

**SEDIVER**



Toughened glass insulators  
for HVAC applications

Experts & Pioneers

# Sediver, Experts and pioneers in insulation technology

With 70 years of experience and investment in R&D, Sediver has gained uncontested expertise in research, design, manufacturing and testing of insulators for power networks up to very high voltages and for railway catenary systems. Sediver is the partner of choice for all insulation applications.

## Our expertise

- > 500 million toughened glass insulators installed in more than 150 countries on lines up to 1,100 kV AC
- > 6.5 million toughened glass DC insulators installed up to 800 kV
- > 5 million composite insulators on lines up to 735 kV
- > 1.5 million Sedicoat insulators, silicone coated toughened glass insulators for both AC and DC applications

## Research & Development, a permanent and continuous investment

Always on the lookout for continuous technological improvements, Sediver heavily invests in Research and Development. Our research and testing facilities as well as our high voltage CEB laboratory both located in France boast state-of-the-art equipment that allows extensive research programs as well as testing of complete strings for systems up to 800 kV.

## Worldwide presence – reinforced proximity



## Unique manufacturing processes

Sediver manufacturing processes are unique in the world.

These processes have been developed and improved thanks to the experience Sediver has gained over the years following-up and assessing the performance of millions of insulators in service as well as through the integration of the latest technological advances.

Our goal: your satisfaction through the reliability of our products on your lines.

# Sediver, our experts at your service

## In-depth technical expertise

Our team of multidisciplinary and highly skilled engineers is dedicated to the research and development of optimum solutions in the field of high-voltage insulation and protection.

## Innovative products

Our engineers and scientists are always searching for new materials, products, designs and technologies that will contribute to improve the performance and the reliability of your systems while reducing the environmental impact.

## Sediver technical assistance

Our technical assistance teams help you throughout all the stages of the insulation related matters from the selection of the optimum insulation solution to the monitoring of performance in service.

We offer specifically:

- Testing and evaluation programs
- Joint research programs related to solving insulation issues
- Training programs dedicated to design, handling and maintenance teams
- End-of-life and failure diagnostics

## Dedicated research and testing facilities



The equipment and facilities of our 7 research and testing centers ensure the development of insulators with excellent long term behavior and performance.

- Investigation of materials and their behavior in service: Vital to ensure a high level of performance and reliability of our insulators
- Mechanical endurance testing: Essential to designing insulators with excellent long term behavior under extreme service conditions
- Evaluation of the insulators' electrical performance: Fundamental to assess the performance of any type of insulator string configuration
- Determination of the pollution performance of insulators and strings: Critical for the choice of the right insulator adapted to each specific environmental condition

## Overview of main testing equipment per country

	Brazil	China	France	Italy	USA
Dielectric tests on insulator units	✓	✓	✓	✓	✓
Dielectric tests on complete strings			up to 800 kV		
AC Salt-fog Pollution tests			150 kV		
AC Solid layer Pollution tests			250 kV		
DC Pollution tests (salt fog/solid layer)			120 kV		
DC Sample tests according to IEC 61325	✓	✓	✓	✓	✓
DC Type tests according to IEC 61325			✓		
Mechanical tests on insulator units	✓	✓	✓	✓	✓
Thermal-mechanical tests	✓	✓	✓	✓	✓
Long duration vibration tests on complete strings			up to 800 kV		
Standard sample tests according to national and international standards	✓	✓	✓	✓	✓

Sediver laboratories are all ISO 9001 or ISO 17025 certified

## Sediver's unique processes

The Sediver design and manufacturing processes have been developed over the past 70 years, taking advantage of millions of insulators supplied and the evolution of new technology, with always the same goal in mind: your satisfaction.

### Sediver's unique processes

#### Glass composition and melting

Sediver glass is obtained through a unique melting process based on the use of a specific furnace technology and proprietary Sediver manufacturing process control and parameters.

The technology developed by Sediver:

- Ensures an outstanding homogeneity in the chemical composition of the glass
- Provides high purity glass without heterogeneity

#### Moulding

Our unique know-how enables us to create complex glass shapes and products up to 420 mm in diameter and weighing more than 10 kg.

#### Toughening

The toughening process developed by Sediver generates a permanent compressive pre-stress on the surface of the glass shells which confers to the glass:

- high mechanical strength
- high resistance to thermal shocks and mechanical impacts
- immunity to the effects of aging

Thanks to the toughening, the behavior of the dielectric shell becomes binary:

- 1) either the glass is intact: no possible internal cracks nor puncture
- 2) or the glass is shattered: the glass is no longer visible outside the metal cap (stub).

#### Assembly of the glass shell with metal fittings

The assembly of Sediver glass insulators is done by a specific hot curing process, using a chemically inert cement (high strength aluminous cement).

