Parabolic Equation Impact on Solar Reflector Conversion Efficiency

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This research examined the effect of changing the parabolic equation of a parabolic trough solar reflector on its solar conversion efficiency. This research was conducted to advance the improvements upon the parabolic trough solar reflector by helping scientists to understand the relationship between reflector shape and solar conversion efficiency. Four model troughs with varying equations (altering the width of the opening of the trough) underwent 30 trials beneath a lamp—imitation sun—to determine which converted more solar energy to thermal energy. The reflector whose trough had the equation of y=x^2/4 converted the most energy overall; the high F-value, which was greater than the F-critical value, indicated that the data rejected the null hypothesis and supported the hypothesis that if the equation of the parabola of the parabolic trough was changed, then the solar reflector would convert solar energy into thermal energy at different rates.

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