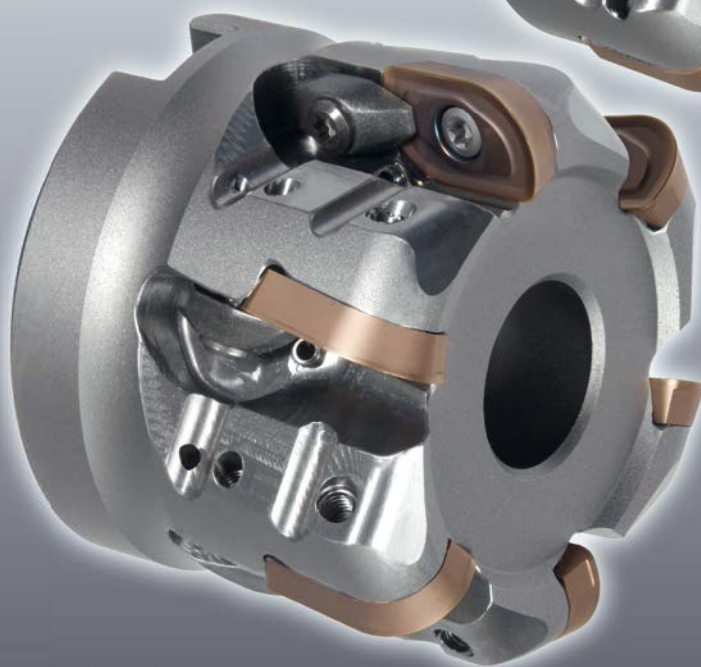


AHR *Mini-Advanced Heavy Roughing*

For High Performance Feed & Depth



- D 35 mm ~ D 125 mm**
- Modular & Bore Types
 - 6 Insert Grades
 - 2 Geometries
 - Real Radius: **R8**



ZDNW

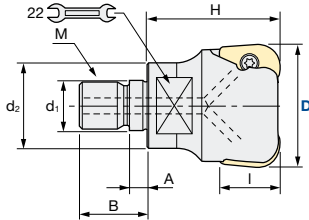
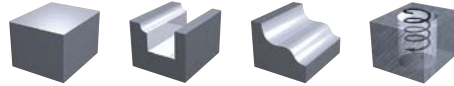


R8



AHRM | Mini – Advanced Heavy Roughing – Modular Type

Q max High Efficient	Jet Air Hole	▽ Roughing	HRC 62	No. of Teeth 3~4
--------------------------------	------------------------	----------------------	------------------	----------------------------



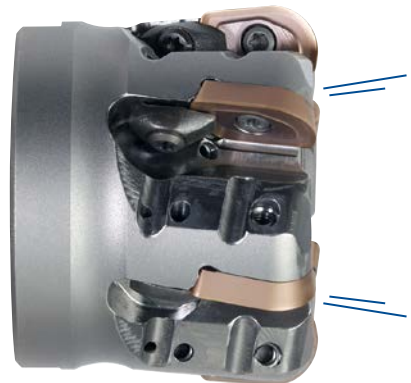
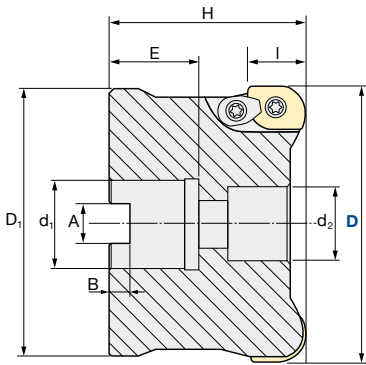
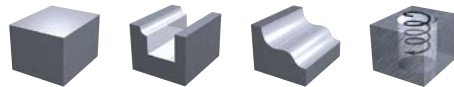
Diameter Holder only [mm]	Fastening Torque [Nm]
-0.1/-0.2 mm	2.9Nm

Modular Type		Flutes	D	H	d ₁	M	d ₂	A	B	C	E	I	Inserts
FH149	AHRM-4035R-3-M16	3	35	45	17	M16	29	6	23	12	22	18	ZDNW...
FH150	AHRM-4042R-4-M16	4	42										ZDMT...

