AMT POLYMER AND METAL COATINGS

Applied Membrane Technology, Inc.

AMT
POLYMER AND METAL COATINGS

Who We Are

- Headquartered in Minneapolis, Minnesota, USA
- 30+ years of Industry expertise
- Collaborative research with major non-profit Research Institutions in Europe, India and USA

AMT
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What We Do

AMT provides solutions to resolve your material surface-related issues and problems, whatever your field of research or business.

We can rapidly tailor membranes and coatings to enhance your lubricity, bonding, tissue interaction and filtration issues to meet the exacting demands of your filtration separation process or bio-medical requirements.

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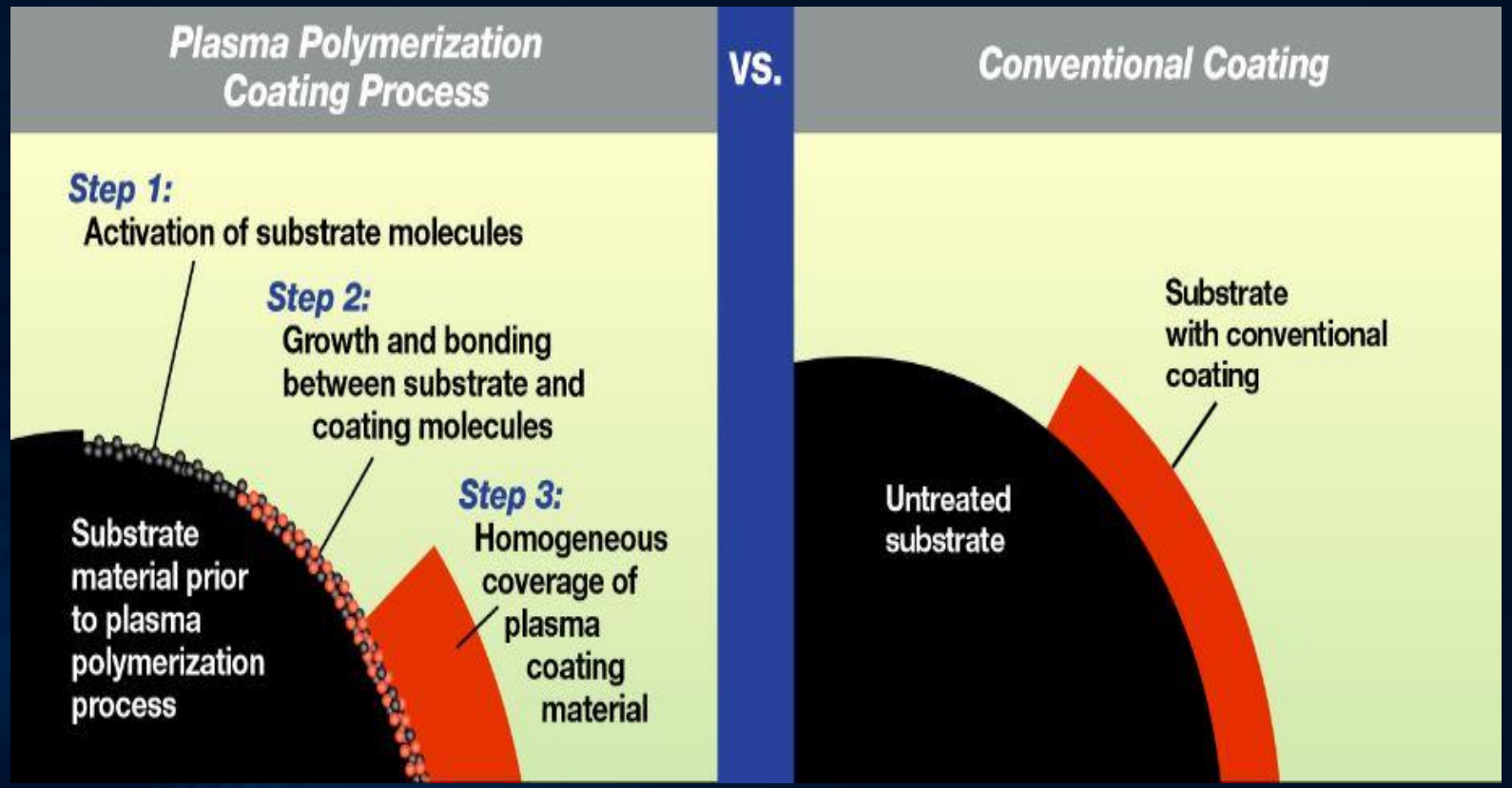
AMT's Polymer and Metal Coatings:

- Applied without solvents directly on to the surfaces of tubing, fiber or small precision components.
- Coatings are covalently bonded.
- AMT's plasma coating technology assures extreme durability, no peeling or flaking.



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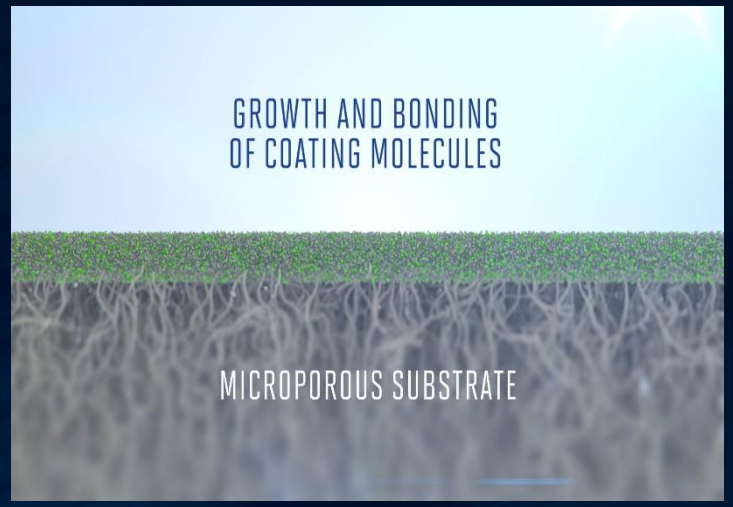
AMT's Polymer and Metal Coatings:

STEP 1



STEP 2

STEP 3

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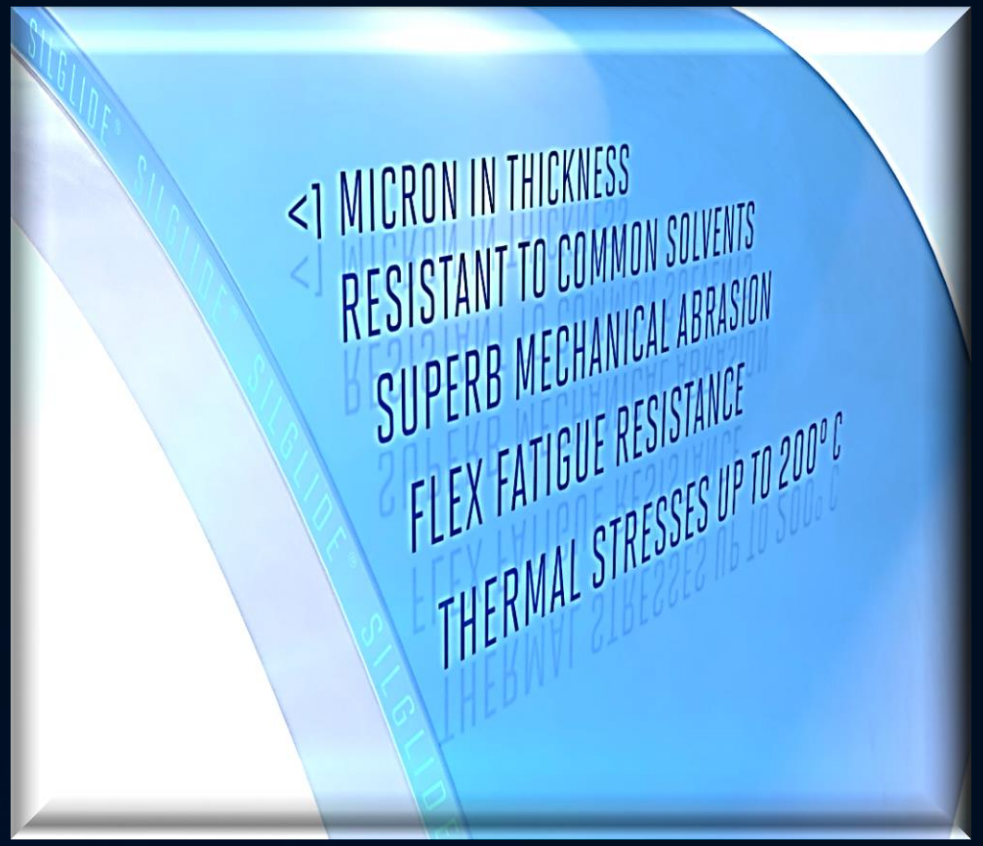
AMT's Silglide® Coating:

- AMT's Silglide® Coating is less than a micron in thickness, is resistant to common solvents, mechanical abrasions, flexural fatigue resistant and thermal stresses up to 200° C.

- AMT's Silglide® Coating applications include the coating of defibrillator and pacemaker leads, wide variety of catheters, O-rings and other implantable devices.



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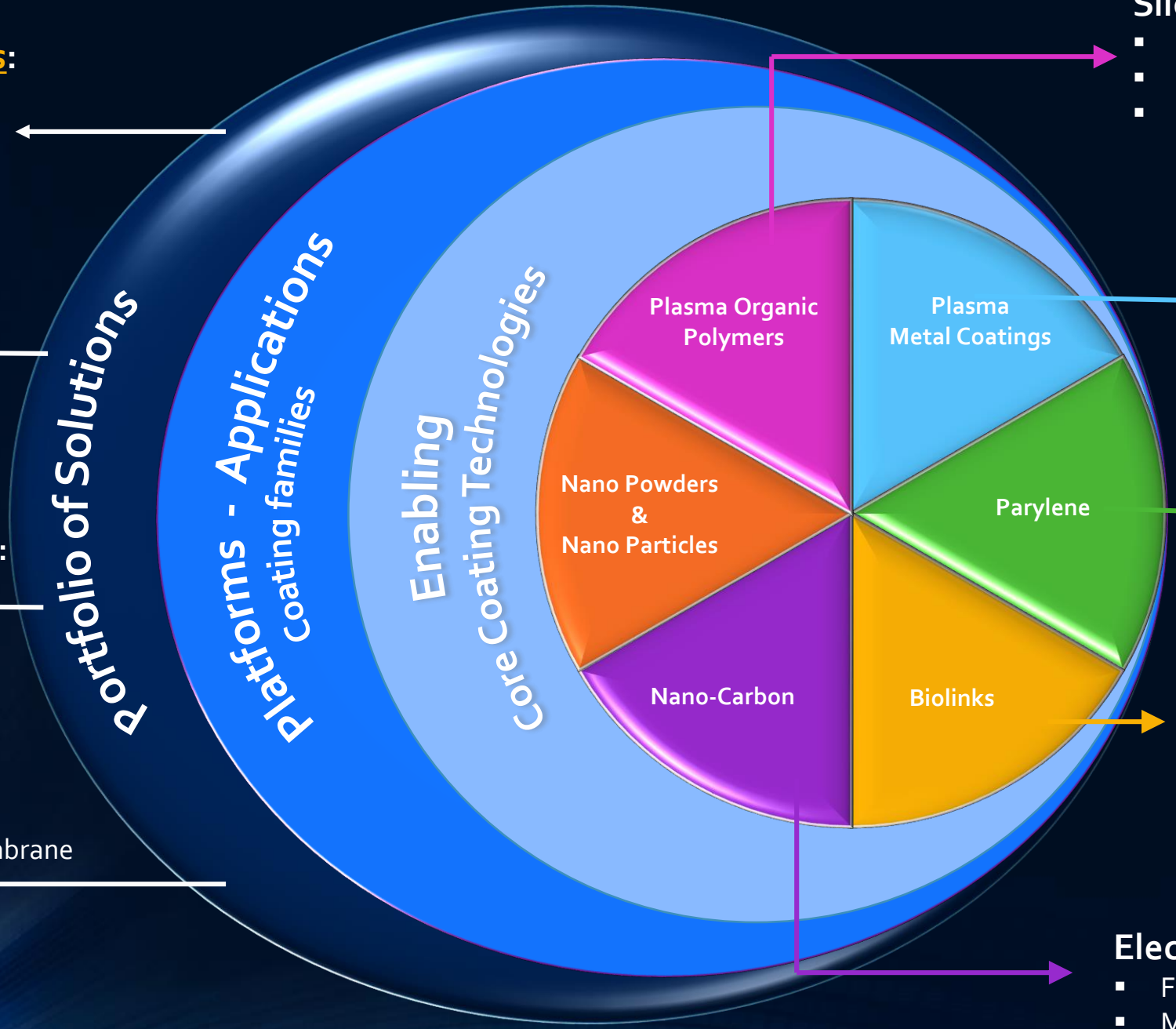

