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JAPANESE INDUSTRIAL STANDARD

Test Code for Performance
and Accuracy of Wood
Working Machinery

JIS B 6501 —1975

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Test Code for Performance and Accuracy of
Wood Working MachineryB 6501-1975
(Reaffirmed: 1978)1. Scope

This Japanese Industrial Standard specifies, pertaining to the wood working machinery⁽¹⁾, the basic items and their testing methods (general rules for testing) commonly used in cases where tests for running performance, static accuracy, dynamic accuracy, and working accuracy of the machinery are carried out.

Note (1) The test methods prescribed in this standard shall be applied correspondingly to those used for wood working machines having special construction or use.

Remark: The test and inspection items for each type of wood working machines shall be selected from those given in this standard according to the aim and performance of the machine, and shall be specified in the separate standard together with the provisions of tolerances for inspections.

2. General Rules for Testing

2.1 The test shall, as a rule, be carried out in the factory where the wood working machines were manufactured.

2.2 The test shall be carried out after the wood working machine has been installed and adjusted in order to be given no influence upon the performance and accuracy required for the running of the wood working machine.

2.3 The test shall be carried out, in principle, on a completely finished machine.

2.4 The test shall be carried out on the machine in which electric motors, electric accessories, and other equipment are mounted, and lubricant, hydraulic oil, and others are appropriately filled.

2.5 The test shall be carried out, in principle, after each moving part of the machine has been run and its temperature and lubrication become stable.

2.6 The static accuracy shall be measured, in principle, under such a condition that the wood working machine is not subjected to any machining load.

2.7 When two or more methods are given for one item to be checked, one method shall be selected from among them for the test.

2.8 The measuring instruments to be used for tests and their accuracies are specified in Appendix.

Applicable Standards and Reference Standards: See page 26.



Documents

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2.9 When the measuring instruments specified in Appendix are not applicable, the test may be carried out with other instruments considered to be, in accuracy, equivalent to or better than the specified instruments.

2.10 When abnormality has occurred during a test, the cause of the abnormality shall be looked for and adjustment shall be made, and then the test shall be carried out again from the beginning, in principle. However, there is no need to repeat the test the result of which is considered not to have been influenced by the adjustment of the abnormality.

2.11 For wood working machines made by the same design, the test results for the rigidity may be represented by the result obtained from the test carried out on one machine, dispensing with the tests on the other machines.

2.12 When it is difficult to test a wood working machine by testing methods specified in this standard because of its configuration, the substituting methods shall be selected from those given in the specifications of this standard.

2.13 On static accuracy test, when an actual distance of measurement is smaller than the specified value, on account of the configuration of wood working machines, the tolerance shall be calculated in proportion to a given distance. In this case, it shall be 0.005 mm when the calculated tolerance is less than 0.005 mm, unless otherwise specified.

2.14 When the result of static test is different from that of working accuracy test having the same test objective, the greater stress shall be laid on the result from the latter test.

3. Specifications of Running Tests

3.1 Test Objectives and Items Running tests are intended to test the performance required for running wood working machines, and they consist of functional test, no-load running test, load running test and rigidity test.

3.2 Functional Test Functional tests are intended to examine, by operating each moving part of a machine, the smoothness of its operation and the certainty of its function. The methods expressing test results and test items and their methods shall be as follows:

- (1) Expressing Method Results shall be expressed as "good" or "bad" in function.

(2) Test Items and Methods

Item		No.	Testing method	Typical examples of application (Reference)
Main motion	Start, stop and running operation	1-11	At one suitable speed, perform start and stop operations (including braking, reversing, interrupted motion and others) repeatedly, and examine smoothness and certainty of operation.	Vertical movement of hot press plate Rotation of spindle of circular saw machine or planing and moulding machine Running of carriage
	Operation of changing speed	1-12	Change the speed and examine the smoothness of operation and the certainty of indication of control device.	Rotation of veneer lathe spindle Rotation of wood lathe spindle
Feed motion	Start, stop and running operation	1-21	Choose one suitable feed rate, perform start and stop operations (including braking, reversing, interrupted motion and others) repeatedly and examine the smoothness and the certainty of operation.	Knife holding stand and table of veneer slicer Head stock of carriage Feed of automatic planing and moulding machine
	Operation of changing feed speed	1-22	Change the feed speed, and examine the smoothness of operation and the certainty of indication.	Feed speed of table of veneer knife grinder Feed speed of rip saw or automatic planing and moulding machine Rotating speed of feed roller of band saw machine
	Operation of changing feed	1-23	Change the feed, and examine the smoothness of operation and the certainty of indication.	Feed of plane stock of veneer lathe Set work amount of carriage
	Operation of changing in-feed speed	1-24	Change the in-feed speed, and examine the smoothness of operation and certainty of indication.	Mechanical in-feed of veneer knife grinder
	Operation of automatic reversing of feed	1-25	Examine the smoothness and the certainty of positioning and action of automatic reversing device.	Feed of plane stock of veneer lathe Running feed of lathe charger Table feed of knife grinder
	Operation of automatic stopping device	1-26	Examine the smoothness and the certainty of positioning and action of automatic stopping device.	Vertical feed of table of veneer slicer Automatic stopping device for carriage head stock
	Manual operation of feed	1-27	Examine the smoothness and the uniformity of motion by manual operation.	Doctor roll of glue spreader Vertical movement of spindle of wood borer Ruler of table band saw

