

Wieland

**Low Finned Tubes
GEWA-K and GEWA-KS**

Wieland Thermal Solutions®
PROVIDING EFFICIENCY



Low Finned Tubes GEWA-K and GEWA-KS



Wieland GEWA-K and GEWA-KS tubes are low finned tubes in copper and copper alloys as well as carbon steel, stainless steel and titanium. They are mainly used in the refrigeration and air-conditioning industry (refrigerant condensers and refrigerant evaporators), in machine and apparatus construction (oil coolers, gas coolers), in the hydrocarbon processing industry (steam interstage superheaters) and in process engineering (coolers, preheaters, condensers and evaporators).

GEWA-K tubes have a plain inner surface. GEWA-KS tubes have grooves on the inner surface for optimum heat transfer.

Interesting applications of copper and copper-alloy tubes include dry-expansion evaporators in the air-conditioning and refrigeration industry with tube-side evaporation of safety refrigerants such as R134a, R407C, R404A and shell-side cooling using water and water/glycol mixtures. Further applications are coaxial evaporators, compressed air driers and other heat exchangers (e.g. water/water, oil/water, etc.).

GEWA-K and GEWA-KS tubes in carbon steel and stainless steel are used for various applications in the oil and gas industry, including refining, petrochemical, chemical and gas-processing applications. Cost-effective solutions such as compact design, reduction of the number of heat exchangers per unit and process efficiency improvement can be developed for various projects ranging from individual heat exchanger replacement and capacity expansion of existing plants to new plant construction.

A version of the GEWA-K tube with a wide fin spacing of 11.5 fpi and a fin thickness of 0.95 mm is suitable for very robust solutions, particularly for operating conditions involving corrosion and fouling, e.g. in the refining industry.

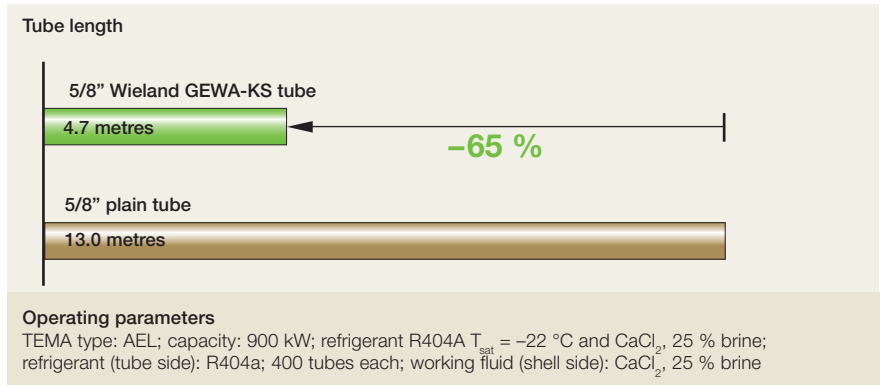
The following three typical applications demonstrate the savings potential offered by our enhanced finned tubes. This cost reduction is multiplied by savings made in the overall design (for example refrigerant and process fluid charges, piping, racks, support structures and foundations as well as control and feedback control systems).



Case illustration using a dry-expansion evaporator

Size reduction of dry-expansion evaporator by 65 % through the use of GEWA-KS tubes

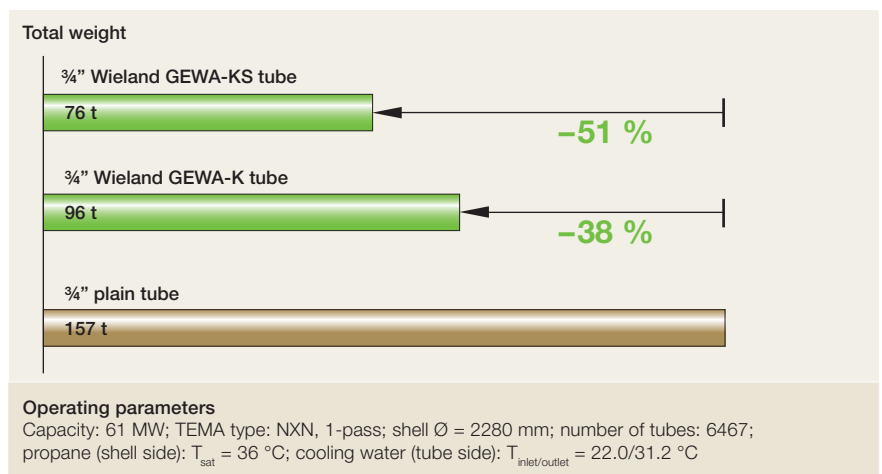
Compared to plain tubes, the size of a dry-expansion evaporator can be reduced, at constant capacity, to about one third using Wieland GEWA-KS finned tubes at the operating conditions indicated.



