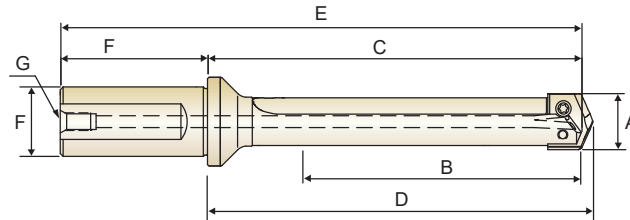
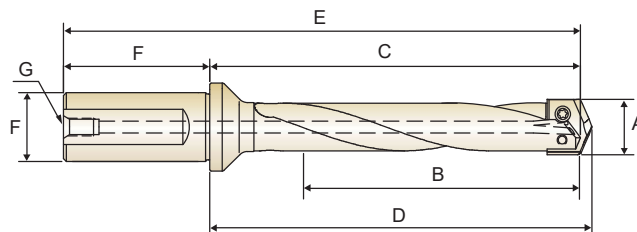


**SPADE DRILLS****Z**ITSF SERIES****Z**ITHF SERIES****CARBIDE****HSS****FLANGED STRAIGHT SHANK HOLDERS****HALTER MIT ZYLINDERSCHAFT UND SPANNFLÄCHE****INTERMEDIATE LENGTH - Straight Flute (Inch)**

Series	EDP No.	Drill Insert Range	Max. Drill Depth	Body Length	Ref. Length	Overall Length	Shank		Pipe Tap
		A	B	C	D	E	Dia.	Length	G
1	Z10ITSF100I	45/64" ~ 15/16"	4-5/8"	6-3/32"	6-15/64"	8-3/8"	1"	2-9/32"	1/8"
1.5	Z15ITSF100I	55/64" ~ 15/16"	4-5/8"	6-3/32"	6-15/64"	8-3/8"	1"	2-9/32"	1/8"
2	Z20ITSF125I	31/32" ~ 1-3/8"	5-3/8"	7-1/16"	7-13/64"	9-11/32"	1-1/4"	2-9/32"	1/4"
2.5	Z25ITSF125I	1-3/16" ~ 1-3/8"	5-3/8"	7-1/16"	7-13/64"	9-11/32"	1-1/4"	2-9/32"	1/4"
3	Z30ITSF150I	1-13/32" ~ 1-7/8"	6-1/2"	8-9/16"	8-3/4"	11-1/4"	1-1/2"	2-11/32"	1/4"

**INTERMEDIATE LENGTH - Helical Flute (Inch)**

Series	EDP No.	Drill Insert Range	Max. Drill Depth	Body Length	Ref. Length	Overall Length	Shank		Pipe Tap
		A	B	C	D	E	Dia.	Length	G
1	Z10ITHF100I	45/64" ~ 15/16"	4-5/8"	6-3/32"	6-15/64"	8-3/8"	1"	2-9/32"	1/8"
1.5	Z15ITHF100I	55/64" ~ 15/16"	4-5/8"	6-3/32"	6-15/64"	8-3/8"	1"	2-9/32"	1/8"
2	Z20ITHF125I	31/32" ~ 1-3/8"	5-3/8"	7-1/16"	7-13/64"	9-11/32"	1-1/4"	2-9/32"	1/4"
2.5	Z25ITHF125I	1-3/16" ~ 1-3/8"	5-3/8"	7-1/16"	7-13/64"	9-11/32"	1-1/4"	2-9/32"	1/4"
3	Z30ITHF150I	1-13/32" ~ 1-7/8"	6-1/2"	8-9/16"	8-3/4"	11-1/4"	1-1/2"	2-11/32"	1/4"

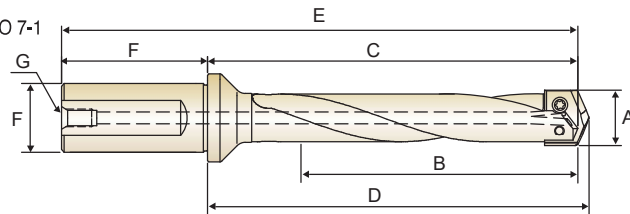
i-DREAM
DRILLSDREAM
DRILLS
-GENERALDREAM
DRILLS
-INOXDREAM
DRILLS
-ALUDREAM
DRILLS
-CFRPDREAM
DRILLS
-MQL TYPEDREAM
DRILLS
for HARDENED
STEELSGENERAL
CARBIDE
DRILLSNC-SPOTTING
DRILLSCENTER
DRILLSMULTI-1
DRILLS

