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# SDC
# SOLENOIDAL DETECTOR NOTES

## WHITE PAINT FOR SCINTILLATOR EDGES

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SDC Note

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The edges of the scintillating tiles for the SDC calorimeter will be painted white. The best paint is BICRON 620. The best method to apply this paint is by a compressed air sprayer for large areas and by dense foam poly brush for single edges. BICRON paint did not show any degradation by 2 Mrad of irradiation.

SDC Central Calorimeter Action Item # 24.

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There are many commercial white paints on the market with the amount of titanium dioxide varying between 10% and 25%. The higher the percentage of titanium dioxide the whiter the paint. Several of these paints were tested for this study. The BICRON 620 paint is the most reflective, while other high gloss white paints, such as Latex High Gloss Enamel manufactured by Coronado Paint Company of Edgewater, Florida have about 90% of the reflectivity of the BICRON 620 paint. In a 10 cm x 10 cm x 0.4 cm tile with a "sigma" groove and BCF91A WLS fiber inserted, the BICRON 620 paint increases the light output by 35%. A two pronged study was undertaken for this project. The first was to locate alternate paints and the second was to improve the application of the BICRON paint. We were successful in both studies.

In addition we tested the reduction in reflectivity of the two best paints, namely the Coronado and Bicron, for radiation damage. With a radiation dose of 1.8 Mrad, no measurable degradation of reflectivity was observed.

The first study tested four (4) high gloss white paints. Each paint was applied to three glass slides and the reflectivity was measured. The light source was a UV excited SCSF38 fiber and the reflected light was measured by a Hamamatsu R329 bialkalai PM tube. As long as the angle of reflection was different from the angle of incidence, the relative values of reflectivity were essentially the same. For this report the PM tube looked vertically down on the horizontal glass slide, while the light beam had an angle of incidence of 45°.

TABLE 1. Reflectivity of white paints. Paints 2 to 4 are high gloss latex enamel.

| PAINT | Slide 1. | Slide 2. | Slide 3. | Average | Relative |
|---|---|---|---|---|---|
| 1. BICRON 620 | 135 | 139 | 135 | 136 ± 2 | 1.00 |
| 2. Coronado | 122 | 124 | 121 | 122 ± 1 | 0.90 |
| 3. Pelikan | 102 | 103 | 108 | 104 ± 2 | 0.76 |
| 4. Devoe | 111 | 111 | 109 | 110 ± 1 | 0.81 |

The paints were applied by high density foam poly brush. The number 1 and 2 paints were also applied to the edges of two SCSN38 (10 cm x 10 cm x 0.4 cm) tiles with "sigma" grooves. With BCF91A fiber inserted in the groove, the light output was measured for minimum ionizing cosmic muons. The Coronado Latex High Gloss Enamel paint tile-fiber unit pulse height was 7% less than that of BICRON 620 painted tile-fiber unit.

The second study was focused on how to improve the application of the BICRON 620 paint. Two methods gave very positive results. The first is to apply the paint with a Poly-Brush, which is a dense foam. This method is very easy and fast and one quick stroke is all it took. These brushes are very cheap, (we paid 35 cents each) and comes in various widths. An even faster and just as uniform painting technique is the use of a disposable high pressure paint spray. We used the Preval Sprayer, (Yonkers, NY) and paid less than $ 4.00. This method is excellent to paint large areas, such as a stack of scintillator tiles. Both methods are fast and very easy to apply the BICRON 620 paint.

CONCLUSION: the BICRON 620 paint is the choice to be applied with a dense foam brush, or for large areas, with a paint sprayer. Even though the High Gloss Coronado is almost as good, its long term stability is not known.

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