Integrated Internal Curing Technology for Enhanced Hydration, Shrinkage Control & Durability for Long-Term High Performance of Concrete

Technology in Brief:

Integrated Internal Curing Technology is a concrete-mix design approach that embeds internal water reservoirs within the concrete matrix to sustain hydration and control shrinkage over the long term. These reservoirs are typically provided by pre-saturated lightweight aggregates, superabsorbent polymers (SAPs), or other porous internal curing agents that gradually release water during cement hydration.

The process involves:

- Pre-soaking or saturating the internal curing agent (e.g., lightweight fine aggregate or SAP) so it acts as a water reservoir.
- Incorporating this pre-soaked material into the concrete mix at a designed volume fraction, replacing part of the normal fine aggregate or added as a functional additive.
- During casting and early-age hydration, when the cement paste begins to self-desiccate, capillary suction draws water out of the internal reservoirs to the surrounding cementitious matrix.
- This internal water supply supports continued hydration, reduces autogenous and drying shrinkage, minimizes microcracking, and enhances long-term strength and durability through more complete reaction and lower permeability.

Salient Features/Advantages:

- Water-use efficiency
- Reduced cracks and longer service life
- Support for sustainable binders
- Compatibility with waste-based materials
- Lower environmental impact from defects
- Employment Generation

Properties & Standards	**IS: 9103**
End Product(s)	Integrated Internal Curing Technology Induced Concrete
License/Commercialization	Technical know-how is ready for commercialization.
TRL	TRL 7
Environmental Impact	• Employment Generation • Sustainable binders • Water-use efficiency
SDG Goals	9, 12 & 13
National Missions	7, 21, 25 & 34