

Sr. No.	IS Code No.	Description
165	4925	Concrete batching and mixing plant
166	4926	Ready mixed concrete
167	4990	Plywood for concrete shuttering work
168	6452	Specification for high alumina cement for structural use
169	6909	Specification for supersulphated cement
170	7861 (Part 1)	Code of practice for extreme weather concreting : Part 1 Recommended practice for hot weather concreting
171	7861 (Part 2)	Code of practice for extreme weather concreting : Part 2 Recommended practice for cold weather concreting
172	8041	Rapid hardening Portland cement
173	8043	Hydrophobic Portland cement
174	8112	43 grade ordinary Portland cement
175	9012	Recommended practice for shotcreting
176	9013	Method of making, curing and determining compressive strength of accelerated cured concrete test specimens
177	9013	Admixtures for concrete
178	10262	Recommended guidelines for concrete mix design
179	12269	53 Grade ordinary Portland Cement
180	13330	Sulphate resisting Portland Cement
181	12600	Low heat Portland cement
182	13311 (Part 1)	Non-destructive testing of concrete - Methods of test : Part 1 Ultrasonic pulse velocity
183	13311 (Part 2)	Non-destructive testing of concrete - Methods of test : Part 2 Rebound hammer
184	SP 23 (S & T)	Handbook on concrete mixes (based on Indian Standards)
185	SP 24 (S & T)	Explanatory handbook on Indian Standard Code for plain and reinforced concrete
186	SP 33 (S & T)	Handbook on timber engineering
187	SP 34 (S & T)	Handbook on concrete reinforcement and detailing
ANTI - TERMITE MEASURES		
188	6313 (Part 1)	Code of practice for anti-termite measures in buildings : Part 1 Constructional measures
189	6313 (Part 2)	Code of practice for anti-termite measures in buildings : Part 2 Pre-constructional chemical treatment measures (first revision) (Amendments 3)
STEEL CONSTRUCTION		
190	104	Ready mixed paint, brushing, zinc chrome, priming
191	123	Ready mixed paint, brushing, finishing, semi-gloss, for general purposes to Indian Standard Colours No. 445, 446, 448, 449, 451, 473 and red oxide
192	456	Code of practice for plain and reinforced concrete
193	800	Code of practice for general construction in steel
194	801	Code of practice for use of cold formed light gauge steel structural members in general building construction.
195	806	Code of practice use of steel tubes in general building construction
196	811	Cold formed light gauge structural steel sections
197	814	Covered electrodes for manual metal arc welding of carbon and carbon manganese steel
198	816	Code of practice for use of metal arc welding for general construction in mild steel
199	817 (Part 1)	Code of practice for training and testing of metal arc welders :

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Sr. No.	IS Code No.	Description
		Part 1 Manual metal are welding
200	819	Code of practice for resistance spot welding for light assemblies in mild steel
201	919 (Part 1)	ISO system of limits and fits : Part 1 Bases of tolerances, deviations and fits
202	1024	Code of practice for use of welding in bridges and structures subject to dynamic loading
203	1030	Carbon steel castings for general engineering purposes
204	1148	Hot-rolled rivet bars (up to 40 mm dia) for structural purposes
205	1149	High tensile steel rivet bars for structural purposes
206	1161	Steel tubes for structural purposes
207	1261	Code of practice for seam welding in mild steel
208	4000	Code of practice for high strength bolts in steel construction
209	1852	Rolling and cutting laterals for list rolled steel structures
210	1278	Filler rods and wires for gas welding
211	1323	Code of practice for oxy-acetylene welding for structural work in mild steels
212	1363 (Part 1)	Hexagon head bolts, screws and nuts of product grade C : Part 1 Hexagon head bolts (size range M 5 to M 64)
213	1363 (Part 2)	Hexagon head bolts, screws and nuts of product grade C : Part 2 Hexagon head screws (size range M 5 to M 64)
214	1363 (Part 3)	Hexagon head bolts, screws and nuts of product grade C : Part 3 Hexagon nuts (size range M 5 to M 64)
215	1364 (Part 1)	Hexagon head bolts, screws and nuts of product grades A and B : Part 1 Hexagon head bolts (size range M 1.6 to M 64)
216	1364 (Part 2)	Hexagon head bolts, screws and nuts of product grades A and B : Part 2 Hexagon head screws (size range M 1.6 to M 64)
217	1364 (Part 3)	Hexagon head bolts, screws and nuts of product grades A and B : Part 3 Hexagon nuts (size range M 1.6 to M 64)
218	1367 (Part 3)	Fasteners - Threaded steel - Technical supply conditions : Part 3 Mechanical properties and test methods for bolts, screws and studs with full loadability
219	1393	Code of practice for training and testing of oxy acetylene welders
220	1477 (Part 1)	Code of practice for painting of ferrous metals in buildings : Part 1 Pretreatment
221	1477 (Part 2)	Code of practice for painting of ferrous metals in buildings : Part 2 Painting
222	1929	Hot forged steel rivets for hot closing (12 to 36 mm diameter)
223	808	Dimensions for hot rolled steel beams, column channels and angle sections
224	1398	Placing paper, water proof bitumen laminated
225	4353	Recommendations for submerged are welding of mild steel and low alloy steel
226	3658	Code of practice for composite constructions
227	1977	Structural steel (ordinary quality)
228	2062	Steel for general structural purposes
229	2074	Ready mixed paint, air drying, red oxide-zinc chrome, priming
230	2155	Cold forged solid steel rivets for hot closing (6 to 16 mm diameter)
231	3502	Steel chequered plates
232	3613	Acceptance tests for wire flux combination for submerged are

