

Underrated danger  
**intercrystalline corrosion**

**the corrosion test in comparison**



Dear Sir or Madam,

TPS-Technitube Röhrenwerke GmbH is known world-wide as a competent manufacturer of tubes and tube accessories. Longstanding customers appreciate our products and services.

The problem "Intercrystalline corrosion on the inside surface of stainless steel tubes" is brought up again and again by our customers. This topic is obviously still up-to-date.

This quality issue occurs especially frequently with deliveries from low-wage countries and often only becomes visible to the customer when it is already too late. The remote damages – especially for tubes which are used in highly-sensitive or security-relevant fields – can be fatal and could cause considerable financial damage!

In this context, we would like to demonstrate with this "test" how a tube with intercrystalline corrosion acts during the Huey test (corrosion test) compared to a TPS tube. Further details on the test process can be found on the following pages.

We assure you that we guarantee a production process which is "free from intercrystalline corrosion". Of course, for this process reliability, a long-time know-how, a lot of experience and a permanent and sustained quality control are required.

We are able to guarantee all these quality features and we are pleased to assist you with any questions that may occur in this regard.

In order to be able to realise our high demands on quality, precision and dimensional accuracy, we run Europe's most modern cold pilger machine and we also have cutting and deburring equipment. Through further investments, such as a new drawing bench which is capable of drawing six tubes at the same time and an additional, highly sophisticated bright annealing furnace, we constantly increase our capacities.

Should you have any questions on this subject, please feel free to contact us.

  
Dietmar Weides  
Managing Director



**The initial tubes**

On both initial tubes, a Huey test (corrosion test) was performed. The changing of the inside surface was documented step by step by means of scanning electron microscope pictures in 500-fold magnification (see back).



Initial tube:  
**Tube in excellent TPS quality**

Delivery condition solution annealed (bright annealed)

Material grade: 1.4306

Dimension: 10,00 x 1,50 mm



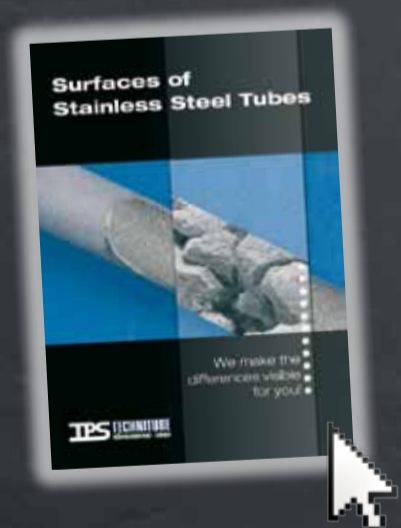
Initial tube:  
**Tube with intercrystalline corrosion attack**

Solution annealed (bright annealed) with intercrystalline corrosion on the inside surface

Material grade: 1.4306

Dimension: 10,00 x 1,50 mm

Further information on this subject can be found in our brochure „Surfaces of stainless steel tubes“.

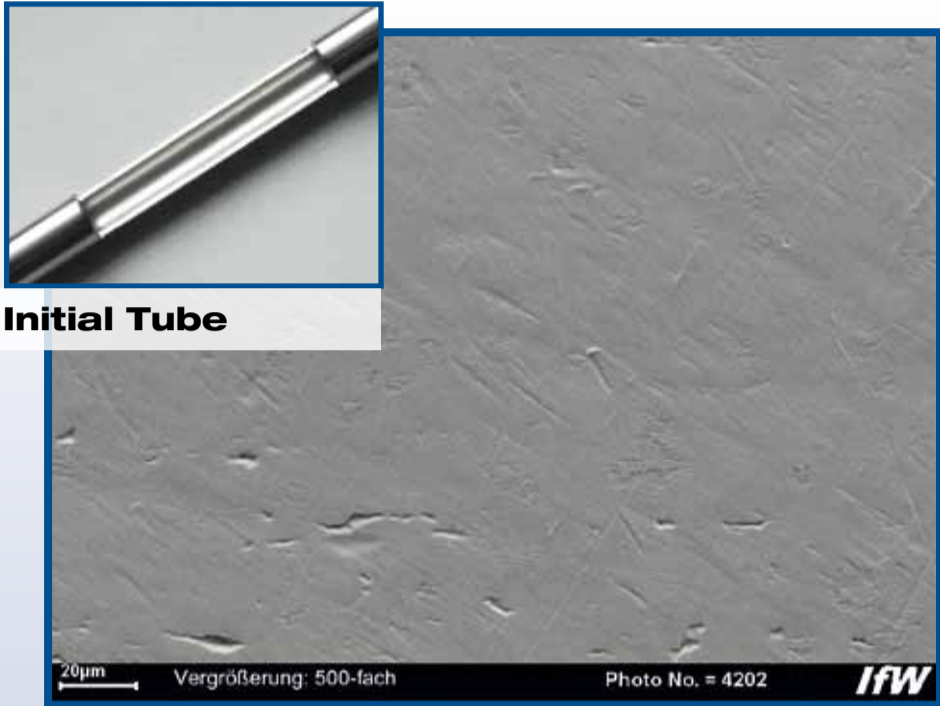


Just download the brochure at [www.tpsd.de](http://www.tpsd.de) or request a printed copy!



