

# INSTRUCTION MANUAL

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## DFT-400/420 Dry Coating Thickness Meters



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## **System Description**

The DFT-400 coating thickness gauge measures all non-magnetic coatings such as lacquer, enamel, chromium, copper, zinc etc. on steel or iron.

The DFT-420 coating thickness gauge additionally measures all insulating coatings such as lacquer, plastic, enamel, etc. on non-magnetic, metal substrates, e.g. on aluminum, copper or brass.

Both gauges conform to national and international standards:

ISO 2178, 2360, 2808

ASTM B 499, D7091

## **General**

This This measuring gauge has been designed for various applications. Despite its rugged design, it should be handled correctly to insure correct measurements at all time.

Do not drop it. Protect it from dirt, dust, humidity, chemicals and aggressive vapors.

Please store the gauge in the protective case after using it.

As with all precision instruments, large temperature variations can influence the measuring result. Please avoid direct solar irradiation and temperature shocks.

Due to the physical measuring principles the measurements can be influenced by strong electromagnetic fields. Please stay away from transformers, high voltage lines or discharge sources for example.

Do not take measurements on magnetized parts. Magnetic fields can affect the Fe-measurements. Strong electromagnetic radiation can affect the NFe-measurements.

The housing is resistant against most solvents. Use a soft damp cloth to clean the housing.

Proper results can only be achieved with clean probes. Please check the probe tip regularly and remove any dirt and paint from the ruby.

## **Cable probe version**

When using DFT-400 and DFT-420 with Cable Probe or transporting it, take care not to bend the cable. In case the cable breaks due to difficult measuring conditions or high strain on the cable you can re-order it and easily replace it yourself.

If you use several DFT-400 and DFT-420 gauges with cable probe, you can switch the probes between the gauges to guarantee highest flexibility during your daily measuring tasks.

If the gauge is not used for a long period, please remove the batteries from the gauge in order to prevent leakage that could damage the unit. In case of a malfunction of the instrument please do not try to repair it on your own. Our customer service will be happy to assist you.

## **Change of Batteries**

The battery compartment is on the rear side of the gauge. The battery should be exchanged when the "BAT"-sign appears on the right side of the display. Additional readings can still be taken even with the "BAT"-indication before the gauge shuts off.

Note! Empty batteries should be disposed of properly. If possible, please use the appropriate method.

## **Zero-Adjustment**

A zero-adjustment is required when using the gauge for the first time or after inserting new batteries, when working with different materials or from, time to time. (e.g. when the ambient temperature changes). We strictly recommend carrying out the reference check on the uncoated original substrate in order to adjust for possible geometric or surface specific characteristics (ref. Technical Data). If this is not possible, please use the zero-reference plates supplied with the case. Place the gauge on one of the zero plates in the case. For the Fe-probe please use the steel plate; for the NFe-probe use the aluminum plate, if you want to measure on aluminum; or use a suitable uncoated Fe- or NFe-substrate.

Please make sure the probe is switched to the correct measuring mode during zero-adjustment. Otherwise false measurements might occur. Please make sure the probe tip is placed perpendicularly and evenly on the surface.

If measuring on a cylindrical body, you can use the v-groove to ensure the position. If the value indicated is not within the range of the accuracy, adjust the gauge as follows: Place the gauge on the zero plate (substrate). Then press the button once. A control number appears on the display and an acoustic signal sounds. Now lift off the gauge at least 10 cm (4 inches) from the zero plate (substrate). The acoustic signal sounds again and another control number appears. The zero-adjustment is completed.

When repeating measurements on the same spot, the reading may not always be 0  $\mu\text{m}$  or 0.00 mil, since surface roughness, dirt, scratches etc. might cause variances.

### **Handling**

Place the gauge evenly on the spot to be tested. Take care that the ringlike bearing area connects completely with the measuring area around the measuring probe. Use the grips near the measurement head to ensure proper placement. The display immediately shows the reading accompanied by an acoustic signal.

Together with the measuring result you will also receive information on what probe, Fe or NFe, the gauge used. This is particularly important when using the Dual-Probe.