Sr. No.	IS Code No.	Description
		welding
233	3640	Hexagon fit bolts
234	3757	High strength structural bolts
235	5369	General requirements for plain washers and lock washers
236	5370	Plain washers with outside diameter 3x inside diameter
237	5374	Taper washers for I-beams (ISMB)
238	6419	Welding rods and bare electrodes for gas shielded arc welding of structural steel
239	6560	Molybdenum and chromium-molybdenum low alloy steel welding rods and bare electrodes for gas shielded arc welding
240	6610	Heavy washers for steel structures
241	6623	High strength structural nuts
242	6649	Hardened and tempered washers for high strength structural bolts and nuts
243	7205	Safety code for erection of structural steel work
244	7215	Tolerances for fabrication of steel structures
245	7280	Bare wire electrodes for submerged arc welding of structural steels
246	7307 (Part 1)	Approval tests for welding procedures : Part 1 Fusion welding of steel
247	7310 (Part 1)	Approval tests for welders working to approved welding procedures : Part 1 Fusion welding of steel
248	7318 (Part 1)	Approval tests for welders when welding procedure approval is not required : Part 1 Fusion welding of steel
249	8500	Structural steel - Microalloyed (medium and high strength qualities)
250	9595	Recommendations for metal arc welding of carbon and carbon manganese steel
251	12843	Tolerances for erection of steel structures
252	5334	Code of practice for magnetic practice flow detention of welds
253	SP 6(5)	Cold - formed, light-gauge steel structures
DAMP - PROOFING AND WATERPROOFING		
254	73	Paving bitumen
255	269	33 grade ordinary Portland cement
256	383	Coarse and fine aggregates from natural sources for concrete
257	702	Industrial bitumen
258	1195	Bitumen mastic for flooring
259	1203	Determination of penetration
260	1322	Bitumen felts for waterproofing and damp-proofing
261	1346	Code of practice for waterproofing of roofs with bitumen felts
262	1580	Bituminous compounds for water proofing and caulking purposes
263	1609	Code of practice for laying damp-proofing treatment using bitumen felts
264	1635	Code of practice for field slaking of building lime and preparation of putty
265	1834	Hot applied sealing compound for joint in concrete
266	2116	Sand for masonry mortars
267	2508	Low density polyethylene films
268	2527	Code of practice for fixing rainwater gutters and downpipes for



Sr. No.	IS Code No.	Description
		roof drainage
269	2541	Code of practice for preparation and use of lime concrete
270	2645	Integral cement water proofing compounds
271	2690 (Part 1)	Burnt clay flat terracing tiles : Part 1 Machine made
272	2690 (Part 2)	Burnt clay flat terracing tiles : Part 2 Hand made
273	3036 : 1992	Laying lime concrete for a waterproofed roof finish
274	3037	Bitumen mastic for use in waterproofing of roofs
275	3067	Code of practice for general design details and preparatory work for damp-proofing and waterproofing of buildings
276	3370 (Part 1)	Code of practice for concrete structures for the storage of liquids : Part 1 General Requirements
277	3384	Specification for bitumen primer for use in waterproofing and damp proofing
278	4098	Lime-pozzolana mixture
279	4365	Code of practice for application of bitumen mastic for water proofing of roofs
280	5871	Bitumen mastic for tanking and damp-proofing
281	6494	Code of practice for waterproofing of underground water reservoirs and swimming pools
282	7193	Glass fibre base coaltar pitch and bitumen felts
283	7198	Code of practice for damp-proofing using bitumen mastic
284	7290	Recommendations for use of polyethylene film for waterproofing of roofs
285	9759	Guidelines for dewatering during construction
286	9918	Code of practice for application of silicone based water repellent
287	12027	Silicone-based water repellents
288	12054	Code of practice for application of silicone based water repellent
289	13182	Waterproofing and damp-proofing of wet areas in building Recommendations
290	1834	Hot applied sealing compound for joint in concrete
291	1838	Performed fillers for expansion joint in concrete pavements and structures (non extruding and resilient type) : Part 1 Bitumen impregnated fibre
292	1838 (Part 2)	Performed fillers for expansion joint in concrete pavements and structures (non extruding and resilient type) : Part 2 CNSI, Aldehyde resin and coconut pith
293	3414	Code of practice for design and installation of joints in buildings
294	10958	General check list of functions of joints in buildings
295	11433 (Part 1)	One part grade polysulphide based joint sealant : Part 1 General Requirements
296	11817	Classification of joints in buildings for accommodation of dimensional deviations during construction
297	11818	Method of test for laboratory determination of air permeability of joints in buildings
298	12118 (Part 1)	Two parts polysulphide based sealant : Part 1 General requirements

