DIAVITE COMPACT

Manual

1.1.0-2007

Manual

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1. Technical data

Measuring instrument

Parameters	ISO/DIN:	Ra, Rz (DIN), Rmax, R3z, Rt, Rq (RMS), Rk, Rpk, Rvk, MR1, MR2, Ppc, Rmr								
	JIS:	Ra, Rz								
	ISO 12085:	R, AR, Rx								
Cutoff lc		0.25	0.8	2.5	mm					
Length of traverse Lt ISO/DIN		1.5	4.8	15.0		mm				
Lt CNOMO		1	2	4	8	16				mm
Total length of traverse lm		0.40	1.25	4.0	12.5					mm
Measuring ranges		Ra, Rq						19.99 µm /	800	µinch
		Values below 0.1 µm will be indicated with three decimal digits!								
		Rz, R3z, Rmax, Rt, R, AR, Rx						199.9 µm /	2000	µinch

Memory of measuring profiles	15 roughness profiles
Display	LCD-display, graphic
Power supply	mains adapter, incorporated rechargeable batteries LiMn
Ambient humidity	max. 80%, not condensing
Range of ambient temperature	10° – 40° C / 50° - 104° F
Tracing system	Hall effect transducer
Tracing speed	0.5 mm/sec.
Diamond stylus	radius 5 µm, angle 90°
Tracing skid	radius 25 mm / 1 inch
	Special tracers: Radius different, according to measuring purpose
Traverse unit	VH for tracers with skid only, VHF for tracers with and without skid
Divers	clock time, date, battery survey

Mains adapter

Entry:	Tension 90 to 264 V~
Frequency	47 … 63 cycles
Plug:	European Community, other national plug adapters are optional
Exit:	Tension 12 V=
Electrical currency	900 mA
Protection	insulated IP40

1. General technical information

1.1 Construction of the instrument

The DIAVITE Compact **VH** is constructed either for one-handed operation with tracer incorporated in the main unit or alternatively equipped with adapter and measuring cable for use as a very versatile surface roughness meter.

When using for one-handed operation, the traverse unit (picture 1) with inserted roughness tracer is plugged directly to the socket of the instrument housing. The instrument is suitable to effect roughness measurements on even or round surfaces.

DIAVITE Compact **VH** as one-handed operated instrument

picture 1

The DIAVITE Compact **VHF** is supplied with an adapter, which, in place of the traverse unit, is connected directly with the instrument socket, and an extension cable for measuring directly with the smaller traverse unit. This enables free measurements, to reach badly accessible measuring spots, and to effect measurements by means of a measuring support as well, unavoidable for measuring with skidless tracers.

For many measuring applications, the adapter (picture 2) is needed, connected with the cable leading to the traverse unit. This way, measurements with special tracers and measuring support are possible. As an option, this adapter with extension cable to the traverse unit can also be supplied for DIAVITE Compact VH.

DIAVITE Compact VHF
as a versatile surface roughness meter.

picture 2

The traverse unit and the adapter, held by two fixing balls in the instrument, must by no means be inserted obliquely, as this could cause damage of the plug contacts.

1.2 First step: Setting of language

1. Press any key - the instrument will be ready for operation after a few seconds.
2. Press the key (M), in the display appears: 'Menu: Tracer'
3. Press the key (R) three times - the display reads: 'Menu: Language'
4. Press the key (↵) once, the display reads: 'Language: German'
5. Press the key (Lt) once, the display reads: 'Language: Français'
6. Press the key (Lt) several times, further languages will appear, one after the other
7. Press the key (↵) you are back in the menu
8. Press the key (M), you are in the measuring mode again

1.3 Connections

Under the cover at the narrow rear of the instrument there are connections for the electrical mains supply and an USB port for connection to a computer.

Mains adapter USB

1.3.1 Mains adapter 90 – 264 VAC / 50 – 60 cycles

The mains adapter connection serves for the electric power supply of the instrument. If this adapter is connected, the instrument is provided with electric current during operation and simultaneously, the batteries are being charged – if necessary.
Only the original mains adapter may be used for this purpose. It is specially designed for use with many international electric mains tensions (for admitted values refer to: Technical data, 'mains adapter', page 2).
Suitable plugs for corresponding national standards are available from the agent or from electro-technical stores.

1.3.2 Interface USB

The interface USB serves for the direct connection to a computer. This must be equipped with a suitable software (option) for receiving the data.

