

PROJECT REPORT ON
**“DEVELOPMENT OF SOLAR ABSORBER COATINGS TO IMPROVE
THE PERFORMANCE OF PARABOLIC TROUGH COLLECTOR”**
(Sponsored by KSCST)



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ABSTRACT

Currently, solar parabolic trough collector (PTC) is employed for a variety of applications such as power generation, industrial steam generation, and hot water Production. Parabolic trough collector is preferred for steam generation because high temperatures can be obtained without any serious degradation of the collector's efficiency. One of the approaches is to increase the operating temperature of the solar field. To accomplish this, new more efficient selective coatings are needed that have both high solar absorptance and low thermal emittance. Although designs are likely to use coating in evacuated environments, the coatings need to be stable in air in case the vacuum is breached. Current coatings do not have the stability and performance desired for moving to higher operating temperatures.

In view of the above, the present study focuses on development of high quality absorber coatings on annular tubes for solar water heater applications by thermal spray process and performance of various absorber coatings (solo chrome, black chrome and nickel chrome) were compared.

Solo chrome, black chrome, nickel chrome powders were successfully plasma sprayed on stainless steel substrate. The coating thickness of 50 microns was maintained for all the materials. Performance test of uncoated pipe and coated stainless steel pipe were carried out under identical test condition by varying different flow rate.

Result reveals that coated specimens exhibits higher water out let Temperature compared to uncoated one. Further among all coatings SOLO CHROME coated specimen shows a superior performance in terms of water out let Temperature under all the flow rates.