Sr. No.	IS Code No.	Description
PAINTING, VARNISHING AND ALLIED FINISHES (WOOD AND METALS)		
299	102	Ready mixed paint, brushing, red lead, non settling, painting
300	110	Ready mixed paint, brushing, grey filler, for enamels for use over primers
301	117	Ready mixed paint, brushing, finishing exterior, semi-gloss for general purposes to Indian Standard Colours No. 101 to 104, 169, 174, 216, 217, 219, 275, 278, 280, 281, 283, 352 to 354, 358 to 365, 384 to 388, 397, 410, 442 to 44.
302	124 (Part 3)	Ready mixed paint, brushing, finishing exterior, semi-gloss for general purposes : Part 3 (superseding IS 119)
303	127	Ready mixed paint, brushing, finishing exterior, semi-gloss for general purposes white
304	128	Ready mixed paint, brushing, finishing exterior, semi-gloss for general purposes black
305	133	Enamel, interior : (a) undercoating, (b) finishing
306	137	Ready mixed paint, brushing, matt or eggshell flat, finishing, interior to Indian Standard colour as required
307	144	Ready mixed paint, brushing, petrol resisting, air-drying, for interior painting of tanks and container, red oxide (colour unspecified)
308	158	Ready mixed paint, brushing, bituminous, black lead-free, acid alkali and heat resisting
309	198	Varnish gold size
310	207	Gate and shutter hooks and eyes
311	337	Varnish, finishing interior
312	348	French polish
313	401	Code of practice for preservation of timber
314	423	Plastic wood for joiners filter
315	524	Varnish, finishing, exterior, synthetic, air drying
316	525	Varnish, finishing, exterior and general purposes
317	1477 (Part 1)	Code of practice for painting of ferrous metals in buildings : Part 1 Pretreatment
318	1477 (Part 2)	Code of practice for painting of ferrous metals in buildings : Part 2 Painting
319	2338 (Part 1)	Code of practice for finishing of wood and wood based materials : Part 1 Operations and workmanship
320	2338 (Part 2)	Code of practice for finishing of wood and wood based materials : Part 2 Schedules
321	2339	Aluminium paint for general purposes, in dual container
322	2554 (Part 1 & 2)	Code of practice for painting of non ferrous metals in buildings
323	2524 (Part 1)	Code of Practice for painting of non-ferrous metals in buildings : Part 1 Pretreatment
324	2524 (Part 1)	Code of practice for painting of non-ferrous metals in buildings : Part 2 Painting
325	2932	Enamel, synthetic, exterior (a) undertaking (b) finishing
326	2933	Enamel, synthetic, exterior (a) undertaking (b) finishing
327	3531	Glossary of terms relating to corrosion of metals
328	3536	Ready mixed paint, brushing, wood primer, pink



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Sr. No.	IS Code No.	Description
329	3537	Ready mixed paint, finishing interior, for general purposes, to Indian Standard Colours No. 101, 216, 217, 219, 275, 281, 352, 353, 358, to 361, 363, 364, 388, 410, 442, 444, 628, 631, 632, 634, 693, 697, white and black
330	3539	Ready mixed paint, undercoating for use under oil finishes to Indian Standard Colours, as required
331	3585	Ready mixed paint, undercoating for use under oil finishes to Indian Standard Colours, as required
332	4597	Code of Practice for finishing of wood and wood based products with nitrocellulose and cold catalyzed materials
333	6005	Code of practice for phosphating of iron and steel
Pipes and laying		
334	1916	Steel cylinder pipes with reinforced concrete lining & coating
335	2062	Steel for general structural purposes
336	1079	Hot rolled Carbon steel sheets & strip
337	814	Covered Electrodes for manual metal arc welding for Carbon and carbon manganese steel
338	13095	Butterfly valves for general purposes
339	3613	Acceptance tests for wire flux combination for submerged arc welding
340	1367	Technical supply conditions for threaded steel fasteners
341	2016	Plain washers
342	1786	High yield strength deformed steel bars and wires for concrete reinforcement
343	432 (part 1)	Mild Steel & Medium Tensile bars and hard drawn steel wire for concrete reinforcement
344	432 (part 2)	Mild steel & medium tensile steel bars and hard drawn steel wire for concrete reinforcement : Part 2 Hard drawn steel wire
345	269	33 grade Ordinary Portland cement
346	8112	43 grade Ordinary Portland Cement
347	8041	Rapid hardening Portland cement
348	383	Specification for coarse and fine aggregate from natural sources
349	12330	Specification for Sulphate Resisting Portland Cement
350	4353	Submerged Arc Welding of Mild Steel and Low Alloy Steels recommendations
351	456	Code for practice for plain and reinforced concrete
352	800	Code of practice for general construction in steel
353	816	Code of practice for use of Metal Arc Welding for General Construction
354	817	Code of practice for Training and Testing of Metal Arc Welders
355	3658	Code of Practice for Liquid Penetrant Flaw Detection
356	5334	Code of practice for Magnetic Particle Flaw Detection of Welds
357	ASTM E 709	Dry Powder Magnetic Particle Inspection
361	ASTM E 138	Wet Magnetic Particle Inspection
362	ASTM E 165	Liquid Penetrant Inspection
363	3600	Methods of testing of Fusion Welded Joints and Weld metal in steel

