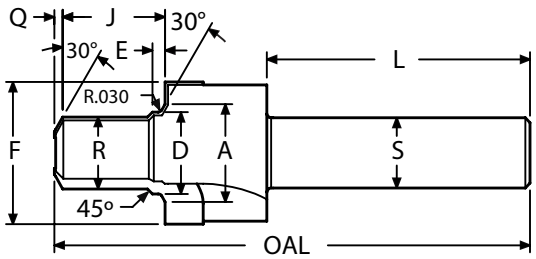
AS5202 (MS33649) - PORT TOOL
REAMER PILOT - CARBIDE TIPPED

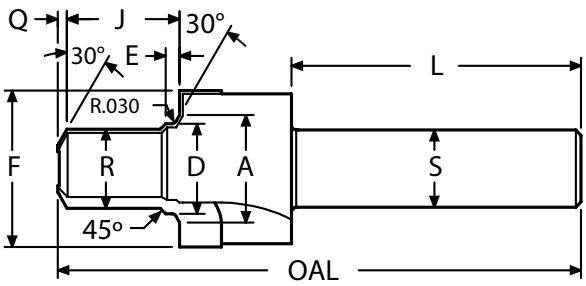


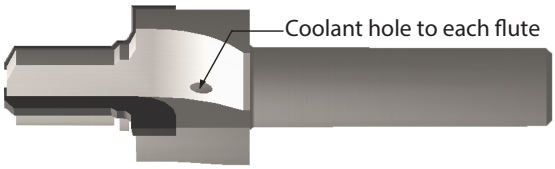
- Reams minor thread diameter to size
- Precision ground for maximum concentricity
- Meets the requirements of MS33649
- ALTiN+ coated tool for higher cutting speed
- This port requires a UNJ thread which specifies a larger minor-thread diameter

A	D	E	F	J	Q	R	L	S	OAL	FLUTES	TUBE	THREAD	ORDER #		EDP #	
													UNCOATED	ALTiN+	UNCOATED	ALTiN+
0.367	0.2665	0.071	0.575	0.425	0.025	0.219	2.00	0.500	3.00	3	N/A	0.2500-28 UNJF-3B	Solid Carbide			
													AS5202-01R	AS5202-01RA	406501	406503
0.446	0.3305	0.071	0.742	0.597	0.032	0.276	1.75	0.500	3.00	3	0.125	0.3125-24 UNJF-3B	Carbide Tipped			
													AS5202-02R	AS5202-02RA	406505	406511
0.508	0.3925	0.071	0.805	0.603	0.040	0.339	1.75	0.500	3.00	3	0.188	0.3750-24 UNJF-3B	AS5202-03R	AS5202-03RA	406513	406519
0.570	0.4565	0.083	0.888	0.676	0.040	0.393	1.88	0.500	3.12	3	0.250	0.4375-20 UNJF-3B	AS5202-04R	AS5202-04RA	406521	406527
0.633	0.5195	0.083	0.950	0.676	0.045	0.455	1.88	0.500	3.12	3	0.312	0.5000-20 UNJF-3B	AS5202-05R	AS5202-05RA	406529	406535
0.696	0.5825	0.091	1.012	0.729	0.060	0.513	1.88	0.500	3.38	3	0.375	0.5625-18 UNJF-3B	AS5202-06R	AS5202-06RA	406537	406543
0.758	0.6455	0.102	1.105	0.745	0.060	0.575	1.88	0.500	3.38	3	0.438	0.6250-18 UNJF-3B	AS5202-07R	AS5202-07RA	406545	406547
0.883	0.7715	0.102	1.240	0.854	0.070	0.693	2.12	0.750	3.84	3	0.500	0.7500-16 UNJF-3B	AS5202-08R	AS5202-08RA	406549	406555
0.946	0.8345	0.115	1.300	0.870	0.070	0.758	2.12	0.750	3.84	3	0.562	0.8125-16 UNJ-3B	AS5202-09R	AS5202-09RA	406557	406559
1.008	0.8985	0.115	1.415	0.950	0.080	0.810	2.12	0.750	3.94	3	0.625	0.8750-14 UNJF-3B	AS5202-10R	AS5202-10RA	406561	406567
1.164	1.0255	0.133	1.500	1.084	0.080	0.925	2.12	0.750	4.12	3	0.688	1.0000-12 UNJF-3B	AS5202-11R	AS5202-11RA	406569	406571
1.242	1.0885	0.133	1.665	1.084	0.080	0.985	2.12	0.750	4.12	3	0.750	1.0625-12 UNJ-3B	AS5202-12R	AS5202-12RA	406573	406579
1.370	1.2135	0.133	1.790	1.084	0.090	1.112	2.25	1.000	4.37	3	0.875	1.1875-12 UNJ-3B	AS5202-14R	AS5202-14RA	406581	406587
1.495	1.3385	0.133	1.965	1.084	0.090	1.235	2.25	1.000	4.37	3	1.000	1.3125-12 UNJ-3B	AS5202-16R	AS5202-16RA	406589	406595
1.683	1.5265	0.133	2.090	1.136	0.090	1.425	2.25	1.000	4.53	3	1.125	1.5000-12 UNJF-3B	AS5202-18R	AS5202-18RA	406597	406599
1.808	1.6505	0.133	2.310	1.136	0.090	1.549	2.25	1.000	4.54	3	1.250	1.6250-12 UNJ-3B	AS5202-20R	AS5202-20RA	406601	406603
2.058	1.9005	0.133	2.628	1.147	0.095	1.799	2.25	1.000	4.54	3	1.500	1.8750-12 UNJ-3B	AS5202-24R	AS5202-24RA	406605	406607
2.433	2.2755	0.133	3.050	1.263	0.095	2.174	2.50	1.250	4.92	3	1.750	2.2500-12 UNJ-3B	AS5202-28R	AS5202-28RA	406609	406611
2.683	2.5265	0.133	3.520	1.388	0.095	2.424	2.50	1.250	5.15	3	2.000	2.5000-12 UNJ-3B	AS5202-32R	AS5202-32RA	406613	406615

