

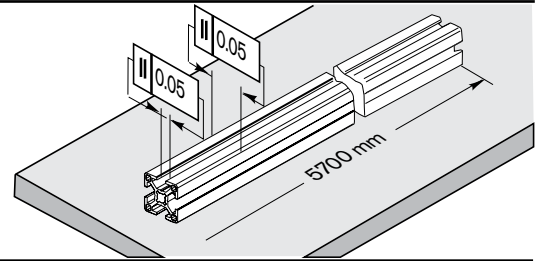
Section 16: Engineering Data and Specifications

Technical Data for Profiles

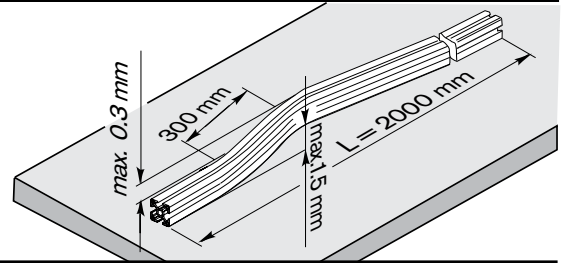
	Metric	U.S. Equivalent
Material designation according to DIN (ISO) for Bosch profiles	AlMgSi 0.5 F25	AW-6063-T66
Material number according to DIN (ISO)	3.3206.7	AW-6063-T66
Tensile strength (expected)	$R_m = 250 \text{ N/mm}^2$	(36,000 lb./in.²)
0.2% proof stress (expected)	$R_{p0.2} = 200 \text{ N/mm}^2$	(29,000 lb./in.²)
Elongation at rupture A_5 or A_{10}	$A_5 = 10\%$ $A_{10} = 8\%$	
Modulus of elasticity E	$E = 70,000 \text{ N/mm}^2$	($10 \times 10^6 \text{ lb./in.}^2$)
Brinell hardness	75 HB	
Coefficient of linear expansion	$\alpha_{(-50^\circ \dots +20^\circ \text{C})} = 21.8 \times 10^{-6} \text{ 1/K}$ $\alpha_{(+20^\circ \dots +100^\circ \text{C})} = 23.4 \times 10^{-6} \text{ 1/K}$	$\alpha_{(-58^\circ \dots +68^\circ \text{F})} = 12.1 \times 10^{-6} \text{ in./in./}^\circ \text{F}$ $\alpha_{(+68^\circ \dots +212^\circ \text{F})} = 13.0 \times 10^{-6} \text{ in./in./}^\circ \text{F}$
Poisson's ratio	$\mu = 0.34$	
Anodizing process–layer thickness–layer hardness	E6/EV1 - 12μm - 300HV	R204 -(0.0003 in-300HV)

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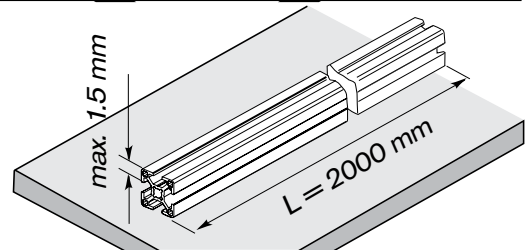
Average accuracy [mm] within a profile bar



Lengthwise profile straightness tolerance



Torsional tolerance in the lengthways direction of the profile

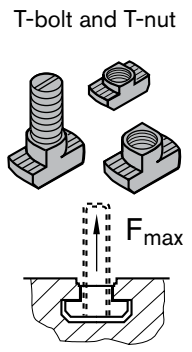
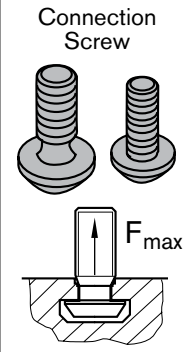
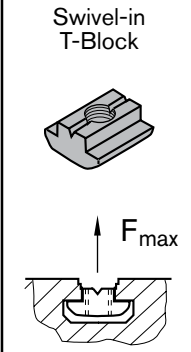
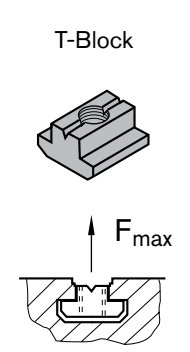


Section 16: Engineering Data and Specifications

Load Carrying Capacity

The load carrying data on the following pages has been determined by actual testing in an independent laboratory. Exceeding any of the published maximum values may cause permanent deformation of the profile T-slot or connector. As with any structural design, it is critical to consider all legal and technical safety requirements. This data supersedes all previous published data and we reserve the right to make technical changes without notice.

