

# Rittling Element

Submittal Data,  
English Language, IP Units

## Submittal data

Project
Job number
Architect
Engineer
Contractor

## Performance data: heating

Mean water temperature	°F
Design room temperature	°F
Heating capacity	BTU/hr ft

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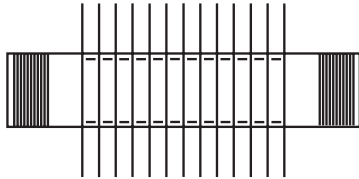
# Element Submittal Data

English, IP Units

## Models and dimensions

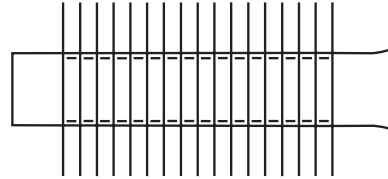
### Steel tube

- 1'-6" min. to 10'-0" max. on 6" increments

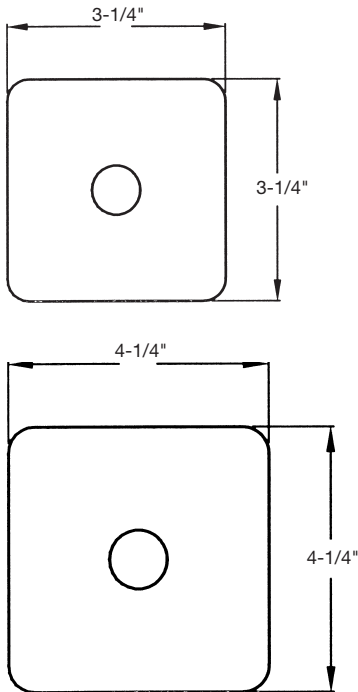


### Copper tube

- 1'-0" min. to 12'-0" max. on 6" increments

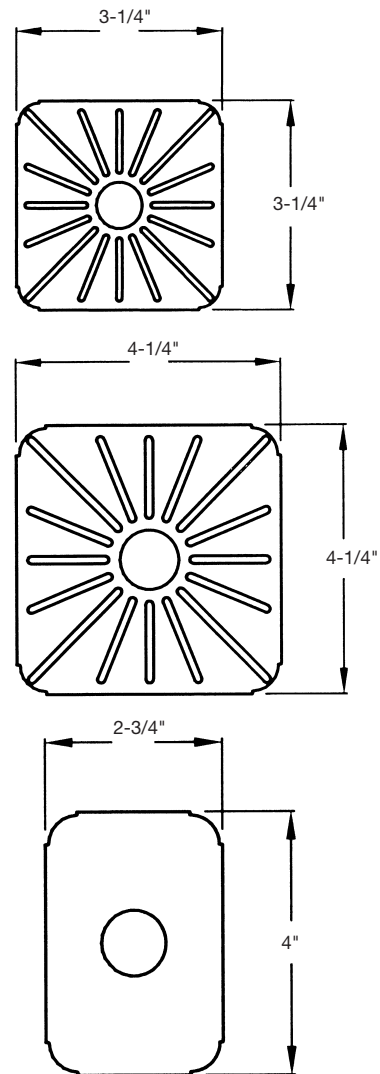


### Steel fins



### Aluminum fins

(with extruded collars) Ribbed for greater rigidity



- Unless otherwise specified, each end has American Standard pipe thread, gauged flush plus or minus one thread. Available on request is plain end, chamfered for welding.

- One end has a swaged end; the other end is plain.

