

products catalogue

fifth
edition

ТЕРМА
ЭНЕРГО

insulated products



Dear Colleagues,

Now you are holding in your hands the fifth edition of OJSC "Therma-Energo" products catalogue amended and supplemented with the information on innovative engineering by our company. Catalogue enables to become acquainted with all products manufactured by our company for the moment.

OJSC "Therma-Energo" is a young and rapidly developing company; it started to work on the market in 2003. The Company designs and manufactures different products using epoxy-charged compositions.

Our firm uses the most innovative 3-dimensional engineering technologies for products and casting forms thereof, as well as applies modern manufacturing equipment and processes acquired from world leading companies in relevant areas, such as Vogel, Herdich, Hunstman. All this facilitates to maintain the highest consumer level of OJSC "Therma-Energo" products.

The Company's operation is targeted not only to serial production but also to fullest satisfaction of Clients' demands on creation of exclusive electrically insulated products. OJSC "Therma-Energo" employees are highly qualified engineers, which can always render relevant technical support to the Client.

During operation on market the following companies became the partners of OJSC "Therma-Energo": CJSC "ABB Electro-engineering", MSUE "Mosvodocanal", CJSC "Tavrida-Electric", OJSC "MEL", OJSC "Ezois" (Moscow), "Electrobalt" Research and Production Enterprise, "Eltechnika" Production Enterprise (Saint-Petersburg), CJSC "ChESZ Electrosila" (Cheboksary), FSUE "Contact" Research and Production Enterprise (Saratov), JSC "Kentau Transformer Plant", OJSC "Sibelectroshchit" Research and Production Enterprise (Omsk), CJSC "Electrograd" (Krivoy Rog) and many others.

Wishing you success in your work and hoping on mutually advantageous cooperation,

Zhukov A.I.
General Director



Production particulars of OJSC "Therma-Energo"

Epoxy insulators of OJSC "Therma-Energo" are produced using pressure casting in heated molds of machines (APG Process). Molds construction enables to reach high precision of fitting arrangement and observe product dimensions. Compound is prepared in process vacuum conditions, therefore, moisture and gaseous substances content in material is minimized. At this expense the following is reached: high uniformity, low level of partial discharges, maximal strength and smooth facture of the surface of finished insulator.

Advantages of OJSC "Therma-Energo" epoxy insulators

- High short-term and long-term strength at bending and twist;
- High impact resistance;
- High electric strength;
- High hydrophobic nature and dirt-resistance;
- Low mass;
- High mechanical strength;
- High stability and minimal dimensional allowance.

Symbol legend structure for insulators:

10-8-065-00 УХЛ2 ВЕОИ

Supporting epoxy cast insulator

Nominal voltage, kV

Bending strength, kN

Insulator index

Version No

Climatic version and allocation category

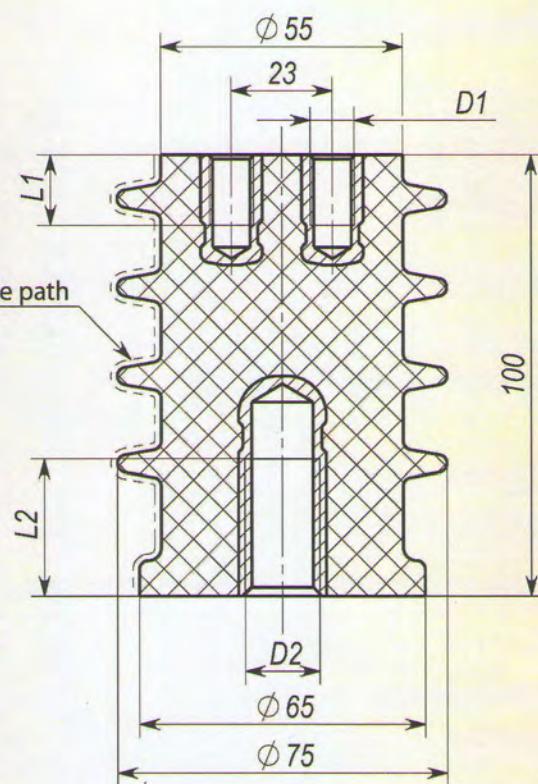
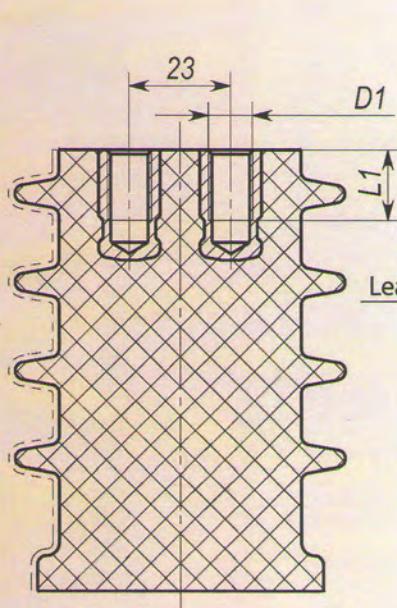
Supporting insulator 6-8-065-00 УХЛ2 and У3

6-8-065-00 УХЛ2 and У3 supporting insulator

(TU 3494-001-73361303-2006)

Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV	6
max. operating voltage, kV	7,2
5-minutes testing voltage of industrial frequency, kV	32
FR intensity in insulator at 4.6 kV, pC	<2,0
leakage path, mm	160
max. mass, kg	0,62

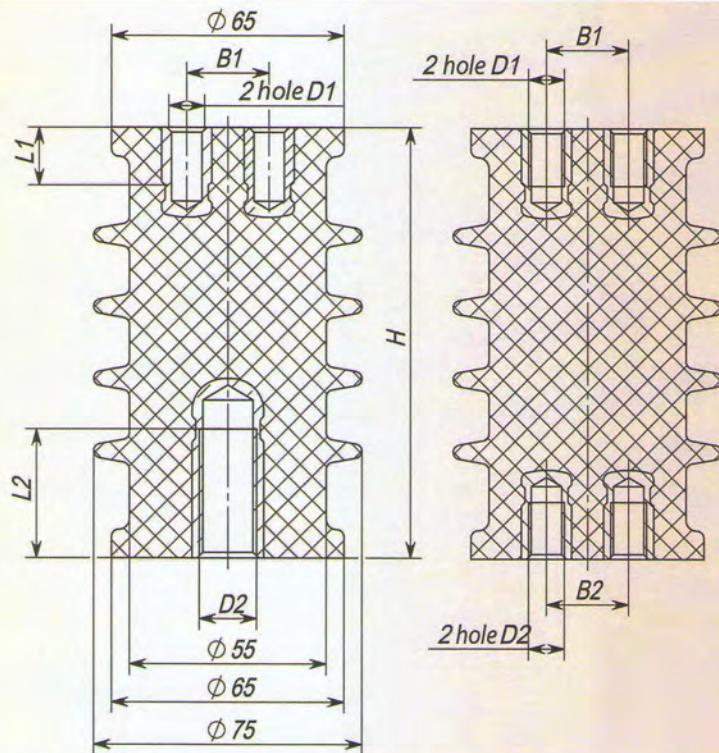


Type	Bending strength, kN	D1	D2	L1, mm	L2, mm
6-8-065-00	8	M10	M16	16	36
6-8-065-01	8	2xM10	M16	16	36
6-5-065-02	5	2xM10	M10	16	16
6-5-065-03	5	2xM10	2xM10	16	16
6-5-065-04	5	2xM10	2xM8	16	12
6-8-065-05	8	2xM10	M12	16	24
6-8-065-06	8	M16	M16	30	30
6-8-065-07	8	M10	M12	16	24
6-8-065-08	8	2xM6	-	12	-
6-8-065-09	8	M10	M8	16	12

Supporting insulator ИОЭЛ 10-8-065-00 УХЛ2 and У3

IEC 10-8-065-00 УХЛ2 and У3 supporting insulator
 Meets the requirements of GOST R 1516.3-96 and IEC 273
 Certificate of Conformity No. ROSS RU.ME.05.H05164
 (TU 3494-001-73361303-2006)

nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
FR intensity in insulator at 7.7 kV, pC	<2,5
max. mass, kg	0,88



Type	H,mm	Bending strength, kN	leakage path, mm	D1	D2	L1, mm	L2, mm	B1, mm	B2, mm
ИОЭЛ 10-8-065-00	120	8	183	2xM10	M16	16	36	23	-
ИОЭЛ 10-5-065-01	120	5	183	2xM10	M10	16	16	23	-
ИОЭЛ 10-5-065-02	120	5	183	2xM10	2xM10	16	16	23	23
ИОЭЛ 10-8-065-03	120	8	183	M16	M16	36	36	-	-
ИОЭЛ 10-8-065-04	130	8	193	2xM10	M16	16	36	23	-
ИОЭЛ 10-5-065-05	130	5	193	2xM10	M10	16	16	23	-
ИОЭЛ 10-5-065-06	130	5	193	2xM10	2xM10	16	16	23	23
ИОЭЛ 10-8-065-07	124	8	187	2xM10	M16	16	36	23	-
ИОЭЛ 10-8-065-08	130	8	193	M16	M16	36	36	-	-
ИОЭЛ 10-5-065-09	124	8	187	2xM8	M16	12	36	30	-
ИОЭЛ 10-8-065-10	130	8	193	M12	M16	24	36	-	-
ИОЭЛ 10-5-065-11	120	5	183	2xM8	M12	12	24	18	-
*ИОЭЛ 10-5-065-12	120	5	183	2xM8	2xM8	12	12	18	18
ИОЭЛ 10-5-065-13	120	5	183	2xM8	M16	12	36	23	-
ИОЭЛ 10-8-065-14	130	8	193	2xM10	M16	16	36	23	-
ИОЭЛ 10-8-065-15	130	8	193	2xM10	M12	16	24	18	-
ИОЭЛ 10-8-065-16	124	8	187	2xM8	M12	12	24	23	-
ИОЭЛ 10-5-065-17	130	5	193	2xM8	2xM10	12	16	26	30
ИОЭЛ 10-8-065-18	120	8	183	2xM8	M12	12	24	23	-
ИОЭЛ 10-5-065-19	120	5	183	M8	M10	12	16	-	-
ИОЭЛ 10-5-065-20	120	5	183	M8	M12	12	24	-	-

* - holes D1 and D2 lay in perpendicular surfaces

Potential divider 6 kV/100 V

ИДЭЛ 6-1,5-065-00 УЗ



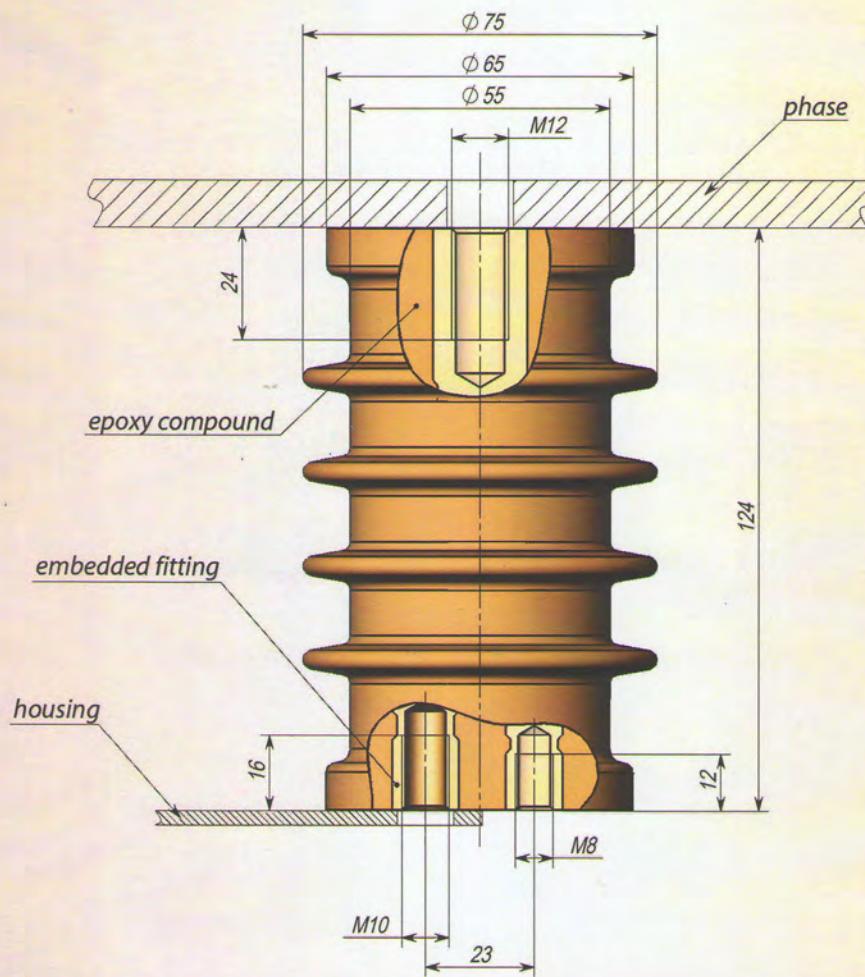
Potential divider 6 kV/100 V is intended to be used in security circuits, and to control phase, voltage quality and value in electric installations for nominal voltage 6 kV as per IEC 61243-5, cl. 1.4.9.

Potential divider is made in ИОЭЛ 6-1,5-065-00 insulator housing, with resistive divider poured inside. High voltage is supplied to embedded fitting in the form of M12 insulator contact. Output voltage is removed from the opposite edge of insulator and from M10 and M8 embedded fittings. M10 embedded fitting constitutes the earthing contact.

No external power source is needed for operation of potential divider.

Technical data:

frequencies range for operation voltage, Hz	17 to 60
nominal output current of divider, mA	2
nominal output voltage, V	100+/-10
operational range of ambient air temperatures, °C	-10 ... +45





Voltage display device ИН 3-10-00 У3

Certificate of Conformity No. ROCC RU.ME05.H07639
(TU 3414-001-73361303-2006)

DC voltage display device ИН 3-10-00 У3 relates to integrated equipment (integrated systems as per IEC 61243-5 cl. 3.1).

The device is made in the form of three ИОЭЛ-10-1.5 type insulators with integrated resistive carry electrodes, through which regulated voltage enters from primary circuit into indication unit. Carry electrodes are connected with indication unit via cables. Insulators are rigidly fixed (to provide electric contact) in switchgear and control gear between the casing and relevant phase.

3 red LEDs and 3 regulating connectors exist on front panel of indication unit. LEDs initiate the presence of operating voltage. LED blinking means the presence of operating voltage. LED blinking frequency is proportional to the value of regulated voltage. Regulating connectors are intended to check the accuracy of indication unit using the TIN testing device, that enables to check indicator in operation conditions (under voltage); meanwhile, the whole internal circuit of indication unit and gauge-integrated overvoltage limiter are checked. Regulating connectors can be also used to define right phases sequence (by IFZ device) and for other measurements. Overvoltage limiter on regulating connectors is similar to the limiter integrated into resistive carry electrode.

Signaling cables are connected to resistive carry electrode via CP-50-74ФB socket and to rear panel of the unit through LS1537 blade connectors. Marking is under bottom surface of indication unit. Contact of protection earthing of indication unit is connected to the casing of electric installation cabinet.

Climatic version У, allocation category 3 as per GOST 15150.



