

## Lubricants in the Manufacturing of Heat Shield Components

### Introduction

The Heat Shield is a crucial thermal management component in automotive exhaust systems, designed to protect surrounding parts from excessive heat, reduce cabin noise, and enhance emission efficiency.

Manufactured from aluminum, stainless steel, or multi-layer composite sheets, heat shields are typically formed through deep drawing, embossing, trimming, perforating, and joining processes.

Throughout production, the selection of suitable lubricants is essential to achieve high precision, reduce tool wear, and maintain surface integrity while ensuring downstream processes such as welding and coating remain contamination-free.

### 1. Importance of Lubricants in Heat Shield Manufacturing

Heat shield production involves thin-gauge metals and complex shapes that demand precise forming and protection from galling or tearing. Lubricants ensure:

**Smooth Forming & Embossing:** Controlled metal flow prevents cracks or wrinkles on thin aluminum or stainless sheets.

**Tool & Die Protection:** Reduces wear during high-speed stamping and forming.

**Surface Cleanliness:** Low-residue lubricants prevent staining or oxidation before coating or assembly.

**Improved Weldability:** Minimizes contamination in welding zones.

**Corrosion Prevention:** Provides temporary protection during storage and transport prior to final assembly.

### 2. Types of Lubricants Used

#### Process Stage

#### Lubricant Type

#### Key Benefits

#### Blanking & Stamping

Water-soluble or semi-synthetic forming emulsions

Enhanced cooling, minimal residue, smooth forming.

#### Deep Drawing & Embossing

Polymer-based or synthetic high-pressure forming lubricants

Prevents tearing, ensures uniform emboss depth.

#### Trimming & Piercing

Water-miscible cutting fluids or light oils

Sharp edges, tool protection, reduced burr formation.

#### Spot Welding / Riveting

Low-residue, weld-compatible lubricants

Ensures clean welds, reduces spatter.

#### Assembly & Fastening

Anti-seize or light assembly greases

Prevents squeaks, galling during fastening.

#### Corrosion Protection

Thin-film rust preventives or solvent-cutback oils

Protects aluminum or stainless surfaces before coating.

### 3. Benefits to Manufacturers

Extended Die & Tool Life: Reduced friction lowers maintenance and replacement costs.

Improved Forming Quality: Consistent lubrication ensures uniform patterns and clean edges.

Clean Welds & Surfaces: Low-residue lubricants improve weld strength and coating adhesion.

Reduced Cleaning Time: Eliminates or minimizes degreasing steps before joining or coating.

Environmental Compliance: VOC-free, biodegradable lubricants enhance workplace safety.

#### 4. Emerging Trends in Heat Shield Manufacturing Lubrication

Dry Film Lubricants: Pre-coated aluminum sheets reduce cleaning and contamination risks.

Water-Based Polymer Lubricants: Offer high lubricity with minimal residue for thin sheet forming.

Eco-Friendly & VOC-Free Solutions: Meet modern sustainability and emission standards.

# Heat Shield

Description:	unknown pitched		
Product:	610-00B	Company:	Unknown
Industry:	Automotive Tier One	Material:	Aluminum
Thickness:	Concentration:		
Author:	Tags:		
Date:	Jan 1, 1990		

