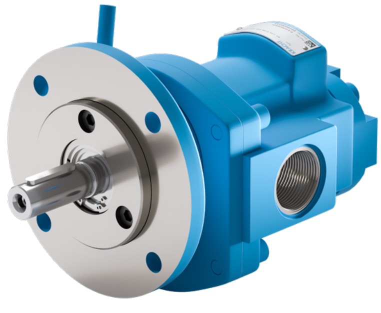
FLUID TECHNOLOGY AND SYSTEMS

Pump technology

Gear pumps

KF 1 coated



KRACHT®

FLUID TECHNOLOGY AND SYSTEMS

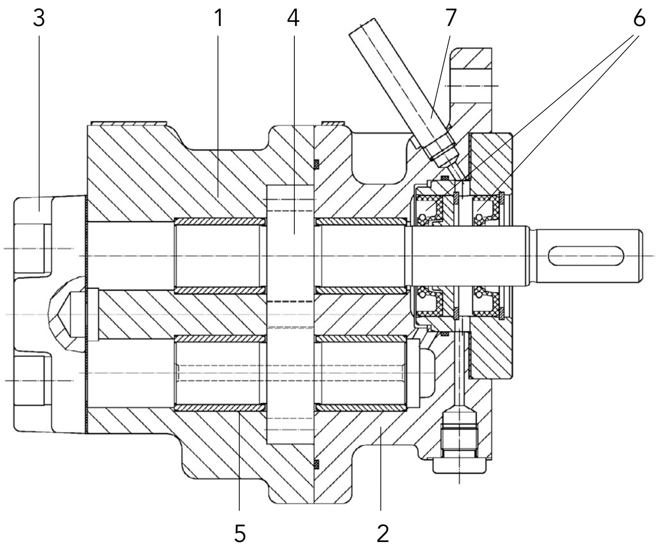
General

Description

The central element in numerous technical processes is the metering of liquids. PU components, plasticisers, resins, adhesives, lacquers and paints are just a few of the important liquids with a broad application spectrum.
The accuracy, uniformity and reproducibility with which these liquids can be processed is also decisive for the quality of the final product.
Ideal for these applications is the KRACHT gear pump KF 1 coated. The KF 1 coated are external gear pumps with a discharge volume of 4 … 24 cm^3/rev.

All gear parts and bearing bushes are protected against wear and corrosion by means of a special coating, so that also filled media up to a certain particle size and hardness of the fillers can be pumped. Guide values in this respect are a maximum particle size of 30 µm and a Mohs hardness of 6.
The double rotary shaft seals enable operation with sealing liquid (quench) to prevent hardening or crystallising of the pumped medium.
On request the KF 1 coated can be supplied with a magnetic drive.

Construction



1 Housing
2 Flange cover
3 End cover
4 Gear
5 Plain bearing bush
6 Shaft end sealing
7 Port for liquid sealing

Technical data

Characteristics

Mounting	Flange type
Pipe connection	Threaded ports
Direction of rotation	cw **or** ccw
Fitting position	Optional
Weight	See page 7

Working characteristics

Nominal size in cm^3/rev		4 · 8 · 11 · 16 · 20 · 24
Working pressure Inlet port	min max	-0.4 bar (-0.6 bar for short time) 1 bar for FKM-rotary shaft sealing 5 bar for PTFE-rotary shaft sealing
Outlet port	max	50 bar (depends of viscosity)
Speed		200 … 2 000 1/min (depends of viscosity)
Viscosity		12 … 15 000 mm^2/s (higher viscosities on request)
Media temperature		-10 … 150 °C for FKM-rotary shaft sealing / 200 °C for PTFE-rotary shaft sealing
Ambient temperature		-20 … 60 °C

Materials

Housing	EN-GJL-250
Gear	Steel 1.7139 nickel plated (with SiC inlets)
Bearing bushes	Steel ETG 100 nickel plated (with SiC inlets)
Seals	FKM, PTFE