1.4 Connection of the tracer

Attention: No measuring is possible without connected tracer and traverse unit.

Remove the supporting shoe by using the enclosed hexagon key (type VH) or by means of the knurled nut (type VHF).

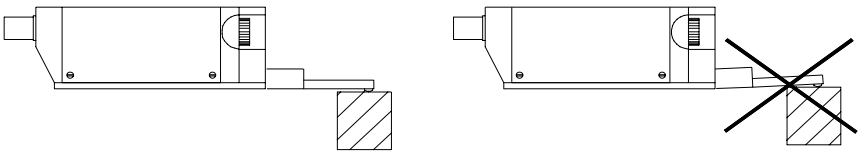
Traverse unit VH or VHF  Supporting shoe

Insert the tracer into the traverse unit as shown in the picture. The two red points must match each other. If manual measurements are to be effected, remount the supporting shoe to the traverse unit again.

Warning: By no means the tracer is to be inserted forcefully; it must be held with the utmost care at its largest diameter!

The position of the supporting shoe is reached correctly when the work piece is supported on its whole length by the traversing unit with supporting shoe. If the measuring area is too small, the bottom surfaces of traversing unit and the supporting shoe must be on the same level.

Warning: When measuring together with the support, please make sure that the tracer is not bent by lowering it too deeply onto the work piece. There is no guarantee for bent tracers.



1.5 Traverse unit

The number of the instrument and the number of the traverse unit must be identically!

Prior to starting the instrument, connect the traverse unit to the measuring unit with the 6-core connection cable. This cable provides the traverse unit with the necessary electric tension and transmits the measuring signal.

The cable plugs for the connection cable have an integrated locking. The cable must, therefore, be held at the plugs only when being inserted or removed, as otherwise the connection between cable and plug could become damaged.

1.6 Switch-on/off of the instrument 

The instrument can be switched-on with any of the keys. It can be operated with the incorporated rechargeable batteries or by means of the electric mains adapter directly from the mains (see 2.6 electric power supply).

If for some time no key of the instrument had been pressed, the instrument would switch-off automatically. The duration of time for automatic switch-off can be set (see 3.1 Menu – Config – Switch-off). A manual switch-off is not possible.

1.7 Calibration

The DIAVITE COMPACT has an automatic calibration, which is at disposal in the menu 3.1 - 'configuration - calibration' (page 10). In order to avoid faulty measurements, it is absolutely indispensable to check the perfect function of the instrument before starting the first daily application, as well as in regular periods of time. This can be effected the easiest way with a roughness specimen 3.00 µm Ra, alternatively with another reference specimen, the exact value of which is known.

When changing a tracer, the instrument has to be recalibrated also. The deviations between the various tracers should be rather small, normally, but could cause anyhow faulty measuring results. The recalibration of the instrument runs automatically. Put the reference specimen onto the supporting shoe of the traverse unit or effect this procedure employing a measuring support. The settings must be correct.

1. Press any button, after some seconds, the instrument is ready for operation
2. Press the button (M), you are in the mode 'Menu: Tracer'
3. Press the button (Lt) until the indication 'Menu: Config.' appears
4. Press the button (↵) once, in the display appears 'Config.: Calibration'
5. Press the button (↵), the indication '3.00' appears

For calibration, the cutoff 0.8 mm will be set automatically!

6. Press the button (Lt) or (R), if you do not employ the original roughness standard
7. Press the button (↵) once, for starting the calibration
8. It takes approximately one minute to effect the calibration (4 measurements)
9. At the end of the calibration procedure, the current measuring value Ra is indicated. In course, the instrument is in the 'main menu' again
10. Press the button (M), you are again in the measuring mode

1.8 Keyboard

The DIAVITE COMPACT is a surface roughness meter easy to operate and for the safe operation of which only few introduction is necessary. The instrument can be set according to the operator's needs using the menu functions. The keys are provided with pictographs for the following functions:

Measuring mode	**Menu mode**
(↵) Start of measuring operation	Confirmation
(Lt) Selection of length of traverse	Menu selection previous menu option
(M) Menu for instrument configuration	Switch-on/off menu, Escape
(R) Interrogation of measuring value	Menu selection next menu option

The emergency stop after release of the measurement can be effected with any key

2. Operation

2.1 Measuring

2.1.1 Start measuring operation 

The area to be measured on the work piece must be properly cleaned in order to avoid that the tracer is getting dirty. If the roughness is measured manually, the tracer is laid onto the work piece and held steadily. At the lowest margin of the display, the position of the feeler can be controlled with the arrow (↑). The ideal setting is reached when this sign appears in the centre of the display: →←. After pressing the start key, the measuring procedure is effected automatically. In course, the measuring values can be read on the LCD-display and printed out.

