Prüfbericht-Nr.: *Test Report No.*:	**50172128-001**	**Auftrags-Nr.:** *Order No.*:	154334770	Seite 1 von 18 *Page 1 of 18*
Kunden-Referenz-Nr.: *Client Reference No.*:	N/A	**Auftragsdatum:** *Order date*:	09.08.2018	
Auftraggeber: *Client*:	Guangzhou Jing Sheng Machine Co.,LTD/N0100 East Wreath Road Luojia Village Shiji Town Panyu Guangzhou China Gu 511450C.			
Prüfgegenstand: *Test item*:	6'' center locking caster			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	Article No.:KKC607CL			
Auftrags-Inhalt: *Order content*:	Mechanical test report according to client's requirements			
Prüfgrundlage: *Test specification*:	ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7) Castors and wheels *- Requirements for use on manually propelled equipment for institutional applications*			

Wareneingangsdatum: *Date of receipt*:	09.08.2018
Prüfmuster-Nr.: *Test sample No.*:	A000788800-001, 002
Prüfzeitraum: *Testing period*:	09.08.2018 - 17.08.2018
Ort der Prüfung: *Place of testing*:	Shanghai
Prüflaboratorium: *Testing laboratory*:	TÜV Rheinland (Shanghai) Co., Ltd.
Prüfergebnis*: *Test result**:	Pass

geprüft von / *tested by*:

17.08.2018	Ricky Wang/ PE	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

kontrolliert von / *reviewed by*:

17.08.2018	Tu Feng / Reviewer	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:
Acc. to client's request, the evaluation of ISO 22881:2004(E) cl. 4.2.4 single bolt fixing, cl. 4.4 wheel &cl. 7 Marking were not performed.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

V04

Prüfbericht-Nr.: 50172128-001
Test Report No.:

Liste der verwendeten Prüfmittel
List of used test equipment

Prüfmittel *Test equipment*	**Prüfmittel-Nr. / ID-Nr.** *Equipment No. / ID-No.*	**Nächste Kalibrierung** *Next calibration*
List of used test equipment could be traceable and provided separately upon request		

Prüfbericht-Nr.: 50172128-001
Test Report No.:

Produktbeschreibung
Product description

1	**Produktdetails** *Product details*	6'' center locking caster
2	**Maße / Gewicht** *Dimensions / Weight*	1.29kg
3	**Bedienelemente** *Operating elements*	N/A
4	**Ausstattung / Zubehör** *Equipment / Accessories*	N/A
5	**Verwendete Materialien** *Used materials*	N/A
6	**Sonstiges** *Other*	Load capacity: 150kg (1500N).

Castor

Castor removed the plastic housing

Locking device worked

Stem

Absatz	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

1	**Scope** This International Standard specifies the technical requirements, the appropriate dimensions and the requirements for testing of castors and wheels that may include braking and/or locking devices, specifically for manually propelled use in an institutional environment. This includes, for example, shops, restaurants, hotels, educational buildings and hospitals.
2	**Normative references** The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. ISO 22877, *Castors and wheels — Vocabulary, symbols and multilingual terminology* ISO 22878:2004*, Castors and wheels — Test methods and apparatus*
3	**Terms and definitions** For the purposes of this document, the terms and definitions given in ISO 22877 apply. Symbols are given in ISO 22878:2004, Annex A.
4	**Dimensions and classification**
4.1	**Characteristics** The characteristics of a castor are — fixing system, — offset, — wheel, and — load capacity.
4.2	**Fixing system**
4.2.1	**General** The fixing system includes the top plate, solid stem and single bolt hole.
4.2.2	**Top plates**

