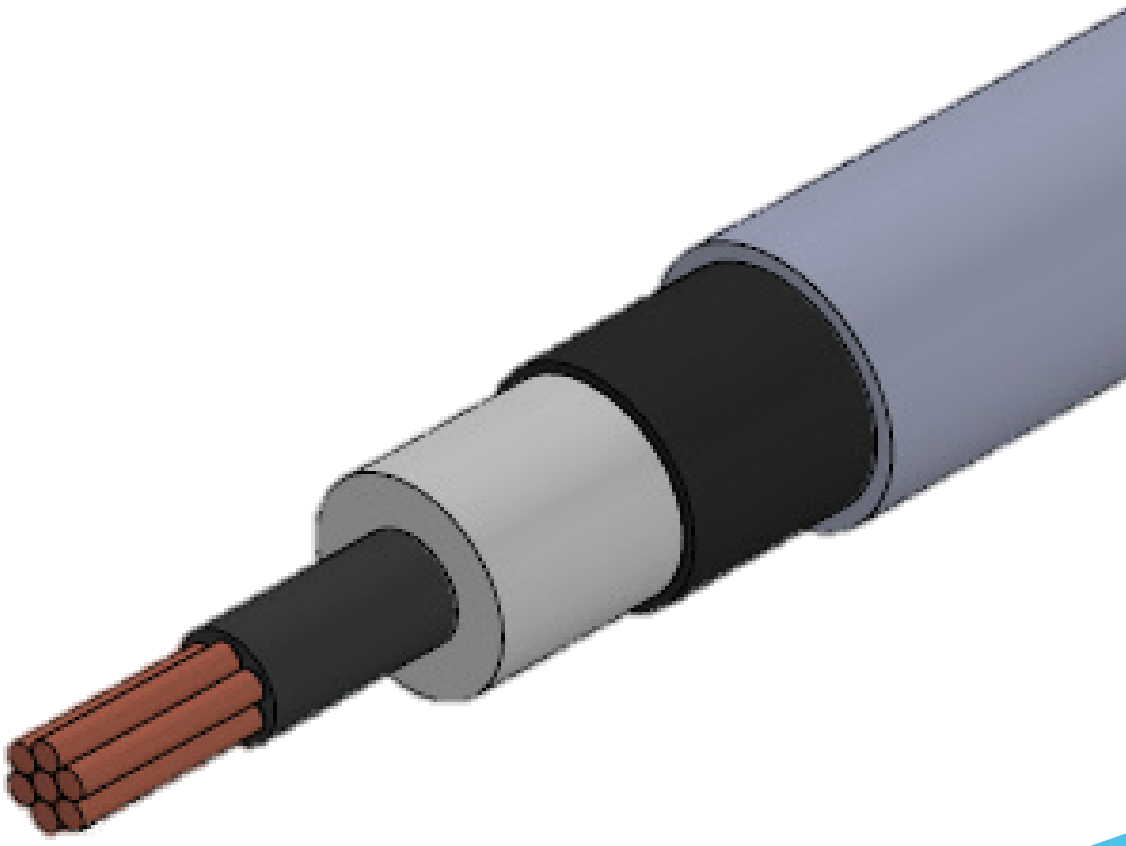
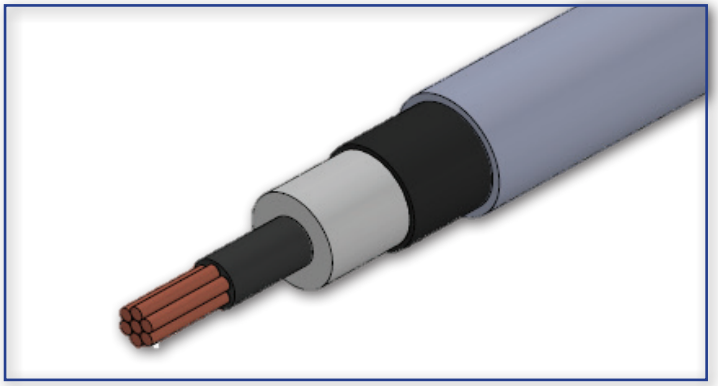
HV INSULATED LIGHTNING DOWN CONDUCTOR CABLE



