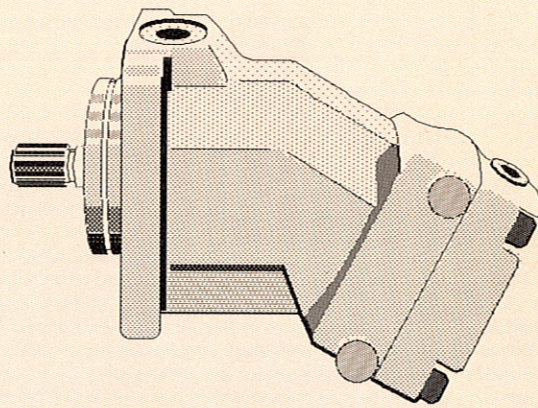


Linde



BMF Motors

**The >short< motor
for high-pressure
high-speed applications**

3. General technical data

3.1 Weight

see dimensional tables

3.2 Hydraulic fluid

Mineral oil type HL or HLP due to DIN 51524, other hydraulic fluids on application

- 3.2.1 Fluid temperature range - 20° ... + 90° [C]
- 3.2.2 Operating viscosity range 10 ... 80 [mm²/s]
- 3.2.3 Optimum operating viscosity range 15 ... 20 [mm²/s]
- 3.2.4 Peak viscosity (transient condition during start-up) 1000 [mm²/s]

Recommendations:

| Operating temperatures | Viscosity class (mm ² /s = cSt) |
|------------------------|--|
| | HL or HLP |
| 30° ... 40° [C] | 22 [mm ² /s] at 40° [C] |
| 60° ... 70° [C] | 68 [mm ² /s] at 40° [C] |
| 80° ... 90° [C] | 100 [mm ² /s] at 40° [C] |

Aside from the minimum requirements to DIN 51 524, any brand hydraulic fluid used must also meet all the requirements inherent in a high pressure hydraulic system. This applies in particular to so-called HLPD (detergent) oils.

Linde recommends that only those hydraulic fluids be used, the suitability of which for high-pressure hydraulic systems can be guaranteed by the manufacturer.

In order to select the correct hydraulic fluid, the operating temperature in the circuit (closed loop) must be known.

The hydraulic fluid should be selected such that, in the operating temperature range, the operating viscosity lies in the optimum range (see 3.2.3).

Note ! As a result of the influence of pressure and speed, the leakage oil temperature is always above the circuit temperature. At no point in the system should the temperature be higher than 90° [C].

If the conditions indicated cannot be complied with in specific applications, please consult us.

3.3 Filtration

Filtration of the hydraulic circuit is necessary.

Note ! When employing the motors in combination with Linde's BPV variable displacement pumps in closed circuit systems, no additional filter is necessary as one is fitted to these pumps as standard.

Recommended filtration: 10 microns (filters with 25 - 40 microns may also be used).

Linde uses and recommends 10 micron filters. These correspond to the current state of the art and can be obtained from the usual commercial sources at no additional expense. Moreover, the finer degree of filtration substantially increases the useful service life of the hydraulic equipment (less wear).

$$\text{Torque } Md_{th} = Md_{const.} \cdot \Delta p$$

$$\text{Speed } n = \frac{Q_{eff} \cdot 1000}{V_g}$$

- Md [Nm] = Torque at the drive shaft
- Δp [bar] = Differential pressure between inlet and outlet
- V_g [m³] = Geometric displacement
- Q_{th} [L/min] = Theoretical flow rate
- n [rpm] = Output speed
- η_{mech} = 0.98 (average mechanical efficiency)
- η_{vol} = 0.97 (average volumetric efficiency)

4. Power take-off

5. Fluid cooling

6. Side and axial loading

3.4 Determining the requisite motor size

3.4.1 Output torque

| Nominal size | 35 | 50 | 75 | 105 | 140 | 186 | 260 |
|---|-------|-------|-------|-------|-------|-------|------|
| $Md_{const.}$ [Nm/bar] | 0.557 | 0.796 | 1.194 | 1.672 | 2.229 | 2.962 | 4.14 |
| $Md_{max\ theor.}$ [Nm] at $p = 420$ bar | 234 | 334 | 501 | 702 | 936 | 1244 | 1739 |

