Güntner

CHOOSING THE RIGHT MATERIALS

FOR YOUR APPLICATION



RECOGNISE AND UNDERSTAND CORROSIVE ATMOSPHERES

Corrosion and protection against corrosion are very important topics in refrigeration and air conditioning technology. To avoid damage due to corrosion on heat exchangers and other system components, it is important for the contractor and project designer and/or the integrator to recognise the reasons for corrosion. Heat exchangers are used in different ambiances that have a more or less corrosive effect on metal.

The most important substances having a detrimental impact on metal are carbon dioxide, ammonia, nitrogen oxide, hydrocarbons, sulphur compounds, fluorides, chlorides, carbon monoxide and their reaction products.

Industrial plant emissions are not the only cause of corrosive atmospheres through their emissions. Natural environmental conditions can also affect materials. For example, in proximity to the ocean, high concentrations of chlorides occur, which can affect Aluminum and lead to pitting corrosion.

In practice, additional environmental and operational influences such as heat, humidity, and soiling can further intensify corrosive effects and shorten the service life of heat exchangers. Especially persistent moisture and fouling on heat exchangers can lead to long-term corrosion. In any case, corrosion is a not totally avoidable risk even if specific protective measures are taken.

Sensible protection against corrosion therefore requires a considered approach, combining the selection of appropriate materials and protective measures to maintain heat exchanger functionality and the leak tightness of the refrigeration system.

If your specific application is not covered in this brochure, our team will be happy to offer bespoke advice. Please contact your local Güntner sales representative for further discussions.

This document is of a generic, informative and non-binding nature only.





SELECTING THE SUITABLE MATERIAL

The materials used in a heat exchanger are exposed to severe conditions on the inside and outside.

From inside, the refrigerant affects the tubes with its chemical properties, pressure and temperature; from outside, the more or less aggressive ambient air influences the heat exchanger's materials.

Thanks to longterm experience, extensive tests and analyses, Güntner is able to match the various possible combinations to the respective applications. The final choice has to be validated and approved by the project designer, the installer or the client's engineering firm taking into account the individual and specific environmental conditions. With the selection of the corresponding materials, every heat exchanger can be designed optimally for almost any application situation.

MATERIALS	INDICATIVE MATERIAL SUITABILITY							
	Chlorides	Vinegar	Drinking water	Cleaning agents (general)	Cleaning agents (with acids)	Various acids	Smoke	Ammonia
Copper - Cu	✓		✓					
Aluminum - Al		✓	✓					
Aluminum-Magnesium alloy - Al-Mg3	✓	✓	✓					✓
Aluminum - Al+EPX epoxy resin-coated		✓	✓	✓				
Copper-Aluminum - Cu/Al+CD with Coil Defender (powder coating)	✓	✓	✓	✓	✓	✓	✓	
Copper-Aluminum - Cu/Al+KTL cathodic dip-coated	✓	✓	✓	✓	✓	✓	✓	
Ferritic stainless steel - V (high quality)		✓	✓	✓			✓	✓
Austenitic stainless steel - V* (high quality)	✓	✓	✓	✓	✓		✓	✓
Austenitic stainless steel - W (highest quality)	✓	✓	✓	✓	✓	✓	✓	✓
Stainless steel A4 according to DIN EN ISO 3506-1	✓	✓	✓	✓	✓	✓	✓	✓
Galvanized steel - St-Zn			✓					
Galvanized steel with powder coating - St-Zn+PC	✓	✓	✓	✓	✓	✓	✓	

The indicated resistances are examples and depend on the concentration, temperature as well as duration of exposure to aggressive substances.

© Güntner

PRODUCT EXAMPLES OF DIFFERENT CORROSION PROTECTION OPTIONS



COIL DEFENDER COATING - Cu/Al+CD

Fully coated heat exchanger coil for air coolers in cold storage applications like catering.

The full coating of the heat exchanger coil extends service life compared with the standard Cu/Al material combination.

Coil Defender is particularly suitable for applications with lightly aggressive environments. It is not suitable for strongly aggressive media, especially environments containing sulphur compounds, ammonia, or sodium chloride.



