

VALIDATION REPORT

CLIENT: Tarkett AB
ADDRESS: Tarkett AB,
 Teknik Centre,
 Ekenasvagen,
 Ronneby,
 Sweden 37231

ITEM TESTED: iQ Granit PVC Sheet
DATE OF TEST: 20 October 2010
REPORT ISSUE DATE: 27 October 2010
REPORT ISSUED TO: Mr. N. Ottosson
DIAMOND SCIENTIFIC TEST ENGINEER: Mr. I. McGee
DIAMOND SCIENTIFIC REFERENCE: JN13368
CLIENT ORDER REFERENCE: 5900041123

INTERNAL REVIEW AND APPROVAL

REPORT WRITTEN BY			
NAME	POSITION	SIGNED	DATE
I. MCGEE	TECHNICIAN	<i>I. McGee</i>	27 Oct 2010
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NAME	POSITION	SIGNED	DATE
F.A.J. CROSS	DIRECTOR	<i>F.A.J. Cross</i>	26 Feb 2010

CLIENT REVIEW AND APPROVAL

NAME	POSITION	SIGNED	DATE
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SECTION 1 - SUMMARY

The sample of PVC sheeting iQ Granit, was submitted to two tests, one for surface shedding and one for surface cleanliness. The results can be summarised as follows:

1.1. Surface Cleanliness

Table 1: ASTM F24/09 Observed loose particles on 25 x 25mm square of floor lining. Count per square cm. of component surface.

PARTICLE SIZE μM	SAMPLE / PRODUCT	THICKNESS	BATCH NO	DENSITY	WEIGHT
	iQ Granit	2.0mm	Unknown	1500kg/m ³	3000gr/m ²
5 - 25	0				
25 - 100	0				
25 - 100	0				
Fibres	0				
Test Result	0 Particles per cm ²				

1.2 Surface shedding

Table 2: ASTM F51/00 loose particles/fibres recovered from 1 sq. ft. of specimen floor lining.

PARTICLE SIZE μM	SAMPLE / PRODUCT	THICKNESS	BATCH NO	DENSITY	WEIGHT
	iQ Granit	2.0mm	Unknown	1500kg/m ³	3000gr/m ²
>5	12				
Fibres >100	2				
Test Result	CLASS A				

The test results (see Section 3) show that the test specimen cleaned easily and thoroughly and gave no indication of significant particle release under the vacuum-cleaning test.

The specimen of PVC floor lining material supplied is very suitable for clean room applications.

SECTION 2 – METHOD STATEMENTS

2.1 Product description

MANUFACTURER	Tarkett AB
BATCH No.	Unknown
PRODUCT NAME	iQ Granit PVC Sheet
Density	1500 kg/m ³
WEIGHT	3.00 gr/m ²
NOMINAL THICKNESS	2.0mm
DATE OF SAMPLE DESPATCH	18 October 2010
FACE TESTED	SMOOTH
TEST METHODS	A.S.T.M. F51/00 A.S.T.M. F24/09

2.2 SPECIMEN PREPARATION

All specimens were lightly scrubbed with a water/liquid detergent solution, using a new nylon toothbrush and rinsed with clean tap water before being introduced into the clean room laboratory. Here they were handled with rubber gloves within an ISO 14644-1 Class 4 horizontal laminar flow bench.

The material specimens were then pressure rinsed with particle free WFI (water for injection), applied via a 1.2 μ "Millipore" membrane RAWP.

The cleaned PVC specimen was then subjected to two standard tests.

2.3 SURFACE CLEANLINESS EVALUATION

The smaller 25 mm square cleaned specimen were first mounted on a microscope slide and examined under incident light using the method for planar surfaces described in A.S.T.M: F24-09 "A Standard Method for Measuring and Counting Particulate Contamination on Surfaces".

In essence, the cleaned surface is viewed at up to 100x magnification and the number of particles noted in the size ranges 5 - 25, 25 - 100 and greater than 100 microns.