Wrench Size

AHRB | Mini – Advanced Heavy Roughing – Bore Type

Q max High Efficient	Jet Air Hole	▽ Roughing	HRC 62	No. of Teeth 5~9
--------------------------------	------------------------	----------------------	------------------	----------------------------



Diameter Holder only [mm]	Fastening Torque [Nm]
-0.1/-0.2 mm	2.9Nm

Bore Type													
ID Code	Item Code	Flutes	D	H	d ₁	d ₂	M	D ₁	A	B	E	I	Inserts
FH151	AHRB-4052RM-5-22	5	52	50	22	15	10*	40	10.4	6.3	20	18	ZDNW... ZDMT...
FH152	AHRB-4052RM-5-27			63		17	12*	45					
FH153	AHRB-4066RM-6-27	6	66	50	27	20	12	60	12.4	7	22		
FH154	AHRB-4080RM-7-27	7	80										
FH155	AHRB-4100RM-8-32	8	100	63	32	26	16	70	14.4	8	25.5		
FH156	AHRB-4125RM-9-40	9	125		40	32	20	105	16.4	9	30		

* Special Screw

INSERTS AHR | Mini – Advanced Heavy Roughing

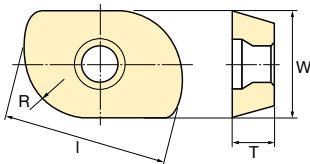


Fig.1: ZDNW Standard Shape

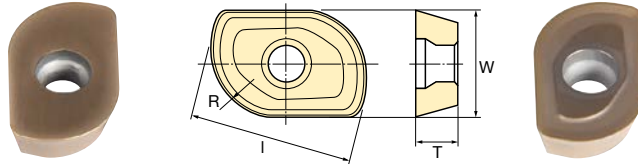






Fig.2: ZDMT with Breaker

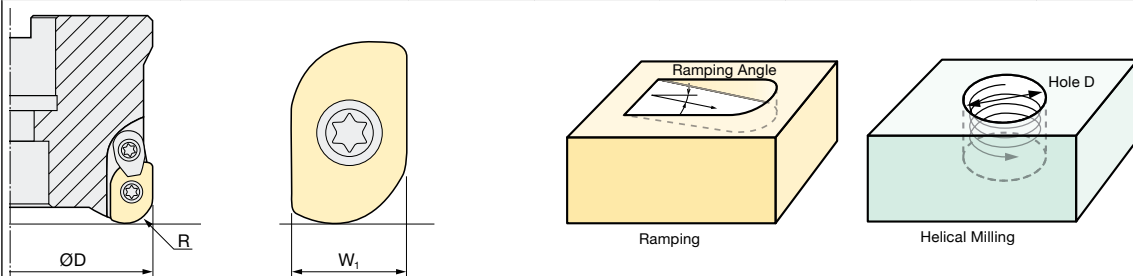


Inserts	Tolerance Class	Grade					Size (mm)				Shape
Item Code		JX1060	JS4060	JX1045	JP4020	JX1005	R	I	T	W	
		ID Code									
ZDNW1204080TR JX1005	N					WF674	8	21.5	4.76	12.7	Fig.1
ZDNW1204080TR JX1045				WF677							
ZDNW1204080TR JX1060		WF678									
ZDNW1204080TR JS4060			WF679								
ZDNW1204080TR JP4020					WF680						
ZDMT1204080TR JX1005	M					WF681					Fig.2
ZDMT1204080TR JX1045				WF684							
ZDMT1204080TR JS4060			WF686								
ZDMT1204080TR JP4020					WF687						

JX1060	PVD · For carbon steels < 35 HRC
JS4060	PVD · General grade for 30–40 HRC Recommended for dry cutting
JX1045	PVD · For carbon steels < 30 HRC and cast iron
JP4020	PVD · For pre-hardened steels 40–55 HRC
JX1005	PVD · Main Grade

	Parts	Clamp Screw		Clamp Piece Set		Wrench			
	Shape								
Type	Cutter body	ID-Code	Item-Code	ID-Code	Item-Code	ID-Code	Item-Code		
Modular	AHRM-40 ...	ET048	262-142	-	-	ET049	105-T15		
Bore Type	AHRB-4 ...			ET054	CM4-141				
		Special Screw							
		ID-Code		Item Code					
Bore Type	D 52 M10 (d _i = 22)	ET051		100-902					
Bore Type	D 52 M12 (d _i = 27)	ET055		100-903					

