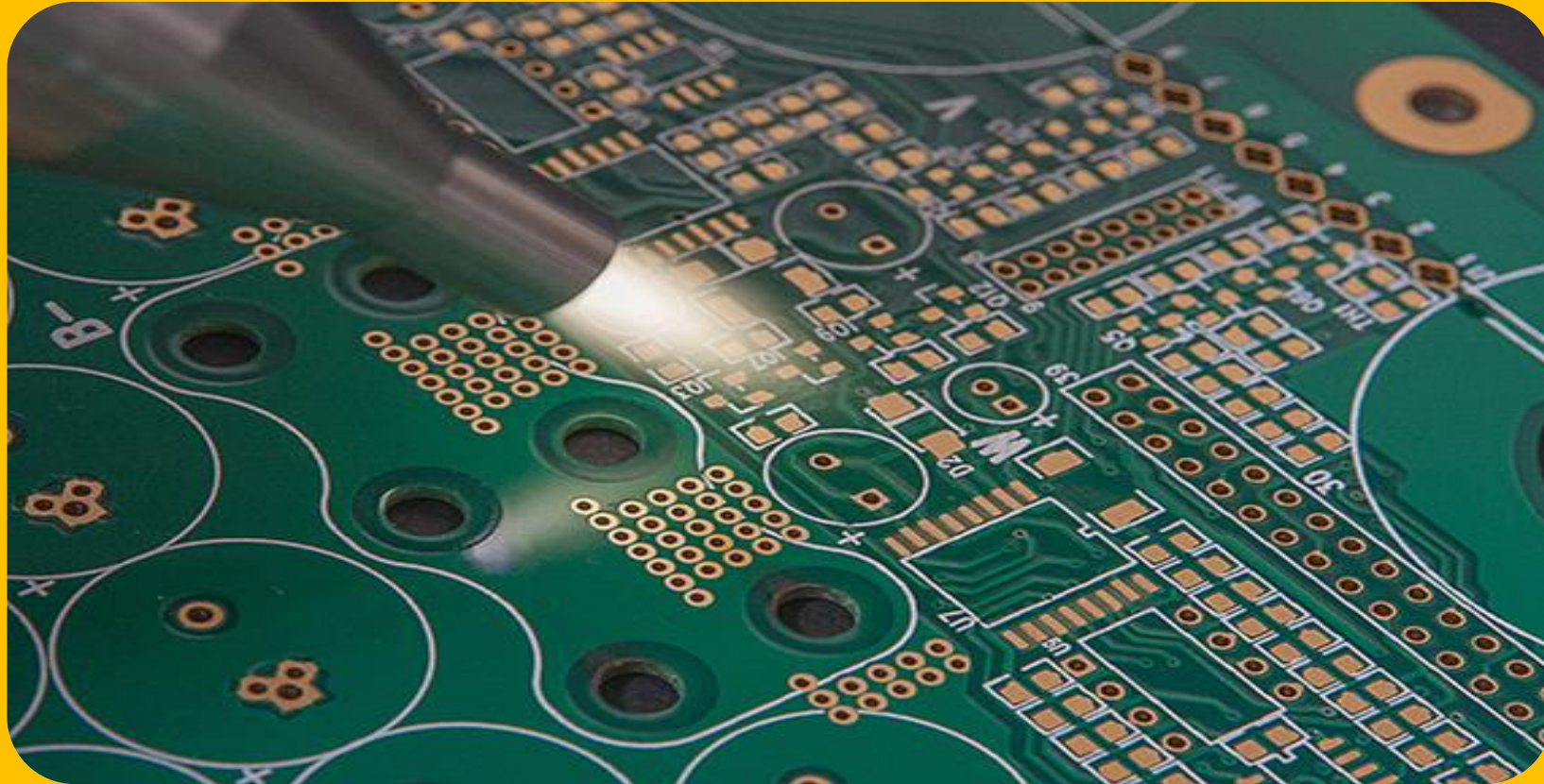


2022 Surface Treating Representative Meeting



AUTOMOTIVE



COATING ADHESION



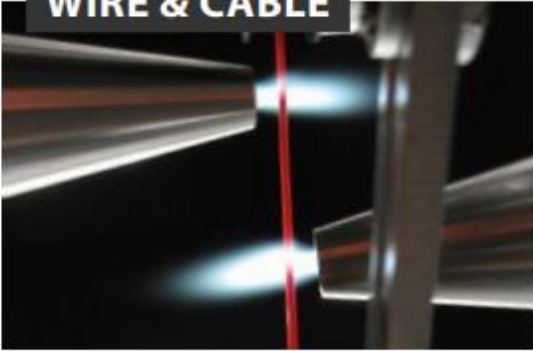
ELECTRONICS



FOLDING CARTON



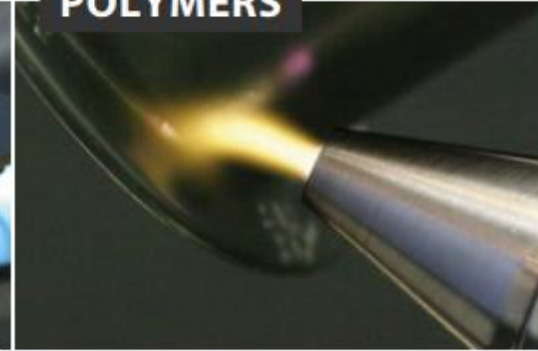
WIRE & CABLE



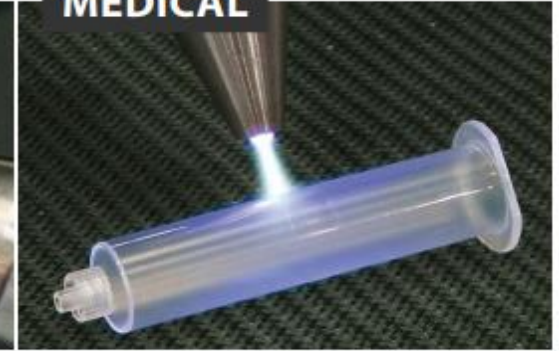
PACKAGING



POLYMERS



MEDICAL



262.255.6070 / www.enerconind.com/treating

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AIS Target Markets

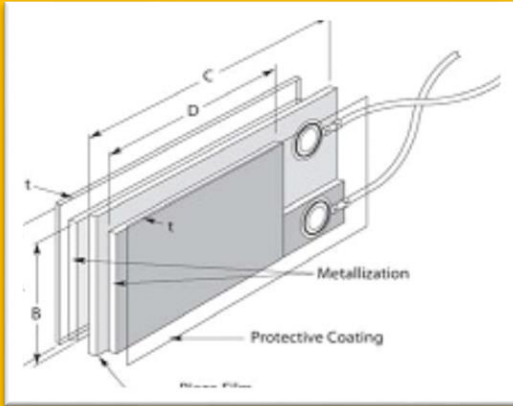
- Electronics
- Printing
- Wire and Cable
- Automotive
- Aerospace
- Consumer Products
- Packaging
- Windows and Doors
- General Manufacturing

Electronics

Applications

- Lead Frames – electroplating
- Cleaning Semiconductors
- Remove oxide layers, solder flux and glue
