PERMOLEX-POLAR

CONTINUOUS RECOVERY OF COOLANT FROM SWARF AND GRINDING SLUDGE PROCESSING

- Continuous and fully automated operation
- The recovered coolant (oil or emulsion) can be fed back into the processing-machine
- High wear resistance is provided by manganese alloy lining
- Low maintenance and servicing costs
- Very low residual moisture values are achievable
- High operating safety
- Short pay-back time

FUNCTION

The metal swarf or grinding sludge mixed with lubricant or coolant is fed to the centrifuge by an appropriate speed-adjustable conveyor i.e. Hinged-belt, Scraper or Auger conveyor. A Centrifuge metering auger (optional on K 41 - K 101 Types) fitted in the in-feed hopper of the centrifuge ensures an even flow of the materials into the bowl. Depending on the type of swarf, lubricant/coolant and the continuity of the swarf flow to the centrifuge, it is not always necessary to use a metering auger. For the processing of swarf with a tendency not to flow freely (i.e. aluminium) the use of a metering auger is generally recommended.

The special centrifuge bowl geometry and the centrifugal force generated, causes the swarf to spin against the internal wall of the bowl and the following swarf-flow progresses slowly up the bowl wall. The centrifuge throughput is governed by the rate of swarf flow through the bowl, which is regulated by the adjustable in-feed conveyor speed.

Permolex-Polar-bowl
Close-up view:
wedge-wire screen

At the bowl's maximum diameter the coolant escapes from the bowl into the collection gallery through a replaceable wedge-wire screening ring.

The dried swarf is pushed out over the rim of the bowl and is flung outward onto a replaceable manganese alloy baffle ring. Swarf and coolant are discharged separately from the centrifuge.

The separated coolant drains from the centrifuge via a discharge outlet. The dried swarf falls out at the base of the centrifuge into a suitable discharge conveyor or directly into a container placed below.

To prevent the swarf 'fines' which are carried out with the coolant, being deposited in the collection gallery, a flushing-out system is provided which must be connected to a continuous coolant supply.

This coolant supply can be drawn from the local coolant collection tank or directly from a central coolant supply.

Optionally the Permolex-Polar Centrifuges can be aquipped with a hot-air blower system which effects a reduction in the coolant's viscosity for better centrifuging separation, resulting in lower residual moisture/coolant values.

CONSTRUCTION

The centrifuge is built on a solid base in which the direct drive motor is attached by means of a flexibly mounted carrier. The centrifuge bowl is directly connected to the drive motor so that a dynamically balanced arrangement is achieved with an out-of-balance working tolerance to allow for load variations. An unbalance switch stops the centrifuge in the event of excessive out-of-balance loads.

The centrifuge casing and the internal baffle ring is lined with manganese alloy steel, or for some applications, is completely manufactured in manganese alloy steel, to reduce abrasive wear.

The swarf is directly discharged at the base of the centrifuge. The simplicity of design and construction of these centrifuges results in a very low incidence of faults occurring, together with low maintenance and servicing costs.