Thanks to this process our insulators offer:

- outstanding mechanical stability over time
- residual mechanical strength close to that of a complete insulator if dielectric shell happens to be broken

#### Systematic control and inspection of the insulators during manufacturing

Guaranteed quality thanks to continuous inspection and control of the production lines

- All glass shells undergo specific and repeated thermal shocks and successive quality controls so as to eliminate pieces that could present defects
- All insulators are subjected to stringent quality inspection by automated systems

The entire process is constantly monitored by highly qualified inspectors.

### Users' benefits

#### Appropriate solutions

Thanks to the different shapes of the glass shells and to mechanical strengths ranging up to 760 kN, Sediver offers solutions adapted to all applications and the most varied environmental conditions.

#### Easy installation, inspection and detection

As Sediver glass insulators are very resistant to mechanical shocks, the stringing and line construction is much easier while the number of accidentally damaged insulators is significantly lower than with porcelain insulators.

As the detection of any damages during installation is evident and immediate, the risk of installing a damaged unit is non-existent.

#### Reduced inspection and maintenance costs

- Unlike other materials, such as porcelain or composites, a quick and easy visual inspection is enough to identify the state of the toughened glass insulators and this without any possible mistake. The inspection costs are thus reduced to a minimum throughout the life cycle of the line
- Sediver toughened glass insulators are unpuncturable and resistant to overvoltage stresses thanks to a defect-free dielectric body and the homogeneity of the glass shell
- The shattering rate of glass shells in service is negligible thanks to the high purity of Sediver glass.
- The residual mechanical strength of Sediver glass insulators remains almost unchanged compared to an intact insulator thanks to unique hot cured aluminous cement assembly process. Therefore, there is no urgency to replace an insulator with a broken glass shell
- Optimum safety for live line working

#### Extended life

The life time of Sediver glass insulators exceeds the life time of the conductors, hardware and structure. Since they do not age, there is no need to replace the insulators during the life of the line.

#### Reliability, traceability

As Sediver technology and quality are homogenous throughout all its production sites, we can therefore guarantee full consistency of performance worldwide. Each insulator is marked with the manufacturing plant's identification code and the production batch.

The marking allows total traceability.

## Sediver insulators: more than a standardized insulator

The design of Sediver insulators is not limited to complying with the minimum requirements of the applicable standards, but is based on requirements for a higher level of performance in service which in turn, reduces the operating cost of the line.

### Users' benefits in choosing Sediver glass insulators

Type of test	Test description	Criteria IEC 60383-1	Sediver criteria	Benefits for the user
Type test	Mechanical failing load test	$X \geq SFL + 0.72 S$ Individual value could be < SFL	$X \geq SFL + 3 S$ Individual value $\geq SFL$	<b>Reinforced reliability and safety</b> <ul style="list-style-type: none"> <li>Individual value <math>\geq SFL</math></li> <li>Low deviation of the results</li> </ul>
	Thermal-mechanical performance test	Temperature cycles -30°/+40° C Tensile load 0.60 SFL $X \geq SFL + 0.72 S$ Individual value could be < SFL	Temperature cycles -50°/+50° C Tensile load 0.70 SFL $X \geq SFL + 3 S$ Individual value $\geq SFL$	<b>High reliability along service life</b> <ul style="list-style-type: none"> <li>No aging</li> <li>High mechanical strength even in case of extreme service conditions</li> </ul>
	Residual strength test	$X \geq 0.65 SFL + 1.645 S$	$X \geq 0.80 SFL + 1.645 S$	<b>Reduced maintenance cost</b> <ul style="list-style-type: none"> <li>High residual mechanical strength maintained in stub state</li> <li>No urgency in replacing the insulator</li> </ul>
Sample test	Mechanical failing load test	$X \geq SFL + 1.7 S (*)$ , or Individual value could be < SFL	$X \geq SFL + 3 S$ Individual value $\geq SFL$	<b>Reinforced reliability</b> <ul style="list-style-type: none"> <li>Even in case of natural disasters</li> <li>Individual value <math>\geq SFL</math></li> <li>Low deviation of the results</li> </ul>
	Puncture withstand test	Puncture in oil	Impulse puncture testing in air (IEC 61211)	<b>No risk of puncture</b> <ul style="list-style-type: none"> <li>Even in case of lightning</li> </ul>
Routine test	Visual inspection	Inspection whether there are no visual defects that would be prejudicial to satisfactory performance in service	<ul style="list-style-type: none"> <li>Inspection whether there are no visual defects such as in IEC</li> <li>Marking verification</li> </ul>	<b>Complete traceability</b> <ul style="list-style-type: none"> <li>Complete identification of each insulator</li> <li>Quality Control full traceability</li> </ul>
	Mechanical test	50 % SFL	<ul style="list-style-type: none"> <li>50 % SFL</li> <li>Marking proving that each insulator passed the routine test</li> </ul>	<b>Guarantee</b> that each insulator passed the mechanical test
	Dimensional verification	None	Spacing verification of each unit	<b>Dimensional conformity</b> <ul style="list-style-type: none"> <li>Guarantee of the string spacing</li> <li>Easy installation</li> </ul>
	Thermal test	None	Thermal treatments specific to Sediver on each glass shell	<b>Reduced operating cost</b> <ul style="list-style-type: none"> <li>Extremely low in service shattering rate thanks to a very high quality glass</li> </ul>