Technical data:

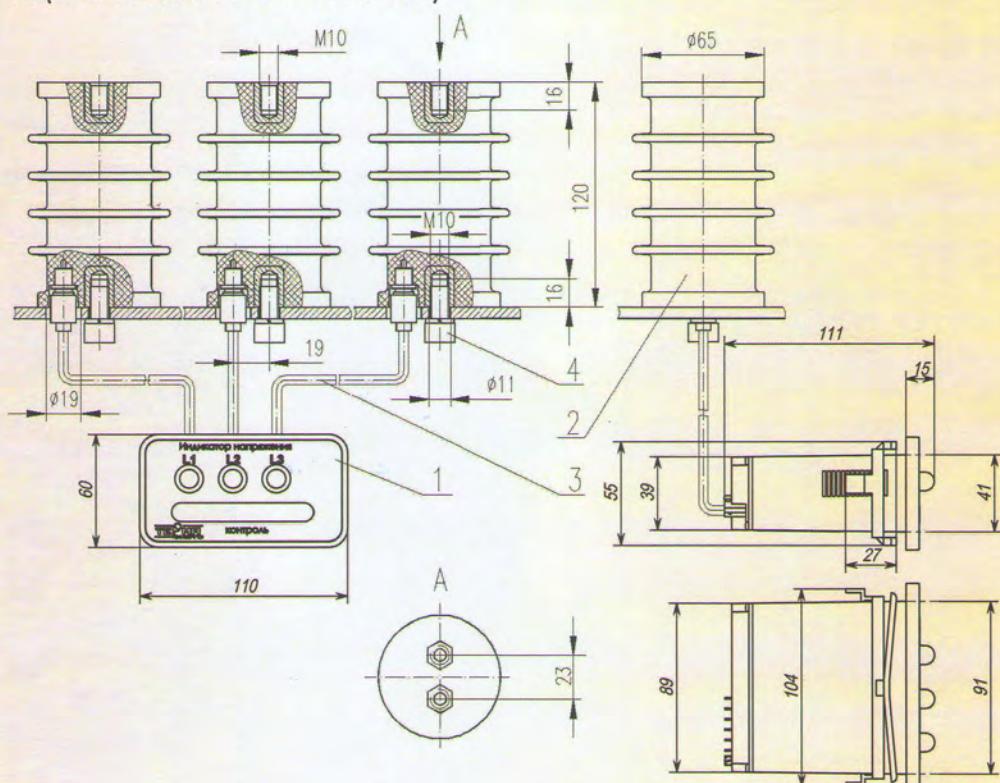
rated frequency, Hz	50-60
$U_o < 10 \% U_n$	no voltage signaling
$U_o \geq 20 \% U_n$	voltage signaling less than 100
Max. voltage on indication unit at any testing voltages, V	
protection	IP40
operating temperatures range for indication unit, °C	-10...+50
operating temperatures range for carry electrodes, °C	-60...+85
type of carry electrode connector	coaxial
mass of one insulator, kg	0,8
set mass, kg	3,7

Completeness:

- resistive carry electrode 3 pcs
- set of connecting wires 1 set
- indication unit 1 pc
- assembling manual 1 pc
- self-testing apparatus to be ordered separately

Overall dimensions and diagram of connection:

- 1 - indication unit
- 2 - resistive carry electrode
- 3 - connecting cables
- 4 - affixture (not included into the set)





Voltage display device ИН 3-10Р-00 У3

Certificate of Conformity No. РОСС RU.ME.05.H07639
(TU 3414-004-73361303-2006)

DC voltage display device ИН 3-10Р-00 У3 relates to integrated equipment (integrated systems as per IEC 61243-5 cl. 3.1).

The device is made in the form of three ИОЭЛ-10-1.5 type insulators with integrated resistive carry electrodes, through which regulated voltage enters from primary circuit into indication unit. Carry electrodes are connected with indication unit via cables. Insulators are rigidly fixed (to provide electric contact) in switchgear and control gear between the casing and relevant phase.

4 LEDs and 3 regulating connectors exist on front panel of indication unit. Small yellow LED initiates the presence of auxiliary voltage. 3 other LEDs initiate the presence of operating voltage. LED blinking means the presence of operating voltage. LED blinking frequency is proportional to the value of regulated voltage. Regulating connectors are intended to check the accuracy of indication unit using the ТИН testing device, that enables to check indicator in operation conditions (under voltage); meanwhile, the whole internal circuit of indication unit and gauge-integrated overvoltage limiter are checked. Regulating connectors can be also used to define right phases sequence (by IFZ device) and for other measurements. Overvoltage limiter on regulating connectors is similar to the limiter integrated into resistive carry electrode.

Signaling cables are connected to resistive carry electrode via CP-50-74ФВ socket and to rear panel of the unit through LS1537 blade connectors. K1 relay actuates, when all three phases of operating voltage exist. K2 relay actuates at no-load condition.

Contact of protection earthing of indication unit is connected to the casing of electric installation cabinet. Technical specifications are similar to those for ИН 3-10-00 У3.

Logic of relay actuation is represented in Table 1.

Completeness:

- resistive carry electrode
- set of connecting wires
- indication unit
- assembling manual
- self-testing apparatus

3 pcs
1 set
1 pc
1 pc

to be ordered separately



Table 1:

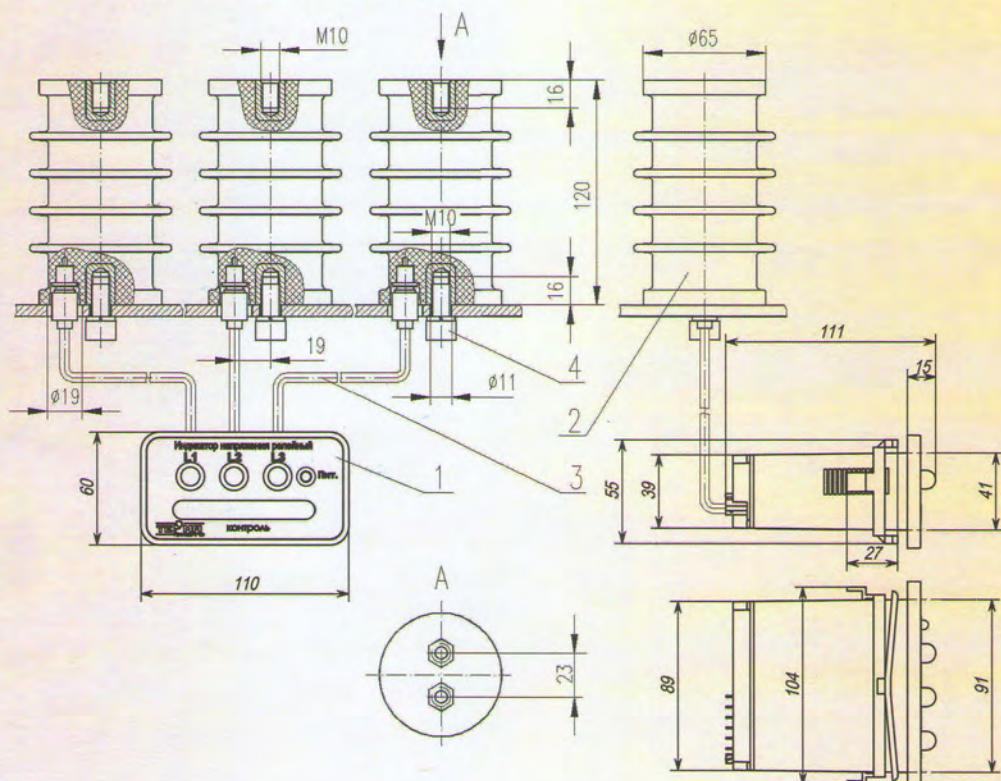
K1	K2	Auxiliary voltage	Phase A	Phase B	Phase C
0	0	0		any combination	
0	1	1	0	0	0
0	0	1	1	0	0
0	0	1	0	1	0
0	0	1	1	1	0
0	0	1	0	0	1
0	0	1	1	0	1
0	0	1	0	1	1
1	0	1	1	1	1

1 in the table means that voltage is supplied (or relay is active), zero means that there is no voltage (or relay is deactivated).

Indication unit is fed from auxiliary source 60-220V (DC or AC, 50 Hz). As agreed with the Client, auxiliary voltage can be replaced by other voltage. The device has 1 kV galvanic insulation between measuring circuits and auxiliary power source.

Overall dimensions and diagram of connection:

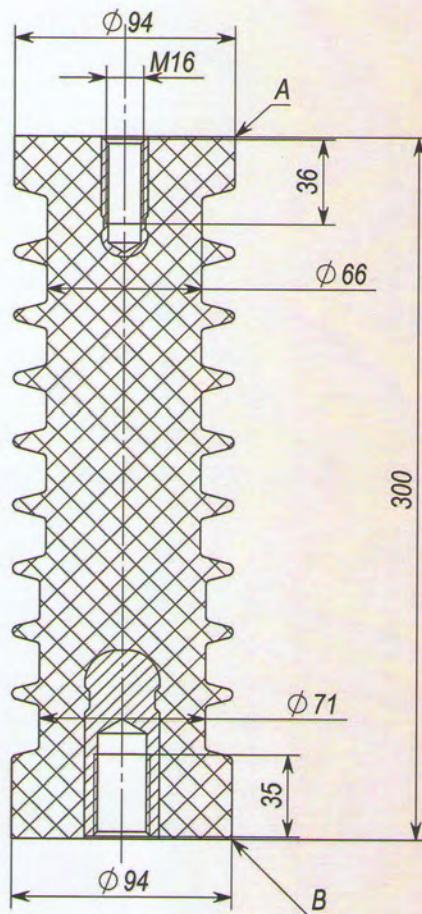
- 1 - indication unit
- 2 - resistive carry electrode
- 3 - connecting cables
- 4 - affixture (not included into the set)



Supporting insulator ИОН 27-5-025-00 УХЛ2 and У3

ИОН 27-5-025-00 УХЛ2 and У3 supporting insulator
 Meets the requirements of GOST R 1516.3-96 and IEC 273
 (TU 3494-001-73361303-2006)

nominal operating voltage, kV	27
max. operating voltage, kV	30
5-minutes testing voltage of industrial frequency, kV	95
bending strength, kN	5
leakage path A to B, mm	464
max. mass, kg	3,1



Type	D1	D2	L1, mm	L2, mm
ИОН 27-5-025-00	2xM10	M16	16	36
ИОН 27-5-025-01	2xM10	M24	16	36
ИОН 27-5-025-02	M16	M24	36	36
ИОН 27-5-025-03	M16	M16	36	36

Supporting insulator ИОН 35-5-025-00 УХЛ2 and У3

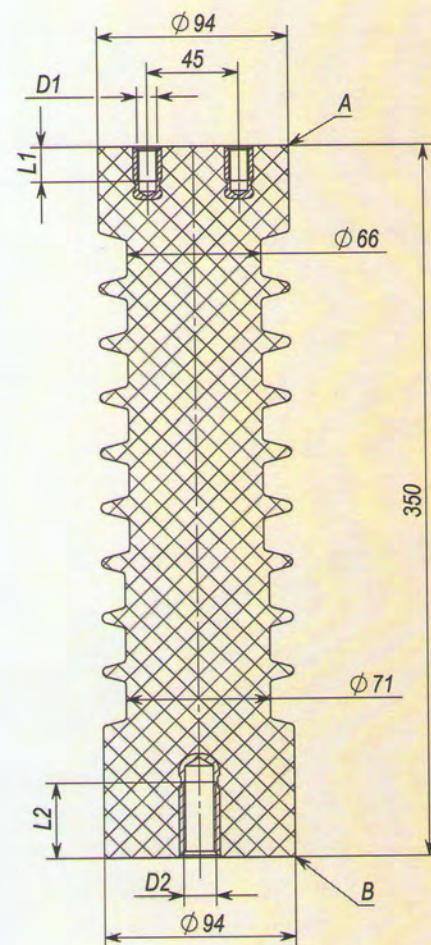


ИОН 35-5-025-00 УХЛ2 and У3 supporting insulator

(TU 3494-001-73361303-2006)

Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV	35
max. operating voltage, kV	40,5
5-minutes testing voltage of industrial frequency, kV	120
bending strength, kN	5
leakage path A to B, mm	514
max. mass, kg	3,5

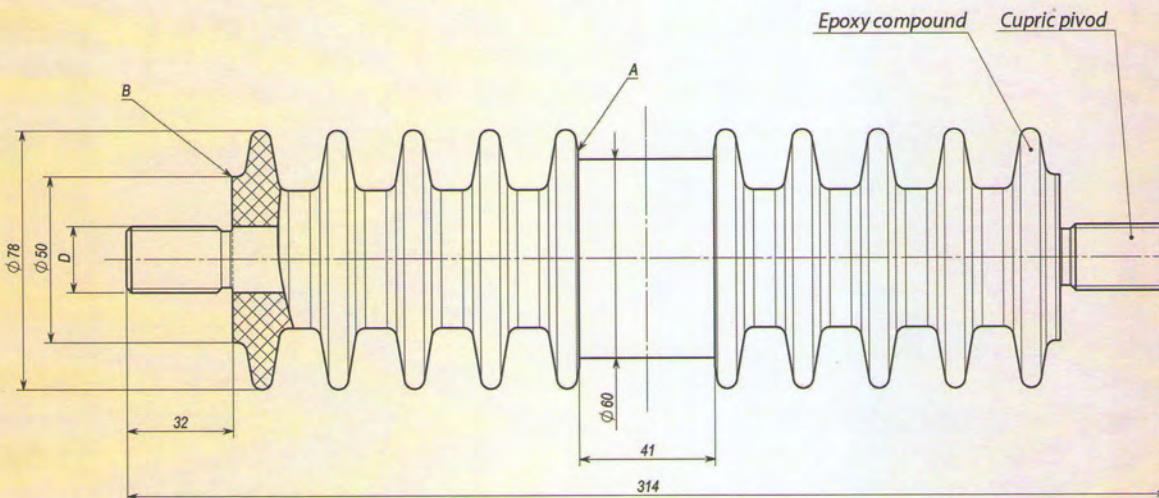


Type	D1	D2	L1, mm	L2, mm
ИОН 35-5-025-00	2xM10	M16	16	36
ИОН 35-5-025-01	2xM10	M24	16	36
ИОН 35-5-025-02	M16	M24	36	36
ИОН 35-5-025-03	M16	M16	36	36
ИОН 35-5-025-04	2xM10	2xM12	16	24

Straight-through insulator ИПЭЛ 10-2,5-002-00 УХЛ2

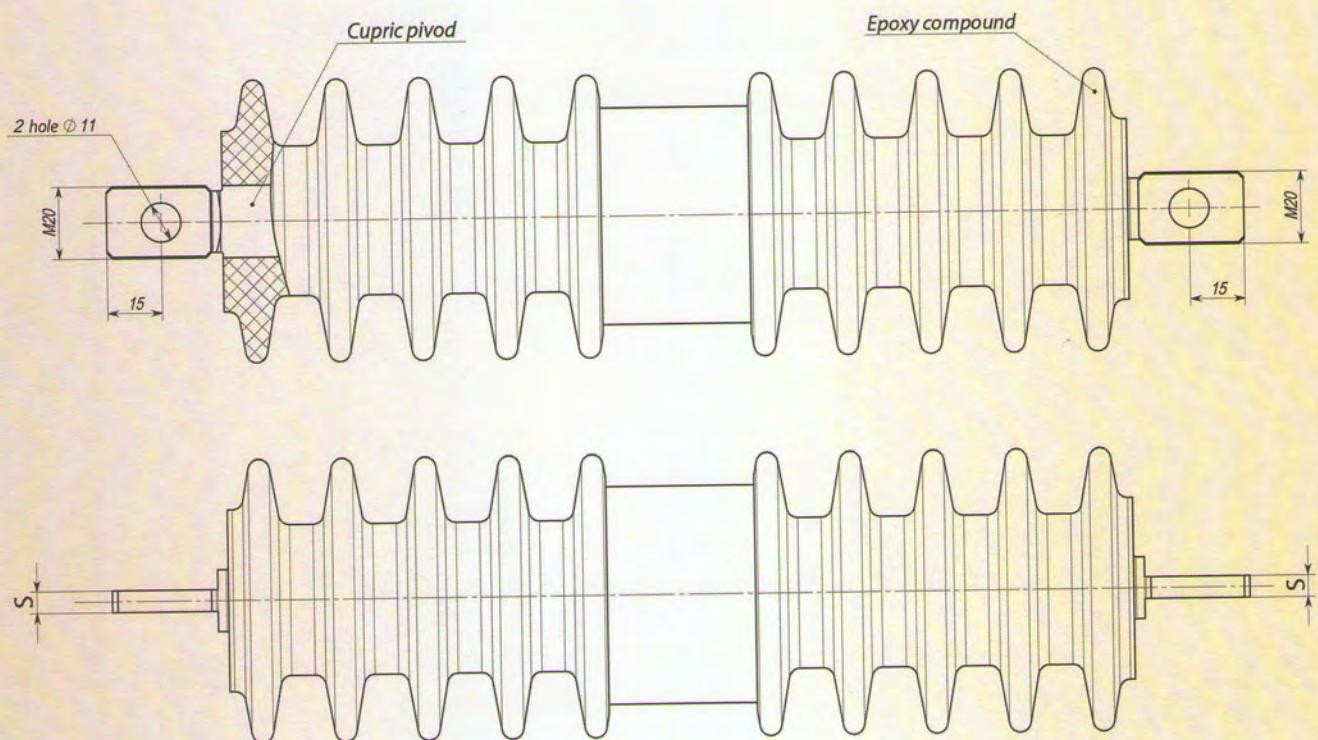
nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
nominal current, A	630
leakage path A to B, mm	230
bending strength, kN	2,5
mass, kg	2