CATHODIC DIP COATING - Cu/Al+KTL

Fully coated heat exchanger coil for fluid coolers, condensers, and gas coolers.

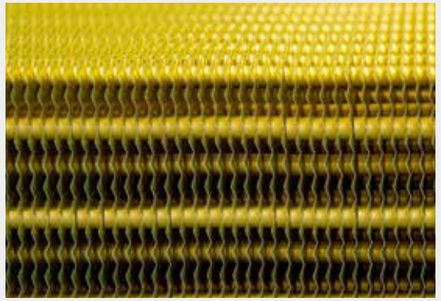
Designed for use in humid operating conditions.
The KTL coating is not suitable for applications in food production environments.



AIR COOLER MADE OF STAINLESS STEEL - V, V*, W, A4 FASTENERS

Required for highly corrosive atmospheres in cold rooms.

And for applications in the food industry where the highest hygiene standards apply and aggressive cleaning agents are used at short intervals.



UNIT WITH ALUMINUM EPOXY-COATED FINS - Al+EPX

Suitable for cold storage applications with lightly aggressive environments.

The epoxy coating is not suitable for strongly aggressive media, particularly environments containing sulphur compounds, ammonia, or sodium chloride.

For food production applications, the use of high-quality material combinations without coatings is recommended.



HEAT EXCHANGER WITH COPPER TUBES AND COPPER FINS - Cu

For installations near cement-processing facilities and for applications with chloride-containing atmospheres, such as t hose found in coastal regions.

© Güntner

TABLE GLOSSARY

MATERIALS

GÜNTNER SYMBOL	DESCRIBTION	DIN/EN	INTERNATIONALE/US
Cu	Copper	–	–
Al	Aluminum	–	–
Al-Mg3	Aluminum-Magnesium alloy	EN AW-5754	–
Al+EPX	Aluminum (epoxy resin-coated)	–	–
Cu/Al+CD	Copper / Aluminum + Coil Defender (powder coating)	–	–
Cu/Al+KTL	Copper / Aluminum (cathodic dip-coated)	–	–
V	Ferritic stainless steel (high quality)	1.4003 / 1.4016	AISI / SST 410S / 430
V*	Austenitic stainless steel (high quality)	1.4301	AISI / SST 304
W	Austenitic stainless steel (highest quality)	1.4404 / higher-alloyed	AISI / SST 316L (enhanced corrosion resistance)
A4	Stainless steel fasteners	DIN EN ISO 3506-1 A4	AISI / SST 316 (fasteners)
St-Zn	Galvanized steel	–	–
St-Zn+PC	Galvanized steel with powder coating	–	–

MATERIAL SELECTION

Advised
Güntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

Basic – reduced service life
Even in the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Guntner's recommendation are to be expected.

CORROSION PROTECTION CLASSES

Güntner Corrosion Protection 5 Powder coated casing passes 720 h in salt spray test according to ISO 9227
Güntner Corrosion Protection 4 Powder coated casing passes 480 h in salt spray test according to ISO 9227

© Güntner

APPLICATION CASES WITH AGGRESIVE AMBIENT AIR



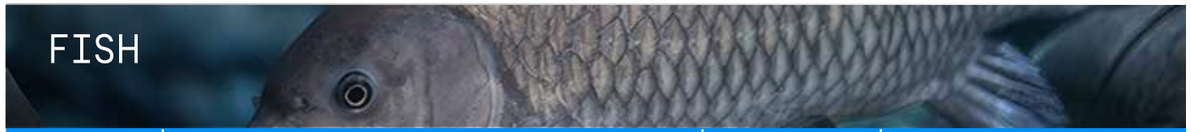
FRUIT

APPLICATION	COIL						STANDARD COIL WITH COATING[3]		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]				CASING/TRAY		FASTENERS[4]
FRUIT	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Bananas	V	-	Al+EPX	Al	V	-	-	-	Al-Mg3/ St-Zn	-	A4
Citrus fruits	V	Cu	Al-Mg3	Al+EPX	V	Al-Mg3	-	Cu/Al+CD	Al-Mg3/ St-Zn	-	A4



