

**PROCESSING ON HIGH EFFICIENCY SOLAR  
COLLECTOR COATINGS**

by

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Coatings are selective as the result of varying reflectivity with respect to wavelength. They are obtained by making the absorptive coating sufficiently thin to take advantage of a substrate with good infrared reflectivity. The problems with selective coatings usually come with their susceptibility to physical and environmental damage. Future development will come with coatings that have better transparency to infrared radiation and increased durability.

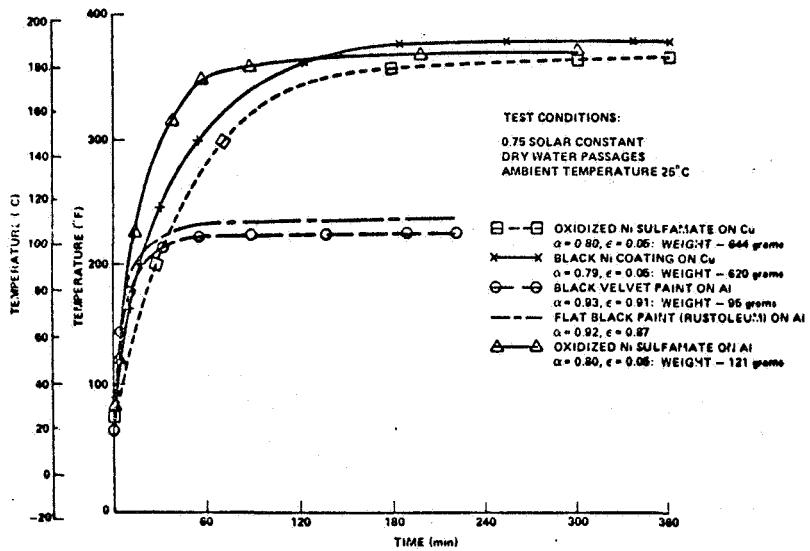


Figure 1. Stagnation temperature comparison ( $0.01579 \text{ m}^2$  replaceable panel evacuated tube collectors).

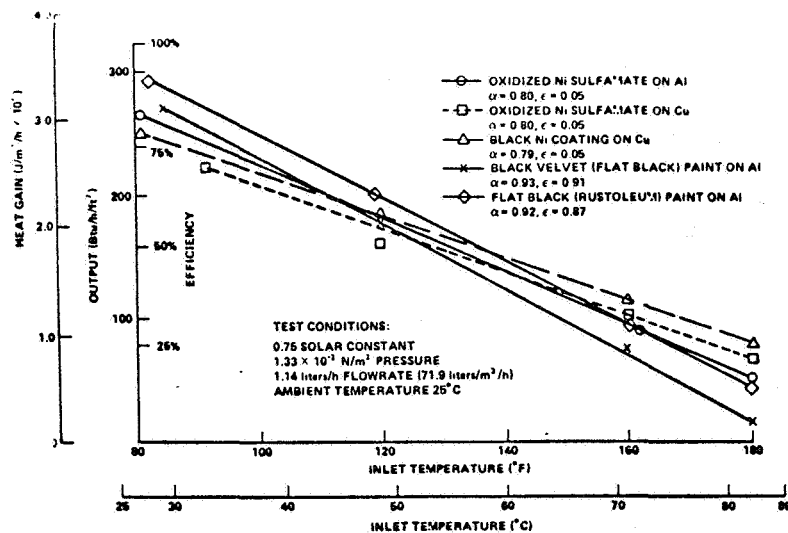


Figure 2. Heat gain versus inlet temperature curves ( $0.01579 \text{ m}^2$  replaceable panel evacuated tube collector).