- Component level cleaning
- Bonding electronic parts
- PCB
- LCD Display

LCD Displays



Piezoelectric Sensor



Junction Box - bonding



Glass/frame bonding

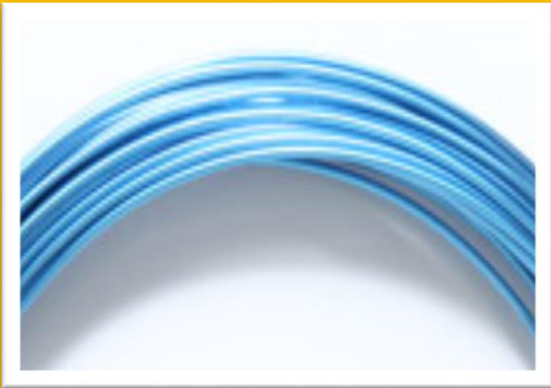


Lead Frames

Printing/Painting

Applications

- Printing on aluminum
- Printing on Plastic
- Wire and Tubing - HDPE Pipe and Conduit
- Fiber Optic Cable and Wire
- Closures and Bottles
- Natural Gas



Printing on Wire/Tubing



Automotive



Packaging



Medical

Applications

- Cleaning lab slides
- catheters
- Bonding dissimilar materials
- Cleaning glass/plastic components
- Cleaning Activating tubing
- Coating Filters (low pressure)
- Removing organics/bio-contaminants
- Bonding SS to Polypropylene (needles)
- Disinfecting



