Product Performance Requirements & Test Methods of Steel Wheels

RTPTS-SW Revision 0A

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Introduction：

This standard, based on the relevant industry standards and national standards, as well as the relevant laws and regulations of the sales area, was determined by both parties of the producer and seller after discussion and deliberation.

This standard provides the product performance requirement and unified standard of the steel single disk wheels produced by Shanghai Baosteel wheels Co. Ltd. (hereinafter referred to as: BAOSTEEL WHEELS).

Please refer to the Wheels Specification Table in the attachment of this document for the wheels models which are applicable to this standard.

This standard was drawn up by Shanghai Baosteel Wheel Co., Ltd. and Shanghai Part Rich Autoparts Co., Ltd.

The main drafters of this standard are: Weng Huihong, Cai Jianzhong, Zhang Yu, Xi Hongqun, Xu Jing, and Xue Qingsong.

Note: any part of this standard shall not pass beyond the existing laws and regulations unless being exceptionally permitted.

Note: in the event of the conflict of English and domestic language for the referred related standards, the original language of the referred standards shall take precedent.

CONTENT

1. Terminology and definition：

The terminology and definition from this standard are referred from " GBT 2933-2009/ISO3900:2004 Wheels and rims for pneumatic tyres --- Vocabulary, designation and marking ".

2. Scope of the application：

This standard is applicable to the steel wheels for the retail market of ROBERT THIBERT INC. company (hereinafter referred to as RT), which are sold from Shanghai PART-RICH Auto Parts Co., Ltd. (hereinafter referred to as: PART-RICH), and produced by Shanghai Baosteel Wheel Co.

The wheels involved in this standard are applicable to the general passenger cars and part of the pickup truck models.

The wheels involved in this standard are only referred to the Single Disk Wheels, not including other types of the wheels.

3. Referred related standards:

This standard is formulated with reference to the following standards, which are also parts of this standard. Except of the special points, the latest versions of the following standards are always applicable.

SAE J2530 NOV2009 Aftermarket Wheels—Passenger Cars and Light Truck—Performance Requirements and Test Procedures

SAE J175 MAR2016 Wheels—Impact Test Procedure—Road Vehicles

GBT 2933-2009/ISO3900:2004 Wheels and rims for pneumatic tyres --- Vocabulary, designation and marking

GBT 3487-2015 Automobile wheel rim specification series, Rims for Passenger Car

Equivalent to：ISO 4000-2-2013, MOD Passenger car tires and rims - Part 2: Rims

QC/T 717-2015 Car wheel run-out requirements and test methods

Equivalent to ISO 16833:2006 “Road vehicle --- Wheels--- Requirements and measuring methods of radial and lateral run-out”

GB/T 10125-2012 Corrosion tests in artificial atmospheres --- Salt spray tests

4. Performance Requirement

4.1 Size and rim contour：

Wheel size shall comply with the size and tolerance specified in the drawing of the corresponding models of the products.

The drawings shall be the latest version and approved by RT.

The rim contour must comply with the following internationally accepted standards. The relevant standards must be in the effective period.

GB/T 3487-2015 Rims for Passenger Cars

Equivalent to ISO 4000-2-2013, MOD Passenger car tires and rims - Part 2: Rims

4.2 Raw Material：

To achieve the better quality of the overall wheels with lightweight, lower yield strength ratio, better welding performance, higher strength, better reaming, bending performance, and better fatigue performance so as to ensure the performance of the wheels, Baosteel company adopted high strength and high performance steel plates as the raw material. The representative types of steel plate models are as below:

4.2.1 Rim：

Steel grade：HR60

Origin：BAOSTEEL

Chemical composition (mass fraction)：

Table 1 Chemical composition of the steel plate for the representative rims (%)

C	P	S	Mn	Si	Nb	Al
≦0.16	≦0.030	≦0.025	≦1.6	≦0.50	≦0.06	0.01～0.06

Tensile property：

Table 2 tensile properties of steel plate for the representing rims

Yield strength	Tensile strength	Elongation
（450～550）MPa	（550～650）MPa	≧24%

4.2.2 Disk：

Steel grade：B420CL

Origin：BAOSTEEL

Chemical composition (mass fraction)：

Table 3 Chemical composition of steel plate for the representing disk (%)

C	P	S	Mn	Si	Al
≦0.12	≦0.03	≦0.025	≦1.50	≦0.30	≧0.01

Tensile property：

Table 4: Tensile properties of the steel plates for the representative disk

Yield strength	Tensile strength	Elongation
≧290MPa	（420～520）MPa	≧28%

Note: due to the models, load and usage are different, different steel plates will be adopted and used at the product development stage. The above steel plates are just listed the representative plate models. The specific use of the steel plate models will be clearly marked in the drawings

4.3 Wheels identification

The wheels identification is made up of Rim contour specification, production origin, wheel models, production date, and other factors.

