Document title General information on inspecting cylinder walls

Document number ah0100p030001amg

Engine 133, 139, 156, 176, 177, 178, 254, 256.9, 276.8, 654, 656
Engine 159

General information for engines with twin-wire-arc-sprayed coating
The following figures and notes assist in assessing the cylinder barrels so that a professional decision can be made concerning the condition and further use of the crankcase.

i A mechanical pressure test and a manual compression test must be conducted for an objective assessment of the cylinder condition or the cylinder barrel.

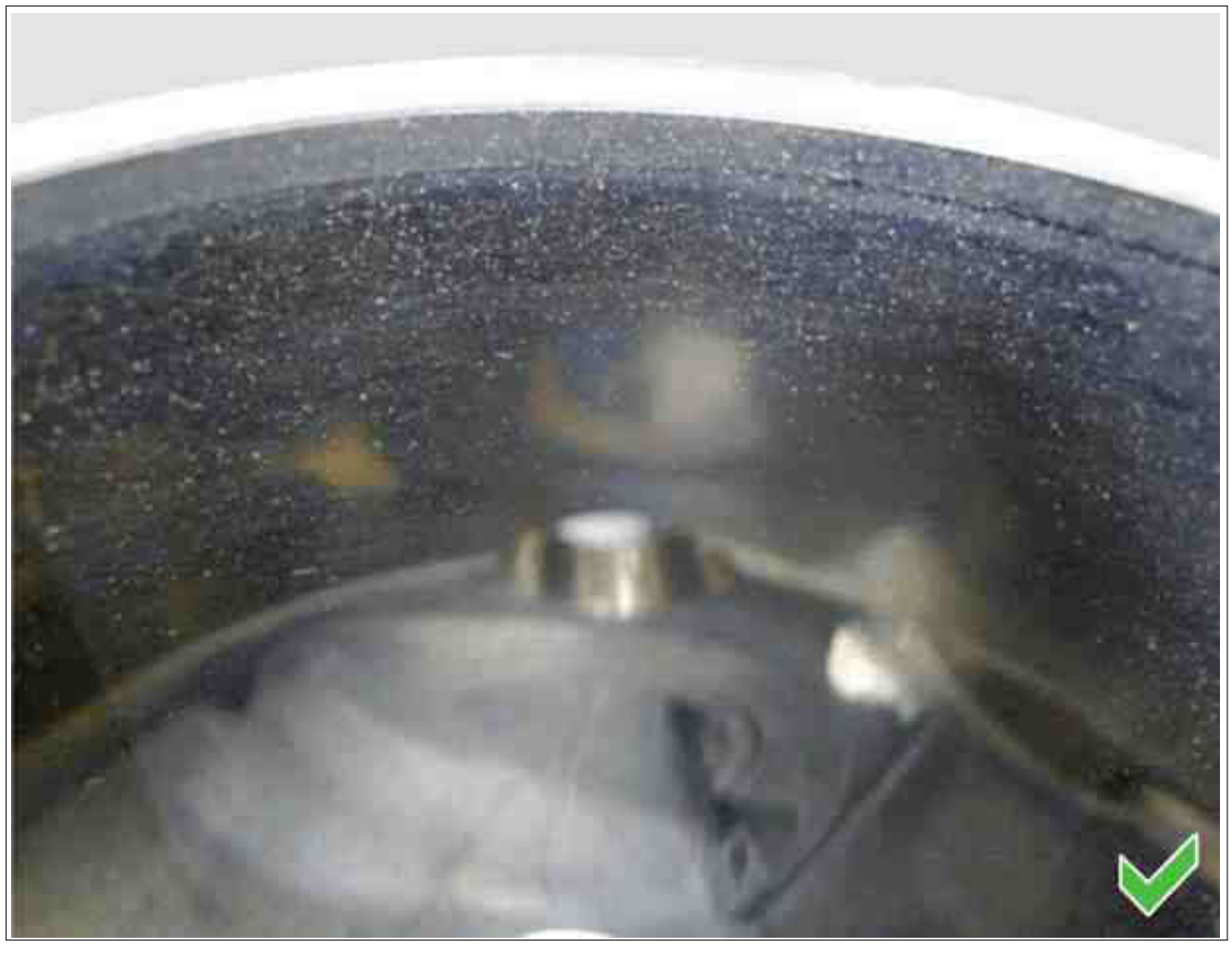
i If an increased pressure loss was found with the cylinder leakage tester, inspect engine by listening at cylinder head gasket, air intake area, exhaust system, oil filler opening and prechamber or spark plug bore of the cylinder or adjacent cylinders and thereby locate the area in which the pressure escapes. The smoke detector can be used to localize the cause of the problem.

i A score mark that can be felt with your fingernail is not permitted as a sole criterion for exchange.

i A significant degree of scoring in the cylinder barrel with material accumulation can justify an engine replacement.
A score mark in the cylinder barrel with significant material accumulation should be documented with representative pictures.

