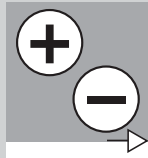




iglidur® V400

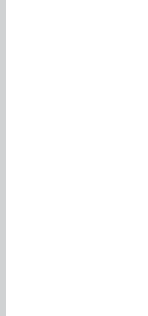
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iglidur® V400 – Wear-Resistant at High Temperatures



- Excellent wear resistance with soft shaft materials
- Good chemical resistance
- High elasticity
- For temperatures up to 200°C



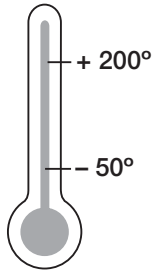
This material widens the scope of applications up to 200°C. Due to their high elasticity, the bearings are also suitable for vibrating applications and high edge pressures.

iglidur® V400

2 styles
> 10 dimensions
Ø 6–20 mm



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igus® GmbH
51147 Cologne

Price index



Wear-Resistant at High Temperatures



When to use iglidur® V400 plain bearings:

- For soft shafts
- For applications at temperatures higher than 100°C
- If vibrations and edge pressure are present
- In dirty environments
- Excellent wear resistance with soft shaft materials
- Good chemical resistance
- High elasticity

When not to use iglidur® V400 plain bearings:

- For hardened shafts
 - ▶ iglidur® W300 (chapter 5), X (chapter 6), Z (chapter 22)
- For applications at normal temperatures
 - ▶ iglidur® G (chapter 2), J (chapter 3), W300 (chapter 5)
- When a cost-effective universal bearing is required
 - ▶ iglidur® G (chapter 2)

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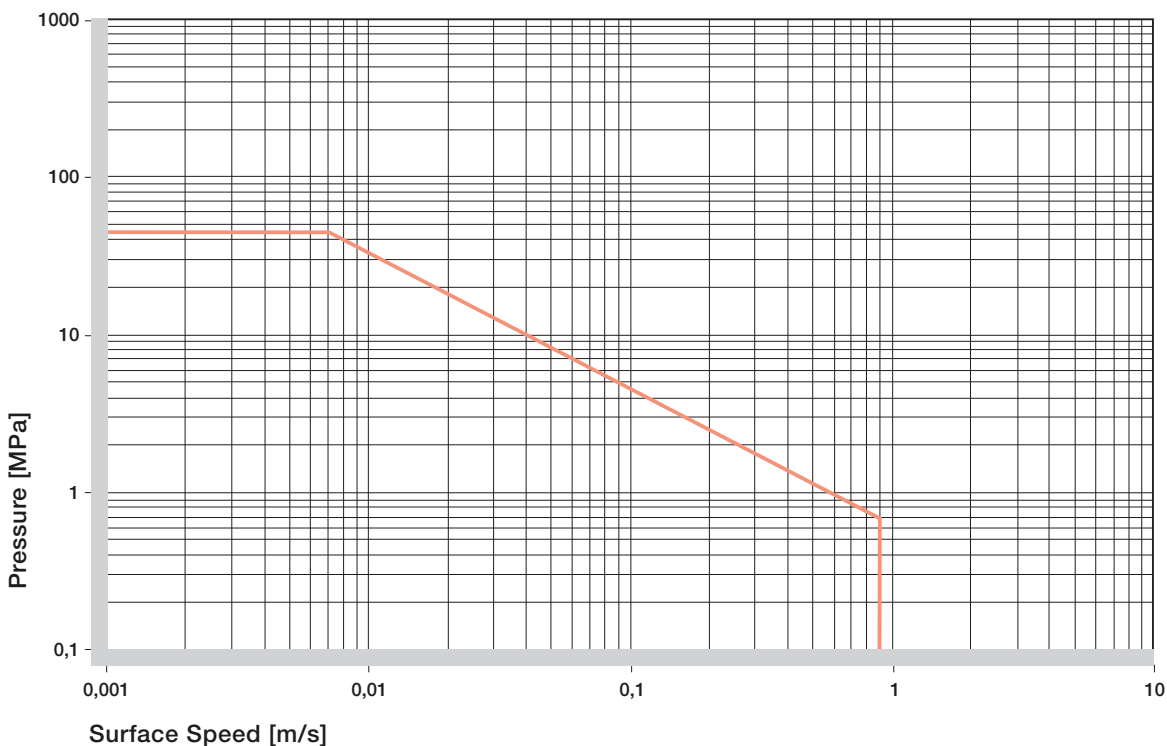
Material Table

