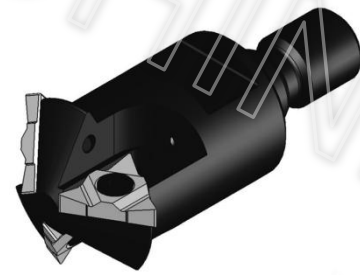
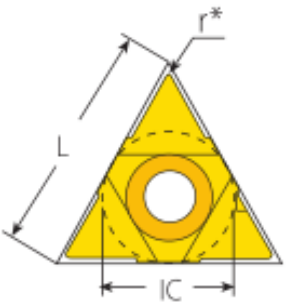
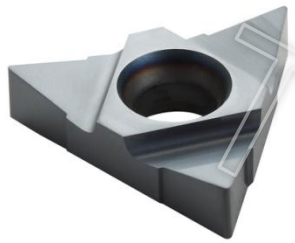
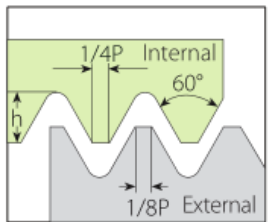


# Thread Mill for Deep Holes

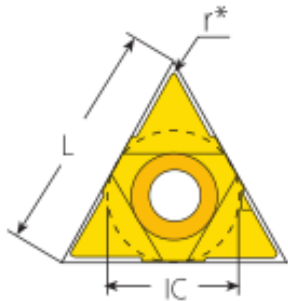
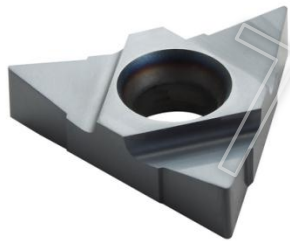




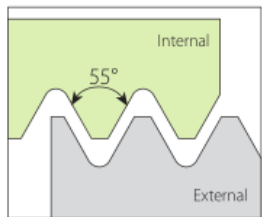
**Internal**



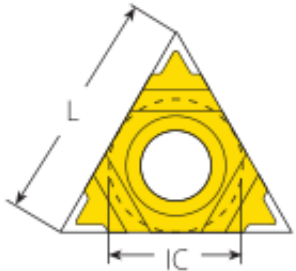
Designation	Pitch		Dimensions		
	mm	tpi	IC	Lmm	r*
11UI 60D	1.5-4.0	16-6	1/4"U	11	0.10
16UI 60D	2.5-6.0	10-4	3/8"U	16	0.20
16UI 60D-16-12	1.5-2.0	16-12	3/8"U	16	0.06
22UI 60D	6.0-8.0	4-3	1/2"U	22	0.30



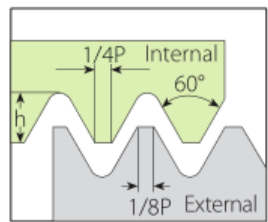
### Internal



Designation	Pitch	Dimensions		
	tpi	IC	Lmm	r*
11UI 55D	16-6	1/4"U	11	0.10
16UI 55D	10-4	3/8"U	16	0.20
16UI 55D-16-12	16-12	3/8"U	16	0.08
22UI 55D	4-3	1/2"U	22	0.50



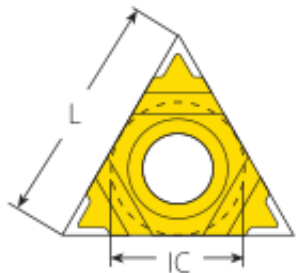
### Internal



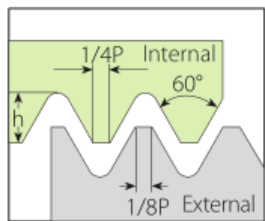
Designation	Pitch	Dimensions		Toolholder Cutting Diameter D2(mm)
	mm	IC	Lmm	* D2 Adjustment
11UI 1.50ISOD	1.5	1/4"U	11	For 1.5ISO change D2 to D2-1.0
11UI 2.00ISOD	2.0	1/4"U	11	For 2.0ISO change D2 to D2-1.15

\* Correct the toolholder cutting diameter D2 according to adjustment, as indicated in the above table.

# American UN - UNC; UNF; UNEF; UNS



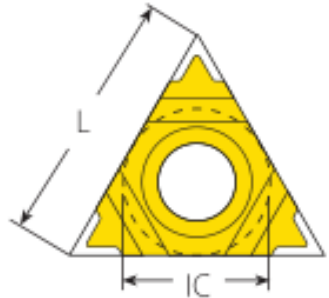
**Internal**



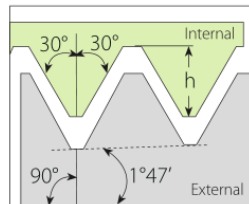
Designation	Pitch	Dimensions		Toolholder Cutting Diameter D2(mm)
	tpi	IC	Lmm	* D2 Adjustment
11UI 14UND	14	1/4"U	11	For 14UN change D2 to D2-1.06
11UI 12UND	12	1/4"U	11	For 12UN change D2 to D2-1.15

\* Correct the toolholder cutting diameter D2 according to adjustment, as indicated in the above table.