A crankcase with twin-wire-arc-sprayed coating

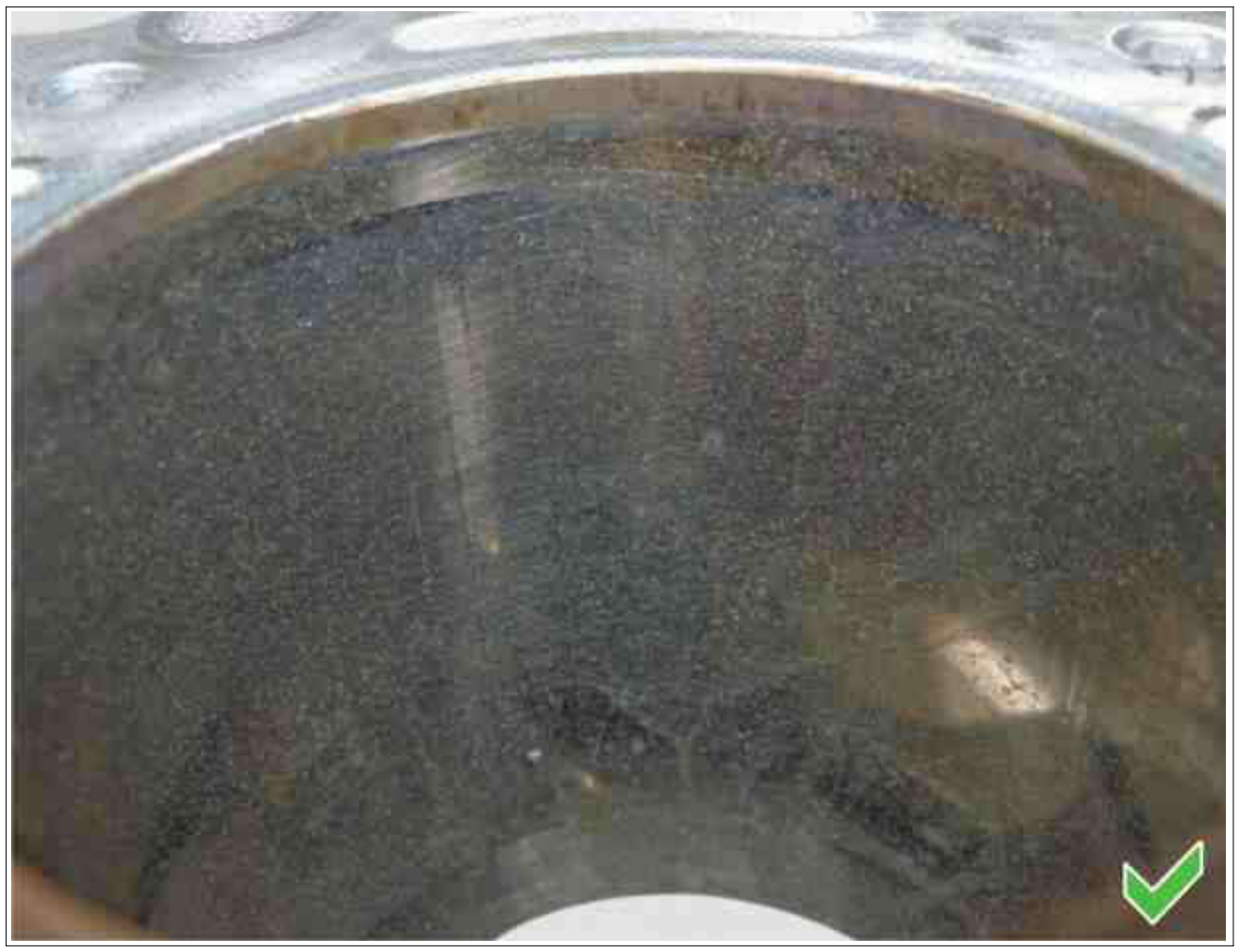
i In the case of crankcases with twin-wire-arc-sprayed coating, an electric arc is used to seal off iron-carbon wires, to then spray them through an inert gas stream onto the inside of the cylinder. The resulting characteristic pores generate a retained oil volume in the surface, which in turn enables the reliable use of an extremely smooth, reflective honing structure.



