

2.29 X-M6/W6, M7/F7, M8, M10/W10 Threaded Studs for Concrete

Application Approvals and Governing Design Guidelines
ICBO, UL

Technical data (design loads, application restrictions, etc.) presented in these approvals and design guidelines reflect specific local conditions and may differ from those published in this handbook. If the project is in a jurisdiction where the fastening is subject to the approval process or where a design guideline must be used, technical data in the approval or design guideline has precedence over data presented here. Approval copies are available from your Hilti technical advisory service.

Standard Program, dimensions in mm unless otherwise shown

	Designation ¹⁾	Standard ²⁾ L _g (mm)	Standard shank lengths ²⁾ L _s (mm)	L (mm)	DX-tools	Hardness (HRC)	Zinc coating (μm) ³⁾
①	X-M6-8-yy FP8	8	17, 22, 27	L _g + L _s	DX 460 DX-A 40/41, DX 36M	55.5 ± 1	5 - 13
	X-M6-11-yy FP8	11	17, 22, 27				
	X-M6-20-yy FP8	20	22, 27				
	X-W6-11-yy FP8	11	22, 27				
	X-W6-20-yy FP8	20	22, 27				
	X-W6-38-27 FP8	38	27				
②	X-M6-xx-yy D8	8, 11, 20	32, 42	L _g + L _s + 3.5	DX 450, DX 451, DX 600N DX 460, DX-A 40/41, DX 36M DX 450, DX 451 DX 460, DX-A 40/41, DX 36M, DX 600N DX 450, DX 451	55.5 ± 1	5 - 13
	X-W6-11-32 D8	11	32				
	X-W6-20-32 D8	20	32				
③	X-M6-xx-yy D12	8, 11, 20	17, 22, 27, 32, 42, 52, 72, 95				
	X-W6-xx-yy D12	11, 20, 38	17, 22, 27, 32, 52				
④	X-F7-xx-yy FP8	7, 15	37				
④	X-F7-xx-yy FS8	7, 15, 20	17, 22, 27, 42	L _g + L _s	DX 750 I, DX 451, DX 600N	55.5 ± 1	5 - 13
③	X-M7-11-yy D12	11	22, 27, 32, 42				
⑤	X-M8-15-yy P8	15	27, 32, 42, 52				
	X-M8-20-yy P8	20	27, 32				
⑥	X-M8-xx-yy P12	15, 20	27, 32, 42, 52				
⑦	M10-24-yy P10	24	27, 32, 47				
	X-W10-27-32 P10	26.5	32	L _g + L _s	DX 750 I, DX 451, DX 600N	55.5 ± 1	5 - 13
⑧	M10-24-yy P12	24	27, 32, 47				
	X-W10-27-yy P12	26.5	27, 32, 42				
⑨	W10-30-yy P10	30	27, 32, 42	L _g + L _s	DX 750 I, DX 451, DX 600N	55.5 ± 1	5 - 13

1) Type of threading : M = metric ; W6, W8, W10 = Whitworth 1/4" ; 5/16" , 3/8" ; F7 = French 7 mm

2) Standard threading and shank lengths. Other lengths and combinations available on special order.

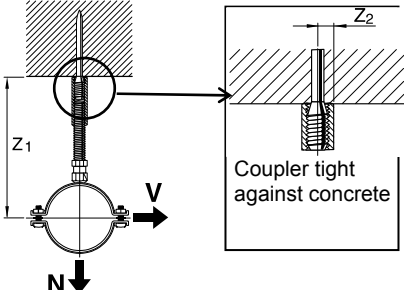
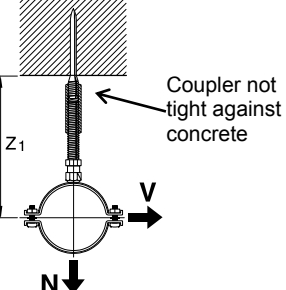
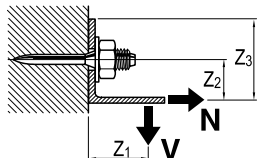
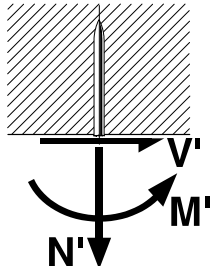
3) Zinc coating (electroplating for corrosion protection during construction and service in protected environment).

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Fastener Selection

Threading type	Threading length	Shank length *: L_s					
Select as needed:	M6, W6, M7, F7	Normal weight concrete			Light weight concrete		
Metric: French : Whitworth:	Required thread length	f_c (N/mm ²)	15	25	≥ 35	15	25
M6 ----- W6 (1/4")	$L_g \geq t_{fix} + t_{washer} + t_{nut} + 2.5$	L_s (mm)	32, 42	27	17, 22	42	32, 42
M7 F7 -----	M8, W8, M10, W10	Normal weight concrete			Light weight concrete		
M8 ----- W8 (5/16")	Required thread length	f_c (N/mm ²)	15	25	≥ 35	15	25
M10 ----- W10 (3/8")	$L_g \geq t_{fix} + t_{washer} + t_{nut}$	L_s (mm)	42, 47	27, 32	27	47	42
* For preliminary selection only, optimise by on-site trials to maximise pullout strength and minimise placing failures/spalls.							

Recommended Loads

Fastener designation	Shank d_s (mm)	N_{rec} (kN)	V_{rec} (kN)	M_{rec} (Nm)	Conditions: 1. Min. 5 fastenings / fastened unit (normal weight conc.) 2. Can increase Nrec and Vrec to 0.6 kN for 8 or more fastenings per fastened unit. 3. All visible failures must be replaced. 4. With lightweight concrete base material and greater loading may be possible, inquire at Hilti. 5. Predominantly static loading. 6. Observance of all application limitations and recommendations. 7. The recommended loads in the table refer to the resistance of the shank cross-section. The loads acting on the cross-section (N' and V') are influenced by the characteristics and arrangement of the part or material fastened and may not be the same as the loads acting on the fastened part or material (N and V). 8. The existence and/or magnitude of moment acting on the fastener shank (M') is influenced by the characteristics and arrangement of the fastened part or material.
M6, W6, M7, F7	3.7	0.4	0.4	4.9	
M8, W8, M10, X-W10	4.5			8.8	
W10-30	5.2			13.6	
Arrangements to reduce or prevent moment on shank:		Arrangement causing moment to act on shank:			
					
Non-symmetric arrangement					
• Moment on fastened part • Prying effect must be considered in determining loads acting on fastener.					

Edge distance / Spacings

Pairs	Row along edge	General (e.g. group of fasteners)
reinforced* non-reinforced c 100 150	reinforced* non-reinforced c 80 150	reinforced* non-reinforced c 80 150 a 80 100

* Minimum Ø6 reinforcing steel continuous along all edges and around all corners. Edge bars must be enclosed by stirrups.

Installation Conditions

M6, W6, M7, F7	M8, W8, M10, W10
Penetration depth $h_{nom} = L_s \pm 2$, $NVS = L - h_{nom}$	Penetration depth $h_{nom} = L_s \pm 2$, $NVS = L - h_{nom}$
Tightening torque $T_{rec} \leq 4 \text{ Nm}$	Tightening torque $T_{rec} \leq 6 \text{ Nm}$