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From: Rob Moran, Ator Labs

To: J. Songer, Ph D., Nick Moser, Helpful Engineering

Subj: Homemade cloth mask testing

Gentlemen,

Testing was completed at 1834 CST on 20 March 2020. Testing was completed using ISO 16900 and NIOSH testing methodologies as adapted for use on the ATOR Labs Automated Breathing and Metabolic Simulator.

All masks were visually inspected prior to being placed over the head form. There were no visible tears, rips, or gross material deformities in the material of the mask, all masks were similar in shape.

The black and the white w/red masks demonstrated the best “sealing” to the ISO head form.

The following charts show the breathing pressures at 40 Lpm Respiratory Minute Volume and 62.5 Lpm RMV.

Mask	Work of Breathing (40 RMV) kPa	Inhale kPa	Exhale kPa	$\Delta P$ mmH2O	MAX mmH2O	MIN mmH2O
Black	0.101	.071	.031	25.3	9.17	-16.09
White w/ blue	.097	.069	.028	22.1	8.48	-13.61
All white mask	0.048	0.042	0.005	16.0	6.06	-9.93
White w/ red	0.132	0.084	0.048	24.4	10.15	-14.25
Mask	Work of Breathing (62.5 RMV) kPa	Inhale kPa	Exhale kPa	$\Delta P$ mmH2O	MAX mmH2O	MIN mmH2O
Black	0.247	0.179	0.068	44.3	13.48	-30.81
White w/ blue	0.194	0.125	0.069	34.6	13.94	-20.69
All white mask	0.096	0.065	0.032	21.5	8.25	-13.21
White w/ red	0.249	0.158	0.090	41.1	16.07	-25.00