AS5202 port tools have replaced MS33649 port tools.
Please see crossover chart below.

AS5202 (MS33649) - REAMER PILOT PORT TOOL
COOLANT THROUGH - CARBIDE TIPPED

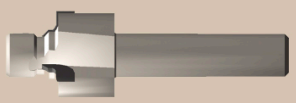




- Reams minor thread diameter to size
- Precision ground for maximum concentricity
- Meets the requirements of MS33649
- ALTiN+ coated tool for higher cutting speed
- This port requires a UNJ thread which specifies a larger minor thread diameter

A	D	E	F	J	Q	R	L	S	OAL	FLUTES	TUBE	THREAD	ORDER #		EDP #	
													UNCOATED	ALTiN+	UNCOATED	ALTiN+
0.446	0.3305	0.071	0.742	0.597	0.032	0.276	1.75	0.500	3.00	3	0.125	0.3125-24 UNJF-3B	AS5202-02R-X3	AS5202-02R-X3A	406507	406509
0.508	0.3925	0.071	0.805	0.603	0.040	0.339	1.75	0.500	3.00	3	0.188	0.3750-24 UNJF-3B	AS5202-03R-X3	AS5202-03R-X3A	406515	406517
0.570	0.4565	0.083	0.888	0.676	0.040	0.393	1.88	0.500	3.12	3	0.250	0.4375-20 UNJF-3B	AS5202-04R-X3	AS5202-04R-X3A	406523	406525
0.633	0.5195	0.083	0.950	0.676	0.045	0.455	1.88	0.500	3.12	3	0.312	0.5000-20 UNJF-3B	AS5202-05R-X3	AS5202-05R-X3A	406531	406533
0.696	0.5825	0.091	1.012	0.729	0.060	0.513	1.88	0.500	3.38	3	0.375	0.5625-18 UNJF-3B	AS5202-06R-X3	AS5202-06R-X3A	406539	406541
0.883	0.7715	0.102	1.240	0.854	0.070	0.693	2.12	0.750	3.84	3	0.500	0.7500-16 UNJF-3B	AS5202-08R-X3	AS5202-08R-X3A	406551	406553
1.008	0.8985	0.115	1.415	0.950	0.080	0.810	2.12	0.750	3.94	3	0.625	0.8750-14 UNJF-3B	AS5202-10R-X3	AS5202-10R-X3A	406563	406565
1.242	1.0885	0.133	1.665	1.084	0.080	0.985	2.12	0.750	4.12	3	0.750	1.0625-12 UNJ-3B	AS5202-12R-X3	AS5202-12R-X3A	406575	406577
1.370	1.2135	0.133	1.790	1.084	0.090	1.112	2.25	1.000	4.37	3	0.875	1.1875-12 UNJ-3B	AS5202-14R-X3	AS5202-14R-X3A	406583	406585
1.495	1.3385	0.133	1.965	1.084	0.090	1.235	2.25	1.000	4.37	3	1.000	1.3125-12 UNJ-3B	AS5202-16R-X3	AS5202-16R-X3A	406591	406593