X = Average value of results  
SFL = Specified Mechanical Failing Load  
S = Standard deviation  
(\*) 12 samples



# Sediver toughened glass suspension insulators

## Dielectric shell profiles

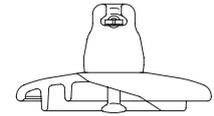
Throughout decades, Sediver engineers have developed and designed different types of insulators adapted to all kinds of climates and environments, such as described in the IEC 60815-1 standard.

### Standard profile:

The standard profile is characterized by a leakage distance\* higher than the values indicated in the IEC 60305 for standard insulators and by shallow and well-spaced under-ribs that allow an effective self-cleaning action by wind or rain. It features a "leakage distance/spacing" ratio of around 2.2 and is particularly effective in suspension and tension applications in very light to medium polluted areas where typically the pollution level (ESDD) is lower than 0.1 mg/cm<sup>2</sup>.

(Examples: zones E1 to E4).

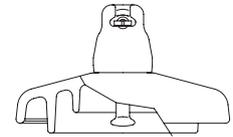
\* or creepage distance



### Fog type profile:

The fog type profile is characterized by long and widely-spaced under-ribs so as to avoid arc bridging between adjacent ribs. It features a « leakage distance/spacing » ratio of around 3.2 and is particularly effective in coastal areas (Salt fog) as well as in polluted areas where a higher specific leakage distance is required.

(Examples: areas E5 to E7).

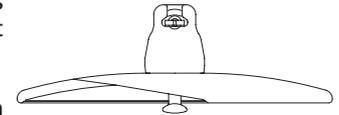


### Open profile:

The open type profile features a « leakage distance/spacing » ratio of around 2.4, with no under-ribs so as to avoid the accumulation of solid pollution deposits (dust, sand) on its lower surface. It is particularly adapted to suspension and tension applications in desert areas where wind is predominant and rain infrequent.

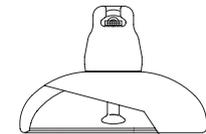
(Example: areas E1 to E4).

It is also effective for dead-end strings in cases of extreme industrial pollution and can solve ice-bridging problems when it is alternated with others profiles in the string.



### Spherical profile:

The spherical shape offers a leakage distance equivalent to that of standard profile type. With a spherical profile manual cleaning is easy and effective.



### External shed profile:

This profile offers a leakage distance equivalent to the anti-pollution profile and is adapted to the most extreme cases of solid pollution.

The elimination of the under-ribs reduces pollution build-up, promotes self-cleaning and facilitates manual cleaning when necessary.



## Corrosion prevention solutions

### Corrosion prevention sleeve

In severely corrosive marine and industrial atmospheres, the galvanized coating on suspension insulator pins may deteriorate over time and be followed by corrosion of the pin itself. To prevent this form of pin damage, Sediver can supply insulators equipped with a corrosion retardation sleeve made of high-purity zinc. The insulators are then designated by "DC" (F100P/146 with zinc sleeve becomes F100P/146DC).

### Heavy galvanization

All Sediver ferrous metal fittings are hot-dip galvanized. IEC 60383-1 and ASTM A153-82 require a zinc coating mass of 600/610 g/m<sup>2</sup> corresponding to a thickness of 85/86 µm. In severe conditions, where this standard protection is known to be insufficient, Sediver offers enhanced protection of the cap and the pin by increasing the thickness of zinc to 110 µm, or up to 125 µm.



