



## STEEL FINNED TUBES 钢翅片管

### S/T TRUFIN® AND TURBO-CHIL® in Ferrous Alloys

Wieland has developed an array of finned tubes in a variety of welded and/or seamless ferrous alloys with surface enhancements on the outside only or outside and inside surfaces. If other alloys are required, please contact the Wieland Marketing Department.

### EXTERNAL STANDARDS

S/T Trufin and Turbo-Chil that is supplied in ferrous alloys are produced from plain surface tube material purchased to one of the following ASTM and/or ASME standards: ASTM A179, A213, A214, A249, A334, A439, ASME SA 179, SA213, SA214, SA249, A334, A439, ASME SA 179, SA 213, SA214, SA 249 and SA334. The ASTM and ASME standards are identical except for A213/SA213 and A249/SA249. The elimination of nonstraightened tubes in the ASME standard is the only difference between the standards. S/T Trufin and Turbo-Chil that meets the requirements of Paragraph UG-8(b), ASME Boiler and Pressure Vessel Code, Section VIII, is made to an average wall in the finned area. When a minimum wall is required, the next heavier wall size should be used. Steel S/T Trufin is also governed by ASTM A498.

### PLAIN SECTION REQUIREMENTS

Plain end lengths 1" (25.4mm) and over are supplied as standard. If plain ends less than 1" (25.4 mm) are required, contact the Wieland Marketing Department.

Land Lengths 1" (25.4mm) and over are supplied as standard. If land lengths down to 5/8" (15.9mm) minimum are required, contact the Wieland Marketing Department.

Distances of 18" (457.2 mm) and over between lands are supplied as standard.

### TEMPER

All Steel S/T Trufin and Turbo-Chil are supplied in the "as finned" condition. Plain ends and lands are supplied in the condition as described by the governing plain tube ASTM or ASME standard.

### LENGTH

The standard maximum straight tube length is 82' (25 m). For shipment of longer lengths, contact the Wieland Marketing Department.

### S/T TRUFIN® 和TURBO-CHIL® 钢翅片管

Wieland 研发了一系列采用焊接或者无缝钢管生产的外翅片管和内外强化的高效换热翅片管。

如果需要其他材料制造的高效换热翅片管,请与我司销售部联系。

### 执行标准

S/T Trufin 和 Turbo-Chil按照ASME和ASTM标准生产,也包括中国国标GB,这些标准包括: ASTM A179, A213, A214, A249, A334, A439, ASME SA179, SA213, SA214, SA249 和 SA334. 除了A213/SA213和A249/SA249以外, ASTM标准系列和ASME 标准系列的内容要求是一样的。在ASME标准中,删除了对非直管的要求。S/T Trufin® 和 Turbo-Chil® 翅片部分底部平均壁厚必须符合钢管标准UG-8(b), ASME 锅炉和压力容器标准, VIII部分的要求。翅片部分最小底壁厚也必须符合该要求。钢外翅片管S/T Trufin须符合ASTM A498的标准要求。

### 光端和中间光段部分尺寸要求

标准产品的光端部分长度通常要求不小于25.4mm, 如果光端长度小于 25.4 mm, 请联系销售部。

标准产品的中间光段的长度通常要求不小于25.4mm. 如果需要中间光段长度小于 25.4 mm,请联系销售部。

标准产品的中间光段之间的翅片段部分长度不宜小于18"(457.2 mm)

### 交货状态

按照标准要求,所有的钢翅片管S/T Trufin 和 Turbo-Chil的翅片部分的交货状态为“成翅状态”。所有光端和中间光段的状态按照ASTM和ASME标准规定的原料光管的状态。