Absatz	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*
4.2.2.1	**General** Top plates are identified by classification and include rectangular and square plates with four fixing holes. The design of the outer profile of the top plates is left to the manufacturer, provided that it is inscribed in a rectangle, as defined in Tables 1 and 2, by sizes *l* and *b* of Figure 1 and *d* and *d'* of Figure 2 which are the maximum acceptable sizes. The holes may be oblong and form slots, provided the width of the slots is suitable for bolts of diameter (D_{G1}) as in Tables 1 and 2. 4.2.2.2 Types of top plates 4.2.2.2.1 Rectangular top plates Dimensions and classification of rectangular top plates are detailed in Table 1 and illustrated in Figure 1. 4.2.2.2.2 Square top plates Dimensions and classification of square top plates are detailed in Table 2 and illustrated in Figure 2.	*No top plate*	**N/A**
4.2.3	**Solid stem** Solid stem fittings are required to suit various tube sizes which have not been defined. The length of the solid stem shall be equal or greater than 1,5 times its diameter. In those cases where the solid stem is supplied with a cross hole for fixing to a tubular structure, the axis of such hole shall be at (19 ± 0,25) mm from the collar of the stem and threaded M8 as illustrated in Figure 3**.**	*Wheel diameter: 150mm* *Stem diameter： 27.89mm* *Stem length： 98.31mm* *Thread size:M8* *Distance of the threaded hole centre from the stem collar ： 19. 17mm*	**P**
4.2.4	**Single bolt fixing** Table 3 specifies the single bolt fixing diameters (D_{G2}) corresponding to the wheel diameter (*D*).	*Not tested acc. to client's request.* *This product is not fully applicable to* ISO 22881:2004(E).	**N/T**

Absatz	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)**	Messergebnisse - Bemerkungen	Bewertung
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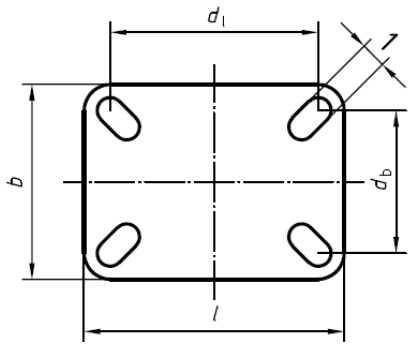


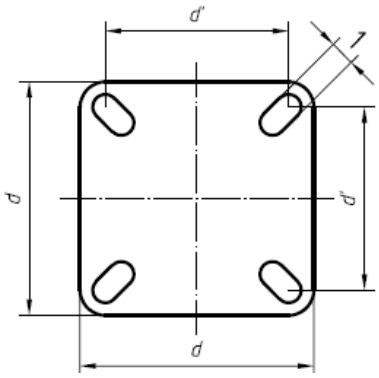
Key
1 adapted to D_{G1}
NOTE The symbols $A \times B$ (top plate outer dimensions) and $a \times b$ (bolt hole spacing) may be used in place of the recommended symbols stated above as these are of common use within the trade.

Figure 1 — Rectangular top plate

Table 1

Dimensions in millimetres

Class	Maximum top-plate dimensions $l \times b$	Bolt hole spacing $d_l \times d_b$	Fixing bolt diameter D_{G1}	Corresponding wheel diameter D
R21	75 × 60	55 × 40	6	50 63 75/80 100
R22	90 × 70	60 × 50	8	75/80 100 125 150/160 200
R23	115 × 85	80 × 60	8	100 125 150/160 200



Key
1 adapted to D_{G1}
NOTE The symbols *A*×*A* (top plate outer dimensions) and *a*×*a* (bolt hole spacing) may be used in place of the recommended symbols stated above as these are of common use within the trade.

