

# TEST REPORT

No.2023115

Sample name: Self-contained compressed air breathing apparatus

Model: RHZK6

Manufacturer: Shanghai Fang Zhan Fire Technology Co., Ltd.

Entrust party: RINA Italy Classification Society(China) Co.,Ltd.

Test type: Entrust

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报告专用章



内部资料



## Test Report

Sample name	Self-contained compressed air breathing apparatus	Model	RHZK6
Amounts/State	4 sets / Good	Sample No	01#-04#
Sampling place	Wuhan	Sampling date	2023.3.17
Test place	Wuhan	Test date	2023.3.20-2023.5.25
Test type	Entrust	Test Standards	ISO 23269-2:2011
Manufacturer	Shanghai Fang Zhan Fire Technology Co., Ltd.	Entrust party	RINA Italy Classification Society(China) Co.,Ltd.
Entrust party place	20 / f, shouxinyindu building, no.1160 yan 'an west road, changning district		

No	Test Items	Requirements	Test Results
1	General design requirements [ISO 23269-2/§ 4]	Breathing apparatus shall be of the self-contained compressed air-operated type for which the volume of air contained in the cylinders shall be at least 1 200 l.	1800 l
		The breathing apparatus shall be of simple and reliable construction and as compact as possible. The design of the breathing apparatus shall be such as to allow its reliable inspection.	Passed
		The breathing apparatus shall be sufficiently robust to withstand the rough usage it is likely to receive in service.	Passed
		The breathing apparatus shall be designed so that there are no protruding parts likely to be caught on projections in narrow passages.	Passed
		The finish of any part of the breathing apparatus likely to be in contact with the wearer shall be free from sharp edges or burrs.	Passed
		The breathing apparatus shall be designed so that the wearer can remove it and, while still wearing the facepiece, continue to breathe from the apparatus.	Passed
		The breathing apparatus shall be designed to ensure its full function in any orientation.	Passed



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No	Test Items	Requirements	Test Results
1	General design requirements [ISO 23269-2/§ 4]	The main valve(s) of compressed air cylinder(s) shall be arranged so that the wearer can operate it (them) while wearing the breathing apparatus and protective firefighters' gloves, see Reference [1].	Passed
		The breathing apparatus shall have a suitable audible warning device that operates when the air remaining in the cylinder reaches a predetermined level. Either the warning device shall be activated automatically when the cylinder valve is opened, or if manually activated it shall not be possible to use the apparatus before the device is activated.	Passed
		The total mass of the breathing apparatus ready for use with facepiece and fully charged compressed air cylinder(s) shall not exceed 18 kg.	17.75 kg Passed
		The breathing apparatus shall be equipped with a class 3 full facepiece according to EN 136 or material proof provided by the manufacturer.	class 3 Proof provided by the manufacturer
		The air provided in the cylinder shall be clean, dry, and free of contaminants. The compressed air shall comply with the specifications given in relevant national or International Standards.	Passed
		The connection between the breathing apparatus and the facepiece may be achieved by a permanent, special or thread type connector. Dismountable connections shall be readily connected and secured, preferably by hand and any means of sealing used shall be retained in position when the connection(s) is (are) disconnected.	Passed
		Where the facepiece includes a speech diaphragm, the speech diaphragm shall be protected against mechanical damage.	No speech diaphragm
		Visors shall be attached in a reliable and gastight manner to the face blank.	Passed
		Visors shall not distort vision and shall not mist to the extent that operation of the apparatus is hampered.	Passed
		Where anti-fogging compounds are used as specified by the manufacturer, they shall be known not to cause irritation or other adverse effects to health.	No manufacturer's anti-fog compound description