T-slot load carrying capacities

	 T-bolt and T-nut	 Connection Screw	 Swivel-in T-Block	 T-Block
6 Profiles with 6mm T-Slots 20x20 20x40 20x20 2SA 20x40x40 20x20 3S 20x60 20x20R	$F_{max} = 1700 \text{ N}$ (382 lbs)	$F_{max} = 2000 \text{ N}$ (450 lbs)	NA	$F_{max} = 3000 \text{ N}$ (674 lbs)
8 Profiles with 8mm T-Slots 11x20 30x30 30x30R 11x30 30x30 1S 30x30°R 22.5x180 30x30 2S 30x45°R 30x30 2SA 30x60°R 30x30 3S 30x45 30x30R 30x60 30x60x60	$F_{max} = 4000 \text{ N}$ (899 lbs)	$F_{max} = 5000 \text{ N}$ (1124 lbs)	$F_{max} = 2200 \text{ N}$ (495 lbs)	$F_{max} = 6000 \text{ N}$ (1349 lbs)
10 Profiles with standard 10mm T-Slots 15x22.5 45x45 50x50 22.5x45 45x45 1S 50x50R 22.5x45x45 45x45 2S 50x100 22.5x180 45x45 2SA 50x150 45x45 3S 40x40 45x45R 60x60 40x40 1S 45x30°R 40x40 2S 45x45°R 80x80 40x40 2SA 45x60°R 80x120 40x40 3S 45x45HR 80x160 40x40R 45x60 40x40HR 45x90 100x100 40x80 100x200 40x80x80 40x120 40x160	$F_{max} = 7000 \text{ N}$ (1574 lbs)	$F_{max} = 10000 \text{ N}$ (2248 lbs)	$F_{max} = 9000 \text{ N}$ (2023 lbs)	$F_{max} = 12000 \text{ N}$ (2698 lbs)

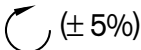
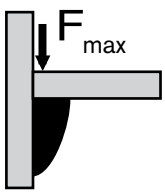
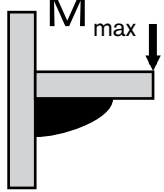
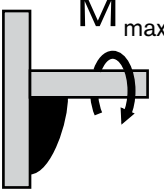









Section 16: Engineering Data and Specifications

Load carrying capacities of gussets

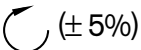
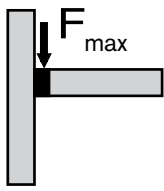
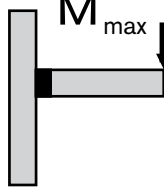
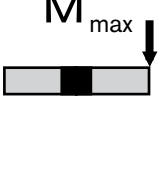