3.4.2 Output speed

| Nominal size | 35 | 50 | 75 | 105 | 140 | 186 | 260 |
|--|-------|------|------|------|------|------|------|
| $Q_{theoretical}$ [L/min] | 171.5 | 225 | 300 | 378 | 462 | 558 | 702 |
| at n_{max} [rpm] | 4900 | 4500 | 4000 | 3600 | 3300 | 3000 | 2700 |
| $P_{cont. theor.}$ [kW] at $p = 250$ bar and n_{max} | 64 | 86 | 113 | 142 | 172 | 213 | 267 |

4.1 Coupling

Suitable coupling elements must be employed for the power take-off (please consult us if you have special application requirements or load conditions).

4.2 Moment of inertia

| Nominal size | 35 | 50 | 75 | 105 | 140 | 186 | 260 |
|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Moment of inertia [kgm ²] | 0.0023 | 0.0038 | 0.0093 | 0.0175 | 0.0338 | 0.0458 | 0.0615 |

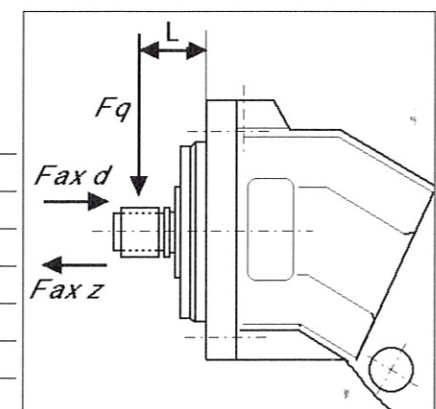
5.1 Requisite cooling capacity

Determined in accordance with the overall heat balance of the hydrostatic system.

6.1 Maximum side and axial forces F_q and F_{ax}

Related to centreline, shaft end (side load application point at distance L) at continuous pressure = 250 bar and maximum speed

| Nom. size | F_q [kN] | $F_{ax d}$ [kN] | $F_{ax z}$ [kN] | Load offset L [mm] |
|-----------|---------------|--------------------|--------------------|-----------------------|
| 35 | 2.0 | 13 | 2.0 | 43.5 |
| 50 | 2.9 | 14 | 7.4 | 54 |
| 75 | 3.1 | 16 | 7.6 | 56.5 |
| 105 | 4.8 | 21 | 12.6 | 64 |
| 140 | 4.4 | 27 | 6.9 | 77 |
| 186 | 2.6 | 35 | 12.8 | 90 |
| 260 | 2.6 | 22 | 13 | 42 |



Transient loading of double these figures is permissible. If the permissible force values indicated in the table are likely to be exceeded in special applications, please consult us.

1. Description

1.1 Design principles and components

Our BMF ... fixed displacement motors are bent axis units which are suitable for both open and closed loop systems.

