18	4	8
HOBH-10-100		100	215	180	158	174	19	3	18	8	10
HOBH-10-125		125	245	210	184	198	21	3	18	8	14
HOBH-10-150		150	280	240	212	194	21	3	22	8	16
HOBH-10-200		200	335	295	268	214	21	3	22	8	21
HOBH-10-250		250	390	350	320	240	23	3	22	12	30
HOBH-10-300		300	440	400	370	262	24	4	22	12	36
HOBH-10-350		350	500	460	430	268	24	4	22	16	47
HOBH-10-400		400	565	515	482	304	26	4	26	16	62
HOBH-10-500		500	670	620	585	308	28	4	26	20	79
HOBH-10-600		600	780	725	685	350	31	5	30	20	110
HOBH-10-700		700	895	840	800	330	34	5	30	24	156
HOBH-10-800		800	1010	950	905	370	37	5	33	24	209
HOBH-10-900		900	1110	1050	1005	358	40	5	33	28	242
HOBH-10-1000		1000	1220	1160	1110	378	43	5	33	28	302

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;

** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Notes

Notes:

1. The data sheet for ordering metallic expansion joints is available at the end of the catalogue.
2. With any questions associated with selection, peculiarities of pipeline system design using expansion joints, as well as installation, please call, in St. Petersburg: +7 (812) 346-88-78, +7 (812) 346-88-98; fax: +7 (812) 784-97-30 or e-mail to: mail@kompensator.ru.


Инв.N7320-3/1
1.14

КОМПЕНСАТОР

General purpose industrial grade expansion joints of various types:

- Angular
- Cardan
- Lateral
- Lateral/angular
- Balanced

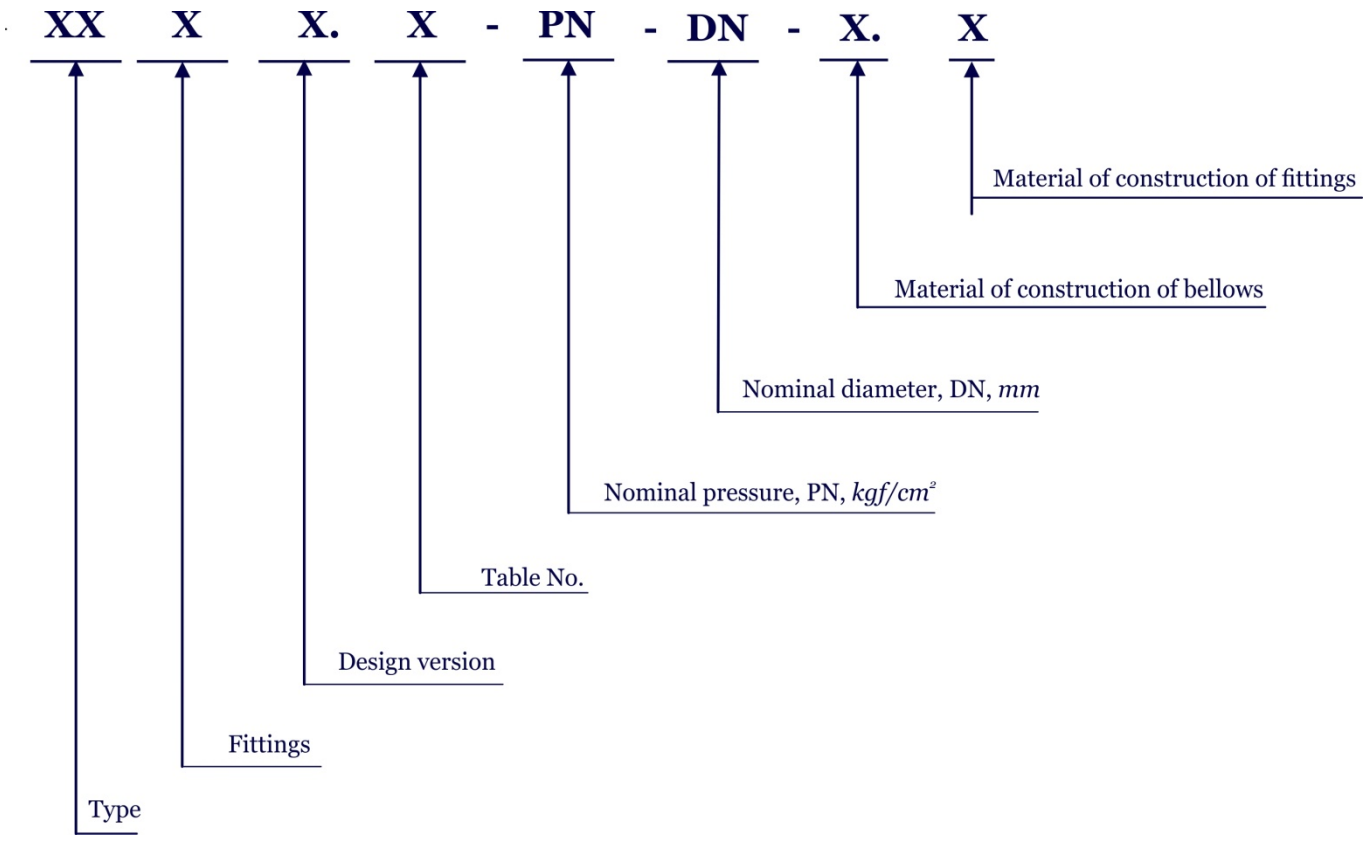
Custom-developed and custom-made

Reference designation of general purpose industrial grade angular expansion joints as per the ИЯНШ.300260.046ТУ specification

The reference designation of expansion joints consists of symbols and values of the main parameters:

Reference designation of expansion joint types and versions					
Type	**Symbol**	**Fittings**	**Symbol**	**Design version**	**Symbol**
Angular, single-plane	**ПО**	Weld branch pipe (on both sides)	**П**	Basic (bellows + 2 branch pipes or flanges)	**Н**
Angular, space	**ППП**	Flange (on both sides)	**Ф**	With a guide branch pipe	**Г**
Lateral, space	**СП**	Flange on one side, weld branch pipe on the other side	**Д**	Enclosed	**К**
Lateral/angular					
Lateral, single-plane	**СО**	Weld branch pipe on one side, weld branch on the other side	**ОП**	With a guide branch pipe and enclosed	**М**
Balanced, universal	**РУ**				

Expansion joint reference designation diagram



Depending on the operating conditions, the material of construction of expansion joints shall be specified at order placement in accordance with the tablesbelow:

Bellows		
Design version	**Material grade**	**Permissible operating temperature K (°C)**
1	– Exterior layers (on the outside) and interior layers (on the side of the handled medium), steel grade 05Х18Н10Т (08Х18Н10Т or 12Х18Н10Т) as per GOST 5632; – Intermediate layers, steel grade 08кп (08пс or 08ю) as per GOST 9045.	253 to 423 (–20 to 150)
2	– All layers, steel grade 05Х18Н10Т (08Х18Н10Т or 12Х18Н10Т) as per GOST 5632;	20 to 773 (–253 to 500)
3	– All layers, steel grade 10Х17Н13М2Т as per GOST 5632	20 to 773 (–253 to 500)

Fittings		
Design version	**Material grade**	**Permissible operating temperature K (°C)**
1	Steel grade 20 as per GOST 1050	253 to 698 (–20 to 425)
2	Steel grade 17Г1С as per GOST 19281	233 to 748 (–40 to 475)
3	Steel grade 09Г2С , 09Г2 as per GOST 19281	203 to 748 (–70 to 475)
4	Steel grade 08Х18Н10Т, 12Х18Н10Т as per GOST 5632	20 to 823 (–253 to 550)
5	Steel grade 10Х17Н13М2Т as per GOST 5632	20 to 823 (–253 to 550)
6	Steel grade 15Х5М as per GOST 20072	223 to 873 (–50 to 600)