Silglide® Solutions:

- Implantable Leads
- Cardiac Rhythm Management
- Neurological

Carbond Solutions:

- Can be coated on Fluoropolymers
- Can be coated on Non-polar surfaces

Fluorocarb Solutions:

- Waterproofing
- Biomaterial and Pharma Industry

Artificial Lungs:

- Hemolung
- Extracorporeal Membrane Oxygenation
- Wearable

Siloxanes

- Copolymers
- PEO
- Hydro-Carbons

Nano Catalytic Metal Coatings

- Nanostructured Silver coatings for micro porous substrates

Parylene – A

- Promotes tissue growth

Parylene - F

- Enhances Moisture resistance

Bio-Tethers

- HPEO
- PEO

Electro-Conductive

- Fuel Cells
- Membrane

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Capabilities:

- Surface coatings to improve performance of Cardiac Rhythm Management devices.
- Coating Technologies for incorporating drugs or attachment of drug permeable control barrier layers.
- Metal Coating to place anti-microbial copper and silver based coatings onto plastic and cellulose based porous materials.
- Silglide® Coating with unique surface bioactive binding sites for subsequent attachment of heparin, peptides and monoclonal antibodies.
- Plasma coating to improve bondability and physical strength of coated material component

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Applications:

- Silglide® Coating on lead systems and pulse generators for CRM-Devices.
- Silglide®, Parylene or Metal deposition on electrophysiology catheters and devices for Atrial Fibrillation.
- Heparin and Silglide® Coating on Trans catheter Valve and delivery system for Trans catheter Aortic Valve Replacement (TAVR) and Trans catheter Mitral Valve Repair (TMVR).

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Applications:

- Silglide® Coatings for Spinal Cord Stimulation (SCS), Deep Brain Stimulation (DBS) and Vagus Nerve Stimulation (VNS) device systems.

- Special plasma coated membranes for Volatile Organic Compounds (VOC) and water distillation systems.

- Artificial Lung Membranes : Microporous polypropylene hollow fibers coated with Siloxane and Heparin.

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POLYMER AND METAL COATINGS

SILGLIDE® COATINGS are manufactured from organo-siloxane monomers using AMT's proprietary plasma polymerization process which can be operated in continuous and batch modes.

Unlike conventional silicone coatings and hydrogels, AMT's SILGLIDE® COATINGS have very low coefficients of friction, and do not require moisture for lubricity. SILGLIDE® won't dissolve in organic solvents, Unlike most spray or liquid dispersion type coatings, AMT's SILGLIDE® COATINGS won't peel off the substrate surface.

Due to their excellent biomedical compatibility, flexible micro and macro-bend strength and excellent thermal, chemical, and radiation stability, AMT's SILGLIDE® COATINGS are finding numerous biomaterial related applications.

