

National Personal Protective Technology Laboratory

Laboratory Respirator Protection Level (LRPL) Requirements

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LRPL Test

Public Comment

Disposition

Failures due to particles produced from PAPR

MSDS, chemical composition, develop procedure for evaluating background data

Rationale for 10,000 LRPL, same environment

Currently not requiring 10,000

Perform at minimum flow and with blower off

Test will be performed with blower off and on

LRPL Test

Public Comment

Disposition

Confusion between LRPL levels of respirators

Different LRPL levels because of different APF, different test configuration

Consider one size fits all

Panel will be determined at later date, at this time following APR panel

Same protection at different work rates

Eleven exercises, blower on/off

LRPL Test

- Concept Criteria
 - Blower on >500 for $\geq 95\%$ of trials
 - Blower off >2000 for $\geq 95\%$ of trials

LRPL Test

- Test Conditions
 - Temperature range = 68°F–80°F
 - Relative humidity = 50% ± 10%
 - Corn oil challenge concentration = 20–40 mg/m³ with a MMAD of 0.4–0.6 μm
 - Oxygen level will be at least 20% during test
 - Two trials with each subject for each testing mode, blower off and blower on
 - Evaluated over an 11 exercise routine
 - Same test panel as APR for full face piece
 - Same test panel as APER for tight fitting neck dam

LRPL Test

- **Benchmark Testing**
 - Performed testing on three different full facepiece PAPR systems
 - Completed both blower on and blower off trial
 - Each PAPR system was tested by more than one subject
 - Take note of test subjects hair placement prior to testing

LRPL Test

- Benchmark Results

Subject	Respirator	Blower Mode	LRPL Value	Pass/Fail
1	Y	On	100,000	Pass
		Off	100,000	Pass
	Z	On	18,023.4	Pass
		Off	20.0 **	Fail **
2	Y	On	100,000	Pass
		Off	11,369.3	Pass
	Z	On	10,884.6	Pass
		Off	82,298.5	Pass

LRPL Test

- Benchmark Results

Subject	Respirator	Blower Mode	LRPL Value	Pass/Fail
3	X	On	100,000	Pass
		Off	100,000	Pass
	Z	On	17,531.3	Pass
		Off	675.3	Pass
4	Y	On	100,000	Pass
		Off	100,000	Pass
	Z	On	12,951.4	Pass
		Off	581.0	Pass

LRPL Test

- Benchmark Results

Subject	Respirator	Blower Mode	LRPL Value	Pass/Fail
5	X	On	100,000	Pass
		Off	17,210.6	Pass
	Z	On	19,143.4	Pass
		Off	1,136.8	Pass
6	X	On	100,000	Pass
		Off	78,351.8	Pass
	Y	On	100,000	Pass
		Off	45,334.8	Pass

LRPL Test

- Benchmark Results

Subject	Respirator	Blower Mode	LRPL Value	Pass/Fail
7	X	On	100,000	Pass
		Off	100,000	Pass
	Y	On	100,000	Pass
		Off	100,000	Pass

LRPL Test

- **Future Direction**
 - Address testing concerns from benchmark test
 - Purchase and test PAPR with tight fitting neck dam to address concerns with this type of PAPR
 - Finalize standard test procedure
 - Perform verification testing with final standard test procedure