



ThermoKey Standards

Dry coolers
and remote condensers



**Standard Thermokey solutions.
Our 25-year experience
is at your disposal in the selection
of the materials.**

Specific contexts require specific solutions

When choosing the heat exchanger, it is important to keep in mind, in addition to one's needs and technical requirements, the context in which the unit will be installed.

During our 25-year experience we have tested different material combinations for our heat exchangers, designed to meet the different needs of our customers.

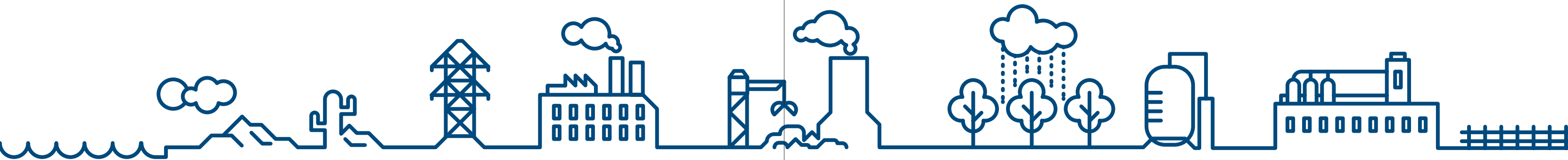
In this document we present our Standard solutions, that is the material combinations proposed by us when there are no special conditions.

In these pages you will find some examples of contexts and working processes that may be corrosive for the plants and their components, which therefore require a combination of specific materials.

Customized solutions

To avoid corrosion, maintain functionality of the systems over time and the tightness of Dry Coolers and Condensers, the first thing to do is to choose the correct combination of materials and possible dedicated specific protection systems.

We are at your complete disposal to guide you in this choice.



INSTALLATION IN COSTAL REGIONS

The high concentration of chloride in coastal areas can be corrosive for metals



HEAT

The protracted exposure to high temperatures can be harmful to the installations



EMISSION OF FLUORIDES

Some factories emit fluorides, among them: power plants, manufacturers of aluminium of iron and steel, brick and ceramic factories



INDUSTRIAL PLANTS

Carbon dioxide, ammonia, nitric oxide, hydrocarbons, compounds of sulphur, fluorides, chlorine, carbon monoxide and their reaction products are among the most corrosive substances for metal



PURIFICATION AND DISPOSAL PLANTS

The Heat exchangers used in waste disposal plants and water purification plants are subject to a greater corrosion



HUMIDITY

High humidity can damage the installations in the long term

Drycoolers and Condensers

DryCoolers and Condensers are air-cooled units used in the Air Conditioning, Refrigeration and Industrial Applications. The typical installation is on the outside in a remote position, e.g. roofs, squares etc. These units consist of one or more heat exchangers installed on two types of structures:

- V Type: generally consisting of two “V-installed” heat exchangers and fans positioned above them
- Table Type : generally consisting of a heat exchanger placed horizontally or vertically and of fans placed with a vertical rotation axis in respect to the finned pack

The use of these units, in most cases, is necessary to control the outlet fluid temperature or to keep the condensation pressure of the used refrigerant under control.

These units are generally provided with air flow regulation systems, which allow to adapt the heat exchange based on the variable environmental conditions (day, night, Summer, Winter, etc.).

Since the units are units installed outdoors, they are subject to all environmental characterisations.

There are several regulations that classify outdoor environments.

The main categories are:

- rural area
- urban area
- coastal area
- industrial area
- coastal-industrial area

These areas, in turn, can be further divided, as they can create specific micro-environments, which are the sum of one or more of the above mentioned.

In addition to these classifications, there are also further burdensome situations due to the significant presence of pollutants such as e.g. SOxes typical of climatic zones with intense presence of acid rain (eg northern Europe) or areas near volcanoes etc.

All these pollutants can significantly change the pH of the environment, making the deposits on the units extremely corrosive.

Another factor to take into consideration is the TOW (time of wetness), that is the amount of time when there is a constant presence of humidity above 80% with a temperature above 0 ° C.

These are only some examples of environmental situations that require an in-depth analysis of the installation before making a technical choice.

Moreover also the instructions on the methods of maintenance and cleaning must be taken into consideration in the following cases:

- after a shipment of the units by sea
- during the operation of the unit in particularly dirty places

The correct definition of the corrosive environment directly impacts on the choice of the materials of the exchanger, of the structure and of the fans to be used.

ThermoKey is able to offer specific technical solutions for each of these cases and to verify new constructive solutions in cases not mentioned up to now.

There are different Drycoolers and Condensers solutions ThermoKey offers a wide range of technical solutions

For what explained above, there are no constructive univocities of the units, but different alternative solutions.

