

2 November, 2005

Astec Paints Australasia Pty Ltd
262 Marion Road
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Attention: Mr Mark Waters

REPORT 05MAAD10444 Part 1
Reissue #1 – 1/11/05 – Data Corrections

CLIENT REFERENCE: Request

TITLE: Astec SRI Test

SAMPLE IDENTIFICATION: Astec Energy Star EC-100 Dirtguard

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

INVESTIGATING OFFICER(S): Natalie Powell

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1. INTRODUCTION

Mark Waters of Astec Paints Pty Ltd supplied reflectance and emittance data of Astec Energy Star EC-100 Dirtguard 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 EC-100 Dirtguard
- ❖ Astec Energy Star colours

2. PROCEDURE

The sample data supplied were 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 EC-100 Dirtguard white base of 0.90.

3. RESULTS

- ❖ Low Wind Conditions

The results of the calculations of the Astec Energy Star EC-100 Dirtguard sample under low wind conditions were as follows.

| <u>Colour</u> | <u>SRI (low)</u> | <u>Surface Temp (K)</u> | <u>Surface Temp (°C)</u> | <u>Surface Temp (°F)</u> |
|---------------------------|------------------|-------------------------|--------------------------|--------------------------|
| White Base | 113.83 | 314 | 41 | 106 |
| 8068 C/B Heritage Red | 41.47 | 354 | 81 | 178 |
| 8069 Red Iron Oxide | 43.45 | 353 | 80 | 176 |
| 8070 Terracotta | 47.95 | 363 | 90 | 195 |
| 8071 Clay Tone | 53.68 | 347 | 74 | 166 |
| 8072 Warm Clay | 70.94 | 338 | 65 | 149 |
| 8073 Tuscany | 79.84 | 333 | 60 | 140 |
| 8074 C/B Ironbark | 45.56 | 352 | 79 | 174 |
| 8075 Pioneer | 30.08 | 360 | 87 | 189 |
| 8076 Regal Brown | 42.92 | 353 | 80 | 176 |
| 8077 Yallara Brown | 40.81 | 354 | 81 | 178 |
| 9078 C/B Weathered Copper | 43.58 | 353 | 80 | 175 |

| <u>Colour</u> | <u>SRI (low)</u> | <u>Surface Temp (K)</u> | <u>Surface Temp (°C)</u> | <u>Surface Temp (°F)</u> |
|---------------------------|------------------|-------------------------|--------------------------|--------------------------|
| 8079 Charcoal | 35.30 | 357 | 84 | 184 |
| 8080 C/B Slate Grey | 45.17 | 352 | 79 | 174 |
| 8082 Nimbus | 38.84 | 355 | 82 | 180 |
| 8083 C/B Beige | 63.89 | 342 | 69 | 156 |
| 8084 Merino | 83.00 | 331 | 58 | 137 |
| 8085 Off White | 91.87 | 326 | 53 | 128 |
| 8086 Sandalwood | 94.66 | 325 | 52 | 125 |
| 8087 C/B Smooth Cream | 97.18 | 323 | 50 | 123 |
| 8088 Mocca | 68.36 | 339 | 66 | 151 |
| 8089 Stone | 83.83 | 331 | 58 | 136 |
| 8098 Carraige Green | 24.63 | 363 | 90 | 194 |
| 8099 Bruns Green | 26.32 | 362 | 89 | 192 |
| 8100 Mist Green | 50.08 | 349 | 76 | 169 |
| 8101 C/B Rivergum | 50.74 | 349 | 76 | 168 |
| 8102 Olive Green | 43.98 | 352 | 79 | 175 |
| 8103 Blue Grass | 39.49 | 355 | 82 | 179 |
| 8104 Botanic | 28.91 | 361 | 88 | 190 |
| 8105 French Green | 63.35 | 342 | 69 | 156 |
| 8108 C/B Mountain Blue | 25.80 | 362 | 89 | 193 |
| 8081 C/B Birch Grey | 74.63 | 336 | 63 | 145 |
| 8094 Quarry | 71.35 | 338 | 65 | 148 |
| 8095 Mid Biscuit | 84.66 | 330 | 37 | 135 |
| 8097 Light Latte | 86.60 | 329 | 56 | 133 |
| 8106 C/B Saltbush | 65.92 | 341 | 68 | 154 |
| 8107 Cobalt | 36.61 | 356 | 83 | 182 |
| 8110 Pewter | 72.58 | 337 | 64 | 147 |
| 8111 Autumn | 72.85 | 337 | 64 | 147 |
| 8112 Chino | 72.44 | 337 | 64 | 147 |
| 8091 Broken White | 101.10 | 321 | 48 | 119 |