Technical data

Physical characteristics

Nominal size	Geometrical displacement	Working pressure	Max. pressure	Permitted forces (n = 1450 1/min)		Moment of inertia (without coupling)
				Radial	Axial	x 10^{-4}
	in cm^3/rev	in bar	in bar	in N	in N	in kg x m^2
4	4.6					0.20
8	8.3					0.35
11	11.3	50	60	500	100	0.45
16	16.6					0.65
20	20.5					0.75
24	24.8		50			0.87

Kinematic viscosity in mm^2/s	<	300	400	500	1 000	2 000	3 000	6 000	10 000	20 000	30 000
Maximum speed in 1/min	≥	1 500	1 250	1 000	750	600	500	400	300	200	100

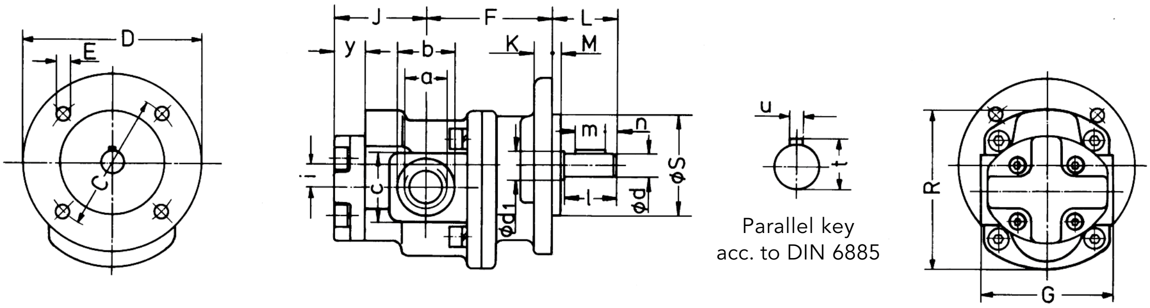
Discharge flow and required drive power for speed n = 1450 1/min

Pressure in bar													Nominal size	Pressure in bar												
2	6	10	14	18	20	22	25	30	35	40	45	50		2	6	10	14	18	20	22	25	30	35	40	45	50
6.6	6.4	6.2	6.0	5.8	5.7	5.6	5.5	5.3	5.0	4.8	4.5	4.3	**4**	0.10	0.16	0.21	0.26	0.31	0.33	0.36	0.40	0.47	0.53	0.60	0.66	0.73
12.0	11.7	11.4	11.1	10.8	10.7	10.5	10.3	9.9	9.6	9.2	8.8	8.5	**8**	0.20	0.28	0.36	0.45	0.54	0.58	0.62	0.69	0.80	0.90	1.00	1.10	1.20
16.1	15.9	15.6	15.2	14.8	14.6	14.4	14.2	13.8	13.4	13.0	12.6	12.1	**11**	0.22	0.33	0.38	0.55	0.65	0.71	0.77	0.85	0.99	1.12	1.26	1.40	1.53
23.8	23.4	23.0	22.7	22.3	22.1	21.9	21.6	21.1	20.6	20.2	19.7	19.2	**16**	0.25	0.40	0.55	0.70	0.85	0.93	1.00	1.12	1.31	1.50	1.69	1.88	2.07
29.4	29.0	28.6	28.2	27.8	27.6	27.4	27.1	26.2	26.1	25.6	25.1	24.6	**20**	0.27	0.37	0.65	0.85	1.05	1.15	1.25	1.40	1.65	1.90	2.10	2.40	2.60
35.6	35.2	34.8	34.4	34.0	33.8	33.6	33.3	32.8	32.3	31.8	31.3	30.8	**24**	0.29	0.54	0.78	1.03	1.30	1.40	1.50	1.70	2.00	2.30	2.60	2.90	3.20
Discharge flow in l/min														**Required drive power in kW**												

The ratings refer to mineral oil with a viscosity of 34 mm^2/s.
The dispersion of the discharge flow as specified in the table may be -5 …+10 %.
At viscosities of < 30 mm^2/s: Reduction of discharge flow.
The drive motor output must be selected 20 % higher than the data as specified in the table.
For viscosity of > 100 mm^2/s, the power input must be increased.

