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# Instruction manual

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## ZCF 2088 Zehntner-Cross-cut tester



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Annexe:

- Certificate of manufacturer

## Exclusion of liability

Illustrations, descriptions as well as the technical specifications accord with the instruction manual in hand for the time of printing. Subject to change resulting from technical improvement, modified construction or similar changes.

This instruction manual has been written with the utmost care. Nevertheless, errors can not entirely be eliminated. The manufacturer shall not be liable for errors contained herein or for incidental or consequential damages resulting from possible errors.

We would therefore welcome any suggestions and references to errors.

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## 1. Safety precautions and warnings

### 1.1 Dangers


#### **Attention!**

This note is included in this instruction manual wherever it is warned about dangers which will arise to life and limb of persons if the apparatus is handled improperly. Observe these notes and be particularly careful in these cases. Also inform other users on all safety notes. Besides the notes in these instruction manual the generally applicable safety instructions and regulations for prevention of accidents have to be taken into account.

#### **Note**

This symbol marks instructions you should take notice of in order to follow directions, specifications and the correct working process as well as to avoid data loss, damage or destruction of the instrument.

### 1.2 Safety notes

 The ZCF 2088 is exclusively designed for easy evaluation of adhesion of single- or multi-coat systems. Any other application is not in accordance with the regulations. The manufacturer is not liable for damage resulting from inappropriate application. The user bears the full responsibility.

- ! Only spare parts and optional components provided by the manufacturer may be used in combination with the ZCF 2088. If components other than provided by ZEHNTNER are used with the ZCF 2088, there is no guarantee by ZEHNTNER for resulting damages, defects or malfunctions.
- ! Unauthorised modifications and changes of the ZCF 2088 are not allowed. These will invalidate the guarantee. The manufacturer is not liable for damages resulting from unauthorised modifications; the user bears the full responsibility.

## 2. Delivery of device

### 2.1 Damages during carriage

During carriage the ZCF 2088 is to be handled with the usual care. To ensure carriage without damages the device is to be transported in the original packaging and under normal freight conditions. Pushes during carriage are to be avoided.

At the receipt of the goods, you have to check if there are any visible damages at the outer packaging. If the packing is alright, you can sign the receipt documents. If you even suspect by your visual impression that damage has occurred, make a note of the suspected damage on the delivery receipt or freight papers and get the carrier to sign it. Moreover, the forwarding agent/courier service must be held responsible for the damage in writing.

If a hidden damage is discovered while unpacking, you have to inform and must held the forwarding agent / courier service immediately in the following way: "When opening the parcel we had to notice that .... etc. etc." This superficial checking of the goods has to be done before the time limit of the forwarding agent / courier service expires which is normally within 7 days. However, the period could be less. Hence, it is recommended to check the exact time limit when receiving the goods.

If there are any damages inform also immediately your authorized ZEHNTNER trader or Zehntner GmbH Testing Instruments directly.

## 2.2 Extent of delivery

The following parts are included in the delivery:

Article No.: ZCF 2088.K:

- 1 cross-cut tester with folding ruler with 11 x 1 mm shims, and 6 x 2 mm and 3 mm shims each
- 1 NT-Cutter with spare blades
- 1 roll adhesive tape (length: 22 m, width: 25 mm)
- 1 certificate of manufacturer
- 1 carrying case

Article No.: ZCF 2088.G:

- 1 cross-cut tester with folding ruler with 11 1 mm shims, and 6 2 mm and 3 mm shims each
- 1 NT-Cutter with spare blades
- 1 roll adhesive tape (length: 22 m, width: 25 mm)
- 1 magnifier
- 1 brush
- 1 certificate of manufacturer
- 1 carrying case