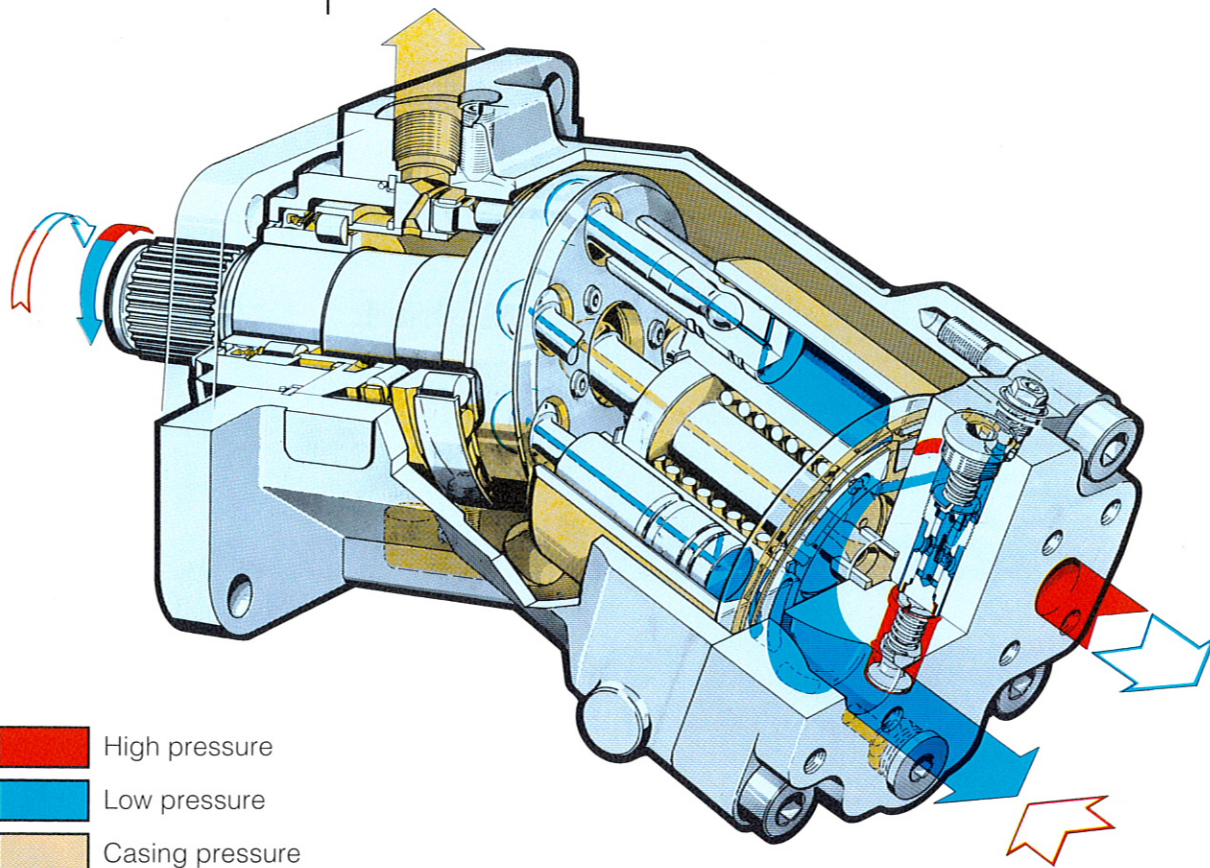
If required, they can also be equipped with a purge valve for circuit and case flushing.

Coupling flanges are likewise available as an optional extra.

1.2 Design features

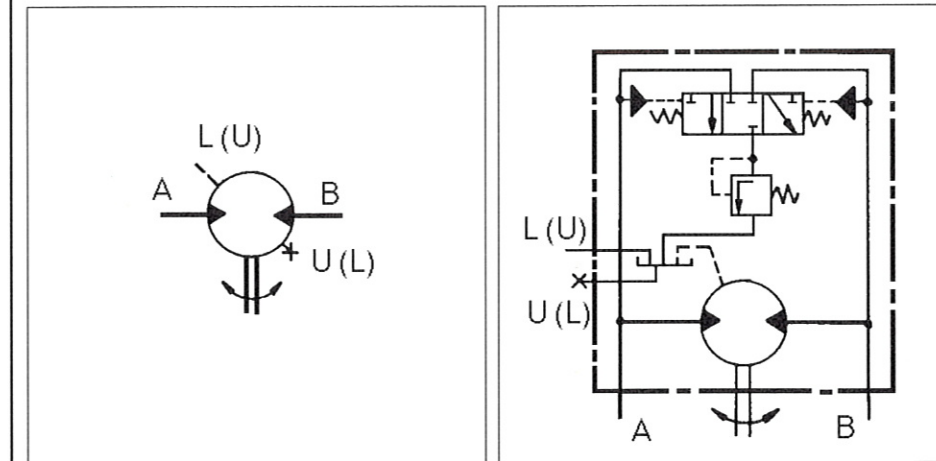
- Bent axis fixed displacement motor with a tilt angle of 28°
- Extremely robust rotary group with drive shaft rated for side loads
- SAE high-pressure ports
- Optional purge valve for circuit and case flushing
- No additional piping required for circuit and case flushing
- Particularly quiet operation
- Ultra-short design
- Clockwise and anti-clockwise rotation

1.3 Functional principles



BMF ... C fixed displacement motor with circuit and case flushing

1.4 Circuit diagram



BMF

BMF with circuit and case flushing

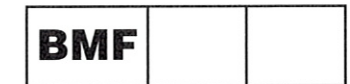
Key :