# The corrosion test in comparison

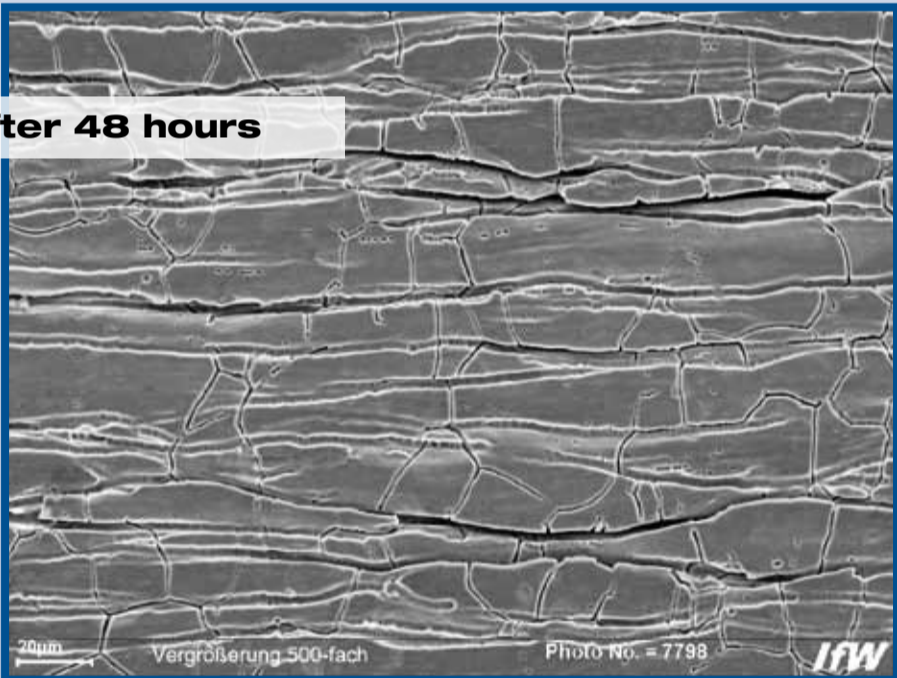
## Tube in excellent TPS quality



Initial Tube

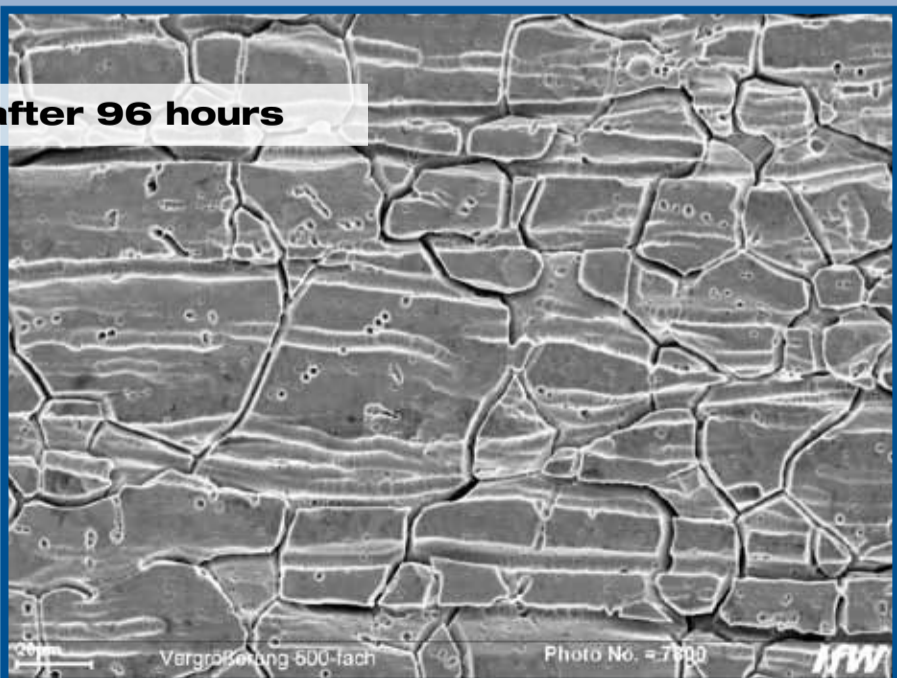
1. Inside surface **without** intercrystalline corrosion on the initial tube (delivery condition)  
Inside roughness:  $<Ra\ 0,5\ \mu m$   
Magnification: 500-fold