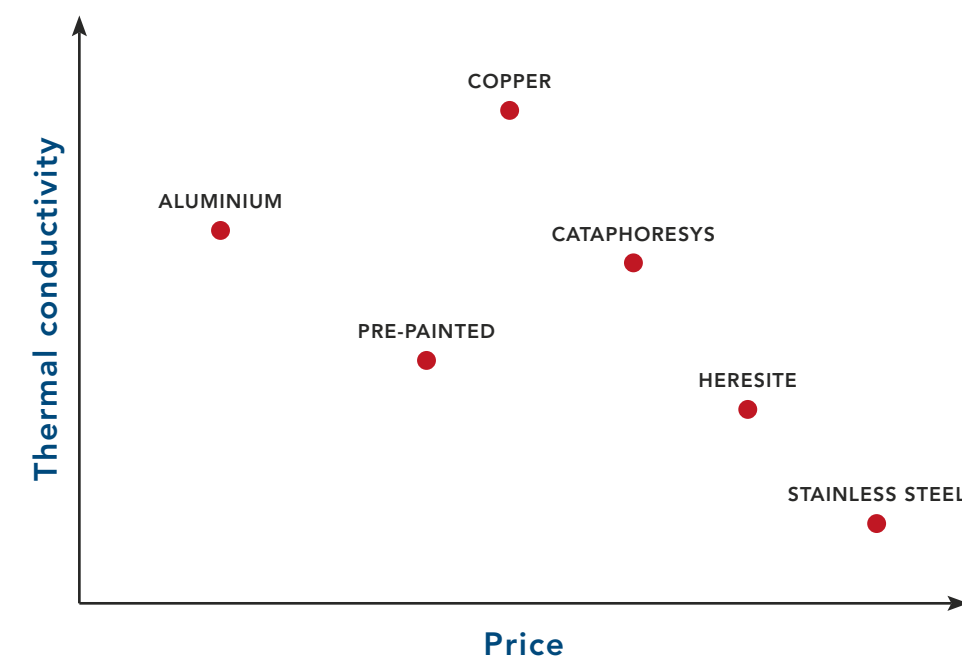
All the factors previously described highlight the importance of the initial technical choice of the unit materials. It is essential to keep in mind the corrosive aspects (due, for example, to the type of installation environment, maintenance methodology, etc.) related to the place of installation and to the method of use and application (eg non-linear regulation systems or absence of anti-vibration devices, etc.). ThermoKey offers a wide range of technical solutions able to respond to different application needs.

For example, it is possible to manufacture both the standard copper-aluminium heat exchanger and the various protective treatments (cataphoresis, blygold, heresite...) and the entirely stainless steel heat exchanger. The choice between these different technical selections has both thermodynamic and cost effects.

Therefore, a heat exchanger with stainless steel tubes and fins will certainly be more resistant to corrosive agents than a heat exchanger with copper tubes and aluminium fins, but with a lower specific heat exchange.

HOW TO CHOOSE THE RIGHT MATERIAL

The choice between the different material combinations influences both the thermal conductivity and the cost of the units.



THERMOKEY STANDARD SOLUTIONS

The right technical choice, from the corrosive point of view, must take into consideration not only the use of the heat exchanger, but also the maintenance of the same that will necessarily be carried out. Therefore it is important to verify that the cleaning products used are compatible with the materials of the unit.

Vtype

Models	Tubes	Fins	Internal metal sheets	Metal cowling	External metal sheets
POWER J	Copper	Aluminium	FeZn	Painted FeZn	Painted FeZn
TURBO J	Copper	Aluminium	FeZn	Painted FeZn	Painted FeZn
MODULAR MCHX	Aluminium	Aluminium	FeZn	Painted FeZn	Painted FeZn

EACH COMPONENT CAN BE CUSTOMIZED ON THE BASIS OF SPECIFIC NEEDS

We are at your disposal to assist you in the most suitable choice, for example stainless steel tubes for applications with NH₃ or copper tubes with increased thicknesses for CO₂, etc.