General Properties	Unit	iglidur® V400 Testing Method	
Density	g/cm ³	1,51	
Colour		White	
Max. moisture absorption at 23°C / 50% r.F.	% weight	0,1	DIN 53495
Max. moisture absorption	% weight	0,2	
Coefficient of friction, dynamic against steel	μ	0,15 - 0,20	
p x v value, max. (dry)	MPa x m/s	0,50	
Mechanical Properties			
Modulus of elasticity	MPa	4.500	DIN 53457
Tensile strength 20°C	MPa	95	DIN 53452
Compressive strength	MPa	47	
Max. recommended surface pressure (20°C)	MPa	40	
Shore D hardness		74	DIN 53505
Physical and Thermal Properties			
Max. long term application temperature	°C	200	
Max. short term application temperature	°C	240	
Max. ambient temperature, short term ¹⁾	°C	250	
Min. application temperature	°C	-50	
Thermal conductivity	W/m x K	0,24	ASTM C 177
Coefficient of thermal expansion (at 23°C)	K ⁻¹ x 10 ⁻⁵	3	DIN 53752
Electrical Properties			
Specific volume resistance	Ωcm	> 10 ¹²	DIN IEC 93
Surface resistance	Ω	> 10 ¹²	DIN 53482

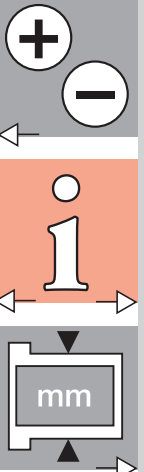
¹⁾Without additional load; no sliding movement; relaxation possible

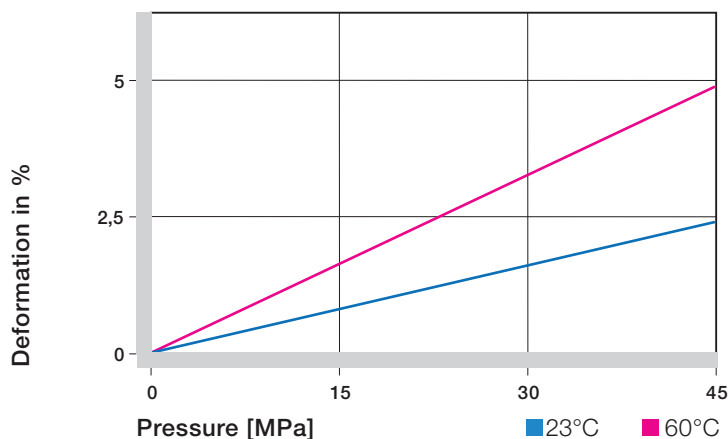
Table 21.1: Material Data

The preliminary data sheet displays the values of a typical compound. Due to optimisation of composition and production, these values may be subject to changes.



Graph 21.1: Permissible p x v values for iglidur® V400 with a wall thickness of 1 mm running dry against a steel shaft at 20°C, mounted in a steel housing





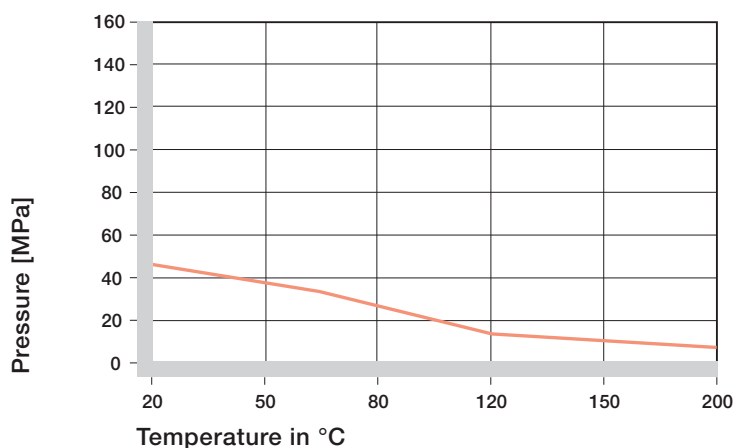
Graph 21.2: Deformation under pressure and temperature

m/s	Rotating	Oscillating	Linear
Continuous	0,9	0,6	2
Short term	1,3	0,9	3

Table 21.2: Maximum surface speed

iglidur® V400 Application Temperature	
Minimum	-50 °C
Max. long term	+200 °C
Max. short term	+240 °C

Table 21.3: Temperature limits for iglidur® V400



Graph 21.3: Recommended maximum surface pressure of iglidur® V400 as a function of temperature

Plain bearings of iglidur® V400 present an excellent solution where high elasticity, durability and wear resistance at high temperatures is required.

