

HIGH-PERFORMANCE INDUSTRIAL EPOXY FLOORING

Technical Specification & Engineering Application Manual

1. System Chemistry & Curing Mechanism

This high-performance flooring system is engineered as a two-component, 100% solids structural thermosetting copolymer. The network is formed by an irreversible exothermic cross-linking reaction between a base resin and a core reactive hardener.

Part A (Base Resin): Typically formulated using pure Diglycidyl Ether of Bisphenol A (DGEBA) or Bisphenol F (DGEBF) resins, augmented with low-viscosity reactive aliphatic monoglycidyl ether diluents to control flow dynamics and substrate wetting properties.

Part B (Curing Agent): Formulated from modified cycloaliphatic amines (e.g., Isophoronediamine) or polyamines. The active amine hydrogens structurally attack the electrophilic oxirane rings of Part A, initiating an addition polymerization that achieves a dense 3D macromolecular network.

2. Mechanical & Physical Properties

When fully cured at standard ambient temperatures (23°C to 27°C) for 7 days, the system establishes mechanical thresholds that significantly exceed standard structural concrete concrete specifications:

Physical Metric	Standard Test Method	Performance Specification Value
Compressive Strength	ASTM D695 / IS 9162	60 to 80 MPa (8,000 to 11,000 psi)
Tensile Strength	ASTM D638 / ASTM C307	16 to 41 MPa (2,400 to 6,000 psi)
Flexural Strength	ASTM D790 / IS 9162	18 to 65 MPa (2,600 to 9,400 psi)
Adhesion/Bond Strength	ASTM D4541 / ISO 4624	>3.5 MPa (100% Concrete Substrate Failure)
Surface Hardness	ASTM D2240	80 to 85 Shore D
Abrasion Resistance	ASTM D4060 (Taber CS-17)	<70 mg loss per 1,000 cycles
Volatile Organic Content	EPA Method 24	0 g/L (100% Solids Formulation)

3. Multi-Layer Cross-Section Architecture

A standard industrial installation ranges from 2.0 mm to 6.0 mm in aggregate dry film thickness (DFT). It uses a sequential layer matrix to deliver optimal adhesion and chemical isolation:

- Topcoat / Wear Layer:** Provides localized scratch and chemical defense. Aliphatic polyurethanes or polyaspartic coatings are recommended if UV stability and color preservation are required.
- Body Coat / Slurry Layer:** The pigmented layer responsible for building the core system thickness. It is mixed directly with fine silica aggregate sand for enhanced stability.
- Primer Coat:** A low-viscosity, high-penetration resin layer engineered to lock into the concrete capillary structure, seal micro-pores, and block subfloor outgassing pinholes.
- Concrete Substrate:** The load-bearing core foundation slab, which must be structurally sound and free from chemical structural contamination.

4. Substrate Engineering & Installation Requirements

Moisture Vapor Transmission (MVT): Rising ground moisture creates high hydrostatic vapor pressure beneath impermeable resin systems. Testing via ASTM F2170 (In-situ RH) must confirm values below 75% RH. If values exceed this limit, a dedicated epoxy moisture barrier primer must be applied before installing the body coat to prevent osmotic blistering and total floor delamination.

Mechanical Surface Profile (CSP): Concrete substrates must be mechanically prepared using automated shot-blasting or diamond grinding. Acid etching is not permitted. The required International Concrete Repair Institute (ICRI) standard profile is CSP 3 to CSP 4 for self-leveling slurry matrices.

Application Rheology: Pot life inside mixing containers ranges from 20 to 30 minutes at 25°C. Mixed material must be spread immediately to avoid localized heat generation and rapid curing.