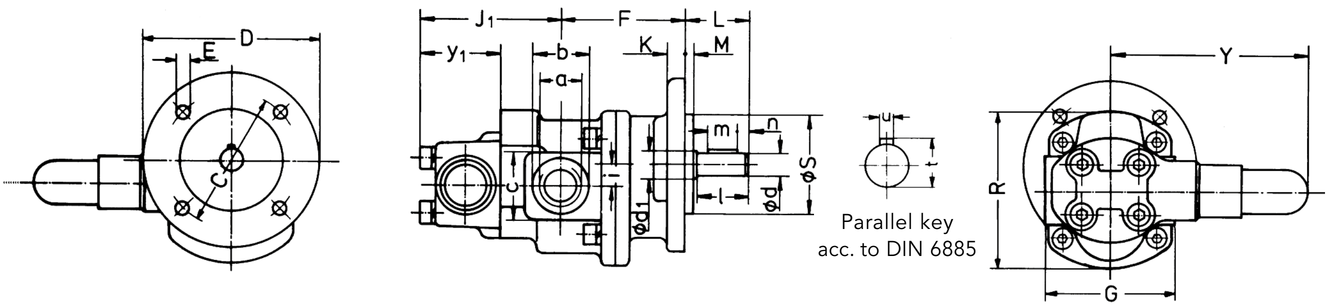
Technical data

Dimensions and weights



Nominal size	Inlet and outlet ports Pipe thread																Shaft end							Weight ca.
	a	b	c	C	D	E	F	G	J	K	L	M	R	S_{h6}	i	y	d_1	d_{K6}	l	m	n	t	u	kg
4	G½ - 16 deep	29	40	90	110	9	64	85	38	11	40	5	100	65	15.5	20	16	14	30	20	5	16	5	3.00
8	G¾ - 17 deep	36					70		57															3.70
11	G¾ - 17 deep	36					70		57															3.75
16	G¾ - 17 deep	36					70		57															3.80
20	G¾ - 17 deep	36					80		57															4.10
24	G¾ - 17 deep	36					80		57															4.20

Dimensions and weights with pressure relief valve



Nominal size	Inlet and outlet ports Pipe thread																	Shaft end							Weight ca.
	a	b	c	C	D	E	F	G	J_1	K	L	M	R	S_{h6}	Y	i	y_1	d_1	d_{K6}	l	m	n	t	u	kg
4	G½ - 16 deep	29	40	90	110	9	64	85	70	11	40	5	100	65	132	15.5	52	16	14	30	20	5	16	5	3.80
8	G¾ - 17 deep	36					70		89																4.50
11	G¾ - 17 deep	36					70		89																4.55
16	G¾ - 17 deep	36					70		89																4.60
20	G¾ - 17 deep	36					80		89																4.90
24	G¾ - 17 deep	36					80		89																5.00

Dimensions in mm

Type key

KF	1	/	4	D	1	X	K	P	0	A	0	D	E	2	/	130	+	DKF1	D	04
1	2		3	4	5	6	7	8	9	10	11	12	13	14		15		16	17	18

1 Product	

2 Size	
1	

3 Nominal size
4 · 8 · 11 · 16 · 20 · 24

4 Flange design	
D	Outside-Ø 110, bolt circle-Ø 90

5 Direction of rotation	
1	clockwise
2	counterclockwise

6 Mounting equipment	
X	with mounting angle
0	without mounting angle

7 Construction of housing and mounting surfaces	
K	Housing with threaded ports

8 Shaft end (Drive)	
P	Straight shaft end without outboard bearing

9 2. Shaft end (drive shaft)	
0	without 2. shaft end

10 End covers	
0	without end cover
A	for direction of rotation 1 or 2

11 Design serial no.	
	internal specified

12 Housing materials and plain bearing	
D	Cast iron with steel bearing bushes

13 Type of gear	
E	Spur gears

14 Seal	
2	FKM-radial shaft sealing for media temperatures … 150 °C
32	PTFE-radial shaft sealing for media temperatures … 200 °C

