



CIVIL AND INFRASTRUCTURE TESTING · CAPABILITY BRIEF

Build on evidence, not assurance.

One accredited laboratory across the whole build: ground to grout, rebar to roof tile, new construction to structural audit.

53

years, since 1973

1,483

NABL scope items

6

regulatory approvals

500+

bridges inspected

Transparency. **C**ompetence. **R**eliability.

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Established 1973 · NABL (NABL T0726MH18640) ISO/IEC 17025:2017 · NADCAP AC7101 · BIS, IBR, BMC, CIDCO Approved



A construction programme fails on the components nobody tested, so the question is not whether to test but whether one accountable laboratory can cover the entire build under a single accreditation

THE ANSWER

THE KERNEL

TCR runs the materials, the site NDT and the structural audit on one ISO/IEC 17025 management system, so a single chain of custody carries your project from the first soil sample to the stability certificate.

ONE · COVERAGE

Every material class, one laboratory

Cement, binders, admixtures, aggregates, concrete, rebar, couplers, blocks, tiles, adhesives, boards, stone, glass, timber, water.

Site NDT and structural audit run off the same bench and the same quality system, so the report reconciles with the lab data.

TWO · DEFENSIBILITY

Accredited, and honest about the edge

1,483 NABL scope items: 1,383 laboratory plus 100 site, valid to 2 March 2030, recognised in 90+ economies under the ILAC MRA.

Where a method sits outside scope we say so on the report. An unmarked claim is what fails an audit, not an unaccredited test.

THREE · CADENCE

We move at your programme, not ours

Cube results next day. Free sample pickup across MMR. Site teams that attend the pour, not the paperwork afterwards.

This is why Godrej Properties, Kalpataru, Shapoorji Pallonji and Rustomjee hold long-term rate contracts rather than job orders.

Three buyers use civil testing for three different reasons, and the rest of this brief is organised the way they buy: build quality, programme risk, and statutory life extension

SEGMENT ONE

Real estate developers

What you are buying: handover quality and zero defect at possession.

The failure you are avoiding: a cracked tile, a warped shutter or a corroding balcony in a luxury tower.

Coverage: new construction materials plus the whole building finishing works bench.

Anchor proof: three-year rate contract with Godrej Properties across the Mumbai zone.

SEGMENT TWO

Infrastructure and EPC contractors

What you are buying: programme certainty and approval-list eligibility.

The failure you are avoiding: a rejected coupler lot that stops a viaduct segment.

Coverage: rebar couplers, prestressing, concrete, soil, roads, bridges, structural steel and welding.

Anchor proof: approved on all three Mumbai-Ahmedabad High Speed Rail civil packages.

SEGMENT THREE

Structural audit clients

What you are buying: statutory compliance and a defensible residual-life opinion.

The failure you are avoiding: a municipal notice, or a collapse nobody saw coming.

Coverage: Clause 77 audits, industrial plant assessment, chimneys, bridges, data centres.

Anchor proof: 12-plus structural audits and 500-plus bridges across India.

Read the segment that matches your role. The credentials, the logistics and the accreditation discipline are common to all three.

Six approvals decide whether a laboratory can even be named in a tender, and TCR holds all six with the reference numbers a procurement team can verify before it awards

Approval	Reference in force	What it unlocks
NABL, ISO/IEC 17025:2017	NABLT0726MH18640, issued 3 March 2026 in lieu of TC-6905, valid to 2 March 2030	1,483 scope items (1,383 laboratory + 100 site). ILAC MRA recognition in 90+ economies.
BIS recognition, rebar couplers	LRMD/LRS/OSL-7103506, IS 16172	First BIS-accredited commercial laboratory in India for the full IS 16172 coupler scope, 8 mm to 40 mm.
BMC Roads Department	ChE/Rds/8292/NF, 25 March 2026	Civic road, bridge and building work inside Greater Mumbai.
CIDCO empanelled MTL	CIDCO/EE(QC)/LAB/2026/247, 13 July 2026	Navi Mumbai, NAINA and the Third Mumbai development belt.
NHSRCL approval	VMAC No. 13, 23 October 2023	All three Mumbai-Ahmedabad High Speed Rail civil packages: C1 MEIL-HCC, C2 Afcons, C3 Larsen and Toubro.
NADCAP AC7101 Materials Testing	PRI certificate 29415245997, valid to 31 May 2027	Aerospace-grade verification discipline applied to the same metallurgical bench that tests your rebar.

Accreditation is not a logo on a letterhead: it is a traceable measurement chain with a stated uncertainty, and that is precisely what survives an arbitration, an audit or a municipal challenge

WHY IT MATTERS



- **Traceability.** Every instrument that produces a number on your report is calibrated against a national standard, and the calibration chain is on file and auditable.
- **Stated uncertainty.** A compressive strength is not a single number, it is a number with a measurement uncertainty budget behind it. Where the decision rule matters, we state it.
- **Method validation.** Each accredited parameter has been validated on the specific material matrix. Accreditation on steel does not automatically extend to concrete or to water; the scope is matrix-specific and we treat it that way.
- **Proficiency testing.** The laboratory participates in interlaboratory comparison programmes and holds the Z-score record that proves the bench agrees with the wider measurement community.
- **Cross-border acceptance.** Under the ILAC mutual recognition arrangement the report is accepted by client organisations across more than ninety economies, which matters when your consultant, your lender or your buyer sits overseas.

An unaccredited number is an opinion with a decimal point in it. An accredited number is evidence.

We publish the boundary of our own accreditation, because a report that overstates its scope is the single fastest way to lose a client an approval, and the disclosure costs us nothing we deserve to keep

INSIDE NABL SCOPE · CARRIES THE ACCREDITATION MARK

- Cement OPC, PPC, PSC and white: chemical to IS 4032, physical to IS 4031.
- Fly ash, GGBFS, UGGBFS, micro silica, Alcofine: IS 1727, IS 16714, IS 16715, IS 15388.
- Admixtures to IS 9103, including bipolar corrosion inhibitor to RDSO M&C/PCN/126/2020.
- Fine and coarse aggregate: IS 383, IS 2386 Parts 1 to 7, BS 1881-124.
- Hardened concrete cube, core, cylinder and beam: IS 516 Parts 1, 2, 4 and 11.
- Durability: RCPT to ASTM C1202, RCMT to NT Build 492, water permeability to BS EN 12390-8.
- AAC blocks IS 2185 Part 3 and IS 6441, burnt clay bricks IS 3495 and IS 1077, paving blocks IS 15658.
- Ceramic tiles: 28 parameters across IS 13630 Parts 1 to 14, plus BS EN 16165 slip resistance.
- Marble, granite and rock: IS 1122, IS 1124, IS 1130, IS 9143, IS 14223.
- Rebar couplers: IS 16172 and ISO 15835-2, in the laboratory AND on site.
- Soil chemistry: IS 2720 Parts 22, 23, 26 and 27, BS 1377 Part 3.
- Site NDT on reinforced concrete: UPV, rebound hammer, half-cell and carbonation.

OUTSIDE NABL SCOPE · REPORTED WITH THE DISCLAIMER

- Tile adhesive, full IS 15477 panel. Only the ASTM D4541 pull-off sits inside scope today.
- Plywood to IS 303, IS 710 and IS 1734, and blockboard.
- Door shutters to IS 2202 Part 1 and IS 4020, including the sixteen-test panel.
- Soil mechanical: CBR, Proctor MDD and OMC, Atterberg limits, sieve, field density, triaxial and direct shear.
- Granular sub base and wet mix macadam suites to MoRTH and IRC.
- Rebar cover survey to BS 1881-204 and ground-penetrating radar.
- Bitumen and road materials, delivered through a qualified partner laboratory under TCR oversight.
- ASTM D412 membrane tensile and AS/NZS 4548.5 crack bridging.
- ASTM G109 macrocell and the full RDSO corrosion-inhibitor qualification panel, subcontracted to qualified partners.
- Drinking water beyond pH, chloride and sulphate: the wider IS 10500 panel is in build.
- Glass, aluminium sections, fibre cement board, precast pipes, LVL and wooden flooring.
- Concrete mix design to IS 10262 is a design service, not an accredited test parameter.

Tests outside scope are performed to the same quality system and reported with the standard non-accredited disclaimer. Nothing on this slide is withheld from a client.

Testing fails on logistics far more often than on chemistry, so the operational answers come first: what to send, how much of it, how fast it comes back, and who collects it

Material	Sample quantity	Turnaround
Concrete cubes, compressive strength	3 Nos per set	1 working day
Concrete core, extraction and strength	1 No per location	4 days
Concrete durability, RCPT / RCMT / permeability	3 Nos cubes per test	5 to 6 days
Cement, full physical analysis	25 kg	28 days (to the 28-day strength)
Cement, chemical analysis	1 kg	6 days
Coarse aggregate, complete physical	50 kg	7 days
Fine aggregate, complete physical	25 kg	7 days
Soil, CBR	30 kg	6 to 7 days
Soil, MDD and OMC (Proctor)	30 kg	3 days
AAC block, complete physical analysis	24 Nos	15 to 21 days
Ceramic and vitrified tile	6 to 24 Nos, by tile size	20 days
Tile adhesive	25 kg per adhesive type	35 days
Plywood	3 Nos of 1 m x 1 m	28 days
Door shutter	1 full-size shutter	20 days
Construction water, IS 456 panel	1 litre	3 days
Drinking water, IS 10500 panel	2 litres	5 days
Site NDT, UPV and rebound hammer	Minimum 10 points per visit	2 days

Free TCR-branded sample pickup van across the entire Mumbai Metropolitan Region, lifting samples from your site to Mahape at no charge.

Long-term rate contracts are not won on price, they are won by a laboratory that holds the client's programme dates as if they were its own, and that is the operating rule we run the civil department on

WE SCHEDULE TO YOUR PROGRAMME

The test calendar is derived from the construction calendar

Cube ages, coupler lot releases and pour temperatures are booked against your bar chart before the month starts, not requested when the sample arrives.

A twenty-eight day cement result is planned twenty-eight days out. Nobody discovers a lead time on the day it is needed.

WE ATTEND, WE DO NOT WAIT

Site teams go to the pour, the pile and the lot release

Fresh concrete temperature, slump, cube casting and cover survey happen at your site with our people and our chain of custody.

Ten minutes from CIDCO Bhavan matters because a concrete cube has a clock on it and a site test has a witness who has to attend.

ONE POINT OF ACCOUNTABILITY

Where a method sits outside our scope we still carry the report

Bitumen goes to a qualified partner laboratory. The macrocell corrosion programme goes to a qualified partner. The consolidated report still comes back with one signature on it.

You manage one relationship, not five.