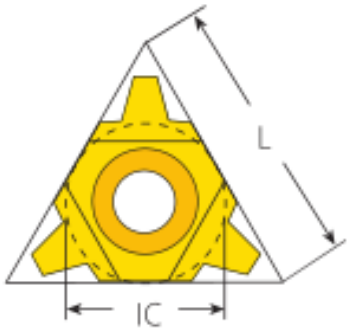
# National Pipe Thread (NPT)



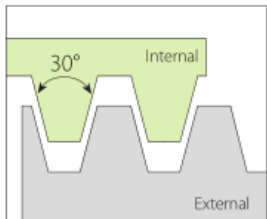
**External / Internal**



Designation	Pitch	Dimensions	
	tpi	IC	Lmm
11UEI 14NPTD	14	1/4"U	11
11UEI 11.5NPTD	11.5	1/4"U	11
16UEI 11.5NPTD	11.5	3/8"U	16
16UEI 8NPTD	8	3/8"U	16
22UEI 8NPTD	8	1/2"U	22

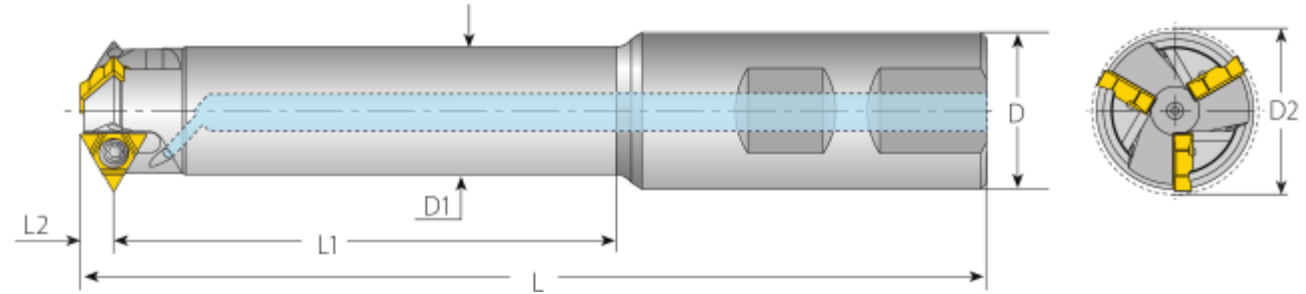


Internal



Designation	Pitch	Dimensions		Application
	mm	IC	Lmm	
11UI 3.0TRD	3.0	1/4"U	11	(TR22-TR30)x3
11UI 4.0TRD	4.0	1/4"U	11	(TR20-TR28)x4
11UI 5.0TRD	5.0	1/4"U	11	TR22x5; TR28x5

# Standard Toolholders - Weldon Shank (U Style)



Coolant-Thru is recommended, especially when  $D2 > 0.7 \times$  nominal thread diameter

Insert Size		Designation	Dimensions (mm)						No. of Flutes	Spare Parts	
L	IC		L	L1	L2	D	D1	D2		Screw	Wrench
11U	1/4"U	SR0015-11U-A16-95	95	40	5.4	16	11.0	14.75	1	M2.5x8	T-8
		SR0021-11U-A25-123	123	60		25	16.0	20.65	2		
		SR0023-11U-A25-135	135	70		25	17.7	23.00	3		
		SR0026-11U-A25-147	147	80		25	20.4	26.00	3		
		SR0031-11U-A32-164	164	95		32	25.7	31.00	4		
16U	3/8"U	SR0036-16U-A32-166	166	95	8.0	32	29.0	36.50	3	M3.5x12	T-15
		SR0036-16U-A32-225	225	145		32	28.0	36.50	3		
		SR0042-16U-A40-201	201	120		40	34.2	42.00	4		



