

**TECHNICAL ASSESSMENT REPORT**

**REPORT DATE / NO:** 09.06.2020 / 2163-KKD-730

**Manufacturer:** Zhejiang Luyao Electronic Technology Co., Ltd.

**Address:** Wei 1st Road Mechanical Park, Wanquan Light Industrial Base Pingyang, Wenzhou, Zhejiang, China

This report is for the, given above, manufacturer prepared according to the test results obtained from BEFITLAB Test Technology Shanghai Co., Ltd. accredited by IAS (International Accreditation Service), signatory to ILAC MRA, with number TL-787 for the product identified below, dated 30.05.2020 with Serial Id BT20200669T based on EN 149: 2001 + A1: 2009 standard and the technical file dated 31 May 2020 Version 01 provided by the manufacturer. The sampling of the product is conducted under our supervision for testing from the manufacturing site of the client.

The technical file of the manufacturer, and risk evaluation against the essential health safety requirements and the test report evaluated for their relation with Essential Requirements of Personal Protective Equipment Regulation and found to be appropriate.

This report is an annex and an integral part of the EU Type Examination Certificate issued to the manufacturer. The test results and issued certificate belongs only to the tested model. The technical report consists of a total of 6 pages.

**Product Description:** Particle Filtering Half Mask

**Classification:** FFP2 NR

**Trademark:** LUYAO **Model:** LY-N900-N909



**THE CLAUSES OF EN 149: 2001 + A1: 2009 STANDARD RELATED TO EUROPEAN UNION DIRECTIVE  
EU 2016/425 REQUIREMENTS**

**1.1. Design principles**

**1.1.1. Ergonomics**

PPE must be so designed and manufactured that in the foreseeable conditions of use for which it is intended the user can perform the risk related activity normally whilst enjoying appropriate protection of the highest possible level.

**1.1.2. Levels and classes of protection**

**1.1.2.1. Highest level of protection possible**

The optimum level of protection to be taken into account in the design is that beyond which the constraints by the wearing of the PPE would prevent its effective use during the period of exposure to the risk or normal performance of the activity.

**1.1.2.2. Classes of protection appropriate to different levels of risk**

Where differing foreseeable conditions of use are such that several levels of the same risk can be distinguished, appropriate classes of protection must be taken into account in the design of the PPE.

**1.2. Innocuousness of PPE**

**1.2.1. Absence of risks and other inherent nuisance factors**

PPE must be so designed and manufactured as to preclude risks and other nuisance factors under foreseeable conditions of use.

**1.2.1.1. Suitable constituent materials**

The materials of which the PPE is made, including any of their possible decomposition products, must not adversely affect the health or safety of users.

**1.2.1.2. Satisfactory surface condition of all PPE parts in contact with the user**

Any part of the PPE that is in contact or is liable to come into contact with the user when the PPE is worn must be free of rough surfaces, sharp edges, sharp points and the like which could cause excessive irritation or injuries

**1.2.1.3. Maximum permissible user impediment**

Any impediment caused by PPE to movements to be made, postures to be adopted and sensory perception must be minimized; nor must PPE cause movements which endanger the user or other persons.

**1.3 Comfort and effectiveness**

**1.3.1. Adaptation of PPE to user morphology**

PPE must be designed and manufactured in such a way as to facilitate its correct positioning on the user and to remain in place for the foreseeable period of use, bearing in mind ambient factors, the actions to be carried out and the postures to be adopted. For this purpose, it must be possible to adapt the PPE to fit the morphology of the user by all appropriate means, such as adequate adjustment and attachment systems or the provision of an adequate range of sizes.

**1.3.2. Lightness and design strength**

PPE must be as light as possible without prejudicing design strength and efficiency.

