

DATA SHEET

**ROTARY GRATING DISK** 

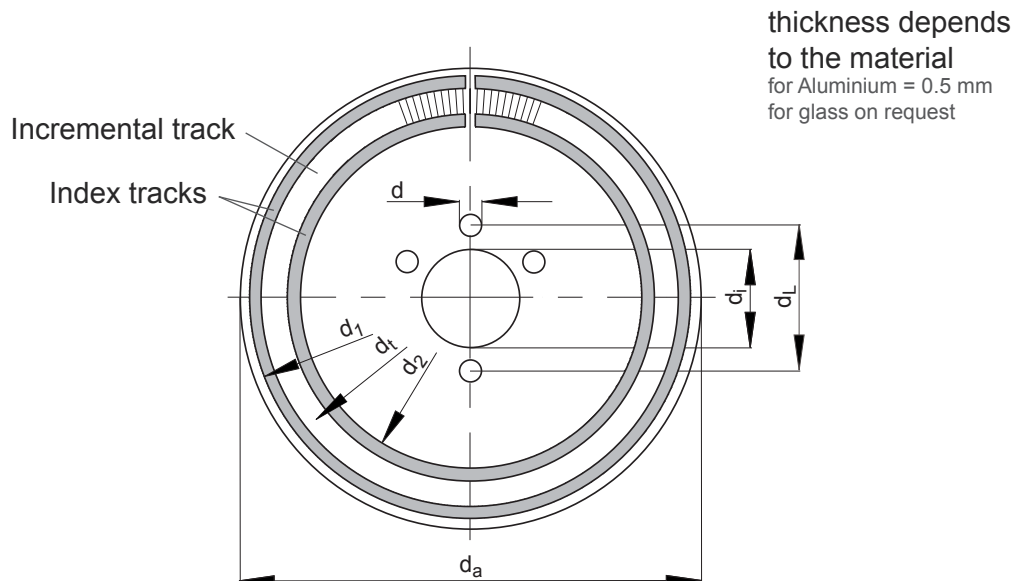
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## 1. Overview

The grating disks from NUMERIK JENA are available in different sizes and versions. Hereto we have a big selection of obtainable grating disks in supply but on request we also manufacture at customer's option.

Our grating disks are made of an aluminium alloy. They are also available in glass on request.



$d_i$	Inside diameter of the grating disk
$d_a$	Outside diameter of the grating disk
$d_t$	Center diameter of the incremental track
$d_1$	Outside diameter of the index track
$d_2$	Inside diameter of the index track
$d_L$	Hole spacing of borings for mounting screws
$d$	Diameter of the borings
$Z$	Number of lines of the grating disk

## 2. Grating disks - types

Type	$d_i$ [mm]	$d_a$ [mm]	$d_t$ [mm]	$d_1$ [mm]	$d_2$ [mm]	$d_L$ [mm]	$d$ [mm]	Z
RS 19/6/3600	6 + 0.1	26 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	19	24	14	-	-	3,600
RS 19/12/3600	12 + 0.1	26 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	19	24	14	-	-	3,600
RS 19/13/3600	13 + 0.1	26 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	19	24	14	-	-	3,600
RS 29/16/900	16 + 0.1	36 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	29	34	24	-	-	900
RS 29/16/1000	16 + 0.1	36 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	29	34	24	-	-	1,000
RS 29/16/4500	16 + 0.1	36 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	29	34	24	-	-	4,500
RS 29/20/900	20 + 0.1	36 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	29	34	24	-	-	900
RS 39/10/1800	10 <sup>M5</sup>	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	14.5	2.3	1,800
RS 39/10/2048	10 <sup>M5</sup>	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	14.5	2.3	2,048
RS 39/10/3600	10 <sup>M5</sup>	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	14.5	2.3	3,600
RS 39/25/1800	25 + 0.1	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	-	-	1,800
RS 39/25/2048	25 + 0.1	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	-	-	2,048
RS 39/25/3600	25 + 0.1	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	-	-	3,600
RS 39/25/6000	25 + 0.1	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	-	-	6,000
RS 39/26/3600	26 + 0.1	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	-	-	3,600
RS 39/30/3600	30 + 0.1	46 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	39	44	34	-	-	3,600
RS 45/30/9000	30 + 0.1	54 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	45	50	40	-	-	9,000
RS 45/33/9000	33 + 0.1	54 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	45	50	40	-	-	9,000
RS 64/48,5/2048	48,5 + 0.1	71 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	64	69	59	-	-	2,048
RS 64/48,5/4096	48,5 + 0.1	71 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	64	69	59	-	-	4,096
RS 64/48,5/9000	48,5 + 0.1	71 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	64	69	59	-	-	9,000
RS 64/48,5/10000	48,5 + 0.1	71 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	64	69	59	-	-	10,000
RS 92/70/3600	70 + 0.1	100 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	92	97	87	-	-	3,600
RS 92/70/9000	70 + 0.1	100 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	92	97	87	-	-	9,000
RS 92/70/18000	70 + 0.1	100 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	92	97	87	-	-	18,000
RS 92/71/18000	71 + 0.1	100 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	92	97	87	-	-	18,000
RS 92/76/3600	76 + 0.1	100 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	92	97	87	-	-	3,600
RS 92/80/3600	80 + 0.1	100 $\begin{smallmatrix} -0.2 \\ -0.5 \end{smallmatrix}$	92	97	87	-	-	3,600

