

## Instruction Manual

Coating thickness gauge

# SaluTron® D4 / D5

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**SaluTron® D4 / SaluTron® D5**

Congratulations on the purchase of our coating thickness gauge **SaluTron® D4/D5!** The gauge belongs to a range of non-destructive coating thickness gauges. It is easy to use and allows the user to make all the necessary adjustments with the aid of a menu – this allows for changes to be implemented quickly and simply. Both gauges can be used for a wide variety of applications and have a large measuring range of 0 to 5 mm to offer. Modern electronics and the robust casing guarantee an extended lifetime for the high precision instruments.

### System overview SaluTron® D4/D5

The coating thickness gauges D4/D5 are simple, cost-effective handheld units (optional: D4 plus, D5 plus, RS 232 interface and memory for data logging purposes).

The gauge **SaluTron® D4-Fe** measures all non-magnetic coatings such as synthetics, laquers, enamels, copper, chromium, zinc, etc. on steel or iron.

The gauge **SaluTron® D5-NFe** measures all isolating coatings such as laquers, synthetics, enamels, paper, glass, rubber, etc. on copper, aluminium or brass. This includes eloxal coatings on aluminium as well.

The **SaluTron® D4/D5** gauges possess a CE sign and conform to the following specifications:

DIN 50981, 50984  
ISO 2178, 2360, 2808  
BS 5411 (3, 11) 3900 (c, 5)  
ASTM B499, D1400

### Handling and storage

The **SaluTron® D4/D5** gauges are high-tech precision instruments with a wide scope of applications. It is therefore of great importance that the unit is handled with care to ensure an extended life and as a pre-requisite for precise and accurate

measurement results. The following guidelines have to be followed to achieve the above:

1. Protect the gauge against dirt and dust, and do not let the gauge fall down!
2. Protect the gauge against moisture, aggressive vapours and chemicals.
3. After use, the gauge has to be returned into its protective casing.
4. Avoid direct, strong sunlight and temperature-shocks as these can have a negative influence on the measurement result.
5. The instrument housing is resistant to most chemical cleaners; use a soft, moist cloth for cleaning.
6. Exact measurements can only be taken with a clean probe.

The probe therefore has to be checked and cleaned regularly so that any paint residue and iron fragments can be removed from the probe and the ruby tip.

7. If the gauge is not used for an extended period of time, the battery should be removed to avoid battery acid spoilage and the resultant destruction of the electronics. If the gauge has a fault condition, please return it to the agent who will assist you if possible or return the gauge to the factory for repair. No other repairs should be attempted under any circumstances.

### Battery exchange

The **SaluTron® D4/D5** gauges are powered by a 9 V alkaline battery. The battery compartment can be found in the top back portion of the instrument. If a "B" appears in the display, the battery has to be exchanged. If a replacement battery is not available immediately, several measurements can still be taken until the gauge shuts down (the display shows "BAT") completely.

### Zero calibration

The gauge has to be zeroed newly when different measurement jobs are called for, when the gauge is used for the first time, after a new battery has been inserted or periodically.

Place the gauge on the iron plate (D4) or the Al-plate (D5) in the instrument case. You can also use a piece of uncoated Fe- or NFe-metal (substrate) as used in your process. Take care to place the probe evenly onto the substrate. If the displayed value is out of the basic tolerance range, the instrument has to be zeroed. The following steps are to be taken to zero the gauge:

- Remove the gauge from the zero plate or the substrate.
- Press the top left button "ZERO". The display shows "P-O.O."
- Place the gauge onto the zero plate or the substrate again. The display shows "PinF" and automatic the last indication. Place on zero plate again. The display shows "0". The unit is now ready for accurate measurements.

**Note:** If the measurement is repeated on the same spot on the zero plate, the gauge will not necessarily show 0.0 my/mil as surface roughness and dirt, etc. can cause differences.

### Operation

Switching the gauge ON:

There are two methods to switch the gauge on:

1. The gauge can be switched on manually with the "ON/OFF" button. The display will show "Sd4"/"Sd5". (Abbreviation for **SaluTron® D4**).
2. The gauge can also be placed onto a test piece - the gauge will switch on automatically and display "Sd4"/"Sd5". After about 2 – 3 sec. the last measurement taken will be displayed for about 40 sec. if no new measurement is taken. The gauge is now ready for use. To switch off the gauges 5 sec. press "ON/OFF"-key approximately.

### **Automatic display average value "Ave" and number of measurements "n".**

Switch the device on, the display shows "Sd4" "Sd5" or the last measuring value. Press "ON/OFF" short, the display shows "Ave" and measuring results (measurements before). Press again "ON/OFF", it shows "n". "n" means the number of measurements. If the store should be deleted proceed as follows:

**Important!** In the normal measuring application manual or automatic go on like follow: Press "MODE", it shows „rSI“. Press "ENTER", it shows "no". Press "MODE" again, it shows "YES". Press "ENTER", it shows the last measuring value in the normal measurement mode. Now check the store, it is empty. Press "ON/OFF", it shows "Ave---". Once more press "ON/OFF", it shows "n" "0". The store is empty. Once more press "ON/OFF".