Sr. No.	IS Code No.	Description
364	3589	Specification for seamless or Electrically welded steel pipes for Water, Gas and Sewage.
365	6631	Steel pipes for Hydraulic Purposes
366		
367	5822	Code of Practice for laying of electrically welded steel pipes for water supply
368	1566	Hard drawn steel wire fabric for concrete reinforcement
369	6419	Welding rods & bare electrodes for glass shielded arc welding of structural steel
370	1974	Bare wire electrodes for submerged arc welding
371	7307 (part 1)	Approval tests for welding procedures fusion welding of steel
372	7310 (part 1)	Approval tests for welder working to approved welding procedure fusion welding of steel
373	2720	Methods of test for soils
374	14846	Sluice valves for water works purposes (50-1200 mm size)
375	2906	Specification for sluice valves for water work purposes (350 to 1200 mm size)
376	7322	Specials for steel cylinder reinforced concrete pipes
377	11906	Recommendation for cement mortar lining for cast iron, mild steel and ductile iron pipes and fittings for transpiration or water
378	10221	Code of practice for coating and wrapping of underground mild steel pipeline.
WATER SUPPLY AND DRAINAGE		
Part 1 Water Supply		
379	1172	Code of basic requirements of water supply, drainage and sanitation
380	1239 (Part 1)	Mild steel tubes, tabulars and other wrought steel fittings : Part 1 Mild steel tubes
381	1536	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage
382	1537	Vertically cast iron pressure pipes for water, gas and sewage
383	1592	Asbestos cement pressure pipes
384	3114	Code of practice for laying of cast iron pipes
385	5822	Code of practice for welded steel pipes for water supply
386	1626 (Part 1)	Asbestos cement building pipes and pipe fittings, gutters and gutter fittings and roofing fittings : Part 1 (Pipe and pipe fittings)
387	2064	Selection, installation and maintenance of sanitary appliances - Code of practice
388	2065	Code of practice for water supply in buildings
389	2692	Ferrules for water services
390	3076	Low density polyethylene pipes of potable water supplies; sewage and industrial effluents
391	4984	Specification for high density polyethylene pipes for potable water supplies; sewage and industrial effluents
392	4985	Specification for unplasticised PVC pipes for potable water supplied
393	7558	Code of practice for domestic hot water installations
394	7634(Part 2)	Code of practice for plastics pipe work for potable water supplies : Part 2 Laying and jointing polyethylene (PE) pipes

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Sr. No.	IS Code No.	Description
395	7634 (Part 3)	Code of practice for plastics pipe work for potable water supplies : Part 3 Laying and jointing of UPVC pipes
396	12183 (Part 1)	Code of practice for plumbing in multi-storeyed buildings : Part 1 Water supply
397	1916	Steel cylinder pipes with lining and coating
398	4127	Code of practice for laying of salt glazed stoneware pipes
399	12709	Glass fibre reinforced plastic pipes, joints and rings for potable water supply
400	3597	Concrete pipes-methods of test
401	7319	Perforated concrete pipes
402	NBC	National Building Code of India
403	SP 35 (S & T)	Handbook of water supply and drainage with special emphasis on plumbing
Part 2 Building Drainage		
404	277	Galvanized steel sheet (plain and corrugated)
405	458	Precast concrete pipes (with and without reinforcement)
406	651	Salt glazed stoneware pipes and fittings
407	782	Caulking lead
408	783	Code of Practice for laying of concrete pipes
409	1230	Cast iron rainwater pipes and fittings
410	1536	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage
411	1537	Vertically cast iron pressure pipes for water, gas and sewage
412	1592	Asbestos cement pressure pipes
413	1626 (Part 1)	Asbestos cement building pipes and pipe fittings, gutters and gutter fittings and roofing fittings : Part 1 (Pipe and pipe fittings)
414	1726	Cast iron manhole covers and frames
415	1742	Code of Practice for building drainage
416	3006	Specification for chemically resistant glazed stoneware pipes and fittings
417	4111 (Parts 1 to 5)	Code of Practice for ancillary structures in sewerage system
418	4733	Methods of sampling and test for sewage effluents
419	4984	Specification for high density polyethylene pipes for potable water supplies; sewage and industrial effluents
420	4985	Specification for unplasticised PVC pipes for potable water supplied
421	5329	Code of Practice for sanitary pipe work above ground for buildings
422	5455	Cast iron steps for manholes
423	12592 (Parts 1 & 2)	Precast manhole covers & frames
424	4350	Concrete porous pipes for Under drainage
425	2470 (Parts 1 & 2)	Code of Practice for installation of septic tank
426	784	Prestressed concrete pipes
427	1893	Criteria for earthquake resistant design of structures
428	4326	Earthquake resistant design and construction of buildings - Code of practice