Pressing any key can interrupt a current measuring operation and bring the tracer to a halt**. Actuate the start button once more, to bring the tracer to its starting position again.**

If the tracer is not in correct position, the measuring procedure can be released nevertheless!

2.1.2 Maximum measuring value

The maximum amplitude of the diamond stylus is 200 µm. **If this is exceeded, there will be no signal of faulty measurement.** However, such high measuring values will always be indicated by the arrow (↑), which means that **the measuring results could be faulty**.

2.1.3 Special tracers (probes)

Complementary to the standard tracer, there are a number of special tracers at disposal. These are constructed to solve specific measuring problems and can be used only together with the measuring stand.

2.1.2 Maximum measuring value

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2.1.3 Special tracers (probes)

Complementary to the standard tracer, there are a number of special tracers at disposal. These are constructed to solve specific measuring problems and can be used only together with the measuring stand.

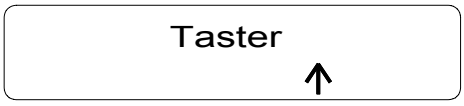
Tracers without skid can be used only with the traverse unit VHF

The traverse unit must be set parallel to the measured surface.
When lowering the tracer onto the work piece, the 0-point of the feeler must be adjusted exactly. The arrow indicates the direction, to which the tracer must be moved:

On the display, the arrow is situated on the left margin and shows downwards

Carefully lower the tracer, until the pointer moves from the left margin towards the centre.

If the correct zero point is reached, two arrows appear in the middle of the indicator screen. Push the key 'M' and start the measuring operation.



If the sensor is set too deep, the arrow appears on the right half of the display and shows upwards. The tracer must be set in a higher position

ATTENTION, the tracer might be damaged!

2.1.4 Calibration

The DIAVITE DH-7 has an automatic calibration, which is at disposal in the menu 'configuration' (page 10). In order to avoid faulty measurements, it is absolutely indispensable to check the perfect function of the instrument before starting the first daily application, as well as in regular periods of time. This can be effected the easiest way by measuring the surface of a roughness specimen. The measured roughness value is compared then with the nominal value indicated on it and – if necessary – a new calibration of the instrument must be effected.
If a tracer is exchanged, the instrument has to be recalibrated. The deviations between the various tracers should be rather small normally, but could anyhow cause faulty measuring results. The instrument can be recalibrated automatically. The settings must be correctly.

You will find a detailed description of calibration on page 6 (point 1.7)

The calibration is always effected with cutoff 0.8 mm (lt=4.8 mm)

2.1.5 Remote control

The traverse unit is equipped with a multifunctional blue remote control button to switch the instrument on, or – if already switched on – to release the measuring operation. When employing the DIAVITE as one-handed operated instrument or with a measuring stand, this button is inactive.

2.2 Selection of the traversing length Lt

The cutoff filters serve to eliminate the long wavy parts of the roughness (waviness). They correspond to the usual standards (BSI, ASA, DIN) and are coupled with the traversing length.

Measuring length Lt mm	**Traversing length lm** mm	**Cutoff Lc** mm
1.5	1.25	0.25
4.8	4.0	0.8
15.0	12.5	2.5

The cutoff should be selected according to the standards valid in your country. If no indications are given in drawings, the cutoff 0.8 mm is normally used.

2.3 Tolerance

In this menu any tolerance value for Ra, Rt od Rz can be set. If the value set is exceeded after a measurement, the indication begins to flash, and in the corner top right appears – if a tolerance is set – the sign ↓.

2.4 Memory functions

The instrument has a memory function which is switched-on and –off in the captioned menu. With that function, it is possible to hold up to 15 measuring values, which can be transferred over the serial interface to a suitable PC, or printed out with the PC. As an acknowledgement, the roughness values are taken over to the memory.
If the memory function is active, an "M" appears in the display.

2.5 Key lock

The instrument is equipped with a key lock preventing any settings being changed by mistake during measuring procedure. It is effective for the buttons lt (length of traverse), and lc (cutoff).