RS 142/120/5400	120 + 0.2	150 <sup>-0.2</sup> <sub>-0.5</sub>	142	147	137	-	-	5,400
RS 142/120/8192	120 + 0.2	150 <sup>-0.2</sup> <sub>-0.5</sub>	142	147	137	-	-	8,192
RS 142/120/18000	120 + 0.2	150 <sup>-0.2</sup> <sub>-0.5</sub>	142	147	137	-	-	18,000
RS 142/122/5400	122 + 0.2	150 <sup>-0.2</sup> <sub>-0.5</sub>	142	147	137	-	-	5,400
RS 142/128/18000	128 + 0.2	150 <sup>-0.2</sup> <sub>-0.5</sub>	142	147	137	-	-	18,000
RS 192/160/24000	160 + 0.2	200 <sup>-0.2</sup> <sub>-0.5</sub>	192	197	187	-	-	24,000

(other sizes on request)

### 3. Properties - Aluminium grating disk

Product	4270GP, MIRO® 27	Extra Bright Rolled, reflection
Material / Alloy	AL 99.85 (to DIN EN 573-3)	Hard (to DIN EN 485-2)
	Density	~ 2.71 kg/m <sup>3</sup>
	Melting point	~ 650°C
Mechanical properties	Tensile strength	160 - 200 N/mm <sup>2</sup>
	Modulus of Elasticity	71000 N/mm <sup>2</sup>
	Yield strength	140 - 180 N/mm <sup>2</sup>
	Elongation (A50)	≥ 2%
	Deformation / Bending	≥ 1.5 x gauge of material [Bending radius]
Thermal properties	Coefficient of thermal expansion $\alpha$	~ 24 x 10 <sup>-6</sup> K <sup>-1</sup>
	Specific thermal capacity $c_p$ (20 - 100 °C)	~ 900 J x (kg x K) <sup>-1</sup>
	Specific thermal conductivity $\lambda$ (20 °C)	~ 222 W x (m x K) <sup>-1</sup>
Geometrical properties	Thickness	0.5 (±0,04) mm
	Radius	on request (ordering key)
Optical properties	Total light reflection (S1)	≥ 95% (to DIN 5036-3 (U-Globe))
	Diffuse light reflection (S1)	< 6%
	Brightness (S1)	
	along	91
across	90	
Surface properties	Treatment (S1)	brightened, anodised and PVD-coated
	PVD Coating (S1)	PVD AL 99,99
	Iridescence Assessment (S1)	Absolutely free of interference colors
	Treatment (S2)	anodised