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Sr. No.	IS Code No.	Description
429	13920	Ductile detailing of reinforced concrete structures subjected to seismic forces - Code of practice
SPECIAL CONSTRUCTION PROCEDURES EARTHQUAKE EFFECTS, Etc.		
430	13935	Repair and seismic strengthening of buildings - Guidelines
431	4991	Criteria for blast resistant design of structures for explosions above ground
432	6922	Criteria for blast resistant design of structures for explosions above ground
433	2190	Selection, installation and maintenance of first-aid fire extinguishers - Code of practice
434	3696 (Part 2)	Safety code of scaffolds and ladders : Part 2 Ladders
435	4912	Safety requirements for floor and wall openings, railings and toe boards
GENERAL		
436	10005	S.I. units and recommendations for use of their multiples and of certain other units
437	6060	Code of practice for day lighting of factory buildings
438	3103	Code of practice for industrial ventilation
439	3483	Code of practice for noise reduction in industrial buildings
440	2440	Guide for day lighting of buildings
441	1200 (1 to 28)	Method of measurement of Building and Civil Engg. Works
442	7973	Code of practice for architectural and building working drawings
443	962	Code of practice for architectural and building drawings
444	13415	Code of safety for protective barrier in and around buildings
445	4801	Safety code for blasting and related drilling operations
446	8969	Safety code for erection of concrete framed structures

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LIST OF TESTS

(Indicative and shall not be limited to the following only)

1. Structural Concrete

Table 1 - Control Tests on Structural Concrete: Pre-Construction

S.No	Test	Test Methods	Minimum Desirable Frequency
a.	Physical and Chemical Tests for Cement	IS : 269, IS : 455, IS : 1489, IS : 8112, IS : 12269	Once for each source of supply and occasionally when called for in case of long/improper storage. Besides, the Contractor also will submit daily test data on cement released by the Manufacturer.
b.	Gradation of Coarse and Fine Aggregates	IS: 2386 Part I	One test for every day's work of each fraction of coarse aggregate and fine aggregate, initially; may be relaxed later at the discretion of the Engineer.
c.	Deleterious constituents of Coarse and Fine Aggregates	IS: 2386 Part - II	One test for every day's work of each fraction of coarse aggregate and fine aggregate, initially; may be relaxed later at the discretion of the Engineer.
d.	Water Absorption of Coarse and Fine Aggregates	IS: 2386 Part - III	Regularly as required subject to a minimum of one test a day for coarse aggregate and two tests a day for fine aggregate. This data shall be used for correcting the water demand of the mix on daily basis.
e.	Los Angeles Abrasion Value or Aggregate Impact Test for Coarse aggregates	IS: 2386 Part - IV	Once for each source of supply and subsequently on monthly basis.
f.	Soundness for Coarse Aggregates	IS: 2386 Part - V	Before approving the aggregates and every month subsequently.
g.	Alkali aggregate reactivity for coarse aggregate.	IS: 2386 Part - VII	Before approving the aggregates and every month subsequently.
h.	Chemical Tests for water	IS : 456	Once for approval of source of supply, subsequently only in case of doubt.

Table 2 - Control Tests for Structural Concrete - During Construction

S. No.	Test	Test Method	Minimum Desirable Frequency	
a.	Strength of Concrete	IS : 516	Quantity, m ³	No. of Samples
			1 - 5	1
			6 - 15	2
			16 - 30	3
			31 - 50	4
			51 and above	4 +additional for each 50 m ³ or part thereof.
b.	Workability of fresh concrete - slump test	IS: 1199	One test per each dumper load initially and one test per alternate dumper.	
c.	Chloride and Sulphate content		One test per each dumper load initially and one test per alternate	

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S No.	Test	Test Method	Minimum Desirable Frequency
	Density of Fresh Concrete		Four tests per each dumper load.
	Density of hardened concrete		Four tests per each dumper load.
	Permeability Test	Clause 1716.5 Most Specifications - 1997	One tests per each dumper load.

