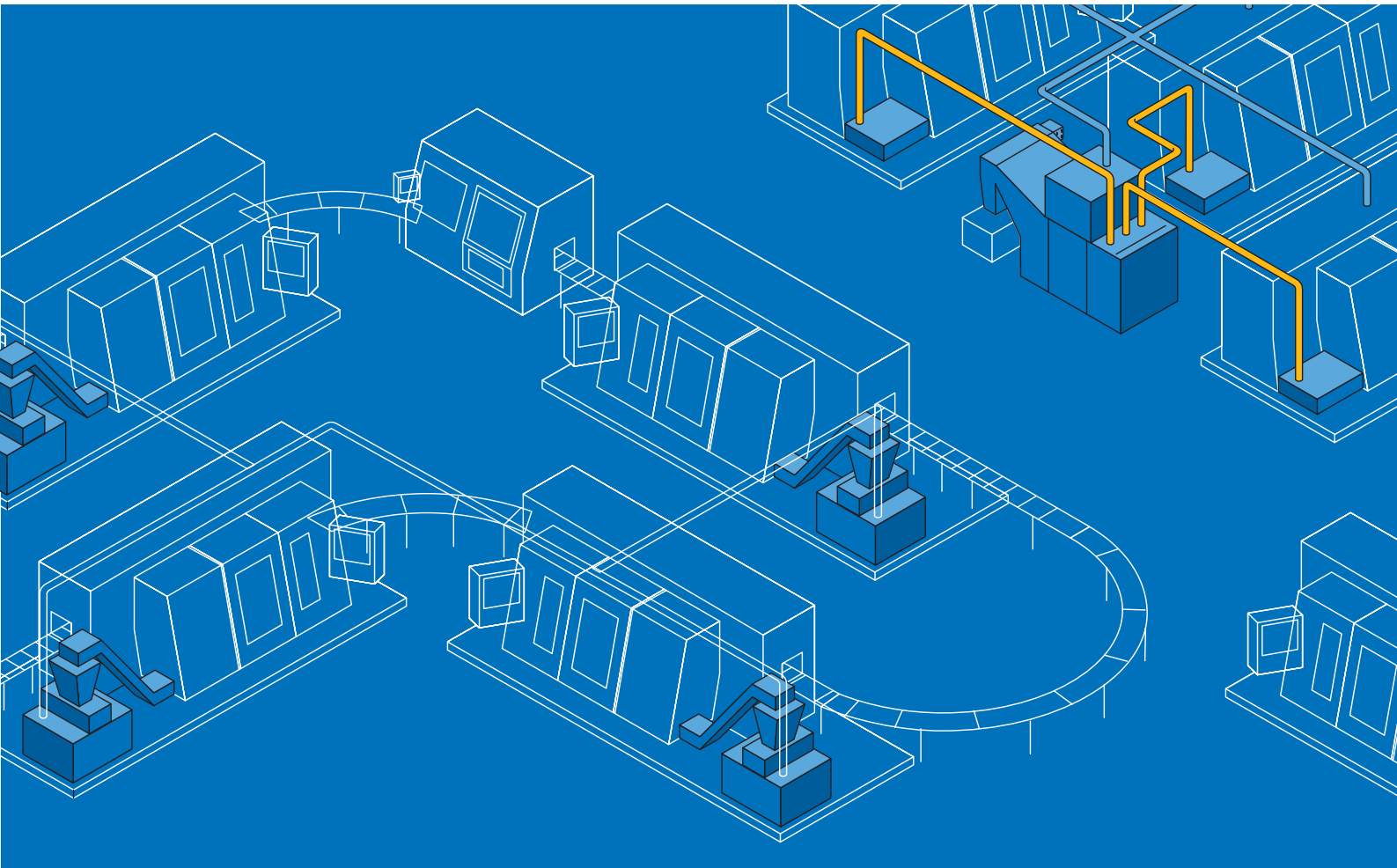
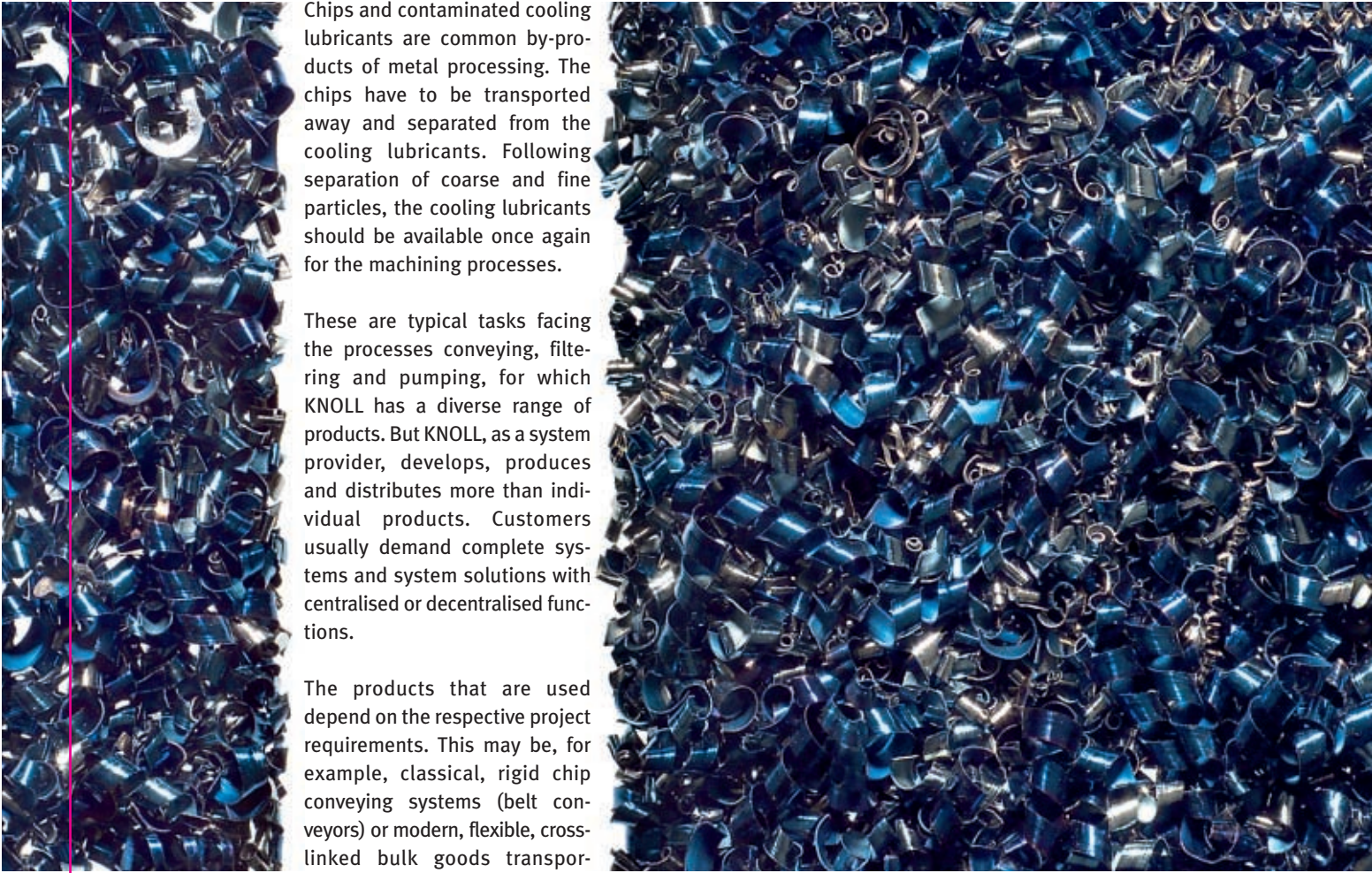


KNOLL
.It works



System Technology

The concept for made-to-measure complete solutions.



Chips and contaminated cooling lubricants are common by-products of metal processing. The chips have to be transported away and separated from the cooling lubricants. Following separation of coarse and fine particles, the cooling lubricants should be available once again for the machining processes.

These are typical tasks facing the processes conveying, filtering and pumping, for which KNOLL has a diverse range of products. But KNOLL, as a system provider, develops, produces and distributes more than individual products. Customers usually demand complete systems and system solutions with centralised or decentralised functions.

The products that are used depend on the respective project requirements. This may be, for example, classical, rigid chip conveying systems (belt conveyors) or modern, flexible, cross-linked bulk goods transportation systems (pumping or extraction technology). Halls and machine layout, machining processes, materials, chip volume and length of conveying path, but also the degree of automation, flexibility, environmental stipulations, disposal costs and budgets are a selection of criteria which our planning experts take into consideration in the design of a suitable system. The aim in all cases is an economic, customised complete solution with high customer benefits.

Product range

a Chip and sludge conveyor

Scraper conveyor K

For short chips, small parts and sludge.

Scraper conveyor SF

For short chips and sludge.

Magnetic belt conveyor M

For short, broken, ferromagnetic chips and small parts (e.g. stampings).

Slat-band chain conveyor S

For long chips, chip balls, wool chips and parts.

Traction flap conveyor ZK

For long and short, broken chips.

Desludger SR

For sedimentable short chips and sludge with large cooling lubrication volume.

b Filter/separator

Gravity belt filter PF

Flat-bed filter for cleaning cooling lubricants with filter fleece. Filter output up to 1000 l/min per unit.

Hydrostat filter HF, HL

Inclined-bed filter for cleaning cooling lubricants with filter fleece. Filter output up to 1000 l/min per unit.

Hydrocyclone separator F 60

Modular centrifugal separator for separating sedimentable solids from low-viscosity (without filter commodities). Filter output up to 90 l/min per unit.

TURBO filter

Modular reversible-flow filter for cleaning cooling lubricants without filter commodities. Filter output up to 250 l/min per unit.

Vacuum rotation filter VRF

Integrated reversible-flow filter for cleaning cooling lubricants without filter commodities. Filter output up to 1000 l/min per unit.

MicroPur®

Modular edge filter for very fine cleaning of cooling lubricants without filter commodities for TC and HSS processing with TT oils. Filter output up to 120 l/min per unit.

Vacuum filter VL

High-efficiency filter for fine cleaning of cooling lubricants with endless belt or filter fleece. Filter output up to 1500 l/min per unit.

c Pre-separator

Slotted hole screens

For pre-separation, integrated in the chip conveyor.

Separation drums

For pre-separation and coarse filtering, integrated in central systems.

d Reverse pump stations

Reverse pump station RRS

For deposit-free transport of grinding oils/emulsions.

Reverse pump station RIS

For transporting short and long chips. Suitable for integration in the machine

bed. With collecting screw and chip breaker.

Reverse pump station RSR

For transporting short or broken chips. Suitable for installation on a machine outfeed. With shift register technology, flat container, chip breaker (option).

Reverse pump station RSP

For transporting short or broken chips. Suitable for installation below discharge conveyor. With pendulum/screw conveyor technology, high design, large storage volume, chip breaker (option).

Reverse pump station RWM

For transporting short or broken chips. With whirl-mix technology, central cooling lubricants fluid feed, chip breaker (option).

e Extraction stations

Extraction station SBS

For collecting and transporting dry, short or broken chips (collecting screw). Suitable for installation under discharge conveyor.

Extraction station SIS

For transporting dry, short and long chips. Suitable for integration in the machine bed. With collecting screw and chip breaker.

f Pumps

Centrifugal pump TG

Vertical submersible pump for pre-cleaned cooling lubricants. Volume flow up to 1600 l/min, pressure up to 6 bar, grain size up to 3 mm.

Non-chokable pump TF

Vertical submersible pump for contaminated cooling lubricants. Volume flow up to 1000 l/min, pressure up to 2.4 bar, grain size up to 30 mm.

Screw centrifugal pump TS

Vertical submersible pump for contaminated cooling lubricants containing air. Volume flow up to 600 l/min, pressure up to 1.8 bar, grain size up to 15 mm.

Screw pump KTS

Dry- and wet-installed high-pressure pump for cleaned cooling lubricants, with a highly wear-resistant version as an option. Volume flow up to 900 l/min, pressure up to 150 bar.

g Chip breaker

Compact chip breaker ZHF

For horizontal chip feed (e.g. with conveyor screw). For breaking up chips in combination with a pump or extraction station. Output up to 200 kg/h.

Chip breaker ZV

For vertical chip feed, with fully automatic (ZV-A) or manual (ZV-M) coarse part ejection and fluid separation (up to 300 l/min). For producing pumpable and extractable chips (with a mixing unit as an option), for volume reduction and for improving transportability. Output up to 200 kg/h.

Chip breaker ZVF

For vertical chip feed, with manual coarse part ejection. Combined with fluid

separation (up to 300 l/min) and a mixing unit. For breaking up and conveying chips. Output up to 200 kg/h.

h Tanks/containers

- Standard coolant systems
- Machine-adapted coolant systems
- Project-specific large systems
- Safety collecting troughs with WHG certification (Federal Law for the Protection of Water)

i Control systems

- Electrical design (EPLAN, ELCAD)
- Programming the PLC control systems and visualisation systems (Siemens, Rockwell, Bosch, Schneider, etc.)
- Switch cabinet construction

Engineering

- Specialist advice, planning and design
- Layout and calculation of complex pipeline networks
- Preparation of project-specific invitations to tender
- Project management
- Custom-designed special constructions

Services

- Mechanical and electrical assemblies
- Building site management
- Commissioning
- Process accompaniment
- Maintenance, repair
- Conversions, extensions

Accessories

- Cleaning centrifuges
- Chip centrifuges
- Magnetic separator
- External oil separator
- Cooling lubricants temperature equaliser
- Chip presses
- Sludge drier
- Lifting/tilting devices
- Cooling lubricants metering and mixing devices

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System solutions.

A Autonomous conveyor and filtering system

Application: For wet processing incl. cooling lubricants care
Purpose: Fully automatic removal of short or long chips from the machine room in collection bins (with volume reduction through chip breakers as an option)

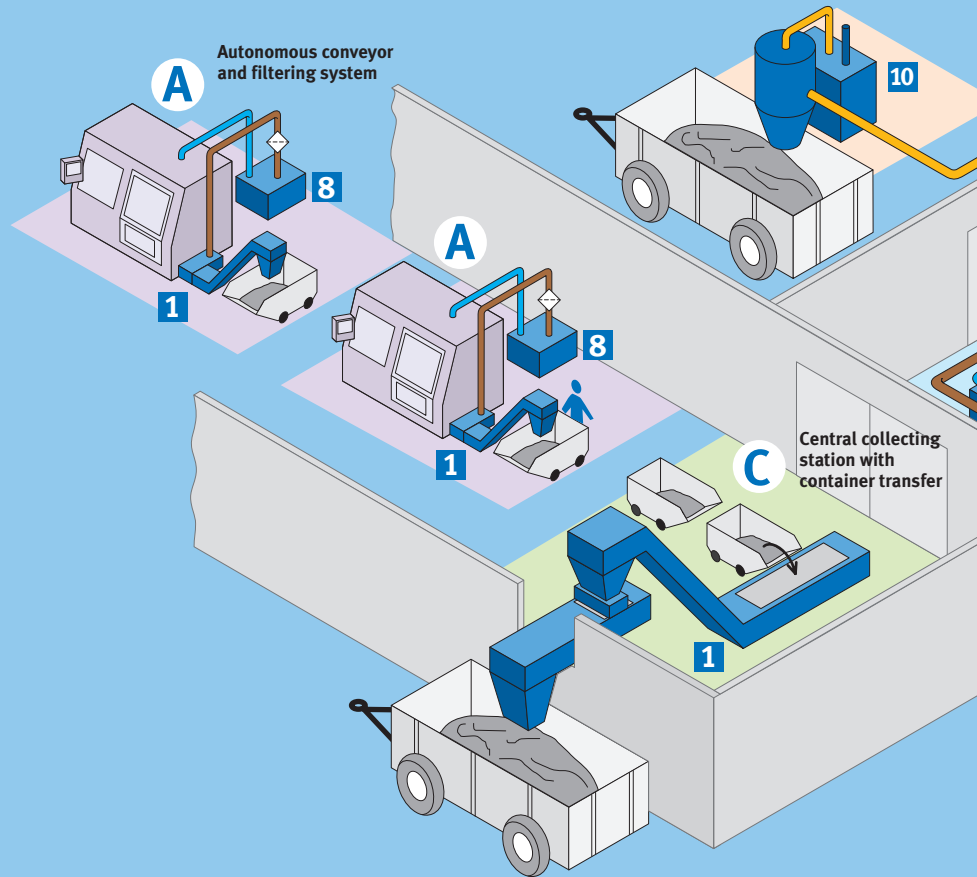
B Central conveyor system (extraction technique)

Application: For dry processing and minimal quantity lubrication and for chips coated with cooling lubricants.
Purpose: Fully automatic return of the chip/air mixture

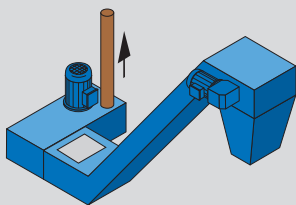
Advantages:

- Low chip volume through chip breaking technique
- Flexibly installable machine arrangement (return line pipework)
- Uncomplicated machine relocation
- Subsequent connection of additional machines to central network also possible and uncomplicated
- Conveying distances of up to max. 500 m

Supply.
 Transport.
 Process.

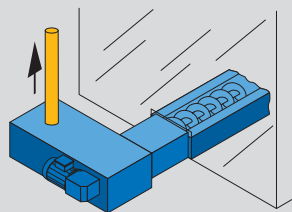


Machine-adapted conveying and filter systems



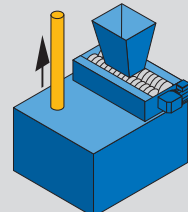
1 Chip conveyor system

Chip conveyor (a), combinable with pre-separator (c), tank (h), pumps (f), chip breaker (g) and control system (i)



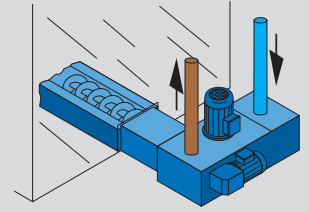
2 Integrated chip conveying station, dry

Extraction station (e), combinable with chip breaker (g) and control system (i)



3 Supplied chip conveying station, dry

Extraction station (e), combinable with chip breaker (g) and control system (i) (ideal for retrofitting)



4 Integrated chip conveying station, wet

Reverse pump station (d) with pump (f), combinable with chip breaker (g) and control system (i)

C Central collecting station with container transfer

Application: For dry processing and minimal quantity lubrication
Purpose: Discontinuous task from the collection bins, with the option of chip breaking technique and reclamation of cooling lubricants

D Local collection and conveying station with central collection (pump or extraction technology)

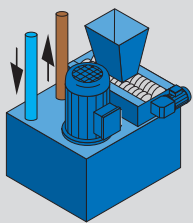
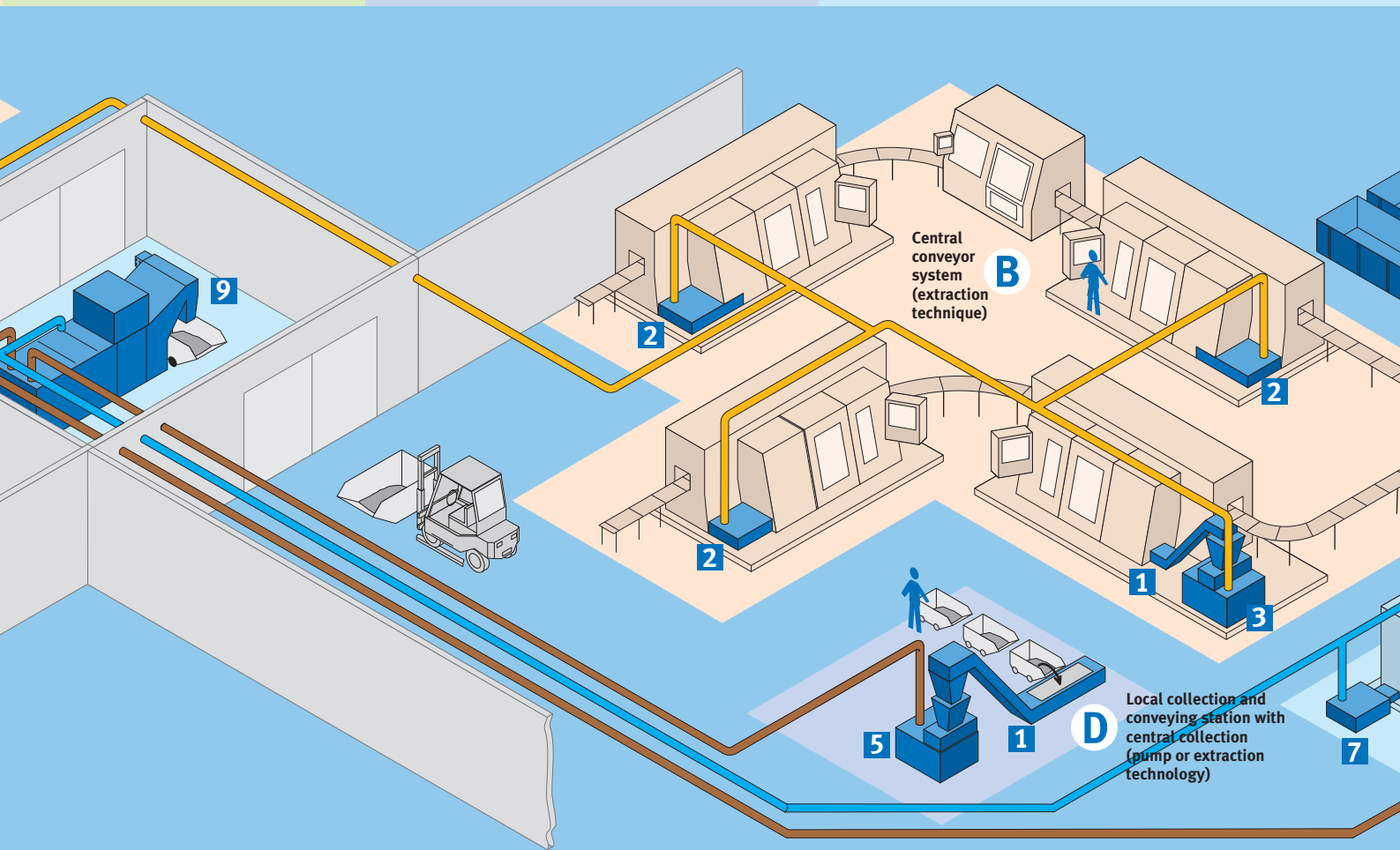
Application: For wet and dry processing
Purpose: Discontinuous task from the collection bins, with the option of reclamation of cooling lubricants
Advantages:

- Low chip volume through chip breaking technique
- Conveying over long distances to central collection point possible
- Connection of several local collection points possible

E Central conveyor and filtering system (pump technology)

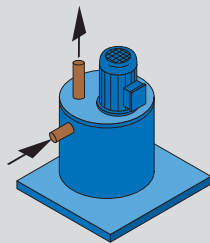
Application: For wet processing incl. cooling lubricants care
Purpose: Fully automatic return of the chip/cooling lubricant mixture (chip breaking technique with long chips)
Advantages:

- Flexibly installable machine arrangement (return line pipework)
- Uncomplicated machine relocation
- Subsequent connection of additional machines to central cooling lubricant circuit system also possible and uncomplicated
- Low maintenance requirements as per TRGS 611 (Technical Regulations for Hazardous Substances)



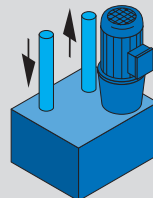
5 Supplied chip conveying station, wet

Reverse pump station (d) with tank (h) and pump (f), combinable with chip breaker (g) and control system (i) (ideal for retrofitting)



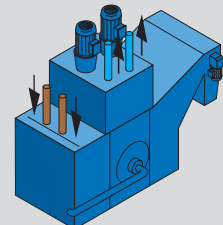
6 Lifting station for fine processing

Standard reverse pump station (d) or individual system with tank (h), pump (f), and control system (i)



7 Pressure increasing station

Process-adapted cooling lubricants supply in different pressure levels with pumps (f) and control system (i)



8 Autonomous cooling lubricant filtering system

Filter/separator (b), combinable with tanks (h), pumps (f), temperature equaliser and control system (i)

F Autonomous conveyor system

Application: For wet processing and minimal quantity lubrication
Purpose: Fully automatic removal of short or long chips from the machine room in collection bins

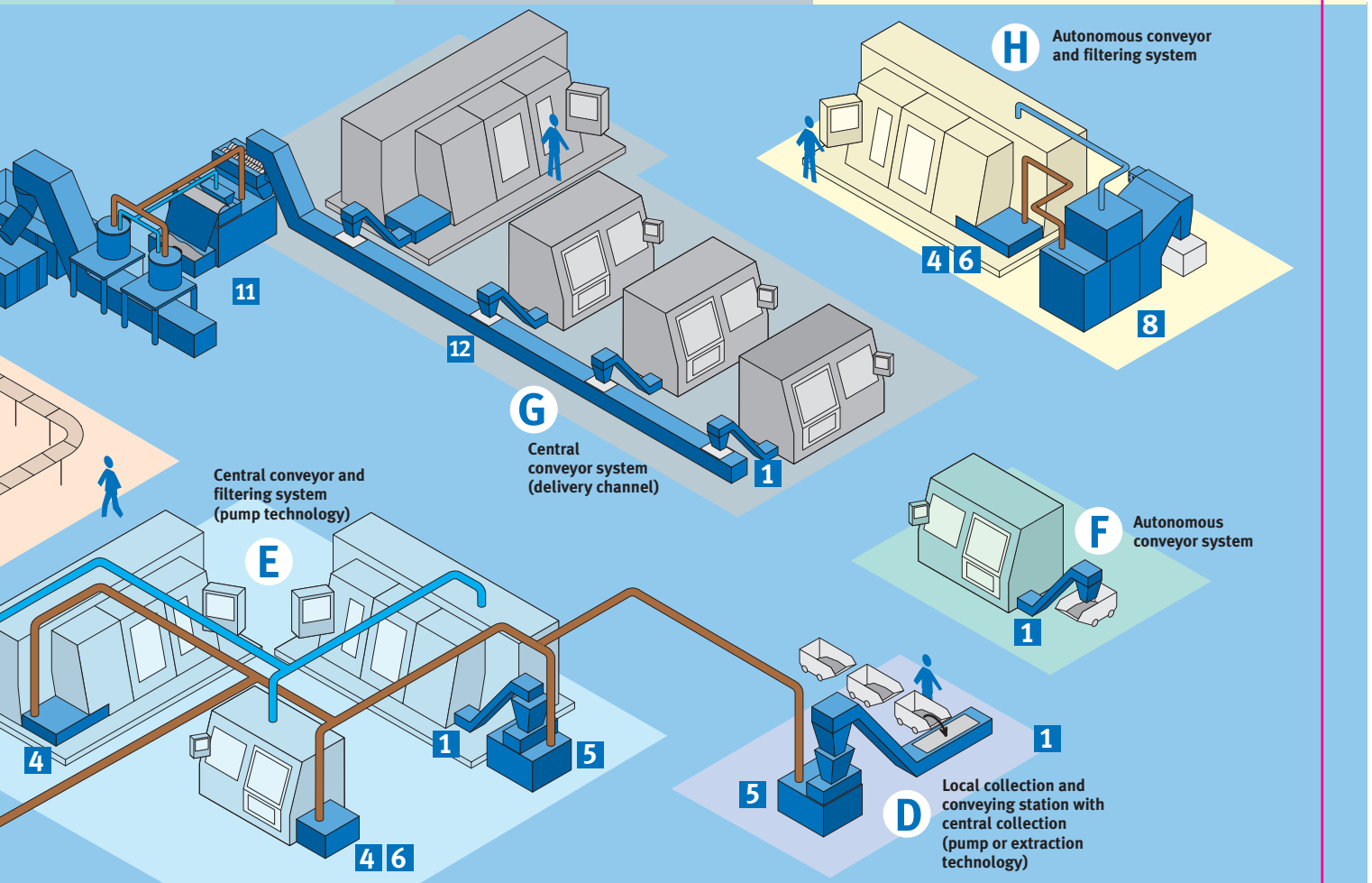
G Central conveyor system (delivery channel)

Application: For wet and dry processing
Purpose: Fully automatic removal of short or long chips from the machine room in collection conveyors
Advantage: Simple technique with uncomplicated planning, but with limited alteration options (rigid system)

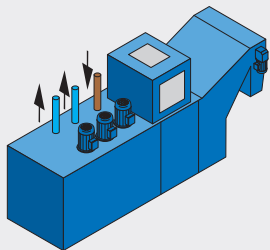
H Autonomous conveyor and filter system (pump technology)

Application: For wet processing incl. cooling lubricants care
Purpose: Fully automatic return of the chip/cooling lubricant mixture (chip breaking technique with long chips)
Advantages:

- Flexibly installable filter arrangement (return and supply line pipework)
- Subsequent connection to central cooling lubricant circuit system also possible and uncomplicated

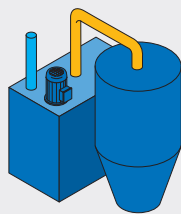


Supply and central systems



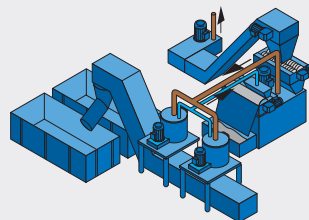
9 Central cooling lubricants filter system

Filter/separator (b), combinable with tanks (h), sludge conveyors (a), pumps (f), temperature equaliser, control system (i) and other process-related technical components



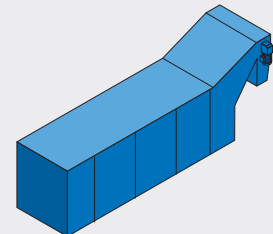
10 Central chip extraction system

System with filter, separator, blower, sluice technology, control system (i) and steel construction



11 Central chip processing system

Chip breaker (g), centrifuges, material separation, container distribution systems, sludge driers, presses, control system (i), steel construction



12 Central collection system

Channels, high tanks (h), chip/sludge conveyor (a), control system (i)