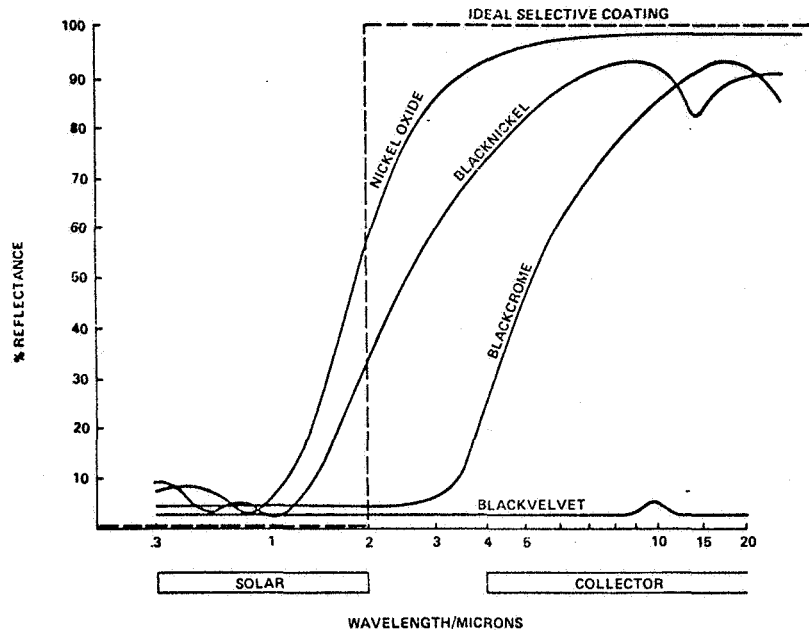


Figure 3. Comparison of ideal selective coating and actual coatings.

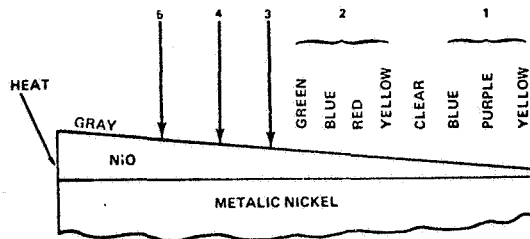


Figure 4. Oxide film and interference patterns.



Figure 5. Interference patterns on black nickel (entire panel).

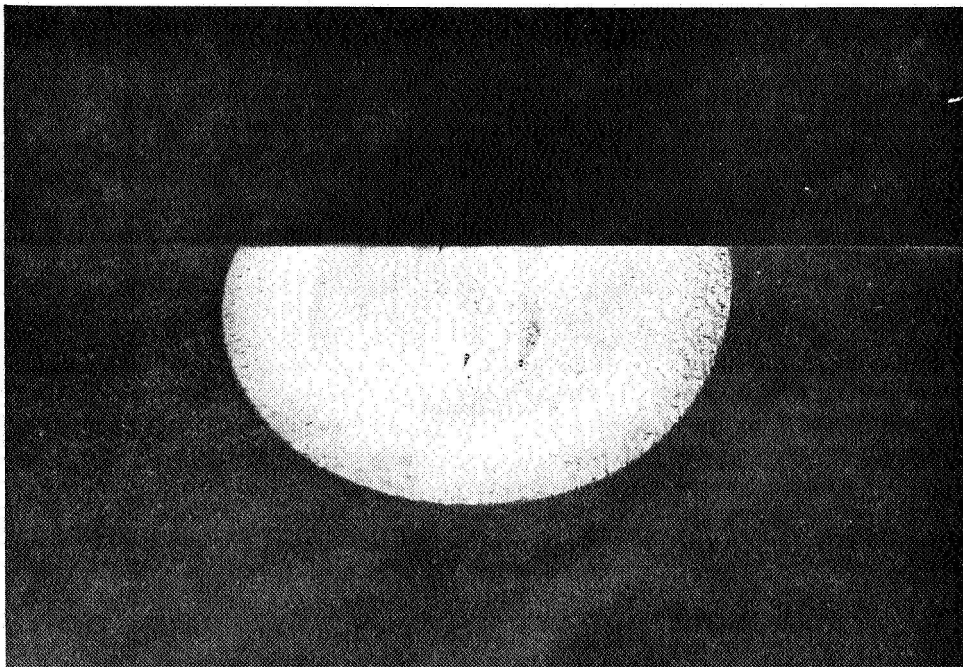


Figure 6. Interference patterns on black nickel (clamped area).