2.4 SURFACE SHEDDING TESTS

The potential particle shedding capacity of the PVC sheet sample supplied was monitored by repeatedly applying vacuum to the large 1ft square cleaned specimen in a method based on A.S.T.M. F51/00 (approved 2000) "A Standard Method for Sizing and Counting Particulate Contaminant In and On Clean Room Clothing". It should be noted that this method is really designed to evaluate porous surfaces.

Essentially the adopted method involves vacuum cleaning the specimen surface with a monitoring head containing a 0.8 μ pore size Millipore membrane AABG, which collected any particles or fibres shed by the material. The membrane was mounted in a Millipore petri-slide and examined under incident illumination at x100 magnification and all particles >5 microns and fibres >100 microns in length were noted. In this application the method was identical to those carried out on previous samples.

SECTION 3 – TEST RESULTS

The test specimen was a sample of PVC sheet, intended for use within clean rooms as a form of lining material.

The material conforms in general format to the various requirements for clean room surfacing materials, e.g.: "In clean areas all exposed surfaces shall be smooth, impervious and unbroken in order to minimise shedding or accumulation of particles or micro-organisms and to permit the repeated application of cleaning agents and disinfectants where used";-"The Rules Governing Medicinal Products in the European Community" and the "Guide to Good Manufacturing Practice for Medicinal Products.

The following further reference is similar in its requirement:

- a) ISO 14644-4 Design Construction and Start Up

Tests were carried out to evaluate the ease and efficiency of surface cleaning and we also carried out an adapted standard surface shedding test intended for clean room garments.

3.1 SURFACE CLEANLINESS EVALUATION

Table 1: ASTM F24/09 Observed loose particles on 25 x 25mm square of floor lining. Count per square cm. of component surface.

PARTICLE SIZE μM	SAMPLE / PRODUCT	THICKNESS	BATCH NO	DENSITY	WEIGHT
	iQ Granit	2.0mm	Unknown	1500kg/m ³	3000gr/m ²
5 - 25	0				
25 - 100	0				
25 - 100	0				
Fibres	0				
Test Result	0 Particles per cm²				

The test specimens were particle free at $>5\mu\text{m}$ and had readily released their surface soil ex the factory after light washing.

3.2 SURFACE SHEDDING TESTS

Table 2: ASTM F51/00 loose particles/fibres recovered from 1 sq. ft. of specimen floor lining.

PARTICLE SIZE μM	SAMPLE / PRODUCT	THICKNESS	BATCH NO	DENSITY	WEIGHT
	iQ Granit	2.0mm	Unknown	1500kg/m ³	3000gr/m ²
>5	12				
Fibres >100	2				
Test Result	CLASS A				

Classification A. The surface shedding potential of the material is extremely low. A Class A surface has less than 1,000 particles >5 μm /sq.ft with an associated fibre count of less than 10.

3.3 CONCLUSION

The PVC lining material examined was readily cleaned of light soiling. The sample did not exhibit any significant particle shedding properties. Both methods of test indicate a particle loading of very much less than 1000 particles >5 microns in size per sq. ft. of surface area and zero counts >25 microns. The material is therefore to Class A in terms of A.S.T.M. F51/00. I regard it as a suitable material for clean room applications.

APPENDIX 1 – TEST CERTIFICATE

CLIENT

**Tarkett AB,
Teknik Centre,
Ekenasvagen,
Ronneby,
Sweden 37231**

TEST SPECIMEN

Product Name	iQ Granit
Density	1500kg/m ³
Weight	3.00 gr/m ²
Thickness	2.0 mm
Batch No.	Not Known
Face Tested	Smooth

SPECIMEN PREPARATION

As received from factory and washed in detergent solution, rinsed with water for injection in ISO 14644-1 Class 4 conditions.

TEST APPLIED (1)

A.S.T.M. F24 - 09
A Standard Test Method for Measuring and Counting Particulate Contamination on Surfaces.

TEST RESULT

0 Particles per cm²

TEST APPLIED (2)

A.S.T.M. F51 - 00
A Standard Method for Sizing and Counting Particulate Contaminant In and On Clean Room Clothing – adapted to a non-porous surface

TEST RESULT

CLASS A - no significant shedding potential

TEST DATE

20 October 2010

ISSUE DATE

27 October 2010



**I. McGEE
TECHNICIAN**



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