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## MATERIAL THICKNESS MEASUREMENT

In cases, when the walls of the item to be measured are not accessible for traditional calliper gauges, the ultrasonic measuring equipment can be used.

This measurement is based on the following principle: Ultrasonic waves are directed onto one side of the material to be measured. They move with a defined speed through the material and are reflected on the other side. The measuring device measures the time required to do this and with this, calculates the thickness of the material.

In this way the wall thickness of, for example, ship's hulls, pipes, tanks and components in sites or machines can be determined.

Ultrasonic measuring equipment can be used to measure all hard and homogeneous materials, such as metal, glass and hard plastics. This method can not be used to measure materials as, e.g. concrete, asphalt, teflon or wood.

### Quick-Finder

Readout	Measuring range	Model	Page
[d]	[Max]		
mm	mm	<b>SAUTER</b>	
0,01	80	<b>TN 80-0.01US</b>	65
0,01	80	<b>TN GOLD 80</b>	64
0,01	80	<b>TU 80-0.01US</b>	67
0,01	230	<b>TN 230-0.01US</b>	65
0,01	230	<b>TU 230-0.01US</b>	67
0,01	300	<b>TN 300-0.01US</b>	65
0,01	300	<b>TU 300-0.01US</b>	67
0,01	600	<b>TN 30-0.01EE</b>	66
0,01	600	<b>TN 60-0.01EE</b>	66
0,01	600	<b>TO 100-0.01EE</b>	68
0,1	80	<b>TN 80-0.1US</b>	65
0,1	200	<b>TB 200-0.1US-RED</b>	62
0,1	200	<b>TB 200-0.1US</b>	62
0,1	225	<b>TD 225-0.1US</b>	63
0,1	230	<b>TN 230-0.1US</b>	65
0,1	300	<b>TN 300-0.1US</b>	65



## IN THE HERE AND NOW



Today the company is in the eighth generation of its story, and is wholly informed and up to speed: with products which can be networked and tailor-made for you, specialised software and a fully-automated high-bay warehouse. The only way in which we will be able to continue to write this success story is with ongoing innovation, further development and sustainable management.

### Digital and interconnected

Nowadays it is becoming increasingly common for measuring and weighing data to be transferred directly from the balance or measuring device to the computer for processing. Weighing, counting and measuring results are shown in stock entries and on delivery notes. We are taking this development into account through products which can be integrated into company networks in a simple and straightforward manner. And the accompanying software is also becoming more important, to meet individual customer requirements.

### Made to measure

Our range now covers around 5,000 products and a myriad of services. Nevertheless, there are often requests for an individual, tailor-made solution. Our Customized Solution Service (CUSOS) will develop this for you at our premises in Balingen. In our development department at our Balingen site, market feedback and ideas are also fed into our product development which go above and beyond individual customer requests.

### Highly automated, quick service for customers

A 25 metre high (3 metres of which are underground) and 22 × 90 metre wide, fully-automated high-bay warehouse ensures a high level of availability and rapid dispatch of products all around the world. It accommodates approx. 80,000 packages and 3,500 pallets. On a daily basis, between 500 and 800 packages and between 30 and 50 pallets leave the warehouse. It was built in 2014, and will soon reach its limits, however.



# 180 YEARS

since 1844

## KERN & SOHN



Martin Sauter, Senior Managing Director



Albert Sauter, Managing Director

### Sustainable

We are already heating and cooling our modern industrial buildings in a largely climate-neutral way using geothermal power. The work on the roof of our high-bay warehouse is now complete and our photovoltaic system has been successfully installed. By doing this we have reached a significant milestone in our sustainability strategy.

With an impressive output of 244.36 kWp the system could power 50 to 60 family homes. The solar module's innovative east/west orientation enables the system to make optimum use of the solar energy. This not only saves considerable costs, but also significantly reduces CO<sub>2</sub> emissions. We are proud to have made another step in the direction of creating a greener and more sustainable future.