Version ИПЭЛ 10-2,5-002-00 and 01

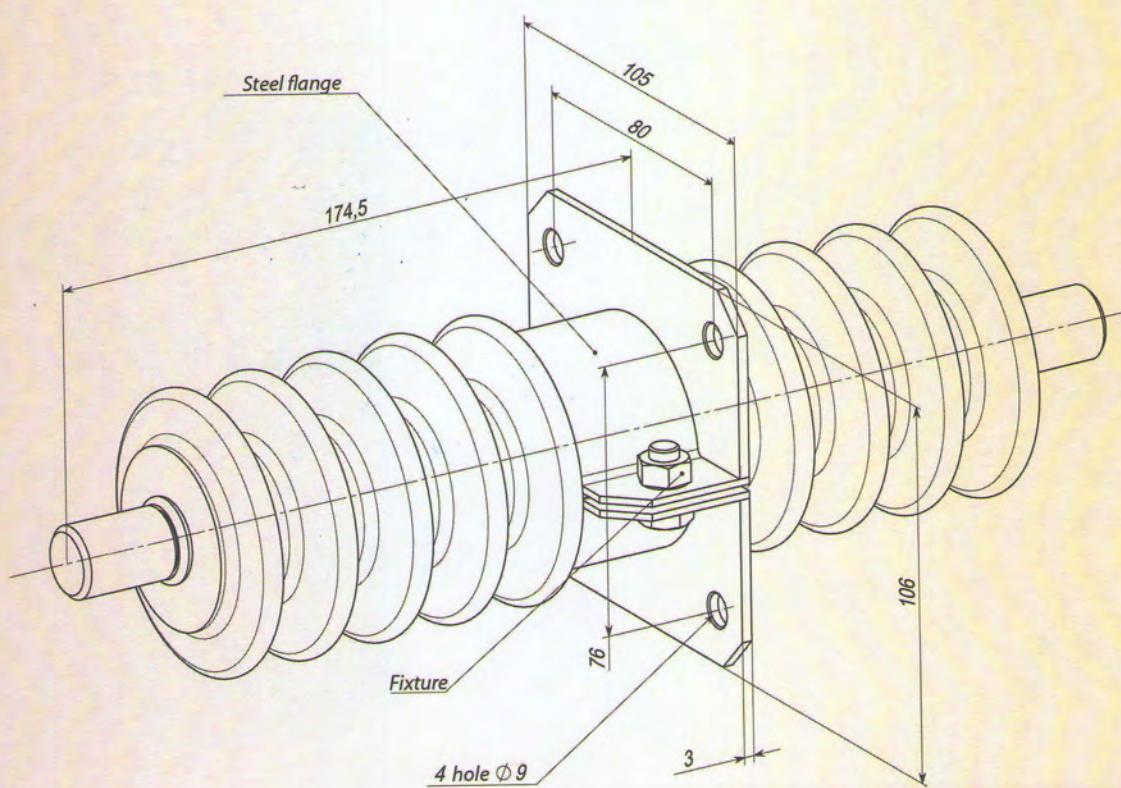


Type	D	S,mm
ИПЭЛ 10-2,5-002-00	M20	-
ИПЭЛ 10-2,5-002-01	M12	-
ИПЭЛ 10-2,5-002-02	-	6

Version ИПЭЛ 10-2,5-002-02



The Insulator with the steel flange IZI002-00-001-00:

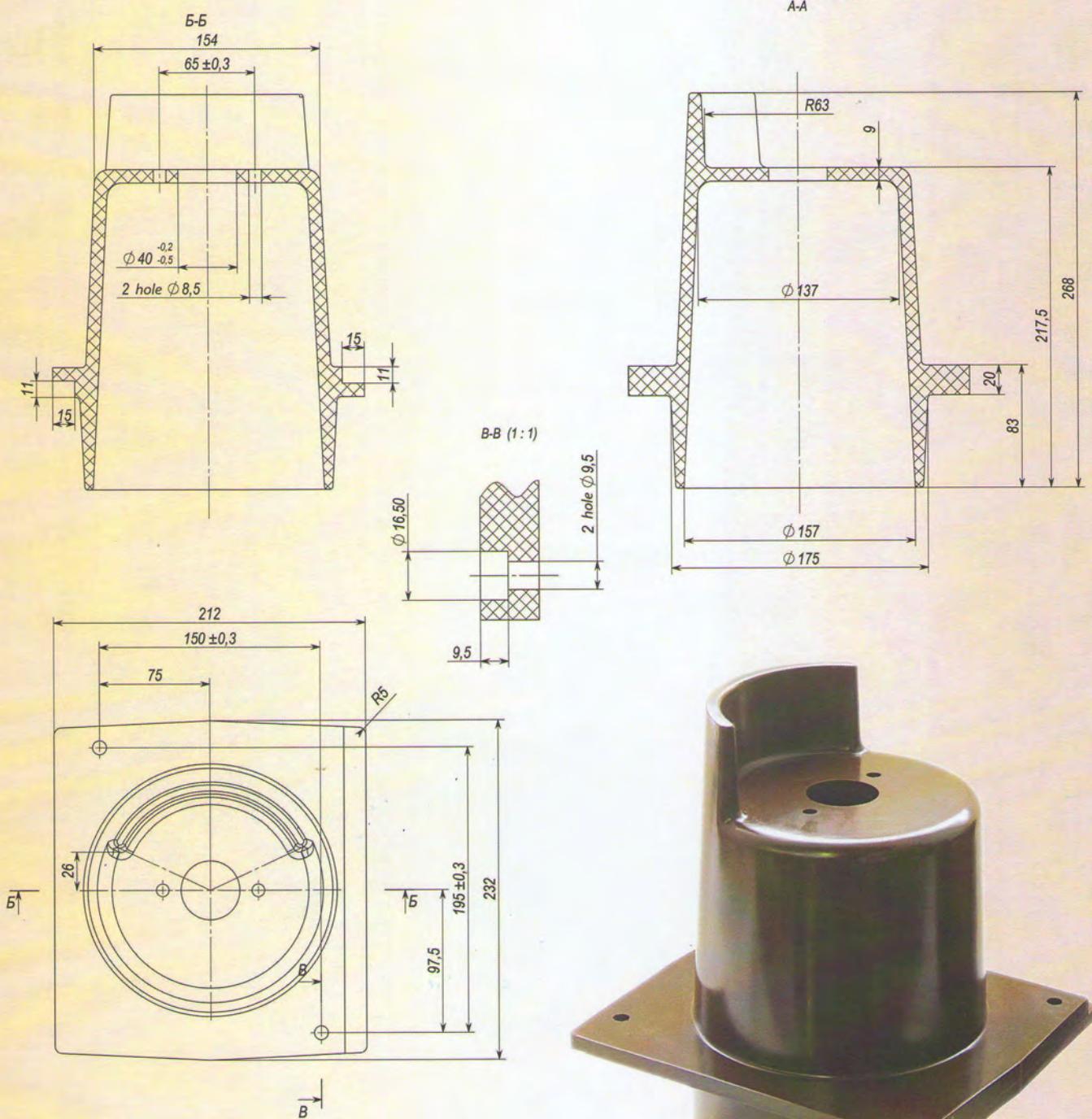




Straight-through insulator

ИПЭЛ 10-024-00 УХЛ2

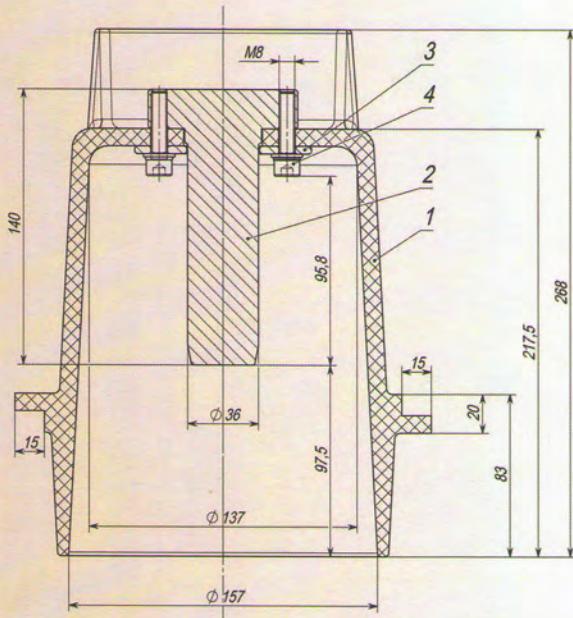
nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
max. mass, kg	2,9



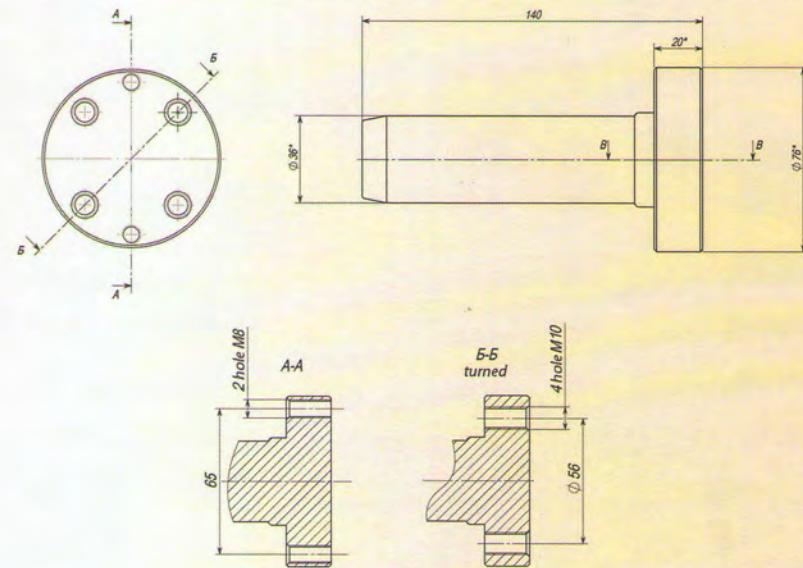
Straight-through insulator ИПЭЛС 10-024-00 УХЛ2



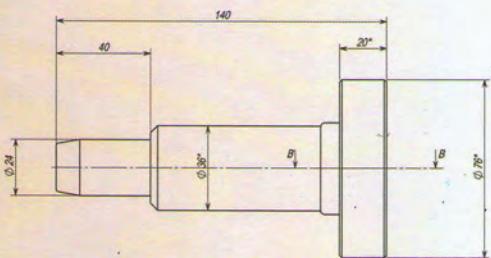
Pivot contact KC-36



- 1 - insulator
- 2 - pivot
- 3 - washer cutting
- 4 - fixture



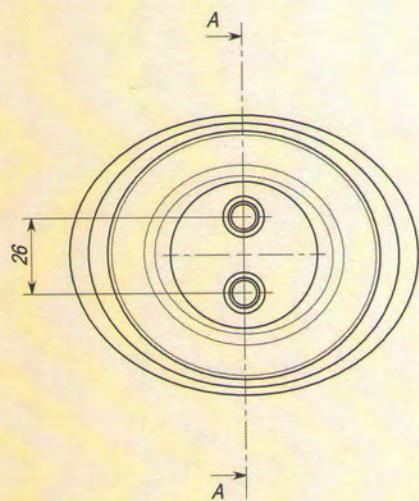
Pivot contact KC-24



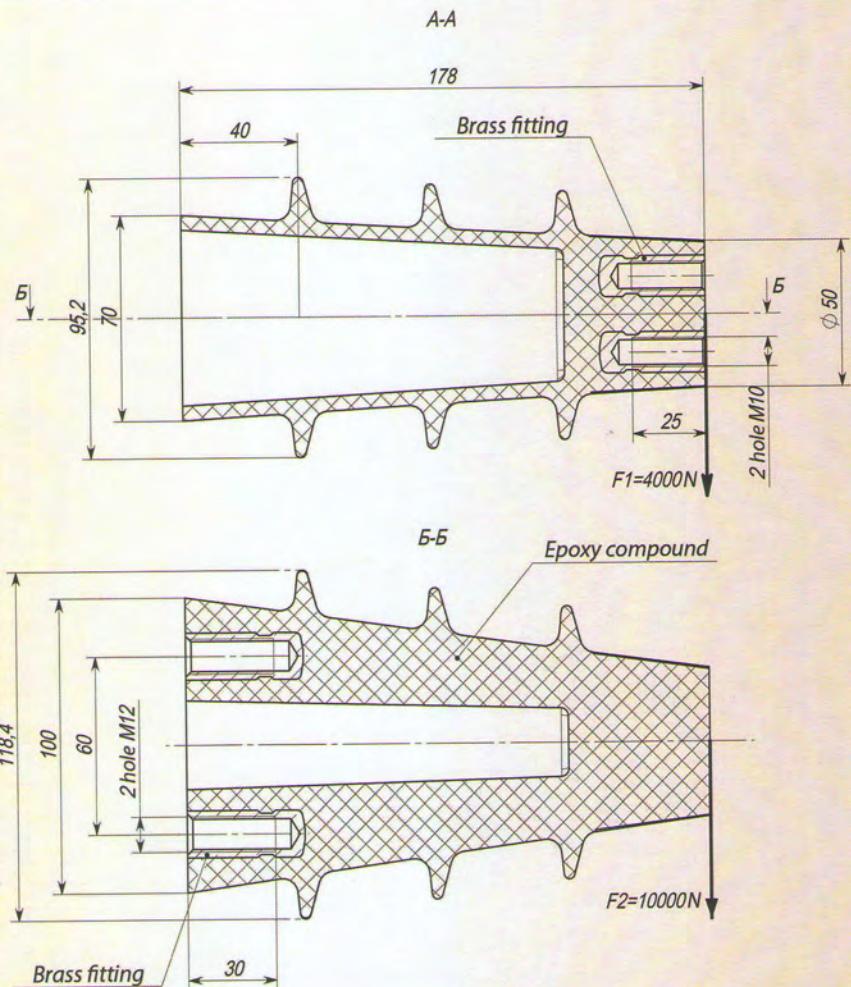
Type	Type pivot	operating current	Mass, kg
ИПЭЛС 10-024-00	KC-24	до 1000	5,48
ИПЭЛС 10-024-01	KC-36	до 1600	5,68