### 长度要求

直管产品最大长度为82'(25米)。如果需要更长的翅片管,请联系我司销售部。

# STEEL FINNED TUBES 钢翅片管

## RANGE OF AVAILABLE DIMENSIONS 标准产品尺寸表

### S/T Trufin® ENHANCED SURFACE TUBES S/T Trufin® 外翅片管

Catalog Number 产品代码	Plain Ends 光端尺寸		Finned Section 翅片部分尺寸			Area 换热面积			Weight Per Unit Length 重量 lbs/ft (kg/m)
	Outside Diameter 外径 inch (mm)	Wall Thickness 壁厚 inch (mm)	Min Wall Under Fins 翅底最小壁厚 inch (mm)	Finned Section Nom. Root Diam. 翅根直径 inch (mm)	Nominal Inside Diameter 名义内径 inch (mm)	Actual Outside Surface 翅外表面积 ft²/ft (m²/m)	Ratio Actual Outside/Nominal Inside 翅外表面积/ 光内表面积		
<b>11 Fins per inch – Alloy Group III 11 翅/英寸 材料组 III</b>									
67-115109	3/4 (19.05)	0.125 (3.18)	0.097 (2.46)	0.625 (15.88)	0.407 (10.34)	0.386 (0.118)	3.64	0.828 (1.232)	
67-117083	1 (25.40)	0.100 (2.54)	0.074 (1.88)	0.875 (22.23)	0.709 (18.00)	0.526 (0.160)	2.84	0.930 (1.384)	
67-117091	1 (25.40)	0.109 (2.77)	0.081 (2.06)	0.875 (22.23)	0.693 (17.60)	0.526 (0.160)	2.91	1.039 (1.546)	
67-117102	1 (25.40)	0.115 (2.92)	0.091 (2.31)	0.875 (22.23)	0.671 (17.04)	0.526 (0.160)	3.01	1.080 (1.607)	
67-117106	1 (25.40)	0.122 (3.10)	0.095 (2.41)	0.875 (22.23)	0.663 (16.84)	0.526 (0.160)	3.04	1.142 (1.699)	
For S/T Trufin® 11 FPI, the average fin height is 0.059" (1.500 mm) and the average fin width is 0.035" (0.889 mm). 翅片高度 0.059" (1.5 mm), 翅片平均厚度 0.035" (0.889 mm).									
<b>16 Fins per inch – Alloy Group II &amp; III 16 翅/英寸 材料组 II 和材料组 II &amp; III</b>									
60-163049	1/2 (12.70)	0.065 (1.65)	0.044 (1.118)	0.375 (9.53)	0.277 (7.04)	0.261 (0.080)	3.60	0.288 (0.428)	
60-164065	5/8 (15.88)	0.085 (2.16)	0.058 (1.473)	0.500 (12.70)	0.370 (9.40)	0.340 (0.104)	3.51	0.481 (0.716)	
60-165065	3/4 (19.05)	0.085 (2.16)	0.058 (1.473)	0.625 (15.89)	0.495 (12.57)	0.418 (0.127)	3.23	0.595 (0.885)	
60-165083	3/4 (19.05)	0.095 (2.41)	0.074 (1.880)	0.625 (15.89)	0.459 (11.66)	0.418 (0.127)	3.48	0.666 (0.990)	
60-166065	7/8 (22.23)	0.085 (2.16)	0.058 (1.473)	0.750 (19.05)	0.620 (15.75)	0.496 (0.151)	3.06	0.681 (1.013)	
60-166083	7/8 (22.23)	0.095 (2.41)	0.074 (1.880)	0.750 (19.05)	0.584 (14.83)	0.496 (0.151)	3.24	0.791 (1.176)	
60-167083	1 (25.40)	0.095 (2.41)	0.074 (1.880)	0.875 (22.23)	0.709 (18.01)	0.574 (0.175)	3.09	0.912 (1.357)	
For S/T Trufin® 16 FPI, the average fin height is 0.053" (1.346 mm) and the average fin width is 0.010" (0.254 mm). 翅片高度 0.053" (1.346 mm), 翅片平均厚度 0.010" (0.254 mm).									
<b>19 Fins per inch – Alloy Group III 19 翅/英寸 材料组 III</b>									
60-193042	1/2 (12.70)	0.060 (1.52)	0.037 (0.940)	0.375 (9.53)	0.291 (7.39)	0.319 (0.097)	4.19	0.239 (0.355)	
