



**ALLIED MACHINE &  
ENGINEERING CORP.**

**AccuThread 856™**

**Thread Milling  
Products**



**the  
HOLE  
advantage**

Represented By:





# AccuThread 856™ Reference

## AccuThread 856™ Item Number

**TM** **U**  
 Thread Mill Thread Class

U - UN, UNF  
 N - NPT, NPTF  
 M - Metric  
 A - AccuPort Specific

**K** **0250**  
 Coating Cutter Diameter

K - AM210™  
 H - AM200  
 T - TiN  
 A - TiAlN  
 N - TiCN  
 U - Uncoated

English - 0250 = 1/4  
 Number Drill - 0008 = #8  
 Metric - 0450 = M 4.5

**20**  
 Thread Pitch

NPT  
 NPTF  
 Metric  
 UN

**S**  
 Special Features  
 (Quoted as Specials)  
 M - Metric Shank  
 S - Straight Fluted  
 C - Coolant

### Thread Specification and Drill Chart

Thread Specification	Use this drill	Closest Fraction	Decimal Inches	Thread Specification	Use this drill	Closest Fraction	Decimal Inches
2-56	#50	-	0.0700	1/2-20	29/64"	29/64"	0.4531
3-56	#45	-	0.0820	1/2-24	29/64"	29/64"	0.4531
4-40	#43	3/32"	0.0890	M14-2.0	12.2mm	-	0.4803
1/8-40	#38	-	0.1015	9/16-12	31/64"	31/64"	0.4844
5-40	#38	-	0.1015	M14-1.5	12.7mm	-	0.4999
6-40	#33	-	0.1130	M14-1.25	12.8mm	-	0.5039
M4-.07	3.4mm	-	0.1338	9/16-18	33/64"	33/64"	0.5156
M4-.075	3.4mm	-	0.1338	5/8-11	17/32"	17/32"	0.5312
8-32	#29	-	0.1360	M16-2.0	14.2mm	35/64"	0.5590
8-40	#28	-	0.1405	5/8-18	37/64"	37/64"	0.5781
3/16-24	#26	-	0.1470	M16-1.5	14.7mm	-	0.5787
10-24	#25	5/32"	0.1495	11/16-11	19/32"	19/32"	0.5938
3/16-32	#22	-	0.1570	M18-2.5	15.8mm	39/64"	0.5220
10-32	#21	5/32"	0.1590	11/16-16	5/8"	5/8"	0.6250
M5-.09	4.2mm	-	0.1653	3/4-10	21/32"	21/32"	0.6562
M5-.08	4.3mm	-	0.1693	M18-1.5	16.8mm	-	0.6614
12-24	#16	11/64"	0.1770	3/4-16	11/16"	11/16"	0.6875
12-28	#14	3/16"	0.1820	M20-2.5	17.8mm	11/16"	0.7008
12-32	#13	-	0.1850	7/8-9	49/64"	49/64"	0.7656
14-20	#10	-	0.1935	7/8-14	13/16"	13/16"	0.8125
1/4-20	#7	13/64"	0.2010	M22-1.5	20.9mm	-	0.8228
14-24	#7	-	0.2010	7/8-18	53/64"	53/64"	0.8281
M6-1.0	5.2mm	-	0.2047	M24-3.0	21.4mm	53/64"	0.8425
1/4-24	#4	-	0.2090	1 - 8	7/8"	7/8"	0.8750
1/4-28	#3	7/32"	0.2130	M24-2.0	22.3mm	-	0.8779
1/4-32	7/32"	7/32"	0.2188	1 - 12	59/64"	59/64"	0.9219
1/4-40	#1	-	0.2280	1-14	15/16"	15/16"	0.9375
M7-1.0	6.1mm	15/64"	0.2401	1-1/8 - 7	63/64"	63/64"	0.9844
5/16-18	Ltr.F	17/64"	0.2570	1-1/8 - 12	1-3/64"	1-3/64"	1.0469
M8-1.25	6.9mm	17/64"	0.2716	1-1/4 - 7	1-7/64"	1-7/64"	1.1094
5/16-24	Ltr.I	-	0.2720	1-1/4 - 12	1-11/64"	1-11/64"	1.1719
M8-1.0	7.1mm	-	0.2795	1-3/8 - 6	1-7/32"	1-7/32"	1.2188
5/16-32	9/32"	9/32"	0.2812	1-3/8 - 12	1-19/64"	1-19/64"	1.2969
M9-1.25	7.9mm	-	0.3110	1-1/2 - 6	1-11/32"	1-11/32"	1.3438
3/8-16	5/16"	5/16"	0.3125	1-1/2 - 12	1-27/64"	1-27/64"	1.4219
M9-1.0	8.1mm	-	0.3189				
M9-0.75	8.3mm	-	0.3268				
3/8-24	Ltr.Q	21/64"	0.3320				
M10-1.5	8.7mm	-	0.3425				
M10-1.25	8.9mm	11/32"	0.3503				
M10-1.0	9.1mm	-	0.3583				
7/16-14	Ltr.U	23/64"	0.3680				
M11-1.5	9.7mm	-	0.3818				
7/16-20	25/64"	25/64"	0.3906				
M12-1.75	10.5mm	-	0.4133				
M12-1.5	10.7mm	27/64"	0.4212				
1/2-13	27/64"	27/64"	0.4291				
M12-1.25	10.9mm	27/64"	0.4291				

### NPT Thread Mill Chart

Thread Specification	Use this drill	Closest Fraction	Decimal Inches
1/8-27 NPT	R	-	0.3390
1/4-18 NPT	7/16"	7/16"	0.4375
3/8-18 NPT	37/64"	37/64"	0.5781
1/2-14 NPT	45/64"	45/64"	0.7031
3/4-14 NPT	59/64"	59/64"	0.9219
1 - 11-1/2 NPT	1-5/32"	1-5/32"	1.1562
1-1/4 - 11.5 NPT	1-1/2"	1-1/2"	1.5000
1-1/2 - 11.5 NPT	1-47/64"	1-47/64"	1.7344
2 - 11.5 NPT	2-7/32"	2-7/32"	2.2188

