

Process cooling in food production

Liquid cooler



WEISSHAAR[®]
industrielle Kältetechnik

Perfect process cooling. Order given. Job done.
Made by WEISSHAAR.

WEISSHAAR – Mission and philosophy.

“You can’t build a reputation on what you are going to do.” (Henry Ford)

WEISSHAAR – Industrial process cooling and cooling technology. In Bad Salzufflen. In the middle of Germany. For 50 years. Privately owned. Flexible. Responsive. Experienced. Reliable. Collaborative.

WEISSHAAR – The company that offers functional solutions in the field of industrial food production. Produced by us, we possess extensive depth of manufacturing and our own regional supply chains as far as possible, with a focus on reliability. Attractive solutions.

WEISSHAAR – Engineers, refrigeration specialists, service technicians. Services on your behalf that we channel completely into your project.

Our customers in the field of process cooling are leading producers and system manufacturers in the food industry and the chemical and plastics processing industries, many of whom specify **WEISSHAAR** systems in their own factory standards.

In this way, we ensure the tailor-made system you receive is specified for your application, providing the best possible cooling for your important processes. We’re experts in implementing the right hydraulics, hygienic aspects, adherence to your specifications and integration with your system, and especially when it comes to system reliability. We offer the optimum solution for such tasks.



Air-cooled condenser, Utah USA

WEISSHAAR – Expertise.

The technical expertise and competence of our engineers, refrigeration and service technicians, plus more than 50 years of experience together mean that: We develop the optimal solution for your project in the area of liquid coolers.

Naturally, the traditional focus of our applications is on the **food industry**. However, with regard to tasks in the area of **plastics** or **pharmaceutical applications**, we're also appreciated as a partner for sensible or even critical removal of heat from thermal processes.

Over the course many years and generations, we've mastered the most diverse tasks, like cooling cameras on blast furnaces, making snow, drying biogas for power generation, and helping to manufacture adhesives.

In the pages that follow, we'd like to describe the advantages of a WEISSHAAR system from the viewpoint of a food producer. Since we know that the challenges of industrial food production clearly transfer over to other areas.

We look forward to your next assignment for us.



FKL with 1.6 MW output



WEISSHAAR – For example: candy producers.

FKL

- ① Your production continuously responds to new conditions resulting from consumer research, food safety, and legal guidelines. Operational influences, new trends and markets demand enormous flexibility in terms of infrastructure and production.
- ② Your cooling production should also include the necessary flexibility. Food production means focusing on operational safety. You know best of all what a production failure of just a few hours can mean.
- ③ Production has a high level of responsibility. It's peace of mind, when you can rely on your cooling equipment. 24 hours a day. 7 days a week, at your side.
- ④ Processes for food production are energy-intensive. We handle energy needs economically. Cooling technology needs to be inspiring.
- ⑤ We all need to master the transformation. Cooling also makes its own contribution. We invest in sustainable technology. We use suitable coolants. We conserve energy.
- ⑥ The goals of production are transparent. Since Industry 4.0, cooling generation no longer hides any secrets. You know what's happening all the time.
- ⑦ Your products are consumed globally by very many people. You have a big responsibility for the quality of your products. That's why you also have your precious infrastructure for producing your products set up and supported by the professionals.