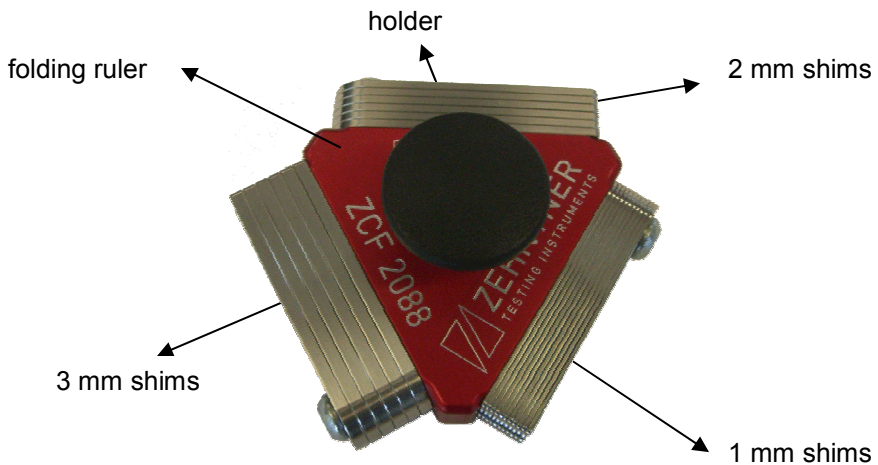


The cuttings of the NT-Cutter are sharpened and could cause injuries by incorrect handling! Operators need to achieve an appropriate security instruction.

### 3. Substrate

- Select the substrate from one of those described in ISO 1514.
- The panels shall be plain and free from distortion. The dimensions shall be such as to allow the test to be carried out at three different positions not less than 5 mm from each other and from the edge of the panel.
- Where panels consist of a relatively soft material such as wood, the minimum thickness shall be 10 mm. Where panels consist of a hard material, the minimum thickness shall be 0,25 mm.
  - Note 1: Rectangular panels, measuring approximately 150 mm x 100 mm, have been found to be convenient
  - Note 2: In cases where the panel is made of wood, the direction and the structure of the grain can influence the test, and a pronounced grain will render the evaluation impossible.

### 4. Outline of the instrument



## 5. Handling ZCF 2088

### 5.1 Preparation and coating

- Prepare each test panel in accordance with ISO 1514 and then coat it by the specified method with the product or system under test. Please also refer to chapter 3 „Substrate“ on page 6.
- Before the test, inspect the cutting edge of the blade and maintain its condition by sharpening or by replacing if needed.

### 5.2 Test conditions

- Carry out the test at a temperature of  $23\text{ °C} \pm 2\text{ °C}$  and a relative humidity of  $50\% \pm 5\%$  (see also ISO 3270).
- In field tests, the ambient conditions will have to be accepted.
- Condition the test panels immediately prior to the test at a temperature of  $23\text{ °C} \pm 2\text{ °C}$  and a relative humidity of  $50\% \pm 5\%$  for a minimum of 16 h.

### 5.3 Cross-cut test

- Carry out Preparation and coating according chapter 5.1 on page 7.
- Place the folding ruler on the substrate under test and hold the folding ruler in such way that the cuts always are executed away from the body and from the hand holding the holder! Never hold the folding ruler at the sides of the slits!



- Do not to put the fingers directly at the area where the cut will be carried out and pay attention not to cut yourself. The cuttings of the NT-Cutter are sharpened and could cause injuries by incorrect handling! Operators need to achieve an appropriate security instruction.
- Carry out six parallel cuts with the desired spacing by cutting through the film to the substrate in one steady motion.
    - According to ASTM D 3359: 11 x 1 mm cuts.
  - Turn the folding ruler for 90° and make the same number of cuts with the same spacing again so that a lattice pattern is formed.
    - According to ASTM D 3359: 11 x 1 mm cuts.
  - Remove any grit from the area of cutting. For suitable methods please refer to chapter 5.4 „Examples for suitable procedures for removing of grit“ on page 9.

- Carefully examine the cut area of the test coating in good lighting using normal or corrected vision or if necessary using a viewing lens. During the viewing process, rotate the panel so that the viewing and lighting of the test area are not confined to one direction.
- Classify the test area according chapter 6 „Overview - Cross-cut classification“ on page 10.