Supporting insulator ИЕЛ 10-4/10-042-00 УХЛ2

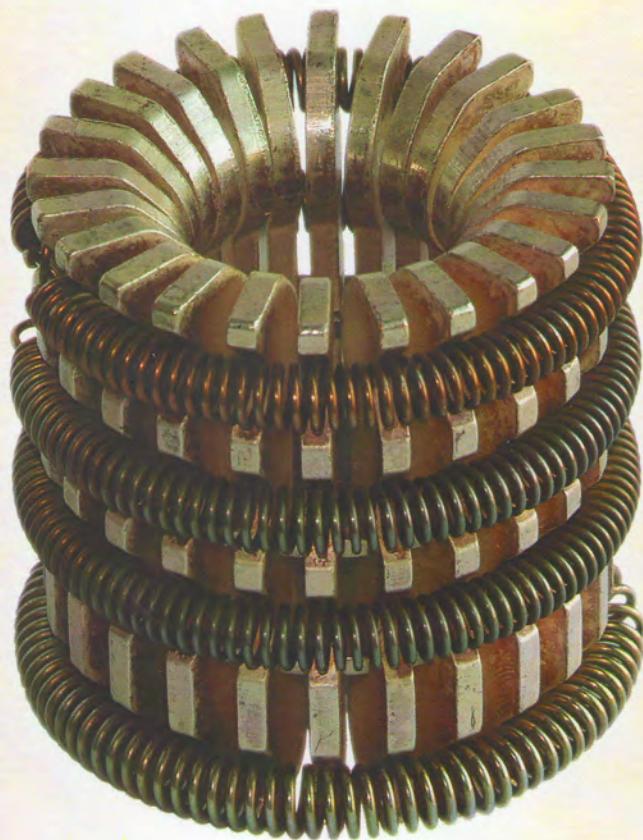
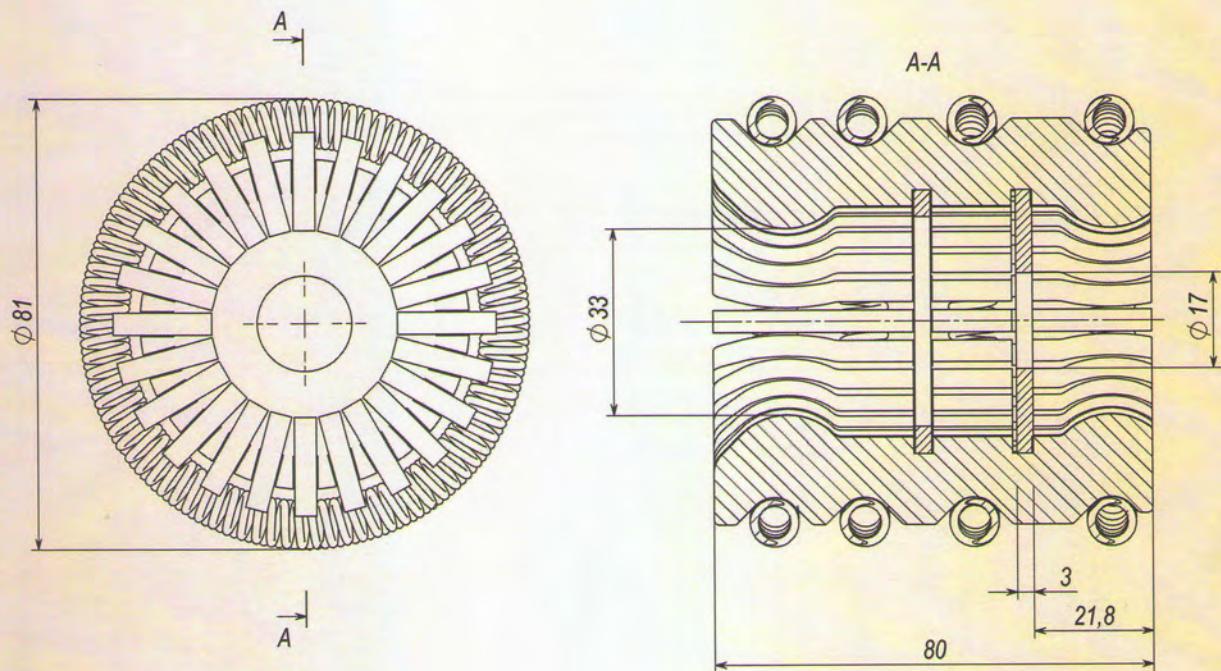


F1,F2 - bending strength



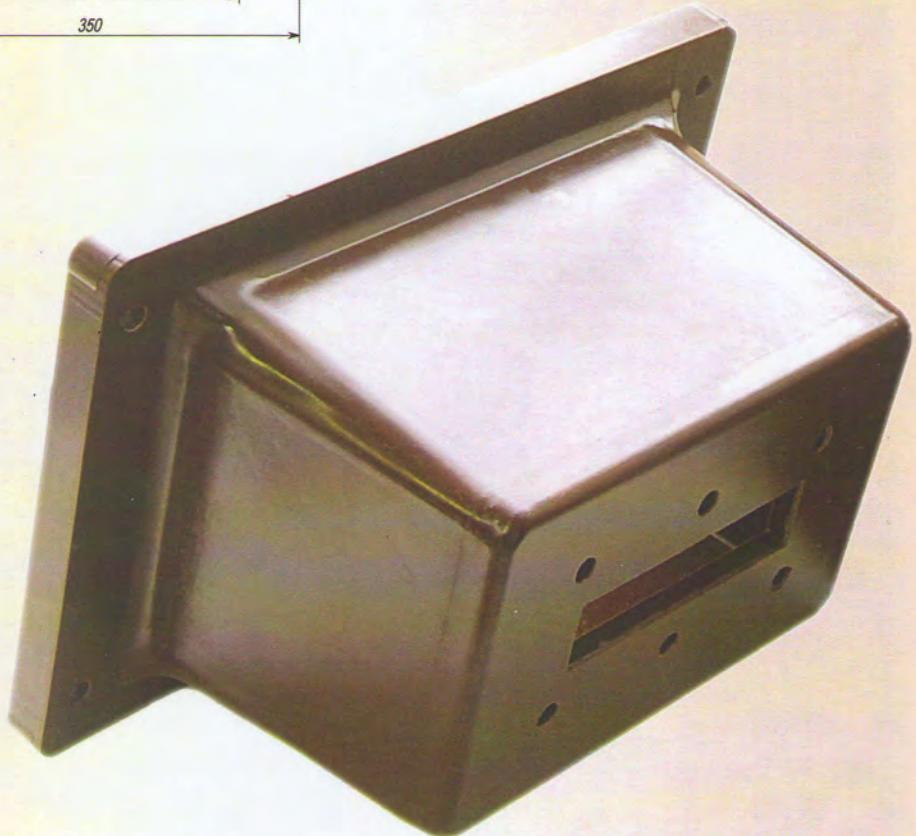
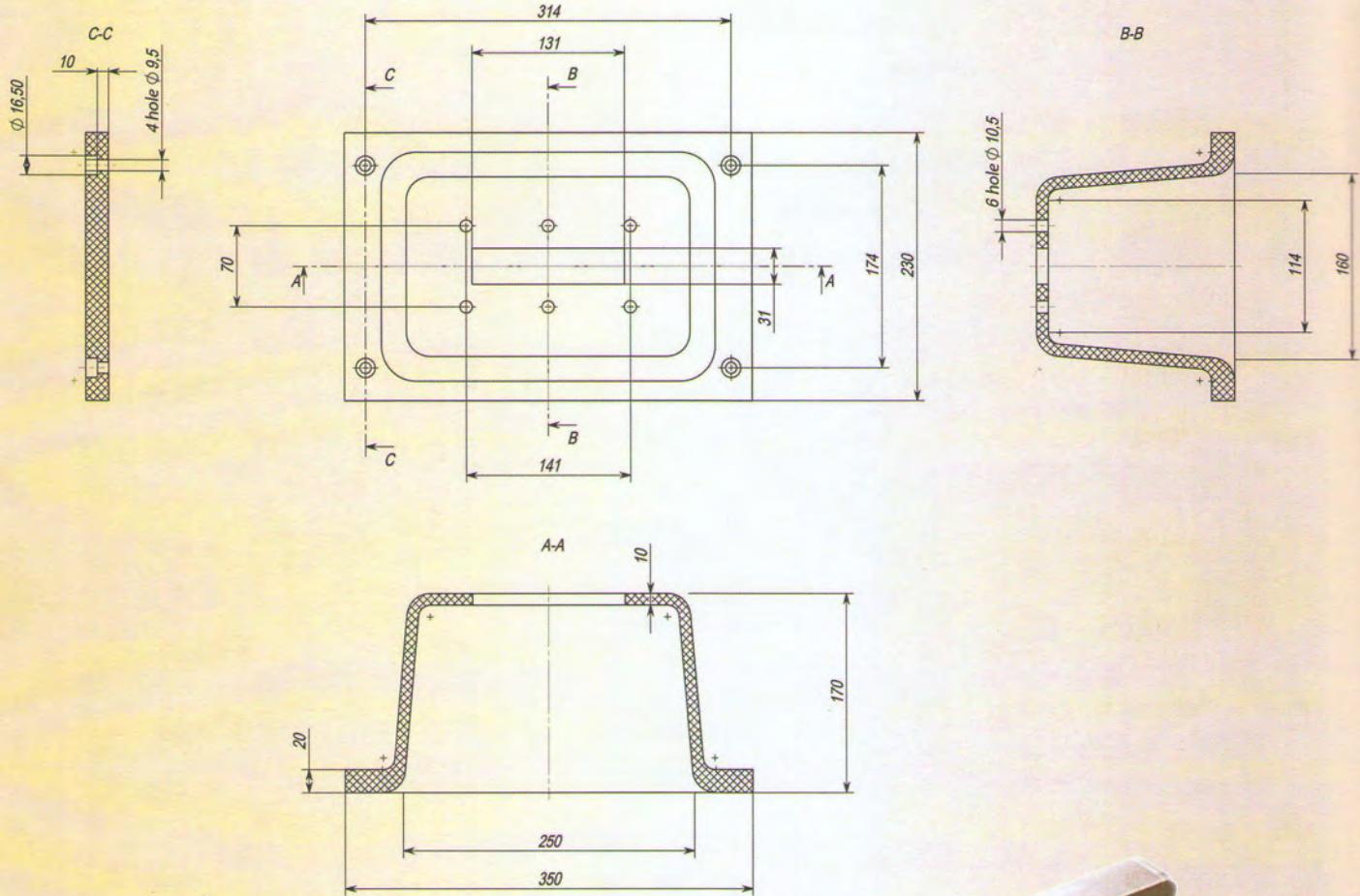
Mass 1,03 kg

Lamellated contact
КП 1600-01-00



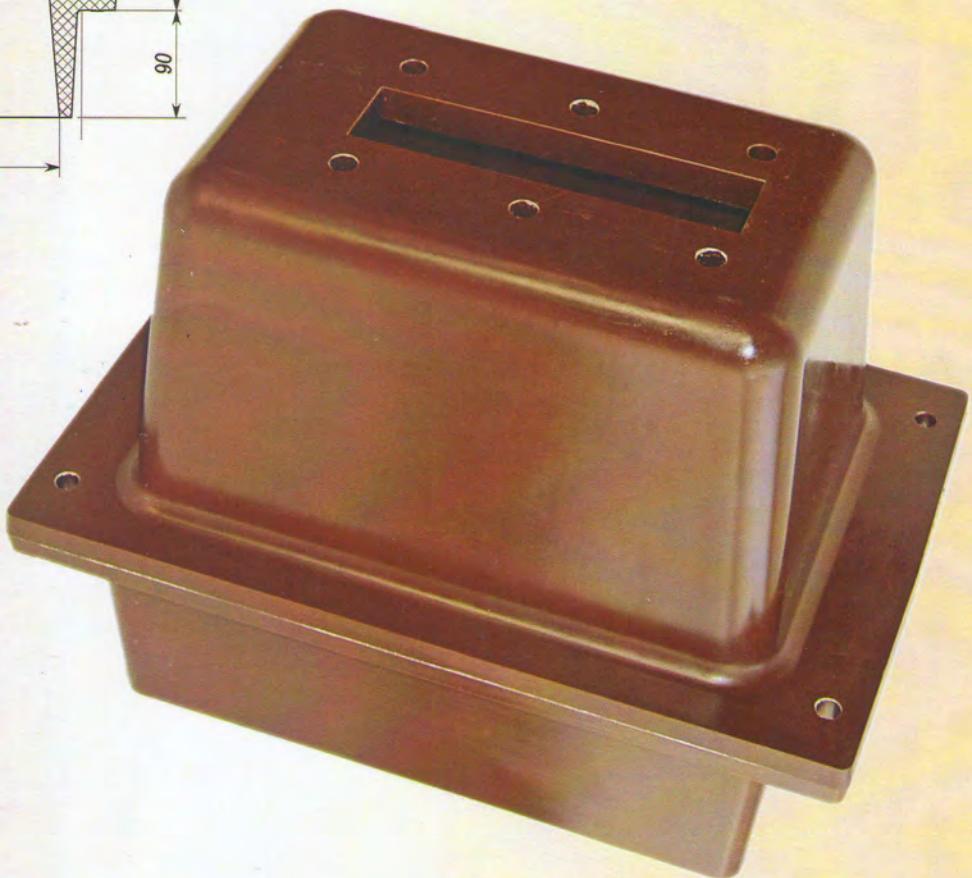
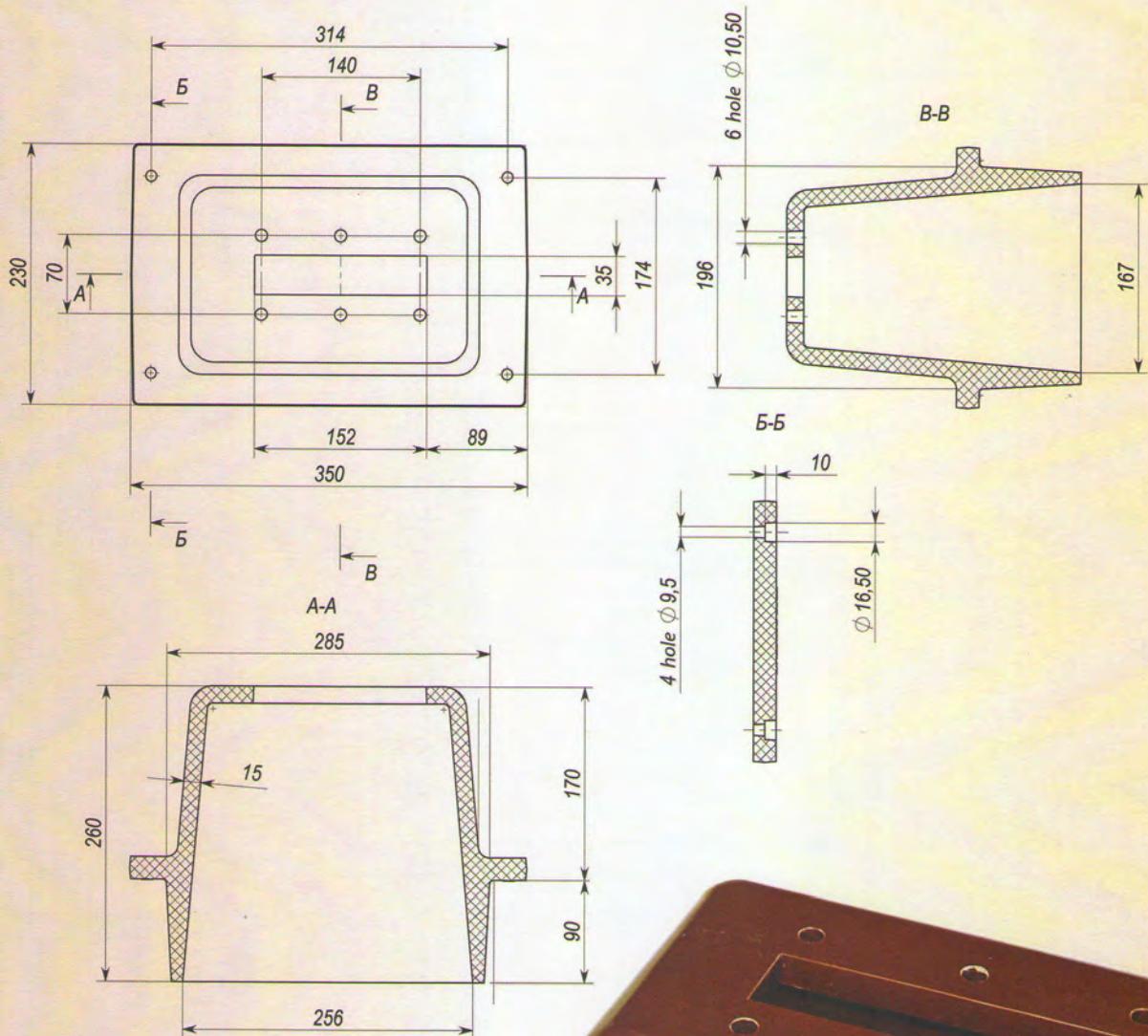
Mass 1,1 kg

