



**HENKEL**  
Beiz- und Elektropoliertechnik

HENKEL-Ferroxyltest  
HC7000

[www.henkel-epol.com](http://www.henkel-epol.com)

## HENKEL ferroxyl test HC 7000

Checking the integrity of your  
stainless steel surfaces on the  
test bed.

## The Passive Layer.

Austenitic stainless steel alloys in accordance with DIN EN 10020, 10027-1/2, including 1.4301/AISI 304, 1.4306/AISI 304L, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4435/AISI 316L, 1.4571/AISI 316Ti, 1.4539/AISI 904L, etc. have the natural capacity to form a protective layer rich in chromium oxide on their surface – known as a passive layer – when oxygen or oxygen-emitting chemicals are present. This layer forms the basis for corrosion resistance in this group of material alloys.

The surface of the component in question will only be resistant to corrosion in the long term if it has a closed, undisturbed passive layer and there are no (local) ferritic and/or iron oxide-based impurities.

Free iron particles and/or iron oxides (tarnish residue) left behind after welding or annealing can lead to the formation of iron ions in aqueous solution. These particles are then able to cause local damage to the passive layer. The HENKEL ferroxyl test HC 7000 is designed specifically to detect these defect sites.

The ferroxyl test is able to show free iron on the stainless steel surface – the test is so sensitive that it reacts to iron dust in the room's atmosphere (rust film).

## How it Works.

The standardised chemical ferroxyl test for detecting free iron or iron oxide is based on procedure 7.3.4 of the ASTM A380 guidelines.

The assessment is performed by spraying or painting a specific test chemical (in this case HC 7000, a compound created from HC 7001 and HC 7002) on the stainless steel surface at room temperature. In principle, the test chemical reveals an acidic media culture, as a result of which all iron atoms pre-

sent on the surface being tested are ionically dissolved and become reactive in the process.

The reactive chemical (HC 7002) is also part of the test solution that reacts with iron ions and typically turns blue within 30 to 60 seconds (formation of Prussian blue).

If no free iron (iron oxide) is present on the stainless steel surface to be checked, the colour of the test solution will not change, thereby indicating a negative result.



*Figure 1: Example of results of ferroxyl test; no change of colour on left of image | local change of colour in middle of image | full colour change to blue on right of image.*

## Limitations.

The HENKEL ferroxyl test HC 7000 is used exclusively to examine the integrity of the passive layer. The ferroxyl test does not provide any detailed or quantitative conclusions as to the quality of the passive layer rich in chromium oxide (Cr/Fe ratio, thickness, morphology, etc.). If the results are negative (no iron or iron oxide on the stainless steel surface), only a general qualitative conclusion can be drawn as to a ferrite-free stainless steel surface and the presence of an undisturbed passive layer in conjunction with any ferrite-based impurities.

HENKEL-Surfaces Assure Your Component's Value.

## Our Service Range.

- | On-site and factory service
- | Electrochemical polishing
- | Anodic cleaning
- | Chemical polishing / deburring
- | Chemical pickling and passivation
- | Professional cleaning (also in clean room)
- | Derouging and repassivation
- | Process and cleaning chemicals
- | Documentation
- | Construction



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## Application Range.

The aim and purpose of the test are to check the integrity of the passive layer on the stainless steel surface and guarantee that free iron and (to a limited extent) iron oxide are entirely absent.

The test is used to detect iron contamination in conjunction with:

- \* Tool wear
- \* Specific airborne dust (rust film)
- \* Insufficiently cleaned weld seams
- \* Iron and iron oxide residue pressed into the surface



## Materials.

The test kit was developed specifically for use on austenitic stainless steel alloys in accordance with DIN EN 10020, 10027-1/2, including 1.4301/AISI 304, 1.4306/AISI 304L, 1.4401/AISI 316, 1.4404/AISI 316L, 1.4435/AISI 316L, 1.4571/AISI 316Ti, 1.4539/AISI 904L, etc. The test kit can also be used on titanium surfaces (this is at the limit of the kit's effectiveness).

## Scope of Delivery.

The ferroxyl test box contains a ready-to-use test kit consisting of the following items:

- \* HC 7001 50 ml container | HC7000 component
- \* HC 7002 50 ml container | HC7000 component
- \* Preparation bottle 100 ml
- \* Plastic brush
- \* 2 plastic pipettes
- \* Protective goggles
- \* Protective gloves for handling chemicals
- \* Safety data sheet
- \* Operating instructions

## Your benefits.

- \* This test kit can be used to check stainless steel surfaces during regular plant checks or, in particular, after repair work (welding). Benefits at a glance:
- \* Simple handling
- \* Reliable results in just 60 seconds
- \* Can also be used on titanium surfaces
- \* Personal protective equipment included
- \* Step-by-step instructions included
- \* Refill sets with greater amounts of chemicals are available



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