DAIRY PRODUCE

APPLICATION	COIL						STANDARD COIL WITH COATING[3]		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]				CASING/TRAY		FASTENERS[4]
DAIRY	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Processing room	V	-	Al-Mg3	Al+EPX	V	Al-Mg3	-	Cu/Al+CD	V*	Al-Mg3/ St-Zn	A4
Cheese (long-term maturation)	W	V	Al-Mg3	Al+EPX	V	Al-Mg3	-	-	V*	Al-Mg3/ St-Zn	A4
Cheese (cream cheese)	W	V	V	Al-Mg3	V	Al-Mg3	-	-	V*	Al-Mg3/ St-Zn	A4



FISH

APPLICATION	COIL						STANDARD COIL WITH COATING[3]		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]				CASING/TRAY		FASTENERS[4]
FISH	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Fresh fish	V	Cu	Al-Mg3	Al+EPX	V	Al-Mg3	-	Cu/Al+CD	Al-Mg3/ St-Zn	-	A4
Salting room, curing room	W	-	W/Cu	-	W	-	-	-	W	-	A4
Cold room for pickled products and salads	V	-	Al-Mg3	Al+EPX	V	Al-Mg3	-	Cu/Al+CD	V	Al-Mg3/ St-Zn	A4
Processing room for pickled products	W	V	V	Al+EPX	V	-	-	-	V	-	A4
Cold room for smoked foods	V	-	V	Al+EPX	V	Al-Mg3	-	-	V	Al-Mg3/ St-Zn	A4

NOTES

[1] **NH_3 air coolers** must be equipped exclusively with stainless steel core tubes.

[2] **Tube Sheets** may be manufactured from aluminum–magnesium alloy (AlMg3) on customer request where structurally permissible. Where this is not possible, stainless steel is required.

[3] **Coil Defender coating** is applied to the entire Cu/Al heat exchanger coil.

[4] **Fasteners according to ISO-3506.**

[5] **Advised**
Güntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

[6] **Basic – reduced service life**
Even in the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Güntner's recommendation are to be expected.

© Güntner

APPLICATION CASES WITH AGGRESIVE AMBIENT AIR



MEAT

APPLICATION	COIL						STANDARD COIL WITH COATING[3]		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]				CASING/TRAY		FASTENERS[4]
MEAT	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Processing room	V	Cu	Al-Mg3	Al+EPX	V	Al-Mg3	-	Cu/Al+CD	V	Al-Mg3/ St-Zn	A4
Cold room for smoked foods	V	-	V	Al+EPX	V	Al-Mg3	-	-	V	Al-Mg3/ St-Zn	A4
Pre-cooling room half carcasses	V	-	V	Al+EPX	V	Al-Mg3	-	-	V	Al-Mg3/ St-Zn	A4
Cold room for cured products	W	-	W/Cu	-	V	Al-Mg3	-	-	V	Al-Mg3/ St-Zn	A4
Cold room for pickled products	V	-	Al-Mg3	Al+EPX	V	Al-Mg3	-	Cu/Al+CD	V	Al-Mg3/ St-Zn	A4
Slaughterhouse waste	W	-	W	V	V	Al-Mg3	-	-	V	Al-Mg3/ St-Zn	A4
Processing room for pickled products	W	V	V	Al+EPX	V	-	-	-	V	-	A4
Curing cellar	W	V	V	Al-Mg3	V	-	-	-	V	-	A4
Salt store room	W	-	W/Cu	-	W	-	-	-	W	-	A4



DOUGH

APPLICATION	COIL						STANDARD COIL WITH COATING[3]		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]				CASING/TRAY		FASTENERS[4]
DOUGH	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Fermentation interrupter	V	Cu	V	Al+EPX	V	Al-Mg3/ St-Zn	-	Cu/Al+CD	V	Al-Mg3/ St-Zn	A4



BEVERAGES

APPLICATION	COIL						STANDARD COIL WITH COATING[3]		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]				CASING/TRAY		FASTENERS[4]
BEVERAGES	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Wine cellar	V	-	Al-Mg3	Al+EPX	V	Al-Mg3	-	Cu/Al+CD	V	Al-Mg3/ St-Zn	A4
Malthouse	V	-	Al+EPX	Al	V	Al-Mg3	-	Cu/Al+CD	V	Al-Mg3/ St-Zn	A4

NOTES

[1] **NH_3 air coolers** must be equipped exclusively with stainless steel core tubes.