Straight-through insulator
ИПЭЛ 3-030-00 УХЛ2



Mass 4,1 kg

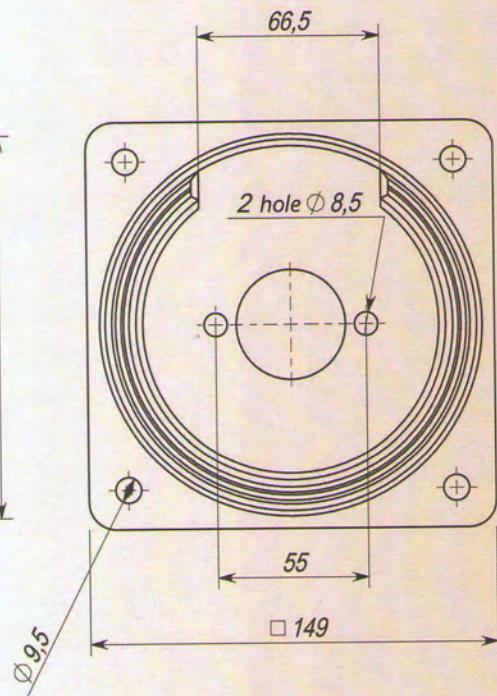
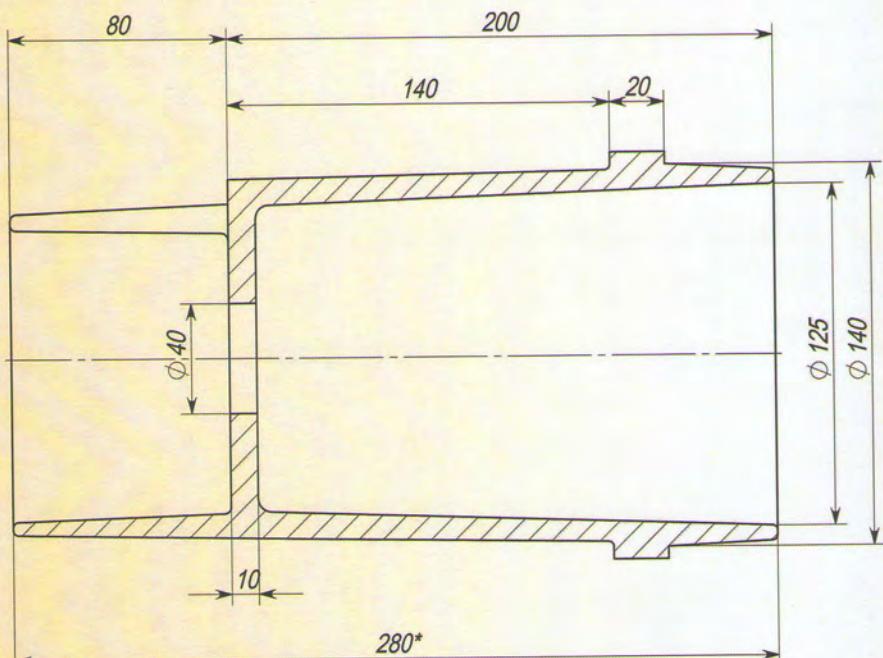
Straight-through insulator ИПЛН 10-005-00 УХЛ2



Mass 7,63 kg

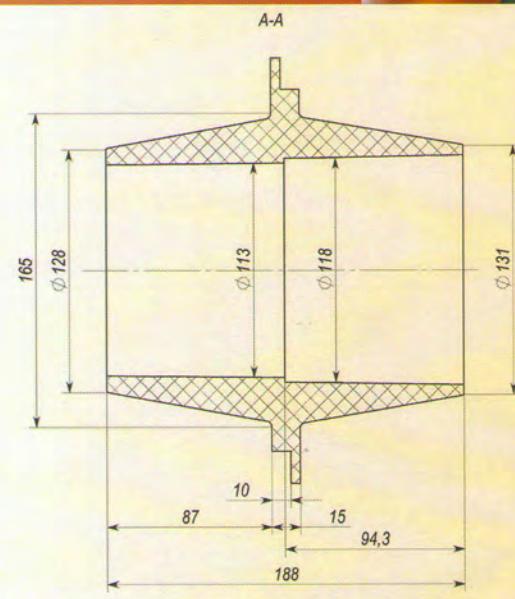
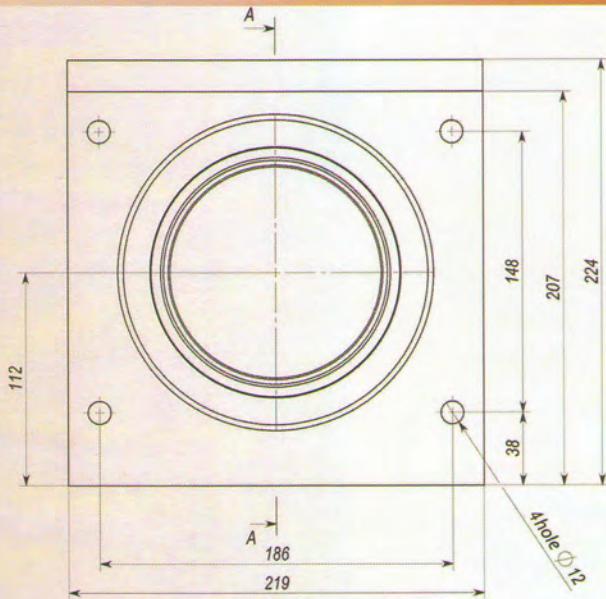


Straight-through insulator ИПЭЛ 10-060-00 УХЛ2

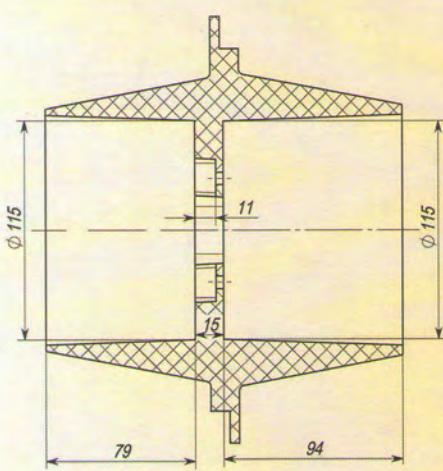
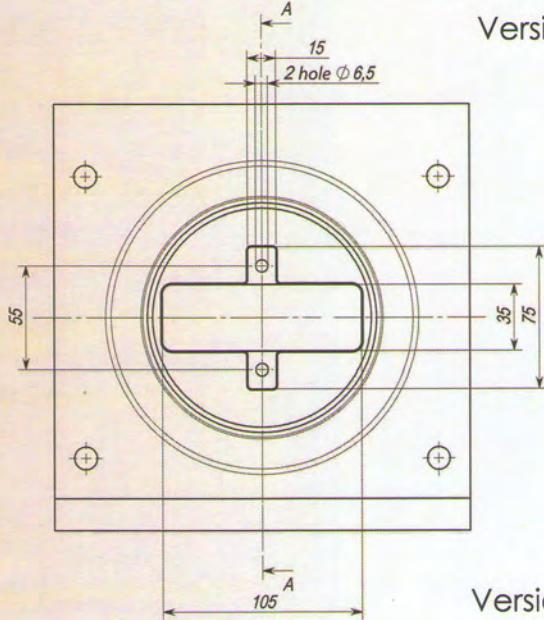


Mass 1,9 kg

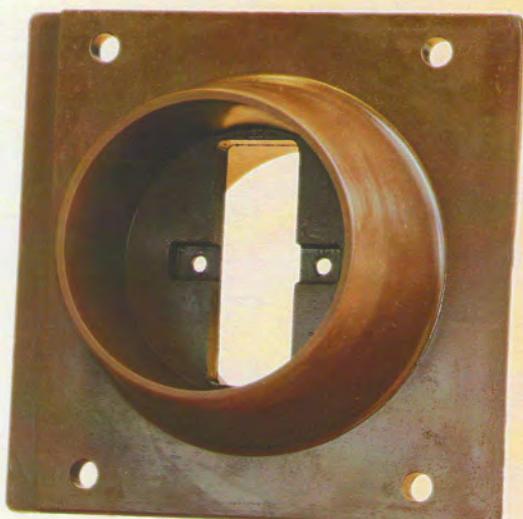
Straight-through insulator ИПЭЛ 10-006-00 УХЛ2



Version 10-006-00



Version 10-006-01



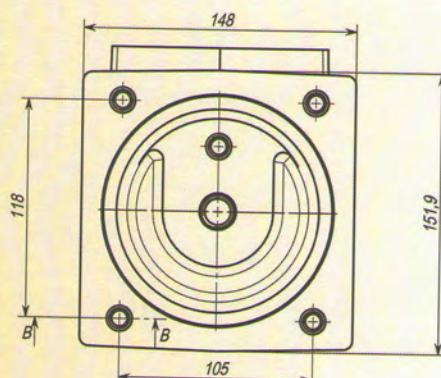
Mass 3,0 kg

Straight-through insulator ИПЭЛ 10-062-00 УХЛ2

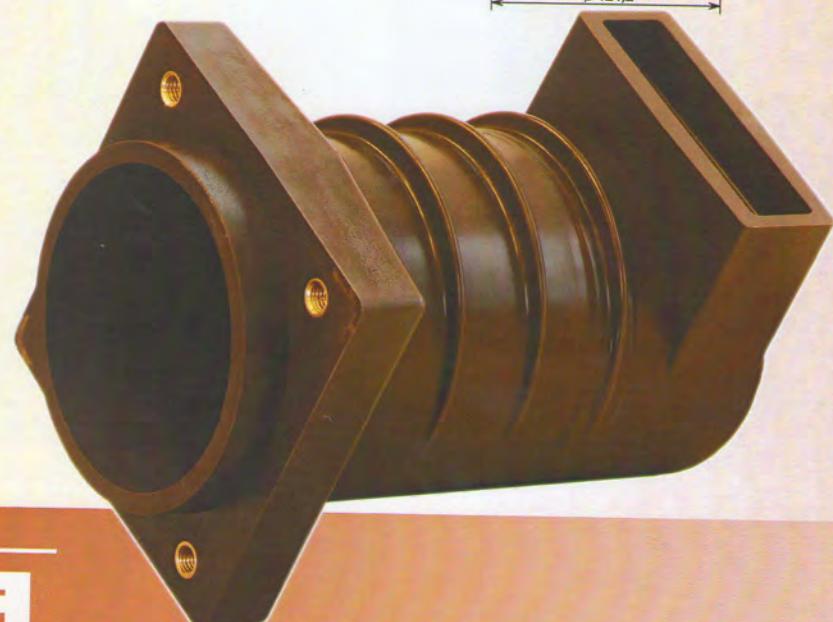
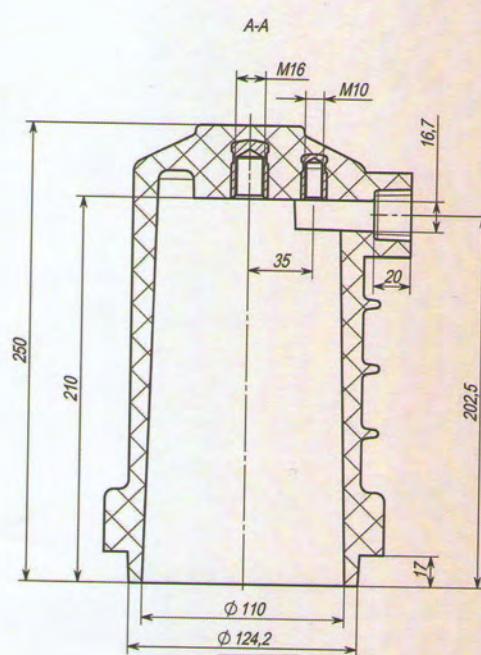
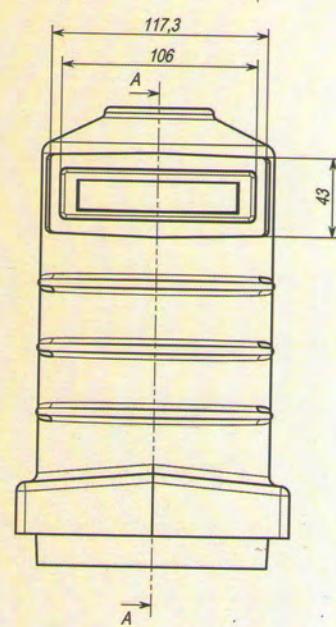
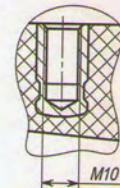
ИПЭЛ 10-062-00 УХЛ2 straight-through insulator
(TU 3494-006-73361303-2007)

Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
mass, kg	2,9



B-B (1 : 1)



Straight-through insulator

ИПЭЛ 10-075-00 УХЛ2

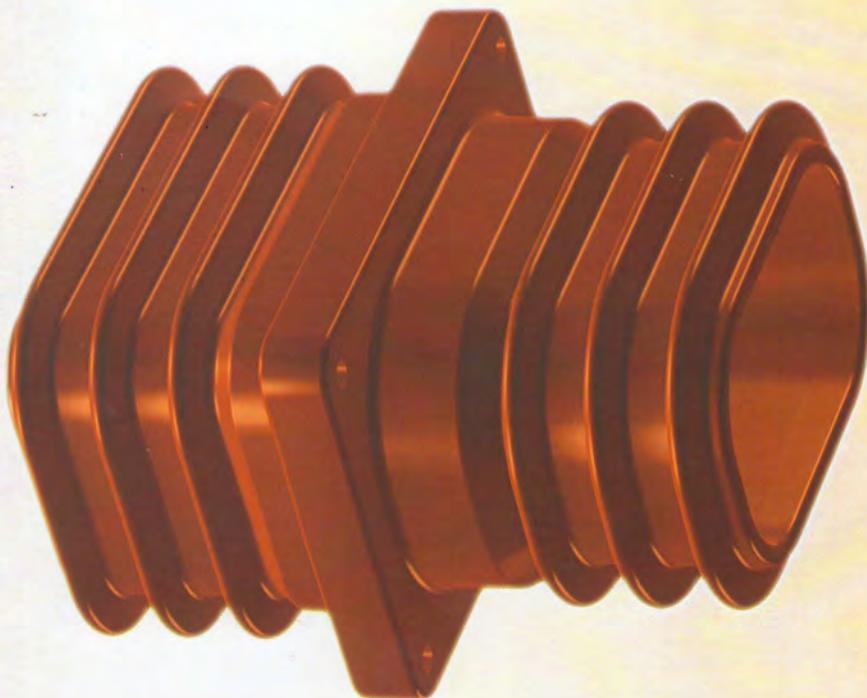
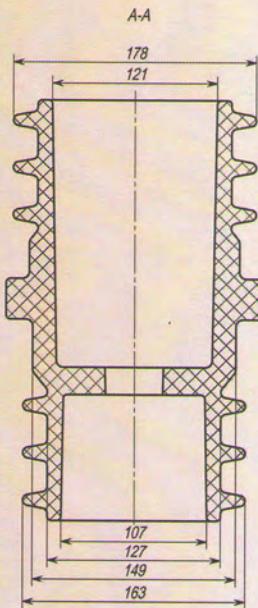
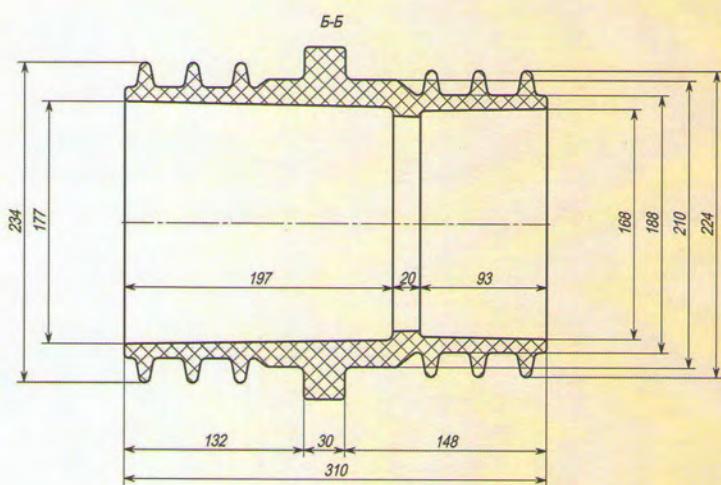
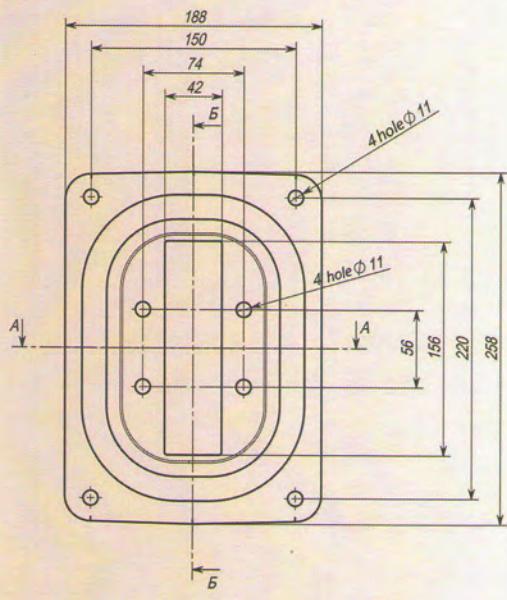


