APAR
Tomorrow's solutions today

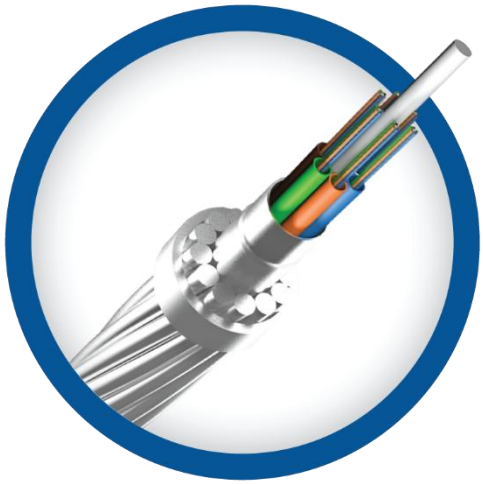
# OPTICAL GROUND WIRES (OPGW)

## CENTRAL ALUMINUM TUBE OPGW

APAR OPGW cable features a central aluminum-extruded tube that houses the optical fibers within polymer loose tubes for superior fiber protection and stability. The outer layer is designed with an optimized combination of Aluminum-Clad Steel (ACS) and All-Aluminum (AA) wires to meet specific mechanical and electrical performance requirements defined by the end user. This extruded aluminum OPGW construction delivers higher conductivity while maintaining excellent tensile strength, lightning performance, and fiber capacity.

## FEATURES

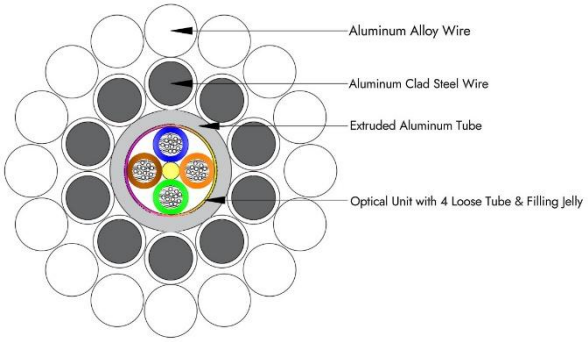
- **Superior Corrosion Resistance:** Designed and tested in accordance with IEEE construction guidelines for installation in high-corrosion environments.
- **Enhanced Electrical Performance:** The aluminum core tube significantly increases the conductor cross-sectional area, improving overall electrical conductivity and short-circuit capacity.
- **Exceptional Lightning Performance:** Fewer AA wires are required to meet electrical specifications, enabling the use of additional or heavier-duty ACS wires. In certain applications, AA wires can be fully replaced with ACS for enhanced lightning resistance and mechanical strength.
- **High Fiber Count Capability:** All optical fibers are contained within the central aluminum tube, providing superior protection and stability. Core tubes are available in a wide range of inner diameters to accommodate fiber counts from 12F to 144F.
- **Superior Optical Performance:** Maintains low optical attenuation and stable performance across a wide operating temperature range of -40°C to +85°C.
- The OPGW cable is run between the tops of high-voltage electricity Pylon.



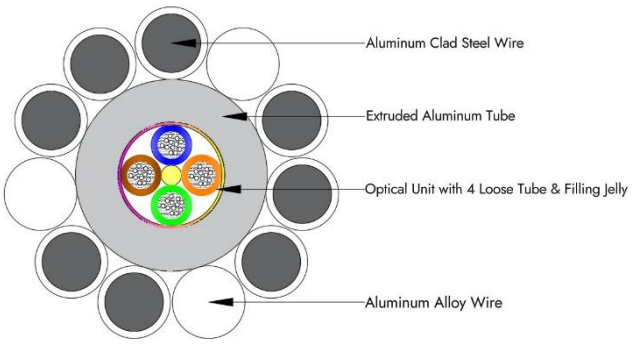
## APPLICATIONS

**Integrated Transmission and Communication Lines:** Designed for installation on overhead high-voltage transmission structures with voltage levels ranging from 132 kV to 765 kV, where the OPGW serves both as a grounding (shield) wire and a high-capacity fiber optic communication link.
**Lightning Protection:** Installed along the tops of transmission towers to shield phase conductors from lightning strikes and other atmospheric discharges.
**Smart Grid and Utility Applications:** Enables simultaneous data transmission for a variety of real-time applications, including Dynamic Line Rating (DLR), Dynamic Monitoring Systems (DMS), data center connectivity, SCADA, and smart grid operations.

