

iglidur® H4

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iglidur® H4 – For Under Bonnet Applications



Good abrasion resistance

Low coefficients of friction

High temperature resistance from -40°C to +200°C

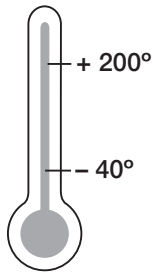
Good chemical resistance

iglidur® H4 bearings show high static load capacity, good wear resistance and good performance at high temperatures. At the same time, the bearings are a cost-effective solution for these challenges.

iglidur® H4

1 Style
more upon request
> 12 dimensions
Ø 6–40 mm

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51147 Cologne

Price index



For Under Bonnet Applications



When to use iglidur® H4 plain bearings:

- If the temperature resistance of iglidur® G is not sufficient
- For applications with fuels, oils etc.
- When high wear resistance is necessary
- In dirty environments
- Good abrasion resistance
- Low coefficients of friction
- High temperature resistance from -40°C to 200°C
- Good chemical resistance

When not to use iglidur® H4 plain bearings:

- When the highest wear resistance is necessary
▶ iglidur® V400 (chapter 21)
- For underwater use
▶ iglidur® H370 (chapter 15)
- When a cost-effective universal bearing is required
▶ iglidur® G (chapter 2)

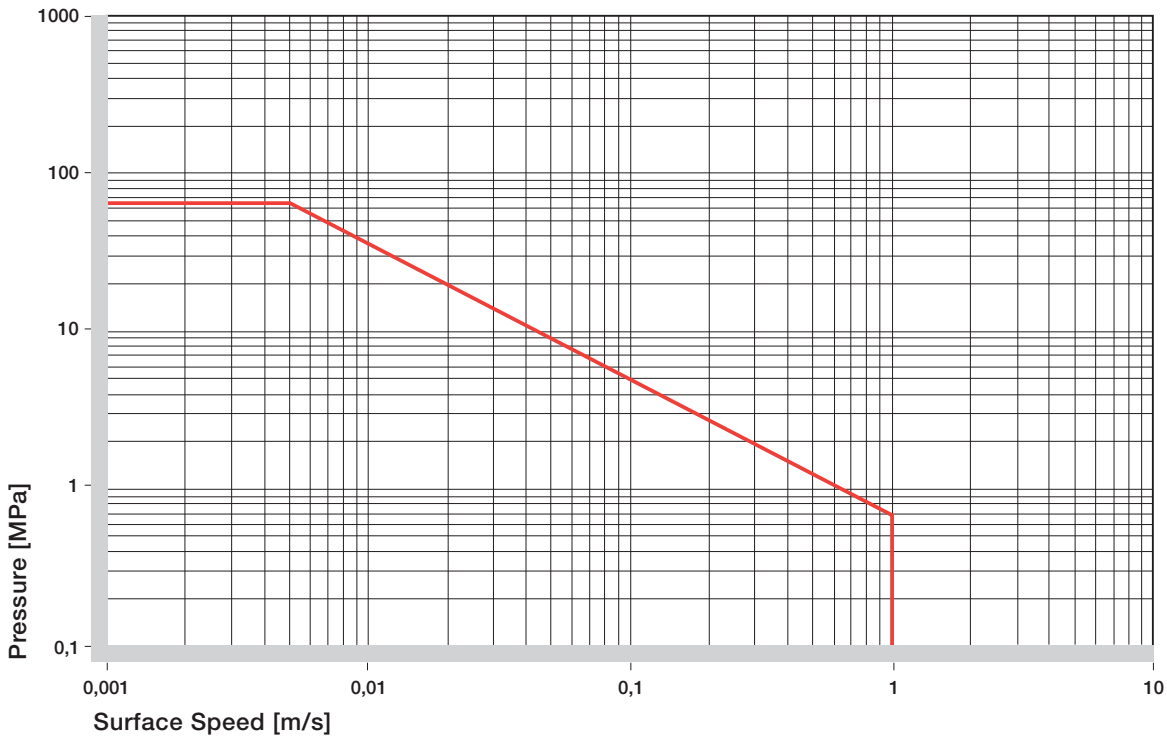
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Material Table

