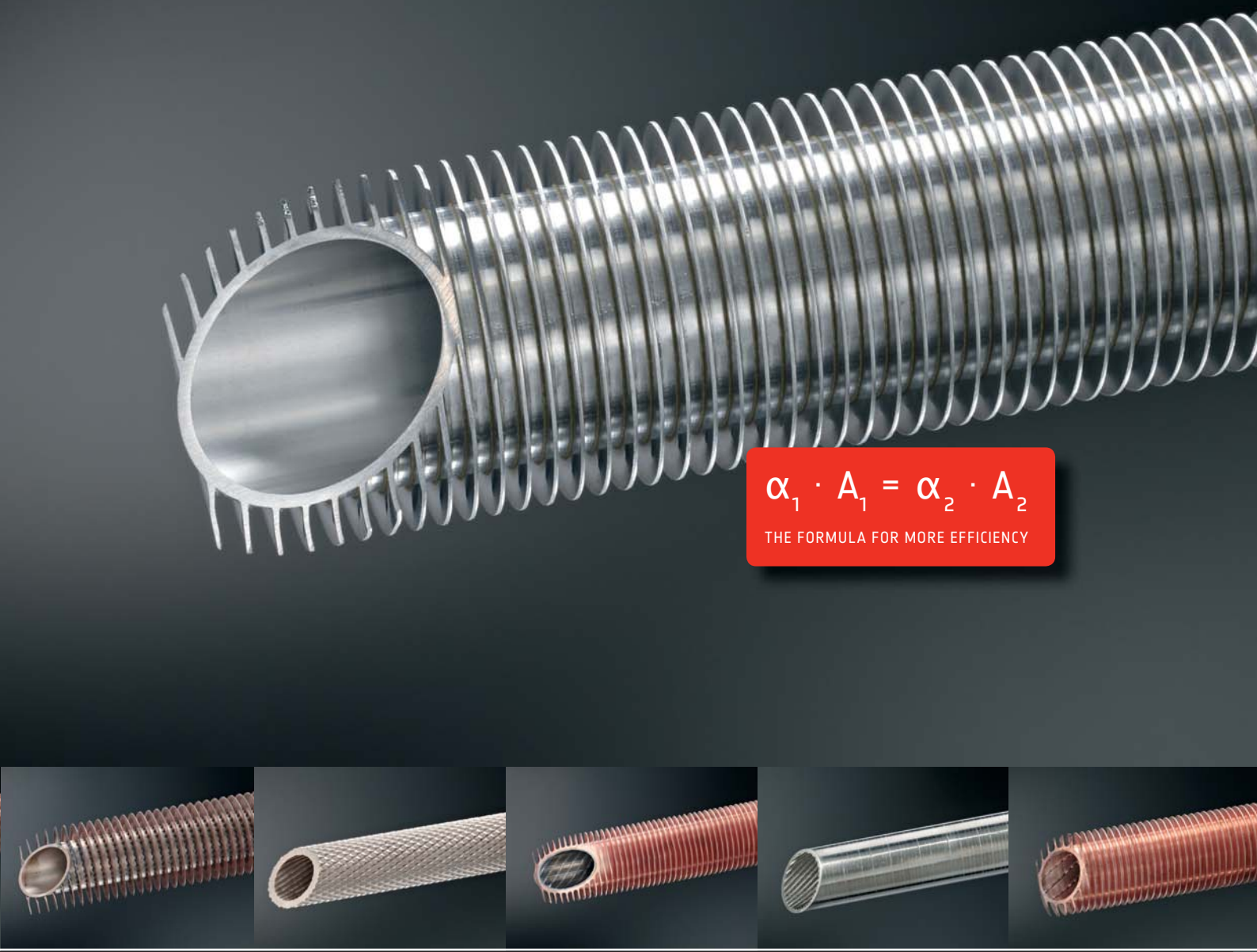
Finned Tubes

Rolled or integral finned tubes
Finned tubes from tube and strip



820 / 2 e

SCHMÖLE
We change Energy.