THE RESULT

Renewals, not repeat quotations

Godrej Properties: three-year rate contract across the whole Mumbai zone from April 2026.

Kalpataru, Shapoorji Pallonji and Rustomjee on continuing long-term rate contracts. CIDCO empanelled. BMC registered.

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SEGMENT ONE

Real estate developers

New construction materials and building finishing works, tested together, because a tower is judged at handover on the finish and twenty years later on the concrete.

Cement, binders, admixtures, aggregates, concrete and rebar under one accredited roof.

Tiles, adhesives, blocks, plywood, shutters, stone, glass and aluminium on the same bench.

Coastal durability: RCPT, permeability and bipolar corrosion-inhibiting admixtures.

Anchor accounts: Godrej Properties, Kalpataru, Shapoorji Pallonji, Rustomjee.

A developer's real exposure is not the cost of the material, it is the cost of removing it after possession, and that ratio is what makes pre-dispatch testing the cheapest line in the budget

WATCH

The supplier certificate is not evidence

A mill certificate or a manufacturer test report describes a lot the manufacturer selected. It is not an independent measurement of the consignment that arrived at your gate.

Aggregate varies quarry to quarry and season to season. Monsoon moisture moves a mix design that was validated in March.

WATCH

Finishing defects are discovered by the buyer

A tile that fails flatness or a shutter that fails the slamming test does not announce itself in the sample flat. It announces itself across three hundred flats, after handover.

Replacement is not the material cost. It is scaffolding, labour, access, goodwill and, in a premium tower, the brand.

WATCH

Durability failures surface after the defect liability period

Cover, chloride ingress and permeability decide whether a coastal Mumbai building corrodes at year eight or year thirty.

By the time rust staining is visible, the service life has already collapsed. The decision was made at the pour.

PROOF

What independent testing actually costs

Less than half a percent of material value, on the published schedule, with a next-working-day cube result and free MMR pickup.

The comparison is not testing versus no testing. It is testing versus rectification, arbitration and reputational cost.

Testing is under half a percent of material cost. It is the half percent that validates the other ninety-nine and a half.

Every cementitious binder that goes into the mix is tested chemically and physically before it is approved for the pour, and each one is inside the accredited scope

Binder	Chemical	Physical	Sample and turnaround
Cement, OPC / PPC / PSC / white IS 269, IS 1489-1, IS 4031, IS 4032	Magnesia, sulphuric anhydride, loss on ignition, insoluble residue, chloride, lime saturation and alumina-iron ratios, free lime	Fineness by Blaine, normal consistency, initial and final setting time, soundness by Le Chatelier and autoclave, compressive strength at 3, 7 and 28 days, density, drying shrinkage	1 kg chemical, 6 days 25 kg physical, to 28 days
GGBFS and UGGBFS IS 16714, IS 16715, IS 12813, IS 4032	Manganese oxide, magnesium oxide, sulphide sulphur, sulphate as SO3, insoluble residue, chloride, loss on ignition, molar ratio, moisture, glass content, total alkali	Fineness by specific surface, slag activity index at 7 and 28 days, consistency, compressive strength	2 kg chemical, 7 days 10 kg + 5 kg OPC physical, 35 days
Micro silica / silica fume IS 15388, IS 1727, IS 4032, ASTM C1240	Silicon dioxide, loss on ignition, alkalis as Na2O, moisture, total chlorides	Oversize retained on 45 micron sieve, accelerated pozzolanic strength, bulk density, 7-day compressive strength as a percentage of the control	2 kg chemical, 10 days 15 kg + 15 kg cement physical, 10 days
Fly ash IS 3812 Part 1, IS 1727	SiO2 + Al2O3 + Fe2O3, reactive silica, total SO3, chlorides, available alkalis as Na2O, loss on ignition, magnesium oxide	Retention on 45 micron by wet sieving, fineness, lime reactivity, soundness by autoclave, specific gravity, compressive strength	1 kg chemical, 7 days 1 bag + 1 bag cement, 35 days
Alcofine IS 1727, IS 4032, IS 12813	Loss on ignition, insoluble residue, SO3, SiO2, Fe2O3, Al2O3, CaO, MgO, sulphide sulphur, total alkalis	Percent retained on 45 micron, specific gravity, comparative compressive strength	2 kg chemical, 7 days 5 kg + 5 kg cement, 35 days

All parameters on this slide are NABL accredited at Mahape.

Admixture and water are the two mix inputs most often accepted on trust, and they are the two that most reliably explain a strength result nobody can otherwise account for

ADMIXTURE · IS 9103:1999

- **Laboratory panel.** Dry material content for liquid and solid admixture, relative density, chloride ion content, pH, ash content.
- **Physical performance.** Water reduction, slump retention, setting time deviation and 3, 7 and 28-day compressive strength against the control mix. Sample: 3 to 4 litres, 40 days.
- **Chemical panel.** 1 litre, 5 days. This is the fast check when a site suspects a batch change.
- **Field verification.** Shelf life and storage check, packing integrity, relative density of the drum that is actually on site.
- **Marsh cone.** ASTM C939 flow test for grout and self-compacting mixes. 1 litre plus 1 bag of cement.
- **Bonding agents and grouts.** Pull-off to ASTM D4541, slant shear bond to ASTM C882, compressive to ASTM C109, flexural to ASTM C348. Grout to ISO 13007-4 and EN 12808-3, including linear shrinkage.

WATER FOR CONSTRUCTION · IS 456:2000 ANNEX A

- **The nine-parameter panel.** pH, total acidity, total alkalinity, chlorides, sulphates as SO₃, inorganic solids, organic solids, suspended matter, total suspended solids. IS 3025 methods throughout.
- **Sample and turnaround.** 1 litre, 3 days for the full panel.
- **Accredited depth.** TCR carries all nine IS 456 Annex A parameters on the NABL scope. Of the eleven accredited water laboratories in MMR, only one other matches that construction-water depth.
- **Why it matters.** Chloride in mixing water attacks the rebar from the inside of the concrete, where no cover thickness protects it. Sulphate attacks the cement paste itself.
- **Site verification.** Visual inspection for clean water and a field pH check at the batching plant, so the source is verified between laboratory panels.
- **Borewell reality.** Most Mumbai sites batch on borewell or tanker water. Neither is a constant. The panel is repeated when the source changes.

Aggregate is sixty to seventy-five percent of the concrete by volume and the most variable input on the site, which is why the aggregate panel is the one we ask developers to run most often

	Coarse aggregate	Fine aggregate (crushed, manufactured, washed, river sand)
Physical IS 2386 Parts 1, 3 and 4	Sieve analysis 80 mm to 4.75 mm, specific gravity, water absorption, rodded and loose bulk density, aggregate impact value, aggregate crushing value, 10 percent fines value, Los Angeles abrasion, flakiness index, elongation index	Sieve analysis 10 mm to 0.15 mm, specific gravity, water absorption, rodded and loose bulk density, material finer than 75 micron by wet sieving, bulkage, silt content on river sand
Chemical IS 2386 Parts 5 and 7, BS 1881-124	Soundness by sodium sulphate and magnesium sulphate, alkali aggregate reactivity by dissolved silica and reduction in alkalinity, chloride content, sulphate content, pH	Soundness by sodium sulphate, alkali aggregate reactivity by dissolved silica and reduction in alkalinity, chloride content, sulphate content, organic impurities, pH
Why it decides the mix	Impact, crushing and abrasion values decide whether the aggregate survives the traffic or the load it is going under. Flakiness and elongation decide workability and the water demand.	The 75 micron fraction and silt content decide the water demand, and the water demand decides the strength. A sand change that nobody tested is the most common cause of an unexplained cube result.

Complete physical analysis: coarse aggregate 50 kg / 7 days, fine aggregate 25 kg / 7 days. Chemical panels 2 to 5 kg.

Reinforcement is where a saving on paper becomes a liability in concrete, so the bar is verified chemically and mechanically and the consignment is verified again at the gate

MECHANICAL · IS 1786, IS 1608

What the bar actually does under load

Tensile strength, 0.2 percent proof stress or yield stress, percentage elongation and percentage reduction in area.

Bend and re-bend test, the check that finds embrittlement a tensile test alone will pass.

Fatigue test to IS 16651, where the design calls for cyclic capacity.

Weight per metre, which is where under-section and therefore under-strength shows up first.

CHEMICAL · ASTM E415, IS 8811

Carbon equivalent and weldability

Carbon, sulphur, phosphorus and the full spark-emission element suite on the optical emission spectrometer.

Carbon equivalent governs weldability and cold-bend behaviour. A bar that passes tensile can still crack at a bend or a weld.

Sulphur and phosphorus limits under IS 1786 are the corrosion and brittleness controls.

AT THE GATE

Field verification on the consignment that arrived

Identification mark and grade of steel checked against the delivery documents.

Visual inspection for rust, pitting and mill scale.

Bend test at site to the internal procedure, and weight per metre on the actual bundle.

This is the check that separates the certificate from the steel.

COATING AND SPECIALS

Epoxy coated, galvanised and corrosion-resistant bar

Coating thickness, continuity and adhesion where a corrosion-resistant specification is called.

Where the design pairs coated bar with a corrosion-inhibiting admixture, both are verified. See the coastal durability slide.

A grade mark rolled onto a bar is a claim by the roller. A tensile curve from an accredited laboratory is a measurement.

Concrete is tested three times over: as a design before the pour, as a fresh mix during it, and as hardened evidence afterwards, and all three have to reconcile

BEFORE THE POUR

Mix design and revalidation

- Proportioning of constituents to IS 10262, grades M10 to M50 and above.
- Design mixes for pavement quality concrete to IRC 15, self-compacting concrete, fibre-reinforced concrete, and dry lean concrete to MoRTH.
- Revalidation of an existing mix for slump, cohesiveness, retention and setting when a binder, sand or admixture source changes.
- Material for each trial: 4 bags fine aggregate, 3 bags cement, 2 litres mineral admixture. Typically 35 days.
- Mix design is a design service, not an accredited test parameter. The component tests behind it are accredited.

DURING THE POUR

Fresh concrete, IS 1199

- Workability by slump, compaction factor and flow.
- Plastic density and yield, the check that finds a batching error the same morning.
- Concrete temperature to ASTM C1064, which is on the NABL SITE scope and is the controlling parameter on a mass pour.
- Cube casting, curing and identification under our chain of custody, at your site.
- Accelerated curing to IS 9013 where a 28-day wait would hold the programme.

AFTER THE POUR

Hardened concrete, IS 516

- Compressive strength on cubes to IS 516 Part 1 Section 1. 3 Nos per set, result the next working day.
- Core extraction and core compressive strength to IS 516 Part 4, plus core water absorption to BS 1881-122.
- Flexural strength on beams to IS 516 Part 1 Section 1.
- Density to IS 516 Part 2 Section 1.
- Cement content to IS 516 Part 11, and chloride and sulphate content on hardened concrete to BS 1881-124. This is the forensic set.