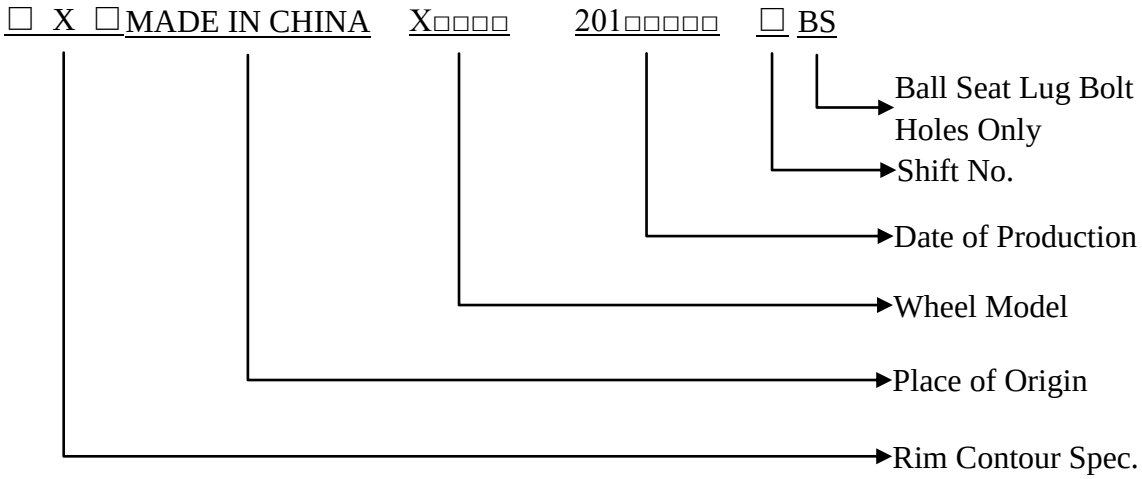


Figure 1: Composition of the wheels identification

The casted markings shall be permanently concave and without sharp edges. The height of the Rome letter and Arabia digitals shall not be lower than 3mm, and they must be clearly identifiable.

The marking position shall be on the outer edge of the wheel rim

4.4 General appearance requirements：

4.4.1 In the visible area after loading：

• Burr, machining marks, pits/fall, fading, edge fins, scratches, bumps, flow coating, pin holing, missed processing, and incomplete spraying defects are not allowed

• All the permanent markings and words on the products shall be clearly identifiable.

4.4.2 Center hole, PCD hole, valve hole

• Collisions are not allowed

• Granular substance is not allowed

• Stamping mark, skin scrapping or rough surface are not allowed

4.4.3 Attachment face (installation surface)

• Damages are not allowed

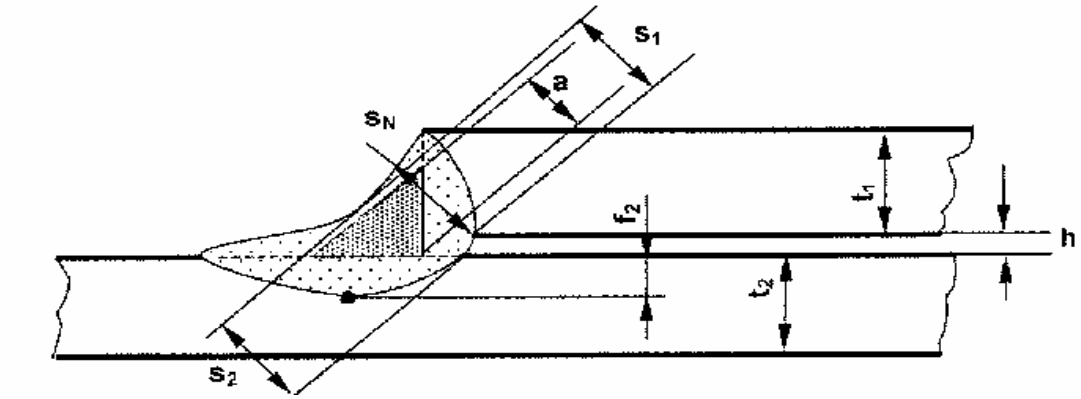
• Particles, sticky powder or any sticky paintings are not allowed

• The installation surface must be flat and smooth

4.5 Welding requirements：

The welding method for the wheels in this standard is the overlapping fillet welding.

4.5.1Definition：Overlapping Fillet is shown in Figure 2



Symbol meaning：

a —Rated welded seam thickness (welded seam height)

f_1 —Weld penetration of t_1 member

S_1, S_2—t_1 and t_2 member welded seam thicknesses

f_2 —Weld penetration of t_2 member

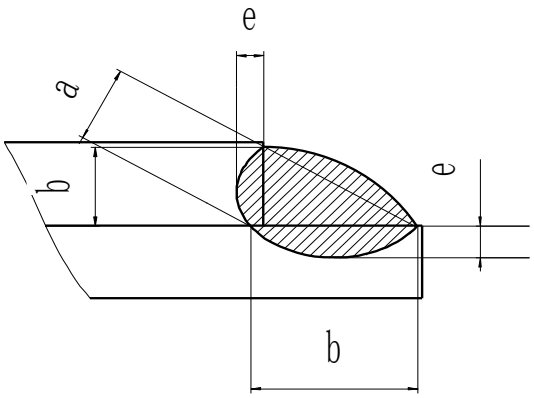
S_N—Minimum and common welded seam thickness

t_1, t_2—Member thicknesses

Fig. 2: Geometric figure of the Overlapping Fillet

4. 5. 2 Weld thickness and penetration requirements

To test and evaluate according to the method in Appendix A, Welded seam and weld penetration need to meet the requirements of the Figure 3.



t_{min}= minimum plate thickness

a ≥ 70% * t_{min}
b ≥ 90% * t_{min}
e ≥ 10% * t_{min}

Fig. 3: Geometric figure of the Overlapping Fillet

4.6 Coating quality requirements:

Electro-Coating techniques	Cathodic electrophoresis
Coating appearance	The appearance of the wheels surface should be smooth. Color difference, running, orange peel, bottom exposition, pinhole, bubbling/foaming, creping/wrinkling are not allowed on the modeling structured face, high apparent density area and direct visible area. Less severe flow marks are acceptable for other areas, but pinhole and cratering are not acceptable.
Coating thickness：	All Surfaces 18～28μm
Coating adhesion	≤1 grade To test according to GB/T 1720—1979 "Paint film adhesion test method"
Salt spray resistance （NSS：Neutral Salt Spray test）	Test Cycle period：720h To test according to GB/T 10125-1997 " Corrosion tests in artificial atmospheres — Salt spray tests"

Fig 5：Coating quality requirements

4.7 Wheel run-out requirement：

4.7.1 Definition of the run-out：

a. Radial run-out (RRO)

Variation over one revolution of the wheel of the distance X of the seat in question

relative to the wheel rotation axis, in millimeters.

