

High Precision Linear Shafts

One End Threaded One End Tapped with Undercut / One End Threaded One End Tapped with Undercut and Wrench Flats

Suitable for assemblies of parts requiring high precision and high perpendicular precision of the shaft end ($\perp 0.03$).

RoHS10

⚠️ Annealing may lower hardness at shaft end machined areas (effective thread length+approx.10mm). **P.112**

⚠️ L Dimension Tolerance, Circularity, Straightness, Perpendicularity, Concentricity and Changes in Hardness **P.111**

⚠️ Features of Low Temp. Black Chrome Plating **P.128**

Type		D Tol.	Material	Hardness	Surface Treatment
W/o Wrench Flats	With Wrench Flats				
VAFD	VAFZ	g6	SUJ2 Equivalent	Effective Hardened Depth of Induction Hardening	Hard Chrome Plating Plating Hardness HV750 - Plating Thickness: 5μ or More Low Temp. Black Chrome Plating
VSAFD	VSAFZ		SUS440C or 13Cr stainless		
VPAFD	VPAFZ		SUJ2 Equivalent	P.112	
VPSAFD	VPSAFZ		SUS440C or 13Cr stainless	SUJ2 Equivalent 58HRC~	
VRFD	VRFZ		SUJ2 Equivalent	SUS440C or 13Cr stainless 56HRC~	

W/o Wrench Flats

With Wrench Flats

D Tol.	
D	g6
8	-0.005
10	-0.014
12	
13	
15	-0.006
16	-0.017
18	
20	
25	-0.007
30	-0.020

Part Number	1mm Increment			M (Coarse) Selection	N (Coarse) Selection	Wrench Flats Dimensions			C	Coarse Thread Undercut Dimension								
	Type	D	L			F	SC	W		l1	(Y) Max.	M	Pitch	MC	(g)			
(W/o Wrench Flats) VAFD (With Wrench Flats) VAFZ VSAFD VSAFZ VPAFD VPAFZ VPSAFD VPSAFZ VRFD VRFZ	8	25-295	5≤F≤Mx3	6	3 4 5	SC=1mm Increment	7	8	300	0.5 or Less	6	1.0	4.2	2				
	10	25-345		6 8	3 4 5 6		8	350										
	12	25-345		6 8 10	4 5 6 8		10	350										
	13	25-345		6 8 10	4 5 6 8		11	350										
	15	25-345		6 8 10 12	4 5 6 8 10		13	350										
	16	25-345		6 8 10 12	4 5 6 8 10		14	350										
	18	25-345		6 8 10 12 16	4 5 6 8 10 12		16	350										
	20	25-445		6 8 10 12 16	4 5 6 8 10 12		17	450										
	25	25-445		8 10 12 16 20	4 5 6 8 10 12 16		22	450										
	30	25-445		8 10 12 16 20 24	6 8 10 12 16 20		27	450										
														3	10	1.5	7.7	3
															12	1.75	9.4	
											16	2.0	13.0	4				
											20	2.5	16.4					
											24	3.0	19.6	5				
											30	3.5	25.0					

⚠️ Overall length L requires Nx3≤L. ⚠️ Shaft ends may have centering holes.

Ordering Example: Part Number - L - F - M - N - SC
 VPAFD20 - 300 - F25 - M16 - N12

Alterations: Part Number - L - F - M (MMC, MMS) - N (NSC, ND) - SC - (LKC-etc.)
 VAFZ30 - 250 - F40 - M20 - N20 - SC10 - LKC

Alteration Details **P.113**

Alterations	Code	Spec.
	LKC	Alteration to L dimension tolerance Ordering Code: LKC ⚠️ Not applicable when D-M≤2. L dimensions can be specified in 0.1mm increment for LKC. ⚠️ L≤200 → L≤0.03
	SX	Second Set of Wrench Flats Ordering Code: SX15 Application Notes: Only applicable to Shafts with Wrench Flats. SX=1mm Increment ⚠️ SC+SX+l1≤L ⚠️ SX≥0 ⚠️ Orientation between two set screw flats is not coplanar.
	FC	Set Screw Flat at One Location Ordering Code: FC10-E8 Application Notes: FC, E=1mm Increment ⚠️ FC≤3xD ⚠️ When 1.5xD<FC, FC≤L/2 ⚠️ E=0 or E≥2 ⚠️ Not available in combination with WFC.
	WFC	Set Screw Flats at Two Locations Ordering Code: WFC8-A8-E4 Application Notes: WFC, A, E=1mm Increment ⚠️ WFC≤3xD ⚠️ When 1.5xD<WFC, 2WFC≤L/2 ⚠️ A(E)=0 or A(E)≥2 ⚠️ Orientation between set screw flats is not coplanar. Not available in combination with FC.
	NSC	Change to Fine Tapped Thread Ordering Code: NSC14 (N is changed to NSC) Application Notes: Applicable to D=12 or more
	ND	Change the effective length of tapped part to Nx3. Ordering Code: ND6 (N is changed to ND) Application Notes: Only applicable to D=10-30, N=6-20 ⚠️ One End Tapped: MDx3.5+4≤L
	MMC MMS	Change to Fine Thread Ordering Code: MMC14 (M is changed to MMC) MMS14 (M is changed to MMS) Undercut Dimensions for Fine Threads (1) Undercut Dimensions for Fine Threads (2)

⚠️ Please see Shaft Alteration Overview for details if provided. **P.113**
 ⚠️ When selecting multiple alteration additions, the distance between machined areas should be greater than 2mm.
 ⚠️ Alterations may lower hardness. See **P.112**