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# Element Submittal Data

English, IP Units

## Models and dimensions

Finned tube Model		1/4 Tube size (D) Nominal	Actual	Tube material	Fin size (H x W) *	Fin material	Fins/ft.
Steel	1S-3 1/4 X 3 1/4-32	1"	IPS	Steel SCH 40	3-1/4" x 3-1/4"	Steel	32
	1S-3 1/4 X 3 1/4-40						40
	1S-3 1/4 X 3 1/4-48						48
	1S-4 1/4 X 4 1/4-32		IPS	Steel SCH40	4-1/4" x 4-1/4"	Steel	32
	1S-4 1/4 X 4 1/4-40						40
	1S-4 1/4 X 4 1/4-48						48
	1 1/4S-3 1/4 X 3 1/4-32	1 1/4"	IPS	Steel SCH 40	3-1/4" x 3-1/4"	Steel	32
	1 1/4S-3 1/4 X 3 1/4-40						40
	1 1/4S-3 1/4 X 3 1/4-48						48
	1 1/4S-4 1/4 X 4 1/4-32		IPS	Steel SCH 40	4-1/4" x 4-1/4"	Steel	32
	1 1/4S-4 1/4 X 4 1/4-40						40
	1 1/4S-4 1/4 X 4 1/4- 48						48
2S-4 1/4 X 4 1/4-32	2"	IPS	Steel SCH 40	4" x 2-3/4"	Steel	32	
2S-4 1/4 X 4 1/4-40						40	
2S-4 1/4 X 4 1/4-48						48	
Copper	3/4C-2 3/4 X 4-32	3/4"	7/8" OD	Copper 0.020" wall	4" x 2-3/4"	Aluminum**	32
	3/4C-2 3/4 X 4-40						40
	3/4C-2 3/4 X 4-48						48
	3/4C-3 1/4 X 3 1/4-32		7/8" OD	Copper 0.020" wall	3-1/4" x 3-1/4"	Aluminum**	32
	3/4C-3 1/4 X 3 1/4-40						40
	3/4C-3 1/4 X 3 1/4-48						48
	3/4C-4 1/4 X 4 1/4-32		7/8" OD	Copper 0.020" wall	4-1/4" x 4-1/4"	Aluminum**	32
	3/4C-4 1/4 X 4 1/4-40						40
	3/4C-4 1/4 X 4 1/4-48						48
	1C-2 3/4 X 4-32	1"	1-1/8" OD	Copper 0.025" wall	4" x 2-3/4"	Aluminum**	32
	1C-2 3/4 X 4-40						40
	1C-2 3/4 X 4-48						48
	1C-3 1/4 X 3 1/4-32		1-1/8" OD	Copper 0.025" wall	4" x 2-3/4"	Aluminum**	32
	1C-3 1/4 X 3 1/4-40				3-1/4" x 3-1/4"		40
	1C-3 1/4 X 3 1/4-48				48		
	1C-4 1/4 X 4 1/4-32		1-1/8" OD	Copper 0.025" wall	3-1/4" x 3-1/4"	Aluminum**	32
	1C-4 1/4 X 4 1/4-40				4-1/4" x 4-1/4"		40
	1C-4 1/4 X 4 1/4-48				48		
	1 1/4C-2 3/4 X 4-32	1 1/4"	1-1/8" OD	Copper 0.025" wall	4-1/4" x 4-1/4"	Aluminum**	32
	1 1/4C-2 3/4 X 4-40						40
	1 1/4C-2 3/4 X 4-48						48
	1 1/4C-3 1/4 X 3 1/4-32		13/8" OD	Copper 0.028" wall	4" x 2-3/4"	Aluminum**	32
	1 1/4C-3 1/4 X 3 1/4-40				3-1/4" x 3-1/4"		40
	1 1/4C-3 1/4 X 3 1/4-48				48		
1 1/4C-4 1/4 X 4 1/4-32	13/8" OD		Copper 0.028" wall	3-1/4" x 3-1/4"	Aluminum**	32	
1 1/4C-4 1/4 X 4 1/4-40				4-1/4" x 4-1/4"		40	
1 1/4C-4 1/4 X 4 1/4-48				48			

■ Unless otherwise specified, each end has American Standard pipe thread, gauged flush plus or minus one thread. Available on request is plain end, chamfered for welding.