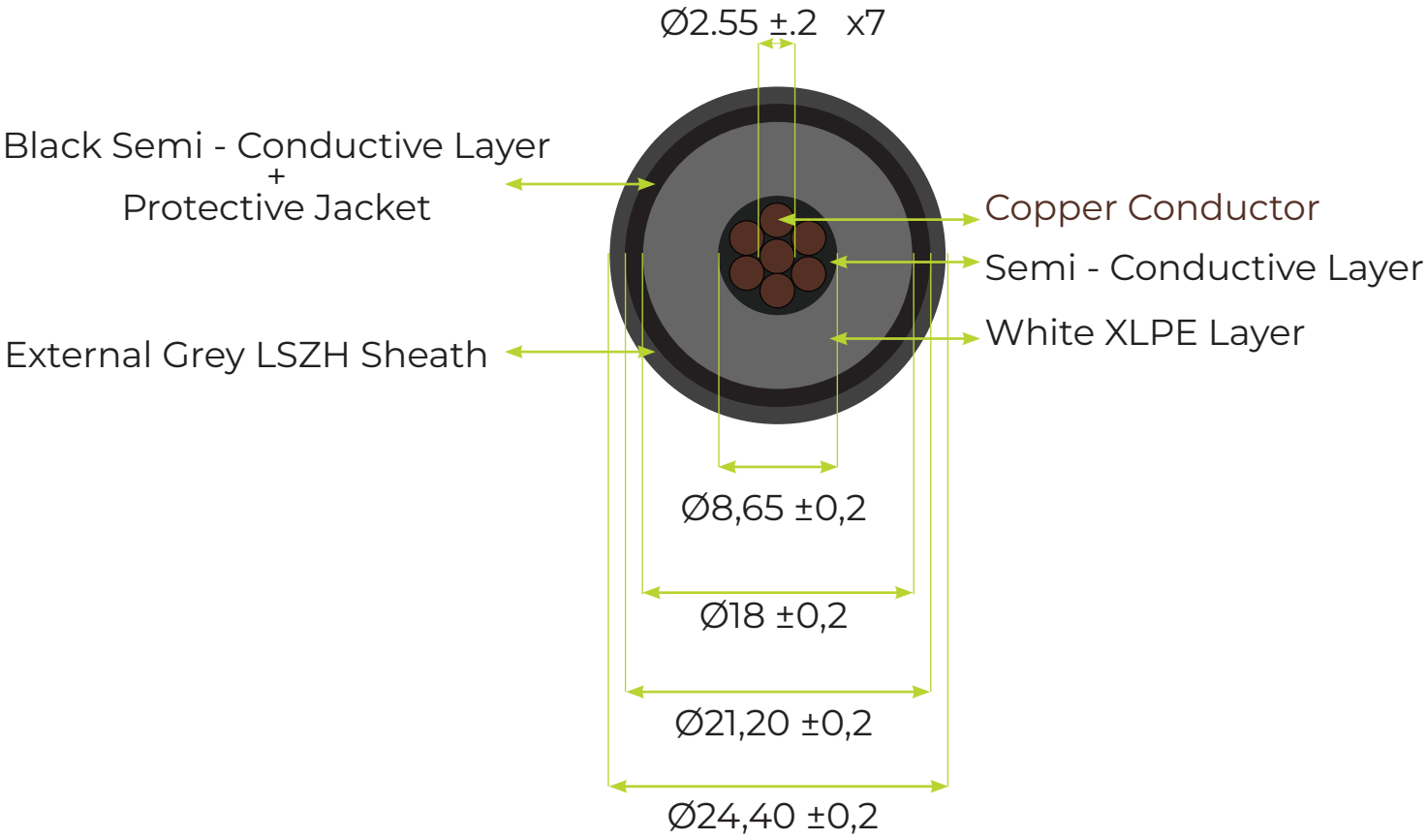
Radsan®

HV INSULATED LIGHTNING DOWN CONDUCTOR CABLE

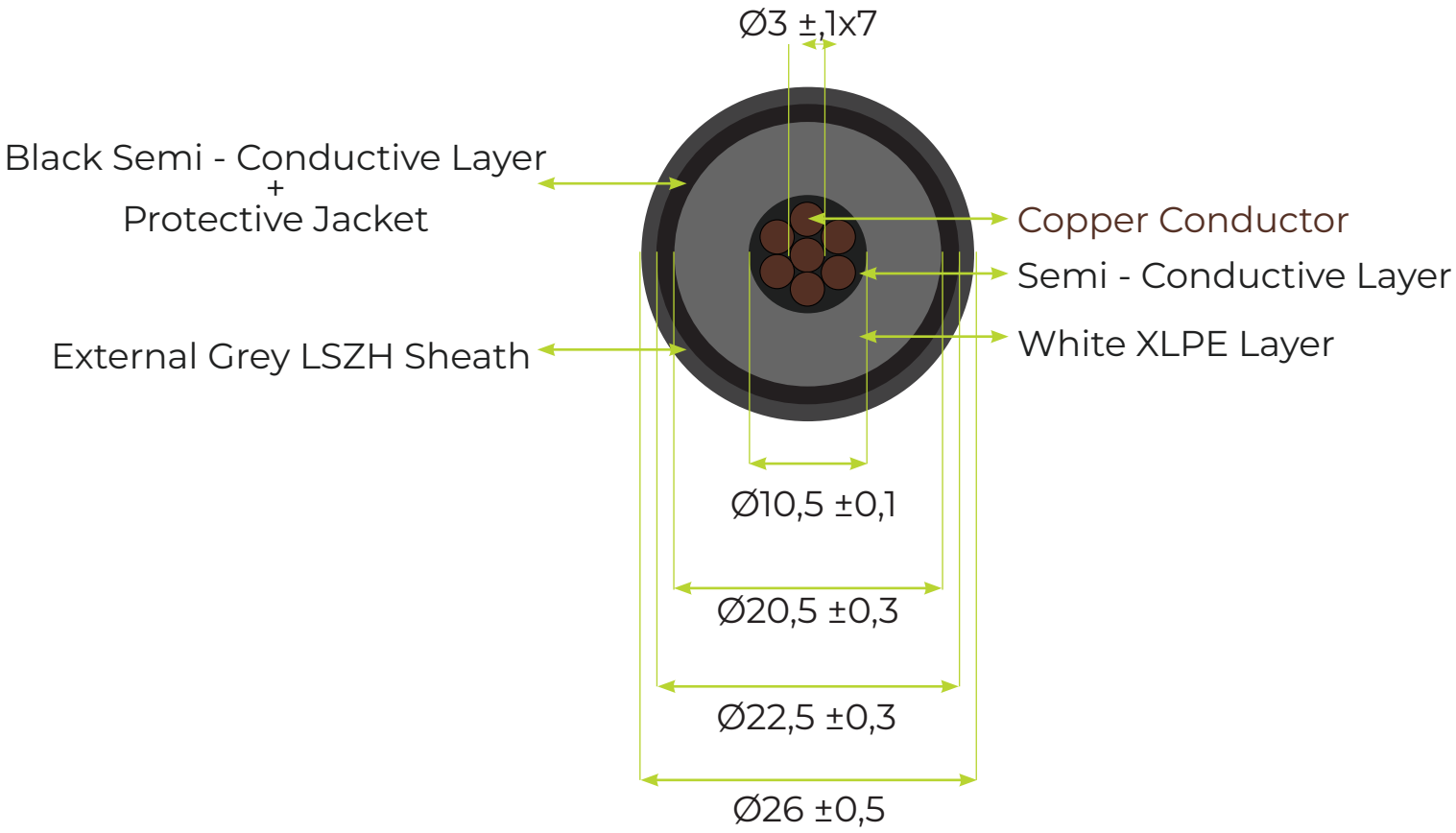
The LICON Lightning Cable is a vital component for modern building complexes, where rooftop installations are dense and maintaining traditional separation distances (S) is impractical. By enabling reduced separation distances without compromising safety, it ensures effective lightning protection, safeguarding both the infrastructure and the occupants.