HPD DRILLS

GOLD-P
DRILLSSTRAIGHT
SHANK
DRILLSTAPER
SHANK
DRILLSNC-SPOTTING
DRILLSCENTER
DRILLSSPADE
DRILLSTECHNICAL
DATA

**SPADE DRILLS****Z**ITHF** SERIES**Z**SDHF** SERIES**CARBIDE****HSS****FLANGED STRAIGHT SHANK HOLDERS****HALTER MIT ZYLINDERSCHAFT UND SPANNFLÄCHE**

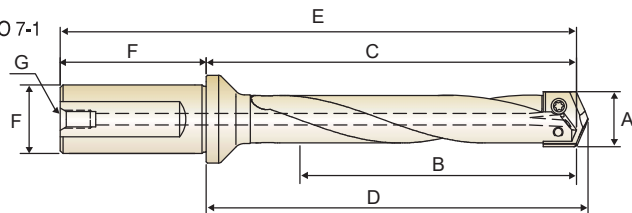
Thread to BSP & ISO 7-1

**INTERMEDIATE LENGTH - Helical Flute (Metric)**

Series	EDP No.	Drill Insert Range	Max. Drill Depth	Body Length	Ref. Length	Overall Length	Shank		Pipe Tap
		A	B	C	D	E	Dia.	Length	G
1	Z10ITHF025M	18.0 ~ 24.0	117.5	154.8	158.4	210.8	25.0	56.0	1/8"
1.5	Z15ITHF025M	22.0 ~ 24.0	117.5	154.8	158.4	210.8	25.0	56.0	1/8"
2	Z20ITHF032M	25.0 ~ 35.0	136.5	179.4	183.0	239.4	32.0	60.0	1/4"
2.5	Z25ITHF032M	30.0 ~ 35.0	136.5	179.4	183.0	239.4	32.0	60.0	1/4"
3	Z30ITHF040M	36.0 ~ 47.0	165.1	217.5	222.3	287.5	40.0	70.0	1/4"



Thread to BSP & ISO 7-1

**STANDARD LENGTH - Helical Flute (Metric)**

Series	EDP No.	Drill Insert Range	Max. Drill Depth	Body Length	Ref. Length	Overall Length	Shank		Pipe Tap
		A	B	C	D	E	Dia.	Length	G
Y	ZY0SDHF020M	9.5 ~ 11.0	60.3	89.7	92.1	139.7	20.0	50.0	1/8"
Z	ZZ0SDHF020M	11.5 ~ 12.5	60.3	89.7	92.1	139.7	20.0	50.0	1/8"
O	Z00SDHF020M	13.0 ~ 17.5	63.5	92.1	94.9	142.1	20.0	50.0	1/8"
0.5	Z05SDHF020M	15.5 ~ 17.5	63.5	92.1	94.9	142.1	20.0	50.0	1/8"
1	Z10SDHF025M	18.0 ~ 24.0	168.3	205.6	209.2	261.6	25.0	56.0	1/8"
1.5	Z15SDHF025M	22.0 ~ 24.0	168.3	205.6	209.2	261.6	25.0	56.0	1/8"
2	Z20SDHF032M	25.0 ~ 35.0	187.3	230.2	233.8	290.2	32.0	60.0	1/4"
2.5	Z25SDHF032M	30.0 ~ 35.0	187.3	230.2	233.8	290.2	32.0	60.0	1/4"
3	Z30SDHF040M	36.0 ~ 47.0	209.6	261.9	266.7	331.9	40.0	70.0	1/4"
4	Z40SDHF040M	48.0 ~ 65.0	231.8	281.0	285.8	351.0	40.0	70.0	1/4"

I-DREAM
DRILLSDREAM
DRILLS
-GENERALDREAM
DRILLS
-INOXDREAM
DRILLS
-ALUDREAM
DRILLS
-CFRPDREAM
DRILLS
-MQL TYPEDREAM
DRILLS
for HARDENED
STEELSGENERAL
CARBIDE
DRILLSNC-SPOTTING
DRILLSCENTER
DRILLSMULTI-1
DRILLS