Corrosion prevention sleeve

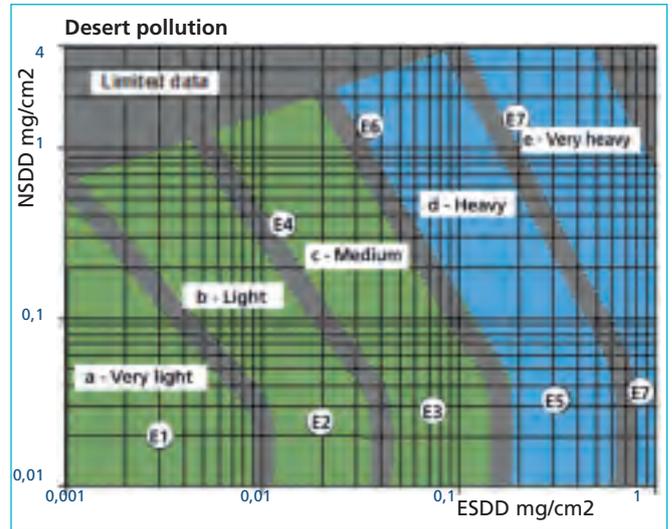
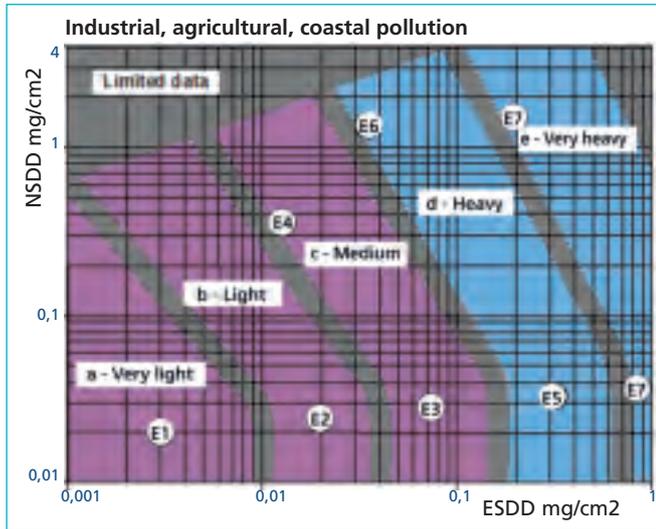
For specific insulators not presented in this catalogue, or for specific applications such as extreme pollution areas or direct current, please contact us.

# Selection criterion

## Choice of the insulator profile

The IEC 60815-1 standard defines 5 levels of pollution according to the pollution severity: very light, light, medium, heavy and very heavy.

The levels of pollution are defined according to the Equivalent Salt Deposit Density (ESDD) and the Non-Soluble Deposit Density (NSDD) on the surface of the insulator.



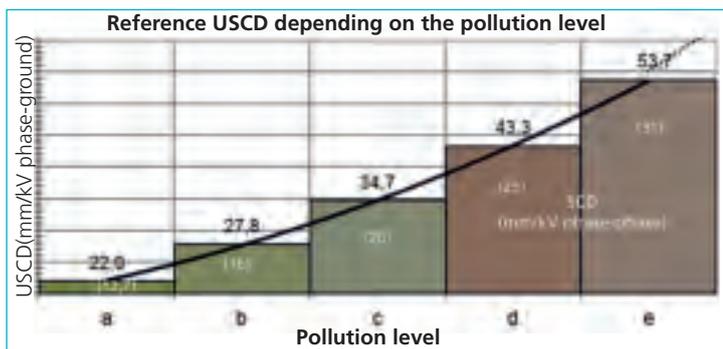
In the case of industrial, agricultural and coastal pollution, Sediver recommends the use of the standard profile in very light, light and medium polluted areas and the fog type profile in heavy and very heavy polluted areas.

In the case of desert pollution Sediver recommends the use of the open profile in very light, light and medium polluted areas and the fog type profile in heavy and very heavy polluted areas.

## Choice of insulation

The number of insulators per string depends on the maximum voltage of the transmission line and the pollution severity of the region.

It should be calculated in accordance with the specific creepage distance (USCD\* or SCD\*\*) as defined by the IEC 60815-2 standard.



(\*) USCD = Leakage distance of the string of insulators divided by the RMS value of the highest power frequency voltage seen by the string (phase - ground).  
 (\*\*) SCD = USCD / √3

### String dimensioning example:

For a 230 kV line,  
 (Max. phase-ground voltage:  $245 / \sqrt{3}$ )  
 located on the coast in a heavy pollution level  
 (ESDD > 0.1 mg/cm², pollution level = d)  
 Selected insulator: F120P / 146  
 (fog type profile with 445 mm leakage distance)

Total leakage distance needed:  
 $43.3 \times 245 / \sqrt{3} = 6125 \text{ mm}$ .

Number of insulators in the string:  
 $6125 / 445 = 14 \text{ insulators}$ .