ИПЭЛ 10-075-00 УХЛ2 straight-through insulator

(TU 3494-006-73361303-2007)

Meets the requirements of GOST R 1516.3-96 and IEC 273

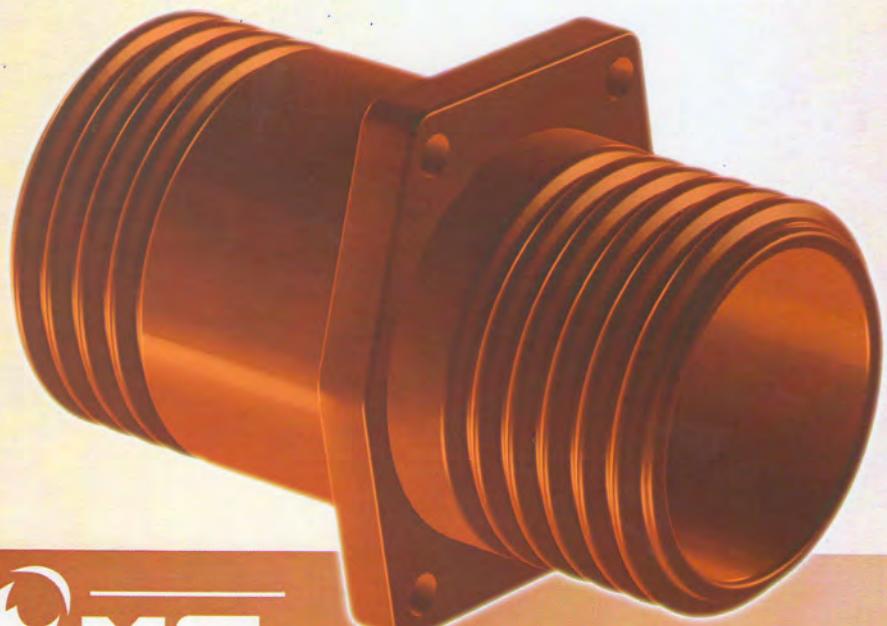
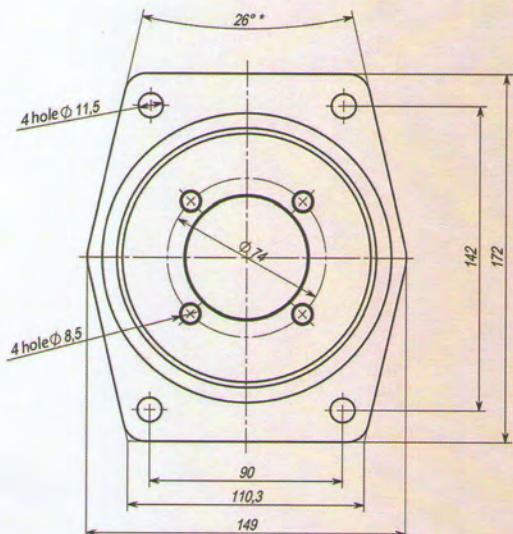
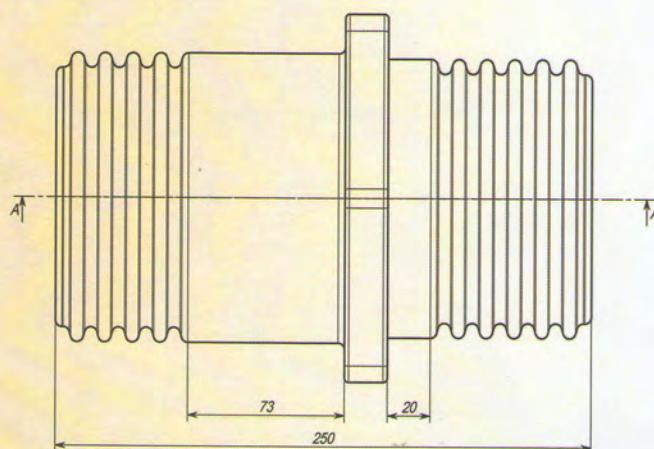
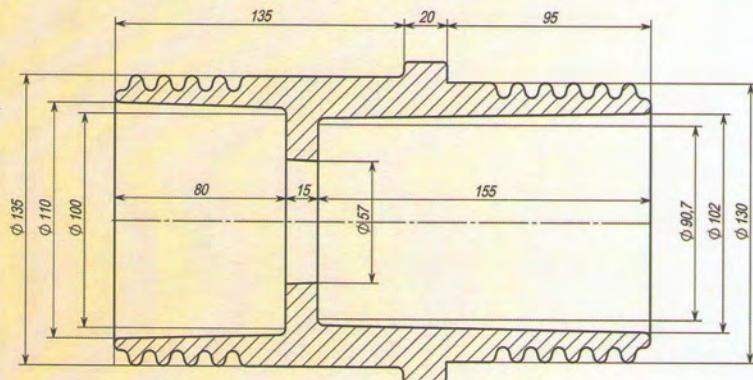
nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
max. mass, kg	6,9



Straight-through insulator ИПЭЛ 10-076-00 УХЛ2

ИПЭЛ 10-076-00 УХЛ2 straight-through insulator
(TU 3494-006-73361303-2007)
Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
max. mass, kg	2,7



Straight-through insulator

ИПЭЛ 10-077-00 УХЛ2



ИПЭЛ 10-077-00 УХЛ2 straight-through insulator

(TU 3494-006-73361303-2007)

Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV

10

max. operating voltage, kV

12

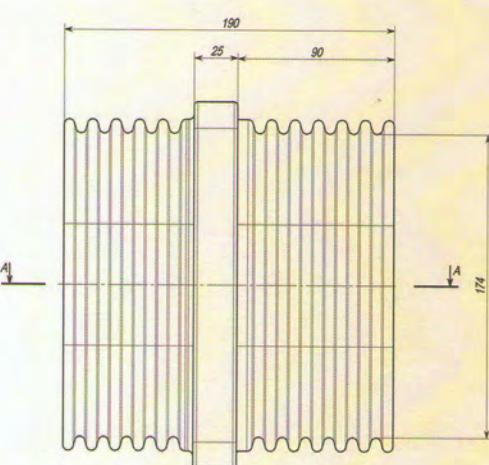
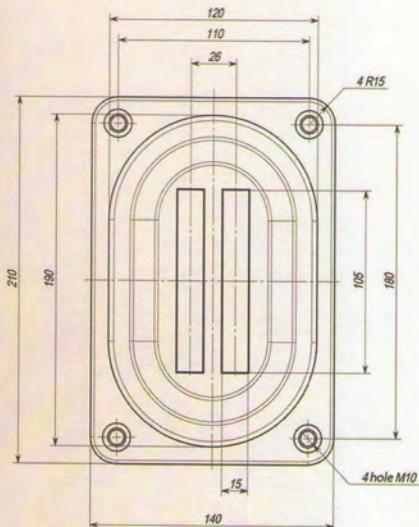
5-minutes testing voltage of industrial frequency, kV

42

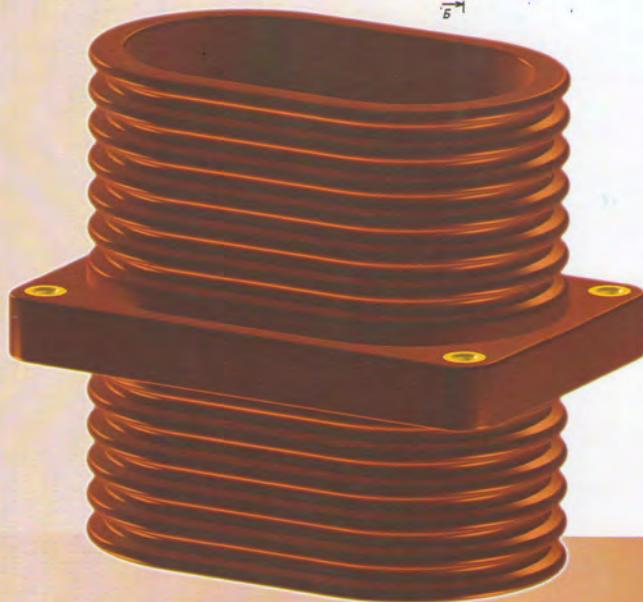
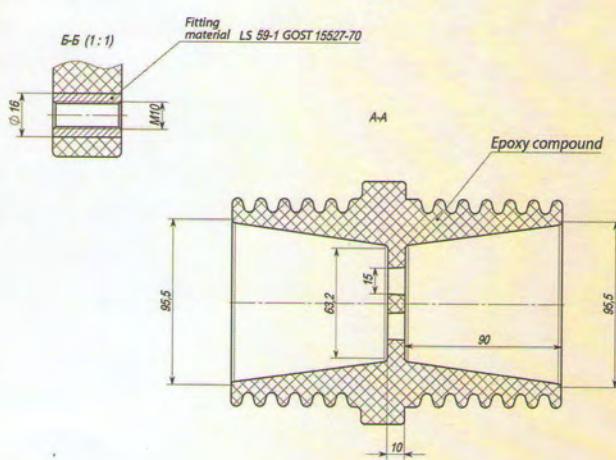
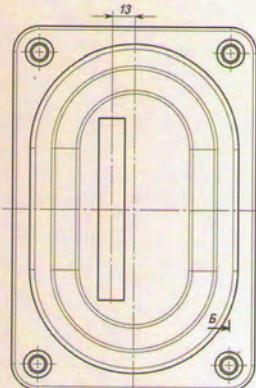
mass, kg

3,4

Version 10-077-00



Version 10-077-01

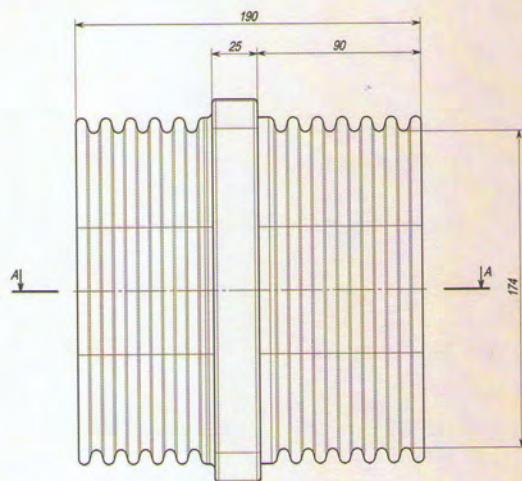
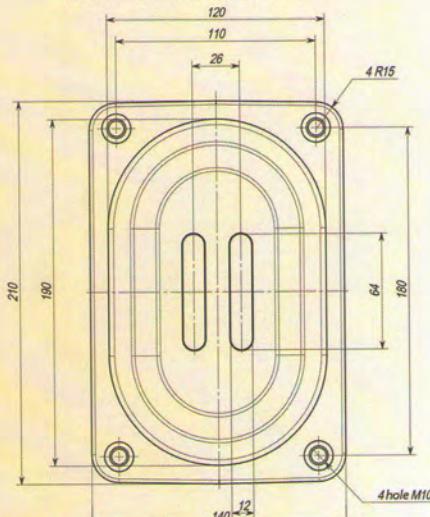


Straight-through insulator ИПЭЛ 10-077-02 УХЛ2

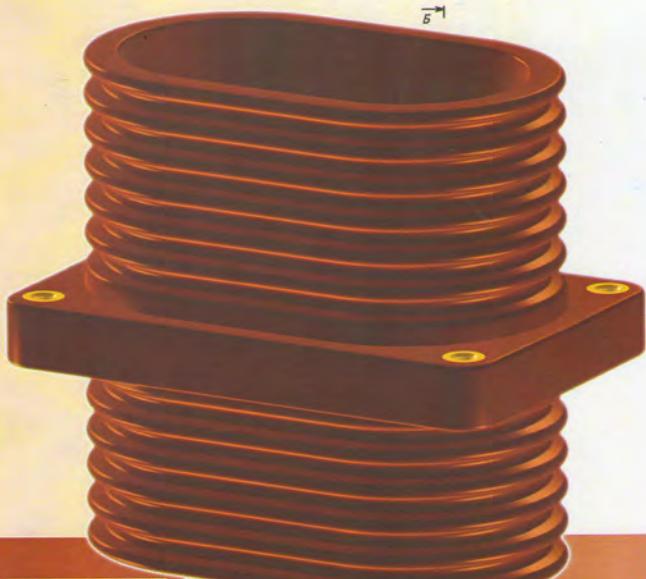
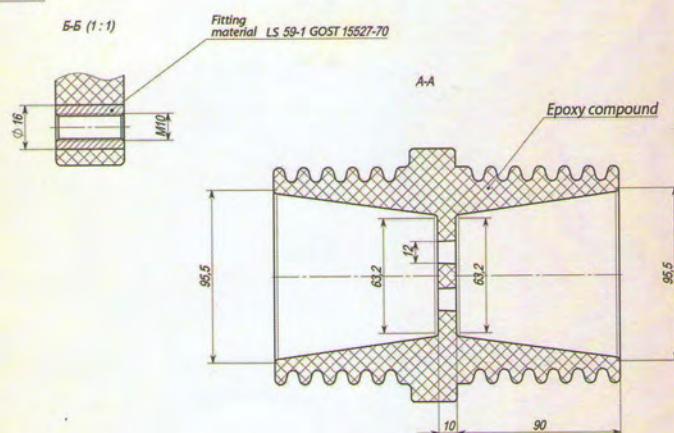
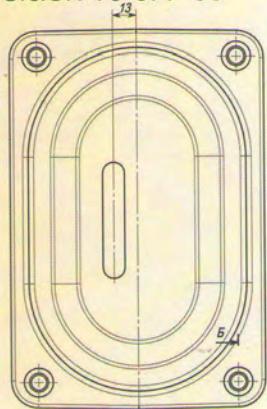
ИПЭЛ 10-077-02 УХЛ2 straight-through insulator
(TU 3494-006-73361303-2007)
Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
mass, kg	3,4

Version 10-077-02



Version 10-077-03



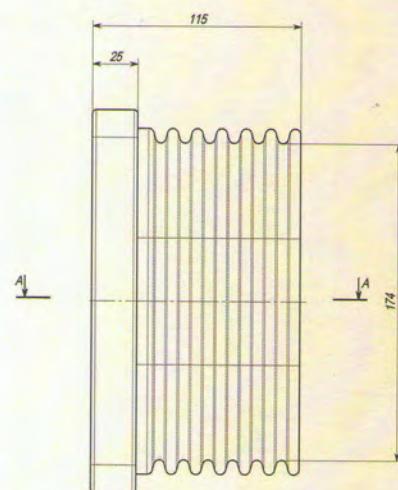
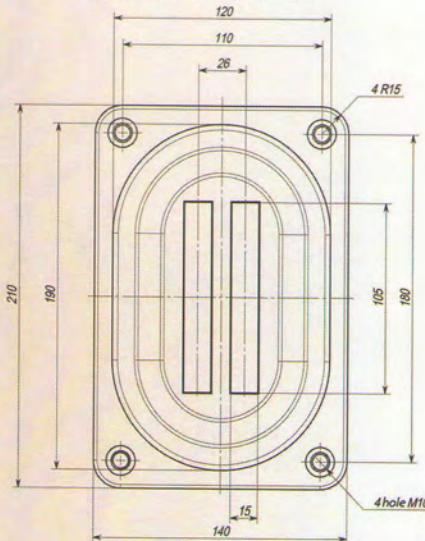
Straight-through insulator ИПЭЛТ 10-077-10 УХЛ2

ИПЭЛТ 10-077-10 УХЛ2 straight-through insulator
(TU 3494-006-73361303-2007)