## 5.4 Examples for suitable procedures for removing of grit

You are at liberty to choose one of the following methods. However, as a first choice we recommend using the method of chapter 5.4.2 or alternatively the method described in chapter 5.4.1.

### 5.4.1 Brushing

- According to ISO/CD 2409 it is recommended to remove the grit with the brush. Brush the panel backwards and several times forwards along each of the diagonals of the lattice pattern.

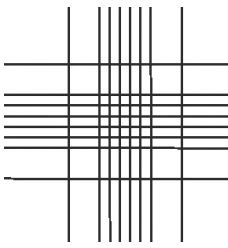
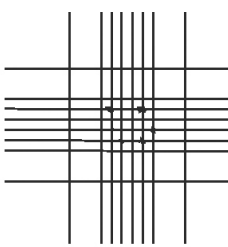
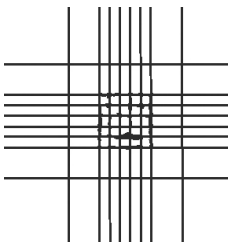
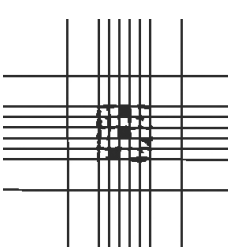
### 5.4.2 Compressed air or nitrogen

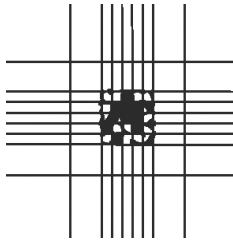
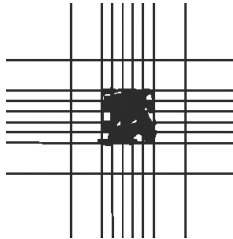
- Remove any grit with compressed air or nitrogen

### 5.4.3 Pressure-sensitive adhesive tape

- Remove a length at a steady rate and cut a piece approximately 75 mm long and place the center of the tape over the lattice in a direction parallel to one set of cuts. To ensure good contact with the coating, rub the tape firmly with a fingertip or fingernail. Within 5 min (ASTM: 90 s  $\pm$  30 s) of applying the tape, remove the tape by grasping the free end and pulling it off steadily in 0,5 s to 1,0 s at an angle which is as close as possible to 60°.
  - According ASTM: as close as possible to 180°
  - According DIN EN ISO: It is recommended that the tape be retained for reference purposes, for example by attaching it to a sheet of transparent film.

## 6. Overview - Cross-cut classification

cross-cut	according to EN ISO 2409	according to ASTM D 3359
	<p>0: the edges of the cuts are completely smooth; none of the squares of the lattice is detached.</p>	<p><b>5B</b> area affected 0%</p>
	<p>1: Detachment of small flakes of the coating at the intersections of the cuts. A cross cut area not significantly greater than 5% is affected.</p>	<p><b>4B</b> less than 5%</p>
	<p>2: The coating has flaked along the edges and/or at the intersections of the cuts. A cross cut area significantly greater than 5% but not significantly greater than 15% is affected.</p>	<p><b>3B</b> area affected 5 - 15 %</p>
	<p>3: The coating has flaked along the edges of the cuts in large ribbons, and/or some squares have detached partly or wholly. A cross-cut area significantly greater than 35% is affected.</p>	<p><b>2B</b> area affected 15 - 35 %</p>

cross-cut	according to EN ISO 2409	according to ASTM D 3359
	<p>4: The coating has flaked along the edges of the cuts in large ribbons, and/or some squares have detached partly or wholly. A cross-cut area significantly greater than 35%, but not significantly greater than 65%, is affected.</p>	<p><b>1 B</b></p> <p>area affected 35 - 65 %</p>
	<p>5: Any degree of flaking that cannot even be classified by classification 4.</p>	<p><b>0 B</b></p> <p>area affected above 65 %</p>

## 7. Technical specification

Shims:	11 x 1 mm shims, and 6 x 2 mm and 3 mm shims each
Material:	Folding ruler: red anodized aluminium Shims: stainless steel Handle: plastic
Standards:	DIN EN ISO 2409, ASTM D 3359
Warranty:	2 years