We focus on using recyclable materials in our packaging. By creating attractive and secure jobs, we are also making an important contribution to strengthening the economic power of the region.

**Our story started over 250 years ago and it continues to move forward. Go back to page 4 to find out more about our history and look to the future with us on page 110!**




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Reliable material thickness gauge for daily use

Features	Technical data	Accessories
<ul style="list-style-type: none"><li>• External measuring head for difficult-to-access measuring points</li><li>• Base plate for adjustment included</li><li>• Auto-Power-Off</li><li>• Selectable measuring units: mm, inch</li><li>• TB 200-0.1US-RED: Can only analyse these materials: cast iron, aluminium, copper, brass, zinc, quartz glass, polyethylene, PVC, grey cast iron, nodular cast iron, steel</li><li>• Scope of delivery: Operating instructions, batteries, external measuring head (ø 8 mm) and ultrasound contact gel</li><li>•  Delivered in a robust carrying case</li></ul>	<ul style="list-style-type: none"><li>• Measuring precision: 0,5 % of [Max]</li><li>• Overall dimensions W×D×H 161×69×32 mm</li><li>• Battery operation, batteries standard (4×1.5 V AA)</li><li>• Net weight approx. 0,30 kg</li></ul>	<ul style="list-style-type: none"><li>• External measuring head, 5 MHz, ø 6 mm, for thin test materials: measuring range (steel) up to approx. 80 mm, SAUTER ATB-US01</li><li>• External measuring head, 5 MHz, ø 12 mm, for hot test materials: Measuring range (steel) 3-200 mm at temperatures of up to 300°C, SAUTER ATB-US02</li><li>• External measuring head, 5 MHz, ø 8 mm, SAUTER ATB-US06</li><li>• External measuring head, 5 MHz, ø 10 mm, SAUTER ATU-US09</li><li>• Ultrasound contact gel, refill pack, approx. 70 ml, SAUTER ATB-US03</li></ul>

STANDARD



OPTION




Model	Measuring range	Readout	Measuring head	Sound velocity	Option Factory Calibration Certificate
SAUTER	mm	[d] mm		m/sec	KERN
TB 200-0.1US	1,5 – 200	0,1	5 MHz   ø 8 mm	500 – 9999	961-113
TB 200-0.1US-RED	1,5 – 200	0,1	5 MHz   ø 8 mm	500 – 9999	961-113





Compact pocket-sized material thickness gauge

Features	Technical data	Accessories
<ul style="list-style-type: none"><li>• External measuring head for difficult-to-access measuring points</li><li>• Data interface RS-232, included</li><li>• AUTO-OFF function to preserve the battery</li><li>• Selectable measuring units: mm, inch</li><li>• Base plate for adjustment included</li><li>• Scope of delivery: Operating instructions, batteries, external measuring head (∅ 8 mm) and ultrasound contact gel</li><li>•  Delivered in a robust carrying case</li></ul>	<ul style="list-style-type: none"><li>• Measuring precision: 0,5 % of [Max] + 0,1 mm</li><li>• Overall dimensions W×D×H 30×65×120 mm</li><li>• Battery operation, batteries standard (4×1.5 V AAA)</li><li>• Net weight approx. 0,20 kg</li></ul>	<ul style="list-style-type: none"><li>• Data transfer software, interface cable included, SAUTER ATC-01</li><li>• External measuring head, 5 MHz, ∅ 6 mm, for thin test materials: measuring range (steel) up to approx. 80 mm, SAUTER ATB-US01</li><li>• External measuring head, 5 MHz, ∅ 12 mm, for hot test materials: Measuring range (steel) 3-200 mm at temperatures of up to 300°C, SAUTER ATB-US02</li><li>• External measuring head, 5 MHz, ∅ 8 mm, SAUTER ATB-US06</li><li>• External measuring head, 5 MHz, ∅ 10 mm, SAUTER ATU-US09</li><li>• External measuring head, 5 MHz, ∅ 10 mm, transducer at an angle of 90°, SAUTER ATU-US10</li><li>• Ultrasound contact gel, refill pack, approx. 70 ml, SAUTER ATB-US03</li></ul>

