Dycem Purity Documentation

Introduction

All Dycem flooring products are CE marked, REACH compliant & comply with State of California Proposition 65 legislation.

The data in the following table is a summary of tests undertaken on Dycem products in recent years as part of the company's continued programme of research and development. The test data, designed to substantiate the properties of Dycem products for use in critical environments, is divided into three distinct areas of investigation:

1. **Outgassing Behaviour – Organic Components:** A series of tests directed to establish whether organic components used in the manufacture of Dycem products are released into the atmosphere under conditions and in environments where the product will be used.

2. **Composition and Physical Transfer – Inorganic Components:** A series of tests directed to establish the presence of inorganic components, existing mainly as metal ions, in Dycem products and electronic components such as wafers or disks.

REACH Compliance – Annual independent testing to ensure that all materials used in our products comply with REACH and that our material suppliers or other parties in the supply chain will register the substances supplied to us.

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Results

Outgassing

In common with many other products based wholly or in part on organic polymeric compositions, Dycem products release minute quantities of organic components when exposed for prolonged periods to elevated temperatures. At 50°C, tests over a period of more than eight hours show release of quantities less than 0.1 microgram per gram of product for Dycem products in the form of Clean-Zone flooring and rollers. A typical peel-off mat shows a slightly higher level of emission.

At 125°C to test methods such as ASTM E-595 and European Space Agency Specifications, levels of emission are observed which exceed those specified for materials to be used in space (Total Material Lost <1%). When tested at 50ºC by ASTM E-595, however, Dycem Clean-Zone meets this criterion.

At ambient temperatures, sensitive measurements by head-space gas chromatograph and mass spectroscopy techniques (HS/GC/MS) used in the Swedish Flooring Association FLEC tests show no detectable levels of emission for Dycem Clean-Zone. Similar performance is observed for commercial grades of flooring widely specified for use within cleanroom environments and typical peel-off mats show the same behaviour.

It is likely that (HS/GC/MS) techniques will be a principal feature of draft standards on outgassing to be published by the Institute of Environmental Sciences in 1998.

Under normal conditions of usage, therefore, a range of results supports the conclusion that Dycem Clean-Zone represents no outgassing hazard in cleanroom environments at ambient temperatures.

Composition and Physical Transfer

Measurement by neutron bombardment in the NAA (Neutron Activation Analysis) test method, a sensitive procedure for bulk material analysis, establishes relatively high levels of Sodium, Potassium and Barium in Dycem products together with somewhat lower levels of Titanium, Zinc and Iron.

These elements are bound within the organic matrix and will not become separated from the mass of material so as to enter the environment in which the product is used. It has been demonstrated, however, by surface measurement technology (TXRF analysis), that some transfer can occur over time to other surfaces with which the product may be in direct continuous contact.

Dycem products are not recommended, therefore for applications where the material may remain in sustained direct contact with surfaces sensitive to electronic contamination, such as a silicon wafer or a disk.

Tests

Outgassing

Surface Science Laboratories CA, USA
Report No: 5030 – 0593
Date: June 24 1993
Method: Analysis by Fourier Transform Infrared (FTIR) Spectroscopy using reflectance microscopy

NASA (Materials Science Laboratory)
Report No: MTB – 711 – 87
Date: June 20 1988
Method: Measurement of Total Material Loss
ASTM G595

MTS Pendar (UK)
Report No: 46798
Date: September 2 1991
Method: Conducted using the European Space Agency
Specifications P55-01-702
Test temperature 125^{o}C
Collector temperature 25^{o}C

Concentration

Genetic GmBH München, Germany
Report No: 10047
Date: July 22 1996
Method: NAA

Transfer Test

Genetic GmBH München, Germany
Report No: 10047
Date: July 22 1996
Method: TXRF

Purity Tests

Dycem has been independently tested (EVC Test Method) at the practical working temperature (ambient) and no emissions were detected.

To the best of our knowledge, this information is correct at the time of printing.