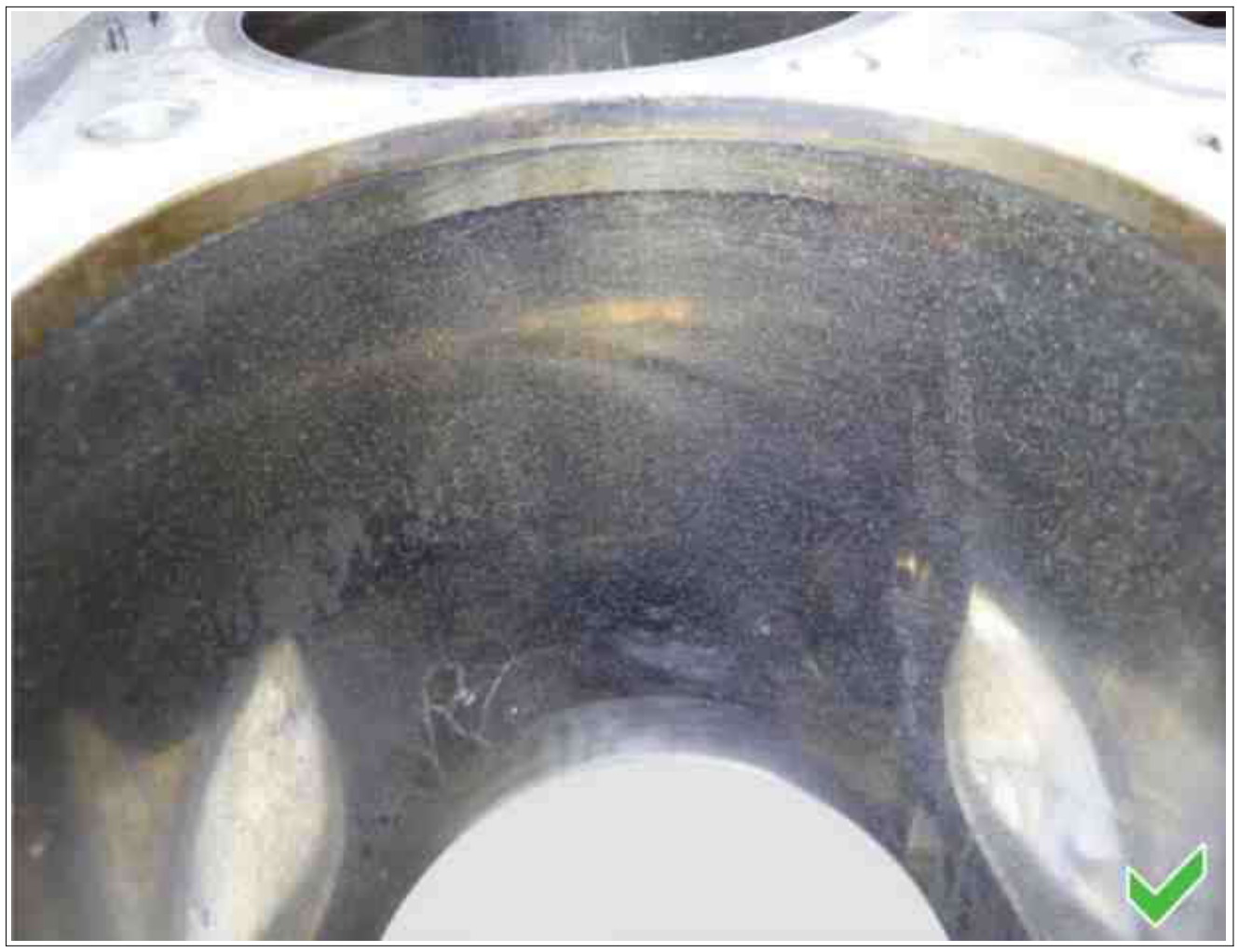
P01.00-3666-76

There now follows some notes on checking cylinder barrels with twin-wire-arc-sprayed coating

Ideal condition
Cylinder barrels with twin-wire-arc-sprayed coating can be recognized by their reflective surface with pores (see white dots in picture) and the honing pattern.
i The piston can be reflected in the barrel surface.