[2] **Tube Sheets** may be manufactured from aluminum–magnesium alloy (AlMg3) on customer request where structurally permissible. Where this is not possible, stainless steel is required.

[3] **Coil Defender coating** is applied to the entire Cu/Al heat exchanger coil.

[4] **Fasteners according to ISO-3506.**

[5] **Advised**
Güntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

[6] **Basic – reduced service life**
Even in the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Güntner's recommendation are to be expected.

© Güntner

APPLICATION CASES WITH AGGRESIVE AMBIENT AIR



APPLICATION	COIL						STANDARD COIL		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]		WITH COATING[3]		CASING/TRAY		FASTENERS[4]
CATERING	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Salad	V	-	V	Al-Mg3	V	Al-Mg3	-	Cu/Al+CD	V	Al-Mg3/ St-Zn	A4



APPLICATION	COIL						STANDARD COIL		MAIN UNIT		
	TUBE[1]		FIN		TUBE SHEET[2]		WITH COATING[3]		CASING/TRAY		FASTENERS[4]
WOOD	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised
Kiln drier	W	V	V	Al+EPX	V	-	-	-	V	Al-Mg3/ St-Zn	A4

STANDARD APPLICATION SITUATIONS

Where no corrosive influences are present in the ambient air, and the heat exchangers are not subject to frequent cleaning with aggressive cleaning agents, the proven standard material combinations may be used.

Standard housings correspond to Güntner Corrosion Protection Class 3 and have passed a 240-hour salt spray test in accordance with ISO 9227.

STANDARD				
Fluid	Tube	Fin	Tube Sheet[2]	Casing/tray
NH_3	V*	Al	V*	Al-Mg3/St-Zn
Glycols	Cu	Al	Al-Mg3/St-Zn	Al-Mg3/St-Zn
HFC	Cu	Al	Al-Mg3/St-Zn	Al-Mg3/St-Zn

Possible applications include: Low-temperature rooms, cold rooms for packed goods, order-picking areas.

NOTES

[1] **NH_3 air coolers** must be equipped exclusively with stainless steel core tubes.

[2] **Tube Sheets** may be manufactured from aluminum–magnesium alloy (AlMg3) on customer request where structurally permissible. Where this is not possible, stainless steel is required.

[3] **Coil Defender coating** is applied to the entire Cu/Al heat exchanger coil.

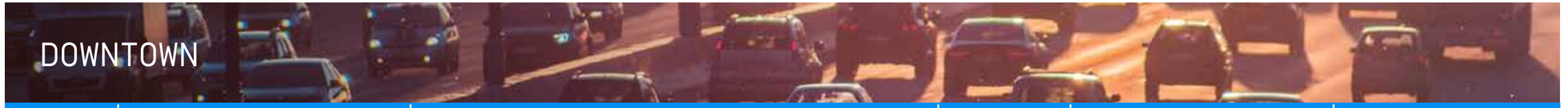
[4] **Fasteners according to ISO-3506.**

[5] **Advised**
Güntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

[6] **Basic – reduced service life**
Even in the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Güntner's recommendation are to be expected.

