



Pages 64 - 67 Recommended Cutting Data - HSS

GEN2 T-A™ HSS Drill Inserts Y-2 Series

GEN2 T-A™ HSS Drill Inserts 3-8 Series

Standard HSS Drill Inserts Y-8 Series

Standard HSS Flat Bottom Drill Inserts

Page 68 - 70 Recommended Cutting Data - Carbide

GEN2 T-A™ Carbide Drill Inserts Y-2 Series

Standard Carbide Drill Inserts Y-3 Series

Standard Carbide Flat Bottom Drill Inserts

Page 71

Coolant Recommendations for all T-A® Inserts

Page 72

Diamond Film Coated Inserts - Cutting Parameters

Page 73

Tap Drill Information

Page 74

How to identify T-A® Holders

How to identify T-A® Drill Inserts

Pages 75 - 79

Material Cross Reference

Pages 80 - 81

Problems and Solutions

Page 82

Request for T-A® Guaranteed Application

Page 83

T-A® Customer Application Report

Page 84

Introduction to Special Products

Page 85

Special Product Overview



Technical Section

GENZ T-A™ Recommended Cutting Data - HSS Drill Inserts Y-2 Series

Material	Hardness			Speed AM200 M/min	Feed mm/rev			
	BHN	KG	Nmm ²		9.5-12.95	12.98-17.53	17.53-24.38	24.41-35
Free Machining Steel	100-150	38-50	370-500	99	0.20	0.30	0.41	0.48
	150-200	50-70	500-700	91	0.18	0.28	0.38	0.43
	200-250	70-88	700-870	85	0.15	0.25	0.36	0.41
Low Carbon Steel	85-125	30-46	300-450	88	0.20	0.25	0.36	0.46
	125-175	46-62	450-600	83	0.18	0.25	0.36	0.43
	175-225	62-77	600-775	79	0.15	0.23	0.33	0.41
Medium Carbon Steel	225-275	77-96	775-940	73	0.13	0.23	0.33	0.41
	125-175	46-62	450-600	83	0.18	0.25	0.36	0.43
	175-225	62-77	600-775	79	0.15	0.23	0.33	0.41
Alloy Steel	225-275	77-96	775-940	73	0.15	0.23	0.33	0.41
	275-325	96-111	940-1090	68	0.13	0.20	0.30	0.38
	125-175	46-62	450-600	73	0.18	0.25	0.36	0.41
High Strength Steel	175-225	62-77	600-775	68	0.15	0.23	0.33	0.41
	225-275	77-96	775-940	64	0.15	0.23	0.33	0.43
	275-325	96-111	940-1090	59	0.13	0.20	0.30	0.38
Structural Steel	325-375	111-129	1090-1265	54	0.10	0.18	0.28	0.36
	225-300	77-104	600-1020	38	0.15	0.23	0.28	0.33
	300-350	104-121	1020-1180	30	0.13	0.20	0.25	0.30
Hardox	350-400	121-139	1180-1365	24	0.10	0.18	0.23	0.28
	100-150	38-50	370-500	71	0.20	0.28	0.38	0.43
	150-250	50-88	500-850	57	0.15	0.25	0.33	0.38
High Temp Alloy	250-350	88-121	850-1180	48	0.13	0.23	0.30	0.33
	400	139	1365	21	0.08	0.15	0.20	0.23
	500	160	1600	14	0.05	0.12	0.18	0.20
Titanium Alloy	600	210	2000	N/A	N/A	N/A	N/A	N/A
	140-220	49-77	480-755	13	0.10	0.18	0.23	0.28
Aerospace Alloy S82	223-310	77-101	755-990	12	0.10	0.15	0.20	0.25
	140-220	49-77	480-755	16	0.10	0.18	0.21	0.27
Stainless Steel 400 Series 416, 420, (303)	220-310	77-101	755-990	15	0.08	0.15	0.18	0.23
	185-275	65-96	640-940	35	0.15	0.20	0.23	0.28
Stainless Steel 300 Series 304, 316, 17-4PH	275-350	96-121	940-1180	31	0.13	0.18	0.20	0.25
	135-185	49-65	480-640	35	0.08	0.18	0.20	0.28
Super Duplex Duplex St.Stl	185-275	65-96	640-940	31	0.08	0.15	0.18	0.25
	185-275	65-96	640-940	22	0.08	0.15	0.18	0.25
Tool Steel	150-200	50-70	500-700	38	0.10	0.18	0.25	0.30
	200-250	70-88	700-870	32	0.10	0.18	0.25	0.30
Hardened Steel	300-400	104-139	1020-1365	29	0.10	0.15	0.23	0.27
	400-500	139+	1365+	14	0.06	0.12	0.18	0.24
Cast Aluminium	30	10	100	(TiCN) 229	0.23	0.38	0.46	0.58
	180	62	600	(TiCN) 122	0.20	0.33	0.40	0.50
Wrought Aluminium	30	10	100	280	0.12	0.33	0.40	0.50
	180	62	600	200	0.12	0.18	0.30	0.35
SG/Nodular/ Grey/White Cast Iron	120-150	44-50	430-500	84	0.20	0.30	0.41	0.51
	150-200	50-70	500-700	79	0.18	0.28	0.38	0.48
	200-220	70-77	700-755	68	0.15	0.23	0.33	0.43
	220-260	77-90	755-890	57	0.13	0.20	0.28	0.36
	260-320	90-104	890-1020	47	0.13	0.18	0.25	0.28
Aluminium Bronze	100-200	38-68	370-670	82	0.15	0.24	0.30	0.38
	200-250	68-87	670-855	65	0.12	0.18	0.23	0.28
Brass	100	38	370	144	0.18	0.27	0.33	0.45
Copper	60	21	200	58	0.07	0.10	0.18	0.26

Formulae: mm/min = RPM • mm/rev M/min = RPM • 0.003 • DIA RPM = M/min • 318.47/DIA

SPEED AND FEED MULTIPLIER For various tool lengths

	Holder Length							
	Stub	Short	Intermediate	Standard	Extended	Long	XL	3XL
SPEED	see above chart				0.90	0.85	0.80	0.75
FEED	see above chart					0.95	0.90	0.90



GEN2 T-A™ Recommended Cutting Data - HSS Drill Inserts 3-8 Series

Material	Hardness			Tool Steel Grade	Speed M/min		Feed (mm/rev)		
	BHN	KG	Nmm ²		TiN	AM200™	35 - 47.8	47.85 - 65	66 - 114.48
Free Machining Steel	100-150	38-50	370-500	HSS/SC	61	99	0.51	0.58	0.71
	150-200	50-70	500-700	HSS/SC	55	91	0.51	0.58	0.71
	200-250	70-88	700-870	HSS/SC	49	85	0.51	0.58	0.71
Low Carbon Steel	85-125	30-46	300-450	HSS/SC	52	88	0.48	0.58	0.69
	125-175	46-62	450-600	HSS/SC	49	83	0.48	0.58	0.69
	175-225	62-77	600-775	HSS/SC	46	79	0.46	0.53	0.61
Medium Carbon Steel	225-275	77-96	775-940	HSS/SC	43	73	0.46	0.53	0.61
	125-175	46-62	450-600	HSS/SC	49	83	0.48	0.58	0.69
	175-225	62-77	600-775	HSS/SC	46	79	0.46	0.53	0.61
Alloy Steel	225-275	77-96	775-940	HSS/SC	43	73	0.46	0.53	0.61
	275-325	96-111	940-1090	SC, PC	40	68	0.41	0.48	0.56
	325-375	111-129	1090-1265	SC, PC	34	54	0.38	0.43	0.51
High Strength Steel	125-175	46-62	450-600	HSS/SC	46	73	0.43	0.48	0.56
	175-225	62-77	600-775	HSS/SC	43	68	0.43	0.48	0.56
	225-275	77-96	775-940	HSS/SC	40	64	0.43	0.48	0.56
Structural Steel	275-325	96-111	940-1090	SC, PC	37	59	0.38	0.43	0.51
	325-375	111-129	1090-1265	SC, PC	34	54	0.38	0.43	0.51
	225-300	77-104	600-1020	SC, PC	24	38	0.36	0.43	0.51
Hardox	300-350	104-121	1020-1180	SC, PC	18	30	0.36	0.43	0.51
	350-400	121-139	1180-1365	PC	15	24	0.30	0.41	0.46
	100-150	38-50	370-500	HSS/SC	43	71	0.46	0.53	0.66
High Temp Alloy	150-250	50-88	500-850	HSS/SC	37	57	0.41	0.48	0.61
	250-350	88-121	850-1180	SC, PC	30	49	0.36	0.43	0.51
	400	139	1365	SC, PC	14	21	0.30	0.41	0.46
Titanium Alloy	500	160	1600	PC	10	14	0.25	0.30	0.40
	600	210	2000	N/A	N/A	N/A	N/A	N/A	N/A
	140-220	49-77	480-755	SC, PC	9	13	0.30	0.38	0.38
Aerospace Alloy	223-310	77-101	755-990	PC	8	12	0.25	0.30	0.30
	140-220	49-77	480-755	SC, PC	11	16	0.30	0.38	0.38
	220-310	77-101	755-990	PC	10	15	0.25	0.30	0.30
Stainless Steel 400 Series	185-275	65-96	640-940	SC, PC	23	35	0.30	0.36	0.46
	275-350	96-121	940-1180	SC, PC	18	31	0.36	0.41	0.51
	185-275	65-96	640-940	SC, PC	23	35	0.30	0.36	0.46
Stainless Steel 300 Series	275-350	96-121	940-1180	SC, PC	18	31	0.36	0.41	0.51
	135-185	49-65	480-640	SC, PC	23	35	0.30	0.36	0.46
	185-275	65-96	640-940	SC, PC	18	31	0.36	0.41	0.51
Super Duplex	135-185	49-65	480-640	SC, PC	18	26	0.36	0.41	0.51
	185-275	65-96	640-940	SC, PC	15	22	0.30	0.36	0.46
	150-200	50-70	500-700	SC	24	38	0.30	0.38	0.43
Tool Steel	200-250	70-88	700-870	SC, PC	18	32	0.30	0.38	0.43
	300-400	104-139	1020-1365	PC	15	29	0.30	0.41	0.46
	400-500	139+	1365+	PC	10	14	0.25	0.30	0.40
Cast Aluminium	30	10	100	HSS	183	TiCN 229	0.56	0.64	0.64
	180	62	600	HSS	91	TiCN 129	0.56	0.64	0.64
	30	10	100	HSS	183	200	0.56	0.64	0.64
Wrought Aluminium	180	62	600	HSS	91	150	0.56	0.64	0.64
	120-150	44-50	430-500	HSS	52	84	0.61	0.69	0.76
	150-200	50-70	500-700	HSS	46	79	0.56	0.64	0.71
SG/Nodular/ Grey/White Cast Iron	200-220	70-77	700-755	HSS	40	68	0.46	0.53	0.61
	220-260	77-90	755-890	SC, PC	34	57	0.36	0.43	0.51
	260-320	90-104	890-1020	SC, PC	27	47	0.28	0.36	0.41
Aluminium Bronze	100-200	38-68	370-670	SC	52	82	0.43	0.48	0.53
	200-250	68-87	670-855	SC	40	65	0.36	0.40	0.46
	100	38	370	HSS	91	144	0.47	0.53	0.58
Brass	100	38	370	HSS	91	144	0.47	0.53	0.58
Copper	60	21	200	SC	40	58	0.23	0.27	0.31

Formulae: mm/min = RPM • mm/rev M/min = RPM • 0.003 • DIA RPM • M/min • 318.47/DIA

SPEED AND FEED MULTIPLIER For various tool lengths

	Holder Length							
	Stub	Short	Intermediate	Standard	Extended	Long	XL	3XL
SPEED	see above chart				0.90	0.85	0.80	0.75
FEED	see above chart					0.95	0.90	0.90