### Number of passes for cutting various NPT/NPTF threads

Thread Size	Materials		
	Easy to machine	Average to machine	Difficult to machine
1/16 NPT	1	1	2
1/8 NPT	1	1	2
1/4 NPT	1	1	2
3/8 NPT	1	1	2
1/2 NPT	1	2	3
3/4 NPT	1	2	3
1" NPT	1	2	3
1-1/4" NPT	1	2	3
1-1/2" NPT	1	2	3
2" NPT	1	2	3
2-1/2" NPT	2	3	4
3" NPT	2	3	4
3-1/2" NPT	2	3	4
4" NPT	2	3	4
5" NPT	2	3	4
6" NPT	2	3	4

### Number of passes for cutting various metric threads

Thread Size	Easy to machine	Average to machine	Difficult to machine
M4.5 x .75	1	2	2
M5 x .8	1	2	2
M6 x .75	1	2	2
M6 x 1	1	2	2
M8 x .75	1	2	2
M8 x 1.25	2	2	3
M10 x 1	1	1	2
M10 x 1.5	2	2	3
M12 x 1	1	1	2
M12 x 1.75	2	2	3
M14 x 1.5	1	2	2
M14 x 2.0	2	2	3
M16 x 1	1	2	2
M16 x 2.0	2	2	3
M18 x 1.5	1	2	2
M18 x 2	2	2	3
M20 x 2.5	2	2	3
M24 x 2	2	3	4

### Number of passes for cutting various UN threads

Thread Size	Easy to machine	Average to machine	Difficult to machine
#2-56	2	3	3
#4-40	2	3	3
#5-40	2	3	3
#6-32	2	2	3
#8-32	2	2	3
#10-24	2	2	3
#10-32	1	2	2
#12-24	2	2	3
#12-28	1	2	2
1/4-20	2	2	3
1/4-28	1	1	2
5/16-18	2	2	3
5/16-24	1	1	2
3/8-16	2	2	3
3/8-24	1	1	2
7/16-14	2	2	3
7/16-20	1	1	2
1/2-13	2	2	3
1/2-20	1	1	2
9/16 - 12	2	2	3
9/16 - 18	1	2	2
5/8 - 11	2	2	3
5/8 - 18	1	2	2
3/4 - 10	2	2	3
3/4 - 16	1	2	2
7/8 - 9	2	2	3
7/8 - 14	1	2	2
1 - 8	2	3	4
1 - 12	2	2	2
1 - 14	2	2	2

Easy machining materials: Non-ferrous and leaded steels  
 Average machining materials: Carbon and alloy steels up to 30 Rc, 300 and 400 series stainless  
 Difficult machining materials: Inconels, harder steels, titanium, 17-4PH stainless

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- AccuPort 432® specific Thread Mills available as standard items. Conforms with J1926 and SAE AS5202.
- AccuThread 856™ has a thicker core and a helical flute which offers increased strength and rigidity when cutting forces are applied.
- AccuThread 856™ standard cutting lengths allow for multiple applications without the need for special thread mills.
- AccuThread 856™ provides superior thread forms compared to other competitive thread mills and taps.
- AccuThread 856™ is backed by the highly experienced technical staff you come to expect from AMEC.
- Allied Machine & Engineering Corp.'s website has a CNC programming software to create CNC G code programs online at [www.alliedmachine.com](http://www.alliedmachine.com)
- AMEC's new AM210™ coating has a 40% increase in tool life over the competition.

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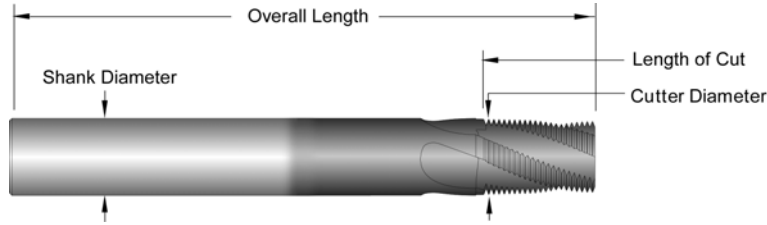
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# AccuThread 856™

inch

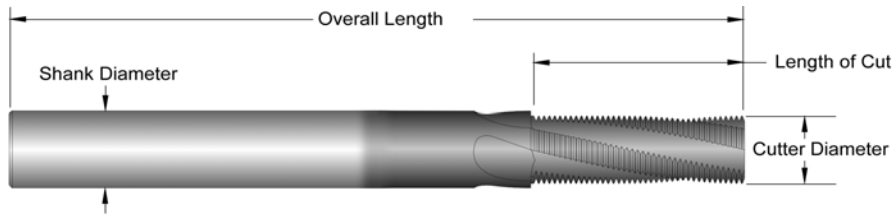


## NPT Thread Mills

NPT Size	Item Number	Pitch	Flutes	Cutter Diameter	Shank Diameter	Length of Cut	Overall Length	*AM210™ ①
1/16 and 1/8 NPT	TMNK0063-NPT	27	3	0.245	0.250	0.437	2.500	●
1/4 and 3/8 NPT	TMNK0250-NPT	18	4	0.305	0.312	0.625	3.000	●
1/2 and 3/4 NPT	TMNK0500-NPT	14	4	0.495	0.500	0.875	3.500	●
1" to 2" NPT	TMNK1000-NPT	11.5	4	0.620	0.625	1.125	4.000	●
2-1/2" to 6" NPT	TMNK2500-NPT	8	4	0.745	0.750	1.500	5.000	●

## NPTF Thread Mills

NPTF Size	Item Number	Pitch	Flutes	Cutter Diameter	Shank Diameter	Length of Cut	Overall Length	*AM210™ ①
1/16 and 1/8 NPTF	TMNK0063-NPTF	27	3	0.245	0.250	0.437	2.500	●
1/4 and 3/8 NPTF	TMNK0250-NPTF	18	4	0.305	0.312	0.625	3.000	●
1/2 and 3/4 NPTF	TMNK0500-NPTF	14	4	0.495	0.500	0.875	3.500	●
1" to 2" NPTF	TMNK1000-NPTF	11.5	4	0.620	0.625	1.125	4.000	●
2-1/2" to 6" NPTF	TMNK2500-NPTF	8	4	0.745	0.750	1.500	5.000	●