FLR.35



FLR.50



Main Features and Advantages:

High Voltage Resistance:

Designed in accordance with IEC/EN 62305-3 standards.
Manufactured to comply with IEC TS 62561-8 standards to ensure reliability.

Lightning Surge Current Capacity:

Tested for 100 kA based on a 10/350 µs lightning surge current.

Separation Distance (S):

Provides an equivalent separation distance of 0.9 meters in air or twice that in solid materials after the initial potential connection.This allows for direct installation over metallic or electrical structures.

Safe Grounding Path:

In the event of lightning, directs incoming energy to the building's grounding system via the LICON conductor.Prevents direct arc formation between the conductor and the protected structure.

Flexible Installation:

Ideal Applications.Perfect for modern building rooftops equipped with air conditioning, ventilation, solar energy, and transmission systems.

Installation Planning

When planning building lightning protection, the following points and possible steps should be considered:

·Determine the protection volume and air-terminal system according to IEC/EN 62305-3.

·Calculate the required separation distance (S).

·Determine the number of LICON conductors based on the lightning protection class and the required conductor length.

·Consider the relevant wind speed zones for the lightning air-terminal rods.

·Take additional measures in areas where there is a possibility of explosive atmospheres.

·Ensure that equipotential bonding is in place.

1. Lightning Arrestor System (Air-Terminal System)

According to IEC/EN 62305-3 Section 5.2, the design of the air-terminal system must be considered during planning. The height and arrangement of the air-terminal system should be designed so that all objects to be protected remain within the protection zone.

2. Protection Zone

Along the entire length of the conductor, it must remain within the protection zone of the air-terminal system.

This must be verified using the protection angle and rolling sphere method according to IEC/EN 62305.

3. Required Separation Distance up to the First Potential Equalization

Within the calculated radius of separation distance, no electrically conductive or grounded parts should be present in the potential equalization zone. This includes metallic structural components, conductor holders, and reinforcements.

4. Potential Connection

The potential connection element must be connected to the equipotential bonding with a conductor of ≥ 6 mm^2 Cu or an equivalent.

5. Bending Radius

Pay attention to the bending radius during the installation of conductors.

6. Additional Equipotential Connections

After the initial equipotential connection is made using a potential bonding component, multiple connections can be made via the LICON conductor to the grounded components of structures that do not carry lightning current.

7. Conductor Installation

The LICON conductor must be secured with appropriate clamps. The maximum distance between fastening points is 1 meter.

8. Separation Distance in Air s ≤ 20 cm

If the separation distance calculated in air is s ≤ 20 cm, no additional equipotential bonding is required.

9 .Calculation of the Separation Distance and Critical Lengths

If it has not yet been decided whether the building in question will be protected by a lightning protection system, the designer must perform a risk assessment according to IEC/EN 62305-2. This assessment will indicate whether a lightning protection system is necessary.

According to IEC/EN 62305-3 Section 6.3, calculate the separation distance at the connection point of the LICON conductor. Measure the distance (L) from the LICON conductor's connection point to the next level of lightning protection equipotential bonding (for example, the grounding system, a metal parapet on a building with an electrically bonded metal façade, or a high-rise building with steel reinforcement).

Check whether the calculated separation distance (s) is less than or equal to the equivalent separation distance specified for the LICON conductor. If the specified equivalent separation distance is exceeded, you must install additional conductors:

·When installing multiple insulated conductors in parallel, the lightning current is divided. In this case, the current splitting factor (kc) decreases, which reduces the calculated separation distance (s).

·Install conductors at least 20 cm apart. This minimizes magnetic fields and prevents the conductors from interfering with each other.

·When conductors are laid directly next to each other, the current splitting factor (kc) does not adequately decrease.

