
Billian
UK
Mastic Training
MADE WITH RECYCLED TYRES
RoadMender
We Recycle Roads
RoadMender
ElastoMac



Aims of training

- PPE required.
- Safety Awareness.
- Daily checks required.
- The use of required tools and equipment.
- Material Temperature control & monitoring
- Correct method of checking the material temperature.
- To understand and implement safety measures while working around the boiler, tool heater and whilst laying Elastomac mastic.
- Procedures of preparing the mastic and correct temperatures for operation.
- Preparation needed before laying mastic.
- To understand the different laying techniques.
- Chipping and cleaning of the patch.
- Cleaning of tools, equipment and machine.
- **Problem-solving**, including identifying issues and taking appropriate corrective action on site

This Mastic Training document should be read in conjunction with:

PR-B05-098 RAMS SSOW Roadmender Mastic Asphalt

PR-B05-088 Roadmender Elastomac Installation Method Statement Code of Practice

COSHH 030 – Roadmender Mastic Asphalt

PPE & Safety

- Safety glasses and gloves are to be worn at all times.
- Gauntlets are to be worn when handling buckets and also when getting mastic out of the machine.
- ALWAYS wear a hard hat, face visor and gauntlets when working around the tool heater & boiler.
- Flame retardant Hi-visibility long sleeve and Hi-visibility trousers suitable for laying hot mastic.
- Safety boots.
- Hard hat.
- Always have a Burns kit, First aid kit, and eye wash kit to hand.
- Always carry two powder fire extinguishers and an oil spill kit.



VIDEO LINK: TRAINING 3: Roadmender Elastomac 'Safety'

Safety measures

- Mastic is very hot! Around 200℃.
- NOTE the thermostat reads the temperature of the material NOT the temperature of the boiler – make sure you NEVER overheat the boiler when preparing material, as this may cause the boiler to flash when you open the lid. When opening the boiler - always be wary of this fact.
- Always open the lid first before attempting to look inside.
- NEVER place your face directly over the boiler when opening it.
- NEVER leave the boiler unattended whilst in operation.
- Always wear the correct PPE around the machine regardless of what your role is.
- NEVER stand directly in front of the discharge outlet or chute. ALWAYS stand to the side.
- NEVER fully open the discharge outlet especially when the boiler is full and the material is hot.
- Always keep fuels and flammable liquids/objects away from the mixer and tool heater.
- Always keep unauthorised personnel away from the machine with barriers.
- ***Hot Works*** signs should be placed around the vehicle and immediate work zone.
- When loading the machine with hot material already inside, open the doors for 10 seconds without looking in, this allows for any steam to escape and lowers the risk of burns.
- When putting the plugs from the discharge chute back into the mixer, be wary as the material will still be hot even when it has a skin on it.

Material Temperature

Target temperature = 195°C to 200°C

Always use a handheld (non-contact) infrared thermometer to check the temperature of the material

To check the temperature, point the laser thermometer at the discharged material in the bucket

Keep a spare infrared thermometer on site at all times (Temperature gauges are only to be used as a guide)



Do not heat the material above 200°C
Product not to be heated past 200°C as this will burn the material,
cause degradation of the product and emit irritant vapours and fumes

If you can smell bitumen, the material is too hot

Installation shall only be carried out in dry conditions when the road surface temperature is between -5°C and 45 °C.
For concrete roads – do not lay when the road surface temperature below 6 °C



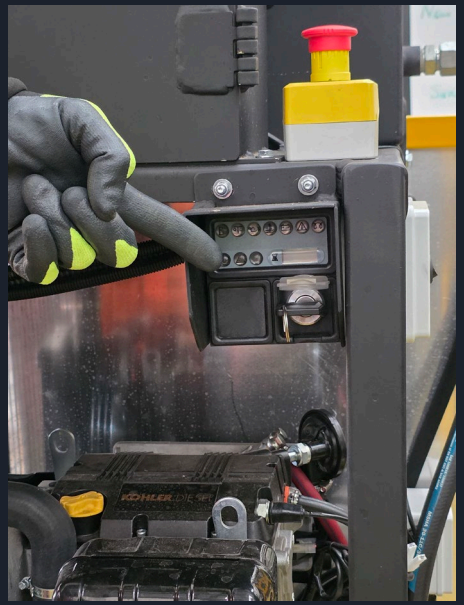
Note: When the road surface temperature is above 45°C we suggest the team should go out at night or very early morning to avoid laying mastic in the midday sun

Health and safety



- If you get hot mastic on any part of your body do not remove it, instead douse with cold water until fully cooled and if safe to do so remove then apply burns kit; for anything more serious seak medical assistance immediately.
- Fire extinguishers are to be present at all times.
- Never bring the material above 200°C - not only can this damage the material but it significantly increases the risk of the material inside the boiler catching fire, the mastic flashpoint is around 240℃ - 260℃.
- Never leave the mixer unattended at any time.