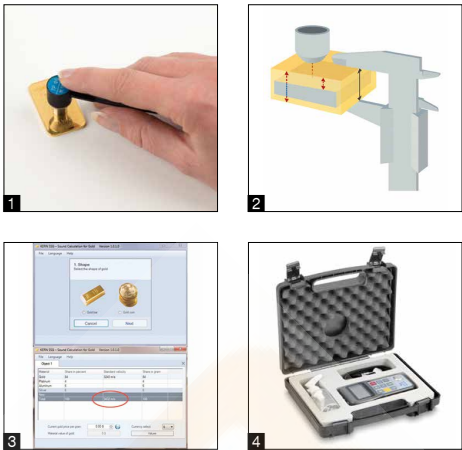
STANDARD



OPTION



Model	Measuring range	Readout	Measuring head	Sound velocity	Option
		[d] mm		m/sec	<b>Factory Calibration Certificate</b>
SAUTER	mm				KERN
TD 225-0.1US	1,2 – 225	0,1	5 MHz   ∅ 8 mm	1000 – 9999	961-113



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Ultrasonic measuring instrument for checking the authenticity of gold bars and coins

Features

- 1 You can use the TN-GOLD to determine whether gold or silver bars and coins are genuine or whether they contain a core of a different material
- The instrument measures the thickness of gold bars and gold coins using ultrasound
- 2 Process: Ultrasound waves are directed onto the test object using a sensor. The waves penetrate the test object, are then reflected from a surface opposite the object and then picked up again by the sensor. The measurement determined by this process will be compared with the material thickness as measured by a traditional calliper gauge. On the basis of the measurement given, false cores (Figure: grey) for example, those made of tungsten, lead, etc. can be easily identified, as the ultrasound reacts differently, compared with pure gold
- Selectable measuring units: mm, inch
- 3 SAUTER SSG software (included) can be used to calculate the sound velocity for various precious metal alloys. This makes it possible to determine whether coins or ingots contain false cores or whether they consist of one and the same material. Compatible with the following operating systems: Windows® 7/8/10

- Known additions in tested gold items – e.g. copper or silver – are compensated by the software
- In addition, the software determines the value of the gold item
- It is a test process which measures right through the whole bar or the whole coin without interference and thereby guarantees the highest level of certainty
- Internal memory for up to 20 files (with up to 100 values per file)
- Base plate for adjustment included
- Scope of delivery: Operating instructions, batteries, external measuring head (ø 6 mm) and ultrasound contact gel
- 4 Delivered in a robust carrying case

Technical data

- Measuring precision: 0,5 % of [Max] ± 0,04 mm
- Overall dimensions W×D×H 150×74×32 mm
- Battery operation, batteries standard (2×1.5 V AA), AUTO-OFF function to preserve the battery
- Net weight approx. 0,25 kg

Accessories

- Data transfer software, interface cable included, SAUTER ATU-04
- USB/PC connection cable (USB-A/USB mini), SAUTER FL-A01
- External measuring head, 7 MHz, ø 6 mm, for thin test materials: Measuring range 0,75–80 mm (steel), SAUTER ATU-US02
- Ultrasound contact gel, refill pack, approx. 70 ml, SAUTER ATB-US03

STANDARD

CAL BLOCK

MEMORY

USB

ZERO

BATT

1 DAY

OPTION

SOFTWARE

ISO +4 DAYS

Model	Measuring range	Readout	Measuring head	Sound velocity	Option
		[d] mm		m/sec	Factory Calibration Certificate
SAUTER	mm				KERN
TN GOLD 80	0,75 – 80	0,01	7 MHz   ø 6 mm	1000 – 9999	961-113