·Whenever possible, place the conductors as far apart as conditions allow. Ideally, the second conductor should be planned to descend to ground on the opposite side of the building.

Conductor Lengths and Lightning Protection Classes

Based on the calculated separation distance **s**, lightning protection class for ki, number of down conductors used for $\mathbf{k_c}$ and electrical insulation $\mathbf{(k_m)}$, the possible length of the LICON conductor can be calculated with the following formula (see IEC/EN 62305-3):

$$\mathbf{L(m)=S.k_m/(k_c.k_i)}$$

Table 1 below presents the calculated value of the possible length of the LICON conductor i for a separation distance of s = 0.90 m in air. If the conductor lengths shown there are insufficient for the construction project, a lightning protection specialist should calculate the kc factor in detail using the building data.The above formula shows that the kc factor will decrease with the use of a larger number of conductors and therefore longer conductor lengths will be

Lightning Protection Level for LPS	Max. Lightning Impulse Current	Down Conductor Nos.	FLR35-FLR50 Cable Lenghts ≤ 0,90m In Air	k_c	k_i
I	200 kA	1	11,25	1	0,08
		2	17,30	0,65	
		3 and more	26,16	0,43	
II	150 kA	1	15,00	1	0,06
		2	23,07	0,65	
		3 and more	35,00	0,43	
III+IV	100 kA	1	22,75	1	0,04
		2	35,00	0,65	
		3 and more	52,00	0,43	

NOTE 1 In using other insulating materials, construction guidance and the value of km is provided by the manufacturer. For an insulating stand-off consisting of FRP (fiberglass reinforced plastic), PE or PVC, with a minimum length of 0,5 m, km = 0,7 can be used. For additional information see IEC TS 62561-8.

NOTE 2 When there are several insulating materials in series, it is a good practice to use the

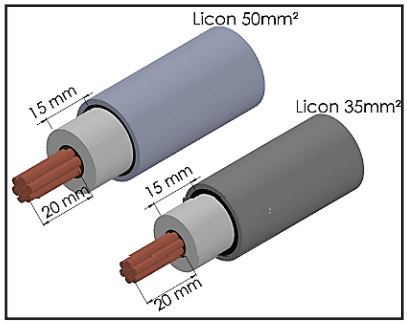
Meterial	k_m
Air	1
Concrete, Bricks, Wood	0,5

In using other insulating materials, construction guidance and the value of km should be provided by the manufacturer. For an insulating stand-off consisting of FRP(fiberglass reinforced plastic), PE or PVC, with a minimum length of 0,5m, km=0,7 maybeused. Foradditional information see IECTS62561-8.

- When there are several insulating materials in series, it is a good practice to use the lower value for km.

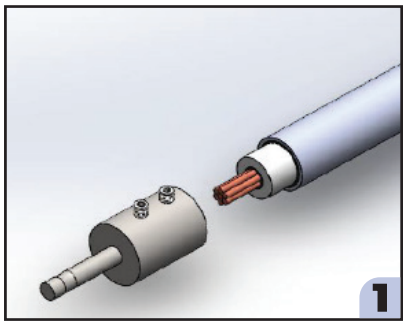
FLR-35 VE FLR-50 LICON CABLE INSTALLATION

FLR-35 AND FLR-50 LICON CABLE STRIPPING DIMENSIONS

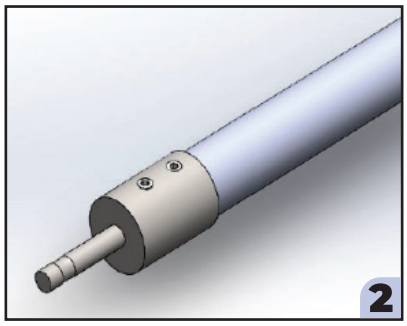


Shorten the LICON conductor to the required length using cable cutting tools or a saw.

