

CCS J 55



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 40330-2021

Safety of machine tools - Stationary grinding machines

Issued on: May 21, 2021

Implemented on: December 1, 2021

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

Table of Contents

1 Scope	1
2 Normative references	1
3 Terms and definitions	3
3.1 General terms	3
3.2 Grinding machine parts	4
3.3 Safe Operation Mode (MSO)	5
3.4 Type and category of grinder	6
3.5 Rotation speed and coordinate axis feed speed	11
4 List of main hazards	12
4.1 General requirements	12
4.2 Main hazardous areas	12
4.3 Main hazards and dangerous situations	13
5 Safety requirements and/or measures	16
5.1 General requirements	16
5.1.1 General	16
5.1.2 Requirements for various types of grinder protection devices	16
5.2 Specific requirements for the mechanical hazards summarized in 1.1~1.4, 1.6 and 1.7 in Table	217
5.2.1 Type 1 grinder. manual control grinder without power drive shaft and digital control	17
5.2.2 Grinding machine of type 2. There is a power drive shaft, if applicable, it can be equipped with a manual control grinder with limited digital control capability	19
5.2.3 Type 3 grinder. digital control grinder	19
5.2.4 Tool holding device	21
5.2.5 Workholding	21
5.2.6 Vertical or inclined axis under gravity	21
5.2.7 Machine operation mode	21
5.2.8 Optional or additional device for grinder	25
5.3 Specific requirements for electrical hazards	26
5.4 Specific requirements for noise hazards	27
5.5 Specific requirements for vibration hazards	27
5.6 Specific requirements for radiation risks	27
5.7 Specific requirements for material or substance hazards	27

5.7.1 General requirements	27
5.7.2 Equipment using metalworking cutting fluid	28
5.7.3 Protective measures against fire and explosion hazards	29
5.8 Specific requirements for the dangers of neglecting ergonomics	30
5.9 Specific requirements for accidental start, overtravel or overspeed generation of danger	31
5.10 Specific requirements for hazards arising from speed changes	32
5.11 Specific requirements for dangerous power failure	32
5.12 Specific requirements for dangerous control circuit failure	33
5.13 Specific requirements for the risk of fluid ejection or substance ejection	35
5.13.1 General requirements	35
5.13.2 Protective device to avoid throwing out when the abrasive tool is broken	35
5.13.3 Device to prevent the workpiece and the parts on the workpiece from being thrown out	36
5.14 Specific requirements for hazards arising from lack of stability	36
5.15 Specific requirements for the hazards caused by people slipping, tripping and falling	36
6 Verification of safety requirements and/or protective measures	37
7 Use Information	39
7.1 Sign	39
7.2 Usage information	39
7.2.1 General requirements	39
7.2.2 Tool	41
7.2.3 Workpiece clamping	41
7.2.4 Machine functions acquired by the NC operation panel	41
7.2.5 Restart	41
7.2.6 Noise	41
7.2.7 Vibration	42
7.2.8 Auxiliary loading and unloading equipment	42
7.2.9 Residual risks that should be paid attention to when using machine tools	42
7.2.10 Grinding machine installation instructions	43
7.2.11 Machine cleaning instructions	43
Appendix A (normative) Abrasive protective cover, work area protective device and the combination of the two	44
A.1 General	44
A.2 Abbreviations and symbols	44

A.3 Requirements for abrasive protective covers and work area protective devices	45
A.3.1 Shape and opening angle of the protective cover for abrasive tools	45
A.3.2 Wall thickness and material	53
A.3.3 Composite abrasive protective cover	64
A.3.4 Transparent baffle for bench or floor grinder	65
A.3.5 Work area closure device	66
A.3.6 Observation window attached to the work area closing device	67
A.3.7 Strength verification, test	69
A.4 Design guidelines for abrasive protective covers and connecting devices	69
A.4.1 General	69
A.4.2 Energy of abrasive tool fragments	70
A.4.3 Determine the wall thickness of the abrasive protective cover	70
A.4.4 Design of the connecting device of the abrasive protective cover	71
Appendix B (Informative) Impact Test of Protective Devices---Collision Test	73
B.1 General Principle	73
B.2 Test method	73
B.2.1 Principle	73
B.2.2 Test conditions	73
B.2.3 Test equipment	73
B.2.4 Test sample	74
B.3 Results	74
B.3.1 Damage situation	74
B.3.2 Evaluation	75
B.4 Test report	75
Appendix C (informative) Impact test of protective devices---projectile impact	76
C.1 General	76
C.2 Test method	76
C.2.1 Principle	76
C.2.2 Test conditions	76
C.2.3 Test equipment	76
C.2.4 Test procedure	78
C.3 Test results	78
C.3.1 Damage	78
C.3.2 Evaluation	78
C.4 Test report	79

Appendix D (Normative) Grinding tool clamping method and safety requirements for clamping device	80
D.1 General	80
D.2 Clamping method	80
D.3 General requirements	80
D.4 Flange design	80
D.4.1 Clamping force and tightening torque	80
D.4.2 External clamping diameter, radial width and cover	80
D.4.3 Stiffness	82
D.4.4 Marking of flange	83
D.5 Device for installing abrasive tools with clamping mandrel	83
D.5.1 Centering threaded mandrel	83
D.5.2 Measuring method of radial runout error of spring chuck	84
D.5.3 Abrasive mandrel model 2, 35, 36, 37 (see EN12413) and abrasive tool comparison	84
Appendix E (informative) Noise suppression	89
Appendix F (informative) Noise determination	90
F.1 Method	90
F.2 Operating conditions	90
Appendix G (Normative) Requirements for grinding machines for processing flammable materials and generating explosive dust	91
G.1 Wet grinding equipment (see Figure G.1)	91
G.2 Dry grinding equipment generates wet sedimentation through instant humidification (see Figure G.2)	91
G.3 Dry grinding equipment produces wet sedimentation through a wet collection system (see Figure G.3)	92
Appendix H (Informative) Measures taken when using flammable metalworking cutting fluid	93
H.1 Choosing low-volatility metalworking cutting fluid	93
H.2 Labyrinth-type sealed fireproof structure	93
H.3 Prevent flames from entering the suction and exhaust system	94
H.4 Design of pressure relief surface size	94
Appendix I (informative) Examples of combined exhaust and fire extinguishing measures using flammable metalworking cutting fluids	96
Appendix J (Informative) Functional Safety---Example of Monitoring the Speed Limitation of Grinding Wheel Spindle	97
J.1 General requirements	97