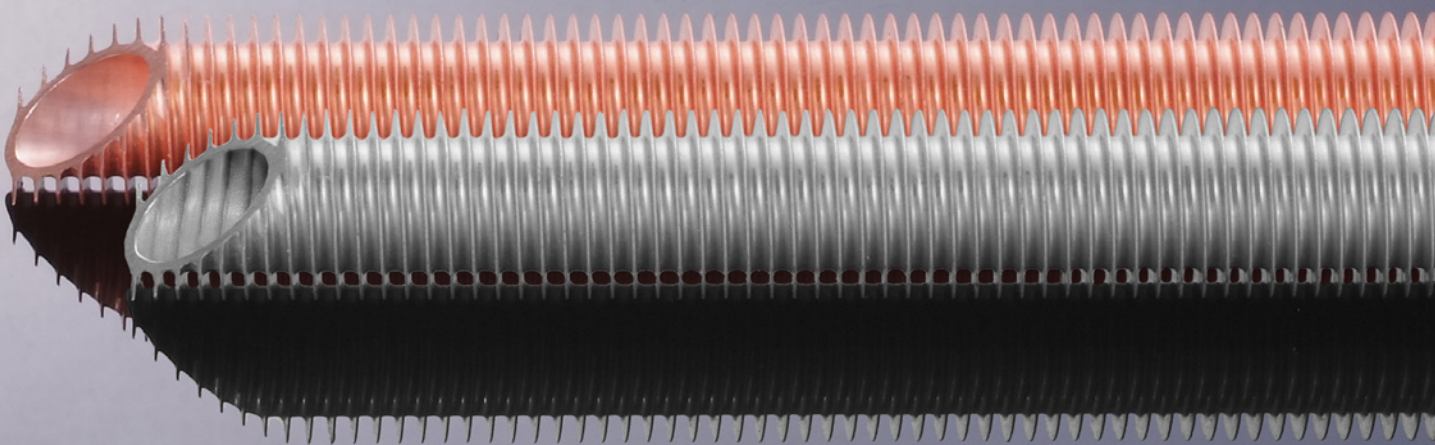


Wieland

Medium-High Finned Tubes
GEWA-D, GEWA-DW, GEWA-DS

Wieland Thermal Solutions®
PROVIDING EFFICIENCY



Medium-High Finned Tubes

GEWA-D, GEWA-DW, GEWA-DS

Wieland GEWA-D tubes are medium-high finned tubes in copper and copper alloys as well as aluminium alloys. The tubes are available in straight lengths or as ready-to-install heat exchangers. GEWA-D tubes resist very high mechanical and thermal stress. They are mainly used for heat transfer in the heating industry (hot water tanks), in air conditioning and refrigeration (refrigerant condensers and evaporators), mechanical engineering (oil coolers, gas coolers) as well as process and automotive engineering (oil coolers).

Wieland GEWA-DW and GEWA-DS

For improved heat transfer the inside of GEWA-DW tubes have an undulation. For the version GEWA-DW this inside undulation has been optimised for very small bending radii and coil diameters. The inside undulation of GEWA-DS tubes (dimensions on request) has been specially designed for highly viscous media.

Production and processing

The fins are obtained by roll forming the outer surface of a seamless plain tube. This process results in an increase in strength of the finned sections. Plain ends and lands remain soft and have a smaller diameter than finned sections. Soft annealing of the tubes is necessary if they must be suitable for coiling or bending into heat exchangers.

Advantages of GEWA-D tubes for your application

- Optimised inner to outer surface ratio
- Availability of different inner structures for optimum operating conditions
- Compact designs through high specific heat capacity
- Enhanced performance through inner structures
- Flexible design possible as bent or coiled heat exchangers (see picture)

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.

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.