S1 = Front  
S2 = Rear

#### 4. Properties - Floatglas grating disk

Mechanical properties	Density $\rho$ (at 25 °C)	2.49 g/cm <sup>3</sup>
	Young's modulus E (at 25 °C)	70 kN/mm <sup>2</sup>
	Poisson's ratio $\mu$	0.23
Thermal properties	Coefficient of linear thermal expansion $\alpha$ (0 - 300 °C)	$9.7 \times 10^{-6} \text{ K}^{-1}$
	Specific thermal capacity $c_p$ (20 °C)	0.72 KJ x (kg x K) <sup>-1</sup>
	Point of deformation	490 °C ( $\pm 10$ °C)
Optical properties	Refraction index $n_d$	1.52 (588 nm)
Chemical properties	Main constituents	SiO <sub>2</sub> (69 - 74%), CaO (5 - 12%), NaO (12 - 16%), MgO (0 - 6%), AlO (0 - 3%)

## 5. Properties - BOROFLOAT® 33 Borosilicate Glass grating disk

Mechanical properties	Density $\rho$ (at 25 °C)	2.2 g/cm <sup>3</sup>
	Young's modulus E (at 25 °C)	64 kN/mm <sup>2</sup> (to DIN 13316)
	Knoop hardness ( <sup>HK</sup> 0.1/20)	480 (to ISO 9385)
	Poisson's ratio $\mu$	0.2 (to DIN 13316)
	Bending strength $\delta$	25 Mpa (to DIN 52292 T 1)
	Impact resistance	The impact resistance of BOROFLOAT® 33 is dependent on the way it is fitted, panel size and thickness, the type of impact it is subjected to and certain other parameters not indicated here.
Thermal properties	Coefficient of linear thermal expansion $\alpha_{(20 - 180\text{ °C})}$	3.25 x 10 <sup>-6</sup> K <sup>-1</sup> (to ISO 7991)
	Specific thermal capacity $c_p_{(20 - 100\text{ °C})}$	0.83 KJ x (kg x K) <sup>-1</sup>
	Specific thermal conductivity $\lambda_{(90\text{ °C})}$	1.2 W x (m x K) <sup>-1</sup>
	Maximum operating temperature	
	for short-term usage $\delta_{\text{max}} (< 10\text{ h})$	500 °C
	for long-term usage $\delta_{\text{max}} (< 10\text{ h})$	450 °C
	Resistance of thermal gradients (RTG)	
1 - 100 h	90 K	
> 100 h	80 K	
Chemical properties	Main constituents	SiO <sub>2</sub> (81%), Al <sub>2</sub> O <sub>3</sub> (2%), Na <sub>2</sub> O/K <sub>2</sub> O (4%), B <sub>2</sub> O <sub>3</sub> (13%)
	Hydrolytic resistance	
	to ISO 719 / DIN 12 111	Class HGB 1
	to ISO 720	Class HGA 1
	Acid resistance	
	to ISO 1776 / DIN 12 116	1
Alkali resistance		
to ISO 695 / DIN 52 322	A2	