Technical Section

Standard Recommended Cutting Data - HSS Drill Inserts Y-8 Series

Material Category	Hardness			Tool Steel Grade *	Speed M/min			Feed (mm/rev)						
	BHN	KG	Nmm ²		TiN	TiCN	TiAlN	9.5-12.95	12.98-17.53	17.53-24.38	24.41-35	35-47.8	47.85-65	66-114.48
Free Machining Steel	100-150	38-50	370-500	HSS	61	80	86	0.18	0.25	0.33	0.41	0.51	0.58	0.71
	150-200	50-70	500-700	HSS	55	72	80	0.18	0.25	0.33	0.41	0.51	0.58	0.71
	200-250	70-88	700-870	HSS	49	64	73	0.15	0.25	0.33	0.41	0.51	0.58	0.71
Low Carbon Steel	85-125	30-46	300-450	HSS	52	67	76	0.15	0.23	0.30	0.38	0.48	0.58	0.69
	125-175	46-62	450-600	HSS	49	64	73	0.15	0.23	0.30	0.38	0.48	0.58	0.69
	175-225	62-77	600-775	HSS	46	60	69	0.13	0.20	0.25	0.36	0.46	0.53	0.61
	225-275	77-96	775-940	HSS	43	55	64	0.13	0.20	0.25	0.36	0.46	0.53	0.61
Medium Carbon Steel	125-175	46-62	450-600	HSS	49	64	73	0.15	0.23	0.30	0.38	0.48	0.58	0.69
	175-225	62-77	600-775	HSS	46	60	69	0.13	0.20	0.25	0.36	0.46	0.53	0.61
	225-275	77-96	775-940	HSS	43	55	64	0.13	0.20	0.25	0.36	0.46	0.53	0.61
	275-325	96-111	940-1090	SC, PC	40	52	60	0.10	0.18	0.23	0.30	0.41	0.48	0.56
Alloy Steel	125-175	46-62	450-600	HSS	46	60	64	0.15	0.20	0.25	0.36	0.43	0.48	0.56
	175-225	62-77	600-775	HSS	43	55	60	0.13	0.20	0.25	0.36	0.43	0.48	0.56
	225-275	77-96	775-940	HSS	40	52	55	0.13	0.18	0.25	0.36	0.43	0.48	0.56
	275-325	96-111	940-1090	SC, PC	37	47	52	0.10	0.15	0.23	0.30	0.38	0.43	0.51
	325-375	111-129	1090-1265	SC, PC	34	44	47	0.08	0.15	0.23	0.30	0.38	0.43	0.51
High Strength Steel	225-300	77-104	600-1020	SC, PC	24	31	34	0.13	0.18	0.23	0.25	0.36	0.43	0.51
	300-350	104-121	1020-1180	SC, PC	18	24	26	0.10	0.18	0.23	0.25	0.36	0.43	0.51
	350-400	121-139	1180-1365	PC	15	20	21	0.08	0.15	0.20	0.23	0.30	0.41	0.46
Structural Steel	100-150	38-50	370-500	HSS	43	55	61	0.15	0.25	0.30	0.36	0.46	0.53	0.66
	150-250	50-88	500-850	HSS	37	47	52	0.13	0.23	0.25	0.30	0.41	0.48	0.61
	250-350	88-121	850-1180	SC, PC	30	40	43	0.10	0.20	0.23	0.25	0.36	0.43	0.51
Hardox	400	139	1365	SC, PC	14	17	21	0.08	0.15	0.20	0.23	0.30	0.41	0.46
	500	160	1600	PC	10	12	14	0.05	0.12	0.18	0.20	0.25	0.30	0.40
	600	210	2000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
High Temp Alloy	140-220	49-77	480-755	SC, PC	9	11	12	0.08	0.18	0.20	0.25	0.30	0.38	0.38
	223-310	77-101	755-990	PC	8	9	11	0.08	0.15	0.18	0.20	0.25	0.30	0.30
Titanium Alloy	140-220	49-77	480-755	SC, PC	11	14	15	0.08	0.18	0.20	0.25	0.30	0.38	0.38
	220-310	77-101	755-990	PC	10	11	14	0.08	0.15	0.18	0.20	0.25	0.30	0.30
Aerospace Alloy S82	185-275	65-96	640-940	SC, PC	23	29	32	0.15	0.20	0.23	0.28	0.36	0.41	0.51
	275-350	96-121	940-1180	SC, PC	18	24	28	0.13	0.18	0.20	0.25	0.30	0.36	0.46
Stainless Steel 400 Series 416, 420, (303)	185-275	65-96	640-940	SC, PC	23	29	32	0.15	0.20	0.23	0.28	0.36	0.41	0.51
	275-350	96-121	940-1180	SC, PC	18	24	28	0.13	0.18	0.20	0.25	0.30	0.36	0.46
Stainless Steel 300 Series 304, 316, 17-4PH	135-185	49-65	480-640	SC, PC	23	29	32	0.08	0.18	0.20	0.28	0.36	0.41	0.51
	185-275	65-96	640-940	SC, PC	18	24	28	0.08	0.15	0.18	0.25	0.30	0.36	0.46
Super Duplex Duplex St.Stl	135-185	49-65	480-640	SC, PC	18	22	24	0.08	0.18	0.20	0.28	0.36	0.41	0.51
	185-275	65-96	640-940	SC, PC	15	18	20	0.08	0.15	0.18	0.25	0.30	0.36	0.46
Tool Steel	150-200	50-70	500-700	SC	24	32	34	0.10	0.15	0.20	0.25	0.30	0.38	0.43
	200-250	70-88	700-870	SC, PC	18	26	28	0.10	0.15	0.20	0.25	0.30	0.38	0.43
Hardened Steel	300-400	104-139	1020-1365	PC	15	21	29	0.08	0.15	0.20	0.23	0.30	0.41	0.46
	400-500	139+	1365+	PC	10	12	14	0.05	0.12	0.18	0.20	0.25	0.30	0.40
Cast Aluminium	30	10	100	HSS	183	229	260	0.2	0.33	0.41	0.50	0.56	0.64	0.64
	180	62	600	HSS	91	122	138	0.2	0.33	0.41	0.46	0.56	0.64	0.64
Wrought Aluminium	30	10	100	HSS	183	229	260	0.1	0.15	0.25	0.30	0.56	0.64	0.64
	180	62	600	HSS	91	122	138	0.2	0.33	0.41	0.46	0.56	0.64	0.64
SG/Nodular/ Grey/White Cast Iron	120-150	44-50	430-500	HSS	52	67	76	0.18	0.30	0.41	0.51	0.61	0.69	0.76
	150-200	50-70	500-700	HSS	46	60	69	0.15	0.28	0.36	0.46	0.56	0.64	0.71
	200-220	70-77	700-755	HSS	40	52	60	0.15	0.23	0.30	0.41	0.46	0.53	0.61
	220-260	77-90	755-890	SC, PC	34	44	50	0.13	0.18	0.23	0.30	0.36	0.43	0.51
	260-320	90-104	890-1020	SC, PC	27	37	41	0.1	0.15	0.18	0.23	0.28	0.36	0.41
Aluminium Bronze	100-200	38-68	370-670	SC	52	67	76	0.15	0.28	0.36	0.46	0.56	0.66	0.71
	200-250	68-87	670-855	SC	40	52	59	0.13	0.18	0.23	0.30	0.36	0.43	0.51
Brass	100	38	370	HSS	91	122	137	0.18	0.30	0.41	0.51	0.61	0.71	0.76
Copper	60	21	200	SC	40	45	50	0.05	0.08	0.15	0.20	0.25	0.35	0.40

Formulae: mm/min = RPM • mm/rev M/min = RPM • 0.003 • DIA RPM • M/min • 318.47/DIA

SPEED AND FEED MULTIPLIER For various tool lengths

	Holder Length							
	Stub	Short	Intermediate	Standard	Extended	Long	XL	3XL
SPEED	see above chart				0.90	0.85	0.80	0.75
FEED	see above chart					0.95	0.90	0.90



Standard Recommended Cutting Data - HSS Flat Bottom Drill Inserts

Material Category	Hardness			Speed M/min			Feed (mm/rev)			
	BHN	KG	Nmm ²	TiN	TiCN	TiAlN	9.5 – 12.95mm	12.98 – 17.53mm	17.53 – 24.38mm	24.41 – 35mm
Free Machining Steel	100-150	38-50	370-500	52	70	76	0.15	0.23	0.28	0.35
	150-200	50-70	500-700	47	62	70	0.15	0.23	0.28	0.35
	200-250	70-88	700-870	43	56	64	0.13	0.23	0.28	0.35
Low Carbon Steel	85-125	30-46	300-450	46	59	67	0.13	0.20	0.25	0.33
	125-175	46-62	450-600	43	56	64	0.13	0.20	0.25	0.33
	175-225	62-77	600-775	40	53	59	0.10	0.18	0.23	0.30
Medium Carbon Steel	225-275	77-96	775-940	37	47	56	0.10	0.18	0.23	0.30
	125-175	46-62	450-600	43	56	64	0.13	0.20	0.25	0.33
	175-225	62-77	600-775	40	53	59	0.10	0.18	0.23	0.30
Alloy Steel	225-275	77-96	775-940	37	47	56	0.10	0.18	0.23	0.30
	275-325	96-111	940-1090	34	46	53	0.10	0.15	0.20	0.25
	125-175	46-62	450-600	40	53	56	0.13	0.18	0.23	0.30
High Strength Steel	175-225	62-77	600-775	37	47	53	0.10	0.18	0.23	0.30
	225-275	77-96	775-940	34	44	47	0.10	0.15	0.23	0.30
	275-325	96-111	940-1090	32	41	44	0.10	0.13	0.20	0.25
Structural Steel A36, A285, A516, etc	325-375	111-129	1090-1265	29	38	41	0.08	0.13	0.20	0.25
	225-300	77-104	600-1020	21	26	29	0.10	0.15	0.20	0.23
	300-350	104-121	1020-1180	15	21	23	0.08	0.15	0.20	0.23
Hardox	350-400	121-139	1180-1365	13	18	20	0.08	0.13	0.18	0.20
	400	139	1365							
	500	160	1600	N/A	N/A	N/A	N/A	N/A	N/A	N/A
High Temp Alloy	600	210	2000							
	140-220	49-77	480-755	7	9	10	0.08	0.15	0.18	0.23
	223-310	77-101	755-990	6	7	9	0.08	0.13	0.15	0.18
Titanium Alloy	140-220	49-77	480-755	10	12	14	0.08	0.15	0.18	0.23
	220-310	77-101	755-990	8	11	12	0.08	0.13	0.15	0.18
Aerospace Alloy S82	185-275	65-96	640-940	20	26	27	0.13	0.18	0.20	0.25
	275-350	96-121	940-1180	15	21	24	0.10	0.15	0.18	0.23
Stainless Steel 400 Series 416, 420, (303)	185-275	65-96	640-940	20	26	27	0.13	0.18	0.20	0.25
	275-350	96-121	940-1180	15	21	24	0.10	0.15	0.18	0.23
Stainless Steel 300 Series 304, 316, 17-4PH	135-185	49-65	480-640	20	26	27	0.13	0.18	0.20	0.25
	185-275	65-96	640-940	15	21	24	0.10	0.15	0.18	0.23
Super Duplex Duplex St.Stl	135-185	49-65	480-640	20	26	27	0.13	0.18	0.20	0.25
	185-275	65-96	640-940	15	21	24	0.10	0.15	0.18	0.23
Tool Steel	150-200	50-70	500-700	21	27	29	0.10	0.13	0.18	0.23
	200-250	70-88	700-870	15	23	24	0.10	0.13	0.18	0.23
Hardened Steel	300-400	104-139	1020-1365	13	18	20	0.08	0.13	0.18	0.20
	400-500	139+	1365+	8	10	12	0.06	0.10	0.15	0.18
Cast Aluminium	30	10	100	160	198	228	0.18	0.28	0.36	0.43
	180	62	600	79	107	122	0.18	0.28	0.36	0.41
Wrought Aluminium	30	10	100	160	198	228	0.18	0.28	0.36	0.43
	180	62	600	79	107	122	0.18	0.28	0.36	0.41
SG/Nodular/ Grey/White Cast Iron	120-150	44-50	430-500	46	59	67	0.15	0.25	0.36	0.43
	150-200	50-70	500-700	40	53	59	0.13	0.23	0.30	0.41
	200-220	70-77	700-755	34	46	53	0.13	0.20	0.25	0.36
	220-260	77-90	755-890	29	38	46	0.10	0.15	0.20	0.25
	260-320	90-104	890-1020	24	32	37	0.10	0.13	0.15	0.20
Aluminium Bronze	100-200	38-68	370-670	40	53	59	0.13	0.23	0.30	0.41
	200-250	68-87	670-855	29	38	46	0.10	0.15	0.20	0.25
Brass	100	38	370	46	59	67	0.15	0.25	0.36	0.43
Copper	60	21	200	35	40	45	0.05	0.08	0.15	0.20

Formulae: $\text{mm/min} = \text{RPM} \cdot \text{mm/rev}$ $\text{M/min} = \text{RPM} \cdot 0.003 \cdot \text{DIA}$ $\text{RPM} = \text{M/min} \cdot 318.47/\text{DIA}$

SPEED AND FEED MULTIPLIER For various tool lengths

	Holder Length							
	Stub	Short	Intermediate	Standard	Extended	Long	XL	3XL
SPEED	see above chart				0.90	0.85	0.80	0.75
FEED	see above chart					0.95	0.90	0.90