The store is empty and the device is in the normal measuring mode back again. The store will be deleted if the device is in the normal measuring mode.

The device is easy to operate. Also the menu on the display makes all adjustments quick, easy and simple.

#### Taking measurements:

- Place the gauge perpendicularly onto the surface of the test piece.
- Place the probe evenly and ensure that it does not sway.
- To get the best results, place the thumb on the position indicated with the other fingers behind the gauge for balance.
- A tone is emitted and the result of the measurement is indicated on the display.
- If the gauge is removed from the test piece prematurely, or placed incorrectly, or the zero calibration is attempted on the incorrect substrate, then the display will show "ErO" (error).
- If the coating thickness exceeds the maximum range (5000 my) or if the gauge is placed on the incorrect substrate (eg, wood, paper, cardboard, etc), then the display will show "InFi" (infinite).
- For measurements on spinerical surfaces (eg, rods, pipes, corrugated surfaces, etc.) the V-groove will assist in the placement of the probe.
- **Do not take measurements on magnets or in magnetic fields!**

#### Using the menu:

The menu can be used to configure / view the following features:

1. The measurement method – single point measurements or continous measurements to find the coating thickness average.
2. The unit for the digital read-out – The result can be displayed in my or in mil. (This is indicated by a line next to the respective unit).
3. The audible tone can be switched on/off.
4. The serial number of the particular gauge can be viewed.

The menu is accessed by pressing the mode button.

Consecutive pressing of the mode button will cause the program to cycle through all the available parameters as mentioned above.

If the parameter has to be changed, press the "Enter" button.

Once the desired set-up has been found, the mode button is pressed once again to activate the desired mode.

For example, to change the measurement method, the mode button is pressed until the display shows "CnT".

The "Enter" button is then pressed to toggle the display between "OFF" and "ON" (OFF = single point measurement, ON = continous measurement).

Once the desired mode of operation has been chosen, the mode button is pressed again to activate the measuring-type.

#### Display readings

ErO	Incorrect use
InF	Incorrect substrate, coating thickness out of range
B	Battery should be replaced soon
BAT	Battery needs to be replaced now
Sd4	Instrument recognize <b>Salu Tron® D4</b>
rSI	Delete store
CnT	Continuously measuring – mode to be used when the average coating thickness is to be found by moving the gauge around on the substrate
OFF or ON	By pressing the "Enter" key the user can toggle between the point measuring and the continuous measuring modes once the mode key has been pressed
UnT	By pressing the "Enter"-key the user can choose between <i>my</i> and <i>mil</i> -mode
bEP	Switch the bEP noise on/off Press "ENTER"
Sn	Press "Enter"- key. The serial number is blinking
Measurement result	Press the mode key after every configuration change with the "Mode and Enter"-key to ensure that the gauge is in the standard measuring mode again.

#### Delivery

The electronic coating thickness gauge **Salu Tron® D4/D5** can be used immediately upon delivery. It is delivered with a carrying case, which includes an enclosed zero plate, a 9-volt battery (alkaline) and the instruction manual.

#### **D4 plus and D5 plus:**

Both gauges with USB connection, memory, transfer cable to a PC, statistic-function, Mini-Thermoprinter "SP 100" with infrared receiver.

#### Technical Specifications

D4:	Substrate: Steel or Iron
Fe	Coatings: All non-magnetic coatings as lacquer, plastics, chromium, copper, zinc, enamel, etc.
D5:	Substrate: Non-magnetic metals such as zinc, copper, brass, aluminium, stainless steel <i>and anodized aluminum</i>
NFe	Coatings: insulating coatings such as lacquer, enamel, plastics, paper, glass, rubber, etc.
Continuous measuring range:	0 - 5000 µm or 0 - 200 mil
Display of measured values	0 - 999 in µm, 1.00 - 5.00 in mm or 0 - 200 in mil
Digital display resolution:	
0.1 µm	in the range of 0.0 - 99.9 µm
1 µm	in the range of 100 - 999 µm
0.01 mm	in the range of 1.00 - 5.00 mm or
0.01 mil	in the range of 0.00 - 9.99 mil
0.1 mil	in the range of 10.0 - 99.9 mil
1.0 mil	in the range of 100 - 200 mil
Repeatability:	± (1 µm + 2%) from 0 -1000 µm ± 3.5% from 1001 - 5000 µm
Tolerance:	+/- 1.0 µm or +/- 0.06 mil
Minimum measurable area	10 x 10 mm or 0.4" x 0.4"
Minimum curvature:	
convex:	5 mm or 0.02"
concave:	30 mm or 1"
Minimum substrate thickness:	
Fe:	0.20 mm or 8 mil
NFe:	0.05 mm or 2 mil
Temperature range:	
Storing:	-10°C to 60°C or 14°F to 140°F
Operating	0°C to 60°C or 32°F to 140 °F
Display:	4-digit liquid crystal display (LCD)
Probes:	Single point
Power supply:	9V E Block Alkali
Dimension (L x W x H):	118 x 58 x 38 mm or 4.6" x 2.3" x 1.5"
Weight:	approx. 150 g or 5.3 oz incl. battery

**Technical data subject to change without notification.**