after 48 hours



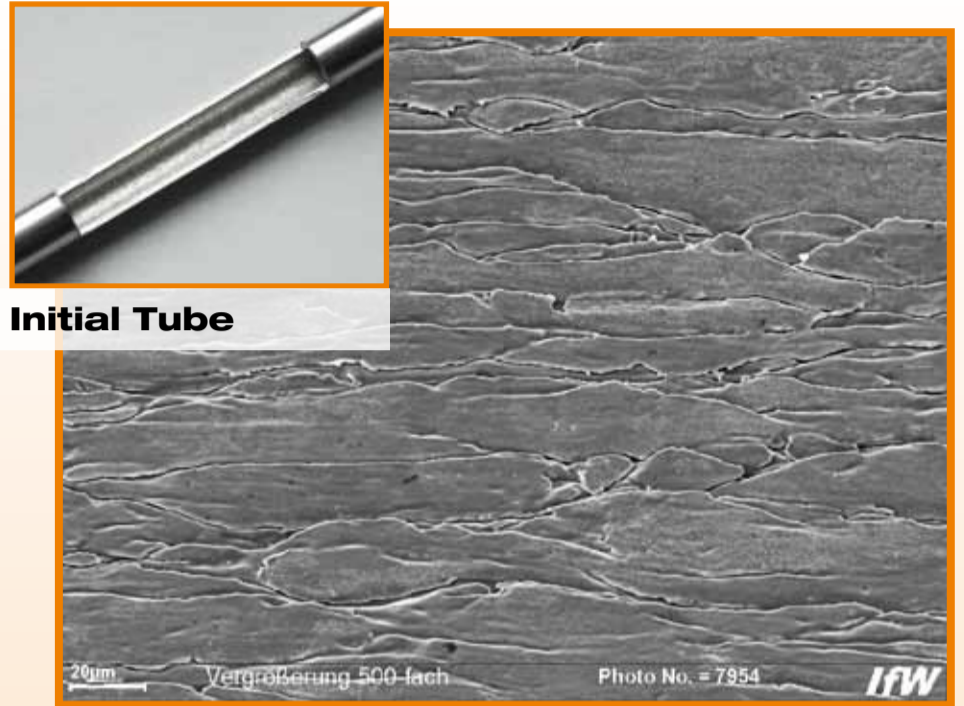
2. Inside surface **without** intercrystalline corrosion on the initial tube after Huey test, 1st cycle (after 48 hours)  
Mass loss rate:  $0,33\ g/m^2\ x\ h$   
Magnification: 500-fold

after 96 hours



3. Inside surface **without** intercrystalline corrosion on the initial tube after Huey test, 2nd cycle (after 96 hours)  
Mass loss rate:  $0,33\ g/m^2\ x\ h$   
Magnification: 500-fold

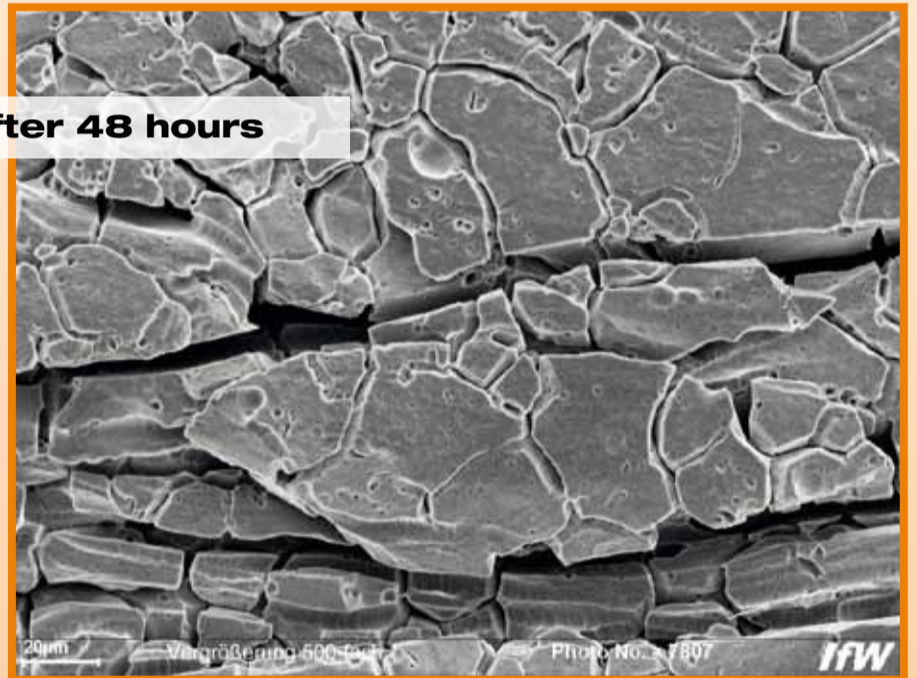
## Tube with intercrystalline corrosion attack



Initial Tube

1. Inside surface **with** intercrystalline corrosion on the initial tube  
Inside roughness:  $>Ra\ 1,5\ \mu m$   
Magnification: 500-fold

after 48 hours



2. Inside surface **with** intercrystalline corrosion on the initial tube after Huey test, 1st cycle (after 48 hours)  
Mass loss rate:  $1,65\ g/m^2\ x\ h$   
Magnification: 500-fold

after 96 hours



3. Inside surface **with** intercrystalline corrosion on the initial tube after Huey test, 2nd cycle (after 96 hours)  
Mass loss rate:  $1,3\ g/m^2\ x\ h$   
Magnification: 500-fold