15 Special design no.	
130	Double shaft seal for quenching port. Bushing and gears with wear protective coating.

16 Pressure relief valve	
DKF1	Pressure relief valve for pump size 1

17 Material (Pressure relief valve)	
D	Housing GJL, seal FKM-O-ring, media temperatures … 150 °C
C	Housing GJL, copper sealing, media temperatures … 200 °C

18 Nominal size (Pressure relief valve)	
04	Pressure setting range: 2 … 4 bar
08	Pressure setting range: 4 … 8 bar
16	Pressure setting range: 8 … 16 bar
25	Pressure setting range: 16 … 25 bar

Technical data

Input power

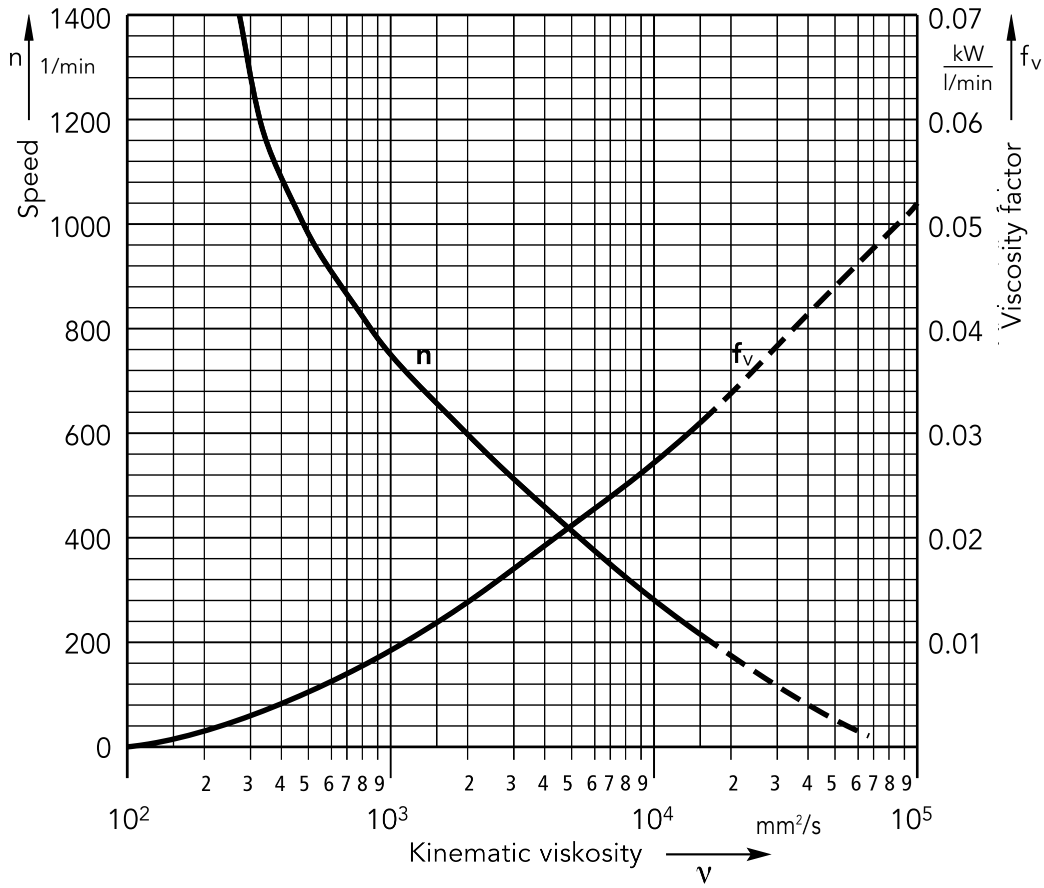


Chart: n, $f_\nu = f(\nu)$

Note:
To determine the power consumption, always take the max. operating viscosity at starting state into consideration.
The power of the drive motor should be selected 20% higher than the value determined.