Symbols

| | |
|-----------|---|
| d_1 | OD of plain end |
| d_3 | ID of finned section |
| d_4 | root diameter |
| d_5 | diameter over fins |
| s_1 | wall thickness of plain end |
| s_2 | root wall thickness |
| l_1 | overall tube length |
| l_2 | length of plain end |
| A_1 | surface area within finned section |
| A_1/A_2 | surface area ratio outside to inside surface within finned section |
| a | transition area: max. 130 mm (max. 90 mm for tubes with plain inner surface and fin heights up to 3.5 mm) |
| b | transition area max. 60 mm |

Available versions

| | |
|---|------------------------|
| A | Tube with plain ends |
| B | Tube finned throughout |



Tube Number Code System

Explanation based on the example GEWA-D tube number D-1135.16100-00

| D | 11 | 35 | 16 | 100 | 00 |
|----------------|---------------------------------|-----------------------|-----------------------------|---------------------------------|--|
| Type GEWA-D | Nominal number of fins per inch | Fin height in 1/10 mm | Nominal root diameter in mm | Root wall-thickness in 1/100 mm | Code number of the inner structure (00 = plain inside surface) |

Code numbers for the inner structure:

00 plain inside surface

16 undulated inside surface (undulation depth min. 0.35 mm)

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

| Materials | f |
|-----------|------|
| L10 | 1.00 |
| A22 | 0.30 |

Manufacturing lengths

| Materials | Temper | Max. manufacturing length |
|-----------|----------------|---------------------------|
| K21, L10 | Hard as rolled | 15.0 m |
| | Soft | 15.0 m |
| A22 | Hard as rolled | 15.0 m |
| | Soft | 10.0 m |

Design of tube ends

Standard: cut with a minimum burr

On request: brush deburred

Tolerances

| Sizes | Tolerance |
|-----------------|--------------------|
| d_1 | -0.2 mm |
| d_5 | ± 0.2 mm |
| s_1 | ± 10 % |
| s_2 | ± 10 % |
| $l_1 < 2000$ mm | +2 mm |
| 2000 – 8000 mm | +1 ‰ |
| > 8000 mm | +0.7 ‰ (min. 8 mm) |
| l_2 | +5 mm |
| l_3 | +3 mm |

Materials and Properties

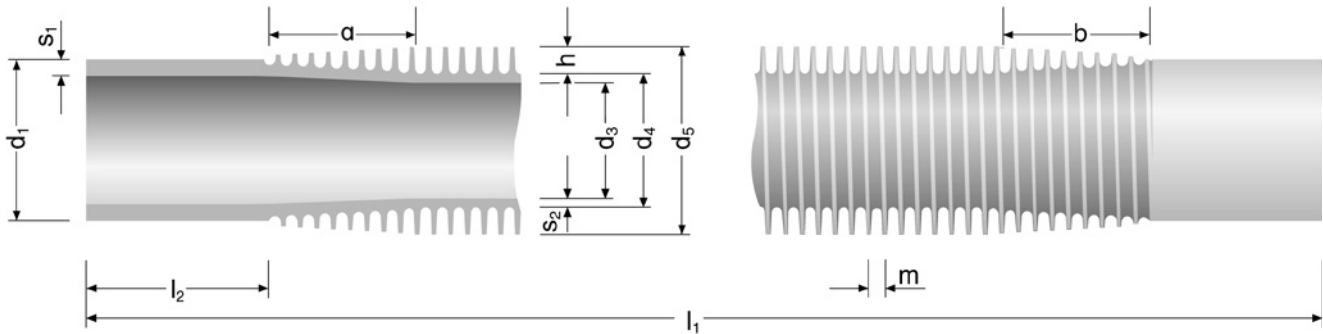
| Wieland | | K21 | L10 | A22 |
|--|--|---------------------------------------|----------------------------------|--|
| EN-symbol | | CU-DHP | CuNi10Fe1Mn | EN AW-AlMgSi |
| Material No. | | CW024A | CW352H | EN AW 6060 |
| Composition as per UNS-number | | EN 12452 | EN 12452 | EN 573-3 |
| C12200 | | C70600 | | |
| Mechanical properties of the plain tube sections/primary material (reference values) | Temper | R220 | R290 | T4 (EN 755-2) |
| | Yield strength $R_{p0.2}$ | (N/mm ²) min. 40 | min. 90 | min. 60 |
| | Tensile strength R_m | (N/mm ²) min. 220 | min. 290 | min. 120 |
| | Elongation A_5 | min. 40 | min. 30 | min. 14 |
| Physical properties (reference values) | Density | (kg/dm ³) 8.94 | 8.92 | 2.70 |
| | Melting range | (°C) 1083 | 1000 – 1145 | 585 – 650 |
| | Mean thermal expansion coefficient between 20 and 300 °C | (10 ⁻⁶ /K) 17.6 | 17 | 23.4 |
| | Thermal conductivity at 20 °C | (W/(mK)) 310 | 45 | 200 – 220 |
| Chemical composition acc. to EN | | (%) Cu 99.9 P 0.020 oxygen-free | Cu 88 Ni 10 Fe 1 Mn 0.7 | Si 0.3 – 0.6 Fe 0.10 – 0.30 Cu 0.10 Mn 0.10 Mg 0.35 – 0.60 |

