AIZ

GLASS INSULATORS

FOR OVERHEAD POWER TRANSMISSION LINES

Depending on purpose and construction insulators are classified as follows:
- line (suspension, pin, cap-and-pin);
- switchgear (support, pin, and post);
- apparatus (support, pin and post).

Insulators are also divided according to their application:
- indoor and
- outdoor

Furthermore operating conditions for the atmosphere may be:
- with normal or
- increased level of contamination.

According to environment, insulators should have definite electrical and mechanical characteristics. The most stringent requirements are applied for the HV line insulators for outdoor installation in the badly contaminated atmosphere, with priming of industrial enterprises and boiler rooms, sea

The required mechanical characteristics are provided by the use of materials, having an appropriate mechanical strength (electrical porcelain, insulation glass, malleable and high strength iron), and creating a reliable construction of the power unit.

Perfect electrical characteristics are ensured by changing and improving the configuration of insulating parts (disk, skirts, etc) with a view to increasing the creepage distance due to the development of their surface and shaping the insulators to the optimal geometrical form, promoting their self-cleaning properties of dirt.

HV LINE SUSPENSION INSULATORS

The HV line suspension insulators are used for insulating and fixing wires and lightning-arrester's cables of overhead power transmission lines, in devices of power stations and substations for high voltages of altering current and direct current with frequency up to 100 Hz, also within a temperature range of +50°C and -60°C.The insulators are made of an insulating element, a cap and a pin.

When suspension insulators are used on HV power transmission lines, they are usually connected in series to form a string. The insulators are hinged between by introducing insulator's pin head into following insulator's top part of the cap (socket connector). To avoid a sudden uncoupling of a string, the pin is locked in the cap slot. The number of insulators per string depends on the line voltage, material of supporting structures, type of insulators and local operating conditions.

Resistant insulators are used on the transmission lines in the regions with polluted atmospheres. These insulators had an increased creepage distance.

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Electrical porcelain, due to its high electrical and mechanical strength, resistance to atmospheric effects and other properties has long been the main dielectric material used in the production of suspension line insulators.

At present the insulating glass has found a wide use for the purpose. Glass can be easily pressed and shaped to any form insulators. The production method of glass insulators is much easier than porcelain. Hence entire process can be completely automated.

Besides the insulators for AC/DC transmission lines, the section covers insulators for 3.3 kV AC/DC contact systems of electrified railways, operating within a temperature range of +50°C and -60°C.

More than 250 mln. pcs. of insulators, manufactured by Corporation are in successful operation on transmission lines with voltage from 0.4 to 1150 kV in Power systems of 50 countries all over the world, which is the best characteristics of excellent quality.

All components are produced in accordance with the requirement of IEC standards:

- the design and main characteristics according IEC305; IEC 815;
- assembling accordance with the IEC 120, IEC 372;
- type test according IEC 383, IEC 507, IEC 575.

No.	Component Part	Material	Standards
1	Insulating detail	hardened glass	IEC 60305
2	Cap	high-strength cast-iron, with corrosion- resisting coverage, produced by hot galvanizing method	IEC 60120
3	Pin	carbon low-alloyed or steel, heat-treated for ensuring of necessary mechanical properties, with corrosion--resisting coverage, produced by hot galvanizing method	IEC 60120
4	Locking device: Lock Split- pin	stainless corrosion- resisting steel or phosphor bronze with hardness not less than 180 HB	IEC 60372