HPD DRILLS

GOLD-P
DRILLSSTRAIGHT
SHANK
DRILLSTAPER
SHANK
DRILLSNC-SPOTTING
DRILLSCENTER
DRILLSSPADE
DRILLSTECHNICAL
DATA

DRILL INSERT (METRIC) - HSS **BOHREINSATZ (METRISCH) - HSS**

Material	Material Hardness		* HSS Grade	Speed (M/min)			Feed (mm/rev)						
	(Bhn)	(HRC)		TiN	TiCN	TiAlN	Ø9.5 ~12.5	Ø13 ~17.5	Ø18 ~24	Ø25 ~35	Ø36 ~47	Ø48 ~65	Ø66 ~114
Free machining Steels 9SMn36, 9SMnPb28 10SPb20 etc	100 - 150		HSS	63	79	84	0.16	0.23	0.31	0.40	0.48	0.55	0.67
	150 - 200	- 13	HSS	58	70	81	0.16	0.23	0.31	0.40	0.48	0.55	0.67
	200 - 250	13 - 24	HSS	51	66	72	0.14	0.23	0.31	0.38	0.48	0.57	0.69
Low Carbon Steels C10, C15, C22, C25 etc	85 - 125		HSS	54	67	75	0.15	0.22	0.28	0.37	0.46	0.56	0.67
	125 - 175	- 7	HSS	51	63	72	0.15	0.22	0.28	0.37	0.46	0.56	0.67
	175 - 225	7 - 20	HSS	49	58	69	0.13	0.19	0.24	0.34	0.43	0.50	0.57
	225 - 275	20 - 28	HSS	45	56	66	0.13	0.19	0.24	0.34	0.43	0.50	0.57
Medium Carbon Steels C35, C40, C45 etc	125 - 175	- 7	HSS	52	63	75	0.14	0.22	0.28	0.35	0.45	0.55	0.65
	175 - 225	7 - 20	HSS	48	59	69	0.13	0.19	0.23	0.34	0.43	0.50	0.58
	225 - 275	20 - 28	HSS	45	56	63	0.13	0.19	0.23	0.34	0.43	0.50	0.58
	275 - 325	28 - 34	SH, PH	42	52	58	0.10	0.17	0.21	0.28	0.38	0.45	0.55
Structural Steels St33, St37-2, St44-2 St52, St60 etc	100 - 150		HSS	44	56	63	0.14	0.23	0.29	0.35	0.44	0.50	0.63
	150 - 250	- 24	HSS	39	47	55	0.13	0.22	0.24	0.28	0.38	0.46	0.59
	250 - 350	24 - 37	SH, PH	32	41	45	0.10	0.20	0.22	0.24	0.34	0.40	0.48
Cast Iron / S,G Iron GG10, 20, 25, 35, 40 GGG50, 70 GTW35, GTS70 etc	120 - 150		HSS	52	64	75	0.16	0.30	0.40	0.49	0.59	0.69	0.75
	150 - 200	- 13	HSS	48	58	70	0.14	0.26	0.35	0.45	0.56	0.64	0.68
	200 - 220	13 - 19	HSS	42	53	58	0.14	0.23	0.30	0.41	0.46	0.52	0.60
	220 - 260	19 - 26	SH, PH	35	44	52	0.13	0.17	0.23	0.30	0.35	0.43	0.50
Alloy Steels 45CrNiMo4, 42CrMo4 16MnCr5, Ck75 35CrMo4, 16MnCr5 etc	260 - 320	26 - 34	SH, PH	29	35	41	0.10	0.15	0.16	0.23	0.28	0.35	0.40
	125 - 175	- 7	HSS	48	58	63	0.15	0.20	0.24	0.36	0.43	0.47	0.53
	175 - 225	7 - 20	HSS	45	56	58	0.13	0.20	0.24	0.36	0.42	0.46	0.55
	225 - 275	20 - 28	HSS	41	50	56	0.13	0.16	0.23	0.35	0.41	0.44	0.55
	275 - 325	28 - 34	SH, PH	39	47	53	0.09	0.15	0.22	0.28	0.38	0.41	0.50
Tool Steels 102Cr6, 105WCr6, C75W etc	325 - 375	34 - 40	SH, PH	36	43	46	0.08	0.15	0.21	0.27	0.38	0.40	0.51
	150 - 200	- 13	SH	25	34	36	0.09	0.15	0.19	0.25	0.28	0.36	0.41
	200 - 250	13 - 24	SH, PH	19	27	29	0.09	0.15	0.19	0.25	0.28	0.36	0.41
High Temp. Alloy Hastelloy B, Inconel etc	140 - 220	- 19	SH, PH	9	11	12	0.08	0.17	0.20	0.24	0.30	0.37	0.39
	220 - 310	19 - 33	PH	8	9	11	0.08	0.14	0.18	0.19	0.25	0.29	0.34
High Strength Alloy 36CrNiMo4, 34CrNiMo8 40NiCrMo73 etc	225 - 300	- 32	SH, PH	25	34	35	0.13	0.18	0.23	0.24	0.36	0.43	0.50
	300 - 350	32 - 37	SH, PH	19	26	27	0.10	0.18	0.23	0.24	0.36	0.43	0.50
	350 - 400	37 - 43	PH	16	21	22	0.08	0.15	0.20	0.22	0.30	0.48	0.46
Aluminum AlCuSiMn, AlMgSi0.5, AlZnMgCu1.5 etc	30		HSS	187	229	244	0.19	0.33	0.41	0.50	0.54	0.64	0.62
	180	- 8	HSS	92	137	137	0.19	0.33	0.41	0.46	0.54	0.64	0.62
Stainless Steels X7Cr13, X10CrAl18, X5CrNi189, X5CrNiMo18 10 etc	135 - 185	- 9	HSS	24	29	34	0.14	0.20	0.23	0.26	0.36	0.41	0.50
	185 - 275	9 - 28	HSS	20	23	29	0.12	0.18	0.20	0.24	0.30	0.36	0.46