SPECIAL CONSTRUCTIONEN

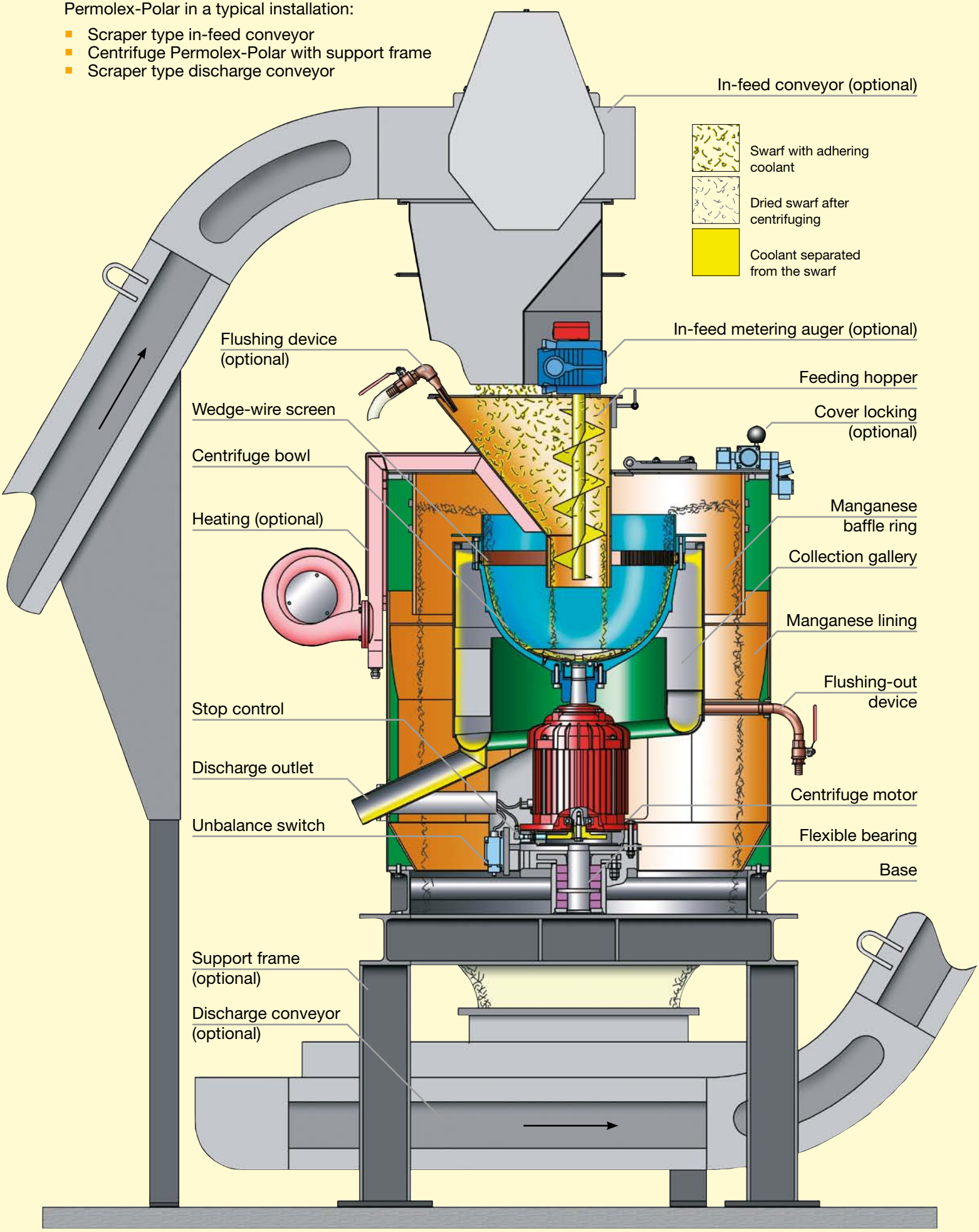
In addition to the standard centrifuge types and equipment options (page 6) we will consider your special requirements and be pleased to recommend the best solution for your application.

For example:
Permolex-Polar K 51 centrifuge fitted with connections for a fire extinguishing agent and blow-down nozzle for preventive protection in critical areas of the centrifuge. A centrifuge for processing magnesium and zirconium swarf and flammable grinding sludge.

CONSTRUCTION

Permolex-Polar in a typical installation:

- Scraper type in-feed conveyor
- Centrifuge Permolex-Polar with support frame
- Scraper type discharge conveyor