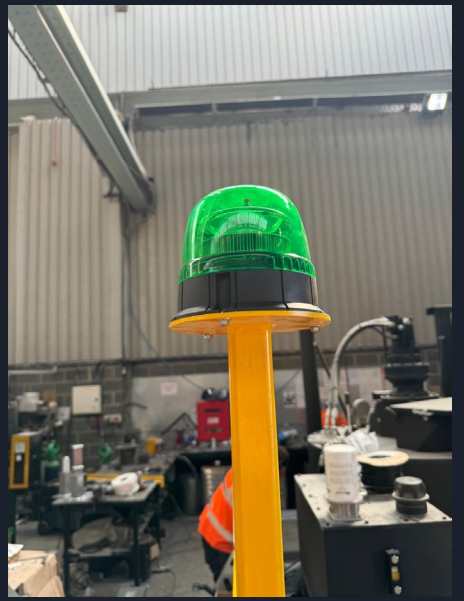
Boiler Operation – Engine & Burner



Turn on engine at keyswitch panel



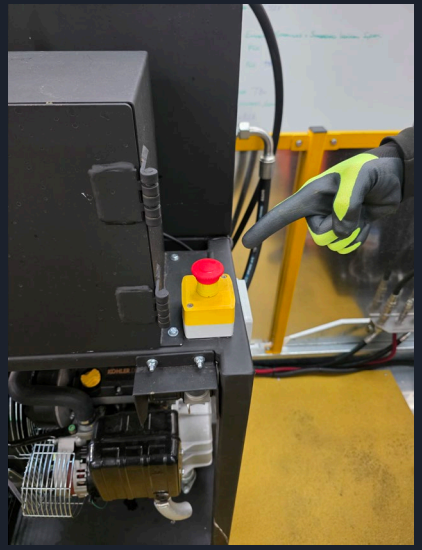
Burner ON switch



Green safety beacon lights when burner is ON

VIDEO LINK: TRAINING 2: Roadmender Elastomac 'Operations'

Boiler Operation – Emergency Cut offs





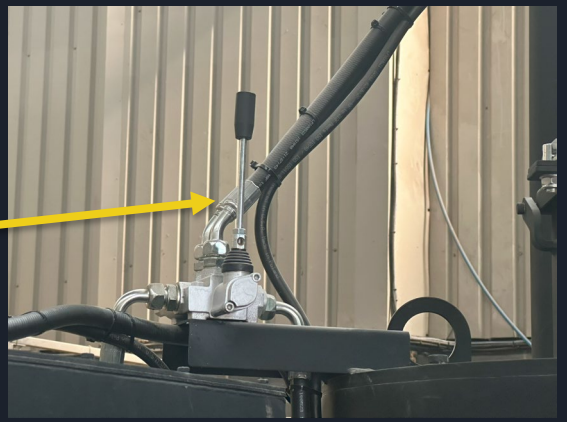
There are 2 emergency cut off switches: 1 located on top of the engine & One on the side of the trailer. This cuts the engine and hydraulics off in case of emergency.

Please Note-
If the engine fires up and cuts off after 10 seconds check the switches haven't been knocked. As this will cause the engine not to start.

Boiler Operation – Mixer



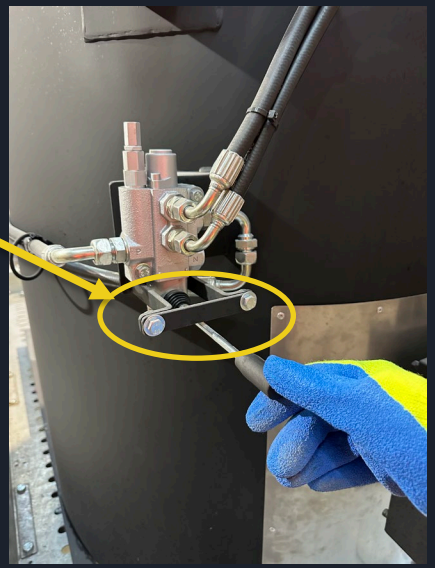
To turn on the Mixer (paddle rotation)



PULL lever towards you for normal operation of the paddles (paddles rotate Counterclockwise)

Boiler Operation – Discharge Door

Remove safety guard to operate (remove left hand locking bolt)