Figure 2 — Square top plate

Table 2

Dimensions in millimetres

Class	Maximum top-plate dimensions $d \times d$	Bolt hole spacing $d' \times d'$	Fixing bolt diameter D_{G1}	Corresponding wheel diameter D
S21	50 × 50	35 × 35	6	50 63 75/80
S22	65 × 65	45 × 45	6	50 63 75/80 100 125
S23	80 × 80	60 × 60	8	63 75/80 100 125 150/160 200
S24	100 × 100	80 × 80	8	75/80 100 125 150/160 200

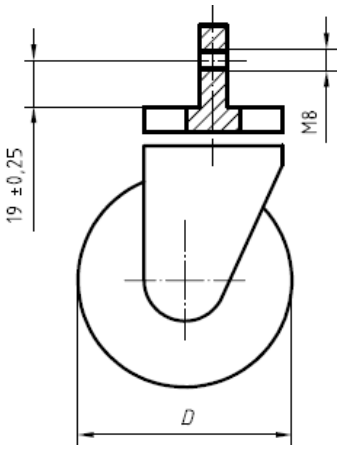


Figure 3 — Solid stem castor with threaded fixing hole

Absatz	ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

Table 3

Dimensions in millimetres

Wheel diameter D	Single bolt fixing diameter D_{G2}
50	8 10
63	8 10
75/80	8 10 12
100	8 10 12
125	8 10 12 16
150/160	12 16
200	12 16

4.3	**Offset** Table 4 specifies the minimum and maximum offset values (d_F) for the swivel castors, corresponding to the wheel diameter (D), as in Figure 4.	*Wheel dia.: 150mm* *F: 43. 03mm*	**P**

Table 4

Dimensions in millimetres

Wheel diameter D	Offset d_F	
	Maximum	Minimum
50	30	20 % of the wheel diameter
63	40	
75	50	
80	50	
100	60	
125	70	
150	80	
160	85	
200	100	

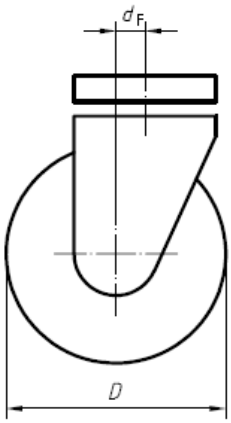


Figure 4 — Offset

Absatz	ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

4.4 **Wheels**

Not tested acc. to client's request.

This product is not fully applicable to ISO 22881:2004(E).

N/T

Characteristics
The characteristics of a wheel are
— diameter,
— hub width,
— bore diameter, and
— load capacity.

The characteristics of the wheel are illustrated in Figure 5, and the hub width (b_{T1}) and bore diameter (D_d) corresponding to each wheel diameter (D) are listed in Table 5. Wheels are not restricted to these hub widths and bores when used in castors.

Wheel diameter tolerance
The tolerance on the wheel diameter (D) is ± 1% with a minimum value of ± 1 mm.

Hub width tolerance
The tolerance on hub width (b_{T1}) is $^{0}_{-2}$ % with a minimum of 1 mm.

Figure 5 — Wheel dimensions

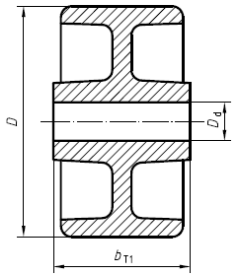


Table 5

Dimensions in millimetres

Wheel diameter D	Hub width[a] b_{T1}	Bore diameter D_d
50	20/25	6 8
63	20/25	6 8
	25	8 10
75/80	30/35	8 10 12
	40/45	10 12
100	30/35	8 10 12
	40/45	10 12
125	30/35	8 10 12
	40/45	10 12
150/160	40/45	12
200	40/45	12

[a] Preferred dimensions are 20 mm, 30 mm and 40 mm.

Absatz	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

4.5	**Load capacity** This is the maximum load, in newtons, which can be carried by a wheel or a castor so as to fully comply with the required acceptance criteria.
5	**Requirements for testing**
5.1	**General** Test methods and apparatus shall be as specified in ISO 22878.
5.2	**Standard conditions**
5.3	**Initial wheel play**
5.3.1	**Test objectives, apparatus and procedures** These shall be as specified in ISO 22878:2004, 4.2.