Portable measuring device for ultrasonic material thickness testing

**Features**

- External measuring head
- Data interface USB standard (only for models with readout [d] = 0,01 mm)
- Scan mode (10 measurements per sec.) or single point measuring mode possible
- Internal memory for up to 20 files (with up to 100 values per file)
- Selectable measuring units: mm, inch
- Scope of delivery: Operating instructions, batteries, device-specific measuring head and ultrasound contact gel
- Delivered in a robust carrying case

**Technical data**

- Measuring precision: 0,5 % of [Max] ± 0,04 mm
- Overall dimensions W×D×H 150×74×32 mm
- Battery operation, batteries standard (2×1.5 V AA), AUTO-OFF function to preserve the battery
- Net weight approx. 0,25 kg

**Accessories**

- Data transfer software, interface cable included, SAUTER ATU-04
- External measuring head, 2,5 MHz, ø 14 mm, for thick samples, in particular cast iron with rough upper surfaces: Measuring range 3–300 mm (steel), SAUTER ATU-US01
- External measuring head, 7 MHz, ø 6 mm, for thin test materials: Measuring range 0,75–80 mm (steel), SAUTER ATU-US02
- External measuring head, 5 MHz, ø 10 mm, SAUTER ATU-US09
- External measuring head, 5 MHz, ø 10 mm, transducer at an angle of 90°, SAUTER ATU-US10
- External measuring head, 5 MHz, ø 12 mm, for hot test materials: Measuring range (steel) 3–200 mm at temperatures of up to 300°C, SAUTER ATB-US02
- Ultrasound contact gel, refill pack, approx. 70 ml, SAUTER ATB-US03

STANDARD

[d]=0,01 mm

OPTION

+4 DAYS

Model	Measuring range	Readout	Measuring head	Sound velocity	Option
		[d]			<b>Factory Calibration Certificate</b>
SAUTER	mm	mm		m/sec	KERN
TN 80-0.1US	0,75 – 80	0,1	7 MHz   ø 6 mm	1000 – 9999	961-113
TN 230-0.1US	1,2 – 230	0,1	5 MHz   ø 10 mm	1000 – 9999	961-113
TN 300-0.1US	3 – 300	0,1	2,5 MHz   ø 14 mm	1000 – 9999	961-113
TN 80-0.01US	0,75 – 80	0,01	7 MHz   ø 6 mm	1000 – 9999	961-113
TN 230-0.01US	1,2 – 230	0,01	5 MHz   ø 10 mm	1000 – 9999	961-113
TN 300-0.01US	3 – 300	0,01	2,5 MHz   ø 14 mm	1000 – 9999	961-113



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## Hand-held measuring device for ultrasonic material thickness testing in Echo-Echo principle

### Features

- External measuring head
- USB data interface, as standard
- Scan mode (10 measurements per sec.) or single point measuring mode possible
- Internal memory for up to 20 files (with up to 100 values per file)
- Selectable measuring units: mm, inch
- Two measuring modes to determine material thickness:
  - Pulse-Echo mode
  - Echo-Echo mode
- Echo-Echo measuring: Determining the actual thickness of materials irrespective of any coating which might be present. In this way, the wall thickness of pipes, for example, can be determined in a non-destructive manner, without having to remove the coating and the measurement can be shown on the display, with the adjustment for the coating thickness already taken into account
- Echo-Echo measurements are only possible with the measuring head included as part of the delivery (SAUTER ATU-US12, see Accessories)

- Scope of delivery: Operating instructions, batteries, external measuring head (ø 10 mm) and ultrasound contact gel
- **1** Delivered in a robust carrying case

### Technical data

- Measuring precision: 0,5 % of [Max] ± 0,04 mm
- Overall dimensions W×D×H 150×74×32 mm
- Battery operation, batteries standard (2×1.5 V AA), AUTO-OFF function to preserve the battery
- Net weight approx. 0,25 kg