60-193049	1/2 (12.70)	0.065 (1.65)	0.044 (1.118)	0.375 (9.53)	0.277 (7.04)	0.319 (0.097)	4.40	0.284 (0.423)	
60-193058	1/2 (12.70)	0.075 (1.91)	0.049 (1.245)	0.375 (9.53)	0.259 (6.58)	0.319 (0.097)	4.71	0.286 (0.425)	
60-194049	5/8 (15.88)	0.065 (1.65)	0.044 (1.118)	0.500 (12.70)	0.402 (10.21)	0.414 (0.126)	3.94	0.362 (0.538)	
60-194058	5/8 (15.88)	0.075 (1.91)	0.049 (1.245)	0.500 (12.70)	0.384 (9.75)	0.414 (0.126)	4.12	0.396 (0.589)	
60-194065	5/8 (15.88)	0.085 (2.16)	0.058 (1.473)	0.500 (12.70)	0.370 (9.40)	0.414 (0.126)	4.27	0.456 (0.679)	
60-194072	5/8 (15.88)	0.090 (2.29)	0.065 (1.651)	0.500 (12.70)	0.356 (9.04)	0.414 (0.126)	4.44	0.480 (0.714)	
60-195049	3/4 (19.05)	0.065 (1.65)	0.044 (1.118)	0.625 (15.88)	0.527 (13.39)	0.507 (0.155)	3.67	0.447 (0.665)	
60-195058	3/4 (19.05)	0.075 (1.91)	0.049 (1.245)	0.625 (15.88)	0.509 (12.93)	0.507 (0.155)	3.80	0.485 (0.722)	
60-195065	3/4 (19.05)	0.085 (2.16)	0.058 (1.473)	0.625 (15.88)	0.495 (12.57)	0.507 (0.155)	3.91	0.568 (0.845)	
60-195072	3/4 (19.05)	0.090 (2.29)	0.065 (1.651)	0.625 (15.88)	0.481 (12.22)	0.507 (0.155)	4.03	0.592 (0.881)	
60-195083	3/4 (19.05)	0.095 (2.41)	0.074 (1.880)	0.625 (15.88)	0.459 (11.66)	0.507 (0.155)	4.22	0.618 (0.920)	
60-196058	7/8 (22.23)	0.075 (1.91)	0.049 (1.245)	0.750 (19.05)	0.634 (16.10)	0.588 (0.179)	3.54	0.595 (0.885)	
60-196065	7/8 (22.23)	0.085 (2.16)	0.058 (1.473)	0.750 (19.05)	0.620 (15.75)	0.588 (0.179)	3.62	0.675 (1.004)	
60-196072	7/8 (22.23)	0.090 (2.29)	0.065 (1.651)	0.750 (19.05)	0.606 (15.39)	0.588 (0.179)	3.71	0.689 (1.024)	
60-196083	7/8 (22.23)	0.095 (2.41)	0.074 (1.880)	0.750 (19.05)	0.584 (14.83)	0.588 (0.179)	3.85	0.762 (1.134)	
60-196095	7/8 (22.23)	0.110 (2.79)	0.084 (2.134)	0.750 (19.05)	0.560 (14.22)	0.588 (0.179)	4.01	0.835 (1.243)	
60-197058	1 (25.40)	0.075 (1.91)	0.049 (1.245)	0.875 (22.23)	0.759 (19.28)	0.695 (0.212)	3.50	0.697 (1.037)	
60-197065	1 (25.40)	0.085 (2.16)	0.058 (1.473)	0.875 (22.23)	0.745 (18.92)	0.695 (0.212)	3.56	0.757 (1.126)	
60-197072	1 (25.40)	0.090 (2.29)	0.065 (1.651)	0.875 (22.23)	0.731 (18.57)	0.695 (0.212)	3.63	0.813 (1.210)	
60-197083	1 (25.40)	0.095 (2.41)	0.074 (1.880)	0.875 (22.23)	0.709 (18.01)	0.695 (0.212)	3.74	0.873 (1.299)	
60-197095	1 (25.40)	0.110 (2.79)	0.084 (2.134)	0.875 (22.23)	0.685 (17.40)	0.695 (0.212)	3.88	0.988 (1.471)	
60-197109	1 (25.40)	0.125 (3.18)	0.097 (2.464)	0.875 (22.23)	0.657 (16.69)	0.695 (0.212)	4.04	1.135 (1.688)	
For S/T Trufin® 19 FPI, the average fin height is 0.053" (1.346 mm) and the average fin width is 0.011" (0.279 mm). 翅片高度 0.053" (1.346 mm) 翅片平均厚度 0.011" (0.279 mm).									