## Thread Applications for Partial Profile Inserts

Tool holder		Min. Thread Dia.						
Designation	D2	ISO Coarse	ISO Fine	UNC	UN/UNF/UNEF/UNS	BSP(G)	Partial 55°	Trapez
SR0015-11U-A16-95	14.75	M18x2.5 M24x3.0	M16x0.5, M16x0.75, 16x1.0, M17x1.25, M17x1.5, 17x2.0	3/4-10	5/8-32UN, 5/8-28UN, 5/8-27UNS, 11/16-24UN, 11/16-20UN, 11/16-16UN, 3/4-14UNS, 3/4-12UN	3/8-19, 1/2-14,1-11	11/16-14; 3/4-12,7/8-11; 3/4-10, 7/8-9; 1-8, 1 1/8-7	TR22x3, TR24x3
SR0021-11U-A25-123	20.65	M24x3.0 M30x3.5	M22x0.5, M22x0.75, 22x1.0, M23x1.25, M23x1.5, 23x2.0	1-8, 1 1/8-7, 1 3/8-6	7/8-32UN,7/8-28UN, 7/8-27UNS, 7/8-24UNS, 7/8-20UNEF, 1-18UNS, 15/16-16UN, 1-14UNS, 15/16-12UN, 1-10UNS	3/4-14, 1-11	1-26, 1-20, 1-16, 1-12, 1-10, 1 1/8-9, 1-8, 1 1/8-7	TR26- TR60x3
SR0023-11U-A25-135	23	M27x3.0 M30x3.5 M36x4.0	M24x0.5, M24x0.75, 25x1.0, M25x1.25, M26x1.5, 26x2.0, M27x2.5	1 1/8-7	1-32UN, 1-28UN, 1-27UNS, 1-24UNS, 1-20UNEF, 1-18UNS, 1-16UN, 1-14UNS, 1-12UNF, 1 1/8-10UNS, 1 1/8-8UN	3/4 -14, 1-11	1-26, 1-20, 1-16, 1 1/16 -12, 1 1/8-9, 1 1/8-7	-
SR0026-11U-A25-147	26	M30x3.5 M36x4.0	M27x0.5, 27x0.75,M28x1.0, M28x1.25, M28x1.5, 29x2.0, M30x2.5, M30x3.0	1 1/4-7, 1 3/8-6	1 1/8-28UN, 1 1/8-24UNS, 1 1/8-20UN, 1 1/8-18UNEF, 1 1/8-16UN, 1 1/8-14UNS, 1 1/8-12UNF, 1 1/4-10UNS, 1 3/16-8UN	7/8 -14, 1-11	1 1/8-26, 1 1/8-20,1 3/8-16, 1 3/8-12,1 3/16-8, 1 1/4-7	-
SR0031-11U-A32-164	31	M36X4.0	M32x0.5, M32x0.75, 33x1.0, M33x1.25, 33x1.5,M34x2.0, M34x2.5, M35x3.0, M36x3.5	1 1/2 -6	15/16-28UN, 1 3/8-24UNS, 1 5/16-20UN, 1 5/16-18UNEF, 1 5/16-16UN, 1 3/8-14UNS, 1 3/8-12UNF, 1 3/8-10UNS, 1 3/8-8UN	1 1/8-11	1 3/8-26, 1 3/8-20,1 3/8-16, 1 3/8-12,1 7/16-8	-
SR0036-16U-A32-166 SR0036-16U-A32-225	36.5	M42x4.5 M48x5.0 M56x5.5 M64x6.0	M39x1.5, M39x2.0,M40x2.5, M41x3.0, M42x3.5,M42x4.0	1 3/4-5, 2-4.5, 2 1/2-4	1 9/16-16UN, 1 5/8-14UNS, 1 9/16-12UN, 1 5/8-10UNS, 1 5/8-8UN, 1 5/8-6UN	1 1/4 -11	1 5/8-16, 1 5/8-12,1 5/8-8, 1 7/8-6,1 3/4-5	-
SR0042-16U-A40-201	42	M48x5.0 M56x5.5 M64x6.0	M45x1.5, M45x2.0,M46x2.5, M48x3.0,M48x3.5, M48x4.0	2-4.5, 2 1/2-4	1 3/4-16UN, 1 3/4-14UNS, 1 13/16-12UN, 1 13/16-8UN, 1 15/16-6UN	1 1/2 -11	1 7/8-16, 1 7/8-12,1 7/8-8, 2 1/4-6,2-4.5	-

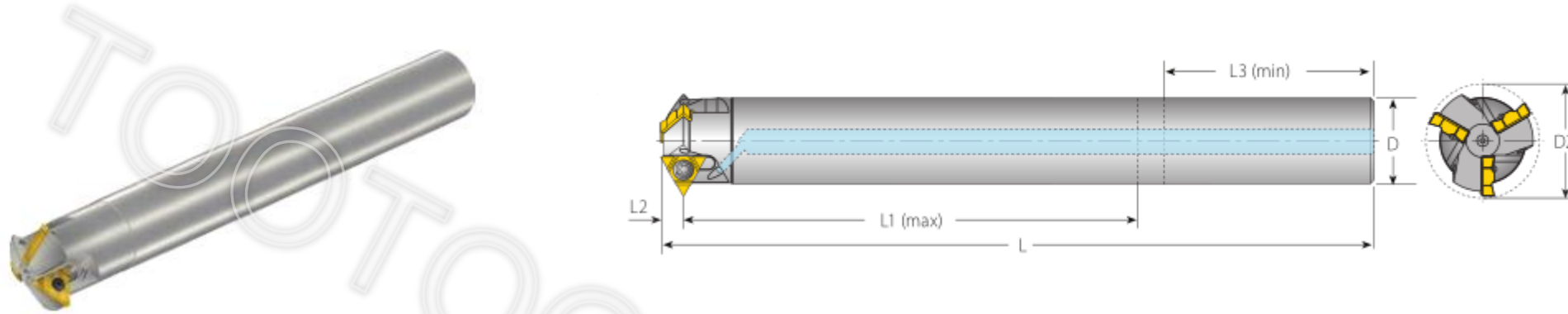
# Thread Applications for Full Profile Inserts (ISO & UN)

Tool holder	Pitch		Toolholder cutting diameter D2 (mm)	Min. Thread Dia	
Designation	mm	tpi	*D2 Adjustment	ISO Fine	UN/UNF/UNEF/UNS
SR0021-11U-A25-123	1.5		22.00	M26x1.5	--
	2.0		21.85	M26x2.0	-
	-	14	21.94	-	1-14UNS
	-	12	21.85	-	1-12UNF
SR0023-11U-A25-135	1.5		25.00	M28x1.5	-
	2.0		24.85	M29x2.0	-
	-	14	24.94	-	1 1/8-14UNS
	-	12	24.85	-	1 1/8-12UNF
SR0026-11U-A25-147	1.5		30.00	M33x1.5	-
	2.0		29.85	M34x2.0	-
	-	14	29.94	-	1 3/8-14UNS
	-	12	29.85	-	1 3/8-12UNF

## Thread Applications for Full Profile Inserts (NPT)

Tool holder	Toolholder cutting diameter D2 (mm)	Pitch	Cylindrical or Conical pre-drilled hole	Cylindrical pre-drilled hole
Designation	*D2 Adjustment	Tpi	NPT Threading by 1 Radial Pass	**NPT Threading by 2 Radial Passes (50% / 50%)
SR0015-11U-A16-95	14.59	14	1/2-14NPT; 3/4-14NPT	-
SR0021-11U-A25-123	20.49	14	3/4-14NPT	-
SR0023-11U-A25-135	22.63	11.5	1-11.5NPT; 1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0026-11U-A25-147	25.63	11.5	1-11.5NPT; 1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0031-11U-A32-164	30.63	11.5	1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0036-16U-A32-166	35.65	11.5	1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0036-16U-A32-225				
SR0036-16U-A32-166	35.65	8	-	2 1/2...10-8NPT
SR0036-16U-A32-225				
SR0042-16U-A40-201	41.15	11.5	1 1/2-11.5NPT; 2-11.5NPT	-
SR0042-16U-A40-201	41.15	8	-	2 1/2...10-8NPT