Example of ordering information:

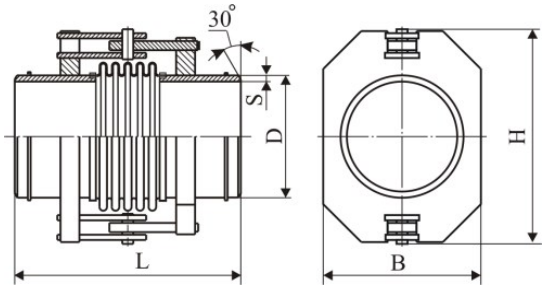
Example of ordering information and information to be included in other documentation on an angular space type expansion joint for welded attachment to a pipeline; nominal pressure, PN, 1.6 MPa (16 kgf/cm^2); nominal diameter, DN, 500 mm; design version; materialof bellows construction (all layers, steel grade 05Х18Н10Т); material of construction of fittings (steel grade 20):
“**Expansion joint ППППН.Т7-16-500-2.1 as per ИЯНШ.300260.046 ТУ**”.

Basic parameters and characteristics of handled media of the products as per ИЯНШ.300260.046ТУ

Handled media	Handled medium temperature, max., K (°C)	Handled medium velocity, m/s
Fresh delivery water, potable water, crude oil, oil products	723 (450)	8 maximum
Steam, natural gas, gaseous media not causing corrosion to expansion joint material	773 (500)	80 maximum
Note: **1. The permissible content of chloride ions in fresh water, the handled medium for expansion joints to be installed in heating networks, shall not exceed 250 mg/l.** **2. The expansion joints may be used for other handled media not capable of causing sulphide stress corrosion cracking.**		

Angular, single-plane expansion joints

Expansion joints, ПОПН type



ПОПН type

ПОПН type axial, angular single-plane expansion joints with welded neck branch pipes. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

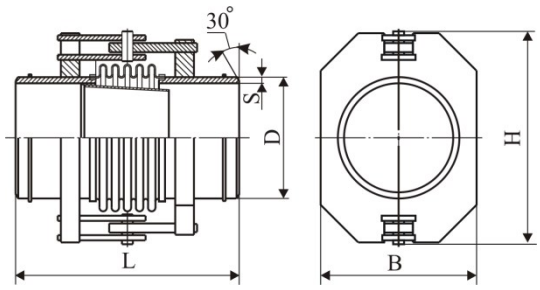
*Table 16**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm					Angular travel amplitude, ± γ, degr. at an operation time		Stiffness at angular movement, C_γ N⋅m/degr.	Weight, kg
			D	s	L	H	B	Mode 1 N = 5000 cycles	Mode 2 N = 200 cycles		
ПОПН.Т5-16-65	1.6 (16)	65	76	3.5	460	250	140	8	15	4	17
ПОПН.Т5-16-80		80	89	3.5	470	270	150	8	15	5	19
ПОПН.Т5-16-100		100	108	4	524	290	180	8	15	6	25
ПОПН.Т5-16-125		125	133	4	536	320	200	8	15	12	33
ПОПН.Т5-16-150		150	159	4.5	536	350	240	8	13	19	42
ПОПН.Т5-16-200		200	219	6	560	430	300	8	12	44	70
ПОПН.Т5-16-250		250	273	7	598	530	370	8	11	61	118
ПОПН.Т5-16-300		300	325	7	628	620	430	8	10	100	176
ПОПН.Т5-16-350		350	377	7	642	700	490	7	10	197	230
ПОПН.Т5-16-400		400	426	8	808	740	550	5	9	304	400
ПОПН.Т5-16-500		500	530	8	836	863	650	5	8	426	520
ПОПН.Т5-16-600		600	630	8	892	997	770	5	8	816	780
ПОПН.Т5-16-700		700	720	8	926	1100	855	5	8	1155	1002
ПОПН.Т5-16-800		800	820	9	1024	1230	970	5	8	1394	1250
ПОПН.Т5-16-900		900	920	10	1164	1370	1070	3	7	2377	1680
ПОПН.Т5-16-1000		1000	1020	10	1218	1470	1170	3	6	2603	1985
ПОПН.Т5-25-65	2.5 (25)	65	76	3.5	460	250	140	8	15	6	19
ПОПН.Т5-25-80		80	89	3.5	470	270	150	8	15	7	22
ПОПН.Т5-25-100		100	108	4	524	290	180	8	15	9	28
ПОПН.Т5-25-125		125	133	4	536	320	200	8	15	16	35
ПОПН.Т5-25-150		150	159	4.5	536	350	240	8	13	26	45
ПОПН.Т5-25-200		200	219	6	560	430	300	8	12	55	73
ПОПН.Т5-25-250		250	273	7	598	530	370	8	11	77	121
ПОПН.Т5-25-300		300	325	7	628	620	430	8	10	120	181
ПОПН.Т5-25-350		350	377	7	642	700	490	7	10	229	233
ПОПН.Т5-25-400		400	426	8	814	785	550	5	9	347	370
ПОПН.Т5-25-500		500	530	8	848	905	650	5	8	533	495
ПОПН.Т5-25-600		600	630	8	904	1035	770	5	8	979	660
ПОПН.Т5-25-700		700	720	8	932	1185	855	5	8	1251	910
ПОПН.Т5-25-800		800	820	9	1036	1310	970	5	8	1626	1180
ПОПН.Т5-25-900		900	920	10	1214	1460	1100	3	7	2717	1804
ПОПН.Т5-25-1000		1000	1020	10	1328	1550	1200	3	6	2975	2265

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Expansion joints, ПОПГ type



ПОПГ type

ПОПГ type axial, angular single-plane expansion joints with an internal guide branch pipe and welded neck branch pipes. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 80 m/s.

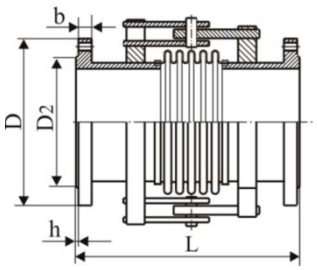
*Table 17**

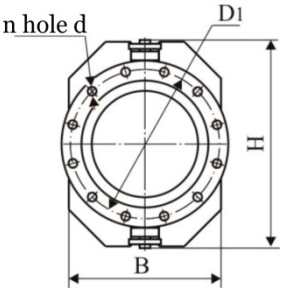
Serial product range**

Reference designation	Nominal pressure, P N, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm					Angular travel amplitude, ± γ, degr. N = 5000 cycles	Stiffness at angular movement, C_γ N⋅m/degr.	Weight, kg
			D	s	L	H	B			
ПОПГ.Т6-10-350	1.0 (10)	350	377	9	700	663	475	3	130 (13.0)	186
ПОПГ.Т6-10-500		500	530	8	750	848	630	3	266 (26.6)	368
ПОПГ.Т6-10-600		600	630	8	954	950	770	3	407 (40.7)	573

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products designed and manufactured according to the customer's ToR).