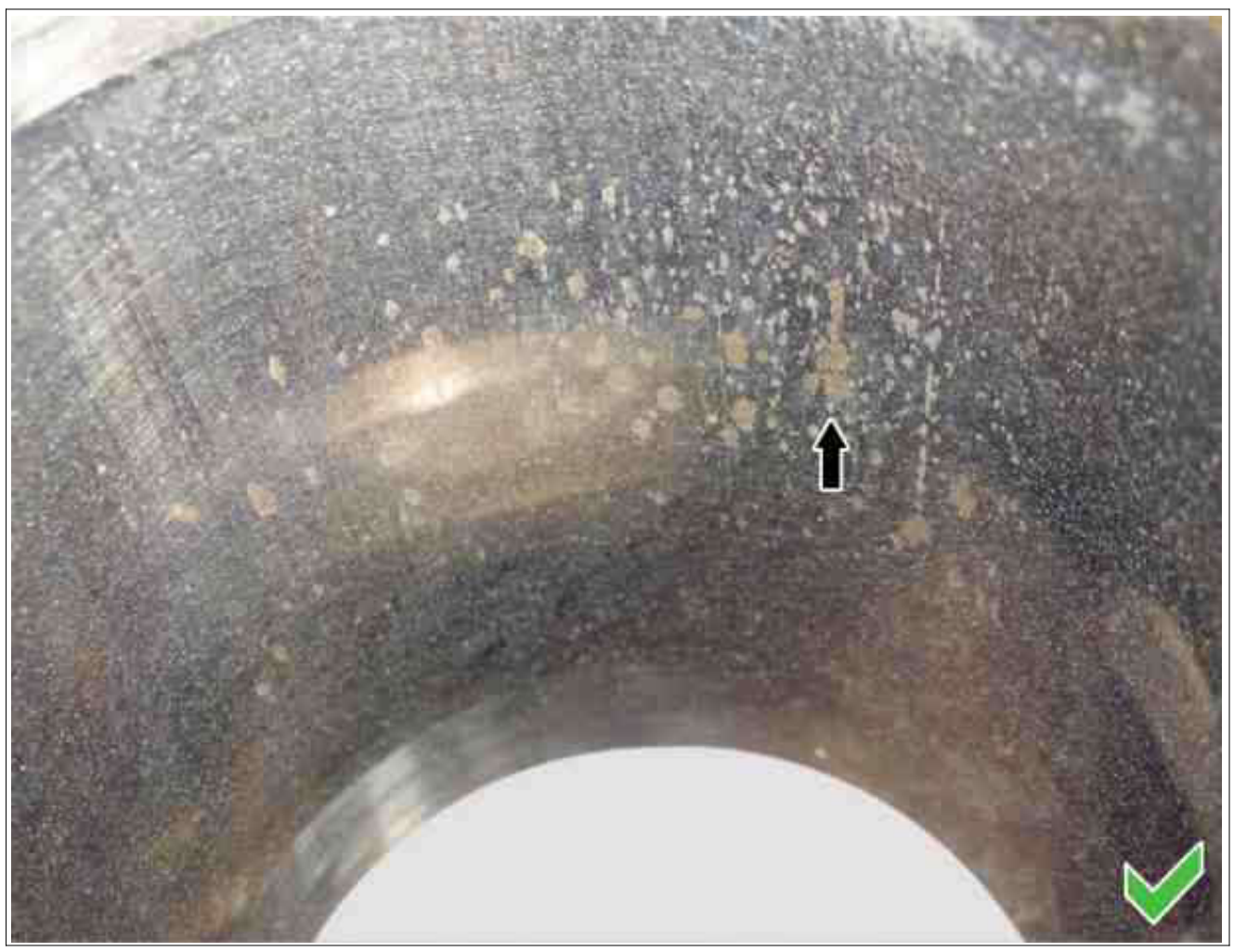


Visible pores (white dots)
White dots or pores distributed over the entire cylinder barrel are typical for cylinder barrels with twin-wire-arc-sprayed coating.
i Reuse crankcase.

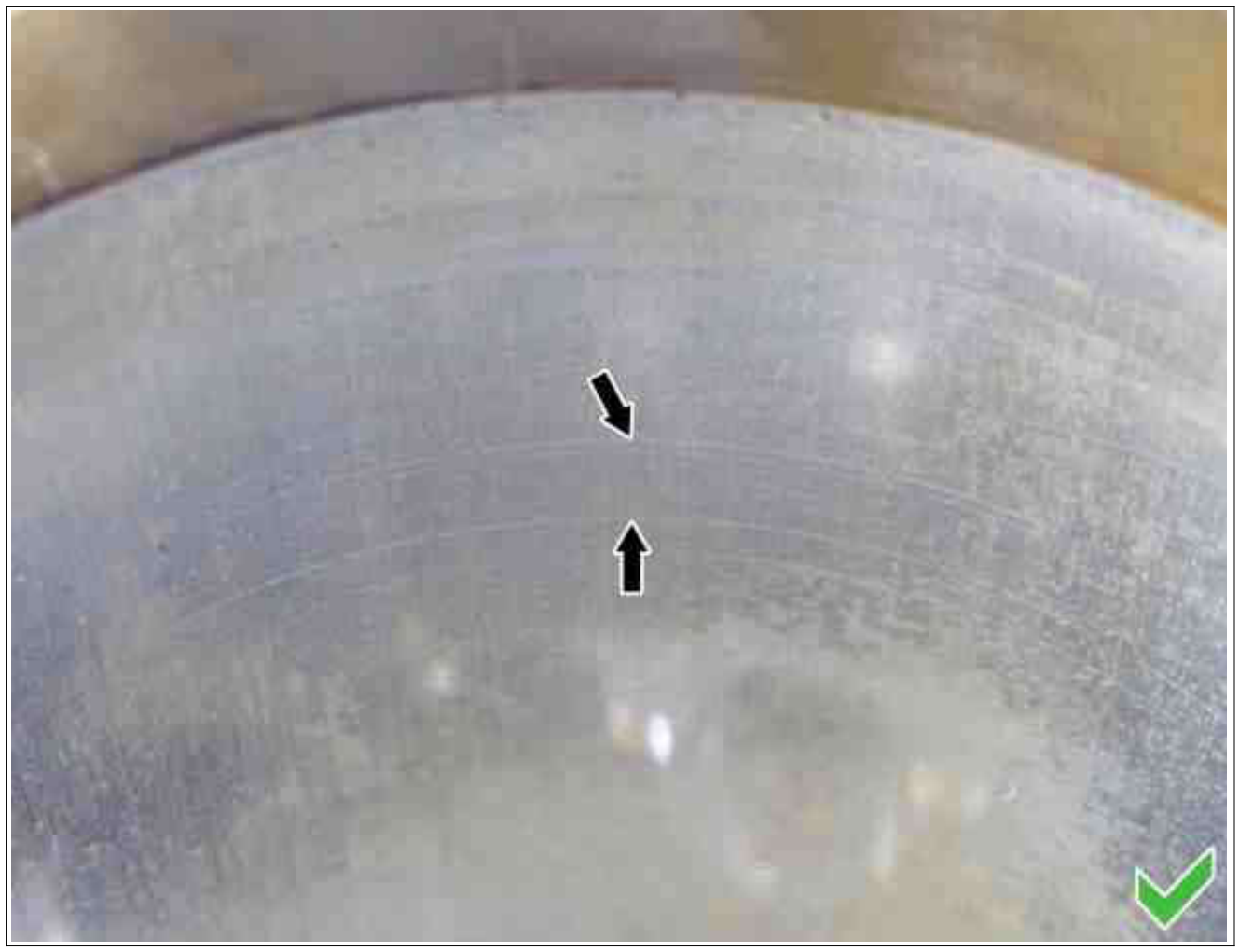


Large-area rust or corrosion spots
Appearance of rust in center of cylinder barrel.
i Reuse crankcase.