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FACTS ABOUT SILGLIDE® COATINGS

SILGLIDE® COATINGS are manufactured from organo-siloxane monomers using AMT's proprietary plasma polymerization process which can be operated in continuous and batch modes. During the manufacturing process, monomeric vapors are converted into covalently bonded polymeric coatings directly on the surface of the substrate. The resulting SILGLIDE® COATINGS are extremely lubricious, submicron in thickness, chemically resistant and biocompatible.

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SIZE CAPABILITIES
Choose from the full range of substrate lengths and diameters available from any supplier of tubing, flat substrates or fibers. Most tubing substrates can be coated continuously reel to reel.

EXTENSIVE THERMAL PROTECTION
Thermal stability of SILGLIDE coatings generally exceeds the substrate's thermal stability.

IDEAL FOR MEDICAL APPLICATIONS
Retains substrate mechanical properties, dimensions and performance in harsh environments. Withstands sterilization by
- Autoclave
- Ethylene oxide
- Gamma radiation

SLIPPERY SURFACE
- Removes silicone tack
- Ideal for catheter lubricity enhancement
- Limit oligomer diffusion into blood or tissue

CHEMICALLY STABLE COATINGS
- Resists attack by most organics. Stable to Saline environment

ADHESIVELY BONDABLE
- Bonds well to other materials via most adhesives

CHEMICALLY BONDED TO TUBING/FIBER
- Applied uniformly to entire surface
- Covalently bonded
- Does not strip or peel
- Can be applied to polyurethanes, silicones, fluoropolymers, hydrocarbon polymers, polyamides, polyimides, and other thermoplastic elastomers such as PVC, polyesters and polycarbonates

SURFACE ACTIVATION SITES
SILGLIDE® coatings can be processed with unique surface bioactive binding sites for subsequent attachment of Heparin, Peptides or Monoclonal antibodies.

BIOCOMPATIBILITY
Generally suitable for invasive medical applications:

1. USP Class VI Biological Test for Plastic Materials
   - SYSTEMIC INJECTION TEST
   - INTRACUTANEOUS TEST
   - 14-DAYIMPLANTATIONTEST
2. USP 14-DAY INTRAMUSCULAR IMPLANTATION TEST
3. CYTOTOXICITY EVALUATION/MEM Elution
4. Human Red Blood Cell HEMOLYSIS TEST

AMT
POLYMER AND METAL COATINGS

FLUOROCARB COATINGS are manufactured from fluorocarbon monomers by AMT's proprietary plasma polymerization process.

AMT's FLUOROCARB COATINGS have low coefficients of friction; they won't dissolve in organic solvents, yet, unlike most PTFE spray or liquid dispersion type coatings, AMT's FLUOROCARB COATINGS Won't peel off the substrate tubing/fiber or filament.

Due to their hydrophobic nature, nanometer thickness, biomedical compatibility, flexibility and excellent thermal and chemical stability, AMT's FLUOROCARB COATINGS are finding numerous applications in biomaterial and pharmaceutical areas. They are also usable for waterproofing of mobile and other electronic devices.

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FACTS ABOUT FLUOROCARB™ COATINGS

FLUOROCARB COATINGS are manufactured from fluorocarbon monomers by AMT's proprietary plasma polymerization process. During the manufacturing process, monomeric vapors are converted into covalently bonded polymeric coatings directly on the surface of substrates. The resulting FLUOROCARB COATINGS are ultrathin, chemically resistant, highly hydrophobic, and biocompatible.

AMT's FLUOROCARB COATINGS have low coefficients of friction; they won't dissolve in organic solvents, yet, unlike most PTFE spray or liquid dispersion type coatings, AMT's FLUOROCARB COATINGS Won't peel off the substrate tubing/fiber or filament.

Due to their hydrophobic nature, nanometer thickness, biomedical compatibility, flexibility and excellent thermal and chemical stability, AMT's FLUOROCARB COATINGS are finding numerous applications in biomaterial and pharmaceutical areas. They are also usable for waterproofing of mobile and other electronic devices.