© Güntner

APPLICATION CASES WITH AGGRESIVE AMBIENT AIR



DOWNTOWN

APPLICATION	POTENTIAL POLLUTANTS	COIL								STANDARD COIL WITH COATING[2]		CONNECTION SYSTEM				MAIN UNIT		
		CORE TUBE[1]		SUPPORT TUBE		FIN		TUBE SHEET				DISTRIBUTION, COLLECTION AND CONNECTION TUBE		FLANGES		CASING[3]		FASTENERS[4]
DOWNTOWN	Moderate conc. | Benzol, Carbon monoxide, Nitrogen dioxide, Nitrogen oxide High conc. | Benzol, Carbon monoxide, Nitrogen dioxide, Nitrogen oxide, Sulfur dioxide	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	
Güntner Corrosion Protection 4 | Moderate Concentration		V	Cu	V	-	Al+EPX[7]	-	V	-	Cu/Al+KTL	-	V	Cu	V	-	St-Zn+PC	V[8]	A4
Güntner Corrosion Protection 5 | High Concentration		W	-	W	-	Al+EPX	-	W	-	Cu/Al+KTL	-	W	-	W	-	W	St-Zn+PC	A4



AGRICULTURE

APPLICATION	POTENTIAL POLLUTANTS	COIL								STANDARD COIL WITH COATING[2]		CONNECTION SYSTEM				MAIN UNIT		
		CORE TUBE[1]		SUPPORT TUBE		FIN		TUBE SHEET				DISTRIBUTION, COLLECTION AND CONNECTION TUBE		FLANGES		CASING[3]		FASTENERS[4]
AGRICULTURE	Moderate conc. | dirt, moisture High conc. | ammonia, dirt, moisture, sulfia	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	
Güntner Corrosion Protection 4 | Moderate Concentration		V	Cu	V	-	V	Al+EPX[7]	V	-	Cu/Al+KTL	-	V	Cu	V	-	St-Zn+PC	V[8]	A4
Güntner Corrosion Protection 5 | High Concentration		W	-	W	-	W	V	W	-	Cu/Al+KTL	-	W	-	W	-	W	St-Zn+PC	A4

NOTES

[1] **NH_3 condensers** must be equipped exclusively with stainless steel core tubes.

[2] **KTL coating coating** is applied to the entire Cu/Al heat exchanger coil.

[3] **Galvanized steel casing plates** with double sided powder coating are available.

[4] **Fasteners** according to ISO-3506.

[5] **Advised**
Guntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

[6] **Basic – reduced service life**
In the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Guntner's recommendation are to be expected.

[7] As cutting edges of the fins are not protected in the standard version, longterm protection and UV-resistance cannot be guaranteed. Cutting edges can be protected on request.

[8] The material must not be used for load-bearing components under the influence of corrosion.

© Güntner

APPLICATION CASES WITH AGGRESIVE AMBIENT AIR



INDUSTRY*

APPLICATION	POTENTIAL POLLUTANTS	COIL								STANDARD COIL WITH COATING[2]		CONNECTION SYSTEM				MAIN UNIT		
		CORE TUBE[1]		SUPPORT TUBE		FIN		TUBE SHEET				DISTRIBUTION, COLLECTION AND CONNECTION TUBE		FLANGES		CASING[3]		FASTENERS[4]
INDUSTRY	Moderate conc. | Benzol, Carbon monoxide, Nitrogen dioxide, Nitrogen oxide High conc. | Benzol, Carbon monoxide, Nitrogen dioxide, Nitrogen oxide, Sulfur dioxide	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	
Güntner Corrosion Protection 4 | Moderate Concentration		W	Cu	W	-	W	Al+EPX	W	-	Cu/Al+KTL	-	W	Cu	W	-	W	St-Zn+PC	A4
Güntner Corrosion Protection 5 | High Concentration		W	-	W	-	W	Al+EPX	W	-	Cu/Al+KTL	-	W	-	W	-	W	St-Zn+PC	A4

* Excluding cement and waste processing.



