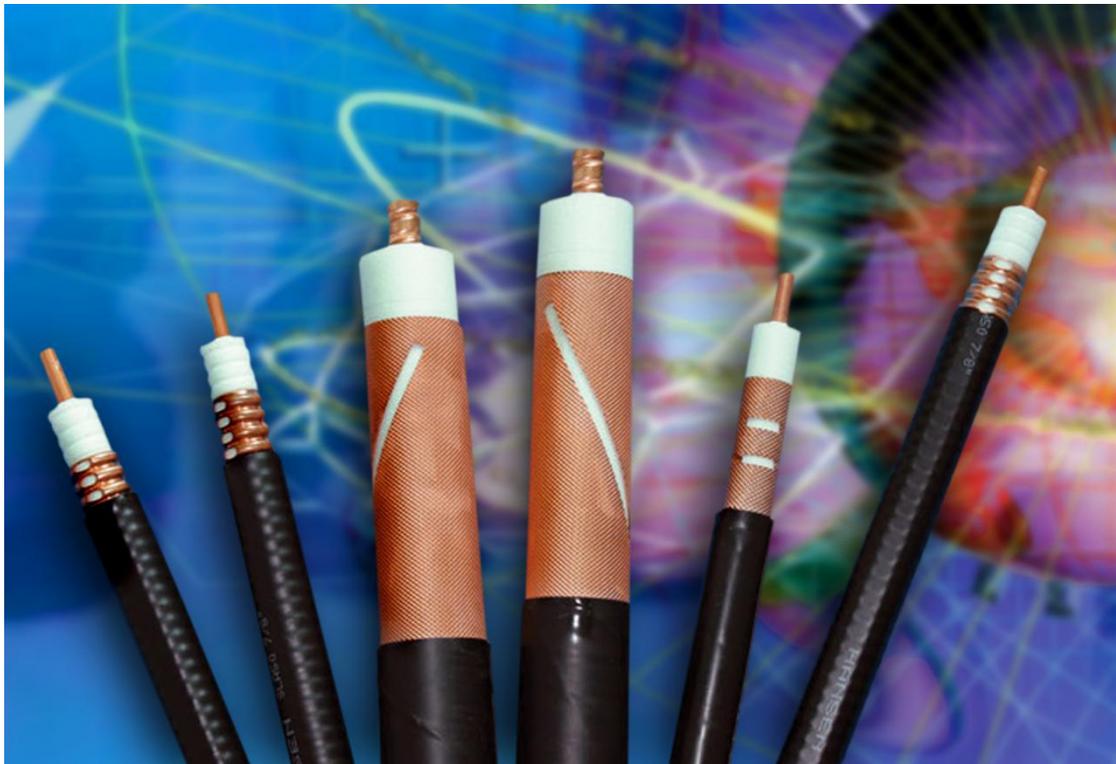


Comba

Selection and Installation of Radiating Leaky Cable



Summary and selection of radiating leaky cable

1.1 Summary

Leaky coaxial cable is a kind of cable that the outer conductor is not completely closed. During the RF signal transferring in the cable, a part of the signal couple to the outer space through the outer conductor. On the other hand, the signal in outer space can also couple to the cable through the outer conductor. Therefore, the leaky coaxial cable has the dual functions of receiving and transmitting the signal. Leaky coaxial cable is generally applied to the specific space where the antenna is difficult to use, especially the separation of antennas for mobile communication systems can not provide enough space for specific field coverage; or that the leaky coaxial cable can completely cover the space that the existing mobile communication system can not reach.

Structurally, the radiating leaky coaxial cable differs from the common feeder, especially in the case of the outer conductor. Common feeders usually use argon-arc welding or spiral rolled copper tubes as outer conductors, and outer conductors are all closed to the insulation without gaps. The pitch of the rolling lines is larger and the depth is deeper. At present, the common conductor of the radiating leaky coaxial cable is usually made of smooth or fine grained copper strip with longitudinal wrapping. The joint is not welded and the pitch is small and the depth is shallow.

1.2 Selection

For different applications and frequency bands, COMBA offer different types of leaky cables.