The primary material complies with the requirements of AD-2000 Merkblatt W6/2 and on request with ASTM B 111 or ASTM B 75.

GEWA-D finned tubes are manufactured acc. to Wieland standard R-2200. On request, a production acc. to VdTÜV 420/2 supporting the European Pressure Equipment Directive PED 97/23/EC or ASME SB/ASTM B 359 is possible.

GEWA-D

The following standard GEWA-D tubes are available. Further sizes and materials are available on request.



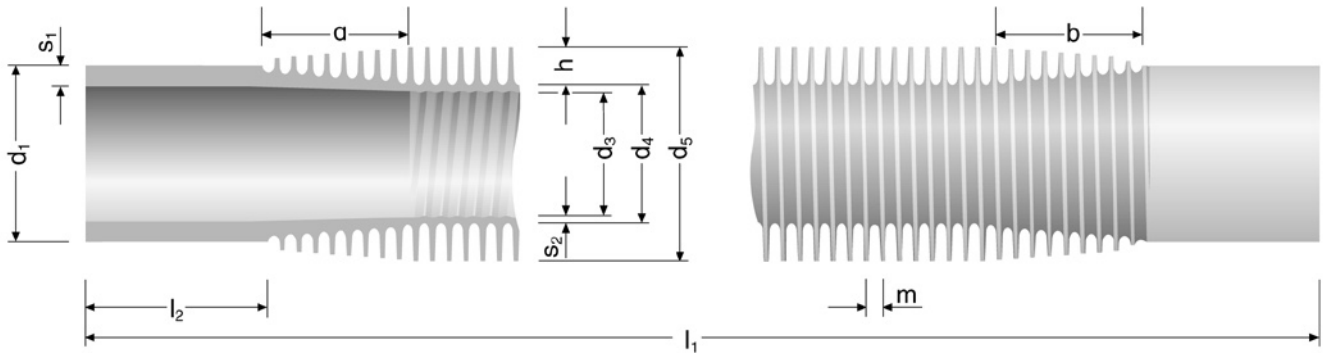
| Fin height 3.5 mm | | | | | | | | | | | | | |
|-------------------|----------------------|-----|-----|---------------|---------------|--|---------------|---------------|---------------|------------------------------|---|---|--------------------------|
| GEWA-D | Plain inside surface | | | | | Fin pitch $m = 2.3 \text{ mm}$ 11 fpi | | | | | Mean fin thickness $\delta_R \approx 0.50 \text{ mm}$ Manufacturing lengths see page 3 | | |
| Tube No. | Materials | | | Plain section | | Finned section | | | | | | Approx. weight G_{K21}^* (kg/m) | p_{\max}^{**} (bar) |
| | K21 | L10 | A22 | d_1 (mm) | s_1 (mm) | d_3 (mm) | d_4 (mm) | d_5 (mm) | s_2 (mm) | A_1 (m ² /m) | A_1/A_2 (-) | | |
| D-1135.10080-00 | • | | | 13.00 | 1.70 | 8.40 | 10.00 | 17.00 | 0.80 | 0.15 | 5.71 | 0.45 | 95 |
| D-1135.12080-00 | • | | | 15.00 | 1.65 | 10.40 | 12.00 | 19.00 | 0.80 | 0.18 | 5.48 | 0.57 | 80 |
| D-1135.12100-00 | • | • | • | 15.00 | 1.85 | 10.00 | 12.00 | 19.00 | 1.00 | 0.18 | 5.70 | 0.62 | 100 |
| D-1135.14080-00 | • | | | 18.00 | 1.60 | 12.40 | 14.00 | 21.00 | 0.80 | 0.20 | 5.22 | 0.65 | 65 |
| D-1135.14100-00 | • | • | • | 18.00 | 1.80 | 12.00 | 14.00 | 21.00 | 1.00 | 0.20 | 5.39 | 0.72 | 85 |
| D-1135.18100-00 | • | • | • | 22.00 | 1.85 | 16.50 | 18.50 | 25.50 | 1.00 | 0.26 | 4.98 | 0.94 | 60 |
| D-1135.24100-00 | • | • | | 28.00 | 2.00 | 22.50 | 24.50 | 31.50 | 1.00 | 0.33 | 4.65 | 1.21 | 45 |