GEN2 T-A™ Recommended Cutting Data - Carbide Drill Inserts Y-2 Series

Material	Hardness			Grade	AM200™ Speed M/min	Feed (mm/rev)			
	BHN	KG	Nmm²			9.5-12.95	12.98-17.53	17.53-24.38	24.41-35
Free Machining Steel	100-150	38-50	370-500	C1	146	0.20	0.30	0.41	0.48
	150-200	50-70	500-700	C1	126	0.18	0.28	0.38	0.43
	200-250	70-88	700-870	C1	119	0.15	0.25	0.36	0.41
Low Carbon Steel	85-125	30-46	300-450	C1	137	0.20	0.25	0.36	0.46
	125-175	46-62	450-600	C1	119	0.18	0.25	0.36	0.43
	175-225	62-77	600-775	C1	108	0.15	0.23	0.33	0.41
Medium Carbon Steel	225-275	77-96	775-940	C1	95	0.13	0.23	0.33	0.41
	125-175	46-62	450-600	C1	119	0.18	0.25	0.36	0.43
	175-225	62-77	600-775	C1	108	0.15	0.23	0.33	0.41
Alloy Steel	225-275	77-96	775-940	C1	95	0.15	0.23	0.33	0.41
	275-325	96-111	940-1090	C1	87	0.13	0.20	0.30	0.38
	325-375	111-129	1090-1265	C1	78	0.10	0.18	0.28	0.36
High Strength Steel	225-300	77-104	600-1020	C1	70	0.15	0.23	0.28	0.33
	300-350	104-121	1020-1180	C1	63	0.13	0.20	0.25	0.30
	350-400	121-139	1180-1365	C1	56	0.10	0.18	0.23	0.28
Structural Steel	100-150	38-50	370-500	C1	108	0.20	0.28	0.38	0.43
	150-250	50-88	500-850	C1	87	0.15	0.25	0.33	0.38
	250-350	88-121	850-1180	C1	80	0.13	0.23	0.30	0.33
Hardox	400	139	1365	C2	45	0.07	0.12	0.20	0.25
	500	160	1600	C2	37	0.05	0.10	0.15	0.20
	600	210	2000	C2	30	0.04	0.08	0.12	0.16
High Temp Alloy	140-220	49-77	480-755	C2	37	0.10	0.18	0.23	0.28
	223-310	77-101	755-990	C2	29	0.10	0.15	0.20	0.25
Titanium Alloy	140-220	49-77	480-755	C2	42	0.10	0.18	0.21	0.27
	220-310	77-101	755-990	C2	33	0.08	0.15	0.18	0.23
Aerospace Alloy 582	185-275	65-96	640-940	C2	73	0.12	0.16	0.18	0.22
	275-350	96-121	940-1180	C2	56	0.10	0.14	0.16	0.19
Stainless Steel 400 Series 416, 420, (303)	185-275	65-96	640-940	C2	73	0.18	0.23	0.30	0.36
	275-350	96-121	940-1180	C2	56	0.15	0.20	0.28	0.30
Stainless Steel 300 Series 304, 316, 17-4PH	135-185	49-65	480-640	C2	73	0.14	0.18	0.24	0.29
	185-275	65-96	640-940	C2	56	0.12	0.16	0.22	0.24
Super Duplex Duplex St/Stl	135-185	49-65	480-640	C2	38	0.12	0.17	0.22	0.26
	185-275	65-96	640-940	C2	30	0.10	0.15	0.18	0.22
Tool Steel	150-200	50-70	500-700	C1	78	0.10	0.18	0.25	0.30
	200-250	70-88	700-870	C1	59	0.10	0.18	0.25	0.30
Hardened Steel	300-400	104-139	1020-1365	C1	47	0.10	0.15	0.23	0.27
	400-500	139+	1365+	C1	37	0.06	0.12	0.18	0.24
Cast Aluminium	30	10	100	C2	300	0.23	0.38	0.46	0.58
	180	62	600	TiCN	225	0.20	0.33	0.40	0.50
Wrought Aluminium	30	10	100	C2	426	0.12	0.33	0.40	0.50
	180	62	600	C2	300	0.12	0.18	0.30	0.35
SG/Nodular/ Grey/White Cast Iron	120-150	44-50	430-500	C2	152	0.20	0.30	0.38	0.48
	150-200	50-70	500-700	C2	146	0.18	0.28	0.33	0.43
	200-220	70-77	700-755	C2	131	0.15	0.23	0.3	0.38
	220-260	77-90	755-890	C2	113	0.13	0.20	0.28	0.33
	260-320	90-104	890-1020	C2	102	0.13	0.18	0.25	0.28
Aluminium Bronze	100-200	38-68	370-670	C2	110	0.15	0.24	0.30	0.38
	200-250	68-87	670-855	C2	90	0.12	0.18	0.23	0.28
Brass	100	38	370	C2	200	0.18	0.27	0.33	0.45
Copper	60	21	200	C2	130	0.07	0.10	0.18	0.26

Formulae:

mm/min = RPM • mm/rev

M/min = RPM • 0.003 • DIA

RPM = M/min • 318.47/DIA



Standard Recommended Cutting Data - Carbide Drill Inserts Y-3 Series

Material Category	Hardness			Carbide Grade	Speed M/min			Feed (mm/rev)				
	BHN	KG	Nmm ²		TiN	TiCN	TiAlN	9.5 – 12.95mm	12.98 – 17.53mm	17.53 – 24.38mm	24.41 – 35mm	34.37 – 47.80mm
Free Machining Steel	100-150	38-50	370-500	C5	96	115	128	0.20	0.30	0.38	0.45	0.53
	150-200	50-70	500-700	C5	85	100	110	0.18	0.28	0.35	0.40	0.48
	200-250	70-88	700-870	C5	79	90	104	0.15	0.25	0.33	0.38	0.43
Low Carbon Steel	85-125	30-46	300-450	C5	91	110	119	0.20	0.25	0.33	0.43	0.48
	125-175	46-62	450-600	C5	79	90	104	0.18	0.25	0.33	0.40	0.45
	175-225	62-77	600-775	C5	73	82	95	0.15	0.23	0.30	0.38	0.43
	225-275	77-96	775-940	C5	64	75	83	0.13	0.23	0.30	0.38	0.43
Medium Carbon Steel	125-175	46-62	450-600	C5	79	90	104	0.18	0.25	0.33	0.40	0.45
	175-225	62-77	600-775	C5	73	84	95	0.15	0.23	0.30	0.38	0.43
	225-275	77-96	775-940	C5	67	72	83	0.15	0.23	0.30	0.38	0.43
	275-325	96-111	940-1090	C5	55	62	70	0.13	0.20	0.28	0.35	0.40
Alloy Steel	125-175	46-62	450-600	C5	76	87	99	0.18	0.25	0.33	0.40	0.45
	175-225	62-77	600-775	C5	70	80	92	0.15	0.23	0.30	0.38	0.43
	225-275	77-96	775-940	C5	64	72	83	0.15	0.23	0.30	0.38	0.43
	275-325	96-111	940-1090	C5	61	68	76	0.13	0.20	0.28	0.35	0.40
	325-375	111-129	1090-1265	C5	52	60	67	0.10	0.18	0.25	0.33	0.38
High Strength Steel	225-300	77-104	600-1020	C5	49	55	61	0.15	0.23	0.25	0.30	0.38
	300-350	104-121	1020-1180	C5	43	49	55	0.13	0.20	0.23	0.28	0.35
	350-400	121-139	1180-1365	C5	37	43	49	0.10	0.18	0.20	0.25	0.30
Structural Steel	100-150	38-50	370-500	C5	73	84	95	0.20	0.28	0.35	0.40	0.45
	150-250	50-88	500-850	C5	61	68	76	0.15	0.25	0.30	0.35	0.40
	250-350	88-121	850-1180	C5	55	62	70	0.13	0.23	0.28	0.30	0.35
Hardox	400	139	1365	C2	23	30	35	0.07	0.12	0.20	0.25	0.30
	500	160	1600	C2	15	21	26	0.05	0.10	0.15	0.20	0.25
	600	210	2000	C2	11	16	22	0.04	0.08	0.12	0.16	0.20
High Temp Alloy	140-220	49-77	480-755	C2	24	28	32	0.10	0.18	0.23	0.28	0.33
	223-310	77-101	755-990	C2	18	22	26	0.10	0.15	0.20	0.25	0.30
Titanium Alloy	140-220	49-77	480-755	C2	30	32	38	0.10	0.18	0.23	0.28	0.33
	220-310	77-101	755-990	C2	24	28	33	0.10	0.15	0.20	0.25	0.30
Aerospace Alloy S82	185-275	65-96	640-940	C2	49	57	64	0.17	0.22	0.29	0.35	0.40
	275-350	96-121	940-1180	C2	37	43	49	0.14	0.19	0.27	0.30	0.35
Stainless Steel 400 Series 416, 420, (303)	185-275	65-96	640-940	C2	49	57	64	0.17	0.22	0.29	0.35	0.40
	275-350	96-121	940-1180	C2	37	43	49	0.14	0.19	0.27	0.30	0.35
Stainless Steel 300 Series 304, 316, 17-4PH	135-185	49-65	480-640	C2	49	57	64	0.13	0.17	0.22	0.26	0.30
	185-275	65-96	640-940	C2	37	43	49	0.11	0.14	0.20	0.22	0.25
Super Duplex Duplex St.Stl	135-185	49-65	480-640	C2	25	29	33	0.11	0.15	0.19	0.23	0.27
	185-275	65-96	640-940	C2	19	22	25	0.09	0.13	0.18	0.20	0.23
Tool Steel	150-200	50-70	500-700	C5	49	58	67	0.10	0.18	0.23	0.28	0.33
	200-250	70-88	700-870	C5	37	45	52	0.10	0.18	0.23	0.28	0.33
Hardened Steel	300-400	104-139	1020-1365	C5	34	39	43	0.10	0.18	0.23	0.28	0.33
	400-500	139+	1365+	C5	20	23	25	0.08	0.15	0.20	0.23	0.28
Cast Aluminium	30	10	100	C2	366	410	460	0.25	0.38	0.45	0.50	0.55
	180	62	600	C2	244	275	306	0.23	0.33	0.40	0.45	0.50
Wrought Aluminium	30	10	100	C2	366	410	460	0.10	0.15	0.25	0.30	0.36
	180	62	600	C2	244	275	306	0.20	0.28	0.36	0.45	0.50
SG/Nodular/ Grey/White Cast Iron	120-150	44-50	430-500	C2	98	127	141	0.20	0.30	0.38	0.48	0.58
	150-200	50-70	500-700	C2	82	102	122	0.18	0.28	0.33	0.43	0.53
	200-220	70-77	700-755	C2	73	93	110	0.15	0.23	0.30	0.38	0.45
	220-260	77-90	755-890	C2	64	79	95	0.13	0.20	0.28	0.33	0.38
	260-320	90-104	890-1020	C2	55	69	83	0.13	0.18	0.25	0.28	0.33
Aluminium Bronze	100-200	38-68	370-670	C2	85	100	110	0.13	0.20	0.25	0.36	0.42
	200-250	68-87	670-855	C2	64	79	94	0.10	0.15	0.18	0.25	0.33
Brass	100	38	370	C2	130	160	184	0.15	0.23	0.28	0.38	0.45
Copper	60	21	200	C2	80	100	120	0.05	0.08	0.10	0.15	0.25

Formulae: mm/min = RPM • mm/rev M/min = RPM • 0.003 • DIA RPM = M/min • 318.47/DIA



