

# MARK<sup>®</sup> OBS<sup>®</sup> stabilizer for PVC pipe and fittings

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## Introduction

In the pipe industry, PVC has long been stabilized with lead compounds. In Europe, the replacement of lead-based stabilisers is currently one of the main focuses. As part of the voluntary initiative 'Vinyl 2010', the European Vinyl Industry has committed to replace lead stabilizers in all PVC applications by 2015 (15% in 2005, 50% already in 2010). To meet this need, Crompton Vinyl Additives GmbH, a Chemtura company developed the Mark<sup>®</sup> Organic Based Stabilizers (OBS<sup>®</sup>).

While Mark<sup>®</sup> OBS<sup>®</sup> stabilizers were initially developed for use in the PVC pipe industry, their use has been expanded to include special grades for PVC fittings, profiles and flexible applications.

## What is MARK<sup>®</sup> OBS<sup>®</sup>?

Mark<sup>®</sup> OBS<sup>®</sup> is a new generation of environmentally acceptable PVC stabilisers based on the pyrimidinedione structure shown below. This structure effectively prevents degradation and change in colour during processing, and also provides some tangible benefits to the converter.

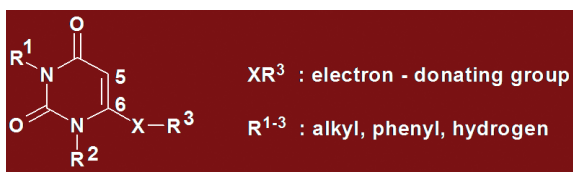


Figure 1 — Structure of Organic Based Stabilizer (MARK<sup>®</sup> OBS<sup>®</sup>)

## Why MARK<sup>®</sup> OBS<sup>®</sup>?

MARK<sup>®</sup> OBS<sup>®</sup> products are environmentally acceptable and are consistent with health and safety requirements. Their use in PVC pipe and fittings results in the following benefits:

- Allows for processing on standard equipment, and allows a wide processing window;
- No catastrophic cross-linking and thermal decomposition;
- Good colour performance on processing;
- Low migration, suitable for potable water contact;
- Low odour, good organoleptic properties; and
- Suitable for recycling, no interaction with other stabilizers

The heat stabilizing effect of MARK<sup>®</sup> OBS<sup>®</sup> materials is linearly dependant on the amount added, as can be seen in Figure 2 below. Hence the formulator can tailor the performance and economics of the formulation using the pure MARK<sup>®</sup> OBS<sup>®</sup>, alternatively the MARK<sup>®</sup> OBS<sup>®</sup> can be added in a one-pack form (MARK<sup>®</sup> OBS<sup>®</sup>200 and 300 series).

Compared to other stabilizer systems, which show a rapid onset of cross-linking in the dynamic heat stability test,

Dehydrochlorination Test at 180°C  
Extruded Pipes (DIN 53381 PVC II)

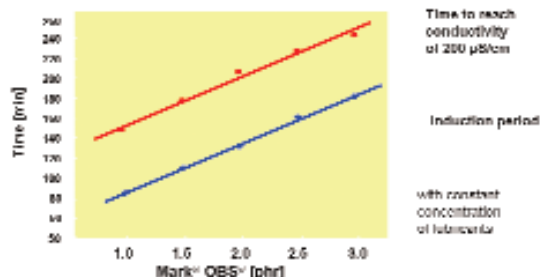


Figure 2 — Linear heat stability of MARK<sup>®</sup> OBS<sup>®</sup>

MARK<sup>®</sup> OBS<sup>®</sup> prevents any tendency of the PVC to crosslink, and thus has a wide processing window. As a result it is also suitable for recycling, and is fully compatible with other stabilizer systems. Also, stripping of dies and maintenance to extruders is minimized due to the lower tendency to crosslink and decompose.

## Conclusion

MARK<sup>®</sup> OBS<sup>®</sup> has been tested in a wide range of pipe formulations and diameters, and meets all current pipe and fitting specifications (Impact strength (EN 1452 - 8.1), fracture toughness (BS 3505), Vicat softening point (EN 727) and pressure tests (EN 1452 - 8.2).

No specific modification is required to equipment and only small adjustments to processing conditions would be required. In trials conducted, higher extruder throughputs were achieved, whilst maintaining excellent physical and surface properties of extruded products.

MARK<sup>®</sup> OBS<sup>®</sup> has proven to be a viable and cost effective alternative to other heavy metal stabilizers for PVC.

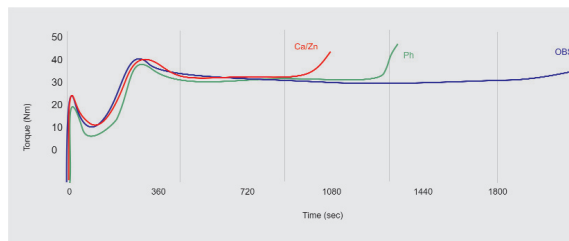


Figure 3 — Brabender heat stability curves of different stabilizers

For more information, please contact Doug Jones at Chemfit in Johannesburg on (011) 918 1900 or [doug@chemfit.co.za](mailto:doug@chemfit.co.za) or see [www.chemfit.co.za](http://www.chemfit.co.za).

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