After having set the parameters, push the button M and then again the button M as long until the indication 'locked' appears. In order to suspend the key lock, repeat the described procedure, until the indication "unprotected" appears.

2.6 Electric power supply

At the narrow side there is a sliding cover which can be drawn downwards (1.3 'Electric power supply'). Behind, you will find a two-core socket for the power supply, serving to charge the batteries for operation independently from the electric mains. The instrument should be operated only with the specially adapted original charger/mains adapter, in order to avoid damages.

To charge the batteries, connect the mains adapter with the DIAVITE COMPACT and switch-on the instrument. A battery symbol in the display shows that the batteries are being charged. The indication will extinguish as soon as the batteries are completely recharged. **Charging takes approximately ten hours.** You may continue to work with DIAVITE COMPACT during the period of recharge.

The charging procedure must not be interrupted!

Important remarks:

The incorporated accumulators (Lithium-Manganese rechargeable batteries) are designed for a long live if treated correctly:

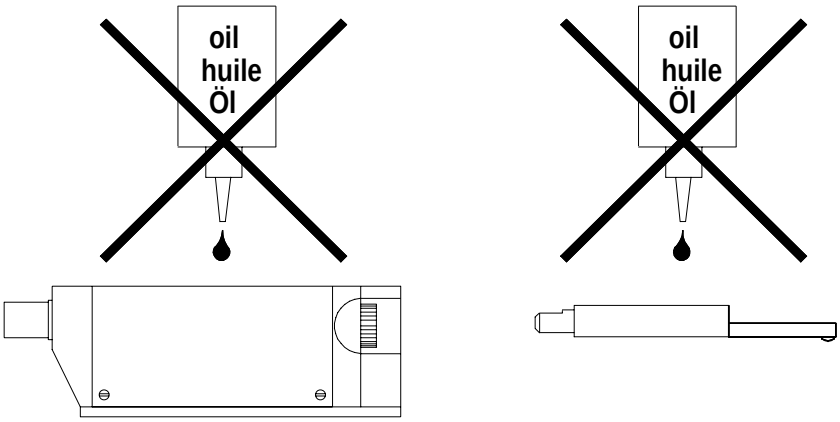
If the instrument has not been in use for a longer time, the accumulators must be charged at least once each month.

If the capacity of the batteries is exhausted, the display indicates 'Low Bat'. No more measuring operations can be effected. The batteries must be recharged **without delay**.

From new or perfectly treated, completely charged batteries, approx. 400 measuring operations could be expected, depending from the selected length of traverse.

2.7 Maintenance

The DIAVITE COMPACT does not need any maintenance **except the charging of the rechargeable batteries** (see 2.6).
Under no circumstances, the traversing unit and the tracers must be treated with oil or detergent. If the housing of the instrument is dirty, it may be cleaned with a mild cleaning liquid or with soap.



3. Settings

3.1 Menu

Main menu	Sub menu	Action	Standard
Tracer	-	Graphical support for exact setting of special tracers (2.1.3)	
Configuration	calibration	Predetermined factory standard (Ra)	3.00 µm
	standard	Select standard DIN/ISO, JIS, ISO 12085	DIN/ISO
	unit	Selector switch µm<->µinch	µm
	Nx	Indication of roughness classes on/off	off
	amplification	Self adjusting, V=1, V=10	automatically
	switch-off	Automatic switch-off in battery mode	2 minutes
	fab	Reset all parameters to factory standard	
Memory	off	Memory function off	off
	on	Memory function on	
	clear	Clear memory and reset counter to zero	
	USB	Transfer of memorised R-values to USB	
Tolerance	---	No tolerance	---
	Ra	Admissible tolerance for Ra	
	Rt	Admissible tolerance for Rt	
	Rz	Admissible tolerance for Rz	
	C (RPc)	c-value for calculation of RPc	
Accu		Charge of the accumulator in percent	
Language	English	Switch to the preferred language	German
	Deutsch		
	Français		
	Español		
	Italiano		
Date/time	indicate	Indication of date and time	
	set	Set time and date	
Version	-	Indication of hard- and software versions	
Further functions and messages:			
M	On display	Memory function active	
↓	On display	Tolerance function active	
<	On display	Reverse tracer	
Malfunctions message			
No tracer		No tracer connected	
Battery defect		Battery is defective	
Memory completed		Memory for profile points complete (full)	
Warnings			
Remote control		Instrument is controlled from PC	
Notifications			
Battery empty		Battery fully discharged	

Press key (M) press key (Lt↓) or (R↑) until reaching requested menu, select with key (↵), search the needed menu in a second sub-menu with keys (Lt↓) or (R↑) and confirm the setting with (↵).