AS5202 Replaces MS33649 Port Tools

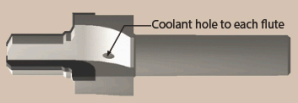


SOLID PILOT

AS5202-S Replaces MS33649-S

REAMER PILOT

AS5202-R Replaces MS33649-R



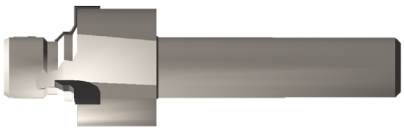
COOLANT THROUGH

AS5202-X Replaces MS33649-X

AS5202 port tools have replaced MS33649 port tools.
Please see crossover chart below.

MS33649 to AS5202 Port Tool Crossover Charts

Scientific Cutting Tools is in the process of changing the MS33649 and MS16142 port tools. **MS33649 tools will be phased out and replaced with AS5202 port tools. MS16142 tools will be replaced with SAE J1926 port tools.** Order numbers and EDP numbers have changed (please refer to chart below.) The cutting dimensions remain the same except for the number of flutes on larger sizes. Previously, the larger-sized tools had 4 or 5 flutes. **All SAE J1926 and AS5202 port tools now have 3 flutes.**

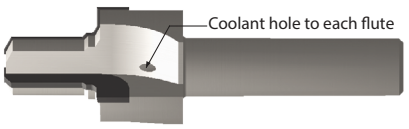


SOLID PILOT

AS5202-S Replaces MS33649-S			
MS33649-S		AS5202-S	
Old Part #	Old EDP	New Part #	New EDP
MS33649-1S	401616	AS5202-01S	406701
MS33649-1SA	401686	AS5202-01SA	406703
MS33649-2S	401628	AS5202-02S	406705
MS33649-2SA	401698	AS5202-02SA	406707
MS33649-3S	401634	AS5202-03S	406709
MS33649-3SA	401704	AS5202-03SA	406711
MS33649-4S	401637	AS5202-04S	406713
MS33649-4SA	401707	AS5202-04SA	406715
MS33649-5S	401640	AS5202-05S	406717
MS33649-5SA	401710	AS5202-05SA	406719
MS33649-6S	401643	AS5202-06S	406721
MS33649-6SA	401713	AS5202-06SA	406723
MS33649-7S	401646	AS5202-07S	406725
MS33649-7SA	401716	AS5202-07SA	406727
MS33649-8S	401649	AS5202-08S	406729
MS33649-8SA	401719	AS5202-08SA	406731
MS33649-9S	401652	AS5202-09S	406733
MS33649-9SA	401722	AS5202-09SA	406735
MS33649-10S	401601	AS5202-10S	406737
MS33649-10SA	401671	AS5202-10SA	406739
MS33649-11S	401604	AS5202-11S	406741
MS33649-11SA	401674	AS5202-11SA	406743
MS33649-12S	401607	AS5202-12S	406745
MS33649-12SA	401677	AS5202-12SA	406747
MS33649-14S	401610	AS5202-14S	406749
MS33649-14SA	401680	AS5202-14SA	406751
MS33649-16S	401613	AS5202-16S	406753
MS33649-16SA	401683	AS5202-16SA	406755
MS33649-20S	401619	AS5202-20S	406757
MS33649-20SA	401689	AS5202-20SA	406759
MS33649-24S	401622	AS5202-24S	406761
MS33649-24SA	401692	AS5202-24SA	406763
MS33649-28S	401625	AS5202-28S	406765
MS33649-28SA	401695	AS5202-28SA	406767
MS33649-32S	401631	AS5202-32S	406769
MS33649-32SA	401701	AS5202-32SA	406771