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No	Test Items	Requirements	Test Results
1	General design requirements [ISO 23269-2/§ 4]	All adjusting devices of the body harness shall be so constructed that once adjusted they will not slip inadvertently.	Passed
		The apparatus shall be equipped with a reliable pressure gauge which will read the pressure in the cylinder(s) on opening the valve and be positioned to enable the pressure to be read conveniently by the wearer. The gauge shall be provided with a suitable safety system to protect the wearer of the apparatus in the event of explosion or fracture of the pressure elements of the gauge. If a window is incorporated in the pressure gauge, it shall be of non-splintering clear material. The information given by the pressure gauge and the warning device shall be complementary in every case.	Passed
		Breathing hoses shall be flexible and non-kinking. The breathing hoses shall permit free head movement and shall not restrict or close off the supply under chin or arm pressure. The hose shall not collapse.	Passed
		The pressure reducer safety valve shall be designed to pass an air flow at a medium pressure not exceeding 3 MPa in accordance with EN 137:2006, 7.5.1 and 7.5.2. When the pressure reducer safety valve opens, the inhalation peak pressure shall be a positive pressure, and the exhalation peak pressure shall be a positive pressure of not more than 2,5 kPa.	01#: exhalation peak pressures: 655 Pa  inhalation peak pressures: 167 Pa
		The demand valve shall provide positive pressure and shall be fitted with a manual or an automatic means to stop the flow of air when the mask is not being worn.	Passed
		The head harness shall be designed so that the full facepiece can be donned and removed easily. The head harness shall be adjustable or self-adjusting and shall hold the full facepiece firmly and comfortably in position.	Passed
		The components of the breathing apparatus supplying compressed air shall be reliably protected against the penetration of particulate matter that may be contained in the compressed air.	Passed
		It shall not be possible to fit a low pressure tube or hose directly to a high pressure part of the circuit.	Passed



## Test Report

No	Test Items	Requirements	Test Results
1	General design requirements [ISO 23269-2/§ 4]	All components requiring manipulation by the wearer shall be readily accessible and easily distinguishable from one another by touch. All adjustable parts and controls shall be constructed so that their adjustment is not liable to accidental alteration during use.	Passed
		The apparatus shall be fitted with a fireproof lifeline of at least 30 m length. The lifeline shall have a minimum nominal breaking load of at least 10 kN, and shall be able to withstand a static proof load of at least 3,5 kN for 5 min without failure. The lifeline shall be capable of attachment by means of a snap hook to the harness of the apparatus or to a separate belt. Lifelines and associated fittings shall be of materials unlikely to create sparks.	Relevant documents provided by the supplier Manufacturer.
2	High temperature, high humidity test [ISO 23269-2/§ 5.2]	Each sample shall be subjected to a temperature of $(65 \pm 2) ^\circ\text{C}$ in an atmosphere with relative humidity of not less than 90 % for at least 48 h, and then left in an environment of $20 ^\circ\text{C}$ to $25 ^\circ\text{C}$ with a relative humidity of $(65 \pm 10) \%$ for at least 48 h. The sample shall be visually inspected, and shall not break or develop deformation corrosion or any other defects which may render it unsuitable for use. The sample shall be visually inspected, and shall not break or develop deformation, corrosion, or any other defects which may render it unsuitable for use.	Passed
3	Temperature cycling test [ISO 23269-2/§ 5.3]	Each sample shall be subjected to a temperature of $(-30 \pm 2) ^\circ\text{C}$ for at least 8 h, and then to a temperature of $(65 \pm 2) ^\circ\text{C}$ for at least 8 h, the cycle to be repeated 10 times. The sample shall be visually inspected, and shall not break or develop deformation, corrosion, or any other defects which may render it unsuitable for use.	Passed
4	Corrosion test [ISO 23269-2/§ 5.4]	Each sample as stored, in its ready-for-use condition shall be exposed to a 5 % solution of neutral salt-water spray in accordance with ISO 9227 for eight hours, then left for 16 hours in an environment between $20 ^\circ\text{C}$ to $25 ^\circ\text{C}$ with relative humidity of 65 %. This procedure shall be carried out three times within a 72 hour period.	Passed