3.2 Key 'Menu' (M)

With the key 'Menu', a menu structure is opened, with which the various instrument parameters are set or with which the basic settings of the instrument can be reset. With support of the 'Menu' key, various instrument settings can be effected, too. The meaning of the keys are indicated in a window on the display.

3.3 Configuration

3.3.1 Calibration

Preset value for calibration is Ra

3.3.2 Standard

In this sub-menu, the standard can be chosen, according to which measurements have to be effected.

3.3.3 Unit

This sub-menu serves to select the parameter unit: for metric (µm) or inch (µin) indication / measurement.

3.3.4 Nx

Switching-on/off of the roughness classes N1 to N12

3.3.5 Amplification

This sub-menu allows the selection of the amplification of the instrument. Normally, the setting 'auto' will be sufficient. The instrument itself will then select, whether the amplification for small or large roughness values is to be set. For very irregular surface or for surfaces with deep grooves, the amplification can be set at choice with factor 'x1' or 'x10'.

3.3.6 Switch-off

In this sub-menu the duration of time can be selected, within which the instrument should be switched-off (in minutes, in steps of 30 seconds).

3.3.7 Factory configuration

When selecting this menu point, the actual instrument setting will be reset to the original factory setting. The view of menu (page 11) shows the basic settings (Standard).

3.4 Memory functions and printout of memorized values

Select menu 'memory functions'. If the memory function is active, an 'M' appears in the display.
15 measuring profiles can be memorized. See 2.4, page 8, Memory function

With 'on'/'off' the function is switched-on or –off. After each measurement effected the measuring value can be saved.

With 'clear' the complete memory contents are cleared.

With "USB" the stored values are released to the Interface USB. The data may be taken over with a suitable software. It's necessary to provide the PC with an USB driver.

3.5 Setting of tolerance

The roughness unit (Ra, Rt, Rz) for which a tolerance should be set, may be selected here. Set the maximum tolerance value. If this value is exceeded, the indication of this value will blink on the display. This sub-menu serves also to set the c-value for the calculation of the RPc unit.

3.6 Rechargeable battery

Here, the charge of the accumulator in indicated. This information appears in the screen also each time after switching-on the instrument. In order to secure a long lasting battery-powered operation, the instrument is provided with an automatic switch-off device. If no key has been actuated within a selected duration of time, the instrument switches-off. This duration of time of 1 … 10 minutes until switch-off may be set in the menu 'Config'.

3.7 Date and clock- time

The DIAVITE COMPACT is equipped with an integrated clock (time and date).

The clock is integrated in the battery pack. If this has to be replaced or if it had been separated from the instrument, the time and date will have to be reset.

3.7.1 Indication of date and clock-time

In the first sub-menu, the actual time and the date can be indicated.

3.8.2 Setting of time and date

This menu option allows the setting of the time. With key 'Lc', the cursor can be moved to right, with key 'P' to left.
The keys 'R' and 'Lt' allow setting the time values under the cursor, i.e. hour, minute and date.
With 'Esc', the values set are taken over. Press button 'M' to return to 'Menu'.

3.9 Indication of the version

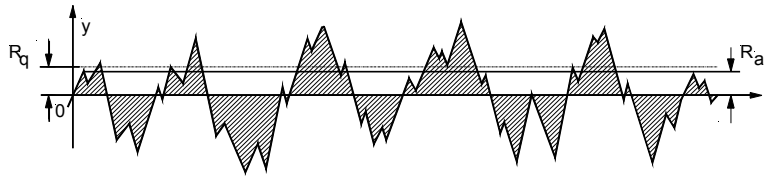
In this option, the versions of the hardware and of the software incorporated is indicated.