See Figure 4 below.

b. Lateral run-out (LRO)

Variation over one revolution of the wheel of the distance Y of the rim flange in question relative to a fixed reference plane perpendicular to the wheel rotation axis, in millimeters

See Figure 5 below.

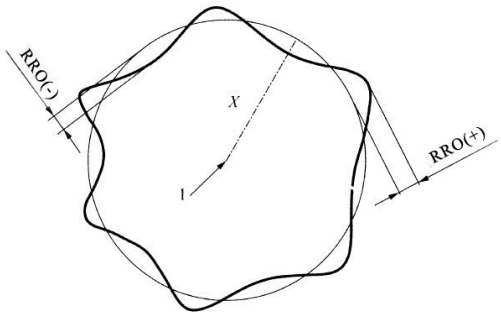


Figure 4: Radial run-out

RRO——Radial run-out;

1——wheel rotation axis;

X——distance of the seat relative to the wheel rotation axis.

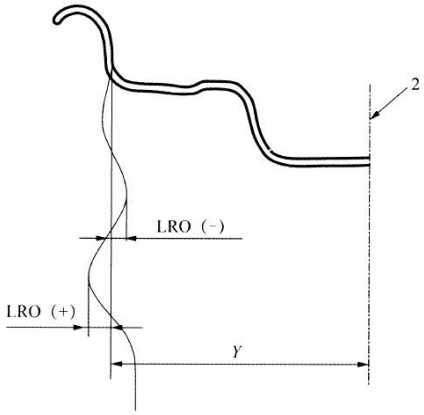


Figure 5: Lateral run-out

LRO——Lateral run-out;

2——fixed reference plane perpendicular to the wheel rotation axis;

Y——distance of the rim flange relative to a fixed reference plane perpendicular to the wheel rotation axis.

4.7.2 Wheel run-out requirement:

The methods and equipment specified in Appendix B shall be used for testing the wheel run-out, and the test results shall meet the requirements of the following table:

Table 6: Requirement of the Run-out peak value of the steel wheel Unit: mm

Items	5°DC	
	D≤16	16<D≤18
Radial run-out peak to peak value	1.0	1.2
Lateral run-out peak to peak value	1.0	1.2
Radial run-out average value of the first harmonic	0.5	0.5
Lateral run-out average value of the first harmonic	0.5	0.5

Note: D is the nominal diameter of the wheel

4.8 Wheel static unbalance requirement

4.8.1 Definition：

The static unbalance of the wheel means non-coincidence between the wheel mass center and the rotational center.

4.8.2 Requirement of the wheel static unbalance:

The method and equipment specified in Appendix C shall be used for testing, and the tested value shall not exceed the maximum allowable static unbalance value as shown in the below table 7.

Table 7: requirements for static unbalance value of the passenger car wheels

Unit：g·cm

Nominal wheel diameter	12	13	14	15	16	17	18
Static unbalance	350	400	450	500	600	700	800

4.9 Performance requirements and test methods of dynamic bending fatigue：

Bending fatigue test is to make the wheel bear a rotating bending moment distribution to simulate the running wheel of a running vehicle bearing the bending moment in the process of continuous turnings. The test principle is shown in Figure 6

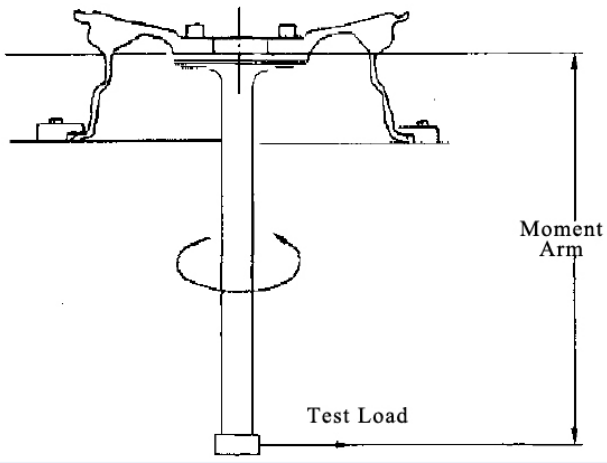


Fig. 6: bending fatigue test

4.9.2 Performance requirements and test methods of dynamic bending fatigue：

The methods and equipment specified in Appendix D shall be used for testing, and the test

values shall meet the requirements of the following table 8.

Table 8: Performance requirements for dynamic bending fatigue test

Sample quantity	Enhancement factor	Minimum cycle times	Friction coefficient μ
2	1.6	40000	0.7
5	1.6	30000	0.7

4.10 Performance requirements and test methods of dynamic radial fatigue:

4.10.1 Wheel radial fatigue test is to make the wheel bear a radial pressure to rotate as to test the minimum times of the cycles, which is the simulation of the running wheels of a running vehicle bearing the vertical loadings.

4.10.2 Performance requirements for dynamic radial fatigue:

The methods and equipment specified in Appendix E shall be used for testing, and the test values shall meet the requirements of the following table 9.