| Fin height 4.5 mm | | | | | | | | | | | | | |
|-------------------|----------------------|-----|-----|---------------|---------------|--|---------------|---------------|---------------|------------------------------|---|---|--------------------------|
| GEWA-D | Plain inside surface | | | | | Fin pitch $m = 2.3 \text{ mm}$ 11 fpi | | | | | Mean fin thickness $\delta_R \approx 0.40 \text{ mm}$ Manufacturing lengths see page 3 | | |
| Tube No. | Materials | | | Plain section | | Finned section | | | | | | Approx. weight G_{K21}^* (kg/m) | p_{\max}^{**} (bar) |
| | K21 | L10 | A22 | d_1 (mm) | s_1 (mm) | d_3 (mm) | d_4 (mm) | d_5 (mm) | s_2 (mm) | A_1 (m ² /m) | A_1/A_2 (-) | | |
| D-1145.10100-00 | • | • | • | 14.00 | 2.40 | 8.00 | 10.00 | 19.00 | 1.00 | 0.20 | 7.96 | 0.66 | 120 |
| D-1145.12100-00 | • | • | • | 16.00 | 2.10 | 10.00 | 12.00 | 21.00 | 1.00 | 0.23 | 7.44 | 0.70 | 100 |
| D-1145.14100-00 | • | • | • | 18.00 | 2.10 | 12.00 | 14.00 | 23.00 | 1.00 | 0.26 | 6.99 | 0.81 | 85 |
| D-1145.16100-00 | • | • | • | 20.00 | 2.10 | 14.50 | 16.50 | 25.50 | 1.00 | 0.30 | 6.60 | 0.94 | 70 |
| D-1145.18100-00 | • | • | • | 22.00 | 2.10 | 16.50 | 18.50 | 27.50 | 1.00 | 0.33 | 6.38 | 1.04 | 60 |

*Tolerances and weight conversion see page 3; **Max. operating pressure calculated acc. to AD 2000-Merkblatt W6/2 in soft temper (R220) for K21 at operating temperatures up to 100 °C

GEWA-DW

The following standard GEWA-DW tubes are available. Further sizes and materials are available on request.