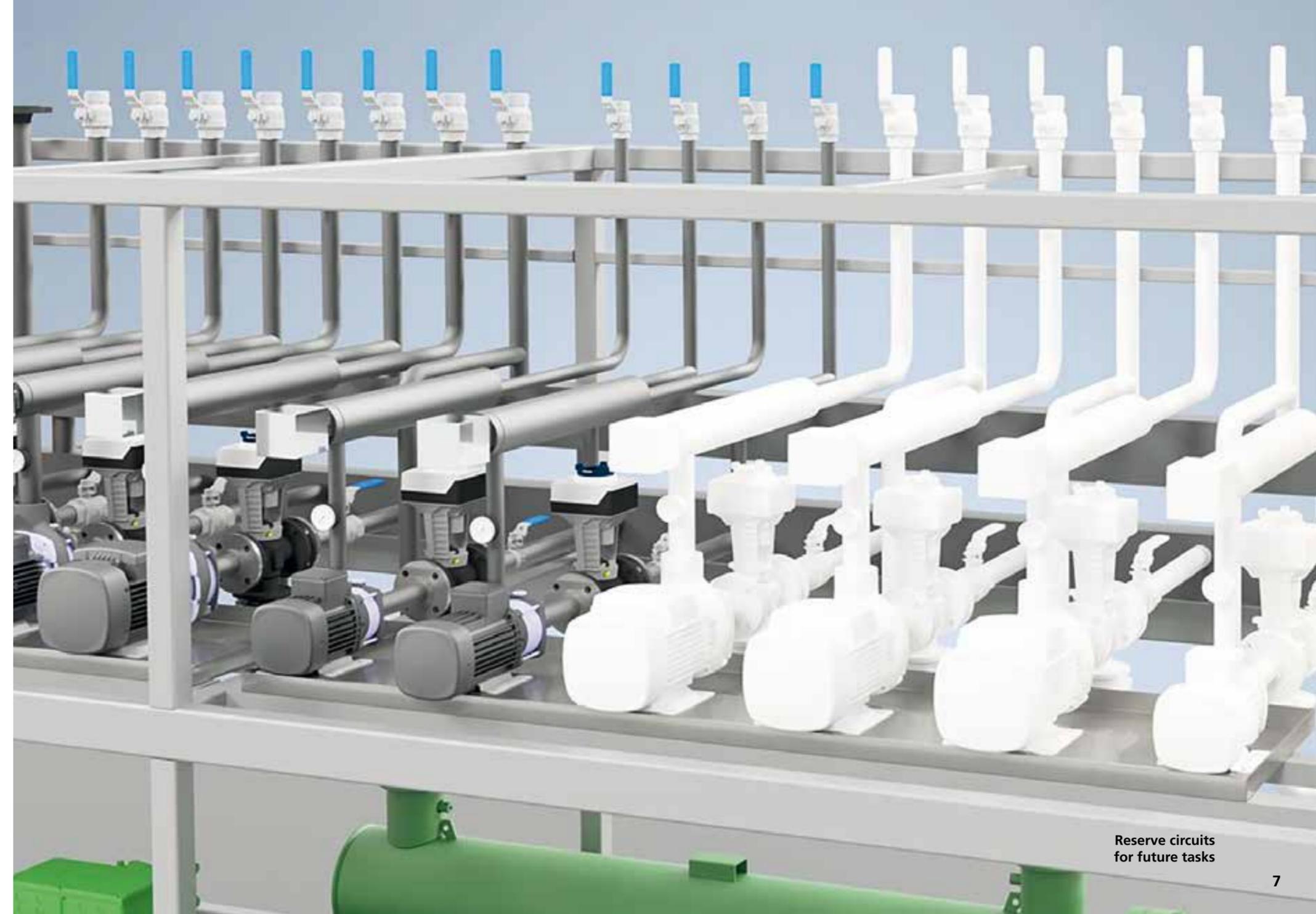


WEISSHAAR – Flexibility.

Your production continuously responds to new conditions resulting from consumer research, food safety, and legal guidelines. Operational influences, new trends and markets demand enormous flexibility in terms of infrastructure and production. Your cooling production should also include the necessary flexibility.

WEISSHAAR plants focus on flexibility from the start. This enables **future power reserves** to be prepared modularly, and cooling consumers can be planned at an early stage.

Additional control circuits, **reserve output**, or simply **space reserves** are also feasible. Both in terms of an easily accessible overall device, as well as ample dimensions for the control cabinet.



Reserve circuits for future tasks

2 WEISSHAAR – Operational safety.

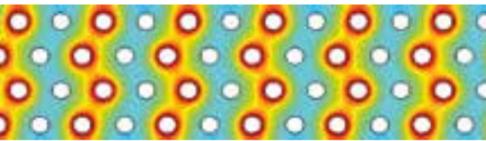
Food production means focusing on operational safety. You know best of all what a production failure of just a few hours can mean.

A redundant core frees up space. **WEISSHAAR** plants are always equipped with the necessary security of a **2nd cooling circuit**. Besides duplicated operational security, the system also gains enormous **energy efficiency** via the frequent partial-load range throughout the year.

Since even if the plant is designed for the numerically underlying full-load hours, this reserve is also able to be used beneficially in more frequent normal operations, right?