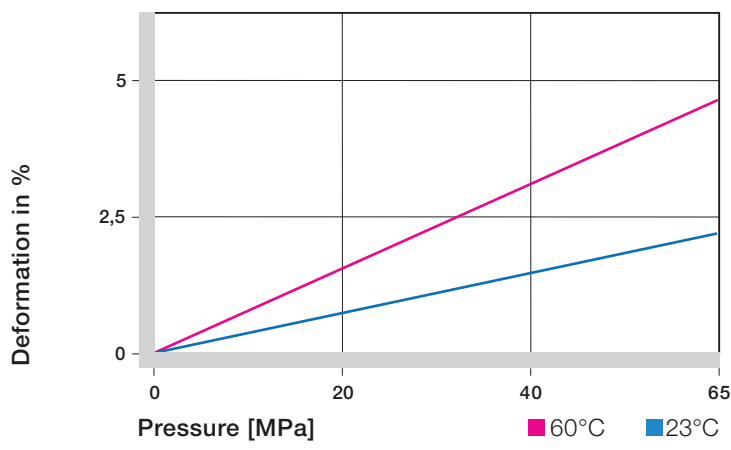
General properties	Unit	iglidur® H4	Testing method
Density	g/cm ³	1,79	
Colour		Brown	
max. moisture absorption 23 °C/50% r.F.	% weight	0,1	DIN 53495
max. water absorption	% weight	0,2	
Coefficient of sliding friction, dynamic against steel μ		0,08-0,025	
p x v value, max. (dry)	MPa x m/s	0,7	
Mechanical properties			
Modulus of elasticity	MPa	7.500	DIN 53457
Tensile strength at 20 °C	MPa	120	DIN 53452
Compressive strength	MPa	50	
Max. recommended surface pressure (20°C)	MPa	65	
Shore D hardness		80	DIN 53505
Physical and thermal properties			
Max. long term application temperature	°C	200	
Max. short term application temperature	°C	240	
Maximum short term ambient temperature ¹⁾	°C	260	
Min. application temperature	°C	-40	
Thermal conductivity	W/m x K	0,24	ASTM C 177
Coefficient of thermal expansion (at 23°C)	K ⁻¹ x 10 ⁻⁵	5	DIN 53752
Electrical properties			
Specific volume resistance	Ω cm	> 10 ¹³	DIN IEC 93
Surface resistance	Ω	> 10 ¹²	DIN 53482

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

Table 14.1: Material Data



Graph 14.1: Permissible p x v values for iglidur® H4 with a wall thickness of 1 mm running dry against a steel shaft at 20°C, mounted in a steel housing



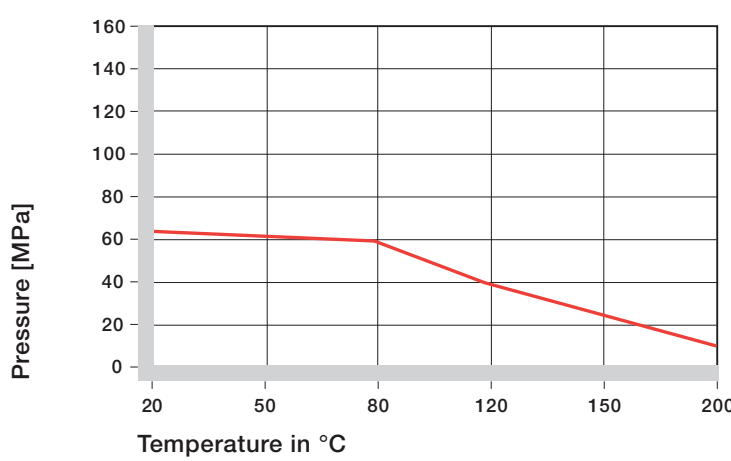
Graph 14.2: Deformation under pressure and temperature

m/s	Rotating	Oscillating	Linear
Continuous	1	0,7	1
Short term	1,5	1,1	2

Table 14.2: Maximum surface speeds

iglidur® H4	Application Temperature
Minimum	-40 °C
Max. long term	+200 °C
Max. short term	+240 °C

Table 14.3: Temperature limits for iglidur® H4



Graph 14.3: Recommended maximum surface pressure of iglidur® H4 as a function of temperature

iglidur® H4 plain bearings are designed for applications which require a high load capacity, good resistance to wear, excellent temperature resistance, all combined with an economic price. With this material, temperatures up to 200 degrees can be achieved, pressures up to 65 MPa can be applied, and good resistance to chemicals is shown. Solid lubricants reduce the friction of the material as well as supporting the wear resistance. When compared with the iglidur® H2 plain bearing material, most mechanical and tribological properties have been considerably improved. iglidur® H4 plain bearings are self lubricating and suitable for all types of motion.