Structural Steel and M.S. Piping

Table 3 - Control Tests on Structural Steel: Pre-Construction

S No.	Test	Test Methods	Minimum Desirable Frequency
	Physical and Chemical Tests for Steel	IS : 226, IS : 2062, IS : 11587, IS : 1977, IS : 8500, IS : 961	Once for each source of supply and occasionally when called for in case of long/improper storage. Besides, the Contractor also will submit test data on steel released by the Manufacturer.
	Mechanical and Chemical properties of Rivets, bolts, nuts, washers, welding consumables,	Appropriate IS code.	Once for each source of supply and occasionally when called for.
	Rolling and Cutting tolerance test	IS : 1852	As required.
	Quality of Paint	Relevant IS codes.	Once for each source of supply and occasionally when called for.

Table-4 - Control Tests On Structural Steel: Post-Construction

S No.	Test	Test Methods	Minimum Desirable Frequency
	Ultrasonic Testing for Laminations in plates		Once for each source of supply and occasionally when called for.
	Bolted Connections	IS : 4000	
	Riveted Connections	Clause 1905.7.4 Most Specifications - b1997	
	Destructive and Non - destructive tests on Welds	IS : 7303 (Part - I), IS : 5334, IS : 1182, IS : 4853, IS : 3658	10% of the length of longitudinal and transverse butt welds in tension flanges 5% of the length of longitudinal and transverse butt welds in compression flanges. All transverse butt welds in webs adjacent to tension flanges as specified by the engineer.

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Mortar for Masonry Work**Table 5 - Control Tests on Mortar**

S. No.	Test	Test Methods	Minimum Desirable Frequency
a.	Compressive Strength	IS : 2250	One sample for every 2 m ³ subject to a minimum of 3 samples in a day's work.
b.	Consistency of Mortar	IS : 2250	One sample for every 2 m ³ subject to a minimum of 3 samples in a day's work.
c.	Water Retentivity	IS : 2250	One sample for every 2 m ³ subject to a minimum of 3 samples in a day's work.

**List of Equipment to be provided in Laboratory
General**

S.No.	Description of Equipment	No.
i)	Oven – Electrically operated, thermostatically controlled, range upto 200 ^o C sensitivity 1 ^o C.	1
ii)	Platform balance 300 kg capacity	1
iii)	Balance 20 kg capacity – self indicating type.	1
iv)	Electronic Balance 5 kg capacity accuracy 0.5 gm.	2
v)	Water bath – electrically operated and thermostatically controlled with adjustable shelves, sensitivity 1 ^o C.	1
vi)	Thermometers: Mercury-in-glass thermometer range 0 ^o C to 250 ^o C. Mercury in steel thermometer with 30 cm stem, range upto 300 ^o C.	4
vii)	Kerosene or gas stove or electric hot plate.	1
viii)	Glasswares, spatulas, wire gauzes, steel scales, measuring tape, casseroles, karahis, enamelled trays of assorted sizes, pestle-mortar, porcelain dishes, gunny bags, plastic bags, chemicals, digging tools like pickaxes, shovels, etc.	As required.
ix)	Set of IS sieves with lid and pan: 450 mm diameter: 63 mm, 53 mm, 37.5 mm, 26.5, 13.2, 9.5 mm, 6.7 mm and 4.75 mm size 200 mm diameter: 2.36 mm, 2.0 mm, 1.18 mm, 600 micron, 425 micron, 300 micron, 150 micron, and 75 micron	1 set 2 sets
x)	Water testing kit	1 set
xi)	First aid box	1 set

For soils and aggregates

S.No.	Description of Equipment	No.
i)	Riffle Box	1
ii)	Atterberg Limits (liquid and plastic limits) determination apparatus	1 set
iii)	Compaction Test Equipment both 2.5 kg and 4.5 kg rammers (Light and Heavy compactive efforts)	1 set
iv)	Dry Bulk Density Test apparatus (sand pouring cylinder, tray, can etc.) complete	1 set
v)	Speedy Moisture Meter complete with chemicals	1 set

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S.No.	Description of Equipment	No.
vi)	Post-hole Auger with extensions	1 set
vii)	Core cutter apparatus 10 cm dia, 10/15 cm height, complete with doly, rammer etc.	1 set
viii)	Aggregate Impact Value Test apparatus/Los Angeles Abrasion Test apparatus	1 set
ix)	Flakiness and Elongation Test Gauges	1 set
x)	Standard measures of 30, 15 and 3 litres capacity along with standard tamping rod	1 set
xi)	Standard measures of 30, 15 and 3 litres capacity along with standard tamping rod	1 set
xii)	Unconfined compression test apparatus	1 set

For cement and cement concrete

S.No.	Description of Equipment	No.
i)	Vicat apparatus for testing setting times	1 set
ii)	Slump testing apparatus	4 sets
iii)	Compression and Flexural strength testing machine of 200 tone capacity with additional dial for flexural testing	1 No.
iv)	Needle Vibrator	2 Nos.
v)	Air Meter	1 No.
vi)	Vibrating hammer for vibrating dry mix as for Dry Lean Cement concrete sub-base	1 No.