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# Element Submittal Data

English, IP Units

**General data**

Performance ratings: Steel

Element	Rows of element (on 6-inch centers)	Recommended minimum installed height (in inches)*	Steam heat	Hot water heat									
			215°F factor of 1.00	220°F factor of 1.05	210°F factor of 0.95	200°F factor of 0.86	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53	150°F factor of 0.45	140°F factor of 0.40	
<b>Steel ratings</b>													
1" Dia. steel	1S-3¼ X 3¼-32	1	8-7/8	890	935	846	765	694	614	543	472	401	356
		2	14-7/8	1550	1628	1473	1333	1209	1070	946	822	698	620
		3	20-7/8	2150	2258	2043	1849	1677	1484	1312	1140	968	860
	1S-3¼ X 3¼-40	1	8-7/8	960	1008	912	826	749	662	586	509	432	384
		2	14-7/8	1650	1733	1568	1419	1287	1139	1007	875	743	660
		3	20-7/8	2280	2394	2166	1961	1778	1573	1391	1208	1026	912
	1S-3¼ X 3¼-48	1	8-7/8	1030	1082	979	886	803	711	628	546	464	412
		2	14-7/8	1740	1827	1653	1496	1357	1201	1061	922	783	696
		3	20-7/8	2400	2520	2280	2064	1872	1656	1464	1272	1080	960
1" Dia. steel	1S-4¼ X 4¼-32	1	8-7/8	1140	1197	1083	980	889	787	695	604	513	456
		2	14-7/8	2010	2111	1910	1729	1568	1387	1226	1065	905	804
		3	20-7/8	2810	2951	2670	2417	2192	1939	1714	1489	1265	1124
	1S-4¼ X 4¼-40	1	8-7/8	1250	1313	1188	1075	975	863	763	663	563	500
		2	14-7/8	2070	2174	1967	1780	1615	1428	1263	1097	932	828
		3	20-7/8	2820	2961	2679	2425	2200	1946	1720	1495	1269	1128
	1S-4¼ X 4¼-48	1	8-7/8	1360	1428	1292	1170	1061	938	830	721	612	544
		2	14-7/8	2130	2237	2024	1832	1661	1470	1299	1129	959	852
		3	20-7/8	2830	2972	2689	2434	2207	1953	1726	1500	1274	1132
1¼" Dia. steel	1¼S-3¼ X 3¼-32	1	8-7/8	870	914	827	748	679	600	531	461	392	348
		2	14-7/8	1570	1649	1492	1350	1225	1083	958	832	707	628
		3	20-7/8	2210	2321	2100	1901	1724	1525	1348	1171	995	884
	1¼S-3¼ X 3¼-40	1	8-7/8	930	977	884	780	725	642	567	493	419	372
		2	14-7/8	1600	1680	1520	1376	1248	1104	976	848	720	640
		3	20-7/8	2220	2331	2109	1909	1732	1532	1354	1177	999	888
	1¼S-3¼ X 3¼-48	1	8-7/8	980	1029	931	843	764	676	598	519	441	392
		2	14-7/8	1640	1722	1558	1410	1279	1132	1000	869	738	656
		3	20-7/8	2240	2352	2128	1926	1747	1546	1366	1187	1008	896
1¼" Dia. steel	1¼S-4¼ X 4¼-32	1	8-7/8	1130	1187	1074	972	881	780	689	599	509	452
		2	14-7/8	1990	2090	1891	1711	1552	1373	1214	1055	896	796
		3	20-7/8	2780	2919	2641	2391	2168	1918	1696	1473	1251	1112
	1¼S-4¼ X 4¼-40	1	8-7/8	1240	1302	1178	1066	967	856	756	657	558	496
		2	14-7/8	2040	2142	1938	1754	1591	1408	1244	1081	918	816
		3	20-7/8	2780	2919	2641	2391	2168	1918	1696	1473	1251	1112
	1¼S-4¼ X 4¼-48	1	8-7/8	1350	1418	1283	1161	1053	932	824	716	608	540
		2	14-7/8	2100	2205	1995	1806	1638	1449	1281	1113	945	840
		3	20-7/8	2780	2919	2641	2391	2168	1918	1696	1473	1251	1112

\* Measured from floor to top of upper fins.