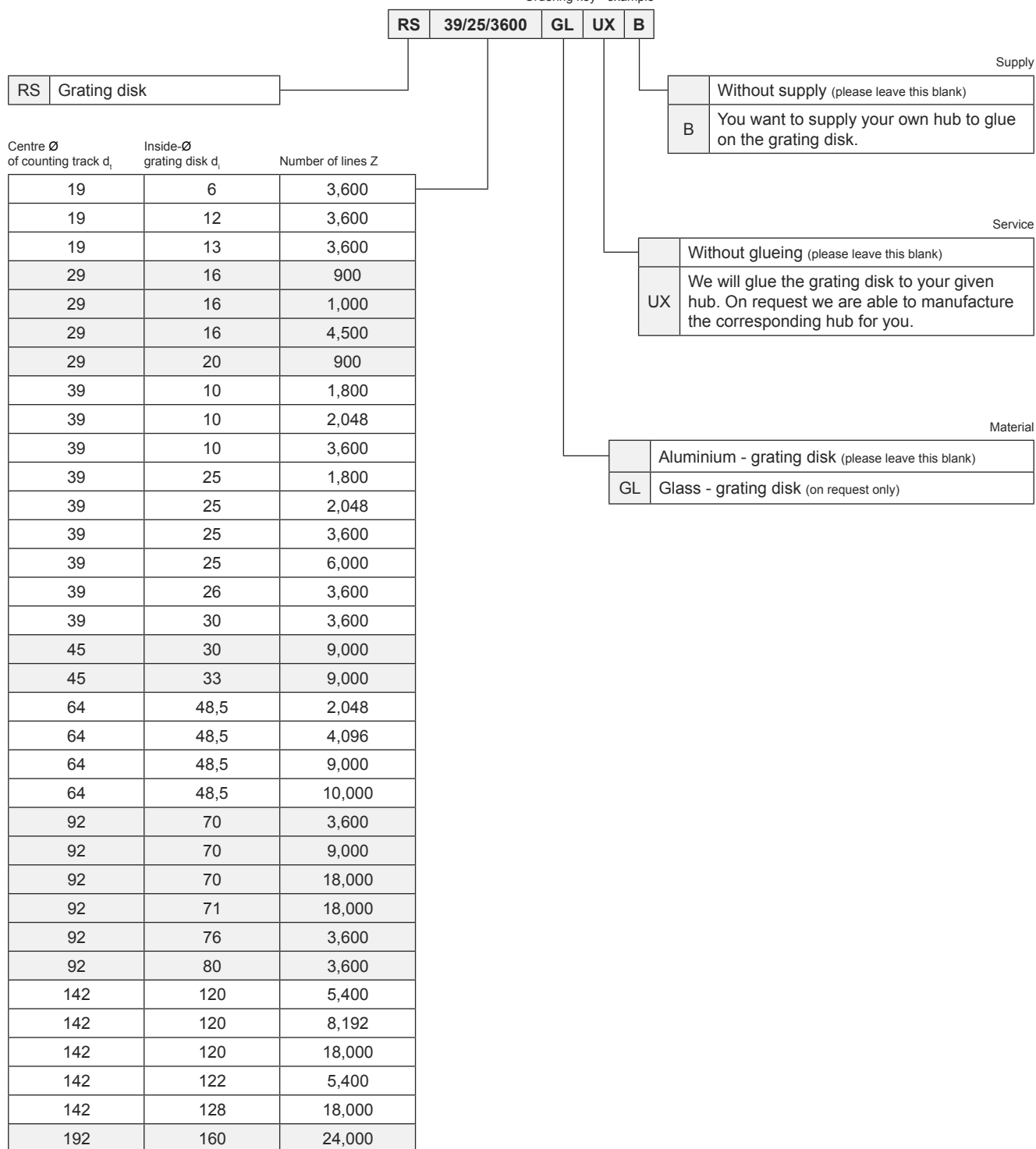
## 6. Properties - ROBAX® Glass ceramic grating disk

Mechanical properties	Density $\rho$ (bei 25 °C)	2.6 g/cm <sup>3</sup>
	Young's modulus E	93 kN/mm <sup>2</sup> (to DIN 13316)
	Poisson's ratio $\mu$	0.25 (to DIN 13316)
	Bending strength $\delta$	35 Mpa (to DIN 52292 T 1)
	Impact resistance	The strength of glass ceramic is material constant. It is dependent on the size and thickness of the panel, the finish condition (edge working, drillings, etc.), usage conditions, (kind and distribution of defects on the surface), and the time related and kind of impact load and the type of panel installation.
Thermal properties	Coefficient of mean linear thermal expansion $\alpha$ (20 - 700 °C)	$(0 \pm 0.5) \times 10^{-6} \text{ K}^{-1}$
	Specific heat $c_p$ (20 - 100 °C)	$0.8 \times 10^3 \text{ J} \times (\text{kg} \times \text{K})^{-1}$
	Thermal conductivity $\lambda$ (90 °C)	$1.6 \text{ W} \times (\text{m} \times \text{K})^{-1}$
Chemical properties	The chemical composition of ROBAX® complies with the requirements for glass ceramic in accordance with EM 1748 T2. ROBAX® is made of ecologically safe raw materials. The glass can be re-used through recycling of the material.	

Please find further information of our rotary measuring systems in the respective data sheets or visit our website [www.numerikjena.com](http://www.numerikjena.com).

## 7. Ordering key

Ordering key - example



(other sizes on request)