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APPENDIX - II

SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK.

- 1) **Workman Compensation Act 1923.**
The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- 2) **Payment of Gratuity Act 1972.**
Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- 3) **Employees PF and Miscellaneous Provision Act, 1952.**
The Act provides for monthly contributions by the employer plus Workers @ 10% or 8.33%. The benefits payable under the Act are
 - a) Pension or family pension on retirement or death as the case may be.
 - b) Deposit linked insurance on the death in harness of the Worker.
 - c) Payment of PF accumulation on retirement/ death etc.
- 4) **Maternity Benefit Act 1951**
Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- 5) **Contract labour (Regulation and Abolition) Act 1970.**
The Act provides for certain welfare measures to be provided by the contractor to contract labour and in case the contractor fails to provide, the same are required to be provided by the Principal Employer by law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principle employer if they employ 20 or more contract labour.
- 6) **Minimum Wages Act 1970**
The Contractor shall see that the provisions set for under the Minimum Wages Act and Contract Regulation and Abolition Act 1970 as amended from time to time are fully complied with by him and shall maintain necessary registers and records for payment of wages, overtime, etc. made to his Workmen as required by the Conciliation Officer (Central), Ministry of Labour, Government of India, or such other organization person appointed by the Central or State Government.
- 7) **Payment of Wages Act 1936**
It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the Workers.
- 8) **Equal Remuneration Act 1979.**
The Act provides for payment of equal wages for Work of equal nature to Male & Female Workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.
- 9) **Payment of Bonus Act 1965**
The Act is applicable to all establishments employing 20 or more Workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 200% of wages to employees drawing Rs. 3,500/- P.M. or less. The bonus to be paid to or employees

getting Rs. 2500/- P.M. above up to 3500/- P.M. shall be worked out by taking wages as Rs. 2500/- P.M. only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

- 10) **Industrial Disputes Act 1947**
The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- 11) **Industrial Employment (Standing Orders) Act 1946**
It is applicable to all establishments employing 1000 or more Workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer or matters provided in the Act and get the same certified by the designated Authority.
- 12) **Trade Unions Act 1926**
The Act lays down the procedure for registration of trade unions of Workmen and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- 13) **Child labour (prohibition and regulation) Act 1986.**
The Act prohibits employment of children below 14 years of age in certain occupation and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry.
- 14) **Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act 1979.**
The Act is applicable to an establishment which employees 5 or more inter-state migrant Workmen through an intermediary (who has recruited Workmen in one state for employment in the establishment situated in another state). The inter-state migrant Workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home up to the establishment and back, etc.
- 15) **The Building & other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996.**
All the establishments who carry on any building or other construction Work and employs 10 or more Workers are covered under this act. All such establishments are required to pay cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. The employer of the establishment is required to provide safety measures at the Building or Construction Work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodation for Workers near the Workplace etc. The employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

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APPENDIX - III

Contractor's Liabilities & Insurance (CAR Policy)

From commencement to completion of the Works, the Contractor shall take full responsibility for the care thereof and for taking precautions to prevent loss or damage and to minimize the loss or damage to the greatest extent possible and shall be liable for any damage or loss that may happen to the Works or any part thereof.

The policy so obtained shall cover entire period of construction (including all extensions) and also shall cover the Defects Liability period. The policy shall be for the total Contract Sum.

Before commencing execution of the Work, the Contractors shall without in any way limiting his obligations and responsibilities under this condition, insure against any damage loss or injury which may occur to any property (Private, Government and/or Corporation/ Development Authority) or to any person (including any employee of the Development Authority) by or arising out of the contract.

Contractor's All Risk insurances (CAR Policy) to be affected by the Contractors and/or his sub-contractors shall be taken.

If the Contractor has a blanket insurance policy for all his Works and the policy covers all the items to be insured under this condition, the said policy shall be assigned by the Contractor, in favour of the Development Authority; provided, however, if any amount is payable under the policy by the insurers in respect of Works other than the Works under this Contract, the same may be recovered by the Contractor directly from the insurers. The amount of claim to the extent payment made by Development Authority shall be directly reimbursed to Development Authority by insurer.

PROVIDED always that the Contractor shall not be entitled to payment under the above provisions in respect of such loss or damage as have been occasioned by any failure on his part to perform his obligations under the Contract or not taking precautions to prevent loss or damage or minimize the amount of such loss or damage.