Lever UP to raise door (discharge material)

Lever DOWN to lower door

Boiler Operation –Discharge Door method

Place bucket below the discharge door, then release material into the bucket using the lever

Lever UP to raise door and discharge material

Lever DOWN to lower door



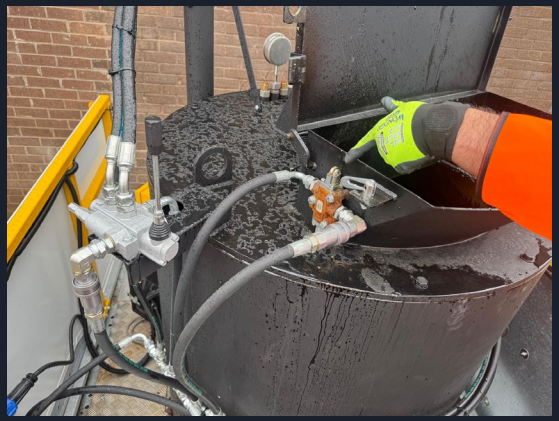
Boiler Operation – Cleaning Buckets out



Release toggle to open lid

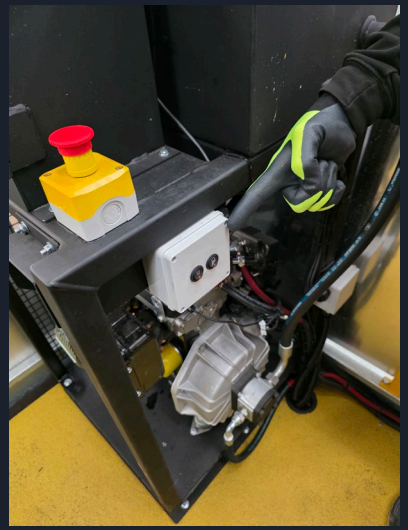


Lift the loading lid to empty any excess material from the buckets back into the mixer



When opening the loading hopper, the paddles will stop spinning. When closing the loading hopper the paddles will re-engage

Boiler Operation – Working Lights & Beacons

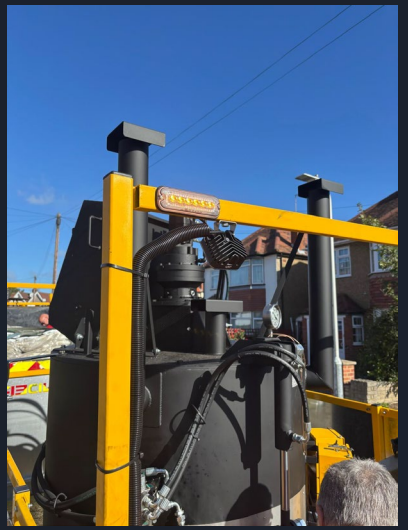


Left switch is Beacons

Right Switch is working lights



Working Lights



Beacons

Boiler Operation – Optional Discharge Chute

Attach the chute securely onto both Antiluce drop catches (x2) and lock in place

Then operate the discharge door as normal





Daily Check Sheet PPE

PPE	√	X
Hard helmet		
Safety boots		
Eye protection		
Gloves		
Flame-retardant hi-visibility trousers		
Flame-retardant hi-visbility long sleeve top		
Face visor		
Gauntlets		

Operatives shall wear flame-retardant hi-visibility long-sleeve garments and trousers manufactured from inherently flame-retardant, non-melting, heat-resistant fabrics

- PPE must be suitable for use during hot mastic asphalt works, including the risk of incidental splashes

Garments should:

- Provide full coverage of arms, legs and torso
- Minimise openings where hot material could enter (e.g. secured cuffs, waist interfaces, fastenings, braces)

Daily Check Sheet STARTER KIT

STARTER KIT (TOOLS & Ancillary Equipment)			
Quantity	Description	√	X
3	Gas Bottles (19kg)		
3	Double headed flazers (gas lance)		
	- Visual check for damage or leaks		
	- CONFIRM Gas Bottles & gas lances are working		
2	Laser Thermometers (tested and working)		
2	500mm Mastic Shoes (no grind)		
1	250mm Mastic Shoe (6mm grind)		
1	250mm Mastic Shoe (no grind)		
2	Mastic Irons		
2	Mastic Scrapers		
2	Chipping rollers		
2	Sieves (includes both 8mm and 10mm mesh)		
2	Gorilla Tubs		
5	Steel Mastic buckets (clean)		
2	Scoops		
4	Trowels		
2	Bituslip bottles filled with cleaner		
6	Water containers		
2	Sparkers		
2	Tape (boxes - adequate amount to complete works)		
1	Battery powered mechanical sweeper		
2	charged batteries for mechanical sweeper		
2	Caution Hot Works sign - Large		
2	Caution Hot Works sign - Small		



Sieve(s)
a combination of an **8mm** mesh on top of a **10mm** mesh works best. This keeps the 6mm chippings in the sieve without any loss until shaken over the repaired area.



