

Lubricants in the Manufacturing of Catalytic Shell Components

Introduction

The **Catalytic Shell** is a critical outer housing of the catalytic converter, designed to protect the catalyst substrate and withstand **extreme exhaust temperatures, vibrations, and corrosive environments**. Typically manufactured from **stainless steel or high-temperature alloy steel**, the catalytic shell requires precise forming, welding, and surface preparation.

Specialized lubricants play a key role in ensuring **accurate forming, high-quality welds, corrosion resistance, and long-term durability**.

1. Why Lubricants Matter in Catalytic Shell Manufacturing

Manufacturing processes such as **tube forming, shell expansion, stamping, trimming, and welding** generate high friction and thermal stress. Correct lubrication helps to:

- **Reduce Friction & Forming Forces**
Enables smooth forming of stainless steel without cracking or distortion.
 - **Protect Tooling & Dies**
Minimizes galling and wear during high-pressure forming operations.
 - **Maintain Surface Quality**
Prevents scratches and defects that could affect heat resistance or coating adhesion.
 - **Ensure Weld Integrity**
Low-residue lubricants prevent weld porosity and contamination.
 - **Provide Temporary Corrosion Protection**
Shields the shell from oxidation before final assembly.
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2. Types of Lubricants Used

Process	Typical Lubricant	Key Benefits
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Blanking / Stamping	Synthetic or water-based forming lubricants	Reduced friction, improved formability
Tube Forming / Expansion	Polymer-based or semi-synthetic drawing lubricants	Prevents tearing, uniform wall thickness
Trimming / Piercing	Light cutting oils or water-miscible coolants	Clean edges, longer tool life
Welding Preparation	Low-residue, weld-compatible lubricants	Defect-free MIG / TIG welds
Surface Protection	Thin-film rust preventive oils	Temporary corrosion protection
Assembly & Fitment	High-temperature assembly greases	Smooth fit, vibration resistance

3. Benefits to Manufacturers

- **Improved Forming Accuracy** – Consistent dimensions for catalytic shells
 - **Extended Tool Life** – Reduced wear on forming and trimming tools
 - **Higher Weld Quality** – Clean surfaces ensure strong, durable weld joints
 - **Reduced Rework & Scrap** – Fewer surface and forming defects
 - **Corrosion-Free Handling** – Protection until final exhaust assembly
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4. Emerging Trends

- **Dry-Film & Pre-Coated Lubricants**
Reduce wet lubrication and post-cleaning steps.

- **Eco-Friendly Lubricant Systems**

Chlorine-free, low-VOC formulations for sustainability compliance.

Automated Lubricant Application

Precise dosing through spray or roller systems to reduce waste.

Catalytic Shell

Description:	Catalytic Shell 409 SS Straight Oil		
Product:	188-000	Company:	Arvin
Industry:	Automotive Tier One	Material:	Stainless Steel
Thickness:		Concentration:	
Author:		Tags:	409
Date:	Jan 1, 1985		