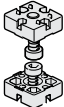


	20x20 5 Nm (44 lb-in) (5%)	6	700 N (157 lbs)	6 Nm (53 lb-in)	25 Nm (221 lb-in)	6 Nm
	20x40 5 Nm (44 lb-in)	6	1400 N (315 lbs)	15 Nm (132 lb-in)	50 Nm (443 lb-in)	8 Nm (71 lb-in)
	30x30 10 Nm (89 lb-in)	8	1250 N (281 lbs)	25 Nm (221 lb-in)	75 Nm (664 lb-in)	11Nm
	30x60 10 Nm (89 lb-in)	8	2500 N (562 lbs)	100 Nm (885 lb-in)	170 Nm (1505 lb-in)	25 Nm (221 lb-in)
	60x60 10 Nm (89 lb-in)	8	5000 N (1124 lbs)	320 Nm (2832 lb-in)	370 Nm (3275 lb-in)	110 Nm (973 lb-in)
	60x60 25 Nm (221 lb-in)	10	3000 N (674 lbs)	125 Nm (1105 lb-in)	150 Nm (1328 lb-in)	28Nm
	40x40 25 Nm (221 lb-in)	10	3000 N (674 lbs)	55 Nm (487 lb-in)	145 Nm (1283 lb-in)	35 Nm (310 lb-in)
	40x80 25 Nm (221 lb-in)	10	6000 N (1349 lbs)	180 Nm (1593 lb-in)	400 Nm (3540 lb-in)	60 Nm (531 lb-in)
	45x45 25 Nm (221 lb-in)	10	3000 N (674 lbs)	60 Nm (531 lb-in)	160 Nm (1416 lb-in)	31 Nm
	45x90 25 Nm (221 lb-in)	10	6000 N (1349 lbs)	180 Nm (1593 lb-in)	400 Nm (3540 lb-in)	60 Nm (531 lb-in)
	50x50 25 Nm (221 lb-in)	10	4000 N (899 lbs)	125 Nm (1106 lb-in)	250 Nm (2212 lb-in)	38 Nm (336 lb-in)
	50x100 25 Nm (221 lb-in)	10	7500 N (1686 lbs)	300 Nm (2655 lb-in)	600 Nm (5310 lb-in)	73 Nm (646 lb-in)
	60x60 25 Nm (221 lb-in)	10	3000 N (674 lbs)	125 Nm (1106 lb-in)	150 Nm (1328 lb-in)	28 Nm
	80x80 25 Nm (221 lb-in)	10	14000 N (3145 lbs)	500 Nm (4424 lb-in)	1000 Nm (8853 lb-in)	400 Nm (3540 lb-in)
	90x90 25 Nm (221 lb-in)	10	12000 N (2698 lbs)	370 Nm (3275 lb-in)	800 Nm (7081 lb-in)	200 Nm (1770 lb-in)
	100x100 25 Nm (221 lb-in)	10	15000 N (3372 lbs)	550 Nm (4868 lb-in)	1100 Nm (9736 lb-in)	480 Nm (4248 lb-in)

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Load carrying capacities of die-cast foundation brackets

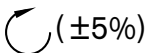
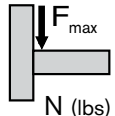
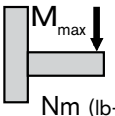
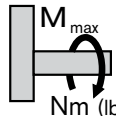
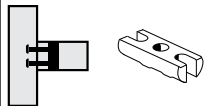
















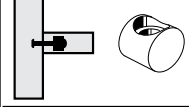





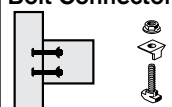


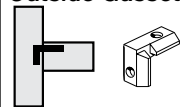






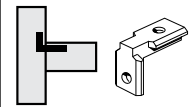









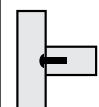








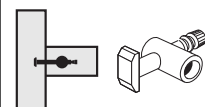









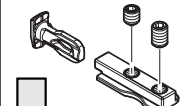










 (± 5%)					
	30x120  10 Nm (89 lb-in)		3750 N (843 lbs)	100 Nm (885 lb-in)	47 Nm (416 lb-in)
	40x160  25 Nm (221 lb-in)		9000 N (2023 lbs)	250 Nm (2213 lb-in)	60 Nm (531 lb-in)
	45x180  25 Nm (221 lb-in)		9000 N (2023 lbs)	250 Nm (2213 lb-in)	65 Nm (575 lb-in)

Load carrying capacities of T-Connectors and End-to-End Connectors

 (± 5%)							
			M5 5 Nm (44 lb-in)	S8 25 Nm (221 lb-in)	30x30 4000 N (899 lbs)	80 Nm (708 lb-in)	--
			M6 10 Nm (88 lb-in)	S12 35 Nm (309 lb-in)	40x40 9000 N (2023 lbs)	150 Nm (1328 lb-in)	--
					45x45 9000 N (2023 lbs)	200 Nm (1770 lb-in)	--
					50x50 10000 N (2247 lbs)	170 Nm (1505 lb-in)	--
			M5 5 Nm (44 lb-in)	S8 25 Nm (221 lb-in)	30x30 --	--	81 Nm (717 lb-in)
			M6 10 Nm (88 lb-in)	S12 35 Nm (309 lb-in)	40x40 --	--	170 Nm (1505 lb-in)
					45x45 --	--	200 Nm (1770 lb-in)
					50x50 --	--	180 Nm (1593 lb-in)

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Load carrying capacities of profile connectors