Case illustration using a propane-refrigerant condenser

Weight reduction of propane-refrigerant condenser for LNG plant by 50 %

In the construction of large heat-exchanger equipment the use of GEWA-K and GEWA-KS finned tubes, compared to plain tubes, makes it possible to meet the requirements regarding maximum unit size. This advantage is demonstrated for a typical large-scale project in the Persian Gulf where the total weight of the condenser could be halved.



Case illustration using a kerosene run-down cooler

Reduction of number of heat exchangers by 50 %

For preheating crude oil in a refinery, the number of heat exchangers could be reduced from two to one through the use of GEWA-KS tubes, compared to plain tubes, while at the same time achieving a pressure drop reduction by 50 %.

Tube type	1" plain tube. carbon steel	1" GEWA-KS tube carbon steel
Heat exchanger / unit	2 heat exchangers (1300 mm shell Ø x 4.88 m tube length)	1 heat exchanger (1500 mm shell Ø x 6.1 m tube length)
Number of tubes [pieces]	1292	1782
Tube length [m]	4.8	6.1
Shell-side pressure drop [kPa]	33.0	16.5
Tube-side pressure drop [kPa]	63	24
Heat transfer coefficient h [$\text{W}/\text{m}^2\text{K}$]	243	455
Operating parameters Capacity: 2.0 MW; TEMA type: AES; crude oil (tube side): $T_{inlet/outlet} = 25\text{ }^{\circ}\text{C}/29\text{ }^{\circ}\text{C}$; Kerosine (shell side): $T_{inlet/outlet} = 47.8\text{ }^{\circ}\text{C}/29.0\text{ }^{\circ}\text{C}$		

Production and processing

The fins are obtained by roll forming the outer surface of a plain tube. This process results in an increase in strength of the finned sections, whereas the plain ends and lands remain soft. Soft annealing of the tubes is required if they have to be suitable for bending and coiling.

Tubes in alloys susceptible to stress corrosion cracking such as CuZn28Sn1 or CuZn20Al2 are thermally stress relieved after finning. Heat treatment is also possible for finned tubes made from all other materials for recrystallisation (normalisation) of the structure. GEWA-K finned tubes resist very high mechanical and thermal stress. The fin diameter does not exceed the maximum outside diameter of the plain tube sections at any single point.

Technical service

Our Technical Marketing experts are available at any time as contact partners to work together with your experts from the very early product planning stages in order to obtain optimum results for the manufacturing stage and for your application. The only way to find the best, most cost-effective solution is by means of comprehensive technical consultation based on computerised thermal engineering rating.

Advantages of GEWA-K and GEWA-KS tubes

- Optimised inner to outer surface ratio
- Compact designs through high specific heat capacity
- Enhanced performance through inner structures (GEWA-KS)
- Flexible design possible as bent or coiled heat exchangers

Tube identification

K	26	15	12	080	00
GEWA-K	Number of fins per inch	Fin height in 1/10 mm	Nominal core-tube diameter in mm	Root wall thickness in 1/100 mm	Code number for the inner structure (00 = plain inside surface)

Weight conversion $G = G_{K21} \cdot f$

Material	f
S28	0.96
S76	0.93
L10, L30	1.0

Wieland offers in-house thermal design software for shell-and-tube dry-expansion evaporators with GEWA-KS finned tubes. For details please refer to www.wieland-thermalsolutions.com.

In addition, tailor-made thermal designs are available from HTRI design software. In case of interest Wieland can provide heat transfer engineering service. Alternatively, for your own designs you may select the option "Wieland GEWA-KS tube" from the HTRI software.

Quality assurance

To ensure consistent product quality, Wieland-Werke AG has a sophisticated quality control system according to DIN EN ISO 9001 which has been verified and certified by the independent certification company, Bureau Veritas Quality International (BVQI). Since 30 December 2002, our test laboratories in the Central Laboratory and Development Services have been accredited to DIN EN ISO/IEC 17025 and DIN EN ISO 9001 as test and certification laboratories.

