Lubricants in the Manufacturing of Bushing Components

Introduction

Bushings are essential mechanical components used in automotive systems such as suspension, steering, engine mounts, exhaust mounts, and chassis assemblies. They reduce friction, absorb vibration, control movement, and improve NVH (Noise, Vibration, Harshness).
Bushing manufacturing involves **metal forming, machining, rubber-to-metal bonding, press fitting, and surface treatment**. Throughout these processes, **specialized lubricants are critical** for dimensional accuracy, tool protection, clean bonding, and long-term performance.

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1. Why Lubricants Matter in Bushing Manufacturing

Operations like stamping, machining, vulcanization, and assembly generate high friction and thermal stress. Proper lubrication helps to:

- **Reduce Tool & Mold Wear** → Protects dies, molds, and machining tools
- **Improve Machining Accuracy** → Ensures tight tolerances for inner and outer diameters
- **Support Rubber-to-Metal Bonding** → Clean, residue-free surfaces ensure strong adhesion
- **Enable Smooth Press Fit Assembly** → Prevents damage during bushing insertion
- **Prevent Corrosion** → Protects metal sleeves during storage and handling

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2. Types of Lubricants Used

Process Stage	Typical Lubricant	Key Benefits
Tube / Sleeve Forming	Water-based or semi-synthetic forming lubricants	Smooth forming, reduced die wear
Machining (Turning, Boring)	Water-miscible cutting fluids / synthetic coolants	Precision finish, thermal control

Rubber Molding / Vulcanization	Mold release agents (silicone-free / low-residue)	Clean release, defect-free bonding
Surface Preparation	Low-residue cleaners & lubricants	Ensures strong rubber-to-metal adhesion
Press Fit Assembly	Assembly lubricants or soap-based press-fit fluids	Damage-free insertion, controlled friction
Final Assembly & NVH Control	Anti-wear / anti-squeak greases	Reduced noise and vibration
Storage & Handling	Thin-film rust preventives	Corrosion protection before shipment

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3. Benefits to Manufacturers

- **Improved Dimensional Consistency** → Reliable fitment across assemblies
- **Stronger Rubber-to-Metal Bonding** → Longer service life
- **Reduced Scrap & Rework** → Cleaner processing and fewer defects
- **Extended Tool & Mold Life** → Lower maintenance costs
- **Enhanced NVH Performance** → Better ride comfort and durability

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4. Emerging Trends in Bushing Lubrication

- **Silicone-Free Mold Releases** → Improved bonding and paint compatibility
- **Eco-Friendly Lubricants** → Biodegradable, low-VOC formulations

- **Dry Assembly Lubricants** → Clean press-fit without residue

Automated Lubricant Application → Precise dosing for consistent quality

Bushing

Description:	Thickness is of the cylinder		
Product:	135-000	Company:	Tenneco
Industry:	Automotive Tier One	Material:	Cold Rolled Steel
Thickness:	1.782	Concentration:	
Author:		Tags:	
Date:	Jan 1, 1998