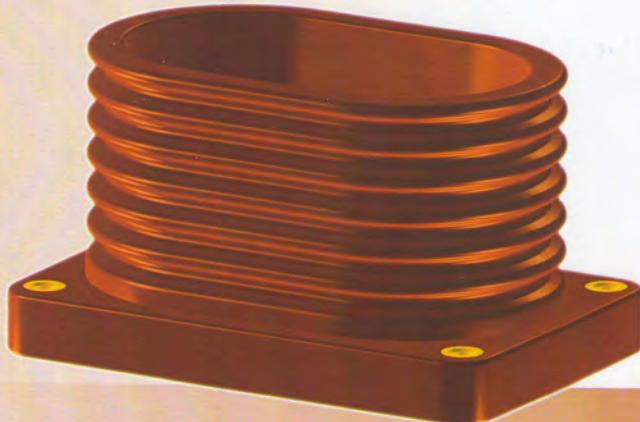
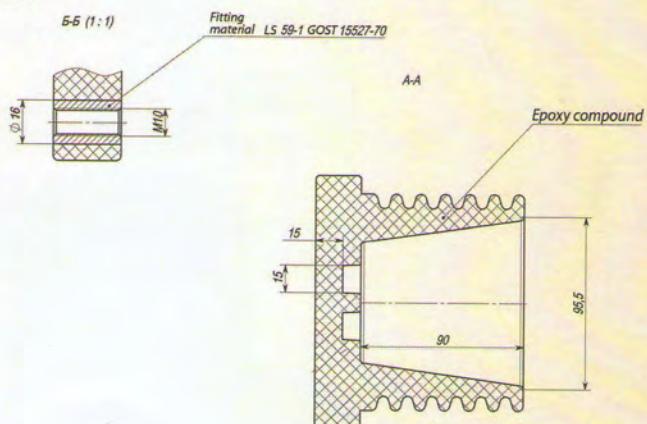
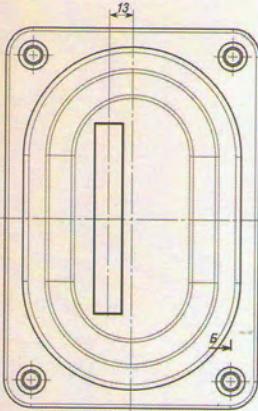
Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
mass, kg	2,6

Version 10-077-10



Version 10-077-11

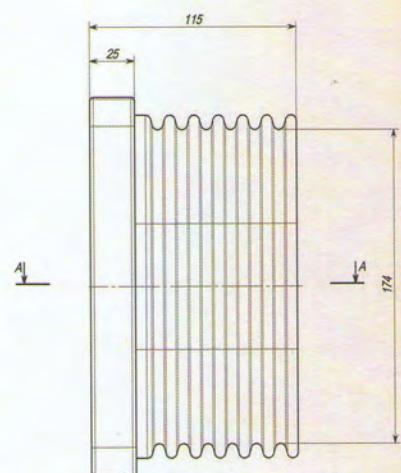
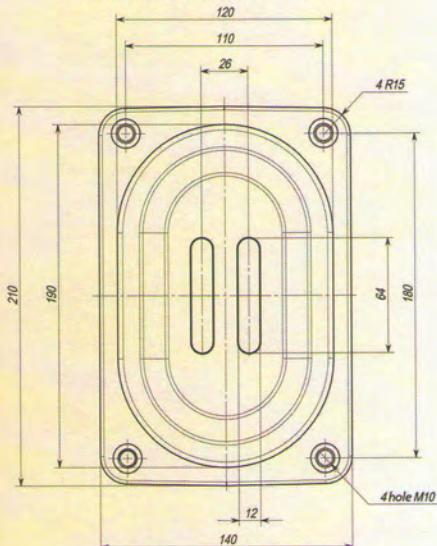


Straight-through insulator ИПЭЛТ 10-077-12 УХЛ2

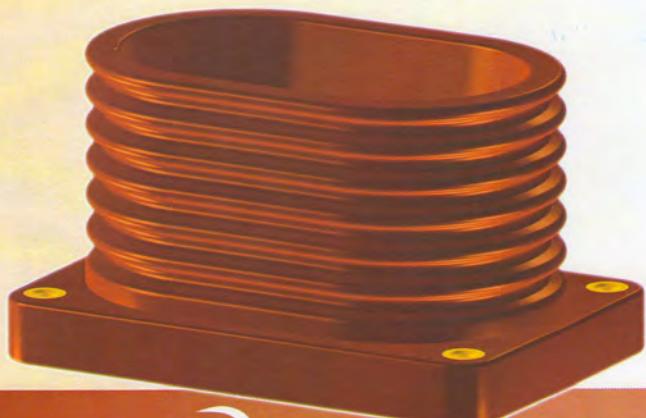
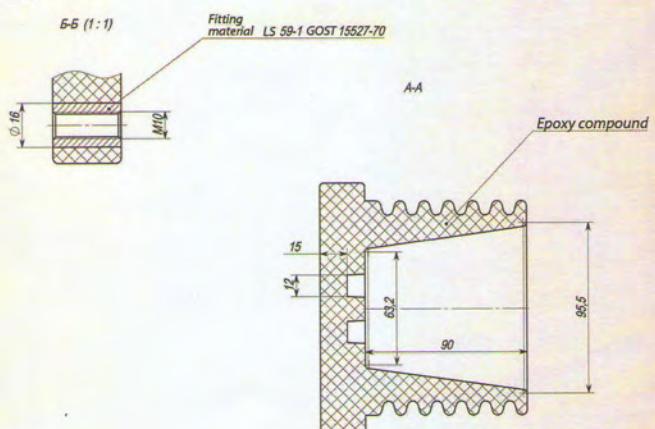
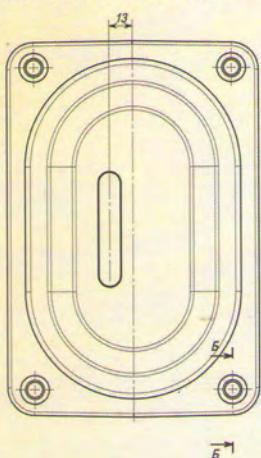
ИПЭЛТ 10-077-12 УХЛ2 straight-through insulator
(TU 3494-006-73361303-2007)
Meets the requirements of GOST R 1516.3-96 and IEC 273

nominal operating voltage, kV	10
max. operating voltage, kV	12
5-minutes testing voltage of industrial frequency, kV	42
mass, kg	2,6

Version 10-077-12

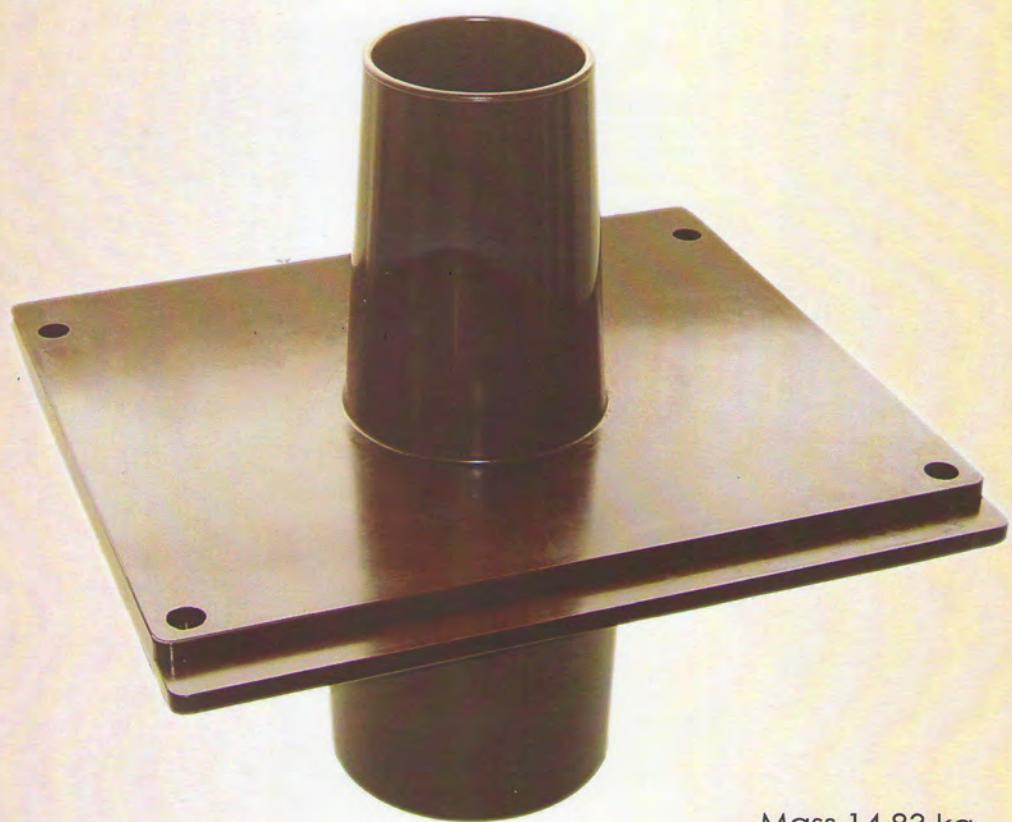
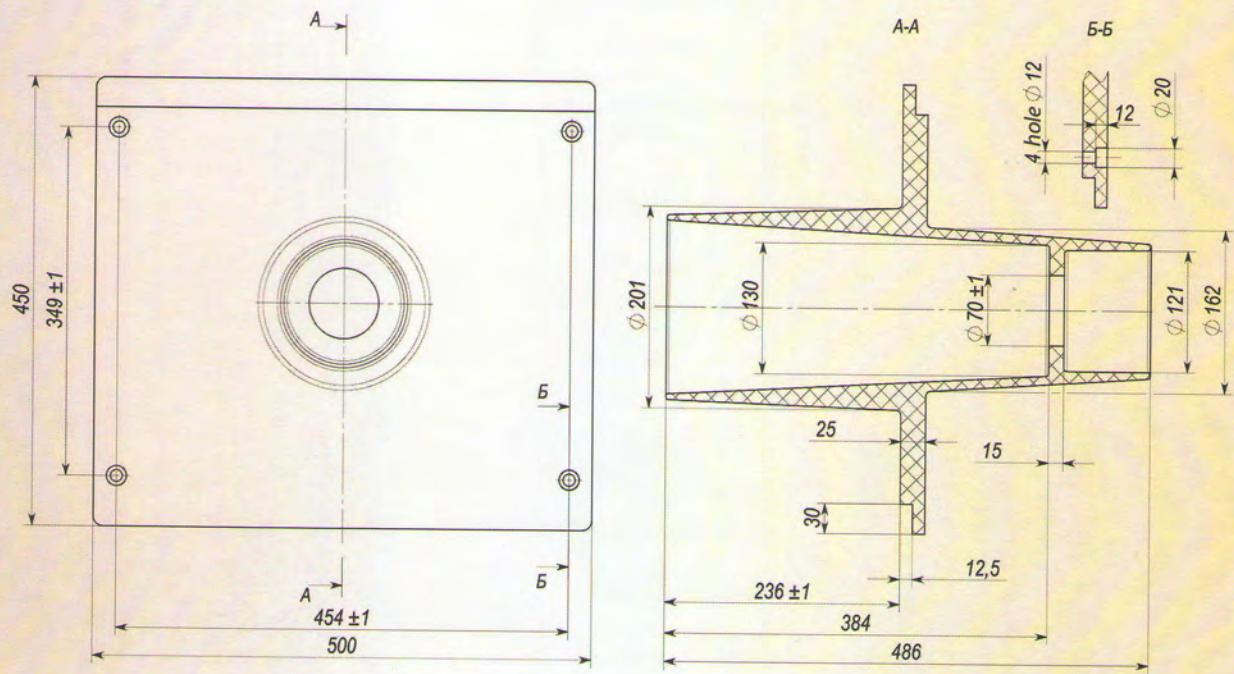


