Viva Healthcare Packaging

チューブ酸素透過率(OTR)テストレポート

我々は、MOCON社の酸素透過率測定装置OX-TRAN®2/21シリーズを使い、
VIVAの射出成形チューブ及び押出チューブの両方の酸素透過率測定を実施した。
検査方法は、ASTM D3985、ASTM F1927、ASTM F1307を使用した。
試験結果の正確性を期する為、下記5種類の検査を行った。

項目	酸素透過率テスト結果 (cc/pkg/日)	酸素透過率テスト結果 (cc/m²/日)
1. EVOHバリアー付き押し出し成型チューブ	0.270730	10.6
2. フォイル・バリアー付き、VIVA射出成型チューブ	0.255750	9.2
3. フォイル・バリアー付き(肩部を含む)、VIVA射出成型チューブ	0.091569	4.6
4. EVOHバリアー付き、VIVA射出成型チューブ	0.216101	9.9
5. EVOHバリアー付き(肩部を含む)、VIVA射出成型チューブ	0.091976	4.2

注:
酸素透過率(OTR)テストレポート (cc/pkg/day) 結果を比較する為、(cc/m²/day)に変換しております。

算定方法は、下記の通りです。

全表面積 = チューブ面積 + 肩部面積 = A m²
酸素透過率(OTR)(伝送速度@100%)テストレポートから= Z CC / PKG/日
酸素透過率(OTR)量(cc/㎡/日)=(Z / A)CC /㎡/日

概要:
VIVAのフォイル/EVOHバリアー付き、射出成型チューブは、EVOHバリアー付き押し出し成型チューブより
良い酸素透過率(OTR)を達成することができます。
現在の市場でバリア特性を必要とする日焼け止め、ヘア・ケア、スキン・ケア、パーソナル・ケアそして食品などカバーします。

MOCON OX-TRAN® 2/21 - Single Test Report

Material Id: C3 Test Number: <D50 Extruded Tube with EVOH Barrier>
Using Method: ASTMD3985, ASTMF1927,ASTMF1307

MODULE INFORMATION:

Module 1, Serial Number:	MH_01761
Setup Name:	Default Setup
Temp Setpoint/Actual:	Auto: 23.0 / 23.0 °C.
Barometric Pressure:	Manual: 760.00 mmHg
Relative Humidity:	Permeant - Auto: 65.0%, Carrier - Auto: 0.8%
Permeant Concentration:	21 %
Ambient Temp:	Manual: 23.0 °C.

CELL A INFORMATION:

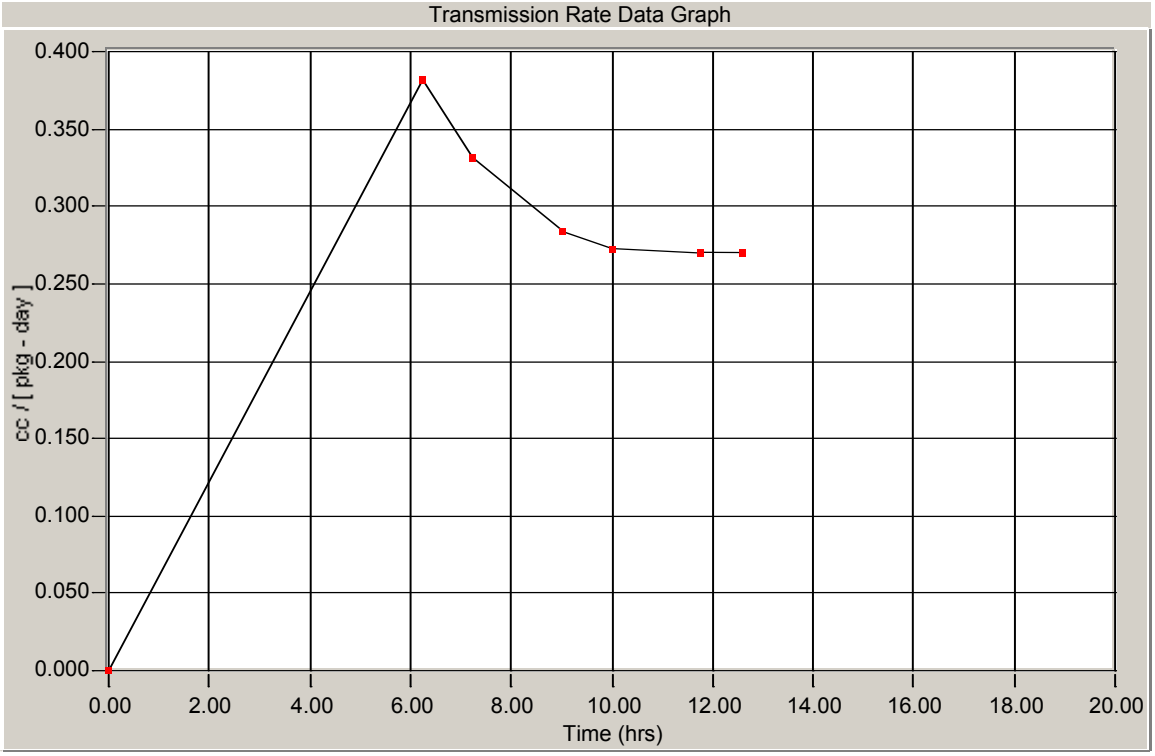
Sample Type:	pkg: 0.4 mm
Test Mode:	Continuous
Control Params:	Infinite
ExamMinutes:	30
Individual Zero:	No Ind. Zero
Conditioning:	5 Hours
Cycles Complete:	6
Current Status:	Test Done
Started Testing:	1/22/2011 8:38:04 AM
Elapsed Time:	12:31

