CROWN USA INC

Tuff-Mark™ available with Tuff-Grip™

Application Procedures

Equipment:

- Powered Blower and/or Broom
- Utility Knife, Putty Knife
- Hammer and Mason Chisel
- Tape Measure
- Propane torch
- Crayon, Chalk Sticks, and Chalk Line
- Supply of Propane
- Water Sprayer (optional)

Additional Equipment for Applications that Require Sealer:

- Tuff-Max™ (Custom or multi-color applications requiring sealer)
- EKO-Seal™ (Aged asphalt or concrete standard applications that need sealer)
- Tuff-Max™ sealer dispenser gun (For Tuff-Max™ only)
- Sprayer (Optional for EKO-Seal™)
- Foam Paint Roller (Only for sealer)

Material:

Tuff-Mark™ can be used either as a no preheat material or a preheat material. Tuff-Mark™ must remain dry at all times. It should be stored indoors in an area that is 35°F – 90°F (2°C – 32°C). The boxes should be stacked flat and no more than 30 boxes high. Do not drop or throw Tuff-Mark™ in temperatures below 50°F (10°C), as Tuff-Mark™ will be less flexible in colder weather. Shelf life is one year. EKO-Seal™ sealer should be used for any standard aged asphalt applications and Tuff-Max™ sealer is required for any multi-color or specialty/custom marking. Tuff-Mark™ does not have any minimum temperature requirements for application. All Tuff-Mark™ lines are packaged as whole sheets of material. These sheets have evenly spaced factory-made score lines in them (exact spacing depends on the specific line width). Before application these sheets should be separated into the individual lines by pulling them apart along the score mark.

- **Surface Preparation:**

  Be sure that the application surface is thoroughly clean and moisture free. Do not apply on top of ANY existing markings other than thermoplastic. When applying on top of existing thermoplastic, remove any loose thermoplastic, then heat and scrape the top surface to reveal fresh material.

  New Asphalt: Tuff-Mark™ can be applied to new asphalt once the asphalt has cooled and the surface is "non-tracking" due to tack or oils.

  Aged Asphalt: Tuff-Mark™ standard applications can be done on aged asphalt using either EKO-seal™ or Tuff-Max™ sealer.

  Sealcoat/Chipseal: Tuff-Mark™ can be applied over completely cured and well bonded sealcoat and chipseal surfaces. It is recommended to apply a small piece on these treatments and perform a chisel test as described herein to assure proper bond is achieved. It is also recommended that Tuff-Max™ sealer be used for a better bond.

Concrete: Any Tuff-Mark™ concrete applications as well as other non-asphalt, color, or specialty/custom applications require using EKO-Seal™ orTuff-Max™ sealer. Tuff-Mark™ can be applied to new concrete once the surface has hardened for 30 days, curing compound has been removed, and the surface is free from any moisture. Concrete surfaces must be porous. Sprinkle some drops of water onto the surface. The concrete surface is not porous enough if the water drops are not promptly absorbed into the surface.

- **Safety Precautions:**

  Be sure to read the Tuff-Mark™ Safety Data Sheet (SDS) before starting application. During the application of Tuff-Mark™, protective clothing shall be worn. The clothing shall consist of work boots, long pants, heat-resistant gloves, a safety vest and safety goggles or a face shield. Be sure to read the Safety Data Sheet (SDS) for EKO-Seal™ or Tuff-Max™ sealer, prior to use.

New Asphalt Single Layer Applications

1. Thoroughly clean the application area of any loose particles and ensure that there is no moisture in the application area.

2. Position all pieces on the surface with the bead side up. Make sure all connecting pieces of the marking are properly aligned, with no gaps, before heating the material.

3. Heat the material by moving an approved heating device slowly and steadily over the material. The heating device should be moved in a sweeping motion over the material at a height of 6" to 10" for even heating of the material. Applying heat closer than heights of 6" and/or without using a sweeping motion (i.e. Direct Heat) may cause the material to scorch causing discoloration during and after application. Heat-Marks (notches) have been factory manufactured into the surface of the material at regularly spaced intervals. As the material is heated these notches will close providing a visual indication that the material has reached a state that may grant a proper bond and bead embedment. Application of heat is to continue, until the Heat-Marks close, the material seams flow together and, the material edges curl. **NOTE:** Overheating the material will cause the marking to be less retroreflective and/or skid-resistant in the beginning from over-embedment. Inadequate heat will cause the bond to fail. Non-surface treated markings do not have Heat-Marks. If any surface treatment is required for a non-surface treated marking, it should be applied to the material surface right after heating while the material is molten for proper embedment.