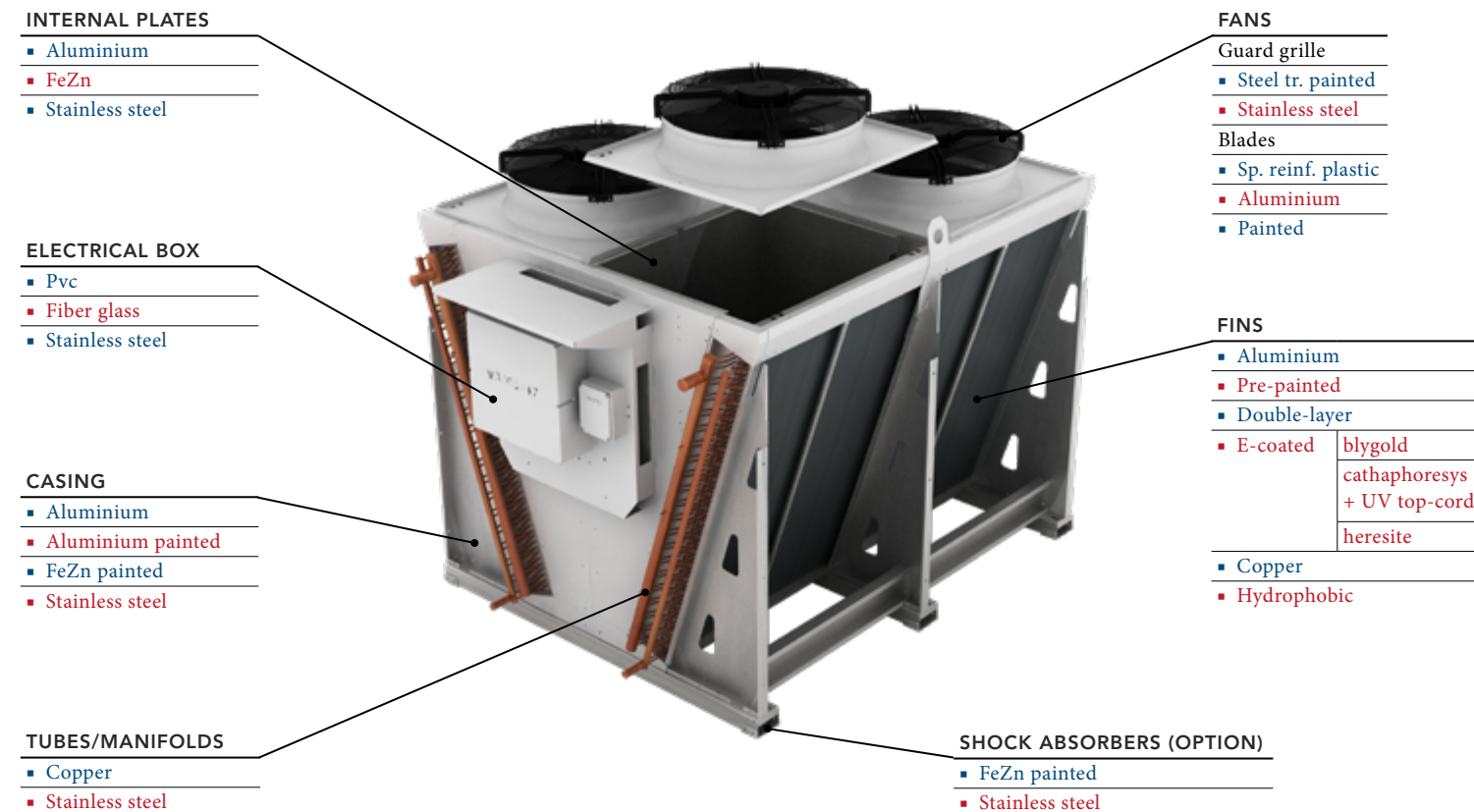
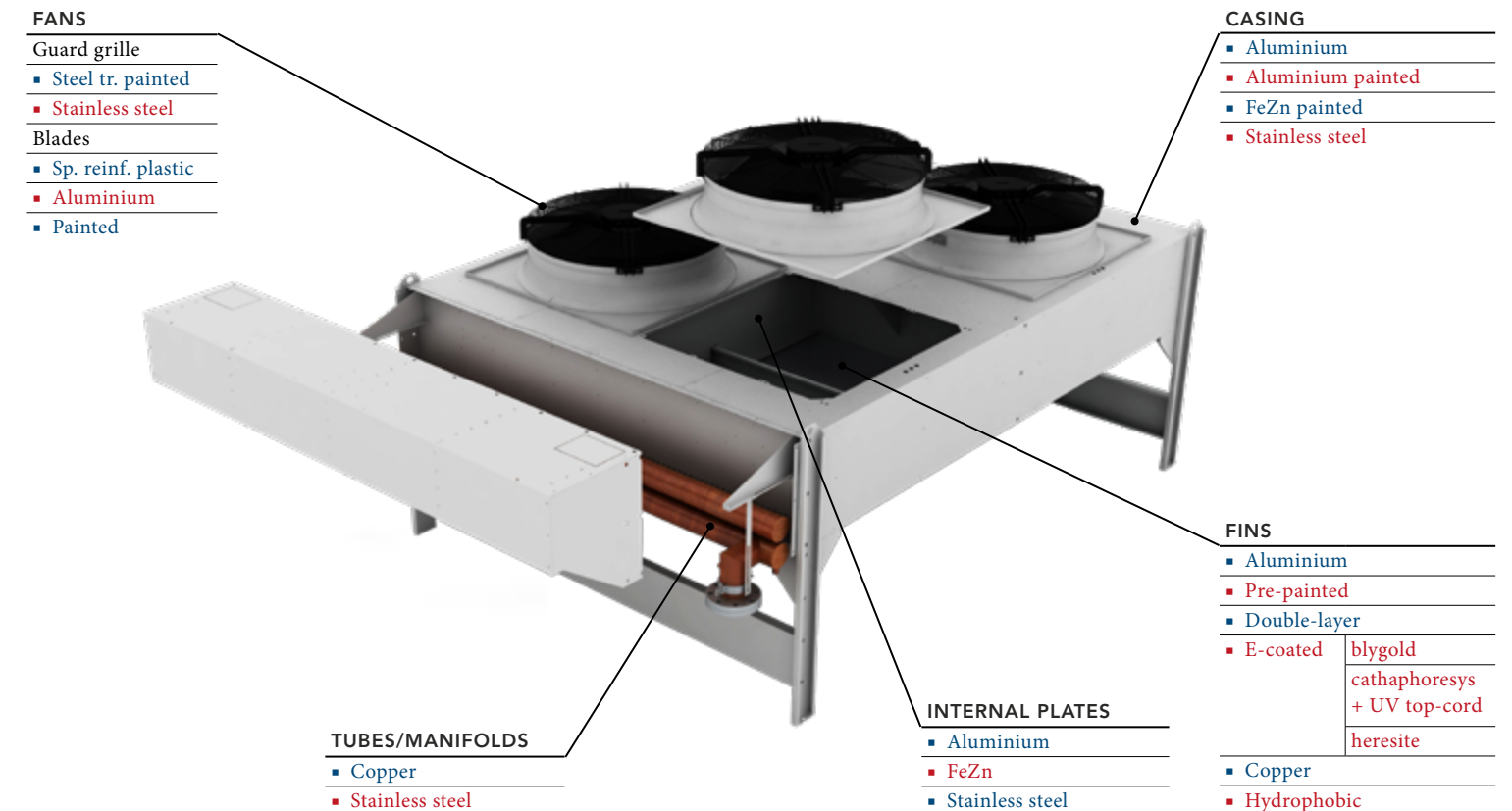


