

## ET18 UPGRADES

### COOPER ET18 TURBOCHARGERS

The Cooper ET18 Turbocharger was originally designed for installation on Cooper-Bessemer™ 2- and 4-cycle engines and integral compressors. The original ET18 configurations can be upgraded with new compressor and turbine stage components to improve reliability and efficiency.

All original ET18 configurations are equipped with internally supplied air from the compressor side of the turbo to the oil seals on both the hot and cold sides of the turbo. This system can be upgraded to an External/Auxiliary Seal Air System.

### ET18 COMPRESSOR STAGE UPGRADES

#### Benefits

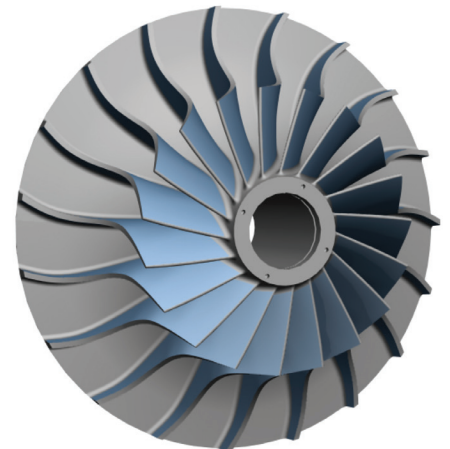
- › Improved compressor efficiency leading to increase in exhaust waste gate margin and increased run-time-between-overhaul.
- › Increased range to surge.
- › Can be done in conjunction with or separately of a turbine stage upgrade. For full optimization of the Cooper ET18 overall turbocharger efficiency, both compressor and turbine upgrades are available.
- › Improved compressor efficiency can be utilized to reduce emissions or improve engine detonation margin.

#### Upgrade summary

- › New 5-axis milled forging impeller for increased strength and efficiency is available.
- › Investment cast aluminum impellers also available.
- › New diffuser design for increased efficiency.
- › Thrust bearing wear detection can be changed from eutectic device to a proximity probe in the bearing case and/or a thermocouple embedded in the compressor end bearing holder.
- › Optional external auxiliary air seal upgrade for startup and low load operation.

#### Interchangeability

- › Upon completing the compressor stage upgrade, the turbocharger is completely interchangeable with the existing turbocharger.



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## ET18 TURBINE STAGE UPGRADES

### Benefits

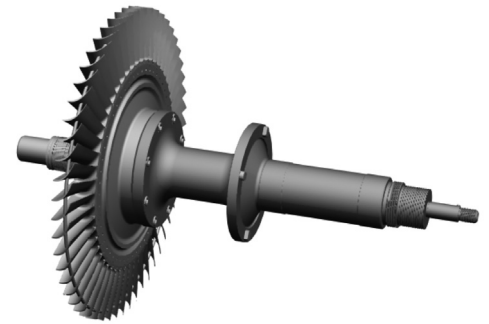
- › Improved turbine efficiency, leading to increase in exhaust waste gate margin.
- › Increased operating range.
- › Can be done in conjunction with or separately of a compressor stage upgrade. For full optimization of the Cooper ET18 overall turbocharger efficiency, both compressor and turbine upgrades are available.
- › Improved turbine efficiency can be utilized to reduce engine emissions.

### Upgrade summary

- › Optimized turbine matching to your applications for maximum performance.
- › Investment cast aluminum impellers also available.
- › New turbine broach angle design for increased efficiency and optimal flow angles.
- › Thrust bearing wear detection can be changed from eutectic device to a proximity probe in the bearing case and/or a thermocouple embedded in the compressor end bearing holder.
- › Optional external auxiliary air seal upgrade for startup and low load operation.

### Interchangeability

- › Upon completing the turbine stage upgrade, the turbocharger is completely interchangeable with the existing turbocharger's connection to the engine.



## ET18 EXTERNAL/AUXILIARY SEAL AIR SYSTEM

### Benefits

- › Improved oil seal function during start-up, light load and shut down. With the External/Auxiliary Seal Air System, more consistent air pressure is supplied to the oil seals when the turbo is at low rpm or not spinning. Consistent minimal air pressure at the seals reduces oil build up in both the turbine and compressor cases during pre-lube, start-up and post-lube.

### Upgrade summary

- › This upgrade includes all of the necessary internal turbo air piping plus the regulator, check valve and gage mounted on the exterior of the turbo.
- › Customer will need to provide a 3 psi plant air supply to the ½ inch connection at the turbo.

### Interchangeability

- › Upon completing the compressor stage upgrade, the turbocharger is completely interchangeable with the existing turbocharger. A minimum of 3 psi plant airline will need to be connected to the turbo.
- › This External/Auxiliary Seal Air System does not affect any normal operating parameters of the turbo.



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