We unify both in this case: Redundancy with economy. Naturally, a 2nd cooling circuit is an investment at first. But if savings result continuously due to power costs, this is a welcome bonus. How does it work? Easy: If the second circuit is unneeded because the other one is performing, the working circuit is able to also use the thermodynamic surface of the paused circuit. This corresponds with an oversized condenser thermodynamically at this particular moment.

In many cases, a reserve pump represents a sensible redundancy. A pump that is already connected to supply tubes and electricity is already a big contribution. However, if it's activated regularly, you can be certain that it will really work in case of an emergency.



3 WEISSHAAR – Responsibility.

Production has a high level of responsibility. It's peace of mind, when you can rely on your cooling equipment. 24 hours a day. 7 days a week, at your side.

- **No compromises** on the components used.
- **Partial availability**, even after many years. This is exactly the reason why we only rely on renowned manufacturers.
- Component quality that has been proved over many years of experience.
- **Service-friendly arrangement** of the components. After all, our service technicians keep an eye on design.

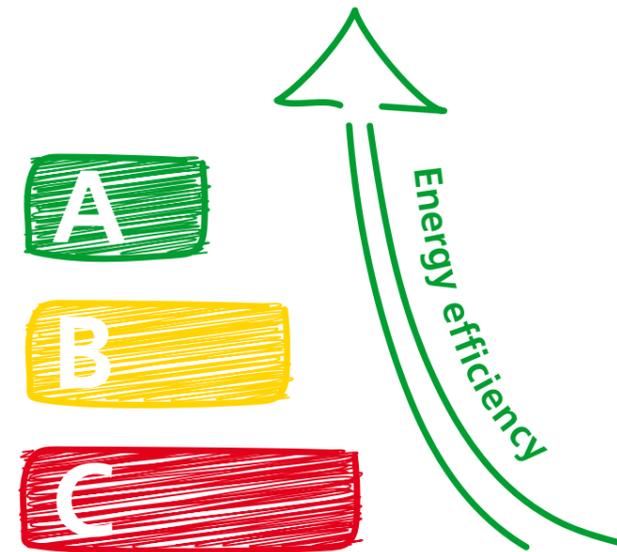


4 WEISSHAAR – Energy savings.

Processes for food production are energy-intensive. We handle energy needs economically. Cooling technology needs to be inspiring.

Let's talk about your cooling consumers. Because we know that a cooling spiral for flour expects a different glycol-water hydraulics system than a chocolate raisin dryer. We want to show you more opportunities in the glycol controls that are almost certainly unavailable from standard providers, or are only available with difficulty. Optimally matched to your special needs.

We give you options you can use to **save energy** sensibly and that simply suit the **operational safety** you want and expect.



5 WEISSHAAR – Sustainability.

We all need to master the transformation. Cooling also makes its own contribution.

We invest in sustainable technology. We use suitable coolants. We conserve energy.

We consider ourselves your technical advisor for selection of a suitable coolant. Different from before, today there are very many options for reaching demanding **ecological goals**. Allow us to show you both the advantages but also the challenges of your own project objectively.

Why throw away a coolant replacement? Please don't, just because the integrated buffer tank and heat exchanger is damaged and the replacement part is no longer available.

Customers with these experiences know what we mean here by the term 'sustainable'. In case of a **WEISSHAAR** device, you just replace the damaged part, the component.

By the way, but also certainly a good argument, when we think back on the pandemic: Let's think globally, but keep the security of **regional supply chains** in mind, too. We align our actions with this.



6 WEISSHAAR – Industry 4.0.

The goals of production are transparent. Since Industry 4.0, cooling generation no longer hides any secrets. You know what's happening all the time.

At the start of the project, we're happy to define your data-side interfaces requirements. And because we programmed the controls ourselves, we're also pleased to accept your change requests later in case anything changes or if something was left out.

WEISSHAAR plants often use **Siemens systems**, but we also work with less frequent systems, e.g. Rockwell.



7 WEISSHAAR – Service.

Your products are consumed globally by very many people. You have a big responsibility for the quality of your products. That's why you also have your precious infrastructure for producing your products set up and supported by the professionals.

WEISSHAAR service is very appreciated by our customers of many years. We know them and their circumstances for as long as 50 years, and we know what this involves. Our **service** starts after the sale, but it doesn't end when the order is confirmed. Because we know: You have to enjoy the plant for many years. We bring the **appreciation** to the plant that is so important to you and your production-relevant core.