Technical Section

Standard Recommended Cutting Data – Carbide Flat Bottom Inserts

Material Category	Hardness			Carbide Grade	Speed M/min				Feed (mm/rev)			
	BHN	KG	Nmm ²		TiN	TiCN	TiAlN	AM200™	9.5 – 12.95mm	12.98 – 17.53mm	17.53 – 24.38mm	24.41 – 35mm
Free Machining Steel	100-150	38-50	370-500	C2	82	98	110	126	0.17	0.26	0.32	0.39
	150-200	50-70	500-700	C2	73	85	94	110	0.15	0.24	0.30	0.35
	200-250	70-88	700-870	C2	67	76	88	102	0.13	0.22	0.28	0.32
Low Carbon Steel	85-125	30-46	300-450	C2	79	94	102	117	0.17	0.22	0.28	0.37
	125-175	46-62	450-600	C2	67	76	88	102	0.15	0.22	0.28	0.35
	175-225	62-77	600-775	C2	61	70	81	93	0.13	0.19	0.26	0.32
	225-275	77-96	775-940	C2	55	64	70	81	0.11	0.19	0.26	0.32
Medium Carbon Steel	125-175	46-62	450-600	C2	67	76	88	102	0.15	0.22	0.28	0.35
	175-225	62-77	600-775	C2	61	72	81	93	0.13	0.19	0.26	0.32
	225-275	77-96	775-940	C2	55	61	70	81	0.13	0.19	0.26	0.32
	275-325	96-111	940-1090	C2	46	53	61	70	0.11	0.17	0.24	0.30
Alloy Steel	125-175	46-62	450-600	C2	64	75	85	99	0.15	0.22	0.28	0.35
	175-225	62-77	600-775	C2	59	67	79	91	0.13	0.19	0.26	0.32
	225-275	77-96	775-940	C2	55	61	70	81	0.13	0.19	0.26	0.32
	275-325	96-111	940-1090	C2	52	58	66	76	0.11	0.17	0.24	0.30
	325-375	111-129	1090-1265	C2	44	50	58	67	0.09	0.15	0.22	0.28
High Strength Steel	225-300	77-104	600-1020	C2	41	47	52	59	0.13	0.19	0.22	0.26
	300-350	104-121	1020-1180	C2	37	41	47	55	0.11	0.17	0.19	0.24
	350-400	121-139	1180-1365	C2	30	37	41	47	0.09	0.15	0.17	0.22
Structural Steel	100-150	38-50	370-500	C2	62	72	81	93	0.17	0.24	0.30	0.35
	150-250	50-88	500-850	C2	52	58	66	76	0.13	0.22	0.28	0.30
	250-350	88-121	850-1180	C2	47	53	61	70	0.11	0.19	0.25	0.26
Hardox	400	139	1365	C2	20	26	31	39	0.06	0.10	0.16	0.20
	500	160	1600	C2	13	18	23	31	0.04	0.08	0.12	0.16
	600	210	2000	C2	10	14	19	25	0.03	0.06	0.10	0.13
High Temp Alloy	140-220	49-77	480-755	C2	21	23	27	32	0.09	0.15	0.19	0.24
	223-310	77-101	755-990	C2	15	18	21	24	0.09	0.13	0.17	0.22
Titanium Alloy	140-220	49-77	480-755	C2	26	28	33	40	0.08	0.14	0.17	0.20
	220-310	77-101	755-990	C2	21	25	29	30	0.08	0.12	0.15	0.18
Aerospace Alloy S82	185-275	65-96	640-940	C2	43	50	37	40	0.15	0.17	0.25	0.30
	275-350	96-121	940-1180	C2	33	38	28	32	0.13	0.15	0.23	0.25
Stainless Steel 400 Series 416, 420, (303)	185-275	65-96	640-940	C2	43	50	56	64	0.15	0.20	0.25	0.30
	275-350	96-121	940-1180	C2	33	38	43	49	0.13	0.18	0.23	0.25
Stainless Steel 300 Series 304, 316, 17-4PH	135-185	49-65	480-640	C2	28	33	37	40	0.13	0.17	0.21	0.25
	185-275	65-96	640-940	C2	21	25	28	32	0.11	0.15	0.19	0.21
Super Duplex Duplex St.Stl	135-185	49-65	480-640	C2	22	26	29	33	0.10	0.14	0.17	0.20
	185-275	65-96	640-940	C2	17	19	22	26	0.08	0.12	0.15	0.17
Tool Steel	150-200	50-70	500-700	C2	41	49	58	67	0.09	0.15	0.19	0.24
	200-250	70-88	700-870	C2	30	37	44	50	0.09	0.15	0.19	0.24
Hardened Steel	300-400	104-139	1020-1365	C5	30	34	38	41	0.08	0.14	0.18	0.22
	400-500	139+	1365+	C5	18	20	22	33	0.06	0.12	0.16	0.18
Cast Aluminium	30	10	100	C2	160	198	228	N/A	0.22	0.32	0.41	0.43
	180	62	600	C2	79	107	122	N/A	0.19	0.28	0.35	0.39
Wrought Aluminium	30	10	100	C2	292	328	368	390	0.12	0.18	0.23	0.25
	180	62	600	C2	195	220	245	260	0.10	0.16	0.20	0.22
SG/Nodular/ Grey/White Cast Iron	120-150	44-50	430-500	C2	82	108	120	137	0.17	0.26	0.32	0.41
	150-200	50-70	500-700	C2	70	87	104	119	0.15	0.24	0.28	0.38
	200-220	70-77	700-755	C2	61	79	94	108	0.13	0.19	0.26	0.32
	220-260	77-90	755-890	C2	55	67	81	93	0.11	0.17	0.24	0.28
Aluminium Bronze	260-320	90-104	890-1020	C2	47	58	70	81	0.11	0.15	0.22	0.24
	100-200	38-68	370-670	C2	73	85	95	105	0.10	0.16	0.20	0.29
Brass	200-250	68-87	670-855	C2	55	68	81	87	0.08	0.12	0.14	0.20
	100	38	370	C2	112	138	160	185	0.12	0.18	0.22	0.30
Copper	60	21	200	C2	68	85	105	117	0.04	0.06	0.08	0.12

Formulae:

mm/min = RPM • mm/rev

M/min = RPM • 0.003 • DIA

RPM = M/min • 318.47/DIA



Coolant Recommendations for all T-A® inserts

Material Category	Hardness			Coolant Pressure Bar											
				Coolant Flow Rate - L/Min											
				HSS Inserts (AM 200™, TiN, TiCN, TiAlN Coated) Diameter Range						Carbide Inserts (AM 200™, TiN, TiCN, TiAlN)					
BHN	KG	Nmm²	9.5 - 12.95	12.98 - 17.53	17.54 - 24.38	24.39 - 35.0	35.1 - 47.8	47.85 - 65.0	66.0 - 114.48	9.5 - 12.95	12.98 - 17.53	17.53 - 24.38	24.41 - 35	34.37 - 47.8	
Free Machining Steel	100-250	38-88	370-870	12.8	8.3	9.6	7.9	6.9	3.5	6.2	20	16.5	16.5	15.2	12
				9.6	11.4	19.7	30.3	53.0	125.0	167.0	12.2	16.3	25.2	41.5	71.9
Low Carbon	85-275	30-96	300-940	11.8	6.2	6.6	5.5	5.2	2.8	4.5	17.5	11	11	11.8	9.0
				9.5	9.8	15.9	26.5	45.4	114.0	144.0	11.4	13.3	20.6	36.5	62
Medium Carbon	125-325	46-111	450-1090	11.4	5.9	6.2	5.2	4.8	2.8	4.5	17.2	9.7	10.4	10.4	7.5
				9.1	9.8	15.5	22.7	45.4	114.0	144.0	11.3	12.5	20	33.8	57
Alloy Steel	125-375	46-129	450-1265	11.4	5.2	5.5	4.8	4.2	2.4	3.5	16.5	9.3	9.7	7.9	7.2
				9.1	9.1	14.8	22.7	41.6	106.0	125.0	11.1	12.3	19.3	30	55.8
High Strength Steel	225-400	77-139	600-1365	10.7	4.2	3.5	2.0	2.0	1.7	2.0	14.5	5.2	4.1	3.1	2.7
				9.1	8.3	11.7	19.0	30.0	87.0	98.0	10.4	9.1	12.6	18.8	33.6
Structural Steel	100-350	38-121	370-1180	11.4	5.9	5.5	3.8	3.5	2.0	3.5	15.8	9.0	7.9	6.9	5.2
				9.1	9.8	14.8	23.0	38.0	98.0	125.0	10.8	12	17.5	27.8	47.1
High Temp Alloy	140-310	49-101	480-990	10.7	4.5	3.8	2.4	2.0	2.0	3.1	16.5	11.4	12.4	11	9.0
				9.1	8.7	12.1	18.9	30.0	98.0	125.0	11.1	13.5	21.9	35.4	62
Titanium Alloy	140-310	49-101	480-990	10.7	4.5	3.8	2.4	2.0	2.0	3.1	16.5	11.4	12.4	11	9.0
				9.1	8.7	12.1	18.9	30.0	98.0	125.0	11.1	13.5	21.9	35.4	62
Austenitic Stainless Steel	135-275	49-96	480-940	11.8	5.9	5.2	3.8	3.5	2.0	3.1	22.7	16.5	17.9	17.2	13.1
				9.5	9.8	14.0	23.0	38.0	98.0	117.0	13	16.3	26.3	44.2	75
400 Series/ 17-4PH (303) Stainless Steel	185-350	65-121	640-1180	11.8	5.9	5.2	3.8	3.5	2.0	3.1	22.7	16.5	17.9	17.2	13.1
				9.5	9.8	14.0	23.0	38.0	98.0	117.0	13	16.3	26.3	44.2	75
Super Duplex Duplex St/Stl	135-275	49-96	480-940	11.8	5.9	5.2	3.8	3.5	2.0	3.1	22.7	16.5	17.9	17.2	13.1
				9.5	9.8	14.0	23.0	38.0	98.0	117.0	13	16.3	26.3	44.2	75
Tool Steel	150-250	50-88	500-870	10.7	4.2	3.5	2.0	2.0	1.7	2.0	14.5	5.2	4.8	3.4	3.1
				9.1	8.3	11.7	19.0	30.0	87.0	98.0	10.4	9.1	13.6	19.7	36.5
Hardened Steel	300-500	104-139	1020-1365	10.7	4.2	3.5	2.0	2.0	1.7	2.0	14.5	5.2	4.8	3.4	3.1
				9.1	8.3	11.7	19.0	30.0	87.0	98.0	10.4	9.1	13.6	19.7	36.5
Cast Aluminium	30-180	62	600	14.5	12.4	15.8	11.0	8.6	3.5	5.5	24.1	22	21.7	19.6	13.8
				10.0	14.0	23.0	34.0	61.0	125.0	159.0	13.4	18.8	29	47.2	77
Wrought Aluminium	30-180	62	600	14.5	12.4	15.8	11.0	8.6	3.5	5.5	24.1	22	21.7	19.6	13.8
				10.0	14.0	23.0	34.0	61.0	125.0	159.0	13.4	18.8	29	47.2	77
SG/Nodular Cast Iron Grey/White Iron	120-320	44-104	430-1020	11.0	4.5	4.2	2.8	2.4	2.0	2.4	15.5	7.2	6.2	6.2	5.5
				9.1	8.7	12.5	19.0	34.0	98.0	106.0	10.7	10.8	15.4	26.5	48.7
Aluminium Bronze	100-250	38-87	370-855	12.8	8.3	9.7	8.0	6.9	3.5	6.2	20	16.5	16.5	15.2	12
				9.6	11.4	19.7	30.3	53.0	125.0	167.0	12.2	16.3	25.2	41.5	71.9
Brass	100	38	370	11.0	4.5	4.2	2.8	2.4	2.0	2.4	24.1	22	21.7	19.6	13.8
				9.1	8.7	12.5	19.0	34.0	98.0	106.0	13.4	18.8	29	47.2	77
Copper	60	-	-	12.8	8.3	9.7	8.0	6.9	3.5	6.2	20	16.5	16.5	15.2	12
				9.6	11.4	19.7	30.3	53.0	125.0	167.0	12.2	16.3	25.2	41.5	71.9

COOLANT MULTIPLIER

Holder Length							
Stub	Short	Intermediate	Standard	Extended	Long	XL	3XL
see above chart				1.3	1.5	2	3

COOLANT RECOMMENDATION:

Example To drill 25mm diameter hole in alloy steel with a hardness value 125-325 BHN

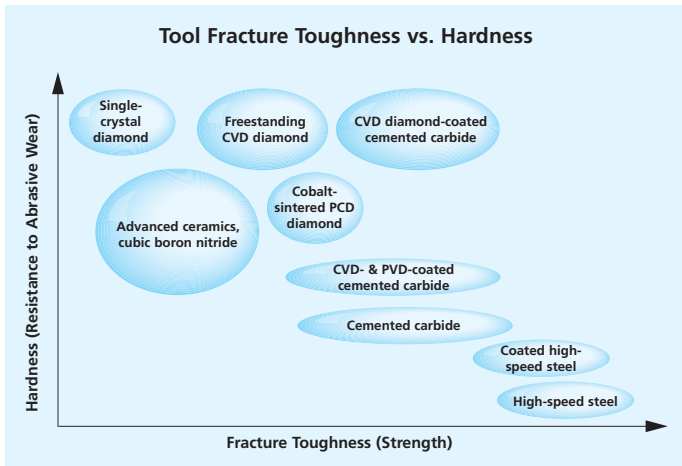
- Standard holder** = 4.8 Bar, 22.7 L/Min
- XL holder** = 4.8 x 2 = 9.6 Bar, 22.7 x 2 = 45.4 L/Min
- 3XL holder** = 4.8 x 3 = 14.4 Bar, 22.7 x 3 = 68.1 L/Min



Technical Section

Diamond Film Coated Inserts

Allied's Diamond film inserts combine the best features of a tough carbide substrate with a hard, durable, Crystalline Diamond CVD coating.



The hardness values of tooling materials are indexed in relation to their toughness.

Customer Benefits

- High penetration rates
- Increased toughness compared to PCD
- 30-50 times increase in tool life over un-coated carbide tools in non-ferrous / non-metallic materials

Target Materials

Polymer Matrix Composites (PMC) - Kevlar, Plastics, Carbon Fibre, Fibreglass, Graphite and Resin materials.

Metal Matrix Composites (MMC) - Aluminium Alloys, Brass, Bronze, Copper and its alloys, Lead Alloys, Magnesium Alloys and Precious metals.

Ceramic Matrix Composites (CMC) - Soft Carbide & Ceramics in the green or pre-sintered state.