AHR-Mini: Helical Bore Formula



Input data		D35	D42	D52	D66	D80	D100	D125
Outside Diameter		R8	R8	R8	R8	R8	R8	R8
Radius of insert		12	12	12	12	12	12	12
Width of insert: W ₁		10°	5°	3.5°	2.5°	2°	1.5°	1°
Ramping angle		53	67	87	115	143	183	233
Flat bottom	Minimum Diameter	54	68	88	116	144	184	234
	Maximum Diameter	55	69	89	117	146	185	235
Through hole	Minimum Diameter	47	61	81	109	137	177	227
	Maximum Diameter	68	82	102	130	158	198	248

AHR | Mini – Recommended Cutting Conditions



Work piece material		Insert Grade	Parameter	Dia 35-z 3				Dia 42-z 4				Dia 52-z 5			
				< 2D	2D-3D	3D-4D	> 5D	< 2D	2D-3D	3D-4D	> 5D	< 2D	2D-3D	3D-4D	> 5D
I II III	Carbon-Steels Alloy-Steels <30HRC Pre-Hardened Steels Alloy-Steels 30~40HRC	JP4020 JS4060 JX1045	n min ⁻¹	1640	1370	1190	820	1370	1140	990	690	1110	920	800	560
			V _c m/min	180	150	130	90	180	150	130	90	180	150	130	90
			V _f mm/min	3450	2470	1790	1230	3840	2740	1980	1380	3890	2760	2000	1400
			f _z mm/tooth	0.7	0.6	0.5	0.5	0.7	0.6	0.5	0.5	0.7	0.6	0.5	0.5
			a _p mm	3.5	3	2	1.5	3.5	3	2	1.5	3.5	3	2	1.5
			a _e mm	25	21	21	18	29	25	25	21	36	31	31	26
			Q cm ³ /min	302	156	76	34	390	206	99	44	491	257	124	55
IV	Pre-Hardened Steels Alloy-Steels 40~50HRC	JP4020	n min ⁻¹	1370	1190	1010	820	1140	990	840	690	920	800	680	560
			V _c m/min	150	130	110	90	150	130	110	90	150	130	110	90
			V _f mm/min	1650	1430	1220	990	1830	1590	1350	1110	1840	1600	1360	1120
			f _z mm/tooth	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
			a _p mm	2	2	1.5	1	2	2	1.5	1	2	2	1.5	1
			a _e mm	25	21	21	18	29	25	25	21	36	31	31	26
			Q cm ³ /min	83	61	39	18	107	80	51	24	133	100	64	30
V	Pre-Hardened Steels Alloy steels (50-55HRC)	JX1005 JP4020	n min ⁻¹	1140	970	820	730	950	810	690	610	770	650	560	490
			V _c m/min	125	106	90	80	125	106	90	80	125	106	90	80
			V _f mm/min	690	590	500	440	760	650	560	490	770	650	560	490
			f _z mm/tooth	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			a _p mm	1.5	1	0.5	0.5	1.5	1	0.5	0.5	1.5	1	0.5	0.5
			a _e mm	25	21	21	18	29	25	25	21	36	31	31	26
			Q cm ³ /min	26	13	6	4	34	17	7	6	42	21	9	7
VI	Pre-Hardened Steels Alloy steels (58-62HRC)	JX1005 JP4020	n min ⁻¹	550	550	550	550	460	460	460	460	370	370	370	370
			V _c m/min	60	60	60	60	60	60	60	60	60	60	60	60
			V _f mm/min	90	90	90	90	100	100	100	100	100	100	100	100
			f _z mm/tooth	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
			a _p mm	0.5	0.4	0.3	0.2	0.5	0.4	0.3	0.2	0.5	0.4	0.3	0.2
			a _e mm	25	21	21	18	29	25	25	21	36	31	31	26
			Q cm ³ /min	2	1	1	1	2	1	1	1	2	2	1	1
VIII	Cast-Iron FC FCD	JX1045 JS4060	n min ⁻¹	1640	1370	1190	820	1370	1140	990	690	1110	920	800	560
			V _c m/min	180	150	130	90	180	150	130	90	180	150	130	90
			V _f mm/min	3450	2470	1790	1230	3840	2740	1980	1380	3890	2760	2000	1400
			f _z mm/tooth	0.7	0.6	0.5	0.5	0.7	0.6	0.5	0.5	0.7	0.6	0.5	0.5
			a _p mm	35	3	2	1.5	3.5	3	2	1.5	3.5	3	2	1.5
			a _e mm	25	21	21	18	29	25	25	21	36	31	31	26
			Q cm ³ /min	302	156	76	34	390	206	99	44	491	257	124	55