TEST RESULTS IN SELECTED UNITS

Transmission @ 21 %	0.056853	cc / [pkg - day]
Transmission @ 100%	0.270730	cc / [pkg - day]
Permeation:	0.270730	cc - mil / [pkg - day]

DATA POINTS

Time	Rate/Event	Time	Rate/Event	Time	Rate/Event	Time	Rate/Event
0:00	Condition	5:00	Test	6:15	0.381410	7:15	0.331250
9:00	0.278504	10:00	0.272031	11:45	0.271307	12:31	0.270730
12:39	Complete						



MOCON OX-TRAN® 2/21 - Single Test Report

Material Id: <v16a> Test Number: <D50 Injection-molded Tube with Foil Barrier>
Using Method: ASTMD3985, ASTMF1927,ASTMF1307

MODULE INFORMATION:

Module 1, Serial Number:	MH_01761
Setup Name:	Default Setup
Temp Setpoint/Actual:	Auto: 23.0 / 23.1 °C.
Barometric Pressure:	Auto: 737.37 mmHg
Relative Humidity:	Permeant - Auto: 63.4%, Carrier - Auto: 0.0%
Permeant Concentration:	21 %
Ambient Temp:	Manual: 23.0 °C.

CELL A INFORMATION:

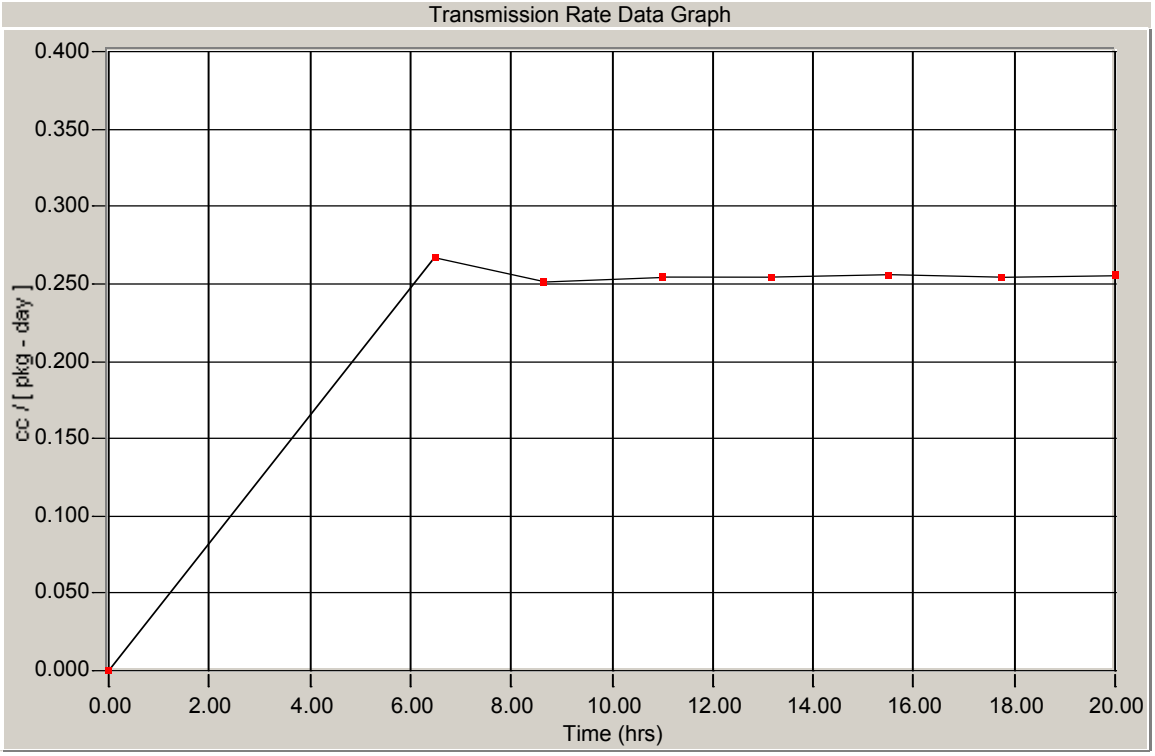
Sample Type:	pkg: 0.4 mm
Test Mode:	Continuous
Control Params:	Infinite
ExamMinutes:	45
Individual Zero:	No Ind. Zero
