

Transportation Safety Division

Bitumen Plus Application Procedure

3M™ Stamark™ Pavement Marking Tapes

Information Folder Bitumen Plus System

November 2020



1 General Explanation

This application manual is designed to assist customers and contractors at applying 3M™ Stamark™ Pavement Marking Tapes and therefore receive best durability and performance. Further it describes the requirements for the applications and procedures, which have to be followed. If a situation is not covered in that folder it is the responsibility of the customer working with the 3M Tapes to contact the 3M Sales or technical representative for further guidance.

3M™ Stamark™ High Performance Pavement Marking Tapes are usually applied successfully with 3M™ Stamark™ Surface Preparation Adhesive P50 on most surface types. (See Information Folder IF OV). Rough surfaces however, like liquid cast asphalt or split-mastix asphalt, can negatively influence the application of Stamark™ tapes due to the extreme surface roughness. Additionally, in regions with high temperature differences throughout the year, like found in the mountain region, e.g. Alps, the risk of adhesion failure, even after years of application, is present.

Therefore, we recommend for the time being the use of the bituminous hot melt adhesive Biguma® DS 01E of Dortmunder Gußasphalt GmbH (DGA) or Böffuga MV of Georg Boerner Chemisches Werk für Dach und Bautenschutz GmbH & Co.KG. Instead of P50 Primer, a safe application and proper adhesion can be ensured.

For the application of the Bitumen a standard Thermoplastic application machine can be used. Best case is to have a machine that is used for the Bitumen, only. For larger scale application a Bitumen boiler is recommended.

2 Series of operations

Weather conditions

The application of 3M™ Stamark™ Pavement Marking Tapes using the BitumenPlus application method requires the following minimum weather conditions: Air temperature and road surface temperature +5°C and rising. Air humidity below 80%. The road surface needs to be visibly dry to assure proper adhesion. If one of the above-mentioned criteria is not fulfilled the application has a high risk of failure and should be postponed until weather conditions are within the limits. Ignoring these recommendations might result in rejection of any warranty claim.

Surface preparation

Perform stability test of the road surface and of the existing marking, if applicable. The old making must be removed. Avoid the application of Bitumen Plus System on existing thermoplastic and multiplayer paint. The application on liquid repair asphalt and asphalt with any kind of impregnation and surface treatment e.g. "Ralumac®" is not recommended. Clean the road surface using a broom or high-pressure air. The road surface must be free of dirt and grease and needs to be dry.

Pre-marking

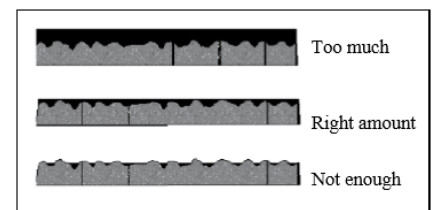
The pre-marking must be positioned so that the bituminous adhesive does not cover the pre-marking. This allows the tape applicator to use the same pre-marking.

Bitumen Application

The technical instructions of the bitumen manufacturers (see attached technical datasheet) have to be followed when using bitumen adhesive. The bitumen has to be heated in a standard bitumen boiler up to a temperature of 180 - 220°C and to be applied with a draw box according to the width needed (See Figure1). The width of the applied bitumen needs to be 1-2cm wider than the tape width.



The thickness of the Bitumen layer is related to the surface roughness. Consumption of the Bitumen is strongly depending on the surface roughness. It can be calculated as written in the technical datasheet. Typical values for a 2mm Bitumen thickness are: 42g Bitumen per cm Bitumen layer width and linear meter.



Tape application

The 3M™ Stamark™ durable tape has to be applied onto the warm Bitumen. The temperature of the Bitumen should range between 30-50°C. Depending on the outside temperature, this level is reached already a couple of meters behind the draw box.



For the application of the Stamark™ tape the usage of the Manual tape applicator MTA-2 is recommended to assure best results



Tamping

Directly after the tape application, the 3M™ Stamark™ tape has to be tamped with 3M™ tamper Cart, RTC-3, carrying a weight of 90 kg. Use a minimum of 3 passes. Do not turn or twist the tamper cart on the tape. Make sure, all edges are firmly adhered. Once tamped, it is virtually impossible to correct the position of the tape.

3 Application protocol / Tools

The application protocol is essential in case of any warranty claim. Without it, no claim will be accepted. An application protocol for each application has to be filled in and signed by the applicator. This protocol is used for the documentation of the application conditions and correct application. The Lot numbers of each roll from the core or the packaging have to be documented as well. The applicator has to send the protocol to the authorities and a copy to the 3M subsidiary within 14 days.

Since the documentation requirements might vary from country to country, please refer to your local 3M sales organization for further information.

For the BitumenPlus application the measurement of the road surface and bitumen temperature are very important. Infrared Thermometers are recommended for the usage, like the 3M™ infrared-thermometer IR 750 Non Contact or comparable equipment. Further all the weather conditions have to be measured with the appropriate Equipment.