Surface Pressure

Graph 14.2 shows the elastic deformation of iglidur® H4 when subjected to radial loads. Among the iglidur® H materials, iglidur® H4 is the one with the lowest modulus of elasticity. This is beneficial for applications with edge loads and presents the reason for a higher mechanical loss factor, identifying the vibration dampening capacity of a material. Where a high static compressive strength is concerned, the other iglidur® H bearing types are advantageous.

- ☒ Graph 14.2
- ▶ Surface Pressure, page 1.18

Permissible Surface Speeds

Compared to the iglidur® H2 plain bearings, which are also cost-effective, iglidur® H4 shows a greatly reduced coefficient of friction. This explains the higher permissible surface speeds that can be achieved with these bearings. When running dry, constant speeds of up to 0.7 m/s are possible. The speeds specified in Table 14.2, are limit values for the lowest bearing loads. In case of higher loads, the permissible speed decreases with increasing load due to the limitations defined by the $p \times v$ value.

- ▶ Surface Speed, page 1.20
- ▶ $p \times v$ value, page 1.22

Temperatures

iglidur® H4 is a temperature resistant material. The short-term maximum permissible temperature is 240°C, and therefore allows for the use of iglidur® H4 plain bearings in applications where the bearings for instance undergo a drying process without further loading. The compressive strength of iglidur® H4, however, decreases with increasing temperatures.

Graph 14.3 clarifies this relationship. At these high temperatures, the additional frictional heat in the bearing system has to be considered.

- ☑ Graph 14.3
- ▶ Application Temperatures, page 1.23

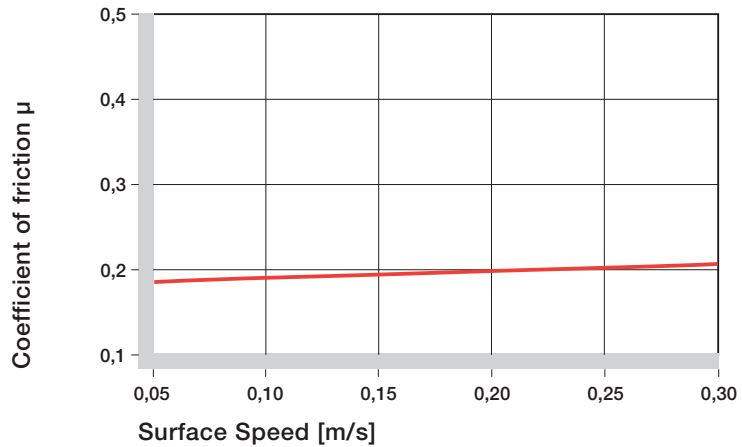
Friction and Wear

As mentioned previously, the coefficient of friction of iglidur® H4 plain bearings is very low. However, it has to be observed that a sliding surface which is too rough causes friction to increase. We recommend a shaft roughness (Ra) of 0.1 to 0.4 µm. The coefficient of friction of iglidur® H4 plain bearings is only dependent on the surface speed to a minor degree. The pressure on the bearing has a greater effect, when increasing the pressure on the bearing the coefficient of friction can be reduced to 0.08.

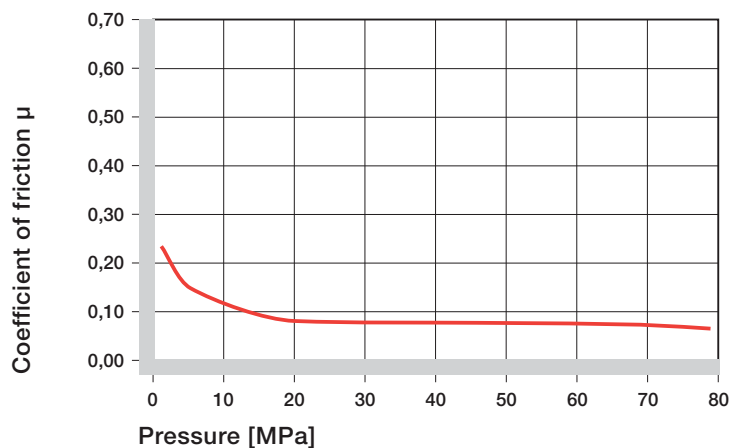
- ☑ Graphs 14.4 to 14.6
- ▶ Coefficients of Friction and Surfaces, page 1.25
- ▶ Wear Resistance, page 1.26