Expansion joints, ПОФН type





ПОФН type

ПОФН type axial, angular single-plane expansion joints with flanges. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 19**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm									n	Angular travel amplitude, ± γ, degr. at an operation time		Stiffness at angular movement, C_γ, N·m/degr.	Weight, kg
			D	D_1	D_2	L	B	H	b	h	d		Mode 1 N = 5000 cycles	Mode 2 N = 200 cycles		
ПОФН.Т9-16-65	1.6 (16)	65	180	145	122	460	140	250	21	3	18	4	8	15	4	32
ПОФН.Т9-16-80		80	195	160	133	470	150	270	21	3	18	8	8	15	5	36
ПОФН.Т9-16-100		100	215	180	158	524	180	290	23	3	18	8	8	15	6	48
ПОФН.Т9-16-125		125	245	210	184	536	200	320	25	3	18	8	8	15	12	57
ПОФН.Т9-16-150		150	280	240	212	536	240	350	25	3	22	8	8	13	19	75
ПОФН.Т9-16-200		200	335	295	268	560	300	430	27	3	22	12	8	12	44	115
ПОФН.Т9-16-250		250	405	355	320	598	370	530	28	3	26	12	8	11	61	175
ПОФН.Т9-16-300		300	460	410	370	628	430	620	28	4	26	12	8	10	100	244
ПОФН.Т9-16-350		350	520	470	430	642	490	700	30	4	26	16	7	10	197	302
ПОФН.Т9-16-400		400	580	525	482	808	550	740	34	4	30	16	5	9	304	465
ПОФН.Т9-16-500		500	710	650	585	836	620	863	44	4	33	20	5	8	426	638
ПОФН.Т9-16-600		600	840	770	685	892	770	997	45	5	39	20	5	8	816	948
ПОФН.Т9-16-700		700	910	840	800	926	855	1100	47	5	39	24	5	8	1155	1175
ПОФН.Т9-16-800		800	1020	950	905	1024	970	1230	49	5	39	24	5	8	1394	1468
ПОФН.Т9-25-65	2.5 (25)	65	180	145	122	460	140	250	21	3	18	8	8	15	6	36
ПОФН.Т9-25-80		80	195	160	133	470	150	270	23	3	18	8	8	15	7	44
ПОФН.Т9-25-100		100	230	190	158	524	180	290	25	3	22	8	8	15	9	58
ПОФН.Т9-25-125		125	270	220	184	536	200	320	27	3	26	8	8	15	16	83
ПОФН.Т9-25-150		150	300	250	212	536	240	350	27	3	26	8	8	13	26	107
ПОФН.Т9-25-200		200	360	310	278	560	300	430	29	3	26	12	8	12	55	149
ПОФН.Т9-25-250		250	425	370	335	598	370	530	31	3	30	12	8	11	77	211
ПОФН.Т9-25-300		300	485	430	390	628	430	620	32	4	30	16	8	10	120	291
ПОФН.Т9-25-350		350	550	490	450	642	490	700	38	4	32	16	7	10	229	385
ПОФН.Т9-25-400		400	610	550	505	814	550	790	40	4	33	16	5	9	347	541
ПОФН.Т9-25-500		500	730	660	615	848	620	904	48	4	39	20	5	8	533	723
ПОФН.Т9-25-600		600	845	770	720	904	770	1030	49	5	39	20	5	8	979	1018
ПОФН.Т9-25-700		700	960	875	820	932	855	1132	55	5	45	24	5	8	1251	1343
ПОФН.Т9-25-800		800	1075	990	930	1036	970	1276	63	5	45	24	5	8	1626	1697

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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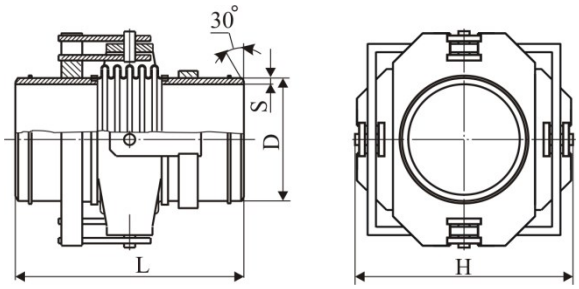
Cardan type expansion joints

Expansion joints, ППП type



ПППН type

ПППН type axial, angular double-plane (cardan) expansion joints with welded neck branch pipes. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 18**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Angular travel amplitude, ± γ, degr. at an operation time of 5000 cycles	Stiffness at angular movement, C_γ N·m/degr.	Weight, kg
			D	S	L	H			
ПППН.Т7-6.3-600	0.63 (6.3)	600	630	8	632	910	5	326	353
ПППН.Т7-10-600	1.0 (10)	600	630	8	640	940	5	408	408
ПППН.Т7-6.3-800	0.63 (6.3)	800	820	9	780	1150	5	581	665
ПППН.Т7-10-800	1.0(10)	800	820	9	824	1180	5	813	879

Table 18 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Angular travel amplitude, ± γ, degr. at an operation time		Stiffness at angular movement, C_γ N·m/degr.	Weight, kg
			D	S	L	H	Mode 1 N = 5000 cycles	Mode 2 N = 200 cycles		
ПППН.Т7-16-65	1.6 (16)	65	76	3.5	418	280	8	15	4	31
ПППН.Т7-16-80		80	89	3.5	446	290	8	15	5	34
ПППН.Т7-16-100		100	108	4	458	320	8	15	6	47
ПППН.Т7-16-125		125	133	4	526	350	8	15	12	57
ПППН.Т7-16-150		150	159	4.5	536	380	8	13	19	77
ПППН.Т7-16-200		200	219	6	546	460	8	12	44	123
ПППН.Т7-16-250		250	273	7	612	550	8	11	61	184
ПППН.Т7-16-300		300	325	7	660	630	8	10	100	265
ПППН.Т7-16-350		350	377	7	702	690	7	10	197	285
ПППН.Т7-16-400		400	426	8	808	740	5	9	304	432
ПППН.Т7-16-500		500	530	8	836	863	5	8	426	599
ПППН.Т7-16-600		600	630	8	892	997	5	8	816	840
ПППН.Т7-16-700		700	720	8	926	1100	5	8	1155	1118
ПППН.Т7-16-800		800	820	9	1024	1230	5	8	1394	1487
ПППН.Т7-16-900		900	920	10	1164	1370	3	7	2377	1812
ПППН.Т7-16-1000		1000	1020	10	1218	1470	3	6	2603	2210
ПППН.Т7-25-65	2.5 (25)	65	76	3.5	430	280	8	15	6	40
ПППН.Т7-25-80		80	89	3.5	458	290	8	15	7	50
ПППН.Т7-25-100		100	108	4	470	320	8	15	9	66
ПППН.Т7-25-125		125	133	4	536	360	8	15	16	92
ПППН.Т7-25-150		150	159	4.5	546	400	8	13	26	120
ПППН.Т7-25-200		200	219	6	578	480	8	12	55	170
ПППН.Т7-25-250		250	273	7	620	550	8	11	77	251
ПППН.Т7-25-300		300	325	7	670	630	8	10	120	280
ПППН.Т7-25-350		350	377	7	710	690	7	10	229	295
ПППН.Т7-25-400		400	426	8	814	790	5	9	347	571
ПППН.Т7-25-500		500	530	8	848	904	5	8	533	778
ПППН.Т7-25-600		600	630	8	904	1030	5	8	979	1023
ПППН.Т7-25-700		700	720	8	932	1132	5	8	1251	1327
ПППН.Т7-25-800		800	820	9	1036	1276	5	8	1626	1787
ПППН.Т7-25-900		900	920	10	1214	1460	3	7	2717	2170
ПППН.Т7-25-1000		1000	1020	10	1328	1550	3	6	2975	2573
ПППН.Т7-40-80	4.0 (40)	80	89	6	310	280	5	–	18	25
ПППН.Т7-40-200		200	219	8	460	480	5	–	88	118
ПППН.Т7-40-250		250	273	10	530	450	5	–	153	185
ПППН.Т7-40-300		300	325	10	620	610	5	–	320	278