4.1 Health and Safety Information

Read all health hazard, precautionary and first aid statements found in the Material Safety Data Sheet (MSDS), and/or product label of chemicals prior to handling or use.

4.2 Disclaimer

THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM OR USAGE OF TRADE.

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Except for the limited remedy stated above, and except where prohibited by law, 3M will not be liable for any loss or damage arising from the Signs or any 3M product, whether direct, indirect, special, incidental or consequential damages (including but not limited to lost profits, business or revenue in any way), regardless of the legal theory asserted including warranty, contract, negligence or strict liability.

5 Other Product Information

Always confirm that you have the most current version of the applicable product bulletin, information folder or other product information from 3M's Website at <http://www.mmm.com/tss>.

6 Guarantee /Liability

3M assumes no responsibility for any injury, loss or damage arising out of the use of a product that is not of our manufacture. Where reference is made in literature to a commercially available product, made by another manufacturer, it shall be the user's responsibility to ascertain the precautionary measures for its use outlined by the manufacturer. Prerequisite for the guarantee is that the tape was processed according the instruction of this technical information folder.

7 Literature References

For additional information on 3M™ Stamark™ Tapes, Application Instructions or 3M™ Application Equipment, refer to the following publications:

IF MTA2	Information Folder Manual Tape Applicator MTA-2
IF RTC-3	Information Folder Roller Tamper Cart RTC-3
PB A380	Product Bulletin 3M Stamark™ High Performance Tape A380

Important Notice to Purchaser

All statements, technical information and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. All questions of warranty and liability relating to this product are governed by the terms of the sale subject where applicable to the prevailing law. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

Reliant for these product-information:

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dortmunder
gußasphalt gmbh & co. kg



BIGUMA® - DS 01 E

Bituminous balancing compound build-in thickness form 1 to 5 mm

Uses:

BIGUMA® - DS 01 E is a polymer modified and balancing compound provided with special bonding agent for the laying of foil within the scope of the 3 M Stamark™ Bitumen Plus Programme.

Properties:

BIGUMA® - DS 01 E consists of modified bitumen, chosen mineral fillers as well as elasticising elastomers.

BIGUMA® - DS 01E is suitable for a layer thickness of 1 to 5 mm

BIGUMA® - DS 01 E or the work carried out with the material distinguish itself by the following characteristics:

- using of elastomer, therefore good usage properties at heat and cold
- easy to pour and/or to elapse
- to elapse with nearly no beginnings
- good bonding at mineral and bituminous materials
- stable enough for a layer thickness of up to 5 mm
- compatible with usual bituminous building materials
- good bonding to the later applied permanent marking foil through bonding agent

Application instructions:

a) Melting:

For the preparation of BIGUMA® - DS 01E it is recommendable to use a boiler equipped with mechanical agitation. The material has to be heated carefully to the application temperature of 180-220°C to avoid an overheating of the sealant, which could damage the material. The temperature of the sealant must be thermostatically regulated; it must be controllable at all times.

b) Requirements to the subsoil:

The subsoil has to be dry and free from dust. A pre-treatment of the areas to be repaired with the help of a high-pressure-air lance is recommendable. At mineral subsoil like i.e. concrete the primer COLZUMIX® - S has to be used.

c) Pouring:

BIGUMA® - DS 01 E is not pumpable. The levelling compound can be poured directly out of the boiler equipped with agitation by pouring or with the help of buckets or similar. The following application takes place with the help of build-in equipment such a slider or pulling box, which guarantee a dimensionally stable application of the levelling compound. The compound will be applied in the corresponding marking width with the help of the slider, preferably mechanically. The applied layer thickness depends on the surface roughness of the subsoil. Through the sharp edges of the marking foil, which has to be applied afterwards, BIGUMA® - DS 01 E can be applied with a small overlap in the width (1 – 2 cm). The application of the STAMARK™ durable marking foil shall take place immediately after the application of the still warm compound. The surface temperature should be between 40 °C and 60 °C.

Please observe the application instructions of 3M Deutschland GmbH for the Bitumen Plus Procedure.

Weather condition:

The application of prepared damaged areas are only allowed to be sealed at dry weather conditions and at a surface temperature of the building part of +5°C

The application of BIGUMA® - DS 01 E is only allowed to take place at dry weather conditions and at a surface temperature of the building part of more than +5 °C.



dortmunder
gußasphalt gmbh & co. kg



Material:

Width of the foil	Bonding width	Total layer thickness	Consumption per running m
12 cm	13/14 cm	2 mm 3 mm	546 g / 588 g 819 g / 882 g
15 cm	16/17 cm	2 mm 3 mm	672 g / 723 g 1008 g / 1085 g
25 cm	27 cm	2 mm 3 mm	1134 g 1701 g
30 cm	32 cm	2 mm 3 mm	1344 g 2016 g

The indicated values are the calculated ones for the theoretical layer thickness. The exact consumption depends on the layer roughness and can depart from the calculative value.

Storage:

Storable for at least 12 months in original unopened tins.