# STEEL FINNED TUBES 钢翅片管

## RANGE OF AVAILABLE DIMENSIONS 标准产品尺寸表

### S/T Trufin® ENHANCED SURFACE TUBES S/T Trufin® 外翅片管

Catalog Number 产品代码	Plain Ends 光端尺寸		Finned Section 翅片部分尺寸			Area 换热面积			Weight Per Unit Length 重量 lbs/ft (kg/m)
	Outside Diameter 外径 inch (mm)	Wall Thickness 壁厚 inch (mm)	Min Wall Under Fins 翅底最小壁厚 inch (mm)	Finned Section Nom. Root Diam. 翅根直径 inch (mm)	Nominal Inside Diameter 名义内径 inch (mm)	Actual Outside Surface 翅外表面积 ft²/ft (m²/m)	Ratio Actual Outside/ Nominal Inside 翅外表面积/ 光内表面积		
<b>26 Fins per inch – Alloy Group II &amp; III 26 翅/英寸 材料组II和材料组 III</b>									
65-264049	5/8 (15.88)	0.069 (1.75)	0.044 (1.118)	0.521 (13.23)	0.423 (10.74)	0.497 (0.152)	4.49	0.385 (0.573)	
65-264058	5/8 (15.88)	0.078 (1.98)	0.049 (1.245)	0.521 (13.23)	0.405 (10.28)	0.497 (0.152)	4.70	0.429 (0.639)	
65-264065	5/8 (15.88)	0.085 (2.16)	0.058 (1.470)	0.521 (13.23)	0.391 (9.930)	0.497 (0.152)	4.87	0.460 (0.693)	
65-265035	3/4 (19.05)	0.055 (1.40)	0.031 (0.787)	0.640 (16.26)	0.570 (14.48)	0.651 (0.198)	4.30	0.367 (0.546)	
65-265042	3/4 (19.05)	0.065 (1.65)	0.037 (0.940)	0.640 (16.26)	0.556 (14.12)	0.651 (0.198)	4.46	0.409 (0.607)	
65-265049	3/4 (19.05)	0.075 (1.91)	0.044 (1.118)	0.640 (16.26)	0.542 (13.77)	0.651 (0.198)	4.58	0.450 (0.670)	
65-265065	3/4 (19.05)	0.085 (2.16)	0.058 (1.473)	0.640 (16.26)	0.510 (12.95)	0.651 (0.198)	4.86	0.592 (0.881)	
65-265083	3/4 (19.05)	0.095 (2.41)	0.074 (1.880)	0.640 (16.26)	0.474 (12.04)	0.651 (0.198)	5.23	0.629 (0.937)	
65-267035	1 (25.40)	0.055 (1.40)	0.031 (0.787)	0.890 (22.61)	0.820 (20.83)	0.885 (0.270)	4.12	0.632 (0.940)	
65-267042	1 (25.40)	0.065 (1.65)	0.037 (0.940)	0.890 (22.61)	0.806 (20.47)	0.885 (0.270)	4.19	0.714 (1.062)	
65-267072	1 (25.40)	0.092 (2.32)	0.065 (1.650)	0.890 (22.61)	0.746 (18.95)	0.885 (0.270)	4.54	0.850 (1.265)	
For S/T Trufin® 26 FPI, the average fin height is 0.052" (1.320 mm) and the average fin width is 0.014" (0.357 mm). 翅片高度 0.052" (1.320 mm), 翅片平均厚度 0.014" (0.357 mm).									
<b>28 Fins per inch – Alloy Group I 28 翅/英寸 材料组 I</b>									
65-285028	3/4 (19.05)	0.050 (1.27)	0.025 (0.635)	0.672 (17.07)	0.616 (15.65)	0.514 (0.157)	3.19	0.363 (0.540)	
65-285035	3/4 (19.05)	0.055 (1.40)	0.031 (0.787)	0.672 (17.07)	0.602 (15.29)	0.514 (0.157)	3.26	0.396 (0.590)	
65-285042	3/4 (19.05)	0.065 (1.65)	0.037 (0.940)	0.672 (17.07)	0.588 (14.94)	0.514 (0.157)	3.34	0.460 (0.684)	
65-285049	3/4 (19.05)	0.070 (1.78)	0.044 (1.118)	0.672 (17.07)	0.574 (14.58)	0.514 (0.157)	3.42	0.493 (0.734)	
65-285065	3/4 (19.05)	0.085 (2.16)	0.058 (1.473)	0.672 (17.07)	0.542 (13.77)	0.514 (0.157)	3.62	0.591 (0.879)	
65-285083	3/4 (19.05)	0.095 (2.41)	0.074 (1.880)	0.672 (17.07)	0.506 (12.85)	0.514 (0.157)	3.88	0.666 (0.991)	
65-286028	7/8 (22.23)	0.050 (1.27)	0.025 (0.635)	0.797 (20.24)	0.741 (18.82)	0.605 (0.184)	3.12	0.421 (0.627)	
65-286035	7/8 (22.23)	0.055 (1.40)	0.031 (0.787)	0.797 (20.24)	0.727 (18.47)	0.605 (0.184)	3.18	0.497 (0.741)	
65-286042	7/8 (22.23)	0.065 (1.65)	0.037 (0.940)	0.797 (20.24)	0.713 (18.11)	0.605 (0.184)	3.24	0.537 (0.799)	
65-286049	7/8 (22.23)	0.070 (1.78)	0.044 (1.118)	0.797 (20.24)	0.699 (17.75)	0.605 (0.184)	3.31	0.575 (0.857)	
65-286065	7/8 (22.23)	0.085 (2.16)	0.058 (1.473)	0.797 (20.24)	0.667 (16.94)	0.605 (0.184)	3.47	0.685 (1.020)	
65-286083	7/8 (22.23)	0.095 (2.41)	0.074 (1.880)	0.797 (20.24)	0.631 (16.03)	0.605 (0.184)	3.66	0.767 (1.141)	
65-287028	1 (25.40)	0.050 (1.27)	0.025 (0.635)	0.922 (23.42)	0.866 (22.00)	0.696 (0.212)	3.07	0.481 (0.717)	
65-287035	1 (25.40)	0.058 (1.47)	0.028 (0.711)	0.922 (23.42)	0.852 (21.64)	0.696 (0.212)	3.13	0.573 (0.852)	
65-287042	1 (25.40)	0.065 (1.65)	0.037 (0.940)	0.922 (23.42)	0.838 (21.28)	0.696 (0.212)	3.18	0.623 (0.928)	
65-287049	1 (25.40)	0.070 (1.78)	0.044 (1.118)	0.922 (23.42)	0.824 (20.93)	0.696 (0.212)	3.24	0.653 (0.972)	
65-287065	1 (25.40)	0.083 (2.11)	0.058 (1.473)	0.922 (23.42)	0.792 (20.12)	0.696 (0.212)	3.37	0.793 (1.182)	
65-287083	1 (25.40)	0.095 (2.41)	0.074 (1.880)	0.922 (23.42)	0.756 (19.20)	0.696 (0.212)	3.53	0.889 (1.337)	
For S/T Trufin® 28 FPI, the average fin height is 0.037" (0.940 mm) and the average fin width is 0.011" (0.279 mm). 翅片高度 0.037" (0.94 mm), 翅片平均厚度 0.011" (0.279 mm).									