SIZE CAPABILITIES

Choose from the full range of substrate lengths and diameters available from any supplier of tubing, fibers, catheters and other substrates.

EXTENSIVE THERMAL PROTECTION

The thermal resistance of FLUOROCARB coatings generally exceeds the thermal resistance of the substrate.

IDEAL FOR MEDICAL APPLICATIONS

Maintains substrate dimension and mechanical performance withstands sterilization by

- Autoclave
- Ethylene oxide

SLIPPERY SURFACE

- Removes silicones tack and enhances catheter lubricity

CHEMICALLY STABLE COATINGS

- Resists attack by organic and inorganic solvents

ADHESIVELY BONDABLE

- Bonds to commonly used adhesives through mechanical interlocking.

CHEMICALLY BONDED TO SUBSTRATES

- Applied uniformly to entire surface
- Covalently bonded
- Does not strip or peel
- Can be applied to polyurethanes, silicones, fluoropolymers, polyamides, polyimides, and other thermoplastic elastomers such as PVC, polyesters and polycarbonates

BIOCOMPATIBILITY

Generally suitable for invasive medical applications:

1. USP Class VI Biological Test for Plastic Materials
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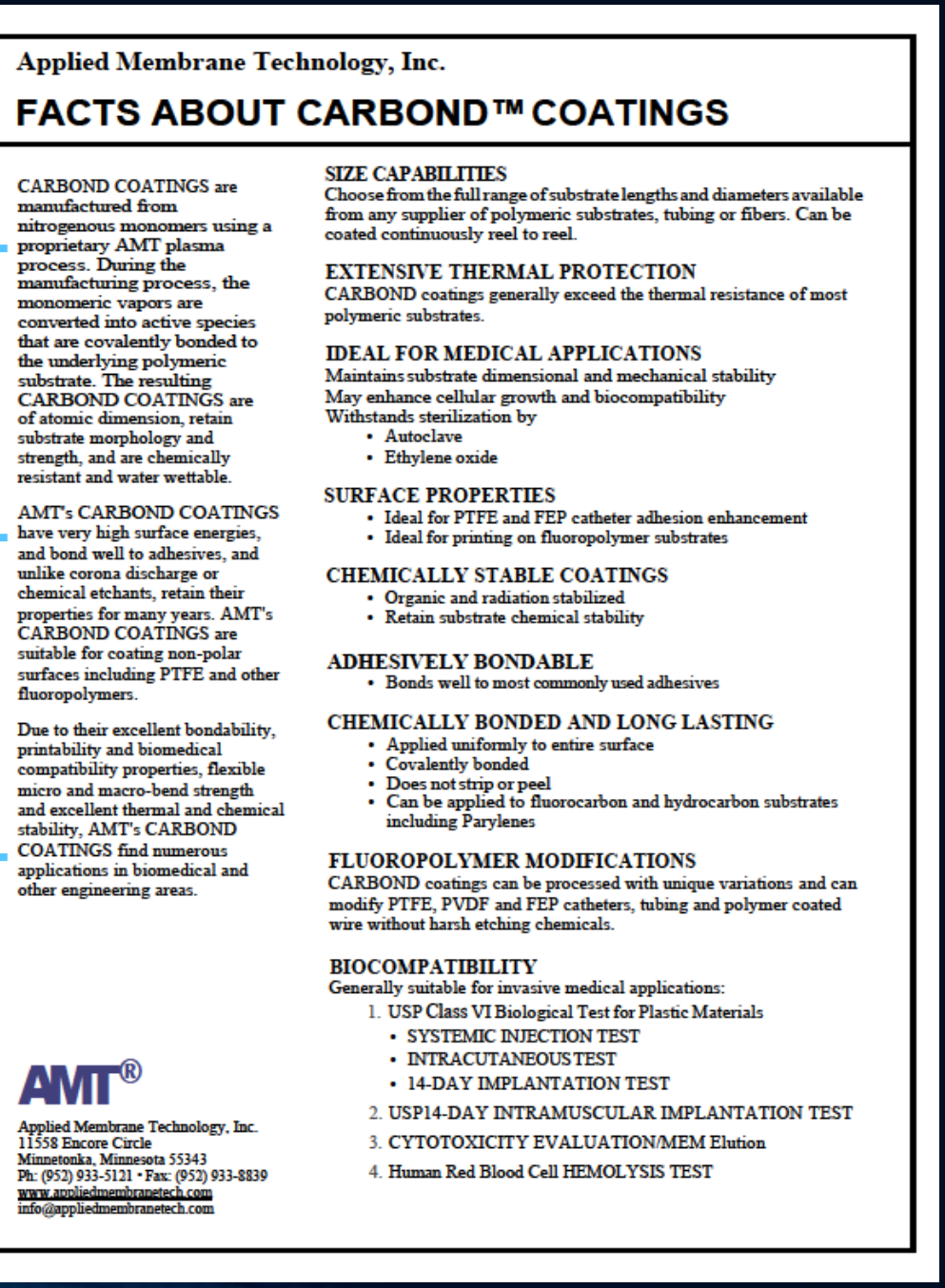
CARBOND COATINGS are manufactured from nitrogenous monomers using a proprietary AMT plasma process. During the