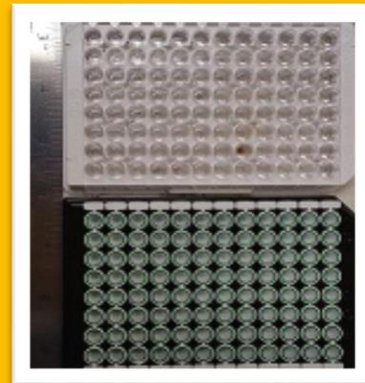
Balloon/catheter



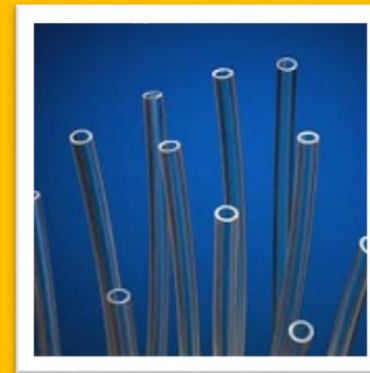
Glass disc



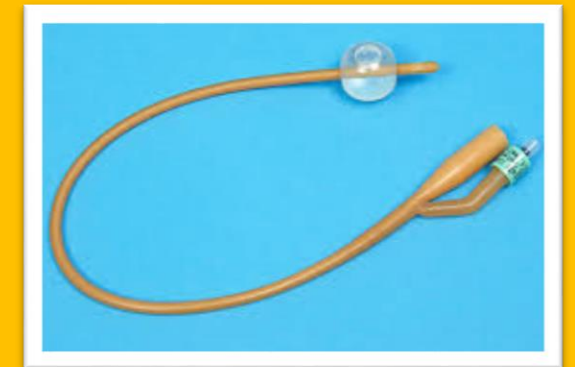
Glass slides



Test trays



Plastic tubing



Catheters

Wire and Cable

Applications

- Printing on jacket
- Activation prior to coating
- Cleaning Aluminum/Copper prior to jacket



Automotive

Applications

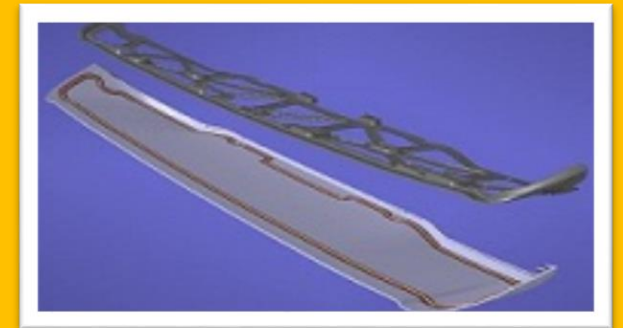
- Lightweight Vehicles
- Aluminum – engine block and transmission
- Composites bonding
- Door seal
- Eliminate metal fasteners
- Headlamps
- Structural bonding truck cargo trailer
- Automotive Injection Molded Parts



dashboard



Door seal



Car Spoiler

Aerospace

Applications

- Window bonding
- Composite Bonding
- Carbon Fiber Reinforced Plastic (CFRP)
- Remove dust and static before bonding
- Eliminate organics before bonding
- Pretreatment for Welding



Window bonding



Welding Prep



Wing assemblies

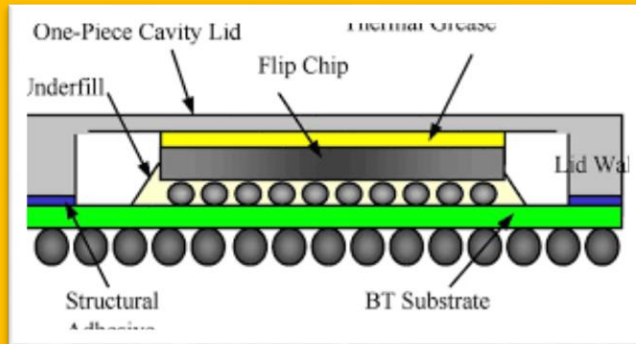


Composites bonding

Consumer Products/Electronics

Applications

- Flooring
- Cell phone cover activations
- PCB cleaning and activation
- Circuit board chip manufacturing
- Flip Chip
- Doors and Windows