Item	No.	Testing method	Typical examples of appli- cation (Reference)	
Adjustment motion of positioning	Operation of engaging and disengaging the devices for mechanical feed and rapid traverse	1-31	Examine the smoothness and the certainty of position- ing and operation of en- gaging and disengaging the devices for mechanical feed and rapid traverse.	Feed mechanism for set work mechanism of veneer lathe
	Operation of automatic positioning device	1-32	Examine the certainty of setting of position to be commanded and operation of automatic stopping device for positioning of ele- ments in performing me- chanical feed.	Positioning of saw blade of double sizer Stopping device
	Operation of position ad- justment and clamping	1-33	Examine the smoothness and uniformity of movement by mechanical or manual ope- ration. In addition, clamp the element at a position of its travel and examine the certainty of its operation.	Wood clamping device for logs in veneer slicer Pivoting and vertical move- ment of arm of radial saw Operation of the ruler of table band saw
Mounting and dismounting	Holding and releasing of cutting tool	1-41	Examine the certainty and smoothness of holding and releasing of cutting tool.	Circular saw of double sizer Knives of planing and moulding machine Router bit
	Loading and unloading of workpiece	1-42	Examine the certainty and smoothness of loading and unloading of workpiece.	Loading of workpiece on veneer lathe, hollow-chisel mortiser and dovetail machine
Auxiliary equipment	Electrical equipment	1-51	Test the insulation of electrical equipment before and after the running test.	Electrical equipment of band saw machine, planing and moulding machine and veneer lathe
	Safety device	1-52	Test the certainty of safety device for ope- rator and the protection of machine against damage.	Front and back moving device and stopping device of plane stock of veneer lathe
	Lubricating device	1-53	Test the certainty of functioning such as oil tightness and correct distribution of oil.	Automatic oil-feed device
	Hydraulic system	1-54	Test the certainty of functioning such as oil tightness and pressure regulation.	Hydraulic system of band saw machine, hot press, veneer lathe, etc.
	Pneumatic system	1-55	Test the certainty of functioning such as air tightness and pressure regulation.	Pneumatic system of band saw machine, veneer lathe and veneer clipper
	Attachment	1-56	Test the certainty of functioning of attachment.	
	Other equipment	1-57	Test the certainty of functioning of equipment.	Dust collector for band saw machine

3.3 No-Load Running Test Methods The wood working machine shall be run under the predetermined no-load condition and shall be tested for running conditions ⁽²⁾, variation of temperature and required electric power. Methods of expressing test results, test items and their measuring methods are as follows:

Note ⁽²⁾ Running conditions mean speed, and number and length of strokes, and their deviations from indications, and the conditions of vibration, noise, lubrication, airtightness, oil tightness, etc.

(1) **Method of Expressing Test Results** Test results shall be expressed in terms of running conditions, temperature, required electric power and others.

(2) **Test Items and their Measuring Methods**

Item		No.	Measuring instrument	Measuring method	Typical examples of application (Reference)
Spindle speed		2-11	Speedometer Stroboscope	Measure spindle rotation speed throughout each step of speed.	Spindle of band saw machine Spindle of veneer lathe router, and moulding machine
Feed		2-21	Speedometer Call meter and stopwatch	Measure feed rate throughout each step of feeds.	Rotation of feed roller of automatic roller band saw machine Caterpillar of rip saw
Temperature	Temperature of bearing	2-31	Etched-stem liquid-in-glass thermometer Thermocouple thermometer Resistance thermometer	Rotate the spindle at speeds of lowest to highest throughout each step and then measure the temperature of bearing while running at the highest.	Main spindle bearing of circular saw, and planing and moulding machine Bearing for saw spindle of band saw machine Bearing for wheel spindle of knife grinder
	Temperature of hydraulic fluid	2-32		Measure the temperature of hydraulic fluid.	Hydraulic fluid of hydraulic carriage
	Temperature of spindle head, gear box, etc.	2-33		Measure the temperature of spindle head, gear box, etc.	Gear box of automatic planing and moulding machine Gear box of slicer, or veneer lathe
	Room temperature	2-34		Measure the room temperature around wood working machine.	