WEISSHAAR – infrastructure concept.

WEISSHAAR's ability to adapt starts with the infrastructure. How are your local conditions? Are several consumers positioned close to each other, while cooling generation is located at another location, e.g. close to the main consumer?

We create solutions. With a **sub-distributor**, series of optimised, hydraulic switches can be arranged for each coolant consumer perfectly, as well as centrally. This saves unbelievable costs on future operation and installation. Our versatile system solutions minimise the local pipework costs.

In the hygienic food industry, the set-up of the plant becomes especially important. The pipe routes to the individual consumers should be grouped, minimised, and simplified as much as possible. The core of the plant is therefore close to the production, or it's even placed in the hygienic area. Leaving the hygienic area unnecessarily, e.g. just to access the cooling controls on the building roof, should be avoided.

Or do you already possess coolant infrastructure, but you don't have access to all of the temperature levels you want? Low-cost solutions from **WEISSHAAR** optimally integrate the energy of the exotic consumer in your cooling plant. We're happy to provide independent advice.

Our solutions, or rather yours, as you've learned, are available **"air-cooled"** or **"water-cooled"**. Air-cooled normally means heat removal to the outside environment, while water-cooled utilises efficient coolant in the building.

Maybe your operations have simply grown and your process cooling hasn't grown along in a structured manner, like you would plan it 'from scratch'? How would you like a device on the roof that reliably removes warmth, while the actual plant is set up close to the production on the interior, and therefore stays easy to reach and control?

The choice of coolant is also decisive. For example, **flammable coolants** require special separation and result in zone separation according to ATEX. For example, set up in the air-cooled condenser outside of the production area or with the complete cooling plant in a security area especially specified for this purpose.

We're happy to advise you extensively on the topic and provide you a recommendation for an optimised technical solution.

Air-cooled liquid cooler FKL with heat removal via the roof and simple connection of consumer circuits directly in the liquid cooler.



Central liquid cooler FKL or FKR with decentralised connection of consumer circuits via sub-distributor.



Liquid cooler FKR in a compact design, set up outside, e.g. in a zone-free environment and with simple connection of consumer circuits in the production area via a sub-distributor.



WEISSHAAR – OEM customer design.

Leading manufacturers take advantage of our many years of experience providing cooling, and numerous customer-specific devices are constructed by us and finished in our customer's name.

This valuable **OEM know-how** is used by companies who wish to outsource cooling equipment to specialists and simultaneously offer their own customers a comprehensive product pallet.

System integration

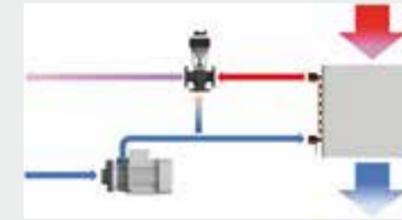
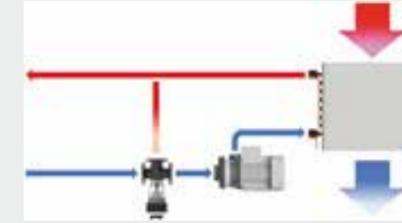
At the same time, we take care of the technical cooling needs of end users.

The problem: In larger production operations with several manufacturer cooling processes, an outfitting company often delivers their 'own' cooling plant for production. Especially in structures that have grown, this can have negative results: Different coolants in one company, different components and replacement parts, unmatched, ineffective island solutions and difficult maintenance.

The solution: Weisshaar offers an integrated concept for this, and our specialists support technical cooling and technical control integration of the project, coordinate the various requirements, and ensure an energy-efficient overall concept. The connection to a central master control system becomes easier, plant standards are met at the same time, and maintenance is simplified. The replacement parts inventory is reduced significantly. A future-capable coolant is used in the complete company. Genuine redundancies on the cooling power side can also be implemented, which results in large savings.



WEISSHAAR – Plant details.



