

To help identify failures in warranty situations and to provide advice on how to prevent future failures occurring, the below information highlights the most common turbo failure modes. Visit Melett's technical information website [www.melett.com/technical](http://www.melett.com/technical) for further information.

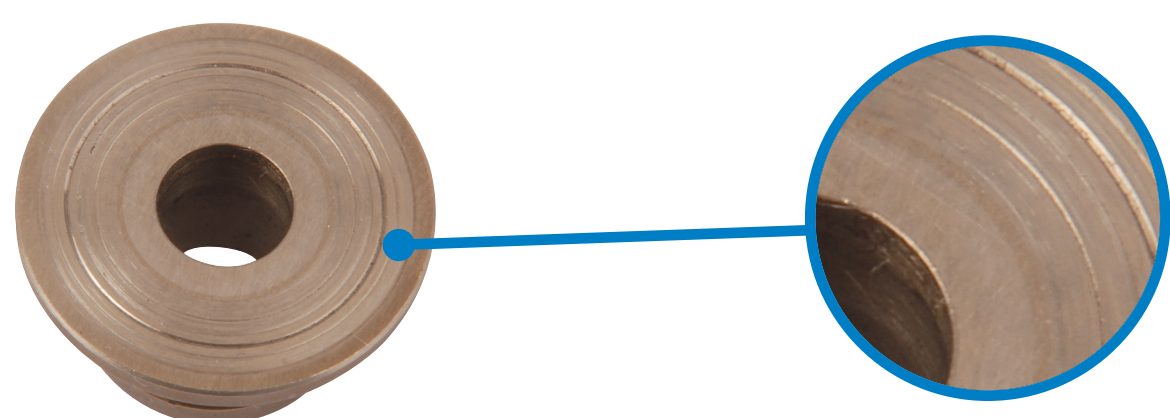
## OIL CONTAMINATION

- Causes:**
- If the oil filter is blocked/damaged or a low-quality oil filter is used
  - Excess moisture can lead to premature oil degradation, increased corrosion and wear
  - High carbon build-up in the engine can quickly contaminate new oil
  - Unchanged oil containing detergent deposits can become very abrasive to the turbo's components
  - Particles from carbon build up in oil feed pipes

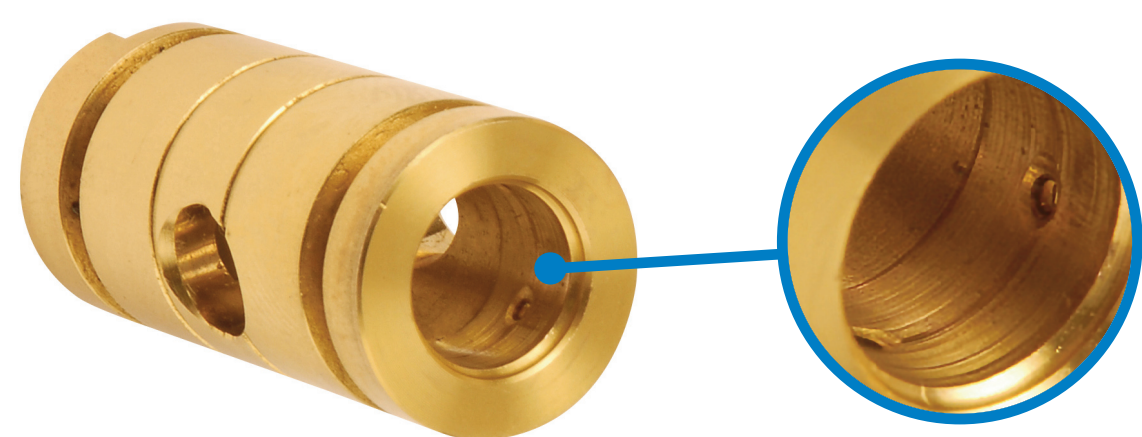
### Signs of Oil Contamination:



Scoring to journal bearing diameter of the shaft



Scoring to thrust parts



Scoring to journal bearing

- Prevention:**
- Using fresh oil and high quality filters helps to reduce the risk
  - Replacing or cleaning the oil inlet pipes and in-line micro filters
  - Take care when changing oil during servicing to prevent accidental contamination
  - Check for engine wear that could leave swarf deposits