Strength tells you whether the building stands up today and durability tells you how long it keeps standing, which in coastal Mumbai is the more expensive of the two questions to get wrong

Test	Method	What it measures	What it decides
Rapid chloride penetration test (RCPT)	ASTM C1202, AASHTO T-259	Charge passed in coulombs over six hours through a 50 mm concrete slice under 60 V	Whether the concrete resists chloride ingress well enough for a marine or coastal exposure class. The single most-specified durability test in Mumbai.
Rapid chloride migration test (RCMT)	NT Build 492:2019	Non-steady-state chloride migration coefficient from a colourimetric penetration front	A migration coefficient that can be fed directly into a service-life model, rather than a comparative index.
Water permeability	BS EN 12390-8, IS 516 Part 2 Section 1	Depth of water penetration under sustained pressure	Whether a water-retaining or basement structure will hold. Frequently the acceptance criterion on a raft or a tank.
Core water absorption	BS 1881-122	Absorption of the concrete actually in the structure, not the cube	The in-situ check on a structure already built, used in structural audits and acceptance disputes.
Hardened density	IS 516 Part 2 Section 1	Density of the cube, cylinder or core	Compaction quality. A low density on a normal mix means a voided pour before any other test says so.
Accelerated curing	IS 9013	Compressive strength on an accelerated-cured cube	An early strength indication where waiting 28 days would hold the programme.

RCPT, RCMT, water permeability, core water absorption and density are all NABL accredited. 3 Nos cubes per test, 5 to 6 days.

Tile testing is the fastest-growing line on the civil bench because a tile is the one material a flat buyer inspects personally, and TCR carries twenty-eight accredited tile parameters

DIMENSIONAL · IS 13630 PART 1

The nine geometry checks a buyer sees

Deviation in length, width and thickness. Rectangularity and straightness of sides.
Surface flatness measured four ways: centre curvature, edge curvature, corner warpage and surface quality.
These are what produce a lipped joint or an uneven floor, and they are visible from standing height.

MECHANICAL · IS 13630 PARTS 2, 4, 6, 11, 12, 13, 14

Whether it survives the floor it is laid on

Modulus of rupture and breaking strength. Water absorption and bulk density.
Surface abrasion resistance for glazed tile, deep abrasion for unglazed, scratch hardness on the Mohs scale.
Impact resistance by coefficient of restitution, and coefficient of linear thermal expansion.

ENVIRONMENTAL · IS 13630 PARTS 3, 5, 9, 10, BS EN 16165

Where the failures actually happen

Thermal shock resistance and frost resistance for external grade.
Crazing resistance and moisture expansion, the pair behind delayed hairline crazing on a wall tile.
Coefficient of friction to BS EN 16165, wet and dry. This is the slip test and it is the one that reaches a court.

CHEMICAL AND ADJACENT · IS 13630 PARTS 7 AND 8

Staining, chemicals, and the rest of the floor family

Resistance to household chemicals, acids and alkalis, and stain resistance on glazed and unglazed tile.
Cement concrete flooring tiles to IS 1237: abrasion, flatness, perpendicularity, water absorption, wet transverse strength.
Paving blocks to IS 15658: compressive, flexural, tensile splitting, abrasion, water absorption, wearing layer thickness. 33 Nos, 2 days.

Twenty-eight ceramic tile parameters under IS 13630, plus cement concrete flooring tiles under IS 1237 and paving blocks under IS 15658, all NABL accredited.

A tile that passes every test still fails if the adhesive lets go, and adhesive is where Indian sites most often substitute a grade without telling anybody

TILE ADHESIVE · IS 15477:2018 · 25 KG PER TYPE · 35 DAYS

- **Tensile adhesion strength.** Dry condition and wet condition. The wet result is the one that predicts a wet-area failure, and it is the one most often omitted from a supplier sheet.
- **Shear adhesion strength.** Dry, wet, and after heat ageing. Heat ageing is the accelerated proxy for a west-facing facade or a terrace.
- **Open time.** How long the adhesive stays workable after spreading. An overstated open time is how a whole wall debonds three months later.
- **Adjustment time.** How long a tile can be repositioned. Short adjustment time on a large-format tile means lipping.
- **Slip.** Vertical movement of a tile on a freshly combed bed. Decides whether the adhesive can hold a heavy wall tile without support.
- **Deformability.** Transverse deformation. This is the property that lets an adhesive absorb substrate movement instead of transmitting it to the tile.

PULL-OFF AND GROUT · NABL ACCREDITED

- **Pull-off to ASTM D4541.** Accredited across the whole finishing family: gypsum, tile adhesive, mortar, plaster and paint coating. 5 kg in the laboratory or 1 No on site, 2 to 7 days.
- **On-site pull-off.** The version that matters, because it measures the bond achieved by your applicator on your substrate, not the bond achievable in a laboratory.
- **Tile grout.** Compressive and flexural strength to ISO 13007-4 and EN 12808-3, and linear shrinkage to ISO 13007-4 and EN 12808-4. All accredited.
- **Jointing mortar.** Compressive and pull-out at 7 and 28 days, dry shrinkage, pot life, soundness by autoclave, setting times, split tensile to ASTM C1660. 10 kg, 35 days.
- **Ready-mix plaster and mortar.** Setting times, compressive strength at 3, 7 and 28 days, bulk density, soundness, pull-off adhesion, flexural and split tensile. 15 kg, 35 days. Plus a site check on batch age and workable life.
- **Wall putty.** Tensile strength at 7 and 28 days, compressive strength, setting time, shrinkage, consistency, and water capillary absorption by Karsten tube. 10 kg, 45 days.

The ASTM D4541 pull-off and the ISO 13007-4 / EN 12808 grout suite are NABL accredited. The full IS 15477 adhesive panel is performed and reported outside accredited scope.

Blocks and bricks are bought by the truckload on price and installed before anybody measures them, so the whole masonry package is verified on arrival rather than after the plaster cracks

Unit	Parameters	Standard	Sample	Days
AAC block (autoclaved aerated concrete)	Dimensions length, width and height; compressive strength; block density; drying shrinkage; moisture content; thermal conductivity	IS 2185 Part 3, IS 6441 Parts 1 and 5, IS 3346	24 Nos for complete analysis 12 Nos compressive 2 Nos thermal conductivity	15 to 21
Burnt clay brick	Compressive strength; water absorption; efflorescence; bulk density; dimensions length, width and thickness; drying shrinkage	IS 3495 Parts 1 to 3, IS 1077, IS 2180	20 Nos full physical 5 Nos per single test	1 to 15
Fly ash brick	Compressive strength; water absorption; efflorescence; drying shrinkage; dimensional tolerance	IS 12894, IS 3495, IS 4139	20 Nos full physical	1 to 15
Solid concrete block	Cutting and conditioning; dimensions; compressive strength; block density; drying shrinkage; moisture movement; water absorption	IS 2185 Part 1:2005	20 Nos complete analysis	15
Paving block	Compressive strength; flexural strength; tensile splitting strength; abrasion resistance; water absorption; length, width, thickness and thickness of the wearing layer	IS 15658:2006	33 Nos complete analysis 8 Nos per single test	1 to 3
Cover block	Sample preparation and compressive strength. Small, cheap, and the reason a cover survey fails later	Internal procedure	1 No	2

AAC blocks, burnt clay bricks and paving blocks are NABL accredited. Fly ash bricks and solid concrete blocks are tested to the same methods and reported outside accredited scope.

Plywood and door shutters are the two finishing items that fail loudest after possession, and both are now high-volume lines on the TCR bench even though neither sits inside accredited scope yet

PLYWOOD · IS 710 / IS 303 / IS 1734 · 3 NOS OF 1 M x 1 M · 28 DAYS

- **Dimensional.** Length, width, thickness, squareness and edge straightness.
- **Moisture content and density.** The pair that predicts warping in a Mumbai monsoon.
- **Glue adhesion, dry state.** Glue shear strength, average and minimum individual, plus adhesion of plies by the knife test.
- **Resistance to water, after 72 hours.** Glue shear strength again, average and minimum individual, and the knife test repeated. This is the BWP versus MR distinction, measured rather than claimed.
- **Tensile strength.** Parallel to face grain and perpendicular to grain.
- **Static bending, dry state.** Modulus of rupture along the grain and across the grain.
- **Nail and screw holding power, and water resistance.** The two that decide whether a hinge or a handle stays attached.

DOOR SHUTTER · IS 2202 PART 1 / IS 4020 · FULL-SIZE SHUTTER · 20 DAYS

- **Geometry.** Dimensions and squareness, general flatness, general planeness.
- **Load and impact.** Impact indentation test, edge loading test, flexure test, buckling resistance test.
- **Abuse simulation.** Shock resistance, slamming test, misuse test, knife test. These reproduce five years of a family opening a door in twenty days.
- **Water.** End immersion test, the check that finds the shutter that swells and jams in the first monsoon.
- **Assembly integrity.** Glue adhesion test and screw withdrawal resistance test.
- **Moisture content.** Measured on the shutter as delivered.
- **Frames.** Wooden door frames to IS 287 and IS 11215 for moisture and density. Laminated veneer lumber frames to IS 14616, IS 1734, IS 1708 and IS 2380 for dimensions, moisture, ply adhesion and strength.

Timber wood density and moisture content to IS 1708 are NABL accredited. The plywood and door shutter panels are performed to the cited standards and reported outside accredited scope.

Stone, boards and plaster complete the finishing package, and the stone family in particular is fully accredited because a marble floor is both the most visible and the most disputed surface in a tower

NABL ACCREDITED

Marble, granite and rock

Marble: water absorption after 24-hour immersion, true specific gravity, hardness on the Mohs scale, dimensions. 7 Nos of 300 x 300 mm, 8 days.

Granite: apparent specific gravity, water absorption, true porosity, Mohs hardness, dimensions to IS 14223 Part 1. 3 Nos.

Also available: compressive strength to IS 1121 Part 1, modulus of rupture to IS 1121 Part 2, abrasion resistance to IS 1706, stain and chemical resistance to IS 13630.

Rock: unconfined compressive strength to IS 9143, saturated specific gravity, porosity, water absorption, core preparation.

NABL ACCREDITED

Gypsum, lime and timber

Gypsum plaster chemistry to IS 1288 and IS 2547: SO3, CaO, soluble magnesium and sodium salts, loss on ignition, free lime. 1 kg, 10 days.