Where a Development Authority's Building or part thereof is rented by the Contractor or is allowed to be used by him, he shall insure the entire building if the building or any part thereof is used by him for the purpose of storing or using materials of combustible nature as to which the decision of the Engineer shall be final and binding.

The Contractor shall indemnify and keep indemnified the Development Authority against all losses and claims for injuries or damage to any person or any property whatsoever which may arise out of or in consequence of the construction and maintenance of the Work and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto.

PROVIDED always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or to the Development Authority, against any compensation or damage caused by the Excepted Risks

The Contractor shall at all times indemnify the Development Authority against all claims, damages or compensation under the provisions of Payment of Wages Act 1936, Minimum Wages Act 1948, Employers Liability Act 1938, the Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Indian Factories Act 1948 and Maternity Benefit Act, 1961 or any modifications thereof and rules made there under from time to time or as a consequence or any accident or injury to any Workman or other persons in or about the Works, whether in the employment of the Contractor or not, save and except where such accident or injury have resulted from any act of the Development Authority, their agents or servants, and also against all cost, charges and expenses of any suit, action or proceedings arising out of such accident or injury and against all sum or sums which may with the consent of the Contractor be paid to compromise or compound any such claim without limiting his obligations and liabilities as above provided. The Contractor shall insure against all claims damages or compensation payable under the various acts mentioned above or any modifications thereof or any other law relating thereto.

The aforesaid insurance policies shall provide that they shall not be cancelled till the Chief Executive Officer has agreed to their cancellations. The Contractor shall prove to the Engineer from time to time that he has taken out all the insurance policies referred to above and has paid the necessary premium for keeping the policies alive till the expiry of the Defects Liability Period after completion of Work for a period of not exceeding 12 months.

The Contractor shall ensure that similar insurance policies are taken out by his sub Contractors (if any) and shall be responsible for any claims or losses to the Development Authority resulting from their failure to obtain adequate insurance protection in connection thereof. The Contractor shall produce or cause to be produced by his Sub-Contractor (if any) as the case may be, the relevant policy or policies and premium receipts as and when required by the Engineer.

If the Contractor and/or his sub-Contractors (if any) shall fail to effect and keep in force the insurance referred above for any other insurance which he/they may require to effect under the terms of Contract then and in any such case the Chief Executive Officer may without being bound to effect and keep in force any such insurance and pay premium or premium as may be necessary for that purpose and from time to time deduct the amount so paid by the Development Authority plus 20 per cent of premium or premium amount as service charges from any money due or which may become due to the Contractor or recover the same as debt from the Contractor.

State, all the necessary charges for the approval of the same, amounts deducted from the claim shall be borne by the contractor.

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of the Contractor



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Chief Executive Officer
Guwahati Metropolitan Dev. Authority

APPENDIX - IV


Safety Provisions

1. Suitable scaffolds shall be provided for workmen for all that cannot safely be done from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than $\frac{1}{4}$ to 1 ($\frac{1}{4}$ horizontal and 1 vertical).
2. Scaffolding or staging more than 3.25 meters above the ground or floor, swung or suspended from an overhead support or erected with stationary support, shall have a guard rail properly attached, belted braced and other wise secured at least 1 meter high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
3. Working platform, gangways, and stairways shall be so constructed that they do not sag unduly or unequally, and if height of a platform or gangway or stairway is more than 3.25 meters above ground level or floor level, it shall be closely boarded, have adequate width and be suitably fenced as described in 2 above.
4. Every opening in floor of a building or in a working platform shall be provided with suitable means to prevent fall of persons or materials by providing suitable fencing or railing with a minimum height of 1 meter.
5. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 meters in length. Width between side rails in a rung ladder shall in no case be less than 30 cm for ladder up to and including 3 meters in length. For longer ladders this width shall be increased by at least 6 mm for each additional 30 cm of length. Uniform step spacing shall not exceed 30 cm.
6. Adequate precaution shall be taken to prevent danger from electrical equipment. No materials on any of the sites shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The Contractor shall provided all necessary fencing and lights to protect public from accidents and shall be bound to bear expenses of defence of every suit, action or other proceeding at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit, action or proceedings to any such person or which may with the consent of the Contractor be paid to compromise any claim by any such person.
Excavation and Trenching: - All trenches, 1.5 metres or more in depth, shall at all times be supplied with at least one ladder for each 30 metres in length or fraction thereof, ladder shall be extended from bottom of trench to at least 1 metre above surface of the ground sides of a trench which is 1.5 meters or more in depth shall be stepped back to give suitable slope, or securely held by timber bracing, so as to avoid the danger of sides collapsing. Excavated material shall not be placed within 1.5 meters of edge of trench or half or depth of trench, whichever is more. Cutting shall be done from top to bottom. Under no circumstances shall undermining or under cutting be done.
7. Demolition: Before any demolition work is commenced and also during the process of the work
 - (a) All roads and open areas adjacent to the work site shall either be closed or suitably protected.

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