Apart from the specific additional requirements which they must satisfy in order to provide adequate protection against the risks in question (see 3), PPE must be capable of withstanding the effects of ambient phenomena inherent under the foreseeable conditions of use

**1.4. Information supplied by the manufacturer**

The notes that must be drawn up by the former and supplied when PPE is placed on the market must contain all relevant information on:

- a) In addition to the name and address of the manufacturer and/or his authorized representative established in the Community
- b) Storage, use, cleaning, maintenance, servicing and disinfection. cleaning, maintenance or disinfectant protection recommended by manufacturers must have no adverse effect on PPE or users when applied in accordance with the relevant instructions;
- c) Performance as recorded during technical tests to check the levels or classes of protection provided by the PPE in question;
- d) Suitable PPE accessories and the characteristics of appropriate spare parts;
- e) The classes of protection appropriate to different levels of risk and the corresponding limits of use;
- f) The obsolescence deadline or period of obsolescence of PPE or certain of its components;
- g) The type of packaging suitable for transport;
- h) The significance of any markings (see 2.12)
- i) Where appropriate the references of the Directives applied in accordance with Article 5(6) (b);
- j) The name, address and identification number of the notified body involved in the design stage of the PPE

These notes, which must be precise and comprehensible, must be provided at least in the official language(s) of the member state of destination



## 2. ADDITIONAL REQUIREMENTS COMMON TO SEVERAL CLASSES OR TYPES OF PPE

### 2.1. PPE incorporating adjustment systems

If PPE incorporates adjustment systems, the latter must be designed and manufactured so that, after adjustment, they do not become undone unintentionally in the foreseeable conditions of use.

### 2.3. PPE for the face, eyes and respiratory system

Any restriction of the user's face, eyes, field of vision or respiratory system by the PPE shall be minimised.

The screens for those types of PPE must have a degree of optical neutrality that is compatible with the degree of precision and the duration of the activities of the user.

If necessary, such PPE must be treated or provided with means to prevent misting-up.

Models of PPE intended for users requiring sight correction must be compatible with the wearing of spectacles or contact lenses.

### 2.4. PPE subject to ageing

If it is known that the design performance of new PPE may be significantly affected by ageing, the month and year of manufacture and/or, if possible, the month and year of obsolescence must be indelibly and unambiguously marked on each item of PPE placed on the market and on its packaging.

If the manufacturer is unable to give an undertaking with regard to the useful life of the PPE, his instructions must provide all the information necessary to enable the purchaser or user to establish a reasonable obsolescence month and year, taking into account the quality level of the model and the effective conditions of storage, use, cleaning, servicing and maintenance.

Where appreciable and rapid deterioration in PPE performance is likely to be caused by ageing resulting from the periodic use of a cleaning process recommended by the manufacturer, the latter must, if possible, affix a marking to each item of PPE placed on the market indicating the maximum number of cleaning operations that may be carried out before the equipment needs to be inspected or discarded. Where such a marking is not affixed, the manufacturer must give that information in his instructions.

### 2.6. PPE for use in potentially explosive atmospheres

PPE intended for use in potentially explosive atmospheres must be designed and manufactured in such a way that it cannot be the source of an electric, electrostatic or impact-induced arc or spark likely to cause an explosive mixture to ignite.

### 2.8. PPE for intervention in very dangerous situations

The instructions supplied by the manufacturer with PPE for intervention in very dangerous situations must include, in particular, data intended for competent, trained persons who are qualified to interpret them and ensure their application by the user.

The instructions must also describe the procedure to be adopted in order to verify that PPE is correctly adjusted and functional when worn by the user.

Where PPE incorporates an alarm which is activated in the absence of the level of protection normally provided, the alarm must be designed and placed so that it can be perceived by the user in the foreseeable conditions of use.

### 2.9. PPE incorporating components which can be adjusted or removed by the user

Where PPE incorporates components which can be attached, adjusted or removed by the user for replacement purposes, such components must be designed and manufactured so that they can be easily attached, adjusted and removed without tools.

### 2.12. PPE bearing one or more identification or recognition marks directly or indirectly relating to health and safety

The identification or recognition marks directly or indirectly relating to health and safety affixed to these types or classes of must preferably take the form of harmonized pictograms or ideograms and must remain perfectly legible throughout the foreseeable useful life of the PPE. In addition, these marks must be complete, precise and comprehensible so as to prevent any misinterpretation; in particular, where such marks incorporate words or sentences, the latter must appear in the official language(s) of the Member State where the equipment is to be used.

If PPE (or a PPE component) is too small to allow all or part of the necessary marking to be affixed, the relevant information must be mentioned on the packing and in the manufacturer's notes.

## 3. ADDITIONAL REQUIREMENTS SPECIFIC TO PARTICULAR RISKS

### 3.10.2. Protection against cutaneous and ocular contact

PPE intended to prevent the surface contact of all or part of the body with substances and mixtures which are hazardous to health or with harmful biological agents must be capable of preventing the penetration or permeation of such substances and mixtures and agents through the protective integument under the foreseeable conditions of use for which the PPE is intended.