Gypsum plaster physical to IS 2547 and IS 2542: setting time, soundness, mechanical resistance of set neat plaster, residue on 150 micron sieve, adhesion strength. 20 kg, 10 days.

Building lime to IS 6932 Part 1: silica, magnesium oxide, insoluble residue in dilute acid and alkali, loss on ignition, aluminium oxide, ferric oxide, calcium oxide. 2 kg, 10 days.

Timber wood density and moisture content to IS 1708. 1 foot, 10 days.

OUTSIDE ACCREDITED SCOPE

Boards, pipes and flooring

Fibre cement board to IS 14862: length, width, thickness, modulus of rupture, apparent density, bending strength.

Gypsum board to IS 2095-I: mass of plaster, flexural strength and breaking load in both directions, board dimensions, plus a chemical panel. 1 m x 1 m, 7 to 10 days.

Precast concrete pipes to IS 3597: dimensional analysis and hydrostatic test.

Wooden flooring to manufacturer specification: moisture, grade, length, width, thickness, joints, surface effects, dimension check.

OUTSIDE ACCREDITED SCOPE

Waterproofing and specials

Waterproofing compound to IS 2645: permeability to water, setting time, compressive strength, chloride content. 1 litre plus 10 kg OPC, 35 days.

Refractory castables to IS 10570: cold crushing strength and modulus of rupture. 3 prisms, 2 days.

Bentonite powder to IS 6186, IS 12446, IS 2911 and IS 2720: moisture, pH, gel formation index, dry and wet fineness, free swelling, liquid limit. 3 kg, 7 days. The diaphragm-wall material.

Curing compound to ASTM C156 and C309: colour, density, water retention over 72 hours, drying time, non-volatile content, pH.

The facade package is where a developer's specification is quietly value-engineered, so aluminium sections and glass are verified for alloy, coating and safety performance rather than for appearance

ALUMINIUM SECTIONS AND FORMWORK · BS 573 / IS 13871 / IS 101

- **Chemical composition, BS 573.** Magnesium, silicon, manganese, iron, copper, zinc, titanium, chromium and aluminium by optical emission spectrometry. This is the check that finds a 6063 section sold as 6061, or the reverse.
- **Mechanical.** Tensile strength, proof stress, elongation and hardness.
- **Weight per metre.** The direct measure of wall thickness, and the parameter most often shaved.
- **Powder coating.** Coating thickness, finish quality, scratch hardness at 3000 g and cross-cut adhesion to IS 101. A coating that fails cross-cut will peel at the first monsoon.
- **Aluminium formwork.** Chemical analysis, coating thickness and tensile strength on the panel as supplied, plus load-cycle qualification where the system is being requalified after re-use.

GLASS · IS 2553 / IS 17004 / IS 14900

- **Toughened glass, IS 2553 and IS 17004.** Thickness, dimensions and squareness, and surface compression. Surface compression is the parameter that decides whether the pane is genuinely toughened or merely heat strengthened.
- **Laminated glass, IS 2553 and IS 17004.** Thickness, dimensions, squareness and edge displacement. Edge displacement finds a delaminating interlayer before it becomes visible.
- **Float glass, IS 14900.** Visual light transmission, dimensions in length, width and squareness, thickness, and visual faults.
- **Why it matters.** A balcony railing, an overhead canopy or a high-rise window is a safety-critical component. The specification is written for a reason and the substitution is invisible from the ground.

Aluminium formwork, aluminium sections and glass are all on the Godrej Properties rate-contract scope.

A waterproofing membrane is specified on its tensile strength and it fails on its elongation, which is why the crack-bridging test matters more than the number on the datasheet

ASTM D412

Tensile strength and elongation at break

Tensile strength is the maximum stress the elastomer carries before it ruptures. Elongation at break is how far it stretches first.

A membrane at 400 percent elongation accommodates five times its original length. One at 100 percent reaches only double.

Tested at a controlled 23 degrees Celsius and 50 percent humidity, because elastomeric properties move sharply with temperature.

Specimen preparation, grip design and loading rate all move the result. A failure at the grip rather than the gauge section is invalid and is retested.

THE LIMITATION NOBODY STATES

D412 tests a uniform strip, not a crack

ASTM D412 pulls a clean specimen under ideal conditions. Buildings do not crack under ideal conditions. The membrane fails where a substrate crack opens beneath it, and a tensile number alone cannot predict that.

This gap is why we pair D412 with a crack-bridging test rather than reporting tensile data on its own.

AS/NZS 4548.5

Crack bridging, the test that reproduces the failure

The specimen is bonded to a substrate, the substrate is cracked, and the crack is opened under control while the membrane is watched for loss of integrity.

This directly simulates settlement, thermal cycling and structural movement, which is what actually breaks a terrace or a basement.

Where the membrane has to bridge, this is the acceptance test and D412 is the supporting data.

INTEGRAL AND ADMIXED SYSTEMS

Waterproofing compound, IS 2645

Permeability to water, setting time and compressive strength, plus chloride content. 1 litre of sample with 10 kg of OPC, 35 days; chloride alone on 200 ml in 3 days.

Paired with the concrete water permeability test to BS EN 12390-8, which IS accredited, so the compound and the concrete it modifies are both measured.

Bonding agents for cold joints: pull-off to ASTM D4541, slant shear to ASTM C882, pot life and gel time. 5 litres, 7 days.

ASTM D412 and AS/NZS 4548.5 are performed at Mahape under the same quality system and reported outside accredited scope. Specimens typically 150 mm x 25 mm strips from a cured film.

Coastal Mumbai concrete is a chloride problem, and TCR holds NABL accreditation on the bipolar corrosion-inhibiting admixture panel that Indian Railways specifies, which very few laboratories in India do

- **The mechanism.** A bipolar inhibitor, usually an amino-alcohol or an amine-carboxylate, acts on both halves of the corrosion cell at once. It forms a protective molecular layer on the steel and simultaneously slows chloride penetration through the concrete.
- **Why bipolar and not anodic.** Older anodic-only inhibitors leave the cathodic half of the mechanism running once chloride arrives. Bipolar chemistry closes both halves.
- **The threshold.** Chloride breaches the passive film on steel at roughly 0.4 percent by mass of cement. Past that point rust expands, cracks the cover and accelerates its own progress.
- **The commercial point.** By the time rust staining is visible on a coastal balcony, service life has already collapsed. An inhibitor prevents; it does not repair. Which is why the admixture has to be verified before the pour, not investigated after the stain.
- **Where TCR sits.** Indian Railways specifies this category under RDSO M&C/PCN/126/2020. TCR holds NABL accreditation on that specification, on seven parameters. The specialist ASTM G109 macrocell programme and the full RDSO qualification panel are subcontracted to qualified partners and consolidated into one accountable report.

NABL ACCREDITED · RDSO M&C/PCN/126/2020

Bipolar Concrete Penetrating Corrosion Inhibiting Admixture

- Accelerated corrosion test, RDSO M&C/PCN/126/2020
- Appearance, RDSO M&C/PCN/126/2020
- Odour, RDSO M&C/PCN/126/2020
- Skin irritation, RDSO M&C/PCN/126/2020
- pH, IS 9103
- Relative density, IS 9103
- Viscosity by Ford cup, IS 101 Part 1 Section 5

Seven bipolar corrosion-inhibitor parameters sit inside TCR's NABL scope under RDSO M&C/PCN/126/2020.

Four of India's largest developers hold long-term rate contracts with TCR rather than issuing job orders, and the scope of the Godrej contract is a fair description of what a full developer engagement looks like

3 years

Godrej Properties rate contract, all Mumbai zone, from April 2026

8+

Godrej locations covered: Vikhroli, Kandivali, Chembur, Panvel, Bhandup, Thane, Mahalaxmi and more

5

Material categories on the Godrej scope

1 to 21

Working-day turnaround band across the contract

Category on the Godrej Mumbai-zone scope	What is tested
Aluminium formwork	Chemical analysis, coating thickness, tensile strength
Tiles and stones	Marble, ceramic and vitrified tiles: dimensional analysis, water absorption, modulus of rupture, thermal shock, stain resistance and the wider IS 13630 durability set
Concrete	RCPT, ultrasonic pulse velocity on site, core extraction with compressive strength
AAC blocks	Compressive strength, density, dimensional accuracy, drying shrinkage, thermal conductivity
Reinforcement steel	Chemical analysis, carbon equivalent, physical properties to IS 1786:2008
Also on long-term rate contract	Kalpataru, Shapoorji Pallonji and Rustomjee. TCR is also CIDCO empanelled and BMC Roads Department registered, which is what made the developer shortlists possible.

This is the page to send to a procurement or quality engineer: what to collect, how much of it, and when the result lands, for the twenty materials a residential tower actually consumes

Material	Sample	Days
Cement, complete physical	25 kg	28
Cement, complete chemical	1 kg	6
Fly ash, complete physical	1 bag + 1 bag cement	35
GGBFS, complete physical	10 kg + 5 kg OPC	35
Micro silica, complete physical	15 kg + 15 kg cement	10
Admixture, chemical panel	1 litre	5
Coarse aggregate, complete physical	50 kg	7
Fine aggregate, complete physical	25 kg	7
Concrete cube set	3 Nos	1
Concrete core, extraction + strength	1 No	4
RCPT / RCMT	3 Nos cubes	6
Water permeability	3 Nos cubes	5

Material	Sample	Days
Construction water, IS 456 panel	1 litre	3
Drinking water, IS 10500 panel	2 litres	5
AAC block, complete analysis	24 Nos	15
Burnt clay brick, full physical	20 Nos	1 to 15
Paving block, complete analysis	33 Nos	2
Ceramic tile	6 to 24 Nos by size	20
Concrete tile (chequered / plain)	24 Nos	2
Tile adhesive	25 kg per type	35
Marble	7 Nos of 300 x 300 mm	8
Granite	3 Nos	8
Plywood	3 Nos of 1 m x 1 m	28
Door shutter	1 full-size shutter	20

Free TCR-branded pickup van across MMR. Call +91 98335 30200 or write to sales@tcrceng.com to book a collection.

02

SEGMENT TWO

Infrastructure and EPC

Metro, high-speed rail, expressways, ports and industrial civil work, where a laboratory has to be on the approved list before the testing package is committed.

First BIS-accredited commercial laboratory in India for IS 16172 rebar couplers, 8 mm to 40 mm.

Approved on all three Mumbai-Ahmedabad High Speed Rail civil packages since March 2024.

500-plus bridges inspected; BMC robotic underwater programme covering 400-plus bridges from March 2026.

BMC Roads Department registered and CIDCO empanelled for the Third Mumbai belt.