WEISSHAAR hydraulics

In addition to construction conditions that match our concept perfectly, your advantage is in the equipment: All control circuits optimised to the respective cooling consumers are positioned clearly laid-out and service-friendly in one frame for easy access. We understand your 'cooling consumer' and provide you the right hydraulic switching. **Not the solution that's cheapest for us.** Every consumer requires different water quantities, temperatures, or places requirements on the cooling medium used. Chocolate tempering places high requirements on the temperature consistency or requires a balanced volume flow. Dehumidification, on the other hand, requires the lowest possible cooling temperature. Two completely different hydraulic switches are used in this case, which already have to be considered during the design phase. The **WEISSHAAR hydraulic concept** implements these fundamental claims! Not every consumer works ideally with standard hydraulic switching. These requirements for precision, control routes, and the function of the different cooling consumers of diverse manufacturers can only be considered in this way.

Of course, every circuit features hydraulic auxiliary components like a compensation tank, flow monitor, frost protection thermostat, or possible flow sensors, as well as temperature displays and manometers at the right positions, while all renowned components are accessible and replaceable in a service-friendly way. The principle: Everything you need is already inside. On-site, only the consumer still needs to be connected.

Upon request, we already integrate tools for you that we know will be needed:

For simple glycol mixture and to ensure the right mixing ratio, the glycol mixing station is already integrated with the device at the factory as an option.

Different housing designs, use of different materials enable use under the conditions specified by you.

WEISSHAAR – Energy concepts.



Radiating heat usage

The resulting radiating heat of a cooling machine can often be used beneficially. In this case, Weisshaar offers different heat usage concepts. For example, **process heat** can be derived and the operator-side heating/warm water supply supported. The remaining radiating heat that cannot be used should at least be guided outside during the summer months.

However, can radiating heat be used beneficially in the winter? Contact us.

WEISSHAAR Eco-Pack

Considered over the life cycle, the energy costs of a cooling plant are normally much higher than the purchase costs, and especially over the course of increasing energy costs, this should be the focus when selecting the cooling plant. Passive and sensible savings options for energy consumption must already be considered during plant design. In this case, a customer-specific system should offer solutions. Depending on the actual climatic plant location, **WEISSHAAR** offers different efficiency increasing concepts: **WEISSHAAR Eco-Packs**.

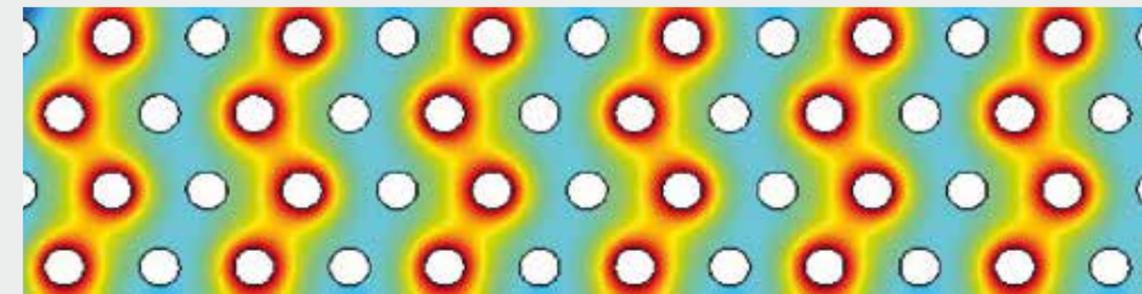
You have the selection: In case of an air-cooled plant, the air-cooled condenser on the roof has enormous energy importance. A generously dimensioned heat exchanger surface enables the compressed gas temperature to sink and saves the compressor or compressors a lot of work. Work that doesn't need to be completed doesn't burden your power metre.



With the option of a Weisshaar Eco-Pack, you're always a step ahead in terms of plant efficiency. Even without a **WEISSHAAR Eco-Pack**, liquid cooling sets in the FKL series are already very energy-efficient. Extremely optimised Bitzer compressors, highly efficient pumps, and energy-optimised controls are already standard, even as they are continuously developed further.

In case of dual-circuit plants, the nested piping inside the lamellae package of the air-cooled condenser on the roof ensures highly efficient work in common partial-load operation: Because if the system doesn't need to work during high summer at maximum output, but rather below 50%, the remaining working circuit now simply uses the unused thermodynamic surface of the deactivated circuit.

The desired side-effect? The work load of the compressor drops and energy is once again saved during a large part of the year. Tell us about your climatic location and talk with us about your consumers; we'll show you sensible options for saving energy over the life cycle of the plant, but which need to be specified during project planning.