Conditioning:	5 Hours
Cycles Complete:	7
Current Status:	Test Done
Started Testing:	9/21/2011 5:18:57 PM
Elapsed Time:	20:00

TEST RESULTS IN SELECTED UNITS

Transmission @ 21 %	0.053707	cc / [pkg - day]
Transmission @ 100%	0.255750	cc / [pkg - day]
Permeation:	0.102300	cc - mm/ [pkg - day]

DATA POINTS

Time	Rate/Event	Time	Rate/Event	Time	Rate/Event	Time	Rate/Event
0:00	Condition	5:00	Test	6:30	0.268904	8:45	0.253837
11:00	0.254084	13:15	0.255499	15:30	0.257819	17:45	0.255686
20:00	0.255750	21:16	Complete				



MOCON OX-TRAN® 2/21 - Single Test Report

Material Id: <V21a> Test Number: <D40 Injection-molded Tube with Foil Barrier & Shoulder>

Using Method: ASTM D3985, ASTMF1927, ASTM F1307

MODULE INFORMATION:

Module 1, Serial Number:	MH_01761
Setup Name:	Default Setup
Temp Setpoint/Actual:	Auto: 23.0 / 23.0 °C.
Barometric Pressure:	Auto: 756.15 mmHg
Relative Humidity:	Permeant - Auto: 61.4%, Carrier - Auto: 0.0%
Permeant Concentration:	20.9 %
Ambient Temp:	Manual: 23.0 °C.

CELL A INFORMATION:

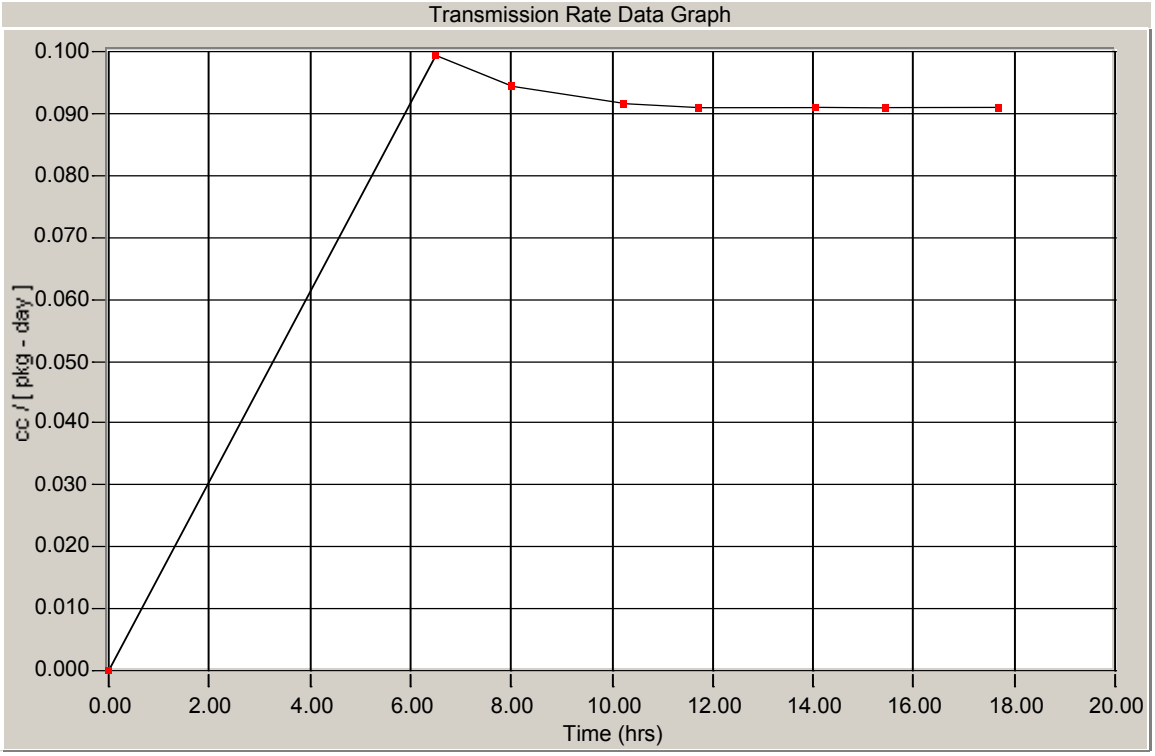
Sample Type:	pkg: 0.4 mm
Test Mode:	Continuous
Control Params:	Infinite
ExamMinutes:	45
Individual Zero:	No Ind. Zero
Conditioning:	5 Hours
Cycles Complete:	7
Current Status:	Test Done
Started Testing:	11/29/2011 4:50:36 PM
Elapsed Time:	17:45

TEST RESULTS IN SELECTED UNITS

Transmission at 20.9%	0.019138	cc / [pkg - day]
Transmission at 100%	0.091569	cc / [pkg - day]
Permeation:	0.036628	cc - mm / [pkg - day]

DATA POINTS

Time	Rate/Event	Time	Rate/Event	Time	Rate/Event	Time	Rate/Event
0:00	Condition	5:00	Test	6:30	0.098507	8:00	0.094598
10:15	0.092000	11:45	0.091675	14:00	0.091297	15:30	0.091541
17:45	0.091569	18:48	Complete				



MOCON OX-TRAN® 2/21 - Single Test Report

Material Id: <23b> Test Number: <D40 Injection-molded Tube with EVOH Barrier>
Using Method: ASTM D 3985, ASTM F 1927, ASTM F 1307

MODULE INFORMATION:

Module 1, Serial Number:	MH_01761
Setup Name:	Default Setup
Temp Setpoint/Actual:	Auto: 23.0 / 23.1 °C.
Barometric Pressure:	Manual: 760.00 mmHg
Relative Humidity:	Permeant - Auto: 28.9%, Carrier - Auto: 0.7%
Permeant Concentration:	21 %
Ambient Temp:	Manual: 23.0 °C.

CELL B INFORMATION:

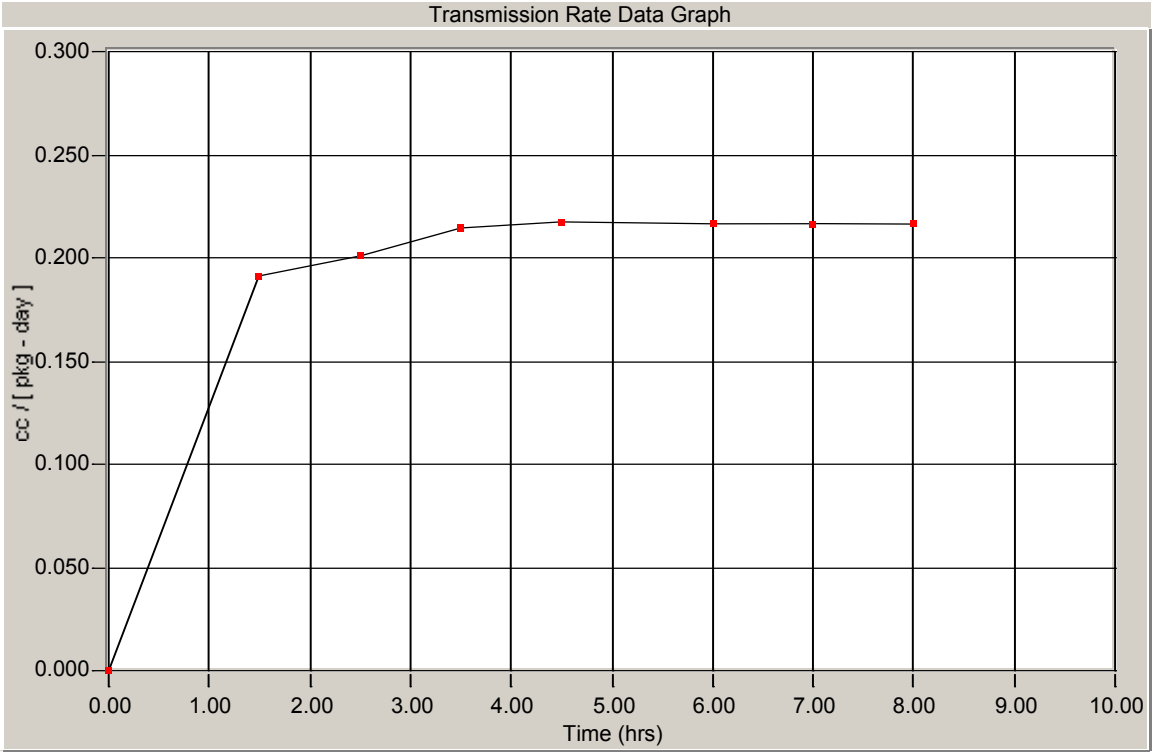
Sample Type:	pkg: 0.4 mm
Test Mode:	Continuous
Control Params:	Infinite
ExamMinutes:	30
Individual Zero:	No Ind. Zero
Conditioning:	Disabled
Cycles Complete:	7
Current Status:	Test Done
Started Testing:	12/27/2011 8:09:01 AM
Elapsed Time:	8:00

TEST RESULTS IN SELECTED UNITS

Transmission @ 21 %	0.045381	cc / [pkg - day]
Transmission @ 100%	0.216101	cc / [pkg - day]
Permeation:	3.403171	cc - mil / [pkg - day]

DATA POINTS

Time	Rate/Event	Time	Rate/Event	Time	Rate/Event	Time	Rate/Event
0:00	Test	1:30	0.191019	2:30	0.200941	3:30	0.214988
4:30	0.217060	6:00	0.216762	7:00	0.216172	8:00	0.216101
8:00	Complete						



MOCON OX-TRAN® 2/21 - Single Test Report

Material Id: <24a> Test Number: <D40 Injection-molded Tube with EVOH Barrier & Shoulder>
Using Method: ASTM D 3985, ASTM F 1927, ASTM F 1307

MODULE INFORMATION:

Module 1, Serial Number:	MH_01761
Setup Name:	Default Setup
Temp Setpoint/Actual:	Auto: 23.0 / 23.0 °C.
Barometric Pressure:	Manual: 760.00 mmHg
Relative Humidity:	Permeant - Auto: 26.0%, Carrier - Auto: 0.1%
Permeant Concentration:	21 %
Ambient Temp:	Manual: 23.0 °C.

CELL A INFORMATION:

Sample Type:	pkg: 0.4 mm
Test Mode:	Continuous
Control Params:	Infinite
ExamMinutes:	30
Individual Zero:	No Ind. Zero
Conditioning:	Disabled
Cycles Complete:	7
Current Status:	Test Done
Started Testing:	12/30/2011 8:01:36 AM
Elapsed Time:	7:30

TEST RESULTS IN SELECTED UNITS

Transmission @ 21 %	0.019315	cc / [pkg - day]
Transmission @ 100%	0.091976	cc / [pkg - day]
Permeation:	1.448461	cc - mil / [pkg - day]

DATA POINTS

Time	Rate/Event	Time	Rate/Event	Time	Rate/Event	Time	Rate/Event
0:00	Test	1:00	0.081440	2:00	0.092307	3:00	0.093571
4:00	0.092998	5:30	0.092020	6:30	0.091160	7:30	0.091976
8:11	Complete