The material has excellent resistance to chemicals, and is well suited to applications involving this type of environment.

iglidur® V400 plain bearings are ideal for use with soft shaft materials, such as 303 stainless steel.

Surface Pressure

iglidur® V400 plain bearings are not suitable for very high pressures or static peak loads. The material gives good wear resistance up to the maximum permissible pressure of 45 MPa.

Please note that the maximum permitted pressure of 20 MPa at 100 degrees is still very high. In Graph 21.2, the effect of the high elasticity can clearly be seen.

Graphs 21.2 and 21.3

► Surface Pressure, page 1.18

Permissible Surface Speeds

The high temperature resistance of iglidur® V400 means that high surface speeds are possible. The low coefficients of friction also are a factor in this area. Rotational speeds up to 1.5 m/s can be achieved (0.8 m/s for continuous use), and linear speeds up to 3 m/s for a short duration.

► Surface Speed, page 1.26

► $p \times v$ value, page 1.22

Temperatures

The long-term maximum permissible application temperature is 200°C, although at these temperatures the bearings have to be mechanically secured. Then, however,

the wear resistance of the bearings is very good and adopts a leading position among all iglidur® materials. The compressive strength of iglidur® V400 plain bearings decreases with increasing temperatures.

Graph 21.3 shows this relationship.

☑ Graph 21.3

▶ Application Temperatures, page 1.23

Friction and Wear

The coefficient of friction depends on the loading of the bearings. When used at a pV rating outside the permissible limits, the bearings respond with an increase of the coefficient of friction. As long as the loads are within the permissible range, the coefficient of friction of the bearings is very low.

In addition, the coefficients of friction of iglidur® V400 are virtually constant. No other iglidur® plain bearing material presents a lower variance with regard to the coefficients of friction in the laboratory tests, even if the shaft material is changed.

With regard to wear, iglidur® V400 plain bearings are better suited to rotating applications than oscillating movements.

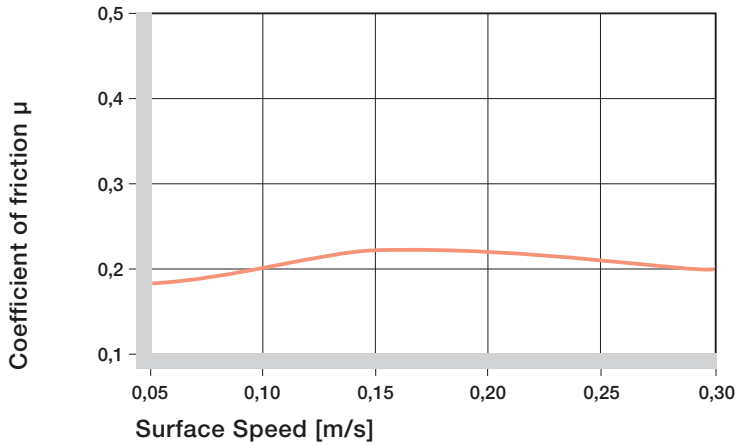
☑ Graphs 21.4 to 21.6

▶ Coefficients of Frictions and Surfaces, page 1.25

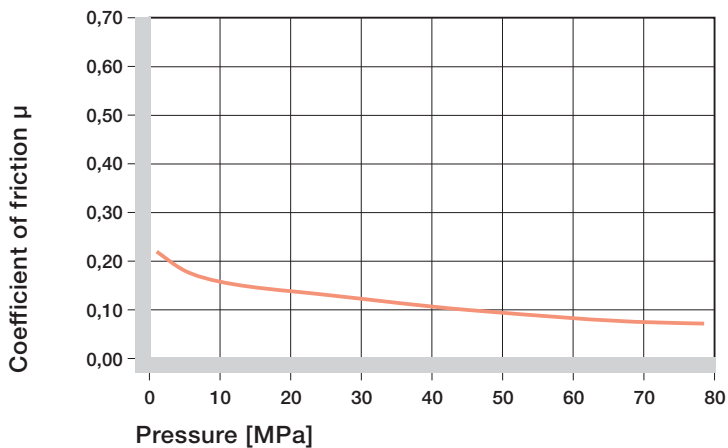
▶ Wear Resistance, page 1.26

iglidur® V400	Dry	Grease	Oil	Water
C.o.f. [μ]	0,15–0,20	0,09	0,04	0,04

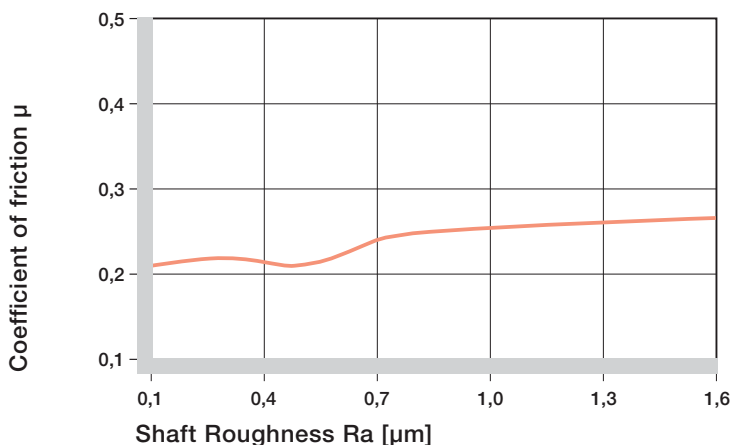
Table 21.4: Coefficients of friction for iglidur® V400 against steel (Ra = 1 μ m, 50 HRC)



Graph 21.4: Coefficients of friction for iglidur® V400 as a function of the surface speed, p = 0.75 MPa



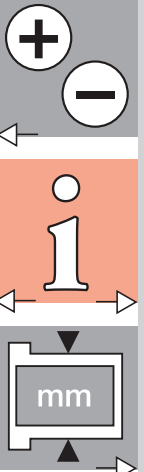
Graph 21.5: Coefficients of friction for iglidur® V400 as a function of pressure, v = 0.01 m/s

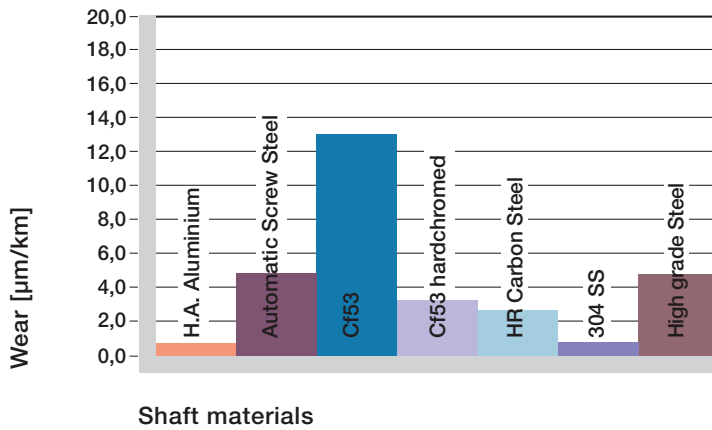


Graph 21.6: Coefficients of friction for iglidur® V400 as a function of the shaft surface (Cf53 hardened and ground steel)

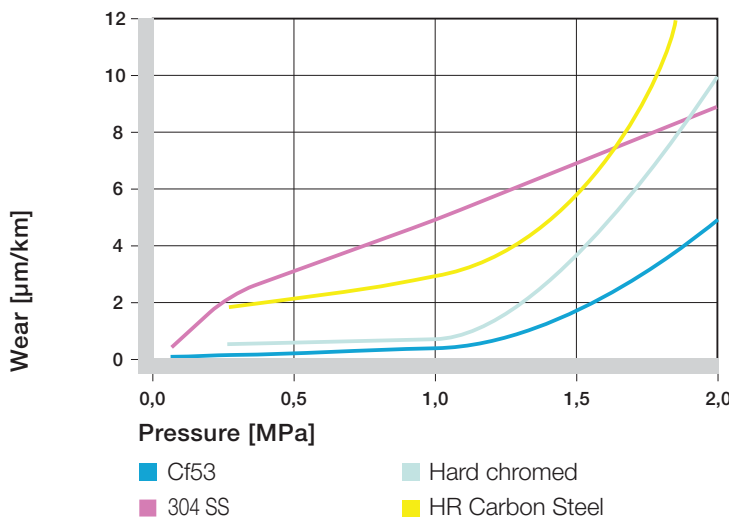
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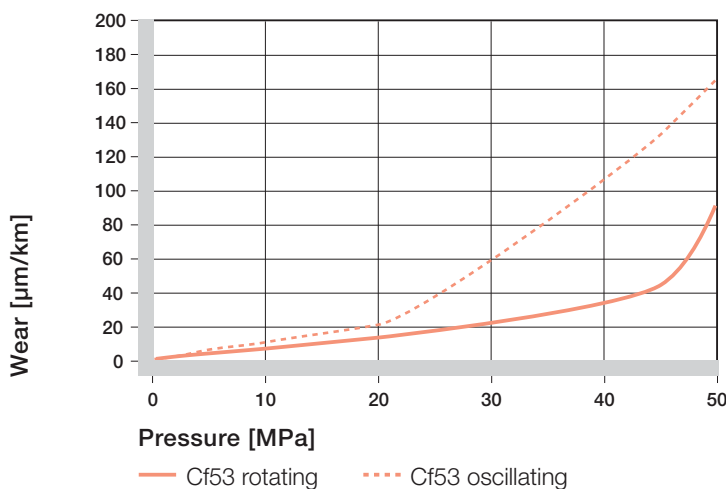




Graph 21.7: Wear of iglidur® V400, rotating application with different shaft materials, $p = 0.75 \text{ MPa}$, $v = 0.5 \text{ m/s}$



Graph 21.8: Wear of iglidur® V400 with different shaft materials in rotating applications



Graph 21.9: Wear for rotating and oscillating applications as a function of the pressure (Cf53 hardened and ground steel)

Shaft Materials

As previously mentioned in the section regarding friction and wear, the friction of iglidur® V400 plain bearings are almost independent of shaft material. This even applies to the case where, in addition to steel shafts, plastics and ceramics are tested. The impact on the wear resistance is greater. Here considerable differences can be noted even with regard to lower loads (0.75 MPa), as shown in Graph 21.7.

- Graphs 21.7 to 21.9
- Shaft Materials, page 1.28

Installation Tolerances

igidur® V400 plain bearings are standard bearings for shafts with h tolerance (h9 recommended at least).

The bearings are designed for pressfit into a housing with a H7 tolerance. After being assembled into a nominal size housing, the inner diameter of the bearings is automatically adjusted to E10 tolerance.

- Testing Methods, page 1.35

Chemical Resistance

igidur® V400 plain bearings feature good chemical resistance. They are resistant to detergents, greases, oils, alcohol, solvents, diluted bases, as well as to diluted acids. The moisture absorption of iglidur® V400 plain bearings is only 0.2% after saturation in water.

- Graph 21.10
- Chemical Table, page 70.1

Radiation Resistance

Plain bearings of iglidur® V400 are resistant to a radiation intensity of 2×10^4 Gy. Higher radiation affects the material and can result in a loss of important mechanical characteristics.

UV Resistance

iglidur® V400 plain bearings are resistant to UV radiation to a large extent.

Vacuum

In the vacuum, iglidur® V400 plain bearings can only be used to a limited extent. Out-gassing takes place.

Electrical Properties

iglidur® V400 plain bearings are electrically insulating.