iglidur® H4	Dry	Grease	Oil	Water
C.o.f. [µ]	0,08–0,25	0,09	0,04	0,04

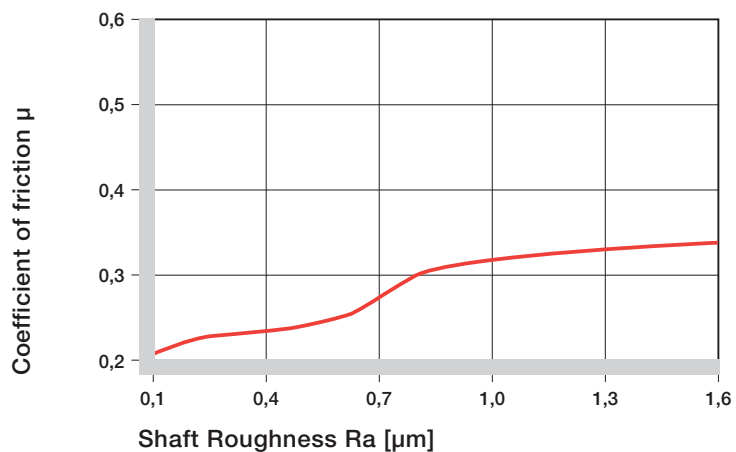
Table 14.4: Coefficient of friction of iglidur® H4 against steel (Ra = 1 µm, 50 HRC)



Graph 14.4: Coefficients of friction of iglidur® H4 as a function of the surface speed, p = 0.75 MPa



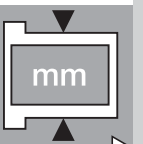
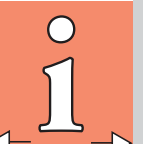
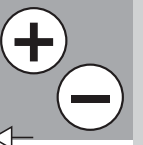
Graph 14.5: Coefficients of friction of iglidur® H4 as a function of the pressure, v = 0.01 m/s

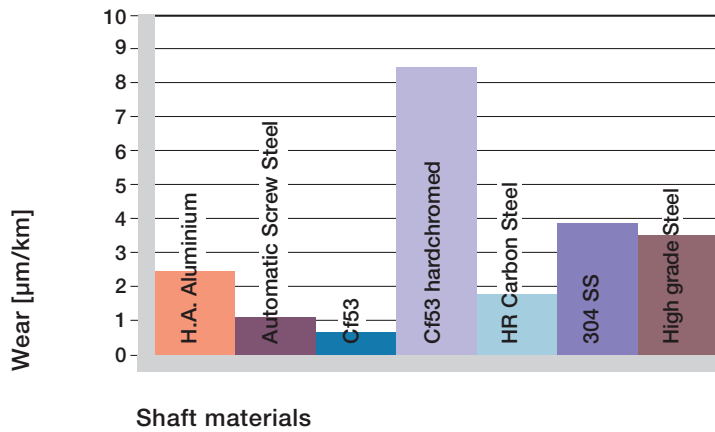


Graph 14.6: Coefficients of friction for iglidur® H4 as a function of the shaft surface (Cf53 hardened and ground steel)