COASTAL / SEA AIR

APPLICATION	POTENTIAL POLLUTANTS	COIL								STANDARD COIL WITH COATING[2]		CONNECTION SYSTEM				MAIN UNIT		
		CORE TUBE[1]		SUPPORT TUBE		FIN		TUBE SHEET				DISTRIBUTION, COLLECTION AND CONNECTION TUBE		FLANGES		CASING[3]		FASTENERS[4]
COASTAL / SEA AIR	Moderate conc. | Chlorides High conc. | Chlorides (high levels)	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	
Güntner Corrosion Protection 4 | Moderate Concentration		Cu	W	W	-	Al-Mg3	-	W	-	Cu/Al+KTL	-	Cu	W	W	-	St-Zn+PC	W	A4
Güntner Corrosion Protection 5 | High Concentration		Cu	W	W	-	Cu	W	W	-	Cu/Al+KTL	-	Cu	W	W	-	St-Zn+PC	W	A4

NOTES

[1] **NH_3 condensers** must be equipped exclusively with stainless steel core tubes.

[2] **KTL coating coating** is applied to the entire Cu/Al heat exchanger coil.

[3] **Galvanized steel casing plates** with double sided powder coating are available.

[4] **Fasteners** according to ISO-3506.

[5] **Advised**
Guntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

[6] **Basic – reduced service life**
In the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Guntner's recommendation are to be expected.

[7] As cutting edges of the fins are not protected in the standard version, longterm protection and UV-resistance cannot be guaranteed. Cutting edges can be protected on request.

[8] The material must not be used for load-bearing components under the influence of corrosion.

© Güntner

APPLICATION CASES WITH AGGRESIVE AMBIENT AIR



CEMENT

APPLICATION	POTENTIAL POLLUTANTS	COIL								STANDARD COIL WITH COATING[2]		CONNECTION SYSTEM				MAIN UNIT		
		CORE TUBE[1]		SUPPORT TUBE		FIN		TUBE SHEET				DISTRIBUTION, COLLECTION AND CONNECTION TUBE		FLANGES		CASING[3]		FASTENERS[4]
CEMENT	Moderate conc. | alkaline (lye) high conc. | alkaline (lye), sulfur	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	
Güntner Corrosion Protection 4 | Moderate Concentration		V	Cu	V	-	V	Cu	V	-	-	Cu/Al+KTL	V	Cu	V	-	St-Zn+PC	V	A4
Güntner Corrosion Protection 5 | High Concentration		W	-	W	-	W	V	W	-	-	Cu/Al+KTL	W	-	W	-	W	St-Zn+PC	A4



WASTE PROCESSING

APPLICATION	POTENTIAL POLLUTANTS	COIL								STANDARD COIL WITH COATING[2]		CONNECTION SYSTEM				MAIN UNIT		
		CORE TUBE[1]		SUPPORT TUBE		FIN		TUBE SHEET				DISTRIBUTION, COLLECTION AND CONNECTION TUBE		FLANGES		CASING[3]		FASTENERS[4]
WASTE PROCESSING	Moderate conc. | digester gases, methane high conc. | ammonia, digester gases, methane, sulfur	Advised[5]	Basic[6]	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	Advised	Basic	
Güntner Corrosion Protection 4 | Moderate Concentration		V	Cu	V	-	V	-	V	-	-	-	V	Cu	V	-	St-Zn+PC	V	A4
Güntner Corrosion Protection 5 | High Concentration		W	V	W	-	W	V	W	-	-	-	W	V	W	V	W	St-Zn+PC	A4

NOTES

[1] **NH_3 condensers** must be equipped exclusively with stainless steel core tubes.

[2] **KTL coating coating** is applied to the entire Cu/Al heat exchanger coil.

[3] **Galvanized steel casing plates** with double sided powder coating are available.

[4] **Fasteners** according to ISO-3506.

[5] **Advised**
Guntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

[6] **Basic – reduced service life**
In the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Guntner's recommendation are to be expected.

[7] As cutting edges of the fins are not protected in the standard version, longterm protection and UV-resistance cannot be guaranteed. Cutting edges can be protected on request.

[8] The material must not be used for load-bearing components under the influence of corrosion.

© Güntner

STANDARD APPLICATION SITUATIONS

Where no corrosive influences are present in the ambient air, and the heat exchangers are not subject to frequent cleaning with aggressive cleaning agents, the proven standard material combinations may be used.

