



PRODUCT MANUAL

Accessories to temperature sensors Nipples Type 991

APPLICATION

- To install thermowells or complete temperature sensors in cases when it is possible to make a bore with a connecting thread directly inside the piping wall, i.e. when wall thickness is below 30 mm, they are welded onto the piping or technological equipment;
- Nipple with a threaded ring is used for the installation of rod temperature sensors with metal protective tube with \varnothing 14 mm; with the use of it, it is possible to set-up the required immersion of the sensor but it cannot be changed afterwards;
- For the environment, where mechanical resistance is required pursuant to EN 60068-2-6 (class AH2) and seismic capability of the electrical equipment of the safety system of the nuclear power stations pursuant to IEC 980 (MVZ level SL-2).

DESCRIPTION

Direct or oblique nipples (chamfer 45°) are made of thick-wall steel tubes; dimensions and material are selected pursuant to parameters of corresponding temperature sensors or thermowells. They are provided with a bore with various types of internal thread and shoulder for a suitable sealing ring.

Nipple with threaded ring consists of own nipple terminated with a thread with internal conical shoulder, threaded ring, thrust ring and cap-nut.

Nipples pursuant to DIN are direct with bore pursuant to the diameter of the selected thermowell pursuant to DIN shape 4.

TECHNICAL DATA

Dimensions of the nipples are based on EN 1434-2 and on DIN 43772

OPERATING CONDITIONS

The environment is defined by the group of parameters and their severity grades IE36 pursuant to EN 60721-3-3 and the following operation conditions.

From time to time, the valves may be exposed to the sea climate pursuant to EN 60068-2-52, severity grade 2.

Relative ambient humidity:

10 to 100 % with condensation, with upper limit of water content 29 g H₂O/kg of dry air

Atmospheric pressure: 70 to 106 kPa

Maximum operation pressure and temperature:
see table of desings

DESIGNATION

Data on product:

In the upper part (on external circumference) is marked

- Nipple material
- Inner thread for the thermowell
- bore diameter for thermowell for nipples pursuant to DIN 43772
- Heat number (if ordered)
- Serial number (if ordered)

Data on certificate of quality and completeness of the product

- Trademark of the manufacturer
- Product ordering number
- Time code

DELIVERY

Unless agreed otherwise with the customer, every delivery includes:

- Delivery note
- Products pursuant to the purchase order
- Accompanying technical documentation in Czech:
 - o Product quality and completeness certificate, which also serves as the warranty certificate
 - o Instruction label is delivered with each nipple with a threaded ring
 - o Product manual

If it is established in the purchase contract or agreed otherwise, the following documentation can also be delivered with the product:

- Copy of the Inspection Certificate 3.1 for the nipple material with the heat number
- Test report about the seismic and the vibration qualification
- Declaration of Conformity of the supplier pursuant to EN ISO/IEC 17050-1

PACKING

The nipples are delivered in a packing ensuring resistance to the impact of thermal effects and mechanical effects pursuant to controlled packing regulations.

TRANSPORT

The products may be transported on conditions corresponding to the set of combinations of classes IE 23 pursuant to EN 60721-3-2 but they may not be exposed to direct rain (i.e. by airplanes and trucks, semi-trailers and trailers, railway wagons with specially designed shock absorbers and ships, in premises that are not ventilated and not protected against atmospheric effects).

STORAGE

The products may be stored on conditions corresponding to the set of combinations of classes IE 12 pursuant to EN 60721-3-1, but with ambient temperature from -30 to 45 °C (i.e. in places where temperature and humidity are not regulated, with a threat of occurrence of condensation, dripping water and formation of ice, without a special threat of an attack with biological agents, with vibrations of small significance and not situated close to sources of dust and sand).

