

Kalibrier-Zertifikat Calibration certificate

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| | |
|--|--|
| Gegenstand Object | Laserscanningmikroskop |
| Hersteller Manufacturer | KEYENCE |
| Typ Type description | VK-X260K |
| Serien Nr. Serial no. | 12345 |
| Inventar Nr. Inventory no. | --- |
| Prüfmittel Nr. Test equipment no. | --- |
| Equipment Nr. Equipment no. | 12345678 |
| Standort Location | --- |
| Auftraggeber Customer | Mustermann GmbH DE-12345 Musterhausen |
| Kunden Nr. Customer ID no. | 1234567 |
| Auftrags Nr. Order no. | 654321 |
| Datum der Kalibrierung Date of calibration | 15.08.2017 |
| Datum der empfohlenen Rekalibrierung Date of the recommended re-calibration | 15.08.2018 |

Hiermit bestätigen wir, dass das durchführende Kalibrierlabor ein Managementsystem nach **ISO 9001:2008**, sowie **ISO/IEC 17025:2005** eingeführt hat. Die Urkunden finden Sie auf www.testotis.de. Die für die Kalibrierung verwendeten Messeinrichtungen werden regelmäßig kalibriert und sind rückführbar auf die nationalen Normale der Physikalisch Technischen Bundesanstalt (PTB) Deutschlands oder auf andere nationale Normale. Wo keine nationalen Normale existieren, entspricht das Messverfahren den derzeit gültigen technischen Regeln und Normen. Die für diesen Vorgang angefertigte Dokumentation kann eingesehen werden. Alle erforderlichen Messdaten sind in diesem Kalibrier-Zertifikat aufgelistet.

Hereby we confirm that the performing calibration laboratory is working with a management system according to **ISO 9001:2008** and **ISO/IEC 17025:2005**. Accreditation certificates can be found under www.testotis.de. The measuring installations used for calibration are regularly calibrated and traceable to the national standards of the German Federal Physical Technical Institute (PTB) or other national standards. Should no national standards exist, the measuring procedure corresponds with the technical regulations and norms valid at the time of the measurement. The documents established for this procedure are available for viewing. All the necessary measured data can be found on this calibration certificate.




Konformitätsaussage Conformity statement

- Messwert(e) innerhalb der zulässigen Abweichung¹. Measured value(s) within the allowable deviation¹.
 Messwert(e) außerhalb der zulässigen Abweichung¹. Measured value(s) outside of the allowable deviation¹.

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¹) Die Messunsicherheit wurde nach GUM mit dem Erweiterungsfaktor k=2 berechnet und enthält die Unsicherheit des Verfahrens sowie die Unsicherheit des Prüflings. Die Konformitätsaussage erfolgte nach DIN EN ISO 14253-1 gemäß der Kalibrieranweisung QSA-TIS 7.5-02.
¹) The measurement uncertainty was calculated according to the regulations of GUM with the coverage factor k=2 and contains the uncertainty of the measuring procedure and the uncertainty of the measuring system. The statement of conformity was made according to DIN EN ISO 14253-1 according to calibration instruction QSA-TIS 7.5-02.

Dieser Kalibrierschein darf nur vollständig weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.
 This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates without signature and seal are not valid.

| | | |
|---|--|--|
| Stempel Seal  | Fachverantwortlicher Supervisor  Max Mustermann | Bearbeiter Technician  Martina Musterfrau |
|---|--|--|

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Messeinrichtungen Measuring equipment

| Referenz Reference | Rückführung Traceability | Rekal. Next cal. | Zertifikat-Nr. Certificate-no. | Eq.-Nr. Eq.-no. |
|--|-----------------------------|---------------------|-----------------------------------|--------------------|
| Glasmaßstab OP-87426 - Referenznormal Glas scale OP-87426 - reference gauge | 12037-01-00 2016-08 | 2019-08 | 2072565 | 12608581 |
| Tiefeneinstellnormal - Referenznormal VK depth meas. standard - ref. gauge VK | PTB 2017-05 | 2020-05 | 2344767 | 12608593 |
| Geometriernormal geometry standard | 15159-01-00 2017-04 | 2018-04 | 2296699 | 10113396 |
| Parallel-Endmaßsatz gage block set | 15190-01-00 2016-11 | 2019-11 | 2164955 | 10113373 |

