AFL Compounds – Applications in Transmission Compression Accessories

Matthew G. Welborn, Senior Field Applications Engineer, AFL

Introduction

Electrical transmission systems achieve maximum lifespan when the correct type and amount of compound is used in legacy two-stage and single-stage conductor compression accessories. Most dead end and splice compression accessory failures AFL receives for inspection display inadequate usage of filler and flat surface joint compounds. The required type and amount of compound depends on the AFL compression accessory catalog series, assembly design and operating temperature of the conductor being installed. Compound specifications are detailed in the AFL Transmission & Distribution catalog, and AFL provides additional direct support through the Accessories technical line (800) 866-7385.

Compounds for Standard Operating Temperatures

100°C continuous operation and below, and temporary loading at elevated temperatures

AFC

AFL Filler Compound (AFC) is the recommended filler for standard two-die and Quick Compress® full-tension compression fittings because inhibits contaminants and improves the mechanical holding ability of the connection. AFC is particularly critical in standard two-die dead ends and splices, as compressing the steel portion of a standard assembly removes galvanization from the steel barrel. AFC fills the void area around the steel barrel component following the compression process, creating a moisture barrier around the exposed steel (**Figure 1**). Filler compound is the "sealant" of a compression assembly, and contains hard metallic particles which operate mechanically to fracture surface films when pressure is applied. As the accessory is compressed, AFC is forced between the conductor strands, effectively sealing out air and moisture.