Insulators nomenclature for overhead lines

Type IEC 60305	Dimensions			Creepage distance	Mechanical failing load	Puncture voltage	Withstand voltage			mass
	Diameter	Spacing	Standard coupling according to IEC 60120				dry	wet	impulse	
	mm	mm	mm	mm	kN	kV	kV	kV	kV	kg
U 40B	175	110	11	185	40	90	55	30	70	1,7
U70BS/BL	255	127/146	16	320	70	130	70	40	100	3,7
U 100BL	255	146	16	320	100	130	70	40	100	4,1
U 120B/BL	255	146/170	16	320	120	130	70	40	100	4,2
U 125B/BL	255	146/170	20	320	125	130	70	40	100	4,5
U 160BS/BL	280	146/170	20	380	160	130	75	45	110	6,2
U 210BS/BL	280	155/170	20	380	210	130	75	45	110	6,7
U 300B	320	195	24	485	300	130	75	45	110	10,0
U 70BP	255	146	16	400	70	130	80	43	120	4,8
U 70BLP	280	146	16	450	70	130	80	43	120	5,3
U100BLP	280	146	16	450	100	130	80	45	120	5,4
U 120BP	280	146/170	16	450	120	130	80	45	120	6,2
U 160BP	280	146/155/170	20	450	160	130	80	45	120	7
U160BLP	320	170/195	20/24	540	160	130	90	55	135	8,8
U210BLP	320	170/195	20/24	550	210	130	90	55	135	9,2
U240BLP	320	170/195	20/24	550	240	130	90	55	135	9,4
U 300B	340	170/195	24	550	300	130	90	55	135	12,2
U300BLP	380	170/195	24	635	300	130	90	55	135	14,3

Tests and dimensional tolerances are in accordance with IEC 60383 and IEC 60305 standards.

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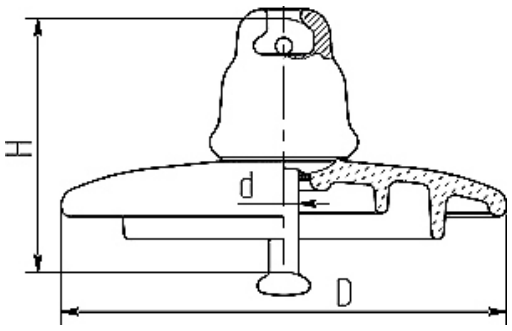


Standards:

GOST 27661
IEC 60305

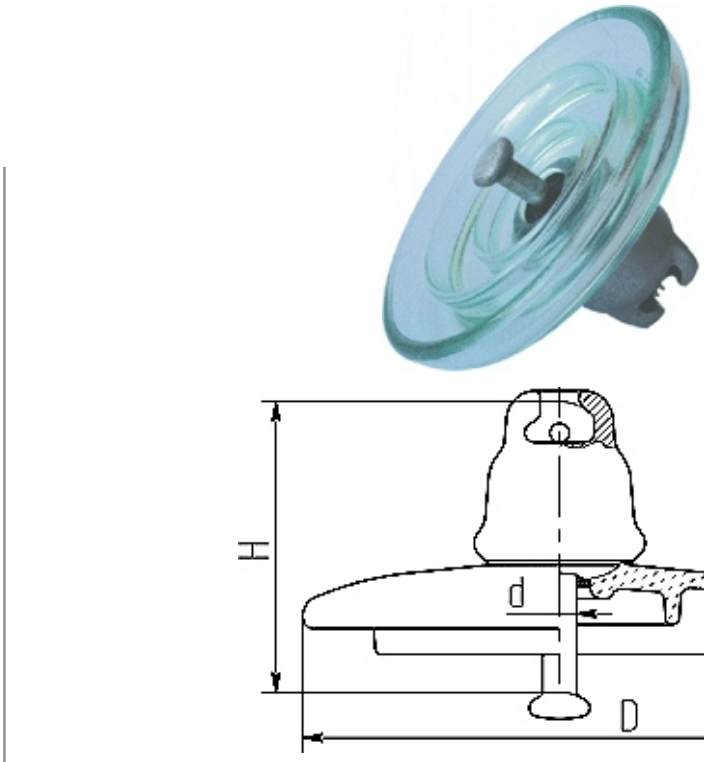
IEC standard for glass insulators (IEC 305)	U40B	U70BS	U70BL	U100BL	U120B
GOST standard for glass insulators (GOST 27661)	PS40A	PS70E	PS70E	PS100E	PS120B
Minimum mechanical failing load kN	40	70	70	100	120
Minimum mechanical residual strength kN	32	56	56	80	96
Diameter of the insulating part, D mm	175	255	255	255	255
Spacing, H mm	110	127	146	146	146
Creepage distance mm	190	303/320	303/320	320	320
Ball and socket coupling, d mm	11	16	16	16	16
Puncture voltage in insulating medium kV	100	130	130	130	130
Dry power frequency withstand voltage kV	55	70	70	70	70
Wet power frequency withstand voltage kV	30	40	40	40	40
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	75/75	100/100	100/100	100/100	100/100
Radio interference voltage dB/ kV		60/20	60/20	60/20	60/20
	86/25	86/25	86/25	86/25	86/25
Weight kg	2.5	3.4/3.6	3.4/3.6	4.1	3.9