Referenzzertifikate sind auf www.primasonline.com abrufbar Reference certificates are available at www.primasonline.com

Umgebungsbedingungen Ambient conditions

Temperatur Temperature 22,0 °C

Feuchte Humidity 56,6 % rF % RH

Druck Pressure

Luftdichte Air density

1014 hPa

--- kg/m³

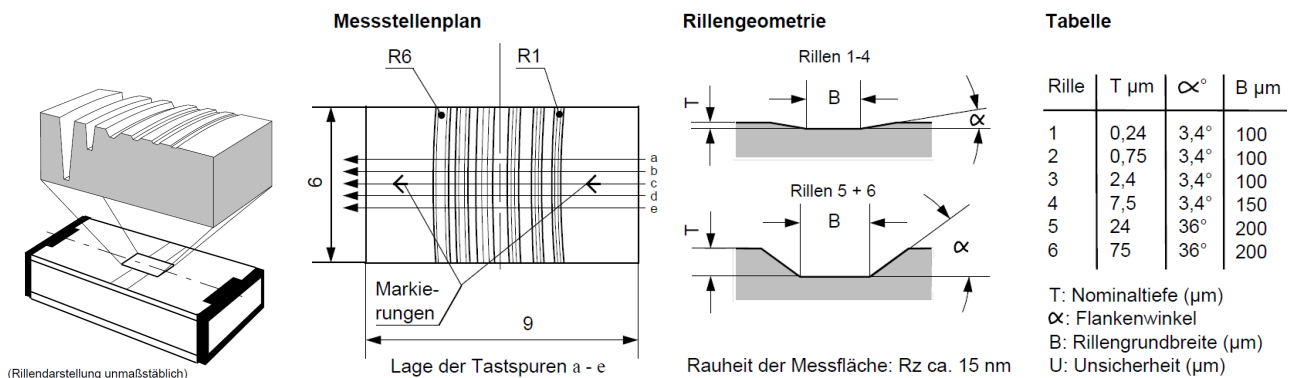
Messverfahren Measuring procedure

Die Kalibrierung erfolgt durch Vergleichsmessung mit der Keyence Software.

The calibration takes place according measurement by comparing with the Keyence software.

