



SIMULATED WORKPLACE PROTECTION FACTOR STUDY

National Institute for
Occupational Safety and Health
NIOSH[®]

CE 2797



T200™ Respirator

The Respiratory Protection **Brand**[®]

rpb[®]

T200 RESPIRATOR SIMULATED WORKPLACE PROTECTION FACTOR REPORT

Why it is important to know the protection level of the Respirator

Employers must understand the hazards that are presented in their work environment and provide suitable respiratory protection for their employees. To understand this, employers need to know their Maximum Use Concentrations (MUC) and select respirators that suitably protect using Assigned Protection Factors (APF) as the measure of protection.

What is the Assigned Protection Factor (APF)?

Means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program, including training, fit testing (where applicable), maintenance and use requirements.

What is Maximum Use Concentration (MUC)?

Means the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance.

OBJECTIVE

The objective of this Simulated Workplace Protection Study was to determine the level of protection that the T200 (Loose Fitting Hood/Helmet) Respirator provided in both a Supplied Air Respirator configuration and in a Power Air Purifying Respirator Configuration, in relation to both the OSHA 3352-02 Respiratory Protection Standard, 29 CFR 1910 and the European Regulation, in accordance with EN 12941 and EN 14594 Standards.

In this Workplace study the EN 12941 and EN 14594 standards were used for the test methods carried out. These test methods match or exceed those set out in the OSHA 3352-02 Standard.

A panel of 10 test subjects are used to evaluate the Total Inward Leakage of the Respirator while performing a sequence of tasks that are an example of a selection of workplace activities. As this respirator has a bib type application the Bending at the Waist exercise was replaced with the optional 4mph (6.5K) walking of the treadmill.

All Testing was carried out by an Independent Laboratory accredited to ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories.

Refer to the calculations and conclusion at the end of this study to show the protection level (APF) that is provided when using the T200 Respirator with either Supplied Air or Powered Air Purifying systems as approved by NIOSH and other Certifying bodies. The following pages list the configurations of the respirators and the NIOSH and BSI certification/approval numbers that are related to these configurations.

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PACKAGES

NIOSH Packages

Description	Part Number
T200 Respirator with T-Link Hood, Air Duct/Head Harness Assembly	17-200-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Head Harness Assembly	17-200-13
T200 Respirator with Face Seal Hood, Air Duct/Head Harness Assembly	17-200-22
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Head Harness Assembly	17-200-32
T200 Respirator with T-Link Hood, Air Duct/Bump Cap Assembly	17-210-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Bump Cap Assembly	17-210-13
T200 Respirator with Face Seal Hood, Air Duct/Bump Cap Assembly	17-210-22
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Bump Cap Assembly	17-210-32

PAPR

T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Head Harness Assembly and PX5 PAPR Assembly	17-205-32
T200 Respirator with T-Link Hood, Air Duct/Head Harness Assembly and PX5 PAPR Assembly	17-208-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Head Harness Assembly and PX5 PAPR Assembly	17-208-13
T200 Respirator with Face Seal Hood, Air Duct/Head Harness Assembly and PX5 PAPR Assembly	17-208-22
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Head Harness Assembly and PX5 PAPR Assembly	17-208-32
T200 Respirator with T-Link Hood, Air Duct/Bump Cap Assembly and PX5 PAPR Assembly	17-218-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Bump Cap Assembly and PX5 PAPR Assembly	17-218-13
T200 Respirator with Face Seal Hood, Air Duct/Bump Cap Assembly and PX5 PAPR Assembly	7-218-22
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Bump Cap Assembly and PX5 PAPR Assembly	17-218-32

SAR

T200 Respirator with T-Link Hood, Air Duct/Head Harness Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-201-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Head Harness Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-201-13
T200 Respirator with Face Seal Hood, Air Duct/Head Harness Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-201-22
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Head Harness Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-201-32
T200 Respirator with T-Link Hood, Air Duct/Head Harness Assembly, 04-833 Breathing Tube, 03-501 C40 Climate Control Device	17-205-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Head Harness Assembly, 04-833 Breathing Tube, 03-501 C40 Climate Control Device	17-205-13
T200 Respirator with Face Seal Hood, Air Duct/Head Harness Assembly, 04-833 Breathing Tube, 03-501 C40 Climate Control Device	17-205-22
T200 Respirator with T-Link Hood, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-211-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-211-13
T200 Respirator with Face Seal Hood, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-211-22
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-101 Constant Flow Valve	17-211-32
T200 Respirator with T-Link Hood, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-501 C40 Climate Control Device	17-215-12
T200 Respirator with T-Link Sealed Seam Hood, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-501 C40 Climate Control Device	17-215-13
T200 Respirator with Face Seal Hood, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-501 C40 Climate Control Device	17-215-22
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Bump Cap Assembly, 04-833 Breathing Tube, 03-501 C40 Climate Control Device	17-215-32

Other packages may be available.