Flip chip

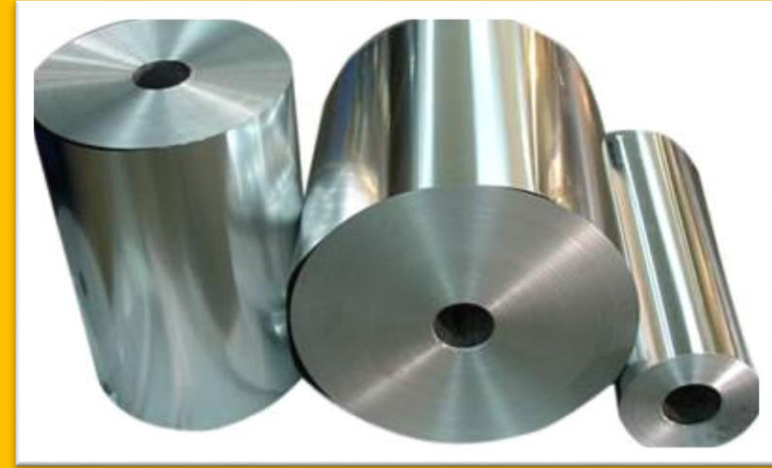


flooring

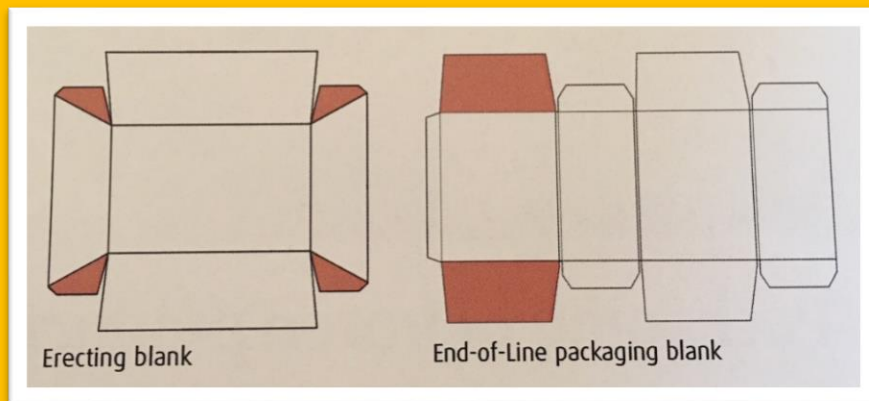
Packaging

Applications

- Roll to roll Al for cans
- Adhesive lines for box
- Fold and Glue box



Roll to roll Aluminum



Box/Packaging

Window and Door

Applications

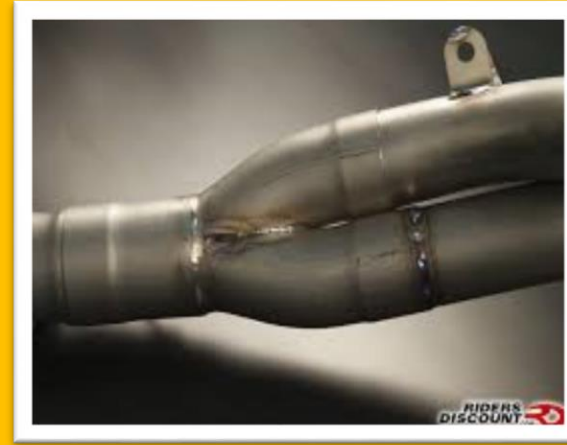
- Glass to Aluminum
- Glass to plastic
- Joint bonding for frames
- Clean glass prior to coatings



General Manufacturing

Applications

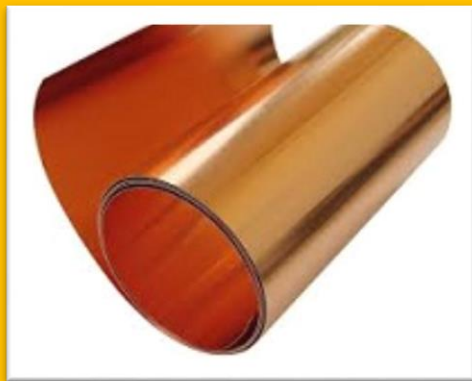
- Thin Wall Tubing
- Welding Applications – improve strength
- Graphene – remove organics from copper
- Window Blinds
- Solar Cells
- 3D printing – coating and Z axis
- Appliances



