

IAPMO IGC-India 308-2014

Polyethylene/Aluminium/ Polyethylene (PE-AL-PE) Composite Pipes



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IAPMO Standard for India

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0 Introduction

This Standard was developed and is intended for the India market.

1 Scope

1.1 General

- 1.1.1** This Standard covers co-extruded polyethylene/aluminium/polyethylene (PE-AL-PE) composite pipes comprising a welded aluminium (AL) tube laminated by a melt adhesive to two layers of polyethylene (PE) in nominal sizes 1216, 1620, 2025, 2532, 3240, 4050, 5063, 6375, 7590, and 90110 and specifies requirements for materials, physical characteristics, performance testing, and markings.

Note: The first two digits of the nominal size indicate the approximate inside diameter, in mm, and the following digits indicate the nominal outside diameter, also in mm. For example, a 2025 pipe means the inside diameter is approximately 20 mm and the outside diameter is approximately 25 mm.

- 1.1.2** PE-AL-PE composite pipes covered by this Standard are intended for use in

- (a) residential and commercial water supply systems;
- (b) residential heating systems; and
- (c) compressed air systems.

- 1.1.3** PE-AL-PE composite pipes covered by this Standard are rated for

- (a) 1,200 kPa at 23 °C; and
- (b) 600 kPa at 65 °C.

- 1.1.4** This Standard does not cover

- (a) PE-AL-PE composite pipes consisting of metallic layers not welded together; and
- (b) fittings and connectors.

1.2 Terminology

In this Standard,

- (a) “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the Standard;
- (b) “should” is used to express a recommendation, but not a requirement;
- (c) “may” is used to express an option or something permissible within the scope of the Standard; and
- (d) “can” is used to express a possibility or a capability.

Notes accompanying sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.3 Units of Measurement

SI units are the primary units of record in India and in global commerce and are the units used in this Standard.

1.4 Amendments

Proposals for amendments to this Standard will be processed in accordance with the standards-writing procedures of IAPMO.

1.5 Patents

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2 Reference Publications

This Standard refers to the following publications, and where such reference is made, it shall be to the current edition of those publications, including all amendments published thereto.

IS 737	Indian Standard - Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes - Specification
IS 2530	Indian Standard - Methods of test for polyethylene moulding materials and polyethylene compounds
IS 4905	Indian Standard - Methods for Random Sampling
IS 7328	Indian Standard - High Density Polyethylene Materials for Moulding and Extrusion
IS 9845	Indian Standard - Determination of Overall Migration of Constituents of Plastics Materials and Articles Intended to Come in Contact with Foodstuffs - Method of Analysis
IS 10141	Indian Standard - Positive List of Constituents of Polyethylene in Contact with Foodstuffs, Pharmaceuticals and Drinking Water
IS 10146	Indian Standard - Polyethylene for its Safe Use in Contact with Foodstuffs, Pharmaceuticals and Drinking Water
ISO 4427-1	Plastics piping systems -- Polyethylene (PE) pipes and fittings for water supply -- Part 1: General

3 Abbreviations

The following abbreviations apply in this Standard:

AL	—	aluminium
PE	—	polyethylene
UV	—	ultraviolet

4 General Requirements

4.1 Description

PE-AL-PE composite pipe comprises a welded aluminium (AL) tube laminated to two layers of polyethylene (PE), one on the inside of the aluminium tube and the other one on the outside. The PE layers are bonded to the aluminium tube by a polymeric adhesive during the extrusion process.

Note: In this standard, "PE-AL-PE composite pipe" is referred to as "PE-AL-PE pipe".

4.2 Materials

4.2.1 Polyethylene

Polyethylene resin shall be PE 63, as specified in ISO 4427-1, complying with or exceeding the properties specified in Table 1.

4.2.2 Ultraviolet (UV) Light Protection

4.2.2.1 Polyethylene used in the manufacture of the outside layer of PE-AL-PE pipe shall be compounded with carbon black to provide UV light exposure stabilization. The carbon black content of the polyethylene resin shall be $2.5 \pm 0.5\%$ by mass when tested in accordance with Clause 10 of IS 2530 and the distribution shall be uniform throughout the compound.

4.2.2.2 Polyethylene used in the manufacture of the inside layer of PE-AL-PE pipe may be compounded with carbon black at the option of the manufacturer.

4.2.3 Aluminium

Aluminium used in the metallic tube (layer) of PE-AL-PE pipe shall comply with or exceed the following properties, when tested in accordance with IS 737:

- (a) Minimum elongation: 18%.
- (b) Ultimate tensile strength: 85 MPa.

4.2.4 Reworked Material

Reworked material shall not be used in the manufacture of PE-AL-PE pipe.

4.3 Dimensions and Methods of Measurement

4.3.1 Aluminium Thickness

The wall thickness of the aluminium tube shall be as specified in Table 2.