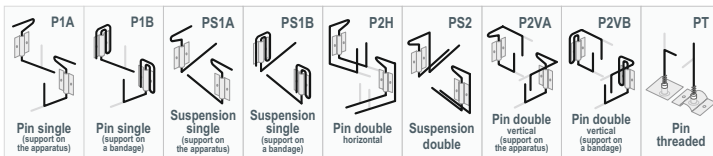


DEVICES FOR FIXING THERMAL INSULATION ON DEVICES AND TANKS

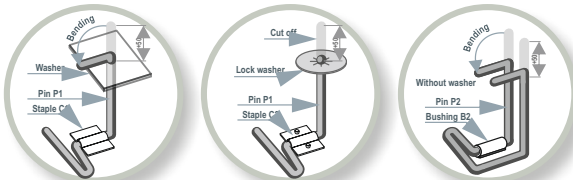


For fixing the main thermal insulation layer on devices and tanks, we have developed and improved existing structures made of single P1 and double P2 pins (GOST 17314-81), the production of which is carried out on automatic CNC lines made of wire steel with a diameter of 5 mm.

Fastening with pins is less labor-intensive and less expensive than with clamps and is used to isolate devices with a diameter of 500 mm, of various heights and lengths.



The methods of fixing the insulation depend on whether welding is allowed on the insulation surface. If welding is possible, the pins are welded to the insulated surface or installed in pre-welded brackets C1 or bushings V1, and if it is impossible to carry out welding work, the pins are attached to tie bands using special brackets C2 fixed to the bandage with the help of exhaust rivets, or, use threaded pins SHR screwed into threaded rivets placed on the bandage.



The thermal insulation material is impaled on the pins, after which the outer end of the pin must be bent at a distance of the insulation thickness. It is possible to use the attachment to the pin with a washer or a locking washer, which, when put on the pin, tightly press the thermal insulation layer to the insulated surface. When using a washer, the outer end of the pin is bent, and when using a locking washer, the excess part of it is cut off.

Removable parts, suspension pins (single PS1, double PS2 or threaded PS), are installed at the installation site of thermal insulation in the following ways:

- Welded directly to the wall of the device or pipeline;
- Into bushings or staples previously welded to the wall of the device or pipeline;
- Into the brackets attached to the tie band with the help of exhaust rivets;
- Into the threaded rivets attached «on the tie band.

Types of pins used for fixing insulation, their placement on the surface depends on the thickness of the insulation.

TECHNICAL CHARACTERISTICS OF PINS FOR FIXING THERMAL INSULATION

Pin designations	Pin Length (mm)	Product dimensions (mm)	Weight (kg)
P1/60 (single); PS1/60	150	180	0,028
P1/100 (single); PS1/100	190	220	0,034
P2/50 (double); PS2/50	150	331	0,051
P2/100 (double); PS2/100	200	431	0,067
P2/160 (double); PS2/160	260	551	0,085
P2/200 (double); PS2/200	300	631	0,098
P2/250 (double); PS2/250	360	751	0,120

* The dimensions of the pins are regulated according to GOST 17314-81.

The length of the pins is used in such a way that its length exceeds the thickness of the thermal insulation by 50 mm.

The number of pins required for mounting depends on the installation step of the pins and the location of the insulation surface.

PIN INSTALLATION STEP (mm)

Pin installation location	The step direction	
	Vertical	Horizontal
Vertical equipment	500	250
Horizontal cylindrical equipment: ↑ Upper half ↓ Lower half	500	500
	250	500
Horizontal surfaces: ↑ From above ↓ From below	500	500
	250	500

The thermal insulation layers on the devices and tanks are fixed with pins, observing the following steps:

- On vertical sections, a step is set through 250 mm horizontally and 500 mm vertically.
- On horizontal lines in all directions through 500 mm, in the lower part along the circumference, the step is made equal to 250 mm, in the upper part along the circumference equal to 500 mm.
- On the bottoms of vertical and horizontal apparatuses and tanks with a diameter of more than 1 m, a step along the circumference through 250 mm, the diameter of the first circle is made 800 mm, each subsequent increases by 1000 mm.