Available versions

- A Tube with plain ends and without plain lands
- B Tube with plain ends and plain lands
- C Tube finned throughout
- D Tube with stripped ends
- E Bent to a U-shape

Length tolerances

l_1	Length tolerance
< 2000	+2 mm
2000–8000	+1 ‰
> 8000	+0.7 ‰ (min. 8 mm)

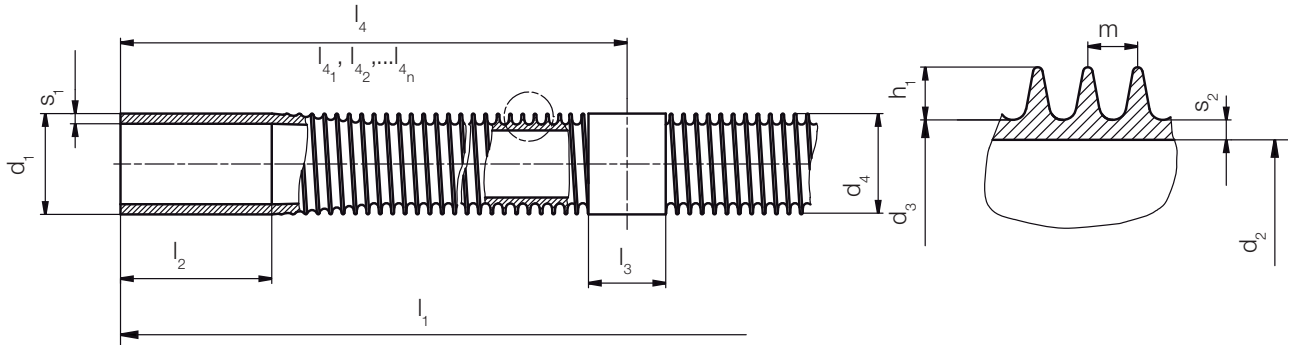
Materials and properties

Wieland symbol			K21	S28	S76	L10	L30
EN symbol Material No. Composition as per			Cu-DHP CW024A EN 12 452	CuZn28Sn1As CW706R EN 12 452	CuZn20Al2As CW702R EN 12 452	CuNi10Fe1Mn CW352H EN 12 452	CuNi30Mn1Fe CW354H EN 12 452
Comparable	USA	UNS	C12200	C44300	C68700	C70600	C71500
Mechanical properties of the plain tube sections (reference values)	Temper		R220 H040	R320S H060S	R340S H060S	R290 H070	R370 H085
	Yield strength $R_{p0.2}$	(N/mm ²)	min. 40	min. 100	min. 120	min. 90	min. 120
	Tensile strength R_m	(N/mm ²)	min. 220	min. 320	min. 340	min. 290	min. 370
	Elongation A_5	(%)	min. 40	min. 55	min. 55	min. 30	min. 35
	Hardness HV	(%)	min. 40	min. 60	min. 60	min. 70	min. 85
Physical properties (reference values)	Density	(kg/dm ³)	8.94	8.56	8.35	8.92	8.93
	Mean thermal expansion coefficient at temperatures between 20 and 300 °C	(10 ⁻⁶ /K)	17.7	20	19	17	16
	Thermal conductivity at 20 °C	(W/(mK))	>310	110	100	45	30

EN symbol Material No. Composition as per			X2CrNi19-11 1.4306 EN 10216-5	X2CrNiMo17-12-2 1.4404 EN 10216-5	X6CrNiTi18-10 1.4541 EN 10216-5	X6CrNiMoTi17-12-2 1.4571 EN 10216-5	Titan Grade 2 (Ti 2) 3.7035 DIN 17850
Comparable	USA	UNS	TP 304L	TP 316L	TP 321	TP 316Ti	R50400 (ASTM B 338)
Mechanical properties of the plain tube sections (reference values)	Yield strength $R_{p0.2}$	(N/mm ²)	min. 180	min. 190	min. 200	min. 190	275–450
	Tensile strength R_m	(N/mm ²)	460–680	490–690	500–730	490–690	min. 345
	Elongation A_5	(%)	min. 40	min. 40	min. 35	35	A5 min. 20°
Physical properties (reference values)	Density	(kg/dm ³)	7.90	7.98	7.90	8	4.51
	Mean thermal expansion coefficient at temperatures between 20 and 300 °C	(10 ⁻⁶ /K)	17	17.5	17	18	9.2
	Thermal conductivity at 20 °C	(W/(mK))	15	15	15	15	17