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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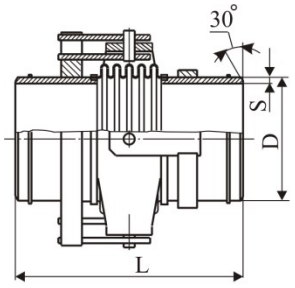
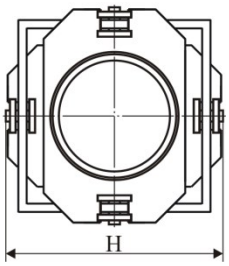
Expansion joints, ППП type





ПППН type

ПППН type axial, angular double-plane (cardan) expansion joints with welded neck branch pipes. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

Table 18 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Angular travel amplitude, ±γ, degr. at an operation time of 5000 cycles	Stiffness at angular movement, C_γ, N·m/degr.	Weight, kg
			D	S	L	H			
ПППН.Т8-6.3-800	0.63 (6.3)	800	820	9	644	1140	3	870	823

Table 18 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Angular movement amplitude, ±γ, degr. at an operation time N	Preset operation time, N, cycles	Angular stiffness, C_γ, kgf·m/degr.	Weight, kg
			D	s	L	H				
ПППН.Т8-6.3-350	0.63 (6.3)	350	377	9	556	684	7	1000	9.5	295
ПППН.Т8-16-200-2.6	1.6 (16)	200	219	10	553	422	8	5000	20	110
ПППН.Т8-16-250-2.6		250	273	10	522	502	8	5000	42	180
ПППН.Т8-16-300-2.1		300	325	10	543	582	8	5000	47	272
ПППН.Т8-25-200-2.1	2.5 (25)	200	219	10	570	446	8	5000	36	147

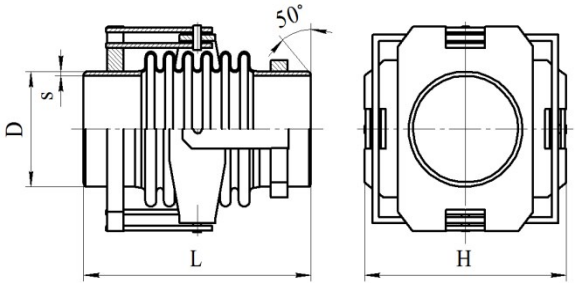
Table 18 continued*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Angular movement amplitude, ±γ, degr. at an operation time N	Preset operation time, N, cycles	Angular stiffness, C_γ, kgf·m/degr.	Weight, kg
			D	s	L	H				
ПППН-2.5-400-2.1	0.25 (2.5)	400	426	10	470	630	5	3000	11.2	130
ПППН-25-300-2.1	2.5 (25)	300	325	8	670	590	5	5000	19.6	280

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Expansion joints, ППП type



ППППН type

ППППН type axial, angular double-plane (cardan) expansion joints with welded neck branch pipes. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

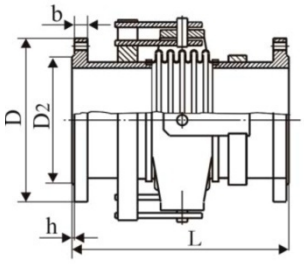
*Table 18a**

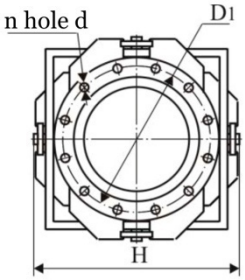
Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm				Angular movement amplitude, ±γ, degr. at an operation time N	Preset operation time, N, cycles	Angular stiffness, C_γ, kgf·m/degr.	Weight, kg
			D	s	L	H				
ППППН-25-125-2.4	2.5 (25)	125	130	4	250	260	4	3000	2.2	20.5
ППППН-25-150-2.4		150	160	4	220	306	3	3000	6.2	28.0

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Expansion joints, ППФН type





ППФН type

ППФН type double-plane (cardan) expansion joints with flanges. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 20**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm								n	Angular travel amplitude, ±γ, degr. at an operation time		Stiffness at angular movement, C_γN⊙m/degr. (kgf*m/degr.)	Weight, kg
			D	D_1	D_2	L	H	b	h	d		Mode 1 N = 5000 cycles	Mode 2 N = 200 cycles		
ППФН.Т10-16-65	1.6 (16)	65	180	145	122	418	280	21	3	18	4	8	15	4	38
ППФН.Т10-16-80		80	195	160	133	446	290	21	3	18	8	8	15	5	42
ППФН.Т10-16-100		100	215	180	158	458	320	23	3	18	8	8	15	6	57
ППФН.Т10-16-125		125	245	210	184	526	350	25	3	18	8	8	15	12	70
ППФН.Т10-16-150		150	280	240	212	536	380	25	3	22	8	8	13	19	93
ППФН.Т10-16-200		200	335	295	268	546	460	27	3	22	12	8	12	44	143
ППФН.Т10-16-250		250	405	355	320	612	550	28	3	26	12	8	11	61	213
ППФН.Т10-16-300		300	460	410	370	660	630	28	4	26	12	8	10	100	301
ППФН.Т10-16-350		350	520	470	430	702	690	30	4	26	16	7	10	197	384
ППФН.Т10-16-400		400	580	525	482	848	740	34	4	30	16	5	9	304	479
ППФН.Т10-16-500		500	710	650	585	886	863	44	4	33	20	5	8	426	715
ППФН.Т10-16-600		600	840	770	685	946	997	45	5	39	20	5	8	816	1014
ППФН.Т10-16-700		700	910	840	800	990	1100	47	5	39	24	5	8	1155	1294
ППФН.Т10-16-800		800	1020	950	905	1080	1230	49	5	39	24	5	8	1394	1719
ППФН.Т10-25-65	2.5 (25)	65	180	145	122	430	280	21	3	18	8	8	15	6	47
ППФН.Т10-25-80		80	195	160	133	458	290	23	3	18	8	8	15	7	58
ППФН.Т10-25-100		100	230	190	158	470	320	25	3	22	8	8	15	9	78
ППФН.Т10-25-125		125	270	220	184	536	360	27	3	26	8	8	15	16	109
ППФН.Т10-25-150		150	300	250	212	546	400	27	3	26	8	8	13	26	141
ППФН.Т10-25-200		200	360	310	278	578	480	29	3	26	12	8	12	55	197
ППФН.Т10-25-250		250	425	370	335	620	550	31	3	30	12	8	11	77	289
ППФН.Т10-25-300		300	485	430	390	670	630	32	4	30	16	8	10	120	414
ППФН.Т10-25-350		350	550	490	450	710	690	38	4	32	16	7	10	229	518
ППФН.Т10-25-400		400	610	550	505	858	777	40	4	33	16	5	9	347	663
ППФН.Т10-25-500		500	730	660	615	898	904	48	4	39	20	5	8	533	919
ППФН.Т10-25-600		600	845	770	720	964	1030	49	5	39	20	5	8	979	1217
ППФН.Т10-25-700		700	960	875	820	996	1132	55	5	45	24	5	8	1251	1592
ППФН.Т10-25-800		800	1075	990	930	1108	1276	63	5	45	24	5	8	1626	2155

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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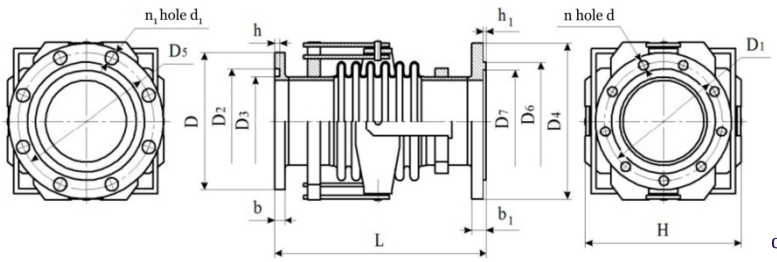
Expansion joints, ППФН type



ППФН type

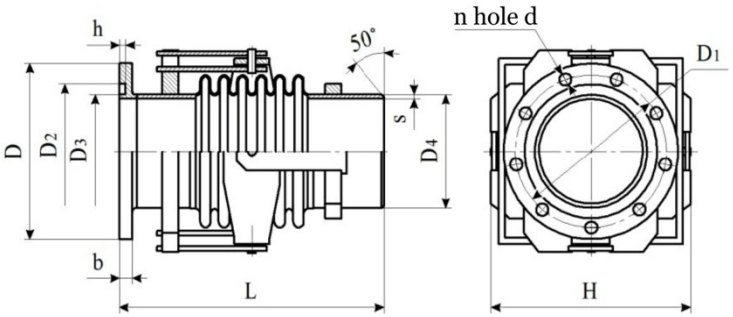
ППФН type double-plane (cardan) expansion joints with flanges. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing orrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 22**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	D1	D2	D3	D4	D5	D6	D7	L	H	b	b1	h	h1	d	d1	Number of holes, n	Number of holes, n1	Preset operation time, N, cycles	Angular movement amplitude, ±γ, degr. at an operation time N	Stiffness at angular movement, Cγ kgf·m/degr.	Weight, kg
ППФН-25-150-2.4	2.5 (25)	150	210	190	174	162	300	250.3	203	183	260	306	15	28	3.5	5	11	25	12	8	3000	3	6.2	39.5

Expansion joints, ППДН type



ППДН type

Axial, angular expansion joints

ППДН type double-plane (cardan) expansion joints with a flange and a branch pipe. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 23**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	D1	D2	D3	D4	L	H	b	h	s	d	Number of holes, n	Preset operation time, N, cycles	Angular movement amplitude, ±γ, degr. at an operation time N	Stiffness at angular movement, Cγ kgf·m/degr.	Weight, kg
ППДН-25-125-2.4	2.5 (25)	125	200	171	140	128	130	270	260	15	3.5	4	13	10	3000	4	2.2	23

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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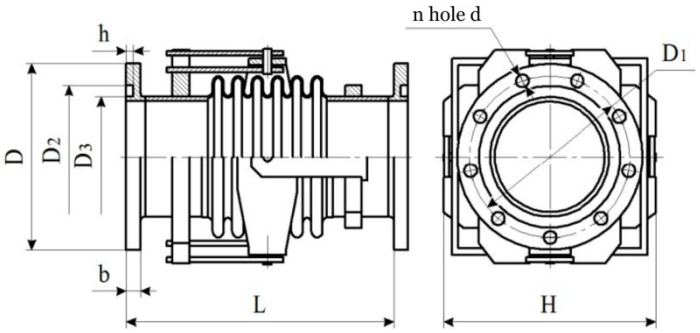
Expansion joints, ППФН type



ППФН type

ППФН type double-plane (cardan) expansion joints with flanges. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 21**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	D_1	D_2	D_3	L	H	b	h	d	Number of holes, n	Preset operation time, N, cycles	Angular movement amplitude, ±γ, degr. at an operation time N	Stiffness at angular movement, $C_γ$ kgf·m/degr.	Weight, kg
ППФН-25-80-2.4	2.5 (25)	80	160	134	106	94	220	200	15	3.5	13	8	3000	2	0.94	12.0
ППФН-25-125-2.4		125	200	171	140	128	270	260	15	3.5	13	10	3000	4	2.2	25.5
ППФН-25-150-2.4		150	210	190	174	162	260	306	15	3.5	11	12	3000	3	6.2	33.0

* The parameters of expansionjoints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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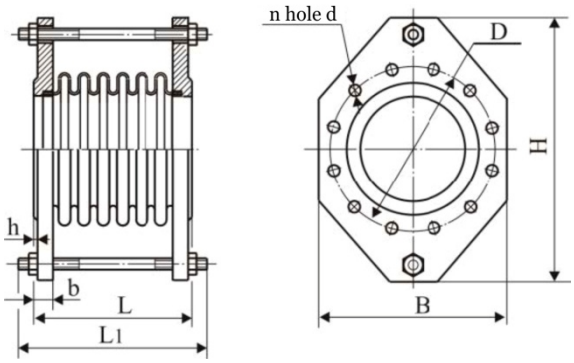
Lateral expansion joints

Expansion joints, СФН type



СФН type

СФН type axial, lateral expansion joints with flanges. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 24**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm								n	Lateral movement amplitude, ±δ, mm, at an operation time of 5000 cycles	Angular travel amplitude, ±γ, degr., at an operation time of 5000 cycles	Stiffness at lateral movement $C_δ$, kN/m	Stiffness at angular movement, $C_γ$, N·m/degr.	Weight, kg
			D	d	L	L_1	B	b	H	h						
СФН.Т11-6.3-250	0.63 (6.3)	250	335	18	280	390	370	30	490	3	12	7	10	553	26.0	50.0
СФН.Т11-10-80	1.0 (10)	80	160	18	204	280	195	25	270	3	4	7	5	190	6.7	17.5
СФН.Т11-10-100		100	180	18	230	310	215	25	300	3	8	7	5	200	8.3	20.5
СФН.Т11-10-125		125	210	18	264	365	245	30	332	3	8	7	5	220	11.0	24.5
СФН.Т11-10-150		150	240	22	274	375	280	30	368	3	8	7	5	250	14.0	28.6

Note: In case of simultaneous action of shear forces and bending moments on an expansion joint, calculation of permissible amplitudes of the lateral and angular movement of the expansion joint shall be made according to the formula:

$$[\delta],\ [\gamma] \le 1$$

where: [δ], [γ] – permissible lateral and angular movement amplitudes, accordingly, at a simultaneous loading with all the types of travel;
δ, γ – maximum lateral and angular travel amplitudes given in the Table.

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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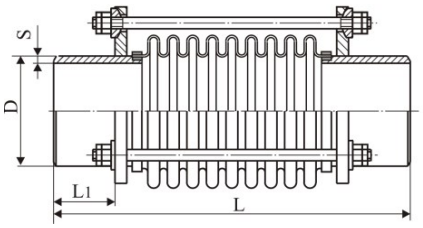
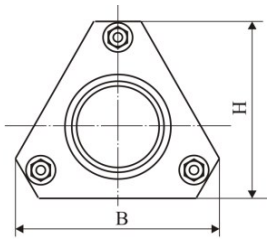
Expansion joints, СППН type

СППН type





СППН type axial, lateral expansion joints. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 25**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm						Lateral movement amplitude, ±δ, mm, at an operation time of 1000 cycles	Stiffness at lateral movement $C_δ$, kN/m	Weight, kg
			D	s	L	L_1	B	H			
СППН.Т12-16-125	1.6 (16)	125	133	5	490	91	273	236	5.6	715	22
СППН.Т12-6.3-150	0.63 (6.3)	150	159	5	502	96	317	275	11.7	312	27