Table 6

Reference in this International Standard	Test sequence	Castors and wheel types	Test procedures given in ISO 22878:2004, subclause
5.3	Initial wheel play	All	**4.2**
5.4	Initial swivel play	Swivel castors with or without accessories	**4.3**
5.5	Electrical resistance	Castors and wheels antistatic or electrically conductive	**4.4**
5.6	Fatigue test for braking and/or locking devices	Castors with — wheel locking/braking device — directional locking device — total locking/braking device — central locking/braking device	**4.5**
5.7	Efficiency check of wheel braking and/or locking devices	Castors with — wheel locking/braking device — total locking/braking device — central locking/braking device	**4.6**

Absatz *Clause*	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)** Anforderungen - Prüfungen / *Requirements - Tests*	Messergebnisse - Bemerkungen *Measuring results - Remarks*	Bewertung *Evaluation*
5.3.2	**Acceptance criteria** The measured initial wheel play shall not exceed the value (d_{W1}) shown in Table 7. **Table 7** Dimensions in millimetres **Wheel diameter D** / **Maximum initial wheel play d_{W1}** 50 / 0,70 63 / 0,70 75/80 / 0,80 100 / 1,00 125 / 1,25 150/160 / 1,60 200 / 2,00	*Requirement :* *Wheel dia.: 150mm* *W1: Max 1.60mm* *Result:* *W1: 0.17mm*	**P**
5.4	**Initial swivel play** 5.4.1 Test objectives, apparatus and procedures These shall be as specified in ISO 22878:2004, 4.3. 5.4.2 Acceptance criteria The measured initial swivel play shall not exceed the value (d_{S1}) given Table 8. **Table 8** **Symbol** / **Value** / **Description** d_{S1} / 4 mm / maximum initial swivel play	*Requirement :* *Wheel dia.: 150mm* *S1: max 4mm* *Result:* *S1: 0.69mm*	**P**

Absatz *Clause*	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)** Anforderungen - Prüfungen / *Requirements - Tests*	Messergebnisse - Bemerkungen *Measuring results - Remarks*	Bewertung *Evaluation*
5.5	**Electrical resistance test** 5.5.1 Test objectives, apparatus and procedures These shall be as specified in ISO 22878:2004, 4.4. 5.5.2 Test values The test values shall be as listed in Table 9. **Table 9** **Symbol** | **Value** | **Description** F_{max} | variable | load capacity F_{17} | 10 % of F_{max} | test load R | variable | electrical resistance 5.5.3 Tolerances The tolerance shall be as shown in Table 10. **Table 10** **Symbol** | **Unit** | **Tolerance** (Acceptable | Unit) F_{17} | N | $^{+2\ \%}_{0}$ | N 5.5.4 Acceptance criteria The resistance *R* of the sample tested shall be — R ≤10^5 Ω for conductive castors or wheels, and — 10^5 Ω < R ≤ 10^7 Ω for antistatic castors or wheels.	*Conductive castor(s) or wheel(s): R ≤10^5 Ω* *Result: 1136Ω* *Test load:* *10% claim load=150. 0N*	**P**

Absatz *Clause*	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)** Anforderungen - Prüfungen / *Requirements - Tests*	Messergebnisse - Bemerkungen *Measuring results - Remarks*	Bewertung *Evaluation*

5.6 **Fatigue test for braking and/or locking devices**

No failure was found with braking/locking.

P

5.6.1 Test objectives, apparatus and procedures
These shall be as specified in ISO 22878:2004, 4.5.

5.6.2 Test values
The test values shall be as listed in Table 11.

Table 11

Symbol	Value	Description
n_E	5 000	number of locking actions
f_E	10 cycles/min	frequency of locking actions
F_{max}	variable	load capacity
F_3	equal to F_{max}	test load

5.6.3 Tolerances
The tolerances shall be as shown in Table 12.

Table 12

Symbol	Unit	Tolerance	
		Acceptable	Unit
n_E	—	$^{+1\ \%}_{0}$	—
f_E	cycles/min	$^{0}_{-2}$	cycles/min
F_3	N	$^{+2\ \%}_{0}$	N

5.6.4 Acceptance criteria
The sample shall not show any wear and/or permanent deformation that adversely affects its performance.

