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TEST REPORT

Client: TMC Hallcrest
Riverside Buildings
Dock Road Industrial Estate
Connah's Quay
Deeside
Flintshire
CH5 4DS

FAO: Sarah Denson-Wright

Sample: **IRREVERSIBLE**

Laboratory No: S1106349/AT Reference No: IRREVERSIBLE STRIPS

Order No: PORO7475 Date received: 1st December 2011

Description: Self-adhesive colour changing temperature indicators in ranges A – E. Temperature graduations as follows:

- A : 37°C - 65°C
- B : 71°C - 110°C
- C : 116°C - 154°C
- D : 160°C - 199°C
- E : 204°C - 260°C

Test conducted: Thermal Accuracy testing for Thermax 8 Level Ranges A to E.

Results: See report details.

Digitally signed by Steve Wilcox
Reason: I am approving this document
Date: 2012-01-11 14:36Z

Steve Wilcox
General Consumer Products Manager

10th January 2012

Registered in England and Wales Registered No.2787492

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REPORT DETAILS

The date of testing should be taken as between the date of the initial receipt of the sample and the date of the issue of the report unless otherwise specified.

Opinions and interpretations are outside the scope of UKAS accreditation.

METHOD

Labels from ranges A to E were individually adhered to the hot stage of a Linkam temperature controller and the glass cover placed over to shield the apparatus from atmospheric changes. The temperature of the stage was set at approximately 5°C below the first temperature of the label. The heating rate was set at 30°C/ per min and the test was started. Once the stage had reached the desired temperature the heating rate was lowered to 2°C/ per min and the maximum temperature was set above the last temperature event of the label. The temperature the indicators showed signs of turning from white to black was recorded (start temperature) along with the temperature that the label turned completely black (end temperature). Both readings were taken from the Linkam digital display. The start and end melt points of all the indicators were tested and recorded and the mid melt point was calculated by adding the start and end of melt temperatures and dividing by two.

RESULTS

The difference between the indicator temperatures and the Linkam temperatures ranged from 0 to 1.7°C, with percentages ranging from 0 to 2.1%. See table below.

Range	Batch	Indicator temp °C	Start melt point temp °C	End melt point temp °C	Average melt point temp °C	Indicator and Linkam temp difference	
						°C	%
A	11027 H	37	37.1	37.9	37.5	0.5	1.4
		40	40	40.6	40.3	0.3	0.8
		43	43.5	44.2	43.9	0.9	2.1
		46	45.7	46	45.9	0.1	0.2
		49	48.9	50.5	49.7	0.7	1.4
		54	53.7	54	53.9	0.1	0.2
		60	60.6	61.4	61	1	1.7
		65	54.9	65.8	65.4	0.4	0.6

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Range	Batch	Indicator temp °C	Start melt point temp °C	End melt point temp °C	Average melt point temp °C	Indicatorand Linkam temp difference	
						°C	%
B	**11027H**	71	70.9	71.7	71.3	0.3	0.4
		77	77	77.8	77.4	0.4	0.5
		82	82	82.8	82.4	0.4	0.5
		88	87.9	88.9	88.4	0.4	0.5
		93	92.7	93.2	93	0	0
		99	98.6	99.2	98.9	0.1	0.1
		104	103.9	104.7	104.3	0.3	0.3
		110	110	111	110.5	0.5	0.5
C	**11013H**	116	115.8	116.8	116.3	0.3	0.3
		121	120.5	121.2	120.9	0.1	0.1
		127	126.5	127.3	126.9	0.1	0.1
		132	131.6	132.9	132.3	0.3	0.2
		138	137.4	138.3	138.3	0.1	0.1
		143	142.3	143.3	143.3	0.2	0.1
		149	148.3	149.2	149.2	0.2	0.1
		154	154.1	155.8	155.8	1	0.6
D	**11010H**	160	159.4	161.7	160.6	0.6	0.4
		166	166	167.9	167	1	0.6
		171	170.4	171.3	170.9	0.1	0.1
		177	176.2	176.6	176.4	0.6	0.3
		182	180.9	181.6	181.3	0.7	0.4
		188	187.7	188.7	188.2	0.2	0.1
		193	193.4	195.8	194.6	1.6	0.8
		199	199.1	201.7	200.4	1.4	0.7
E	**11023H**	204	203	204.7	203.9	0.1	0
		210	211.4	211.9	211.7	1.7	0.8
		216	215.5	217.6	216.6	0.6	0.3
		224	223.8	225.1	224.5	0.5	0.2
		232	231.8	233.4	232.6	0.6	0.3
		241	240.2	241.3	240.8	0.2	0.1
		249	249.4	250.8	250.1	1.1	0.4
		254	253	254.1	253.6	0.4	0.2
		260	259.4	261.2	260.3	0.3	0.1

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ILLUSTRATION

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