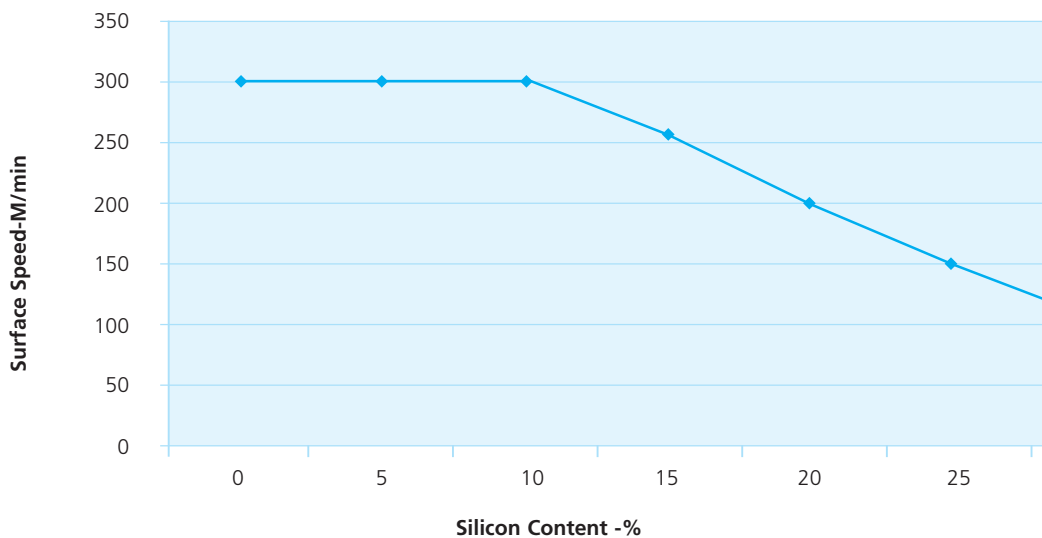
Materials not suitable for Diamond Film inserts.

Beryllium, Chrome, hard CMC's, Cobalt based materials, Iron base materials, Molybdenum, Nickel base materials, Titanium alloys, hard Tungsten alloys.

Starting Point for Diamond Film Drilling Parameters

Material Group:	Speed M/min	Feed mm/rev	Vacuum	Coolant
PMC's (polymer matrix composites)	75 - 600	0.025 - 0.38	Yes	Air
MMC's (metal matrix composites)	30 - 300	0.076 - 0.5	No	Water sol.
CMC's (ceramic matrix composites)	15 - 75	0.025 - 0.25	Yes	Air

CVD Diamond Film Surface Speed Guide - Aluminium/Silicon alloys





Tap Drill Information

METRIC – m – Profile Screw Thread						
Tap Size	Tap Drill Size	Decimal Equivalent	* Theo % Thread	Probable Mean Oversize	Probable Hole Size	** Probable % Thread
12 x 1.75	10.2mm	.4016"	79%	0.075mm	10.28mm	76%
	$1\frac{3}{32}$ "	.4063"	74%	0.075mm	10.40mm	71%
12 x 1.25	$\frac{27}{64}$ "	.4219"	79%	0.075mm	10.79mm	74%
	10.8mm	.4252"	74%	0.075mm	10.88mm	69%
14 x 2.0	$1\frac{5}{32}$ "	.4688"	81%	0.075mm	11.98mm	78%
	12.0mm	.4724"	77%	0.075mm	12.08mm	74%
14 x 1.5	12.5mm	.4921"	77%	0.075mm	12.58mm	73%
16 x 2.0	14.0mm	.5512"	77%	0.075mm	14.08mm	74%
16 x 1.5	14.5mm	.5709"	77%	0.075mm	14.58mm	73%
	$\frac{37}{64}$ "	.5781"	68%	0.075mm	14.76mm	64%
18 x 2.5	15.5mm	.6102"	77%	0.075mm	15.58mm	75%
18 x 1.5	16.5mm	.6496"	77%	0.075mm	16.58mm	73%
	$2\frac{1}{32}$ "	.6563"	68%	0.075mm	16.75mm	64%
20 x 2.5	$1\frac{1}{16}$ "	.6875"	78%	0.075mm	17.54mm	76%
	17.5mm	.6890"	77%	0.075mm	17.58mm	74%
20 x 1.5	18.5mm	.7283"	77%	0.075mm	18.58mm	73%
	$\frac{47}{64}$ "	.7344"	69%	0.075mm	18.66mm	65%
22 x 2.5	$\frac{49}{64}$ "	.7656"	79%	0.075mm	19.52mm	76%
	19.5mm	.7677"	77%	0.075mm	19.58mm	75%
22 x 1.5	20.5mm	.8071"	77%	0.075mm	20.58mm	73%
	$1\frac{3}{16}$ "	.8125"	70%	0.075mm	20.71mm	66%
24 x 3	$1\frac{3}{16}$ "	.8125"	86%	0.075mm	20.71mm	84%
	21.0mm	.8268"	76%	0.075mm	21.08mm	75%
24 x 2	22.0mm	.8661"	77%	0.075mm	22.08mm	74%
	$\frac{7}{8}$ "	.8750"	68%	0.075mm	22.30mm	65%
27 x 3	24.0mm	.9449"	77%	0.075mm	24.08mm	75%

* Based on nominal tap drill diameter.

** Based on 0.075mm probable mean oversize

To Calculate % of full thread for a given hole Ø:

$$\% \text{ Thread} = \frac{76.93}{\text{Pitch (mm)}} \times (\text{Basic major } \varnothing \text{ mm} - \text{Drill hole size mm})$$

Taper Pipe Thread (BSP & ISO 7-1)						
Tap Size	Tap Drill Size	Decimal Equivalent	* Theo % Thread	Probable Mean Oversize	Probable Hole Size	** Probable % Thread
$\frac{1}{4}$ " - 19	$\frac{7}{16}$ "	.4325"	N/A	0.075mm	11.19mm	N/A
$\frac{3}{8}$ " - 19	$\frac{37}{64}$ "	.5781"	N/A	0.075mm	14.76mm	N/A
$\frac{1}{2}$ " - 14	$2\frac{3}{32}$ "	.7188"	N/A	0.075mm	18.33mm	N/A
$\frac{3}{4}$ " - 14	$1\frac{5}{16}$ "	.9375"	N/A	0.075mm	23.89mm	N/A

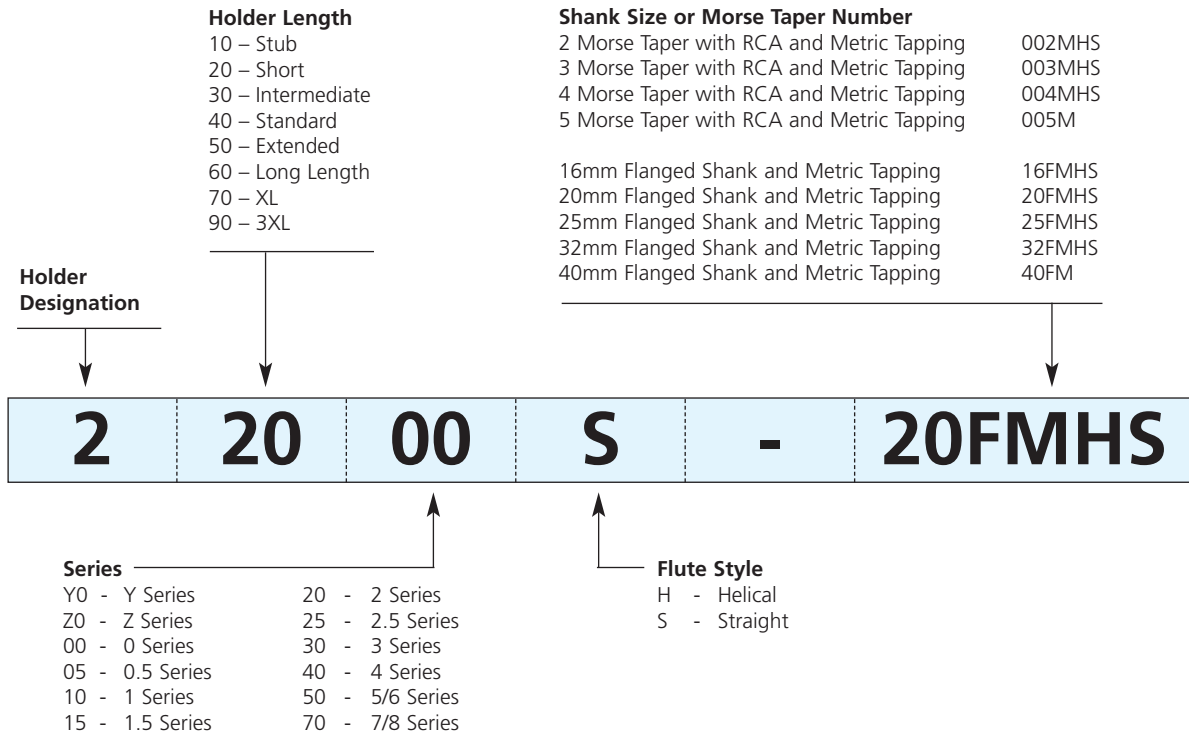
The above tap drill information represents probable thread percentages for the standard tap drills stocked at AMEC. Special blade diameters may be required in order to meet a user specific percentage of thread requirements.

The 0.075mm probable mean oversize hole condition is based on optimum cutting conditions. Probable % of full thread may vary based on less ideal cutting conditions.



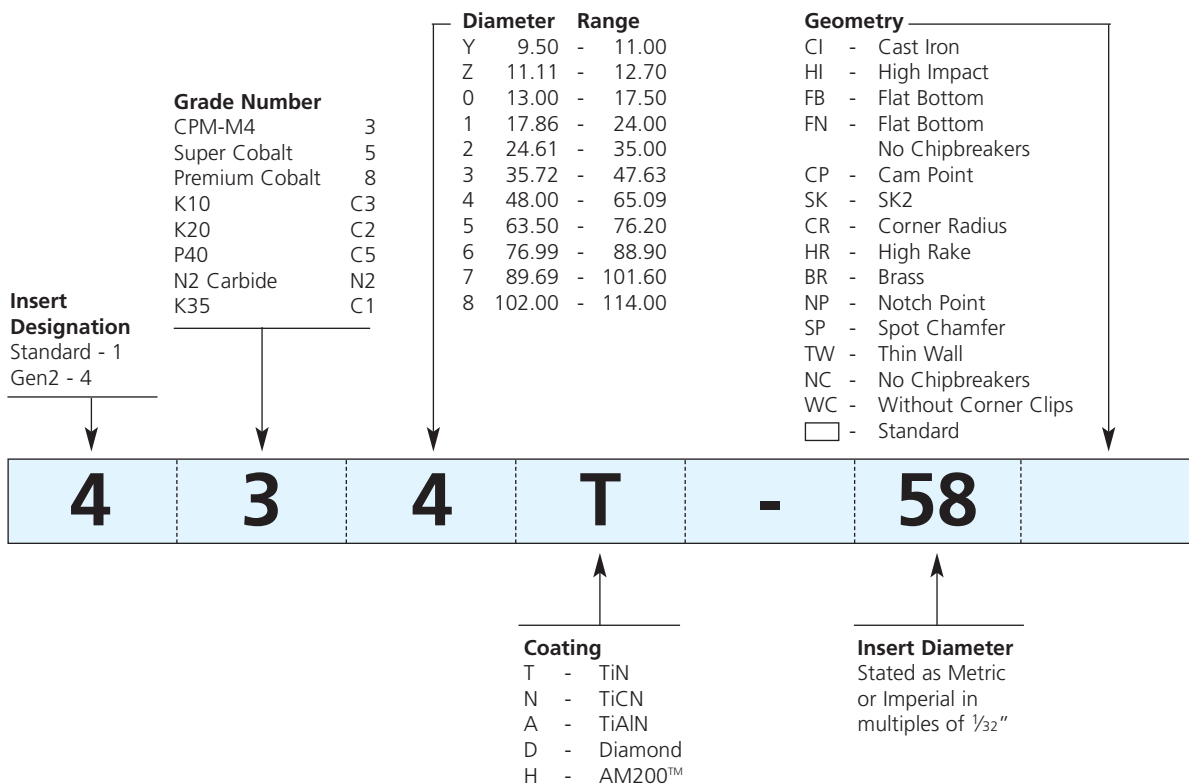
Technical Section

How to identify T-A® Holders



Example: Holder Short 0 Series Straight Fluted with 20mm diameter Flange.

How to identify T-A® Drill Inserts



Example: 4 Series, Gen2, 58mm diameter, TiN coated CPM-M4 insert.