Table 9: Performance requirements for dynamic radial fatigue test

Sample quantity	Enhancement factor	Minimum cycle times
2	2.25	750000
5	2.25	475000

4.11 Wheel lateral impact test

The wheel lateral impact test provides an evaluation of the minimum performance requirements and bench test methods used to determine the lateral impact of the wheel rim.

To carry out the test according to the provisions of appendix F, need to meet the requirement as below:

- Visible crack is not allowed to penetrate the central cross section of the wheel after the lateral impact test.
- The separation between the wheel central portion and the rim is not allowed.
- The phenomenon of the tire air pressure all leaked in one minute is not allowed.

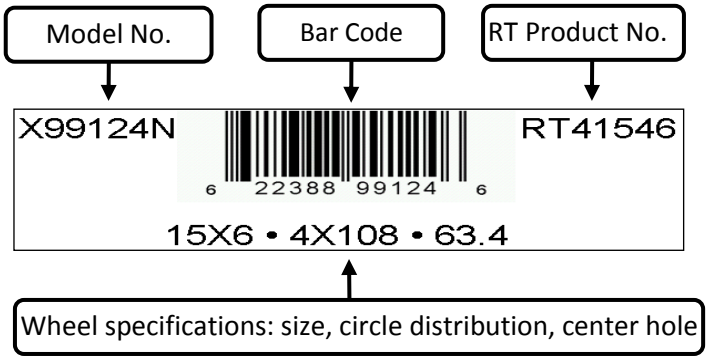
5、Packaging and labeling：

5.1 Product label: each wheel must be affixed with a RT tag that contains the following information (see Figure 7).

- Products number

- Bar code
- Management number/RT product number
- Wheel specifications: size, circle distribution, center hole

Figure 7: product labeling



5.2 Packaging

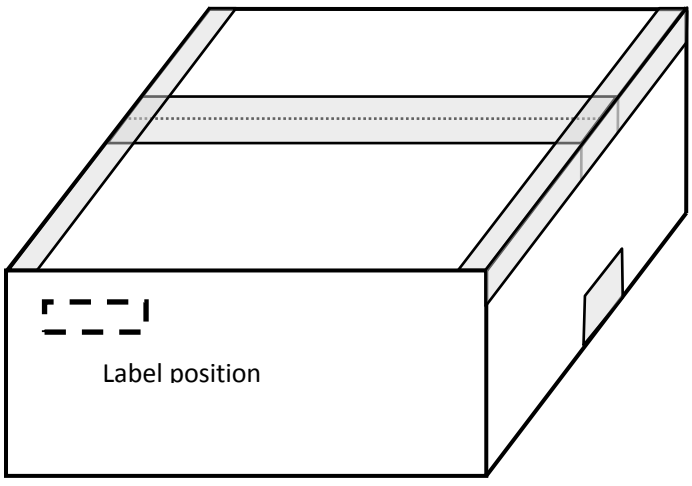
5.2.1 According to the wheel size, the corresponding size of the corrugated carton shall be used for packaging.

5.2.2 Sealing method： Transparent adhesive tape shall be used to stick the folding edges and middle junction line to seal the carton, see Figure 8

5.2.3 Post labels at the designated position, see Figure 8

5.2.4 Packing: The tape shall be stretched and symmetrically stick on the basis of the middle junction line. The tape cut need to be right even, and firmly stick with the carton without curl-up or flip-up.

Figure 8: Packaging requirements



Note: Labels need to post on two sides of the carton

APPENDIX A：
Welding evaluation method

1. Testing equipment：microscope（accuracy 0.01mm）

2. Evaluation methods and requirements for welding penetration

2.1 Sample preparation and measurement method

1) The cutting spot need to be at least at 10mm or the middle point before the start of the weld or after the end of the weld

2) Samples should not be made at arc-striking area and arc-closing area.

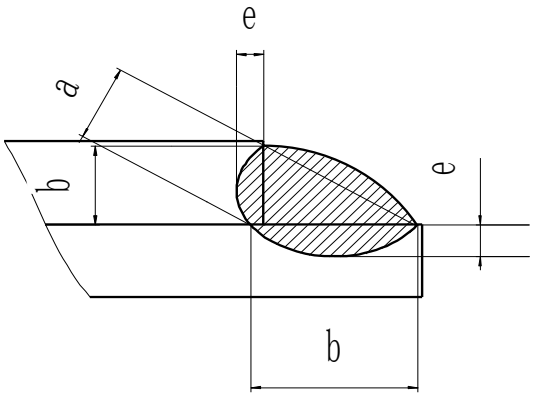
3) The cutting surface should be polished, and etched with 2%～20% nitric acid solution so as to find out the penetration of welding metal in base material. Cut samples are placed under optical microscope with the suitable magnification factor (X10 – X 20 magnifications) to measure weld penetration, welded seam thickness, and welding flaw.

2.2 Evaluation method

Welded seams should conform to the required values of thickness and weld penetration of welded seams listed in the following table.

Weld penetration width should not be less than the minimum thickness of plate. Deviation of actual effective welded seam length should not be less than 90% of the stipulated length.

Interruptions and starts with flaws are not calculated into the effective length of welded seams.（Follow any stipulations on the drawing. But the requirements should be higher than the effective length of welded seams stipulated in the standard）.



a ≥70% * t_{min}
b ≥90% * t_{min}
e ≥10% * t_{min}

t_{min}=minimum plate thickness

Welding thickness and penetration requirements

APPENDIX B：
Automobile wheel run-out test requirement and testing method （Equivalent to the standard of QC/T 717-2015）

1. Test equipment：

The test equipment should have the rotating components which are equivalent to the actual installation and positioning of the wheel and a measuring device for testing the run-out. The accuracy of the equipment shall meet the requirements as following:

a) The system error from the rotating connection parts shall meet the requirement that radial and lateral run-out is less than 0.05mm.