Item	No.	Measuring instrument	Measuring method	Typical examples of application (Reference)
Required electric power	2-41	Watt meter { Voltmeter Ammeter and power-factor meter	Measure the required electric power (watt, volt and ampere) under given running conditions. At the end of running, measure the total power required at full running.	Carriage of band saw machine Circular cutter block of planing and moulding machine Main spindle of veneer lathe
Vibration	2-51	Vibration indicator, accelerometer	Sensory test, or JIS B 6003 shall be correspondingly applied.	
Noise	2-61	Sound level meter	Sensory test, or JIS B 6004 shall be correspondingly applied.	

3.4 Load Running Test Method The wood working machine shall be run under the loading conditions and then shall be tested for its running conditions ⁽³⁾ and required electric power. Methods of expressing test results, and test items and their measuring methods are as follows:

Note ⁽³⁾ Running conditions mean speed and number and length of strokes and their variation, and conditions of vibration, noise, lubrication, airtightness, oil tightness, etc.

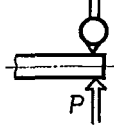
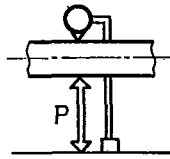
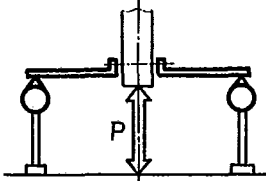
(1) Methods of Expressing Test Results Test results shall be expressed in terms of running conditions and required electric power.

(2) Test Items and their Measuring Methods

Item	No.	Measuring instrument	Measuring method	Typical examples of application (Reference)
Capacity of machine	3-11	Watt meter { Voltmeter Ammeter and power-factor meter	Change the load and measure power at each step of feed.	
Vibration	3-21	Vibration indicator Accelerometer	Sensory test or JIS B 6003 shall be correspondingly applied.	
Noise	3-31	Indicating sound level meter	Sensory test or JIS B 6004 shall be correspondingly applied.	
Condition of surface finish	3-41		Sensory test.	

3.5 Rigidity Test Methods In rigidity tests, the deformation of a machine shall be tested, by applying the load to the machine part the deformation of which is considered to affect significantly the working accuracy. The method of expressing test results, and test items and their measuring methods are as follows:

- (1) Method of Expressing Test Results The results shall be expressed as the total displacement caused by elastic deformation and clearance of mechanism.
- (2) Test Items and their Measuring Methods

Item	No.	Measuring instrument	Measuring method	Drawing	Typical examples of application (Reference)
Rigidity of spindle against bending	5-11	Test indicator and weighing instrument	Measure the displacement of spindle when the load (P) is applied to the spindle vertically.		Saw spindle of circular saw Spindles of veneer lathe and band saw sharpener
Resultant rigidity of spindle and table	5-21	Test indicator and weighing instrument	The load (P) is applied via table to spindle vertically or horizontally. Measure the relative displacements between spindle and table.	(1)  (2) 	Cutter block and table of automatic planing and moulding machine Spindle and table of multi-spindle wood borer Grinding drum and table of drum sander

4. Specifications of Static Accuracy Tests

4.1 Objectives and Items of Static Accuracy Test Static accuracy tests are intended to check the accuracies of forms and motions of essential parts which compose a wood working machine and the assembling accuracies of units or components, especially, considered to affect working accuracy. These include straightness, circularity, cylindricity, parallelism, flatness, perpendicularity, run-out of rotating axis, axial movement of rotating axis, coaxiality, and lead accuracy of screw threads.

4.2 Straightness The definition of straightness and its expressing method, and test items and their measuring methods are as follows:

- (1) Definition The degree of deviation from the geometrical straight line of the form of machine part or its motion supposed to be a straight line.
- (2) Expressing Method The straightness shall be expressed as the difference of the maximum distance and the minimum distance between the measured line and the reference line, or the difference of the largest tangents and the smallest tangent of angles formed by measured lines with reference to the reference line. The distance shall be measured in normal direction to the reference line.