Vertikale Richtung

vertical direction

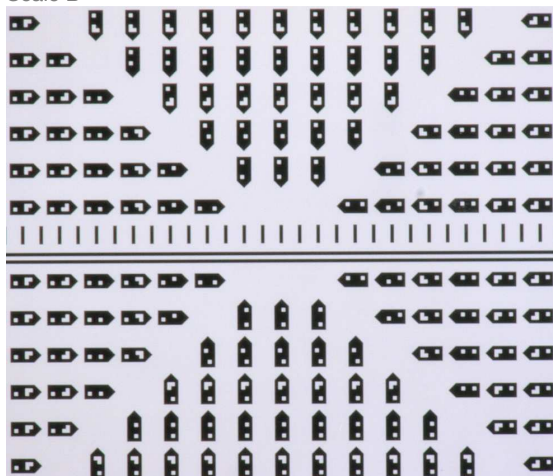


Horizontale Richtung

horizontal direction

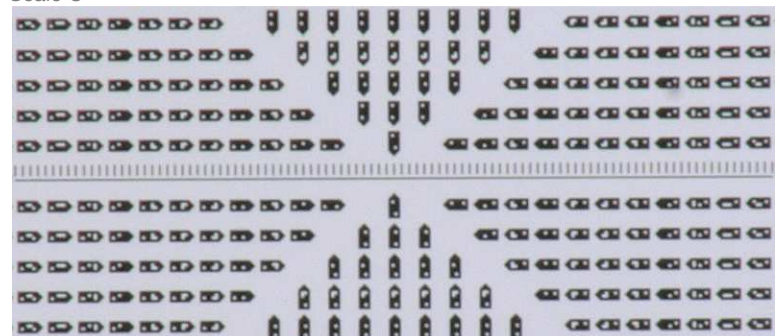
Skala B

Scale B



Skala C

Scale C





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Ort der Kalibrierung Location of calibration

Messlabor SQA

Messunsicherheit Measurement uncertainty

$U = 2 \mu\text{m}$

Vorbereitende Prüfungen und Tätigkeiten Preparing examinations and activities

Sichtprüfung:
Visual Check

In Ordnung
In order

Funktionsprüfung:
Functional Check

In Ordnung
In order

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Messergebnisse Measuring results

Vertikale Richtung - Vergrößerung 10x
vertical direction - magnification 10x

Serien Nr. MUL00101
Serial no.

| lfd. Nr. seq. no. | 0,24 μm | 0,75 μm | 2,40 μm | 7,50 μm | 24,00 μm | 75,00 μm |
|---|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|
| 1 | --- | --- | 2,402 | 7,456 | 23,879 | 75,057 |
| 2 | --- | --- | 2,401 | 7,451 | 23,873 | 75,042 |
| 3 | --- | --- | 2,407 | 7,461 | 23,890 | 75,049 |
| 4 | --- | --- | 2,388 | 7,449 | 23,890 | 75,051 |
| 5 | --- | --- | 2,390 | 7,473 | 23,910 | 75,037 |
| Max max | --- | --- | 2,407 | 7,473 | 23,910 | 75,057 |
| Min Min | --- | --- | 2,388 | 7,449 | 23,873 | 75,037 |
| Max - Min Max - Min | --- | --- | 0,019 | 0,024 | 0,037 | 0,020 |
| Mittelwert avarage | --- | --- | 2,398 | 7,458 | 23,888 | 75,047 |
| Standardabw. σ Standard deviation σ | --- | --- | 0,007 | 0,009 | 0,013 | 0,007 |
| Bezugswert Reference value | 0,240 | 0,750 | 2,400 | 7,500 | 24,000 | 75,000 |
| Abw. der Referenz Dev. according to cert. | 0,001 | 0,001 | 0,002 | -0,003 | -0,007 | 0,250 |
| korrigiertes Sollmaß Corrected nominal size | 0,241 | 0,751 | 2,402 | 7,497 | 23,993 | 75,250 |
| Mittelwert avarage | --- | --- | 2,398 | 7,458 | 23,888 | 75,047 |
| Abweichung Deviation | --- | --- | -0,004 | -0,039 | -0,105 | -0,203 |
| Zulässige Abweichung Allowed deviation | 1,002 | 1,008 | 1,024 | 1,075 | 1,240 | 1,750 |
| Wiederholpräzision (Standardabw. σ) repeatability (Standard deviation σ) | --- | --- | 0,007 | 0,009 | 0,013 | 0,007 |
| zul. Wiederholpräzision Allowed repeatability | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 | 0,100 |

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Messergebnisse Measuring results

Vertikale Richtung - Vergrößerung 20x
vertical direction - magnification 20x

Serien Nr. MUL00201
Serial no.