RPM= revolution per minute (rev/min)

M/min= surface meter per minute(M/min)

DIA= diameter of drill (mm)

mm/rev = feed rate(mm/rev)

*** Formulas :**

$$M/min = \frac{(RPM) \cdot (\pi) \cdot (DIA.)}{1000}$$

$$mm/min = (RPM) \cdot (mm/rev)$$

$$RPM = \frac{(M/min) \cdot (1000)}{(\pi) \cdot (DIA.)}$$

*** HSS Grade :** HSS = HSS M4, SH = Super HSS T15, PH = Premium HSS M48

The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.



DRILL INSERT (METRIC) - CARBIDE

BOHREINSATZ (METRISCH) - VOLLHARTMETALL

Material	Material Hardness		CARBIDE Grade	Speed (M/min)			Feed (mm/rev)				
	(Bhn)	(HRC)		TiN	TiCN	TiAlN	Ø 9.5 ~12.5	Ø 13 ~17.5	Ø 18 ~24	Ø 25 ~35	Ø 36 ~47
Free machining Steels 9SMn36, 9SMnPb28 10SPb20 etc	100 - 150		P40	101	113	125	0.18	0.28	0.36	0.44	0.50
	150 - 200	- 13	P40	88	99	110	0.16	0.26	0.33	0.39	0.45
	200 - 250	13 - 24	P40	82	88	101	0.14	0.23	0.31	0.41	0.42
Low Carbon Steels C10, C15, C22, C25 etc	85 - 125		P40	94	110	119	0.20	0.24	0.31	0.42	0.46
	125 - 175	- 7	P40	82	88	107	0.18	0.24	0.31	0.39	0.43
	175 - 225	7 - 20	P40	76	82	96	0.15	0.22	0.29	0.36	0.40
Medium Carbon Steels C35, C40, C45 etc	225 - 275	20 - 28	P40	62	73	84	0.13	0.22	0.29	0.36	0.40
	125 - 175	- 7	P40	82	88	102	0.17	0.24	0.31	0.37	0.42
	175 - 225	7 - 20	P40	75	84	93	0.15	0.22	0.28	0.36	0.40
Structural Steels St33, St37-2, St44-2 St52, St60 etc	225 - 275	20 - 28	P40	66	70	84	0.15	0.22	0.28	0.36	0.40
	275 - 325	28 - 34	P40	56	64	67	0.13	0.19	0.26	0.33	0.37
	100 - 150		P40	75	82	91	0.19	0.26	0.34	0.39	0.43
Cast Iron / S,G Iron GG10, 20, 25, 35, 40 GGG50, 70 GTW35, GTS70 etc	150 - 250	- 24	P40	62	70	75	0.15	0.24	0.29	0.33	0.37
	250 - 350	24 - 37	P40	55	64	73	0.13	0.23	0.27	0.29	0.33
	120 - 150		K20,K10	98	125	137	0.18	0.30	0.37	0.46	0.56