When being zeroed on a non-metallic substrate or when operated in the wrong way a "Zero Reference Error" appears. Readings exceeding the measuring range are indicated with „INFI" (infinite) if the substrate has been selected as fixed. If substrate selection is enabled, the gauge will switch the substrate. The gauge switches on automatically when placed on a surface and turns off when not in use for about 30 seconds. The v-groove on the measuring tip helps measuring on rods or tubes etc.

### **Setting the measuring mode or unit ( $\mu\text{m}$ or mil)**

Using the operating key while the gauge is switched on and not placed on a surface will display the possible measuring modes and "Unit".

The current measuring mode is then marked on the display. When the operating key is used, the gauge switches to the next measuring mode which activates if the button is not used again for 2 seconds. If "Unit" is marked and nothing else happens, a menu opens with the entries ' $\mu\text{m}$ ' and 'mil' and the current unit marked. Using the operating key you can choose the unit you want.

### **Measurements with the Dual-Probe**

The gauge offers several ways to select the measuring mode. One way to do this while the gauge is switched on is the operating key as described above.

#### **Fe- or NFe-mode:**

For applications with clearly indicated substrate, the Fe or NFe mode can be set as a fix mode. The current measuring mode is then indicated at the left hand side.

#### **Fe/NFe mode:**




When constantly changing between steel and non-iron substrate, activate the Fe/NFe mode. In this mode, indicated as two round arrows on the display, the gauge switches to semi-automatic operation. A change of substrate is then indicated by a message prompting to take another reading by lifting and re-placing the probe.

Please note that the NFe measuring method allows measurements on ferro-magnetic substrate (e.g. iron, steel). However, due to the substrate's magnetic characteristics, the gauge does not display a correct result. Therefore check whether the substrate is ferro-magnetic when using the NFe measuring principle, e.g. by means of an additional check measurement using the Fe measuring principle.

When using the NFe measuring principle, measurements on the supplied zeroing plate might result in an INFI message or a number indicated on the display. This can not be changed and is not a quality defect.

If you find the measuring results to be inadequate despite zero-adjustment (e.g. if no zero results are produced when zeroing on the plates supplied), deactivate the automatic mode selection and zero the gauge in both modes using the plates supplied.

## Display Messages

Fe	=	measurement on ferrous materials (steel or iron)
NFe	=	measurement on non-ferrous substrates
Zero Reference Error	=	zeroing error or handling error
INFI	=	wrong substrate, reading beyond measuring range
	=	battery is getting weak, have new ones ready
	=	low or empty battery, please exchange
	=	automatic substrate selection activated

## Technical Data

Substrate  
Iron or steel

Fe-probe

### DFT-420 includes:

Non-magnetic metals, e.g.  
aluminum, zinc, copper, brass

NFe-Probe

Measuring range	Fe	0 - 3000 $\mu\text{m}$ or 0.00 - 120 mil
	NFe	0 - 2000 $\mu\text{m}$ or 0.00 - 80 mil
Resolution		Range 0 – 999 $\mu\text{m}$ : 1 $\mu\text{m}$ Range $\geq$ 1 mm: 0.01 mm 0.01 mil up to 9.99 mil 0.1 mil from 10 to 99.9 mil 1 mil from 100 to 120 mil
	resp.	
Accuracy		+/- (2 $\mu\text{m}$ + 3%*) +/- (0.08 mil + 3 %*) (* ) of reading
	resp.	
Minimum object size	Fe	10 x 10 mm <sup>2</sup> (0.4"x0.4")
	NFe	6x6 mm <sup>2</sup> (0.24"x0.24")
Minimum curvature convex		5 mm (0.02")
concave		25 mm (1")
Minimum substrate thickness	Fe	0.2 mm (8 mil)
	NFe	0.05 mm (2 mil)
Temperature range Storage		-10°C to 60°C (14°F to 140°F)
Operation		0°C to 50°C (32°F to 122°F)
Probe type		Integrated or - optional - Cable probe with 1 m cable
Power supply		2 batteries 1,5V (AA alkaline)
Dimensions	approx.	100 x 60 x 27 mm (3.9" x 2.4" x 1.1")
Weight incl. batteries		with integrated probe: 105 g with cable probe: 147 g





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