Schmöle GmbH

The Company

- ➔ More than 160 years of experience
- ➔ Outstanding quality
- ➔ 3 different finning processes
- ➔ 16 finning machines
- ➔ Different coiling and bending processes
- ➔ R & D partnership for your projects
- ➔ Highly skilled craftsmen
- ➔ Robust financial status and strong owners

The Product Range

Finned tubes and heat exchanger

- ➔ Rolled finned tubes
- ➔ Laser welded finned tubes
- ➔ Soldered finned tubes
- ➔ Corrugated tubes
- ➔ Finned coil
- ➔ Finned coil with fittings
- ➔ Coaxial heat exchanger
- ➔ Heat exchanger up to 150 kW
- ➔ Special constructions

Tube systems and surface heat exchanger

- ➔ Tubes with different dimensions and profiles
- ➔ Tube register
- ➔ Tube register with connecting elements
- ➔ Tube register on carrier
- ➔ Module with additional options
- ➔ Module with insulation
- ➔ Space solutions

Certification of Quality Management Systems

Our company is certified by independent bodies to the quality standards ISO 9001:2008 and PED 97/23/EC.
Due to consistent quality awareness, we have gained a worldwide reputation as a reliable supplier.

SCHMÖLE

We change Energy.

Highest efficiency meets effectiveness.

Optimise your heat exchangers by using
high performance Schmöle tubes in regard to:

Energy Saving – Corrosion Resistance
Economy – Environmental Protection

Finned Tubes

$$\alpha_1 \cdot A_1 = \alpha_2 \cdot A_2$$

THE FORMULA FOR MORE EFFICIENCY

Our engineers and technicians goal can be reduced to the simple formula $\alpha_1 \cdot A_1 = \alpha_2 \cdot A_2$. It states that a heat exchanger reaches the optimum heat transfer when the mathematical product of the specific heat transfer coefficient α and surfaces A are equal on both sides. The essence of all of Schmöle's claims and services lie in this formula.

Economy and Energy Saving

By using finned tubes the thermal output of heat exchangers can be considerably increased and their dimensions and costs significantly reduced.

When considering the parameters of a heat exchanger to be optimized, such as the connection between tube and fins, operating temperatures, corrosion resistance, overall dimensions etc., a wide range of finned tube designs is available and suitable for special applications.

The technical and economical advantages for heat exchangers are not only caused by the increase of the heat transfer by finned tubes, but also by the reduction of the overall dimesions. By the use of finned tubes heat exchangers cannot only be built very much smaller, but also, because of the lower pressure load, be designed with reduced material thickness for shell and tube plates, with its consequent material savings.

Environmental Protection and Corrosion Resistance

In addition to the use of the approved materials copper and copper alloys Schmöle can manufacture finned tubes from corrosion resistant metallic materials, such as stainless steel, special stainless steel, titanium and nickel-base alloys.

Special double-walled safety tubes with leak-detecting possibilities offer maximum safety when using aggressive media.

