
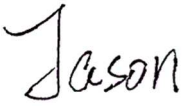



<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	<b>SHI50092 002</b>	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	244522236	Seite 1 von 9 Page 1 of 9
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2023-06-12	
<b>Auftraggeber:</b> <i>Client:</i>	Anhui Laite Gas Spring Co., Ltd.			
<b>Prüfgegenstand:</b> <i>Test item:</i>	Tapered pressure tubes for self-supporting gas springs for the height adjustment of seating			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	SKQ-A/B-20 "LANT"			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	Periodical verification test for TÜV-Mark Approval			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	EN 16955:2017 Hardware for furniture - Tapered pressure tubes for self-supporting gas springs for the height adjustment of seating - Test methods and requirements for strength and durability			
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	2023-07-31			
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	20230801-04			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2023-08-01 - 2023-08-04			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>geprüft von:</b> <i>tested by:</i>			<b>genehmigt von:</b> <i>authorized by:</i>	
<b>Datum:</b> <i>Date:</i>	2023-08-04		<b>Ausstellungsdatum:</b> <i>Issue date:</i>	2023-08-09
<b>Stellung / Position:</b>	Project Engineer		<b>Stellung / Position:</b>	Reviewer
<b>Sonstiges / Other:</b>	<p>1. The test result is copied from initial type test report No. 94642851-02, issued by TÜV Rheinland LGA Bautechnik GmbH, and SHI50092 001.</p> <p>2. Test samples for periodical verification test were prepared and sent by manufacturer: Anhui Laite Gas Spring Co., Ltd.</p>			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
<p><b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

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**Anmerkungen**  
*Remarks*

- |   |   |
|---|---|
| 1 | <p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.<br/>Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>  |
| 2 | <p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.</p> <p><i>As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.</i></p> |
| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.<br/>Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i><br/><i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>  |

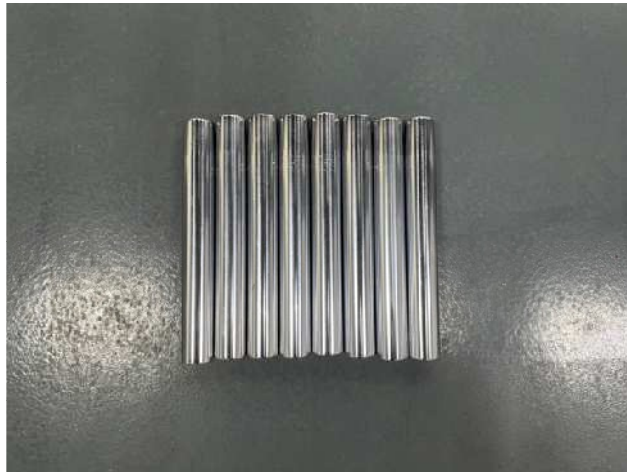
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**Produktbeschreibung**  
 Product description

1	<b>Produktdetails</b> <i>Product details</i>	Type: SKQ-A/B-20 "LANT"	Outside diameter: 28 mm
		Wall thickness: 2.0 mm	Surface finish: Hard chrome plated
2	<b>Maße / Gewicht</b> <i>Dimensions / Weight</i>	N/A	
3	<b>Bedienelemente</b> <i>Operating elements</i>	N/A	
4	<b>Ausstattung / Zubehör</b> <i>Equipment / Accessories</i>	N/A	
5	<b>Verwendete Materialien</b> <i>Used materials</i>	Q235B steel according to GB/T 31315-2014	
6	<b>Sonstiges</b> <i>Other</i>	Test sample(s), as well sample information, description, product details and intended usage was provided by customer.	
7	<b>Prüfmusterbereitstellung:</b> <i>Test sample obtaining:</i>	<input checked="" type="checkbox"/> Sending by customer <input type="checkbox"/> Sampling by TÜV Rheinland Group <input type="checkbox"/> others:	