Welding



Aluminum Tubing



Copper Cleaning



Solar cells/junction box



Window blinds



3D printing



®

enercon

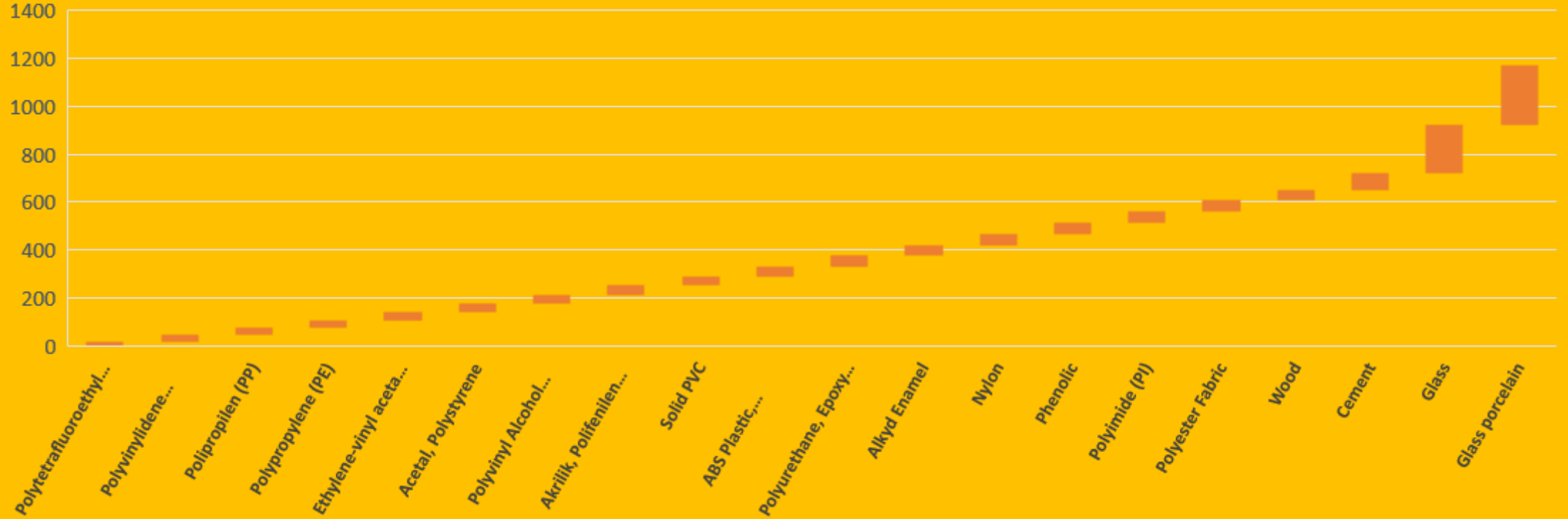
INDUSTRIES LIMITED

Plasma Surface Treatment



Surface Energy of Meterials

Artış Düşüş Toplam



Surface Treatment Plastics Typical Starting Dynes

Material	Initial Dyne Level	Post Treatment Dyne Level
ABS	31-35	44-72
ETFE	30>	50
ETFE	30>	50
Flexible PVC	33-36	40-56
PEEK	30	>72
PET	35	44-60

Material	Initial Dyne Level	Post Treatment Dyne Level
Polycarbonate	37	56-72
Polyethylene	32-34	42-60+
Polypropylene	30-34	45-60
Polystyrene	36	52-70
PTFE	30>	50
Rigid PVC	33-36	42-60+
TPU	34	48

Several factors can impact initial and post treatment dyne level readings.
The chart above is provided as a general guideline of typical results.

Plasma-Generated Adhesion

Depending on the material to be treated and the nature of the plasma gas, several mechanisms contribute to adhesion:

- **Surface Activation:** Plasma activation has a large mechanical effect, continuously removing single atoms from surfaces.
- **Density of Functional Groups:** Adhesion strength can be linearly aligned to functional group density.
- **Free Radical Effect:** Remaining radical sites highly reactive and promote adhesion of inks, coating and adhesives.
- **Increased Polarity:** Reactive gases added to the plasma activation process can deliver new surface functionalities which reverse polarity of materials, such as polypropylene.
- **High Wettability:** After plasma activation, aqueous solutions with high surface tension spread on the activated surface, showing very small contact angles.
- **Reductive Chemistry:** On foils, surface oxide layers form within minutes. Plasma activation with hydrogen-containing plasma gas reduces superficial oxide layers to improve foil surfaces for bonding.