### Accessories

- Data transfer software, interface cable included, SAUTER ATU-04
- External measuring head, 5 MHz, ø 10 mm, for echo-echo measuring, SAUTER ATU-US12
- Ultrasound contact gel, refill pack, approx. 70 ml, SAUTER ATB-US03

**Note:** All following Pulse-Echo sensors can only be used in Pulse-Echo mode, not in Echo-Echo mode

- External measuring head, 2,5 MHz, ø 14 mm, for thick samples, in particular cast iron with rough upper surfaces: Measuring range 3–300 mm (steel), SAUTER ATU-US01
- External measuring head, 7 MHz, ø 6 mm, for thin test materials: Measuring range 0,75–80 mm (steel), SAUTER ATU-US02
- External measuring head, 5 MHz, ø 10 mm, SAUTER ATU-US09
- External measuring head, 5 MHz, ø 10 mm, transducer at an angle of 90°, SAUTER ATU-US10

STANDARD

OPTION

Model	Measuring range Echo-Echo	Measuring range Puls-Echo	Readout [d] mm	Measuring head	Sound velocity m/sec	Option Factory Calibration Certificate
SAUTER	mm	mm				KERN
TN 30-0.01EE	3 – 30	0,65 – 600	0,01	5 MHz   ø 10 mm	1000 – 9999	961-113
TN 60-0.01EE	3 – 60	0,7 – 600	0,01	5 MHz   ø 10 mm	1000 – 9999	961-113











Premium ultrasonic thickness gauge

5

Features	Technical data	Accessories
<ul style="list-style-type: none"><li>External measuring head for difficult-to-access measuring points</li><li>Base plate for adjustment included</li><li>1 USB data interface, as standard</li><li>Scan mode (10 measurements per sec.) or single point measuring mode possible</li><li>Internal memory for up to 20 files (with up to 100 values per file)</li><li>Measuring with tolerance range (limit-setting function): Upper and lower limiting can be programmed individually. The process is supported by an audible and visual signal</li><li>Selectable measuring units: mm, inch</li><li>Robust metal housing</li><li>Scope of delivery: Operating instructions, batteries, device-specific measuring head and ultrasound contact gel</li><li>2 Delivered in a robust carrying case</li></ul>	<ul style="list-style-type: none"><li>Measuring precision: 0,5 % of [Max] ± 0,04 mm</li><li>Overall dimensions W×D×H 130×76×32 mm</li><li>Battery operation, batteries standard (2×1.5 V AA)</li><li>Net weight approx. 0,50 kg</li></ul>	<ul style="list-style-type: none"><li>Software, interface cable included, SAUTER ATU-04TU</li><li>External measuring head, 2,5 MHz, ø 14 mm, for thick samples, in particular cast iron with rough upper surfaces: Measuring range 3–300 mm (steel), SAUTER ATU-US01</li><li>External measuring head, 7 MHz, ø 6 mm, for thin test materials: Measuring range 0,75–80 mm (steel), SAUTER ATU-US02</li><li>External measuring head, 5 MHz, ø 12 mm, for hot test materials: Measuring range (steel) 3–200 mm at temperatures of up to 300°C, SAUTER ATB-US02</li><li>External measuring head, 5 MHz, ø 10 mm, SAUTER ATU-US09</li><li>External measuring head, 5 MHz, ø 10 mm, transducer at an angle of 90°, SAUTER ATU-US10</li><li>Ultrasound contact gel, refill pack, approx. 70 ml, SAUTER ATB-US03</li></ul>

STANDARD	OPTION
<div> CAL BLOCK</div> <div> MEMORY</div> <div> USB</div> <div> TOL</div> <div> ZERO</div> <div> BATT</div> <div> 1 DAY</div>	<div> SOFTWARE</div> <div> ISO +4 DAYS</div>