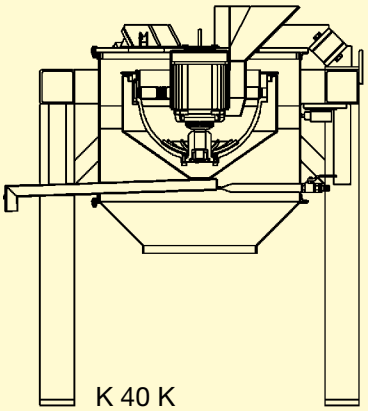
DIMENSIONS AND TECHNICAL DATA

Dimension	K 41	K 51	K 61	K 81	K 101
a	1,350 mm	1,619 mm	1,663 mm	1,972 mm	2,376 mm
b	1,222 mm	1,420 mm	1,459 mm	1,775 mm	2,170 mm
c	1,127 mm	1,215 mm	1,260 mm	1,500 mm	1,820 mm
d	911 mm	975 mm	1,028 mm	1,237 mm	1,510 mm
e	590 mm	413 mm	498 mm	615 mm	740 mm
f	371 mm	244 mm	232 mm	313 mm	425 mm
g	943 mm	1,053 mm	1,183 mm	1,580 mm	1,986 mm
h	875 mm	985 mm	1,115 mm	1,670 mm	2,180 mm
i	780 mm	912 mm	1,042 mm	1,410 mm	1,790 mm
j	DN 20	DN 20	DN 20	DN 20	DN 20
k	DN 65	DN 65	DN 65	DN 150	DN 150
Weight [1]	700 kg	1,050 kg	1,250 kg	1,850 kg	4,250 kg
Bowl diameter	400 mm	500 mm	600 mm	800 mm	1,000 mm
Bowl height	303 mm	386 mm	400 mm	430 mm	600 mm
Bowl speed [2]	1,400 RPM	980/1,400 RPM	980/1,400 RPM	735/980 RPM	735/980 RPM
Electrical data	**K 41**	**K 51**	**K 61**	**K 81**	**K 101**
Voltage [3]	400 V / 50 Hz	400 V / 50 Hz	400 V / 50 Hz	400 V / 50 Hz	400 V / 50 Hz
Power centrifuge motor	6.5 kW	6.5 kW	7.5 kW	7.5 kW	15 kW
Power metering auger	0.18 kW	0.25 kW	0.25 kW	0.37 kW	0.37 kW
Power heating	6 kW	6 kW	6 kW	6 kW	6 kW
Power heating blower	0.18 kW	0.18 kW	0.18 kW	0.18 kW	0.18 kW
Through-put	**K 41**	**K 51**	**K 61**	**K 81**	**K 101**
Steel swarf	up to 0.5 m³/h	0.5 - 1.7 m³/h	1.7 - 3.4 m³/h	3.4 - 6 m³/h	6 - 10 m³/h
Grey cast iron swarf	up to 0.4 m³/h	0.5 - 1.7 m³/h	1.7 - 3.4 m³/h	3.4 - 6 m³/h	6 - 10 m³/h
Brass swarf	up to 0.4 m³/h	0.5 - 1.7 m³/h	1.7 - 3.4 m³/h	3.4 - 6 m³/h	6 - 10 m³/h
Aluminium swarf	up to 0.5 m³/h	0.5 - 1.7 m³/h	1.7 - 3.4 m³/h	3.4 - 6 m³/h	6 - 10 m³/h
Grinding sludge [4]	up to 0.2 m³/h	0.2 - 0.6 m³/h	0.6 - 1.2 m³/h	1.2 - 2 m³/h	2 - 3.5 m³/h
Recommended values for bulk density	**Steel**	**Grey cast iron**	**Brass**	**Aluminium**	**Grinding sludge**
	0.5 - 1.0 kg/ltr.	0.8 - 1.5 kg/ltr.	0.5 - 1.5 kg/ltr.	0.1 - 0.7 kg/ltr.	0.5 - 1.5 kg/ltr.

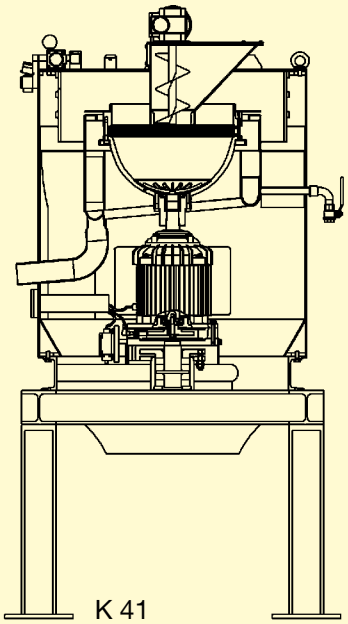
[1] Incl. metering unit and heating, without control. Technical and textual subject to modifications.

[2] At 50 Hz line frequency, other speeds on request. The second speed is application dependent, optionally available.

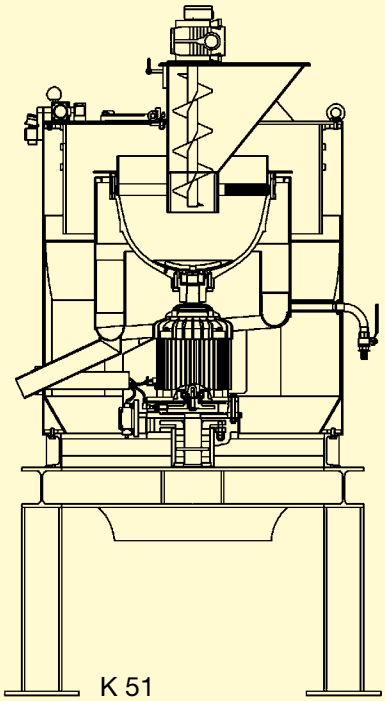
[3] Other voltages / frequencies on request. [4] Only after tests of a grinding sludge sample.