Tests and dimensional tolerances are in accordance with IEC 60383 and IEC 60305 standards.

U160BS, U160BL, U210BS, U210BL, U240B, U300B

Standards:

GOST 27661
IEC 60305



IEC standard for glass insulators (IEC 305)	U160BS	U160BL	U210BS	U210BL	U240B	U300B
GOST standard for glass insulators (GOST 27661)	PS160	PS160D	PS210D	PS210D	PS240B	PS300B
Minimum mechanical failing load kN	160	160	210	210	240	300
Minimum mechanical residual strength kN	128	128	168	168	168	240
Diameter of the insulating part, D mm	280	280	280	280	280	320
Spacing, H mm	146	170	155	170	170	195
Creepage distance mm	380	380	380	380	380	485
Ball and socket coupling, d mm	20	20	20	20	24	24
Puncture voltage in insulating medium kV	130	130	130	130	130	130
Dry power frequency withstand voltage kV	75	75	75	75	75	75
Wet power frequency withstand voltage kV	45	45	45	45	45	45
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	110/110	110/110	110/110	110/110	130/130	130/130
Radio interference voltage dB/ kV	86	86	86	86	86	86
	35	35	35	35	35	35
Weight kg	6.2	6.2	6.7	6.7	6.8	10.7

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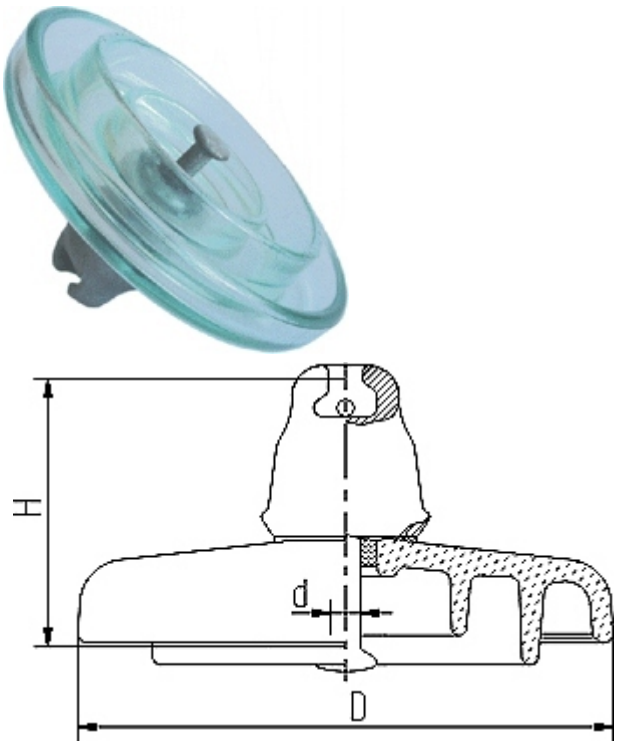
U70BP, U70BLP, U100BLP, U120BP



Standards:

GOST 27661
IEC 60305

IEC standard for glass insulators (IEC 305)	U70BP	U70BLP	U100BLP	U120BP
GOST standard for glass insulators (GOST 27661)	PSV70B	PSV70A	PSV100A	PSV120B
Minimum mechanical failing load kN	40	70	100	120
Minimum mechanical residual strength kN	32	56	96	96
Diameter of the insulating part, D mm	255	280	280	280
Spacing, H mm	146	146	146	146/170
Creepage distance mm	400	442/450	442/450	442/450
Ball and socket coupling, d mm	11	16	16	16
Puncture voltage in insulating medium kV	100	130	130	130
Dry power frequency withstand voltage kV	70	80	80	80
Wet power frequency withstand voltage kV	40	45	45	45
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	100/100	125/125	125/125	125/125
Radio interference voltage dB/ kV		60/20	60/20	60/20
	86/25	86/25	86/30	86/30
Weight kg	3.0	5.3	5.4	6.2