## UN Thread Mills \* Items marked with an asterisk are straight fluted.

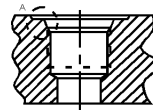
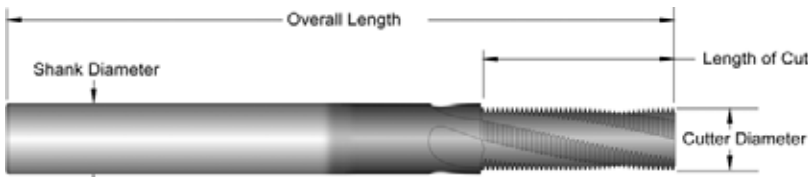
Minimum Thread Size	Pitch	Item Number	Flutes	Cutter Diameter	Shank Diameter	Length of Cut	Overall Length	*AM210™ ①
#2	56	TMUK0002-56	3*	0.065	0.125	0.125	2.000	●
#4	40	TMUK0004-40	3*	0.085	0.125	0.175	2.000	●
#6	32	TMUK0006-32	3	0.100	0.125	0.218	2.000	●
#8	32	TMUK0008-32	3	0.115	0.125	0.250	2.000	●
#10	32	TMUK0010-32	3	0.120	0.125	0.312	2.000	●
#10	28	TMUK0010-28	3	0.120	0.125	0.312	2.000	●
1/4	28	TMUK0250-28	3	0.180	0.187	0.500	2.500	●
#10	24	TMUK0010-24	3	0.120	0.125	0.312	2.000	●
5/16	24	TMUK0313-24	3	0.235	0.250	0.625	2.500	●
3/8	24	TMUK0375-24	4	0.285	0.312	0.750	3.000	●
1/4	20	TMUK0250-20	3	0.180	0.187	0.500	2.500	●
7/16	20	TMUK0438-20	4	0.335	0.375	0.875	3.500	●
5/16	18	TMUK0313-18	3	0.235	0.250	0.625	2.500	●
9/16	18	TMUK0563-18	4	0.370	0.375	0.875	3.500	●
3/8	16	TMUK0375-16	4	0.285	0.312	0.750	3.000	●
3/4	16	TMUK0750-16	4	0.490	0.500	1.250	3.500	●
7/16	14	TMUK0438-14	4	0.305	0.312	0.750	3.000	●
7/8	14	TMUK0875-14	4	0.409	0.500	1.250	3.500	●
1/2	13	TMUK0500-13	4	0.350	0.375	0.875	3.500	●
9/16	12	TMUK0563-12	4	0.370	0.375	0.875	3.500	●
3/4	12	TMUK0750-12	4	0.495	0.500	1.250	3.500	●
5/8	11	TMUK0625-11	4	0.470	0.500	1.250	3.500	●
3/4	10	TMUK0750-10	4	0.495	0.500	1.250	3.500	●
7/8	9	TMUK0875-9	4	0.620	0.625	1.375	4.000	●
1	8	TMUK1000-8	4	0.620	0.625	1.375	4.000	●

### ① Availability Codes

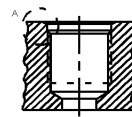
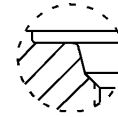
- Stocked.
- ▲ Non-stocked

\*All other coatings are non-stocked standards 10 to 15 day delivery.

# AccuThread 856™ inch



SAE J-1926-1/ISO 11926-1



SAE AS5202

Accuport Specific - International Unified Series (UN) manufactured specifically for use with AccuPort 432® hydraulic port forms. The length of cut allows full thread with one pass. Conforms with J1926 and SAE AS5202 port form spec.

## AccuPort 432® Specific Thread Mills (For use with AccuPort 432® Port Contour Cutter)

Port Size	Pitch	Item Number	Flutes	Cutter Diameter	Shank Diameter	Length of Cut	Overall Length	*AM210™ ●
-4 to -5	20	TMAK0438-20	4	0.335	0.375	0.600	3.5	●
-6	18	TMAK0563-18	4	0.370	0.375	0.666	3.5	●
-8	16	TMAK0750-16	4	0.495	0.500	0.750	3.5	●
-10	14	TMAK0875-14	4	0.495	0.500	0.857	3.5	●
-12 to -32	12	TMAK1063-12	4	0.495	0.500	0.917	3.5	●



## AccuPort 432® AccuThread 856™ Ferrous Material Kit

Tube Dash Number	Port Thread Size	Port Contour Cutter Number	QTY	T-A® Drill Item Numbers		Port Form Insert Item Numbers		AccuThread 856™ Item Numbers		Kit Item Number
				Super Cobalt (AM200®)	QTY	C5 Carbide (TiAlN)	QTY	Solid Carbide (AM210™)	QTY	
- 4	7/16-20 UNF-2B	J1926-04Y-063F	1	15YA-.386	2	J1926-02-C5A	2	TMAK0438-20	1	ATK-K-04
- 5	1/2-20 UNF-2B	J1926-05Z-063F	1	45ZH-11.5	2	J1926-02-C5A	2	TMAK0438-20	1	ATK-K-05
- 6	9/16-18 UNF-2B	J1926-060-075F	1	450H-13	2	J1926-02-C5A	2	TMAK0563-18	1	ATK-K-06
- 8	3/4-16 UNF-2B	J1926-080-075F	1	450H-0022	2	J1926-07-C5A	2	TMAK0750-16	1	ATK-K-08
-10	7/8-14 UNF-2B	J1926-101-100F	1	451H-20.5	2	J1926-07-C5A	2	TMAK0875-14	1	ATK-K-10
-12	1 1/16-12 UN-2B	J1926-122-125F	1	452H-25	2	J1926-08-C5A	2	TMAK1063-12	1	ATK-K-12
-14	1 3/16-12 UN-2B	J1926-142-125F	1	452H-28	2	J1926-08-C5A	2	TMAK1063-12	1	ATK-K-14
-16	1 5/16-12 UN-2B	J1926-162-125F	1	452H-31	2	J1926-08-C5A	2	TMAK1063-12	1	ATK-K-16
-20	1 5/8-12 UN-2B	J1926-203-150F	1	453H-39	1	J1926-10-C5A	2	TMAK1063-12	1	ATK-K-20
-24	1 7/8-12 UN-2B	J1926-243-150F	1	453H-45.5	1	J1926-10-C5A	2	TMAK1063-12	1	ATK-K-24
-32	2 1/2-12 UN-2B	J1926-324-150F	1	454H-61.5	1	J1926-12-C5A	2	TMAK1063-12	1	ATK-K-32