| | | | | | | |
|---|--------------|---------------|---------------|---------------|---------------|---------------|
| lfd. Nr. seq. no. | 0,24 | 0,75 | 2,40 | 7,50 | 24,00 | 75,00 |
| | µm | µm | µm | µm | µm | µm |
| 1 | --- | 0,737 | 2,378 | 7,417 | 23,927 | 75,207 |
| 2 | --- | 0,737 | 2,379 | 7,425 | 23,934 | 75,192 |
| 3 | --- | 0,741 | 2,382 | 7,422 | 23,934 | 75,201 |
| 4 | --- | 0,735 | 2,383 | 7,493 | 23,931 | 75,215 |
| 5 | --- | 0,740 | 2,376 | 7,418 | 23,936 | 75,210 |
| Max max | --- | 0,741 | 2,383 | 7,493 | 23,936 | 75,215 |
| Min Min | --- | 0,735 | 2,376 | 7,417 | 23,927 | 75,192 |
| Max – Min Max – Min | --- | 0,006 | 0,007 | 0,076 | 0,009 | 0,023 |
| Mittelwert avarage | --- | 0,738 | 2,380 | 7,435 | 23,932 | 75,205 |
| Standardabw. σ Standard deviation σ | --- | 0,002 | 0,003 | 0,029 | 0,003 | 0,008 |
| Bezugswert Reference value | 0,240 | 0,750 | 2,400 | 7,500 | 24,000 | 75,000 |
| Abw. der Referenz Dev. according to cert. | 0,001 | 0,001 | 0,002 | -0,003 | -0,007 | 0,250 |
| korrigiertes Sollmaß Corrected nominal size | 0,241 | 0,751 | 2,402 | 7,497 | 23,993 | 75,250 |
| Mittelwert avarage | --- | 0,738 | 2,380 | 7,435 | 23,932 | 75,205 |
| Abweichung Deviation | --- | -0,013 | -0,022 | -0,062 | -0,061 | -0,045 |
| Zulässige Abweichung Allowed deviation | 0,202 | 0,208 | 0,224 | 0,275 | 0,440 | 0,950 |
| Wiederholpräzision (Standardabw. σ) repeatability (Standard deviation σ) | --- | 0,002 | 0,003 | 0,029 | 0,003 | 0,008 |
| zul. Wiederholpräzision Allowed repeatability | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 |

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Messergebnisse Measuring results

Vertikale Richtung - Vergrößerung 50x
vertical direction - magnification 50x

Serien Nr. Y037
Serial no.

| lfd. Nr. seq. no. | 0,24 μm | 0,75 μm | 2,40 μm | 7,50 μm | 24,00 μm | 75,00 μm |
|---|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|
| 1 | 0,237 | 0,745 | 2,397 | --- | 23,946 | --- |
| 2 | 0,237 | 0,748 | 2,400 | --- | 23,949 | --- |
| 3 | 0,238 | 0,743 | 2,406 | --- | 23,941 | --- |
| 4 | 0,233 | 0,747 | 2,399 | --- | 23,932 | --- |
| 5 | 0,234 | 0,746 | 2,404 | --- | 23,947 | --- |
| Max max | 0,238 | 0,748 | 2,406 | --- | 23,949 | --- |
| Min Min | 0,233 | 0,743 | 2,397 | --- | 23,932 | --- |
| Max - Min Max - Min | 0,005 | 0,005 | 0,009 | --- | 0,017 | --- |
| Mittelwert avarage | 0,236 | 0,746 | 2,401 | --- | 23,943 | --- |
| Standardabw. σ Standard deviation σ | 0,002 | 0,002 | 0,003 | --- | 0,006 | --- |
| Bezugswert Reference value | 0,240 | 0,750 | 2,400 | 7,500 | 24,000 | 75,000 |
| Abw. der Referenz Dev. according to cert. | 0,001 | 0,001 | 0,002 | -0,003 | -0,007 | 0,250 |
| korrigiertes Sollmaß Corrected nominal size | 0,241 | 0,751 | 2,402 | 7,497 | 23,993 | 75,250 |
| Mittelwert avarage | 0,236 | 0,746 | 2,401 | --- | 23,943 | --- |
| Abweichung Deviation | -0,005 | -0,005 | -0,001 | --- | -0,050 | --- |
| Zulässige Abweichung Allowed deviation | 0,202 | 0,208 | 0,224 | 0,275 | 0,440 | 0,950 |
| Wiederholpräzision (Standardabw. σ) repeatability (Standard deviation σ) | 0,002 | 0,002 | 0,003 | --- | 0,006 | --- |
| zul. Wiederholpräzision Allowed repeatability | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 |