5.7 **Efficiency check of wheel braking and/or locking devices**

No revolving movement of the wheel around its axis

Test load:
20% claim load=300N

P

5. 7. 1 Test objectives, apparatus and procedures
These shall be as specified in ISO 22878:2004, 4.6.
5. 7. 2 Test values
The test values shall be as listed in Table 13.

Table 13

Symbol	Value	Description
F_{max}	variable	load capacity
F_{11}	equal to F_{max}	test load
F_{K1}	20 % of F_{max}	horizontal tractive force

5. 7. 3 Tolerances
The tolerances shall be as shown in Table 14.

Table 14

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_{11}	N	$^{+2\ \%}_{0}$	N
F_{K1}	N	$^{+4\ \%}_{0}$	N

5. 7. 4 Acceptance criteria
The wheel shall have no revolving movement around its axis during the second application of the force F_{K1}.

Absatz	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

5.8

Efficiency check of swivel braking and/or locking devices

5. 8. 1 Test objectives, apparatus and procedures
These shall be as specified in ISO 22878:2004, 4.7.
5. 8. 2 Test values
The test values shall be as listed in Table 15.

Table 15

Symbol	Value	Description
F_{max}	variable	load capacity
F_{11}	equal to F_{max}	test load
F_{K2}	20 % of F_{max}	horizontal tractive force

5. 8. 3 Tolerances
The tolerances shall be as shown in Table 16.

Table 16

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_{11}	N	$^{+2\ \%}_{0}$	N
F_{K2}	N	$^{+4\ \%}_{0}$	N

5. 8. 4 Acceptance criteria
No swivelling movement shall be detected during the second application of the force F_{K2}.

No swiveling movement is detected

Test load:
20% claim load=300N

P

Absatz	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

5.9 **Static test**

5.9.1 Test objectives, apparatus and procedures
These shall be as specified in ISO 22878:2004, 4.9.

5.9.2 Test values
The test values shall be as listed in Table 17.

Table 17

Symbol	Value	Description
F_{max}	variable	load capacity
y_1	1,5	load factor
F_6	$F_{max} \times y_1$	test load
t_{y1}	1 h	time of application of the load
t_{y2}	24 h	elapsed time prior to inspection

5.9.3 Tolerances
The tolerances shall be as shown in Table 18.

Table 18

Symbol	Unit	Tolerance	
		Acceptable	Unit
F_6	N	$^{+2\ \%}_{0}$	N
t_{y1}	h	$^{+15}_{0}$	min
t_{y2}	h	± 1	h