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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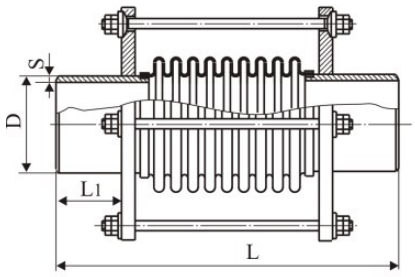
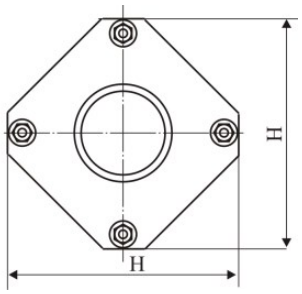
СППН type





СППН type axial, lateral expansion joints. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 26**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm					Lateral movement amplitude, ±δ, mm, at an operation time of 3000 cycles	Permutation force, kgf	Stiffness at lateral movement $C_δ$, kN/m	Weight, kg
			D	s	L	L_1	H				
СППН.Т13-6.3-800	0.63 (6.3)	800	820	8	726	110	1200	7.5	2475	2900	551

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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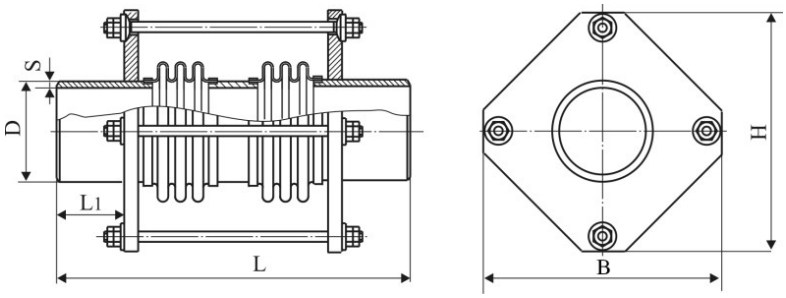
Expansion joints, 2СППН type



2СППН type

2СППН type axial, lateral double-bellows expansion joints. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 27**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm						Lateral movement amplitude, ±δ, mm, at an operation time of 3000 cycles	Permutation force, kgf	Stiffness at lateral movement $C_δ$, kN/m	Weight, kg
			D	s	L	L_1	B	H				
2СППН.Т14-6.3-800	0.63 (6.3)	800	820	8	780	56	1200	1200	10	1100	970	516
2СППН.Т14-10-600	1.0 (10)	600	630	8	1000	116	920	1000	10	1610	610	520

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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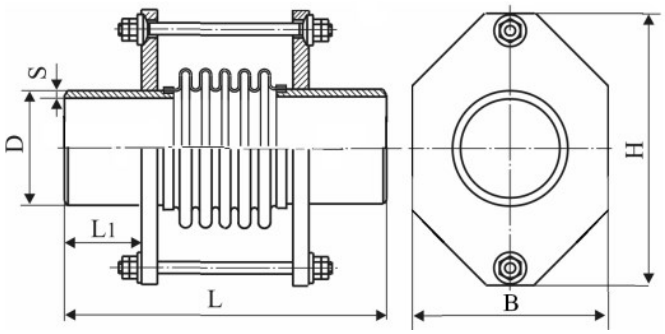
Expansion joints, СОПН type



СОПН type

СОПН type axial, lateral expansion joints. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 28**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm						Lateral movement amplitude, ±δ, mm, at an operation time of 1000 cycles	Stiffness at lateral movement $C_δ$, kN/m	Weight, kg
			D	s	L	L_1	B	H			
СОПН.Т15-6.3-150	0.63 (6.3)	150	159	4.5	387	55	230	330	7.5	1630	28
СОПН.Т15-6.3-200		200	219	5	433	60	300	430	2.5	1070	34

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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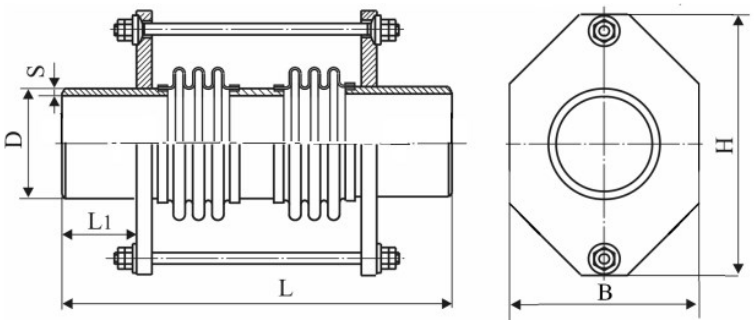
Expansion joints, 2СОПН type



2СОПН type

2СОПН type axial, lateral double-bellows expansion joints. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 29**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm						Lateral movement amplitude, ±δ, mm, at an operation time of 1000 cycles	Stiffness at lateral movement $C_δ$, kN/m	Weight, kg
			D	s	L	L_1	B	H			
2СОПН.Т16-2.5-150	0.25 (2.5)	150	159	4.5	610	85	230	330	15	80	27
2СОПН.Т16-16-150	1.6 (16)	150	159	4.5	610	80	230	295	16.5	140	53

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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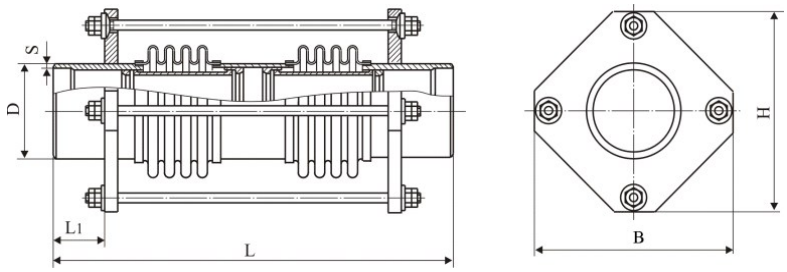
Expansion joints, 2СППГ type



2СППГ type

2СППГ type axial, lateral double-bellows expansion joints. These expansion joints are installed directly in pipelines and steam lines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, oil and oil products with a temperature up to 450 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 31**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm						Lateral movement amplitude, ±δ, mm, at an operation time of 3000 cycles	Permutation force, kgf	Stiffness at lateral movement $C_δ$, kN/m	Weight, kg
			D	s	L	L_1	B	H				
2СППГ.Т18-10-400	1.0 (10)	400	426	8	1032	130	640	640	10	292	180	227
2СППГ.Т18-10-600	1.0 (10)	600	630	8	1000	116	920	1000	10	505	610	612

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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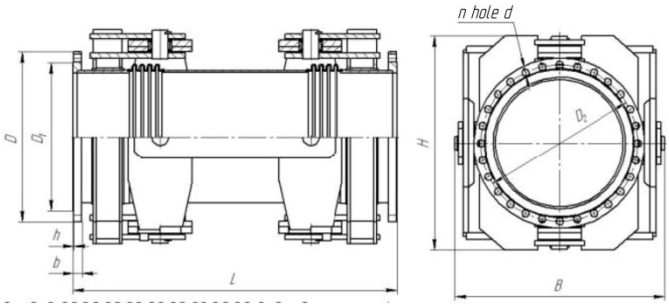
Lateral/angular expansion joints

Expansion joints, 2СФН type



2СФН type

2СФН type double-bellows, lateral/angular expansion joints. These expansion joints can be installed directly in pipelines and steam lines transferring water with a temperature up to 150 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 34**

Serial product range**

Reference designation	Design pressure, Pp, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	D_1	D_2	L	H	B	b	h	d	Number of holes, n	Lateral movement amplitude±δ, mm	Angular movement amplitude, ±γ, mm	Lateral stiffness, $C_δ$, kgf/mm.	Angular movement $C_γ$ kgf·m/degr.	Weight, kg
2СФН-18.6-900	1.86 (18.6)	900	1170	1022	1086	2310	1490	1460	90.5	1.5	41	32	±200	±2	22	152.5	5700