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Messergebnisse Measuring results

Vertikale Richtung - Vergrößerung 150x
vertical direction - magnification 150x

Serien Nr. Y040
Serial no.

| lfd. Nr. seq. no. | 0,24 | 0,75 | 2,40 | 7,50 | 24,00 | 75,00 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|
| | μm | μm | μm | μm | μm | μm |
| 1 | 0,229 | 0,763 | 2,385 | --- | --- | --- |
| 2 | 0,232 | 0,752 | 2,381 | --- | --- | --- |
| 3 | 0,230 | 0,750 | 2,386 | --- | --- | --- |
| 4 | 0,236 | 0,736 | 2,375 | --- | --- | --- |
| 5 | 0,226 | 0,739 | 2,369 | --- | --- | --- |
| Max max | 0,236 | 0,763 | 2,386 | --- | --- | --- |
| Min Min | 0,226 | 0,736 | 2,369 | --- | --- | --- |
| Max - Min Max - Min | 0,010 | 0,027 | 0,017 | --- | --- | --- |
| Mittelwert average | 0,231 | 0,748 | 2,379 | --- | --- | --- |
| Standardabw. σ Standard deviation σ | 0,003 | 0,010 | 0,006 | --- | --- | --- |
| Bezugswert Reference value | 0,240 | 0,750 | 2,400 | 7,500 | 24,000 | 75,000 |
| Abw. der Referenz Dev. according to cert. | 0,001 | 0,001 | 0,002 | -0,003 | -0,007 | 0,250 |
| korrigiertes Sollmaß Corrected nominal size | 0,241 | 0,751 | 2,402 | 7,497 | 23,993 | 75,250 |
| Mittelwert average | 0,231 | 0,748 | 2,379 | --- | --- | --- |
| Abweichung Deviation | -0,010 | -0,003 | -0,023 | --- | --- | --- |
| Zulässige Abweichung Allowed deviation | 0,202 | 0,208 | 0,224 | 0,275 | 0,440 | 0,950 |
| Wiederholpräzision (Standardabw. σ) repeatability (Standard deviation σ) | 0,003 | 0,010 | 0,006 | --- | --- | --- |
| zul. Wiederholpräzision Allowed repeatability | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 |

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Messergebnisse Measuring results

Vertikale Richtung - Vergrößerung 20x LD
vertical direction - magnification 20x LD

Serien Nr. MUL03201
Serial no.

| lfd. Nr. seq. no. | 0,24 | 0,75 | 2,40 | 7,50 | 24,00 | 75,00 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|
| | μm | μm | μm | μm | μm | μm |
| 1 | --- | 0,749 | 2,396 | 7,491 | 23,989 | 75,315 |
| 2 | --- | 0,756 | 2,400 | 7,497 | 23,996 | 75,290 |
| 3 | --- | 0,746 | 2,398 | 7,492 | 24,000 | 75,296 |
| 4 | --- | 0,755 | 2,408 | 7,491 | 23,996 | 75,305 |
| 5 | --- | 0,753 | 2,406 | 7,494 | 23,991 | 75,307 |
| Max max | --- | 0,756 | 2,408 | 7,497 | 24,000 | 75,315 |
| Min Min | --- | 0,746 | 2,396 | 7,491 | 23,989 | 75,290 |
| Max - Min Max - Min | --- | 0,010 | 0,012 | 0,006 | 0,011 | 0,025 |
| Mittelwert avarage | --- | 0,752 | 2,402 | 7,493 | 23,994 | 75,303 |
| Standardabw. σ Standard deviation σ | --- | 0,004 | 0,005 | 0,002 | 0,004 | 0,009 |
| Bezugswert Reference value | 0,240 | 0,750 | 2,400 | 7,500 | 24,000 | 75,000 |
| Abw. der Referenz Dev. according to cert. | 0,001 | 0,001 | 0,002 | -0,003 | -0,007 | 0,250 |
| korrigiertes Sollmaß Corrected nominal size | 0,241 | 0,751 | 2,402 | 7,497 | 23,993 | 75,250 |
| Mittelwert avarage | --- | 0,752 | 2,402 | 7,493 | 23,994 | 75,303 |
| Abweichung Deviation | --- | 0,001 | 0,000 | -0,004 | 0,001 | 0,053 |
| Zulässige Abweichung Allowed deviation | 0,202 | 0,208 | 0,224 | 0,275 | 0,440 | 0,950 |
| Wiederholpräzision (Standardabw. σ) repeatability (Standard deviation σ) | --- | 0,004 | 0,005 | 0,002 | 0,004 | 0,009 |
| zul. Wiederholpräzision Allowed repeatability | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 |