Material Cross Reference

Material Class	German	DIN	French	UK	Swedish	Spanish	USA
Free Machining Steel	1.0718	96MnPB28	S250Pb		1914	F.2112 – 11SMnPb28	12L13
	1.0721	10S20	10F1	210M15		F.2121 – 10 S 20	1108
	1.0722	10SPb20	10PbF2			F.2122 – 10 SPb 20	11L08
	1.0723	15S20		210A15	1922	F.210F	
	1.0736	95Mn36	S300	240M07 EN 1B		F.2113-12 SMn 35	1215
	1.0737	9MnPb36	S300Pb		1926	F.2114 – 12 SMnPb 35	12L14
Low Carbon Steel	1.0301	C10	AF34C10/XC10	045M10			1010
	1.0401	C15	AF37C12/XC18	080M15;040A15	1350	F.111	1015
	1.0402	C22	AF42C20/XC25	050A20/055M15-EN2C	1450	F.112	1020
	1.0406	C25	AF50C30	070M26		F.221	1025
	1.0711	9S20		220M07			1212
	1.0715	95Mn28	S250	230M07	1912	F.2111-11SMn28	1213
	1.1121	Ck10	XC10	040A10	1265	F.1510 – C 10 k	1010
	1.1133	20Mn5	20M5	120M19		F.1515 – 20Mn 6	1022/1518
	1.1141	Ck15	XC15/C15E	080M15 EN32C	1370	F.1511 – C 16 k	1015
	1.1151	Ck22	XC25/C22E	050A20		F.1120 – C 25 k	10201023
	1.1158	Ck25	XC25/C25E	070M26		F.1120 – C 25 k	1025
	1.5622	14Ni6	15N6/15Ni6			F.2641 – 15 Ni 6	A350-LF5
1.5752	14NiCr14	12NC15	655M13/A12 EN 36A			3310/9314	
1.7015	15Cr3	12C3	523M15			5015	
Medium Carbon Steel	1.0501	C35	AF55C35/XC38	060A35	1550	F.113	1035
	1.0503	C45	AF65C45/C45	080M46	1650	F.114	1045
	1.0511	C40	AF60C40/C40			F.114.A	1040
	1.0535	C55	C55	070M55	1655		1055
	1.0601	C60	AF70C55/C60	080A62-EN 43D		F.115	1060
	1.0726	35S20	35MF6	212M36 EN 8M	1957	F.210G	1140
	1.0727	45S20	45MF4	212M44	1973		1146
	1.0903	51Si7	51S7	250A53 EN 45	2090	F.1450 – 50 Si 7	9255
	1.0904	55Si7	55S7	250A53	2085	F.1440 – 56 Si 7	9255
	1.0909	60Si7	60S7	250A58		F.1441 – 60 Si 7	9260
	1.0961	60SiCr7	60SC7	250A61		F.1442 – 60 SiCr 8	9262
	1.1165	30Mn5	35M5/30Mn5	120M36/150M28		F.1203 – 36 Mn5	1330
	1.1166	34Mn5	35M5/34Mn5			F.8211 – 30 Mn5	1536
	1.1167	36Mn5	40M5/36Mn5	150M36 EN 15	2120	F.1203 – 36 Mn5	1335
	1.117	28Mn6	20M5/28Mn6	150M 28 EN 14A			1330
	1.118	Cm35	XC32/C35R	080M36	1572	F.1135 – C 35 K-1	1035
	1.1186	Ck40	XC42H1/C40E	060A40/080A40			1040
	1.1191	Ck45	XC42H1/C45/XC45	080M46/060A47	1672	F.1140 – C 45 k	1045
	1.1201	Cm45	XC42H1/C45R	080M46	1660	F.1145 – C 45 k	1045
	1.1203	Ck55	XC55H1/C55E	060A57/070M55		F.1150 – C 55 k	1055
	1.1206	Ck50	XC48H1/C50E	080M50			1050
1.1213	Cf53	XC48H1TS	060A52	1674		1050	
1.1221	Ck60	XC60/C60E/2C60	060A62	1665/1678	F.511/F.512	1060	
1.1231	Ck67	XC68	060A67	1770		1070	
1.7003	38Cr2	38C2/38Cr5			38 Cr 3		
Alloy Steel	1.1248/1269	Ck75	XC75/C75E/XC90	060A78	1774/1778	F.513/514/515	1080/1078/1086
	1.1274	Ck101	XC100	060A96	1870		1095
	1.233	35CrMo4/47CrMo4	34CD4/35CrMo4/42CD4	708A37/708M40	2234/2244		4135/4142
	1.5711/5711	36NiCr6/40NiCr6	35NC6	640A35/640M40 EN111A			3135/3140
	1.5736	36NiCr10	30NC11				3435
	1.6523/43	21NiCrMo2	20NCD2	805M20/805A20 EN 362	2506	F.1522 – 20 NiCrMo 2	8620/8720
	1.6546	40NiCrMo22	40NCD2	311-Type 7		F.1204 – 40 NiCrMo2	8740
	1.6587	17CrNiMo8	18NCD6	820A16		F.1560 – 14 NiCrMo13	
	1.6657	14NiCrMo134	16NCD13	832M13		F.1569 – 14 NiCrMo 131	
	1.7006	46Cr2	42C2/46Cr2				5045/5046
	1.703	28Cr4		530A30			5130
	1.7033	34Cr4	32C4/34Cr4	530A32 EN18B		F.8221 – 35 Cr 4/F.224	5132
	1.7034	37Cr4	38C4/37Cr4	530A36		F.1201 – 38 Cr 4	5135
	1.7035	41Cr4	42C4/41Cr4	530M40/530A40 EN 18		F.1202 – 42 Cr4	5140
	1.7045	42Cr4	42C4TS	530A40	2245	F.1202 – 42 Cr 4	5140
	1.7131	16MnCr5	16MC5	527M17	2511	F.1515 – 16 MnCr 5	5115
	1.7147	20MnCr5	20MC5			F.150.D	5120
	1.7176	55Cr3	55C3	527A60 EN 48	2253	F.1431 – 55 Cr3	5155
	1.7218	25CrMo4	25CD4/25CrMo4	1717CDS110	2225	F.8330 – AM 25 CrMo4	4130
	1.722	34CrMo4	35CD4/34CrMo4	708A37 EN 19B	2234	F.8231 – AM 34 CrMo4	4135/4137
	1.7225	42CrMo4	42CD4/42CrMo4	708M40 EN 19A	2244	F.8232 – 42 CrMo4	4140/4142
1.7228	50CrMo4	50CrMo4	708A47			4150	
1.8159	50CrV4	50CV4/51CrV4	735A50 EN 47	2230	F.1430 – 51 CrV4	6150	
High Strength Alloy Steel	1.8507	34CrAlMo5	30CAD6.12	905M31		F.1741 – 34 CrAlMo5	A355Cl.D
	1.8509	41CrAlMo7	40CAD6.12	905M39 EN 41B	2940	F.1740 – 41 CrAlMo7	A355Cl.A
	1.5755	31NiCr14	18NC13	653M31		F.123	
	1.6511	36CrNiMo4	40NCD3/36CrNiMo4	816M40 EN 110		F.1280 – 35 NiCrMo4	9840
	1.6562	40NiCrMo73		817M40			4340
	1.658	30CrNiMo8	30CND8/30CrNiMo8	823M30			
	1.6582	34CrNiMo8	35NCD6/34CrNiMo6	817M40 EN 24	2541	F.1272 – 40 NiCrMo 7	4340
	1.6746	32NiCrMo145	35NCD14	830M31		F.1262 – 32 NiCrMo 12	
	1.6747	30NiCrMo166	35NCD16	835M30		F.1260 – 32 NiCrMo 16	
	1.8515	31CrMoV139	30CD12	722M24 EN 40B	2240	F.1712 – 31 CrMo 12	
1.8523	39CrMoV139		897M39 EN 40C				



Material Cross Reference

Material Class	German	DIN	French	UK	Swedish	Spanish	USA
Structural Steel	1.0038	RSt37-2	E24-2NE/S235JRG2	4360-40C	1312		A570 (36)
	1.0044	St44-2	E28-2/S275JR	4360-43B	1412	A 430B	A570 (40)
	1.005	St50-2	A50-2/E295	4360-50B	2172		A570 (50)
	1.0067,007	St60-2/St70-2	A60-2/E335-A70-2/E360	4360-55E			
	1.0116	St37-3	E24-3;-4/S235J2G3	4360-40C/D-1449-37C	1313	A360 C;D	A284/A573/A611
	1.033	St12	DC01	1449 – 2/3/4CR		AP 00	A366/1012/A619
	1.0333	St13		1449 2CR; 3CR		AP 02	1008
	1.0338	St14	DC04	1449 1CR; 2CR		AP 04	A620
	1.0345	H I	A37CP;AP/P235GH	1501Gr.161-360/400	1330	A 37 RC I;RA II	A516Gr.65;-55
	1.0347	RRSt13	DC03	3CR			A619
	1.0425	H II	A42CP;AP/P265GH	161-400;	1430	A42 RC 1	
	1.0473	19Mn6	A52CP;AP/P335GH		2101/2102	A 47 RB II	A537
	1.0481	17Mn4	A48CP;AP/P295GH			A 47 RC1; RA II	A516 (70)
	1.0562	StE355	E355R/FP/S355N		2132	AE 355 KG;DD	A633 (C)
	1.057	St52-3	E36-3;E36-4/S355J2G3	4360-50B;50C;50D	2132	A 510 C;D	
	1.5415	15Mo3	15D3/15Mo3	1501-240	2912	F.2601 – 16 Mo 3	A204 (A)
	1.5423	16Mo5		1503-245-420		F.2602 – 16 Mo 5	4520
	1.5637	10Ni14	12N14/12Ni14	1501-503-690		F.152	A350-LF3
	1.5713	13NiCr6	10NC6				3115
	1.5732	14NiCr10	14NC11			F.1540 – 15 NiCr 11	3415
1.7335	13CrMo44	15CD3.05	620Gr.27;31	2216	F.2631 – 14 CrMo 4 5	A182-F11;F12	
1.7337	16CrMo44	15CD4.5	620Gr.27	2216		A387 (12)	
1.738	10CrMo910	12CD9.10/10CrMo9-10	622Gr.31;45	2218	TU.H	A182F22	
1.7715	14MoV63		660/440		F.2621 – 13 MoCrV6		
1.8902	StE420	E420RIFP/S420N	4360-55E		AE 420 KG	A633Gr.E	
1.8905	StE460	E460RIFP/S460N			AE 460 KG	A633Gr.E	
High Temperature Alloys	1.4864	X12NiCrSi3616	Z12NCS37.18	NA17		F.3313-X 12 CrNi 36-16	330
	1.4865	G-X40NiCrSi3818		330C40			
	1.4876	X10NiCrAlTi3320	Z8NC3221	NA15(H)		F.3545-X 9NiCr 33-21	B163
	2.436	NiCu30Fe	NU30	3072-76/NA13			4544/SB127/164
	2.4375	NiCu30Al		3072-76/NA18/3146			4676
	2.4602	NiCr17Mo17FeW	NC 17 DWY				5388 C
	2.463	NiCr20Ti	NC 20 T	HR5/203-4/703-B	MH-05		
	2.4631	NiCr20TiAl	NC 20 TA	HR 401HR601/736B	MH-07		
	2.4634	NiCo20Cr15MoAlTi	NCKD 20 ATV	HR 3/5007	MH-14		
	2.4636	NiCo15Cr15MoAlTi	NCKD 20 AT				687
	2.465	NiCr20Co19MoTi	NCK 20 D	HR 10			
	2.4662	NiCr15MoTi	Z8 NCDT 42		MH-16		5660C
	2.4665	NiCr22Fe18Mo	Nc 22 FeD	HR 6/204	MH-03		5536E
	2.4668	NiCr19Fe19NbMo	NC 19 FeNb	HR 8	MH-06		
	2.4669	NiCr16FeTi	NC 15 Fe TNb	HR 505			5542G
	2.467	G-NiCr13Al6MoNb	NC 13 AD	HC 203	MH-31		5391A
	2.4674	NiCo15Cr10MoAlTi	NK 15 CAT	HC 204			
	2.4676	NiCo10W10Cr9AlTi					
	2.4816	NiCr15Fe	NC 15 Fe	3072-76			5540
	2.4856	NiCr22Mo9Nb	NC 22 FeDNB				5581
2.4858	NiCr21Mo	NC 21 FeDU	3072-76				
2.4973	NiCr19Co11MoTi	NC 19 KDT					
2.4983	NiCr18Co18MoAlTi	NCK 19 DAT				684	
	NiFe33Cr17Mo	NW 11 AC	HR 207/5047				
Titanium Alloys	3.7024/25	Ti99,8	T-35	TA.1		Ti-PO1	
	3.7124	TiCu2	T-U2	TA.21-24/52-55/58		Ti-P11	
	3.7154	TiAl6Zr5Mo0,5Si0,2	T-A6ZD	TA.43/44		Ti-P67	
	3.7184	TiAl4Mo4Sn2Si0,5	T-A4DE	TA.45-51/57		Ti-P68	
	3.7034/35	Ti99,7	T-40	TA-2/34/5		Ti-PO2	4941/42/51/4902
	3.7064/65	Ti99,5	T-60	TA-6/7/8/9		Ti-PO4	4901/21
	3.7164/65	TiAl6V4	T-A6V	TA.10-13/28/56		Ti-P63	491128/35/54/65/67
		T-50	DTD5023/5283			4900	
Stainless Steels	1.4	X6Cr13	Z6013/Z6Cr13	403S17	2301	F.3110-X6 Cr 13	403
	1.4001	X7Cr14	Z3014	403S17	2301	F.8401-AM-X12 Cr 13	410S
	1.4002	X6CrAl13	Z6CA13/Z6CrAl13	405S17	2302	F.3111-X6 CrAl13	405
	1.4005	X12CrS13	Z12CF13/Z12CrS13	416S21	2380	F.3411-X12 CrS 13	416
	1.4006	X10Cr13	Z12C13/Z12Cr13	410S21 ENEN56A	2302	F.3401-X12 Cr 13	410/CA-15
	1.4016	X6Cr17	Z8C17/Z6Cr17	430S1 EN 60	2320	F.3113-X8 Cr17	430
	1.4021	X20Cr13	Z20C13/Z20Cr13	420S37	2303	F.3402-X20 Cr 13	420
	1.4028	X30Cr13	Z20C13/Z20Cr13	420S45	2304	F.3403-X30 Cr 13	
	1.4031	X38Cr13	Z40C14/Z40Cr14		2304	F.3404-X40 Cr 13	
	1.4034	X46Cr13	Z40C14/Z40Cr14	420S45 EN 56D		F.3405-X46 Cr 13	
	1.4057	X20CrNi172	Z15CN16.02	431S29 EN 57	2321	F.3427-X15 CrNi16	431
	1.4104	X12CrMoS17	Z10CF17		2383	F.3117-X10 CrS17	430F
	1.4113	X6CrMo17	Z8CD17.01	434S17	2325		434
	1.4125	X105CrMo17	Z100CD17				440C
	1.4301	X5CrNi1810	Z6CN18.09	304S15 EN 58E	2332	F.3451-X5 CrNi18-10	304/304H
	1.4303	X5CrNi1812	Z8CN18.12	305S19		F.3513-X8CrNi.18-12	308;305
	1.4305	X10CrNiS189	Z10CNF18.09	303S21 EN 58M	2346	F.3508-X10CrNiS18-09	303
1.4306	G-X2CrNi189/1911	Z2CN18.10/Z3CN19.10m	304S12/S11/C12	2333/52	F.3503-X 2CrNi19-10	304L	