A and B = Main ports

L (U) = Drain ports

U (L) = Flushing ports

1.5 Type designation



Fixed displacement motor (series B)

Nominal size 35, 50, 75, 105, 140, 186, 260

With integral purge valve for circuit and case flushing = C

2. Specifications

2.1 Pressures

| | |
|---|-----------|
| Maximum pressure * | 500 [bar] |
| Rated pressure (= maximum operating pressure) | 420 [bar] |
| Continuous pressure ** | 250 [bar] |
| Permissible internal case pressure | 1.5 [bar] |

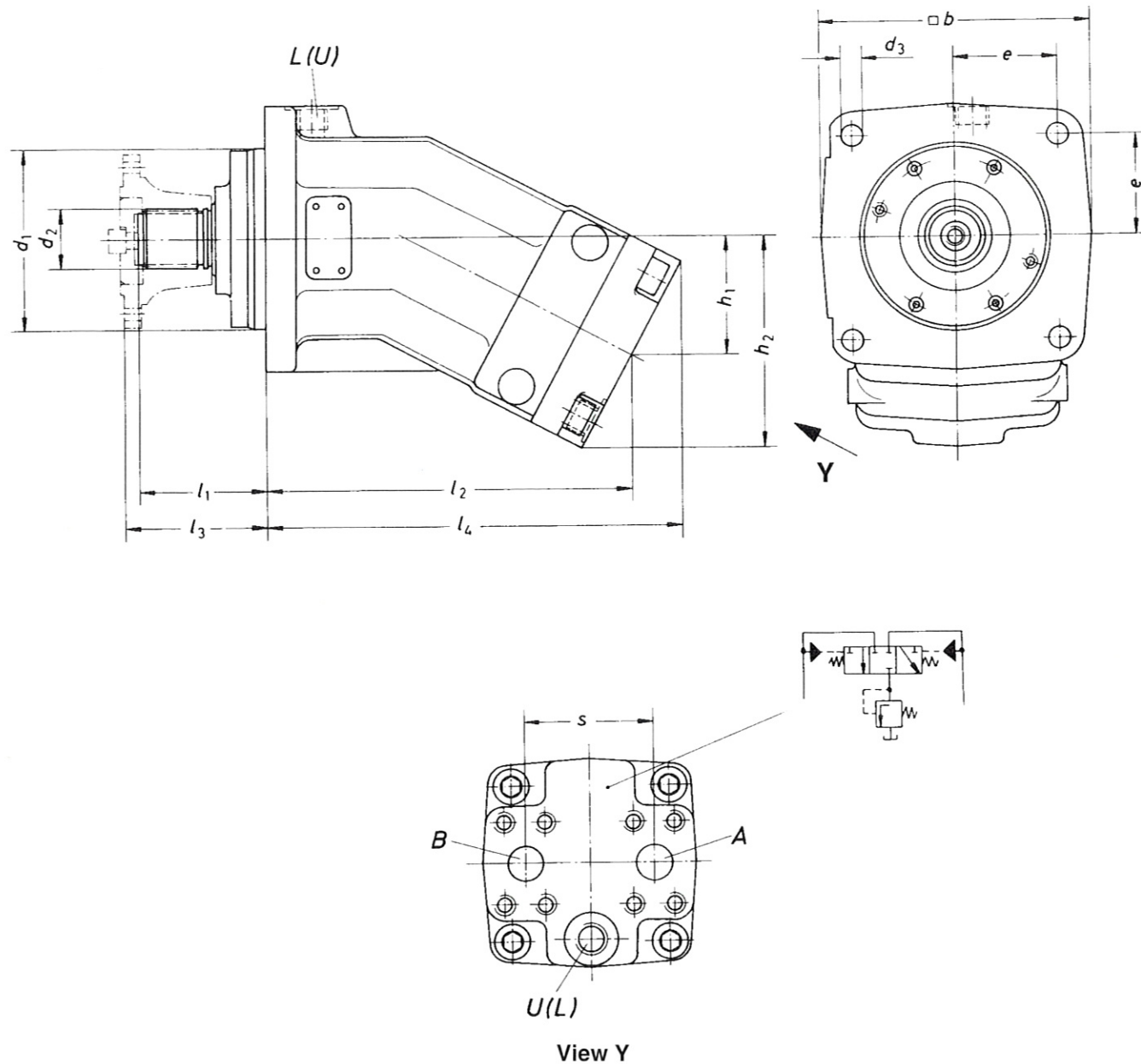
| Nominal sizes | 35 | 50 | 75 | 105 | 140 | 186 | 260 |
|--|------|------|------|------|------|------|-------|
| 2.2 Displacement [cm ³] | 34.7 | 50.2 | 74.9 | 105 | 140 | 186 | 260.3 |
| 2.3 Speed [rpm] | | | | | | | |
| Max. speed (100 % duty cycle) | 4500 | 4200 | 3700 | 3300 | 3000 | 2800 | 2500 |
| Peak speed (transient) | 4900 | 4500 | 4000 | 3600 | 3300 | 3000 | 2700 |