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Messergebnisse Measuring results

Vertikale Richtung - Vergrößerung 50x LD
vertical direction - magnification 50x LD

Serien Nr. MUL03501
Serial no.

| lfd. Nr. seq. no. | 0,24 | 0,75 | 2,40 | 7,50 | 24,00 | 75,00 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|
| | μm | μm | μm | μm | μm | μm |
| 1 | 0,244 | 0,742 | 2,400 | --- | 23,982 | --- |
| 2 | 0,242 | 0,749 | 2,403 | --- | 24,002 | --- |
| 3 | 0,245 | 0,747 | 2,399 | --- | 24,000 | --- |
| 4 | 0,241 | 0,749 | 2,402 | --- | 24,017 | --- |
| 5 | 0,245 | 0,746 | 2,397 | --- | 24,021 | --- |
| Max max | 0,245 | 0,749 | 2,403 | --- | 24,021 | --- |
| Min Min | 0,241 | 0,742 | 2,397 | --- | 23,982 | --- |
| Max - Min Max - Min | 0,004 | 0,007 | 0,006 | --- | 0,039 | --- |
| Mittelwert avarage | 0,243 | 0,747 | 2,400 | --- | 24,004 | --- |
| Standardabw. σ Standard deviation σ | 0,002 | 0,003 | 0,002 | --- | 0,014 | --- |
| Bezugswert Reference value | 0,240 | 0,750 | 2,400 | 7,500 | 24,000 | 75,000 |
| Abw. der Referenz Dev. according to cert. | 0,001 | 0,001 | 0,002 | -0,003 | -0,007 | 0,250 |
| korrigiertes Sollmaß Corrected nominal size | 0,241 | 0,751 | 2,402 | 7,497 | 23,993 | 75,250 |
| Mittelwert avarage | 0,243 | 0,747 | 2,400 | --- | 24,004 | --- |
| Abweichung Deviation | 0,002 | -0,004 | -0,002 | --- | 0,011 | --- |
| Zulässige Abweichung Allowed deviation | 0,202 | 0,208 | 0,224 | 0,275 | 0,440 | 0,950 |
| Wiederholpräzision (Standardabw. σ) repeatability (Standard deviation σ) | 0,002 | 0,003 | 0,002 | --- | 0,014 | --- |
| zul. Wiederholpräzision Allowed repeatability | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 |

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Messergebnisse Measuring results

Vertikale Richtung - Vergrößerung 100x LD
vertical direction - magnification 100x LD

Serien Nr. MUL04901
Serial no.