Samples before testing

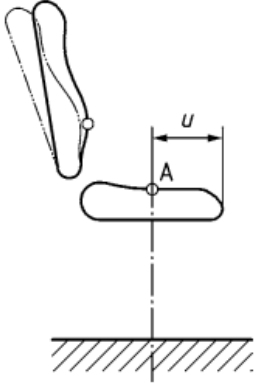


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<p><b>1</b></p>	<p><b>Scope</b></p> <p>This European Standard specifies test methods and requirements for the strength and durability of tapered pressure tubes for self-supporting gas springs for the height adjustment of seating.</p> <p>Annex A (normative) contains product information.</p> <p>Annex B (informative) contains a guide for choosing the correct strength class.</p>															
<p><b>2</b></p>	<p><b>Normative references</b></p> <p>The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.</p> <p>EN ISO 4288, Geometrical product specifications (GPS) - Surface texture: Profile method - Rules and procedures for the assessment of surface texture (ISO 4288)</p> <p>EN ISO 7500-1:2016, Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Verification and calibration of the force-measuring system (ISO 7500-1)</p> <p>EN ISO 9934-2, Non-destructive testing - Magnetic particle testing - Part 2: Detection media (ISO 9934-2)</p> <p>ISO 1099, Metallic materials - Fatigue testing - Axial force-controlled method</p>															
<p><b>3</b></p>	<p><b>Terms and definitions</b></p> <p>Not applicable.</p>															
<p><b>4</b></p>	<p><b>Strength classes for pressure tubes</b></p> <p>The determination of the strength classes is based on characteristics given in Table 1. The dimension <math>u</math> of the seating is given in Figure 1.</p> <p style="text-align: center;"><b>Table 1 — Strength classes for pressure tubes</b></p> <table border="1"> <thead> <tr> <th>Strength class<sup>a</sup></th> <th>Alternate bending moment</th> <th>Largest distance between load bearing structure of the seat and centre of the column</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;"><math>M</math> Nm</td> <td style="text-align: center;"><math>u</math> mm</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">±190</td> <td style="text-align: center;">≤ 340</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">±210</td> <td style="text-align: center;">≤ 370</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">±240</td> <td style="text-align: center;">≤ 400</td> </tr> </tbody> </table> <p><sup>a</sup> Due to increased requirements, strength class 1 is not part of this European Standard.</p>	Strength class <sup>a</sup>	Alternate bending moment	Largest distance between load bearing structure of the seat and centre of the column		$M$ Nm	$u$ mm	2	±190	≤ 340	3	±210	≤ 370	4	±240	≤ 400
Strength class <sup>a</sup>	Alternate bending moment	Largest distance between load bearing structure of the seat and centre of the column														
	$M$ Nm	$u$ mm														
2	±190	≤ 340														
3	±210	≤ 370														
4	±240	≤ 400														

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	 <p><b>Key</b> A mid of centre column u largest distance between load bearing structure of the seat and centre of the column</p> <p><b>Figure 1 — Largest distance <math>u</math> between load bearing structure of the seat and centre of the column</b></p>		
<b>5</b>	<b>Test apparatus</b>		
<b>5.1</b>	<p><b>Material testing machine</b></p> <p>A material testing machine capable of performing tests in accordance with ISO 1099 shall be used. The testing machine force measuring system shall be verified statically in accordance with EN ISO 7500-1:2016, Class 1.</p>		P <input checked="" type="checkbox"/> F <input type="checkbox"/> N/A <input type="checkbox"/> N/T <input type="checkbox"/>
<b>5.2</b>	<p><b>Testing equipment for magnetic powder flaw test</b></p> <p>A testing equipment for magnetic powder flaw test for the particle inspection for the detection of surface imperfections shall be used.</p>		P <input checked="" type="checkbox"/> F <input type="checkbox"/> N/A <input type="checkbox"/> N/T <input type="checkbox"/>
<b>6</b>	<b>Test</b>		
<b>6.1</b>	<p><b>General</b></p> <p>For each combination of dimensions, production procedure, surface finish, materials or condition of the material or any other characteristic, which affects the strength and durability, a separate test shall be conducted.</p>		P <input checked="" type="checkbox"/> F <input type="checkbox"/> N/A <input type="checkbox"/> N/T <input type="checkbox"/>
<b>6.2</b>	<b>Strength and durability</b>		
<b>6.2.1</b>	<p><b>Sampling</b></p> <p>The test samples shall consist of 32 pressure tubes taken on a random basis from the series production.</p> <p>Any kind of marking on the pressure tube shall be done before strength and durability test.</p>		P <input checked="" type="checkbox"/> F <input type="checkbox"/> N/A <input type="checkbox"/> N/T <input type="checkbox"/>

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**6.2.2 Test procedure**

**6.2.2.1 Test setup**

The test setup is shown in Figure 2.

