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Sealing Roofs with a Sealing Systems Based on Combined Polymers, Applied by Spray

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Sealing roofs with sprayed applied polymer based products is an accepted practice for many years. The market share of these products, which was minor in the past, is increasing steadily in recent years, due to three main reasons:

a. Technological development which resulted in advanced materials, with enhanced properties, at reasonable prices.

b. Understanding the limitations of sealing systems comprised of bitumen membranes, especially in small roofs with multiple parapets and beams, in roofs carrying numerous installations or roofs with abnormal geometrical shapes and/or slopes.
c. The need to renovate roofs which were previously sealed with aggregate coated bitumen membranes and the difficulties encountered in the attempt to torch new bitumen membranes, due to the space between the old and the new membranes, caused by the aggregate.

Several types of polymer based products, designated for sealing roofs are currently available in the market:

1. Standard, water based acrylic products.
2. Solvent based polyurethane products.
3. Advanced, combined, water-based polymer product, resistant to ponding water - such as **Multigum**, made by Bitum.

1. **The standard, water-based acrylic products**, are available on the market for about 20 years. These products have one significant flaw - the material softens under ponding water, until the impermeability properties are lost after prolonged exposure to ponding water.

   This disadvantage prevented the standard acrylic products from capturing a significant share of the sealing market.

2. **The solvent-based polyurethane products** are universally used as roof sealing systems for many years.

The polyurethane products are divided into two groups:

2.1 Aliphatic Polyurethanes – the higher quality group of polyurethane products with good resistance to U.V. radiation and various chemicals, such as solvents, acids, etc. However, these products are very expensive and in recent years the application as sealants holds a minor share of the market.

2.2 Aromatic Polyurethanes – the medium quality (and cheaper) group of polyurethane products, with reduced resistance to U.V. radiation and various chemicals, such as solvents, acids, etc.

These products, usually supplied in white, tend to yellow slightly after exposure to sunlight for several months. Such yellowing is a clear indication that the polyurethane product used to seal the roof is made of aromatic polyurethane.

The aromatic polyurethane products capture a relatively large market share of the total polyurethane products market, due to the cheaper price, compared to the aliphatic polymer products.

Polyurethane products in general contain the solvent "Xylene". This solvent is hazardous due to its flammability and toxicity. According to the Material Safety Data Sheet – MSDS attached to manufacturers declarations, Xylene is suspected to cause toxic effects on the blood, the central nerves system, the liver and other organs in the human body after prolonged exposure.

When the product is applied by spraying, as a common practice in recent years, the Xylene is diffused in the air and inhaled in significant quantities by the spraying person and by any person in the vicinity. In addition, Xylene is absorbed through the skin and finds its way to the blood.

Customers in the U.S.A. and Western Europe are highly aware of the risks involved in using these products and increasingly demand to replace these products with user and environment friendly products (zero Volatile Organic Content (VOC).

3. An advanced, water-based, combined polymer product is applied in Israel and other countries throughout the world at the last years. This product is **Multigum** made by "**Bitum**". This innovative product is comprised of a mix of high quality polymers that provide the product with the following unique properties:

3.1 Resistance to ponding water (which is the main flaw of the acrylic products).

3.2 High bridging capability over cracks in the substrate.

3.3 High resistance to U.V. radiation.

3.4 Flexibility in very low temperatures (up to -30°C).

3.5 User and environment friendly, thanks to the water base.

Multigum is not toxic and does not have any adverse effects on the user or other persons in the vicinity.

3.6 Extremely fast curing.

Multigum was tested by the Israeli Standards Institute, according to Israeli Standard No. 4518, and results show that its properties exceed the requirements of a product at an M Class (special). These tests included a strict cracks bridging test of **Multigum** (2mm thick coat): 1,000 cycles over a 1mm wide crack and 5,500 cycles over a 3mm wide crack, 5,000 cycles over the standard requirements for M Class.

Multigum was also subjected to a special cracks bridging test, which is not required by the standard: 5,000 cycles over a 3mm wide crack, after 1,000 hours of U.V. radiation.

Multigum is used to seal new and old concrete roofs, roofs coated with old bitumen membranes which require renovation, old bitumen (tar) coated roofs, roofs coated with old acrylic sealing systems, old tin and asbestos roofs (coating an asbestos roof with **Multigum** solves the problem of dispersed asbestos fibers inhaled by people in its vicinity). **Multigum** is also used as a high quality elastic coating for exterior walls.

Multigum is applied by spraying (as well as a roller or a brush). **Multigum** is available in white and blue, to enhance control of the number of applied coats. The resulting membrane is continuous, seamless coat (unlike typical seams in bitumen sheets which are a main source of failures). The sealing membrane is fully adhered to the roof, regardless of its structure and uneven surface, thereby avoiding the other significant flaw of bitumen sheets: partial adhesion to the surface, insufficient adhesion and detachment of the sheets from the substrate in uneven surfaces, such as the parapet joints, corners or roof areas with installed devices.

Application of **Multigum** by spray is significantly more effective and time saving, compared to the complicated and unfriendly application of bitumen membranes, which involves use of open fire and lifting heavy rolls.

Several unique and dedicated primers were adapted to **Multigum**, according to the substrate designated for sealing. Application of these primers ensures complete and strong adhesion to the substrate, which is highly important to the proper, long term function of the sealing system.

Multigum, as an innovative, water-based sealant comprised of combined polymers, certainly expands the range of application possibilities in the sealing market, by providing a continuous, flexible, seamless sealing system, with complete adhesion to typical uneven roof substrates.

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Correct application of **Multigum,** achieved by carefully following the correct surface preparation and application instructions, will result in a reliable sealing system that will maintain its properties for a long time.

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