Material Cross Reference

Material Class	German	DIN	French	UK	Swedish	Spanish	USA	
Stainless Steels	1.4308	G-X6CrNi189	Z6CN18.10M	304C15	2333		CF-8	
	1.431	X12CrNi177	Z12CN17.07	301S21		F.3517-X12CrNi17 07	301	
	1.4311	X2CrNiN1810	Z2CN18.10Az	304S62	2371		304LN	
	1.4312	G-X10CrNi188	Z10CN18.9M	302C25				
	1.4313	G-X5CrNi134	Z4CND13.4M	425C11		2385	CA6-NM	
	1.4401	X5CrNiMo17122	Z6CND17.11	316S16/S31 EN 58J	2347	F.3543-X5CrNiMo17-12/03	316/316L	
	1.4404	X2CrNiMo17132	Z2CND18.13	316S11/S12	2348	F.3533-X 2CrNiMo17 12-03	316L	
	1.4406	2CrNiMoN17122	Z2CND17.12Az	316S61			316LN	
	1.4408	G-X6CrNiMo1810		316C16	2343	F.8414-AM-X7 CrNiMo20 10	CF-8M	
	1.4429	X2CrNiMo17133	Z2CND17.13Az	316S62	2375		316LN	
	1.4435	X2CrNiMo18143	Z2CND17.13	316S11/S12	2353	F.3533-Z 2 CrNiMo 17-12-03	316L	
	1.4436	X5CrNiMo17133	Z6CND17.12	316S16	2343	F.3534-X 6 CrNiMo 17-12-03	316	
	1.4438	X2CrNiMo18164	Z2CND19.15	317S12	2367		317L	
	1.4449	X5CrNiMo1713		317S16			317	
	1.4452	G-X5CrNiNb189	Z6NNb18.10M	347C17				
	1.446	X8CrNiMo275				2324	F.3309-X 8CrNiMo27-05	329
	1.451	X6CrTi17	Z8CT17				F.3114-X8CrTi17	XM8/430Ti
	1.4512	X5CrTi12	Z6CT12		409S19			409
	1.4541	X6CrNiTi1810	Z6CNT18.10		321S12/S31 EN 58B	2337	F.3553-X 7 CrNiTi 18-11	321
	1.4542	X5CrNiCuNb1714	Z6CNU17.04					630
	1.4546	X5CrNiNb1810			347S17/S18			348
	1.455	X6CrNiNb1810	Z6CNNb18.10		347S17/S31 EN 58F	2338	F.3552-X 7 CrNiNb 18-11	347
	1.4571	X6CrNiMoTi17122	Z6CNDT17.12		320S31/S17 EN58J	2350	F.3552-X 6 CrNiMoTi17-12-03	316Ti
	1.4573	X10CrNiMoTi1812			320S33			316Ti
	1.458	X6CrNiMoNb17122	Z6CNDNb17.12/19.13		318S17			316Cb
	1.4718	X45CrSi93	Z45CS9		401S45 EN52		F.3220-X 4 CrSi 09-03	HNv3
	1.4724	X10CrAl13	Z10C13		403S17		F.13152-X 10 CrAl13	
	1.4731	X40CrSiMo102	Z40CS10				F.3221-X 40 CrSiMo 10-02	
	1.4742	X10CrAl18	Z10CAS18		430S15		F.3153-X 10 CrAl 18	430
	1.4747	X80CrNiSi20	Z80CSN20.02		443S65 EN 59		F.3222-X 80CrNiSi20-02	HNv6
	1.4762	X10CrAl24	Z10CAS24				F.3154-X 10 CrAl24	446
	1.4828	X15CrNiSi2012	Z15CNS20.12		309S24			309
	1.4833	X7CrNi2314	Z15CN24.13		309S24			309S
	1.4837	G-X40CrNiSi2520			309C30			
	1.4841	X15CrNiSi2520	Z15CNS25.20				F.3310-X15 CrNiSi 25-20	314/310
	1.4845	X12CrNi2521	Z12CN25.20		310S24	2361	F.331	310S
	1.4848	G-X40CrNiSi2520			310C40		F.8452-AM-X 40 CrNi 25 20	HK
	1.4871	X53CrMnNiN219	Z5CMN21.09		349S54		F.3217-X 53 CrMnln 21-09	EV8
	1.4873	X45CrNiW189	Z35CNWS14.14		331S40		F.3211-X45 CrNiSiW 28-09	
	1.4878	X12CrNiTi189	T6CNT18.12(B)		321S20	2337	F.3523-X 6CrNiTi 18 11	321
	1.5662	X8Ni9	Z8N9		1501-509;510		F.2645 - X 8 Ni 09	A353
	1.568	12Ni19	Z18N5					2515
	Tool Steels	0.962	G-X260NiCr42		Grade2A			A532IBNiCr-LC
		0.9625	G-X330NiCr42		Grade2B			A532IANiCr-HC
		0.963	G-X300CrNiSi952		Grade2C,D,E			A532IDNi-HiCr
0.964		G-X300CrMoNi152		Grade3A,B				
0.9645		G-X260CrMoNi202		Grade3C			A532IID20%CrMo-LC	
0.965		G-X260Cr27		Grade3D			A532IIIA25%Cr	
0.9655		G-X300CrMo271		Grade3E			A532IIIA25%Cr	
1.1525		C80W1	Y190;Y180				W108	
1.1545		C105W1	Y1105			1880	W110	
1.1645		C105W2					F.5117 C102	
1.1663		C125W	Y2120				F.5123 C120	
1.1673		C135W	Y2140					
1.175/.1625		C75W/C80W1			BW1A/BW1B		F.1507 C80	
1.2067		100Cr6	Y100C6		BL3		F.5230 100 Cr6	
1.208		X210Cr12	Z200C12		BD3		F.5212 X210 Cr12	
1.221		115CrV3					L2	
1.2343		X38CrMoV51	Z38CDV5		BH11		F.5317 X37 CrMoV5	
1.2344		X40CrMoV51	Z40CDV5		BH13	2242	F.5318 X40 CrMoV5	
1.2363		X100CrMoV51	Z100CDV5		BA2	2260	F.5227 X100 CrMoV5	
1.2365		X32CrMoV33	32DCV28		BH10		F.5313 CrMoV 12	
1.2379		X155CrVMo121	Z160CDV12		BD2			
1.2419		105WCr6	105WC13				F.5233 105 WCr5	
1.2436		X210CrW12				2312	F.5213 X210 CrW12	
1.251		100MnCrW4			BO1	2140	F.5220 95 MnCrW5	
1.2542		45WCrV7			BS1	2710	F.5241 45 WCrSi 8	
1.255		60WCrV7	55WC20					
1.2567		X30WCrV53	Z32WCV5					
1.2581		X30WCrV93	Z30WCV9		BH21		F.5323 X30 WCrV9	
1.2601		X165CrMoV12				2310	F.5211 X160 CrMoV12	
1.2606		X37CrMoW51	Z35CWDV5		BH12			
1.2713		55NiCrMoV6	55NCDV7				F.528	
1.2833		100V1	Y1105V		BW2			
1.2842		90MnCrV8	90MV8		BO2			
1.3202		S12-1-4-5			BT15		F.5563 12-1-5-5	



Material Cross Reference

Material Class	German	DIN	French	UK	Swedish	Spanish	USA
Tool Steels	1.3207	S10-4-3-10	Z130WKCDV10-10-04-03			F.553 10-4-3-10	
	1.3243	S6-5-2-5	Z85WDKCV06-05-05-04-02		2723	F.5613 6-5-2-5	
	1.3246	S7-4-2-5	Z110WKCDV07-05-04-04-02			F.5613 6-5-2-5	M41
	1.3247	S2-10-1-8	Z110DKCWW09-08-04-02-01	BT42		F.5615 7-4-2-5	M42
	1.3249	S2-9-2-8		BM34		F.5611 2-9-2-8	M33/M34
	1.3255	S18-1-2-5	Z80WKCV18-05-04-01	BT4		F.5530 18-1-1-5	T4
	1.3265	S18-1-2-10		BT5		F.5540 18-0-2-10	T5
	1.3342	SC6-5-2	Z90WDCV06-05-04-03				M3
	1.3343	S6-5-2	Z85WDCV06-05-04-02	BM2	2722	F.5603 6-5-2	M2
	1.3344	S6-5-3	Z130WDCV06-05-04-04			F.5605 6-5-3	M3Class2
	1.3346	S2-9-1	Z85DCVW08-04-02-01	BM1			H41/M1
	1.3348	S2-9-2	Z100DCVW09-04-02-02		2782	F.5607 2-9-2	M7
	1.3355	S18-0-1	Z80WCV18-04-01	BT1		F.5520 18-0-1	T1
	1.3401	X120Mn12	Z120M12/Z120Mn12			F.82551-AM-X 120 Mn 12	A128(A)
1.3505	100Cr6	100C6		534A99	2258	F.1310 – 100 Cr 6	52100
Hardened Steel				HARDOX 400/500/600			
Cast Aluminium	3.2151	G-AISI6Cu4	A-S5U	LM4-LM22	4230	L-2660	319,2
	3.2161	G-AISI8Cu3	A-S9U3	LM24	4252	L-2630	380,1
	3.2341	G-AISI5Mg	A-S4G	DTD716B			
	3.2371	G-AISI7Mg	A-S7GO,3	2L99/LM25	4244		A356.2
	3.2373	G-AISI9Mg	A7-S10G		4253		
	3.2381	G-AISI10Mg	A-S10G	LM9	4253	L-2560	A360
	3.2583	G-AISI12Cu	A-S12U	LM20	4260	L-2530	413,1
	3.3561	G-ALMg5	A-G6	LM5			514,1
	3.3581	G-AISI12	A-S13	LM6	4261	L-2520	A413
	3.3591	G-ALMg10	A-G10-Y4	LM10		L-2310	520
	AlSi17Cu4					390	
	AlSi18-25CuNiMg		LM28/LM29			393	
Wrought Aluminium	3.0205	Al99	A4	1C	144010	L-3001	1200
	3.0255	Al99,5	A5	1B	144007	L-3051	1050A
	3.0257	E-Al	A5/L	1E	144008	L-3052	1350A
	3.0275	Al99,7	A7		144005	L-3071	1070A
	3.0285	Al99,8	A8	1A	144004	L-3081	1080A
	3.0385	Al99,98R	A99	1			1199
	3.0505	AlMn0,5Mg0,5		N31			3105
	3.0525	AlMn1Mg0,5	A-M1G0,5				3005
	3.0526	AlMnMg1	A-M1G	N4		L-3820	3004
	3.0915	AlFeSi	A-FeS				8011A
	3.1255	AlCuSiMn	A-U4SG	H15	144338	L-3130	2014
	3.1305	AlCu2,5Mg0,5	A-U2G	3L86/HR13		L-3180	2117
	3.1325	AlCuMg1	A-U4G	H14		L-3120	2017A
	3.1355	AlCuMg2	A-U4G1	2L98		L-3140	2024
	3.1645	AlCuMgPb	A-U4Pb		144335	L-3121	2003
	3.1655	AlCuBiPb	A-U5PbBi	FC1	144355	L-3182	2011
	3.2305	E-ALMgSi		91E		L-3431	6101B
	3.2307	Al99,85MgSi	A85-GS	BTR6			6463
	3.2315	Al-Si1 Mg	A-SGMO,7	H30	144212	L-3451	6181
	3.3206	AlMgSi0,5		H9	144103	L-3441	6060
	3.3207	E-ALMgSi0,5	A-GS/L	BTR6	144102		6101C
	3.3315	AlMg1	A-GO,6	N41	144106	L-3350	5005A
	3.3316	AlMg1,5	A-G1,5	3L44		L-3380	5050B
	3.3345	AlMg4,5					5082
	3.3523	AlMg2,5	A-G2,5C	N5Mg3,5	144120	L-3360	5052
	3.3525	AlMg2Mn0,3	A-G2M	N4			5251
	3.3535	AlMg3	A-G3M		144133	L-3390	5754
	3.3537	AlMg2,7Mn	A-G2,5MC	N51			5454
	3.3547	AlMg4,5Mn	5083	N8	144140	L-3321	5083
	3.3555	AlMg5		N6	144146	L-3320	5056A
	3.4335	AlZn4,5Mg1	A-Z5G	H17	144425	L-3741	7020
	3.4345	AlZnMgCu0,5	A-Z5Gu0,6				7022
	3.4365	AlZnMgCu1,5	A-Z5GU	2L95		L-3710	7075
	SG/Nodular Cast Iron	0.704	GGG-40	FGS-400-12	420/12	0717-02	
0.7043		GGG-40.3	FGS370-17	370/17	0717-15		
0.705		GGG-50	FGS500-7	500/7	0727-02		65-45-12
0.706		GGG-60	FGS 600-3	600/3	0732-03		80-55-06
0.707		GGG-70	FGS 700-2	700/2	0737-01		100-70-03
0.708		GGG-80	FGS 800-2	800/2			120-90-02
0.8035		GTW-35-04	MB 35-7	W 340/3			
0.804		GTW-40-05	MB 40-10	W 410/4			
0.8045		GTW-45-07					
0.8135		GTS-35-10	MN 35-10	B 340/12	SIS 08 15-00		32510
0.8145		GTS-45-06	MP 50-5	P 440/7	SIS 08 54-00		
0.8155		GTS-55-04	MP 60-3	P 540/5	SIS 08 56-00		
0.8165		GTS-65-02			SIS 08 62-03		
0.817	GTS 70-02	MP 70-2	P 690/2	SIS 08 62-03		70 003	



