

10 Portman Road, Reading, Berkshire, RG30 1EA, UK Phone: 0118 939 8700 Fax: 0118 939 8701 E-Mail: enquiries@struk.co.uk www.struk.co.uk

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MINIMA

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.

Steve Wilcox

General Consumer Products Manager

10th January 2012



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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.

		Indicator	Start melt	End melt point temp	Average melt point	Indicator and Linkam temp difference	
Range	Batch	temp °C	°C	°C	temp °C	°C	%
	11027 H	37	37.1	37.9	37.5	0.5	1.4
A		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	%
		71	70.9	71.7	71.3	0.3	0.4
В	11027H	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
		116	115.8	116.8	116.3	0.3	0.3
C	11013H	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
Е	11023Н	204	203	204.7	203.9	0.1	0
	1102311	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