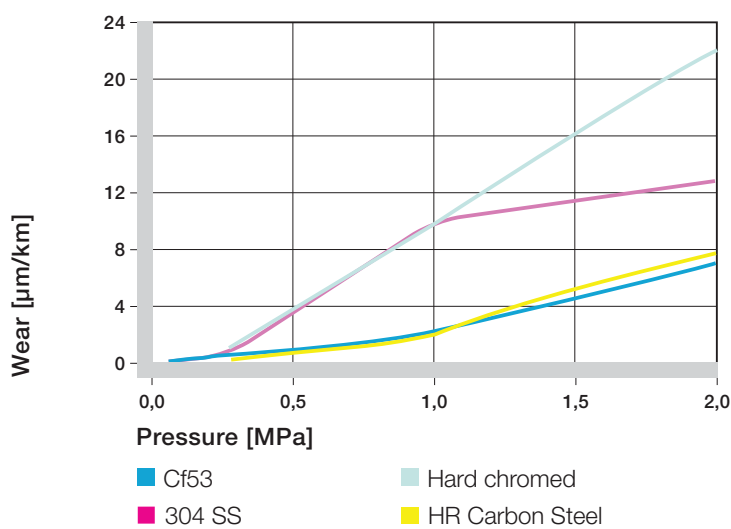
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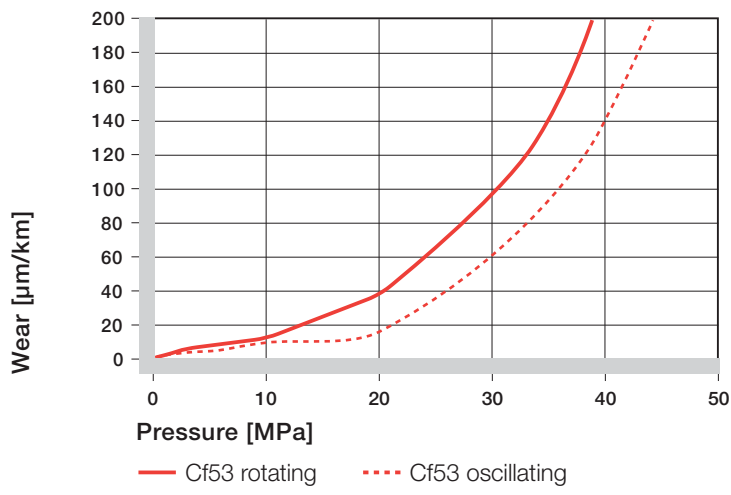




Graph 14.7: Wear of iglidur® H4, rotating applications with different shaft materials, p = 0.75 MPa, v = 0.5 m/s



Graph 14.8: Wear of iglidur® H4 with different shaft materials in rotational applications



Graph 14.9: Wear for rotating and oscillating applications as a function of the pressure (Cf53 hardened and ground steel)

Shaft Materials

As well as being an economic bearing, iglidur® H4 offers further savings when the shaft material is selected. Many alternatives are possible, although the correct shaft is also dependent on the type of application. There is no general rule to say if iglidur® H4 is better with soft or hard shafts. However, it is true that oscillating applications produce better wear results than rotating applications. When used in rotation, the wear rate increases significantly from pressures of 10 MPa.

- ☑ Graphs 14.7 to 14.9
- ▶ Shaft Materials, page 1.28

Installation Tolerances

iglidur® H4 plain bearings are standard bearings for shafts with h tolerance (h9 recommended at least). The bearings are designed for pressfit into a housing machined to a H7 tolerance. After being assembled into a nominal size housing, the inner diameter of the bearings is automatically adjusted to an F10 tolerance.

- ▶ Testing Methods, page 1.35

Chemical Resistance

iglidur® H4 plain bearings feature good chemical resistance. They are resistant to most lubricants. iglidur® H4 is not affected by most light organic and inorganic acids. The moisture absorption of iglidur® H4 plain bearings is below 0.1% in standard atmosphere. The saturation limit in water is 0.2%. iglidur® H4 is therefore an ideal material for wet environments.

- ☑ Graph 14.10
- ▶ Chemical Table, page 70.1

Radiation Resistance

iglidur® H4 withstands neutron radiation as well as gamma radiation without noticeable losses of its excellent mechanical characteristics. Plain bearings of iglidur® H4 are radiation resistant up to a radiation intensity of 2×10^2 Gy.

UV Resistance

iglidur® H4 plain bearings change under the influence of UV radiation and other climatic influences. The surface gets rougher, and the compressive strength decreases. The use of iglidur® H4 in applications directly exposed to atmospheric conditions should therefore be tested.

Vacuum

In a vacuum, any moisture present will out gas. Due to the low moisture absorption of iglidur® H4, this means that use in a vacuum is usually possible.

Electrical Properties

Unlike iglidur® H and iglidur® H370, iglidur® H4 is electrically insulating.