Finned Tubes

ROLLED OR INTEGRAL FINNED TUBES

Low finned tubes

- Trufin® S / T 1
- Trufin® S / TT 2
- Trufin® S / TK 3
- Trufin® S / TV 4

Medium-high finned tubes

- Trufin® W / H 5
- Trufin® W / HS 6
- Trufin® W / HT 7

Inside grooved tubes

- I / R-Evaporator Tube 8
- S / RX-Evaporator Tube 9
- Safety (outer) Tube 10

Corrugated tubes 11

High finned tubes

- Trufin® H / R 12
- Trufin® L / C 13

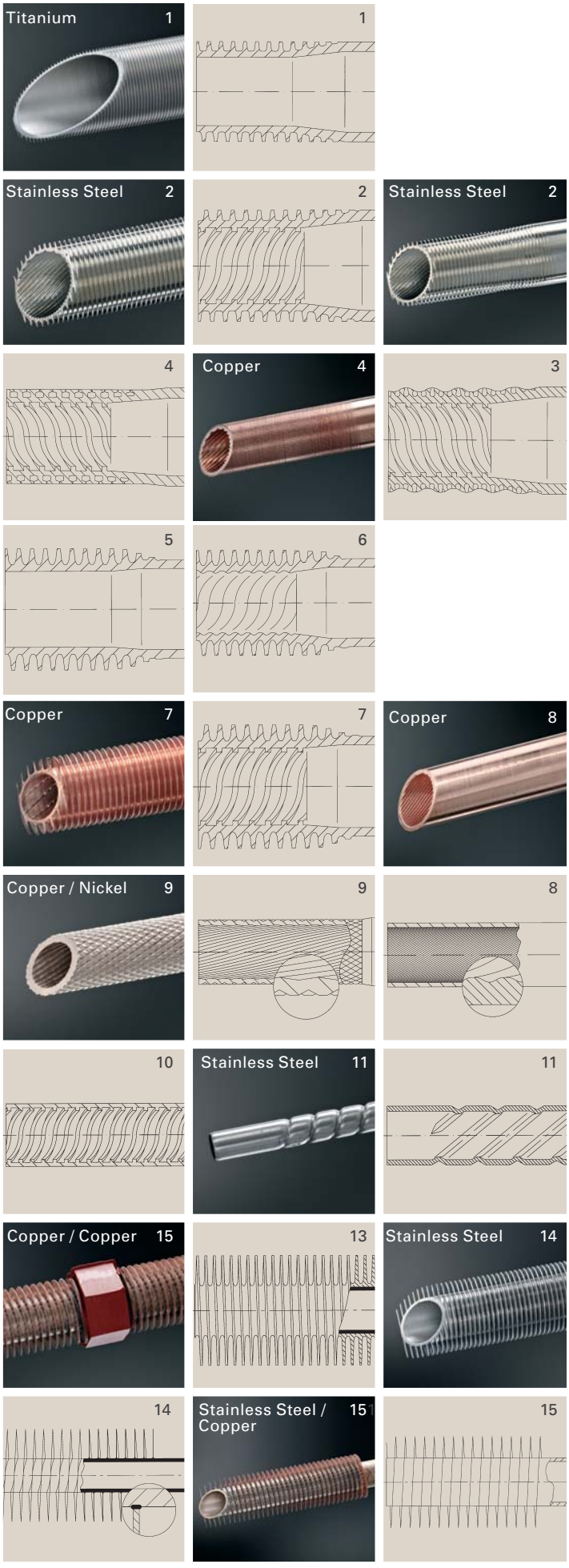
FINNED TUBES FROM TUBE AND STRIP

Laser welded

- Laserfin® 14

Soldered

- Corrofin® 15

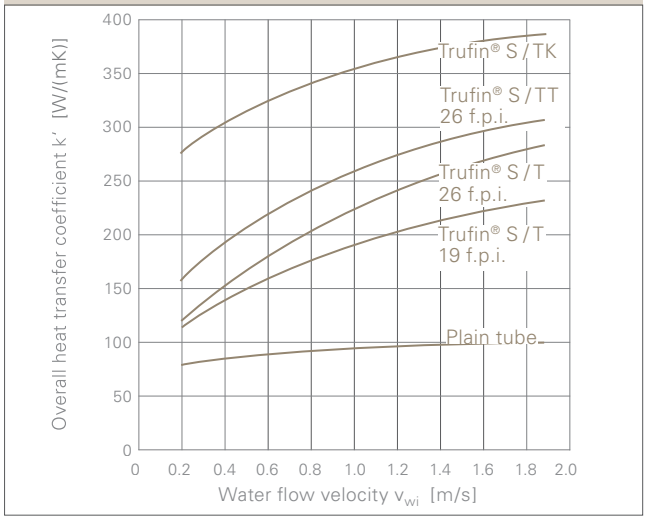


Performance Comparisons

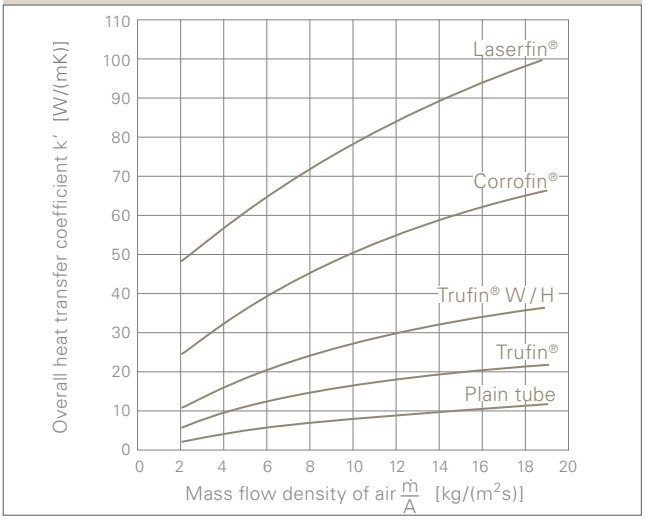
The following graphs show performance comparisons of various finned tubes for five typical fields of application.

By means of these performance comparisons a preselection of the finned tube types suitable for a specific application can be made.
The performance comparing dimension is for all examples the overall heat transfer coefficient per unit length k' in W / (mK). As variable either the mass flow density of the air $\frac{\dot{m}}{A}$ in kg / (m²s) on the shell side or the water flow velocity v_W in m / s on the tube or shell side have been chosen.

