

28 November, 2005

Astec Paints Australasia Pty Ltd
262 Marion Road
NETLEY SA 5037

Attention: Mr Mark Waters

REPORT 05MAAD12330 – Part 1

CLIENT REFERENCE: Request

TITLE: Astec SRI Test

SAMPLE IDENTIFICATION: Astec Energy Star Ceram-4000

WORK REQUESTED: Determine Solar Reflectance Index according to ASTM E 1980-01

INVESTIGATING OFFICER(S): Natalie Powell

Monty Luke
Laboratory Manager
Materials Services

1. INTRODUCTION

Mark Waters of Astec Paints Pty Ltd supplied reflectance and emittance data of Astec Energy Star Ceram-4000 samples of various colours to the Amdel Materials Services Laboratory. It was requested that Amdel should carry out calculations to determine the Solar Reflectance Index according to ASTM E1980 – 01. The samples supplied for evaluation were identified as follows.

- ❖ Astec Energy Star Ceram-4000
- ❖ Astec Energy Star colours

2. PROCEDURE

The sample data supplied was inserted into the American Cool Roof Rating Council ASTM E 1980-01 calculator and the results reported for three convective coefficients corresponding to low, medium and high wind conditions. Standard solar conditions of Solar Flux = 1000W/m² Ambient Air Temp = 310K (37°C), Ambient Sky Temp = 300K (27°C) and no conductive heat transfer were used for all calculations. Each sample used the Emittance value for Astec Energy Star Ceram-4000 white base of 0.87.

3. RESULTS

- ❖ Low Wind Conditions

The results of the calculations of the Astec Energy Star Ceram-4000 sample under low wind conditions were as follows.

Colour	SRI (low)	Surface Temp (K)	Surface Temp (°C)	Surface Temp (°F)
White Base	108.56	317	44	111
8068 C/B Heritage Red	40.27	355	82	179
8069 Red Iron Oxide	42.27	353	80	177
8070 Terracotta	46.83	348	78	172
8071 Clay Tone	52.63	348	75	167
8072 Warm Clay	70.13	338	65	149
8073 Tuscany	79.14	333	60	141
8074 C/B Ironbark	44.42	352	79	175
8075 Pioneer	28.73	361	88	190
8076 Regal Brown	41.74	354	81	177
8077Yallara Brown	39.60	355	82	179
8078 C/B Weathered Copper	42.41	353	80	177
8079 Charcoal	34.02	358	85	185
8080 C/B Slate Grey	44.01	352	79	175
8082 Nimbus	37.60	356	83	181

Colour	SRI (low)	Surface Temp (K)	Surface Temp (°C)	Surface Temp (°F)
8083 C/B Beige	62.98	342	69	157
8084 Merino	82.35	332	59	137
8085 Off White	91.34	327	54	129
8086 Sandalwood	94.17	325	52	126
8087 C/B Smooth Cream	96.72	324	51	123
8088 Mocca	67.51	340	67	152
8089 Stone	83.19	331	58	137
8098 Carraige Green	23.22	364	91	195
8099 Bruns Green	24.92	363	90	194
8100 Mist Green	48.99	350	77	170
8101 C/B Rivergum	49.66	349	76	170
8102 Olive Green	42.81	353	80	176
8103 Blue Grass	38.27	356	83	181
8104 Botanic	27.55	361	88	191
8105 French Green	62.43	342	69	157
8108 C/B Mountain Blue	24.40	363	90	194
8081 C/B Birch Grey	73.86	336	63	146
8094 Quarry	70.54	338	65	149
8095 Mid Biscuit	84.03	331	58	136
8097 Light Latte	85.99	330	57	134
8106 C/B Saltbush	65.04	341	68	155
8107 Cobalt	35.34	357	84	184
8110 Pewter	71.79	337	64	148
8111 Autumn	72.06	337	64	148
8112 Chino	71.65	337	64	148
8091 Broken White	100.70	321	48	119
8092 Neutral White	96.72	324	51	123
8093 Pale Buscuit	92.33	326	53	128
8096 Light Cream	97.00	324	51	123
8109 Gull Grey	82.35	332	59	137

❖ Medium Wind Conditions

The results of the calculations of the Astec Energy Star Ceram-4000 sample under medium wind conditions were as follows.