1-5/8" Leaky Cable

LC-CF158CFR-MH



Selection and installation of the clamp

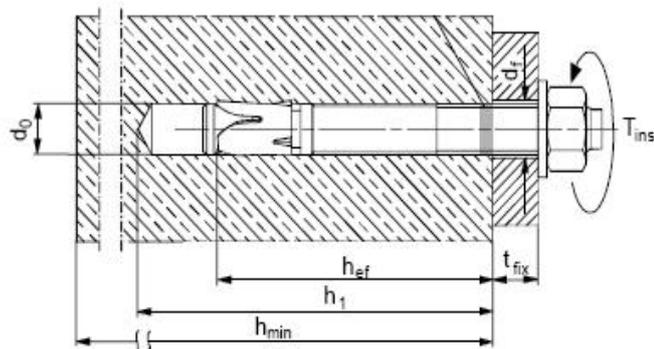
For the applications above 200km/h, we shall use high-speed clamps. For the applications below 100km/h, it's better to use low-speed clamps. As for the applications between 100 to 200km/h, we can use middle-speed clamps or high-speed clamps according to the design drawing and the specific situation.

Normally, the distance of non fire resistant clamps is 1m, the distance of fire resistant clamps is 10m. So every 10 clamps contains 9 non fire resistant clamps and 1 fire resistant clamps. The distance of the clamp can be changed according to the design drawing as well.

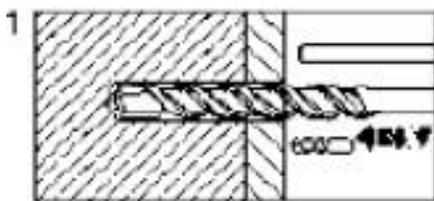
As follows is the specific install method of the clamps.

3.1 High-speed clamp

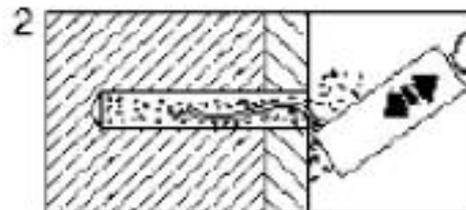
Step 1 : Erect the M8×80 anchor bolt



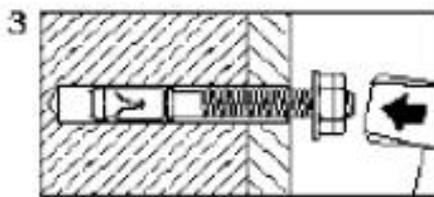
Anchor bolt	M8×80
Minimum thickness of the concret	100mm
Drilling depth	60mm
Drilling diameter	10.5mm
Burial depth	55mm
Tightening torque	15Nm



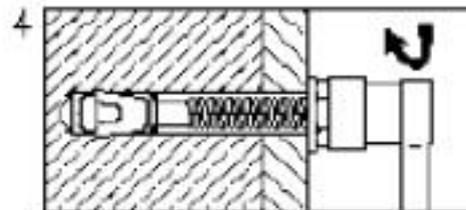
Drill a hole



Blow the dust off



Knock the anchor bolt in lightly



Tighten the nut

Attention:

- To ensure the depth of the hole, concret debris should be blown off with the blower after drilling.
- Do not hit the anchor bolt hardly, or the hex sleeve cannot fit the broken anchor bolt.

Step 2: Fix the pad,hex sleeve and the clamp with the screw



Step 3: Erect the cable to the clamp



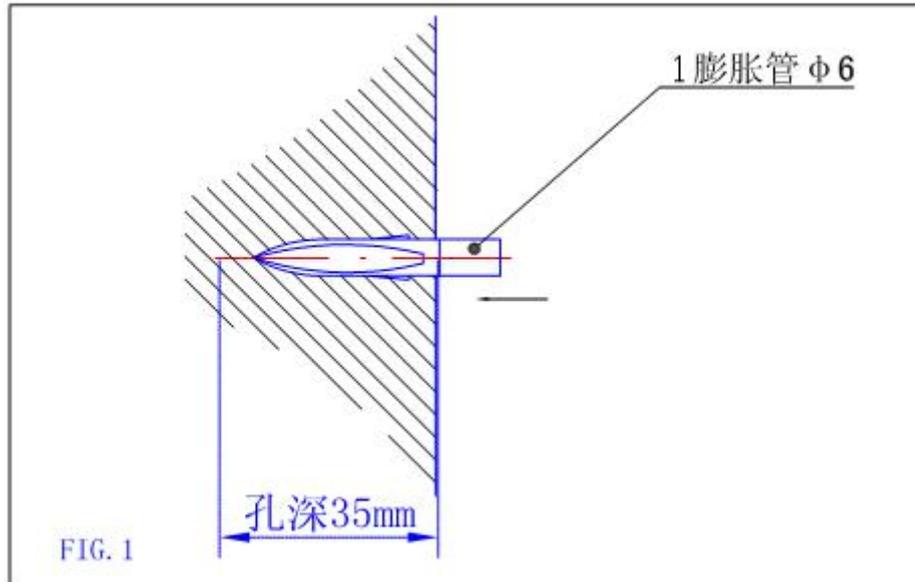
While erecting the cable, the identification line of the cable should face the groove of the cable.