Diameter d1 [mm]	Shaft h9 [mm]	iglidur® H4 F10 [mm]
up to 3	0–0,025	+0,006 +0,046
> 3 to 6	0–0,030	+0,010 +0,058
> 6 to 10	0–0,036	+0,013 +0,071
> 10 to 18	0–0,043	+0,016 +0,086
> 18 to 30	0–0,052	+0,020 +0,104
> 30 to 50	0–0,062	+0,030 +0,150

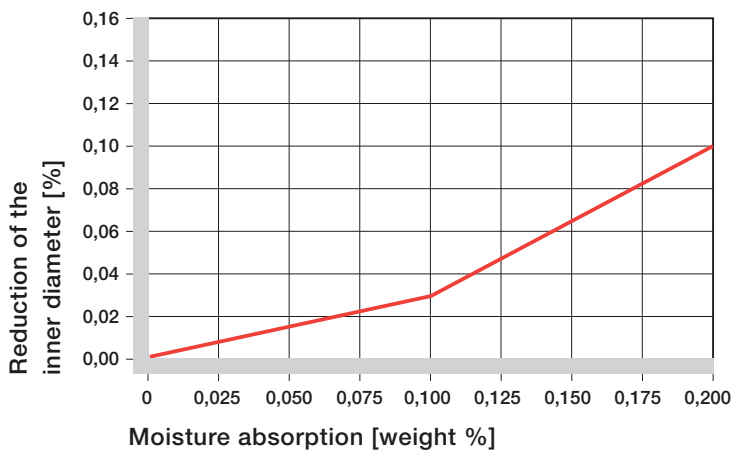
Table 14.5: Essential tolerances for iglidur® H4 plain bearings according to ISO 3547-1 after pressfit

Medium	Resistance
Alcohol	+
Hydrocarbons	+
Greases, oils	
without additives	+
Fuels	+
Diluted acids	+ to 0
Strong acids	+ to –
Diluted alkalines	+
Strong alkalines	+

Table 14.6: Chemical resistance of iglidur® H4 – detailed list, page 70.1

+ resistant 0 conditionally resistant – not resistant

All data given at room temperature [20°C]



Graph 14.10: Effect of moisture absorption on iglidur® H4 plain bearings

iglidur® H4	
Specific	
volume resistance	> $10^{13} \Omega\text{cm}$
Surface resistance	> $10^{12} \Omega$

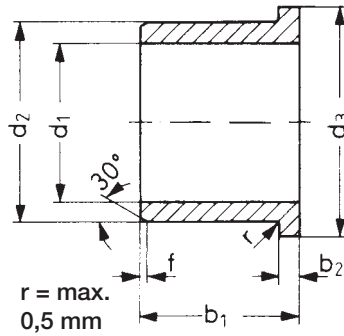
Table 14.7: Electrical properties of iglidur® H4

iglidur® H4

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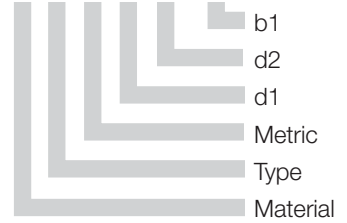


iglidur® H4 | Flange Bearing | mm



Data in mm

Structure – part no.
H4 F M-0608-08



mm

iglidur® H4 – Type F

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Dimensions according to ISO
3547-1 and special dimensions

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

Part Number	d1	d1 Tolerance*	d2	d3	b1	b2
H4FM-0608-08	6,0	+0,010 +0,058	8,0	12,0	8,0	1,0
H4FM-0810-10	8,0	+0,013 +0,071	10,0	15,0	10,0	1,0
H4FM-1012-05	10,0	+0,013 +0,071	12,0	18,0	5,0	1,0
H4FM-1012-12	10,0	+0,013 +0,071	12,0	18,0	12,0	1,0
H4FM-1214-12	12,0	+0,016 +0,086	14,0	20,0	12,0	1,0
H4FM-1517-12	15,0	+0,016 +0,086	17,0	23,0	12,0	1,0
H4FM-1618-17	16,0	+0,016 +0,086	18,0	24,0	17,0	1,0
H4FM-1820-17	18,0	+0,016 +0,086	20,0	26,0	17,0	1,0
H4FM-2023-21	20,0	+0,020 +0,104	23,0	30,0	21,5	1,5
H4FM-2528-21	25,0	+0,020 +0,104	28,0	35,0	21,5	1,5
H4FM-3034-30	30,0	+0,020 +0,104	34,0	40,0	30,0	2,0
H4FM-4044-40	40,0	+0,030 +0,150	44,0	52,0	40,0	2,0

*after pressfit. Testing methods ► page 1.35

Order example

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10-24	50-99	200-499	1000-2499	

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Type F