Purity study of Dycem vs. Peel-off mat

	Dycem				Peel-off mat	
Element	Concentration	Outgassing		Transfer test	Outgassing	
		RT*	Ug/gram*	Conc (at/cm^2)	RT*	Ug/gram*
Aliphatic Alcohol	-				6.2	0.04
Aliphatic Hydocarbon	-				2.80 7.00	0.04 0.04
Carbon Disulfides	-				1.47	0.04
Chlorinated solvent	-	2.32	0.1			
Antimony (Sb)	2.93					
Arsenic (As)	-					
Barium (Ba)	500			2.3E + 13		
Bromine (Br)	12.9					
Cadmium (Cd)	1.20					
Caesium (Cs)	0.089					
Calcium (Ca)	-					
Cerium (Ce)	0.65					
Chromium (Cr)	0.51					
Chlorine (Cl)	-			5.8E + 13		
Cobalt (Co)	0.76					
Copper (Cu)	-			3.9E + 11		
Europium (Eu)	0.016					
Gadolinium (Gd)	-					
Gallium (Ga)	0.41					
Gold (Au)	0.0011					
Hafnium (Hf)	0.043					
Holmium (Ho)	-					
Indium (In)	-					
Iridium (Ir)	-					
Iron (Fe)	60.2			2.0E + 12		
Lanthanum (La)	0.28					
Lutetium (Lu)	-					
Mercury (Hg)	-					

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Dycem
CleanZone Technology

Purity study of Dycem vs. Peel-off mat

	Dycem				Peel-off mat	
Element	Concentration	Outgassing		Transfer test	Outgassing	
		RT*	Ug/gram*	Conc (at/cm^2)	RT*	Ug/gram*
Molybdenum (Mo)	-					
Neodymium (Nd)	-					
Nickel (Ni)	-					
Osmium (Os)	-					
Palladium (Pd)	-					
Platinum (Pt)	-					
Potassium (K)	630			6.0E + 13		
Praseodymium (Pr)	-					
Rhenium (Re)	-					
Rubidium (Rb)	1.55					
Ruthenium (Ru)	-					
Samarium (Sm)	0.11					
Scandium (Sc)	0.049					
Selenium (Se)	-					
Silver (Ag)	-					
Sodium (Ng)	1904					
Strontium (Sr)	-					
Sulphur (S)	-			1.6R + 14		
Tantalum (Ta)	-					
Terbium (Tb)	0.030					
Thorium (Th)	0.17					
Tin (Sn)	-					
Titanium (Ti)	305					
Tungsten (W)	0.17					
Tellurium (Te)	-					
Uranium (U)	0.15					
Yiterbium (Yg)	0.034					
Yitrium (Y)	-					
Zirconium (Zr)	-					

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ENVIRONMENT

REDUCE YOUR CARBON FOOTPRINT WITH DYCEM

Dycem is a world leading manufacturer and supplier of contamination control floor coverings. Our flooring products are solely manufactured in the UK at our Bristol site. We recognise that environmental issues are of fundamental importance to a successful and responsible business strategy and strive to develop new and existing products with sustainability in mind, never compromising on value or performance.

RECYCLING

• Dycem products are 100% recyclable at no charge at the end of their working life and can be recycled into less critical applications.
• All Dycem products are washable & re-usable systems. This means less wastage and a reduced carbon footprint.

HEALTH & SAFETY

Dycem polymeric flooring is widely used in pharmaceutical, biomedical, automotive, food and healthcare industries. Dycem uses high grade raw materials to produce its floor coverings to standards that exceed all prescribed health and safety requirements.

• Safe raw materials: no heavy metals, no solvent based inks, no phthalates and components rated as carcinogenic, no formaldehydes, no PCP.

• Non-toxic, no Silicon, latex or DOP outgassing.

• There are no known hazardous components above regulatory thresholds in this product.

• Dycem materials are compliant with both REACH and the state of California Proposition 65 legislation.