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Att.: Nicole Miller

Date
April 8, 2014
Your ref.:
Our ref.: G25274/JH

Test report

Sample material

Sample identification	Chemical Protective Glove: Lab no. G2527401: Nitril BestGen
Test Chemical	Kohrsolin FF as challenge chemical Monitoring breakthrough of Glutaraldehyde and isopropyl alcohol.
Receipt of samples	March 5, 2014
Analytical period	March 10 – April 7, 2014

Applied methods

Method	Parameter	Break through LOQ value	U _m ①
EN 374-3	Permeation rate and break through defined as 1 µg/cm ² /minute	0.01 µg/cm ² /min.	20%
ASTM F739	Permeation rate and break through defined as 0.1 µg/cm ² /minute	0.01 µg/cm ² /min.	20%

Principle:

The protective glove was fixed between the two compartments of a standard permeation cell. The outer side of the glove in test was covered with a solution of the challenge chemical – hence the glove was exposed continuously. The whole test area of 19.4 cm² was exposed. The cell temperature was kept at 23 °C through out the test.

Method GC/FID for detecting isopropyl alcohol:

The internal side of the cell was flushed with synthetic air as collection medium in an open loop and the permeation of volatile organic solvents was monitored continuously by passing part of the collection medium to a flame ionisation detector (FID), calibrated against toluene. For determination of permeation rate the substance specific response factor was applied. This method was applied to the challenge chemical isopropyl alcohol.

Method for detecting the test chemical Glutaraldehyde:

The internal side of the cell was flushed with water as collection medium in a closed loop and the permeation of Glutaraldehyde was monitored by frequent sampling of the collection medium and analyse these samples for Glutaraldehyde by HPLC with diode array UV detection, calibrated against Glutaraldehyde

The determination has been carried out in triplicate.

① U_m (%): The expanded uncertainty U_m is equal to 2 x RSD%, see also www.eurofins.dk. Keyword: Uncertainty

Test Result

Test results are summarised in table 1 below. See detailed results on the following pages. Test data and results for protective glove Nitril NextGen are reported below in table 2 to 5 and the permeation recordings in figure 1 to figure 2

Analytical results

Tabel 1. Permeation test results

Glove:		Nitril BestGen				
			Breakthrough time		Permeation rate at steady state	Performance level
			EN 374-3	ASTM F739	ASTM F739	EN 374-1
No.	Challenge chemical / product tested	CAS	Min	Min	$\mu\text{g} / \text{cm}^2 / \text{min.}$	
1	Glutaraldehyde	111-30-8	410	170	3.0	5
2	Isopropyl alcohol	67-56-1	> 480	> 480	0.04	6
	Kohrsolin FF (overall)		410	170	3.0	5

