

IS 7328 : 2020

Specification for polyethylene material for moulding and extrusion

Low Density Polyethylene (LDPE) is manufactured by high pressure processes, resulting in highly branched (short and long chains) structure and the material has a density of 910 kg/m³ to 925 kg/m³. Linear Low Density Polyethylene (LLDPE) is manufactured by low pressure processes and contains significant amounts of short chain branching and small amounts of long chain branching and normally has a density of 910 kg/m³ to 940 kg/m³. High Density Polyethylene (HDPE) is manufactured by low pressure processes and contains very few short-chain branches and has a density greater than 940 kg/m³. These materials are used extensively in preparation of polyethylene sheets that are used in one form or another for various applications such as squeeze bottles, toys, carrier bags, high frequency insulation, chemical tank linings, heavy duty sacks, general packaging, household and kitchenware, and food wrapping material, to name a few. These materials are also used in moulding of gas and water pipes for potable water supply as well as irrigation and sanitation.

The polymers LDPE, LLDPE, and HDPE are usually tested for their density, malleability, and strength to determine their end use application. The most important requirements for these materials are density and melt flow index; however, based on end use application, other tests such as colour fastness or safety of use in contact with food stuffs, pharmaceuticals and drinking water etc. may also be required.

IS 7328:2020, issued by the Bureau of Indian Standards (BIS), outlines specifications for polyethylene materials – LDPE, LLDPE, HDPE - used in moulding and extrusion processes. The standard was originally published in 1974 and the 2020 version is the second revision which consolidates earlier standards for low, linear low, and high-density polyethylene (LDPE, LLDPE, and HDPE). It specifies the requirements for density and melt flow rate (MFR) testing, introduces a classification and designation system, and includes guidelines for intended applications, additives, and physical characteristics. Additional sections detail quality requirements for polyethylene used in food, pharmaceutical, and water contact applications. The standard also covers procedures for sampling, packing, marking, and BIS certification. Amendments to the standard include updated guidelines on pigments, migration limits for food contact, and permissible variations in material properties during production.

Quality Control Order issued by Department of Chemicals and Petrochemicals (DCPC) mandates that this product can be sold, manufactured, or imported in India only under a valid BIS licence. Hence, this standard is a key reference for manufacturers and regulatory bodies ensuring quality control in the production and use of LDPE, LLDPE and HDPE.

Keywords: LDPE, LLDPE, HDPE, Extrusion, Moulding, Density, Melt Flow Index, QCO, DCPC