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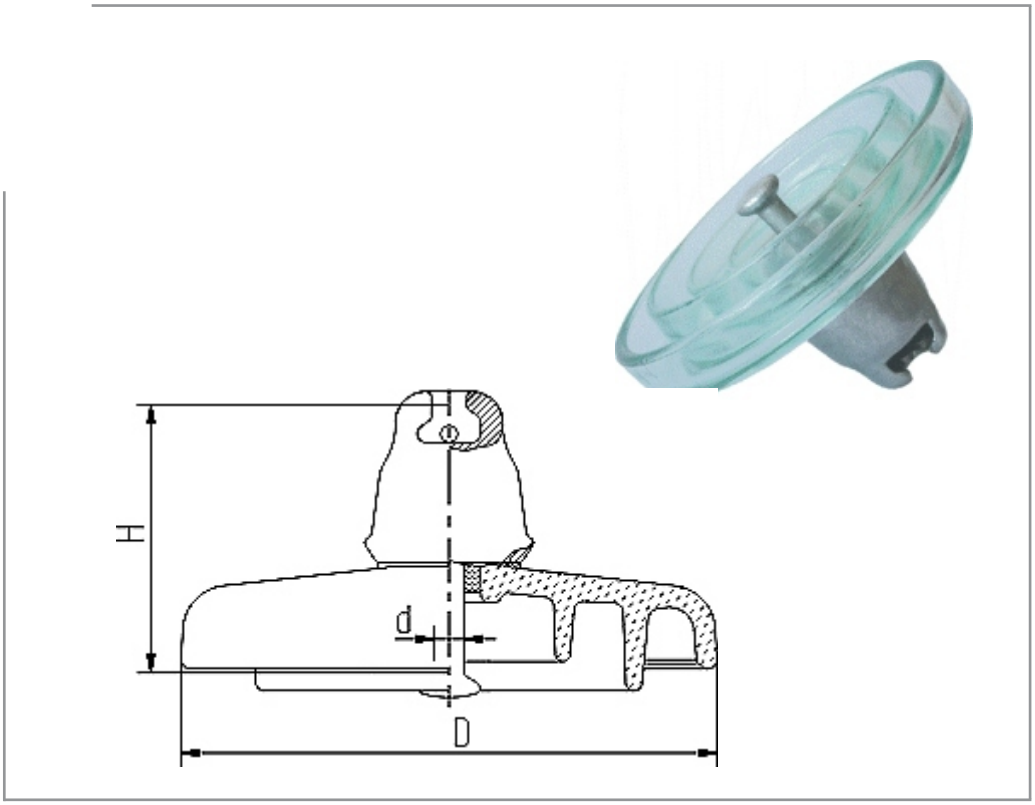
U160BP, U160BLP, U210BP, U240BLP

Standards:

GOST 27661
IEC 60305



IEC standard for glass insulators (IEC 305)	U160BP	U160BLP	U210BP	U240BLP
GOST standard for glass insulators (GOST 27661)	PSV160B	PSV160A	PSV210B	PSV24A
Minimum mechanical failing load kN	160	160	210	240
Minimum mechanical residual strength kN	128	128	168	168
Diameter of the insulating part, D mm	320	320	320	320
Spacing, H mm	146	170	170/195	170/195
Creepage distance mm	540/545	540/545	550/561	550/561
Ball and socket coupling, d mm	20	20/24	20	20
Puncture voltage in insulating medium kV	130	130	130	130
Dry power frequency withstand voltage kV	90	90	90	90
Wet power frequency withstand voltage kV	55	55	55	55
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	140/140	140/140	140/140	140/140
Radio interference voltage dB/ kV	34/10	34/10	34/10	34/10
	86/35	86/35	86/40	86/40
Weight kg	8.28	8.28	9.2	9.4