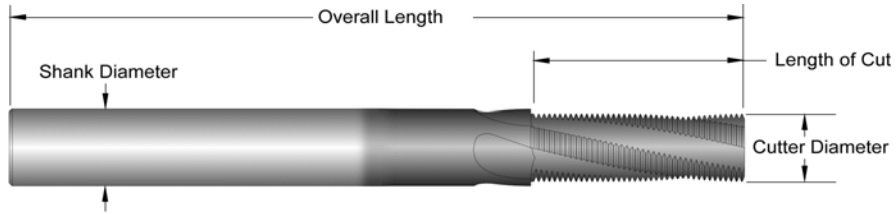
## AccuPort 432® AccuThread 856™ Non-ferrous Material Kit

Tube Dash Number	Port Thread Size	Port Contour Cutter Number	QTY	T-A® Drill Item Numbers		Port Form Insert Item Numbers		AccuThread 856™ Item Numbers		Kit Item Number
				Super Cobalt (TiN)	QTY	C5 Carbide (TiAlN)	QTY	Solid Carbide (Uncoated)	QTY	
- 4	7/16-20 UNF-2B	J1926-04Y-063F	1	15YT-.386	2	J1926-02-C5A	2	TMAU0438-20	1	ATK-U-04
- 5	1/2-20 UNF-2B	J1926-05Z-063F	1	15ZT-11.5	2	J1926-02-C5A	2	TMAU0438-20	1	ATK-U-05
- 6	9/16-18 UNF-2B	J1926-060-075F	1	150T-13	2	J1926-02-C5A	2	TMAU0563-18	1	ATK-U-06
- 8	3/4-16 UNF-2B	J1926-080-075F	1	150T-0022	2	J1926-07-C5A	2	TMAU0750-16	1	ATK-U-08
-10	7/8-14 UNF-2B	J1926-101-100F	1	151T-20.5	2	J1926-07-C5A	2	TMAU0875-14	1	ATK-U-10
-12	1 1/16-12 UN-2B	J1926-122-125F	1	152T-25	2	J1926-08-C5A	2	TMAU1063-12	1	ATK-U-12
-14	1 3/16-12 UN-2B	J1926-142-125F	1	152T-28	2	J1926-08-C5A	2	TMAU1063-12	1	ATK-U-14
-16	1 5/16-12 UN-2B	J1926-162-125F	1	152T-31	2	J1926-08-C5A	2	TMAU1063-12	1	ATK-U-16
-20	1 5/8-12 UN-2B	J1926-203-150F	1	453T-39	1	J1926-10-C5A	2	TMAU1063-12	1	ATK-U-20
-24	1 7/8-12 UN-2B	J1926-243-150F	1	453T-45.5	1	J1926-10-C5A	2	TMAU1063-12	1	ATK-U-24
-32	2 1/2-12 UN-2B	J1926-324-150F	1	454T-61.5	1	J1926-12-C5A	2	TMAU1063-12	1	ATK-U-32

\*All other coatings are non-stocked standards 10 to 15 day delivery.



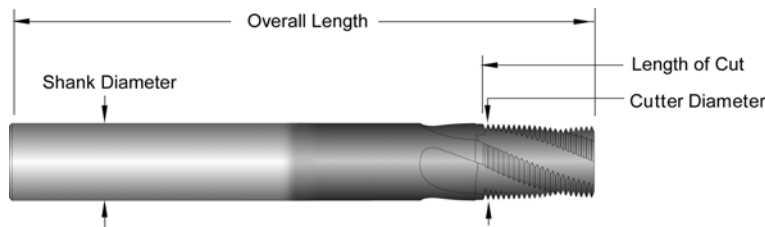
# AccuThread 856™ metric



Metric Thread Mills									
Minimum Thread Size	Pitch	Item Number	Flutes	Cutter Diameter		Shank Diameter	Length of Cut	Overall Length	*AM210™ ●
				Inch	mm				
M4.5	0.75	TMMK0450-075	3	0.120	3.048	0.125	0.250	2.000	●
M8	0.75	TMMK0800-075	3	0.235	5.969	0.250	0.625	2.500	●
M5	0.8	TMMK0500-080	3	0.120	3.048	0.125	0.312	2.000	●
M6	1.0	TMMK0600-100	3	0.170	4.318	0.187	0.500	2.500	●
M12	1.0	TMMK1200-100	4	0.360	9.144	0.375	0.875	3.500	●
M8	1.25	TMMK0800-125	3	0.235	5.969	0.250	0.625	2.500	●
M10	1.5	TMMK1000-150	4	0.300	7.620	0.312	0.750	3.000	●
M14	1.5	TMMK1400-150	4	0.370	9.398	0.375	0.875	3.500	●
M18	1.5	TMMK1800-150	4	0.490	12.446	0.500	1.250	3.500	●
M12	1.75	TMMK1200-175	4	0.360	9.144	0.375	0.875	3.500	●
M16	2.0	TMMK1600-200	4	0.470	11.938	0.500	1.250	3.500	●
M20	2.5	TMMK2000-250	4	0.495	12.573	0.500	1.250	3.500	●
M24	3.0	TMMK2400-300	4	0.620	15.748	0.625	1.375	4.000	●

## Made to order tool specification - Priced on Request

Fax or mail a copy of the table below to AMEC's Application Engineering Department (330) 364-7666 to receive pricing for a special thread mill.



Thread Size	Thread Form	Pitch	# Flutes	Cutter Diameter	Shank Diameter	Length of Cut	OAL	Flute Style	Coating	QTY
Company Name			Contact Name			Telephone		Fax		
Distributor Name			Distributor Contact Name			Telephone		Fax		

### ● Availability Codes

- Stocked.
- ▲ Non-stocked

\*All other coatings are non-stocked standards 10 to 15 day delivery.