To this end, the constituent materials and other components of those types of PPE must be chosen or designed and incorporated so as to ensure, as far as possible, complete leak-tightness, which will allow where necessary prolonged daily use or, failing this, limited leak-tightness necessitating a restriction of the period of wear.

Where, by virtue of their nature and the foreseeable conditions of their use, certain substances and mixtures which are hazardous to health or harmful biological agents possess high penetrative power which limits the duration of the protection provided by the PPE in question, the latter must be subjected to standard tests with a view to their classification on the basis of their performance. PPE which is considered to be in conformity with the test specifications must bear a marking indicating, in particular, the names or, in the absence of the names, the codes of the substances used in the tests and the corresponding standard period of protection. The manufacturer's instructions must also contain, in particular, an explanation of the codes (if necessary), a detailed description of the standard tests and all appropriate information for the determination of the maximum permissible period of wear under the different foreseeable conditions of use.



Technical Assessment of EN 149: 2001 + A1: 2009 Standard and other Standards it refers to, Clauses Corresponding to the  
(EU) 2016/425 Directive


Conforming to EN 149:2001 + A1:2009 Standard Requirements

Article 5	<p><b>Classification:</b> Particle Filtering Half Mask</p> <p>The mask subject to evaluation based on the test results and technical file provided by the manufacturer is classified as; Filtering Efficiency and maximum Total Inward Leakage: Classified as FFP2</p> <p>Mask is classified for single shift use, NR</p>																																						
Article 7.4	<p><b>Packing:</b> Particle filtering half masks are packaged to protect them from contamination before use and with cardboard boxes to prevent mechanical damage. The packaging design and the product is considered to withstand the foreseeable conditions of use based on the visual inspection results given in the test report.</p>																																						
Article 7.5	<p><b>Material:</b> Materials used in particle filtering half masks, according to the simulated wearing treatment and temperature conditioning results; It is understood it withstands handling and wear over the period for which the particle filtering half mask is designed to be used, it suffered mechanical failure of the facepiece or straps, any material from the filter media released by the air flow through the filter has not constitute a hazard or nuisance for the wearer. The manufacturer declares that the materials used in manufacturing of the mask does not have an adverse affect to the health and safety of users.</p> <p>Based on the test results, the masks did not collapse when subject to simulated wearing and temarature conditioning. No nuisance situation is reported during the practical performance tests by human subjects.</p>																																						
Article 7.6	<p><b>Cleaning and Disinfection:</b> Particle filtering half mask is <b>not</b> designed to be as re-usable. No cleaning or disinfection procedure provided by the manufacturer.</p>																																						
Article 7.7	<p><b>Practical Performance :</b></p> <p>The test report indicates that the human subjects did not face any difficulty in performing the excercises while they were weared by the sample masks, in walking test or work simulation tests. The wearers did not report any failure by means of head harness / straps/ earloops comfort, security of fastenings and field of vision. Also no imperfections reported during total inward tests about the comfort, field of vision and fastening issues.</p> <table><tr><th>Assessed Elements</th><th>Positive</th><th>Negative</th><th>Requirements in accordance with EN 149:2001 + A1:2009 and Result</th></tr><tr><td>2.Head harness comfort</td><td>2</td><td>0</td><td rowspan="3">Positive results are obtained from the test subjects <b>No imperfections</b></td></tr><tr><td>3.Security of fastenings</td><td>2</td><td>0</td></tr><tr><td>5.Field of vision</td><td>2</td><td>0</td></tr></table> <p><b>Conditioning :</b> (A.R.) As Received, original</p>	Assessed Elements	Positive	Negative	Requirements in accordance with EN 149:2001 + A1:2009 and Result	2.Head harness comfort	2	0	Positive results are obtained from the test subjects <b>No imperfections</b>	3.Security of fastenings	2	0	5.Field of vision	2	0																								
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Article 7.8	<p><b>Finish of Parts:</b> The test report states that the particle filtering half masks, which are likely to come into contact with the user, do not have sharp edges and do not contain burrs.</p>																																						
Article 7.9.1	<p><b>Total Inward Leakage:</b></p> <p>The Total Inward Lekage test is conducted by 10 individual in an aerosol chamber with a walking band, and samples are taken during the conduction of the excercises defined in the standard. The samples used in the test are subjected to the conditioning required in the standard as Temperature conditioning and as received. The face dimensions of the subjects are also reported. The measurement details for each subject and for each excersize are available in the test report.</p> <p>It was reported that;</p> <p>All 50 exercise measurement results are smaller or equal to 11% the values varies between 5,0 % and 9,9 %.</p> <p>All 10 individual's arithmetic mean is smaller or equal to 8% the values varies between 6,9 % and 7,9 %.</p> <p style="text-align: center;"><b>According to the reported results, the product meets the limits for FFP1 and FFP2 classification.</b></p>																																						