# STEEL FINNED TUBES 钢翅片管

## RANGE OF AVAILABLE DIMENSIONS 标准产品尺寸表

### S/T TURBO-CHIL® DOUBLE ENHANCED SURFACE TUBES – S/T TURBO-CHIL® 双面强化翅片管

Catalog Number 产品代码	Plain Ends 光端尺寸		Finned Section 翅片部分尺寸			Area 换热面积		Weight Per Unit Length 重量 lbs/ft (kg/m)
	Outside Diameter 外径 inch (mm)	Wall Thickness 壁厚 inch (mm)	Min Wall Under Fins 翅底最小壁厚 inch (mm)	Finned Section Nom. Root Diam. 翅根直径 inch (mm)	Nominal Inside Diameter 名义内径 inch (mm)	Actual Outside Surface 翅外表面积 ft <sup>2</sup> /ft (m <sup>2</sup> /m)	Ration Actual Outside/Nominal Inside 翅外表面积/ 光内表面积	
<b>19 Fins per inch – Alloy Group III 19翅/英寸 材料组 III</b>								
56-1952542	3/4 (19.05)	0.072 (1.83)	0.037 (0.940)	0.678 (17.22)	0.594 (15.09)	0.359 (0.109)	2.30	0.506 (0.754)
For S/T Turbo-Chil® 19 FPI, the average fin height is 0.032" (0.813 mm) and the average fin width is 0.015" (0.381 mm). 翅片高度 0.032" (0.813 mm), 翅片平均壁厚 0.015" (0.381 mm).								
<b>28 Fins per inch – Alloy Group I 28翅/英寸 材料组 I</b>								
56-2850628	3/4 (19.05)	0.053 (1.35)	0.025 (0.635)	0.668 (16.97)	0.612 (15.54)	0.496 (0.151)	3.10	0.379 (0.564)
56-2850635	3/4 (19.05)	0.059 (1.50)	0.031 (0.787)	0.668 (16.97)	0.598 (15.19)	0.496 (0.151)	3.16	0.420 (0.626)
For S/T Turbo-Chil® 28 FPI, the average fin height is 0.037" (0.940 mm) and the average fin width is 0.011" (0.279 mm). 翅片高度 0.037" (0.94 mm) 翅片平均厚度 0.011" (0.279 mm)								