For the fire resistant clamp, a stainless fire resistant ring is added as below.

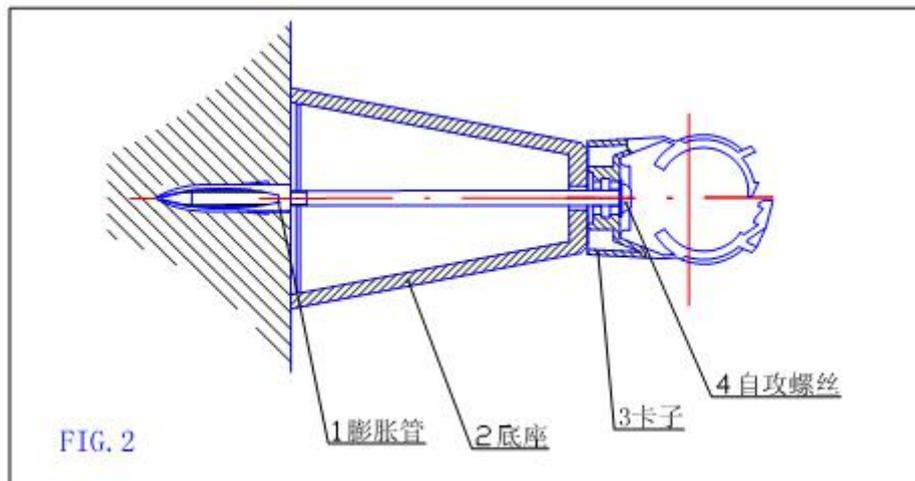


3.2 Low-speed clamp

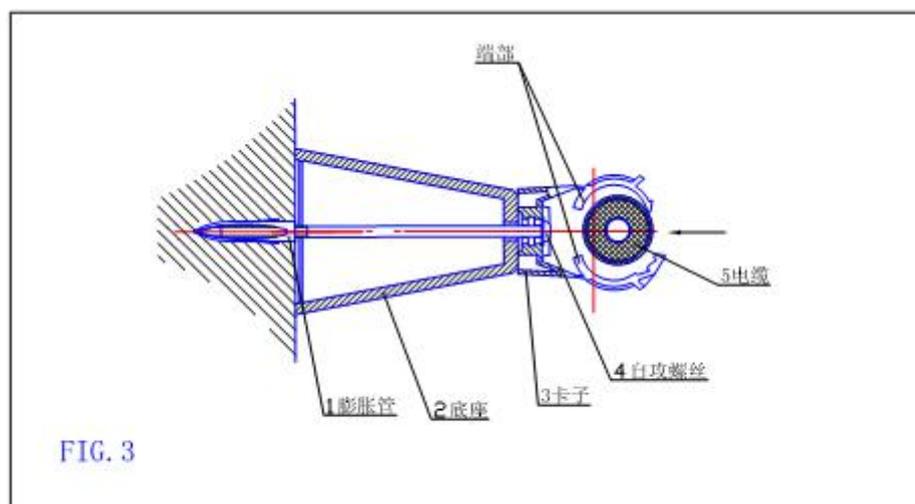
- Drill a hole with a \varnothing 6mm driller, the minimum drilling depth is 35mm, then clean the hole and put the anchor(1) in, shown as Fig. 1.