Article 7.9.2	<p><b>Penetration of filter material: Sodium Chloride Testing</b></p> <table><tr><th>Condition</th><th>No. of Sample</th><th>Sodium Chloride Testing 95 L/min max (%)</th><th>Requirements in accordance with EN 149:2001 + A1:2009</th><th>Result</th></tr><tr><td>(A.R.)</td><td>11</td><td>2,3</td><td rowspan="3">FFP1 ≤ 20 %</td><td rowspan="9">Filtering half masks fulfill the requirements of the standard EN EN 149:2001 + A1:2009 given in 7.9.2 in range of the <b>FFP1, FFP2</b> classes.</td></tr><tr><td>(A.R.)</td><td>12</td><td>1,3</td></tr><tr><td>(A.R.)</td><td>13</td><td>0,5</td></tr><tr><td>(S.W.)</td><td>14</td><td>1,7</td><td colspan="2" rowspan="3">FFP2 ≤ 6 %</td></tr><tr><td>(S.W.)</td><td>15</td><td>2,5</td></tr><tr><td>(S.W.)</td><td>16</td><td>1,4</td></tr><tr><td>(M.S. T.C.)</td><td>17</td><td>1,8</td><td colspan="2" rowspan="3">FFP3 ≤ 1 %</td></tr><tr><td>(M.S. T.C.)</td><td>18</td><td>1,8</td></tr><tr><td>(M.S. T.C.)</td><td>19</td><td>1,6</td></tr></table> <p><b>Conditioning :</b> (M.S.) Mechanical Strength (T.C.) Temperature Conditioning (A.R.) As Received, original (S.W.) Simulated wearing treatment</p> <p style="text-align: right;">95 L/min = 1,6 dm<sup>3</sup>.sn<sup>-1</sup></p>	Condition	No. of Sample	Sodium Chloride Testing 95 L/min max (%)	Requirements in accordance with EN 149:2001 + A1:2009	Result	(A.R.)	11	2,3	FFP1 ≤ 20 %	Filtering half masks fulfill the requirements of the standard EN EN 149:2001 + A1:2009 given in 7.9.2 in range of the <b>FFP1, FFP2</b> classes.	(A.R.)	12	1,3	(A.R.)	13	0,5	(S.W.)	14	1,7	FFP2 ≤ 6 %		(S.W.)	15	2,5	(S.W.)	16	1,4	(M.S. T.C.)	17	1,8	FFP3 ≤ 1 %		(M.S. T.C.)	18	1,8	(M.S. T.C.)	19	1,6
Condition	No. of Sample	Sodium Chloride Testing 95 L/min max (%)	Requirements in accordance with EN 149:2001 + A1:2009	Result																																			
(A.R.)	11	2,3	FFP1 ≤ 20 %	Filtering half masks fulfill the requirements of the standard EN EN 149:2001 + A1:2009 given in 7.9.2 in range of the <b>FFP1, FFP2</b> classes.																																			
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Article 7.9.2	Penetration of filter material: : Paraffin Oil Testing					
	Condition	No. of Sample	Paraffin Oil Testing 95 L/min max (%)	Requirements in accordance with EN 149:2001 + A1:2009	Result	
	(A.R.)	20	1,7	FFP1 ≤ 20 %  FFP2 ≤ 6 %  FFP3 ≤ 1 %	Filtering half masks fulfill the requirements of the standard EN EN 149:2001 + A1:2009 given in 7.9.2 in range of the FFP1, FFP2 classes.	
	(A.R.)	21	2,7			
	(A.R.)	22	2,2			
	(S.W.)	23	2,0			
	(S.W.)	24	1,9			
	(S.W.)	25	3,1			
	(M.S. T.C.)	26	2,9			
	(M.S. T.C.)	27	2,5			
(M.S. T.C.)	28	2,0				
Conditioning : (M.S.) Mechanical Strength (T.C.) Temperature Conditioning (A.R.) As Received, original (S.W.) Simulated wearing treatment						
Article 7.10	Compatibility with skin: In Practical Performance report, the likelihood of mask materials in contact with the skin causing irritation or other adverse effect on health was not reported.					
Article 7.11	Flammability :					
	Condition	No. of Sample	Visual inspection	Requirements in accordance with EN 149:2001 + A1:2009	Result	
	(A.R.)	29	Burn for 0s	Filtering half mask shall not burn or not continue to burn for more than 5 s after removal from the flame	Passed  Filtering half masks fulfill requirements of the standard	
	(A.R.)	30	Burn for 0s			
	(T.C.)	31	Burn for 0s			
	(T.C.)	32	Burn for 0s			
Conditioning : (A.R.) As Received, original (T.C.) Temperature Conditioning						
Article 7.12	Carbon dioxide content of the inhalation air:					
	Condition	No. of Sample	CO <sub>2</sub> content of the inhalation air [%] by volume	An average CO <sub>2</sub> content of the inhalation air	Requirements in accordance with EN 149:2001 + A1:2009	Result
	(A.R.)	33	0,69	0,69	CO <sub>2</sub> content of the inhalation air shall not exceed an average of 1,0% by volume	Passed  Filtering half masks fulfil requirements of the standard
	(A.R.)	34	0,68			
	(A.R.)	35	0,71			
	Conditioning : (A.R.) As Received, original					
Article 7.13	Head harness: In Practical Performance and TIL test reports no adverse effects have been reported for donning and remove of the mask also the results of these tests indicates that the ear loops / head harness are capable of holding the mask firmly enough.					
Article 7.14	Field of vision: In Practical Performance report, no adverse effects were reported for the field of vision availability when the mask is worn.					
Article 7.15	Exhalation Valve(s): The model under inspection have no valves.					
Article 7.16	Breathing Resistance: Inhalation					
	The overall evaluation of the results gathered for 9 different samples 3 as received, 3 with temperature conditioning, 3 simulated wearing treatment complies with the limits given in the standard for FFP1, FFP2 and FFP3 classes. This is valid for inhalation results for 30 L/min, 95 L/min and exhalation at 160 L/min. The measurement details for each single mask tested are available in the test report.					
Passed.						