REAMER PILOT

AS5202-R Replaces MS33649-R			
MS33649-R		AS5202-R	
Old Part #	Old EDP	New Part #	New EDP
MS33649-1R	401778	AS5202-01R	406501
MS33649-1RA	401878	AS5202-01RA	406503
MS33649-2R	401793	AS5202-02R	406505
MS33649-2RA	401893	AS5202-02RA	406511
MS33649-3R	401802	AS5202-03R	406513
MS33649-3RA	401902	AS5202-03RA	406519
MS33649-4R	401808	AS5202-04R	406521
MS33649-4RA	401908	AS5202-04RA	406527
MS33649-5R	401814	AS5202-05R	406529
MS33649-5RA	401914	AS5202-05RA	406535
MS33649-6R	401820	AS5202-06R	406537
MS33649-6RA	401920	AS5202-06RA	406543
MS33649-7R	401826	AS5202-07R	406545
MS33649-7RA	401926	AS5202-07RA	406547
MS33649-8R	401829	AS5202-08R	406549
MS33649-8RA	401929	AS5202-08RA	406555
MS33649-9R	401835	AS5202-09R	406557
MS33649-9RA	401935	AS5202-09RA	406559
MS33649-10R	401751	AS5202-10R	406561
MS33649-10RA	401851	AS5202-10RA	406567
MS33649-11R	401757	AS5202-11R	406569
MS33649-11RA	401857	AS5202-11RA	406571
MS33649-12R	401760	AS5202-12R	406573
MS33649-12RA	401860	AS5202-12RA	406579
MS33649-14R	401766	AS5202-14R	406581
MS33649-14RA	401866	AS5202-14RA	406587
MS33649-16R	401769	AS5202-16R	406589
MS33649-16RA	401869	AS5202-16RA	406595
MS33649-18R	401775	AS5202-18R	406597
MS33649-18RA	401875	AS5202-18RA	406599
MS33649-20R	401781	AS5202-20R	406601
MS33649-20RA	401881	AS5202-20RA	406603
MS33649-24R	401787	AS5202-24R	406605
MS33649-24RA	401887	AS5202-24RA	406607
MS33649-28R	401790	AS5202-28R	406609
MS33649-28RA	401890	AS5202-28RA	406611
MS33649-32R	401799	AS5202-32R	406613
MS33649-32RA	401899	AS5202-32RA	406615



COOLANT THROUGH

AS5202-X Replaces MS33649-X			
MS33649-X		AS5202-X	
Old Part #	Old EDP	New Part #	New EDP
MS33649-2R-X3	401963	AS5202-02R-X3	406507
MS33649-2R-X3A	402013	AS5202-02R-X3A	406509
MS33649-3R-X3	401966	AS5202-03R-X3	406515
MS33649-3R-X3A	402016	AS5202-03R-X3A	406517
MS33649-4R-X3	401969	AS5202-04R-X3	406523
MS33649-4R-X3A	402019	AS5202-04R-X3A	406525
MS33649-5R-X3	401972	AS5202-05R-X3	406531
MS33649-5R-X3A	402022	AS5202-05R-X3A	406533
MS33649-6R-X3	401975	AS5202-06R-X3	406539
MS33649-6R-X3A	402025	AS5202-06R-X3A	406541
MS33649-8R-X5	401978	AS5202-08R-X3	406551
MS33649-8R-X5A	402028	AS5202-08R-X3A	406553
MS33649-10R-X5	401951	AS5202-10R-X3	406563
MS33649-10R-X5A	402001	AS5202-10R-X3A	406565
MS33649-12R-X5	401954	AS5202-12R-X3	406575
MS33649-12R-X5A	402004	AS5202-12R-X3A	406577
MS33649-14R-X5	401957	AS5202-14R-X3	406583
MS33649-14R-X5A	402007	AS5202-14R-X3A	406585
MS33649-16R-X5	401960	AS5202-16R-X3	406591
MS33649-16R-X5A	402010	AS5202-16R-X3A	406593

The AS5202 port tools will replace MS33649 port tools.