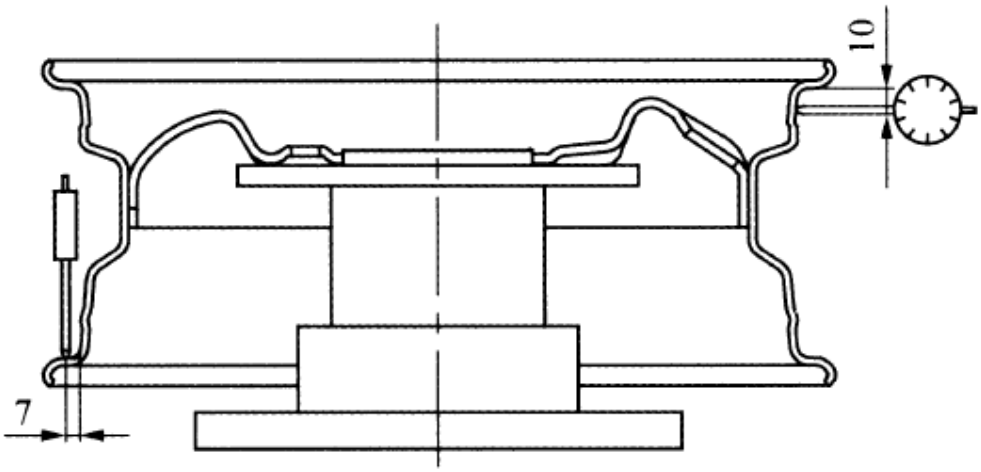
b) Precision shall be within 0.02mm in the dial indicator or sensor of the measuring device.

2. Test surface：

Installation surface and the center hole of the wheel

3. Test position

To test the radial run-out at about 10mm of the bead seat, and test the lateral run-out at about 7mm of the rim flange, as shown below:



4. Test method:

Fasten the wheel onto the test equipment according the wheel centering requirement. The detecting head shall be aligned with the corresponding measuring position. Record the run-out value as rotating a round, accurate to two digits after the decimal point.

APPENDIX C
Requirements and test methods of the static unbalance test for the auto wheels （Equivalent to the standard of QC/T 242-2014）

1. Test equipment：

Select the balancing machine in the reference to the maximal mass, size, and maximum unbalance value of the wheels. The evaluation criteria and the test methods from the balancing machine shall comply with the standard of GB/T4201 2006, and the calibration standard from the balancing machine shall meet the requirement of JJF115—2006.

2. Location datum

Locating by the center hole

3. Static unbalance testing method

Position and clamp the wheel firmly, enter the corresponding parameters according to the selected sequential operation command of the balancing machine, and then start the machine. The static unbalance value of the wheel can be determined when after the balancing machine stops rotating.

a) Determination of the static unbalance value

i. According to the different results of the displayed degree on the balancing machine, the static unbalance value can be determined.

ii. The static unbalance value can be red directly from the balancing machine when the result from the balancing machine display showing the unit of g.cm
When the balance is displayed as a static unbalance value, it can be read directly.

iii. when the balancing machine display shows the value of the calibration block mass needed for calibrating the wheels, the static unbalance value shall be calculated by the formula below (1)

$$U = m \text{ x } R$$

In the formula where：
U——Wheel static unbalance value；
m——Calibration block mass required for the wheel alignment, g；
R——Calibrating radius of at the calibration block, cm。

4. Eligibility criteria:

Comparing the tested static unbalance value with the maximum static unbalance value allowed of the wheel, the test value shall not exceed the allowed maximum static unbalance value of the wheel.

APPENDIX D
Performance requirements and test methods for the wheels dynamic rotary bending fatigue test
（Equivalent to the standard of SAE J2530 NOV2009）

1. Equipment—Use a test machine that:

a. Imparts a constant rotating bending moment to the wheel (see Figure 1.)

b. Maintains the test load within ±2.5%.

c. Monitors and measures the deflection of the system at the point of load application during the test.