		 (±5%)	 N (lbs)	 Nm (lb-in)	 Nm (lb-in)	
Bolt Connector 	Ø11 (L = 30 mm)	 6 Nm (53 lb-in)  8	2500 (562)	60 (531)	20 (177)	
	Ø17 (L = 40 mm)	 20 Nm (177 lb-in)  10	4000 (899)	180 (1593)	40 (354)	
	Ø17 (L = 45 mm)	 20 Nm (177 lb-in)  10	4000 (899)	180 (1593)	60 (531)	
	Ø17 (L = 50 mm)	 20 Nm (177 lb-in)  10	4000 (899)	200 (1770)	65 (575)	
	Ø17 (L = 60 mm)	 20 Nm (177 lb-in)  10	4000 (899)	200 (1770)	80 (708)	
	Ø17 (L = 80 mm)	 20 Nm (177 lb-in)  10	5000 (1124)	800 (7080)	170 (1505)	
	Ø17 (L = 90 mm)	 20 Nm (177 lb-in)  10	5000 (1124)	800 (7080)	200 (1770)	
	Ø17 (L = 100 mm)	 20 Nm (177 lb-in)  10	5000 (1124)	1000 (8850)	480 (4248)	
Bolt Connector 	Ø11 (L = 11 mm)	 7 Nm (62 lb-in)  8  10	500 (112)	50 (443)	7 (62)	
	Ø17 (L = 15 mm)	 12 Nm (106 lb-in)  10	500 (112)	50 (443)	10 (89)	
Bolt Connector 	Ø28 (L = 19.5 mm)	 25 Nm (221 lb-in)  10	500 (112)	50 (443)	-	
Inside-to-Outside Gusset 	8 mm	 12 Nm (106 lb-in)  8  8	2200 (495)	50 (443)	-	
	10 mm	 15 Nm (133 lb-in)  10  10	2800 (629)	100 (886)	-	
Inside-to-Inside Gusset 	6 mm	 3 Nm (26 lb-in)  6  6	600 (135)	10 (89)	-	
	8 mm	 12 Nm (106 lb-in)  8  8	2500 (562)	50 (443)	-	
	10 mm	 15 Nm (133 lb-in)  10  10	3000 (674)	100 (886)	-	
Connection Screw 	S6 x 16 mm	 10 Nm (88 lb-in)  6	500 (112)	8 (71)	-	
	S8 x 25 mm	 25 Nm (221 lb-in)  8	800 (180)	43 (381)	-	
	S12 x 30 mm	 35 Nm (310 lb-in)  10	1300 (292)	80 (708)	-	
	M12 x 30 mm	 35 Nm (310 lb-in)  10	3000 (674)	80 (708)	-	
Quick Connector 	8 mm T-bolt Ø11 Barrel	 12 Nm (106 lb-in)  8  8	500 (112)	40 (354)	-	
	10 mm T-bolt Ø11 Barrel	 12 Nm (106 lb-in)  8  10	2000 (450)	70 (619)	-	
	10 mm T-bolt Ø17 Barrel	 25 Nm (221 lb-in)  10  10	4000 (899)	140 (1239)	-	
Tension Connector 	SV8-30 series profiles	 6 Nm (53 lb-in)  8	1000 (224)	35 (311)	15 (133)	
	SV10L-45 series profiles	 15 Nm (133 lb-in)  10	3500 (786)	110 (975)	30 (266)	
	SV10	40H series profiles	 15 Nm (133 lb-in)  10	3500 (786)	110 (975)	30 (266)
		45H series profiles	 15 Nm (133 lb-in)  10	3500 (786)	110 (975)	30 (266)
		60H series profiles	 15 Nm (133 lb-in)  10	3500 (786)	195 (1728)	60 (531)

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Load carrying capacities of profile connectors