- BUFFING
- CHEMICAL POLISHING
- ELECTRO-CHEMICAL POLISHING
- PLATING

Figure 7. Reflective surface processing.

- COPPER 4%
- NICKEL 6%
- ALUMINUM 4%
- CHROMIUM 8%

Figure 8. Typical reflective surfaces.

- OXIDATION
- PLATING
- CHEMICAL OXIDATION
- VAPOR DEPOSITION

Figure 9. Typical selective coatings.

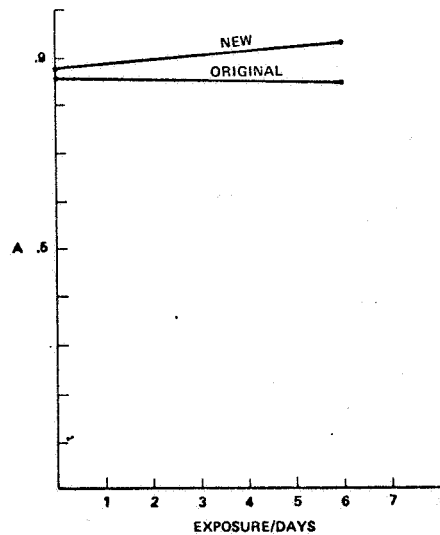


Figure 10. Improved black nickel weathering test.

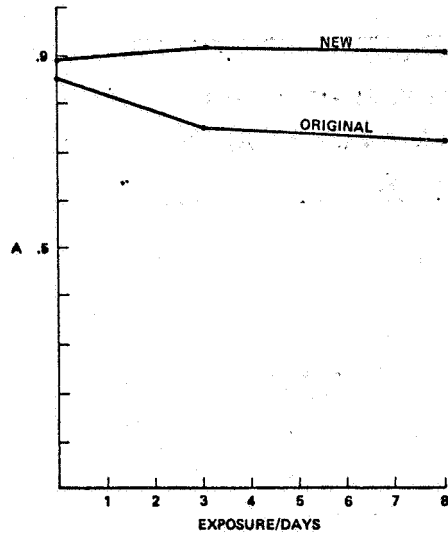


Figure 11. Improved black nickel humidity test.

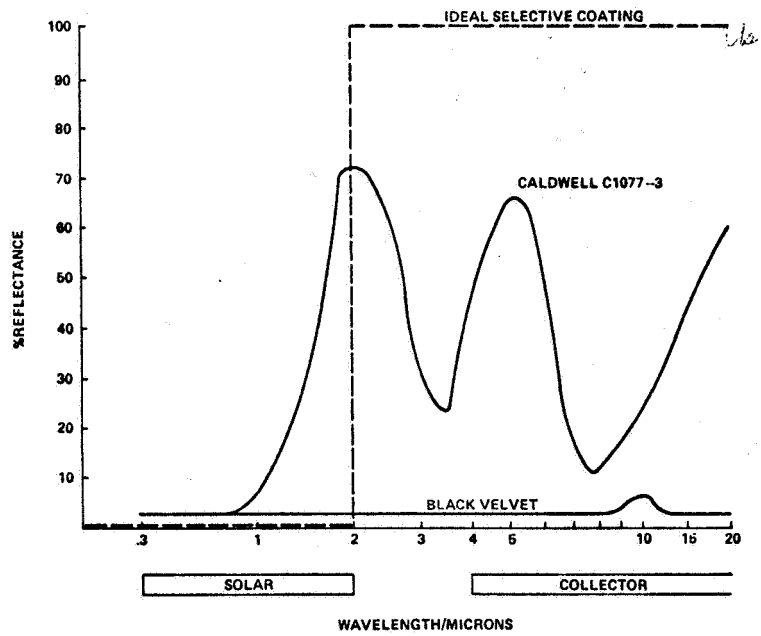


Figure 12. Comparison of ideal selective coating with a presently available selective paint.