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CE/AS/NZS Packages

Description

Part Number

PAPR

T200 Respirator with Face Seal Hood, Air Duct/Head Harness Assembly, 04-831 PX5 Breathing Tube	17-200-22-CE
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Head Harness Assembly, 04-831 PX5 Breathing Tube	17-200-32-CE
T200 Respirator with Face Seal Hood, Air Duct/Bump Cap Assembly, 04-831 PX5 Breathing Tube	17-210-22-CE
T200 Respirator with Full Hood w/Internal Face Seal, Air Duct/Bump Cap Assembly, 04-831 PX5 Breathing Tube	17-210-32-CE

Other packages may be available.

CERTIFICATION & APPROVAL NUMBERS

NIOSH POWERED AIR PURIFYING RESPIRATOR APPROVAL NUMBERS

NIOSH Approval No.	Product description
TC-21C-1139	T200, all hood types with Head Harness and PX5 PAPR
TC-21C-1140	T200, all hood types with Bump Cap and PX5 PAPR

NIOSH SUPPLIED AIR RESPIRATOR APPROVAL NUMBERS - APPROVALS COMING SOON

NIOSH Approval No.	Product description
TC-19C-0586	T200, all hood types with Head Harness and C40 or Constant Flow Valve
TC-19C-0587	T200, all hood types with Bump Cap and C40 or Constant Flow Valve

CE CERTIFICATION NUMBERS FOR POWERED AIR PURIFYING RESPIRATOR - EN 12941

BSI Certificate No.	Product description
CE 718714	T200, all hood types with Head Harness or Bump Cap and PX5

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Simulated Workplace Protection Factor (SWPF) study of the T200® Respirator

Conducted by: BSI Group (2797)
 Date: November 2020
 Reference Test Report: 041120RPB12941

RESULTS - POWERED AIR

Table 1: Inward Leakage (%)

SUBJECT	DEVICE	FANS	WALK	HEAD SIDE/SIDE ¹	HEAD UP/DOWN ¹	TALK/GRIMACE	WALK/JOG ¹²
BH	001	Front	0.0035	0.0036	0.0036	0.0045	0.0036
		Side	0.0036	0.0036	0.0038	0.0035	0.0035
		Rear	0.0030	0.0030	0.0034	0.0055	0.0032
ED		Side	0.0052	0.0055	0.0059	0.0061	0.0054
KRB		Front	0.0036	0.0034	0.0041	0.0088	0.0036
SR		Side	0.0002	0.0026	0.0038	0.0122	0.0086
PT		Rear	0.0008	0.0007	0.0009	0.0059	0.0012
SMT		Front	0.0003	0.0007	0.0009	0.0082	0.0002
VE		Rear	0.0002	0.0005	0.0006	0.0005	0.0006
AH	Rear	0.0005	0.0004	0.0004	0.0059	0.0004	
AG	Front	0.0066	0.0054	0.0050	0.0059	0.0048	
NRA	Side	0.0036	0.0033	0.0031	0.0026	0.0024	
MAXIMUM PERMITTED			≤0.05				

¹ Fan on in relevant position.

² Walk/Jog is substituted for the Bending at Waist, as per the OSHA test criteria for Respirators with a Bib.

Table 2: Subject facial dimensions

SUBJECT	LENGTH (MM)	WIDTH (MM)	DEPTH (MM)	WIDTH (MM)
BH	120	139	108	54
ED	114	138	100	47
KRB	108	130	108	49
SR	126	137	138	52
PT	118	139	120	54
MLT	109	136	103	41
VE	116	132	115	45
AH	119	133	115	50
AG	133	148	116	51
NRA	114	138	116	50

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RESULTS CONTINUED

Calculation of the Assigned Protection based on inward leakage percentage is calculated utilizing the following calculation:

$$APF = \frac{100}{\%}$$

To calculate an assigned protection factor of 1000 the equation would equal:

$$1000 = \frac{100}{0.1\%}$$

POWERED AIR

The results of the study as detailed in Table 1 Demonstrate that the T200 is capable of achieving simulated workplace protection factors (SWPF) of greater than 1,000. The Calculated average inward leakage during the period of the test equals 0.00344% which equates to an assigned protection factor of 29,095.28.

$$29,095.28 = \frac{100}{0.00344\%}$$

CONCLUSION

The simulated workplace protection factor study proves that the T200 is more than capable of supporting an assigned protection factor of APF1000 when a safety margin of 25 is applied to the SWPF results as recommended by OSHA.

$$>1,000 = \frac{APF}{25}$$

POWERED AIR SAFETY MARGIN

$$>1,163.81 = \frac{29,095.28}{25}$$

*SUPPLIED AIR DATA PENDING

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