



SUBANA GROUP



## BHAGYANAGAR INDIA LIMITED *Copper Products*

*An ISO 9001-2000 Company*

Products	Type of Customers
Conductors, Field Coils & Copper Rods	- Autoparts manufacturers (Starter Motors & Alternators)
Paper Covered Copper Conductors	- Transformer Manufacturing Industries
Copper Flats & Strips	- Industrial Batteries & Switchgear Manufacturing Industries
Copper Tubes	- Refrigeration & Air Conditioning Industries
Copper Sheets	- Transformer Ancilliary Industries
NALSUN Solar Copper Fins	- Solar Water Heater Manufacturing Units



## COPPER PRODUCT RANGE

### ETP/OFC/SILVER BEARING COPPER PRODUCTS

CONTINUOUS COPPER ROD  
Sizes: 8mm to 40mm



### APPLICATIONS

Telecommunication  
Power & Distribution Transformers  
Terminals, Battery Connectors  
Electrodes in Wire Cutting Machine &  
Other Power Engineering Publications

COPPER TUBES  
Sizes: 3/16", 1/4", 5/16", 3/8", 7/16",  
1/2", 9/16", 5/8", 11/16", 15/16", 1",  
1 1/8", 1 1/4", 1 1/2" and  
Thickness 16 SWG to 25 SWG



Refrigeration  
Air Conditioning  
Heat Exchangers  
Commutators & Slip rings in Automobile  
Industry

COPPER FLATS / BUS BARS  
Min. Size 15mm x 3mm  
Max. Size 150mm x 20mm



Traction Motors, Earthing  
Heavy Electrical Machines, Panel Boards

COPPER SHEETS  
Sizes: Max Width 190mm  
Min. Thickness 0.05mm



Switchgears & Low Range Transformers  
Automobile Radiators Lightning  
Arresters, Solar Energy Collectors &  
Copper Gaskets & Power Cables.

ANNEALED BARE COPPER STRIPS  
WITH DIFF. RADIUS  
Sizes: Max. 18x3mm  
Min. 2.67x1.14



Armature Pins in Starter Motors  
Connectors in Heavy Electrical Machines  
etc.,

PAPER INSULATED COPPER  
CONDUCTORS (Strip & Wire)



Power & Distribution Transformers

COTTON TAPE INSULATED  
COPPER COILS  
(Field Coils)



All Kinds of Starter Motors for  
Automobile Engines.

NALSUN SOLAR COPPER FINS



Solar Water Heater Manufacturing



SURANA GROUP

## **SURANA SOLAR ABSORBER**

With absorptance  $(\alpha) > 96$

An ISO 9001-2000 company

**Surana Solar Absorber** was started in 2006 with know-how technology from **National Aerospace Laboratories**, under **Bhagyanagar India Limited**.

Integrated Manufacturers of the solar absorber right from the stage of melting of copper cathodes and it completes all the process in-house, we use **Oxygen-Free copper tubes and**

**sheets for manufacturing solar absorbers. Oxygen - Free copper has superior thermal properties for the absorber compared to ordinary copper therefore we are lowcost manufacturers.**

We use ultrasonic welding for manufacturing of Solar Absorber which has high thermal conductivity between fin and tube.

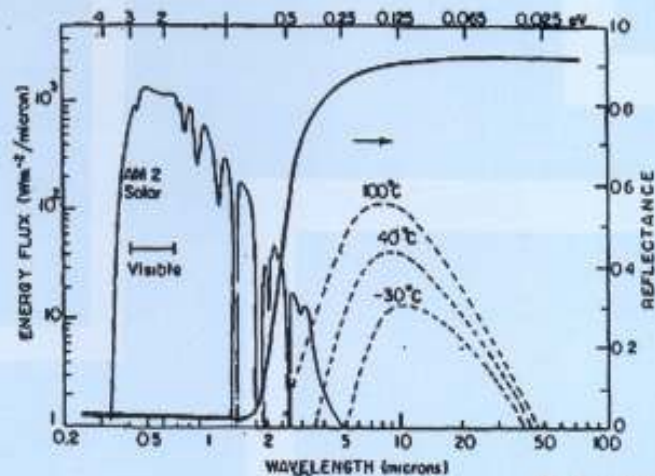
**The Values give are the mean values of 9 samples**

Values	Optical properties of unaged absorber coatings	
	Solar Absorptance, $\alpha$	Emittance, $E$
Mean Value $\pm$ standard deviation	0.960 $\pm$ 0.001	0.12 $\pm$ 0.002
Maximum value	0.970	0.125
Minimum value	0.965	0.096

Surana Solar absorber (flat-plate collectors) are used for temperature requirement upto 120°C.  
SIZES of solar flat plate collector-

Standard size- Fin and Tube Assembly  
Fin-D12XW118Xl900mm,  
Tube-D12.5XG0.56XL1921mm, and also we make as per customer requirement

**We use solar selective coating(black chromium), which has high absorptance and low emittance in the thermal region.** Spectrum of solar radiation with a super imposed selective reflectance of a solar selective coating is shown below.



XDL 800-57500

This **black chromium coating** has an edge over other coatings for solar collectors applications because of the following advantages.

- 1) High color stability against solar radiation and higher thermal resistance than colored aluminum
- 2) Higher abrasion resistance than coloured zinc
- 3) Higher thermal stability and abrasion resistance than paints.
- 4) Higher resistance against impact and breakage than enamel.
- 5) The colour and physical properties of black chromium are not affected by higher temperatures – 200 0c
- 6) Its colour is not affected by ultraviolet light and free from colour change when exposed to sun
- 7) The thickness of the black chromium film can be controlled in such a way that the emittance is mainly controlled by the substrate

THE SELECTIVE COATING ENSURES ABSORPTANCE OF SOLAR RADIATION TO THE EXTENT OF 96% OR MORE AND THE LOSS BY THERMAL RADIATION WITHIN 12%