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® V400 10 [mm]	
up to 3	0–0,025	+0,014	+0,054
> 3 to 6	0–0,030	+0,020	+0,068
> 6 to 10	0–0,036	+0,025	+0,083
> 10 to 18	0–0,043	+0,032	+0,102
> 18 to 30	0–0,052	+0,040	+0,124
> 30 to 50	0–0,062	+0,050	+0,150

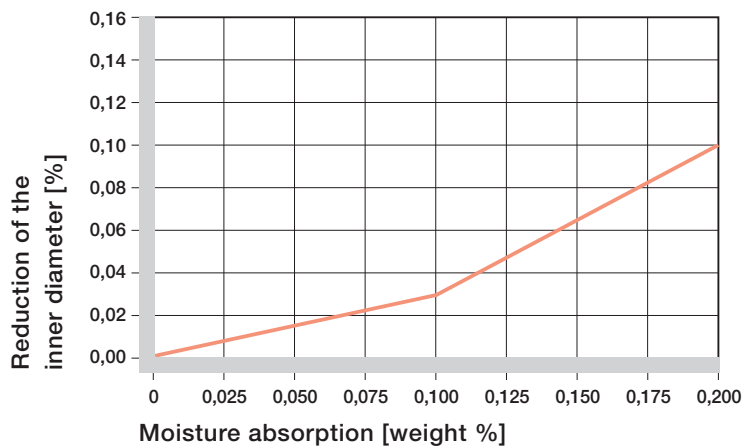
Table 21.5: Essential tolerances for iglidur® V400 plain bearings according to ISO 3547-1 after pressfit

Medium	Resistance
Alcohol	+
Hydrocarbons	+
Greases, oils	
without additives	+
Fuels	+
Diluted acids	+
Strong acids	+
Diluted alkalines	+
Strong alkalines	–

Table 21.6: Chemical resistance of iglidur® V400 – detailed list, page 70.1

+ resistant 0 conditionally resistant – not resistant

All data given at room temperature [20°C]



Graph 21.10: Effect of moisture absorption on iglidur® V400 plain bearings

iglidur® V400

Specific

volume resistance > $10^{12} \Omega\text{cm}$

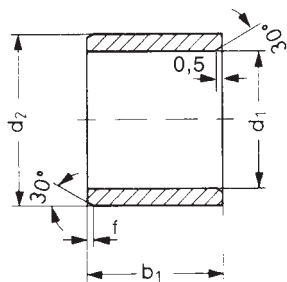
Surface resistance > $10^{12} \Omega$

Table 21.7: Electrical properties of iglidur® V400

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Data in mm

Structure – part no.
V S M-0608-06



Chamfer in relation to the d1

d1 [mm]:	Ø 1-6	Ø 6-12	Ø 12-30	Ø > 30
f [mm]:	0,3	0,5	0,8	1,2

Dimensions according ISO 3547-1 and special dimensions

Part Number	d1	d1 Tolerance*	d2	b1
VSM-0608-06	6,0	+0,010 +0,058	8,0	6,0
VSM-0810-10	8,0	+0,013 +0,071	10,0	10,0
VSM-1012-10	10,0	+0,013 +0,071	12,0	10,0
VSM-1214-12	12,0	+0,016 +0,086	14,0	12,0
VSM-1618-15	16,0	+0,016 +0,086	18,0	15,0
VSM-2023-20	20,0	+0,020 +0,104	23,0	20,0

*after pressfit. Testing methods ► page 1.35

mm

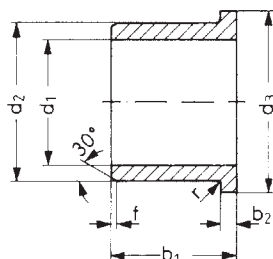
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51147 Cologne

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E-mail info@igus.de

iglidur® V400 | Flange Bearing | mm



r = max. 0,5 mm

Chamfer in relation to the d1

d1 [mm]:	Ø 1-6	Ø 6-12	Ø 12-30	Ø > 30
f [mm]:	0,3	0,5	0,8	1,2

Data in mm

Structure – part no.
V F M-0608-06



Dimensions according ISO 3547-1 and special dimensions

Part Number	d1	d1 Tolerance*	d2	d3	b1	b2
VFM-0608-06	6,0	+0,010 +0,058	8,0	12,0	6,0	1,0
VFM-0810-10	8,0	+0,013 +0,071	10,0	15,0	10,0	1,0
VFM-1012-10	10,0	+0,013 +0,071	12,0	18,0	10,0	1,0
VFM-1214-12	12,0	+0,013 +0,071	14,0	20,0	12,0	1,0
VFM-1618-17	16,0	+0,016 +0,086	18,0	24,0	17,0	1,0
VFM-2023-21	20,0	+0,016 +0,086	23,0	30,0	21,5	1,5

*after pressfit. Testing methods ► page 1.35