AHR | Mini – Recommended Cutting Conditions



					Dia 66-z6				Dia 80-z7			Dia 100-z8			Dia 125-z9		
Work piece material		Insert Grade	Parameter		< 2D	2D-3D	3D-4D	>5D	< 1D	1D-2D	2D-3D	< 1D	1D-2D	2D-3D	< 1D	1D-2D	2D-3D
I II III	Carbon-Steels Alloy-Steels <30HRC Pre-Hardened Steels Alloy-Steels 30~40HRC	JP4020 JS4060 JX1045	n	min ⁻¹	870	730	630	440	720	520	360	580	420	290	460	340	230
			V _c	m/min	180	150	130	90	180	130	90	180	130	90	180	130	90
			V _f	mm/min	3660	2630	1890	1320	3530	1820	1260	3250	1680	1160	2900	1530	1040
			f _z	mm/tooth	0.7	0.6	0.5	0.5	0.7	0.5	0.5	0.7	0.5	0.5	0.7	0.5	0.5
			a _p	mm	5	4	2	1.5	5	4	3	5	4	3	5	4	3
			a _e	mm	46	40	40	33	55	50	40	70	60	50	90	75	65
			Q	cm³/min	842	421	152	65	971	364	152	1138	404	174	1305	459	203
			n	min ⁻¹	730	630	540	440	600	440	360	480	360	290	390	290	230
IV	Pre-Harden Steels Alloy-Steels 40~50HRC	JP4020	V _c	m/min	150	130	110	90	150	110	90	150	110	90	150	110	90
			V _f	mm/min	1760	1520	1300	1060	1680	1240	1010	1540	1160	930	1410	1050	830
			f _z	mm/tooth	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
			a _p	mm	3	2.5	1	1	3	2	2	3	2	2	3	2	2
			a _e	mm	46	40	40	33	55	50	40	70	60	50	90	75	65
			Q	cm³/min	243	152	52	35	278	124	81	324	140	93	381	158	108
			n	min ⁻¹	610	520	440	390	500	360	320	400	290	260	320	230	210
V	Pre-Hardened Steels Alloy steels (50-55HRC)	JX1005 JP4020	V _c	m/min	125	106	90	80	125	90	80	125	90	80	125	90	80
			V _f	mm/min	740	630	530	470	700	510	450	640	470	420	580	420	380
			f _z	mm/tooth	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			a _p	mm	2	1.5	1.0	0.5	2	1.5	1	2	1.5	1	2	1.5	1
			a _e	mm	46	40	40	33	55	50	40	70	60	50	90	75	65
			Q	cm³/min	69	38	22	8	77	39	18	90	43	21	105	48	25
			n	min ⁻¹	290	290	290	290	240	240	240	200	200	200	160	160	160
VI	Pre-Hardened Steels Alloy steels (58-62HRC)	JX1005 JP4020	V _c	m/min	60	60	60	60	60	60	60	60	60	60	60	60	60
			V _f	mm/min	90	90	90	90	90	90	90	80	80	80	80	80	80
			f _z	mm/tooth	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
			a _p	mm	0.5	0.4	0.3	0.2	0.5	0.3	0.2	0.5	0.3	0.2	0.5	0.3	0.2
			a _e	mm	46	40	40	33	55	50	40	70	60	50	90	75	65
			Q	cm³/min	3	2	2	1	3	2	1	3	2	1	4	2	2
			n	min ⁻¹	870	730	630	440	720	520	360	580	420	290	460	340	230
VIII	Cast-Iron FC FCD	JX1045 JS4060	V _c	m/min	180	150	130	90	180	130	90	180	130	90	180	130	90
			V _f	mm/min	3660	2630	1890	1320	3530	1820	1260	3250	1680	1160	2900	1530	1040
			f _z	mm/tooth	0.7	0.6	0.5	0.5	0.7	0.5	0.5	0.7	0.5	0.5	0.7	0.5	0.5
			a _p	mm	5	4	3	2	5	4	3	5	4	3	5	4	3
			a _e	mm	46	40	40	33	55	50	40	70	60	50	90	75	65
			Q	cm³/min	842	421	227	88	971	364	152	1138	404	174	1305	459	203

