

Fire collars -Are they as simple as many think?

Introduction

There is more to compliance than just whacking a fire collar on a plastic pipe and walking away. This article is written to assist those working with fire collars understand a little bit more about them; that is what they are, what they do, how and why they are fire tested, and the different variable which must be considered when selecting a fire collar or a compliant installation.

What is a fire collar?

Fire collars or some would say “firestop collars” are used to protect openings where plastic pipes pass through fire barriers.

A fire collar contains a black graphite based material inside its body, which when exposed to heat swells up to around 30 times its original volume, in the process filling the whole where the plastic pipe is, as the plastic pipe softens and melts from the heat of the fire. This action of swelling up and “choking” the plastic pipe closed, is called intumescence and therefore the graphite-based material is an intumescent material.

intumescence

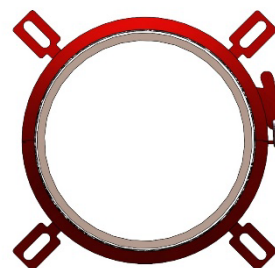
[in-too-mes-uhns, -tyoo-] [SHOW IPA](#)

[SEE SYNONYMS FOR intumescence ON THESAURUS.COM](#)

noun

- 1 a swelling up, as with congestion.
- 2 the state of being swollen.
- 3 a swollen mass.

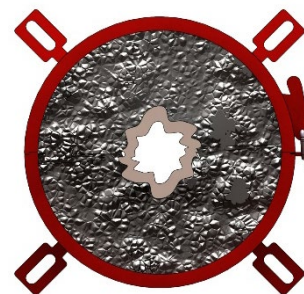
1. Plastic pipe inside a fire collar before heat



2. Pipe starts to soften and intumescent material start expanding



3. Further activation of intumescent material



4. Full closure of intumescent material and fully melted pipe on fire side



Fire testing requirements

The National Construction Code (NCC), which many of us will remember by its former name, the Building Code of Australia or BCA, requires all services that pass through fire building elements such as walls, floor slabs, shafts or ceilings, to maintain the fire rating of the building element in question.

The fire rating is referred to as an FRL; short for the Fire Resistance Level.

FRL's are determined from actual fire testing at registered fire test laboratories and we have a few important Australian Standards that provide the method and rules for fire testing of plastic pipes.

The test method is AS1530 Part 4 and the rules for fire testing are covered in AS4072.1; by rules I mean the number and type of fire tests that are required and the applications, materials and sizes of pipes that need to be addressed by the manufacturer of a fire collar.



Photo of a Trafalgar Fire collar on the fire side after 4 hours of fire testing



Different plastic pipes being fire tested with collars under the floor slab inside the fire test furnace



A photo of a fire test on a Trafalgar fire collar in a Speedpanel wall system

Seven (7) helpful items to verify to help ensure fire collar compliance with the NCC / BCA

1. Fire testing results are specific to the building element type

Different fire testing is required for the following building elements:

- Floor slabs; be careful to check the minimum thickness of slab approved for each brand of collar
- Fire rated ceiling; this is a difficult one to understand as there is an additional fire requirement for ceiling cavities, called the Resistance to Incipient Spread of Fire, RISF; get help from the consultant or manufacturer with collars on fire rated ceilings
- Fire rated plasterboard walls; different testing is required for single and double layer wall types; that is for 60, 90 and 120 minute fire rated “pink” plasterboard wall types
- Fire rated plasterboard shafts; these are constructed differently than walls and care must be taken to check that fire test data exists for shaft wall constructions.
- Block and brick walls
- Proprietary walls & services shafts require their own fire testing; some examples include SpeedPanel, Walsc, Hebel and Pronto.

2. Fire testing is required for each plastic pipe material type and wall thickness

Quite often we only think of uPVC, but there are many different plastic pipes being used for plumbing applications now:

- HDPE, PP, PE
- PEX
- PEX-AL-PEX
- Special proprietary ones like Valsir Triplus, Aquaheat, SilentFlow etc

3. Each pipe sizes requires fire testing

4. Fire testing is required with and without fitting inside the fire collar



Fire collar with elbow inside collar before fire testing

5. For floor slabs, different fire testing is necessary for a floor waste and for a pipe that continues through the slab; often referred to as a stack application.

6. The opening size and configuration around the plastic pipe is important also in term of fire testing and approved systems

7. The use of the as fire tested and correct fixing are IMPERATIVE for fire collars that are attached after the pipe is in situ

Main types of fire collars

There are some fire collar types that are worth of mention

Cast-in floor slab collars

So called, because these fire collars are fixed to formwork prior to the concrete being poured and are cast-in situ once the concrete is poured; forming an opening complete with the cast-in fire collar in situ when the formwork is removed.

As discussed earlier there are two main and very different types of cast-in fire collars
Stack and floor waste



Retrofit fire collars

These are applied after the pipe is in the opening through the fire wall. They can open up and be placed around the pipe, and then fixed to the underside of a floor slab or ceiling, or to BOTH sides of a vertical wall or shaft.



Conduit collars

These are smaller collars designed and fire tested specifically for small plastic conduits.

Yes, fire ratings and FRL requirements apply to every opening and service that passed through any fire rated building element required; even for small opening, contrary to the wife tales that often get shared around the plumbing industry.