# Standard Toolholders - Steel Cylindrical Shank (U Style)



Coolant-Thru is recommended, especially when  $D2 > 0.7 \times$  nominal thread diameter

Insert Size		Designation	Dimensions (mm)						No. of Flutes	Spare Parts	
L	IC		L	L1(max)	L2	L3(min)	D	D2		Screw	Wrench
11U	1/4"U	SR0023-11U-C18-166	166	86	5.4	40	18	23.3	2	M2.5x8	T-8
		SR0026-11U-C20-186	186	105		40	20	26.0	3		
		SR0031-11U-C25-196	196	115		46	25	31.0	4		
16U	3/8"U	SR0036-16U-C25-193	193	125	8.0	46	25	36.5	3	M3.5x12	T-15
		SR0036-16U-C28-222	222	144		60	28	36.5	3		

\* The length of cylindrical shank toolholders can be modified to reduce chatter (vibration).  
 Note: The length of the shank inside the clamping device should be L3 at minimum.

## Thread Applications for Partial Profile Inserts

Tool holder		Min. Thread Dia.					
Designation	D2	ISO Coarse	ISO Fine	UNC	UN/UNF/UNEF/UNS	BSP(G)	Partial 55°
SR0023-11U-C18-166	23.3	M27x3.0, M30x3.5, M36x4.0	M24x0.5, M25x0.75, M25x1.0, M25x1.25, M26x1.5, M26x2.0, M27x2.5	1 1/8-7	1-32UN, 1-28UN, 1-27UN,1-24UNS, 1-20UNEF, 1-18UNS, 1-16UN,1-14UNS, 1 1/16-12UN, 1 1/8-10UNS, 1 1/8-8UN	3/4-14, 1-11	1-26, 1-20,1 1/8-16, 1 1/8-12,1 1/8-9, 1 1/8-7
SR0026-11U-C20-186	26.0	M30x3.5, M36x4.0	M27x0.5, M27x0.75, M28x1.0, M28x1.25, M28x1.5, M29x2.0, M30x2.5, M30x3.0	1 1/4 -7, 1 3/8-6	1 1/8-28UN, 1 1/8-24UNS,1 1/8-20UN, 1 1/8-18UNEF,1 1/8-16UN, 1 1/8-14UNS, 1 1/8-12UNF, 1 3/8-10UNS,1 7/16-8UN	7/8-14, 1-11	1 1/8-26, 1 1/8-20, 1 3/16-16, 1 3/16-12, 1 3/16-8, 1 1/4-7
SR0031-11U-C25-196	31.0	M36x4.0	M32x0.5, M32x0.75, M33x1.0, M33x1.25, M33x1.5, M34x2.0, M34x2.5, M35x3.0, M36x3.5	1 1/2-6	1 5/16-28UN, 1 1/2-24UNS,1 1/2-20UN, 1 1/2-18UNEF,1 3/8-16UN, 1 3/8-14UNS, 1 3/8-12UNF, 1 3/8-10UNS,1 7/16-8UN	1 1/8-11	1 5/16-26, 1 5/16-20, 1 3/8-16, 1 3/8-12,1 7/16-8
SR0036-16U-C25-193 SR0036-16U-C28-222	36.5	M42.5x4.5, M48x5.0, M56x5.5, M64x6.0	M39x1.5, M40x2.5, M41x3.0, M42x3.5, M42x4.0	1 3/4 -5, 2-4.5, 2 1/2-4	1 9/16-16UN, 1 5/8-14UNS,1 9/16-12UN, 1 5/8-10UNS,1 5/8-8UN, 1 5/8-6UN	1 1/4 -11	1 5/8-16, 1 5/8-12,1 5/8-8, 1 7/8-6,1 3/4-5

# Thread Applications for Full Profile Inserts (ISO & UN)

Tool holder	Pitch		Toolholder cutting diameter D2 (mm)	Min. Thread Dia	
Designation	mm	tpi	*D2 Adjustment	ISO Fine	UN/UNF/UNEF/UNS
SR0023-11U-C18-166	1.5		22.00	M26x1.5	--
	2.0		21.85	M26x2.0	-
	-	14	21.94	-	1-14UNS
	-	12	21.85	-	1-12UNF
SR0026-11U-C20-186	1.5		25.00	M28x1.5	-
	2.0		24.85	M29x2.0	-
	-	14	24.94	-	1 1/8-14UNS
	-	12	24.85	-	1 1/8-12UNF
SR0031-11U-C25-196	1.5		30.00	M33x1.5	-
	2.0		29.85	M34x2.0	-
	-	14	29.94	-	1 3/8-14UNS
	-	12	29.85	-	1 3/8-12UNF