4. After the Tuff-Mark™ has cooled check the bond to the surface. Using a mason chisel and hammer, cut a small "V" shape into the material. Lift the point off of the pavement surface. Properly bonded Tuff-Mark™ will bring up some of the asphalt with it. If bonding is not adequate, continue heating until the material is properly bonded. Do not leave until proper bonding has been achieved. Reheating at a later date will not work due to moisture trapped beneath the Tuff-Mark™ material.

5. Tuff-Mark™ will cool within a few minutes of application. A spray of cool water may be used to accelerate cooling time. Do not allow foot or vehicle traffic until material has cooled and hardened.

Aged Asphalt Standard Non-colored Single Layer Applications

1. Follow step 1 of the new asphalt single layer applications.

2. Create outline of marking pattern on surface with chalk or crayon for guidance to aid with sealer application.

3. Apply EKO-Seal™ sealer within the marking outline with a sprayer or a foam roller. If a sprayer is used, even out the coverage with a foam roller. Dry time at 77°F (25°C) is 5 – 7 minutes. Once the EKO-Seal™ sealer is completely dry, positioning of the Tuff-Mark™ pieces can begin.

4. Continue with steps 2 through 5 of the new asphalt single layer applications.

Applications Requiring Tuff-Max™ Sealer

Notes before starting application: Any multicolor or specialty/custom applications require using Tuff-Max™ sealer. Surface and air temperatures must be 45°F (7°C) and rising to use Tuff-Max™ sealer. Working times are approximate, may be linearly interpolated between listed temperatures and are based on cartridge/nozzle performance. At temperatures around 45°F (7°C) Tuff-Max™ may dispense at a slower rate. Keep unopened Tuff-Max™ cartridges inside the work vehicle or insulated in a material heater blanket so the sealer stays closer to room temperature until it is needed. Until Tuff-Max™ cures, Tuff-Mark™ will not completely bond with the surface.

Base Material Temperature °F (°C)	Working Time
50 (10)	45 min
75 (24)	30 min
100 (38)	22 min

Wait longer to check the bond in the cooler temperature ranges since Tuff-Max™ will take longer to cure at those temperatures. At the lowest allowable temperature Tuff-Max™ should cure within one hour. At temperatures above 100°F (38°C) Tuff-Max™ will cure even faster. When applying markings that cover a large area (Interstate Shields, Route Shields, Colored Bike Lanes, etc.), do not apply Tuff-Max™ sealer to an area bigger than can be heated in the appropriate curing time.

1. Thoroughly clean the application area of any loose particles and ensure that there is no moisture in the application area. The surface of worn polished concrete should be roughed up.

2. When applying on new concrete, all curing compounds should be removed before sealer application.

3. Tuff-Mark™ multicolor applications are sections of linked individual pieces. DO NOT move or lift a whole section by holding onto a single piece, as it may come apart. The sections should be moved on the plastic sheets they are packed with until placed in their final positions.

4. Create outline of marking pattern on surface with chalk or crayon for guidance to aid with sealer application. Carefully move the symbol from the outline and set to the side for application of Tuff-Max™ sealer.

5. **Shake the Tuff-Max™ cartridge vigorously for 60 seconds,** then stand cartridge upright for at least 1 minute allowing any bubbles to rise to the top. Fit the Tuff-Max™ cartridge into the sealer dispenser gun. Point upwards at about a 45° angle. Remove the plastic cap and plugs from the top of the cartridge. (Optional: Find the flow control inside the threaded end of the mixing nozzle. While still holding the dispensing gun upwards, insert the flow control into the two holes at the top of the

cartridge.) Install the mixing nozzle onto the cartridge and make sure it is properly secured. Hold the dispensing gun straight up and slowly squeeze the handle until the sealer is about 2 inches from the end of the mixing nozzle. If the mixed sealer is not used within 10 minutes, remove the mixing nozzle, reseal with the plugs and cap the cartridge. Try to dispense an entire cartridge at one time with no interruption of flow to prevent the sealer from hardening in the mixing nozzle. If you have any problems dispensing sealer, replace the nozzle. The sealer may have begun to cure in the nozzle which will affect the mix ratio. Never transfer a used nozzle to a new cartridge. Repeat the cartridge balancing steps listed above after replacing the nozzle.

6. One cartridge of Tuff-Max™ sealer should cover 50ft^2. The sealer must not cure before Tuff-Mark™ can be heated down so do not apply the sealer to an area bigger than can be heated in the appropriate curing time. Holding the dispensing gun over the application area, squeeze out the right amount of sealer for the application. Spread the sealer within the outlined area with a foam roller.

7. Immediately position all pieces of the Tuff-Mark™ on the surface with the bead side up. Make sure all sections of the marking are properly aligned, with no gaps, using the diagram in the package. Begin heating immediately.

