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the boundaries of possible

INDUSTRIAL CASE STUDY

BANBURY-TYPE RUBBER MIXER DUST STOP

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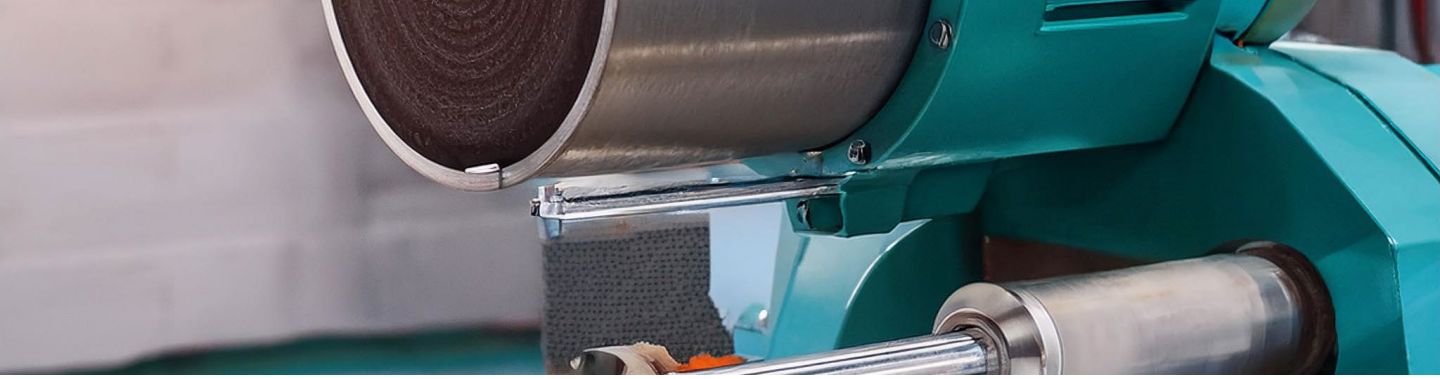

HYCOMP™ COMPOSITES

BANBURY-TYPE RUBBER MIXER DUST STOP

Patrick McSweeney September 2024

INDUSTRIAL SELF-LUBRICATION EXTENDED LIFE DRY RUNNING

Environment

Over a century old, the Banbury mixer remains a vital part of the rubber industry and has generated many variations of this heavy-duty machinery. Industrial mixers of this Banbury-type (also known as internal mixers) use intermeshing rotors enclosed in a mixing chamber that hold and blend together the various raw materials required to make the rubber compounds. Due to mechanical heat and friction, the sealed chamber experiences temperatures around 160°C, not becoming hotter as the compound may get damaged due to “scorching”.

The rubber composition may include a variety of fine particulate additives that produce dust, e.g., carbon black, which must remain in the chamber to maintain proper batch chemistry. Since the rotors are externally driven, and dust particulates seek an escape path from the chamber, a seal or dust stop is utilized to prevent media escape.

Challenge

This rubber mixing application may be one of the heaviest, dirtiest and most energy consuming processes in the industrial industry, requiring thorough mixing at high temperatures and pressures. The dust stop plays a critical part in sealing its outer edge with an opening in the mixing chamber side-wall, which is then mechanically pressed against the flange of each rotor and seals in the compound. Many dust stops are either made from a non-ferrous metal that requires lubricant that typically dries out if shorted or contaminates the batch if overused; or a self-lubricating, graphite-based, composite that is expensive and has a relatively short service life.

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Solution

Factory dust stop seals are typically made from either soft metal for strength, or a composite with high graphite content for lubricity. Metallic seals demand lubrication, which risks contaminating the batch when over supplied, or running dry if under-supplied; and leads to metal on metal interface. Although a composite graphite seal is self-lubricating and does not depend on lubrication, it is relatively brittle and can wear out quickly due to impact or overloading.

Hycomp™ composite materials are made from high strength, high temperature, self-lubricating polymers, typically used in heavy industrial applications as an alternative to non-ferrous bearing grade metals. This material solution has been proven to provide over twice the service life and a drastically reduced, or eliminated, amount of grease. Customers get the best technology advantages of both performance and maintenance worlds.

From A Valued Customer:

"We reached out to Omniseal Solutions a few years ago looking for support on a specific seal application. Through a great collaboration of our needs and their available materials, we designed a seal using Hycomp™ composite material.

The results are **SUBSTANTIAL - TWICE THE LIFE** of the exchanged bronze seal material on several applications. We will continue to use these composite materials and look forward to new innovative materials from Omniseal Solutions."

Benefits

- High strength to handle the rigors of the intensive mixing process
- Longer service life that reduces machine downtime
- Self-Lubrication that reduces the risk of batch contamination

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Design Expertise & Tailor-made Solutions for Your Critical Applications

Omniseal Solutions is a global engineering leader with over 65 years of historical legacy, relentlessly dedicated to the design and manufacture of precision sealing and wear control solutions that protect critical applications in the most demanding environments and passionately driven to push *Beyond the Boundaries of Possible*.

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