EXAMPLES OF A CONDITIONAL DESIGNATION

P1/60 GOST 17314-81-Single pin P1; insulation thickness up to 60mm
 P1/100 GOST 17314-81-Single pin P1; insulation thickness up to 100mm
 P2/50 GOST 17314-81-Double pin P2; insulation thickness up to 50mm
 P2/100 GOST 17314-81-Double pin P2; insulation thickness up to 100mm
 P2/160 GOST 17314-81-Double pin P2; insulation thickness up to 160mm
 P2/200 GOST 17314-81-Double pin P2; insulation thickness up to 200mm
 P2/250 GOST 17314-81-Double pin P2; insulation thickness up to 250mm

PS1/60 GOST 17314-81-Pin-suspension single PS1; insulation thickness up to 60mm
 PS1/100 GOST 17314-81-Pin-suspension single PS1; insulation thickness up to 100mm
 PS2/50 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 50mm
 PS2/100 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 100mm
 PS2/160 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 160mm
 PS2/200 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 200mm
 PS2/250 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 250mm

C1 GOST 17314-81-Welded bracket (attached to the device)
 C2 GOST 17314-81-Rivet bracket (attached to a bandage)
 B1 GOST 17314-81-Welded bushing (attached to the device)

EXAMPLES OF CONDITIONAL DESIGNATION OF DEVICES

C1-P1/60 GOST 17314-81
 (Welded bracket C1; single pin P1; insulation thickness up to 60mm)
 C1-P2/160 GOST 17314-81
 (Welded bracket C1; double pin P2; insulation thickness up to 160mm)
 C2-P1/100 GOST 17314-81
 (Bracket for bandage C2; single pin P1; insulation thickness up to 100mm)
 C2-P1/160 GOST 17314-81
 (Bracket for bandage C2; single pin P1; insulation thickness up to 160mm)
 B1-PS1/160 GOST 17314-81
 (Welded bushing B1; pin-suspension single PS1; insulation thickness up to 160mm)
 B1-PS2/100 GOST 17314-81
 (Welded bushing B1; pin-suspension double PS2; insulation thickness up to 100mm)



Type pins and holders of pins	⚠	In the Assortment // According to the technical task of the Customer.
Metal type of pins	Ⓚ	5-O-H steel; 65G steel; AISI 304 steel, etc. (According to the Customer's technical specification)
The length of the pins	➔	The thickness of the thermal insulation + 50 mm. (According to the Customer's technical specification)
Number of pins (along the circumference)	⊙	From 4x (360°) or more (depending on the diameter of the product and in accordance with the load). The installation step on the Tie band (Unloading device) is ≈250mm.
Metal type of pin holders	Ⓚ	Ordinary /galvanized steel (St3 / 08PS / 08KP / 09G2C); Stainless steel (AISI 301; AISI 304; AISI 403; 12X18H9).
Accessories	⚙	In the Assortment // According to the technical task of the Customer.
Mounting direction	↻	They are installed directionally.