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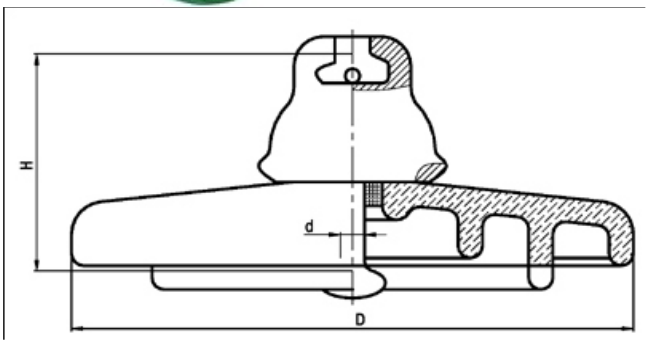


Standards:
GOST 27661
IEC 60305

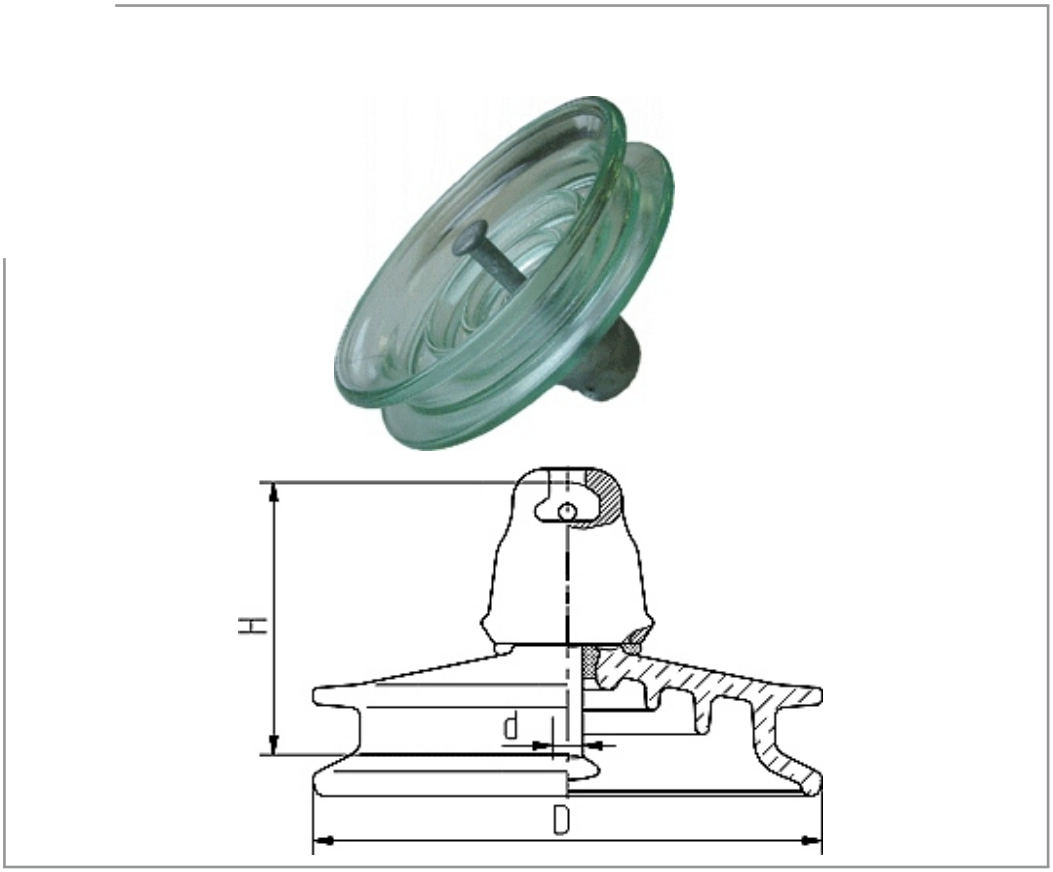
IEC standard for glass insulators (IEC 305)	U300BP	U300BLP
GOST standard for glass insulators (GOST 27661)	PS300B	PS300A
Minimum mechanical failing load kN	300	300
Minimum mechanical residual strength kN	240	240
Diameter of the insulating part, D mm	340	380
Spacing, H mm	170/195	170/195
Creepage distance mm	550	635
Ball and socket coupling, d mm	24	24
Puncture voltage in insulating medium kV	130	130
Dry power frequency withstand voltage kV	90	90
Wet power frequency withstand voltage kV	55	55
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	130/130	130/130
Radio interference voltage dB/ kV	60/20	34/10
	86/40	86/40
Weight kg	12.2	14.3