# AccuThread 856™ Recommended Speeds and Feeds

## inch



MATERIAL	Material Hardness (BHN)	Material Machinability	AM210™ SFM	Cutter Diameter (in)							
				Inches Per Tooth (IPT)							
				1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
Free Machining Steel 1118, 1215, 12L14	110-150	Easy	500	0.0003	0.0006	0.0010	0.0018	0.0025	0.0030	0.0040	0.0050
	150-200	Easy	475	0.0003	0.0006	0.0010	0.0018	0.0025	0.0030	0.0040	0.0050
	200-250	Easy	450	0.0003	0.0006	0.0010	0.0018	0.0025	0.0030	0.0040	0.0050
Low Carbon Steel 1010, 1020, 1025, 1522, 1144	85-125	Average	500	0.0003	0.0006	0.0010	0.0018	0.0025	0.0030	0.0040	0.0050
	125-175	Average	475	0.0003	0.0006	0.0010	0.0018	0.0025	0.0030	0.0040	0.0050
	175-225	Average	450	0.0003	0.0006	0.0010	0.0018	0.0025	0.0030	0.0040	0.0050
	225-275	Average	425	0.0003	0.0006	0.0010	0.0018	0.0025	0.0030	0.0040	0.0050
Medium Carbon Steel 1010, 1040, 1050, 1527, 1140	125-175	Average	450	0.0003	0.0006	0.0007	0.0010	0.0015	0.0020	0.0025	0.0030
	175-225	Average	375	0.0003	0.0006	0.0007	0.0010	0.0015	0.0020	0.0025	0.0030
	225-275	Average	300	0.0002	0.0004	0.0006	0.0009	0.0014	0.0018	0.0023	0.0027
	275-325	Average	250	0.0002	0.0004	0.0006	0.0009	0.0014	0.0018	0.0023	0.0027
Alloy Steel 4140, 5140, 8640	125-175	Average	350	0.0003	0.0005	0.0008	0.0010	0.0013	0.0018	0.0028	0.0030
	175-225	Average	310	0.0003	0.0005	0.0007	0.0010	0.0013	0.0018	0.0025	0.0030
	225-275	Average	290	0.0003	0.0004	0.0007	0.0009	0.0012	0.0017	0.0025	0.0030
	275-325	Difficult	270	0.0003	0.0004	0.0007	0.0009	0.0012	0.0016	0.0024	0.0030
	325-375	Difficult	250	0.0003	0.0003	0.0007	0.0009	0.0012	0.0015	0.0023	0.0030
High Strength Alloy 4340, 4330V, 300M	225-300	Average	290	0.0003	0.0004	0.0007	0.0010	0.0013	0.0018	0.0028	0.0030
	300-350	Difficult	275	0.0003	0.0004	0.0007	0.0010	0.0013	0.0015	0.0025	0.0025
	350-400	Difficult	250	0.0003	0.0004	0.0006	0.0009	0.0012	0.0015	0.0023	0.0020
Structural Steel A36, A285, A516	100-150	Average	400	0.0003	0.0004	0.0007	0.0010	0.0015	0.0020	0.0025	0.0030
	150-250	Average	350	0.0003	0.0004	0.0006	0.0009	0.0012	0.0015	0.0020	0.0025
	250-350	Difficult	300	0.0003	0.0004	0.0005	0.0007	0.0010	0.0010	0.0015	0.0020
High Temperature Alloy Hastelloy B, Inconel 600	140-220	Difficult	260	0.0003	0.0006	0.0008	0.0013	0.0015	0.0025	0.0028	0.0030
	220-310	Difficult	250	0.0003	0.0004	0.0005	0.0007	0.0012	0.0015	0.0020	0.0030
Stainless Steel 303, 416, 420, 17-4PH	135-185	Average	400	0.0003	0.0004	0.0006	0.0010	0.0013	0.0020	0.0025	0.0030
	185-275	Difficult	250	0.0003	0.0004	0.0005	0.0008	0.0011	0.0016	0.0020	0.0025
Tool Steel H-13, H21, A-4	150-200	Difficult	325	0.0003	0.0004	0.0007	0.0010	0.0015	0.0020	0.0025	0.0030
	200-250	Difficult	250	0.0003	0.0004	0.0007	0.0010	0.0015	0.0020	0.0025	0.0030
*Aluminum	30	Easy	1200	0.0004	0.0008	0.0012	0.0020	0.0025	0.0035	0.0045	0.0055
	180	Easy	1000	0.0004	0.0008	0.0010	0.0016	0.0020	0.0030	0.0040	0.0050
Cast Iron Gray, Ductile, Nodular	120-150	Easy	500	0.0005	0.0007	0.0010	0.0015	0.0020	0.0040	0.0050	0.0060
	150-200	Easy	475	0.0005	0.0007	0.0010	0.0015	0.0019	0.0038	0.0048	0.0058
	200-220	Easy	450	0.0004	0.0006	0.0009	0.0014	0.0018	0.0035	0.0045	0.0055
	220-260	Average	425	0.0004	0.0006	0.0009	0.0013	0.0017	0.0032	0.0042	0.0052
	260-320	Average	400	0.0004	0.0006	0.0009	0.0012	0.0016	0.0030	0.0040	0.0050
Brass	30-125	Easy	1000	0.0004	0.0007	0.0010	0.0015	0.0020	0.0030	0.0040	0.0050

**Formulas:** Linear Feed Rate = RPM • (IPT • # of Teeth)      SFM = RPM • 0.262 • DIA.      RPM = (SFM • 3.82)/DIA.

**Adjusted Feed Rate (AFR) for Internal Thread Milling = ((Major DIA. - Cutter DIA.) / Major DIA.) • Linear Feed Rate**

The above formula on an internal thread program adjusts the linear feedrate to be applied to the O.D. instead of the center of the cutting tool. If the feedrate is not adjusted, the excessive feed rate will cause the thread mill cutting edges to fail.

**Example of an Internal Thread Feed Rate Calculation:** Cast Iron 125 BHN with a 1/2-13 thread form

Step 1	Step 2	Step 3
RPM = (SFM • 3.82) / DIA.	Linear Feed Rate = RPM • (IPT • # of Teeth)	AFR for Internal Thread Milling = ((Major DIA. - Cutter DIA.) / Major DIA.) • Linear Feed Rate
RPM = (500 • 3.82) / .350	Linear Feed Rate = 5457 • (.0015 • 4)	AFR for Internal Thread Milling = ((.500 - .350) / .500) • 32.74
RPM = 5457	Linear Feed Rate = 32.74 IPM	AFR for Internal Thread Milling = 9.88 IPM

**Note: Reduce feed and speed by 70% for NPT and NPTF Thread Forms due to tapered cutting action.**

\* Uncoated thread mills are recommended for aluminum applications.