EXAMPLES OF A CONDITIONAL DESIGNATION

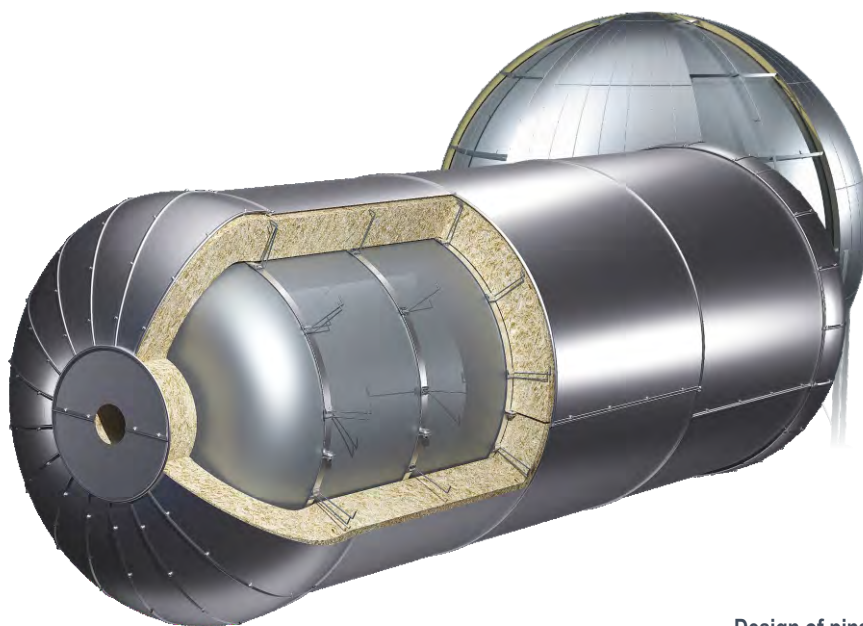
P1/60 GOST 17314-81-Single pin P1; insulation thickness up to 60mm
P1/100 GOST 17314-81-Single pin P1; insulation thickness up to 100mm
P2/50 GOST 17314-81-Double pin P2; insulation thickness up to 50mm
P2/100 GOST 17314-81-Double pin P2; insulation thickness up to 100mm
P2/160 GOST 17314-81-Double pin P2; insulation thickness up to 160mm
P2/200 GOST 17314-81-Double pin P2; insulation thickness up to 200mm
P2/250 GOST 17314-81-Double pin P2; insulation thickness up to 250mm

PS1/60 GOST 17314-81-Pin-suspension single PS1; insulation thickness up to 60mm
PS1/100 GOST 17314-81-Pin-suspension single PS1; insulation thickness up to 100mm
PS2/50 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 50mm
PS2/100 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 100mm
PS2/160 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 160mm
PS2/200 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 200mm
PS2/250 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 250mm

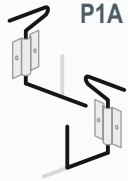
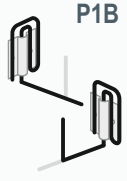
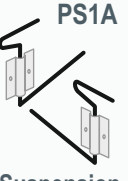
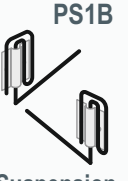
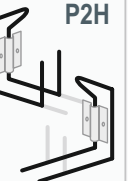
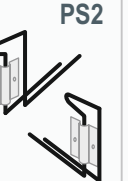


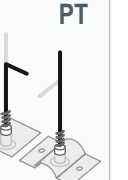
C1 GOST 17314-81-Welded bracket (attached to the device)
C2 GOST 17314-81-Rivet bracket (attached to a bandage)
B1 GOST 17314-81-Welded bushing (attached to the device)

EXAMPLES OF CONDITIONAL DESIGNATION OF DEVICES

C1-P1/60 GOST 17314-81
(Welded bracket C1; single pin P1; insulation thickness up to 60mm)
C1-P2/160 GOST 17314-81
(Welded bracket C1; double pin P2; insulation thickness up to 160mm)
C2-P1/100 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 100mm)
C2-P1/160 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 160mm)
C2-P1/200 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 200mm)
C2-P1/250 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 250mm)
B1-PS1/160 GOST 17314-81
(Welded bushing B1; pin-suspension single PS1; insulation thickness up to 160mm)
B1-PS2/100 GOST 17314-81
(Welded bushing B1; pin-suspension double PS2; insulation thickness up to 100mm)
B1-PS2/200 GOST 17314-81
(Welded bushing B1; pin-suspension double PS2; insulation thickness up to 200mm)



Design of pins and devices PIPEWOOL

								
Pin single (support on the apparatus)	Pin single (support on a bandage)	Suspension single (support on the apparatus)	Suspension single (support on a bandage)	Pin double horizontal	Suspension double	Pin double vertical (support on the apparatus)	Pin double vertical (support on a bandage)	Pin threaded