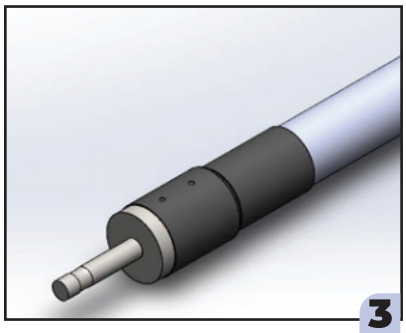
FLR-35 VE FLR-50 LICON CABLE END



PREPARE THE CABLE END, STRIP THE INSULATION

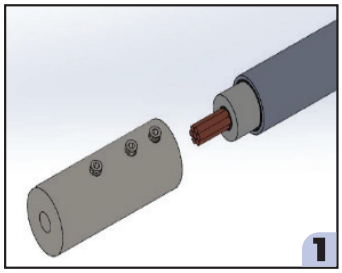


END THE CABLE, TIGHTEN THE CONNECTOR SCREWS

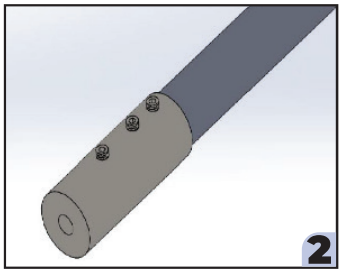


INSULATION IS COMPLETED WITH HEAT SHRINK TUBE

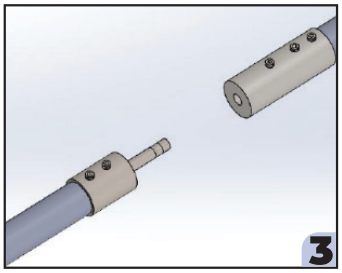
FLR-35 VE FLR-50 LICON CABLE JOINTING



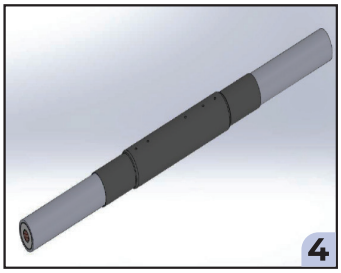
PREPARE THE CABLE END, STRIP THE INSULATION



PUT THE END ATTACHED TO THE CABLE INTO THE JOINT CONNECTOR AND TIGHTEN THE SCREWS



TERMINATED CABLE END, PUT IT INTO THE JOINT CONNECTOR AND TIGHTEN THE



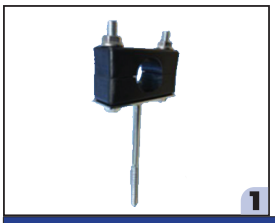
INSULATION IS COMPLETED WITH HEAT SHRINK TUBE

LICON İLETKENİNİ KABLO KESME ALETLERİ VEYA BİR TESTERE KULLANARAK GEREKLİ UZUNLUKTA KISALTIN.

TECHNICAL SPECS.

LICON CABLE "LCR"	LCR-35	LCR-50
Colour	Light Grey	
Equivalent separation distance (in air)	90 cm	
Equivalent separation distance (in solid)	180 cm	
Outer Diameter	24,5 mm	26 mm
Min. Bending Radius (10 x Cable Outer Diameter)	245 mm	260 mm
Cross - Section	35mm^2	50 mm^2
Inner Conductor	Stranded / Copper	
Operation Temperature	-30^{0}C-70^{0}C	
Tested, I_{imp} (10/350 µs)	100-150 kA	
Tested, TS EN 60332-1-2,	Test For Vertical Flame	
Weathering resistance (UV - Stabilised)	YES	
Halogen-Free	YES	
Cable Weight / 100m	79 kg	92 kg

FLR-35 / FLR-50 İÇİN KROŞELER



SERIES NO	REFERENCE NO	DESCRIPTION	BOLT
1	IKFR.113	P+(D1-D2-N-A)	DC-NC
2	IKFR.111	P+(D1-D2-N-A)	DC-NC
3	IKFR.122	P+(D1-D2-N-A)	DC-NC
4	IKFR.109	P+(D1-D2-N-A)	DC-NC
5	IKFR.133	P+(D1-D2-N-A)	DC-NC

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