The end of the pressure tube shall be firmly fixed to the element which applies the load. If the element which applies the load is secured against coming loose by a counter-cone on the internal side of the pressure tube the free bending length  $l_5$  shall be at least 50 % of the overlap  $l_3$  (see Figure 2).

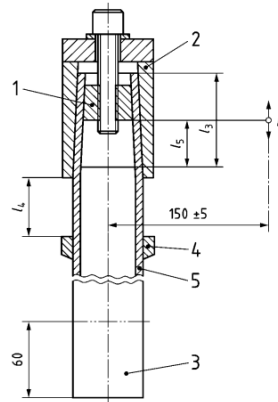
The free length  $l_4$  between the upper and lower clamps shall be at least 50 mm. If there are series-produced shapings, embossings etc. in the area of the bearing length of the pressure tube, these areas shall be included in the tests so that they are in the compression-tension zone. Exceptions to this are pressure tubes with shapings, embossings etc. which are up to 60 mm away from the lower end of the pressure tube.

Dimensions of the test fixture:  
according to the details  
supplied by the manufacturer  
of the pressure tubes

Overlap  $l_3$  in test fixture:  
27.7 mm ~ 28.1 mm

P   
F   
N/A   
N/T

Dimensions in millimetres



**Key**

- 1 counter-cone
- 2 element which applies the load
- 3 shapings and embossings permitted in this area without testing
- 4 lower clamp
- 5 pressure tube
- $l_3$  length of connection between the holding cone and the pressure tube cone
- $l_4$  free length between upper and lower clamp
- $l_5$  free bending length
- $F$  test load

Tolerances:  $\pm 0,5$  mm of the nominal dimensions, unless otherwise stated

**Figure 2 — Test setup for strength and durability**

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<p><b>6.2.2.2</b></p>	<p><b>Test procedure</b></p> <p>The test shall be performed according to ISO 1099.</p> <p>The alternate bending moment <math>M</math> shall be as specified in Table 1. It shall act in parallel to the longitudinal axis of the pressure tube. The length of the lever arm which applies the force is <math>(150 \pm 5)</math> mm. The time characteristic of the test force shall be sinusoidal. The stress cycle frequency shall not exceed 30 Hz. The alternate bending stress shall be applied with stress regulation. The temperature of the test piece shall not exceed 50 °C during the test.</p> <p>To determine the strength and durability, the alternate bending stresses shall be applied in <math>2 \times 10^6</math> cycles and a mean stress of 0.</p>	<p>Alternate bending moment: <math>\pm 210</math> Nm</p> <p>Strength class: 3</p> <p>Cycle frequency: 10 Hz</p>	<p>P <input checked="" type="checkbox"/></p> <p>F <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p> <p>N/T <input type="checkbox"/></p>
<p><b>6.2.3</b></p>	<p><b>Evaluation and requirement</b></p> <p>After the test, the surfaces of the test pieces shall be subjected to a magnetic powder flaw test over their entire length and their entire circumference.</p> <p>The magnetic powder flaw test shall be performed on pressure tubes made of unalloyed and low-alloyed steels with alternating current magnetization. The test areas shall be cleaned and free of interfering impurities. Suitable test apparatus shall be used to ensure that a tangential field strength of at least 2 kA/m is achieved. Wet test media shall be used for the test. The particle size of the magnetic powder shall be according to EN ISO 9934-2.</p> <p>Only carrier liquids which do not cause any corrosion to the subject of the test shall be used. If oil is used as a carrier agent, the sort selected shall be easily removed and leave no interfering residue. Marked test oils are suitable.</p> <p>If water is used as a carrier agent, it can be necessary to use additives to ensure that the surface is properly wet (amount according to manufacturer's instructions). The detection sensibility shall not be impaired by these additives.</p> <p>The test is deemed to have been passed if no cracks or fractures are seen on any of the 32 pressure tubes tested.</p>	<p>Test results refer to Appendix I.</p>	<p>P <input checked="" type="checkbox"/></p> <p>F <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p> <p>N/T <input type="checkbox"/></p>