EN symbol Material No. Composition as per			P235GH (St35.8) 1.0345 EN 10216-2	P255QL (TTSt35N) 1.0452 EN 10216-4	13CrMo4-5 1.7335 EN 10216-2	X12CrMo5+I 1.7362+I EN 10216-2
Comparable	USA	UNS	ASTM A179	ASTM A334 grade 1	ASTM A-213 T11	ASTM A-213 T5
Mechanical properties of the plain tube sections (reference values)	Yield strength $R_{p0.2}$	(N/mm ²)	min. 225	min. 225	min. 290	min. 175
	Tensile strength R_m	(N/mm ²)	360–500	340–490	430–580	440–590
	Elongation A_5	(%)	min. 25	min. 25	22	20
Physical properties (reference values)	Density	(kg/dm ³)	7.85	7.85	7.85	7.80
	Mean thermal expansion coefficient at temperatures between 20 and 300 °C	(10 ⁻⁶ /K)	13	13	18.5	19
	Thermal conductivity at 20 °C	(W/(mK))	57	57	42	28.2

GEWA-K



Symbols

A_a	Outside surface	l_3	Length of plain land
A_i	Inside surface	l_4	Distance between land centre and tube end
A_a/A_i	Surface area ratio (outside to inside surface area within finned section)	$l_{4_1}, l_{4_2}, \dots, l_{4_n}$	Distance between centre of lands and one and the same tube end
d_1	Outside diameter of plain section	m	Fin pitch
d_2	Inside diameter of finned section	s_1	Wall thickness of plain end and plain lands
d_3	Root diameter	s_2	Root wall thickness
d_4	Diameter over fins ($\leq d_1$)		
h_1	Fin height outside		
l_1	Overall tube length		
l_2	Length of plain end		

GEWA-K 11.5 fins/inch			Fin pitch $m = 2.20$ mm Fin height $h = 1.50$ mm			Mean fin thickness $\bar{\delta}_R \approx 0.95$ mm Production length max. 18 m					
Tube No.	Material			Plain section			Finned section				Approx. weight G (kg/m)
	1.0345	1.7335	1.7362+I	d_1 (inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_a (m ² /m)	A_a/A_i (-)	
K-1115.12150-00	•	•	•	5/8	15.88	2.11	12.70	1.50	0.091	3.00	0.653
K-1115.15150-00	•	•	•	3/4	19.05	2.11	15.90	1.50	0.111	2.74	0.825
K-1115.22220-00	•	•	•	1	25.40	2.77	22.20	2.20	0.152	2.72	1.480
K-1115.22245-00	•	•	•	1	25.40	3.05	22.20	2.45	0.152	2.80	1.590

GEWA-K 19 fins/inch			Fin pitch $m = 1.35$ mm Fin height $h = 1.50$ mm			Mean fin thickness $\bar{\delta}_R \approx 0.30$ mm Production length max. 18 m							
Tube No.	Material					Plain section			Finned section				Approx. weight G (kg/m)
	K21	L10	L30	S28	S76	d_1 (inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_a (m ² /m)	A_a/A_i (-)	
K-1915.09080-00	•	•				1/2	12.70	1.20	9.50	0.80	0.103	4.15	0.407
K-1915.09090-00	•	•				1/2	12.70	1.30	9.50	0.90	0.103	4.26	0.429
K-1915.09100-00	•	•	•	•	•	1/2	12.70	1.40	9.50	1.00	0.103	4.37	0.450
K-1915.09125-00	•	•	•	•	•	1/2	12.70	1.65	9.50	1.25	0.103	4.68	0.501
K-1915.09150-00	•	•	•	•	•	1/2	12.70	1.90	9.50	1.50	0.103	5.04	0.549
K-1915.12070-00	•					5/8	15.90	1.10	12.70	0.70	0.131	3.69	0.417
K-1915.12080-00	•	•				5/8	15.90	1.20	12.70	0.80	0.131	3.76	0.448
K-1915.12090-00	•	•				5/8	15.90	1.30	12.70	0.90	0.131	3.83	0.479
K-1915.12100-00	•	•	•	•	•	5/8	15.90	1.40	12.70	1.00	0.131	3.90	0.510
K-1915.12110-00	•	•	•	•	•	5/8	15.90	1.50	12.70	1.10	0.131	3.97	0.539
K-1915.12120-00	•	•	•	•	•	5/8	15.90	1.60	12.70	1.20	0.126	3.89	0.561
K-1915.12170-00	•	•	•	•	•	5/8	15.90	2.10	12.70	1.70	0.126	4.31	0.699