# AccuThread 856™ Sample Programming Guide

- Thread Milling can be easily accomplished with simple G code programming.
- If your machine is capable of 3 axis (Helical) Interpolation, you can and should be thread milling.
- Basic programming of a one pass thread mill can be achieved in 6 basic steps (see below).

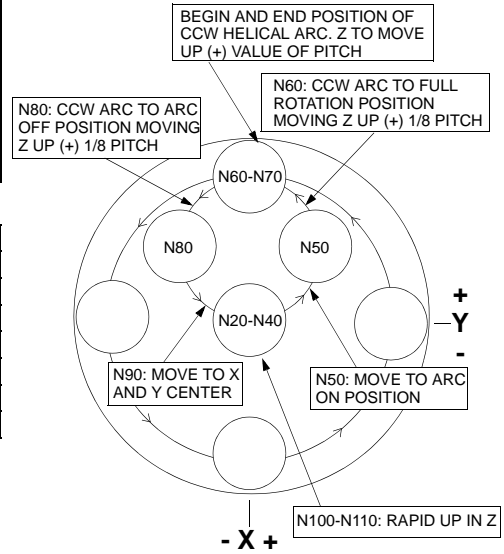
The following are examples of how to calculate and program a 7/16-20 right hand thread that will be 1/2" deep and produced in one pass.

Maj Thread Diameter	0.4375	Major diameter of thread (7/16 = .4375)
Threads Per Inch	20	Number of threads per inch (20 is from 7/16-20 designation)
Length Of Thread	0.5	Desired length of thread
SFM	475	Recommended surface footage for material to be cut
Feed Per Flute	0.0025	Recommended feet rate per cutting edge
Number Of Flutes	4	Number of flutes on tool to be used
Tool Diameter	0.335	Diameter of cutting tool - specified on pages 4 through 6

## Using the information below, the values can be calculated

Pitch	0.05	= 1/Threads Per Inch
RPM	5416	(SFM • 3.82)/Tool Dia
Linear Feed	54.16	RPM • Feed Per Flute • Number of Flutes
Feed Rate for Thread Milling	12.69	Linear Feed • ((Maj Thread Dia - Tool Dia)/Maj Thread Dia)
Z axis move for full Thread	0.5063	(pitch/8)+Length Of Thread
Z axis move on Arc On	0.0063	(pitch/8)
Arc On/Off Value	0.0256	(Maj Thread Dia-Tool Dia)/4
Full Rotation Value	0.05125	(Maj Thread Dia-Tool Dia)2

Maj Thread Dia	0.4375	Feed Rate for Thread Milling	12.69	Arc On/Off Value	0.0256
Cutter Diameter	0.335	Z Axis Depth for Full Thread	0.5063	Full Rotation Value	0.05125
Length of Thread	0.5	Z Axis Move for Arc On/Off	0.0063	Pitch Value	0.05



## Incremental Program for 1 Pass Thread Mill

```

1 N10 S 5416 M03
  N20 G90 G00 X 0.0000 Y 0.0000
  N30 Z 0.0000

2 N40 G91 G01 Z -0.5063 F 50.0
  N50 G41 G01 X 0.0256 Y 0.0256 D 1 F 3.17
  N60 G03 X -0.0256 Y 0.0256 Z 0.0063 I -0.0256 J 0.0000 F 12.69
  N70 G03 X 0.0000 Y 0.0000 Z 0.0500 I 0.0000 J -0.0513 F 12.69
  N80 G03 X -0.0256 Y -0.02563 Z 0.0063 I 0.0000 J - 0.0256 F 25.38
  N90 G40 G01 X 0.0256 Y -0.0256 F50.0
  N100 G00 Z 0.4438
  N110 G90 G00 Z 1.0000
  
```

**1** ABSOLUTE POSITION IN RAPID TO CENTER OF HOLE IN X AND Y, THEN RAPID TO Z0 (LEVEL WITH SURFACE OF HOLE) (ASSUMED TO BE X0, Y0, Z0 FOR DEMONSTRATION PURPOSES). TO BE DONE BY CUSTOMER.

**2** SWITCH TO INCREMENTAL POSITIONING AND HIGH FEED TO (Z AXIS DEPTH FOR FULL THREAD).

**3** ACTIVATE LEFT DIAMETER COMPENSATION FOR TOOL NUMBER 1 (NEEDS TO BE WHATEVER TOOL NUMBER YOU ARE USING) AND FEED TO (ARC ON/OFF POSITION) AT 1/4 (FEED RATE FOR THREAD MILLING).

**4** CCW ARC TO FULL ROTATION FROM THE ARC ON POSITION AT THE CALCULATED THREAD MILLING FEEDRATE MOVING Z UP (+) 1/8 PITCH VALUE (Z AXIS MOVE UP FOR ARC ON/OFF). X AND Y POSITIONS ARE THE INCREMENTAL DISTANCE FROM WHERE TOOL IS TO WHERE IT WILL BE AFTER ARC (ARC ON/OFF VALUE) . I IS THE INCREMENTAL X VALUE OF CENTER OF ROTATION FROM WHERE TOOL CURRENTLY IS (ARC ON/OFF VALUE • - 1) . J IS THE INCREMENTAL Y VALUE FROM CURRENT TOOL POSITION TO CENTER OF ROTATION.

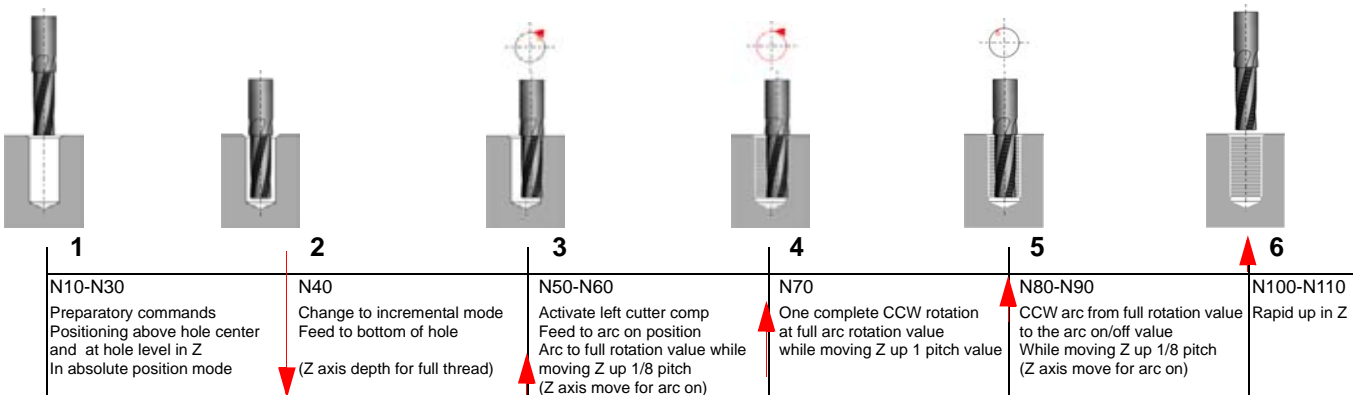
**5** ONE COMPLETE CCW ARC FROM THE FULL ARC ROTATION POSITION AT THE CALCULATED THREAD MILLING FEEDRATE MOVING Z UP ( POSITIVE PITCH VALUE). I AND J VALUES ARE CALCULATED THE SAME AS ABOVE. I WILL BE 0.0 AND J WILL BE (FULL ROTATION VALUE • - 1).