Alloy Steels 45CrNiMo4, 42CrMo4 16MnCr5, Ck75 35CrMo4, 16MnCr5 etc	150 - 200	- 13	K20,K10	95	101	125	0.17	0.26	0.32	0.42	0.53
	200 - 220	13 - 19	K20,K10	75	91	111	0.14	0.23	0.30	0.38	0.45
	220 - 260	19 - 26	K20,K10	66	81	93	0.13	0.15	0.28	0.33	0.37
Tool Steels 102Cr6, 105WCr6, C75W etc	260 - 320	26 - 34	K20,K10	56	70	79	0.13	0.18	0.23	0.28	0.33
	125 - 175	- 7	P40	79	85	98	0.18	0.25	0.32	0.40	0.45
	175 - 225	7 - 20	P40	73	81	88	0.15	0.23	0.29	0.38	0.42
High Temp. Alloy Hastelloy B, Inconel etc	225 - 275	20 - 28	P40	66	73	81	0.15	0.21	0.28	0.37	0.41
	275 - 325	28 - 34	P40	62	70	78	0.12	0.20	0.27	0.33	0.40
	325 - 375	34 - 40	P40	53	58	64	0.10	0.18	0.23	0.30	0.38
High Strength Alloy 36CrNiMo4, 34CrNiMo8 40NiCrMo73 etc	150 - 200	- 13	P40	50	56	67	0.09	0.18	0.22	0.28	0.31
	200 - 250	13 - 24	P40	37	46	50	0.09	0.18	0.22	0.28	0.31
	140 - 220	- 19	K20	26	27	30	0.10	0.17	0.23	0.27	0.33
Aluminum AlCuSiMn, AlMgSi0.5, AlZnMgCu1.5 etc	220 - 310	19 - 33	K20	20	23	24	0.10	0.14	0.20	0.24	0.30
	225 - 300	- 32	P40	49	55	62	0.15	0.23	0.25	0.29	0.38
	300 - 350	32 - 37	P40	43	49	55	0.12	0.20	0.23	0.27	0.35
Stainless Steels X7Cr13, X10CrAl18, X5CrNi189, X5CrNiMo18 10 etc	350 - 400	37 - 43	P40	38	43	47	0.10	0.18	0.20	0.24	0.30
	30		K20	366	396	427	0.24	0.38	0.45	0.50	0.53
	180	- 8	K20	244	290	291	0.22	0.33	0.40	0.45	0.48
	135 - 185	- 9	K20	50	55	62	0.19	0.19	0.21	0.24	0.30
	185 - 275	9 - 28	K20	38	44	46	0.15	0.17	0.20	0.21	0.25

RPM= revolution per minute (rev/min)

M/min= surface meter per minute(M/min)

DIA= diameter of drill (mm)

mm/rev = feed rate(mm/rev)

*** Formulas :**

$$M/min = \frac{(RPM) \cdot (\pi) \cdot (DIA.)}{1000}$$

$$mm/min = (RPM) \cdot (mm/rev)$$

$$RPM = \frac{(M/min) \cdot (1000)}{(\pi) \cdot (DIA.)}$$

The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.