AMT's CARBOND COATINGS have very high surface energies, and bond well to adhesives, and unlike corona discharge or chemical etchants, retain their properties for many years. AMT's CARBOND COATINGS are suitable for coating non-polar surfaces including PTFE and other fluoropolymers.

stability, AMT's CARBOND COATINGS find numerous applications in biomedical and other engineering areas.



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FACTS ABOUT CARBOND™ COATINGS

CARBOND COATINGS are manufactured from nitrogenous monomers using a proprietary AMT plasma process. During the manufacturing process, the monomeric vapors are converted into active species that are covalently bonded to the underlying polymeric substrate. The resulting CARBOND COATINGS are of atomic dimension, retain substrate morphology and strength, and are chemically resistant and water wettable.

AMT's CARBOND COATINGS have very high surface energies, and bond well to adhesives, and unlike corona discharge or chemical etchants, retain their properties for many years. AMT's CARBOND COATINGS are suitable for coating non-polar surfaces including PTFE and other fluoropolymers.

Due to their excellent bondability, printability and biomedical compatibility properties, flexible micro and macro-bend strength and excellent thermal and chemical stability, AMT's CARBOND COATINGS find numerous applications in biomedical and other engineering areas.

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SIZE CAPABILITIES
Choose from the full range of substrate lengths and diameters available from any supplier of polymeric substrates, tubing or fibers. Can be coated continuously reel to reel.

EXTENSIVE THERMAL PROTECTION
CARBOND coatings generally exceed the thermal resistance of most polymeric substrates.

IDEAL FOR MEDICAL APPLICATIONS
Maintains substrate dimensional and mechanical stability
May enhance cellular growth and biocompatibility
Withstands sterilization by
- Autoclave
- Ethylene oxide

SURFACE PROPERTIES
- Ideal for PTFE and FEP catheter adhesion enhancement
- Ideal for printing on fluoropolymer substrates

CHEMICALLY STABLE COATINGS
- Organic and radiation stabilized
- Retain substrate chemical stability

ADHESIVELY BONDABLE
- Bonds well to most commonly used adhesives

CHEMICALLY BONDED AND LONG LASTING
- Applied uniformly to entire surface
- Covalently bonded
- Does not strip or peel
- Can be applied to fluorocarbon and hydrocarbon substrates including Parylenes

FLUOROPOLYMER MODIFICATIONS
CARBOND coatings can be processed with unique variations and can modify PTFE, PVDF and FEP catheters, tubing and polymer coated wire without harsh etching chemicals.

BIOCOMPATIBILITY
Generally suitable for invasive medical applications:
1. USP Class VI Biological Test for Plastic Materials
   - SYSTEMIC INJECTION TEST
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