| lfd. Nr. seq. no. | 0,24 | 0,75 | 2,40 | 7,50 | 24,00 | 75,00 |
|--|--------------|--------------|--------------|--------------|--------------|--------------|
| | µm | µm | µm | µm | µm | µm |
| 1 | 0,253 | 0,761 | 2,407 | --- | 24,056 | --- |
| 2 | 0,266 | 0,752 | 2,410 | --- | 24,022 | --- |
| 3 | 0,253 | 0,761 | 2,412 | --- | 24,037 | --- |
| 4 | 0,253 | 0,756 | 2,416 | --- | 24,045 | --- |
| 5 | 0,249 | 0,752 | 2,418 | --- | 24,021 | --- |
| Max max | 0,266 | 0,761 | 2,418 | --- | 24,056 | --- |
| Min Min | 0,249 | 0,752 | 2,407 | --- | 24,021 | --- |
| Max – Min Max – Min | 0,017 | 0,009 | 0,011 | --- | 0,035 | --- |
| Mittelwert avarage | 0,255 | 0,756 | 2,413 | --- | 24,036 | --- |
| Standardabw. σ Standard deviation σ | 0,006 | 0,004 | 0,004 | --- | 0,013 | --- |
| Bezugswert Reference value | 0,240 | 0,750 | 2,400 | 7,500 | 24,000 | 75,000 |
| Abw. der Referenz Dev. according to cert. | 0,001 | 0,001 | 0,002 | -0,003 | -0,007 | 0,250 |
| korrigiertes Sollmaß Corrected nominal size | 0,241 | 0,751 | 2,402 | 7,497 | 23,993 | 75,250 |
| Mittelwert avarage | 0,255 | 0,756 | 2,413 | --- | 24,036 | --- |
| Abweichung Deviation | 0,014 | 0,005 | 0,011 | --- | 0,043 | --- |
| Zulässige Abweichung Allowed deviation | 0,202 | 0,208 | 0,224 | 0,275 | 0,440 | 0,950 |
| Wiederholpräzision (Standardabw. σ) repeatability (Standard deviation σ) | 0,006 | 0,004 | 0,004 | --- | 0,013 | --- |
| zul. Wiederholpräzision Allowed repeatability | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 | 0,040 |

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Messergebnisse Measuring results

Horizontale Richtung
horizontal direction

| lfd. Nr. seq. no. | 10x μm Skala B Scale B | 20x μm Skala B Scale B | 50x μm Skala C Scale C | 150x μm Skala C Scale C | 20x LD μm Skala B Scale B | 50x LD μm Skala C Scale C | 100x LD μm Skala C Scale C |
|---|--|--|--|---|---|---|--|
| 1 | 999,403 | 598,745 | 99,486 | 39,896 | 599,756 | 100,257 | 100,124 |
| 2 | 999,314 | 598,733 | 99,487 | 39,899 | 599,741 | 100,236 | 100,136 |
| 3 | 999,313 | 598,752 | 99,481 | 39,905 | 599,725 | 100,259 | 100,140 |
| 4 | 999,246 | 598,744 | 99,487 | 39,902 | 599,719 | 100,236 | 100,125 |
| 5 | 999,329 | 598,751 | 99,496 | 39,908 | 599,750 | 100,252 | 100,135 |
| Max max | 999,403 | 598,752 | 99,496 | 39,908 | 599,756 | 100,259 | 100,140 |
| Min Min | 999,246 | 598,733 | 99,481 | 39,896 | 599,719 | 100,236 | 100,124 |
| Max – Min Max – Min | 0,157 | 0,019 | 0,015 | 0,012 | 0,037 | 0,023 | 0,016 |
| Mittelwert average | 999,321 | 598,745 | 99,487 | 39,902 | 599,738 | 100,248 | 100,132 |
| Standardabw. σ Standard deviation σ | 0,050 | 0,007 | 0,005 | 0,004 | 0,014 | 0,010 | 0,006 |
| Bezugswert Reference value | 1000,000 | 600,000 | 100,000 | 40,000 | 600,000 | 100,000 | 100,000 |
| Abw. der Referenz Dev. according to cert. | -0,020 | 0,000 | 0,000 | -0,010 | 0,000 | 0,000 | 0,000 |
| korrigiertes Sollmaß Corrected nominal size | 999,980 | 600,000 | 100,000 | 39,990 | 600,000 | 100,000 | 100,000 |
| Mittelwert average | 999,321 | 598,745 | 99,487 | 39,902 | 599,738 | 100,248 | 100,132 |
| Abweichung Deviation | -0,659 | -1,255 | -0,513 | -0,088 | -0,262 | 0,248 | 0,132 |
| Zulässige Abweichung Allowed deviation | 20,000 | 12,000 | 2,000 | 0,800 | 12,000 | 2,000 | 2,000 |
| Wiederholpräzision (Standardabw. 3σ) repeatability (Standard deviation 3σ) | 0,150 | 0,020 | 0,015 | 0,013 | 0,043 | 0,030 | 0,019 |
| zul. Wiederholpräzision Allowed repeatability | 0,200 | 0,100 | 0,040 | 0,020 | 0,100 | 0,040 | 0,030 |