Individual corrosion spots
Individually occurring corrosion spots over entire cylinder barrel can also occur as cavities.
i Reuse crankcase.

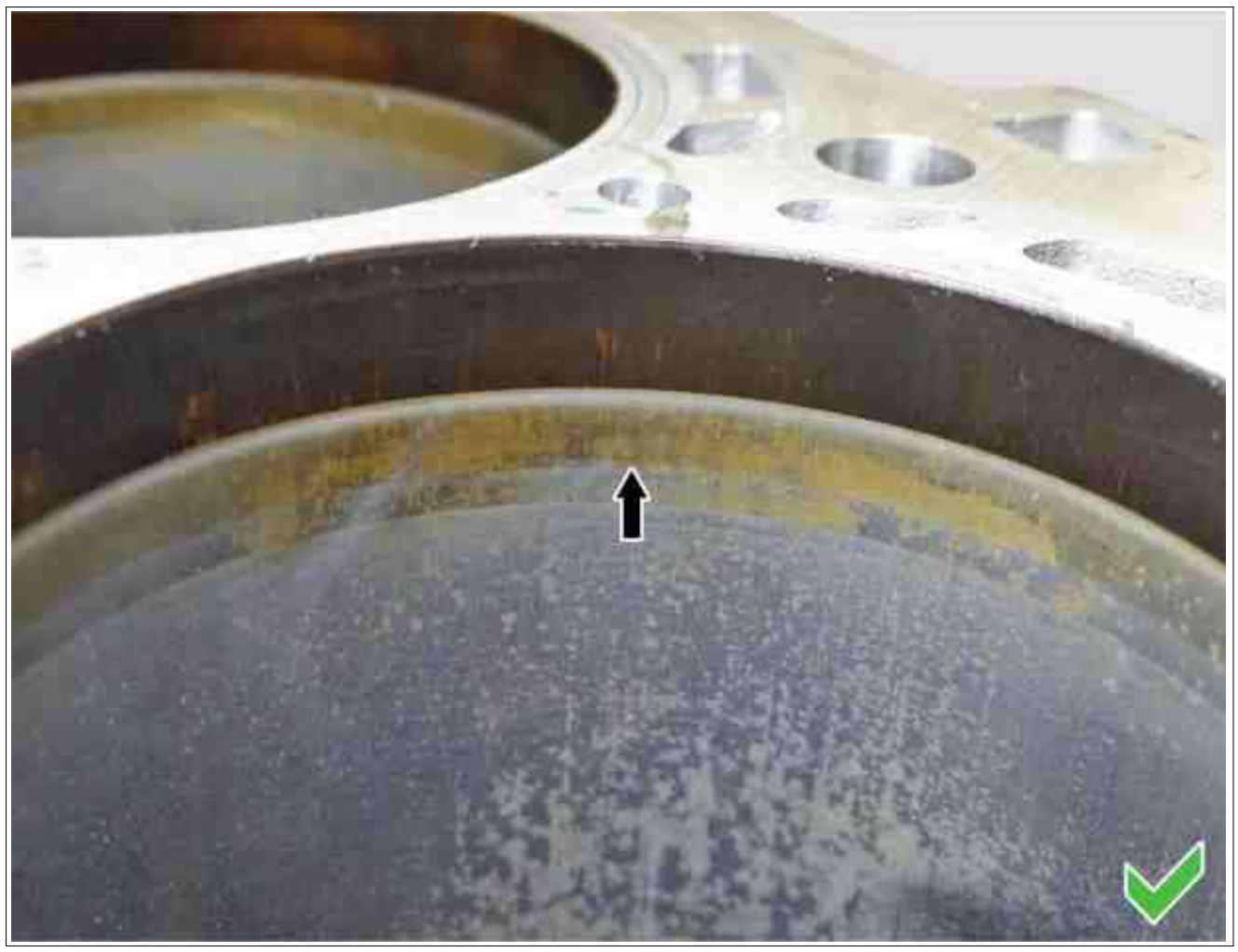


Honing marks in cylinder barrel
Honing marks, depressions in cylinder barrel running at honing angle, caused by machining without burring.
i Reuse crankcase.



P01.00-3672-76

Optical strips and easily recognizable honing pattern
Visible rust strips in upper piston ring reversal area of cylinder barrel and clearly recognizable honing pattern.
i Reuse crankcase.



P01.00-3673-76

Partial corrosion in cylinder barrel
Partial corrosion in cylinder barrel.
i Reuse crankcase.