Tests and dimensional tolerances are in accordance with IEC 60383 and IEC 60305 standards.

PSD70E

Standards:

GOST 27661
IEC 60305



IEC standard for glass insulators (IEC 305)	
GOST standard for glass insulators (GOST 27661)	PSD70E
Minimum mechanical failing load kN	70
Minimum mechanical residual strength kN	56
Diameter of the insulating part, D mm	270
Spacing, H mm	127
Creepage distance mm	411
Ball and socket coupling, d mm	16
Puncture voltage in insulating medium kV	130
Dry power frequency withstand voltage kV	75
Wet power frequency withstand voltage kV	45
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	110/110
Radio interference voltage dB/ kV	60/20
	86/25
Weight kg	4.6

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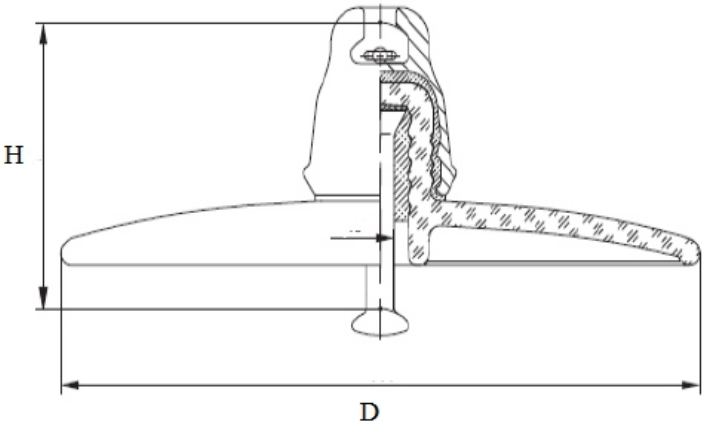

IEC standard for glass insulators (IEC 305)	U120
GOST standard for glass insulators (GOST 27661)	PSS-120
Minimum mechanical failing load kN	120
Minimum mechanical residual strength kN	96
Diameter of the insulating part, D mm	380
Spacing, H mm	127/146
Creepage distance mm	365
Ball and socket coupling, d mm	16
Puncture voltage in insulating medium kV	130
Dry power frequency withstand voltage kV	60
Wet power frequency withstand voltage kV	50
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	95/95
Radio interference voltage dB/ kV	60/20
	86/25
Weight kg	5,2

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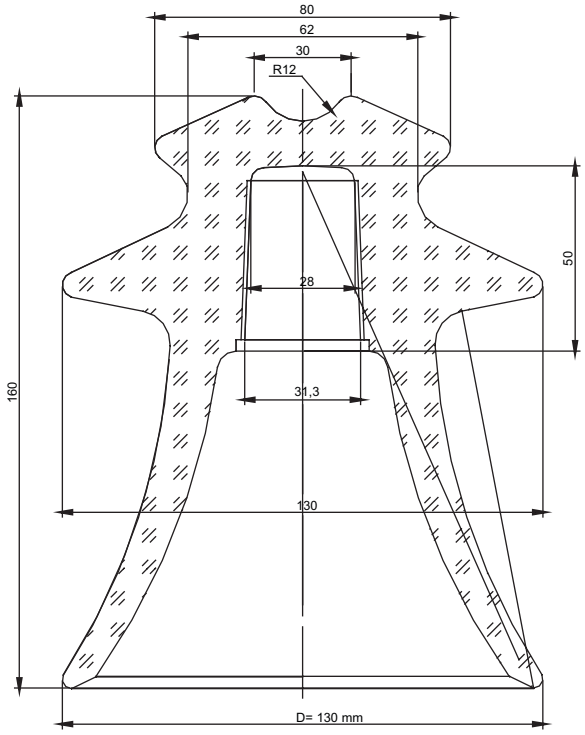
PIN TYPE GLASS INSULATORS SHS10D