Form of supply:

BIGUMA® - DS 01E will be filled into thin metal tins (hobbocks) of 20 kg and transported on non-returnable pallets. A separation agent coating and the welted type of the hobbocks guarantee a fast, problem-free and safe removal of the mass out of the tin. The removed blocks can be filled into the heater together with the probably still adherent separation agent coating. Alternatively the maintenance compound can be supplied in silicone coated cartons.

Thin metal tin: 20 kg
Carton: 22 kg

Cleaning agent:

Equipment: petrol and commercial solvents
At skin contact: hand washing paste

Authoritative regulations:

At the application of BIGUMA – DS 01 the application regulations of 3M Deutschland GmbH are valid for the bitumen plus procedure.

Technical data:

Density: approx. 2,1 g/cm³
Application temperature: 180°C - 220 °C

This product information is in accordance with our current information stand, the stated data are average values under normal conditions. The applicator is obliged to check the suitability and the possible applications for the intended purposes. For special technical information please do not hesitate to contact us. Our products are sold subject to our General Terms and Conditions of Sale.

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Product Data Sheet



As of: 10 / 2019

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Trade name: BÖRFUGA® MV

Article No.: 12333

Technical Data:

	Unit	Value	Regulation
External characteristics	-	Black, solid, homogeneous	DIN A 1425
Softening point ring and ball	° C	>100° C	DIN A 1427
Density at 25°C	g / cm ³	1.8 ± 0.05	DIN A 13 880-1
Stamp penetration depth	mm	≤ 20	DIN 1996 Part 13, but at 20°C after 30 min at 525 N on 5 cm ²
Binding agent content	M-%	>20%	TP A-StB, Part 1

Product

BÖRFUGA® MV is based on a special bitumen with fine mineral fillers for an installation thicknesses of 1 to 3 mm.

Purpose

BÖRFUGA® MV is used for the 3M Stamark Bitumen Plus program as a levelling and laying compound for foil lying procedures in traffic areas.

Application Advice

The following conditions must be met for the proper execution of the work with BÖRFUGA® MV.

- The application should be carried out in dry weather.
- The surface temperature of the components must be at least + 5°C.
- The area to be processed shall be kept free from traffic.
- The substrate must be dry and free of dust.
- BÖRFUGA MV is not suitable for laying on concrete.

Product Data Sheet



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Melting of the levelling and laying compound:

BÖRFUGA® MV is slowly melted to the processing temperature of 180 -210 °C in an indirectly heated and thermostat-controlled melting boiler/cooker with agitator. The melting should only be carried out in cleaned boilers/cookers that must free from solidly burned residues. Simple bitumen melting boilers/cookers bear the risk of overheating the mass with the result that the ingredients added for stabilisation and coating of the mass settle on the ground or are destroyed. Repeated melting of the mass should be avoided.

Application

Basically, the installation guidelines for 3M Bitumen Plus Stamark TM durable paving marking tape must be followed. After being melted, BÖRFUGA MV can be processed directly from the agitating boiler with a suitable built-in appliance. Machine laying devices with a heated screed box are suitable and appropriate for the foil width with little overlay.

The processing temperature shall be adjusted to the substrate temperature as follows:

<u>Substrate temperature</u>	<u>Processing temperature</u>
5 - 15° C	Approx. 200°C
15 - 25°C	Approx. 190°C
>25°C	Approx. 180°C

Note: When laying on mastic asphalt, a processing temperature of 200°C should generally be maintained.

The foil application should be carried out at a substrate temperature of the mass between 30 - 50 °C.

Temperatures must be controlled with suitable measuring instruments.

Material consumption

Width of marking foil (cm)	Application width BÖRFUGA MV (cm)	Total coating thickness (mm)	Material consumption (g/m)
12	13/14	2	468/504
		3	702/756
15	16/17	2	576/620
		3	864/930
25	27	2	972
		3	1460
30	32	2	1152
		3	1730

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Specifications are subject to change without prior notice. The given information is correct on the date of production.

Product Data Sheet



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The mass cannot be pumped!

The specified consumption values are calculated purely based on a mathematical equation and as such should be used as a planning aid. The effective consumption depends on the open-porousness of the existing top layer (asphalt concrete, split mastic, mastic asphalt, OPA).

The objective must be to achieve an even and sealed layer of BÖRFUGA MV.

The speed of the laying machine must be adapted to these conditions.

Important: The batch number of the used mass must be noted on the installation protocol! This can be found at the bottom left of the box (00 000 XY). A complaints process is not possible without the registered batch number!

Packaging:

Forms of delivery / packaging:

18 kg cardboard boxes / 40 cardboard boxes per euro pallet / 720 kg

Storage:

Upright in a cool and dry place protected against direct sunlight. Place pallets on a flat surface and do not stack them! Open pallets or pallets with a damaged shrink cover must be protected from moisture.

This technical leaflet is based on our previous application experiences. These are non-binding recommendations and information. All the values contained herein are average values. They are not legally guaranteed properties. If unspecified types of use or other conditions are to be considered, please request further advice.

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