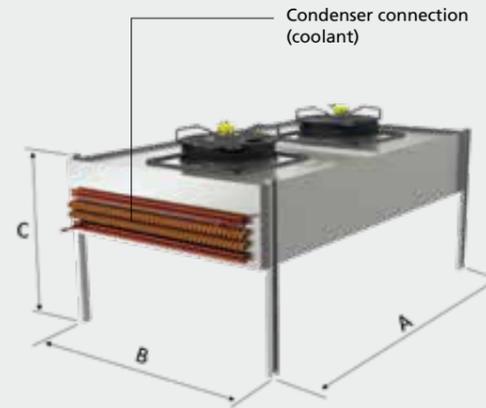


Dual-circuit condenser in the partial-load range

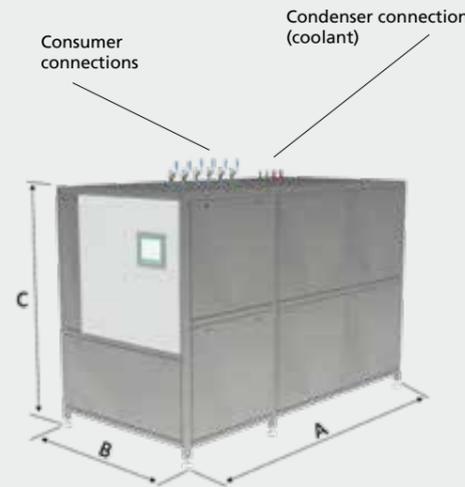
WEISSHAAR – FKL series technical data. (air-cooled)

Model/ Type FKL	Nominal cooling capacity ¹⁾				Airflow condenser	Motor power consump- tion ¹⁾	Buffer tank size	Dimensions FKL				Dimensions condenser			
	+14/+10°C	+10/+5°C	+6/+2°C	+2/-2°C				Depth	Width	Height	Weight	Depth	Width	Height	Weight
	[KW]	[KW]	[KW]	[KW]				[m³/h]	[KW]	[l]	[mm]	[mm]	[mm]	[kg]	[mm]
6	5,8	4,8	4,1	3,4	2390	3,8	50	800	1100	1400	370	330	660	560	25
9	9,8	7,6	6,3	4,9	2900	5,2	200	1000	1300	1700	390	330	1200	460	32
15	14,8	12,3	10,4	7,3	5200	7,5	200	1000	1500	1700	450	330	1200	560	43
19	19	15	13,5	10,5	5450	10,5	300	1400	2000	1950	710	900	1450	1000	100
25	25	20,5	17	15	9600	13	300	1400	2000	1950	785	1200	1450	1200	130
36	36	30	25	23	11500	18	300	1400	2200	1950	860	1200	1800	1200	180
50	50	40	34,5	30	19200	21	500	1500	2800	2200	1290	1200	2600	1200	210
60	60	50	41	36	23000	26	500	1500	2800	2200	1345	2300	1800	1200	240
73	73	61	51	46	24000	32	500	1500	2800	2200	1350	2300	1800	1200	305
87	87	70	59	48	26100	33	500	1600	3000	2200	1590	2210	1760	1200	320
100	104	84	70	58	33580	45	500	1600	3000	2200	1620	2210	2600	1200	385
120	116	94	78	66	42100	52	500	1600	3100	2200	1770	1800	3750	1200	586
140	134	109	92	77	48500	59	750	1600	3100	2200	1810	2210	2512	1200	480
160	154	125	106	89	53500	62	750	1700	3300	2200	1900	2365	2630	2060	650
180	182	149	127	107	72600	79	750	1700	3300	2200	1990	2210	4700	1200	668
210	222	182	154	129	84600	90	750	1700	3300	2200	2040	2210	3620	1200	697
250	270	221	187	158	102000	107	2 x 500	1800	3500	2200	2100	2210	4670	1200	852
300	310	258	225	190	122700	96	2 x 500	1920	3500	2200	2390	2200	4100	1200	790
350	376	312	268	228	147200	124	2 x 500	1920	3500	2200	2530	2200	4800	1200	880
400	428	356	306	260	167900	135	2 x 500	1920	3500	2200	2920	1200	9700	1500	1250
450	468	390	334	284	183400	160	2 x 750	1920	3800	2450	3260	1500	8100	1500	1270
500	502	430	380	330	213100	180	2 x 750	1920	3800	2450	3410	1600	9700	1500	1430
550	582	482	422	349	225400	192	2 x 750	1920	4200	2450	3600	1500	9700	1500	1450
650	662	548	468	400	258300	210	2 x 750	1920	4200	2450	3850	2300	7400	1500	1590
750	752	626	536	460	297000	298	2 x 1000	1920	6000	2450	5200	a.A.	a.A.	a.A.	a.A.