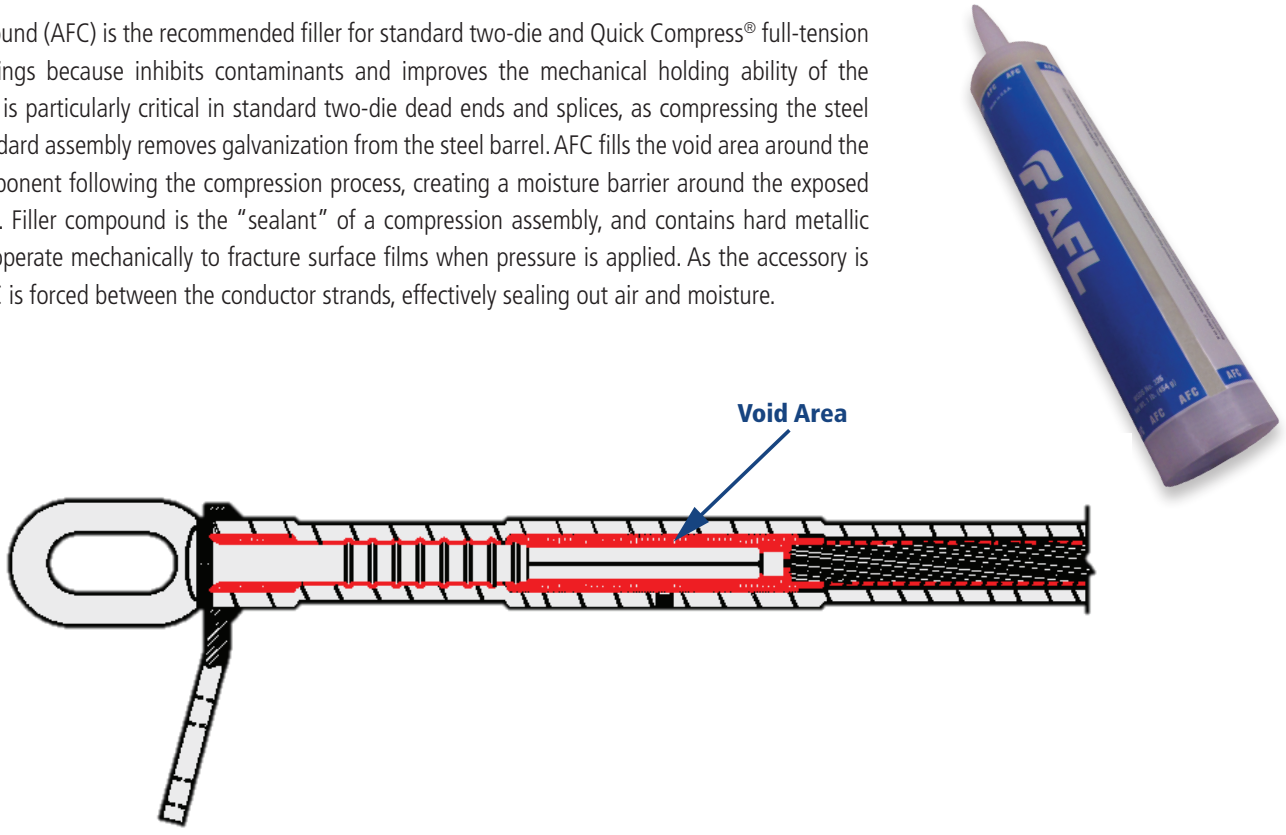

Figure 1 – AFC fills the void area within the compression accessory.

No. 2 EJC

No. 2 Electrical Joint Compound (EJC) provides efficient service on aluminum-to-aluminum and aluminum-to-copper flat-to-flat surfaces, including terminal-to-dead end tongue, terminal pad-to-bus, and bus-to-bus connections. No. 2 EJC is non-gritted and contains active fluoride in a petroleum-based medium that "dissolves" oxide film and seals the mating surfaces against moisture. Unlike most other compounds which contain fluoride chemicals, AFL's EJC oxide removal is not damaging. The typical action of other compounds containing fluoride generates a pitting attack of an aluminum surface, with localized action going relatively deep into the surface. With No. 2 EJC, however, action of the fluoride constituent creates a light surface etch with no deep, localized attack. The only prolonged attack of EJC is on the oxide, giving AFL's EJC the lowest electrical resistance on flat surfaces.

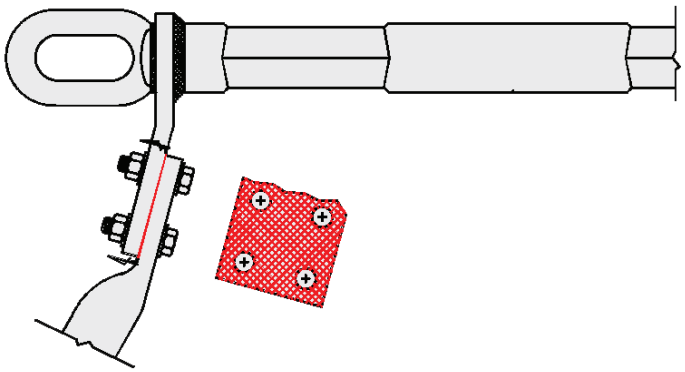

Figure 2 – EJC application onto the deadend tongue to terminal pad mating surface.

CF1

The primary use of CF1 in the electrical utilities market is between two surfaces where at least one of the surfaces is tin-plated. CF1 is also used on contact surfaces between bolted accessories and stranded conductors, and copper-to-aluminum flat mating surfaces, to keep moisture out and reduce oxidation formation. Application of CF1 is similar to that of No. 2 EJC; however unlike EJC, CF1 can be used on plated surfaces. The fluoride migrates through plating and attacks oxides on the base metal – thus lifting the plating. CF1 does not. CF1 will keep the connection from developing oxidation during operation and will not interfere with the current flow between the conductor and accessory, yet it does not enhance the current transfer.

