

## 15/15 Versus 12/18 Armor Packages for 7/32' Cables

Choosing between a 15 X 15 and 12 X 18 armor package on 7/32" cables is always a topic of discussion among operators. The electrical characteristics of both type cables is essentially the same. The finished diameter, weight and rated breaking strength of both constructions are the same. There are, however, several factors that influence the choice for general operations with cables using standard galvanized steel (GIPS), armor wires and there are other special factors in the choice for cables using Alloy armor wires. This technical bulletin outlines factors affecting which 7/32" cables to choose when selecting from GIPS or Alloy armor wires with either 12 inner and 18 outer armor wires or 15 inner and 15 outer armor wires. These factors have been reported by some wireline operators and are presented to assist you in your decision making. Please note that your operational practices and environment must be considered in making any decision, and that your own experience may vary from that reported by these wireline operators.

### Armor Specifications

Armor Package	12 inner X 18 outer	15 inner X 15 outer
Cable Diameter - inches	0.224 +.005/-0.002	0.224 +.005/-0.002
Diameter - Inner Wires - inches	0.0310	0.0245
Diameter - Outer Wires - inches	0.0310	0.0358
Steel Area Inner - inches square	0.009056	0.007070
Steel Area Outer - inches square	0.013585	0.015098
Total Steel Area - inches square	0.022641	0.022168
Rated Breaking Strength - pounds	5,600	5,600
Torque Factor**	2.2	3.2

\*\* Torque Factor = (Area of outer armor)( Pitch diameter of outer armor) / ( Area of inner armor)( Pitch diameter of inner armor).

### Comparing 7/32 " Standard GIPS

#### 15 X15 Construction

- Larger outer armor wires wear longer.
- Larger outer wires are stiffer and therefore easier to thread through flow tubes.
- Larger outer wires do not become "crossed over" as easily during re-heading.
- Smaller inner wires will corrode to brittleness faster, reducing cable life.
- The larger Torque Factor means this type of cable, especially when new, will try to unwind more, which can result in loose outer armor wires.
- The outer armor of the 15 X 15 construction will require more frequent trips to a service center for "normalization" and post forming, to tighten the outer armor.

#### 12 X 18 Construction

- Larger inner armor wires will not corrode and become brittle as fast.
- The smaller Torque Factor means the cable will not unwind as easily, so the outer armor will stay tight longer, requiring less service.
- The outer and inner armor wires are the same diameter making a better head termination.

### Comparing 7/32 " Alloy, Stainless & MP35

The very high costs of alloy cables and their resistance to corrosion makes the decision on the best armor package different. The primary consideration is on obtaining maximum cable life. With these armor materials the cost of the frequent cable service is small compared to the cost of the cables.

#### 15 X 15 Construction

- Larger outer armor wires will wear longer.
- Alloy wires do not corrode, so smaller inner armor wires are not a problem.
- With no corrosion of the armor wires, the normal corrosion products, that inhibit cable rotation, are not present between the armor wires, so the cable under load will unwind more, loosening the outer armor.
- This cable construction, with a high torque factor and low rotational resistance, requires frequent trips to the service center to have the outer armor tightened and post formed.

#### 12 X 18 Construction

- The lower torque factor means this construction will unwind less than the 15X15 construction and will require less frequent service.
- The same diameter armor wires make a better head termination.
- This construction would be favored for use in extremely remote locations where cable service is not readily available.