Standards:

GOST 27661
IEC 60305

These pin glass insulators have following advantages against pin porcelain insulators: it is easy to detect failure place visually without any special facility, it just collapses into a small pieces, but the main part with pin and installed wire stays on the HV line. You can install them in the areas with high pollution degree.

IEC standard for glass insulators (IEC 60383)	SHS-10D
GOST standard for glass insulators (GOST 27661)	
Nominal voltage kV	10
Maximum working voltage kV	12
Diameter of the insulating part, D mm	130
Spacing, H mm	160
Creepage distance mm	280
Minimum mechanical residual strength kN	12,5
Puncture voltage in insulating medium kV	75
Dry power frequency withstand voltage kV	40
Wet power frequency withstand voltage kV	40
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	75
Radio interference voltage dB/ kV	40
Weight kg	1,35

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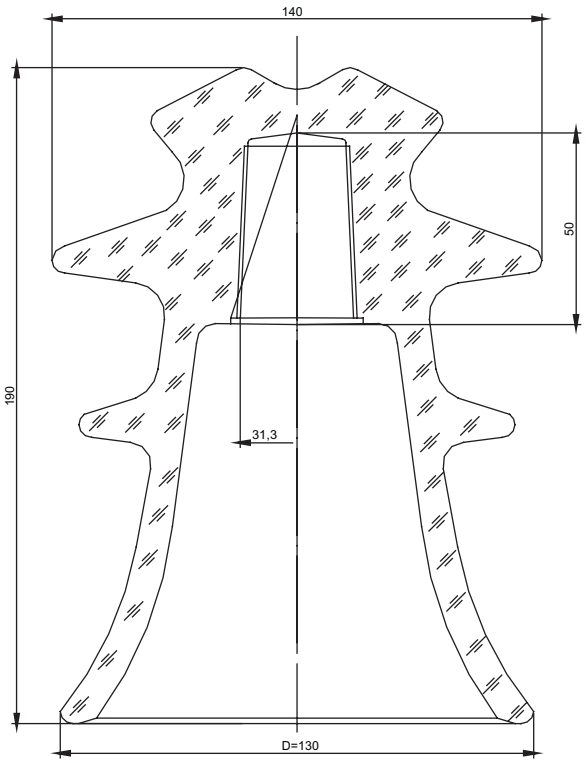
PIN TYPE GLASS INSULATORS SHS-20G



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IEC standard for glass insulators (IEC 60383)	SHS-20G
GOST standard for glass insulators (GOST 27661)	
Nominal voltage kV	20
Maximum working voltage kV	24
Diameter of the insulating part, D mm	130
Spacing, H mm	190
Creepage distance mm	400
Minimum mechanical residual strength kN	12,5
Puncture voltage in insulating medium kV	135
Dry power frequency withstand voltage kV	50
Wet power frequency withstand voltage kV	50
Dry lightning impulse withstand voltage 1.2/50 (+/-) kV	135
Radio interference voltage dB/ kV	50
Weight kg	1,7

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Universal package (UP)

Cylindrical package (CP)

Capacity of CP:
Depending on type of insulators it is possible to pack garlands of 4, 5 or 6 insulators.

Grate package (GP)

Capacity of GP depends on type of insulators

ISO 9001 certificate UAB “AIZ” commitment to maintain a high-level of quality and strong customer service within an environment that has safety as a first priority, is focused on the customers, and fosters continual improvement.

“AIZ” company was based in 1996 in Lytkarino the suburban city of Moscow. “AIZ” manufactures glass and composite insulators, also bus bar fittings. Factory's vision is to be the leading and dynamic company, which manufactures products for medium and high voltage lines. The corporate strategy is to accomplish purposes, such as:

a) create unique product solutions,
b) achieve comprehensive progress in the areas of service,
c) increasing the company market share and
d) continuously improving company performance.

