

CLEANROOM WALL SYSTEM TECHNICAL REFERENCE

FORM 7647

ISO CLASSIFICATION

Cleanrooms are classified from ISO 3 to 8 based upon foreign particle size and number of particles per cubic foot. The ISO class for a particular room is determined for the entire room and not for individual component or material. As an example, ISO class 5 (or class 100) cleanrooms can have a maximum allowable number of 100 particles at a size of 0.5 micrometers, 300 of 0.3 μm and 750 of 0.2 μm . Previously, US standards (Fed. Std. 209 E) ranged from 1 to 10,000.

CLEANROOM CLASS (NEW) ISO	CLEANROOM CLASS (OLD) FED. STD. 209E	CLASS LIMITS "NOT TO EXCEED" PARTICLES PER CU. FT. FOR PARTICLE SIZES SHOWN				
		0.1 μm	0.2 μm	0.3 μm	0.5 μm	5.0 μm
3	1	35	7.5	3	1	-
4	10	350	75	30	10	-
5	100	-	750	300	100	-
6	1000	-	-	-	1000	7
7	10000	-	-	-	10000	70
8	100000	-	-	-	100000	700

PARTICLE EMISSION (ISO 14644-1)

- Tribological stress test was performed on Fire-X Glasbord (FSFM) using normal force of 300N against PA6 Nylon
- The level of particle concentration emitted during the testing lies within the permissible value of the corresponding Air Cleanliness Class ISO Class 5 in accordance with ISO 14644-1

MATERIAL PAIRING			ISO CLASS
SPECIMEN	COUNTER SPECIMEN	LUBRICANT	
FIRE-X GLASBORD FSFM	PA6 Nylon	(none)	5

LOAD	NORMAL FORCE	DETECTED PARTICLE SIZE (CALCULATED IN ACCORDANCE TO ISO 14644-1)					
		0.1 μm	0.2 μm	0.3 μm	0.5 μm	1.0 μm	4.1 μm
REEL-ON-DISK TEST	300N	3.1	3.7	3.9	3.8	3.6	4.1

BIOLOGICAL RESISTANCE (ISO 846)

- The test was performed on Fire-X Glasbord (FSFM) in accordance with ISO 846 to assess if the sample is inert or interacts with molds or bacteria.
- After molds (procedure A) and bacteria (procedure C) were applied, the samples were incubated at 24°C with a relative humidity of 95%.
- Samples were visually inspected for mold and bacteria growth after a period of 4 weeks.
- All Surfaseal products have been certified via ISO 846 by an independent third party.

RATING KEY (CLEANROOM SUITABLE MATERIALS SM CLASSIFICATION ACCORDING TO ISO 846)

- Excellent (0): No growth visible under microscope inspection
- Very good (1): No Growth visible by eyesight, but with microscopic inspection
- Good (2): Growth visible by eyesight, and up to 25% of the sample surface is covered
- Weak (3): Growth visible by eyesight, and up to 50% of the sample surface is covered
- Very weak (4): Strong growth visible by eyesight, and over 50% of the sample surface is covered
- None (5): Strong growth visible by eyesight, and whole sample surface is covered





METHOD	RESULT	OVERALL RESULT
FUNGI (PROCEDURE A)	Excellent (0)	Excellent (0)
BACTERIA (PROCEDURE B)	Excellent (0)	

VOLATILE ORGANIC COMPOUND (ISO 16000-9)

- FSFM panel was tested per ISO 16000-9 to determine quantities of Volatile Organic Compounds (VOC) emitted for a 28 day period.
- VOC of seam sealant and adhesives were determined by manufacture.

STATE	FIRE-X GLASBORD PANEL (FSFM)	POLYURETHANE SEAM SEALANT (R53827)	ADVANCED POLYMER ADHESIVE (R53829)	FAST GRAB ADHESIVE (R53828)
DURING CURE (GRAMS/LITER)	NA	0	35	2.6
POST CURE (GRAMS/LITER)	2.216 x 10 ⁻⁵	0	0	0

CHEMICAL RESISTANCE (ISO 2812-1)

- Test was performed per ISO 2812-1 at room temperature.
- Seam Sealant was cured for 24 hours at room temperature prior to testing.
- Samples were immersed in a variety of chemicals for 24 hours and inspected at 1, 3 and 24 hours.
- Ratings are based on visual observations. Performance ratings are not necessarily valid outside of the temperature range and exposure time tested.

Rating Key

- E (Excellent): Suitable for use in most exposure conditions.
- G (Good): Probably suitable for use; testing under specific exposure conditions is suggested.
- F (Fair): Possibly unsuitable for use; testing under specific exposure conditions is recommended.
- P (Poor): Unsuitable for use in most exposure conditions.
- NT: Not tested

CHEMICAL	RATING		COMMENTS
	FIRE-X GLASBORD PANEL (FSFM)	POLYURETHANE SEAM SEALANT (R53827)	
ACETONE	E	E	
AMMONIUM HYDROXIDE, 25%	E	E	
BENZENE	E	NT	
BUTYL ACETATE	E	NT	
DIETHYL ETHER	E	NT	
DISTILLED WATER	E	E	
ETHYL ALCOHOL, 100%	E	E	
FORMALDEHYDE, 37%	E	NT	
HYDROCHLORIC ACID, 5%	E	E	
HYDROGEN PEROXIDE, 3%	NT	E	
HYDROGEN PEROXIDE, 30%	E	NT	
ISOPROPANOL, 70%	E	E	
PERACETIC ACID, 1%	E	NT	
SOAP SOLUTION	NT	E	
SODIUM HYDROXIDE, SOLUTION, 20%	F	E	Panel had no issue up to 3 hour exposure
SULFURIC ACID, 5%	E	E	





PRODUCT	MANUFACTURER	RATING				COMMENTS
		GLASBORD (FSFM)	GLASBORD (FSI)	GLASBORD (PSIF)	SEAM SEAL-ANT (R53827)	
CLOROX REGULAR-BLEACH	The Clorox Company	E	E	E	E	
CIDECON	Decon Laboratories Inc.	E	E	E	E	
HDQ NEUTRAL	Spartan Chemical Company, Inc.	E	E	E	E	
LOPHENE ST	Decon Laboratories Inc.	E	E	E	G	
LYSOL IC	Reckitt Benckiser	E	E	E	E	
SEPTHOL STERILE	STERIS Corporation	E	E	E	E	
SPOR-KLENZ READY FOR USE	STERIS Corporation	E	E	E	G	No issue up to 24 hour exposure. Possible discoloration with sealant only after extended exposure.
PERIDOX RTU	BioMed Protect, LLC	E	E	E	E	
PROCESS VESPHENE LIST	STERIS Corporation	E	E	E	F	Minor yellowing observed with sealant at 24 hour exposure. No issue up to 3 hour exposure.
PROCESS LPHST	STERIS Corporation	E	E	E	F	Minor yellowing observed with sealant at 24 hour exposure. No issue up to 3 hour exposure.
14 ANTIBACTERIAL ALL PURPOSE CLEANER	Ecolab	E	E	E	E	