| <u>Colour</u> | <u>SRI (low)</u> | <u>Surface Temp (K)</u> | <u>Surface Temp (°C)</u> | <u>Surface Temp (°F)</u> |
|--------------------|------------------|-------------------------|--------------------------|--------------------------|
| 8092 Neutral White | 97.18 | 323 | 50 | 123 |
| 8093 Pale Buscuit | 92.85 | 326 | 53 | 127 |
| 8096 Light Cream | 97.46 | 323 | 50 | 122 |
| 809 Gull Grey | 83.00 | 331 | 58 | 137 |

❖ Medium Wind Conditions

The results of the calculations of the Astec Energy Star EC-100 Dirtguard sample under medium wind conditions were as follows.

| <u>Colour</u> | <u>SRI (medium)</u> | <u>Surface Temp (K)</u> | <u>Surface Temp (°C)</u> | <u>Surface Temp (°F)</u> |
|---------------------------|---------------------|-------------------------|--------------------------|--------------------------|
| White Base | 113.89 | 313 | 40 | 103 |
| 8068 C/B Heritage Red | 41.91 | 340 | 67 | 152 |
| 8069 Red Iron Oxide | 43.88 | 339 | 66 | 150 |
| 8070 Terracotta | 48.36 | 342 | 69 | 155 |
| 8071 Clay Tone | 54.06 | 335 | 62 | 143 |
| 8072 Warm Clay | 71.23 | 328 | 55 | 132 |
| 8073 Tuscany | 80.08 | 325 | 52 | 126 |
| 8074 C/B Ironbark | 45.99 | 338 | 65 | 149 |
| 8075 Pioneer | 30.58 | 344 | 71 | 159 |
| 8076 Regal Brown | 43.36 | 339 | 66 | 151 |
| 8077 Yallara Brown | 41.26 | 340 | 67 | 152 |
| 9078 C/B Weathered Copper | 44.01 | 339 | 66 | 150 |
| 8079 Charcoal | 35.77 | 342 | 69 | 156 |
| 8080 C/B Slate Grey | 45.59 | 338 | 65 | 149 |
| 8082 Nimbus | 39.30 | 341 | 68 | 154 |
| 8083 C/B Beige | 64.22 | 331 | 58 | 137 |
| 8084 Merino | 83.23 | 324 | 51 | 124 |
| 8085 Off White | 92.05 | 321 | 48 | 118 |
| 8086 Sandalwood | 94.82 | 320 | 47 | 116 |
| 8087 C/B Smooth Cream | 97.32 | 319 | 46 | 114 |

| <u>Colour</u> | <u>SRI (medium)</u> | <u>Surface Temp (K)</u> | <u>Surface Temp (°C)</u> | <u>Surface Temp (°F)</u> |
|---------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| 8088 Mocca | 68.66 | 329 | 56 | 134 |
| 8089 Stone | 84.05 | 324 | 51 | 123 |
| 8098 Carraige Green | 25.17 | 346 | 73 | 163 |
| 8099 Bruns Green | 26.84 | 345 | 72 | 162 |
| 8100 Mist Green | 50.48 | 336 | 63 | 146 |
| 8101 C/B Rivergum | 51.14 | 336 | 63 | 145 |
| 8102 Olive Green | 44.41 | 339 | 66 | 150 |
| 8103 Blue Grass | 39.95 | 340 | 67 | 153 |
| 8104 Botanic | 29.42 | 344 | 71 | 160 |
| 8105 French Green | 63.68 | 331 | 58 | 137 |
| 8108 C/B Mountain Blue | 26.32 | 345 | 72 | 162 |
| 8081 C/B Birch Grey | 74.90 | 327 | 54 | 129 |
| 8094 Quarry | 71.64 | 328 | 55 | 132 |
| 8095 Mid Biscuit | 84.88 | 323 | 50 | 123 |
| 8097 Light Latte | 86.80 | 323 | 50 | 121 |
| 8106 C/B Saltbush | 66.24 | 330 | 57 | 135 |
| 8107 Cobalt | 37.08 | 341 | 68 | 155 |
| 8110 Pewter | 72.86 | 328 | 55 | 131 |
| 8111 Autumn | 73.13 | 328 | 55 | 131 |
| 8112 Chino | 72.72 | 328 | 55 | 131 |
| 8091 Broken White | 101.23 | 317 | 44 | 112 |
| 8092 Neutral White | 97.32 | 319 | 46 | 114 |
| 8093 Pale Buscuit | 93.02 | 320 | 47 | 117 |
| 8096 Light Cream | 97.60 | 319 | 46 | 114 |
| 809 Gull Grey | 83.23 | 324 | 51 | 124 |