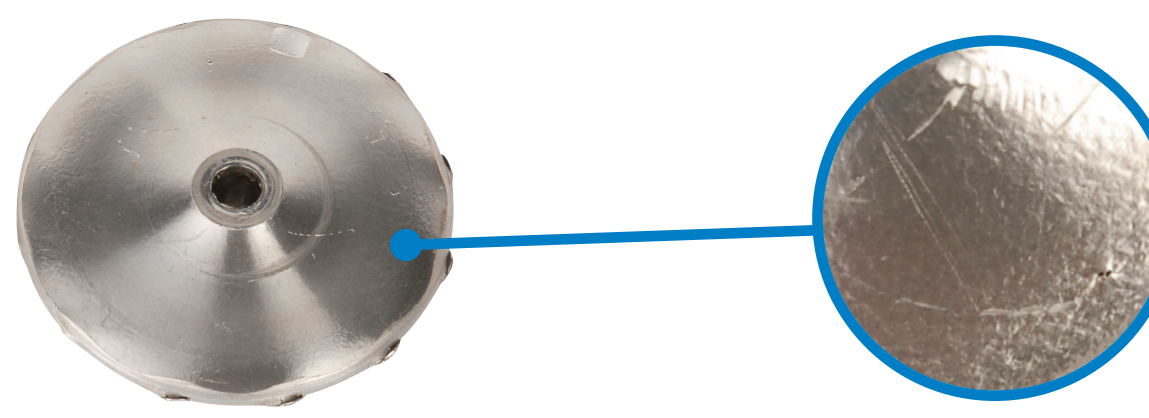
## OVERSPEEDING

- Causes:**
- Engine modifications including 'chipping' or 'over-fuelling'
  - Inconsistent flow of air into the turbo
  - The wastegate or VNT mechanism has been set incorrectly
  - Worn injectors
  - Installing an incorrect turbo
  - Loss of signal to the electronic actuator for the wastegate or VNT

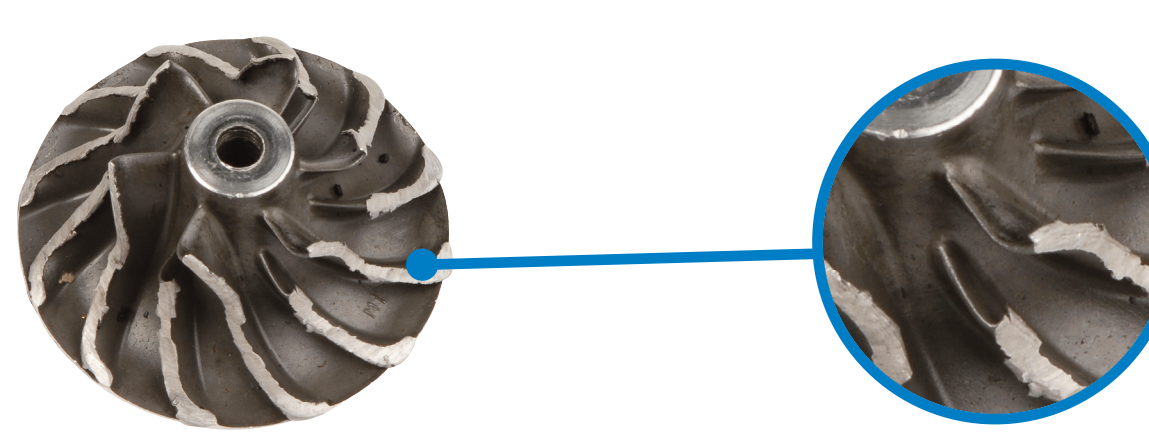
### Signs of Overspeeding:



Complete component failure



Orange peel effect to compressor wheel



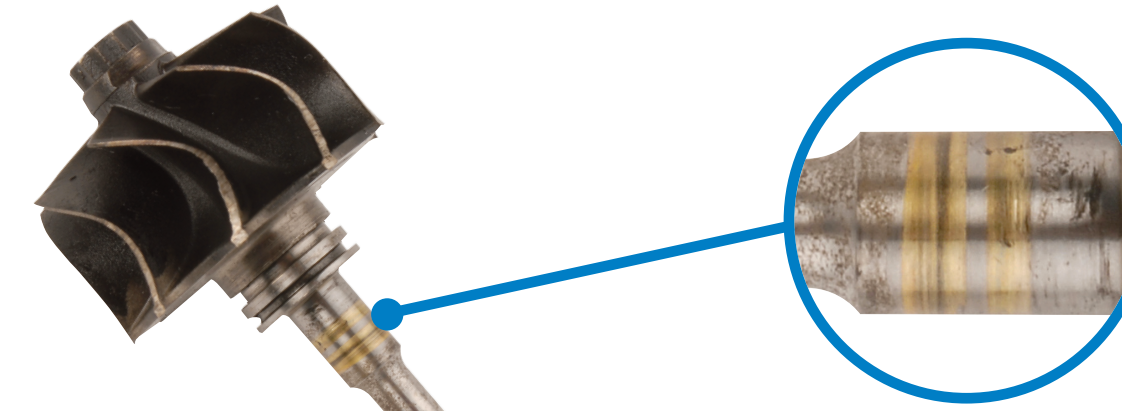
Compressor wheel rub

- Prevention:**
- Check there are no restrictions or leaks in the air intake pipe
  - Ensure the wastegate or VNT linkage is operating freely and is properly calibrated
  - Avoid remaps, chipping or over-fuelling

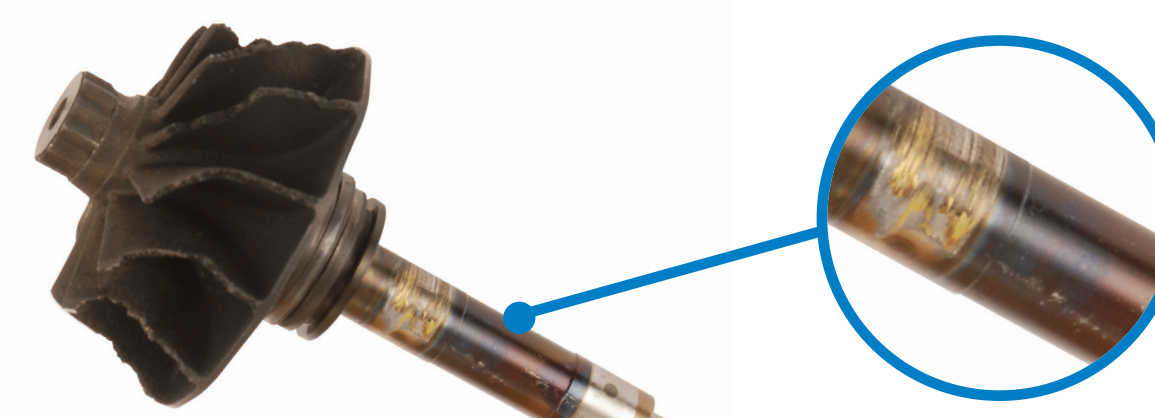
## INSUFFICIENT LUBRICATION

- Causes:**
- Poor oil filter maintenance
  - Insufficient oil in the sump
  - Incorrect oil inlet gasket used leading to restriction in oil supply
  - A damaged, blocked or low-quality oil filter
  - Failure to prime the turbo with oil before initial run