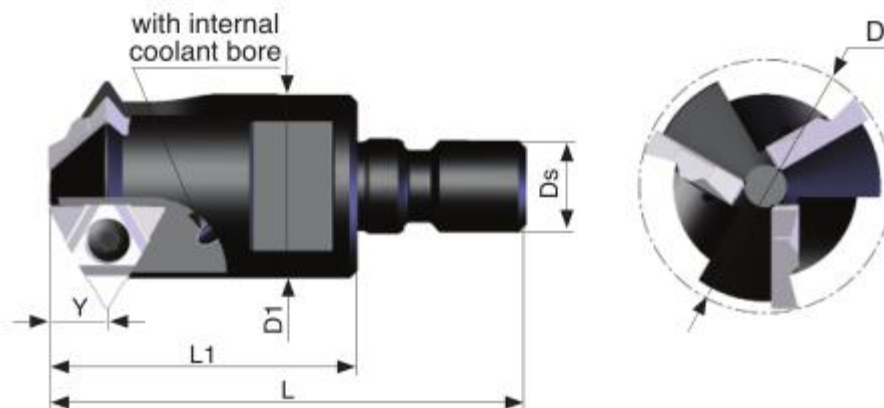
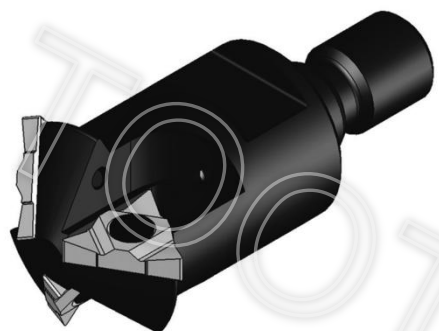
# Thread Applications for Full Profile Inserts (NPT)

Tool holder	Toolholder cutting diameter D2 (mm)	Pitch	Cylindrical or Conical pre-drilled hole	Cylindrical pre-drilled hole
	*D2 Adjustment	Tpi	NPT Threading by 1 Radial Pass	**NPT Threading by 2 Radial Passes (50% / 50%)
SR0023-11U-C18-166	22.63	11.5	1-11.5NPT; 1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0026-11U-C20-186	25.63	11.5	1-11.5NPT; 1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0031-11U-C25-196	30.63	11.5	1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0036-16U-C25-193	35.65	11.5	1 1/4-11.5NPT; 1 1/2-11.5NPT; 2-11.5NPT	-
SR0036-16U-C28-222				
SR0036-16U-C25-193	35.65	8	-	2 1/2...10-8NPT
SR0036-16U-C28-222				

\* Correct the toolholder cutting diameter D2 according to adjustment, as indicated in the above table.

\*\* Note: When the pre-drilled hole for 8 NPT is conical, the thread can be machined in one pass.

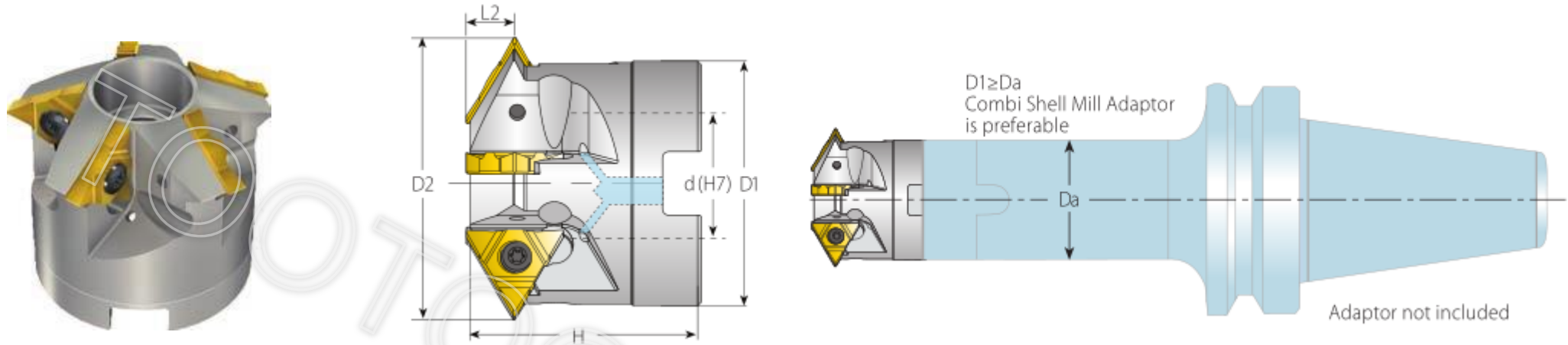
# Standard Toolholders – Modular (U Style)



Insert Size		Designation	Dimensions (mm)						No. of Flutes	Spare Parts	
L	IC		Y	D	D1	Ds	L1	L		Z	Screw
11U	1/4"U	SR0017-11U-M8	5.4	17	14	M8	21	38	2	M2.5x8	T-8
		SR0020-11U-M8		20	16	M8	32	50	2		
		SR0026-11U-M10		26	20	M10	35	56	3		
		SR0031-11U-M12		31	24	M12	36	60	4		
16U	3/8"U	SR0033-16U-M12	8.0	33	24	M12	40	64	3	M3.5x12	T-15
		SR0036-16U-M16		36	30	M16	45	72	3		
		SR0041-16U-M16		41	32	M16	47	74	4		
		SR0046-16U-M16		46	36	M16	47	74	4		



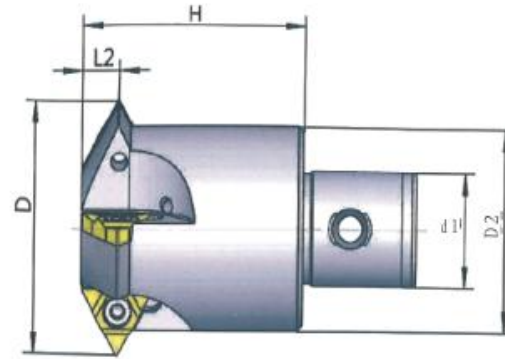
# Shell Mill (U Style)