Colour	<u>SRI</u> (medium)	<u>Surface Temp (K)</u>	<u>Surface Temp (°C)</u>	<u>Surface Temp (°F)</u>
White Base	108.72	315	42	107
8068 C/B Heritage Red	41.10	340	67	152
8069 Red Iron Oxide	43.09	339	66	151
8070 Terracotta	47.61	335	64	148
8071 Clay Tone	53.35	335	62	144
8072 Warm Clay	70.68	329	56	132
8073 Tuscany	79.60	325	52	126
8074 C/B Ironbark	45.21	338	65	150
8075 Pioneer	29.68	344	71	160
8076 Regal Brown	42.56	339	66	151
8077Yallara Brown	40.44	340	67	153
8078 C/B Weathered Copper	43.22	339	66	151
8079 Charcoal	34.91	342	69	157
8080 C/B Slate Grey	44.81	338	65	150
8082 Nimbus	38.46	341	68	154
8083 C/B Beige	63.60	331	58	137
8084 Merino	82.78	324	51	124
8085 Off White	91.67	321	48	118
8086 Sandalwood	94.47	320	47	116
8087 C/B Smooth Cream	97.00	319	46	115
8088 Mocca	68.08	330	57	134
8089 Stone	83.61	324	51	124
8098 Carraige Green	24.22	346	73	164
8099 Bruns Green	25.90	346	73	163
8100 Mist Green	49.74	337	64	146
8101 C/B Rivergum	50.41	336	63	146
8102 Olive Green	43.62	339	66	151
8103 Blue Grass	39.12	341	68	154
8104 Botanic	28.50	345	72	161
8105 French Green	63.06	332	59	137
8108 C/B Mountain Blue	25.38	346	73	163

<u>Colour</u>	<u>SRI</u> <u>(medium)</u>	<u>Surface Temp (K)</u>	<u>Surface Temp (°C)</u>	<u>Surface Temp (°F)</u>
8081 C/B Birch Grey	74.37	327	54	130
8094 Quarry	71.09	329	56	132
8095 Mid Biscuit	84.44	324	51	123
8097 Light Latte	86.38	323	50	122
8106 C/B Saltbush	65.63	331	58	136
8107 Cobalt	36.23	342	69	156
8110 Pewter	72.32	328	55	131
8111 Autumn	72.59	328	55	131
8112 Chino	72.18	328	55	131
8091 Broken White	100.94	317	44	112
8092 Neutral White	97.00	319	46	115
8093 Pale Buscuit	92.65	320	47	117
8096 Light Cream	97.28	319	46	114
8109 Gull Grey	82.78	324	51	124

❖ High Wind Conditions

The results of the calculations of the Astec Energy Star Ceram-4000 sample under high wind conditions were as follows.

Colour	<u>SRI</u> <u>(high)</u>	<u>Surface Temp</u> <u>(K)</u>	<u>Surface Temp</u> <u>(°C)</u>	<u>Surface Temp</u> <u>(°F)</u>
White Base	108.87	312	39	102
8068 C/B Heritage Red	41.85	326	53	127
8069 Red Iron Oxide	43.82	325	52	325
8070 Terracotta	48.30	323	51	124
8071 Clay Tone	53.99	323	50	122
8072 Warm Clay	71.17	320	47	116
8073 Tuscany	80.01	318	45	113
8074 C/B Ironbark	45.93	325	52	125
8075 Pioneer	30.52	328	55	131
8076 Regal Brown	43.30	325	52	126
8077 Yallara Brown	41.20	326	53	127
8078 C/B Weathered Copper	43.95	325	52	126
8079 Charcoal	35.71	327	54	129
8080 C/B Slate Grey	45.53	325	52	125
8082 Nimbus	39.24	326	53	128
8083 C/B Beige	64.15	321	48	118
8084 Merino	83.16	317	44	111
8085 Off White	91.98	315	42	108
8086 Sandalwood	94.75	315	42	107
8087 C/B Smooth Cream	97.25	314	41	106
8088 Mocca	68.60	320	47	117
8089 Stone	83.98	317	44	111
8098 Carraige Green	25.11	329	56	133
8099 Bruns Green	26.78	329	56	132
8100 Mist Green	50.41	324	51	124
8101 C/B Rivergum	51.08	324	51	123
8102 Olive Green	44.35	325	52	126
8103 Blue Grass	39.89	326	53	127
8104 Botanic	29.36	328	55	131
8105 French Green	63.61	321	48	119
8108 C/B Mountain Blue	26.27	329	56	133

<u>Colour</u>	<u>SRI</u> <u>(high)</u>	<u>Surface Temp</u> <u>(K)</u>	<u>Surface Temp</u> <u>(°C)</u>	<u>Surface Temp</u> <u>(°F)</u>
8081 C/B Birch Grey	74.83	319	46	115
8094 Quarry	71.57	320	47	116
8095 Mid Biscuit	84.80	317	44	111
8097 Light Latte	86.73	316	43	110
8106 C/B Saltbush	66.17	321	48	118
8107 Cobalt	37.02	327	54	129
8110 Pewter	72.79	319	46	115
8111 Autumn	73.06	319	46	115
8112 Chino	72.66	319	46	115
8091 Broken White	101.15	314	41	105
8092 Neutral White	97.25	314	41	106
8093 Pale Biscuit	92.94	315	42	108
8096 Light Cream	97.53	314	41	106
8109 Gull Grey	83.16	317	44	111