Model	Measuring range	Readout	Measuring head	Sound velocity	Option Factory Calibration Certificate
SAUTER	mm	[d] mm		m/sec	KERN
TU 80-0.01US	0,75 – 80	0,01	7 MHz   ø 6 mm	1000 – 9999	961-113
TU 230-0.01US	1,2 – 230	0,01	5 MHz   ø 10 mm	1000 – 9999	961-113
TU 300-0.01US	3 – 300	0,01	2,5 MHz   ø 14 mm	1000 – 9999	961-113



## Material thickness gauge for ultrasonic material thickness testing in Echo-Echo principle

### Features

- Premium thickness gauge device using ultrasonic technology: New NT measuring technology generation with automatic sensor adjustment (V-path correction for improved accuracy and more rapid display speed)
- Dual measuring modes to determine material thickness:
  - Pulse-Echo mode (up to 600 mm)
  - Echo-Echo mode (up to 100 mm)
- Echo-Echo measurement: Determining the actual thickness of materials regardless of any existing coating, such as, for example, paint or an anti-corrosion coating on the base metal. In this way, the wall thickness, for example of pipes, can be determined in a non-destructive manner, without having to remove the coating and the measurement can be shown on the display, with the adjustment for the coating thickness taken into account
- Can be used on these materials, as well as others: Metals, plastics, ceramics, composite materials, epoxy, glass and other materials
- High-precision mode: Readout accuracy can be switched from 0.1 mm to 0.01 mm
- 1** Premium display with colour TFT display (320×240 mm) with adjustable brightness so that it can be read easily in any environmental conditions

- Large internal data memory for up to 100 data sets each with 100 individual values
- Energy-saving operation with 2× AA batteries and an operating time of at least 30 hours, adjustable power-off time (sleep mode) and adjustable display switch-off (standby mode)
- 2** USB data output for easy data download from the device memory to the PC, as standard
- Triple-calibration mode: Automatic 0-point adjustment, 1-point adjustment at a specified material thickness, 2-point precision adjustment with two specified material thicknesses
- 3 different measurement modes with standard measuring (single measurement), scan mode (for continuous measurement and display of the ACTUAL value, the MIN and MAX value of the measuring sequence) and DIFF mode with calculation of the difference between the ACTUAL measured value and a manually defined nominal thickness
- Limit alarm function: Upper and lower limit adjustable. The measurement process is supported by an audible and visual signal
- Menu languages: DE, EN, FR, ES, IT
- Date and time can be adjusted. It is possible to store the measurement values with a time stamp

- Standard measuring head SAUTER ATU-US12 included with delivery
- Scope of delivery: Operating instructions, batteries, external measuring head (Ø 10 mm) and ultrasound contact gel
- 3** Delivered in a robust carrying case
- Interface cable SAUTER FL-A01 (for use of the software) included

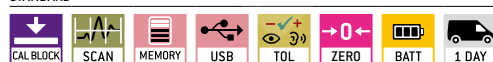
### Technical data

- Measuring precision: 0,4 % of [Max] ± 0,04 mm
- Overall dimensions W×D×H 31×69×130 mm
- Battery operation, batteries standard (2×1.5 V AA), AUTO-OFF function to preserve the battery
- Net weight approx. 0,25 kg

### Accessories

- External measuring head, 5 MHz, Ø 10 mm, for echo-echo measuring, SAUTER ATU-US12
- Ultrasound contact gel, refill pack, approx. 70 ml, SAUTER ATB-US03
- Software BalanceConnection, for flexible recording or transmission of measured values, in particular also to Microsoft® Excel or Access as well as transfer of this data to other Apps and programs, for more details see internet, scope of supplies: 1 CD, 1 license, KERN SCD-4.0
- Other sensors on request
- Further details and plenty of further accessories see internet

#### STANDARD



#### OPTION



Modell	Measuring range Echo-Echo	Measuring range Puls-Echo	Readout	Measuring head	Sound velocity	Option Factory Calibration Certificate
SAUTER	mm	mm	[d] mm		m/sec	KERN
TO 100-0.01EE	3 – 100	0,7 – 600	0,01	5 MHz   Ø 10 mm	200 – 19999	961-113