Maharashtra has committed a new-project pipeline from 2026 onward that will consume construction-materials testing for a decade, and the laboratory decision on each package is being made now

Priority	Project	Status	Testing TCR is positioned for
A+	Third Mumbai / KSC New Town	New master-planning phase; 323.44 sq km Raigad growth corridor; MMRDA appointed New Town Development Authority	Civil materials, structural steel, NDT, fatigue, building materials across arterial roads, bridges, water supply, drainage, utilities and logistics districts
A+	NAINA development	Active planning and development-permission pipeline; Panvel to Ulwe to Chirner to Uran to Pen	Concrete, soil, aggregate, road materials and building materials on town-planning schemes and new residential and commercial development
A+	NMIA airport-influence ecosystem	Airport operational from December 2025; secondary and supporting infrastructure now building	Concrete, pavement, rebar, structural steel, welding and NDT on cargo, logistics, warehousing and aerocity development
A+	Thane Ring Metro	New project; approximately 29.1 km, 22 stations, elevated and underground; CRZ clearance reported 2026	Concrete, rebar and couplers, structural steel, weld testing, NDT and component fatigue testing
A+	Mumbai Metro Line 5A	Newly approved extension strengthening the Thane, Bhiwandi and Kalyan network	Civil materials, structural steel, fasteners, welding, NDT and fatigue where specified
A+	Vadhavan Port to Samruddhi freight corridor	New approved freight corridor; PWD records show approval to undertake	Road, pavement, concrete, bridges, structural steel, welding, NDT and fatigue
A	Nagpur-Gondia expressway; Virar-Alibaug corridor; Jaigad-Chiplun-Satara; AIIB and NDB road programme (approx. 1,500 km first phase); new PWD road and bridge packages	Active monitoring; land acquisition, DPR and package award stages	Soil, aggregate, bitumen, asphalt, concrete, bridges, structural steel, field density and NDT

The strategy is to be on the approved laboratory list at the planning and EPC stage, not after the package has already chosen its laboratory.

TCR is the first and only commercial laboratory in India accredited by BIS for the full IS 16172 rebar coupler scope from 8 mm to 40 mm, and on a viaduct programme that is not a credential, it is a critical-path dependency

FIRST

BIS-accredited commercial laboratory in India for IS 16172 couplers

8 to 40

Bar diameter range, millimetres, on the accredited coupler scope

2

Standards accredited: IS 16172 and ISO 15835-2

Lab + site

Coupler testing accredited in both the Mahape laboratory and the site scope

WHY A COUPLER EXISTS

A lap splice you cannot afford

In heavily congested reinforcement, a lap splice needs bar length, cover and space that a metro pier cap or a viaduct segment does not have. A mechanical splice replaces it.

Once the coupler carries the load path, the coupler IS the reinforcement. A coupler that slips has moved the design assumption, silently.

WHY BIS ACCREDITATION MATTERS

Lot release sits on the critical path

Coupler lots are released against test evidence. If the laboratory is not accepted by the authority, the lot does not release and the segment does not cast.

Being the first BIS-accredited commercial laboratory means the evidence is accepted without a second argument, and the programme keeps its date.

WHERE IT IS ALREADY DEPLOYED

Metro, coastal road and high-speed rail

Larsen and Toubro Mumbai Metro: rebar coupler, concrete, soil and structural NDT.

Mumbai Coastal Road Project: rebar coupler, concrete and structural NDT.

Mumbai-Ahmedabad High Speed Rail, all three civil packages: HT strand, rebar coupler, concrete, soil and HSR-specification materials.

Couplers are accredited in the laboratory AND on site. Very few laboratories in India hold either; TCR holds both.

The coupler qualification set is five mechanical tests plus the chemistry, and each one exists because a different real failure mode was found in service

Test	Standard	What is measured	The failure mode it catches
Static tensile test	IS 16172, ISO 15835-2	Ultimate tensile strength, percentage extension under load at maximum force; under ISO 15835-2 also 0.2 percent yield stress, percentage elongation and percentage reduction in area	A splice weaker than the bar it joins. The failure must occur in the bar, not in the coupler.
Slip test	IS 16172, ISO 15835-2	Residual slip across the splice after a defined load cycle, measured in millimetres	A coupler that is strong but not stiff. Slip becomes crack width in service, and crack width becomes chloride ingress.
Cyclic tensile test	IS 16172	Behaviour under repeated load cycles within the elastic range	Progressive loosening under traffic or wind cycling that a single static pull will never reveal.
Low cycle fatigue (LCF)	IS 16172, ISO 15835-2	Survival under a small number of large strain reversals	Seismic demand. This is the earthquake test, and on a metro viaduct it is not optional.
High cycle fatigue (HCF)	IS 16172, ISO 15835-2	Survival under a large number of small stress reversals	Live-load fatigue over decades of train or vehicle passage.
Chemical analysis	ASTM E415	Full element suite on the coupler body by optical emission spectrometry	A coupler machined from the wrong grade. The mechanical tests may pass on a good sample and the lot may not.

All six rows are NABL accredited. IS 16172 and ISO 15835-2 are both on scope, in the laboratory and at site.

Prestressing steel and reinforcement carry the load in every viaduct and every long-span deck, and the HT strand programme is where a high-speed rail specification differs most from ordinary construction

HIGH TENSILE STRAND

Prestressing for viaducts and bridge decks

Breaking load, 0.2 percent proof load, elongation and relaxation on strand to IS 14268 and ASTM A416. Delivered on the Mumbai-Ahmedabad High Speed Rail packages as part of the HSR-specification materials scope under NHSRCL VMAC No. 13. Strand governs the camber, the prestress loss and therefore the long-term geometry of a segmental viaduct.

TMT REINFORCEMENT

IS 1786 and the ASTM equivalents

Tensile, 0.2 percent proof stress, elongation, reduction in area, bend and re-bend, weight per metre. Fatigue to IS 16651 where cyclic capacity is designed for. Chemical analysis and carbon equivalent by optical emission spectrometry for weldability. ASTM A615, A706 and A1064 where the specification is written to the American codes, plus ACI 318 acceptance.

ANCHORAGE AND WELDED CONNECTIONS

Where the bar meets everything else

Welded fabric and shear connectors to IS 2770 and the relevant weld procedure qualification. Bolt, screw, stud and nut testing to IS 1367 Part 1, including 1.0 percent proof stress. Weld bend testing to ASME Section IX, AWS D1.1, API 1104, ASTM E190 and E290, all NABL accredited on the metals bench.

WHY ONE LABORATORY FOR STEEL AND CONCRETE

The interface is where structures fail

A rebar failure is rarely a rebar problem. It is a cover problem, a chloride problem, a coupler problem or a weld problem. TCR runs the metallurgical bench, the concrete bench and the site NDT bench under one management system, so an anomaly in one is chased into the others rather than reported in isolation. That bench is also NADCAP AC7101 accredited for aerospace materials testing, which is the strictest audit any of it faces.

Geotechnical and pavement-layer testing is a large part of every highway and township package, and this is the area where we are most explicit that the mechanical tests sit outside our accredited scope

Layer or purpose	Tests	Standard	Sample	Days
Foundation and general soil	Standard and modified maximum dry density with OMC, CBR, plastic limit, liquid limit, dry sieve analysis, specific gravity, natural moisture, unconfined compression, differential free swell index, hydrometer analysis, field density by sand replacement and by core cutter	IS 2720 Parts 3 to 40	30 kg for CBR and Proctor; 1 to 15 kg for the rest; 1 point for field density	2 to 7
Soil chemistry · NABL ACCREDITED	pH, chloride content, total soluble sulphate content, organic matter, calcium carbonate content, total soluble solids, colloidal silica	IS 2720 Parts 21 to 27, BS 1377 Part 3	1 kg	1 to 4
Embankment and subgrade	Sand content, plasticity, density OMC and MDD, deleterious content, moisture content, soaked CBR	IS 2720 Parts 2, 4, 5, 7, 8, 16 and 27	5 to 30 kg	2 to 6
Granular sub base (GSB)	Gradation, 10 percent fines, Atterberg limits, deleterious constituents, soaked CBR, wet impact value, maximum dry density and OMC, design mix for GSB	IS 2386 Parts 1 and 2, IS 2720 Parts 5, 7 and 16, IS 5640, MoRTH	5 to 30 kg; design mix on 40, 20 and 10 mm plus stone	2 to 7
Wet mix macadam (WMM)	Aggregate impact value, grading, flakiness and elongation index, Atterberg limits, design mix for WMM	IS 2386 Parts 1 and 4, IS 2720 Part 5, MoRTH	10 to 40 kg; design mix on 40, 20 and 10 mm plus stone	2 to 7
Rock and core	Unconfined compressive strength, water content, specific gravity, density, porosity, preparation of core	IS 9143, IS 13030, IS 9179	1 No	2 to 4

Soil chemistry (pH, chloride, sulphate, organic matter, calcium carbonate) is NABL accredited. The mechanical suite below is performed to the cited standards and reported outside accredited scope.

Road and pavement work reaches TCR through the BMC Roads Department registration secured in March 2026, and bitumen itself is delivered through a qualified partner laboratory under TCR oversight

WHAT BMC REGISTRATION COVERS

Three testing categories inside Greater Mumbai

- Chemical.** Ferrous and non-ferrous metals, RoHS compliance, material identification by portable XRF.
- Mechanical.** Burnt clay bricks, aggregates, hardened concrete, reinforcement bars, mechanical splices and couplers, welded rails, fasteners, carbon steel pipes, copper tubes, welding electrodes, zinc-coated steel.
- Non-destructive.** Ferrous and non-ferrous metals in all product forms including castings, pipes, plates, welds and forgings, with on-site deployment.

BITUMEN, STATED PLAINLY

Partner-laboratory delivery, TCR oversight

- Bitumen and bituminous mix testing to IS 73, IS 1206, IRC SP 53 and IRC 37 is delivered through a qualified partner laboratory.
- TCR coordinates, oversees and consolidates. One report, one signature, one point of accountability.
- We do not present partner work as our own accredited scope. That is the same discipline we apply to the macrocell corrosion programme.

PAVEMENT LAYERS AND MIXES

From subgrade to wearing course

- Granular sub base and wet mix macadam gradation, impact, flakiness and Atterberg suites to MoRTH.
- Dry lean concrete and pavement quality concrete design mixes to MoRTH and IRC 15.
- Aggregate impact, crushing, abrasion, flakiness and elongation on the accredited aggregate bench.
- Field density by sand replacement and by core cutter, on the compacted layer.

ROAD INSPECTION AND EVALUATION

Condition assessment on the built road

- Pavement condition index survey.
- Non-destructive roughness measurement.
- Deflection measurement by Benkelman beam and falling weight deflectometer.
- This is what turns a maintenance budget from a guess into a prioritised programme.