| Fin height 3.5 mm | | | | | | | | | | | | | |
|-------------------|--------------------------|-----|-----|--|---------------|----------------|---------------|---------------|---------------|---|------------------|---|-------------------------|
| GEWA-DW | Undulated inside surface | | | Fin pitch $m = 2.3 \text{ mm}$ 11 fpi | | | | | | Mean fin thickness $\delta_R \approx 0.50 \text{ mm}$ Manufacturing lengths see page 3 | | | |
| Tube No. | Materials | | | Plain section | | Finned section | | | | | | Approx. weight G_{K21}^* (kg/m) | P_{max}^{**} (bar) |
| | K21 | L10 | A22 | d_1 (mm) | s_1 (mm) | d_3 (mm) | d_4 (mm) | d_5 (mm) | s_2 (mm) | A_1 (m ² /m) | A_1/A_2 (-) | | |
| D-1135.12080-16 | • | | | 15.00 | 1.65 | 10.40 | 12.00 | 19.00 | 0.80 | 0.18 | 5.14 | 0.57 | 80 |
| D-1135.12100-16 | • | • | • | 15.00 | 1.85 | 10.00 | 12.00 | 19.00 | 1.00 | 0.18 | 5.35 | 0.62 | 100 |
| D-1135.14080-16 | • | | | 18.00 | 1.60 | 12.40 | 14.00 | 21.00 | 0.80 | 0.20 | 4.90 | 0.65 | 65 |
| D-1135.14100-16 | • | • | • | 18.00 | 1.80 | 12.00 | 14.00 | 21.00 | 1.00 | 0.20 | 5.06 | 0.72 | 85 |
| D-1135.18080-16 | • | | | 22.00 | 1.80 | 16.90 | 18.50 | 25.50 | 0.80 | 0.26 | 4.58 | 0.85 | 50 |
| D-1135.18100-16 | • | • | • | 22.00 | 1.85 | 16.50 | 18.50 | 25.50 | 1.00 | 0.26 | 4.67 | 0.94 | 60 |
| D-1135.24100-16 | • | • | | 28.00 | 2.00 | 22.50 | 24.50 | 31.50 | 1.00 | 0.33 | 4.43 | 1.21 | 45 |

*Tolerances and weight conversion see page 3; **Max. operating pressure calculated acc. to AD 2000-Merkblatt W6/2 in soft temper (R220) for K21 at operating temperatures up to 100 °C

| Fin height 4.5 mm | | | | | | | | | | | | | |
|-------------------|--------------------------|-----|-----|--|---------------|----------------|---------------|---------------|---------------|---|------------------|---|-------------------------|
| GEWA-DW | Undulated inside surface | | | Fin pitch $m = 2.3 \text{ mm}$ 11 fpi | | | | | | Mean fin thickness $\delta_R \approx 0.40 \text{ mm}$ Manufacturing lengths see page 3 | | | |
| Tube No. | Materials | | | Plain section | | Finned section | | | | | | Approx. weight G_{K21}^* (kg/m) | P_{max}^{**} (bar) |
| | K21 | L10 | A22 | d_1 (mm) | s_1 (mm) | d_3 (mm) | d_4 (mm) | d_5 (mm) | s_2 (mm) | A_1 (m ² /m) | A_1/A_2 (-) | | |
| D-1145.12100-16 | • | • | • | 16.00 | 2.10 | 10.00 | 12.00 | 21.00 | 1.00 | 0.23 | 6.98 | 0.70 | 100 |
| D-1145.14100-16 | • | • | • | 18.00 | 2.10 | 12.00 | 14.00 | 23.00 | 1.00 | 0.26 | 6.55 | 0.81 | 85 |
| D-1145.16100-16 | • | • | • | 20.00 | 2.10 | 14.00 | 16.00 | 25.00 | 1.00 | 0.29 | 6.25 | 0.91 | 70 |
| D-1145.18100-16 | • | • | • | 22.00 | 2.10 | 16.00 | 18.00 | 27.00 | 1.00 | 0.32 | 6.03 | 1.01 | 60 |

*Tolerances and weight conversion see page 3; **Max. operating pressure calculated acc. to AD 2000-Merkblatt W6/2 in soft temper (R220) for K21 at operating temperatures up to 100 °C

Wieland-Werke AG

www.wieland-thermalsolutions.com

Tube division

Graf-Arco-Str. 36, 89079 Ulm, Germany, Phone +49 (0)731 944-0, Fax +49 (0)731 944-2213, info@wieland.de

This brochure is for your general information only and is not subject to revision. No claims can be derived from it unless there is evidence of intent or gross negligence. The data given are no warranty that the product is of a specified quality and they cannot replace expert advice or the customer's own tests.