¹⁾related to 32°C ambient temp, exemplary design incl. primary and secondary pumps



Condenser
(exterior device)

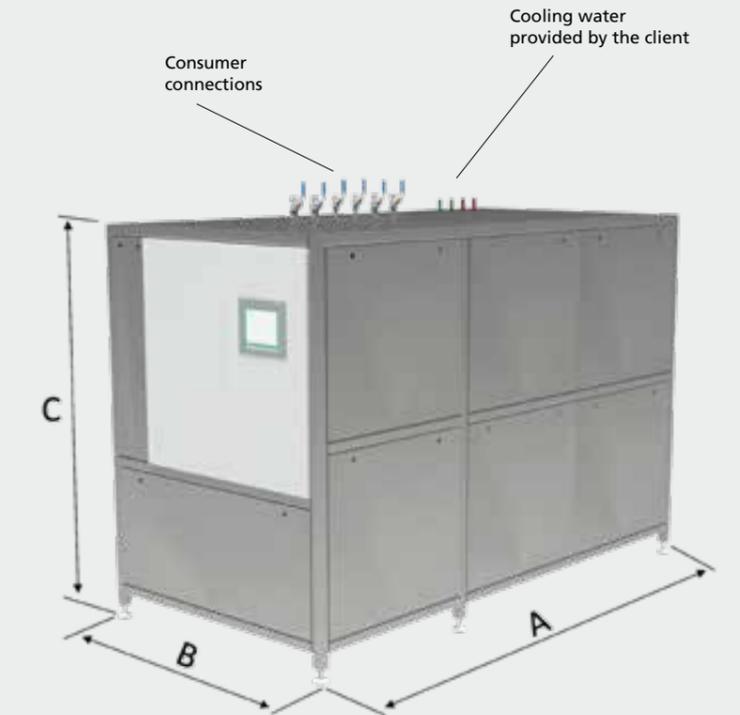


Liquid cooler
(interior device)

WEISSHAAR – FKW series technical data. (water-cooled)

Model/ Type FKL	Nominal cooling capacity ¹⁾				Recooling water flowrate ¹⁾	Motor power consump- tion ¹⁾	Buffer tank size	Dimensions FKW			
	+14/+10°C	+10/+5°C	+6/+2°C	+2/-2°C				Depth	Width	Height	Weight
	[KW]	[KW]	[KW]	[KW]				[m³/h]	[KW]	[l]	[mm]
6	6,1	4,9	3,85	3	0,8	3,2	50	800	1100	1400	380
9	9	7,3	5,8	4,7	1,5	4	200	1000	1300	1700	400
15	15,5	12,7	11	9	2,3	6,2	200	1000	1500	1700	460
19	19	15,5	12,4	10	2,7	8	300	1400	2000	1950	730
25	27	22	19	16	3,5	11,5	300	1400	2000	1950	795
36	34	28	24	20	4,4	15,5	300	1400	2200	1950	890
50	54	44	38	32	8	23,5	500	1500	2800	2200	1340
73	68	56	48	40	9	27	500	1500	2800	2200	1395
87	82	64	56	46	10	25,5	500	1500	3000	2200	1660
100	98	80	70	60	12	29	500	1600	3000	2200	1680
120	124	102	90	76	16	36	500	1600	3100	2200	1840
140	142	118	104	88	17,5	44	750	1600	3100	2200	1880
160	164	136	120	102	20,5	50	750	1700	3300	2200	1980
180	184	154	136	114	28	55	750	1700	3300	2200	2090
210	212	176	156	132	30,5	66	750	1700	3300	2200	2140
250	244	204	180	152	31	74	1000	1800	3500	2220	2250
290	292	240	214	180	32	90	1000	1800	3500	2220	2530
350	350	288	256	216	46	106	1000	1800	3700	2200	2740
410	410	340	302	257	58	131	1000	1800	3700	2200	3170