The new 3 fluted design is less likely to chatter, requires less horsepower, and has a larger flute pocket for improved chip evacuation.

PORT & CAVITY TECHNICAL INFORMATION

MATERIAL	HB/Rc	SPEED (SFM)		CUTTING CONDITIONS	
		UNCOATED	ALTiN+	INFEED PER FLUTE REAM	INFEED PER FLUTE SPOT FACE
CAST IRON	130 HB	75-210	200-450	.001-.0025	.0008-.0020
CARBON STEEL	18 Rc	125-190	190-400	.001-.0030	.001-.0020
ALLOY STEEL	20 Rc	70-135	130-350	.001-.0030	.0008-.0020
TOOL STEEL	25 Rc	75-100	100-220	.001-.0025	.0005-.0020
300 STAINLESS STEEL	150 HB	90-100	100-230	.001-.0020	.0007-.0015
400 STAINLESS STEEL	195 HB	90-135	135-300	.001-.0020	.0005-.0015
HIGH TEMP ALLOY (NICKEL & COBALT BASE)	20 Rc	30-125	100-150	.0008-.0015	.0005-.0010
TITANIUM	25 Rc	50-100	100-140	.001-.0020	.0005-.0010
HEAT TREATED ALLOYS (38-45Rc)	40 Rc	50-75	75-130	.0008-.0015	.0005-.0010
ALUMINUM	100 HB	850-1000	800-1500	.002-.0040	.0010-.0030
BRASS, ZINC	80 HB	750-950	800-1200	.002-.0040	.0010-.0030

SFM = Surface Feet per Minute
RPM = SFM x 3.82 divided by tool diameter

Starting parameters only. Setup and machine rigidity may affect performance.

PROBLEM	CAUSE	SOLUTION
RAPID FLANK WEAR	CUTTING CONDITIONS	Check for excessive speed and feed - see chart.
	TOOL	Select a coated tool.
	PROGRAM	Remove dwell from program at end of cut.
BUILT-UP EDGE	TOOL	Select a coated tool. The coating will resist built-up edges.
	HEAT	Use coolant through port tool. If coolant is not available, use shop air and a coated tool.
SURFACE TORN	TOOL	Use a coated tool. On most carbon steels, an uncoated tool will not produce an acceptable finish.
CHATTER	TOOL	Hone cutting edge of spot face. Use Coated Tool. Increase chip load.
LIGHT CHATTER	PROGRAM	Increase speed by 15-20%. A faster speed reduces forces. A dwell typically will not remove chatter.
POOR TOOL LIFE	AMOUNT OF STOCK	Rough port to 0.97 inch of finish size.
	PART	Make sure prior operation did not work harden the material.

SAMPLE PROGRAM FOR MAXIMUM PRODUCTIVITY

N51 (Sample Port Tool Program: MS33649-4RA (ALTiN+) cutting Carbon Steel

T51 M06	**Select Tool**
S2916 M03	**SFM = 300 ; RPM = 300 x 3.82 / Reamer Diameter**
G00 G90 G54 X0. Y0.	**RPM = 300 X 3.82 / 0.393**
G43 H51 Z0.1 M08	**RPM = 2916**
G01 Z-0.6 F23.3	**Feed Rate = RPM x 0.002 x 4 (Number of Flutes)**
S1290 M03	**RPM = 300 x 3.82 / 0.888 (Spot Face Diameter)**
G04 P1.	**Dwell to slow down spindle**
G01 Z-.73 F10.3	**Feed rate = RPM x 0.002 x 4 (Number of Flutes)**
G00 Z5. M09	