Ratings shown are based on:

- Installation height shown. Lower heights are not recommended.
- Entering air temperature of 65 °F.
- Steam at nominal 1 (actual 0.9) psig and 215 °F.

- Average Water Temperature (degrees F) shown with a water velocity of 3 feet per second or more.
- For other conditions, refer to EZSelect selection software.



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# Element Submittal Data

English, IP Units

General data

Performance ratings: Steel

Element	Rows of element (on 6-inch centers)	Recommended minimum installed height (in inches)*	Steam heat	Hot water heat									
			215°F factor of 1.00	220°F factor of 1.05	210°F factor of 0.95	200°F factor of 0.86	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53	150°F factor of 0.45	140°F factor of 0.40	
<b>Steel ratings</b>													
2" Dia. steel	2S-4¼ X 4¼-32	1	8-7/8	1090	1145	1036	937	850	752	665	578	491	436
		2	14-7/8	1930	2027	1834	1660	1505	1332	1177	1023	869	772
		3	20-7/8	2700	2835	2565	2322	2106	1863	1647	1431	1215	1080
	2S-4¼ X 4¼-40	1	8-7/8	1200	1260	1140	1032	936	828	732	636	540	480
		2	14-7/8	1960	2058	1862	1686	1529	1352	1196	1039	882	784
		3	20-7/8	2650	2783	2518	2279	2067	1829	1617	1405	1193	1060
	2S-4¼ X 4¼-48	1	8-7/8	1310	1376	1245	1127	1022	904	799	694	590	524
		2	14-7/8	1990	2090	1891	1711	1552	1373	1214	1055	896	796
		3	20-7/8	2610	2741	2480	2245	2036	1801	1592	1383	1175	1044

\* Measured from floor to top of upper fins.

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# Element Submittal Data

English, IP Units

General data

Performance ratings: Copper

Element	Rows of element (on 6-inch centers)	Recommended minimum installed height (in inches)*	Steam heat	Hot water heat									
			215°F factor of 1.00	220°F factor of 1.05	210°F factor of 0.95	200°F factor of 0.86	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53	150°F factor of 0.45	140°F factor of 0.40	
<b>Copper ratings</b>													
3/4" Dia. copper	¾C-2¾ X 4-32	1	8-7/8	1010	1061	960	869	788	697	616	535	455	404
		2	14-7/8	1850	1943	1758	1591	1443	1277	1129	981	833	740
		3	20-7/8	2620	2751	2489	2253	2044	1808	1598	1389	1179	1048
	¾C-2¾ X 4-40	1	8-7/8	1160	1218	1102	998	905	800	708	615	522	464
		2	14-7/8	2030	2132	1929	1746	1583	1401	1238	1076	914	812
		3	20-7/8	2840	2982	2698	2242	2215	1960	1732	1505	1278	1136
	¾C-2¾ X 4-48	1	8-7/8	1310	1376	1245	1127	1022	904	799	694	590	524
		2	14-7/8	2220	2331	2109	1909	1732	1532	1354	1177	999	888
		3	20-7/8	3050	3203	2898	2623	2379	2105	1861	1617	1373	1220
3/4" Dia. copper	¾C-3¼ X 3¼-32	1	8-7/8	940	987	893	808	733	649	573	498	423	376
		2	14-7/8	1700	1785	1615	1462	1392	1173	1037	901	765	680
		3	20-7/8	2400	2520	2280	2064	1872	1656	1464	1272	1080	960
	¾C-3¼ X 3¼-40	1	8-7/8	1060	1113	1007	912	827	731	647	562	477	424
		2	14-7/8	1830	1922	1739	1574	1427	1263	1116	970	824	732
		3	20-7/8	2540	2667	2413	2184	1981	1753	1549	1346	1143	1016
	¾C-3¼ X 3¼-48	1	8-7/8	1190	1250	1131	1023	928	821	726	631	536	476
		2	14-7/8	1960	2058	1862	1686	1529	1352	1196	1039	882	784
		3	20-7/8	2670	2804	2537	2296	2083	1842	1629	1415	1202	1068
3/4" Dia. copper	¾C-4¼ X 4¼-32	1	8-7/8	1260	1323	1197	1084	983	869	769	668	567	504
		2	14-7/8	2160	2268	2052	1858	1685	1490	1318	1145	972	864
		3	20-7/8	2990	3140	2841	2571	2332	2063	1824	1585	1346	1196
	¾C-4¼ X 4¼-40	1	8-7/8	1420	1491	1349	1221	1108	980	866	753	639	568
		2	14-7/8	2290	2405	2176	1969	1786	1580	1397	1214	1031	916
		3	20-7/8	3080	3234	2926	2649	2402	2125	1879	1632	1386	1232
	¾C-4¼ X 4¼-48	1	8-7/8	1590	1670	1511	1367	1240	1097	970	843	716	636
		2	14-7/8	2420	2541	2299	2081	1888	1670	1476	1283	1089	968
		3	20-7/8	3160	3318	3002	2718	2465	2180	1928	1675	1422	1264