**In cases of extreme pollution when regular washing of the insulator strings becomes necessary, Sediver offers Sedicoat®: Sediver silicone coated toughened glass insulator (see page 23)**



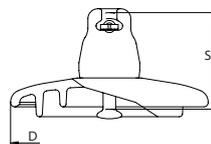
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# Sediver toughened glass suspension insulators

IEC

## Ball & Socket type

**70 kN**  
**100 kN**



CATALOG N°		Standard Profile			
		F70/127	F70/146	F100/127	F100/146
IEC class <sup>(1)</sup>		U70BS	U70BL	U100BS	U100BL
<b>MECHANICAL CHARACTERISTICS</b>					
Minimum mechanical failing load	kN	70	70	100	100
<b>DIMENSIONS</b>					
Diameter (D)	mm	255	255	255	255
Spacing (S)	mm	127	146	127	146
Creepage distance	mm	320	320	320	320
Metal fitting size <sup>(2)</sup>		16A	16A	16A	16A
<b>ELECTRICAL CHARACTERISTICS <sup>(3)</sup></b>					
Power frequency withstand voltage					
- Dry one minute	kV	70	70	70	70
- Wet one minute	kV	40	40	40	40
Dry lightning impulse withstand volt.	kV	100	100	100	100
Puncture withstand voltage	kV	130	130	130	130
<b>PACKING AND SHIPPING DATA</b>					
Approx. net weight	kg	3.6	3.6	3.9	4
N° of insulators per crate		6	6	6	6
Volume per crate	m <sup>3</sup>	0.05	0.05	0.05	0.05
Gross weight per crate	kg	31.7	31.7	31.7	31.3
N° of insulators per pallet		90	90	90	90
Volume per pallet	m <sup>3</sup>	1.3	1.34	1.3	1.3
Gross weight per pallet	kg	447	452	447	447

(1) in accordance with IEC publication 60305

(2) in accordance with IEC publication 60120

(3) in accordance with IEC publication 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

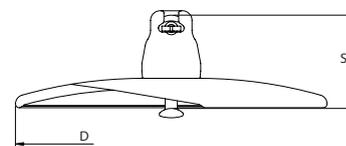
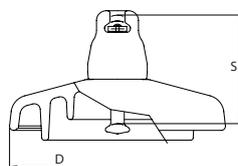
For specific markets we also supply a range of customized products which are not shown here. Please contact our sales department for more details.

# Sediver toughened glass suspension insulators



## Ball & Socket type

**70 kN**  
**100 kN**



CATALOG N°	Fog Type Profile			Open Type Profile
	F9P-A/146	F100P/146	F100PF/146	F100D/127
IEC class <sup>(1)</sup>	U100BLP			
<b>MECHANICAL CHARACTERISTICS</b>				
Minimum mechanical failing load	kN	100	100	100
<b>DIMENSIONS</b>				
Diameter (D)	mm	255	280	330
Spacing (S)	mm	146	146	127
Creepage distance	mm	390	445	365
Metal fitting size <sup>(2)</sup>		16A	16A	16A
<b>ELECTRICAL CHARACTERISTICS <sup>(3)</sup></b>				
Power frequency withstand voltage				
- Dry one minute	kV	72	80	90
- Wet one minute	kV	42	50	55
Dry lightning impulse withstand volt.	kV	110	125	140
Puncture withstand voltage	kV	130	130	130
<b>PACKING AND SHIPPING DATA</b>				
Approx. net weight	kg	4.6	5.8	8.9
N° of insulators per crate		6	6	6
Volume per crate	m <sup>3</sup>	0.06	0.086	0.095
Gross weight per crate	kg	33.7	44	63.5
N° of insulators per pallet		96	72	54
Volume per pallet	m <sup>3</sup>	1.34	1.44	1.23
Gross weight per pallet	kg	557	472	553

(1) in accordance with IEC publication 60305  
(2) in accordance with IEC publication 60120  
(3) in accordance with IEC publication 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

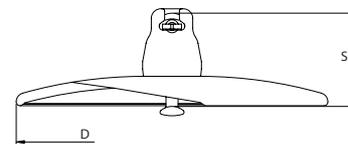
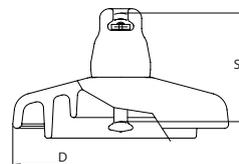
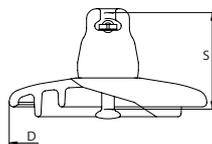
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# Sediver toughened glass suspension insulators

