



STAR TUBES FOR ENHANCED HEAT TRANSFER

APPLICATIONS

Star tubes are heat-exchanger tubes with the inside surface enhanced by a star-shaped aluminum extrusion. The tube is bonded onto the extrusion ensuring excellent thermal contact.

Star tubes are primarily used for

- dry expansion heat-exchangers,
- compressed air cooling and
- heat-recovery systems.

BENEFITS

- enhanced performance in heat transfer on the inside due to the star shape
- allows compact heat-exchanger design
- economic or established solution

PRODUCT TYPES

- Outside tube: plain or finned
- Inside tube: 5 and 10 beams, others upon request
- straight lengths or upon request as coiled heat exchanger

TUBE MATERIAL

Tube				
EN	EN number	USA	UNS	Composition as per
Cu-DHP	EN CW024A	C12200		EN 12452
CuNi10Fe1Mn	EN CW352H	C70600		EN 12452
CuNi30Mn1Fe	EN CW354H	C71500		EN 12452
P235GH	1.0345	ASTM A179		EN 10216-2
AW-ALMgSi	EN AW6060	(A96101)*		EN 573-3

Extrusion				
EN	EN number	USA	UNS	Composition as per
AW-ALMgSi	EN AW6060	(A96101)*		EN 573-3

*impurities not absolutely identical with DIN.

FABRICATION AND CERTIFICATION

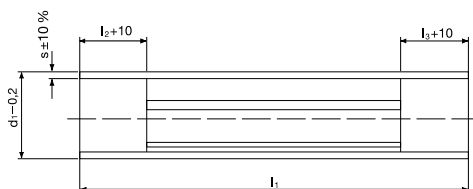
- DIN EN ISO 17025
- DIN EN ISO 9001

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RANGE OF AVAILABLE DIMENSIONS

5 beams I_1 up to 8 m								Tube weight (kg/m)			Weight of extrusion (kg/m)
Tube No.	d_1 (mm)	s (mm)	A_i (m ² /m)	A_i / A_a (-)	F (mm ²)	d_h (mm)	D_m (mm)	Cu-DHP (K21)	CuNi10Fe1Mn (L10) CuNi30Mn1Fe (L30)	P235GH (Carbon steel)	AW-AMgSi (A22)
5-15-08	15	0.8	0.097	2.06	101	4.19	130	0.32	0.32	0.28	0.12
5-15-10	15	1.0	0.093	1.97	94	4.04	130	0.39	0.39	0.35	0.11
5-16-08	16	0.8	0.104	2.07	120	4.59	130	0.34	0.34	0.30	0.13
5-16-10	16	1.0	0.101	2.01	112	4.43	130	0.42	0.42	0.37	0.12
5-19-08	19	0.8	0.129	2.16	186	5.74	150	0.41	0.41	0.36	0.15
5-19-10	19	1.0	0.126	2.11	176	5.59	150	0.50	0.50	0.44	0.14

10 beams I_1 up to 8 m								Tube weight (kg/m)			Weight of extrusion (kg/m)
Tube No.	d_1 (mm)	s (mm)	A_i (m ² /m)	A_i / A_a (-)	F (mm ²)	d_h (mm)	D_m (mm)	Cu-DHP (K21)	CuNi10Fe1Mn (L10) CuNi30Mn1Fe (L30)	P235GH (Carbon steel)	AW-AMgSi (A22)
10-16-08	16	0.8	0.135	2.69	84	2.50	80	0.34	0.34	0.30	0.22
10-16-10	16	1.0	0.125	2.49	78	2.50	80	0.42	0.42	0.37	0.21
10-19-08	19	0.8	0.174	2.92	141	3.22	90	0.41	0.41	0.36	0.27
10-19-10	19	1.0	0.164	2.75	132	3.22	90	0.50	0.50	0.44	0.26



Other dimensions on request.

Symbols

- d_1 tube OD
- s tube wall
- l_1 tube length
- l_2, l_3 length of tube protruding over extrusion
- A_i inside surface area within finned section
- A_i / A_a surface area within finned section
- F flow area ratio (inside/outside within finned section)
- d_h hydraulic diameter within finned section
- D_m smallest possible mean bending diameter, nominal, for hairpin tubes

TOLERANCE ON TUBE LENGTH

Tube length l_1		Tolerance
above (mm)	up to (mm)	
-	2000	+2 mm
2000	8000	+1%, max. 5 mm

Tube tolerances according to EN 12451

Tube length l_1	Tolerances l_3 (mm)	
(mm)	K20, L10, L30	P235GH
up to 2000	+10	+40
2000-5000	+20	+40
about 5000	+30	+60

For further information please contact

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