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Date
December 10, 2013
Your ref.:
Our ref.: G24408/JH

Test report

Sample material

Sample identification	Chemical Protective Glove: Lab no. G2440801B: Nitril BestGen Lot no. 0070813, production date 08-2013
Test Chemical	Ethidium bromide, water solution 1% used as challenge chemical Monitoring breakthrough of ethidium bromide cas no. 1239-45-8 Sybr Green using Dimethyl sulfoxide as challenge chemical Monitoring breakthrough of Dimethyl sulfoxide (DMSO) cas no. 67-68-5
Receipt of samples	November 11, 2013
Analytical period	November 25 – December 6, 2013

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 were 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 19.5 cm² was exposed. The cell temperature was kept at 25 °C through out the test.

Method for detecting ethidium bromide:

The internal side of the cell was flushed with water as collection medium in a closed loop and the permeation of ethidium bromide was monitored by frequent sampling of the collection medium, and then analysed for Ethidium bromide by HPLC with diode array UV detection, calibrated against ethidium bromide reference standard.

Method for detecting Dimethyl sulfoxide (DMSO):

The internal side of the cell was flushed with water as collection medium in a closed loop and the permeation of dimethyl sulfoxide (DMSO) was monitored by frequent sampling of the collection medium, and then analysed for DMSO by GC/MS detection, calibrated against dimethyl sulfoxide reference standard.

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

Result

Test results are summarised in table 1 below. See detailed results on the following pages.

Test data and results for protective glove Nitril BestGen Lot no. 0070813 are reported below in table 2 and 3 and the permeation recordings in figure 1 for ethidium bromide and in table 4 and 5 and the permeation recordings in figure 2 for Sybr Green (DMSO).

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	1% ethidium bromide	1239-45-8	> 480	> 480	< 0.01	6
2	Sybr Green (DMSO)	67-68-5	< 1	< 1	> 5	0

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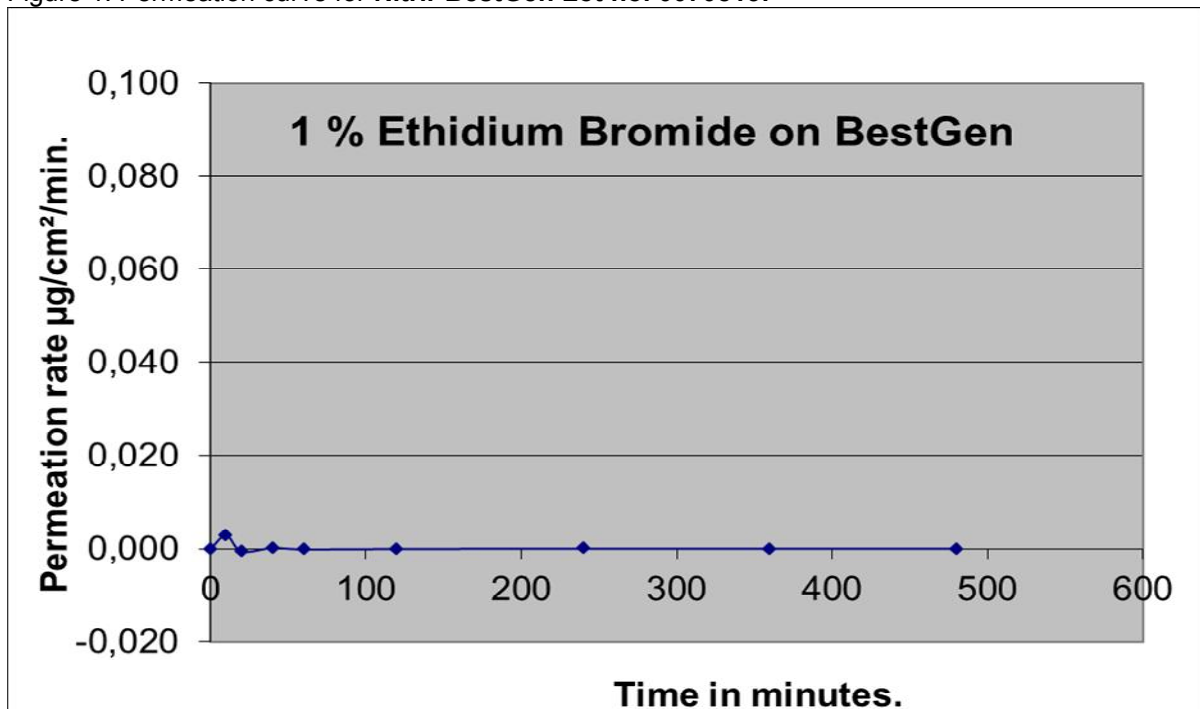
Analytical results