¹⁾related to 27°C recooling water, exemplary design incl. primary and secondary pumps



Liquid cooler
(interior device)

DESIGN DATA

Please send to: WEISSHAAR GmbH & Co. KG • industrial cooling technology
 Fax +49 (0) 52 22/92 73-33 • E-mail: info@weisshaar.com

Location / customer / project _____

Industrial applications Plastic Food processing
 other industry Pharmaceuticals

Application _____
 please describe the application and the consumers to be cooled (type and quantity) use separate included sheet as required

Is the required or desired cooling power already specified? _____
 If yes _____ kW

Water/brine in and outlet temperature _____ °C

The following data are required for each consumer:
For air coolers:

Air flow _____ m³/h

Inlet temperature _____ °C

Inlet moistness _____ r.F.

Desired air outlet condition (temperature/moistness) _____ / _____ °C/r.F.

Cooling requirement specifications
For other consumers:

Water/brine quantity _____ m³/h

In and outlet temperature _____ / _____ °C

How should the consumer be regulated? constantly or on/off

Climatic location (e.g. Central Europe) _____

Min. and max. outside temperature _____ / _____ °C

Where will the device be set up? _____
(mechanical room or exterior set-up)

The plants are normally equipped with an air-cooled condenser (this removes the absorbed energy of the liquid cooler into the ambient air). In this case, it's sensible to set up the complete liquid cooler with condenser (compact design) or the condenser separate from the machine aggregate (split design) outside (on level ground or the roof). The complete plant featuring a compact design may only be set up in a well-ventilated mechanical room in case of small power levels.

If cooling water is available, alternatively:

What pilot temperature is available in the summer? _____ °C

Special cooling water characteristics (cooling tower operation, well and river water) _____

Voltage (volts) _____

Frequency (Hz) _____

Controls voltage (volts) _____

Are there special requirements in relation to materials? _____

Do special factory standards apply? _____

Special local conditions _____

ATEX zone allocation if required _____

Illustrative process diagram/schemata:
 Please use separate included sheet!

Image sources:

P. 5 above: Adobe Stock I PARILOV EVGENIY
 P. 7 above: Adobe Stock I industrieblick/below: Adobe Stock I klikk
 P. 10 above / 21: Seasonal energy efficiency (ESEER) of different installation solutions of chillers using screw compressors for R134a; UNIVERSITY OF STUDIES OF PADUA; Prof. Eng. Ezio Fornasieri, Dr. Eng. Marco Corradi, Dr. Eng. Luca Cecchinato; BITZER ITALIA Srl; Eng. Pietro Trevisan
 P. 14 below: Adobe Stock I PARILOV EVGENIY



WEISSHAAR – Quality.

“Our name is on our products.
That places us under obligation.” (Stefan Weißhaar)

All **WEISSHAAR** liquid coolers, sub-distributors, and low-temperature cooling systems are designed and built in Germany.

At **WEISSHAAR**, every employee vouches for the quality of their own work. So that you are assured of only ever receiving a perfect product, we have established an extensive quality management system.

Every device that leaves our factory is subject to stringent test criteria and undergoes a 100% final test and a test run before delivery. In addition, we offer you as a further service, an ex works FAT (Factory Acceptance Test), which will assure you directly of the quality of the custom production of your order.

Because we know:

- The operational reliability of our customers' production processes depends, among other things, on the perfect air conditioning of the process air.

We want to be better. Accordingly, our entire team of employees undergo regular, goal-oriented training and further education.

WEISSHAAR Service:

For us more than just an empty phrase. Perfect service is an integral part of our corporate philosophy: 24 hours a day, worldwide, we are there for you to help you.

We will gladly look after your systems with our service team and thereby obtain the operational safety and optimal function over the lifetime of the device.





WEISSHAAR GmbH & Co. KG
industrielle Kältetechnik

Max-Planck-Straße 65
D-32107 Bad Salzuflen
Germany

Fon: +49 (0) 5222/9273-0
Fax: +49 (0) 5222/9273-33

Postfach 3610
D-32080 Bad Salzuflen
Germany

E-Mail: info@weisshaar.com
Internet: www.weisshaar.com



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