GEWA-K

GEWA-K 19 fins/inch		Fin pitch m = 1.35 mm Fin height h = 1.50 mm					Mean fin thickness $\delta_R \approx 0.30$ mm Production length max. 18 m						
Tube No.	Material					Plain section			Finned section				Approx. weight
	K21	L10	L30	S28	S76	d ₁ (inch)	d ₁ (mm)	s ₁ (mm)	d ₃ (mm)	s ₂ (mm)	A _a (m ² /m)	A _a /A ₁ (-)	
K-1915.15070-00	•					3/4	19.00	1.20	15.80	0.70	0.153	3.38	0.554
K-1915.15080-00	•					3/4	19.00	1.30	15.80	0.80	0.153	3.43	0.594
K-1915.15090-00	•	•				3/4	19.00	1.35	15.80	0.90	0.153	3.48	0.633
K-1915.15100-00	•	•	•	•	•	3/4	19.00	1.45	15.80	1.00	0.153	3.53	0.673
K-1915.15125-00	•	•	•	•	•	3/4	19.00	1.75	15.80	1.25	0.153	3.66	0.768
K-1915.15140-00	•	•	•	•	•	3/4	19.00	1.90	15.80	1.40	0.153	3.75	0.823
K-1915.15150-00	•	•	•	•	•	3/4	19.00	2.00	15.80	1.50	0.154	3.83	0.814
K-1915.15235-00	•	•	•	•	•	3/4	19.00	2.85	15.80	2.35	0.154	4.42	1.099
K-1915.19100-00	•	•				7/8	22.20	1.50	19.00	1.00	0.182	3.41	0.810
K-1915.19125-00	•	•	•	•	•	7/8	22.20	1.75	19.00	1.25	0.182	3.51	0.927
K-1915.19150-00	•	•	•	•	•	7/8	22.20	2.00	19.00	1.50	0.182	3.62	1.042
K-1915.19170-00	•	•	•	•	•	7/8	22.20	2.20	19.00	1.70	0.182	3.71	1.130
K-1915.19180-00	•	•	•	•	•	7/8	22.20	2.30	19.00	1.80	0.183	3.78	1.120
K-1915.19250-00	•	•	•	•	•	7/8	22.20	3.00	19.00	2.50	0.183	4.16	1.409
K-1915.22125-00	•	•				1	25.40	1.75	22.20	1.25	0.211	3.41	1.087
K-1915.22165-00	•	•	•	•	•	1	25.40	2.15	22.20	1.65	0.211	3.55	1.304
K-1915.22210-00	•	•	•	•	•	1	25.40	2.60	22.20	2.10	0.212	3.75	1.476
K-1915.22250-00	•	•	•	•	•	1	25.40	3.00	22.20	2.50	0.212	3.92	1.673

GEWA-K 19 fins/inch		Fin pitch m = 1.35 mm Fin height h = 1.42 mm					Mean fin thickness $\delta_R \approx 0.30$ mm Production length max. 18 m						
Tube No.	Material					Plain section			Finned section				Approx. weight
	1.0345 (St35.8I)	1.0452 (TTSt35N)	1.4306	1.4541	1.4571	d ₁ (inch)	d ₁ (mm)	s ₁ (mm)	d ₃ (mm)	s ₂ (mm)	A _a (m ² /m)	A _a /A ₁ (-)	
K-1914.12125-00	•	•	•	•	•	5/8	15.88	1.65	12.90	1.25	0.121	3.70	0.507
K-1914.12165-00	•	•				5/8	15.88	2.10	12.90	1.65	0.121	4.01	0.594
K-1914.16125-00	•	•				3/4	19.05	1.75	16.00	1.25	0.148	3.49	0.635
K-1914.16138-00			•	•	•	3/4	19.05	1.80	18.90	1.38	0.148	3.53	0.690
K-1914.16165-00	•	•	•	•	•	3/4	19.05	2.10	16.00	1.65	0.148	3.71	0.764
K-1914.16210-00	•	•				3/4	19.05	2.50	16.00	2.10	0.148	3.99	0.900
K-1914.16235-00	•	•				3/4	19.05	2.75	16.00	2.35	0.148	4.21	0.985
K-1914.19165-00	•	•				7/8	22.22	2.10	19.20	1.65	0.175	3.50	0.927
K-1914.19210-00	•	•	•	•	•	7/8	22.22	2.50	19.20	2.10	0.175	3.71	1.099
K-1914.19240-00	•	•	•	•	•	7/8	22.22	2.80	19.20	2.40	0.175	3.87	1.208
K-1914.22210-00	•	•				1	25.40	2.50	22.40	2.10	0.203	3.55	1.298
K-1914.22240-00	•	•	•	•	•	1	25.40	2.80	22.40	2.40	0.203	3.67	1.430
K-1914.22275-00	•	•	•	•	•	1	25.40	3.15	22.40	2.75	0.203	3.82	1.579