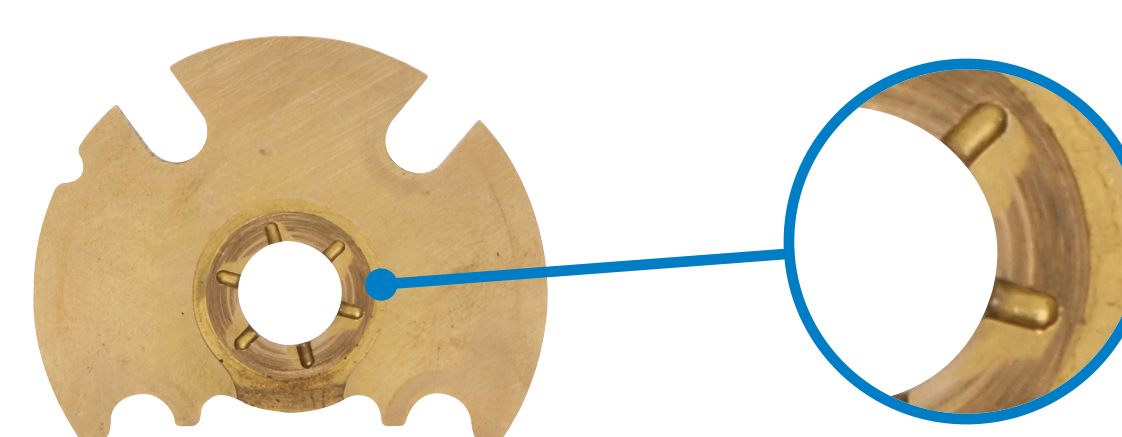
### Signs of Insufficient Lubrication:



Material transfer from journal bearing



Discolouration to journal bearing diameter of the shaft



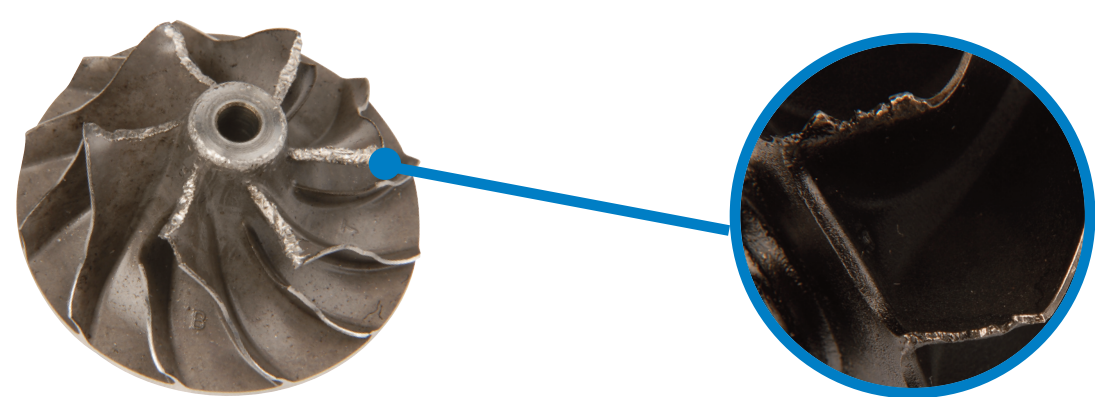
Excessive wear to thrust bearing

- Prevention:**
- Oil supply is critical to the turbo, please ensure the oil flow is correct
  - Remember to prime the replacement turbocharger with oil before fitting
  - Do not use silicone on oil gaskets as it can become detached blocking oil passages
  - Clean or replace oil inlet pipes to remove carbon deposits or sludge that could restrict oil flow
  - Use fresh oil and new oil filters when fitting a replacement turbocharger