\* Measured from floor to top of upper fins.

Ratings shown are based on:

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English, IP Units

General data

Performance ratings: Copper

Element	Rows of element (on 6-inch centers)	Recommended minimum installed height (in inches)*	Steam heat	Hot water heat									
			215°F factor of 1.00	220°F factor of 1.05	210°F factor of 0.95	200°F factor of 0.86	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53	150°F factor of 0.45	140°F factor of 0.40	
<b>Copper ratings</b>													
1" Dia. copper	1C-2¼ X 4-32	1	8-7/8	1010	1061	960	869	788	697	616	535	455	404
		2	14-7/8	1850	1943	1758	1591	1443	1277	1129	981	833	740
		3	20-7/8	2610	2741	2480	2245	2036	1801	1592	1383	1175	1044
	1C-2¼ X 4-40	1	8-7/8	1190	1250	1131	1023	928	821	726	631	536	476
		2	14-7/8	2020	2121	1919	1737	1576	1394	1232	1071	909	808
		3	20-7/8	2820	2961	2679	2425	2200	1946	1720	1495	1269	1128
	1C-2¼ X 4-48	1	8-7/8	1300	1365	1235	1118	1014	897	793	689	585	520
		2	14-7/8	2200	2310	2090	1892	1716	1518	1342	1166	990	880
		3	20-7/8	3020	3171	2869	2597	2356	2084	1842	1601	1359	1208
1" Dia. copper	1C-3¼ X 3¼-32	1	8-7/8	930	977	884	800	725	642	567	493	419	372
		2	14-7/8	1690	1775	1606	1453	1318	1166	1031	896	761	676
		3	20-7/8	2350	2468	2233	2021	1833	1622	1434	1246	1058	940
	1C-3¼ X 3¼-40	1	8-7/8	1050	1103	998	903	819	725	641	557	473	420
		2	14-7/8	1830	1922	1739	1574	1427	1263	1116	970	824	732
		3	20-7/8	2480	2604	2356	2133	1934	1711	1513	1314	1116	992
	1C-3¼ X 3¼-48	1	8-7/8	1210	1271	1150	1041	944	835	738	641	545	484
		2	14-7/8	1940	2037	1843	1668	1513	1339	1183	1028	873	776
		3	20-7/8	2600	2730	2470	2236	2028	1794	1586	1378	1170	1040
1" Dia. copper	1C-4¼ X 4¼-32	1	8-7/8	1300	1365	1235	1118	1014	897	793	689	585	520
		2	14-7/8	2300	2415	2185	1978	1794	1587	1403	1219	1035	920
		3	20-7/8	3130	3287	2974	2692	2441	2160	1909	1659	1409	1252
	1C-4¼ X 4¼-40	1	8-7/8	1460	1533	1387	1256	1139	1007	891	774	657	584
		2	14-7/8	2440	2562	2318	2098	1903	1684	1488	1293	1098	976
		3	20-7/8	3250	3413	3088	2795	2535	2243	1983	1723	1463	1300
	1C-4¼ X 4¼-48	1	8-7/8	1620	1701	1539	1393	1264	1118	988	859	729	648
		2	14-7/8	2550	2678	2423	2193	1989	1760	1556	1352	1148	1020
		3	20-7/8	3330	3497	3164	2864	2597	2298	2031	1765	1499	1332