4. Divers

4.1 Definitions

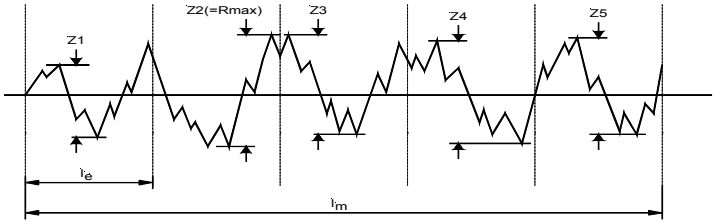
Ra (CLA, AA), Rq (RMS)

$$Ra = \frac{1}{l_0}\int^{l} |y(x)|\,dx \qquad Rq = \sqrt{\frac{1}{l_0}\int^{l} |y^2(x)|\,dx}$$

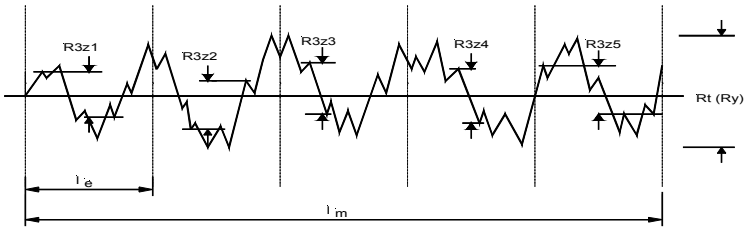


Rz (DIN 4768)
Rmax (DIN 4768)
R3z (standard DB N 31007)
Rt (corresponds to the definition Ry (DIN 4762/1960, withdrawn 1978)

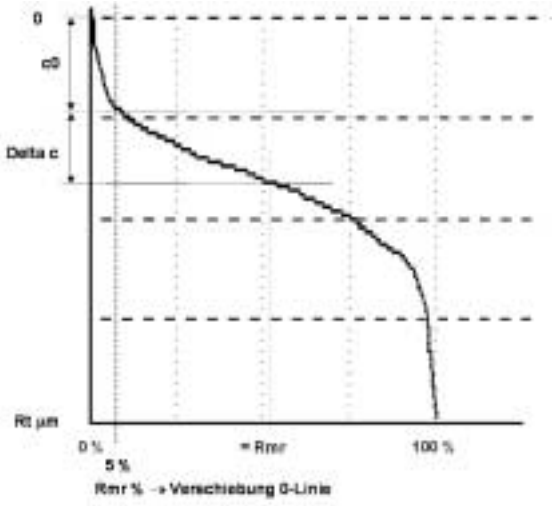
Rz (DIN) = (Z1+Z2+ ... + Z5)/5



R3z = (R3z1+R3z2+ ... + R3z5)/5



Rmr



4.2 Malfunctions

The DIAVITE COMPACT has been constructed for workshop use. The tracers are, however, very delicate and susceptible to damages. They should not be exposed to mechanical strain. If, when putting a tracer with skid onto a flat surface, the green control LED does not start to flash up, the tracer could be damaged. If possible, check the instrument with a second tracer or send the complete instrument to the dealer for a check.

4.3 Repairs

Repairs are to be effected by the manufacturer only.

Upon written request, a repair cost estimate will be submitted. The necessary efforts for controlling, partially dismantling of parts, inspection time as well as an adequate share for administration effort, and transport costs, must be paid by the customer in any case, even if the estimate of cost is rejected by the customer.

80% of the repairs concern the standard tracer SH (dirt, oil, break of diamond point and suspension). It is recommended to buy a spare standard tracer.

4.4 Guarantee

The guarantee is valid for one year after factory dispatch and is applicable to damage caused by parts of proved insufficient quality. The guarantee does not cover damages of the diamond tip and the rechargeable batteries, nor malfunctions due to mechanical damages, such as break of suspension, bending or breaking of parts (which are delicate due to their nature of construction), nor damages caused by non-observation of the working instructions, or damages caused by insufficient packing for transport back to the factory. Parts to be replaced must be sent back to the factory.

4.5 Referenced Documents (Basis documents in German language)

EN ISO 3274	Nenneigenschaften von Tastschnittgeräten (1998)
EN ISO 4287	Oberflächenbeschaffenheit: Tastschnittverfahren (1998)
EN ISO 4288	Regeln und Verfahren für die Beurteilung der Oberflächenbeschaffenheit (1997)
En ISO 11562	Oberflächenmesstechnik: Profilfilter zur Anwendung in elektrischen Tastschnittgeräten - Phasenkorrekte Filter (1998)
EN ISO 12085	Geometrische Produktspezifikationen (GPS) – Oberflächenbeschaffenheit: Tastschnittverfahren – Motif-Kenngrössen (1996)
EN ISO 13565-1	Filterung und allgemeine Messbedingungen (1998)
EN ISO 13565-2	Beschreibung der Höhe mittels linearer Darstellung der Materialanteilkurve (1998)