Calculation of input power

Calculation / Characteristics

$$P_{1Pu} = P_{tab} \cdot \frac{n}{1450} + f_\nu \cdot Q$$

P_{1Pu} = Power input, pump (kW)

P_{tab} = Power input acc. to table (kW)

n = Speed (1/min)
Observe dependance of viscosity

f_ν = Viscosity factor $\left[\frac{kW}{l/min}\right]$
see chart

Q = Discharge flow (l/min) with $Q = \frac{V_g \cdot n}{1000}$

V_g = Geometrical displacement (cm^3/rev)

Sample calculation: Pump type KF 1/24

Viscosity	ν =	3000 mm^2/s
Operating pressure	p =	18 bar
with	P_{tab} =	1.3 kW
	n =	500 1/min
	f_ν =	$0.017 \frac{kW}{l/min}$
	Q =	34 l/min

then

$$P_{1pu} = \left(1.3 \cdot \frac{500}{1450} + 0.017 \cdot 34\right) kW$$

P_{1Pu} = 1.03 kW

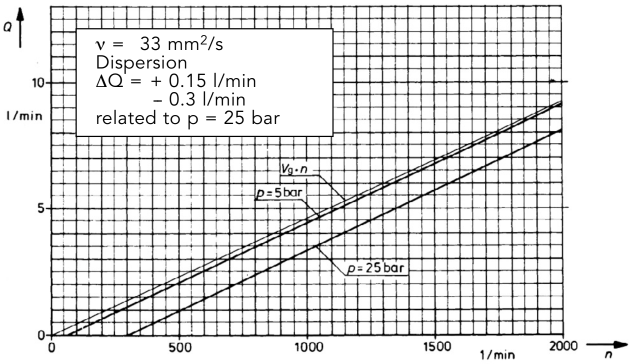
Motor power output: $P_{2Mot} = 1.2 \cdot P_{1Pu} = 1.24$ kW

