



## Directions for use

# DIFFU-THERM<sup>®</sup>

**Method for non-destructive testing  
Red-White penetrant method (BDR)**

Approved and accepted according to  
DIN EN ISO 3452-2 and DIN 54 152 part 2 corresponding to MIL-I-25135C  
Penetration method to DIN EN ISO 3452-1 [EN 571] = **IIAc, IIAe, IICc, IICe**  
According to DIN EN ISO 3452-3 **sensitivity class 2**  
Penetration method to DIN 54 152 part 1 = **CAB + CBB + CCB + CCC**  
According to DIN 54 152 part 3 **sensitivity class 2-3**  
Free of chlor, fluor and sulphur to ASTM - Code Section V

### Scope

DIFFU-THERM is a non-destructive method, used for the detection of faults such as cracks, flaws, pores, lap joints, micro-contractions, bonding-faults and similar defects, which have an opening to the material's surface. The method is applicable to finished or semi-finished products as well as to used metal or metalloid parts. Defects become visible in red on a white background.

### Sequence of operations

1. Pre-cleaning
2. Penetration
3. Intermediate cleaning (removal of penetrant)
4. Drying
5. Developing
6. Inspection

### Pre-cleaning

Before testing, all types of engine varnish or electro-platings must be taken off. Oil films, grease, dirt and scale have to be removed.

Parts to be inspected, which have been treated with acids or alkaline solutions, must be neutralized and carefully rinsed.

### Drying

After the pre-treatment, it is necessary that the parts are thoroughly dried, so that neither water nor any solvent remaining in the defective spot or on the surface, prevents Diffusions-Red from entering. Slight heating or fanning with a hot-air stream, max. 50°C, reduces the drying time.

### Application of DIFFU-THERM Diffusions-Red

Diffusions-Red should be applied to the test surface by spraying, dipping or brushing in such a way that the entire surface is thoroughly and evenly wetted. To ensure proper penetration, the following penetration times should be observed:

for light metals or light metal alloys	10 - 15 min.
for steels or steel alloys	15 - 30 min.
for other solid materials	5 - 30 min.

p.t.o.

### **Intermediate cleaning (removal of penetrant)**

After adequate penetration, all surplus penetrant that remains on the surface should be completely removed by rinsing or douching with water. Warm water may be used, but its temperature should not exceed 50°C.

When the surface are very rough, the intermediate cleaning can also be done with the help of **DIFFU-THERM** Cleaner **BRE**, **BRE-2**, **BRE-3** or **BRE-S**.

### **Drying of the inspected parts**

The cleaned pieces must be carefully dried with a dry, clean and lint-free cloth by normal evaporation at ambient temperature or by fanning with compressed air (light air stream) whose temperature must not exceed 50°C.

### **Developing with DIFFU-THERM Developer**

The Developer **BEA**, **BEA-N** or **BEA-W** should be evenly applied with the test surface. This operation is preferably carried out by spraying. Application with a brush is not admissible. Before and during use the developer should be shaken well so that the white pigments contained in the carrier fluid do not settle. When a permanent fixing of the defect is wanted, use Developer **BEW** permanent (**IIAf**, **IICf**, **IIEf**).

### **Developing time / Evaluation of the results**

After the application of the Developer, work pieces should be allowed sufficient developing time for any indication to appear. This time depends on the material under test and the nature of the expected defects. In general, it is half the penetration time.

The finer the cracks, the longer the penetration time. Cracks and bonding-faults are seen as red lines on a white background. Hairline cracks and laps appear as broken lines. Pores and micro-contractions produce either scattered small dots or merely a hazy coloration.

### **Cleaning after inspection / Preservation**

After inspection, the removal of the Developer is necessary only in cases where it can interfere with subsequent processing or with service requirements, or where it might produce corrosive action on the tested parts.

Where necessary, the cleaned work pieces must be protected against corrosion.

### **Precautions**

All DIFFU-THERM products are marked on conformity with the legal regulations in force. The safety rules enclosed to each consignment should be strictly observed.