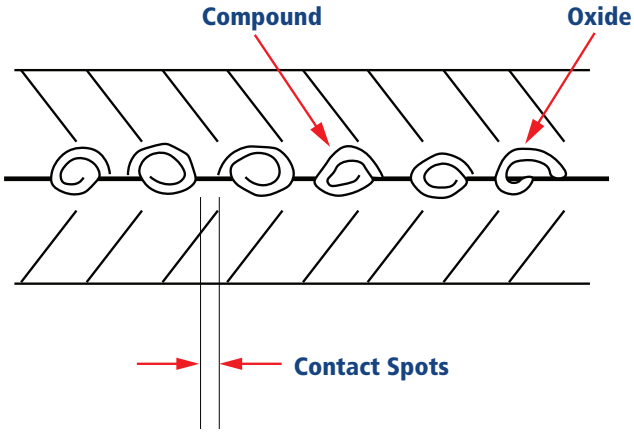

Figure 3 – Joint compounds fill voids at the pad connection and reduce oxidation.

Compounds for Elevated Operating Temperatures

120°C continuous operation and above

AFCHT™

The HiTemp® AFL Filler Compound serves the same installation purpose as standard AFC in boosting mechanical holding strength of compression accessories when tension is applied, and improving conductivity by breaking the oxide layer on bare metal to metal connections. AFCHT however is recommended for use in AFL HiTemp compression fittings designed for High Temperature/Low Sag conductors such as ACSS. AFCHT differs from AFC in that the AFCHT formula has a melting point above 250°C and does not drip during continuous high temperature. HiTemp AFL Filler Compound resists physical changes associated with exposure to elevated temperatures up to 310°C, sustaining the performance of HiTemp compression fittings with the rising temperatures of HTLS transmission systems.

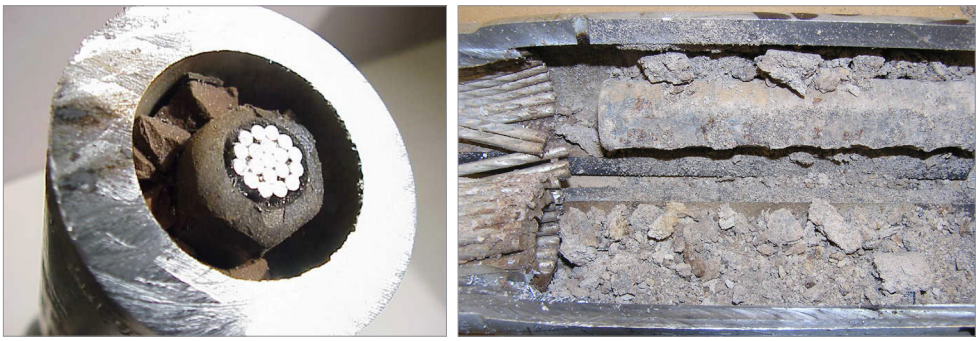

Figure 4 – Compression accessory failure due to water intrusion and dried up Filler Compound.

Alnox®

Alnox is a petroleum-grease joint compound formula containing hard metallic particles, which reinforce the dead end tongue to terminal pad electrical connection at elevated temperatures. Unlike No. 2 EJC, Alnox uses gritted particles, contains no fluoride, and is suitable for continuous temperatures above 100°C. Similar to AFCHT, Alnox will not drip at elevated temperatures – making it ideal for pad to pad connections installed in high temperature compression accessory applications.

HiTUC

AFL HiTemp Universal Compound is similar composition of Alnox, except the base is silicon instead of petroleum. Since HiTUC also contains extremely hard metallic grit it can be used in compression accessory applications as both a high temperature filler as well as pad to pad compound. The resulting abundant metal to metal contact points establish low contact resistance, and improve conductivity between the HTLS conductor and inside wall of the accessory. The dual-purpose feature of HiTUC serves to eliminate the need for linemen to have two different compounds available during HiTemp compression accessory installation.

AFL has over 100 years of experience in the design and application of compression accessories. AFL developed the first accessories for ACSS in 1978 and has superior knowledge through years of technical support to provide in-depth assistance on compression accessories and related compounds.

Visit AFL's Compounds webpage for more information and specifications. For technical support, contact us at (800) 866-7385.