IEC

## Ball & Socket type

120 kN



CATALOG N°	Standard Profile		Fog Type Profile		Open Type Profile	
	F12/127	F12/146	F12P-A/146	F120P/146	F12D/127	
IEC class <sup>(1)</sup>	U120B		U120BP			
<b>MECHANICAL CHARACTERISTICS</b>						
Minimum mechanical failing load	kN	120	120	120	120	
<b>DIMENSIONS</b>						
Diameter (D)	mm	255	255	255	280	380
Spacing (S)	mm	127	146	146	146	127
Creepage distance	mm	320	320	390	445	365
Metal fitting size <sup>(2)</sup>		16A	16A	16A	16A	16A
<b>ELECTRICAL CHARACTERISTICS <sup>(3)</sup></b>						
Power frequency withstand voltage						
- Dry one minute	kV	70	70	72	80	60
- Wet one minute	kV	40	40	42	50	50
Dry lightning impulse withstand volt.	kV	100	100	110	125	90
Puncture withstand voltage	kV	130	130	130	130	130
<b>PACKING AND SHIPPING DATA</b>						
Approx. net weight	kg	4	4	4.6	5.8	5.6
N° of insulators per crate		6	6	6	6	6
Volume per crate	m <sup>3</sup>	0.05	0.05	0.06	0.074	0.1
Gross weight per crate	kg	31.3	33.1	33.7	45.4	43.8
N° of insulators per pallet		90	90	90	72	36
Volume per pallet	m <sup>3</sup>	1.3	1.34	1.34	1.24	1.05
Gross weight per pallet	kg	447	452	557	524	485

(1) in accordance with IEC publication 60305

(2) in accordance with IEC publication 60120

(3) in accordance with IEC publication 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

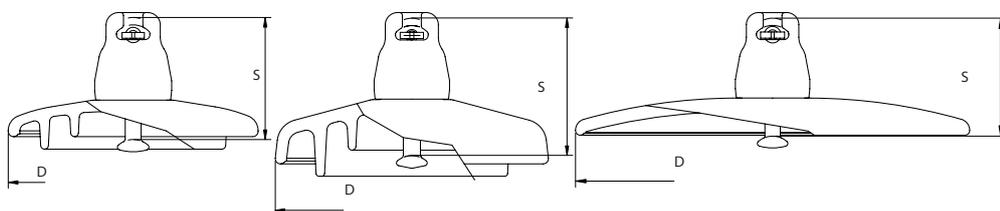
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# Sediver toughened glass suspension insulators

IEC

## Ball & Socket type

160 kN



CATALOG N°	Standard Profile		Fog Type Profile		Open Type Profile	
	F160/146	F160/170	F160P/146	F160P/170	F160D/146	
IEC class <sup>(1)</sup>	U160BS	U160BL	U160BSP	U160BLP		
<b>MECHANICAL CHARACTERISTICS</b>						
Minimum mechanical failing load	kN	160	160	160	160	
<b>DIMENSIONS</b>						
Diameter (D)	mm	280	280	330	330	420
Spacing (S)	mm	146	170	146	170	146
Creepage distance	mm	380	380	545	545	375
Metal fitting size <sup>(2)</sup>		20	20	20	20	20
<b>ELECTRICAL CHARACTERISTICS <sup>(3)</sup></b>						
Power frequency withstand voltage						
- Dry one minute	kV	75	75	90	90	60
- Wet one minute	kV	45	45	55	55	50
Dry lightning impulse withstand volt.	kV	110	110	140	140	90
Puncture withstand voltage	kV	130	130	130	130	130
<b>PACKING AND SHIPPING DATA</b>						
Approx. net weight	kg	6	6.5	8.8	8.9	8
N° of insulators per crate		6	6	6	6	6
Volume per crate	m <sup>3</sup>	0.07	0.07	0.09	0.1	0.154
Gross weight per crate	kg	48.6	47.6	63.5	66.2	60.4
N° of insulators per pallet		72	72	54	54	36
Volume per pallet	m <sup>3</sup>	1.4	1.35	1.22	1.46	1.35
Gross weight per pallet	kg	533	590	560	542	350

(1) in accordance with IEC publication 60305

(2) in accordance with IEC publication 60120

(3) in accordance with IEC publication 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

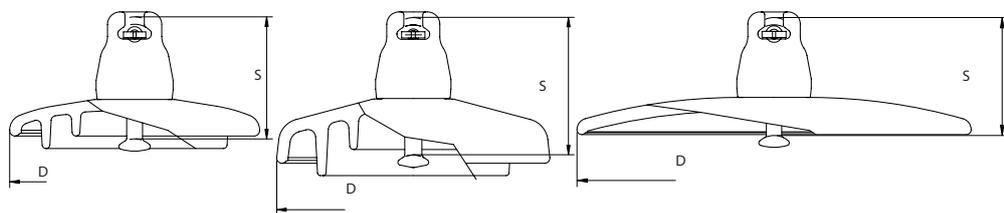
For specific markets we also supply a range of customized products which are not shown here. Please contact our sales department for more details.