**6** CCW ARC FROM FULL ROTATION DIAMETER TO ARC OFF POSITION AT DOUBLE THE CALCULATED THREAD MILLING FEED RATE MOVING Z UP (+) 1/8 PITCH VALUE (Z AXIS MOVE UP FOR ARC ON/OFF). I AND J VALUES ARE CALCULATED SAME AS ABOVE.

**7** SHUT OFF CUTTER COMP AND MOVE FROM ARC OFF POSITION TO CENTER OF HOLE IN X (ARC ON/OFF VALUE -1) AND Y (ARC ON/OFF VALUE • - 1) AT HIGH FEED RATE.

**8** RAPID Z UP INCREMENTAL VALUE (LENGTH OF THREAD - ALL Z VALUES IN G03 ARC COMMANDS).

**9** SWITCH BACK TO ABSOLUTE POSITIONING AND RAPID TO A SAFE POINT IN Z ABOVE PART LEVEL (ASSUMED TO BE 1" ABOVE PART LEVEL FOR DEMONSTRATION PURPOSES).



# AccuThread 856™ Application Request Form



**Allied Machine & Engineering Corp.**

Telephone: (330) 343-4283

Toll Free USA & Canada: (800) 321-5537

Engineering Fax: (330) 364-7666

www.alliedmachine.com

- Guaranteed Test
- Program

Distributor P.O.#: \_\_\_\_\_

**The following form must be filled out completely before test will be considered.**

Distributor: _____	End User: _____
Contact: _____	Contact: _____
Branch or City: _____	Industry: _____
Phone: _____	Phone: _____
Email: _____	Email: _____

## Application Information

Thread Size and Pitch: \_\_\_\_\_ Thread Depth: \_\_\_\_\_ Material: \_\_\_\_\_ Hardness: \_\_\_\_\_

OAL: \_\_\_\_\_ Drill Size: \_\_\_\_\_  Thru  Blind Material State:  Forged  
 Bar  
 Cast  
 Other \_\_\_\_\_

Thread Form%:  100  75  Other \_\_\_\_\_ Thread:  Internal  External

## Machine Information

Machine Type:  Machine Center  Lathe  Mill  Other \_\_\_\_\_ Builder: \_\_\_\_\_ Model #: \_\_\_\_\_

Horse Power: \_\_\_\_\_ Thrust: \_\_\_\_\_ Spindle Orientation:  Vertical  
 Horizontal

Spindle Taper:  Cat 40 Rigidity:  Excellent Tool Rotating:  Yes  
 Cat 50  Good  No  
 Other \_\_\_\_\_  Poor

CNC Control Info: TYPE:  Fanuc Helical Interpolation:  Yes ISO - ASCII Compatible:  Yes  
 Siemens  No  No  
 Mazatrol  
 Other \_\_\_\_\_

## Coolant Information

Coolant Pressure: \_\_\_\_\_ Coolant Volume: \_\_\_\_\_ Coolant Type: \_\_\_\_\_

Tooling To Be Used		Programming Data	
Item Number	QTY	Dimensions: <input type="checkbox"/> Inch <input type="checkbox"/> Metric	
		Arc Center: <input type="checkbox"/> I and J <input type="checkbox"/> R (Radius)	
		Tool Path: <input type="checkbox"/> Offset <input type="checkbox"/> No Offset	
		Arc Limitation: <input type="checkbox"/> Full Circle <input type="checkbox"/> Quadrant	
		K Value: <input type="checkbox"/> Not Required <input type="checkbox"/> Required	
		If Required: <input type="checkbox"/> In Radians <input type="checkbox"/> Per Revolution	



# AccuThread 856™ Trouble Shooting Guide

Causes		Problem										
		Thread mill is showing accelerated or excessive wear	Cutting edges are chipping	Thread mill is breaking in the first hole or part	Thread mill is creating excessive chatter	Out of round thread is produced	Bell mouthed thread form (small at bottom, big at top)	Part rejection because of rough flank finish	Steps in thread profile	Gauge difference from part to part	Machine not making correct paths to create thread profile	Control not accepting the program
Catalog	Incorrect tool selection			1	1							
	Incorrect speed and feed selection	2, 3	2, 3		2, 3			2, 3				
Speed and Feed	RPM too high	5										
	RPM too low				4		4	4				
	Machine tool specifications restricts RPM's			5, 19								
	Feed rate too high		7	7			7	7	7			
	Feed rate too low	6										
	Incorrect adjusted feed rate adjustment ratio			12								
	Machine tool specification restrict feedrate					7, 19						
	Ramp-in is programmed as an axial move			20					20			
Tool	Thread mill moved or slipped in its holding device	13	13	13	13			13	13			
	Tool is sticking out of the holder too far	15	15	15	15			15	15	15		
	Runout between thread mill and holder				10			10				
	Incorrect coating creating built up edge	8, 17								8, 17		
	Helix angle too low				9			9				
	Excessive thread mill wear								11	11		
	Excessive tool pressure	7, 11, 14						7, 11, 14				
Machine	Workpiece moving in its fixturing	16	16	16	16			16		16		
	Insufficient coolant pressure or flow	17	17									
	Lack of machine rigidity	16	16		16			16	16			
Programming	Incorrect number of passes			22				22				
	Incorrect program variables			18, 26							18, 26	
	Didn't account for X/Y radial moves for tapered threads										24, 26	
	Incorrect cutter compensation variables			23, 26								23, 26
	Helical interpolation option not on machine or turned "off"										21, 26	21, 26
	Machine tool control is not formatted to standard EIA/ASCII/ISO Code											25, 26

