

## BLISTERING ON GALVANIZED COMPONENT

### Determine causes of faults after climate simulation

#### TASK

Several apparently perfectly galvanized PC/ABS components showed clear blistering in some areas after a temperature cycling test (Fig. 1). This led to the entire production batch being blocked.

#### SOLUTION

The bubble was opened at Analytik Service Obernbuurg. The polymer surface below the bubble appears darker than in the freshly removed reference area (red arrow in Fig. 2). In the bubble area, hardly any polymer adheres to the metal, while the adhesion in the reference area is so high that part of the polymer was torn off when the metal layer was removed - the underside of the metal is covered by numerous polymer flags (Fig. 3). In a further step, the polymer in the reference area was chemically dissolved away and the metal underside exposed (Figs. 4 and 5), revealing a cavern structure of varying degrees of intensity.

#### Industries

Automotive suppliers  
 Electroplating companies  
 Plastics processors  
 Medical technology

#### Analysis objectives

Damage analysis  
 Process optimization

#### Materials

Galvanized plastics

#### Analysis methods

Scanning electron microscope

#### Supplementary procedures

Light microscopy  
 IR spectroscopy  
 Climate storage  
 Initial sample testing

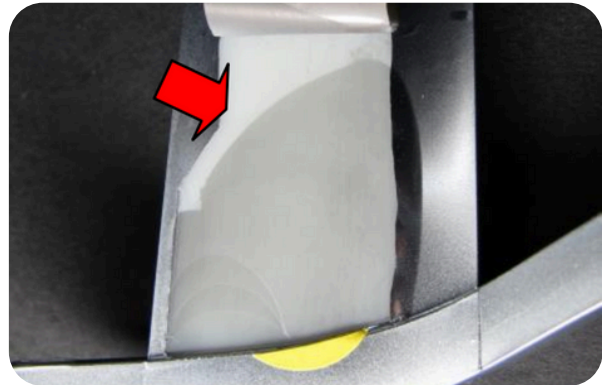
#### Related questions

Flaw analysis  
 Crater paint adhesion  
 Wetting problems

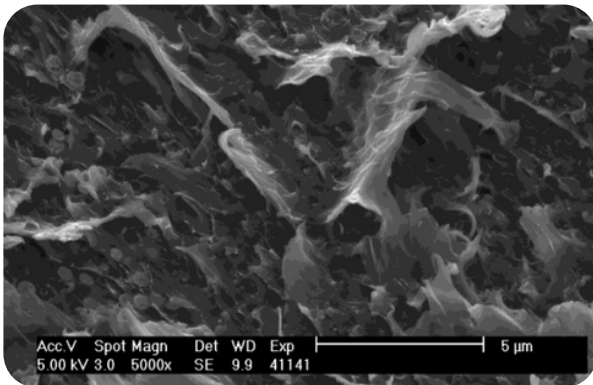




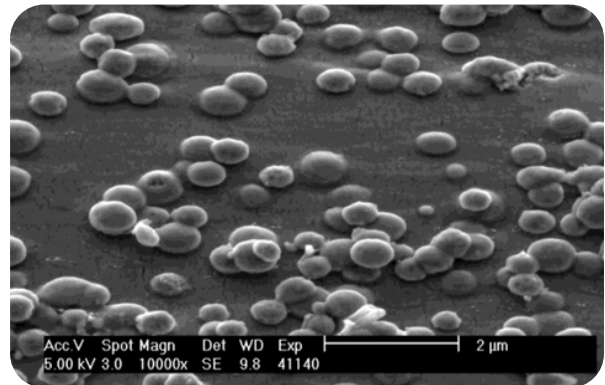
**Fig. 1: Galvanized component with blistering**



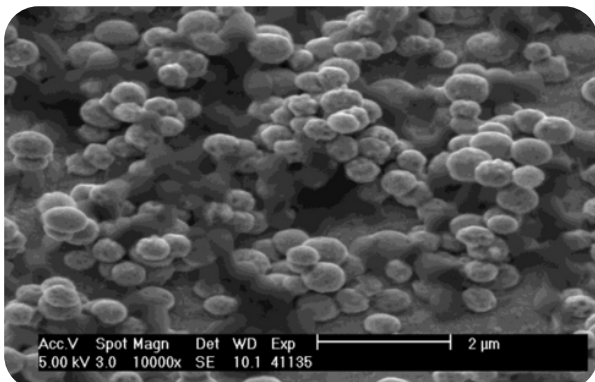
**Fig. 2: Opened bladder**



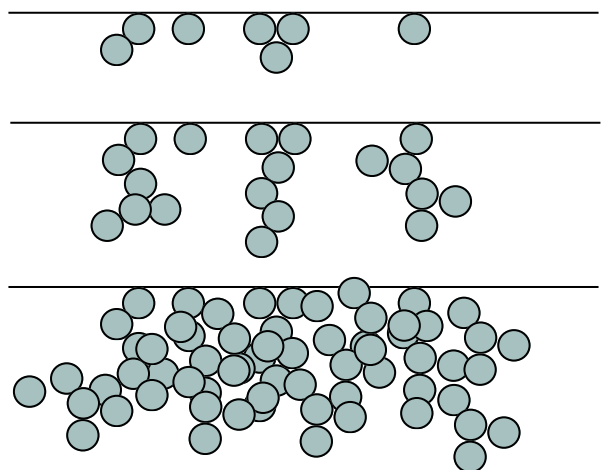
**Fig. 3: Metal underside of the reference area with adhering polymer**



**Fig. 4: Metal underside in the bubble area with relatively few anchoring points**



**Fig. 5: Cleaned metal underside in the reference area (many spherical caps allow an intimate connection with the polymer)**



**Fig. 6a-c: Surfaces stained to different degrees**

## **BLISTERING ON GALVANIZED COMPONENT**

### **Determine causes of defects after climate simulation**

During electroplating, the butadiene component of the ABS is first oxidized in a pickling process. This creates a cavern structure that is filled with metal in the subsequent process steps, which causes the anchoring. If the pickling is too low (Fig. 6a), too few anchoring points are created. If, on the other hand, it is too high (Fig. 6c), too few polymer bars remain and the strength is also reduced.

#### **ADVANTAGES**

The method described allows damage to be analyzed for various defect patterns. The method is also suitable for determining the element composition in the defect area and thus identifying possible foreign materials.