\* Measured from floor to top of upper fins.

Ratings shown are based on:

- Installation height shown. Lower heights are not recommended.
- Entering air temperature of 65 °F.
- Steam at nominal 1 (actual 0.9) psig and 215 °F.
- Average Water Temperature (degrees F) shown with a water velocity of 3 feet per second or more.
- For other conditions, refer to EZSelect selection software.



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# Element Submittal Data

English, IP Units

General data

Performance ratings: Copper

Element	Rows of element (on 6-inch centers)	Recommended minimum installed height (in inches)*	Steam heat	Hot water heat									
			215°F factor of 1.00	220°F factor of 1.05	210°F factor of 0.95	200°F factor of 0.86	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53	150°F factor of 0.45	140°F factor of 0.40	
<b>Copper ratings</b>													
1 1/4" Dia. copper	1 1/4C-2 3/4 X 4-32	1	8-7/8	1010	1061	960	869	788	697	616	535	455	404
		2	14-7/8	1850	1932	1748	1582	1435	1270	1122	975	828	736
		3	20-7/8	2610	2741	2480	2245	2036	1801	1592	1383	1175	1044
	1 1/4C-2 3/4 X 4-40	1	8-7/8	1150	1208	1093	989	897	794	702	610	518	460
		2	14-7/8	2010	2111	1910	1729	1568	1387	1226	1065	905	804
		3	20-7/8	2800	2940	2660	2408	2184	1932	1708	1484	1260	1120
	1 1/4C-2 3/4 X 4-48	1	8-7/8	1290	1355	1226	1109	1006	890	787	684	581	516
		2	14-7/8	2170	2279	2062	1866	1693	1497	1324	1150	977	868
		3	20-7/8	2980	3129	2831	2563	2324	2056	1818	1579	1341	1192
1 1/4" Dia. copper	1 1/4C-3 1/4 X 3 1/4-32	1	8-7/8	920	966	874	791	718	635	561	488	414	368
		2	14-7/8	1680	1764	1596	1445	1310	1159	1025	890	756	672
		3	20-7/8	2300	2415	2185	1978	1794	1587	1403	1219	1035	920
	1 1/4C-3 1/4 X 3 1/4-40	1	8-7/8	1030	1082	979	886	803	711	628	546	464	412
		2	14-7/8	1820	1911	1729	1565	1420	1256	1110	965	819	728
		3	20-7/8	2430	2552	2309	2090	1895	1677	1482	1288	1094	972
	1 1/4C-3 1/4 X 3 1/4-48	1	8-7/8	1130	1187	1074	972	881	780	689	599	509	452
		2	14-7/8	1920	2016	1824	1651	1498	1325	1171	1018	864	768
		3	20-7/8	2520	2646	2394	2167	1966	1739	1537	1336	1134	1008
1 1/4" Dia. copper	1 1/4C-4 1/4 X 4 1/4-32	1	8-7/8	1350	1418	1283	1161	1053	932	824	716	608	540
		2	14-7/8	2440	2562	2318	2098	1903	1684	1488	1293	1098	976
		3	20-7/8	3270	3434	3107	2812	2551	2256	1995	1733	1472	1308
	1 1/4C-4 1/4 X 4 1/4-40	1	8-7/8	1500	1575	1425	1290	1170	1035	915	795	675	600
		2	14-7/8	2600	2730	2470	2236	2028	1794	1586	1378	1170	1040
		3	20-7/8	3430	3602	3259	2950	2675	2367	2092	1818	1544	1372
	1 1/4C-4 1/4 X 4 1/4-48	1	8-7/8	1650	1733	1568	1419	1287	1139	1007	875	743	660
		2	14-7/8	2680	2814	2546	2305	2090	1849	1635	1420	1206	1072
		3	20-7/8	3510	3686	3335	3019	2738	2422	2141	1860	1580	1404