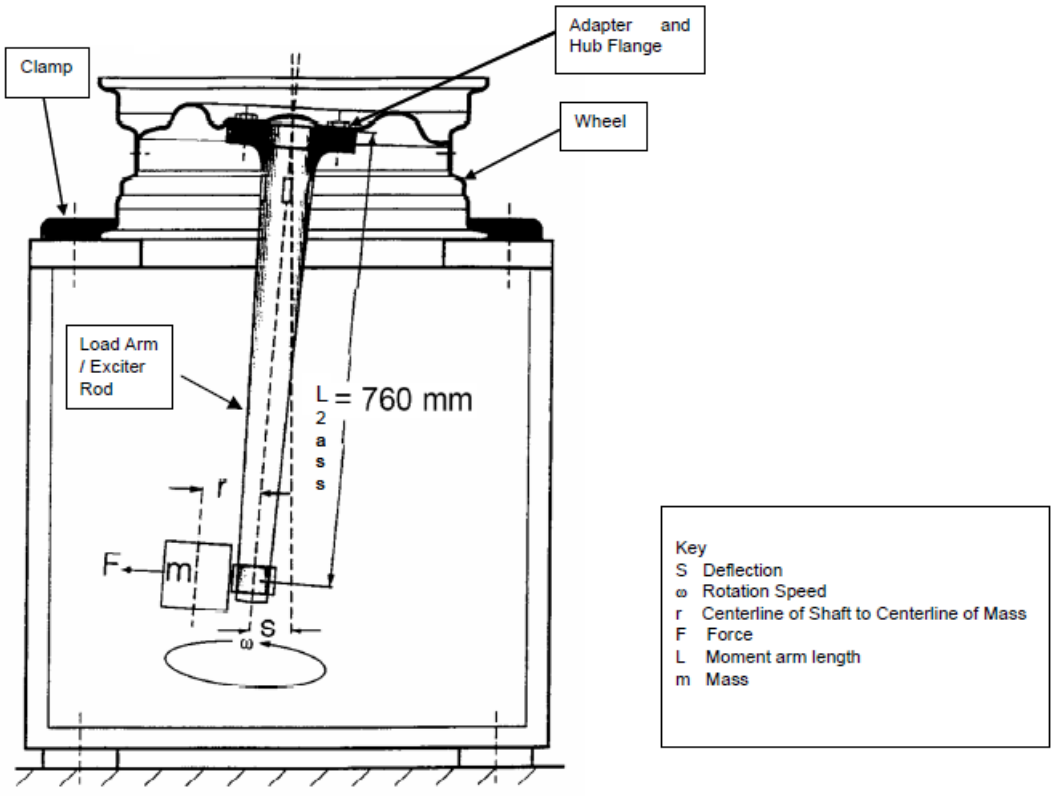


Figure 1: Stationary Wheel – Rotary Bending Fatigue Test Machine Design

2. Procedure

a. Use a test adapter, studs, and nuts representative of those specified for the wheel.

b. Verify the mating surfaces of the wheel and adapter are free of foreign material or excessive wear.

c. Attach a rigid load arm shaft and test adaptor to the wheel mounting surface.

d. Tighten the nuts to 115 N m ± 7 N m (85 ft-lb ± 5 ft-lb) or as specified by the wheel or vehicle manufacturer.

e. Clamp the rim securely to the test device.

f. Adjust the system to be within 0.25 mm (0.010 in) total indicator reading normal to the load arm shaft at the point of load application.

g. Apply the test load parallel to the plane of the rim.

3. Bending Moment—Calculate the bending moment (Force x Load Arm Length) to be applied to the test wheel as follows.

$$\mathbf{M = W(R\mu + d)S} \quad \text{(Eq. 1)}$$

Where:

W = Load rating of the wheel as specified by the wheel manufacturer.

R = One half of the largest overall diameter of the tires to be used on the wheel as specified by the current Tire and Rim Association yearbook or the vehicle/wheel manufacturer.

μ = Coefficient of friction developed between the tire and the road. Use μ = 0.7.

d = The inset or outset of the wheel (offset): use positive sign for inset and negative sign for outset.

S = Load factor – See Table 1. Use one of the factors for the type of wheel being tested.

NOTE: When calculating the Bending Moment, all units of measurement must be of the same system.

4. Test Criteria/Test Termination

4.1Acceptance Criteria

The samples under test must complete the minimum number of test cycles for the sample size used without termination.

4.2Test Termination

Terminate the test when any of the following conditions occur.

a. Wheel exceeds the initial deflection at point of load application by 20%.

b. A visually detected crack penetrating through a section of the wheel in the base metal or propagation of any existing fracture/crack resulting in a fatigue crack penetrating through any section of the wheel at the minimum cycles for the sample size used specified as in Table 1. Inspection should be done at the minimum cycles for the sample size used in Table 1. Cracking in the wheel finish alone shall not be the basis for finding a test termination.

c. One or more lug nuts loosening to less than 60% of the initial torque at the minimum cycles for the sample size used as specified in Table 1. If loosening is due to broken wheel bolts, studs or nuts see 4.2e. Inspection should be done at the minimum cycles for the sample size used as specified in Table 1.

d. Break or crack of a functional fastener.

e. Broken lug bolts or other parts of the test fixture do not require test termination but may result in damage to the wheel and test invalidation. Broken lug bolts shall not be replaced more than once per test. All bolts should be replaced if lug bolts are replaced. If necessary the test shall be terminated and the wheel retested or replaced and retested.

Table1: Test Factors And Minimum Cycle Requirements For Wheels In Normal Highway Service-Dynamic Cornering Fatigue

Sample quantity	Enhancement factor	Minimum cycle times	Friction coefficient μ
5	1.6	40000	0.7

APPENDIX E
Performance requirements and test methods for dynamic radial fatigue test of the auto wheels
（Equivalent to the standard of SAE J2530 NOV2009）

1. Equipment—Use a test machine that:

a. Has a driven rotatable drum which presents a smooth surface wider than the loaded test tire section width.
b. Has a suggested drum diameter of 1707.06 mm - 187.5 revolutions per kilometer (67.23 in - 300revolutions per mile).
c. Imparts a constant load to the test wheel and tire normal to the surface of the drum and in line radially with the center of the test wheel and drum.
d. Can maintain the test load within ±2.5%.
e. The axis of the test wheel and drum are parallel.

2. Procedure

a. To test with the recommended series of the tire models from the attachment of "Size and maximum loading range of the single wheel".

b. Use a test adaptor, studs, and nuts that are representative of those specified for the wheel.

c. Mount and inflate the tire to 448 kPa ±14 kPa (65 psi ±2 psi) for tires with usage pressure of 310 kPa(45 psi) or less. For wheels and tires intended for use at higher pressures, use 1.2 times the usage pressure, but not less than 448 kPa ±14 kPa (65 psi ±2 psi).

d. Tighten the wheel nuts to 115 N·m ±7 N·m (85 ft-lb ±5 ft-lb) or as specified by the vehicle or wheel manufacturer.

e. There may be an increase in inflation pressure during the test. This is normal, but it is permissible to adjust back to the test pressure.

f. Use caution as the test tires are severely overloaded and may fail.