				Nm (lb-in)	Nm (lb-in)
\curvearrowright ($\pm 5\%$)					
Corner Cube 20/2S		6 mm	\curvearrowright 10 Nm (88 lb-in)	18 (159)	-
Corner Cube 20/3S		6 mm	\curvearrowright 10 Nm (88 lb-in)	-	23 (204)
Corner Cube 30/2S		8 mm	\curvearrowright 25 Nm (221 lb-in)	80 (709)	-
Corner Cube 30/3S		8 mm	\curvearrowright 25 Nm (221 lb-in)	-	85 (753)
Corner Cube 40/2S		10 mm	\curvearrowright 35 Nm (310 lb-in)	60 (532)	-
Corner Cube 40/3S		10 mm	\curvearrowright 35 Nm (310 lb-in)	-	70 (620)
Corner Cube 45/2S		10 mm	\curvearrowright 35 Nm (310 lb-in)	45 x 45 150 (1329)	-
				45 x 45H 200 (1772)	-
Corner Cube 45/3S		10 mm	\curvearrowright 35 Nm (310 lb-in)	45 x 45 -	170 (1506)
				45 x 45H -	240 (2126)
Corner Cube 50/2S		10 mm	\curvearrowright 35 Nm (310 lb-in)	120 (1063)	-
Corner Cube 50/3S		10 mm	\curvearrowright 35 Nm (310 lb-in)	-	140 (1240)

Radius Compensator			These values were determined under static conditions and are guide values only. Allow appropriate safety margins during planning!					
	S8	\curvearrowright 25 Nm (221 lb-in)	600 (135)	37 (327)	28 (248)			
30x30	Quick Connector	\curvearrowright 12 Nm (106 lb-in)	600 (135)	37 (327)	28 (248)			
	M12, S12	\curvearrowright 30 Nm (310 lb-in)	1000 (224)	47 (416)	55 (487)			
40x40	Quick Connector	\curvearrowright 22 Nm (221 lb-in)	1000 (224)	47 (416)	55 (487)			
	M12, S12	\curvearrowright 35 Nm (310 lb-in)	1200 (270)	53 (469)	59 (522)			
45x45	Quick Connector	\curvearrowright 25 Nm (221 lb-in)	1200 (270)	53 (469)	59 (522)			

* Load Ratings when Radius Compensator is used with indicated connector

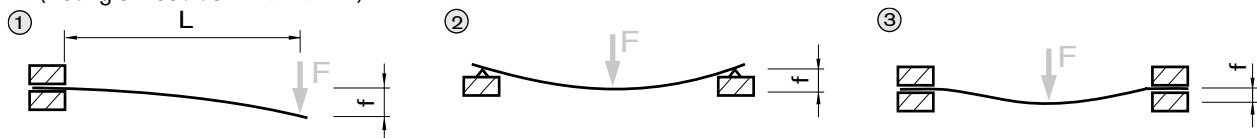
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Bending Deflection for Aluminum Profiles