8. Heat the material by moving an approved heating device slowly and steadily over the material. The heating device should be moved in a sweeping motion over the material at a height of 6" to 10" for even heating of the material. Applying heat closer than heights of 6" and/or without using a sweeping motion (i.e. Direct Heat) may cause the material to scorch causing discoloration during and after application. Heat-Marks (notches) have been factory manufactured into the surface of the material at regularly spaced intervals. As the material is heated these notches will close providing a visual indication that the material has reached a state that will grant a proper bond and bead embedment. Application of heat is to continue, until the Heat-Marks close, the material seams flow together and, the material edges curl. **NOTE:** Overheating the material will cause the marking to be less retroreflective and/or skid-resistant in the beginning from over-embedment. Inadequate heat will cause the bond to fail. Non-surface treated markings do not have Heat-Marks. If any surface treatment is required for a non-surface treated marking, it should be applied to the material surface right after heating while the material is molten for proper embedment.

9. After the Tuff-Mark™ has cooled check the bond to the surface. Using a mason chisel and hammer, cut a small "V" shape into the material. Lift the point off of the pavement surface. Properly bonded Tuff-Mark™ will leave some residue on concrete. If bonding is not adequate, continue heating until the material is properly bonded. Do not leave or start applying adjoining rows until proper bonding has been achieved. Reheating at a later date will not work due to moisture trapped beneath the Tuff-Mark™ material.

10. When applying a large marking with many sections (Interstate Shields, etc.) **DO NOT** heat uncovered areas of Tuff-Max™ sealer, as this will cause it to cure too soon. Leave several inches closest to the continuing edge unheated. Repeat steps 1 – 10 until whole application is complete.

11. Tuff-Mark™ will cool within a few minutes of application. A spray of cool water may be used to accelerate cooling time. Do not allow foot or vehicle traffic until material has cooled and hardened.

Multi-Layer Applications

1. Follow notes and steps 1 – 6 of the applications requiring Tuff-Max™ sealer.

2. Immediately position all Tuff-Mark™ base pieces (no design cut outs) on the surface. Make sure all connecting pieces of the Tuff-Mark™ base material are properly aligned, with no gaps, using the diagram in the package before heating the material.

3. After pieces are aligned, heat the material by moving an approved heating device slowly and steadily over the material. The heating device should be moved in a sweeping motion over the material at a height of 6" to 10" for even heating of the material. Applying heat closer than heights of 6" and/or without using a sweeping motion (i.e. Direct Heat) may cause the material to scorch causing discoloration during and after application. Heat-Marks (notches) have been factory manufactured into the surface of the material at regularly spaced intervals. As the material is heated these notches will close providing a visual indication that the material has reached a state that will grant a proper bond and bead embedment. Application of heat is to continue, until the Heat-Marks close, the material seams flow together and, the material edges curl. **NOTE:** Overheating the material will cause the marking to be less retroreflective and/or skid-resistant in the beginning from over-embedment. Inadequate heat will cause the bond to fail. Non-surface treated markings do not have Heat-Marks. If any surface treatment is required for a non-surface treated marking, it should be applied to the material surface right after heating while the material is molten for proper embedment.

4. After the Tuff-Mark™ base has cooled but is still soft, position the Tuff-Mark™ top (with design cut outs) over the Tuff-Mark™ base. Make sure all connecting pieces of the Tuff-Mark™ top material are properly aligned, with no gaps, using the diagram in the package and apply slight pressure to them before heating the material.

5. Heat the Tuff-Mark™ top at a slower rate (hold the heating device a few inches further away) than the Tuff-Mark™ base to avoid smearing the design. Heat-Marks (notches) have been factory manufactured into the surface of the material at regularly spaced intervals. As the material is heated these notches will close providing a visual indication that the material has reached a state that will grant a proper bond and bead embedment. Continue applying heat until the Heat-Marks close, the material seams flow together and, the material edges curl. **NOTE:** Overheating the material will cause the marking to be less retroreflective and/or skid-resistant in the beginning from over-embedment. Inadequate heat will cause the bond to fail. Non-surface treated markings do not have Heat-Marks. If any surface treatment is required for a non-surface treated marking, it should be applied to the material surface right after heating while the material is molten for proper embedment.

6. After Tuff-Mark™ has cooled check the bond to the surface. Using a mason chisel and hammer, cut a small "V" shape into the material. Lift the point off of the pavement surface. Properly bonded Tuff-Mark™ will bring up some of the asphalt with it, or it will leave some residue on concrete. If bonding is not adequate, continue heating until the material is properly bonded. Do not leave until proper bonding has been achieved. Reheating at a later date will not work due to moisture trapped beneath the Tuff-Mark™ material.

7. Tuff-Mark™ will cool within a few minutes of application. A spray of cool water may be used to accelerate cooling time. Do not allow foot or vehicle traffic until material has cooled and hardened.