3. The radial load to be applied to the wheel shall be determined as follows.

$$F=WK \qquad \text{（Eq.2）}$$

Where:

F = Radial load.

W = Load rating of the wheel as specified by the wheel manufacturer.

K = Load factor – See Table 2. Use one of the factors for the type of wheel being tested.

NOTE: When calculating the Radial Load, all units of measurement must be of the same system.

4. Test Criteria/Test Termination

4.1 Acceptance Criteria

The samples under test must complete the minimum number of test cycles without termination.

4.2 Test Termination

Terminate the test when any of the following conditions occur.

a. Inability of the wheel to sustain the test load.

b. A visually detected crack penetrating through a section of the wheel in the base metal or propagation of any existing fracture/crack resulting in a fatigue crack penetrating through any section of the wheel at minimum cycles for the sample size used as specified in Table 1. Inspection should be done at the minimum cycles for the sample size used in Table 1.Cracking in the wheel coating alone shall not be the basis for finding a test termination.

c. Loss of air pressure through a fatigue crack in rim.

d. Break or crack of a functional fastener

e. Failure of the test tire, broken lug bolts or studs, or other parts of the test fixture do not require test termination but may result in damage to the wheel and test invalidation. Broken lug bolts shall not be replaced more then once per test. If necessary the test shall be terminated and the wheel retested or replaced and retested.

Table 1 – Test Factors And Minimum Cycle Requirements For Wheels In Normal Highway service-Dynamic Radial Fatigue

Number of the samples	Enhancement factor	Minimum cycle times
5	2.25	475000

APPENDIX F
Performance requirements and test methods for the lateral impact testing of the auto wheels
（Equivalent to the standard of SAE J2530 NOV2009）

1. **Equipment**

The test machine shall be one in which an impact loading is applied to the rim flange of a wheel complete with tire. The wheel shall be mounted with its axis at an angle of 13 degrees ±1 degree to the vertical so that its highest point is presented to the vertically acting striker. The impacting face of the striker system shall be at least 125 mm wide and at least 375 mm long. (See Figure 1.)

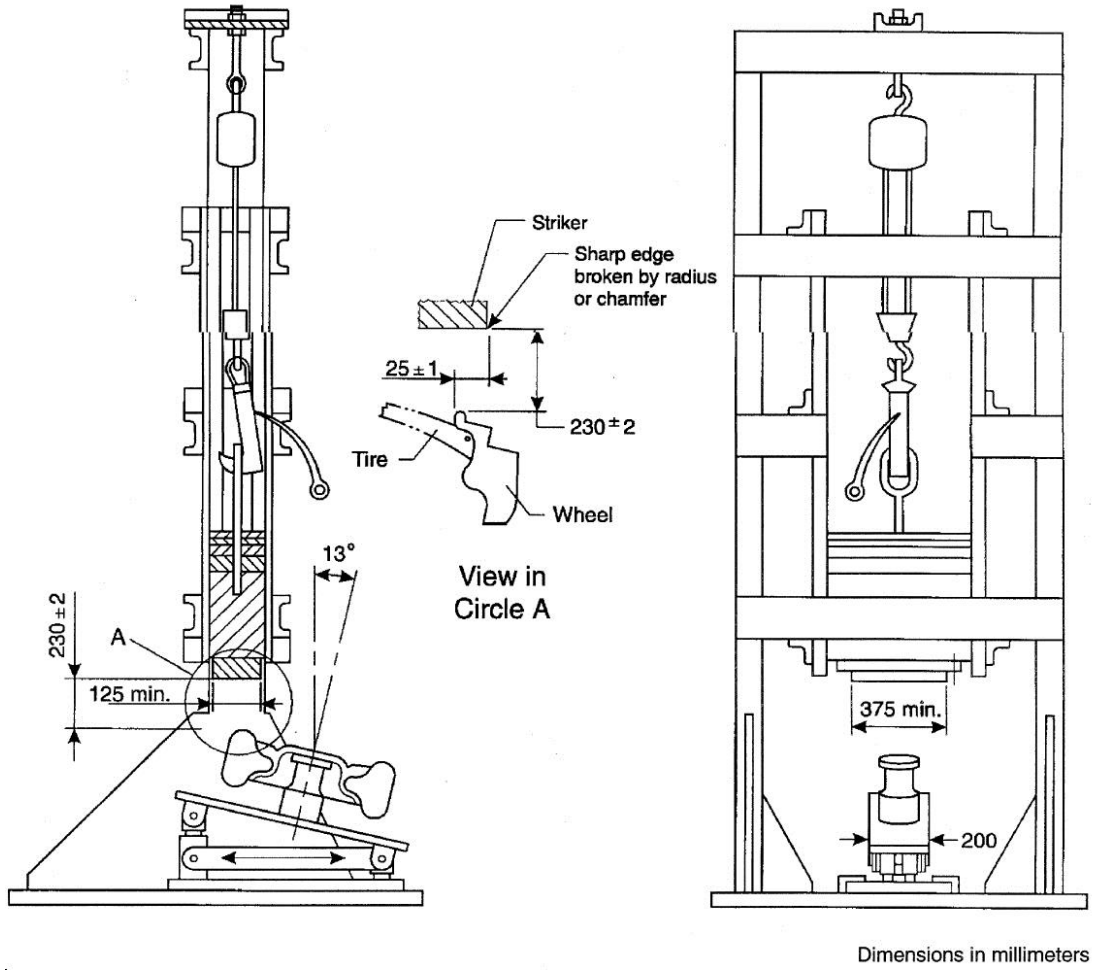


FIGURE 1—Impact Loading Test Machine

2. Procedure

Adjust the striker mass to the magnitude calculated in 2.3. It is necessary to rigidly constrain any weights added to the striker mass so that is acts as one mass. The wheel shall be mounted on the hub fixture by a means dimensionally representative of attachment used on the vehicle. The wheel attachment system shall be manually tightened to 115 N·m ± 7 N·m or the torque

recommended by the vehicle or wheel manufacturer.