# Sediver toughened glass suspension insulators

IEC

## Ball & Socket type

210 kN



		Standard Profile	Fog Type Profile	Open Type Profile
CATALOG N°		F21/170	F210P/170	F21D/170
IEC class <sup>(1)</sup>		U210B	U210BP	
<b>MECHANICAL CHARACTERISTICS</b>				
Minimum mechanical failing load	kN	210	210	210
<b>DIMENSIONS</b>				
Diameter (D)	mm	280	330	420
Spacing (S)	mm	170	170	170
Creepage distance	mm	380	550	370
Metal fitting size <sup>(2)</sup>		20	20	20
<b>ELECTRICAL CHARACTERISTICS <sup>(3)</sup></b>				
Power frequency withstand voltage				
- Dry one minute	kV	75	90	60
- Wet one minute	kV	45	55	50
Dry lightning impulse withstand volt.	kV	110	140	90
Puncture withstand voltage	kV	130	130	130
<b>PACKING AND SHIPPING DATA</b>				
Approx. net weight	kg	7.2	10.2	8.9
N° of insulators per crate		6	6	6
Volume per crate	m <sup>3</sup>	0.085	0.106	0.17
Gross weight per crate	kg	54.8	72.5	60
N° of insulators per pallet		72	54	48
Volume per pallet	m <sup>3</sup>	1.45	1.5	2.24
Gross weight per pallet	kg	593	572	495

(1) in accordance with IEC publication 60305

(2) in accordance with IEC publication 60120

(3) in accordance with IEC publication 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

For specific markets we also supply a range of customized products which are not shown here. Please contact our sales department for more details.

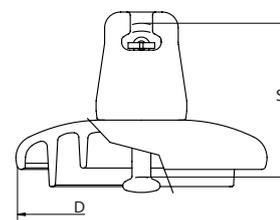
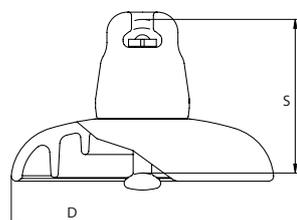
# Sediver toughened glass suspension insulators

IEC

## Ball & Socket type

**240 kN**

**300 kN**



**Standard Profile**

**Fog Type Profile**

CATALOG N°		F24/170	F300/195	F300P/195	F30P/195
IEC class <sup>(1)</sup>			U300B	U300BP	U300BP
<b>MECHANICAL CHARACTERISTICS</b>					
Minimum mechanical failing load	kN	240	300	300	300
<b>DIMENSIONS</b>					
Diameter (D)	mm	280	320	380	320
Spacing (S)	mm	170	195	195	195
Creepage distance	mm	380	480	690	595
Metal fitting size <sup>(2)</sup>		24	24	24	24
<b>ELECTRICAL CHARACTERISTICS <sup>(3)</sup></b>					
Power frequency withstand voltage					
- Dry one minute	kV	75	85	100	90
- Wet one minute	kV	45	50	55	50
Dry lightning impulse withstand volt.	kV	110	130	150	135
Puncture withstand voltage	kV	130	130	130	130
<b>PACKING AND SHIPPING DATA</b>					
Approx. net weight	kg	7.5	10.9	15.3	11.1
N° of insulators per crate		6	5	2	5
Volume per crate	m <sup>3</sup>	0.08	0.1	0.06	0.1
Gross weight per crate	kg	54.8	66.8	34.7	68.8
N° of insulators per pallet		72	45	24	45
Volume per pallet	m <sup>3</sup>	1.42	1.4	1.13	1.34
Gross weight per pallet	kg	760	556	413	608

(1) in accordance with IEC publication 60305

(2) in accordance with IEC publication 60120

(3) in accordance with IEC publication 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

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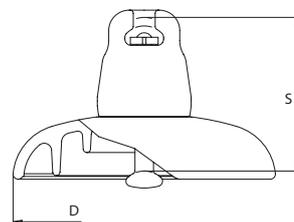
# Sediver toughened glass suspension insulators

IEC

## Ball & Socket type

**400 kN**

**760 kN**



Standard Profile

CATALOG N°		F400/205	F530/240	F760/270
IEC class <sup>(1)</sup>		U400B	U530B	
<b>MECHANICAL CHARACTERISTICS</b>				
Minimum mechanical failing load	kN	400	530	760
<b>DIMENSIONS</b>				
Diameter (D)	mm	360	360	400
Spacing (S)	mm	205	240	270
Creepage distance	mm	550	620	680
Metal fitting size <sup>(2)</sup>		28	32	36
<b>ELECTRICAL CHARACTERISTICS <sup>(3)</sup></b>				
Power frequency withstand voltage				
- Dry one minute	kV	90	90	90
- Wet one minute	kV	55	55	55
Dry lightning impulse withstand volt.	kV	140	140	145
Puncture withstand voltage	kV	130	130	130
<b>PACKING AND SHIPPING DATA</b>				
Approx. net weight	kg	14	18	26.1
N° of insulators per crate		2	2	2
Volume per crate	m <sup>3</sup>	0.05	0.05	0.08
Gross weight per crate	kg	31.6	41.7	57.9
N° of insulators per pallet		24	24	16
Volume per pallet	m <sup>3</sup>	1.08	1.2	0.99
Gross weight per pallet	kg	384	494	477