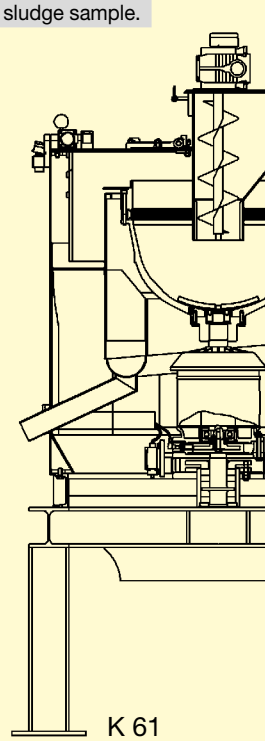
K 40 K



K 41

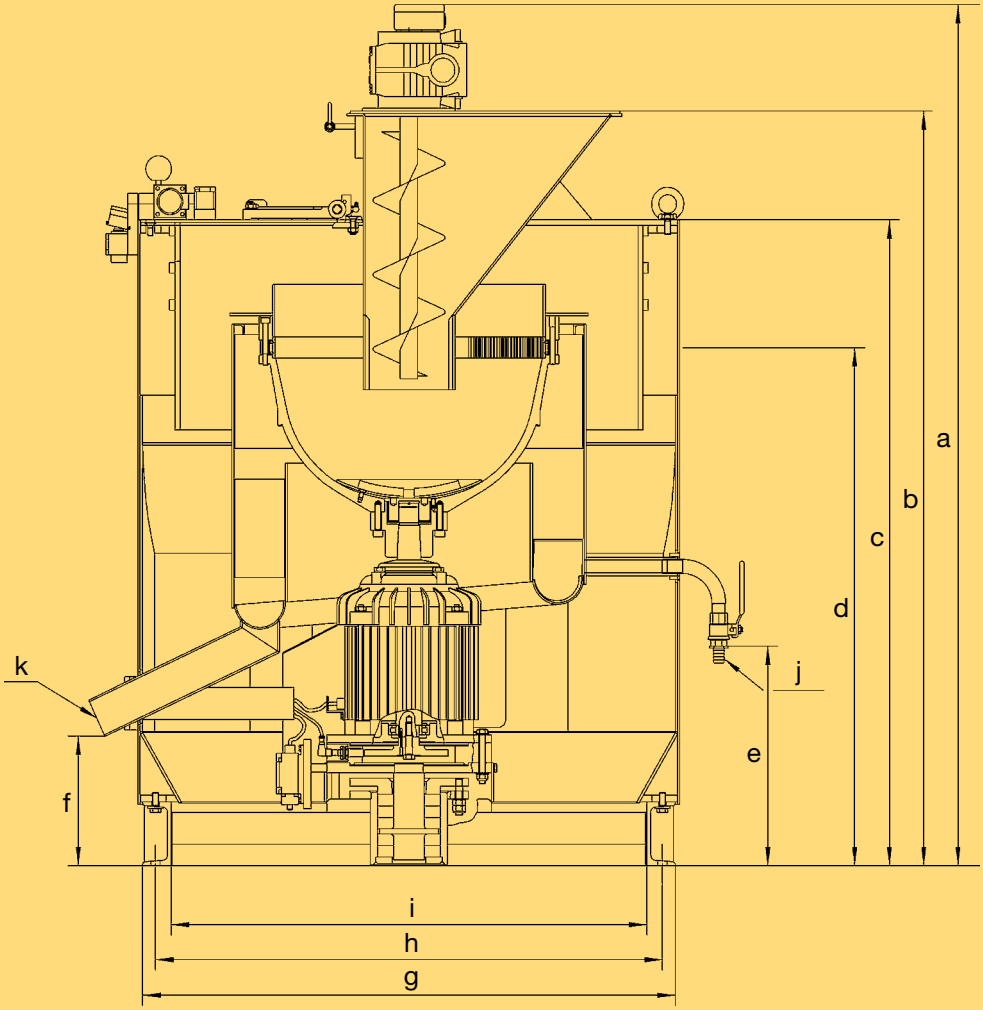


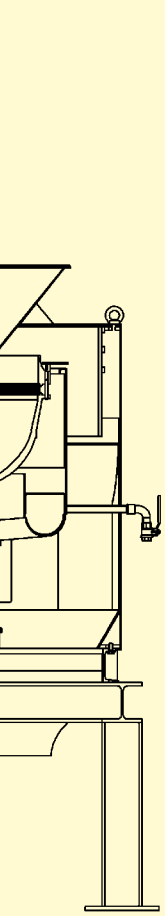
K 51

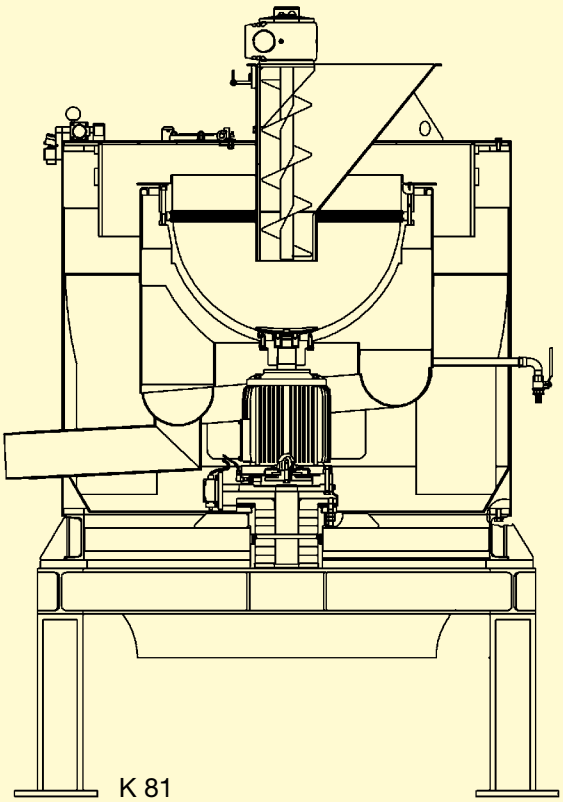


K 61

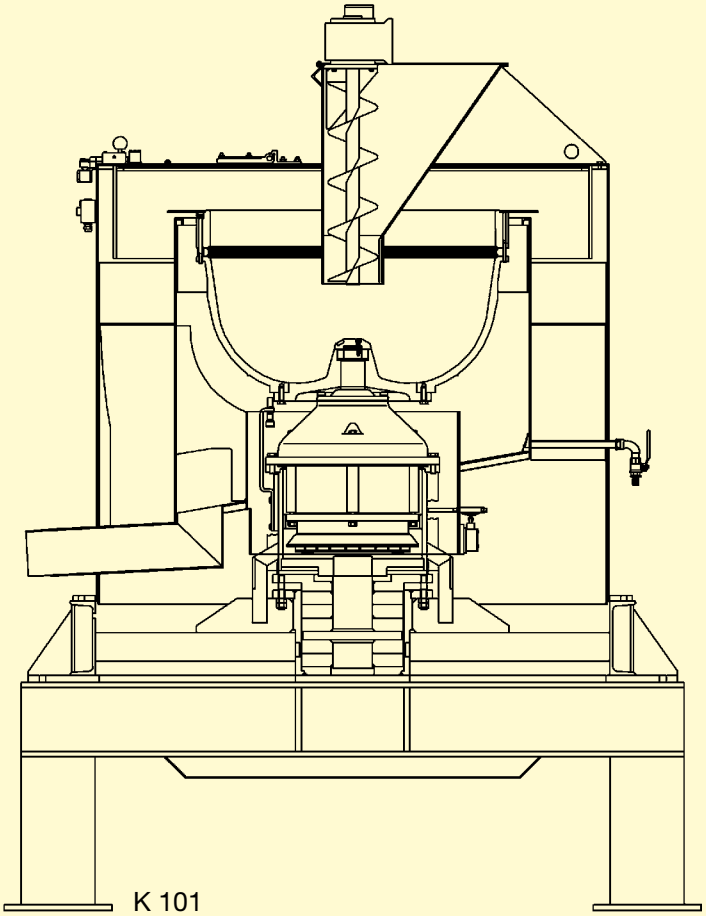
DIMENSIONS AND TECHNICAL DATA







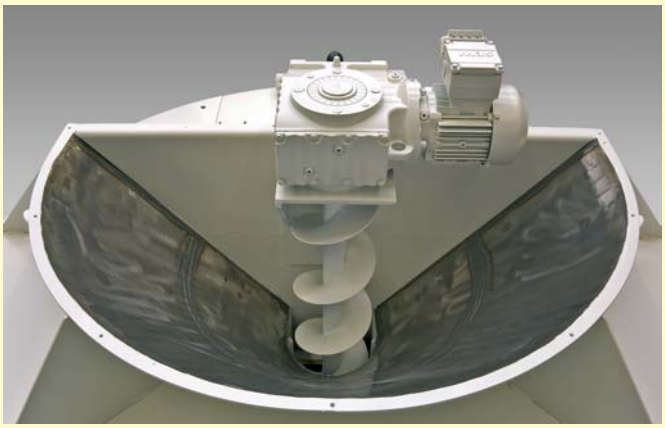
K 81



K 101

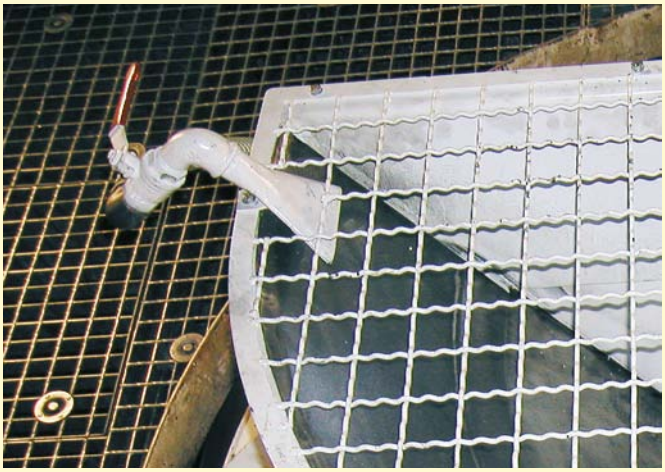
OPTIONAL EQUIPMENT FOR PERMOLEX-POLAR TYPES K41 TO K101

▲ A hinged maintenance inspection access lid interlock, is actuated by a solenoid, permitting access only when the centrifuge bowl monitored rotation has completely stopped. This safe condition of the non rotating bowl is indicated on the control panel as “cover opening possible”. The solenoid locking is released via a push-button and permits the opening of the access lid. In the standard version this maintenance lid is bolted to the centrifuge casing.



▲ The metering auger in the in-feed hopper of the centrifuge ensures the constant and regulated feeding of swarf into the centre of the centrifuge bowl and allows the hopper to accommodate small surges of swarf. The auger is designed to prevent blockages but if they occur the auger automatically changes rotational direction a number of times to free the blockage or to stop.

The guarding over the feeding hopper (picture below) needs to be cut accordingly, to the hopper opening for the in-feed conveyor. The guarding ensures safe-working protection from the rotating metering auger.



▲ The flushing system is necessary to prevent some swarf types from sticking in the feeding hopper and is designed to be connected to the pumped coolant supply. A flushing nozzle provides a regulated coolant flow into the feeding hopper, which flushes adhering swarf into the centrifuge bowl. For cast iron swarf the flushing device is necessary due to cast iron and coolant’s congealing nature.

◄ With a heater/blower system, hot-air is ducted into the centrifuge to heat-up the mixed swarf and coolant, reducing the coolant viscosity for better separation resulting in lower residual moisture/coolant values in the swarf and better coolant recovery.

The heating is available for several temperature levels. Heating levels are attained by setting a 3 position heating switch with thermostat or PT100.

CENTRIFUGE PERMOLEX-POLAR K 40 K ▪ THE SPECIAL COMPACT SOLUTION

The small, continuous swarf centrifuge for short and fluid swarf up to 20 mm.

ADVANTAGES

- **Compact construction**
- **Low maintenance and service costs**
- **Low residual moisture after drying of the swarf**

FUNCTION

The centrifuge, for example, can be fed directly by the discharge conveyor from your process machine and if necessary the discharge chute will have to be modified slightly. The swarf flows via the in-feed hopper into the base of the centrifuge bowl.