To test with the recommended series of the tire models from the attachment of "Size and maximum loading range of the single wheel". The inflation pressure is 200kPa.

Because the design features of the wheel may vary, a sufficient number of locations on the circumference of the rim shall be tested to ensure that the integrity of the wheel is investigated. A separate wheel shall be used for each test.

The test should be conducted at room temperature (10 to 38 ℃).

2.1 DROPPING HEIGHT—The dropping height for the striker weight shall be 230 mm ± 2 mm above the highest part of the rim flange.

2.2 ALIGNMENT OF STRIKER—The striker shall be over the tire and the edge must overlap the rim flange by 25 mm ± 1 mm.

2.3 MAGNITUDE OF STRIKER MASS

$$D = 0.6W + 180 \quad \text{(Eq. 1)}$$

where

D = mass of striker ±2%, expressed in kilograms;

W = maximum static wheel loading as specified by wheel and/or vehicle manufacturer, expressed in kilograms.

3. Test Criteria/Test Termination

3.1 Acceptance Criteria

If the following conditions in 3.2 do not occur.

3..2 Test Criteria and Test Termination

a. A crack completely passing through a section of the center member of the wheel assembly.

b. Total loss of air pressure within one minute after impact.

c. Separation of the center member from the rim.

NOTE 1: Deformation of the wheel assembly, or fractures in the area of the rim section contacted by the face plate of the weight system is allowed and does not affect conformance.

NOTE 2: If it is suspected that conformance is affected from subsequent impacts caused by the mass rebounding or the mass resting on the tire, means should be employed to capture the mass after first impact. Only one impact is intended.

Attachment：

Size and maximum loading range of the single wheel

Page:1

NO.	Item no	Size	Loading Range(kg)	Testing tires models
1	X40619	15x6	525 kg	195/65 R15
2	X40720	14x5.5	448 kg	185/60 R14
3	X40831	15x6	483 kg	195/65 R15
4	X40838	16x6	670 kg	215/65 R16
5	X40861	15x6	430 kg	195/65 R15
6	X40876	16x6.5	550 kg	215/65 R16
7	X40922	15x6	625 kg	195/65 R15
8	X40957	15x5.5	448 kg	195/65 R15
9	X43786	17x7	1600 kg	245/65 R17
10	X45108	15x6	510 kg	195/65 R15
11	X45112	15x6	510 kg	195/65 R15
12	X45483	16x7	980 kg	215/70 R16
13	X45521	16x6.5	900 kg	215/70 R16
14	X45567	15x6	525 kg	195/65 R15
15	X45619	15x5.5	525 kg	195/65 R15
16	X45656	15x6.5	595 kg	205/65 R15
17	X45921	15x6	550 kg	195/65 R15
18	X46444	16x6.5	920 kg	215/70 R16
19	X46460	16x6.5	510 kg	215/65 R16
20	X46510	16x7	638 kg	215/65 R16
21	X46512	16x6.5	510 kg	215/65 R16
22	X46520	16x6.5	620 kg	215/65 R16
23	X46556	16x6.5	610 kg	215/65 R16
24	X46598	16x6	735 kg	215/70 R16
25	X46645	16x6	525 kg	215/65 R16
26	X46656	16x6.5	595 kg	215/65 R16
27	X47112	17X7	530 kg	225/65 R17
28	X47127	17x7	900 kg	235/60 R17
29	X47279	17x7	615 kg	225/65 R17
30	X47351	17x7	900 kg	235/60 R17
31	X47472	17x7	638 kg	225/65 R17
32	X47501	17x7.5	635 kg	235/60 R17
33	X47505	17x7	595 kg	225/65 R17
34	X47508	17x7	675 kg	235/60 R17
35	X47512	17x7	650 kg	225/65 R17

NO.	Item no	Size	Loading Range(kg)	Standardized test tire models
36	X47514	17x7	600 kg	225/65 R17
37	X47556	17x7	610 kg	225/65 R17
38	X47561	17x7	665 kg	225/65 R17
39	X47564	17x7	760 kg	235/60 R17
40	X47567	17x7	725 kg	235/60 R17
41	X47620	17x7	800 kg	235/60 R17
42	X47767	17x7	625 kg	225/65 R17
43	X99103N	15x6	510 kg	195/65 R15
44	X99118N	15x6	530 kg	195/65 R15
45	X99121N	16x6.5	598 kg	215/65 R16
46	X99123N	15x6	448 kg	195/65 R15
47	X99126N	15x6.5	650 kg	205/65 R15
48	X99127N	16x6.5	625 kg	215/65 R16
49	X99128N	16x6.5	850 kg	215/70 R16
50	X99130N	15x6	703 kg	205/65 R15
51	X99139N	17x7	730 kg	235/60 R17
52	X99143N	16x6.5	730 kg	215/70 R16
53	X99144N	16x6.5	760 kg	215/70 R16
54	X99148N	14x5.5	510 kg	185/60 R14
55	X99149N	16x6.5	510 kg	215/65 R16
56	X99154N	16x6.5	685 kg	215/70 R16
57	X99441N	17x7	880 kg	235/60 R17
58	X99715N	17x7	850 kg	235/60 R17