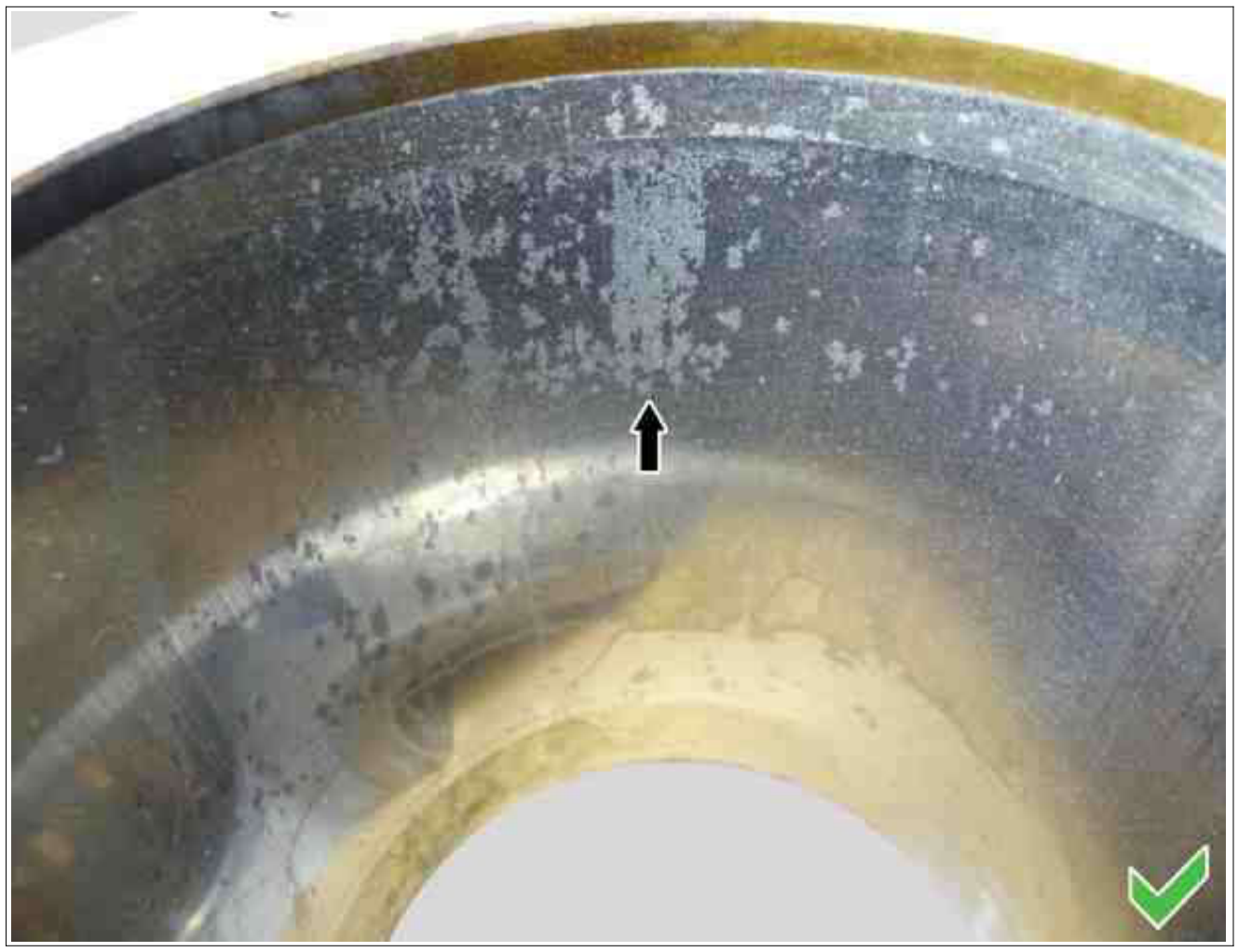
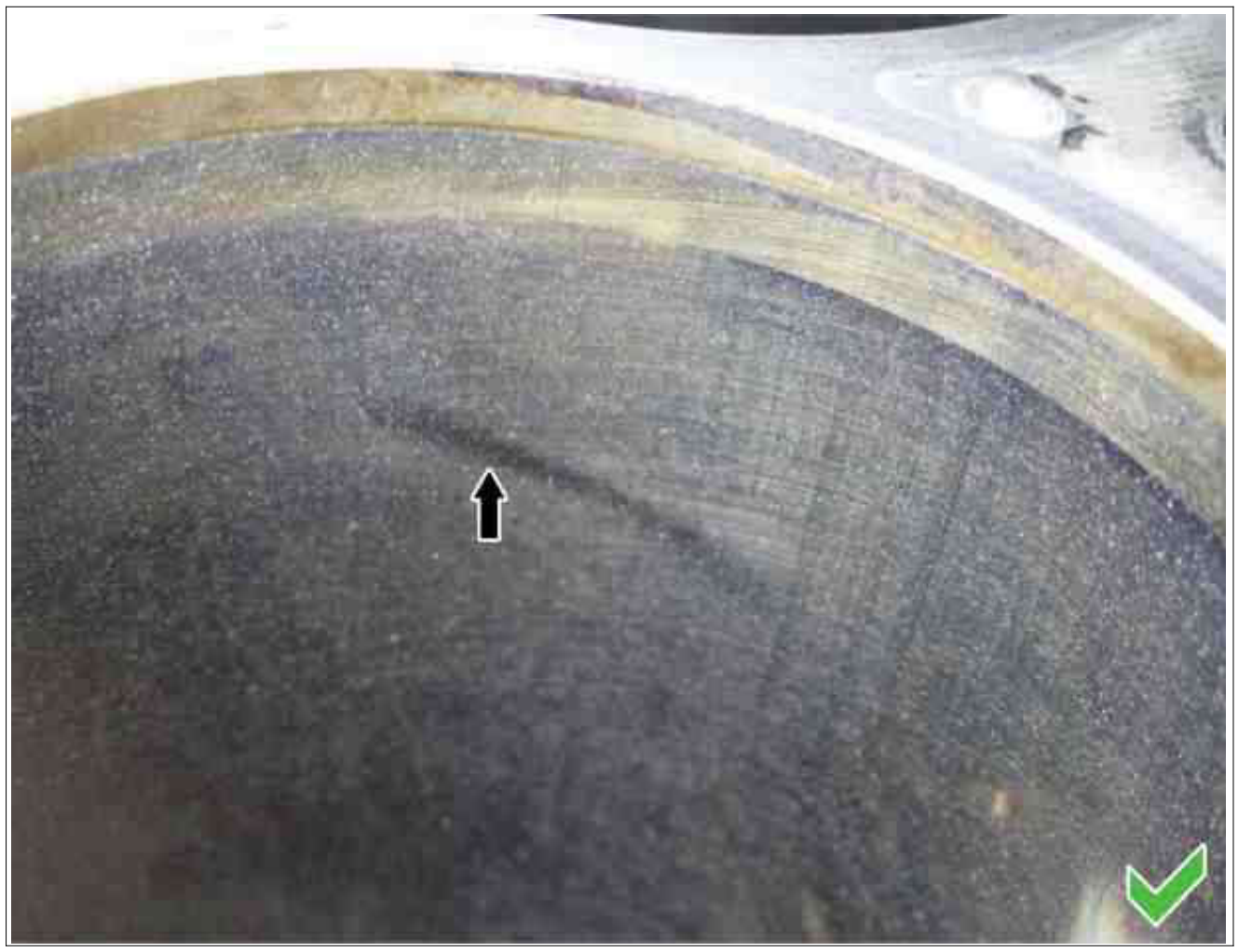