RELIABILITY

Reliability indicators in operation conditions and ambient conditions specified herein

- Mean time of operation between failures 96 000 hours (inf. value)
- Expected service life 10 years

PLACING AN ORDER

The purchase order shall include:

- Name
- Product ordering number
- Requirement for other documentation pursuant to Article DELIVERY
- Number of pieces

ORDER EXAMPLES:

Standard design:

Direct nipple
991 NVP 1 M20 13
20 pcs

Special requirement:

Nipple pursuant to DIN 43772
991 NVD 4 D24 50
nipple material 1.5415
10 pcs

TABLE 1 - OVERVIEW OF DESIGNS AND ORDERING OF NIPPLES FOR SCREW IN THERMOWELLS

SPECIFICATION					ORDERING NUMBER				
					991	xxx	x	xxx	xx
Shape	Direct					NVP			
	Oblique (chamfer 45°)					NVS			
Design pursuant to Fig. 1 to 6	Fig. 1	Application examples	210 and thermowells with thread M20×1,5 a G1/2		PN	40		1	
	Fig. 2		112 80, 112 80/P, 210, 113 17, 113 18 and thermowells with thread M20×1,5 and G1/2					2	
	Fig. 3		112 70, 112 80, 112 80/P, 213 and thermowells with thread M20×1,5 and G 1/2					3	
	Fig. 4		112 82, 232, 234, 242, 244, 332, 334, 342, 344 and thermowells with thread M20×1,5, G1/2, M27×2, G3/4 and 3/4-14 NPT					4	
	Fig. 5		thermowells with thread M33×2 a G1					5	
	Fig. 6		251, 252, 351, 352 and temperature sensor with metal protective tube Ø14 a Ø22 [mm]					6	NVP
	other*)							9	
Internal thread (diameter)**)	M20×1,5							M20	
	G 1/2							G12	
	M27×2						4	M27	
	G 3/4							G34	
	M33×2							M33	
	G1						5	G01	
	3/4 – 14 NPT						4	N34	
	Ø 14 mm							D14	
	Ø 22 mm						6	D22	
other *)							999		
Material***)	1.0308 nebo 1.0122	surface treatment	conservation by fat - by oil	Maximum operation temperature [°C]	300 (only PN 40)				13
	1.0577				400				15
	15 128				550				51
	1.4541				550				72
	other *)								99

*) Only as a special request on the basis of an agreement with the manufacturer
 **) Permitted combinations of designs, internal threads and materials of nipples are specified in the following tables
 ***) Nipple material 1.0308 or 1.,122 only PN40
 For materials 1.0308, 1.0122 and 1.0577 the manufacturer reserves the right to use equivalent materials

FIGURE 1 - DIMENSIONAL DRAWING AND TABLE OF DESIGNS OF NIPPLES NVP1 AND NVS1



Z (thread)	Material	Ordering number
M20x1,5	1.0308	991 NVP1 M20 13
	1.4541	991 NVP1 M20 72
G1/2	1.0308	991 NVP1 G12 13
	1.4541	991 NVP1 G12 72

Z (thread)	Material	Ordering number
M20x1,5	1.0308	991 NVS1 M20 13
	1.4541	991 NVS1 M20 72
G 1/2	1.0308	991 NVS1 G12 13
	1.4541	991 NVS1 G12 72

FIGURE 2 - DIMENSIONAL DRAWING AND TABLE OF DESIGNS OF NIPPLES NVP2 AND NVS2



Z (thread)	Material	Ordering number
M20x1,5	1.0308	991 NVP2 M20 13
	1.4541	991 NVP2 M20 72
G1/2	1.0308	991 NVP2 G12 13
	1.4541	991 NVP2 G12 72

Z (thread)	Material	Ordering number
M20x1,5	1.0308	991 NVS2 M20 13
	1.4541	991 NVS2 M20 72
G 1/2	1.0308	991 NVS2 G12 13
	1.4541	991 NVS2 G12 72

FIGURE 3 - DIMENSIONAL DRAWING AND TABLE OF DESIGNS OF NIPPLES NVP3 AND NVS3



Z (thread)	Material	Ordering number
M20×1,5	1.0308	991 NVP3 M20 13
	1.4541	991 NVP3 M20 72
G 1/2	1.0308	991 NVP3 G12 13
	1.4541	991 NVP3 G12 72

Z (thread)	Material	Ordering number
M20×1,5	1.0308	991 NVS3 M20 13
	1.4541	991 NVS3 M20 72
G 1/2	1.0308	991 NVS3 G12 13
	1.4541	991 NVS3 G12 72

Recommended application of nipples

- Direct nipple - for piping DN 25 to 40, sensor type 112 20 with nominal length 50 mm
- Oblique nipple - for piping DN 100 to 150, sensor type 112 20 with nominal length 100 mm
- Oblique nipple - for piping DN 50 to 80, sensor type 112 20 with nominal length 100 mm