\* Measured from floor to top of upper fins.

Ratings shown are based on:

- Installation height shown. Lower heights are not recommended.
- Entering air temperature of 65 °F.
- Steam at nominal 1 (actual 0.9) psig and 215 °F.
- Average Water Temperature (degrees F) shown with a water velocity of 3 feet per second or more.
- For other conditions, refer to EZSelect selection software.



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## Mechanical specifications

### General

Furnish and install finned tube heating elements and enclosures as indicated on plans, with required mounting components and accessories. Material shall be manufactured in accordance with Zehnder Rittling's High Quality Standards and in conformance to ISO 9001:2008 standards established and maintained by Zehnder Rittling of Buffalo, New York.

### Steel heating elements

Steel heating elements shall consist of 0.027" thick galvanized fins permanently bonded to high pressure A106 seamless schedule 40B steel tubing by mechanically expanding the steel tubing to the steel fins. Steel tube wall thickness; 1" dia. - 0.0133", 1-1/4" dia. - 0.140", 2" dia - 0.154", prior to tube expansion.

### Guaranteed working pressures:

1" IPS - 780 psig at temperature up to 650°F. 1-1/4" IPS - 660 psig at temperatures up to 650°F. 2" IPS - 405 psig at temperatures up to 650°F.

### Copper-aluminum heating elements

Copper-Aluminum heating elements shall consist of 0.016" thick, 1100 grade aluminum fins permanently bonded to lightly annealed copper alloy 122 seamless drawn tubing by mechanically expanding the copper tubing to the aluminum fins. Copper tube wall thickness; 3/4" dia - 0.020", 1" dia. - 0.025", 1-1/4" dia. - 0.028", prior to tube expansion. Copper tube meets the following ASTM standard designations: ASTM B42, ASTM B68, ASTM B75, ASTM B88, ASTM B111, ASTM B152, ASTM B280.

### Guaranteed working pressures:

1-1/4" CU - 194 psig at temperatures up to 300°F.  
1" CU - 204 psig at temperature up to 300°F. 3/4" CU - 218 psig at temperatures up to 300°F.

### Hanger brackets

All hanger brackets shall be die formed for rigidity.

All hangers must provide for lengthwise movement of elements during expansion and contraction as well as aligning elements to prevent contact with brackets, walls or enclosure.

## Warranty

Zehnder Rittling guarantees its products to be free from defects in material and workmanship for a period of one year from date of shipment from our Buffalo, New York factory.

Should there be any defects in the good(s), the purchaser should promptly notify Zehnder Rittling and upon receipt of written consent from Zehnder Rittling, the purchaser shall return the defective good(s) to the factory for inspection with freight prepaid. If inspection shows the goods to be defective, Zehnder Rittling will at its discretion repair or replace the said item(s).

Defects arising from damage due to shipment, improper installation, negligence or misuse by others are not covered by this warranty.

This warranty is extended only to the original purchaser from Zehnder Rittling.