Table type






Models	Tubes	Fins	Internal metal sheets	Metal cowling	External metal sheets
POWER LINE	Copper	Aluminium	FeZn	Painted FeZn	Painted FeZn
TURBO LINE	Copper	Aluminium	FeZn	Painted FeZn	Painted FeZn
MICRO TK SMART	Aluminium	Aluminium	Aluminium	Aluminium	Aluminium

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Application cases with aggressive ambient air

APPLICATION AREA	TUBE		FIN		METAL COILS SHEET		CASING METAL SHEET	
	min	max	min	max	min	max	min	max
 Urban area	Cu	X	Al	P	FeZn	Inox	P-FeZn	Inox
 Industrial area	Cu	X	Al	D	FeZn	Inox	P-FeZn	Inox
 Industrial-coastal area	Cu	X	Al	D	FeZn	Inox	P-FeZn	Inox
 Costal area	Cu	X	Al	D	FeZn	Inox	P-FeZn	Inox
 Rural area	Cu	X	Al	D	FeZn	Inox	P-FeZn	Inox

Cu = Copper
 X = Stainless steel
 Al = Aluminium
 P = Pre-painted aluminium
 D = Double layer fin (available additional painting for external cut edges)
 P-FeZn = Painted galvanized steel (available painting thickness up to 180 um)

Additional possibilities for special applications (High concentration of Salt / SO₂...) or environments (C4 / C5 ... according to ISO12944) or special cleaning procedures/agents:

- AlMg fin
- E-Coated (cathaphoresys + UV Topcoat layer) → complete treated coil
- Blygold → complete treated coil
- Heresite → complete treated coil
- Thermoguard → complete treated coil
- Stainless steel tube/fin
- Stainless steel tube/fin + e-coated → complete treated coil
- Cu-Cu tube/fin
- Cu-Cu tube/fin + e-coated → complete treated coil

The choice of one of these treatments has to be checked with the chemical compatibility of the specific resin.

Additional possibilities for special applications:

- ATEX fans
- UL fans



ThermoKey Standard solutions have been identified during our 25-year experience in the field of heat exchangers.

Our standards propose the correct material combinations in the absence of needs or particular environmental contexts.

Our technical staff provides individual assistance; analyses the context and accompanies the customer to find a tailor-made solution.



We design customized products to meet every need

We at ThermoKey know that specific contexts require specific solutions, we are happy to help you identify the best solution for your needs.



Our technicians assist the customer in the choice

Our technical staff is at your complete disposal to identify the best heat exchanger for you.

We individually analyse your specific needs and the context in which the heat exchanger will be installed.



After sales

ThermoKey stays at your side throughout the product life cycle for spare parts replacement and technical assistance.

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