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POST TENSION MATERIAL SPECIFICATIONS

Sr. No.	Material	Unbonded PT Specifications	Bonded PT Specifications
1	Concrete	• Min. grade: M35 • Min. cement quantity: 300-360 kg/m^3	• Min. grade: M35 • Min. cement quantity: 300-360 kg/m^3
2	Post Tensioning Steel	• Low-Relaxation 7 wire Strand of Class II (Grade 270) with 12.7 mm nominal diameter used in monostrand unbonded post tensioning tendons shall conform to the requirements of IS 14268:1995 (reaffirmed 2013). • Sectional Steel Area of Strand: 98.7 mm^2 • Yield Load: Not less than 180 kN • Ultimate Strength: Not less than 1860 N/mm^2 • Minimum Breaking Strength: Not less than 183.7 kN • Modulus of Elasticity: At least 196,500 N/mm^2 • Minimum Elongation: 3.5% for gauge length of 600 mm • Relaxation at 1000 hours: Less than 2.5% @ 70% Minimum Ultimate Tensile Strength. • Weight of Bare Strand: More than 0.785 kg/m	• Low-Relaxation 7 wire Strand of Class II (Grade 270) with 12.7 mm nominal diameter used in bonded post tensioning tendons shall conform to the requirements of IS 14268:1995 (reaffirmed 2013). • Sectional Steel Area of Strand: 98.7 mm^2 • Yield Load: Not less than 180 kN • Ultimate Strength: Not less than 1860 N/mm^2 • Minimum Breaking Strength: Not less than 183.7 kN • Modulus of Elasticity: At least 196,500 N/mm^2 • Minimum Elongation: 3.5% for gauge length of 600 mm • Relaxation at 1000 hours: Less than 2.5% @ 70% Minimum Ultimate Tensile Strength. • Weight of Bare Strand: More than 0.785 kg/m
3	Sheating	• Sheathing Material: polyethylene or polypropylene. • Minimum Density: 0.941 gram/cm^3 • Minimum Thickness: 1.27 mm • Inside Diameter: At least 0.76 mm greater than the maximum diameter of the strand. • Appearance: Sheathing provides a smooth circular outside surface and shall not visibly revealing of the strand. • Coverage: Sheathing shall be continuous over the entire length to be unbonded and shall prevent intrusion of cement paste or loss of PT coating.	• Sheathing Material: HDPE or GI • Minimum Density: 0.94-0.96 gram/cm^3 23 ºC • Minimum Thickness: 1.5 mm to 3.0 mm • Appearance: Spiral corrugated oval or circular shape. • Coverage: Sheathing is continuous over the entire length to be bonded, and shall prevent intrusion of cement paste or loss of PT coating. • Met Flow Index (15) ASTM D 1238: 1.0 gm/10 min • Coefficient of thermal expansion for 20º C - 80º C: 1.5X10^4 kj/m • Shore Hardness D (BS EN ISO 2039-1): 3 sec. - 60 mins. 15 sec. – 58 mins. • Elongation at yield (BS ENISO 527-3): 7% minimum • Confirming to: IRC 18-2000 FIB Bulletin 7 Standard Colour Black

4	Grease Coating	• Grease coating provides protection against corrosion to the Pre-stressing steel. • It provides proper lubrication between the strand and sheathing & shows resist to flow within anticipated temperature range of exposure. • It is chemically stable and non-reactive with Pre-stressing steel, reinforcing steel, sheathing material and concrete. • Minimum weight of the grease coating on the Pre-stressing strand shall not be less than 1.14 kg per 30.5 m (37.4 grams/m) for 12.7 mm diameter strand. • The coating material shall completely fill the annular space between the strand and sheathing and shall extend over the entire tendon length.	NA
5	Anchor Plate/Cone	• Microstructure: 1. Graphite Type (As per ASTM A247 Plate I & III) a) Form I & II (Spheroid or Nodular type) b) Distribution A (Uniform Distribution) c) Size: 6 – 8 • Nodularity: 80 / 150% • Carbide: Less than 5% • Pearlite: Less than 50% • Raw Material: SG-500/7 Grade • Chemical Composition: a) C% : Min.: 3.20, Max.: 3.80 b) Si% : Min.: 2.00, Max.: 2.80 c) Mn% : Min.: 0.20, Max.: 0.70 d) P% : Min.: 0.00, Max.: 0.10 e) S% : Min.: 0.00, Max.: 0.10 f) Cu% : Min.: 0.20, Max.: 0.60 g) Mg% : Min.: 0.02, Max.: 0.06 • Mechanical Properties: a) Hardness Number (BHN): 170 – 230 b) Elongation: Minimum 7% c) TS: Minimum 500 N/mm^2 d) YS: Minimum 320 N/mm^2	• Raw Material: FG-260 Grade (IS-210:2009) • Chemical Composition: a) C% : Min.: 3.10, Max.: 3.40 b) Si% : Min.: 1.95, Max.: 2.30 c) Mn% : Min.: 0.60, Max.: 0.90 d) P% : Min.: 0.00, Max.: 0.20 e) S% : Min.: 0.00, Max.: 0.20 • Mechanical Properties: a) Hardness in BHN : 180 - 230 b) Tensile Strength (kg/mm^2): 26.60 kg/mm^2 • Micro Structure: a) Perlite: 90% b) Ferrite: 10% c) Size : 4-6
6	Wedges	• Hardness: a) At Surface: 56 – 65 HRC b) At Core: 40 – 46 HRC • Material Grade: a) IS:9175 (Part 20)-1986 Grade 20MnCr5 • Mechanical Properties: a) Hardness Number (BHN): 170 – 230	• Hardness: a) At Surface: 56 – 65 HRC b) At Core: 40 – 46 HRC • Material Grade: a) IS:9175 (Part 20)-1986 Grade 20MnCr5 • Mechanical Properties: a) Hardness Number (BHN): 170 – 230

7	Grouting	N.A.	• Grouting provides protection against corrosion to the Pre-stressing steel. • Cement grout with W/C ratio: 0.4-0.45 as per site temperature condition. (20 to 22.5 liter water per bag) • Admixture complying with BS 8110 Part I, 1985, Section 8.9.4.6. (Cebex 100) • Time for expansion: 15 minutes to 2 hours. Temperature above 20° C may slightly reduce these times. • Grouting pressure: 3 to 5 kg/cm^2 • It provides proper bond between strand and sheathing pipe and transfer force from strand to sheathing. • Compatibility: Compatible with all types of Portland cement. • Setting time: It does not affect setting time of cement grouts.
8	Bearing Plate	N.A.	• Raw Material: EN8D (BS-970:1955) • Chemical Composition: a) C% : Min.: 0.40, Max.: 0.45 b) Mn% : Min.: 0.70 , Max.: 0.90 c) S% : Min.: - , Max: 0.05 d) P% : Min.: - , Max.: 0.05 e) Si% : Min.: 0.10, Max.: 0.35