

# INNOVATION

**SPOTLIGHT** from the brands of Altra Industrial Motion Corp.



## EXCLUSIVE FORMCHROME® PROCESS EXTENDS OVERRUNNING CLUTCH LIFE AND IMPROVES RELIABILITY IN CRITICAL APPLICATIONS

In the aerospace industry, all components including overrunning clutches, are required to meet extremely high quality standards.

Although they're seldom larger than a few inches in diameter and a couple inches in length, Formsprag overrunning clutches perform some of the most critical functions within many types of aircraft. In addition to permitting drive during normal operations and autorotation during emergency situations in helicopters, sprag clutches also allow twinning in multi-engine helicopters for efficient power sharing and synchronization.

In commercial jets, overrunning sprag retainer assemblies are used in the starter drive of the jet turbine engine to provide automatic disconnect from the gas turbine engine upon light-up. They're also used in the starter drive of auxiliary power units (APUs) to disconnect the starter after powering up.

### LONGER LASTING SPRAGS WAS THE KEY

As the widely recognized world leaders in overrunning clutch design, the Formsprag engineering team was uniquely positioned to develop the patented Formchrome® process that extended the life of their popular sprag designs.

In aircraft applications, this process enables higher clutch rotational speeds and extended wear life. In addition, the Formchrome process also improves the performance of Formsprag overrunning clutches in a wide range of other industry applications.



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## PATENTED FORMCHROME PROCESS PROVIDES LONG-LASTING PERFORMANCE

Formsprag's Formchrome process extends sprag life to reduce equipment and maintenance costs. This special technique diffuses chromium into the surface of the sprags in the clutch creating a surface hardness that translates into extended wear life.

Formchrome increases the surface hardness of the sprag's base metal, SAE 52100 steel, from 800 Knoop to approximately 1,300 Knoop (63Rc to above the Rc Scale). Subsequent heat treatment ensures a hard sprag core to support the chromized surface.

For the most demanding applications, patented Pink Phase Super Formchrome offers enhanced protection against wear. An intermediate layer of chromium nitride, the pink phase, is formed by diffusion of nitrogen into the metallic surface. The surface hardness produced by this process is approximately 1,300 Knoop.

PCE and standard sprags come with Formchrome chromium carbide surfaces as a standard feature. Pink Phase Super Formchrome is optional.

Sprags chromized by either method will last significantly longer than plain steel sprags hardened to 800 Knoop.

When combined with the proven sprag and race designs that Formsprag has developed over the years, Formchrome-treated clutches commonly provide 1.8 times the life of competitive units.

## EXTENDING CLUTCH LIFE IN A VARIETY OF APPLICATIONS WORLDWIDE

While originally developed to meet the stringent demands of the aerospace industry, Formsprag overrunning clutches with Formchrome-treated sprags are also hard at work in two-speed drives used on large steel and aluminum roll slitters, creep drive units used in paper and corrugated manufacturing and indexing clutches found on commercial meat slicers. In each case, the extended life created by Formchrome is important in maintaining unit life in high value production processes.

Other common applications include auto plant conveyors, punch presses, roller coasters and ski lifts.



*Formsprag manufactures a wide variety of sprag sizes and shapes to meet specific application requirements.*



\* Source: IATA's Maintenance Cost Task Force Executive Commentary