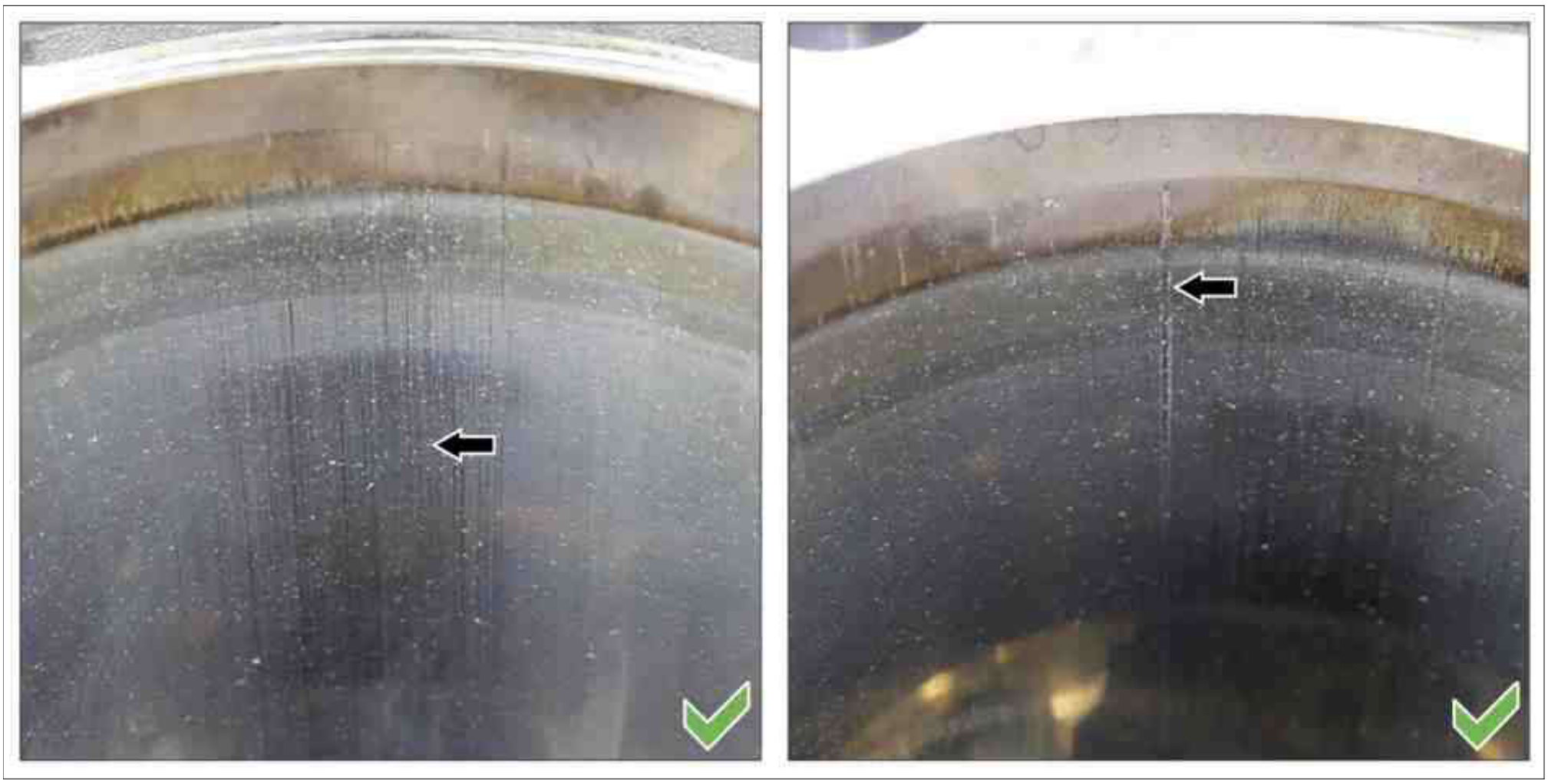


