

COOLING TECHNOLOGY INSTITUTE

CTI CODE TOWER Standard Specifications

**Polyvinyl Chloride and Chlorinated
Polyvinyl Chloride Materials
Used for Film Fill, Splash Fill, Louvers
and Drift Eliminators**



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This guideline document summarizes the best current state of knowledge regarding the specific subject. This document represents a consensus of those individual members who have reviewed this document, its scope and provisions. It is intended to aid all users or potential users of cooling towers.

Approved by the CTI Executive Board



This document has been reviewed and approved as part of CTI's Five Year Review Cycle. This Document is again subject to review in 2025.

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CTI Standard Specification for Thermoplastic Materials Used for Film Fill, Splash Fill, Louvers And Drift Eliminators

1.0 SCOPE

- 1.1** This specification covers the most common thermoplastics used in the manufacture of film fills, splash fills, louvers and drift eliminators for use in standard cooling tower application and the physical properties, burning properties and recommended testing procedures employed to determine the defined values, whether processed from virgin or reground material.

This specification is written around the materials utilized in the production of common cooling tower fills, drift eliminators, and louver products. It does not address the manner in which these materials are utilized in the final products. A CTI Standard for cooling tower products is separate from CTI STD-136 for materials. The configuration, material density, material thickness, material mechanical properties, support spans and overall design application of materials should be considered when evaluating cooling tower products.

- 1.2** Materials covered by this standard are polyvinyl chloride; hereafter called PVC; chlorinated polyvinyl chloride hereafter called CPVC; heat elevated PVC hereafter called HPVC; Polypropylene hereafter called PP; Fire Retardant Polypropylene hereafter called FR-PP; high density polyethylene hereafter called HDPE; and Fire Retardant high density polyethylene hereafter called FR-HDPE.

1.2.1 PVC – used in the manufacture of film fill, splash fill, inlet louvers, and drift eliminators. PVC by its nature has a lower flammability risk, is easily thermoformed and extruded into complex shapes, and is rigid with minimal creep characteristics. PVC is not easily used for injection molded products.

1.2.2 CPVC – used in the manufacture of film fill and drift eliminators. CPVC has a heat deflection temperature of about 30°F (16.67°C) greater than that of PVC, making it a potential material for high temperature applications. CPVC can have embrittlement problems. Blends of CPVC and PVC with intermediate heat resistance may also be available. Both CPVC and blends of CPVC and PVC are more susceptible to ultraviolet degradation and will degrade and lose impact resistance when exposed. CPVC or its blends should only be used when the lower impact resistance and shorter useful life are considered.

1.2.3 HPVC – used in the manufacture of film fills and drift eliminators, HPVC has a higher heat deflection temperature than PVC but lower than CPVC. HPVC does not have the embrittlement problems of CPVC and will add about 15°F (8.33°C) to the heat deflection temperature of PVC.

1.2.4 FR-PP – Polypropylene with the addition of adequate fire retardant additives is used in the manufacture of injection-molded products such as splash grids and thermoformed film fills, drift eliminators and inlet louvers. It is also used in other smaller components, such as nozzles. Refer to section 2.1. FR-PP can not be solvent or adhesively bonded so for products requiring assembly; the design must include an alternate means to assemble. The heat deflection temperature of FR-PP can benefit by the addition of fillers to add stiffness. FR-PP inherently is softer and more susceptible to creep factors when loaded. Copolymers may impart better impact resistance to the part. FR-PP has a material density approximately 35% less than PVC and for the same design configuration should be supplied in an increased thickness to compare to PVC.

1.2.5 PP – used in the manufacture of injection-molded products such as splash grids and thermoformed film fills, drift eliminators and inlet louvers. It is also used in other smaller components, such as nozzles. PP will generally melt and drip in a fire and is more flammable than PVC. PP cannot easily be solvent or adhesively bonded, so for products requiring assembly, the design will most likely include an alternate means to assemble. At low stress levels, the heat deflection temperature of PP can benefit by the addition of fillers to add stiffness. PP inherently is softer and more susceptible to creep factors when loaded. Copolymers may impart better impact resistance to the part. PP has a material density approximately 35% less than PVC and for the same design configuration should be supplied in an increased thickness to compare to PVC.

1.2.6 FR-HDPE – High density polyethylene with the addition of adequate fire retardant additives is used in the manufacture of injection-molded products and extruded splash fill products. FR-HDPE will generally melt and drip