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No	Test Items	Requirements	Test Results
5	Resonance and vibration tests [ISO 23269-2/§ 5.5]	<p>Each sample shall be subjected to the resonance tests and followed by the vibration tests.</p> <p>Resonance tests:</p> <ol style="list-style-type: none"> <li>Total amplitude 2mm, frequency 5-16 Hz continuous change, sweep period 10min, direction of vibration in each of the 3 planes, 3 times in each direction, total duration of tests is 1.5 hours.</li> <li>Acceleration is <math>\pm 1</math> g, frequency 16-60 Hz continuous change, sweep period 10min, direction of vibration in each of the 3 planes, 3 times in each direction, total duration of tests is 1.5 hours.</li> </ol> <p>Vibration test:</p> <ol style="list-style-type: none"> <li>Where resonant frequency within the vibration test frequencies. Amplitude or acceleration used for vibration tests, frequency shall be at resonant frequency, direction of vibration in each of the 3 planes, 1 times in each direction, total duration of tests is 4.5 hours.</li> <li>No resonant frequency within the vibration test frequencies. Total amplitude 2mm, frequency 16 Hz, frequency shall be at resonant frequency direction of vibration in each of the 3 planes, 1 times in each direction, total duration of tests is 4.5 hours. The sample shall be visually inspected, and shall not break or develop deformation, corrosion, or any other defects which may render it unsuitable for use.</li> </ol>	Passed
6	Visual inspection [ISO 23269-2/§ 7.3]	The visual inspection shall be made by the test house prior to laboratory or practical performance tests. This may entail a certain amount of dismantling in accordance with the manufacturer's instructions for maintenance. The visual inspection shall include the assessment of the device marking and information supplied by the manufacturer and any safety data sheets (if applicable) or declarations relevant to the materials used in its construction.	Passed
7	Demand valve [ISO 23269-2/§ 6.1]	If a by-pass valve is incorporated in the demand valve, it shall pass at least 60 l/min, at all air cylinder pressures above 5 MPa.	No by-pass valve



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No	Test Items	Requirements	Test Results
8	System leakage test [ISO 23269-2/§ 6.2\7.4]	With the facepiece seal completely sealed using a dummy head or similar, and with a fully charged air cylinder fitted, open the cylinder valve. When the breathing apparatus is completely pressurized, close the cylinder valve and measure the pressure drop. The pressure drop shall not be greater than 2 MPa/min.	03#: 2 bar/min
9	Inhalation resistance [ISO 23269-2/§ 6.3]	The inhalation peak pressure in the cavity of the mask shall be positive at cylinder pressures above. — 1 MPa for the breathing simulator setting of 25 times 2 l/min, and — 2 MPa for the breathing simulator setting of 40 times 2,5 l/min.	01# 25 cycle/min × 2.0 l/stroke: inhalation peak pressures: 220 Pa  40 cycle/min × 2.5 l/stroke: inhalation peak pressures: 235 Pa  02# 25 cycle/min × 2.0 l/stroke: inhalation peak pressures: 233 Pa  40 cycle/min × 2.5 l/stroke: inhalation peak pressures: 246 Pa
10	Exhalation resistance [ISO 23269-2/§ 6.4]	The exhalation peak pressure shall be positive by not more than 1,0 kPa when testing with the breathing simulator setting of 40 times 2,5 l/min and 0,7 kPa when testing with the breathing simulator setting of 25 times 2 l/min.	01# 25 cycle/min × 2.0 l/stroke: exhalation peak pressures: 615 Pa  40 cycle/min × 2.5 l/stroke: exhalation peak pressures: 644 Pa  02# 25 cycle/min × 2.0 l/stroke: exhalation peak pressures: 638 Pa  40 cycle/min × 2.5 l/stroke: exhalation peak pressures: 650 Pa