Version 10-077-13



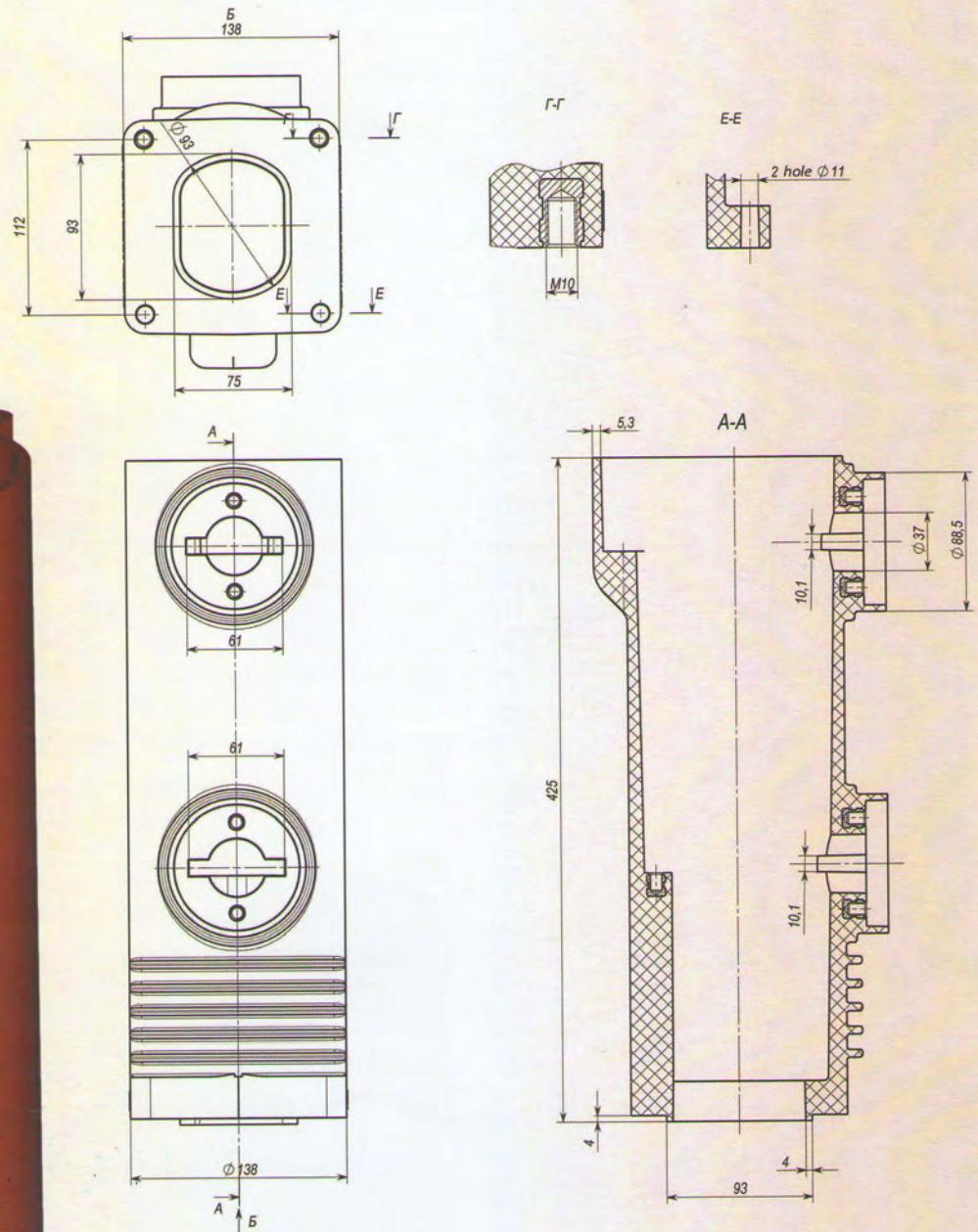
Straight-through insulator

ИПЭЛ 35-023-00 УХЛ2



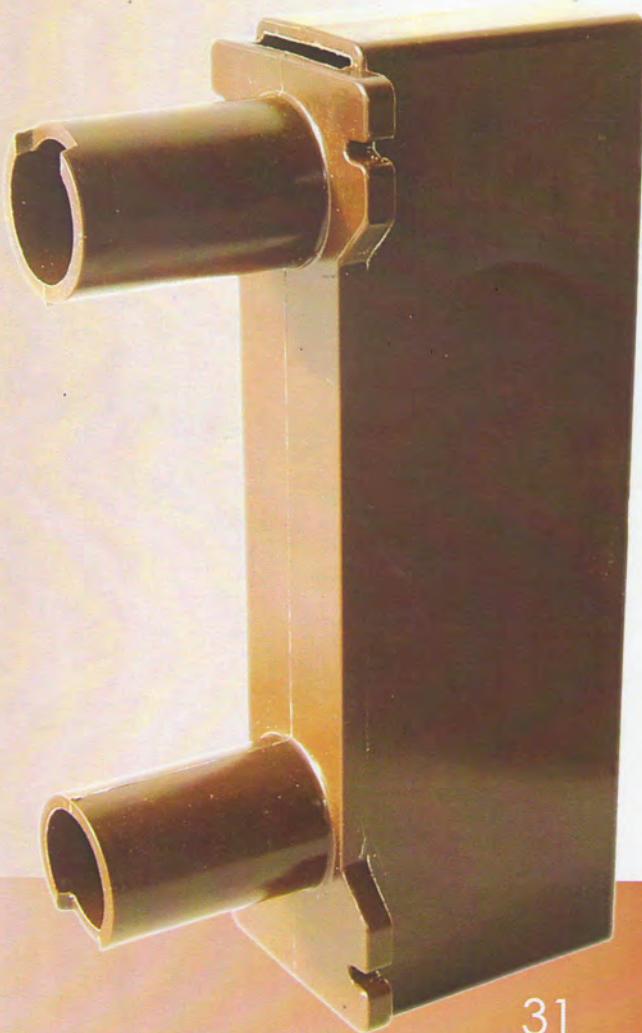
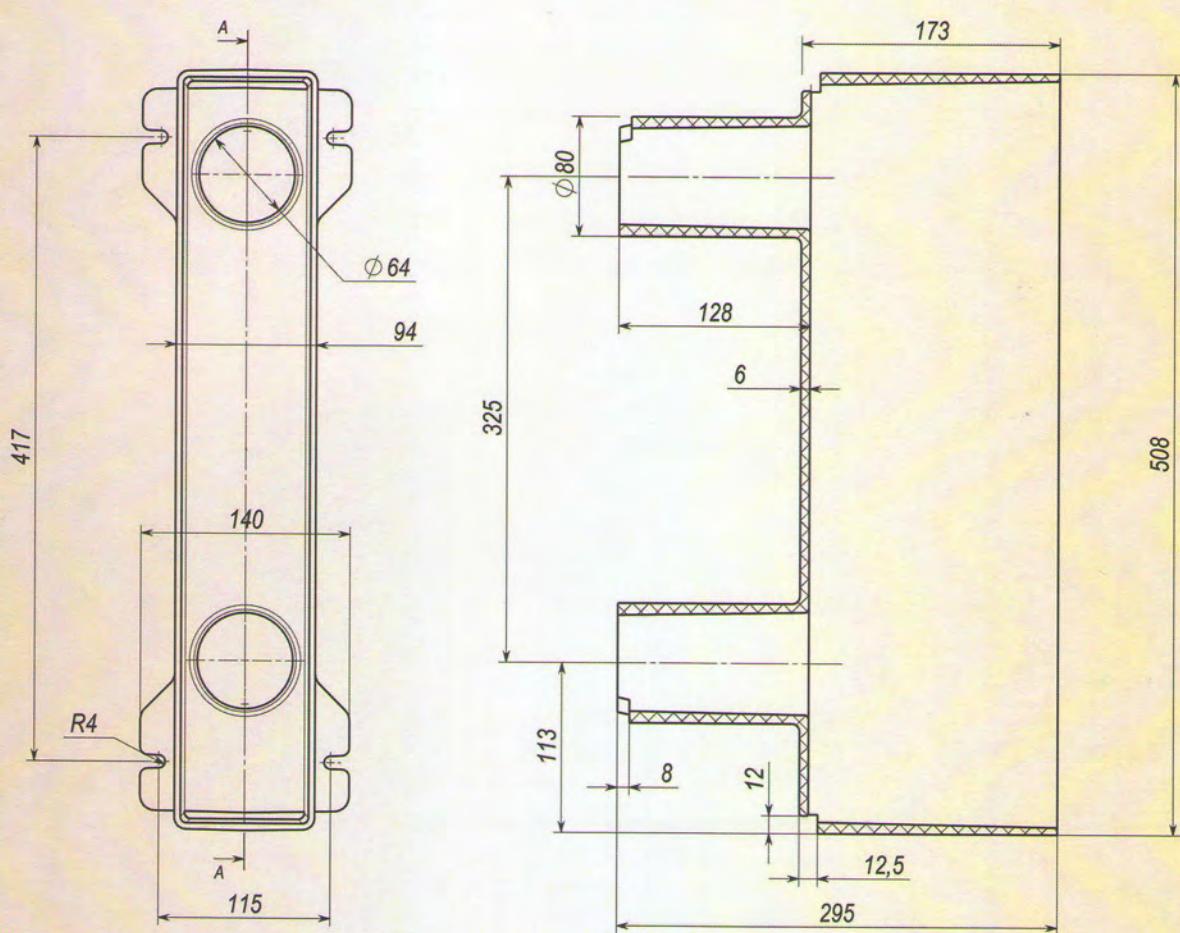
Mass 14,83 kg

Insulating body
КИЭЛ 10-027-00 УХЛ2



Mass 3,95 kg

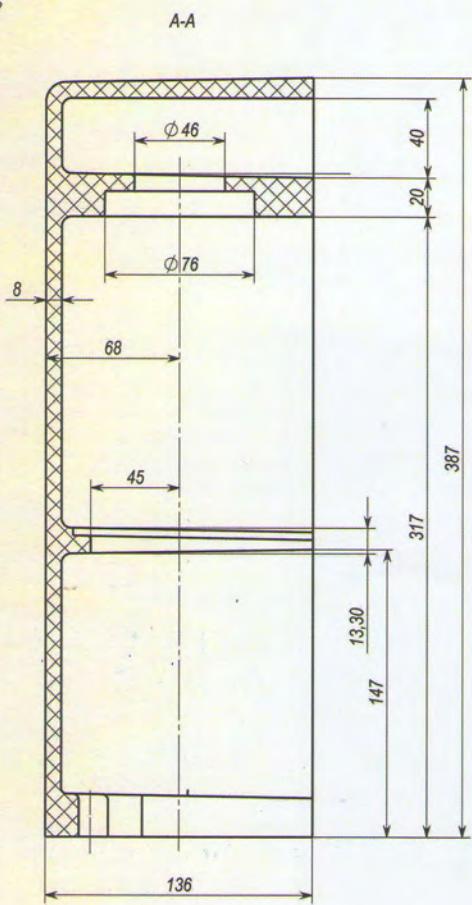
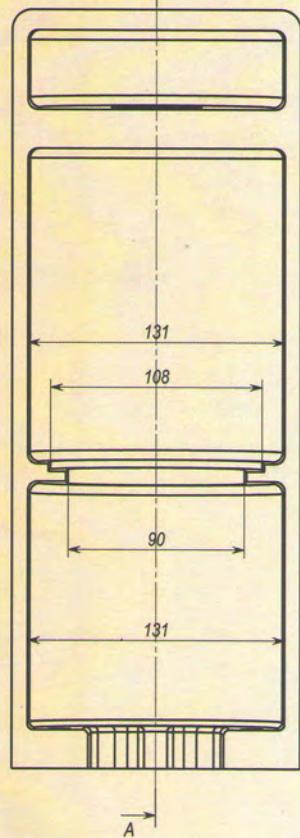
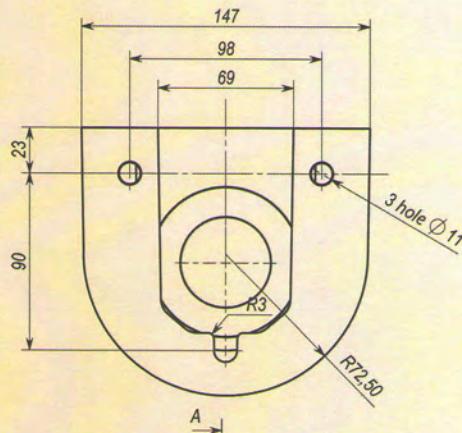
Insulating body
ИКЭЛ 10-001-00 УХЛ2



Mass 3,41 kg



Insulating body КИЭЛ 10-008-00 УХЛ2

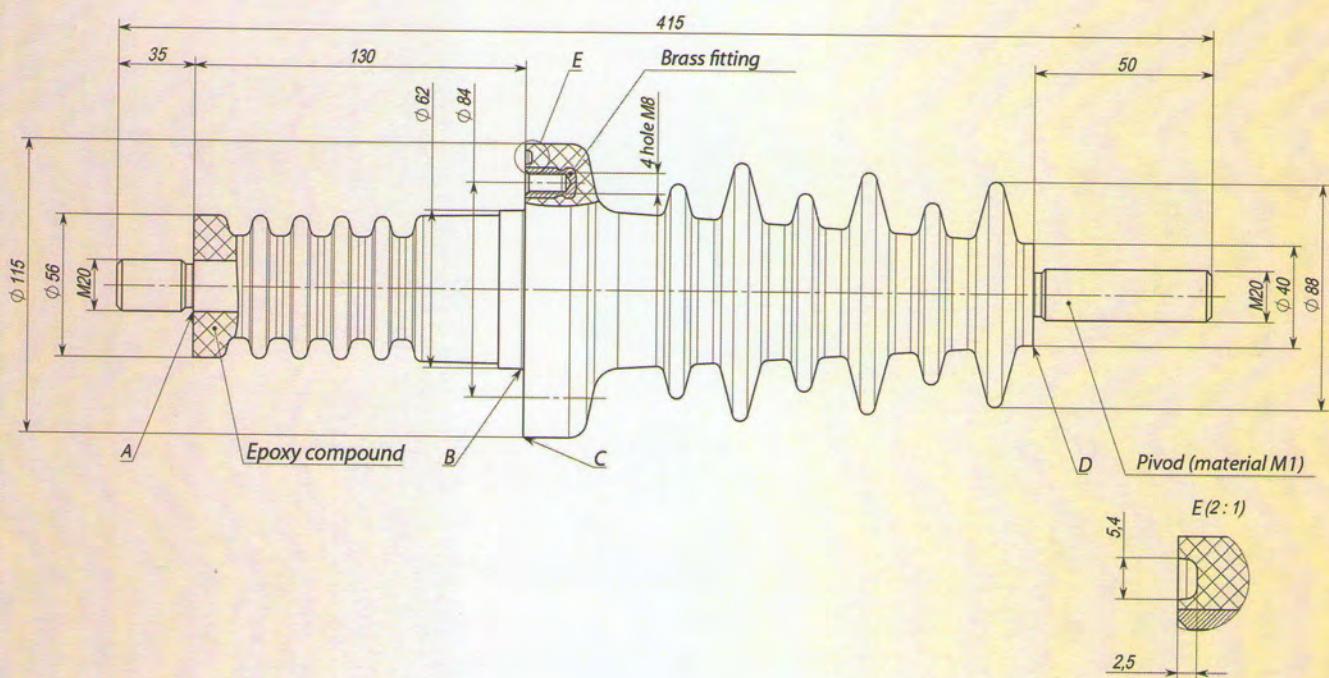


Mass 3,13 kg

Straight-through insulator ИПЭЛ 10-5-045-00



nominal operating voltage, kV	10
nominal current, A	630
leakage path A to B, mm	198
leakage path C to D, mm	367
mass, kg	3,13



Type	Climatic version GOST 15150
ИПЭЛ 10-5-045-00	УХЛ2
ИПЭЛ 10-5-045-00С	УХЛ1

Current conductor

nominal operating voltage, kV	6 to 10
nominal operating current, A	630 to 4000
nominal current electrodynamic firmness, kA	< 100
type	closed, rectangular, УХЛ 2

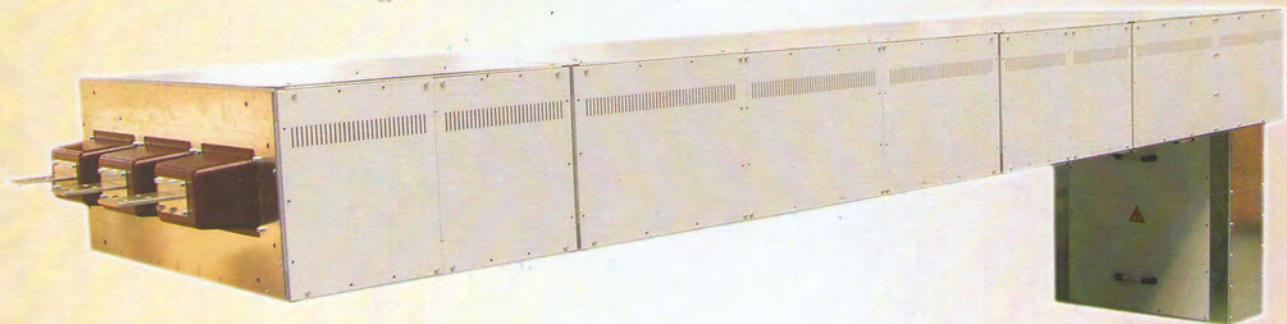
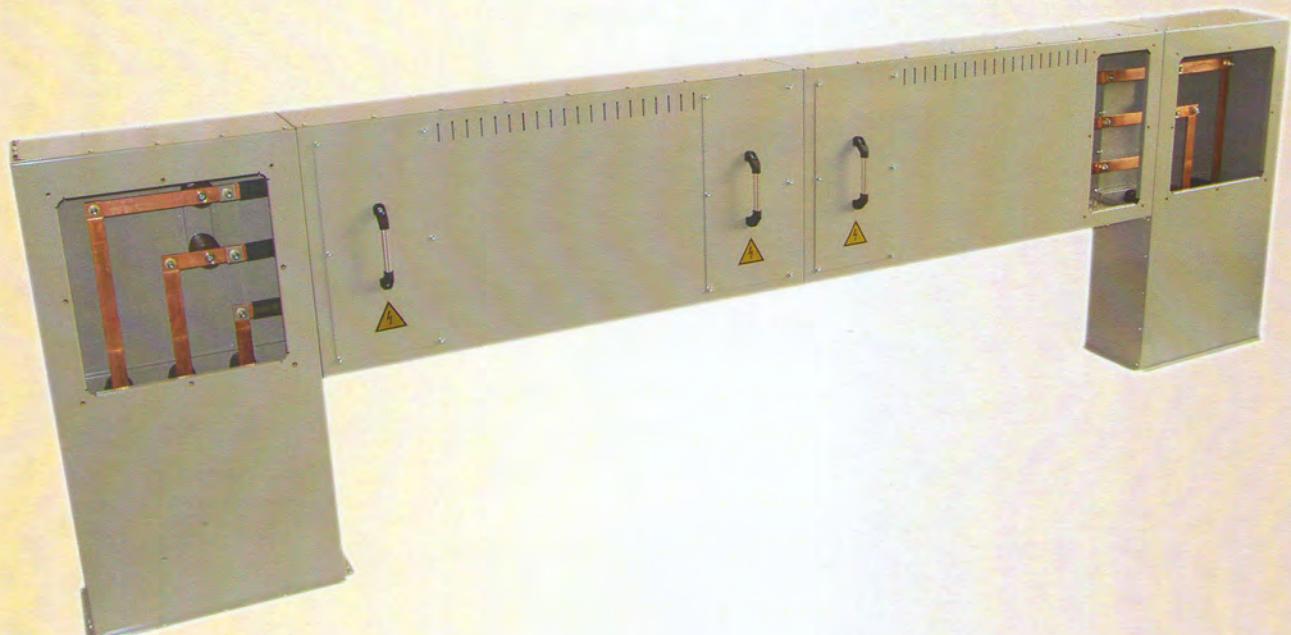




ABB Electro-engineering, Moscow



NIIIEFA-Energo, St.-Petersburg



Tavrida-Electric



Eltechnika, St.-Petersburg



Electrobalt, St.-Petersburg



Electromash, St.-Petersburg



Electropult, St.-Petersburg



Electroshchit, Moscow



MEL, Moscow



Electroshchit, Samara



Electrocomplex, Minusinsk



Ishlejsky factory, Cheboksary



Ezois, Moscow



Electrosila, Cheboksary



FSUE Contact T, Saratov

and others.

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