BMC registration ChE/Rds/8292/NF, March 2026, extended to 24 March 2028 on NABL revalidation. NABL accreditation was the prerequisite.

Five hundred bridges is not a marketing number, it is an operating capability: robotic access, underwater inspection and AI-assisted assessment on assets that cannot be closed for a survey

500+

Bridges inspected across India, Maharashtra PWD programme continuous

400+

Bridges in the BMC robotic underwater inspection programme from March 2026

3

Levels: routine, principal and special inspection under IRC SP 35 and SP 18

2026

BMC AI-assisted underwater programme start

ACCESS

Robotic, underwater and drone

Robotic crawler access to soffits, bearings and pier caps that a cherry picker cannot reach without a lane closure.

Underwater inspection of piers, pile caps and scour protection, which is where the majority of unexpected bridge failures actually originate.

Drone capture for high-level and long-span geometry and for facade and soffit documentation.

ASSESSMENT

NDT on the deck, the pier and the bearing

Ultrasonic pulse velocity, rebound hammer, half-cell potential and carbonation depth on the concrete, all NABL accredited on the site scope.

Cover survey and ground-penetrating radar for rebar mapping and embedded utilities, outside accredited scope and marked as such.

Core extraction and compressive strength for in-situ verification.

Ultrasonic, magnetic particle and radiographic testing on steel girders, welds and bearings, all NABL accredited.

OUTPUT

A prioritised rehabilitation programme

Condition rating against IRC SP 35 and SP 40, with a defect register and photographic record.

Root-cause diagnosis, repair scheme, technical specifications, tender documents and cost estimates.

This is the deliverable a PWD or municipal engineer can actually put into a budget cycle, rather than a list of observations.

Structural steel, welding and fatigue sit on the same NABL and NADCAP accredited metallurgical bench that serves aerospace, which is the strictest audit any TCR laboratory faces

MECHANICAL

What the section will carry

Tensile, yield and 0.2 percent proof stress, elongation and reduction in area to IS 1608 Part 1 and ASTM E8.
Charpy and Izod impact to ASTM E23, including at sub-zero test temperature where the specification calls for notch toughness.
Hardness by Brinell, Vickers and Rockwell.
Fatigue and component fatigue testing where the design carries cyclic load: bridge components, bearings, connections.

NON-DESTRUCTIVE

On the fabrication and on the erected frame

Ultrasonic testing on plates, pipes, castings, forgings and welds to ASME Section V Articles 4, 5 and 23, ASME SA388, SA435, SA577, SA578, SE164, SE213 and SE273.
Radiographic testing, X-ray to 250 kV and gamma with Ir-192, to ASME Section V Articles 2 and 22.
Magnetic particle testing to ASME Section V Article 7 and ASTM E709; liquid penetrant to ASME Section V Article 6 and ASTM E165.
All of the above accredited on both the laboratory and the site scope.

WELDING

Procedure and welder qualification

Bend testing to ASME Section IX, AWS D1.1, API 1104, ASTM E190 and E290, all accredited.
Macro etch and micro examination of the weld, heat affected zone and fusion line, on the accredited metallography bench.
Welding consumable testing: diffusible hydrogen content, moisture content, efficiency, metal recovery and deposition coefficient.
Procedure qualification record and welder performance qualification support.

COATINGS AND PROTECTION

Galvanising, paint and cathodic protection

Zinc coating mass, thickness and adhesion on galvanised steel.
Dry film thickness, adhesion by cross-cut and pull-off, and holiday detection on protective coating systems.
Salt spray and electrochemical corrosion testing on the accredited corrosion bench.
Cathodic protection survey support to NACE SP0169 principles for buried and immersed infrastructure.

The same bench that qualifies an aerospace fastener qualifies your PEB connection. That is not a coincidence, it is the point.

Industrial civil infrastructure is a distinct market from buildings and roads, and TCR certifies grain silos to 10,000 metric tonnes as well as the foundations and plinths that carry a plant

- **Grain silo certification to 10,000 MT.** Silos of ten thousand metric tonne capacity certified against EN 10346 S350GD coated steel sheet, which is the material specification that governs the coating class, the yield and the corrosion behaviour of the shell.
- **ATEX and PESO framework.** Where the silo carries an explosive-dust scope, the assessment runs inside the ATEX and PESO certification framework rather than as a general structural check. Grain dust is an explosion hazard and the regulatory register is different.
- **Pipe-rack foundations.** The structure that carries every process line in a refinery or a fertiliser plant, and the one most often found under-designed for the load it ended up carrying after three expansions.
- **Equipment plinths and machine foundations.** Vibration-sensitive foundations under rotating equipment. Assessed for concrete quality, cover, cracking and the dynamic behaviour that causes bolt loosening and misalignment.
- **Chimney and stack assessment.** Structural condition, concrete or steel shell integrity, lining condition and verticality, read against IS 4998 Part 1 for concrete chimney design, IS 11960 for industrial steel chimneys, and IS 875 Part 3 for the wind-load implications.
- **Why an industrial client uses one provider.** The same visit produces the civil assessment, the NDT on the steel, the metallurgical opinion on the corroded section and the water chemistry behind it. Four reports from four vendors do not reconcile; one report does.

STANDARDS REGISTER · INDUSTRIAL CIVIL

What the assessment is read against

- **EN 10346** S350GD coated steel sheet for grain silo shells
- **IS 4998 Part 1** Criteria for design of reinforced concrete chimneys
- **IS 11960** Design of industrial steel chimneys
- **IS 875 Part 3** Wind loads on buildings and structures
- **ATEX / PESO** Explosive-dust scope certification framework
- **IS 456, IS 516** Concrete for foundations, plinths and pile caps
- **AISC 360** Specification for structural steel buildings
- **IS 13311, IS 516 Part 5** In-situ NDT on the concrete of an operating plant

A chimney, a stack or a tall building core that is out of plumb is carrying a wind moment nobody designed for, and theodolite survey is the measurement that turns a suspicion into a number

WHAT IS MEASURED

Verticality, straightness, twist

Deviation from vertical at successive elevations, measured by theodolite from established ground stations.

Straightness of the shell or core between those elevations, which distinguishes a uniform lean from a local bulge or kink.

Twist, where a stack or tower has rotated as well as leaned.

WHAT IT IS FOR

Chimneys, stacks, towers, building cores

Industrial chimneys and flue stacks, concrete and steel.

Communication and transmission towers.

Tall building cores, during construction as a verification of the slip-form or jump-form, and afterwards as an audit input.

Silos, water towers and any slender structure where the slenderness ratio makes the wind case govern.

WHY THE WIND CASE GOVERNS

A lean is a permanent eccentricity

A vertical structure carries its self-weight through its own axis. A leaning one carries it at an eccentricity, and that eccentricity adds a permanent moment at the base.

IS 875 Part 3 gives the design wind load. The verticality deviation tells you how much of the design capacity has already been consumed before the wind arrives.

That is the number an owner needs before deciding to repair, de-rate or demolish.

WHAT YOU RECEIVE

A deviation report, not a photograph

Tabulated deviation at each measured elevation, with the survey station geometry and the instrument record.

Plotted deviation profile against the permissible envelope from IS 4998 Part 1 or IS 11960.

An engineering statement on the wind-load implication, and the recommended action.

Paired, where appropriate, with the NDT and structural audit described in segment three, so the geometry and the material condition are read together.

Output is a verticality deviation report, read against IS 4998 Part 1, IS 11960 and the IS 875 Part 3 wind-load implications.

The infrastructure track record is the part of this brief a procurement team can verify independently, which is exactly why it carries more weight than any capability claim on the preceding slides

Client or project	TCR service anchor	Period
Mumbai-Ahmedabad High Speed Rail, NHSRCL packages C1, C2 and C3	Construction-stage civil testing under MEIL-HCC (C1), Afcons (C2) and Larsen and Toubro (C3): HT strand, rebar coupler, concrete, soil and HSR-specification materials	Approved under VMAC No. 13, 23 October 2023; engaged across all three packages since March 2024
Maharashtra PWD bridge programme	Robotic NDT, structural audit and rehabilitation recommendation on 500-plus bridges	Continuous
BMC robotic underwater bridge programme	AI-assisted underwater inspection across 400-plus bridges	March 2026 onward
Statue of Unity, Larsen and Toubro	Mechanical, chemical, metallurgical and NDT through construction; year-long continuous on-site engagement, recorded in appreciation letters	Construction era
Statue of Oneness, Adi Shankaracharya	Conventional NDT for structural fabrication	Multiple phases
Larsen and Toubro Mumbai Metro	Rebar coupler, concrete, soil and structural NDT	Multiple phases
Mumbai Coastal Road Project	Rebar coupler, concrete and structural NDT	Multiple phases
Antilia, Mumbai	NDT through construction	Construction era
Wankhede Stadium, Mumbai	NDT through redevelopment	Multiple phases
CIDCO empanelled Material Testing Laboratory, Maharashtra	Construction material testing across the Navi Mumbai and NAINA belt	Empanelment extended to 7 February 2027

On an infrastructure package the laboratory decision is made earlier than most contractors expect, so the useful question is who to bring TCR to and at what stage

WHO TO INVOLVE, IN ORDER

- The authority or development agency, for the approved-laboratory list itself.
- The DPR or project consultant, who writes the testing specification.
- The EPC contractor, who owns the testing budget.
- The project director or project head.
- The QA and QC head, who lives with the laboratory daily.
- The materials head, who controls sampling frequency.
- Procurement and vendor registration, for the empanelment paperwork.
- The structural or bridge sub-contractor.
- The ready-mix concrete or asphalt supplier.
- The steel or pre-engineered building fabricator.

AT WHAT STAGE, AND WHY

- **Master plan and DPR.** The testing specification is written here. If the specification names a scope no accredited laboratory in the region holds, the programme discovers it two years later.
- **Vendor registration and empanelment.** This is a paperwork exercise with a lead time. Starting it when the first sample is ready is starting it too late.
- **Mobilisation.** Sampling plan, chain of custody, site laboratory arrangement and the test calendar derived from the construction bar chart.
- **First lot release.** Couplers, strand and rebar. Get the first release right and the rest of the programme runs on rhythm.
- **Construction stage.** Cubes, cores, fresh concrete temperature, field density, cover survey and NDT, running to the bar chart.
- **Handover and defect liability.** Structural audit baseline, so the owner starts the asset's life with a measured condition record rather than a memory.

The objective is to be on the approved laboratory list before the major testing packages are committed, not after.

03

SEGMENT THREE

Structural audit

Statutory audits under Maharashtra Clause 77, industrial plant assessment, and the condition evidence that decides whether an ageing asset is repaired, de-rated or replaced.