STANDARD					
	Fluid	Tube	Fin	Tube Sheet[2]	Casing/tray
Gas coolers	CO_2	High-strength Cu	AI	St-Zn	St-Zn
Condenser finoox	NH_3	V*	AI	St-Zn	St-Zn
Fluid coolers	Glycols	Cu	Al	St-Zn	St-Zn

Standard housings correspond to Güntner Corrosion Protection Class 3 and have passed a 240-hour salt spray test in accordance with ISO 9227.

NOTES

[1] **NH_3 condensers** must be equipped exclusively with stainless steel core tubes.

[2] **KTL coating coating** is applied to the entire Cu/Al heat exchanger coil.

[3] **Galvanized steel casing plates** with double sided powder coating are available.

[4] **Fasteners** according to ISO-3506.

[5] **Advised**
Guntner's advised selection is based on our decades of practical experience. It does not constitute a normative requirement and does not replace the final assessment of corrosion protection by the plant manufacturer or the practical experience of the user.

[6] **Basic – reduced service life**
In the presence of low concentrations of aggressive substances (e.g., in the atmosphere or from cleaning agents), visual changes, corrosion during the warranty period, potential leakage, and a reduced service life compared to Guntner's recommendation are to be expected.

[7] As cutting edges of the fins are not protected in the standard version, longterm protection and UV-resistance cannot be guaranteed. Cutting edges can be protected on request.

[8] The material must not be used for load-bearing components under the influence of corrosion.

© Güntner

COIL DEFENDER



The Coil Defender coating is applied to the entire coil including connection system and bend side to ensure there is no chance of any aggressive substances attacking it.

FOR LIGHT AGGRESSIVE ENVIRONMENTS OR SMALL ROOMS

The Coil Defender coating is a corrosion protection solution available for all COMPACT air coolers.

Favor stainless steel solutions wherever possible. However, there are certain applications where space, weight, or cost constraints require more compact and economical equipment – for example in gastronomy or commercial refrigeration with small rooms, where processed food is stored covered or packaged and only mildly aggressive environments occur. In such cases, Coil Defender can represent a viable compromise solution.

It is an even coating applied to the entire coil, protecting the heat exchanger's standard material combination of copper tubes and Aluminum fins.

Food safe and resistant to commonly used cleaning agents, including conventional water-based cleaners, Coil Defender can extend the service life of air coolers in lightly aggressive environments compared with the standard Cu/Al configuration.

It is not suitable for strongly aggressive media, in particular environments containing sulphur compounds, ammonia, or sodium chloride.

© Güntner

BASIC KNOWLEDGE OF CLEANING AGENTS

To prevent corrosion and maximise the service life of heat exchangers, units should be cleaned as part of regular maintenance activities. Particularly in food-processing environments, the use of cleaning agents is essential. Under certain conditions, however, cleaning agents can have a corrosive effect comparable to that of aggressive ambient atmospheres, which in many cases are influenced by the refrigerated goods themselves.

The pH value of a cleaning agent is a key parameter in assessing both its effectiveness and its compatibility with materials.

Material resistance depends on the frequency of cleaning as well as on the primary constituents of the cleaning agents used. The following overview provides a general indication of pH values and material resistance based on the fundamental components of common cleaning agents.

AS A GENERAL CLASSIFICATION:

- Acidic cleaners (pH value < 7) are typically used to remove mineral residues such as scale or rust.
- Neutral cleaners (pH value ≈ 7) are generally multi-purpose products and often also act as disinfectants.
- Alkaline cleaners (pH value > 7) are used to dissolve organic soiling such as fats, oils, and proteins.

THE PRODUCT DATA SHEET OF THE CLEANING AGENT MANUFACTURER USUALLY PROVIDES THIS INFORMATION.