Table 2. Test Conditions

Test chemical		Test parameters	Cont.
Challenge chemical	Ethidium bromide	Glove area exposed	19.5 cm ²
Supplier	Sigma Aldrich	Collection system	Closed loop
Chemical state/Purity	Liquid/ 1% in water	Contact type	Continuous
Sample clothing		Collection media	Water
Brand	BestGen	Collection volume	100 ml
Lot no.	0070813	Analytical method	HPLC/DAD/UV
Glove type	Nitril/New single layer	Sampling frequency	10 - 60 minutes
Test parameters		Test temperature	25 °C
Monitoring chemical	Ethidium bromide	Test duration	480 minutes
Cas no.:	1239-45-8	Minimum detection rate	0.01 µg/cm ² /min.
Supplier/Purity	Sigma/ E-8751/ 95%	Calibration	Ethidium bromide 0.01 µg/ml

Table 3. Results, Ethidium bromide on BestGen:

Sample	Nitril BestGen Lot no. 0070813			
Cell no.	1	2	3	Mean
Breakthrough EN 374-3, minutes	> 480	> 480	> 480	> 480
Breakthrough ASTM F739, minutes	> 480	> 480	> 480	> 480
Permeation rate breakthrough µg/cm ² /min	-	-	-	< 0.01
Permeation rate steady state µg/cm ² /min	-	-	-	< 0.01
Post test condition	Strongly colored from ethidium bromide otherwise no changes observed			

Figure 1. Permeation curve for Nitril BestGen Lot no. 0070813:


Analytical results

Table 4. Test Conditions

Test chemical		Test parameters	Cont.
Challenge chemical	Dimethyl sulfoxide	Glove area exposed	19.5 cm ²
Supplier	Sigma Aldrich	Collection system	Closed loop
Chemical state/Purity	Liquid/ 99.5%	Contact type	Continuous
Sample clothing		Collection media	Water
Brand	BestGen	Collection volume	100 ml
Lot no.	0070813	Analytical method	GC/MS
Glove type	Nitril/New single layer	Sampling frequency	10 - 60 minutes
Test parameters		Test temperature	25 °C
Monitoring chemical	Dimethyl sulfoxide	Test duration	100 minutes
Cas no.:	67-68-5	Minimum detection rate	0.01 µg/cm ² /min.
Supplier/Lot	Sigma Aldrich /SZBD1790V	Calibration	Dimethyl sulfoxide 0.01 µg/ml

Table 5. Results, Sybr Green on BestGen:

Sample	Nitril BestGen Lot no. 0070813			
Cell no.	1	2	3	Mean
Breakthrough EN 374-3, minutes	< 1	< 1	< 1	< 1
Breakthrough ASTM F739, minutes	< 1	< 1	< 1	< 1
Permeation rate breakthrough µg/cm ² /min	-	-	-	> 5
Permeation rate steady state µg/cm ² /min	-	-	-	> 5
Post test condition	No visible changes			

Figure 2. Permeation curve for Nitril BestGen Lot no. 0070813:
