FULL BODY SAFETY HARNESS WITH WAIST BELT

June 2025

Engineering Department

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TECHNICAL SPECIFICATION OF FULL BODY SAFETY HARNESS

(For Working on High-Voltage Transmission Lines& Substations)

1. SCOPE

1.1 This specification covers design, materials, manufacture, testing at manufacturer's works; inspection, marking, packing and documentation for full-body safety harnesses (FBH) used by electricians and linemen for working at height on high-voltage transmission towers.
1.2 The harness shall comply with IS 3521 (Part 1): 2021 (Personal Fall Arrest Systems – Full-Body Harness), and is intended for single-person use up to 100 kg total mass.

2. APPLICABLE STANDARDS

Unless otherwise specified, the harness and its components shall be designed, manufactured and tested in accordance with the latest editions of the following standards:

- IS 3521 (Part 1): 2021; Personal Fall Arrest Systems – Full-Body Harness
- IS 3521 (Part 5): 2021; PFAS Connectors
- IS 3521 (Part 6): 2021; PFAS System Performance Tests
- ISO 9227: 1990; Salt Spray Corrosion Test
- Relevant occupational safety rules and regulations

3. MATERIALS

3.1 Webbing

- Virgin filament polyester or nylon, minimum tensile strength 0.6 N/tex^2
- Primary straps minimum width: 40 mm; secondary straps minimum width: 20 mm
- Flame resistant, UV-stabilized; color contrasting for visual inspection

3.2 Thread

- High-tenacity polyester; color contrasting to webbing; minimum 3 stitches/cm

3.3 Fittings

- Buckles, D-rings, collector plates, cleats, tool loops shall be smoothly finished
- Minimum chrome plating thickness: 8 µm or epoxy powder coating: 45 µm

4. DESIGN & CONSTRUCTION

4.1 Classification

- Class A: Mandatory fall-arrest attachment D-ring at back (between shoulder blades)
- Class D: controlled descent/ascent purposes
- Class E:for confined-space access purposes
- Class P: for work-positioning purposes

NOTE — A FBH may be in more than one class.

4.2 Harness Configuration

- Shoulder straps, sub-pelvic strap, thigh straps, waist belt and chest strap
- Adjusting buckles on shoulder, waist and thigh straps for snug fit

- A fall indicator identification shall be provided in the FBH

4.3 Ergonomics & Comfort

- Padding on shoulder, waist and thigh straps
- Load distribution to minimize pressure points
- Straps shall not migrate or loosen under dynamic load

5. TEST REQUIREMENTS

5.1 Corrosion Resistance

- Salt spray (ISO 9227): 24 h + 1 h dry + 24 h; no red rust

5.2 Buckle Performance

- Shake test: 25 cycles; fastening buckles shall not uncouple; adjustment buckles ≤25 mm slip

5.3 Static Strength

- Apply a tensile force of 15kN between the fall-arrest attachment element and the lower eyebolt of the torso dummy, ensuring that the time to reach this force is (4 ± 1) min. Maintain this force for a period of 3 min.

5.4 Dynamic Test

- The FBH shall retain the torso test mass clear of the ground and in an upright position when tested at each fall-arrest attachment element in accordance with IS 3521.

5.5 Static Suspension

- User suspension test by human subjects; no extreme pain, adequate breathing, no pressure on vulnerable areas with IS 3521 (part 5).

6. MARKING & DOCUMENTATION

6.1 Harness shall be indelibly marked:

- Manufacturer name/trademark, year of manufacture, batch/serial number
- IS 3521 (Part 1): 2021 designation and class (e.g. A, AP)
- Fiber type, maximum user mass (100 kg), fall-indicator identification.

6.2 Instructions

- Fitting, adjustment, use, inspection, maintenance
- A warning against making any alterations or additions to the product
- Annual inspection by competent person
- An instruction that any equipment that has been used to arrest a fall be removed from service

7. PACKING & STORAGE

- Each harness shall be supplied wrapped but not necessarily sealed in moisture-proof material
- Clear storage instructions shall be supplied with each FBH.

8. GUARANTEE

- Electrical & mechanical characteristics shall be guaranteed by the bidder. In case of failure of materials to meet the guarantee, WBSETCL shall have right to reject the material.