GEWA-K

GEWA-K 26 fins/inch		Fin pitch $m = 1.00$ mm Fin height $h = 1.50$ mm					Mean fin thickness $\delta_R \approx 0.30$ mm Production length max. 18 m						
Tube No.	Material					Plain section			Finned section				Approx. weight G_{K21} (kg/m)
	K21	L10	L30	S28	S76	d_1 (inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_a (m ² /m)	A_a/A_1 (-)	
K-2615.09080-00	•	•				1/2	12.70	1.20	9.50	0.80	0.129	5.20	0.329
K-2615.09090-00	•	•				1/2	12.70	1.30	9.50	0.90	0.129	5.33	0.351
K-2615.09100-00	•	•	•	•	•	1/2	12.70	1.40	9.50	1.00	0.129	5.47	0.372
K-2615.09125-00	•	•	•	•	•	1/2	12.70	1.65	9.50	1.25	0.129	5.87	0.423
K-2615.09150-00	•	•	•	•	•	1/2	12.70	1.90	9.50	1.50	0.129	6.32	0.471
K-2615.12070-00	•					5/8	15.90	1.10	12.70	0.70	0.167	4.70	0.408
K-2615.12080-00	•	•				5/8	15.90	1.20	12.70	0.80	0.167	4.79	0.440
K-2615.12090-00	•	•				5/8	15.90	1.30	12.70	0.90	0.167	4.88	0.471
K-2615.12100-00	•	•	•	•	•	5/8	15.90	1.40	12.70	1.00	0.167	4.97	0.501
K-2615.12110-00	•	•	•	•	•	5/8	15.90	1.50	12.70	1.10	0.167	5.06	0.531
K-2615.12120-00	•	•	•	•	•	5/8	15.90	1.60	12.70	1.20	0.163	5.04	0.582
K-2615.12170-00	•	•	•	•	•	5/8	15.90	2.10	12.70	1.70	0.163	5.58	0.720
K-2615.15070-00	•					3/4	19.00	1.20	15.80	0.70	0.204	4.51	0.507
K-2615.15080-00	•					3/4	19.00	1.35	15.80	0.80	0.204	4.57	0.547
K-2615.15090-00	•	•				3/4	19.00	1.45	15.80	0.90	0.204	4.64	0.587
K-2615.15100-00	•	•	•			3/4	19.00	1.50	15.80	1.00	0.204	4.71	0.626
K-2615.15150-00	•	•	•	•	•	3/4	19.00	2.00	15.80	1.50	0.199	4.95	0.839
K-2615.15235-00	•	•	•	•	•	3/4	19.00	2.85	15.80	2.35	0.199	5.71	1.125
K-2615.19100-00	•	•				7/8	22.20	1.50	19.00	1.00	0.242	4.53	0.755
K-2615.19125-00	•	•	•	•		7/8	22.20	1.75	19.00	1.25	0.242	4.67	0.872
K-2615.19165-00	•	•	•	•	•	7/8	22.20	2.15	19.00	1.65	0.242	4.91	1.003
K-2615.19180-00	•	•	•	•	•	7/8	22.20	2.30	19.00	1.80	0.236	4.88	1.150
K-2615.19250-00	•	•	•	•	•	7/8	22.20	3.00	19.00	2.50	0.236	5.37	1.439
K-2615.22125-00	•	•				1	25.40	1.75	22.20	1.25	0.281	4.54	1.023
K-2615.22165-00	•	•	•	•	•	1	25.40	2.15	22.20	1.65	0.281	4.73	1.240
K-2615.22210-00	•	•	•	•	•	1	25.40	2.60	22.20	2.10	0.274	4.85	1.510
K-2615.22250-00	•	•	•	•	•	1	25.40	3.00	22.20	2.50	0.274	5.07	1.708