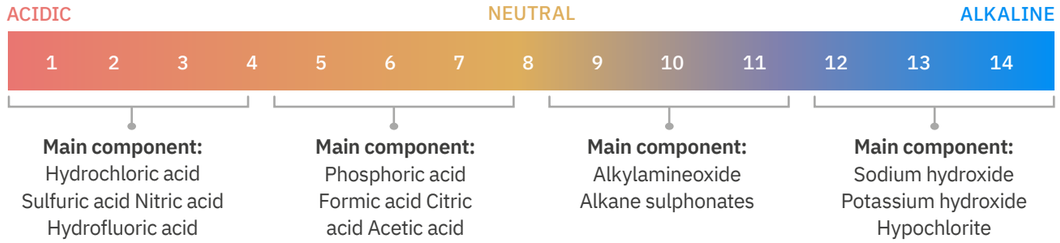
- Prior to using cleaning agents, always check their compatibility with the materials of the coil.
- The cleaning agent is to be applied according to the mixing ratio prescribed by the cleaning agent manufacturer.
- After removing any soiling from the unit, the cleaning agent needs to be rinsed thoroughly using clear water so that there are no residues

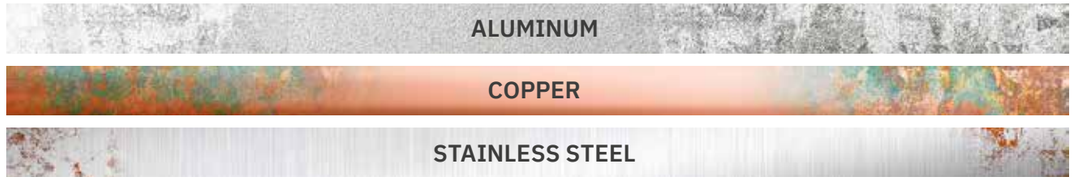
As a supplier of components for refrigeration systems, Güntner has no knowledge of the specific application or of the products handled by the system operator, in particular their chemical composition or any application-specific interactions, (which may vary depending on temperature and other factors, meaning these indications cannot be taken as absolute rules for all circumstances). Nor do we have information regarding existing or anticipated levels of soiling or microbial contamination. Responsibility for maintenance and cleaning planning therefore lies with the system operator.

For this reason, the cleaning of our equipment should be carried out exclusively by professional cleaning personnel. Following order confirmation, Güntner provides customers with an overview of the material combinations used in the respective air cooler. This information, together with the relevant installation and operating instructions, must be made available to the cleaning personnel to enable them to select appropriate cleaning procedures and suitable cleaning agents. Cleaning instructions for our components can be found in the Güntner installation and operating manuals.

Güntner therefore does not provide recommendations for specific cleaning agents and does not assess individual cleaning products.

RESISTANCE OF THE STANDARD MATERIALS ALUMINUM, COPPER AND STAINLESS STEEL REGARDING THE USE OF DIFFERENT CLEANING AGENTS





© Güntner

FURTHER IMPORTANT NOTES

The information provided in this brochure constitutes non-binding recommendations based on Güntner's fundamental experience as a component manufacturer. It is intended solely as guidance and does not replace individual consultation.

Fans and electrical components are not assessed in this brochure. Should your application require a specific classification of fans or electrical components, such as control cabinets, Güntner will be pleased to provide advice on request. Please contact us in such cases.

Binding information, in particular regarding the suitability of materials for specific applications, depends on the individual conditions at the installation site. These conditions must be assessed and evaluated by the client.

For this reason, recommendations can only be provided in the context of specific enquiries and following a careful analysis of the respective installation environment.

In no case do these general recommendations replace preliminary **engineering studies and dedicated execution studies** by the project designer, the installer or the client's engineering firm taking into account the individual and specific environmental conditions.

The recommendation of material combinations does not prevent the long-term degradation of heat exchangers used in aggressive environments, but merely delays it.

If Güntner, as a component manufacturer, is not informed of corrosive operating conditions, it is assumed that standard units can be supplied
(see pages 15 and 22).

The specification and description of our products and services are provided without warranty. Any liability is excluded to the fullest extent permitted by applicable law.. Errors and technical modifications reserved.

© Güntner

Güntner

GUNTNER.COM

Material Selection Brochure
JUNE 2026