12-plus structural audits completed across India.

Mumbai alone carries 30,000-plus buildings inside the audit mandate.

Three-part method: visual survey, non-destructive evaluation, repair and rehabilitation consultancy.

Output is a Form A or Form B certificate and, after repair, a Structural Stability Certificate.

Clause 77 of the Maharashtra Municipal Corporations Act puts a statutory clock on every building past fifteen years, and the obligation sits with the society or the owner, not with the municipality



- **Who carries the obligation.** The society, the owner or the occupier, not the municipal corporation. The corporation issues the notice; it does not do the audit.
- **What the audit has to establish.** The present structural condition, the expected residual life, the areas requiring immediate repair, and a preventive and corrective programme. A certificate that states only 'structurally safe' does not satisfy that.
- **What the certificate is.** A Form A or Form B structural audit certificate carrying repair and rehabilitation recommendations under the CPWD framework, submitted to the municipal authority.
- **What follows the repair.** A Structural Stability Certificate issued on completion of the recommended work. This is the document that closes the municipal file, and it is issued only after periodic inspection during the repair, not on a contractor's completion letter.
- **Why the fifteen-year recommendation matters commercially.** Between fifteen and thirty years, repair is a maintenance decision. Past thirty, with corrosion already through the cover, it becomes a structural rehabilitation project at several times the cost. The audit is what makes that a choice rather than a discovery.
- **Beyond housing societies.** The same statutory and best-practice framework is applied to industrial plants, government buildings, schools, hospitals, data centres and commercial estates, where the driver is insurance, lender covenant or corporate risk policy rather than a municipal notice.

Mumbai's building stock alone runs to 30,000-plus buildings inside the audit-mandate scope.

The audit runs in three parts and the sequence is the discipline: the visual survey decides where to test, the testing decides what is wrong, and only then does anybody write a repair scheme

PART A

Visual inspection

- Member-by-member survey inside and outside the structure.
- Photographic documentation of every recorded defect.
- Review of architectural, RCC and structural drawings where they exist, which on a thirty-year-old building is frequently not the case.
- Recording of the load transfer system and the structural framing as built, not as drawn.
- Defects logged: cracking and its pattern, settlement, leakage and seepage paths, spalling, rust staining, and non-structural element distress.
- Output: the list of locations that Part B will test. Testing everywhere is not an audit, it is a budget.

PART B

Non-destructive evaluation

- Ultrasonic pulse velocity to IS 516 Part 5 Section 1 for concrete homogeneity and internal voiding. NABL accredited.
- Rebound hammer to IS 13311 Part 2 and IS 516 Part 5 Section 4 for surface hardness correlation. NABL accredited.
- Half-cell potential to ASTM C876 and IS 516 Part 5 Section 2 for corrosion likelihood mapping. NABL accredited.
- Carbonation depth to BS EN 14630 and IS 516 Part 5 Section 3. NABL accredited, and the test that explains why corrosion started.
- Cover survey to BS 1881-204 and ground-penetrating radar for rebar mapping. Outside accredited scope; reported as such.
- Core extraction and compressive strength for in-situ verification, plus core water absorption. NABL accredited.
- Drone capture for high-rise facade and roof access.

PART C

Repair and rehabilitation consultancy

- Interpretation of the visual and NDT results together, as one picture.
- Diagnosis and root cause analysis. Not 'the beam is cracked' but why it cracked and whether the cause is still acting.
- A repair and rehabilitation scheme for durability and structural health.
- Technical specifications and draft tender documents.
- Cost estimates and tender scrutiny.
- Periodic inspection during the repair work itself.
- Issue of the Structural Stability Certificate on completion.

Six site tests carry almost every structural audit conclusion, and four of the six sit on TCR's NABL site scope, which is a materially stronger position than most audit providers can offer

THE ONSITE NDT BENCH

Test	Method	NABL	What it tells you	Sample basis
Ultrasonic pulse velocity	IS 516 Part 5 Section 1	Accredited (site)	Concrete homogeneity, internal voiding, honeycombing and crack depth. A low velocity is a warning before anything is visible.	Min. 10 points per visit
Rebound hammer	IS 13311 Part 2, IS 516 Part 5 Section 4	Accredited (site)	Surface hardness, correlated to compressive strength. Always read with UPV, never alone.	Min. 10 points per visit
Half-cell potential	ASTM C876, IS 516 Part 5 Section 2	Accredited (site)	Probability of active corrosion in the reinforcement, mapped across a grid. The corrosion map, not a spot reading.	1 No per location
Carbonation depth	BS EN 14630, IS 516 Part 5 Section 3	Accredited (site)	How far the carbonation front has advanced towards the steel. This is the test that explains WHY corrosion started.	1 No per location
Rebar cover survey	BS 1881-204	Outside scope	Rebar location, cover depth and bar diameter by pulsed eddy current or electromagnetic induction. Typically ± 10 mm on cover.	1 No per location
Ground-penetrating radar	Industry practice	Outside scope	Deeper rebar mapping, embedded utilities, voids and slab thickness where the cover meter cannot reach.	Per grid
Core extraction and strength	IS 516 Part 4, BS 1881-122	Accredited (lab)	The in-situ compressive strength and water absorption, which is the only direct measurement in the list.	1 No per location
Fresh concrete temperature	ASTM C1064	Accredited (site)	Placement temperature during a new pour. Included here because the audit of a new structure starts at the pour.	Per pour

Minimum 10 measurement points per visit for UPV and rebound hammer; 1 No per location for half-cell, cover meter and carbonation. Two-day report.

Rebar cover survey has become one of the fastest-growing services on the bench because clear cover is the single design parameter most often lost between the drawing and the pour

- **What the instrument does.** A rebar scanner uses pulsed eddy current or electromagnetic induction to detect the ferromagnetic steel and return three things at once: rebar location, cover depth to the nearest bar, and bar diameter. Advanced instruments infer diameter rather than requiring the operator to enter it, which removes a major source of error.
- **Accuracy, stated honestly.** Typically ± 10 mm on cover and within one specification class on diameter. High-cover structures in the sixty to one hundred and twenty millimetre range need instrumentation selected for that depth; a general-purpose meter will under-read.
- **Method.** Grid-based systematic scanning rather than spot checks, with digital 2D and 3D reporting so the cover map can be overlaid on the reinforcement drawing. Spot scanning is used only to confirm a specific bar.
- **Why it is growing.** Two drivers. On new construction, developers and EPCs have started verifying cover before the pour rather than arguing about it afterwards. On existing structures, cover is the first thing a corrosion investigation has to establish, because a half-cell map without a cover map cannot be interpreted.
- **Scope discipline.** Rebar scanner testing falls outside TCR's NABL scope and is reported as a non-accredited test. It is run under the same quality system, by the same civil laboratory, with the same chain of custody.

IS 456:2000 · NOMINAL COVER BY EXPOSURE

What the survey is measured against

Exposure class	Nominal cover
Mild	20 mm
Moderate	30 mm
Severe	45 mm
Very severe	50 mm
Extreme	75 mm

Most of coastal Mumbai is severe or very severe. A slab detailed for 45 mm and poured at 22 mm has not lost half its cover, it has lost most of its service life, because carbonation and chloride both advance as a function of depth. That is the gap a survey finds while it is still cheap to fix.

Up to 10 measurement locations of 1 m x 1 m per day, grid-scanned, with 2D and 3D digital reporting.

Fresh concrete temperature monitoring is the other fast-growing onsite line, and unlike the cover survey it sits squarely inside TCR's accredited site scope under ASTM C1064

THE MECHANISM

Heat of hydration in a thick pour

Cement hydration is exothermic. In a raft, a pile cap, a transfer girder or a mass foundation, the core cannot shed that heat as fast as the surface can.

The core expands while the surface is cooler and restrains it. When the core then cools and contracts against a hardened surface, the structure cracks from the inside out.

The controlling variable is the differential between core and surface, not the absolute peak alone.

WHY IT IS BOOMING NOW

Larger pours, hotter placements, tighter durability specs

Transfer slabs and rafts on Mumbai high-rises have grown thicker, and the pours are placed through a summer where ambient alone can put concrete near the specification limit at the chute.

Once a durability specification is written around RCPT and permeability, thermal cracking defeats it directly, because a through-crack is a chloride path no mix design can close.

WHAT TCR DOES ON SITE

Placement temperature and thermal profile

Placement temperature measured to ASTM C1064 at the point of discharge, on an accredited method, so the record is defensible at acceptance.

Embedded thermocouple monitoring of core and surface through the hydration peak, with the differential tracked against the specification limit.

Ambient and mix-water temperature logged alongside, so a rejected load can be traced to its cause rather than argued about.

WHAT IT PREVENTS

The crack you cannot repair afterwards

Delayed ettringite formation risk at elevated core temperature, which is a durability failure with no economical remedy once it is in the structure.

Through-thickness thermal cracking in a water-retaining or basement element, where the whole point of the element is that it does not leak.

Getting it right the first time is the entire commercial argument. Rework on a mass pour is not a repair, it is a demolition.

ASTM C1064 fresh concrete temperature is NABL accredited on the site scope. It is one of a very small number of accredited site parameters for building materials.

Source: NABL scope NABL T0726MH18640 Part B section B3, row 69, ASTM C1064; IS 1199; IS 456:2000; IS 16700 for tall buildings.

An industrial or government structural audit answers a different question from a housing society audit: not whether the building is safe to occupy, but whether the asset can carry another operating cycle

MANUFACTURING AND PROCESS PLANTS

The structure under the process

Plant buildings, workshop frames, crane gantries and craneway runways.
Pipe-rack foundations, equipment plinths and machine foundations, assessed for concrete condition, cover, cracking and dynamic behaviour.
Chimneys and stacks: shell integrity, lining condition and verticality by theodolite.
Where the structural finding touches the equipment, TCR Advanced Engineering carries the fitness-for-service, remaining-life and risk-based-inspection work on the pressure equipment itself.

GOVERNMENT AND PUBLIC ASSETS

Where the audit funds the budget line

Municipal buildings, schools, hospitals and public offices.
Bridges, flyovers and road-over-bridges under the PWD and municipal programmes.
Water-retaining structures, reservoirs and treatment plants.
The deliverable is written to be usable inside a budget cycle: condition rating, prioritised defect register, repair scheme, specification, quantities and cost estimate.

COMMERCIAL AND INSTITUTIONAL

Where the driver is a covenant, not a notice

Data centres, where a structural audit is frequently an insurance or a client-covenant requirement rather than a municipal one. TCR audited the STT Global Data Centre built by Larsen and Toubro.
Commercial estates, malls, hotels and educational campuses.
Housing societies under the statutory Clause 77 cycle, which remains the largest volume segment.