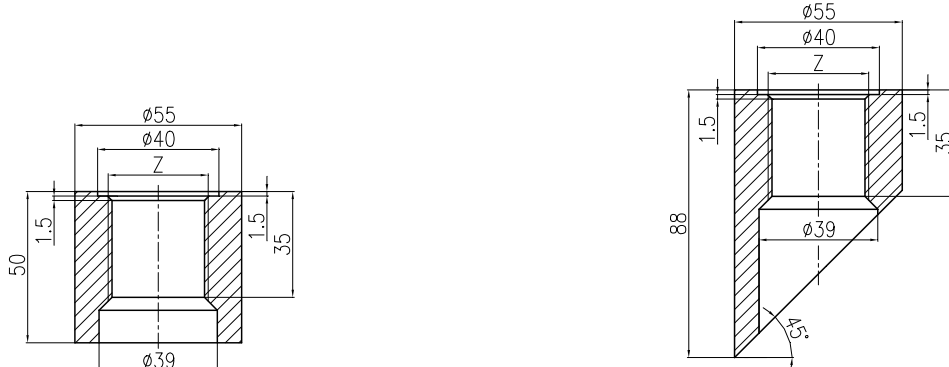
FIGURE 4 - DIMENSIONAL DRAWING AND TABLE OF DESIGNS OF NIPPLES NVP4 AND NVS4



Z (thread)	Material	Ordering number
M27x2	1.0308	991 NVP4 M27 13
	15 128	991 NVP4 M27 51
	1.4541	991 NVP4 M27 72
G3/4	1.0308	991 NVP4 G34 13
	15 128	991 NVP4 G34 51
	1.4541	991 NVP4 G34 72
3/4-14 NPT	1.0122	991 NVP4 N34 13
	15 128	991 NVP4 N34 51
	1.4541	991 NVP4 N34 72

Z (thread)	Material	Ordering number
M27x2	1.0308	991 NVS4 M27 13
	15 128	991 NVS4 M27 51
	1.4541	991 NVS4 M27 72
G3/4	1.0308	991 NVS4 G34 13
	15 128	991 NVS4 G34 51
	1.4541	991 NVS4 G34 72
3/4-14 NPT	1.0122	991 NVS4 N34 13
	15 128	991 NVS4 N34 51
	1.4541	991 NVS4 N34 72

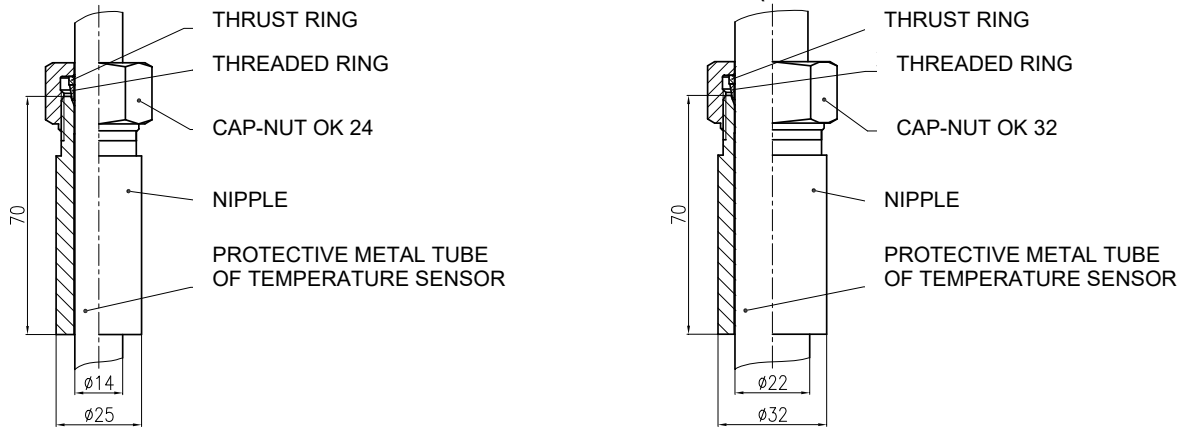
FIGURE 5 - DIMENSIONAL DRAWING AND TABLE OF DESIGNS OF NIPPLES NVP5 AND NVS5



Z (thread)	Material	Ordering number
M33x2	1.0577	991 NVP5 M33 15
	1.4541	991 NVP5 M33 72
G1	1.0577	991 NVP5 G01 15
	1.4541	991 NVP5 G01 72