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John Hansen
MSc. Chemistry

Picture of sample



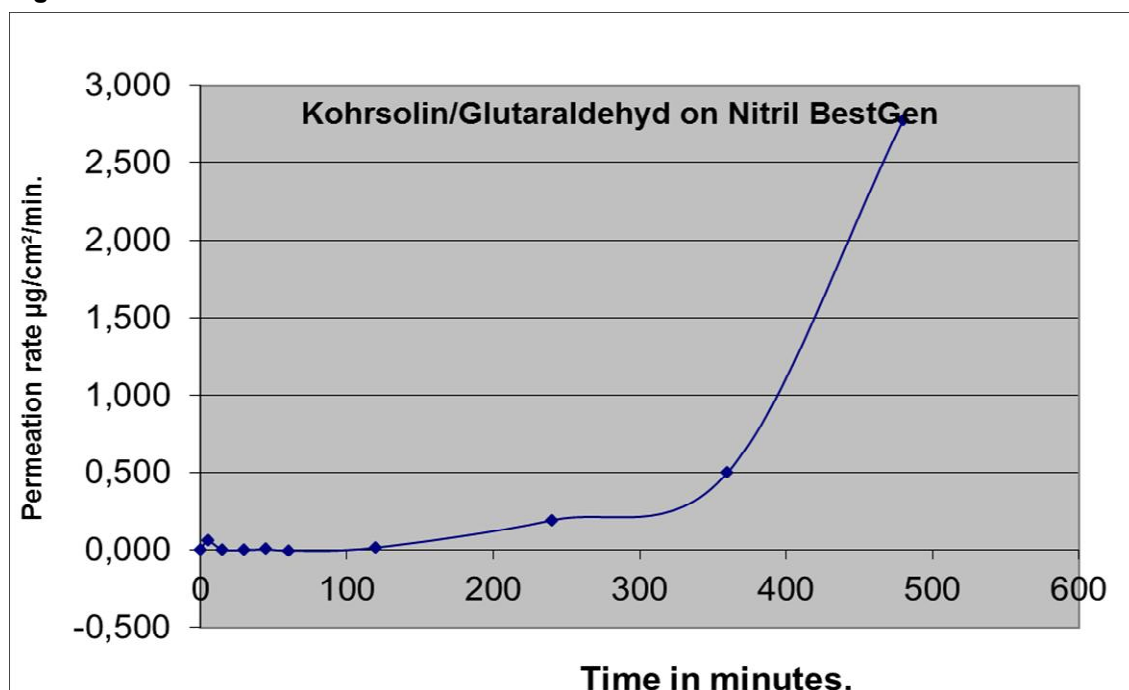
Analytical results

Table 2. Test Conditions Kohrsolin
Test Conditions

Challenge chemical	Kohrsolin FF	Test parameters	
Monitoring chemical	Glutaraldehyde	Collection system	Closed loop
Cas no.:	111-30-8	Contact type	Continuous
Supplier/Product	Hartmann	Collection media	Water
Purity/concentration	<10%	Collection volume	80 ml
Chemical state	Liquid	Analytical method	HPLC/DAD/UV
Glove sample		Sampling frequency	60 minutes
Brand	Nitril BestGen	Test temperature	23 °C
Type	Nitril	Test duration	500 minutes
Condition	New single layer	Minimum detection rate	0.01 µg/cm ² /min.
Glove area exposed	19.5 cm ²	Calibration	Glutaraldehyde 0.1 µg/ml
Thickness in mm		Supplier	Sigma-Aldrich G4004
Weight/area in g/m ²		Batch no	S70391

Table 3. Results, Glutaraldehyde:

Sample	Nitril BestGen			
Cell no.	1	2	3	Mean
Breakthrough ASTM (minutes)	178	165	161	170
Breakthrough EN (minutes)	396	430	400	410
Permeation rate steady state µg/cm ² /min.				3.0
Performance level EN				5
Post test condition	Color slightly faded, loss of elasticity			

Figure 1. Permeation curve


Analytical results

Tabel 4. Test Conditions

Challenge chemical	Kohrsolin	Test parameters	
Monitoring chemical	Isopropyl alcohol	Collection system	Open loop
Cas no.:	67-63-0	Contact type	Continuous
Supplier/Product	Hartmann	Collection media	Syntetic air
Purity/concentration	3%	Collection flow rate	0.24 l/min.
Chemical state	Liquid	Analytical method	GC/FID
Glove sample		Sampling frequency	1 – 5 minutes
Brand	Nitril BestGen	Test temperature	23 °C
Type	Nitril	Test duration	480 minutes
Condition	New single layer	Minimum detection rate	0.01 µg/cm ² /min.
Glove area exposed	19.5 cm ²	Calibration	Toluene 38.8 µg/l
Thickness in mm			
Weight/area in g/m ²			

Tabel 5. Results, Permeation of Isopropyl alcohol:

Sample	Nitril BestGen			
	1	2	3	Mean
Cell no.				
Breakthrough ASTM (minutes)	>480	>480	>480	>480
Breakthrough EN (minutes)	>480	>480	>480	>480
Permeation rate steady state µg/cm ² /min.				0.04
Performance level EN				6
Post test condition	Color slightly faded, loss of elasticity			

Figure 2. Permeation curve
