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Vinyls : Turning Vision into Reality

Vivek Kale
Baerlocher India Additives (P) Ltd.

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From Discovery to Application

- In the early 20th century, PVC had no commercial direction.
- Dr. Waldo Semon, exactly a century ago, changed that.
- By plasticizing PVC, he unlocked real-world usability.
- From that moment, vinyl moved from laboratory to society.

Material We Live With Every Day

- Clean drinking water flows safely through vinyl pipes.
- Electricity reaches our homes protected by vinyl insulation.
- Hospitals depend on vinyl for life-critical medical devices.
- Flooring, windows, cables, packaging, cars, consumer goods—vinyl surrounds us.
- Often underappreciated. Always indispensable.

Quietly Shaping Modern Life

- For decades, vinyl has enabled infrastructure at scale.
- It has delivered performance where failure is not an option.
- It rarely makes headlines—but society stops without it.
- Vinyl succeeds precisely because it works silently and reliably.

Chemistry That Matters

- ~57% of PVC comes from chlorine derived from common salt.
- Only ~43% comes from fossil-based carbon.
- This inherently reduces dependency on oil and gas.
- Vinyl is resource-efficient.

Industrial Excellence Behind The Scene

- Chemistry alone does not create value.

- Value is created when ideas become **reliable, scalable processes**:

  - Efficient chlor-alkali electrolysis

  - Safe and optimized EDC & VCM production

  - Consistent, high-quality polymerization

Engineering Possibilities Like No Other

- Vinyl can be:
  - Rigid or flexible
  - Transparent or opaque
  - Flame retardant
  - Chemically resistant
  - Highly durable
  - Cost effective
- Very few materials offer **this breadth with this consistency**.

Performance is Engineered, Not Accidental

- Continuous advances in:
  - Formulation science
  - Additive development
  - Processing technologies
  - Application-specific engineering
- Stabilizers, plasticizers, impact modifiers, fillers, pigments — each plays a precise and deliberate role.

Vinyl is a Journey

- Innovation does not stop at resin.
- All the value chain members including additive and machinery manufacturers, compounders, and processors are central to progress.
- This journey delivers:
  - Water infrastructure lasting 50+ years
  - Safer electrical systems
  - Reliable healthcare products
  - Cost-efficient, resilient buildings

Every Improvement Matters

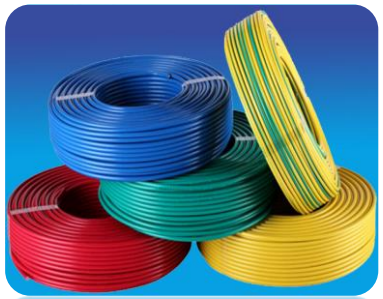
- Adapting formulations to climate conditions
- Replacing legacy additives with safer alternatives
- Improving processing efficiency
- Long lasting products
- Idea → Performance
- Performance → Confidence
- **Confidence → Long-term societal trust**

Vinyl in daily life – Creating Social value

Water We Drink

PVC in Water Management

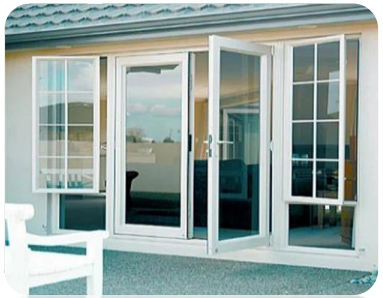
- Water management is a national priority
- Low leakage, long service life, affordable solution with Vinyl piping systems



Electricity We Use

PVC in Electricals & Electronics

- Reduction of fire risks and electrical accidents
- Protection of million homes and work places



Homes We Live in

PVC – The Infrastructure Polymer

- Excellent sound insulation, prevent dust and water ingress, is termite proof
- Save wood

Healthcare We Trust

PVC – Reliable Healthcare Material

- Blood bags, Urine bags, tubings and catheters
- Silent reliability where failure is unacceptable

PVC & Sustainability

- PVC is one of the most debated materials—often discussed emotionally rather than scientifically.
- Sustainability discussions must be grounded in:

  - Lifecycle thinking
  - Measurable data
  - Real-world performance

- The key question is not: *“whether Vinyl is perfect?”*

  But rather: “Is Vinyl willing to evolve?” *And the answer is Clear Yes..*

- **When assessed across its full lifecycle, PVC offers distinct sustainability advantages compared many alternatives.**

PVC & Sustainability

Climate Action & Carbon Reduction
- PVC requires less energy to produce compared to competing materials
- Most of the products have long service life

People Sustainability
- PVC's lower processing temperatures make it safer for workers
- Very low VOC during processing particularly in rigid PVC

Resource Efficiency & Circularity
- PVC is highly recyclable
- Long service life of products reduces material replacement

Governance & Ethical Compliance
- Strong adherence to product stewardship, additive safety transitions, standards & regulations