❖ High Wind Conditions

The results of the calculations of the Astec Energy Star EC-100 Dirtguard sample under high wind conditions were as follows.

| <u>Colour</u> | <u>SRI (High)</u> | <u>Surface Temp (K)</u> | <u>Surface Temp (°C)</u> | <u>Surface Temp (°F)</u> |
|---------------------------|-------------------|-------------------------|--------------------------|--------------------------|
| White Base | 113.94 | 311 | 38 | 100 |
| 8068 C/B Heritage Red | 42.32 | 326 | 53 | 127 |
| 8069 Red Iron Oxide | 44.28 | 325 | 52 | 126 |
| 8070 Terracotta | 48.73 | 325 | 52 | 126 |
| 8071 Clay Tone | 54.40 | 323 | 50 | 122 |
| 8072 Warm Clay | 71.50 | 320 | 47 | 116 |
| 8073 Tuscany | 80.30 | 318 | 45 | 113 |
| 8074 C/B Ironbark | 46.37 | 325 | 52 | 125 |
| 8075 Pioneer | 31.04 | 328 | 55 | 131 |
| 8076 Regal Brown | 43.75 | 325 | 52 | 126 |
| 8077 Yallara Brown | 41.66 | 326 | 53 | 127 |
| 9078 C/B Weathered Copper | 44.41 | 325 | 52 | 126 |
| 8079 Charcoal | 36.20 | 327 | 54 | 129 |
| 8080 C/B Slate Grey | 45.98 | 325 | 52 | 125 |
| 8082 Nimbus | 39.71 | 326 | 53 | 128 |
| 8083 C/B Beige | 64.51 | 321 | 48 | 118 |
| 8084 Merino | 83.43 | 317 | 44 | 111 |
| 8085 Off White | 92.21 | 315 | 42 | 108 |
| 8086 Sandalwood | 94.97 | 315 | 42 | 107 |
| 8087 C/B Smooth Cream | 97.46 | 314 | 41 | 106 |
| 8088 Mocca | 68.94 | 320 | 47 | 117 |
| 8089 Stone | 84.25 | 317 | 44 | 111 |
| 8098 Carraige Green | 25.65 | 329 | 56 | 133 |
| 8099 Bruns Green | 27.31 | 329 | 56 | 132 |
| 8100 Mist Green | 50.84 | 324 | 51 | 123 |
| 8101 C/B Rivergum | 51.50 | 324 | 51 | 123 |
| 8102 Olive Green | 44.80 | 325 | 52 | 126 |

| <u>Colour</u> | <u>SRI (High)</u> | <u>Surface Temp (K)</u> | <u>Surface Temp (°C)</u> | <u>Surface Temp (°F)</u> |
|---------------------------|-------------------|-------------------------|--------------------------|--------------------------|
| 8103 Blue Grass | 40.36 | 326 | 53 | 127 |
| 8104 Botanic | 29.88 | 328 | 55 | 131 |
| 8105 French Green | 63.98 | 321 | 48 | 118 |
| 8108 C/B Mountain Blue | 26.80 | 329 | 56 | 132 |
| 8081 C/B Birch Grey | 75.14 | 319 | 46 | 114 |
| 8094 Quarry | 71.90 | 319 | 46 | 116 |
| 8095 Mid Biscuit | 85.07 | 317 | 44 | 111 |
| 8097 Light Latte | 86.99 | 316 | 43 | 110 |
| 8106 C/B Saltbush | 66.52 | 321 | 48 | 118 |
| 8107 Cobalt | 37.50 | 327 | 54 | 128 |
| 8110 Pewter | 73.12 | 319 | 46 | 115 |
| 8111 Autumn | 73.39 | 319 | 46 | 115 |
| 8112 Chino | 72.98 | 319 | 46 | 115 |
| 8091 Broken White | 101.34 | 313 | 40 | 105 |
| 8092 Neutral White | 97.46 | 314 | 41 | 106 |
| 8093 Pale Buscuit | 93.18 | 315 | 42 | 108 |
| 8096 Light Cream | 97.74 | 314 | 41 | 106 |
| 809 Gull Grey | 83.43 | 317 | 44 | 111 |