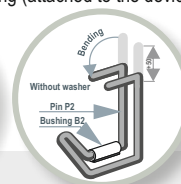
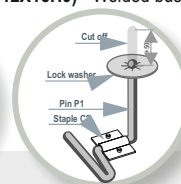
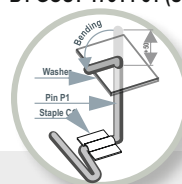
Type pins and holders of pins	⚠	In the Assortment // According to the technical task of the Customer.
Metal type of pins	Ⓚ	5-O-H steel; 65G steel; AISI 304 steel, etc. (According to the Customer's technical specification)
The length of the pins	📏	The thickness of the thermal insulation + 50 mm. (According to the Customer's technical specification)
Number of pins (along the circumference)	🔄	From 4x (360°) or more (depending on the diameter of the product and in accordance with the load). The installation step on the Tie band (Unloading device) is ≈250mm.
Metal type of pin holders	Ⓚ	Ordinary /galvanized steel (St3 / 08PS / 08KP / 09G2C); Stainless steel (AISI 301; AISI 304; AISI 403; 12X18H9).
Accessories	🔧	In the Assortment // According to the technical task of the Customer.
Mounting direction	🔄	They are installed directionally.

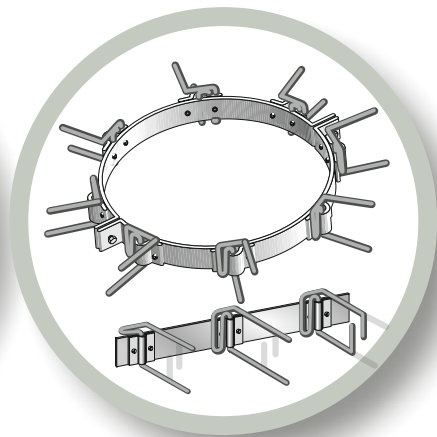
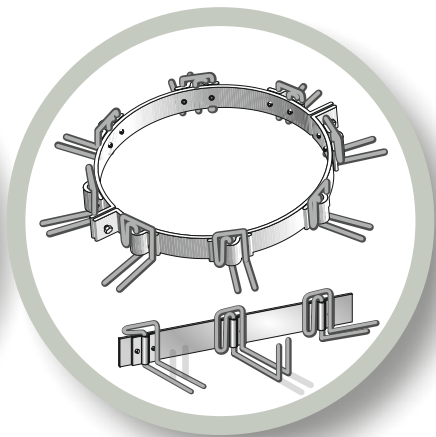
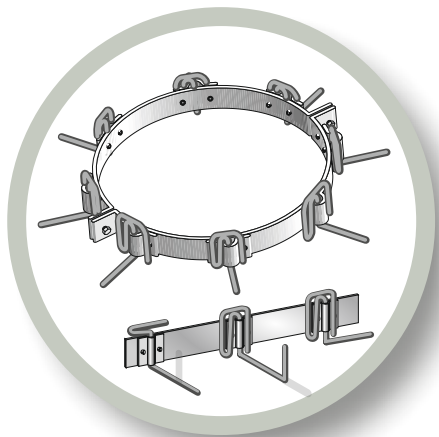
EXAMPLES OF THE CONDITIONAL DESIGNATION OF PINS

- P1A/60 GOST 17314-81 (St. 5-O-H)**
• Single pin (support on the device); insulation thickness up to 60mm
- P1B/100 GOST 17314-81 (St. 65G)**
• Single pin (support on the bandage); the thickness of the thermal insulation is up to 100mm
- PS1A/60 GOST 17314-81 (St. AISI 304)**
• Single pin suspension (support on the device); insulation thickness up to 60mm
- PS1B/100 GOST 17314-81 (St. 5-O-H)**
• Single pin-Suspension (support on the bandage); the thickness of the thermal insulation is up to 100 mm
- P2G/200 GOST 17314-81 (St. 5-O-H)**
• Double horizontal pin; insulation thickness up to 200mm
- PS2/160 GOST 17314-81 (St. 65G)**
• Double pin suspension; insulation thickness up to 160mm
- P2VA/100 GOST 17314-81 (St. 5-O-H)**
• Double vertical pin (support on the device); thermal insulation thickness up to 100 mm
- P2VB/160 GOST 17314-81 (St. AISI 304)**
• Double vertical pin (support on the bandage); insulation thickness up to 160mm
- PT/60 GOST 17314-81 (St. 5-O-H)**
• Threaded pin; insulation thickness up to 60mm

EXAMPLES OF CONDITIONAL DESIGNATION OF BRACKETS

- C1 GOST 17314-81 (St. AISI 304)** • Welded bracket (attached to the device)
- C1 GOST 17314-81 (St. 08PS)** • Welded bracket (attached to the device)
- C1 GOST 17314-81 (St. 08KP)** • Welded bracket (attached to the device)
- C1 GOST 17314-81 (St. AISI 403)** • Welded bracket (attached to the device)
- C2 GOST 17314-81 (St. 08PS)** • A bracket on rivets (attached to a bandage)
- C2 GOST 17314-81 (St. 08KP)** • A bracket on rivets (attached to a bandage)
- C2 GOST 17314-81 (St. AISI 301)** • Bracket on rivets (attached to a bandage)
- C2 GOST 17314-81 (St. AISI 403)** • Bracket on rivets (attached to a bandage)
- B1 GOST 17314-81 (St. 09G2S)** • Welded bushing (attached to the device)
- B1 GOST 17314-81 (St. 12X18H9)** • Welded bushing (attached to the device)





Design of pins and devices PIPEWOOL:

Pin single (support on the apparatus)	Pin single (support on a bandage)	Suspension single (support on the apparatus)	Suspension single (support on a bandage)	Pin double horizontal	Suspension double	Pin double vertical (support on the apparatus)	Pin double vertical (support on a bandage)	Pin threaded

TU 23.99.19-007-61278130-2019; ГОСТ 17314-81

Type pins and holders of pins	! In the Assortment // According to the technical task of the Customer.
Metal type of pins	5-O-H steel; 65G steel; AISI 304 steel, etc. (According to the Customer's technical specification)
Feature	The length of the pins ↔ The thickness of the thermal insulation + 50 mm. (According to the Customer's technical specification)
	Number of pins (along the circumference) ↻ From 4x (360°) or more (depending on the diameter of the product and in accordance with the load). The installation step on the Tie band (Unloading device) is ≈250mm.
	Metal type of pin holders ↻ Ordinary /galvanized steel (St3 / 08PS / 08KP / 09G2C); Stainless steel (AISI 301; AISI 304; AISI 403; 12X18H9).
	Accessories ↻ In the Assortment // According to the technical task of the Customer.
Mounting direction	↻ They are installed directionally.

EXAMPLES OF A CONDITIONAL DESIGNATION

P1/60 GOST 17314-81-Single pin P1; insulation thickness up to 60mm
P1/100 GOST 17314-81-Single pin P1; insulation thickness up to 100mm
P2/50 GOST 17314-81-Double pin P2; insulation thickness up to 50mm
P2/100 GOST 17314-81-Double pin P2; insulation thickness up to 100mm
P2/160 GOST 17314-81-Double pin P2; insulation thickness up to 160mm
P2/200 GOST 17314-81-Double pin P2; insulation thickness up to 200mm
P2/250 GOST 17314-81-Double pin P2; insulation thickness up to 250mm

PS1/60 GOST 17314-81-Pin-suspension single PS1; insulation thickness up to 60mm
PS1/100 GOST 17314-81-Pin-suspension single PS1; insulation thickness up to 100mm
PS2/50 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 50mm
PS2/100 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 100mm
PS2/160 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 160mm
PS2/200 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 200mm
PS2/250 GOST 17314-81-Pin-suspension double PS2; insulation thickness up to 250mm

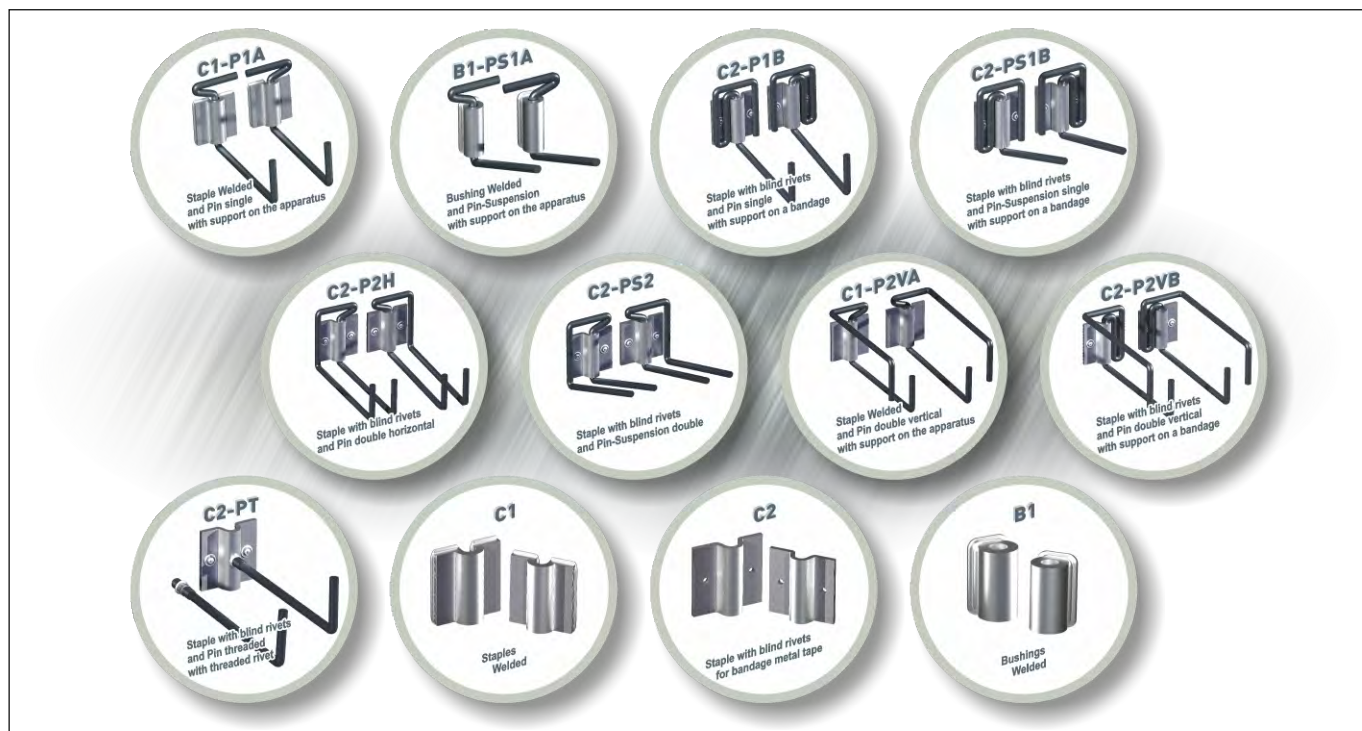
C1 GOST 17314-81-Welded bracket (attached to the device)
C2 GOST 17314-81-Rivet bracket (attached to a bandage)
B1 GOST 17314-81-Welded bushing (attached to the device)

EXAMPLES OF CONDITIONAL DESIGNATION OF DEVICES

C1-P1/60 GOST 17314-81
(Welded bracket C1; single pin P1; insulation thickness up to 60mm)
C1-P2/160 GOST 17314-81
(Welded bracket C1; double pin P2; insulation thickness up to 160mm)
C2-P1/100 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 100mm)
C2-P1/160 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 160mm)
C2-P1/200 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 200mm)
C2-P1/250 GOST 17314-81
(Bracket for bandage C2; single pin P1; insulation thickness up to 250mm)
B1-PS1/160 GOST 17314-81
(Welded bushing B1; pin-suspension single PS1; insulation thickness up to 160mm)
B1-PS2/100 GOST 17314-81
(Welded bushing B1; pin-suspension double PS2; insulation thickness up to 100mm)
B1-PS2/200 GOST 17314-81
(Welded bushing B1; pin-suspension double PS2; insulation thickness up to 200mm)