Coolant-Thru is recommended, especially when  $D2 > 0.7 \times$  nominal thread diameter

Insert Size		Designation	Dimensions (mm)					No. of Flutes	Spare Parts	
L	IC		D2	D2	d(h7)	H	L2		Z	Screw
16U	3/8"U	SR0042B16U-4	34	42	16	40	8.0	4	M3.5x12	T-15
		SR0048B16U-5	40	48	22	40	8.0	5		
		SR0056B16U-6	48	56	22	40	8.0	6		
22U	1/2"U	SR0088B22U-6	76	88	27	50	10.8	6	M4.0x16	T-20
		SR0098B22U-7	85	98	32	55	10.8	7		

# CK Holder Connection Type (U Style)



Insert Size		Designation	Thread Type	Dimensions (mm)					No. of Flutes	Spare Parts	
L	IC			D	D2	d1(h6)	H	L2		Screw	Wrench
11U	1/4"U	SR0026-11U-CK1	M30x3.5	26.0	19	11	30	5.4	3	M2.5x8	T-8
		SR0036-11U-CK3	M40x1.5	36.5	31	18	40		4		
		SR0045-11U-CK4	M50x3	45.0	39	22	45		5		
		SR0056-11U-CK5	M64x3	56.0	50	28	45		6		
16U	3/8"U	SR0031-16U-CK2	M36x4	31.0	24	14	35	8.0	3	M3.5x12	T-15
		SR0042-16U-CK3	M48x5	42.0	31	18	35		3		
		SR0047-16U-CK4	M64x6	47.0	39	22	45		4		
		SR0058-16U-CK5	M80x6	58.0	50	28	45		5		
		SR0080-16U-CK6	M100x6	80.0	64	36	65		6		

## Thread Applications for Partial Profile Inserts

Tool holder		Min. Thread Dia.					
Designation	D2	ISO Coarse	ISO Fine	UNC	UN/UNF/UNEF/UNS	BSP(G)	Partial 55°
SR0042B16U-4	42	M48x5.0, M56x5.5 M64x6.0	M45x1.5, M45x2.0, M46x2.5, M48x3.0, M48x3.5, M48x4.0	2-4.5, 2 1/2 - 4	1 3/4 -16UN, 1 3/4 -14UNS, 1 13/16 -12UN, 1 13/16 -8UN, 1 15/16 -6UN	1 1/2 - 11	1 7/8 -16, 1 7/8 -12, 1 7/8 -8, 1 7/8 -6, 2-4.5
SR0048B16U-5	48	M56x5.5 M64x6.0	M52x1.5, M52x2.0, M52x2.5, M52x3.0, M55x4.0	2 1/4 - 4.5, 2 1/2 - 4	2-16UN, 2-14UN, 2-12UN, 2 1/4 -10UNS, 2 1/8 -8UN, 2 1/8 -6UN	1 3/4 - 11	2-16, 2 1/4 -12, 2 1/4 -8, 2 1/4 -6, 3-5, 3 1/2 -4.5, 2 1/4 -4
SR0056B16U-6	56	M64x6.0	M60x1.5, M60x2.0, M60x2.5, M60x3.0, M64x4.0	2 1/2 - 4	2 3/8 -16UN, 2 3/8 -14UN, 2 3/8 -12UN, 2 1/2 -10UNS, 2 3/8 -8UN, 2 1/2 -6UN	2 - 11	2 1/2 -16, 2 1/2 -12, 2 1/2 -8, 2 3/4 -6, 3-5, 3 1/2 -4.5, 4 1/4 -4
SR0088B22U-6	88	-	M95x6.0, M125x8	4- 4	4 1/4 -4UN	-	4-3, 4 1/4 -4
SR0098B22U-7	98	-	M105x6.0, M125x8	-	4 1/4 -4UN	-	4 1/4 -4

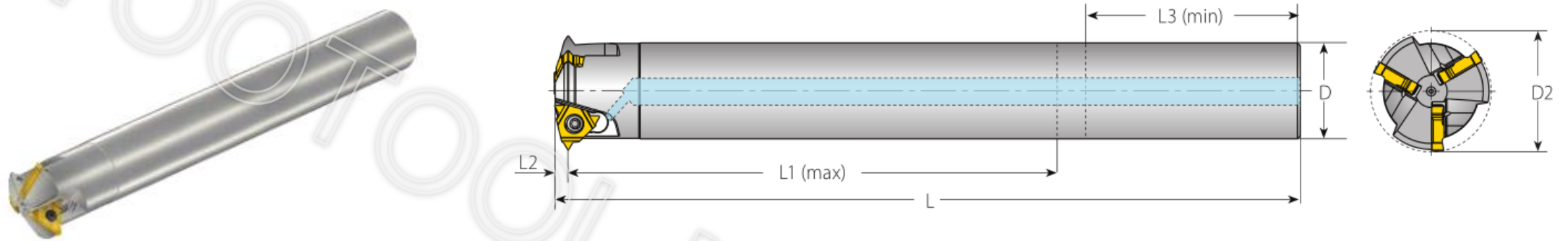
## Thread Applications for Full Profile Inserts (NPT)