5.9.4 Acceptance criteria
There shall be no permanent deformation of the sample that adversely affects its performance.

No visible permanent deformation was found

Test load:
1.5 time of claim load=2250N

P

Absatz *Clause*	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)** Anforderungen - Prüfungen / *Requirements - Tests*	Messergebnisse - Bemerkungen *Measuring results - Remarks*	Bewertung *Evaluation*
5.10	**Dynamic test** 5.10.1 Test objectives, apparatus and procedures These shall be as specified in ISO 22878:2004, 4.8. 5.10.2 Test values The test values shall be as listed in Table 19. **Table 19** **Symbol** | **Value** | **Description** F_{max} | variable | load capacity v_1 | 0,83 m/s (3 km/h) | average speed of running period v_2 | 0,83 m/s (3 km/h) | speed at impact with obstacles h_1 | 3 % of D | height of obstacles d_c | 1 m to 3 m | distance between obstacles n | 10 times D, in mm | number of obstacles to be passed by the wheel n_{r1} | not required in this test | number of wheel revolutions t_{z1} | 3 min | running period t_{z2} | 3 min | pause D | variable | wheel diameter The actual wheel diameter shall be measured prior to commencement and on completion of the test to establish wear. The tolerances shall be as shown in Table 20. **Table 20** **Symbol** | **Unit** | **Tolerance** (Acceptable | Unit) v_1 | m/s | $^{+5\ \%}_{0}$ | m/s v_2 | m/s | $^{+5\ \%}_{0}$ | m/s h_1 | mm | $^{0}_{-5\ \%}$ | mm n | — | $^{+1\ \%}_{0}$ | — n_{r1} | — | $^{+1\ \%}_{0}$ | — t_{z1} | min | $\pm$ 10 | s 5.10.4 Acceptance criteria There shall be no permanent deformation of the sample which adversely affects its performance. The reduction of the wheel diameter shall not exceed 2% of the measured diameter.	*No permanent deformation was found after dynamic test* *Before dynamic test of wheel diameter: 150.55mm* *After dynamic test of wheel diameter: 150. 32mm < 2 % of the measured diameter* *Test load: 150kg*	**P**
5.11	**Efficiency check of wheel braking and/or locking devices** Repeat test 5.7.	*No swiveling movement is detected* *Test load:* *20% claim load=300N*	**P**
5.12	**Efficiency check of swivel braking and/or locking devices** Repeat test 5.8.	*No swiveling movement is detected* *Test load:* *20% claim load=300N*	**P**

Absatz	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)**	Messergebnisse - Bemerkungen	Bewertung
Clause	Anforderungen - Prüfungen / *Requirements - Tests*	*Measuring results - Remarks*	*Evaluation*

5.13 **Final wheel play**

5.13.1 Test objectives, apparatus and procedures
These shall be as specified in ISO 22878:2004, 4.2.

5.13.2 Acceptance criteria
The wheel wear play shall not exceed the value d_{W2} detailed in Table 21.

Table 21

Dimensions in millimetres

Wheel diameter D	**Maximum wheel wear play** d_{W2}
50	0,40
63	0,50
75/80	0,64
100	0,80
125	1,00
150/160	1,28
200	1,60

Requirement:
Wheel dia.: 150mm
W2: Max.1.28mm

Result:
W2: 0.23mm

P

5.14 **Final swivel play**

5.14.1 Test objectives, apparatus and procedures
These shall be as specified in ISO 22878:2004, 4.3.

5.14.2 Acceptance criteria
The swivel wear play calculated from the difference between the measured initial and final swivel play shall not exceed the value d_{S2}.

Table 22

Symbol	**Value**	**Description**
d_{S2}	4 mm	maximum swivel wear play

Requirement:
Wheel dia.: 150mm
S2: max 4mm

Result:
S2: 2.64mm

P

6 **Conformity**

On request, the manufacturer shall declare by a certificate of conformity that the castors or wheels are in accordance with the requirements as stated in this International Standard.

The type of testing machine shall be stated in the conformity document.

Test report was applied only as per client's request.

N/A

Absatz *Clause*	**ISO 22881:2004(E) (w/o cl.4.2.4 ,4.4&7)** Anforderungen - Prüfungen / *Requirements - Tests*	Messergebnisse - Bemerkungen *Measuring results - Remarks*	Bewertung *Evaluation*
7	**Marking of the product**		
7.1	**Product marking** All the products shall be permanently and visibly marked with a name and/or trademark of the manufacturer.	*Not tested acc. to client's request.*	**N/T**
7.2	**Marking of electrically conductive or antistatic castors or wheels** All products shall bear, on their outer surface, a clearly visible mark as follows: — antistatic: a white mark and, where appropriate and possible, the word "antistatic"; — conductive: a yellow mark and, where appropriate and possible, the word "conductive".	*Not tested acc. to client's request.*	**N/T**

- END OF TEST REPORT-