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No	Test Items	Requirements	Test Results
11	Resistance to pressure [ISO 23269-2/§ 6.5\7.1\7.3]	<p>1. Metallic high pressure tubes, valves and couplings shall be tested to prove that they are capable of withstanding a pressure of 150 % of the maximum filling pressure of the compressed air cylinder.</p> <p>2. Non-metallic high pressure components shall be tested to prove that they are capable of withstanding a pressure of twice the maximum filling pressure of the compressed air cylinder.</p> <p>3. All medium pressure parts downstream of the pressure reducer shall be capable of withstanding twice their maximum attainable working pressure without damage.</p>	Passed
12	Equilibrium pressure in the facepiece [ISO 23269-2/§ 6.6]	<p>Equilibrium pressure in the facepiece, when not breathing, shall not be greater than 500 Pa. No special measuring devices or measuring methods are required; commonly used methods and devices shall be applied.</p>	330 Pa
13	Warning device [ISO 23269-2/§ 6.7\7.6]	<p>The warning device must perform within the temperature and humidity range.</p> <p>The performance of the warning device is measured during a breathing machine test at 25 cycles/min × 2 l/stroke. To test the warning device at temperatures between 0 °C and 10 °C, air shall be passed through the apparatus in a climatic test chamber using a breathing machine (adjusted to 25 cycles/min × 2 l/stroke) outside the climatic chamber at room temperature.</p> <p>The environment during the test of the apparatus shall have a temperature of (3 ± 1) °C and a relative humidity of &gt;90 %. Every 5 min water shall be sprayed on for 3 s using a spray gun directed at the warning device from a distance of 200 mm.</p>	Passed
14	Pressure indicator and tube [ISO 23269-2/§ 6.8]	<p>The pressure indicator and tube shall have accuracy class 1.6 as defined in Clause 6 of EN 837-1:1996.</p>	Passed



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No	Test Items	Requirements	Test Results
15	Temperature performance [ISO 23269-2/§ 6.9.1]	<p>1. General The apparatus shall operate trouble-free over the temperature range of <math>-30\text{ }^{\circ}\text{C}</math> to <math>60\text{ }^{\circ}\text{C}</math>. Apparatus specifically designed for temperatures beyond these limits shall be tested and the temperature(s) shall be marked on the apparatus. Apparatus shall meet the breathing resistance requirements.</p> <p>2. Breathing resistance at low temperatures The apparatus including the cylinder(s) and full face mask shall be cooled in an ambient temperature of <math>(-30 \pm 3)\text{ }^{\circ}\text{C}</math> for <math>(4 \pm 1)</math> h. In the case of wrapped composite pressure vessels the time shall be at least 12 h. Subsequently, the apparatus shall be connected to a breathing machine placed outside the cooling system and shall be tested in accordance with EN 13274-3, method 2, setting E. The breathing machine shall then be operated until the compressed air supply is exhausted (20 bar). The test shall be repeated with the same cooled apparatus after having replaced the empty pressure vessel(s) by a fully charged pressure vessel(s) previously stored at room temperature. A positive pressure shall be maintained in the cavity of the mask adjacent to the face seal. The exhalation resistance shall not exceed 1 kPa.</p>	<p>01# exhalation peak pressures: 626 Pa inhalation peak pressures: 233 Pa</p> <p>02# exhalation peak pressures: 621 Pa inhalation peak pressures: 228 Pa</p> <p>03# exhalation peak pressures: 640 Pa inhalation peak pressures: 240 Pa</p> <p>04# exhalation peak pressures: 633 Pa inhalation peak pressures: 232 Pa</p>
		<p>3. The apparatus including cylinder(s) (filling pressure: 100 bar) and a full face mask is stored in a chamber at a temperature of <math>(60 \pm 3)\text{ }^{\circ}\text{C}</math> and a relative humidity of not more than 50 % for <math>(4 \pm 1)</math> h. In the case of wrapped composite pressure vessels the time shall be at least 12 h. The apparatus shall be tested in accordance with EN 13274-3, method 2, setting H until the compressed air supply is exhausted (20 bar). A positive pressure shall be maintained in the cavity of the mask adjacent to the face seal. The exhalation resistance shall not exceed 1 kPa.</p>	<p>01# exhalation peak pressures: 708 Pa inhalation peak pressures: 245 Pa</p> <p>02# exhalation peak pressures: 711 Pa inhalation peak pressures: 232 Pa</p> <p>03# exhalation peak pressures: 715 Pa inhalation peak pressures: 230 Pa</p> <p>04# exhalation peak pressures: 730 Pa inhalation peak pressures: 227 Pa</p>



