

Boron Nitride Powders and Coatings



Solutions for Release Lubrication in Aluminum Extrusion

CHALLENGES IN ALUMINUM EXTRUSION PROCESS

The typical Aluminum extrusion process involves a preheated cylindrical aluminum billet, pressed through a steel die with a pressing ram (also called, the dummy block).

Since at temperatures above 450°C aluminum tends to stick to steel, most common challenges in the extrusion process are sticking of the billet to the dummy head and sealing of the dummy head against the die/container.

To avoid rejects due to blistering and uneven surface in the aluminum profile caused by these issues, each extrusion cycle must end with the dummy block separating quickly and effortlessly from the billet.

The traditional release agents or lubricants such as graphite suspensions in oil / greases and acetylene have their own set of challenges:

- Graphite suspensions are messy and need repeated application in every press cycle. Their flammable nature at high temperatures may cause blisters and holes in aluminum profiles. Moreover, graphite based lubricants can cause short-circuits in electrical equipment.
- Carbon black generated by acetylene flames is a very good release agent, but is carcinogenic and requires special safety procedures for handling and disposal. Acetylene itself requires precaution in storage and handling due to its flammable nature. Furthermore, it can cause black marks to the profile that may interfere with anodizing.

COMBAT® BORON NITRIDE SOLVES THE PROBLEM

Available as powder as well as aqueous suspensions or coatings, Combat Hexagonal Boron Nitride (hBN) from Saint-Gobain Boron Nitride offers the ideal solution for high temperature release and lubrication in aluminum extrusion, overcoming the drawbacks of both graphite and acetylene based release agents.

BENEFITS OF USING COMBAT BORON NITRIDE RELEASE AGENTS

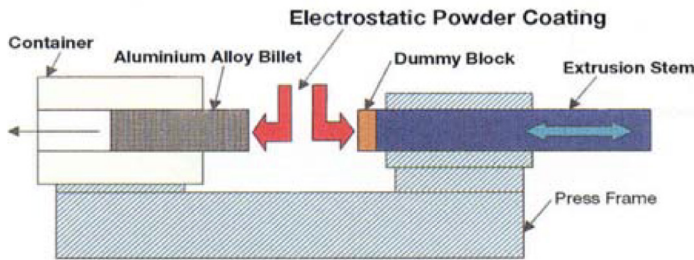
With its unique combination of physical and chemical properties, Combat boron nitride when used as a release agent for aluminum extrusion, offers many advantages over graphite or carbon black:

- Low coefficient of friction – soft, lubricious and non-abrading even at higher temperatures
- Minimizes surface defects as unlike Carbon black, boron nitride does not leave less visible or even nonvisible any marks in the profile
- High temperature resistance – up to 900°C in air, 2000°C in inert atmosphere
- White, clean appearance
- Corrosion resistant and non-wet by most molten metals
- Inert, non-flammable, non-toxic – safe to store and handle
- Electrically insulating – reduces risks of short-circuit in electrical installations
- Reduces release agent consumption from every cycle (as is the case with both carbon soot and graphite) to every third to fifth pressing cycle

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Application of Combat Boron Nitride in Aluminum Extrusion

During the aluminum extrusion process, the aluminum alloy billet is laterally fed to the press, as depicted in the picture below.



Boron nitride can be applied either as a powder or as a water-based coating.

AS A POWDER

- Combat Boron Nitride powder is applied to the front face of the aluminum billet, and/or the dummy block via a manual electrostatic spray gun available from various OEM's.
- Upon application, as indicated visually by the change in color from gray to white, a very thin coating layer of BN (a few microns thick) is enough to assure the release properties (usually 1 - 3 grams per shot)

AS A COATING

- Combat Boron Nitride coatings may be applied by spraying using standard industrial sprayers available from various manufacturers.
- Combat BN coatings, are also used as release agents for shear blades, providing superior lubrication and even, clean surfaces without leaving any residues.

Besides acting as a release agent, the lubrication provided by Combat also prevents the sealing of the dummy block against the die container, as well as prolongs the life of the dummy block by reducing friction and wear.

Saint-Gobain Boron Nitride Advantage

Saint-Gobain has more than 50 years of experience in synthesizing hexagonal Boron Nitride, and transforming it to fit a multitude of applications.

With its proud heritage of product innovation, technology expertise and market leadership, Saint-Gobain Boron Nitride is dedicated to working with its customers to solve the challenges in advanced materials applications such as Aluminum Extrusion.

For further information on Combat boron nitride solutions for aluminum extrusion, contact us at bnsales@saint-gobain.com.



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