Material Cross Reference

Material Class	German	DIN	French	UK	Swedish	Spanish	USA
Grey/White Cast Iron	0.6025	GG25	Ft25D/FGL250	Grade 260	0125-00	FG 25	A48-40B
	0.601	GG10	Ft10D/FGL100		0110-00	FG 10	A48-20B
	0.6015	GG15	Ft15D/FGL150	Grade 150	0115-00	FG 15	A48-25B
	0.602	GG20	Ft20D-FGL200	Grade 220	0120-00	FG20	A48-30B
	0.603	GG30	Ft30D/FGL300	Grade 300	0130-00	FG 30	A48-45B
	0.6035	GG35	Ft35D/FGL350	Grade 350	0135-00	FG35	A48-50B
	0.604	GG40	Ft40D/FGL400	Grade 400	0140-00		A48-60B
Bronze Aluminium- Bronze Tin Bronze	2.0918	CuAl5As	CuAl6				C 60 800
	2.092	CuAl8	CuAl8				C 61 000
	2.0932	CuAl8Fe3	CuAl7Fe2	CA 106			C 61 400
	2.0936	CuAl10Fe3Mn2	CuAl9Fe3Mn2	CA 105			C 62 300
	2.094	CuAl10Fe	CuAl9Fe3	AB 1			C 95 200
	2.094	G-FeA/BzF50	CuAl9Fe3	AB 1			B 505
	2.096	CuAl9Mn2	CuAl9Mn2				
	2.0966	CuAl10Ni5Fe4	CuAl9Ni5Fe3Mn	CA 104			C 63 200
	2.097	G-NiABzF50	CuAl9Ni5Fe	AB 2			C 95 800
	2.0978	CuAl11NiFe5	CuAl11Ni5Fe5				
2.1188	G-CuPb20Sn	CuPb20Sn5	LB5			C 94100	
Brass	2.022/2.032	CuZn5	CuZn5	CZ 125/101			C 21000/34500
	2.034	G-CuZn37Pb	CuZn40-Y30	PCB 3			C 85700
	2.036/2.041	CuZn40/44Pb2	CuZn40/44Pb2	CZ 109/CZ130			C 28000/38500
	2.046	CuZn20Al2	CuZn22Al2	CZ 110			C 68700
	2.047	CuZn28Sn1		CZ 111			C 44300
	2.053	CuZn38Sn1		CZ 112			C 46400
	2.055	CuZn40Al2		CZ 114			C 67400
	2.0591	G-CuZn38Al		PCB1, DCB 3			C 86400
	2.0592	G-CuZn35Al1	CuZn40-Y30	HTB 1			C 86400
	2.0596	G-CuZn34Al2					C 86200
	2.0598	G-CuZn25Al5		HTB 3			C 86300
	2.105	G-CuSn10Zn		G1			C 90500
	2.1052	G-CuSn12	CuSn12	Pb2			C 90800
	2.106	G-CuSn12Ni		CT2			C 91700
	2.1086	G-CuSn10		CT1			C 90250
	2.109	G-CuSn7ZnPb	CuSn7Pb6Zn4				C 93200
	2.1093	G-CuSn6ZnNi		LG4			C 92410
	2.1096	G-CuSn5ZnPb/RG5	CuPb5Sn5Zn5	LG2			C 83600
	2.1176	G-CuPb10Sn	CuPb10Sn10	LB2			C 93700
	2.1182	G-CuPb15Sn		LB1			C 93800
2.1293	CuCrZr		CC 102			C 18100	
Copper Copper/ Nickel Alloys	2.0815	G-CuNi10					C 96200
	2.083	CuNi25	CiNi25	CN 105			C 71300
	2.0835	G-CuNi30		CN 2			C 96400
	2.0842	CuNi44Mn1	CuNi44				C 72150
	2.0872	CuNi10Fe1Mn	CuNi10Fe1Mn	CN 102			C 70600
	2.0882	CuNi30Mn1Fe	CuNi30Mn1Fe	CN 107			C 71500
	2.1245	CuBe1,7	CuBe1,7	CB 101			C 17000
	2.1247	CuBe2	CuBe1,9				C 17200
	2.1285	CuCo2Be		C112			C 17500
	2.131	CuFe2P					C 19400
		CuNi9Sn2					C 72500
		CuNi30Fe2Mn2	CuNi30Fe2Mn2	CN 108			C 71640
	2.004	OF-Cu	Cu-c1/C2	Cu-OF C 103/110			OF
	2.006	E-Cu57	Cu-a1/A2	Cu-ETP-2 C 101			C 11000
	2.0065	E-Cu58	Cu-a1	Cu-ETP-2 C 101			C 11000
	2.007	Se-Cu					C 10300
	2.0076	SW-Cu	Cu-b2				C 1200
	2.009	SF-Cu	Cu-b1	Cu-DHP C 106			C 12200
	2.1191	Cu-Ag 0,1P					C 10700
	2.1203	Cu-AG 0,1			CuAg-4		C 11600



Problems and Solutions

Problem	Cause				
	Use of Standard & Extended Holders	Starting on an inclined surface	Worn or mis-aligned spindle	Use of low rigidity spindle	Poor work piece support
Accelerated corner wear			2,6,7		
Spiral or large diameter at hole start	1,2,3,4,27		2,6,7,27	2,4,8,27	10,26,27
Insert Chipping				2,4,8,9	8,9,10,26
Blue Chips					
Built Up Edge (BUE)					
Chatter	1,2,3,4,27	1,3,4,5	2,6,7	2,4,8	8,10,26
Chip Packing					
Chipping of point	1,2,3,4,27	1,3,4,5	2,6,7	2,4,8,9	
Damaged or broken tools		1,3,4,5	2,6,7	2,4,8,9	8,9,10
Excessive margin wear		1,3,4,5	2,6,7		8,9,10
High flank wear					
Hole lead off	1,2,3,4,27	1,3,4,5	2,6,7,27	2,4,8	
Hole out of position	1,2,3,4,27			2,4,8	
Hole out of round		1,3,4,5			8,10,26,27
Notching of insert					
Oversize hole			2,6,7,27		
Poor hole finish			2,6,7		8,10
Poor tool life					
Power Fluctuation of load metre					
Retraction spiral	1,2,3,4,27	1,3,4,5	2,6,7	2,4,8	8,9,10,27
Step burnt on insert					

Solutions

1. Use a short holder to drill a pilot hole 1 x D deep.
2. Spot hole with stub tool of same or greater included angle as T-A insert.
3. Decrease feed minimum 50% until full diameter established.
4. Use special holder with wear pads or chrome bearing area to work with drill bushing.
5. Spot face to provide flat entry surface.
6. Align spindle or turret or tailstock.
7. Repair spindle.
8. Reduce penetration rate to fall within physical limits of machine set up, but do not fall below feed threshold required to form a chip or speed threshold to cut material.
9. Use tougher grade tool steel with high wear resistant coating (i.e. if using Premium Cobalt (PC) use Super Cobalt. If using Super Cobalt use CPM-M4
10. Provide additional support for the workpiece.
11. Run coolant through holder when drilling greater than 1xD
12. Increase coolant volume and pressure through the holder
13. Reduce penetration rate to fall within coolant limitations, but do not fall below feed threshold required to form a chip or speed threshold to cut material
14. Add peck cycle to clear chips, do not remove insert from hole during peck



Cause

External coolant-Low pressure/volume	Interrupted Cuts	Drilling hardened materials	Poor material micro-structure	Poor chip control	Spot drilled holes	High wear resistant tool grades
11,12,13,19		12,18,19,20			2,23	
	2,15,16,17,4,9		9,20,21,22,23		2,23	9,26
11,12,13		12,18,19,20				
11,12,13		12,13,18,19,20	9,20,21,23			
	2,4,15,16,17				2,23	
11,12,13,14				12,14,19,24,25		
	2,9,15,16,17					
9,11,12,13,14	2,4,15,16,17	12,18,19,20	9,20,21,23	12,19,24,25		9,26
	2,15,16,17			12,19,24,25		
11,12,13,19,20		12,18,19,20	9,20,21,23			
	2,4,15,16,17,27		9,20,21,23	12,19,24,25	2,23,27	
	2,4,15,16,17,27					
	2,4,15,16,17					
			9,20,21,23		2,23	
11,12,13,14	2,15,16,17			12,19,24,25,27		
11,12,13,14	2,15,16,17			12,19,24,25		
11,12,13,14,19,20	2,15,16,17	12,18,19,20	9,20,21,23	12,14,19,24,25	2,23	
11,12,13,14				12,19,24,25		
11,12,13,18,20		12,18,19,20				

15. Pre-mill or spot face entry or exit to remove interruption.
16. Decrease feed up to 50% through entry or exit interruption using Nyloc screws to retain insert.
17. Use short holders in low impact entry cuts.
18. Reduce speed if a step or burn diameter is worn on insert. Calculate the speed at worn diameter, reduce this velocity by 10% and apply to original tool diameter.
19. Improve quality and condition of coolant (water soluble preferred at 7-8% dilution with EP additive).
20. Use more heat and wear resistant tool grade. If using CPM-M4 use Super Cobalt. If using Super Cobalt, use Premium Cobalt. If using Premium Cobalt, use Carbide (if micro structure problems present). Use most wear resistant coating.-TiCN/TiAlN/AM200™.
21. Anneal or normalise parts if all cutting tools exhibiting poor tool life.
22. For hard spots, use tougher grade tool steel with high wear resistant coating (i.e If using Premium Cobalt (PC) use Super Cobalt. If using Super Cobalt, use CPM-M4).
23. Reduce feed, but not below threshold of good chip formation.
24. Increase feed to recommended levels.
25. Contact AMEC or use one of chip enhancement geometries page at front of catalogue.
26. Increase rigidity of set up.
27. Use AMEC's Notch Point Geometry.