Solutions			
1.	Refer to the catalog to insure proper tool selection.	14.	Check the tool for excessive wear, beginning threads will wear the fastest.
2.	Verify the correct speed was selected from the catalog speed and feed chart.	15.	Make the amount of overhang in the holding device as short as possible.
3.	Verify the correct feed rate was selected from the catalog speed and feed chart.	16.	Verify the workpiece is being properly clamped, retighten or increase stability if necessary.
4.	Increase the spindle speed (RPM).	17.	Increase the coolant flow and volume.
5.	Decrease the spindle speed (RPM).	18.	Check the milling program variables, especially the positive or negative value associated with I and J values.
6.	Increase the feed per tooth (IPT).	19.	Make sure the machine tool has the appropriate axis and path speed capabilities.
7.	Decrease the feed per tooth (IPT).	20.	Make sure the thread mill is arcing in the major diameter instead of making a radial move.
8.	Investigate other coatings.	21.	Make sure the machine tool has helical interpolation option and that it is "on".
9.	Increase the tool helix.	22.	Increase the number of thread mill passes.
10.	Gauge runout between thread mill and tool holder.	23.	Make sure the cutter compensation variables are input into the G41 program line.
11.	Perform tool change at quicker intervals.	24.	Adjust the program for pipe tap threads to taper out on diameter in X/Y directions to create proper form.
12.	Adjust the feedrate ratio properly to the correct actual penetration rate for internal threads. Refer to page 7 for formula.	25.	Request information from the machine tool builder regarding its programming formats.
13.	Use hydraulic clamping chuck.	26.	Fax a copy of your program to the Applications Engineering Department at 330-364-7666.

# Warranty



Allied Machine & Engineering Corp. warrants to original equipment manufacturers, distributors, industrial and commercial users of its products, that each new product manufactured or supplied by Allied Machine shall be free from defects in material and workmanship.

Allied's obligation under this warranty is limited to furnishing without additional charge a replacement or, at its option repairing or issuing credit for any product which shall within one year from the date of sale be returned freight prepaid to the plant designated by an Allied representative and which upon inspection is determined by Allied to be defective in materials or workmanship.

Complete information as to operating conditions, machine setup, and application of cutting fluid should accompany any product returned for inspection. The provisions of this warranty shall not apply to any Allied product which has been subjected to misuse, improper operating conditions, machine setup or application of cutting fluid or which has been repaired or altered if such repair or alteration in the judgement of Allied would adversely affect performance of the product.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Allied shall have no liability or responsibility on any claim of any kind, whether in contract, tort or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery or use of any product sold hereunder, in excess of the cost of replacement or repair as provided herein. IN NO EVENT SHALL ALLIED MACHINE & ENGINEERING CORP. BE LIABLE FOR ANY SPECIAL INCIDENTAL OR CONSEQUENTIAL DAMAGES. Allied makes no other warranty, express or implied, except as set forth above, and Allied neither assumes nor authorizes any other person or entity to assume for it any other obligation or liability in connection with any of its products.

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## WARNING

Cutting tools, tooling and metalworking machines may fail during use. Use safety glasses, appropriate safety equipment and exercise personal safety at all times while operating machinery.

Allied Machine & Engineering Corp.  
Telephone: (330) 343-4283  
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# Regional Distribution Warehouse Locations:

## USA

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Kingswinford, West Midlands  
DY6 7FR ENGLAND

Telephone: 011-44-1384-400900  
Fax: 011-44-1384-400105

## Other Product Literature:

### AccuPort 432<sup>®</sup> Port Contour Cutter ONE OPERATION PORT HOLE DRILLING SYSTEM



AMEC's revolutionary port hole drilling system combines two manufacturing functions into one. The patent-pending design provides excellent repeatability and surface finish while eliminating lost production time due to pre-drilling, setups, and regrinding.

Literature Order Number: AP432-05

### Structural Steel T-A<sup>®</sup> Drilling System HIGH PERFORMANCE HOLDERS AND INSERTS



Designed specifically for use on structural steel materials, this patent-pending system delivers Outstanding Performance and Durability. TiAlN insert coating allows for increased tool life and better heat resistance while providing better hole tolerances. tool holders can be used with standard T-A Drill Inserts

Literature Order Number: SS-06

### ALVAN<sup>®</sup> Expandable Reamers



The ALVAN<sup>®</sup> product line includes both monobloc and ring style expandable reamers, offered with carbide, cermet, PCD and CBN cutting edges and are available in sizes from 0.228 inch to 7.898 inch (5.8 mm to 200.6 mm) diameter.

Literature Order Number: ALV-05

### EcoCut DRILLING AND TURNING WITH ONLY ONE TOOL



AMEC offers a versatile line of lathe tools that can perform up to four machining operations. One EcoCut tool can be used for drilling, boring applications, facing operations and standard turning operations.

Literature Order Number: EC-05

### Wheel Drilling System T-A<sup>®</sup> LUG HOLE AND VALVE HOLE TOOLS



A unique drilling system designed for the Aluminum Automotive Wheel Industry. AMEC's engineering staff will evaluate your application and respond with a quotation (through your distributor) and a design to meet your requirements.

Literature Order Number: 96RDAMC

### High Performance and Universal Style DRILLS, HOLDERS AND ACCESSORIES

This catalog lists the widest variety of Spade Drills and Holders in the industry. Our TiN, TiAlN and TiCN Coated High Performance Spade Drills (31/32" to 5") offer a 100% to 500% INCREASE IN PRODUCTIVITY and an EXTENDED TOOL LIFE of 3 to 20 times over uncoated tools.



Literature Order Number: 2003SDC

### T-A<sup>®</sup> & ASC 320<sup>®</sup> Drilling Products



This catalog includes our entire drilling products line. The T-A<sup>®</sup> Drilling System, GEN2 T-A<sup>®</sup>, T-A<sup>®</sup> Structural Steel Drilling System, AccuPort 432<sup>®</sup> Port Contour Cutters and ASC 320<sup>®</sup> Solid Carbide Drills

Literature Order Number: TAASC-05



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