Figure showing valve cooling bore in cylinder barrel
Shading in cylinder barrel in cylinder wall area in development direction of valve cooling bore after runtime (score marks and honing pattern recognizable).
i Reuse crankcase.

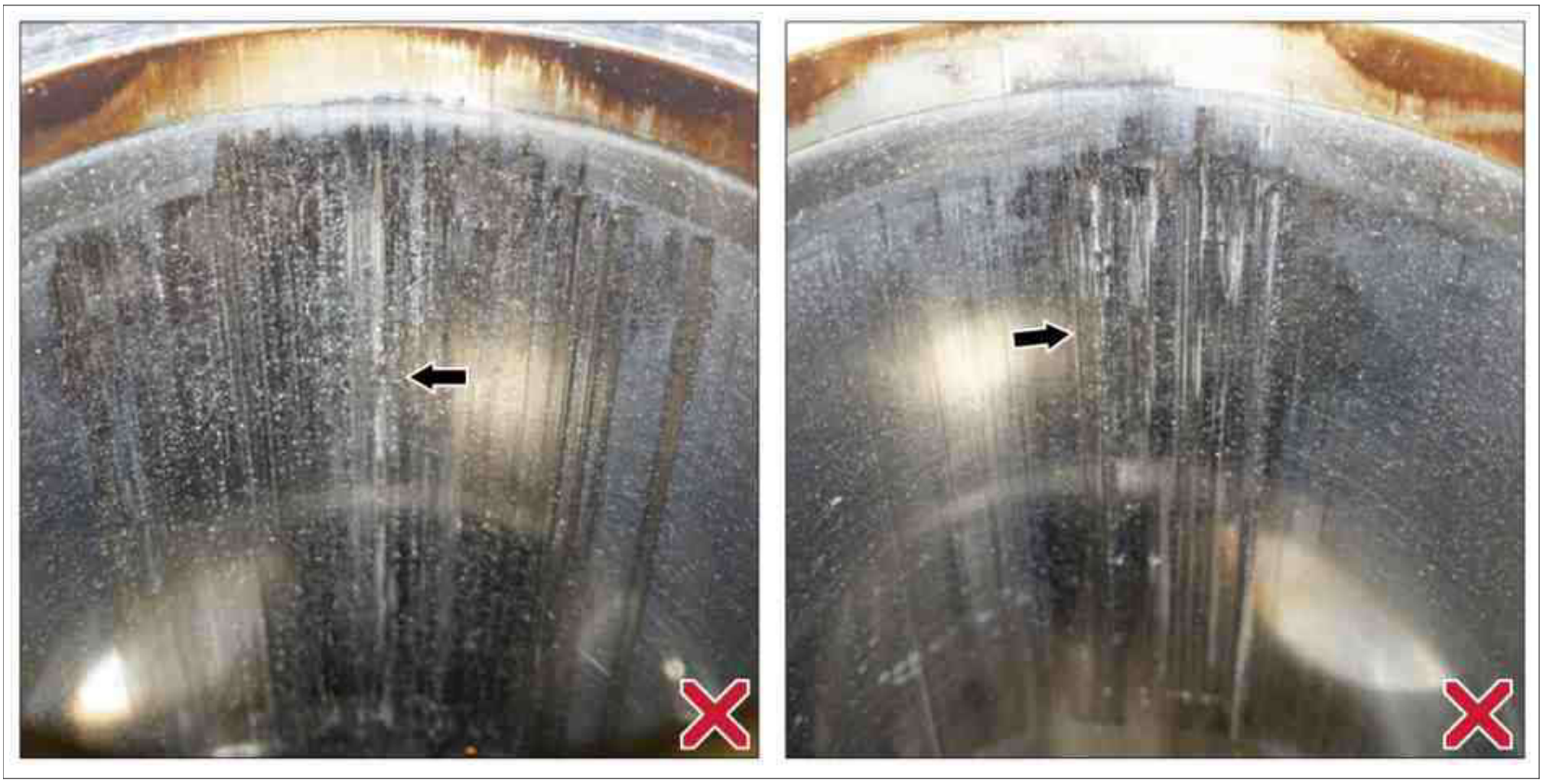




P01.00-3761-79

Individual score marks up to areas of score marks (not with engine 156, 159)
Caused by initial dirt or soiling during operation, e.g. through back pulsation of particles from the catalytic converter or the exhaust system.

i If the compression pressure is within the permissible range, use the crankcase again.



P01.00-3762-79

Piston seizure, ring seizure
Most of cylinder wall perceptibly roughened over the entire length and noticeable seizing marks, cylinder barrel unusable.

i Do not use crankcase again.