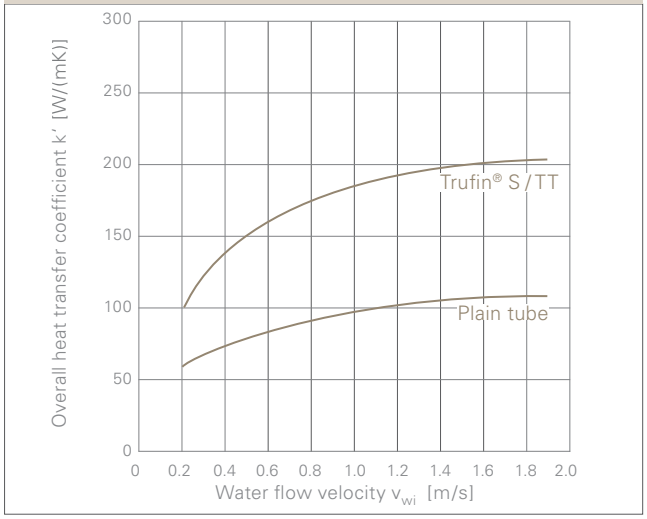
Shell side condensation



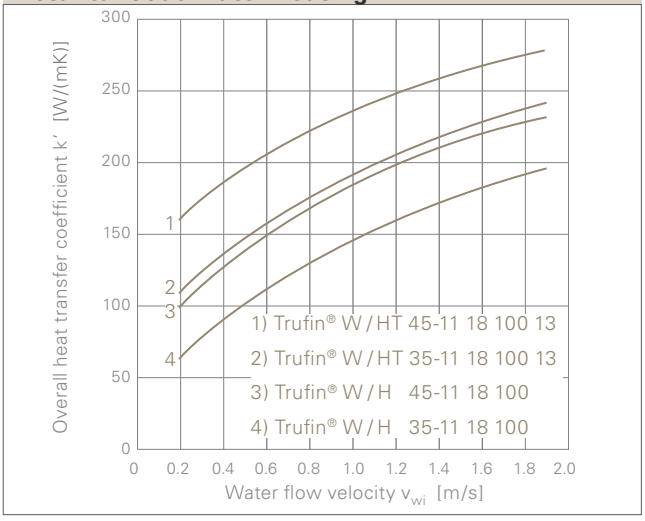
Air cooling / heating



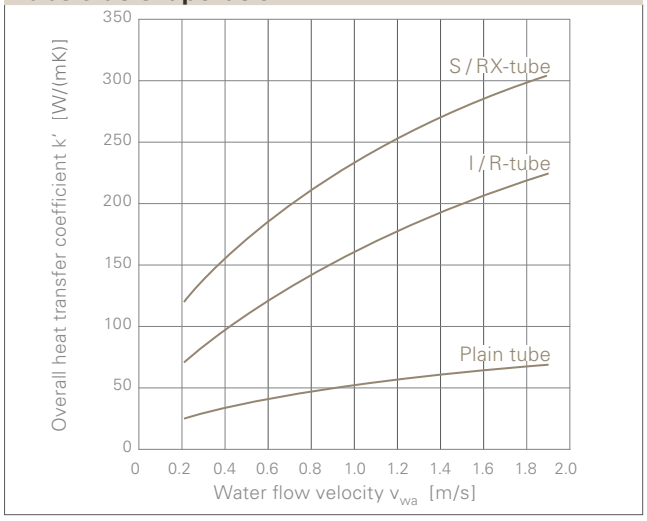
Shell side evaporation



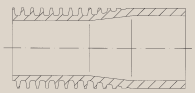
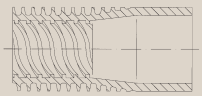
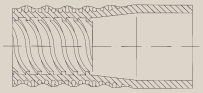
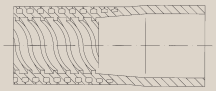
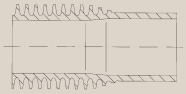
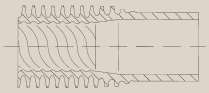
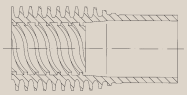
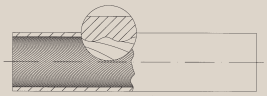
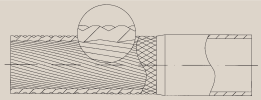
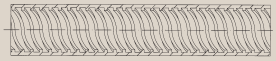
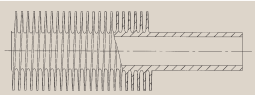
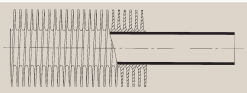
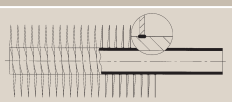
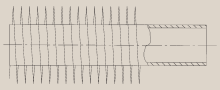
Instantaneous water heating