CUSTOMER SURVEY SHEET # _____

Information about the customer.	
Customer?* The company?*	
Object / # Order form / Date	
Phone / Your name?*	
Mail:	



Parameters of the Pins.		* 000.00 - Fill it out & <input checked="" type="checkbox"/> mark it.	
Type Pins	P1A <input type="checkbox"/> P1B <input type="checkbox"/> PS1A <input type="checkbox"/> PS1B <input type="checkbox"/> P2H <input type="checkbox"/> PS2 <input type="checkbox"/> P2VA <input type="checkbox"/> P2VB <input type="checkbox"/> PT <input type="checkbox"/>		
Metal type of Pins	Steel 5-O-H <input type="checkbox"/> Steel 65G <input type="checkbox"/> Steel AISI 304 <input type="checkbox"/>		
Length Pins (insulation thickness)	<input type="text"/> mm	Insulation <input type="checkbox"/> - One layer <input type="checkbox"/> - Two layers	
Type of pins holders	C1 Staple on welding <input type="checkbox"/> C2 Staple on rivets <input checked="" type="checkbox"/> B1 Sleeve on welding <input type="checkbox"/>		
Metal type of pins holders	Ordinary /galvanized steel St3 <input type="checkbox"/> 08PS <input type="checkbox"/> 08KP <input type="checkbox"/> 09G2C <input type="checkbox"/> Other <input type="text"/> Stainless steel AISI 301 <input type="checkbox"/> AISI 304 <input type="checkbox"/> AISI 403 <input type="checkbox"/> 12X18H9 <input type="checkbox"/> Other <input type="text"/>		
Washers	Without washer <input type="checkbox"/> Washer 50x50mm (hole Ø6mm) <input type="checkbox"/> Lock washer 50x50mm (hole Ø5mm) <input type="checkbox"/>		

Calculation of components.		* 000.00 - Fill it out & <input checked="" type="checkbox"/> mark it.	
Number of support rings KO *	<input type="text"/> pcs (*formula N1)	<input type="text"/> pcs (*formula N1)	
Number of EKO elements	<input type="text"/> pcs (*formula N2)	<input type="text"/> pcs (*formula N2)	
Number of paws for KO	<input type="text"/> pcs (*formula N3)	<input type="text"/> pcs (*formula N3)	
Number of rings SB1	<input type="text"/> pcs (*formula N4-1)	<input type="text"/> pcs (*formula N4-1)	
Number of rings ESB1	<input type="text"/> pcs (*formula N4-2)	<input type="text"/> pcs (*formula N4-2)	
Number of rings ESB2	<input type="text"/> pcs (*formula N4-3)	<input type="text"/> pcs (*formula N4-3)	
Number of rings on the tank *	<input type="text"/> pcs (*formula N5H)	<input type="text"/> pcs (*formula N5U)	

Formula N1
$$N1 = \frac{L-L1-L2}{1000mm} + 1$$

Formula N2
$$N2 = \frac{D*3,14}{2500mm}$$

Formula N3
$$N3 = \frac{D*3,14}{500mm} + 1$$

Formula N4-1
$$N4 = \frac{D*3,14}{250mm} + 1$$

Formula N4-2
$$N4 = \frac{R*3,14}{250mm} + 1$$

Formula N4-3
$$N4 = \frac{2500mm}{250mm} + 1$$

Formula N5H
$$N5H = (2L+1)*D*3,14*3$$

Formula N5U
$$N5U = (2L+1)*D*3,14*3$$

* See the drawings on the page [Capacitive tanks].