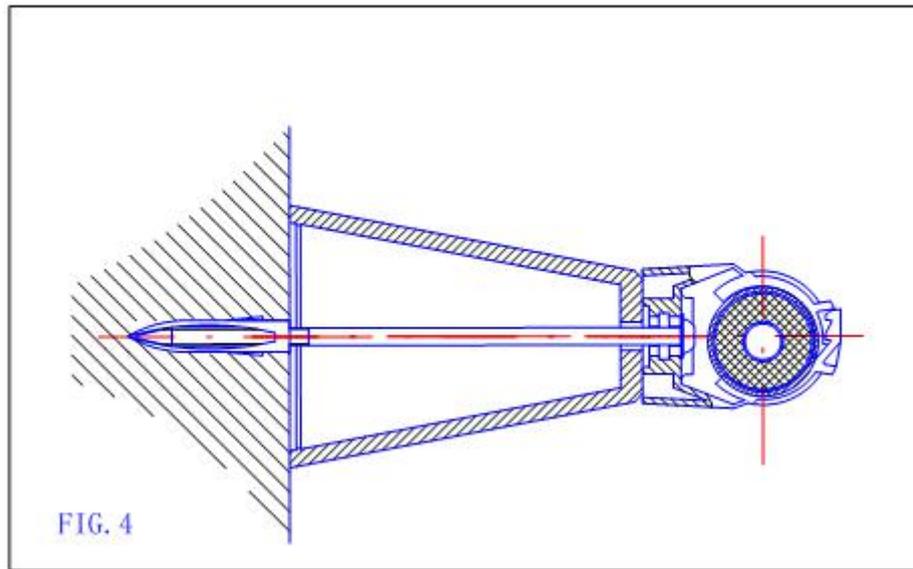
- Erect the base(2), the clamp(3), the screw(4) on the wall, shown as Fig. 2.



- Erect the cable(5) as Fig. 3, make the identification line face the groove.



- Close the clamp cover and press it as Fig. 4.



Unloading and fixing of leaky cable

After the leaky cable arrives at the construction site, we use the wire rack or track flat car to fix the cable tray first, and then pull out the cable after removing the cover batten and other protective measures.

Fix the cable on the hanger with the construction platform car. Specially, the process of pulling cable and fixing the clamp should cooperate well, speed should maintain the same, to avoid excessive tension strain of cable, but also to avoid the cable torsion phenomenon, which caused the direction leaky cable difficult to adjust.

For situations requiring bending of cables, such as bypassing the weight of the contact net, care should be taken to avoid the leakage of the cable in bending below the required bend radius.

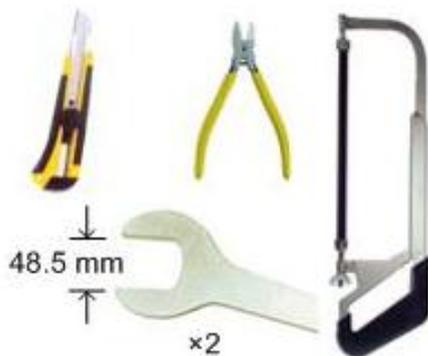
On the surface of the sheath of the leaky cable, there are two convex identification lines in parallel with the direction of the cable, and the slot of the leaky cable is on the back of the two identification lines. When the leakage cable is fixed to the clamp, make sure that the two identification lines are directed toward the wall so that the slot of the leaky cable is aligned with the tunnel space area to be covered. According to the characteristics of different coverage systems, such as the private network and the public network, the part of the car that needs to be covered is different, and the location of the mark line in the clamp can be adjusted to obtain the best coverage effect.

The distance between the leaky cable and the mounting surface (there may be a ceiling or wall, depending on the type of installation) has a certain effect on the longitudinal attenuation and coupling loss. In order to reduce bad effects to the electrical performance and the cover performance of the leaky cable caused by the distance of the mounting surface, and make the system achieve the best results, we suggest that leave a certain distance between the leaky cable and the building surface. Take 1-5/8 leaky cable as an example, installing distance from the surface is 10-15cm. In engineering, a hanger with an appropriate height of the base or support rod is used to secure the distance of the cable from the building. In addition to the fire resistant clamp, a non-metallic clamp is used as the clamping head of the cable. Also, please avoid using a large area of metal surface as the mounting position when you select the mounting position.

