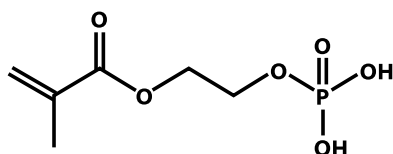


VISIOMER® HEMA-P 70M — A new all-rounder: adhesion promoter, anti-corrosion & flame-retardant agent

VISIOMER® HEMA-P 70M: AN OVERVIEW

2-Hydroxyethyl-Methacrylate-Phosphate (HEMA-P) is a well-known adhesion promoter in applications like adhesives or coating resins. Evonik Performance Materials GmbH offers **VISIOMER® HEMA-P 70M**.

FIGURE 1: Structure of the active ingredient in VISIOMER® HEMA-P 70M



VISIOMER® HEMA-P 70M contains 70% phosphate components and 30% MMA. It is particularly easy to process because of its low viscosity of 40 - 75 mPa·s in comparison to pure HEMA-P and shows a low color value. Recent studies on the performance of **VISIOMER® HEMA-P 70M** in acrylic resins revealed the following additional benefits:

- an improved corrosion protection and
- flame-retardant properties

Its versatile capabilities are described in detail below.

ADHESION PROMOTION

VISIOMER® HEMA-P 70M can be used as a functional co-monomer for adhesives and coatings. It enables superior adhesion to polar surfaces like minerals, glass and metals.

FIGURE 2: Shear strength enhancement of a standard structural adhesive using VISIOMER® HEMA-P 70M as adhesion promoter

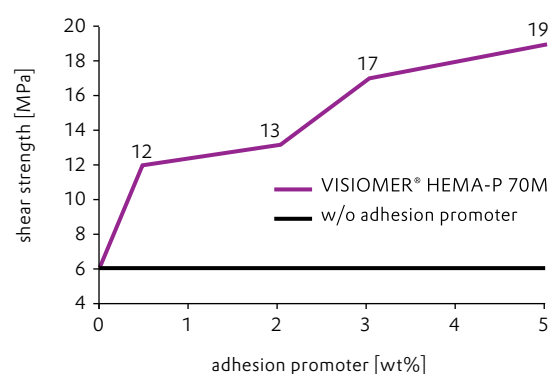
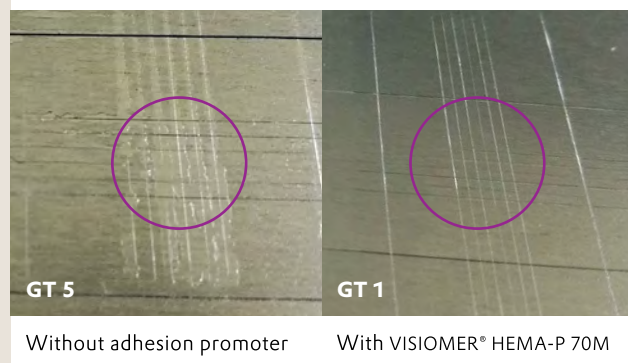


Figure 2 shows that even small concentrations of **VISIOMER® HEMA-P 70M** increase the shear strength of a standard 2K methacrylate-based structural adhesive on steel substrates substantially. It easily triples the shear strength at an addition of 5 wt% **VISIOMER® HEMA-P 70M**.

In emulsion coatings, **VISIOMER® HEMA-P 70M** also provides superior adhesion. The addition of the adhesion promoter boosts the adhesion of emulsion-based films on metal substrates from GT5 to GT1, as shown in Figure 3.

FIGURE 3: Cross-cut test for emulsion coatings on metal substrates with and without VISIOMER® HEMA-P 70M



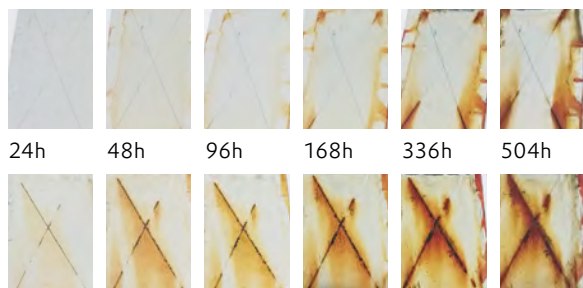
In a nutshell, **VISIOMER® HEMA-P 70M** is a specialty methacrylate, which improves adhesion dramatically even at low concentrations. It merges high polarity with adequate flexibility, rendering it an additional value for developers.

CORROSION PROTECTION

Corrosion protection has always been an important requirement for coatings. The trend towards water-borne systems makes anti-corrosion properties a challenge. Our studies on acrylic emulsions with a low amount of **VISIOMER® HEMA-P 70M** demonstrate enhanced corrosion resistance compared to resins without any anti-corrosion agent (Figure 4). Panels coated with **VISIOMER® HEMA-P 70M** containing emulsion polymers withstood corrosion up to 168h in a saltwater immersion test.

FIGURE 4: Saltwater immersion test on galvanized steel substrate for emulsion coating with and without VISIOMER® HEMA-P 70M

With VISIOMER® HEMA-P 70M



Without

FLAME-RETARDENT PROPERTIES

New regulations drive industry interest towards alternatives for conventional halogen based flame-retardant, alternatives that are non-migrating and less hazardous. **VISIOMER® HEMA-P 70M** is a reactive flame-retardant with a smart combination of a phosphorous acid and methacrylate functionality. The phosphate group is responsible for the flame-retardant properties. Whereas, the methacrylate group readily polymerizes and leads to a non-migrating agent. Depending on flame-retardant performance targets, **VISIOMER® HEMA-P 70M** can replace non-reactive flame-retardant agents partly or completely.

Glow-wire tests conducted on acrylic polymers containing **VISIOMER® HEMA-P 70M** confirm the flame-retardant properties.

In conclusion, **VISIOMER® HEMA-P 70M** is a specialty methacrylate monomer offering versatile solutions for different industries like adhesives, coatings, composites and construction.

VISIOMER® METHACRYLATES—READY FOR THE NEXT LEVEL

Evonik Methacrylates looks forward to supporting you in finding the best solution for your next challenge in polymer design. Contact us for further information on **VISIOMER® HEMA-P 70M**.

OUR PROMISE TO YOU

- We are your methacrylate experts for specialty monomers.
- We are at your service with a globally available sales and technology organization.
- We are your solution provider with tailor-made products and joint research & development projects.
- We support your growth through a reliable and flexible global production & technology network.
- We are looking for a long-term partnership and mutual value creation.

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