Tube side evaporation



Range of Finned Tubes and Applications

Finned Tubes		Leaflet No.	Sketch	Surfaces		
Type	Group			outside fin pitch	inside	
Rolled or Integral Finned Tubes						
Trufin® S/T	**low finned** fin height: up to 1.5 mm	835 e		16 – 40 fins / inch 1.59 – 0.64 mm	plain	
Trufin® S/TT (Turbo-Chil®)	**low finned** fin height: up to 1.5 mm	835 e		16 – 40 fins / inch 1.59 – 0.64 mm	6– 40 ridges	
Trufin® S/TK Condenser Tube	**special outside texture**	836 e			10 – 30 ridges	
Trufin® S/TV Evaporator Tube	**special outside texture**				10 – 30 ridges	
Trufin® W/H	**medium-high finned** fin height: 3.0 – 4.5 mm	837 e		11 fins / inch 2.31 mm	plain	
Trufin® W/HS	**medium-high finned** fin height: 3.0 – 4.5 mm	837 e		11 fins / inch 2.31 mm	corrugated	
Trufin® W/HT (Turbo-Chil®)	**medium-high finned** fin height: 3.0 – 4.5 mm	837 e		11 fins / inch 2.31 mm	6 – 10 ridges	
I/R Evaporator Tube	**outside plain**	833 e		plain	grooves	
S/RX Evaporator Tube	**special outside texture**	833 e		pyramid knurled	grooves	
Safety (outer) Tube	**for further processing to safety tube**			plain	60 – 40 ridges	
Corrugated Tube	**corrugated structure**			swirl grooves single and multi-lane	corrugated	
Trufin® H/R	**high finned** fin height: 6 – 11 mm	838 e		9 – 11 fins / inch 2.82 – 2.31 mm	plain	
Trufin® L/C	**high finned** fin height: 6 – 11 mm	838 e		9 – 11 fins / inch 2.82 – 2.31 mm	with inner tube	
Finned Tubes from tube and strip						
Laserfin®	**Laser welded** fin height: 5 – 17 mm	843 e		5 – 13 fins / inch 5.08 – 1.95 mm	plain	
Corrofin®	**soldered** fin height: 5 – 15 mm	841 e		5 – 14 fins / inch 5.08 – 1.81 mm	plain	

	Materials	Dimensions	Surface area ratio	Examples of application		
				Process	Media outside	Media inside
	Rolled or Integral Finned Tubes					
	Cu / Cu alloys, steel, stainless steel, titanium, inconel	Plain tube o.d.: 12.7 – 31.8 mm lenght up to 40 m	3– 6	condensation evaporation oil cooling	refrigerant refrigerant oil	water water water
	Cu / Cu alloys, steel, stainless steel	Plain tube o.d.: 12.7 – 31.8 mm lenght up to 20 m	3 – 5	steam reheating flue gas heating flue gas heating	steam flue gas flue gas	steam steam thermal oil
	Cu	Plain tube o.d.: 15.9 – 25.4 mm lenght up to 20 m	–	condensation	refrigerant	water
	Cu	Plain tube o.d.: 15.9 – 25.4 mm lenght up to 20 m	–	evaporation	refrigerant	water
	Cu / CuNi. Al and Al alloys	fin o.d.: 16.5 – 35 mm lenght up to 20 m	5 – 9	water heating oil cooling oil cooling	water air oil	water oil water
	Cu / CuNi. Al and Al alloys	fin o.d.: 16.5 – 35 lenght up to 20 m	5 – 9	water heating oil cooling oil cooling	water air oil	water oil water
	Cu / CuNi. Al and Al alloys	fin o.d. 16.5 – 35 mm lenght up to 20 m	4 – 7	water heating condensation evaporating compr. air cooling	water water oil / water air	water refrigerant refrigerant compressed air
	Cu / CuNi. steel and stainless steel	o.d.: 10 – 28 mm lenght up to 10 m	1	dry expansions evaporation	water heat carrier	refrigerant
	Cu / CuNi steel and stainless steel	o.d.: 10 – 28 mm lenght up to 10 m	1.7	flooded evaporation	water heat carrier	refrigerant
	Cu / CuNi steel and stainless steel	o.d.: 10 – 28 mm lenght up to 10 m		Outer tube for safety tube		
	Cu / CuNi steel and stainless steel	o.d.: 7 – 25 mm		AGR tube bundles	air gas gas	flue gas gas water
	Al and Al alloys	fin o.d.: 22 – 60 mm lenght up to 20 m	6 – 14	gas cooling gas heating	air / gas air / gas	water / oil / air water / oil / air
	Outer tube: Al and Al alloys Inner tube: after choice	fin o.d.: 22 – 60 mm lenght up to 20 m	6 – 14	gas cooling gas heating	air / gas air / gas	water / oil / air water / oil / air
	Finned Tubes from tube and strip					
	Tube and strip: St, stainless steel, Al, special alloys, Ni-base alloys	tube o.d.: 8 – 84 mm fin o.d.: up to 125 mm lenght up to 12 m	4 – 25	flue gas cooling flue gas heating condensation in gas heaters	flue gas flue gas flue gas	steam / thermal oil thermal oil / water water
	Tube: Cu / Cu alloys, stainless steel Strip: Cu	tube o.d.: 10 – 30 mm fin o.d.: up to 60 mm lenght up to 6 m	6 – 23	gas cooling gas heating	air / gas air / gas	water / oil / compressed air water / oil