Installation of connector and other related accessories

5.1 Installation of connector and waterproof stuffs

(1) Connector and tools

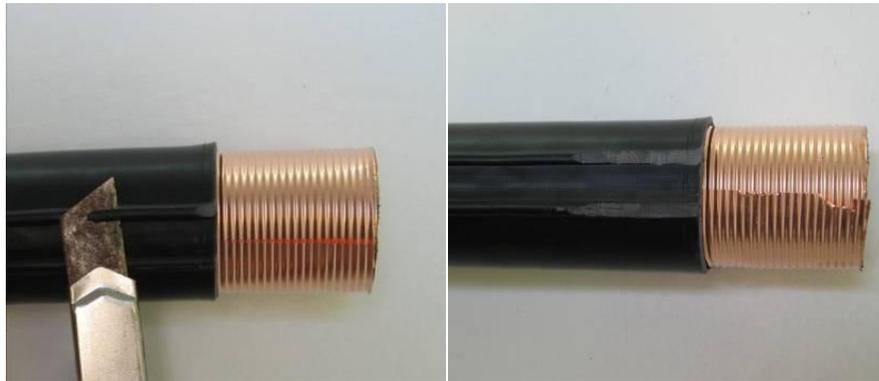


(2) Cut the redundant cable off, keep the section perpendicular to the axis of the cable while cutting.

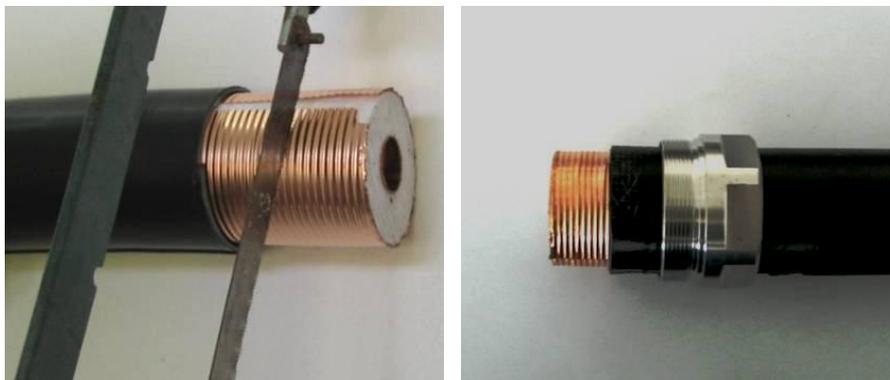
(3) Cut off the jacket about 5cm, do not damage the outer conductor.



(4) Cut two identification lines about 3cm from the end.



(5) Brush the dust off the section, and pull the end of the connector on.



(6) Make the edge of the outer conductor appress the insulation, pull the ring on and press it tight.



(7) Put the inner conductor of the connector in the cable, and screw it with the spanner.



(8) Pull the front of the connector on, screw it with a spanner, and screw the end of the connector with another spanner at the same time.



(9) After connecting to the RF jumper, the load and the antenna, waterproof treatment should be given with the tape(3M 1712) and the daub(3M 2228).



(10) Final result



5.2 Installation of grounding clamp

5.2.1 Design

In the application environment of high-speed railway, for different situation of the leaky cable, the grounding design of the leaky cable is mainly as follows, except for the feeders' grounding requirements.

- Leakage cables and equipment are connected by jumper or feeder

In the leaky cable and equipment connected by a jumper or feeder under the condition of considering the system maintenance or troubleshooting, and leaky cable feeder is connected with a jumper or may be artificially broken, if the leaky cable side is not grounded, the leaky cable may have a higher induction voltage which threatens the safety of the personnel concerned. Therefore, we recommend the ground side of the leaky cable. If both ends of the leaky cable are connected to the equipment through a jumper or feeder, both ends of the leaky cable need to be contacted to ensure safety.

- The leaky cable is connected to the antenna or other leaky cable by jumper or feeder

When the leaky cable is connected to an antenna or another piece of leaky cable through a jumper or feeder, there is no need for additional ground on the leaky cable.

5.2.2 Installation

- Connect the ground terminal (if attached) to the additional points (public main thread, etc.), then mark the line on the feeder by the length of the circlip, and strip the feeders 2.25" (57mm) .
- Cut a piece of tape of 1.5" (38mm) length, and put it near the ground wire.



