

## Introduction

**Exhaust internal components**—such as baffles, perforated tubes, diffusers, cones, and flow directors—play a crucial role in **noise reduction, exhaust flow management, and thermal stability** within the exhaust system. These parts are typically manufactured from **stainless steel or aluminized steel** and must withstand **high temperatures, pressure pulses, and corrosive exhaust gases**.

Specialised lubricants are essential to ensure **smooth forming, clean welding, dimensional accuracy, and long service life**.

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### 1. Why Lubricants Matter in Exhaust Internal Part Manufacturing

Manufacturing operations like **perforation, deep drawing, tube forming, expansion, trimming, and welding** generate friction and heat. Proper lubrication helps to:

- **Improve Formability**  
Enables smooth forming of thin-gauge stainless steel without cracking or distortion.
  - **Reduce Tool Wear**  
Prevents galling and scoring on punches, dies, and perforation tools.
  - **Maintain Clean Surfaces**  
Ensures internal parts remain free from residue that could affect exhaust flow or weld quality.
  - **Ensure Weld Quality**  
Low-residue lubricants prevent porosity and weak joints during MIG/TIG welding.
  - **Provide Temporary Corrosion Protection**  
Protects internal components during storage and assembly.
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### 2. Types of Lubricants Used

Process	Typical Lubricant	Key Benefits
Perforation / Stamping	Synthetic or water-based forming lubricants	Clean holes, reduced tool wear

Tube Forming / Expansion	Polymer-based or semi-synthetic drawing lubricants	Uniform expansion, no tearing
Deep Drawing / Cone Forming	Heavy-duty water-based drawing lubricants	Smooth metal flow
Trimming / Cutting	Light cutting oils or water-miscible coolants	Burr-free edges
Welding Preparation	Low-residue, weld-compatible lubricants	Strong, clean welds
Storage & Handling	Thin-film rust preventive oils	Temporary corrosion protection

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### 3. Benefits to Manufacturers

- **Consistent Internal Geometry** – Optimized exhaust flow and noise control
  - **Longer Tool Life** – Reduced maintenance and downtime
  - **Improved Weld Strength** – Reliable internal assemblies
  - **Lower Scrap Rates** – Fewer forming and welding defects
  - **Cleaner Production Lines** – Reduced cleaning and rework
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### 4. Emerging Trends

- **Dry-Film Lubricants**  
Ideal for perforated and internal exhaust parts requiring residue-free surfaces.
- **High-Temperature Compatible Lubes**  
Designed to burn off cleanly without residue.

- **Eco-Friendly Formulations**  
Low-VOC, chlorine-free lubricants for sustainable manufacturing.
- **Precision Application Systems**  
Controlled spray systems ensure consistent lubrication and minimal waste.

# Exhaust part (inside)

Description: four step forming from a tube to part

Product: 980-323K, 323-00K Company: Tenneco

Industry: Automotive Material: Stainless Steel  
OEM

Thickness: 1.5 Concentration: 50

Author: Markus Ehrgott Tags: 1.4512, four, step, forming, tube, to, part, Caterpillar, exhaust, (inside, Part), dimension, 1, 5, \*, 80, \*, 150, mm, tool, coated, with, TIC/TIN, Lubricat, failed, because, scratches, on, the, outside, (see, picture, 9a)

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