Lloyd's Register
LRQA

ZERTIFIKAT

Hiermit wird bescheinigt, dass das Qualitätsmanagementsystem von:

Schmöle GmbH
Ardeyer Str. 15, 58730 Fröndenberg
Westicker Str. 84, 58730 Fröndenberg
Deutschland

durch Lloyd's Register Quality Assurance geprüft und bewertet wurde und den folgenden Normen zum Qualitätsmanagement entspricht:

ISO 9001:2008

Das Qualitätsmanagementsystem ist anwendbar für:

Entwicklung und Herstellung von Rippenrohren und Wärmetauschern.

Zertifikat
Registrier-Nr.: KLN 0926985

Erstmalige Zulassung: 01. April 1993
Bestehendes Zertifikat: 01. April 2014
Dieses Zertifikat ist gültig bis: 31. März 2017

Ausgestellt von: Lloyd's Register Quality Assurance GmbH
Für und im Auftrag von: Lloyd's Register Quality Assurance Limited

UKAS
001

Dieses Dokument unterliegt der unten stehenden Bestimmung.
Innere Kanalstr. 15, 50823 Köln, Deutschland, Handelsregister Nr. B 34582
Für und im Auftrag von Hiramford, Middlemarch Office Village, Siskin Drive, Coventry, CV3 4FJ, United Kingdom

Inspections and Testings

In order to verify the quality of our finned tubes, the following inspection and test methods are used:

Non-destructive Testing

- ➔ Eddy current test acc. to DKI[1)] 801
  ASTM B 359 / ASME SB 359
  ASTM E 309 / ASME SE 309
  ASTM E 426 / ASME SE 426
- ➔ Pneumatic pressure test under water
- ➔ Hydraulic pressure test

Destructive Testing

The following mechanical and structural properties are determined:

- ➔ Tensile strength
- ➔ Yield strength
- ➔ Elongation
- ➔ Grain size

[1)] DKI = German Copper Institute, Düsseldorf

The Company

Schmöle GmbH is considered to be one of the leading manufacturers in the fields of finned tubes and heat exchangers.

Our clients expect both our involvement in solving their application-specific problems as well as a constantly being improved products and processes.

With 160 years of experience and a continued commitment to intensive research and development and modern manufacturing procedures, supported by a certified quality system, we shall continue to meet these challenges.

Schmöle GmbH has two product divisions:

Product Division 1: Finned tubes
Heat exchangers

Product Division 2: Ceiling cooling batteries
Surface heat exchanger

Quality Management

Manufacturing at Schmöle is accompanied by tests laid down in a Quality Assurance plan which is established for the individual product, containing all operations and examinations.

Schmöle, since 1993, is known for a certified Quality Management System according to DIN EN ISO 9001 as well as approval according to PED 97/23/EC.

By consistent development of the Quality Management System, Schmöle is familiar to its customers as a reliable business partners and manufacturer of high quality products.

We are looking forward to advise you!

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SCHMÖLE

We change Energy.