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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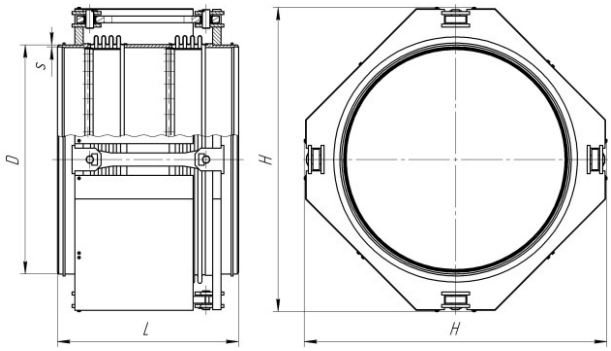
Expansion joints, 2СППМ type



2СППМ type

2СППМ type lateral/angular expansion joints. These expansion joints can be installed directly in pipelines and steam lines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

*Table 32**

Serial product range**

Reference designation	Nominal diameter, DN, mm	Nominal pressure, PN, MPa (kgf/cm²)	D	S	H	L	Lateral movement amplitude, ±δ, mm, at an operation time of 3250 cycles	Lateral stiffness, $\frac{N}{mm}\frac{kgf}{mm}$	Weight, kg
2СППМ.Т19-2.5-1200-2.1	1200	0.25 (2.5)	1,220	9.5	1620	1800	50	915 (91.5)	1390
2СППМ.Т19-2.5-900-2.1	900	0.25 (2.5)	920	9	1251	1230	36	811 (81.1)	810

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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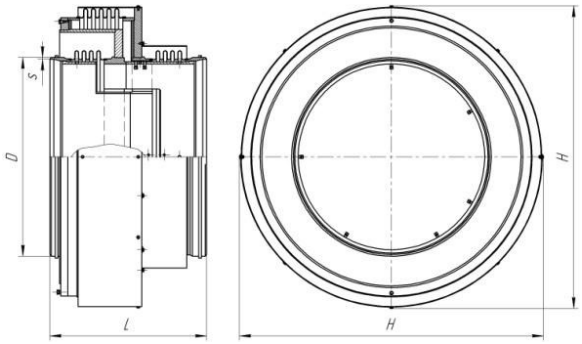
Balanced expansion joints

Expansion joints, 3РОПК type



3РОПК type

3РОПК three-bellows, balanced expansion joints with a guide branch pipe and a casing. These expansion joints can be installed directly in pipelines and steam lines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

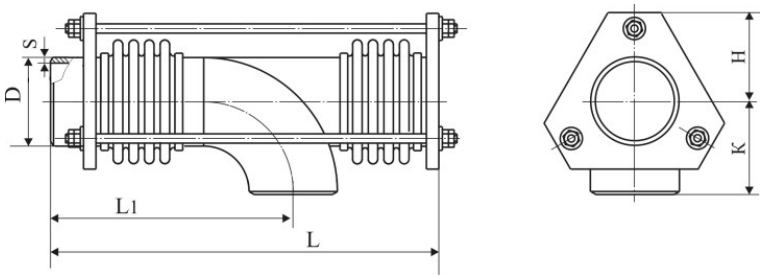
*Table 33**

Serial product range**

Reference designation	Nominal diameter, DN, mm	Nominal pressure, PN, MPa (kgf/cm²)	D	S	H	L	Axial stroke amplitude, ±λ, mm, at an operation time of 3250 cycles	Axial stiffness, $\frac{N}{mm}$ $\frac{kgf}{mm}$	Weight, kg
3РОПК.Т20-2.5-900-2.1	900	0.25 (2.5)	920	9	1463	1100	25	891 (89.1)	1250

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Expansion joints, 2РУОП type



2РУОП type

2РУОП type balanced, universal expansion joints. These expansion joints can be installed directly in pipelines transferring water (delivery and potable) and with a temperature up to 150 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

*Table 30**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	Dimensions, mm						Axial stroke amplitude, ± λ, mm, at an operation time of 14600 cycles	Lateral movement amplitude, ± δ, mm, at an operation time of 14600 cycles	Angular movement amplitude, ± γ, mm, at an operation time of 14600 cycles	Axial stroke stiffness, C_δ, kN/m	Stiffness at lateral movement C_δ, kN/m	Stiffness at angular movement, C_γ, Nm/degr.	Weight, kg
			D	s	L	L_1	K	H							
2РУОП.Т17-16-500	1.6 (16)	500	530	8	1975	1200	600	840	5	3	1	1000	4680	320	1100
2РУОП.Т17-10-600	1.0 (10)	600	630	8	1760	1070	500	735	15	3	1	730	3510	330	1670

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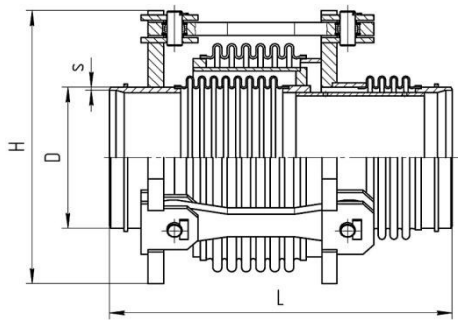
Expansion joints, 3РУПН type



3РУПН type

3РУПН type three-bellows balanced, universal expansion joints with welded neck branch pipes. These expansion joints can be installed directly in pipelines and steam lines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity of 20 to 80 m/s.

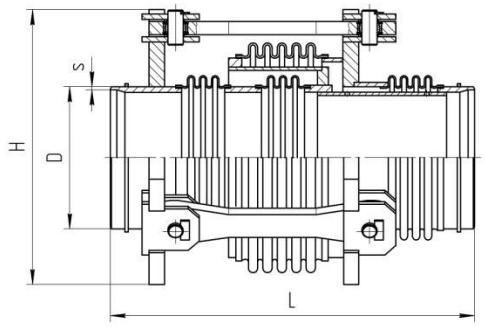
*Table 35**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	H	L	s	Movement absorbed			Preset operation time, N, cycles	Stiffness at			Handled medium temperature, °C	Weight, kg
							Axial stroke, λ, mm	Lateral movement, δ, mm	Angular movement, γ, degr.		axial, $C_δ$, kgf/mm	lateral, $C_δ$, kgf/mm	angular, $C_γ$, kgf·m/degr.		
DN200 PN2.5	0.25 (2.5)	200	219	498	615	7	10	2	0.5	3000	43.3	50	6.9	400	110
DN300 PN16	1.6 (16)	300	325	726	786	7	15	10	±1	10000	200	208.9	81.6	20...60	330
3РУПН-1.0-350-2.1	0.1 (1.0)	350	377	780	600	9	8	13	1	3000	49.9	75	23.6	33	215

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
** The scientific, material and technical facilities, as well as testing equipment of the factory make it possible to supply both serial products and customized products (designed and manufactured according to the customer's ToR).

Expansion joints, 4РУПН type



4РУПН type

4РУПН type four-bellows balanced, universal expansion joints with welded neck branch pipes. These expansion joints can be installed directly in pipelines and steam lines transferring water with a temperature up to 150 °C and at a velocity above 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperatureup to 500 °C and at a velocity of 20 to 80 m/s.