Size 135 available on application

* Transient increase in pressure beyond rated pressure (= max. operating pressure) at which motor capable of functioning.
 ** Pressure at which all the components of the motor remain resistant to fatigue.

7. Motor dimensions

A and B = Main ports
 L = Drain ports, M 22 x 1.5
 U = Flushing ports, M 22 x 1.5



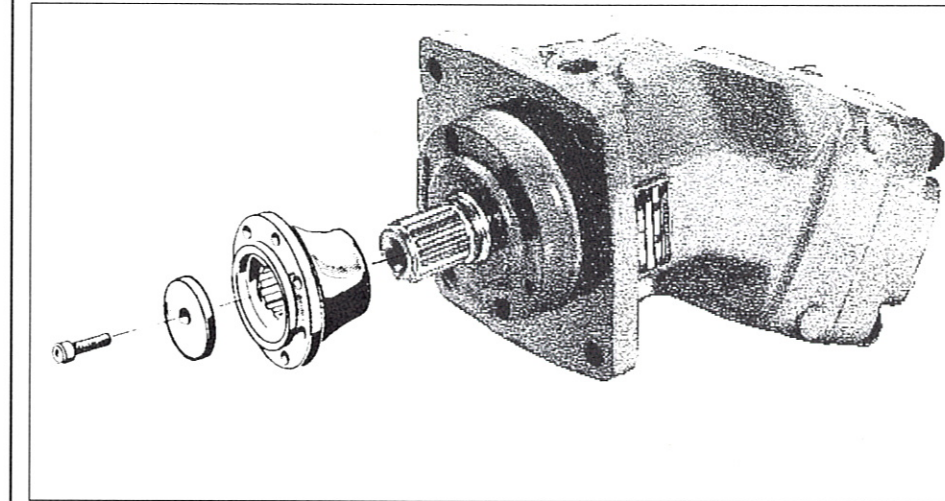
Dimensions (in mm)

| Nom. size | b | d_1 | d_2 DIN 5482 e ⁹ | ANSI B 92.1 (SAE) $\alpha = 30^\circ$ | d_3 | e | h_1 | h_2 | l_1 | l_2 | l_3 | l_4 | s | A and B SAE flange High press. series | Weight [kg] |
|-----------|-----|-------|-------------------------------------|--|-------|------|-------|-------|-------|-------|-------|-------|-----|---|----------------|
| 35 | 148 | 100 | B2 5 x 22 | — | 12 | 56.6 | 65.3 | 126 | 60.5 | 194.7 | 67.5 | 225 | 66 | 3/4" | 15 |
| 50 | 150 | 100 | B 30 x 27 | — | 12 | 56.6 | 69 | 130 | 74 | 202 | 81.5 | 232 | 66 | 3/4" | 18 |
| 75 | 170 | 115 | B 35 x 31 | — | 14 | 63.6 | 84 | 148 | 77.5 | 244 | 87.5 | 278 | 82 | 1" | 28 |
| 105 | 184 | 125 | B 40 x 36 | — | 18 | 70.7 | 88.3 | 152 | 86.5 | 260.5 | 95.5 | 295 | 82 | 1" | 32 |
| 140 | 200 | 140 | B 45 x 41 | — | 18 | 70.7 | 102 | 182 | 104 | 298 | 115 | 340 | 112 | 1 1/4" | 47 |
| 186 | 210 | 160 | B 50 x 45 | — | 18 | 79.2 | 107 | 186 | 120 | 308 | 131 | 350 | 112 | 1 1/4" | 57 |
| 260 | 210 | 165,1 | — | 30Z,16/32 | 22 | 81 | 101 | 202 | 74.8 | 375 | — | 424 | 112 | 1 1/4" | 65 |

For binding dimensions and other dimensions not indicated, please see installation drawings.- Subject to change in the interests of technical progress.