Due to the bowl design geometry the swarf is pushed up the internal bowl profile by the generated centrifugal force. The swarf passes the wedge-wire screen where the adhering coolant is spun off.

The swarf is finally pushed out over the rim of the bowl and is flung out against the baffle ring. From there the swarf falls out at the base of the centrifuge into a container or discharge conveyor.

CONSTRUCTION

The Permolex-Polar K 40 K is suspended in a rigid frame supported on flexible mounts. The over-head mounting plate carries the centrifuge casing and also the drive motor with directly mounted centrifuge bowl.

The motor is positioned in the centre of the bowl so that a low overall profile is achieved.

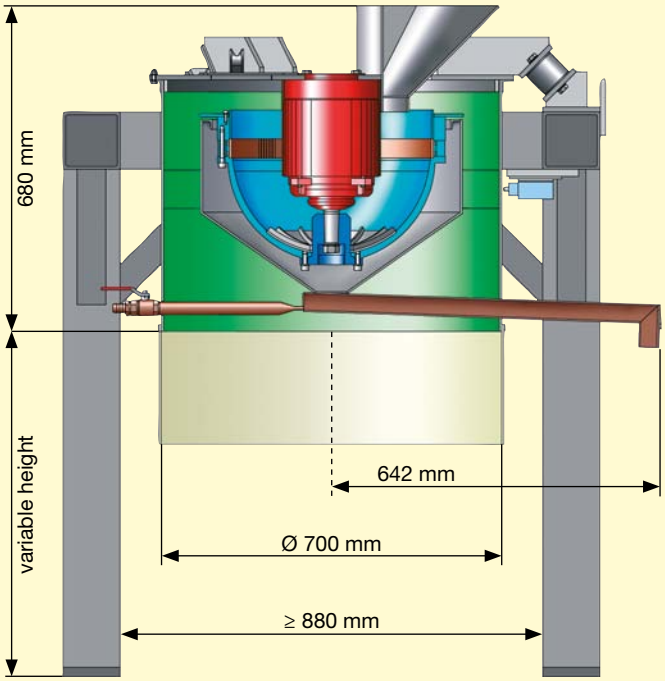
The baffle ring is manufactured in wear resistant manganese alloy steel.

The height of the frame, as well as its clear width, can be designed according to the customers requirements (see also the first example of use on page 8).

TECHNICAL DATA OF THE K 40 K

Through-put steel [1]	up to 0,5 m³/h
Through-put grey cast iron [1]	up to 0,4 m³/h
Through-put brass [1]	up to 0,4 m³/h
Through-put aluminium [1]	up to 0,5 m³/h
Bowl diameter	400 mm
Bowl height	303 mm
Speed	1,480 U/min
Motor voltage	400 V
Motor starting current	12.1 A
Motor operating current	2.6 A
Power	3 kW
Swarf discharge	Ø 700 mm
Centrifuge height	680 mm
Centrifuge diameter	700 mm
Centrifuge weight	210 kg

[1] Recommended values can be found in the table on page 4



OUR DEMONSTRATION/TEST UNIT

To be able to achieve ideal solutions and to select suitable units from the range of Gebr. Steimel products, it is often necessary to determine by tests in the preliminary project stages, the appropriate equipment for various applications. Steimel has therefore provided a test plant facility, which is available to our customers for simulated trials to be carried-out with their swarf material etc.

Steimel are quite prepared to conduct these tests to determine the right equipment for particular applications.

Our engineers working with our customers, to determine the best project solutions, will prepare their proposals and quotations to meet your specific requirements.

APPLICATION EXAMPLES

◄ A Permolex-Polar type K 40 K centrifuge, which is loaded by a scraper conveyor and discharges the dried swarf into a container, placed below.

▲ Swarf processing system, consisting of: Lifting and tipping unit for loading a Type RS 300 E swarf crusher and a scraper conveyor to in-feed a Permolex-Polar Type K 51 centrifuge. The crushed and dried swarf is discharged into on-site container.

◄ In this system the swarf is loaded by a lifting and tipping unit. A Steimel scraper conveyor Type KF 450 transports the wet swarf into the Permolex-Polar centrifuge. The swarf, dried in the centrifuge, then falls into a container placed below.

GEBR. STEIMEL GMBH & CO. MASCHINENFABRIK **COMPETENCE AND PASSION.**
Pumps and centrifuges

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