Z (thread)	Material	Ordering number
M33x2	1.0577	991 NVS5 M33 15
	1.4541	991 NVS5 M33 72
G1	1.0577	991 NVS5 G01 15
	1.4541	991 NVS5 G01 72

FIGURE 6 - DIMENSIONAL DRAWING AND TABLE OF DESIGNS OF NIPPLES NVP6 (WITH THREADED RING)



∅ Protective metal tube [mm]	Material	Ordering number
14	1.0122	991 NVP6 D14 13
	1.4541	991 NVP6 D14 72
22	1.0122	991 NVP6 D22 13
	1.4541	991 NVP6 D22 72

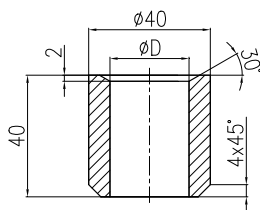
TABLE 2 - OVERVIEW OF DESIGNS AND ORDERING OF NIPPLES FOR THERMOWELLS, SHAPE 4 PURSUANT TO DIN 43772

SPECIFICATION				ORDERING NUMBER						
				991	xxx	x	xxx	xx		
Direct nipple					NVD					
Nipple for welding thermowell shape 4 pursuant to DIN (acc. to Fig. 7)						4				
Nominal pressure	PN 250	Internal bore	∅ 24					D24		
			∅ 26					D26		
			Other ∅ *)					999		
Material **)	15 128 **)		Maximum operation temperature [°C]	550					51	
				550						72
				530						99
				620						
				425						
				550						

*) Only as a special request on the basis of an agreement with the manufacturer
 **) Surface treatment of nipple: preservation with grease – oil

Nipple type	Thermowell type	Type number of resistance or thermoelectric temperature sensor
991 NVD 4 D24	991 DIN 4x7 2xx	231, 233, 331, 333
991 NVD 4 D26	991 DIN 4x7 3xx to 991 DIN 4x7 5xx	231, 233, 235, 236, 331, 333, 335, 336

FIGURE 7 - DIMENSIONAL DRAWING AND TABLE OF DESIGNS OF NIPPLES NVD4



∅D	Material	Ordering number
24G7	15 128.5	991 NVD4 D24 51
26G7		991 NVD4 D26 51
24G7	1.4541	991 NVD4 D24 72
26G7		991 NVD4 D26 72

INSTALLATION AND CONNECTION

Examples of recommendations for the installation of direct and angular nipples are identified in figure 8. Recommendations for the installation of nipples pursuant to DIN are provided in figure 9.

The right choice of the nipple and its location significantly influences metrological properties of the sensor and its service life.

With respect to maintaining metrological properties and the longest possible service life, it is not recommended to install the sensors in places with high turbulence of the medium flow (unless it is vitally required), which is caused e.g. by a rapid transition from a small diameter of the piping to a larger one (when failing to comply with the required shape and dimensions of diffuser behind the flow meter), etc.

Recommended distance of the temperature sensor from the installation flange of the flow meter is min. 1 m.

Installation of the nipple with a threaded ring shall be made pursuant to the instructional label as follows:

1. Uninstall the complete nipple by unscrewing the cap-nut.
2. Weld the nipple itself (after possible shortening) onto the wall of the piping or other technological equipment.
3. Put the following pieces on the metal protective tube of the temperature sensor in the said order: cap-nut, thrust ring and threaded ring.
4. Insert the temperature sensor with put-on pieces pursuant to point 3 into the prepared nipple and only after the definitive selection of immersion, tighten it duly with a torque wrench (torque 60-70 Nm for tube diameter 14, 100 Nm for tube diameter 22).



WARNING:

The length of the immersion part cannot be changed repeatedly; the sensor can only be uninstalled!

COMMISSIONING

Nipples do not require any operation and maintenance.

SPARE PARTS

Nipples do not require any delivery of spare parts.