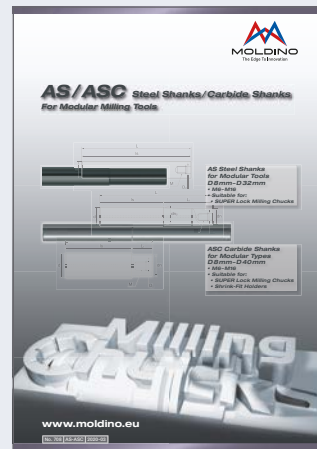
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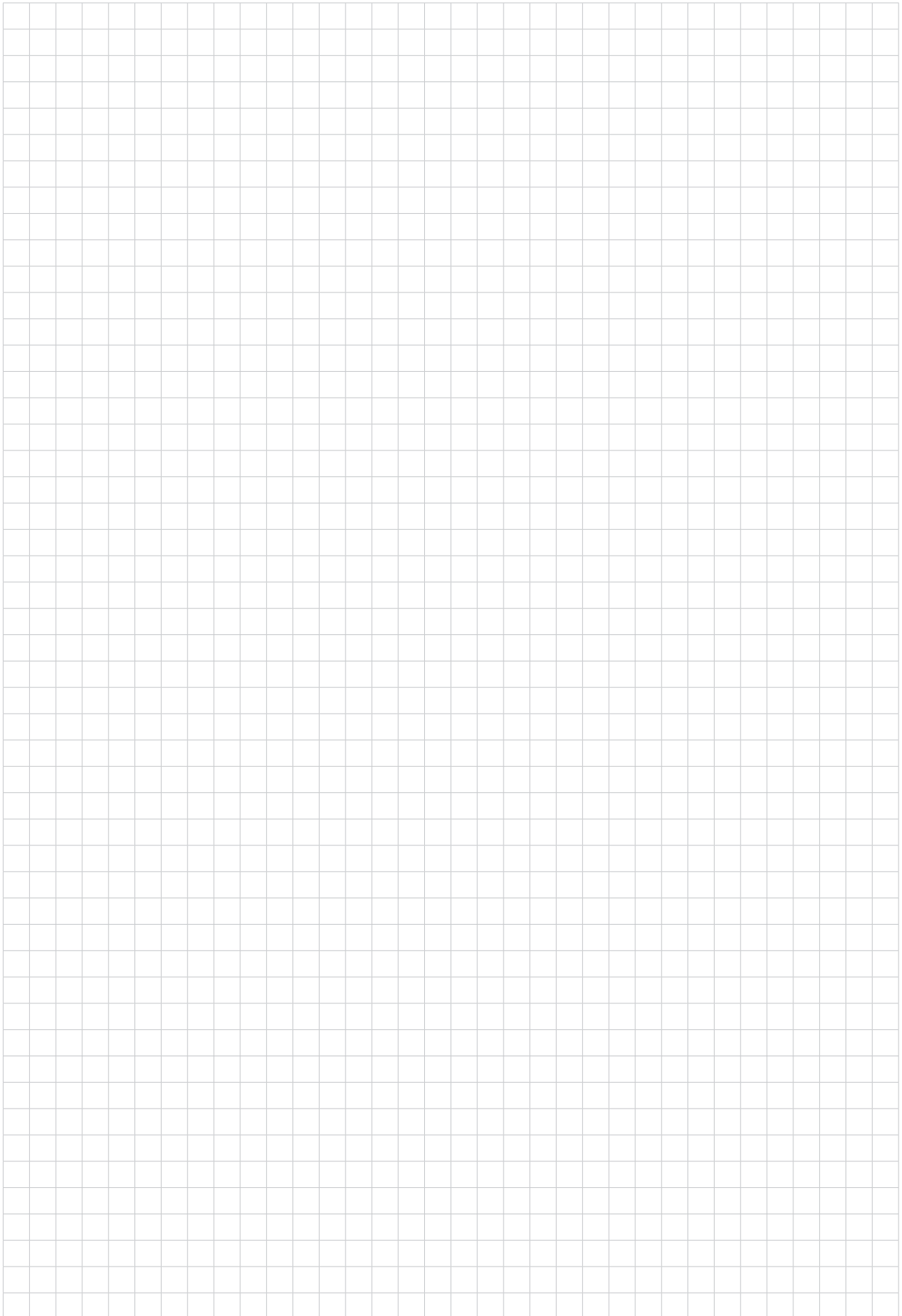
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Attentions on Safety

1. Cautions regarding handling

- (1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.
- (2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

- (1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.
- (2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.
- (4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.
- (5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

- (1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.
- (2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.
- (3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

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