

# Compressor Section Repair Kit

## Overview

The **GTR-COMP-MAJOR-004 Compressor Section Repair Kit** is a full-service maintenance package tailored for major compressor overhauls. Weighing **540 pounds** with a lead time of **10–12 weeks**, this kit delivers all the precision-engineered components needed to restore airflow efficiency, mechanical integrity, and pressure ratio performance across the compressor section.

## Critical Components

### Primary Compressor Blading

The heart of the compressor relies on **First-Stage Rotor Blades (CP-BLD-001)** — 132 forged blades manufactured from **Ti-6Al-4V titanium alloy**. Produced through precision forging and five-axis CNC machining, these blades undergo **solution annealing at 1,700°F for 2 hours** followed by air cooling. Surface finishing includes **shot peening** for fatigue resistance and a final **micro-polish** to reduce aerodynamic drag.

Accompanying them are **First-Stage Stator Vanes (CP-VNE-001)** — 96 units fabricated from **17-4PH stainless steel**. These vanes are cast, precision-machined, and solution heat-treated at **1,925°F for 1 hour** with aging at **1,150°F for 4 hours**, ensuring strength and corrosion resistance. A **diffused aluminide coating** enhances oxidation resistance.

### Rotor Support System

The compressor rotor assembly is anchored by a **Main Compressor Disk (CP-DSK-001)**, forged from **Inconel 718** and machined to exact tolerances. Solution treated at **1,750°F for 8 hours** and double-aged for maximum tensile strength, the disk ensures reliable blade retention and high rotational stability.

To secure rotor blades, the kit includes **264 Fir-Tree Blade Locks (CP-LCK-001)** produced from **Inconel X-750**. Cold-formed and heat-treated, these locks provide vibration resistance under cyclic loading conditions.

## Airflow and Sealing Systems

### Air Sealing

The compressor efficiency depends on **Labyrinth Seal Assemblies (CP-SEA-001)** — 24 segments manufactured from **Inconel 625** with honeycomb abradable liners. These undergo **vacuum brazing at 2,050°F** followed by passivation, ensuring sealing performance under high-pressure gradients.

## Flow Path Liners

Airflow containment is supported by **18 Flow Path Casings (CP-CAS-001)**, machined from **15-5PH stainless steel forgings**. Post-machining, they are **solution treated and aged** to achieve maximum toughness. Each casing is coated with a **polytetrafluoroethylene (PTFE) anti-fouling layer** to minimize particle buildup.

## Important Support Components

### Vibration and Structural Support

Compressor structural stability is reinforced with **72 Damping Rings (CP-DMP-001)** fabricated from **Inconel X-750**. Cold-rolled and solution treated at **1,950°F**, these rings reduce vibration amplitudes across rotating assemblies.

To support alignment, the kit includes **12 Bearing Housings (CP-BHS-001)**, cast from **AISI 4140 steel** and carburized to enhance surface hardness for rolling element bearing support.

### Instrumentation and Monitoring

For operational monitoring, **6 Pressure Probe Assemblies (CP-PRS-001)** are included. Manufactured from **Inconel 600 tubing** with welded diaphragms, each probe undergoes calibration and passivation to ensure accurate pressure ratio measurement across compressor stages.

## Standard Assembly Materials

### Joining and Sealing Materials

Assembly support is provided by **2 pounds of Braze Alloy (CP-BZE-001)** — a **BNi-2 nickel-based brazing alloy** in fine powder form. Vacuum-melted and sieved to -325 mesh, this alloy is engineered for high-temperature joint reliability.

For casing assembly, the kit includes **8 cartridges of High-Temperature Sealant (CP-HTS-001)**, a **silicate-based paste** cured at **1,200°F** to ensure leak-tight sealing between compressor casings and liners.

## Manufacturing and Quality Standards

All compressor section components are produced under **ISO 9001, AS9100, and OEM aerospace standards**, with rigorous inspection and certification. Forging, precision machining, and specialized coatings ensure optimum aerodynamic performance, corrosion resistance, and fatigue durability. The **10–12 week lead time** accounts for the precision manufacturing and stringent quality checks essential for compressor reliability.