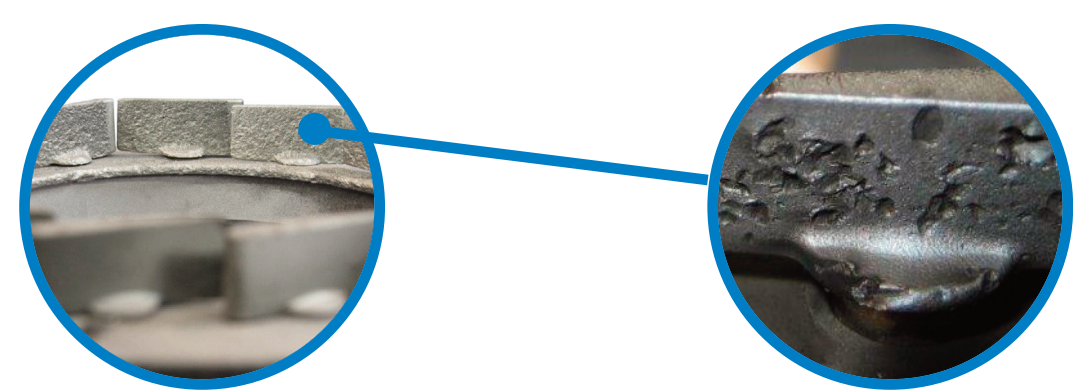
## FOREIGN OBJECT DAMAGE

- Causes:**
- Small particles entering through damaged hoses
  - If the air filter is damaged (or faulty), of a low quality, or missing, objects will be sucked into the air intake
  - Debris from a previous turbocharger failure
  - Broken engine components, e.g. valves or fragments of damaged piston or injector tips
  - Particles in the exhaust gas e.g. coke from poor combustion

### Signs of Foreign Object Damage:



Damage to inducer of compressor or turbine wheel



Pitting on the VNT blades

- Prevention:**
- Make sure air hoses are clear from blockages, splits and other loose objects
  - Ensure no debris or engine fragments remain from the previous turbo failure
  - Using new gaskets help to prevent the possibility of gasket break up and ensure a perfect seal

## OIL LEAKS

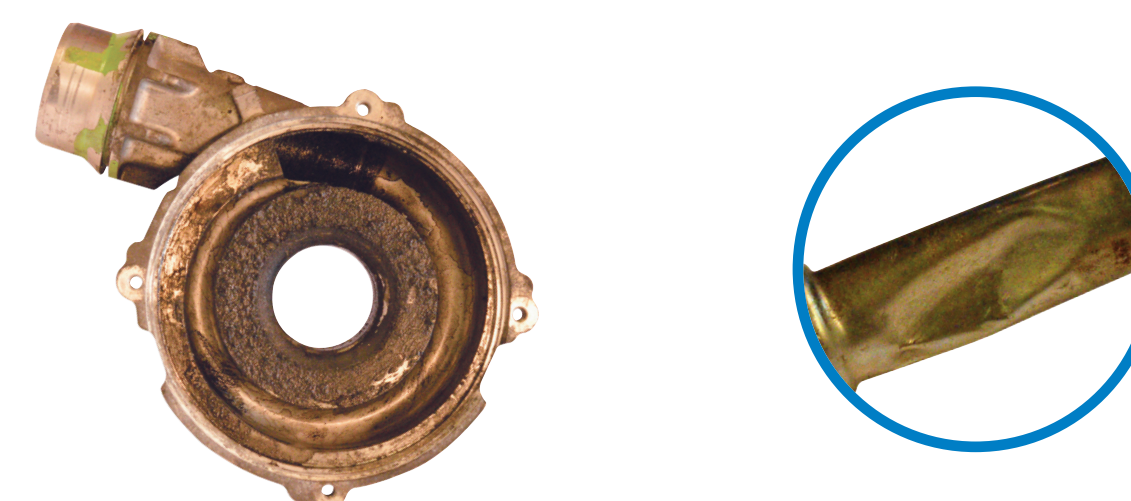
- Causes:**
- Oil leaks at the compressor end:**
    - Blockages or restrictions to the air intake pipe, hose or air intake filter can create a vacuum, causing oil to leak into the compressor housing
    - Air leaks in the intake hoses or at the intercooler
  - Oil leaks at the turbine end:**
    - Leaks within the exhaust system
    - A clogged bearing housing
    - Leaks in the EGR (exhaust gas recirculation) system
  - Oil leaks into the compressor and turbine ends:**
    - Repeated hot engine shutdowns leading to carbon deposits (coke) in the centre housing
    - Physical damage to the turbo's rotating parts and excessive bearing clearance
    - Fitting the incorrect turbocharger
    - Restrictions in the oil return pipe

- Prevention:**
- Ensure air and oil drain systems are clear from blockages or restrictions
  - Check the exhaust system to make sure there are no leaks present
  - Ensure DPF and Catalytic converter are free of blockages

### Signs of Oil Leaks:



Blue or black smoke from exhaust



Restriction or damage to the oil return pipe and evidence of an oil leak to the compressor end



Using precision engineered turbocharger parts, which are manufactured to OE specifications, will significantly reduce warranty situations.