CORRO CHEM PLAST

CORROSION & AIR POLLUTION CONTROL SYSTEM: - FABRICATOR OF CHEMICAL STORAGE TANK/VESSELS, HOODS, DUCTING, HEADER, DAMPER, BLOWER, SCRUBBER, CHIMNEY SYSTEMS IN FRP/PVDF/PPH/PP/PVC/HDPE.FRP STRUCTURAL PLATFORM, RAILING, LADDER, WALKWAY, GRATING, HDPE/PVC/PP/PVDF/CPVC/PPR/PPH PIPE AND FITTINGS. PP/PVC/HDPE/PPGL/FRP/RUBBER LINING AND ALL TYPE OF EPOXY FLOORING/LINING/GROUTING/COATING.

ADD- G-141 RAJMAHAL MALL, BESIDE MILLENNIUM PARK, DINDOLI, GUJARAT(24), INDIA- 394210

GSTIN: 24AMMPS0752K1ZQ | 9427171318 / 9727685579 | corrochemplast@gmail.com

PROJECT REPORT

Detailed Project Report: Usage of Non-Metallic Products and Services (PPH Ducting, PPH Piping/Tanks, UPVC Piping, FRP Lining, and FRP Tanks) in the Solar (Photovoltaic) and Semiconductor Industries.

Date: April 1, 2026.

Executive Summary.

Non-metallic materials such as. Polypropylene Homopolymer (PPH). ducting/piping/tanks, Unplasticized Polyvinyl Chloride (UPVC). piping, and. Fiberglass Reinforced Plastic (FRP). linings/tanks play a critical role in the solar photovoltaic (PV) cell manufacturing and semiconductor fabrication industries. These sectors rely on highly corrosive chemicals (e.g., hydrofluoric acid (HF), hydrochloric acid (HCl), sulfuric acid, and phosphoric acid) for wet etching, cleaning, texturing, and photolithography processes, alongside the need for ultra-pure water (UPW) and fume exhaust systems to prevent contamination and ensure safety.

Key drivers for adoption include superior corrosion resistance, high chemical inertness, low leachable (to maintain purity), lightweight design, ease of installation, and cost-effectiveness compared to exotic metals or coated steel. PPH and FRP dominate chemical handling, exhaust ducting, and storage in manufacturing environments, while UPVC is primarily used in downstream solar installations for electrical conduits and moderate-temperature water systems.

Market context: Global semiconductor fab expansions and solar PV manufacturing growth (driven by AI, renewables, and advanced nodes <14nm) are fueling demand for high-purity non-metallic systems. The non-metallic pipes market is projected to grow significantly through 2028+, with semiconductor piping systems alone expanding due to new fabs.

This report details product properties, industry-specific applications, advantages, challenges, and opportunities, serving as a comprehensive reference for project planning, procurement, or business development in these sectors.

---

1. Introduction.

The solar PV and semiconductor industries involve aggressive wet-chemical processes that generate corrosive fumes, require ultra-pure fluids, and demand contamination-free environments. Metallic materials risk corrosion, ion leaching, and yield-killing defects. Non-metallic thermoplastics and composites address these issues effectively.

- PPH.: Beta-modified polypropylene Homopolymer – rigid, high-temperature resistant (up to 95–110°C), excellent acid/alkali resistance.
- UPVC.: Rigid, Unplasticized PVC – good UV/corrosion resistance, cost-effective for non-aggressive applications.
- FRP.: Fiberglass-reinforced plastic, often dual-laminate with thermoplastic liners (e.g., PVDF, PFA) for ultra-high purity.

- ❖ Services- typically include design, fabrication, installation, welding (butt/socket fusion for PPH; specialized for FRP), lining of existing tanks, and maintenance of exhaust/scrubber systems.

---

2. Product Descriptions and Technical Properties.

Product	Key Properties	Standards / Features	Typical Sizes / Forms
PPH Ducting / Piping	Excellent chemical resistance (acids, alkalis, solvents); temperature resistance up to ~100–110°C; smooth internal surface (low friction, minimal particle adhesion); low extractables; lightweight and easy to fabricate via hot-melt welding	Conforms to ASTM / ISO standards; beta-crystal modified polypropylene for enhanced mechanical strength	Ducts: round, square, rectangular; Pipes: DN 50–1000+ mm
PPH Tanks	High rigidity and impact resistance; suitable for large-volume storage; excellent resistance to corrosive chemicals	Fusion-welded construction; optional dual-laminate design for enhanced protection	100 to 50,000+ liters; vertical and horizontal configurations
UPVC Piping	Strong corrosion and UV resistance; rigid structure; suitable for water distribution and electrical conduits; temperature limit ~60°C (higher for CPVC variants)	IS 9537 (India) for conduits; high dielectric strength	Conduits: 16–63 mm; Pipes for water supply and drainage
FRP Lining	Combines structural strength with thermoplastic liner (e.g., PVDF, PFA) for high purity and corrosion resistance; suitable for aggressive chemical environments	ISO-compliant; suitable for cleanroom and high-purity applications	Applied as lining on steel, concrete, or FRP tanks and vessels
FRP Tanks	High-strength composite construction; dual-laminate design (FRP + fluoropolymer liner) for ultra-pure and corrosive chemicals; excellent durability	GRP construction using C-glass / E-glass; liner thickness typically 2–3 mm	Storage tanks, process vessels, scrubbers; custom-built sizes