SUPER HSS T-15 FLAT BOTTOM SPADE DRILL BOHRER-EINSÄTZE - SUPER COBALT T15(FLACH-NUT)

Material	Material Hardness		Speed		Feed			
	(Bhn)	(HRC)	TiN	TiAlN (Hardslick)	Ø 9.5 ~ 12.5	Ø 13 ~ 17.5	Ø 18 ~ 24	Ø 25 ~ 35
Free machining Steels 9SMn36, 9SMnPb28 10SPb20 etc	100 - 150		63	67	0.13	0.18	0.25	0.32
	150 - 200	- 13	56	65	0.13	0.18	0.25	0.32
	200 - 250	13 - 24	53	58	0.11	0.18	0.25	0.30
Low Carbon Steels C10, C15, C22, C25 etc	85 - 125		54	60	0.12	0.18	0.22	0.30
	125 - 175	- 7	50	58	0.12	0.18	0.22	0.30
	175 - 225	7 - 20	46	55	0.10	0.15	0.19	0.27
	225 - 275	20 - 28	45	53	0.10	0.15	0.19	0.27
Medium Carbon Steels C35, C40, C45 etc	125 - 175	- 7	50	60	0.11	0.18	0.22	0.28
	175 - 225	7 - 20	47	55	0.10	0.15	0.18	0.27
	225 - 275	20 - 28	45	50	0.10	0.15	0.18	0.27
	275 - 325	28 - 34	42	46	0.08	0.14	0.17	0.22
Structural Steels St33, St37-2, St44-2 St52, St60 etc	100 - 150		45	50	0.11	0.18	0.23	0.28
	150 - 250	- 24	38	44	0.10	0.18	0.19	0.22
	250 - 350	24 - 37	33	36	0.08	0.16	0.18	0.19
Cast Iron / S,G Iron GG10, 20, 25, 35, 40 GG650, 70 GTS35, GTS70 etc	120 - 150		56	66	0.13	0.25	0.35	0.41
	150 - 200	- 13	51	60	0.12	0.21	0.29	0.40
	200 - 220	13 - 19	47	51	0.12	0.20	0.25	0.36
	220 - 260	19 - 26	38	48	0.10	0.14	0.20	0.25
	260 - 320	26 - 34	30	37	0.10	0.13	0.13	0.20
Alloy Steels 45CrMo4, 42CrMo4 16MnCr5, Ck75 35CrMo4, 16MnCr5 etc	125 - 175	- 7	46	50	0.12	0.16	0.19	0.29
	175 - 225	7 - 20	45	46	0.10	0.16	0.19	0.29
	225 - 275	20 - 28	40	45	0.10	0.13	0.18	0.28
	275 - 325	28 - 34	38	42	0.07	0.12	0.18	0.22
	325 - 375	34 - 40	34	37	0.06	0.12	0.17	0.22
Tool Steels 102Cr6, 105WCr6, C75W etc	150 - 200	- 13	27	29	0.07	0.12	0.15	0.20
	200 - 250	13 - 24	22	23	0.07	0.12	0.15	0.20
High Temp. Alloy Hastelloy B, Inconel etc	140 - 220	- 19	9	10	0.06	0.14	0.16	0.19
	220 - 310	19 - 33	7	9	0.06	0.11	0.14	0.15
High Strength Alloy 36CrNiMo4, 34CrNiMo8 40NiCrMo73 etc	225 - 300	- 32	27	28	0.10	0.14	0.18	0.19
	300 - 350	32 - 37	21	22	0.08	0.14	0.18	0.19
	350 - 400	37 - 43	17	18	0.06	0.12	0.16	0.18
Aluminum AlCuSiMn, AlMgSi0.5, AlZnMgCu1.5 etc	30		208	213	0.17	0.28	0.36	0.43
	180	- 8	112	121	0.17	0.28	0.36	0.41
Stainless Steels X7Cr13, X10CrA118, X5CrNi189, X5CrNiMo18 10 etc	135 - 185	- 9	26	29	0.12	0.18	0.20	0.23
	185 - 275	9 - 28	20	25	0.09	0.15	0.18	0.22

RPM= revolution per minute (rev/min)

M/min= surface meter per minute(M/min)

DIA= diameter of drill (mm)

mm/rev = feed rate(mm/rev)

*** Formulas :**

$$M/min = \frac{(RPM) \cdot (\pi) \cdot (DIA.)}{1000}$$

$$mm/min = (RPM) \cdot (mm/rev)$$

$$RPM = \frac{(M/min) \cdot (1000)}{(\pi) \cdot (DIA.)}$$

The recommendations for speeds, feeds and other parameters presented in this chart are nominal recommendations and should be considered only as good starting points.

Speed and feed reductions (20% reduction in speed and 10% reduction in feed) are recommended.