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Messergebnisse Measuring results

Vertikale Richtung - Rauheit
vertical direction – roughness

| lfd. Nr. seq. no. | Ra μm | Rz μm | Rmax μm |
|----------------------|---------------------|---------------------|-----------------------|
| 1 | 1,010 | 3,346 | 3,404 |
| 2 | 1,011 | 3,347 | 3,385 |
| 3 | 1,012 | 3,329 | 3,408 |
| 4 | 1,010 | 3,335 | 3,393 |
| 5 | 1,010 | 3,334 | 3,400 |

| Rauheitsparameter Roughness measuring parameter | Bezugswert Reference value μm | Mittelwert average μm | Standard- abweichung Standard deviation μm | Abweichung Deviation | | Zulässige Abweichung Allowed deviation % v.Mw. o.mv. |
|---|--|--|--|-------------------------|---------------------|---|
| | | | | μm | % v.Mw. o.mv. | |
| Ra | 1,038 | 1,011 | 0,00 | -0,027 | -2,64 | 1,038 |
| Rz DIN | 3,450 | 3,338 | 0,01 | -0,112 | -3,24 | 3,450 |
| R max | 3,490 | 3,398 | 0,01 | -0,092 | -2,64 | 3,490 |

Die Messwerte sind Mittelwerte aus 5 Messungen, über die Messfläche verteilt.

The measured values are the average values of 5 measurements spread over the section of measurements.

Grenzwellenlänge Cut off λ_c : 0,8 mm; Tastspitzenwinkel tip angle α : 90°; Tastspitzenradius tip radius r : 4,5 mm

Messergebnisse Measuring results

Vertikale Richtung - Parallelendmaße
vertical direction – gauge block

| Bezugswert Reference value mm | 1,00 | 2,00 | 3,00 | 4,00 | 5,00 | 6,00 | 6,50 |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Abw. der Referenz Dev. according to cert. μm | -0,04 | 0,05 | 0,02 | -0,04 | 0,06 | 0,04 | 0,08 |
| korrigiertes Sollmaß Corrected nominal size mm | 0,99996 | 2,00005 | 3,00002 | 3,99996 | 5,00006 | 6,00004 | 6,50008 |
| korrigiertes Sollmaß Corrected nominal size μm | 999,960 | 2000,050 | 3000,020 | 3999,960 | 5000,060 | 6000,040 | 6500,080 |
| Messwert Measurement value μm | 1002,666 | 2002,300 | 3001,518 | 4007,647 | 5010,367 | 6000,585 | 6506,590 |
| Abweichung Deviation μm | 2,706 | 2,250 | 1,498 | 7,687 | 10,307 | 0,545 | 6,510 |
| Zulässige Abweichung Allowed deviation μm | 11,000 | 21,000 | 31,000 | 41,000 | 51,000 | 61,000 | 66,000 |

Besondere Bemerkungen Special remarks