- Clip the clasp around the skin. Note: snap ring is secured around.



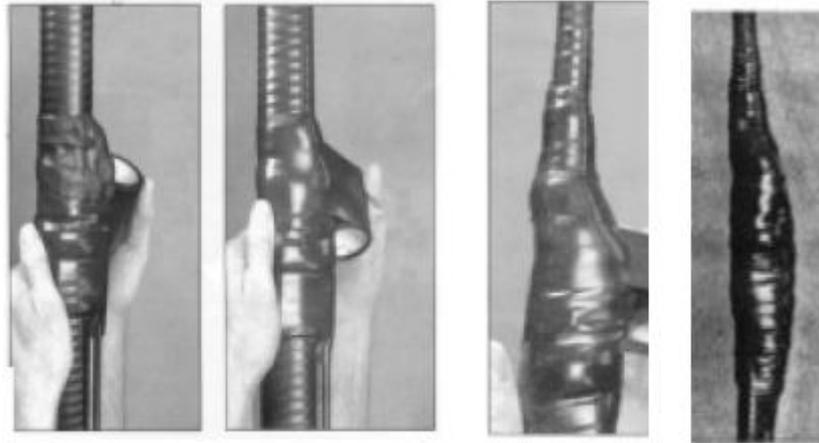
- Attach the head of the tape to the interface.



- Start at the bottom and tape the joint. When more than half of the belt is tight, tighten the tape to secure the tape securely around the joint.



- Place the adhesive tape around the joint, with each layer of clay covered at the 1" (25mm) of the front floor, and reserve a part at the bottom, reversing one direction at the end of each layer. Do not turn the last two layers outside the joint so that the adhesive tape is disengaged when it is tight.
- Wrap the PVC insulation tape in the same way.



5.3 DC-Block



5.3.1 Function

In order to protect the equipment from the influence of the induced voltage, the inductive DC current in the transmission system is prevented from damage to the equipment, and the DC partition device is needed between the equipment and the leaky cable.

5.3.2 Selection

Confirm the interface type before selecting. Since DC-Block are usually a male and female device, it is possible to specify the interface standards. For example, if the system is using N type interface, choose N type DC-Block device, and if the system is using DIN type interface, choose DIN type DC-Block.

5.3.3 Installation

In principle, the DC-Block can be installed anywhere between the cable and the device, but it is usually connected directly to the leaky cable connector. In general, the male head of the DC-Block is connected to the leaky cable connector, and the female head of the DC-Block is connected to the jumper. When connecting, pay attention to the effective connection of the interface. If necessary, especially when using the DIN type interface, you need to use torque wrench to ensure the fastening.

5.4 Arrester



5.4.1 Function

Arrester is a device that avoid damage to the equipment caused by an instantaneous high voltage or high current caused by lightning.

5.4.2 Selection

The selection of arrester is similar to DC-Block, and also mainly considers interface type. In addition, some arresters are not broadband products, so it's necessary to choose the appropriate arrester according to the system's frequency range.

5.4.3 Installation

The installation position of arrester is similar to DC-Block, and the typical installation method is to install it next to DC-Block. Unlike the DC-Block, the arrester itself needs to be grounded, so when it is installed, the grounding wire needs to be installed on its grounding terminal and connected to the ground reliably.

5.5 Terminal load



According to the engineering requirements, the terminal load is usually used at the end of the leaky cable. The conventional power rating is 5W. Select the appropriate type of interface and connect directly to the connector at the end of the cable. The terminal of the leaky cable is directly connected to the next level repeater or RRU, or the end of the leaky cable is connected with the antenna, and the terminal load can not be used.

Routine maintenance and maintenance

After the storage and installation of the cable, no special maintenance is required, but the following items should be paid attention to.

- Leakage cable should be stored indoor or outdoor with the rain proof ceiling, and avoid raining or directly in the sun.
- Avoid the cable construction in extreme weather conditions.
- Periodically check whether the cable hanger is loose or the chuck is falling off.
- For more dust covered sites, it is necessary to regularly clean the surface of the cable to avoid metal dust and other things attached to the surface of the leaky cable, which results in a decrease in coverage effect.