GEWA-K

GEWA-K 26 fins/inch			Fin pitch m = 1.00 mm Fin height h = 1.42 mm			Mean fin thickness $\delta_R \approx 0.30$ mm Production length max. 18 m					
Tube No.	Material			Plain section			Finned section				Approx. weight
	1.0345 (St35.8I)	1.0452 (TTSt35N)	1.4571	d_1 (inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_a (m ² /m)	A_a/A_1 (-)	$G_{ST35.8}$ (kg/m)
K-2614.09100-00			•	1/2	12.70	1.40	9.70	1.00	0.118	4.80	0.343
K-2614.12125-00	•	•		5/8	15.88	1.65	12.90	1.25	0.155	4.74	0.525
K-2614.12165-00	•	•		5/8	15.88	2.10	12.90	1.65	0.155	5.09	0.612
K-2614.16125-00				3/4	19.05	1.75	16.00	1.25	0.195	4.60	0.632
K-2614.16165-00	•	•		3/4	19.05	2.10	16.00	1.65	0.190	4.76	0.786
K-2614.16210-00	•	•		3/4	19.05	2.50	16.00	2.10	0.190	5.13	0.922
K-2614.19125-00	•	•		7/8	22.22	1.85	19.20	1.25	0.231	4.40	0.763
K-2614.19200-00	•	•		7/8	22.22	2.40	19.20	2.00	0.225	4.71	1.087
K-2614.19240-00	•	•		7/8	22.22	2.80	19.20	2.40	0.225	4.97	1.233
K-2614.22165-00	•	•		1	25.40	2.10	22.40	1.65	0.267	4.45	1.087
K-2614.22210-00	•	•		1	25.40	2.50	22.40	2.10	0.260	4.55	1.327
K-2614.22240-00	•	•		1	25.40	2.80	22.40	2.40	0.260	4.70	1.460

GEWA-K 30 fins/inch			Fin pitch = 0.85 mm Fin height h = 0.90 mm			Mean fin thickness $\delta_R \approx 0.30$ mm Production length max. 18 m							
Tube No.	Material				Plain section			Finned section				Approx. weight	
	1.0345 (St35.8I)	1.0452 (TTSt35N)	1.4306	1.4404	1.4571	d_1 (Inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_a (m ² /m)	A_a/A_1 (-)	$G_{ST35.8}$ (kg/m)
K-3009.13125-00			•			5/8	15.88	1.65	13.90	1.25	0.129	3.60	0.522
K-3009.13150-00	•	•	•			5/8	15.88	1.90	13.90	1.50	0.129	3.77	0.590
K-3009.13165-00	•	•	•			5/8	15.88	2.10	13.90	1.65	0.129	3.87	0.630
K-3009.13180-00	•	•	•			5/8	15.88	2.20	13.90	1.80	0.129	3.99	0.669
K-3009.17165-00	•	•	•			3/4	19.05	2.10	17.00	1.65	0.156	3.62	0.784
K-3009.17210-00	•	•	•			3/4	19.05	2.50	17.00	2.10	0.156	3.88	0.931
K-3009.17071-00			•	•	•	3/4	19.05	1.30	17.00	0.71	0.152	3.11	0.440
K-3009.17138-00			•	•	•	3/4	19.05	1.80	17.00	1.38	0.152	3.40	0.690
K-3009.23210-00	•	•	•			1	25.40	2.50	23.40	2.10	0.214	3.55	1.331
K-3009.23240-00	•	•	•			1	25.40	2.80	23.40	2.40	0.214	3.66	1.473