(1) in accordance with IEC publication 60305

(2) in accordance with IEC publication 60120

(3) in accordance with IEC publication 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

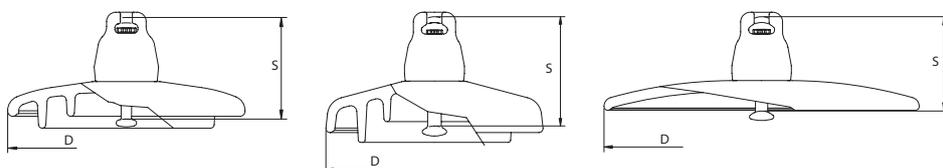
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# Sediver toughened glass suspension insulators

**BS**

## Ball & Socket type

**80 kN**  
**120 kN**



CATALOG N°	Standard Profile		Fog Type Profile		Open Type Profile	
	B8/140	B12/146	B8P-A/146	B80P/140	B80D/146	
<b>MECHANICAL CHARACTERISTICS</b>						
Minimum mechanical failing load	kN	80	120	80	80	80
<b>DIMENSIONS</b>						
Diameter (D)	mm	255	255	255	280	380
Spacing (S)	mm	140	146	146	140	146
Creepage distance	mm	320	320	390	445	365
Metal fitting size <sup>(1)</sup>		16B	16B	16B	16B	16B
Locking device designation		W	W	W	W	W
<b>ELECTRICAL CHARACTERISTICS <sup>(2)</sup></b>						
Power frequency withstand voltage						
- Dry one minute	kV	70	70	72	80	60
- Wet one minute	kV	40	40	42	50	50
Dry lightning impulse withstand volt.	kV	100	100	110	125	90
Puncture withstand voltage	kV	130	130	130	130	130
<b>PACKING AND SHIPPING DATA</b>						
Approx. net weight	kg	4	4	5	5.8	5.6
N° of insulators per crate		6	6	6	3	6
Volume per crate	m <sup>3</sup>	0.05	0.05	0.06	0.37	0.1
Gross weight per crate	kg	33.1	33.1	33.7	22.3	34.8
N° of insulators per pallet		90	90	90	54	90
Volume per pallet	m <sup>3</sup>	1.34	1.34	1.34	0.95	2.42
Gross weight per pallet	kg	452	452	557	429	585

(1) in accordance with IEC 60120 & BS 3288

(2) in accordance with IEC 60383-1 & BS 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

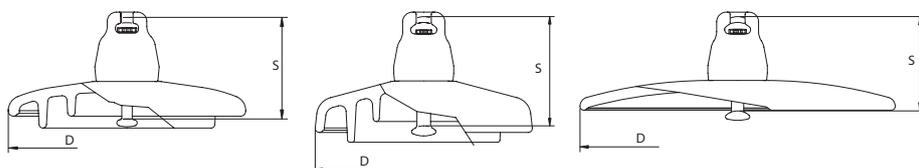
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# Sediver toughened glass suspension insulators

BS

## Ball & Socket type

125 kN



		Standard Profile	Fog Type Profile	Open Type Profile
CATALOG N°		B13/140	B130P/146	B13D/140
<b>MECHANICAL CHARACTERISTICS</b>				
Minimum mechanical failing load	kN	125	125	125
<b>DIMENSIONS</b>				
Diameter (D)	mm	255	280	380
Spacing (S)	mm	140	146	140
Creepage distance	mm	320	445	365
Metal fitting size <sup>(1)</sup>		20	20	20
Locking device designation		W	W	W
<b>ELECTRICAL CHARACTERISTICS <sup>(2)</sup></b>				
Power frequency withstand voltage				
- Dry one minute	kV	70	80	60
- Wet one minute	kV	40	50	50
Dry lightning impulse withstand volt.	kV	100	125	90
Puncture withstand voltage	kV	130	130	130
<b>PACKING AND SHIPPING DATA</b>				
Approx. net weight	kg	4.4	5.8	5.6
N° of insulators per crate		6	6	6
Volume per crate	m <sup>3</sup>	0.05	0.07	0.12
Gross weight per crate	kg	33.1	45.3	44.6
N° of insulators per pallet		90	72	90
Volume per pallet	m <sup>3</sup>	1.35	1.24	2.6
Gross weight per pallet	kg	452	545	624

(1) in accordance with IEC 60120 & BS 3288

(2) in accordance with IEC 60383-1 & BS 60383-1

**Corrosion prevention solution:** Insulators with specific protection against corrosion are also available (see page 6)

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