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No	Test Items	Requirements	Test Results
16	Flammability [ISO 23269-2/§ 6.9.2.1]	<p>Take out from flame, the specimens' burning time shall be &lt; 5s.</p> <p>The components shall remain leak-tight, fulfill the breathing resistance requirements and the air supply shall not be interrupted after the test although they may be deformed.</p>	<p>No specimens burnt, only partly glowing. They are leak-tight and meet the breathing resistance requirements.</p> <p>02# exhalation peak pressures: 650 Pa inhalation peak pressures: 190 Pa</p>
17	Flame engulfment [ISO 23269-2/§ 6.9.2.2]	<p>No afterflame shall continue for more than 5 s. Additionally, no component that secures the apparatus to the user's body or that secures the pressure vessel to the apparatus shall separate or be displaced to such an extent that would cause the breathing apparatus to become detached from the wearer's body or to fail the breathing resistance requirements.</p>	<p>Operate trouble-free ;No break off and no specimens burnt.</p> <p>04# exhalation peak pressures: 621 Pa inhalation peak pressures: 171 Pa</p>
18	Resistance to radiant heat [ISO 23269-2/§ 6.9.3]	<p>The breathing hose(s) leading to the full face mask, medium pressure tube(s) and lung governed demand valve shall be tested for resistance to radiant heat.</p> <p>The components are considered to be resistant to radiant heat if they remain leak tight, fulfil the breathing resistance requirements and if the air supply is not interrupted after a test period of 20 min although they may be deformed.</p>	<p>02# exhalation peak pressures: 618 Pa inhalation peak pressures: 192 Pa</p>



## Test Report

No	Test Items	Requirements	Test Results
19	<p>Practical performance test [ISO 23269-2/§ 7.7.3]</p>	<p>1. General Two test subjects, who conducted the donning test, shall don the apparatus as supplied by the manufacturer and make two return trips of the course shown in Annex B at a normal speed and confirm that</p> <ul style="list-style-type: none"> <li>a) wearers can perform without difficulty each of the movements specified in the course,</li> <li>b) wearers do not experience abrasion, cuts, pain, pressure, etc. during the test,</li> <li>c) wearers do not experience breathing difficulty during the test,</li> <li>d) the visor does not fog up or move such as to disturb the vision during the test,</li> <li>e) the self-contained breathing apparatus is not damaged in any way which would affect its operation.</li> </ul> <p>2. Test at low temperature Two sets of apparatus, as ready for use, shall be cooled at a temperature of <math>(-30 \pm 3) ^\circ\text{C}</math> for a period of <math>(4 \pm 1)</math> h. Two warmly clothed subjects shall don the cooled apparatus in a cold chamber and perform work at an ambient temperature of <math>(-15 \pm 3) ^\circ\text{C}</math>. The test shall be continuous without removal of the apparatus over a period of 30 min or at least until the warning device starts to operate. The test shall be conducted according to activity 17 of EN 13274-2 with the exception that the apparatus shall be donned in the cold chamber at an ambient temperature of <math>(-15 \pm 3) ^\circ\text{C}</math>. At the end of the test, the resistance to breathing shall be measured at room temperature according to EN 13274-3, method 2, settings E and H to determine whether there is any obstruction and the apparatus shall be examined for malfunction due to the low temperature.</p>	Passed



# Test Report

No	Test Items	Requirements	Test Results
19	Practical performance test [ISO 23269-2/§ 7.7.3]	<p>3. Test at low temperature after storage at room temperature Two sets of apparatus, as ready for use, shall be stored at room temperature (from 16 °C to 32 °C) for a period of (4 ± 1) h.</p> <p>Two warmly clothed subjects shall don the apparatus at room temperature (from 16 °C to 32 °C) and enter a cold chamber (-6 ± 2) °C. The same test programme as that described in 7.7.3.2.2 shall be carried out for a period of 30 min or at least until the warning device starts to operate.</p>	Passed
Comprehensive assessment		Passed	
Remark			

\*\*\*END\*\*\*

Ratifier:

Inspector: 薛斗坤

Compiler: 杜海

Date: 2023.05.27