Major Customers: Power, power supply companies, wholesale traders of electrical equipment, installation companies, contracting companies from Russia, Lithuania, Latvia, Belarus, Ukraine, Czech Republic, Finland, Estonia, Vietnam, Nigeria, Sweden, Bulgaria, Poland and others.

Main UAB “AIZ” objective is to take regularly care of its working team, raise skills of employees, interests in the latest power and energy technology and products. While company is caring about the environment, welfare of employees and clients, ensuring quality control of manufactured products, it offers customers quality products at the best price.

By implementing the quality management (ISO 9001:2008) and environmental management (ISO 14001:2004) systems, management ensures:

a) compliance with legal and other requirements related to the company's activities;
b) effective planning, service delivery and control;
c) buying equipment necessary for manufacturing insulators and fittings only from the best and most reliable suppliers;
d) continuous improvement of produced and sold products quality;
e)prevention of adverse environmental impact at production and sale process.

ISO 9001
ISO 14001
DNV
CERTIFIED ORGANISATION

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 115856-2012-AQ-LTU-FINAS

This is to certify that

UAB AIZ

S.Dariaus ir S.Girėno g. 107, LT-02189 Vilnius; Lithuania

has been found to conform to the Management System Standard:

ISO 9001:2008

This Certificate is valid for the following product or service ranges:

PRODUCTION AND SALE OF GLASS INSULATORS AND ARMATURE FOR LOW, MEDIUM AND HIGH VOLTAGE POWER LINES.

Initial Certification date: 09 May 2012

This Certificate is valid until: 09 May 2015

The audit has been performed under the supervision of Jonas Kapturauskas, *Lead Auditor*

Place and date: Kaunas, 09 May 2012

for the Accredited Unit: DNV Certification OY/AB, FINLAND

Audrius Šilelis, *Management Representative*

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

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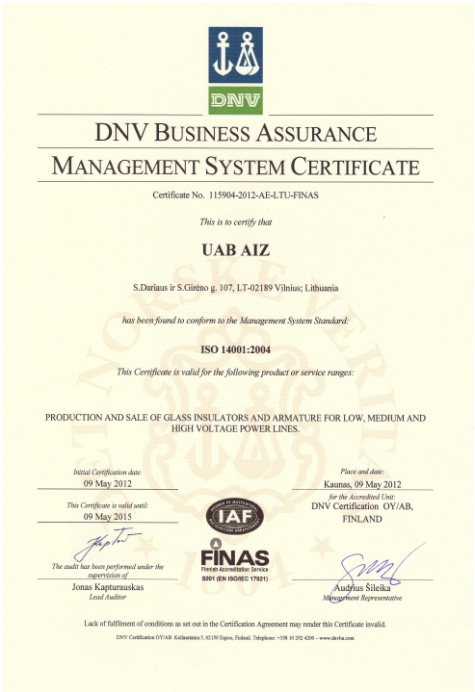

DNV BUSINESS ASSURANCE

MANAGEMENT SYSTEM CERTIFICATE

Certificate No. 115904-2012-AE-LTU-FINAS

This is to certify that

UAB AIZ

S.Dariaus ir S.Girėno g. 107, LT-02189 Vilnius; Lithuania

has been found to conform to the Management System Standard:

ISO 14001:2004

This Certificate is valid for the following product or service ranges:

PRODUCTION AND SALE OF GLASS INSULATORS AND ARMATURE FOR LOW, MEDIUM AND HIGH VOLTAGE POWER LINES.

Initial Certification date: 09 May 2012

This Certificate is valid until: 09 May 2015

The audit has been performed under the supervision of Jonas Kapturauskas, *Lead Auditor*

Place and date: Kaunas, 09 May 2012

for the Accredited Unit: DNV Certification OY/AB, FINLAND

Audrius Šilelis, *Management Representative*

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid.

DNV Certification OY/AB Keilasatama 5, 02150 Espoo, Finland. Telephone: +358 10 292 4200 – www.dnvba.com