Select helical geared motor
Size 100 L with P = 1.5 kW
n = 490 1/min

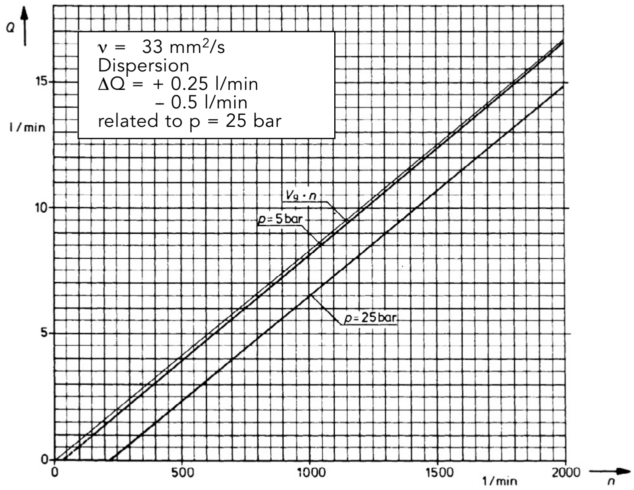
Technical data

Characteristic curves

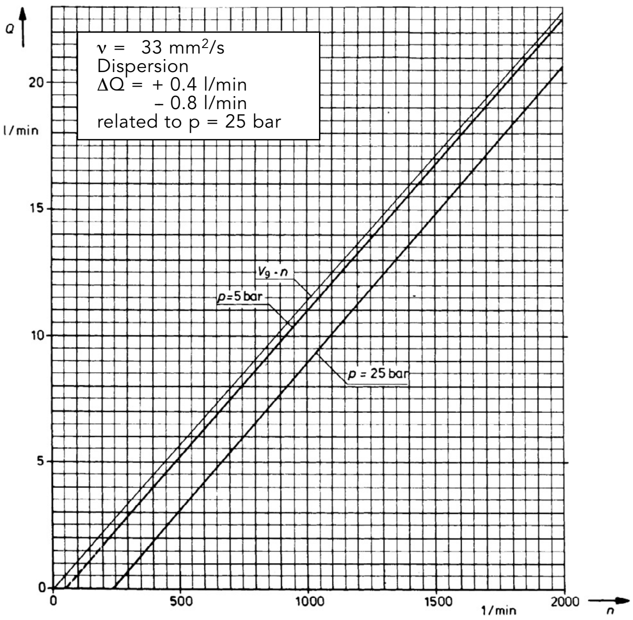
KF 1/4 … E



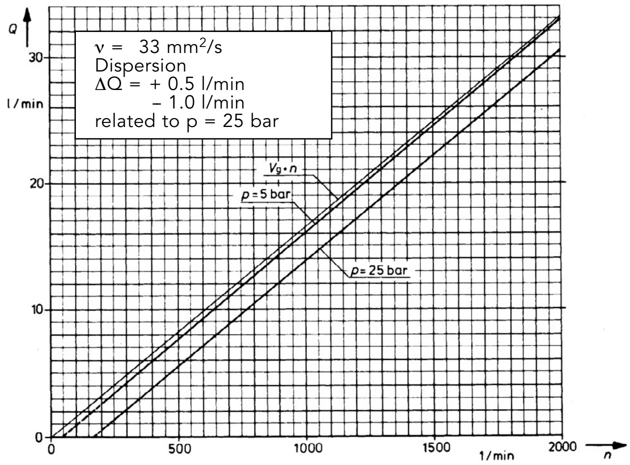
KF 1/8 … E



KF 1/11 … E



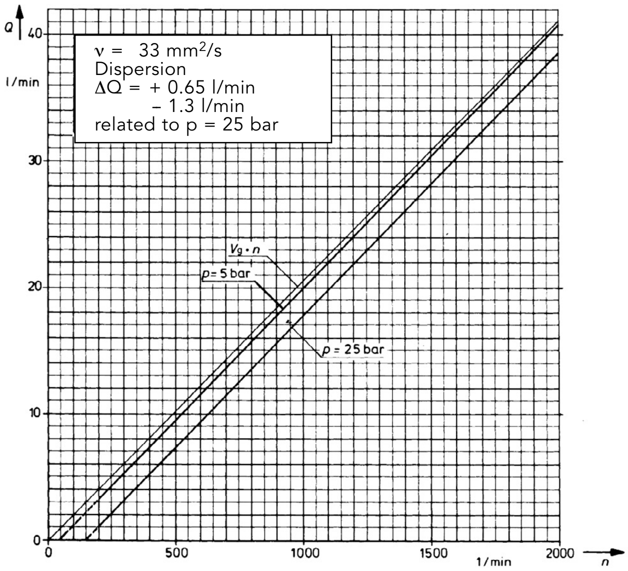
KF 1/16 … E



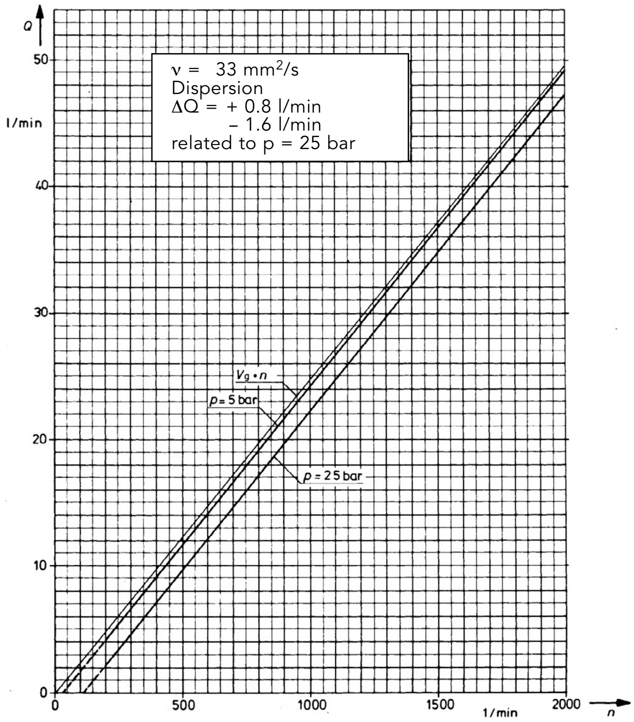
Technical data

Characteristic curves

KF 1/20 ... E



KF 1/24 ... E



Pump technology

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KF 1 coated/EN/07.2024