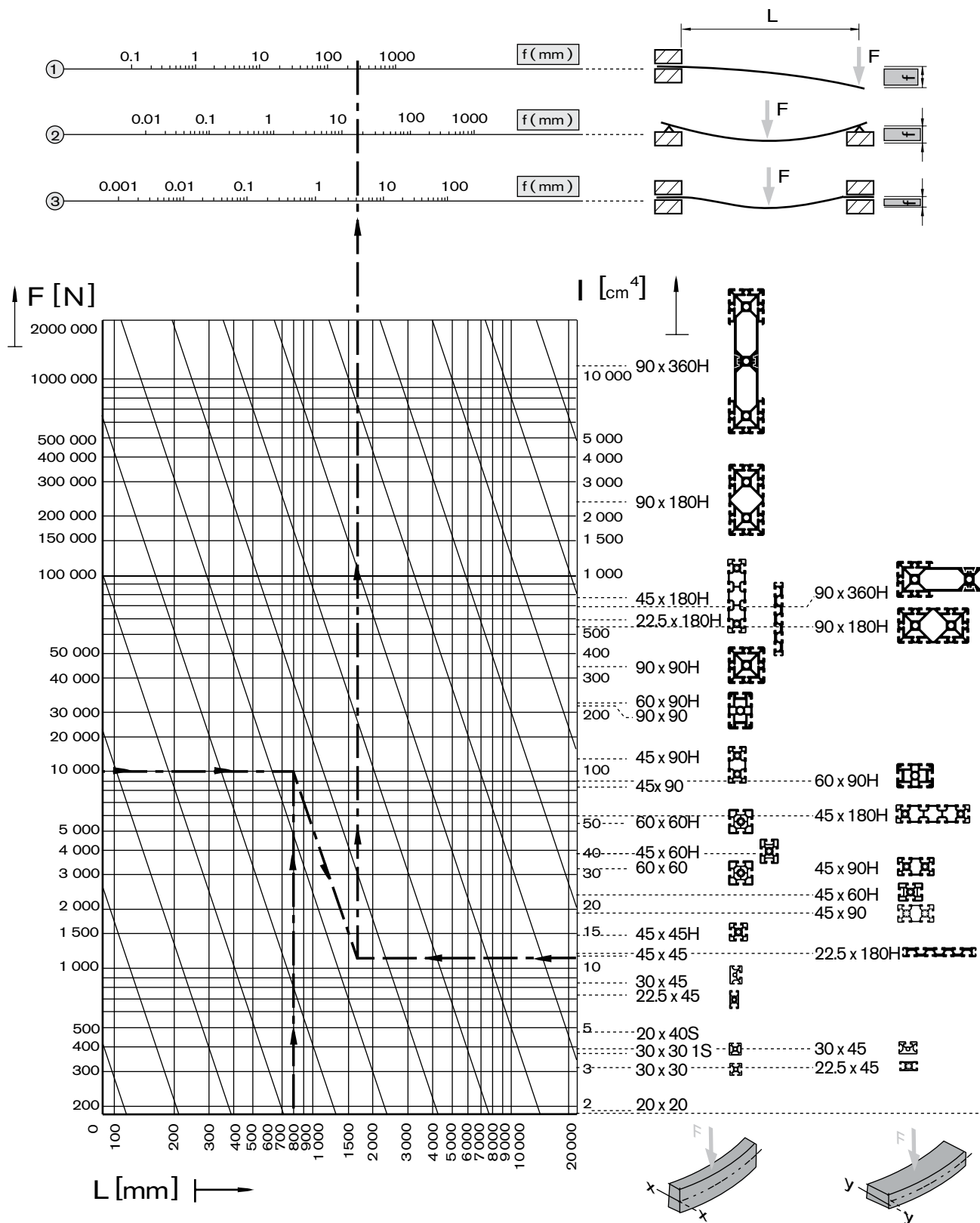
	Metric	U.S. Equivalent
Profile bending deflection for static load case①②③ from force F.	$f_{①} = \frac{F \times L^3}{3E \times I \times 10^4}$ mm	$f_{①} = \frac{FL^3}{3EI}$ in
	$f_{②} = \frac{F \times L^3}{48E \times I \times 10^4}$ mm	$f_{②} = \frac{FL^3}{48EI}$ in
	$f_{③} = \frac{F \times L^3}{192E \times I \times 10^4}$ mm	$f_{③} = \frac{FL^3}{192EI}$ in
Profile bending deflection from the profile's own weight	$f_{①} = \frac{F \times L^3}{8E \times I \times 10^4}$ mm	$f_{①} = \frac{FL^3}{8EI}$ in
	$f_{②} = \frac{5 \times F \times L^3}{384E \times I \times 10^4}$ mm	$f_{②} = \frac{5FL^3}{384EI}$ in
	$f_{③} = \frac{F \times L^3}{384E \times I \times 10^4}$ mm	$f_{③} = \frac{FL^3}{384EI}$ in
Determination of maximum occurring bending stress	$\sigma_{mm}^{①} = \frac{F \times L}{W \times 10^3}$	$\sigma_{in}^{①} = \frac{FL}{W}$
	$\sigma_{mm}^{②} = \frac{F \times L}{4W \times 10^3}$	$\sigma_{in}^{②} = \frac{FL}{4W}$
	$\sigma_{mm}^{③} = \frac{F \times L}{8W \times 10^3}$	$\sigma_{in}^{③} = \frac{FL}{8W}$
$\sigma_{max} < 200 \text{ N/mm}^2$		$\sigma_{max} = \text{maximum allowable bending stress} = 28,000 \text{ lb/in}^2$

E = modulus of elasticity = 70,000 N/mm²
(Young's modulus = 10x10⁶ lb/in²)

Force = F [N](lb)
Amount of Deflection = f [mm](in)
Length of Profile = L [mm](in)
Inertia = I [cm⁴](in⁴)
Section Modulus = W [cm³](in³)



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Example: 1. $F = 10000$ N; 2. $L = 800$ mm; 3. $f_{\text{max}} = 4$ mm; $\rightarrow I_{\text{min}} = 11.0$ cm⁴ \rightarrow **45 x 45**