## ENGINEERING DATA 工程数据

	Wall in Finned Portion 翅底壁厚 inch (mm)	Number of (Starts) Internal Ridges 管内里脊数 (头数)	Sieder and Tate <sup>2</sup> Constant 西德塔特数 <sup>2</sup> STC <sub>i</sub>	Constans used in Calculating Darcy Friction Factor <sup>1</sup> 达西摩阻常数 <sup>1</sup>	
				C	D
19 Fin Turbo-Chil	0.042 (1.067)	10	0.043	0.750	0.293
28 Fin Turbo-Chil	0.028 (0.711)	10	0.053	0.806	0.264
28 Fin Turbo-Chil	0.035 (0.889)	10	0.051	1.028	0.293

1. Constants applicable to Reynolds numbers greater than 20,000.  $[f_{Darcy} = C(Re)^{-D}]$  常数应用与雷诺数大于20000的工况.  $[f_{Darcy} = C(Re)^{-D}]$

2. To calculate inside heat transfer coefficient:  $hi = (k/D_{i, nom})(STC_i)Re^{0.8}Pr^{0.4}[\mu/\mu_{wall}]^{0.14}$  计算管内传热系数:  $hi = (k/D_{i, nom})(STC_i)Re^{0.8}Pr^{0.4}[\mu/\mu_{wall}]^{0.14}$

## 材料组

UNS Nomenclature 标准代号	Common Industry Name 金属代号	*ASTM Spec Number Welded (Seamless) *ASTM 标准号 焊接管 (无缝管)	Tensile Strength Minimum 最小抗拉强度 ksi (MPa)	Yield Strength Minimum 最小屈服强度 ksi (MPa)	Hardness Maximum Rockwell B 最大洛氏硬度 Rockwell B
<b>Alloy Group I – Austenitic Stainless Steel 材料组 I 奥氏体不锈钢</b>					
S31600	316 Welded (Seamless)	A249 (A213)	75 (517)	30 (207)	90
S31603	316L Welded (Seamless)	A249 (A213)	70 (485)	25 (170)	90
S30400	304 Welded (Seamless)	A249 (A213)	75 (517)	30 (207)	90
S30403	304L Welded (Seamless)	A249 (A213)	70 (485)	25 (170)	90
<b>Alloy Group II – Ferritic Stainless Steel 材料组 II 铁素体不锈钢</b>					
S43035	TP 439 Welded (Seamless)	A268	60 (415)	30 (205)	90
<b>Alloy Group III – Plain Carbon Steel 材料组 III 普通碳钢</b>					
K01200	Seamless Low Carbon	A179	60 (414)	30 (207)	72
K01807	Welded Low Carbon	A214	–	–	72
K03008	Seamless Grade 1	A334	55 (379)	30 (207)	85
K31918	Seamless Grade 3	A334	65 (448)	35 (241)	90
K03006	Seamless Grade 6	A334	60 (415)	35 (240)	90

\*For equivalent ASME specification, mechanical property data is identical. 对于等同的ASME标准, 机械性能完全一致。

For further information please contact our sales department. 需要更多信息, 请联系销售部

维联传热技术(上海)有限公司

Wieland Thermal Solutions (Shanghai) Co., Ltd

Trevor Zhang

Tel: 86-21-57464000

Fax: 86-21-57464111

E-mail: trevorz@wlv.com.cn

WWW.WIELAND-THERMALSOLUTIONS.CN

本公司保留对此样本资料的解释权, 如有更改, 恕不另行通知。