Water & Pollution Management
- PVC production uses less water which gets recirculated
- PVC pipes help in total water management

Innovation & Technology Adoption
- Significant innovation in heavy metal-free stabilizers, phthalate-free plasticizers, bio-attributed PVC, PVC recycling

Supply Chain Resilience
- Production and Demand not aligned geographically
- Geopolitical shifts affect the raw materials availability

Community & Social Impact
- PVC supports essential infrastructure like water systems and affordable housing
- PVC has a high societal value relative to its cost and footprint

Circularity & Road Ahead

- PVC is technically recyclable multiple times without fundamental loss of performance.
- Key opportunities lie in:
  - Advanced mechanical recycling
  - Feedstock and chemical recycling technologies
  - Design-for-recycling at the formulation and product stage
- The real bottleneck is not material science, it is:
  - Collection systems
  - Sorting infrastructure
  - Market demand for recycled PVC
- Circularity is a system challenge—requiring shared responsibility.

Collaboration is Non-Negotiable

- One value chain – one responsibility:
  - Vinyl's future cannot be delivered in silos.
  - Sustainability, circularity, and trust depend on value-chain alignment.
- Shared responsibilities across the chain:
  - **Producers:** Reduce carbon intensity, improve safety & traceability
  - **Additives & compounders**: Enable safer, recyclable, high-performance formulations
  - **Machinery manufacturers** : Energy efficient equipment with high output
  - **Converters**: Minimise waste, maximise efficiency, design for long life
  - **Brand owners & End users**: Value lifecycle performance over short-term cost
  - **Recyclers**: Integrate with design, not react after use
  - **Policymakers & associations**: Enable science-based regulation
  - **Associations** – Bring the value chain members under one umbrella to move forward

PVC Resin Producers –Leading by Example

Ineos
Neovyn™ PVC with 37% lower product carbon footprint produced across nearly all sites with renewable energy inputs

Orbia
Bio-mass balanced resin with >50% CO_2 reduction. Pathway to non-fossil feedstocks and renewable energy

Vynova
Bio-attributed PVC with >90% CO_2 reduction v/s conventional PVC

Westlake
GreenVin® PVC with renewable power using renewable ethylene
25% lower carbon intensity

Machinery Manufacturers – Leading by Example

Battenfeld - Cincinnati

- Dual vent technology for recycled PVC
- Intelligent Operating Adjustment (IOA) system

Bausano

-Twin screw extruders converting rigid/flexible waste into high quality granules
- Multidrive transmission technology resulting in ~ 30% reduction in energy consumption

Krauss - Maffei

- Carbon neutral operations by 2030 and carbon neutral machines by 2035
- Rooftop solar system at Parsdorf HQ with a capacity of 9.1 MWp

Theysohn

- Energy efficient lines using intelligent drive system
- Durable components designed to extend machine life cycles

Stabilizer Sector – from Molecule to Mindset

- Regulatory compliance – ensuring quality / consistency and green chemistry
- Shift toward safer and more environmentally responsible chemistry - From **Lead-based** systems to **Ca-based** systems
- Focus on producing stabilizers in a “green” way - integrated perspective
- Evolution from being just additive suppliers to lifecycle solution providers, actively shaping how PVC is produced, processed, used, and recycled
- Change of mindset – from “*Are our products safe?”* to *“Are we enabling a truly sustainable lifecycle for PVC?”*

Baerlocher India – Our Sustainability Roadmap

- CO_2 emissions intensity (scope 1 & 2) per ton of product **reduced by 50%**
- Our aim to achieve carbon neutrality **(Scope 1 & 2)** across our chemical facility by **2027**
- Manufacturing Unit II achieved **PAS 2060**–certified (BSI-assured) carbon neutrality for Scope 1 & 2 emissions and the building is **IGBC Platinum rated**

- Close to **70%** of energy from **renewable sources**
- 1 MW WSH use started from 2025 onwards
- **6 TPH** biomass boiler for green energy
- Almost **30%** of freshwater **recycled**
- Close **to 50%** of RM's from renewable resources
- Achieved over **80% reduction** in waste landfilling

India’s Moment of Responsibility

- India is growing fast—infrastructure, housing, healthcare, energy.
- Vinyl can transform development if sustainability grows alongside consumption.
- The opportunity:

  - Build circularity from the start

  - Avoid future correction costs
- If ideas meet responsibility,

  - innovation meets collaboration,

    - **Vinyl will not only remain relevant. Vinyl will lead.**

https://youtu.be/lztbO-RUkfg?si=HiwHSkQwmgy2knz9

Thank you

Scan to connect

BÆRLOCHER
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Baerlocher India Additives Pvt. Ltd.
Unit nos. 501, 502 and 503, Eco Star Building, 5th floor,
Vishweshwar Nagar, Off Aarey road, Goregaon (east),
Mumbai – 400 063.

+91 22 68157000

hello@baerlocher.com