*Table 36**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	H	L	s	Movement absorbed			Preset operation time, N, cycles	Stiffness at			Handled medium temperature, °C	Weight, kg
							Axial stroke, λ, mm	Lateral movement, δ, mm	Angular movement, γ, degr.		axial, $C_δ$, kgf/mm	lateral, $C_δ$, kgf/mm	angular, $C_γ$, kgf·m/degr.		
DN600 PN6.3	0.63 (6.3)	600	630	1284	1200	8	±5	±5	2	15000	135	26.8	196	200	1150
DN600 PN6.3		600	630	1284	1000	8	±7	±9		3000	108	73.2	147.2	53	1105
DN350 PN6.3		350	377	745	800	9	±5	18		3000	105.8	22.6	49.4	53	335
DN800 PN6.3		800	820	1490	1200	9	±8	±12		3000	144.6	125.7		53	1740
4РУПН-1.0-800-2.3	0.1 (1.0)	800	820	1410	1000	9	15	5	0.5	3000	77	105	182.6	48	1110

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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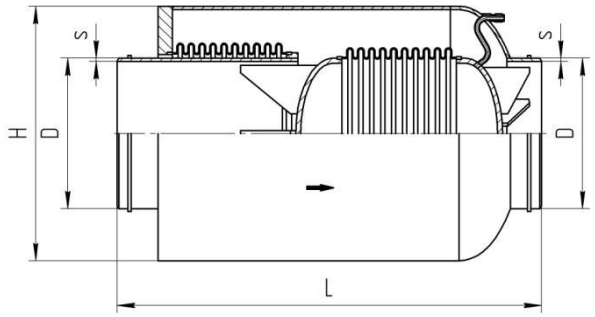
Expansion joints, 2РДН type



2РДН type

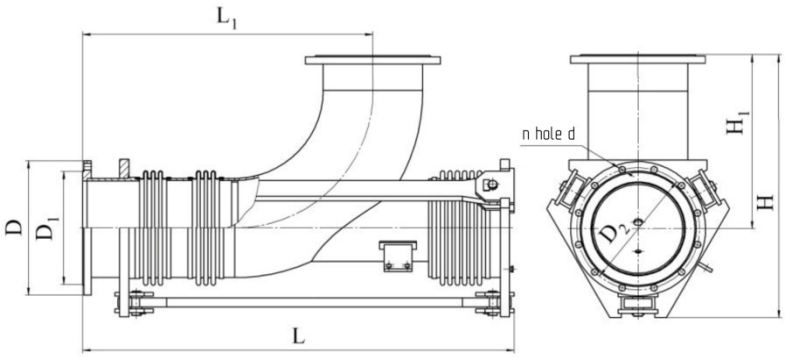
2РДН type balanced axial expansion joints with external pressure.

*Table 37**

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	H	L	s	Axial stroke amplitude, λ, mm, at an operation time N	Preset operation time, N, cycles	Axial stiffness, C_x, kgf/mm	Handled medium temperature, °C	Weight, kg
2РНД-16-1000	1.6 (16)	1000	1020	1497	2000	12	±110	1000	184	70...150	2350
2РНД-25-250	2.5 (25)	250	273	611	1200	6	±17	3000	131	130	276
2РНД-40-150	4.0 (40)	150	159	395	1200	7	±30	3000	60	375	160
2РНД-10-500	1.0 (10)	500	530	938	1100	8	±20	10000	122	85	490
2РНД-16-350	1.6 (16)	350	377	748	1300	8	±20	10000	122	85	390
DN800 P10	1.0 (10)	800	813	1408	1565	10	90 (±45)	10000	86	200	1350

Expansion joints, 3РУОФ type



3РУОФ type

3РУОФ type balanced, universal expansion joints. These expansion joints can be installed directly in pipelines transferring (delivery and potable) water with a temperature up to 150 °C and at a velocity up to 8 m/s, as well as steam and gaseous media not causing corrosion to the expansion joint material, with a temperature up to 500 °C and at a velocity up to 20 m/s.

Table 38*

Serial product range**

Reference designation	Nominal pressure, PN, MPa (kgf/cm²)	Nominal diameter, DN, mm	D	D_1	D_2	L	L_1	H	H_1	d	Number of holes, n	Movement absorbed			Preset operation time, N, cycles	Stiffness at			Weight, kg
												Axial stroke, λ, mm	Lateral movement, δ, mm	Angular movement, γ, degr.		axial, $C_δ$, kgf/mm	lateral, $C_δ$, kgf/mm	angular, $C_γ$, kgf·m/degr.	
3РУОФ-16-250	1.6 (16)	250	425	335	370	1400	900	764	500	30	12	18	12	3	5000	95.6	58.1	18	295
3РУО-6.3-500-2.3	0.63 (6.3)	500	640	570	600	1625	1075	1015	625	20	22	16	±5	±3	5000	40.7	39.8	27	560
3РУО-25-500-2.3	2.5 (25)	500	730	615	660	2065	1360	1100	657	39	20	16	±5	±3	5000	148.7	60.1	103	1382

* The parameters of expansion joints given in the Table are for reference only; for precise product performance please contact the factory's technical specialists;
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КОМПЕНСАТОР

Data sheet
for ordering expansion joints

Form M01/ОЛ-15 dated 21.07.2015

If you cannot save this form, please print it as a PDF file and fax it to: (812) 784-97-30 or e-mail to: mail@kompensator.ru

Site of installation of the expansion joint

NPP ☐	Chemical industry ☐	Shipbuilding Industry ☐
HTPP/TPP/SDPP ☐	Oil transport and storage ☐	Aerospace industry ☐
Heating network ☐		Water ducts ☐
Iron and steel industry ☐		Other ☐

Name of facility (equipment/unit)

Expansion joint designation (according to the specification or the catalogue)

Nominal diameter, DN, mm

Pressure

Internal ☐ External ☐

Nominal pressure PN = kgf/cm², Operating pressure Pp = kgf/cm², Testing pressure Pпр = kgf/cm²

Handled medium temperature, T, °C

Expansion joint type

Axial ☐	Lateral ☐	Balanced ☐
Angular ☐	Lateral/angular ☐	Universal ☐

Compensation capacity (indicate full compensation capacity)

Axial stroke λ = mm, Angular movement γ = degree, Lateral movement, δ= mm

In plane ☐ In two mutually perpendicular planes ☐

Number of cycles

N = cycles over the service period years

Limiting dimensions

Length = mm, Diameter = mm

Connection to a pipeline

Welded neck: Dext = mm, S (pipe thickness) = mm

Flanged (GOST/Version/PN): / / kgf/cm²

With loose flanges: yes ☐ no ☐

Pipeline material

Handled medium

Gas ☐ Liquid ☐ Steam ☐

Handled medium composition (content of chlorides, sulfides, solids)

Pipeline type

Process ☐	Distribution ☐		Main ☐
Above-ground ☐	Trenched ☐	Trenchless ☐	Intrashop ☐

Explosion hazards	yes ☐	no ☐
Toxicity	yes ☐	no ☐
Handled medium velocity, V, m/s		
Guide branch pipe (internal)	yes ☐	no ☐
Casing	yes ☐	no ☐
Thermal insulation type		
Availability of the rapid remote control system	yes ☐	no ☐

Visual inspection

Customer ☐ Military Representative Office of Ministry of Defence ☐ Maritime register ☐

Additional requirements

Total expansion joints requirement, pcs.

Delivery time

Customer's details

Customer

Address:

Telephone: Fax:

Position: Surname: Date:

E-mail:

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Our ref. No.

Notes

Notes:

1. The data sheet for ordering metallic expansion joints is available at the end of the catalogue.
2. With any questions associated with selection, peculiarities of pipeline system design using expansion joints, as well as installation, please call, in St. Petersburg: +7 (812) 346-88-78, +7 (812) 346-88-98; fax: +7 (812) 784-97-30 or e-mail to: mail@kompensator.ru.

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