Article 7.17	<b>Clogging:</b> This test is not applied to Particle Filtering Half Mask which is not reusable. <i>(For single shift use devices, the clogging test is optional test. For re-usable devices test is mandatory.)</i>
Article 7.18	<b>Demountable Parts:</b> There are no demountable parts of the mask.
Article 8	<b>Testing:</b> All tests conducted according to Clause 8 of this standard is available in the test report and are evaluated in this report for qualification and classification of the mask.
Article 9	<b>Marking – Packaging:</b> Necessary markings are available on the product package (box). The manufacturer and its trademark is clearly visible. The type of the mask and the classification including the status of re-usability, the reference to EN 149:2001+A1:2009 standard, the end date of shelf life, using and storage instructions and pictograms and CE mark are available on the product package. The above evaluation is based on the technical document for packaging and marking, for box design. Verified on the Annex 9.1 of the technical file.  The technical documentation for mask design (drawing) also evaluated for marking requirements, drawing LY-N900-N909. The mask template (drawing) indicates that the mask will carry information about the manufacturer / trademark (LUYAO) of the manufacturer, Type of mask, the reference to EN 149+A1:2009 standard and classification including the re-usability of the mask. The manufacturer also printed CE mark with our Notified Body number. The mask do not have sub-assemblies. Even the tested sample by the laboratory do not carry necessary marking information as stated in the technical documentation, the manufacturer shall follow marking instructions for serial production. Model drawing LY-N900-N909 exists in the technical file of the manufacturer, Annex 6 of technical file.
Article 10	<b>Information to be supplied by the manufacturer:</b> In each of the smallest commercially available packaging of the product, implementation (installation instructions) pre-use controls, warning and usage limitations, storage and meanings of symbols / pictograms are defined. User instruction document in the technical file found to be appropriate, Annex 8. The manufacturer shall include this documented user information text in every smallest commercially available package.

PREPARED BY	APPROVED BY
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