## CABLE COMPONENTS*




**Double Layer**




**Single Layer**

** Indicative combination, available in variety of permutation and combinations*

# SINGLE & DOUBLE LAYER CONSTRUCTION

## TYPICAL DESIGNS

| FIBRES (MAX) | OPGW SIZE | FAULT CURRENT (KA)^2 | TOTAL CONDUCTOR AREA | | OVER ALL DIAMETER | | WEIGHT | | APPROXIMATE RBS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IN^2 | MM^2 | IN | MM | LBS/FT | KG/M | LBS | KGF |
| 12 | 48F12ASAT[72,39.9] | 40 | 0.1031 | 66.54 | 0.449 | 11.40 | 0.243 | 0.362 | 16186 | 7342 |
| 24 | 24F11ASAT[92.9,40] | 40 | 0.1139 | 73.48 | 0.472 | 12.00 | 0.299 | 0.445 | 20885 | 9473 |
| 24 | 24F-ALT-81[85,41] | 40 | 0.1262 | 81.39 | 0.492 | 12.50 | 0.323 | 0.480 | 19109 | 8668 |
| 36 | 36F12ASAT[100,50] | 50 | 0.1555 | 100.31 | 0.531 | 13.50 | 0.380 | 0.565 | 22481 | 10197 |
| 48 | 48F11ASAT[101.72,40] | 40 | 0.1519 | 97.99 | 0.531 | 13.50 | 0.384 | 0.572 | 22868 | 10373 |
| 48 | 48F10ASAT[118,81] | 81 | 0.1745 | 112.60 | 0.567 | 14.40 | 0.457 | 0.680 | 26527 | 12033 |
| 60 | 60F14ASAT[101,81] | 81 | 0.2062 | 133.06 | 0.602 | 15.30 | 0.450 | 0.670 | 22706 | 10299 |
| 72 | 72F14ASAT[85,100] | 100 | 0.1691 | 109.08 | 0.571 | 14.50 | 0.386 | 0.575 | 19109 | 8668 |
| 72 | 72F13ASAT[92.2,92] | 92 | 0.1725 | 111.27 | 0.583 | 14.80 | 0.400 | 0.595 | 20727 | 9402 |
| 96 | 96F12ASAT[104,144] | 144 | 0.2240 | 144.51 | 0.669 | 17.00 | 0.517 | 0.769 | 23380 | 10605 |
| 96 | 96F-ALT102-227[85.4,424.2] | 424.4 | 0.3523 | 227.29 | 0.815 | 20.70 | 0.564 | 0.839 | 19199 | 8708 |
| 144 | 144F13ASAT[109,151] | 151 | 0.2052 | 132.41 | 0.646 | 16.40 | 0.509 | 0.757 | 24504 | 11115 |
| 144 | 144F17ASAT[112,148] | 148 | 0.2209 | 142.54 | 0.651 | 16.53 | 0.521 | 0.775 | 25179 | 11421 |

**NOTES**:
The data presented in this table are approximations. The designs shown above represent only a sample of the configurations available from APAR. **For a cable engineered to your exact requirements, please contact our Sales team and refer to the customized cable data sheet for the most accurate and up-to-date specifications.**

| REFERENCE STANDARDS | | |
|---|---|---|
| IEEE | 1138 | Cable |
| IEC | 60794 | Cable |
| EIA/TIA | 598-D | Fiber |
| ASTM | B415<br>B398 | ACS Wires<br>AA Wires |

| TEMPERATURE RANGE | |
|---|---|
| Operation | -40 $^0$C to +85 $^0$C |
| Storage | -50 $^0$C to +85 $^0$C |
| Installation | -30 $^0$C to +85 $^0$C |

| QUALIFICATIONS |
|---|
| APAR'S OPGW -Type tested and validated by internationally acknowledged independent test laboratory according to IEC 60794 and IEEE 1138 standards |