

PISTON SEIZURE

Quick Reference Guide.

Piston seizures will only occur when metal-to-metal contact between the piston, rings to liners exists. Thermal expansion and/or lack of lubrication are the primary causes for seizures. Piston seizures can be, but are not limited to, one or a combination of the following operational or serviceable conditions:

1. Causes for piston burning, crown erosions, crown overheating, crater cracking, thermal fracturing and nibbling.

- 1 Defective contaminated or incorrect injector
- 2 Incorrect or improperly calibrated injection pump
- 3 Early injection timing
- 4 Intake restriction
- 5 Exhaust restriction
- 6 Inoperative or incorrect turbo
- 7 inoperative or misdirected oil spray jet
- 8 Lugging
- 9 Overloading
- 10 Incorrect rack settings
- 11 Inoperative and/or misadjusted governor
- 12 Use of ether

2. Four point scoring and either side of pin bore and piston skirt overheating causes:

- 1 Overheated cooling system
- 2 Loss of coolant level
- 3 Loss of coolant flow
- 4 Stuck thermostat
- 5 Water pump impeller spinning on shaft
- 6 Lack of crown cooling by the lube oil (spray jets)
- 7 Incomplete combustion (fuel washdown)
- 8 Defective or contaminated injector
- 9 Improper cold start and/or hot shutdown procedures
- 10 Inoperative radiator louvers if applicable
- 11 Defective pressure cap
- 12 Damaged or broken impeller
- 13 Air pocket at water pump
- 14 Plugged radiator
- 15 Plugged radiator cooling fins (bugs, paper etc.)
- 16 Coolant leaks
- 17 Inoperative or damaged piston cooling jet
- 18 Low oil pressure

3. Total piston scoring and/or seizure causes:

- 1 Progression from four point scoring (refer to list 2)
- 2 Counterbore or receiverbore distortions (out-of-round)
- 3 Pinched or rolled liner o-rings/crevice seal
- 4 Counterbore not concentric with block deck
- 5 Progression from ring scuffing
- 6 Use of silicone in o-ring/crevice seal groove area (form-a-gasket)
- 7 Grease or oil in o-ring/crevice seal groove prior to installation
- 8 O-ring contamination prior to installation (swelling)
- 9 Lube oil contamination (abrasives)
- 10 Air born contaminates (abrasives)
- 11 Bent or twisted connecting rod
- 12 Overloading
- 13 Lugging
- 14 Detonation
- 15 High air intake temperature and/or restriction
- 16 Exhaust restriction
- 17 Overfueling
- 18 Incorrect injection timing
- 19 Incorrect rack settings
- 20 Inoperative and/or incorrect turbo
- 21 Incorrect compression ratio
- 22 Air / Fuel ration imbalance
- 23 Incorrect fuel cetane rating
- 24 Incorrect oil classification

4. Center skirt scuffing, elliptical cold/round when warmed causes:

- 1 High RPM before operating temperature
- 2 Engine load before operating temperature
- 3 Lack of skirt to liner clearance
- 4 Dry starts when prelube is required
- 5 Particle abrasive present

5. Causes for piston crown damage, foreign material or other:

- 1 Progression from ring scuffing
- 2 Progression from distortion seizure
- 3 Turbo compressor failure
- 4 Debris entering intake system
- 5 Installation debris
- 6 Valve failure - valve-impact
- 7 Incorrect installation of pin bushing, lack of retention might cause rod eye bushing to rotate
- 8 Malfunctioning and/or misadjusted jake brake
- 9 Incorrect jake brake usage
- 10 Extreme detonation
- 11 Excessive ether
- 12 Cold operation
- 13 Fast timing
- 14 Cyclic loading
- 15 Leaking injector

Conclusion:

A thorough examination of the four major systems will aid in the investigation process.

The four major systems are as follows:

- ▶ **AIR INTAKE / EXHAUST SYSTEM**
- ▶ **FUEL SYSTEM**
- ▶ **COOLING SYSTEM**
- ▶ **LUBRICATING SYSTEM**

The examination should also include operational hazards and repair practices.