Tool holder	Toolholder cutting diameter D2 (mm)	Pitch	Cylindrical or Conical pre-drilled hole	Cylindrical pre-drilled hole
	*D2 Adjustment	tpi	NPT Threading by 1 Radial Pass	**NPT Threading by 2 Radial Passes (50% / 50%)
SR0042B16U-4	41.15	11.5	1 1/2-11.5NPT; 2-11.5NPT	-
SR0042B16U-4	41.15	8	-	2 1/2...10-8NPT
SR0048B16U-5	47.15	11.5	2-11.5NPT	-
SR0048B16U-5	47.15	8	-	2 1/2...10-8NPT
SR0056B16U-6	55.15	8	-	2 1/2...10-8NPT
SR0088B22U-6	88.06	8	3 1/2 ... 160D-8NPT	160D ... 240D-8NPT
SR0098B22U-7	98.06	8	4 ... 160D-8NPT	160D ... 240D-8NPT

\* Correct the toolholder cutting diameter D2 according to adjustment, as indicated in the above table.

\*\* Note: When the pre-drilled hole for 8 NPT is conical, the thread can be machined in one pass.

## Standard Toolholders - Steel Cylindrical Shank (A Style)

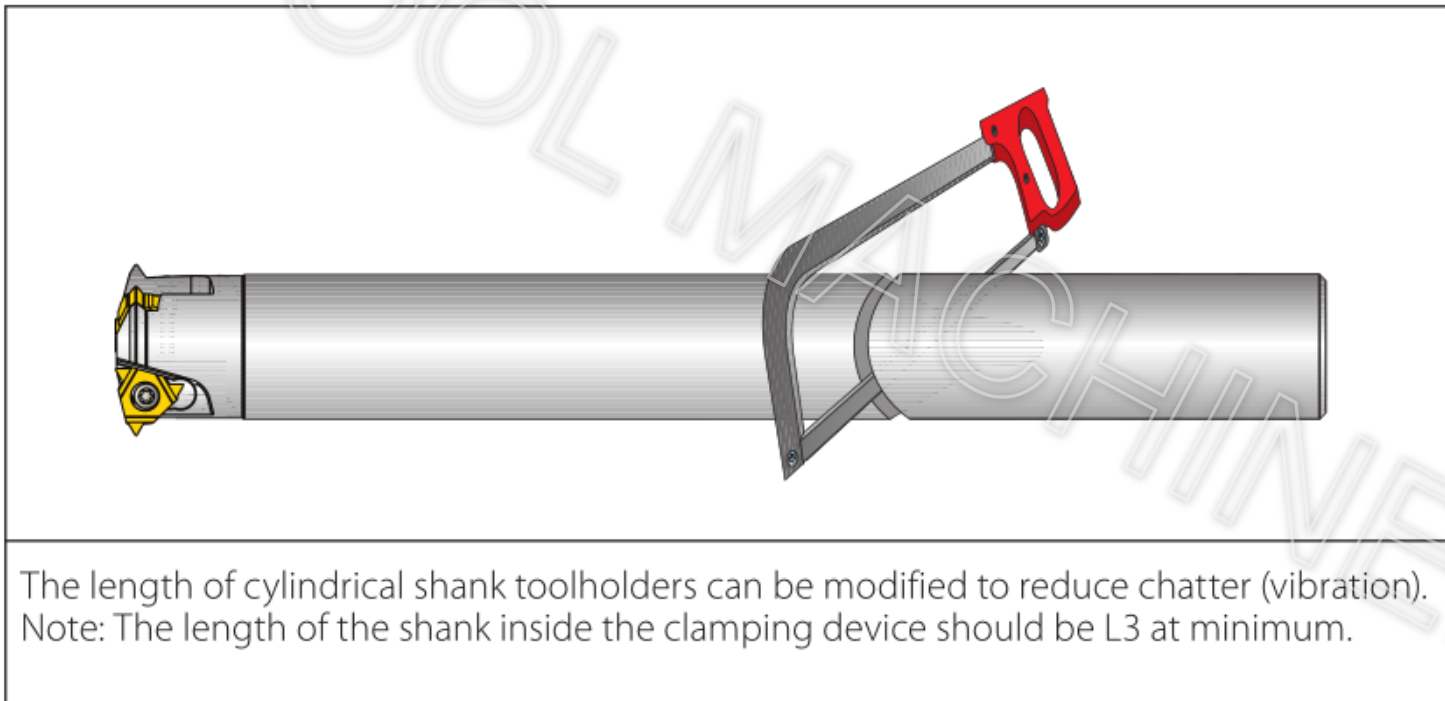


Coolant-Thru is recommended, especially when  $D2 > 0.7 \times$  nominal thread diameter

Insert Size		Designation	Dimensions (mm)						No. of Flutes	Spare Parts	
L	IC		L	L1(max)	L2	L3(min)	D	D2	Z	Screw	Wrench
11A	1/4"A	SR0026-11A-C20-184	184	105	3.0	40	20	26	3	M2.5x8	T-8
16A	3/8"A	SR0035-16A-C28-218	218	144	4.0	46	28	35.3	3	M3.5x12	T-15

## Thread Applications for Partial Profile Inserts

Tool holder			Min. Thread Dia.				
Designation	D2	ISO Coarse	ISO Fine	UNC	UN/UNF/UNEF/UNS	BSP(G)	Partial 55°
SR0026-11A-C20-184	26	-	M28x1.5, M29x2.0, M30x2.5, M30x3.0	-	1 1/8 -16UN, 1 1/8 -14UNS, 1 3/16 -12UN, 1 1/4 -10UNS, 1 3/16 -8UN	-	-
SR0035-16A-C28-218	35.3	-	M38x2.0, M39x2.5, M39x3.0, M40x4.0	-	1 9/16 -12UN, 1 5/8 -10UNS, 1 5/8 -8UN, 1 5/8 -6UN	-	-



