

IS 1677:2018 specifies requirements for rubber hoses used in agricultural spraying, crucial for safe and effective dispersal of fertilizers and pesticides. Designed to endure challenging agricultural environments, these hoses operate within a temperature range of -10°C to +60°C and are classified by working pressure limits: Type A (1 MPa), Type B (4 MPa), and Type C (6 MPa). Each type has specific dimensions, reinforcements, and structural properties to ensure durability, flexibility, and resistance to environmental wear.

The hoses consist of a synthetic rubber lining, textile fiber reinforcement, and a natural or synthetic rubber cover. These layers provide resilience against agricultural chemicals and physical wear. The lining must have minimum thicknesses based on hose type: 1.6 mm for Types A and B, and 2.0 mm for Type C, to prevent leaks and withstand high pressures. The cover also has minimum thickness standards to protect the hose from abrasion and environmental exposure.

IS 1677:2018 includes extensive testing as mentioned below which are vital for user safety and product longevity in agricultural settings.

1. **Hydrostatic Testing:** Hoses are subjected to proof and burst pressure tests, ensuring they can withstand operational pressure without leaks or damage.
2. **Dimension and Tolerance Testing:** Accurate bore size and thickness are essential for compatibility and performance. Tolerances are defined for both inner diameters and lengths, ensuring that hoses meet strict sizing requirements.
3. **Tensile and Elongation Tests:** Conducted on the rubber lining and cover, these tests evaluate tensile strength and elongation. High tensile strength is crucial for the hose's flexibility and ability to endure stretching and bending in agricultural applications.
4. **Fluid Resistance Testing:** Hoses are immersed in the specific chemical solutions they will handle, testing for up to 72 hours to ensure minimal swelling or weakening in agricultural chemicals. This test confirms that the hose materials remain stable when exposed to agricultural chemicals, maintaining structural integrity.
5. **Ageing and Environmental Resistance Tests:** Samples are tested at 100°C to simulate aging over 72 hours, with elongation and tensile strength reductions analyzed to assess hose longevity. Additionally, ozone resistance tests are conducted to ensure hoses can withstand UV exposure and prevent cracking, essential for outdoor storage and usage.
6. **Bending and Flexibility Tests:** Hoses must maintain flexibility under bending with a minimum radius requirement of 10 times the nominal bore. This test ensures hoses are pliable enough for maneuvering in fields without cracking or failing.
7. **Adhesion Tests:** The bonding strength between the layers is tested ensuring the inner, middle, and outer layers adhere adequately, which is critical for preventing delamination under pressure and bending.

IS 1677:2018 ensures that agricultural rubber hoses are durable, reliable, and safe for high-pressure chemical applications. By defining strict standards and testing procedures, this standard assures farmers and manufacturers that these hoses can withstand rigorous conditions, safeguarding both user safety and the integrity of the spraying process thereby contributing to UN SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land).