

Transportation Safety Division

# Asphalt Plus Application Procedure

## 3M™ Stamark™ Pavement Marking Tapes

Information Folder Asphalt Plus System

November 2020



# 1 General Explanation

Generally it is not possible to apply the final road marking on new asphalt surfaces. A several weeks long waiting time is required, during which a so-called release marking is providing the delineation temporarily. 3M™ Stamark™ High Performance Pavement Marking Tapes allow the application directly on the fresh, still warm asphalt. Using this tape together with the Asphalt Plus application method yields in a very durable and well adhering road marking. As soon as the asphalt has cooled down, the road can be opened for traffic.



3M™ Stamark™ tape applied with the Asphalt Plus application method has several advantages compared to conventional pavement markings: the opening of the road without marking with a costly signposting drops out; the temporary markings as well. Same counts repeated traffic interference until the final marking is applied. In comparison to conventional road marking materials, 3M™ Stamark™ tape offers a very long service life with a high performance level, so that the repeated and necessary remarking drops out. This is especially advantageous for highways with high traffic load.

## Fundamentals of the Asphalt Plus Program:

- The Asphalt Plus System can be used for asphalt-concrete, grit-mastic-asphalt as well as drain- and open-pore-asphalt. Those asphalts should have max. 1kg/m<sup>2</sup> of crushed stones (gravel) on the surface. The concept is not to be used for melted asphalt.
- The application of 3M™ Stamark™ pavement marking tapes on the fresh asphalt is possible within a certain temperature window and is relatively independent from the weather conditions.
- The optimal temperature of the asphalt ranges between 30°C – 50°C for 3M™ Stamark™ A380 High Performance Pavement Marking.
- Especially for inner-city application where the marking is facing high shear forces the temperature recommendations have to be followed strictly, so that the best possible bond to the road surface is achieved. The thickness of the asphalt-layer should not fall below 2,5cm during final compaction.
- Longitudinal markings that are exposed to freely rolling traffic can be applied also at lower asphalt-temperatures and thus in a larger distance to the asphalt working convoy, as long as the asphalt has not cooled down completely.

Applications temperatures of over 50°C will negatively influence the performance of the pavement marking tape.

# 2 Preparation Meeting

A preparation meeting of the involved companies and authorities is essential for the success of the Asphalt Plus System. During that meeting, the marking company explains to the Asphalt construction company the Asphalt Plus applications procedure. Especially, clear instructions for the steamroller for

compacting and tamping the tape must be given. In that way a smooth application and tamping process is achieved, which is needed, due to the tape application temperature window.

If crushed stones are being used on the asphalt, the compaction step must take place prior to the tape application, so that the gritting material is properly embedded in the asphalt layer. The amount of crushed stones needs to be as low as possible. In practise it showed that about 1 kg/m<sup>2</sup> leads to a sufficient initial skid resistance of the road surface. Before applying the tape, residues and loose particles need to be removed, preferably with an air blowing system. Strewing and compaction of smaller sized particles (e.g. sand) must take place after positioning the tape. It has to be taken care that the sand is brushed off the tape prior to the final compaction step, otherwise the tape will be damaged severely. This would reduce its performance drastically.

The position of the marking needs to be checked thoroughly with the authority representative, in doubts, it needs to be clarified on the spot.

If the road width is too wide to be paved with one asphalt working pass, it must be avoided that the joint is positioned at the place where the marking is to be applied. Same counts for paving a new surface next to an old/cold one. Therefore a narrower width should be manufactured first, so that the seam will have a sufficient distance to the marking area. The second wider asphalt pass will provide sufficient space for the pavement marking tape. (See Figure 1)

Example:

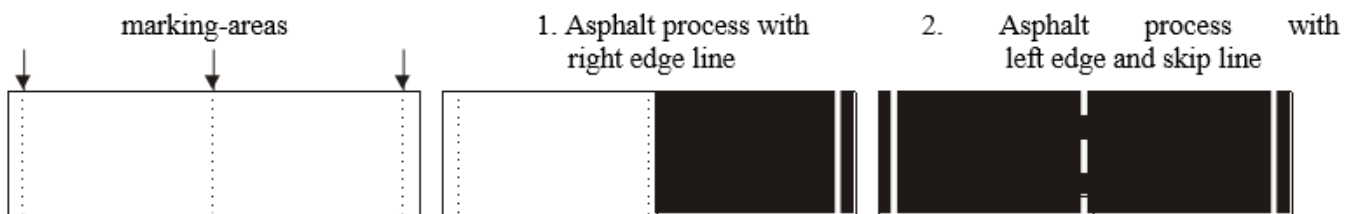
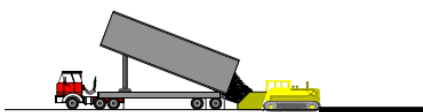


Figure 1: Asphaltting according Tape application needs

### 3 Series of operations

#### Asphaltting

After being applied by the asphalt maker, the asphalt surface typically has a temperature of 140°C-100°C.



#### Compacting

Type, weight and number of the steamrollers are related to the layer-thickness and asphalt mixture in order to reach the necessary compaction degree.



### Pre-marking

The pre-marking process is performed like for any other pavement markings. It is known that fresh asphalt discolours and absorbs the silver-bronze premarking paint easily. Therefore the pre-marking paint should not be applied too thin. In areas of high shear forces, the pre-marking paint should be applied directly after the first compaction, in order to be in the optimal temperature window for the tape. This is needed to ensure the optimal bond to the road surface.



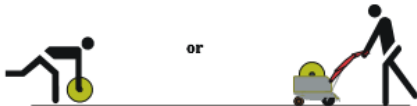
For longitudinal-markings, the distance to the asphalt maker and the road roller can be larger. Nevertheless, the temperature must not be lower than recommended.

### Tape application

For the Asphalt Plus application the use of Primer is not allowed. It can solve or even destroy fresh bituminous components of the asphalt surface:

Caution: Never use Primer !

Sweeping of the area of tape application is necessary before applying the tapes, in order to get rid of loose particles and grit.



For longline application the use of suitable application equipment is recommended. Do not overlap the tape, use Butt Splices.

Tip: Blocks and lines for pedestrian-crossings also should be pre-cut.

### Tamping the tape

#### *First tamping*

Before steamrolling the tape, it should be tamped slowly with the RTC 3 = 90kg or the RTC 300 in order to avoid wrinkles. Do not turn or twist the tamping device on the tape. Make sure all edges are firmly adhered



If applying block markings or pedestrian crossings, start in the center of the marking, then work towards the edges to remove trapped air.

### *Final Tamping*

The steamroller has to drive slowly (3-5km/h) over the tape with the vibrator switched off. Only a minimum amount of water to clean and lubricate the steel rollers should be used during inlay application. The tape should always be steamrolled in the same direction it has been applied. Ensure that gravel or sand is brushed off prior to final compaction, otherwise tape will be severely damaged

Caution! Steamrolling of A380 tape is only allowed below 40°C and only one pass, since the pattern is compressed otherwise. Ignoring this recommendation will result in tape damages and will drastically reduce its performance!



Note: If the tape wrinkles or distorts severely in front of the roller, the surface temperature may be too hot or the roller speed may be too fast. Do not remove the inlaid tape since removal of the tape will remove the asphalt.

Possible impurities of the white marking through bitumen will be worn off by the traffic after a short time. As soon as the asphalt has cooled down, the road can be opened for traffic. The new road is equipped with the complete and very durable high performance marking.

## **4 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.

Important for the Asphalt Plus Application is the measurement of the asphalt surface temperature. Infrared Thermometers are recommended for the usage, like the 3M™ infrared-thermometer IR 750 Non Contact or comparable equipment.

## 5 Summary

### 1 Asphaltting



### 2 Compaction / Sand strew Temp. window 120°- 80°C



### 3 Pre-marking Temp. window 80°- 70°C



### 4 tape application and First tamping Temp. window 50-30°C



### 5 Final tamping Temp. Window below 40°C A380 = only single pass The steamroller vibrator switched off



## 6.1 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.

## 6.2 Disclaimer

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## 8 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.

## 9 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 / RTC 300
PB A380	Product Bulletin 3M™ Stamark™ A380 High Performance Tape

### 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



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