# Recommended Grades, Cutting Speeds Vc [m/min] and Feed f [mm/tooth]

Material Group	Material		Hardness Brinell HB	Vc [m/min]		Feed* f [mm/tooth] by Cutting Dia. (D2)		
				TTIP30	TTIM45	13-23	24-42	Shell Mill
<b>P</b> steel	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	100-210	90-180	0.20-0.32	0.30-0.50	0.30-0.75
		Medium Carbon (C=0.25-0.55%)	150	100-180	90-170	0.20-0.32	0.30-0.50	0.30-0.75
		High Carbon (C=0.55-0.85%)	170	100-170	90-160	0.15-0.23	0.25-0.35	0.25-0.52
	Low Alloy Steel (alloying elements≤5%)	Non Hardened	180	60-90	90-155	0.17-0.28	0.28-0.45	0.28-0.67
		Hardened	275	80-150	80-160	0.15-0.28	0.25-0.45	0.25-0.67
		Hardened	350	70-140	70-150	0.15-0.25	0.25-0.40	0.25-0.60
	High Alloy Steel (alloying elements>5%)	Annealed	200	60-130	70-115	0.15-0.22	0.20-0.30	0.20-0.45
		Hardened	325	70-110	60-100	0.13-0.21	0.18-0.30	0.18-0.45
	Cast Steel	Low Alloy (alloying elements <5%)	200	100-170	100-170	0.15-0.22	0.20-0.30	0.20-0.45
		High Alloy (alloying elements >5%)	225	70-120	70-130	0.12-0.22	0.17-0.30	0.17-0.45
<b>M</b> Stainless steel	Stainless Steel Ferritic	Non Hardened	200	100-170	120-180	0.15-0.22	0.22-0.34	0.22-0.50
		Hardened	330	100-170	120-180	0.16-0.23	0.21-0.32	0.21-0.48
	Stainless Steel Austenitic	Austenitic	180	70-140	100-140	0.15-0.25	0.25-0.40	0.25-0.60
		Super Austenitic	200	70-140	100-140	0.12-0.20	0.17-0.26	0.17-0.39
	Stainless Steel Cast Ferritic	Non Hardened	200	70-140	100-140	0.16-0.24	0.25-0.37	0.25-0.55
		Hardened	330	70-140	100-140	0.12-0.20	0.17-0.26	0.17-0.39
	Stainless Steel Cast Austenitic	Austenitic	200	70-120	100-120	0.15-0.22	0.20-0.30	0.20-0.45
		Hardened	330	70-120	100-120	0.12-0.20	0.17-0.26	0.17-0.39

# Recommended Grades, Cutting Speeds Vc [m/min] and Feed f [mm/tooth] (Con't)

Material Group	Material		Hardness Brinell HB	Vc [m/min]		Feed* f [mm/tooth] by Cutting Dia. (D2)		
				TTIP30	TTIM45	13-23	24-42	Shell Mill
<b>K</b> Cast Iron	Malleable Cast Iron	Ferritic (short chips)	130	60-130	100-120	0.16-0.24	0.25-0.37	0.25-0.55
		Pearlitic (long chips)	230	60-120	80-100	0.15-0.22	0.20-0.30	0.20-0.45
	Grey Cast Iron	Low Tensile Strength	180	60-130	80-100	0.15-0.22	0.22-0.34	0.22-0.50
		High Tensile Strength	260	60-100	80-100	0.15-0.22	0.20-0.30	0.20-0.45
	Nodular Sg Iron	Ferritic	160	60-125	80-100	0.10-0.20	0.15-0.25	0.15-0.37
		Pearlitic	260	50-90	60-90	0.15-0.22	0.20-0.30	0.20-0.45
<b>N(K)</b> Non-Ferrous Metals	Aluminum Alloys Wrought	Non Aging	60	100-250		0.30-0.50	0.60-1.00	0.60-1.50
		Aged	100	100-180		0.28-0.50	0.50-0.90	0.50-1.20
	Aluminum Alloys	Cast	75	150-400		0.28-0.50	0.50-0.90	0.50-1.20
		Cast & Aged	90	150-280		0.25-0.40	0.40-0.60	0.40-0.90
	Aluminum Alloys	Cast Si 13-22%	130	80-150		0.28-0.50	0.50-0.90	0.50-1.20
	Copper and Copper Alloys	Brass	90	120-210	100-200	0.30-0.50	0.60-1.00	0.60-1.50
		Bronze and Non Leaded Copper	100	120-210	100-200	0.28-0.50	0.50-0.90	0.50-1.20
<b>S(M)</b> Heat Resistant Material	High Temperature Alloys	Annealed (iron based)	200	20-45	20-40	0.09-0.15	0.12-0.22	0.12-0.33
		Aged (iron based)	280	20-30	20-30	0.07-0.13	0.10-0.20	0.10-0.30
		Annealed (nickel or cobalt based)	250	15-20	15-20	0.08-0.15	0.08-0.20	0.08-0.30
		Aged (nickel or cobalt based)	350	10-15	10-15	0.08-0.15	0.08-0.20	0.08-0.30
	Titanium Alloys	Pure 99.5 Ti	400Rm	70-140	70-120	0.07-0.13	0.10-0.20	0.10-0.30
		α+β alloys	1050Rm	20-50	20-50	0.07-0.13	0.10-0.20	0.10-0.30