

# 5. ARMOR

5.1	<u>Interlocked Armor</u>	66
5.2	<u>Continuously Corrugated and Welded (CCW)</u>	66
5.3	<u>Basket-Weave</u>	67
5.4	<u>Lead Sheath</u>	67
5.5	<u>Wire Serve</u>	67

## 5. Armor

Cables often need to be placed in areas where they are subjected to harsh mechanical stresses. These stresses could damage the insulated conductors or the optical fibers in the cable if they are not properly protected. Armor (usually a metal) is frequently applied over the cable core to provide this protection. The armor extends the life, while improving the reliability, safety and performance of the cable core. The following are some frequently used armor types.

### 5.1 INTERLOCKED ARMOR

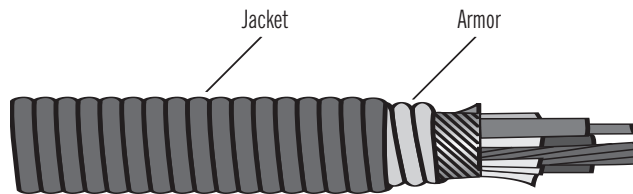
Interlocked armor typically uses galvanized steel or aluminum. However, other metals are sometimes used for specialized applications. The interlocking construction protects the cable from damage during and after installation. The armor may be applied directly over the insulation or over an inner jacket. Materials and construction generally comply with the requirements of UL, CSA and/or ICEA.

**Table 5.1—ICEA Recommended Thickness of Interlocked Armor**

Diameter of Cable (in.)	Nominal Thickness (mils)	
	Steel or Bronze	Aluminum
0 to 1.500	20	25
1.501 and larger	25	30

### 5.2 CONTINUOUSLY CORRUGATED AND WELDED (CCW)

CCW armor is made by forming an aluminum strip into a circle along its length and then welding it at the seam. This smooth tube is then rolled or crimped to form ridges to prevent kinking while bending (see Fig. 5.1). This type of sheath provides an impervious seal against moisture and other chemicals as well as physical protection.



**Figure 5.1—Continuously Corrugated and Welded (CCW) Armor**

### 5.3 BASKET-WEAVE

---

Basket-weave armor is constructed of metal wires forming a braided outer covering. The wires may be of galvanized steel, aluminum or bronze. This armor is generally used on shipboard cables because it provides the mechanical protection of an armored cable, yet is much lighter in weight than other types of armored coverings. Materials and construction generally comply with the requirements of IEEE Standard 45 and various military specifications. This type of armor is referred to as GSWB (galvanized steel wire braid) in some international standards.

### 5.4 LEAD SHEATH

---

For underground installations in conduits, ducts and raceways, a lead sheath may be used to protect insulated cables from moisture. In locations where corrosive conditions may be encountered, a jacket over the lead is recommended.

Commercially pure lead is used on some lead-covered cables, which conforms to the requirements of ASTM B29 and ICEA S-93-639 (NEMA WC74). Lead alloy sheaths, containing added tin or antimony, are used where a harder sheath is desired or where vibration may be encountered.

### 5.5 WIRE SERVE

---

Wire serve armor is most commonly found on submarine cable because it provides excellent physical protection from boat anchors, sharp rocks, sharks, etc. This type of armor normally consists of 1/8- to 1/4- inch diameter solid steel wires, which are laid helically around the circumference of the cable. Tar or asphalt (bitumen) is placed over and around the steel wires to reduce the effects of corrosion. This type of armor is referred to as SWA (steel wire armor) in some international standards.