WHAT MAKES THE INDUSTRIAL AUDIT DIFFERENT

The structure is not the only thing being assessed

A cracked plinth under a rotating machine is a vibration problem before it is a concrete problem. A corroded pipe rack is a coating and an environment problem before it is a steel problem.
TCR runs the civil assessment, the NDT, the metallurgical opinion, the corrosion work and the water chemistry on one management system.
The audit therefore names the cause and not just the symptom, which is what turns it into a maintenance decision instead of a repair quotation.

The named audit engagements span a data centre, a pharmaceutical factory, a power transmission facility, an educational campus and a residential complex, which is the range the method is built to cover

Engagement	Location	Nature of the work
STT Global Data Centre, built by Larsen and Toubro	India	Structural audit of a mission-critical facility where continuous operation constrains both access and intrusive testing
Vikas Complex	Thane West	Structural audit of a large residential complex under the Maharashtra Clause 77 framework
KC College	Thane	Structural audit of an educational campus, where occupancy and academic calendar govern the survey window
Essential Power Transmission	Andheri, Mumbai	Structural audit of a power transmission facility
Synergia Life Sciences	Wada, Maharashtra	Structural analysis for a pharmaceutical manufacturing factory
Petro India	Sanganer, Jaipur	Structural assessment at a petroleum-sector facility
Antilia	Mumbai	Non-destructive testing through construction
Wankhede Stadium	Mumbai	Non-destructive testing through redevelopment
Maharashtra PWD bridge programme	Maharashtra	Robotic NDT, structural audit and rehabilitation recommendation across 500-plus bridges, continuous
BMC robotic underwater bridge programme	Greater Mumbai	AI-assisted underwater inspection of 400-plus bridges from March 2026

12-plus structural audits completed across India, and 500-plus bridges inspected.

An audit that stops at a report has done half a job, because the expensive decisions come afterwards, and TCR stays in the engagement through the repair to the stability certificate

01

Diagnose

Interpretation of the visual survey and the NDT results together, with root cause analysis. The question answered is not what is damaged but why, and whether the cause is still acting.

02

Specify

A repair and rehabilitation scheme for durability and structural health, with technical specifications written to standards a contractor can price and an engineer can enforce.

03

Tender

Draft tender documents, bill of quantities and cost estimates, followed by tender scrutiny of the bids received. The owner gets an independent read on whether the priced scheme is the specified scheme.

04

Supervise

Periodic inspection during the repair work. This is where a specification either gets executed or gets quietly substituted, and it is the stage most owners have no independent presence at.

05

Certify

Issue of the Structural Stability Certificate on completion, for submission to the municipal authority. Issued against inspected work, which is the only basis on which it means anything.

The Structural Stability Certificate is issued on completion of the recommended work, after periodic inspection during the repair, not on a contractor's completion letter.

Water testing is the newest line on the bench and the honest position is that construction water is deep and accredited, drinking water is accredited on three parameters today, and the wider panel is in build

Matrix	Parameters	Standard	NABL	Sample / days
Water for construction	pH, total acidity, total alkalinity, chlorides, sulphates, inorganic and fixed solids, organic and volatile solids, suspended matter, total suspended solids	IS 456:2000 Annex A, IS 3025	All nine accredited	1 litre / 3
Drinking water	pH, chlorides, sulphates ACCREDITED. Conductivity, turbidity, total dissolved solids, total hardness, calcium, magnesium, total alkalinity performed outside scope	IS 10500, IS 3025	3 parameters accredited	2 litres / 5
Drinking water, microbiology	Coliform and E. coli	IS 10500	Partner laboratory	1 litre / 5
Machine cooling water	Full chemical panel for cooling-tower and process water: pH, chloride, sulphate, hardness, alkalinity, calcium, magnesium, TSS, TDS, COD, BOD, dissolved oxygen	IS 3025	Industrial water matrix accredited on 13 parameters	2 litres / 7
Sewage and effluent	pH, total suspended solids, chemical oxygen demand, biological oxygen demand	IS 3025	Outside scope	1 litre / 5
Boiler feed water	The boiler fingerprint: silica, specific and cation conductivity, sodium, iron, copper, phosphate, dissolved oxygen, hydrazine residual, total organic carbon	IS 3025, ABMA and IBR practice	In build; the strategic priority	1 litre / 7

Construction water: 9 accredited parameters, 1 litre, 3 days. Drinking water: pH, chloride and sulphate accredited; the wider IS 10500 panel is performed and reported outside accredited scope.

This is the standards register a consultant or an authority will ask for, grouped the way a specification is written rather than the way a laboratory is organised

Domain	Indian Standards	International
Concrete and cement	IS 516 (Parts 1, 2, 4, 5, 11), IS 1199, IS 2386, IS 383, IS 4031, IS 4032, IS 8112, IS 12269, IS 456, IS 10262, IS 9013, IS 16700	ASTM C39, C496, C617, C1202, C1064, C1383; AASHTO T-259; NT Build 492; BS EN 12390 series; BS 1881 (122, 124, 204, 208)
Soil and geotechnical	IS 2720 (Parts 2 to 40), IS 4332, IS 5640, IS 9143, IS 13030, IS 9179	ASTM D698, D1883, D4318; AASHTO T89, T180; BS 1377 Part 3
Bitumen and road	IS 73, IS 1206, IRC SP 53, IRC 37, IRC 15	MoRTH Specifications for Road and Bridge Works
Rebar, couplers and prestressing	IS 1786, IS 16172, IS 16651, IS 2770, IS 14268, IS 3757, IS 1608 Part 1, IS 1367 Part 1	ISO 15835-2; ASTM A615, A706, A1064, A416, E415, E8; ACI 318
Structural steel and welding	IS 800, IS 2062, IS 8811	AISC 360; ASME Section IX and Section V Articles 2, 4, 5, 6, 7, 22, 23; AWS D1.1; API 1104; ASTM E23, E164, E165, E190, E290, E709, A388, A578
NDT for concrete	IS 13311 Parts 1 and 2, IS 516 Part 5 Sections 1 to 4	ASTM C876; BS EN 14630; BS 1881-204
Building and finishing materials	IS 2185 Parts 1 and 3, IS 6441, IS 3346, IS 3495, IS 1077, IS 2180, IS 12894, IS 15658, IS 1237, IS 13630, IS 15622, IS 15477, IS 1542, IS 2645, IS 9103, IS 1727, IS 3812, IS 16714, IS 16715, IS 15388, IS 2547, IS 2542, IS 1288, IS 2095, IS 14862, IS 710, IS 303, IS 1734, IS 2202 Part 1, IS 4020, IS 1708, IS 14616, IS 2553, IS 17004, IS 14900, IS 13871, IS 101, IS 6932, IS 3597, IS 14223, IS 1122, IS 1124, IS 1130, IS 1121, IS 1706, IS 10570, IS 6186, IS 12446, IS 2911	ISO 8302, ISO 10545, ISO 13007-4; ASTM C177, E228, D4541, C882, C109, C348, C1660, C939, C1107, C156, C309, C307, C1240, C989, D412, D1475, D2556, D638; EN 196, EN 998, EN 1015, EN 12808 (3 and 4), EN 10346, BS EN 16165, BS 573, AS/NZS 4548.5
Bridge and structural assessment	IRC SP 18, IRC SP 35, IRC SP 40, IS 4998 Part 1, IS 11960, IS 875 Part 3, CPWD framework	BS 5400; AASHTO LRFD Bridge Design Specifications; FHWA BIRM; ATEX and PESO
Water	IS 456 Annex A, IS 3025 series, IS 10500	APHA methods where cited
Laboratory quality	NABL 100, NABL 120, NABL 160, NABL 216	ISO/IEC 17025:2017; ILAC MRA (NABL/ILAC/11591, CAB ID T-0294); GUM / JCGM 100; EURACHEM; ISO 5725

The second engagement card covers the infrastructure and audit side: what a site team collects for the geotechnical, pavement, steel and onsite tests, and when each result lands

Test	Sample	Days
Soil, CBR (soaked)	30 kg	6 to 7
Soil, MDD and OMC (Proctor)	30 kg	3
Soil, Atterberg limits	1 kg each	2
Soil, dry sieve analysis	15 kg	2
Soil, field density (sand replacement / core cutter)	1 point	2
Soil chemistry panel (accredited)	1 kg	1 to 4
GSB, gradation	30 kg	2
GSB, Atterberg limits	10 kg	3
WMM, grading	40 kg	2
WMM, flakiness and elongation	20 kg	3
Rock, unconfined compressive strength	1 No	4
Refractory castable, CCS and MOR	3 prisms	2

Test	Sample	Days
UPV, site (accredited)	Min. 10 points per visit	2
Rebound hammer, site (accredited)	Min. 10 points per visit	2
Half-cell potential (accredited)	1 No per location	2
Carbonation depth (accredited)	1 No per location	2
Cover meter survey	1 No per location	2
Fresh concrete temperature (accredited)	Per pour	Same day
Pull-off test, on site	1 No	2
Pull-off test, in laboratory	5 kg	7
Concrete core extraction and strength	1 No	4
Bonding agent, full panel	5 litres	7
Cementitious grout, full panel	15 kg	30
Bentonite powder, full panel	3 kg	7

Free TCR-branded pickup van across MMR. Site teams mobilise to the pour, the lot release and the survey.

If you take one page from this brief, take this one: what TCR is, what it is accredited for, what it is honest about, and the two numbers that get a sample collected tomorrow

ONE

One laboratory for the whole build

Ground, concrete, steel, couplers, blocks, tiles, adhesives, joinery, stone, facade, water, site NDT and structural audit.

One chain of custody, one management system, one signature, one point of accountability.

TWO

Accreditation that a procurement team can verify

NABL ISO/IEC 17025:2017, certificate NABLT0726MH18640, 1,483 scope items, valid to 2 March 2030, ILAC-recognised in 90-plus economies.

First BIS-accredited commercial laboratory in India for IS 16172 couplers. BMC registered. CIDCO empanelled. NHSRCL approved. NADCAP AC7101.

THREE

Honesty about the boundary

Where a method sits outside accredited scope, the report says so. Where work goes to a partner laboratory, we name it.

An unmarked claim is what costs a client an approval. A marked non-accredited test never has.

FOUR

A laboratory that runs on your calendar

Cube results the next working day. Free TCR-branded sample pickup van across the entire Mumbai Metropolitan Region.

Site teams that attend the pour and the lot release. Long-term rate contracts with Godrej Properties, Kalpataru, Shapoorji Pallonji and Rustomjee.

Transparency is a metrological commitment at TCR, not a marketing word. It is why the accredited boundary is published on slide six.



CIVIL AND INFRASTRUCTURE TESTING

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