Comparison Notes.:

- PPH vs. PVDF.: PPH is stiffer/cheaper for large tanks/ducts; PVDF offers superior ultra-purity (lower leachable) and higher temp (140°C) but at higher cost.
- FRP excels in structural applications with liners ensuring zero contamination.

---

3. Product-Wise Applications

3.1 PPH Ducting Systems

Applications

- Chemical exhaust systems
- Fume extraction (acid vapors, solvents)
- Scrubber systems

In Semiconductor Industry

- Used in **cleanroom exhaust systems**
- Removes hazardous gases from etching and deposition processes

In Solar PV Industry

- Exhaust from:
  - Etching lines
  - Diffusion furnaces
  - Chemical cleaning units

Advantages

- High chemical resistance
- Smooth surface reduces particle buildup
- Weldable → leak-proof systems

3.2 PPH Piping Systems

Applications

- Chemical transfer lines
- DI water pipelines
- Acid/alkali distribution

Semiconductor Use

- High-purity chemical delivery
- Prevents contamination and particle shedding

Solar PV Use

- Transport of:
  - Hydrofluoric acid
  - Nitric acid
  - Cleaning chemicals

Key Benefit

- Low extractables → critical for wafer quality

3.3 PPH Tanks

Applications

- Storage of acids and chemicals
- Process tanks (etching, cleaning)

Semiconductor Industry

- Storage of:
  - Ultra-pure chemicals
  - DI water

Solar Industry

- Used in:
  - Wet processing lines
  - Chemical baths

Advantages

- Corrosion-resistant
- Custom fabricated
- Suitable for large volumes

3.4 UPVC Piping Systems

Applications

- Water supply and drainage
- Electrical conduits
- Utility piping

Semiconductor Industry

- Used in:
  - Cooling water systems
  - Drainage lines

Solar Industry

- Used in:
  - Utility water systems
  - Wastewater discharge

Advantages

- Cost-effective
- Good chemical resistance (moderate)
- High dielectric strength

3.5 FRP Lining

Applications

- Internal lining of tanks, ducts, and vessels

Semiconductor Industry

- Protects against:
  - Highly aggressive acids
  - Ultra-pure chemical reactions

Solar Industry

- Used in:
  - Acid storage tanks
  - Wastewater treatment systems

Advantages

- Combines structural strength + chemical resistance
- Long service life

3.6 FRP Tanks

Applications

- Chemical storage
- Scrubber systems
- Wastewater treatment

Semiconductor Industry

- Storage of:
  - Acid waste
  - Process chemicals

Solar Industry

- Used in:
  - Effluent treatment plants (ETP)
  - Chemical storage

Advantages

- High strength-to-weight ratio
- Corrosion-proof
- Customizable

---

4. Advantages of Non-Metallic Products Over Metallic Alternatives.

- Corrosion Resistance.: Withstand aggressive acids without degradation (vs. stainless steel pitting).
- Purity.: No ion leaching; smooth surfaces reduce particles (critical for wafer/cell yields).
- Cost & Weight.: 30–50% lower installed cost; easier transport/installation.
- Maintenance.: Low scaling; long service life (10–20+ years).
- Safety.: Fire-rated options; reduced static in conductive variants for explosive H_2 byproducts.
- Sustainability.: Recyclable (PPH); lower energy in production.

Limitations.: Temperature/pressure limits (addressed by hybrids); UV protection needed outdoors for some grades.

5. Market Trends, Opportunities, and Challenges

Growth Drivers. Semiconductor market >$1T by 2030; solar PV manufacturing boom (especially Asia); new fabs requiring high-purity infrastructure.
Opportunities. Domestic substitution in high-purity systems; turnkey services (design-to-installation); retrofits with FRP linings.
Challenges.: Strict cleanliness certification; skilled welding/lining labor; competition from PVDF/PFA in ultra-critical apps.
Regional Focus.: Asia-Pacific dominates PV/semi production; India/Europe growing via solar EPC and CHIPS Act-style incentives.
---

6. Conclusion and Recommendations

Non-metallic products like PPH ducting/piping/tanks, FRP linings/tanks, and UPVC systems are indispensable for safe, efficient, and high-yield operations in solar PV and semiconductor industries. They enable corrosion-free chemical handling, ultra-pure environments, and reliable exhaust management.