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7	<p><b>Test report</b></p> <p>Each type test shall be documented in a test report.</p> <p>The test report shall contain at least the following information:</p> <ul style="list-style-type: none"> <li>— address of testing laboratory;</li> <li>— date of testing;</li> <li>— date of production of the pressure tubes;</li> <li>— full description of the pressure tubes (e.g. type, material, surface finish, dimensions);</li> <li>— manufacturer of the pressure tubes;</li> <li>— dimensions of the test fixture (according to the details supplied by the manufacturer of the pressure tubes);</li> <li>— overlap <math>l_3</math> in test fixture;</li> <li>— alternate bending moment and the strength class;</li> <li>— cycle frequency;</li> <li>— documentation of the test equipment and the test setup;</li> <li>— condition of the test pieces after the magnetic powder flaw test (fracture, visible crack lengths).</li> </ul>	<p>Condition of the test pieces after the magnetic powder flaw test: No fracture or visible crack</p>	<p>P <input checked="" type="checkbox"/></p> <p>F <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p> <p>N/T <input type="checkbox"/></p>
8	<p><b>Marking of the pressure tube</b></p> <p>The following shall be marked indelibly in a clearly visible place on each pressure tube:</p> <ul style="list-style-type: none"> <li>— manufacturer;</li> <li>— type designation of the manufacturer;</li> <li>— reference to this European Standard and strength class (according to Table 1) (e.g. EN 16955-2).</li> </ul>		<p>P <input checked="" type="checkbox"/></p> <p>F <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p> <p>N/T <input type="checkbox"/></p>
<p><b>Annex A Product information</b></p> <p>(normative)</p> <p>→ See details in EN 16955:2017</p>			
<p><b>Annex B Guide for choosing the correct strength class</b></p> <p>(informative)</p> <p>→ See details in EN 16955:2017</p>			



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Appendix I - Test Date Sheet

Serial sample no.	Serial bearing element no.	Cone angle $\alpha$	Outside diameter (mm)	Wall thickness (mm)	Load alternation achieved	Result of magnetic powder flaw test
1	1	1°26'16"	28.00	2.00	2.00	Pass
	2	1°26'16"	28.00	2.00	2.00	Pass
	3	1°26'16"	28.00	2.00	2.00	Pass
	4	1°26'16"	28.00	2.00	2.00	Pass
	5	1°26'16"	28.00	2.00	2.00	Pass
	6	1°26'16"	28.00	2.00	2.00	Pass
	7	1°26'16"	28.00	2.00	2.00	Pass
	8	1°26'16"	28.00	2.00	2.00	Pass
2	1	1°26'16"	28.00	2.00	2.00	Pass
	2	1°26'16"	28.00	2.00	2.00	Pass
	3	1°26'16"	28.00	2.00	2.00	Pass
	4	1°26'16"	28.00	2.00	2.00	Pass
	5	1°26'16"	28.00	2.00	2.00	Pass
	6	1°26'16"	28.00	2.00	2.00	Pass
	7	1°26'16"	28.00	2.00	2.00	Pass
	8	1°26'16"	28.00	2.00	2.00	Pass
3	1	1°26'16"	28.00	2.00	2.00	Pass
	2	1°26'16"	28.00	2.00	2.00	Pass
	3	1°26'16"	28.00	2.00	2.00	Pass
	4	1°26'16"	28.00	2.00	2.00	Pass
	5	1°26'16"	28.00	2.00	2.00	Pass
	6	1°26'16"	28.00	2.00	2.00	Pass
	7	1°26'16"	28.00	2.00	2.00	Pass
	8	1°26'16"	28.00	2.00	2.00	Pass
4	1	1°26'16"	28.00	2.00	2.00	Pass
	2	1°26'16"	28.00	2.00	2.00	Pass
	3	1°26'16"	28.00	2.00	2.00	Pass
	4	1°26'16"	28.00	2.00	2.00	Pass
	5	1°26'16"	28.00	2.00	2.00	Pass
	6	1°26'16"	28.00	2.00	2.00	Pass
	7	1°26'16"	28.00	2.00	2.00	Pass
	8	1°26'16"	28.00	2.00	2.00	Pass

----- End of Report -----