

Four-stroke Small bore

April 2026

Action code: WHEN CONVENIENT

Wear on piston skirts

Concerns

GenSets: L16/24, L21/31, L27/38, L23/30H/DF, L28/32H/DF, V28/32H(S)

Propulsion: L21/31, L27/38, L23/30A, L-V28/32A

Power plants: L16/24, L21/31, L27/38, L23/30H/DF, L28/32H/DF, V28/32H(S)

References

SL2021-710 – New procedure for honing of cylinder liners

SL2020-691 – Fretting marks on piston crown and skirt assembly surfaces.

SL2015-601 – Loosening of Plugs in Piston.

SL94 – 325 – Hardened ring grooves.

M5060110-XX – Working card – Piston



Piston skirt wear and damage assessment

Wear at the piston skirt is influenced by the oil film formed on the cylinder liner. Due to the continuous reciprocating movement of the piston, the development of wear marks over time is inevitable.

Wear marks on piston skirts are primarily observed on the thrust side of the piston. When evaluating these marks, it is essential to distinguish between normal wear and tear and seizure damage, as their causes, severity, and required actions differ significantly.

Normal Wear and Tear

Wear and tear marks are mainly caused by combustion particles trapped between the piston skirt and the cylinder liner. These marks typically appear as:

- Single, fine longitudinal lines
- Minor polishing of the surface

Such marks are considered acceptable and are not a cause for concern, provided they remain limited in severity and do not progress into deep scoring or surface damage.



Fig. 1-2: Wear and tear marks on the piston skirt – acceptable for reuse.

Seizure Marks

Seizure marks on the piston skirt are a clear indication of abnormal friction and overheating between the piston and the cylinder liner. In the case of seizure, the following characteristics are typically observed:

- Breakdown of the phosphate coating on the piston skirt
- Significant increase in surface roughness
- Signs of localized welding between piston and liner
- Torn or ripped-off material on the skirt surface

When seizure marks are present, the piston skirt must be replaced, as the material properties and surface treatment are no longer adequate for continued operation.

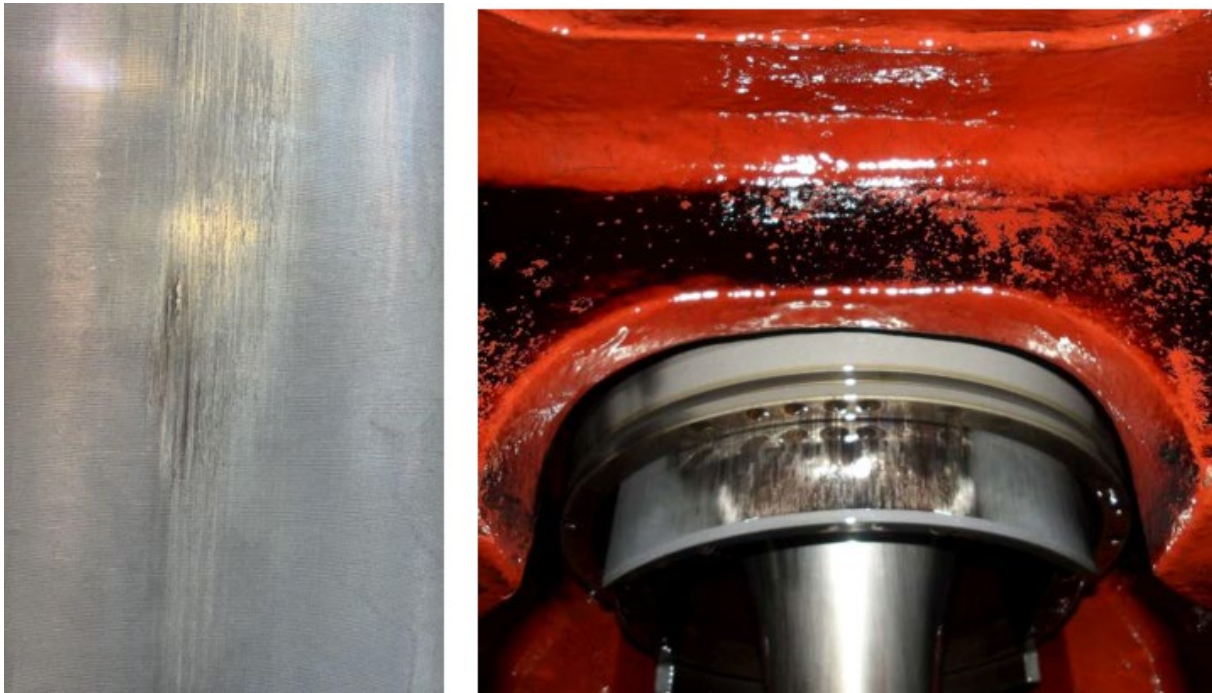


Fig. 3-4: Seizure marks on the piston skirt – replacement of the skirt is required.

Root Causes of Piston Skirt Seizure

The root causes of seizure marks can generally be categorized into lubrication, temperature, and combustion-related issues. The examples below are representative but not exhaustive.

Lubrication Issues

- Incorrect lubricating oil type or SAE viscosity grade
- Lubricating oil temperature too high or too low
- High contamination levels in the lubricating oil

Temperature Issues

- Excessively high cooling water temperature
- Insufficient cooling oil supply to the piston
- Engine overload
- High engine load applied to a cold engine without proper pre-lubrication and preheating

Combustion Issues

- Poor fuel injection resulting in high soot formation
- Incorrect injection timing causing engine knocking

Liner Condition Requirements

If scoring marks are observed on the piston skirt, the cylinder liner must be replaced or re-honed, where applicable, before installing a piston with a new skirt. Failure to restore an acceptable liner surface condition will lead to rapid recurrence of damage.

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