WARRANTY

The warranty period is 24 months from the receiving of the product by the customer, unless established otherwise in the contract. The rejection of defects shall be enforced in writing at the manufacturer within the warranty period. The rejecting side shall identify product name, ordering and manufacturing numbers, date of issue and number of the delivery note, clear description of the occurring defect and subject of the claim. If the rejecting side is invited to send the device for repair, it shall do so in the original package of the manufacturer and/or in another package ensuring safe transport.

The warranty shall not apply to defects caused by unauthorized intervention into the device, its forced mechanical damage or failure to comply with operation conditions of the product and the product manual.

REPAIRS

Nipples do not require any repair.

DISABLING AND LIQUIDATION

The product and its package do not include any parts that could impact the environment.

The products withdrawn from the operation (including their packing) can be disposed of to sorted or unsorted waste pursuant to the type of waste.

The sensor package and metal parts of the product shall be recycled.

FIGURE 8 - EXAMPLES OF RECOMMENDATIONS FOR INSTALLATION OF DIRECT AND ANGULAR NIPPLES (ACCORDING TO EN 1434-2)

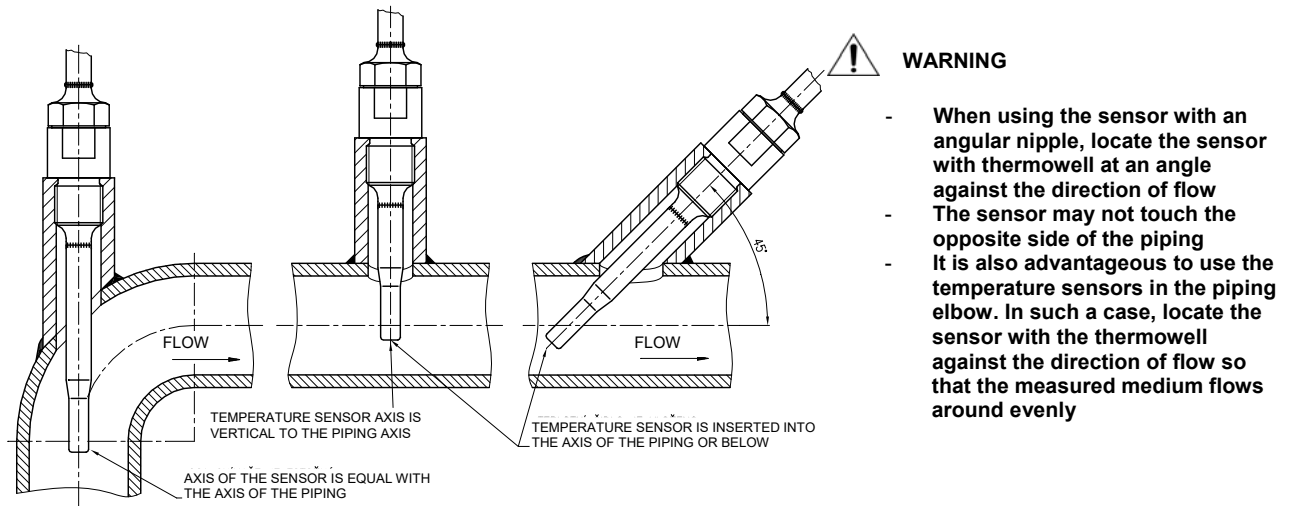
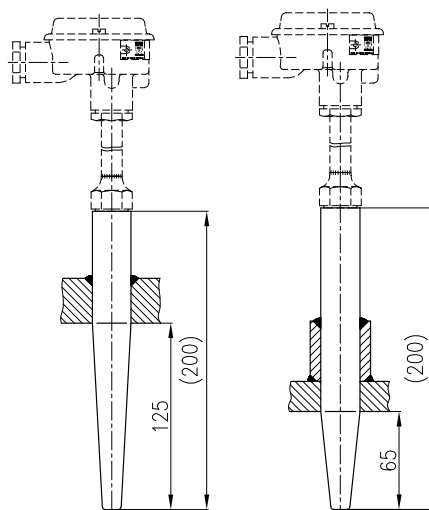


FIGURE 9 - EXAMPLES OF WELDING OF THERMOWELL AND NIPPLES PURSUANT TO DIN 43 772

For the installation of resistance and thermoelectric temperature sensors with external connecting thread, with a conical thermowell for welding, shape 4 pursuant to DIN 43772



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