8. Appendix

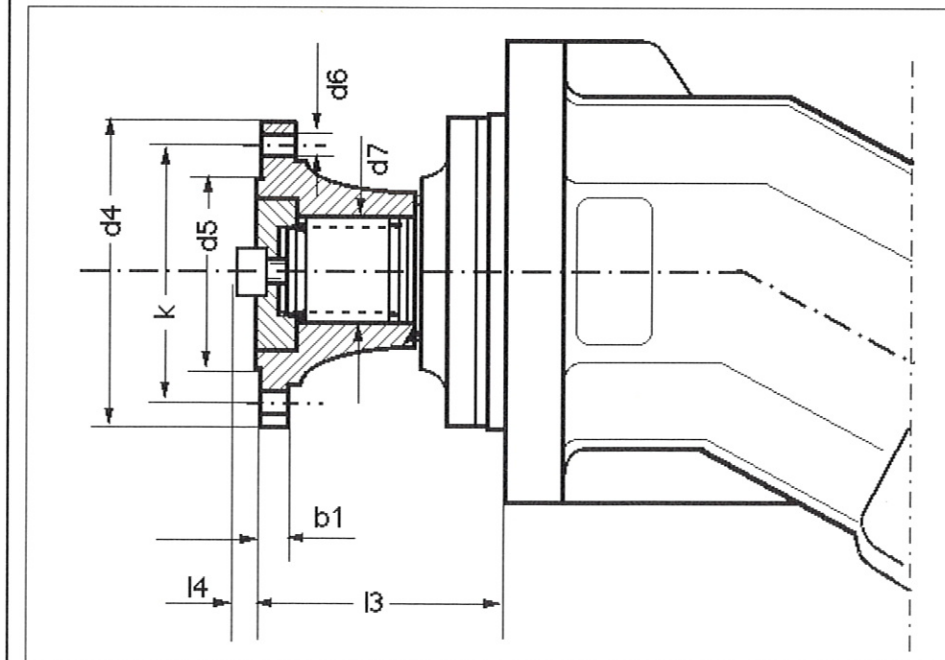
8.1 Coupling flanges



BMF ... fixed displacement motor with coupling flange

8.2 Dimensions

8.2.1 Coupling flange for output shaft



Dimensions (in mm)

| Nom. size | b_1 | d_4 | d_5 | d_6 H 13 | d_7 DIN 5482 | k | l_3 | l_4 | Weight in [kg] |
|-----------|-------|-------|-------|-------------------------|-------------------|-------|-------|-------|----------------------|
| 35 | 10 | 99.5 | 57 | 6 x 8.2 | A 25 x 22 | 84 | 67.5 | 7.5 | 1.1 |
| 50 | 10 | 99.5 | 57 | 6 x 8.2 | A 30 x 27 | 84 | 81.5 | 6 | 1.1 |
| 75 | 12 | 114.5 | 75 | 8 x 8.2 | A 35 x 31 | 101.5 | 87.5 | 7 | 0.9 |
| 105 | 12 | 120 | 75 | 8 x 8.2 | A 40 x 36 | 101.5 | 95.5 | 10 | 2.5 |
| 140 | 12 | 120 | 75 | 8 x 10.2 | A 45 x 41 | 101.5 | 115 | 8 | 2.4 |
| 186 | 15 | 149 | 90 | 8 x 10.2* 12 x 10.2* | A 50 x 45 | 130 | 131 | 8 | 3.6 |
| 260 | — | — | — | — | — | — | — | — | — |

* either

The Linde logo is a stylized, black, cursive script of the word "Linde". It is positioned on a white rectangular background that is part of a larger vertical strip on the left side of the page. The strip is bordered by dark brown sections above and below it.

Linde

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