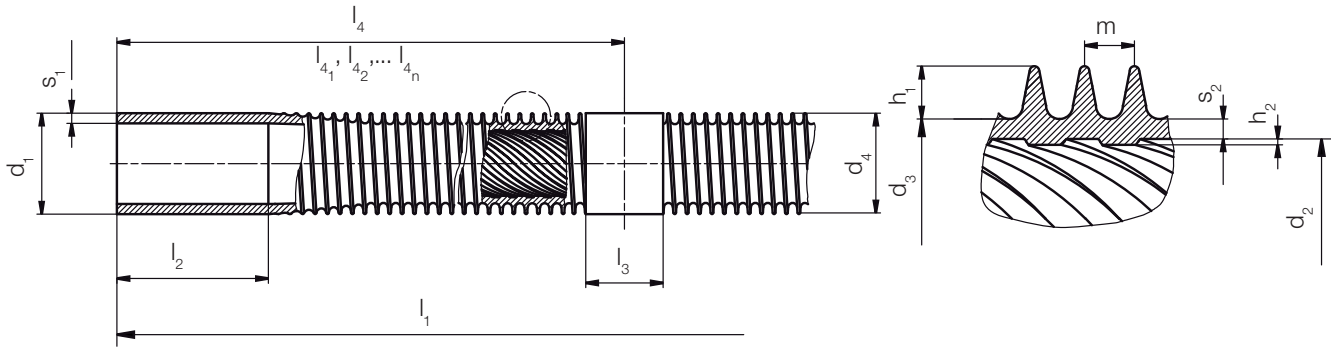
GEWA-K

GEWA-K 30 fins/inch		Fin pitch $m = 0.85$ mm Fin height $h = 0.66$ mm			Mean fin thickness $\bar{\delta}_R \approx 0.30$ mm Production length max. 18 m				Approx. weight	
Tube No.	Material		Plain section			Finned section				G (kg/m)
	Ti Gr2		d_1 (inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_3 (m ² /m)	A_3/A_1 (-)	
K-3007.17071-00	•		3/4	19.05	1.25	17.60	0.71	0.141	2.28	0.250

GEWA-K 36 fins/inch		Fin pitch $m = 0.64$ mm Fin height $h = 0.66$ mm			Mean fin thickness $\bar{\delta}_R \approx 0.30$ mm Production length max. 18 m				Approx. weight	
Tube No.	Material		Plain section			Finned section				G (kg/m)
	Ti Gr2		d_1 (inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_3 (m ² /m)	A_3/A_1 (-)	
K-3607.17071-00	•		3/4	19.05	1.25	17.60	0.71	0.149	2.95	0.250

GEWA-K 40 fins/inch			Fin pitch $m = 0.64$ mm Fin height $h = 0.90$ mm			Mean fin thickness $\bar{\delta}_R \approx 0.30$ mm Production length max. 15 m				Approx. weight
Tube No.	Material		Plain section			Finned section				G (kg/m)
	K21	L10	d_1 (inch)	d_1 (mm)	s_1 (mm)	d_3 (mm)	s_2 (mm)	A_3 (m ² /m)	A_3/A_1 (-)	
K-4009.17070-00	•	•	3/4	19.00	1.12	17.00	0.70	0.194	3.96	0.495
K-4009.17090-00	•	•	3/4	19.00	1.35	17.00	0.90	0.194	4.06	0.600

GEWA-KS



Nomenklatur

A_a	Outside surface	l_1	Overall tube length
A_i	Inside surface	l_2	Length of plain end
A_a/A_i	Surface area ratio (outside to inside surface area within finned section)	l_3	Length of plain land
d_1	Outside diameter of plain section	l_4	Distance between land centre and tube end
d_2	Inside diameter of finned section	$l_{41}, l_{42}, \dots, l_{4n}$	Distance between centre of lands and one and the same tube end
d_3	Root diameter	m	Fin pitch
d_4	Diameter over fins ($\leq d_1$)	s_1	Wall thickness of plain end and plain lands
h_1	Fin height outside	s_2	Root wall thickness
h_2	Fin height inside		

GEWA-KS		Production length K21 max. 8 m, steel max. 18 m									
Tube No.	Material	Plain section				Finned section					Approx. weight G (kg/m)
		d_1 (inch)	d_1 (mm)	s_1 (mm)	h_1 (mm)	d_3 (mm)	s_2 (mm)	h_2 (mm)	A_a (m ² /m)	A_a/A_i (-)	
19 fpi											
K-1908.14070-22	K21	5/8	15.90	1.30	0.80	14.1	0.70	0.45	0.091	1.36	0.460
K-1908.17070-24	K21	3/4	19.00	1.35	0.80	17.2	0.70	0.50	0.107	1.28	0.570
K-1914.16140-53	1.0345	3/4	19.05	2.11	1.40	16.1	1.40	0.20	0.149	2.91	0.785
K-1915.22240-53	1.0345	1	25.40	3.05	1.50	22.2	2.40	0.35	0.212	2.73	1.470
30 fpi											
K-3009.17140-48	1.0345	3/4	19.05	2.11	0.90	17.1	1.40	0.40	0.162	2.81	0.780
K-3009.23220-48	1.0345	1	25.40	2.80	0.90	23.4	2.20	0.45	0.212	2.71	1.450
K-3009.17071-48	304L	3/4	19.05	1.35	0.90	17.10	0.71	0.35	0.152	2.50	0.480
36 fpi											
K-3607.17071-48	304L	3/4	19.05	1.35	0.70	17.50	0.71	0.35	0.149	2.38	0.480



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Tube Division

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