A water container (tray) to wet the roller (a 50-litre polythene container works well).
An extra water supply for cooling patches in hot weather using watering cans



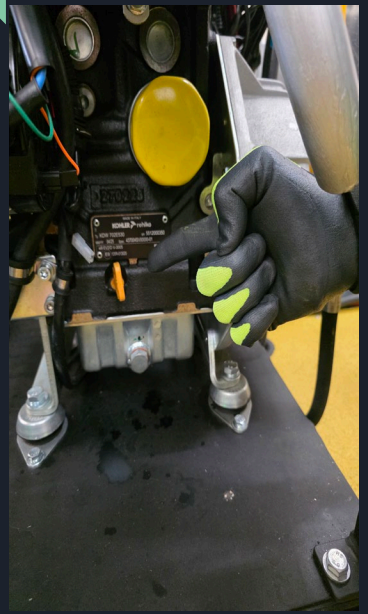
A plastic scoop to fill the **sieve with 6mm chippings**



Daily Check Sheet Trailer & Mastic Mixer

TRAILER	√	X
Visual check for any damage		
Check wheel nut indicators are alligned		
Check condition of wheels and tyres		
Check towing lights are working		
Check Trailer is hitched correctly and all safety pins are in place		
Check breakaway cable is attached correctly		
Check number plate on the trailer is the same as the vehicle towing it		
Check spare wheel is attached correctly		
MASTIC MIXER (pre-start check)	√	X
Check diesel level		
Visual check fuel filters		
Check engine oil level		
Check coolant level		
Check hydraulic oil level		
Visual inspection of hydraulic pipe & wiring looms for damage (non-intrusive)		
Check cleanliness of radiator		
Check burner green light works		
Visual check for damage or leaks		
Remove key from ignition WHEN NOT IN USE & ASSIGN TO KEY HOLDER		
Check the thermostat setting on the machine does not exceed 195°C		
Check there is no more than a 1/3 of a boiler full of cold material		
Check the code on the burner is correct before starting		
Check Propane levels if its a propane boiler		
TOWING VEHICLE (in additional to required daily checks)	√	X
Check is suitable and adequate for purpose		
Check towing hitch and electrics are in good working order		

Daily Checks – To Be Carried out before Starting the Engine



Oil Dipstick



Coolant Level



Hydraulic Oil



Diesel Level & Fuel Filters

Heating mastic and preparations involved



- Max load in the mixing drum: 700kg
- STEP 1: Turn on the engine and let it run for 5 minutes
- STEP 2: Turn on the burner and allow the machine to heat for 5 - 10 minutes.
- STEP 3: pull the hydraulic lever towards you to engage the paddles.
  (NOTE: if the paddles do not turn, wait until the machine is warm enough)
  The minute the paddles are able to turn - start loading material.

  LOADING MATERIAL:
- Load an initial 5 Elastomac bags (100kg) into the mixer one at a time (Open the loading lid and add ONE 20kg bag of Elastomac then close the lid. Wait a few seconds to allow the paddles to break up the bag. Repeat process with the other 4 bags).
- Allow the material to reach at least 170°C before adding any more, this helps the bagged material to melt quicker.
- Load additional material in 3 x bag (60kg) batches ONE bag at a time and allow material to melt before adding more.
- Do not leave heated material inside the boiler for more than 8 hours.

NOTE: The thermostat reads the temperature of the material not the boiler. Be very careful not to burn the material when there is only a small amount in the boiler as it could overheat and carbonize the material which will then have to be dug out.
This is an expensive mistake you want to avoid.



Heating mastic continued

Once the machine is full allow it to heat up and mix thoroughly while taking temperature readings with a laser thermometer from the discharging material (into bucket or chute).

Spray your buckets and the machine's chute with a good coating of bituslip, this allows for a lot easier cleaning and removal of the mastic.

Once the target temperature (195℃ to 200℃) is reached the built-in preset thermostat will shut the burner down. It is important to keep checking the temperature with the supplied infrared thermometer to ensure the material does not go below the desired temperature or in the case of a malfunction, above.

If you have multiple loads to put into the mixer we would recommend that you bring the boiler down to half way and retop the machine up with mastic. That way it speeds up the heating time.

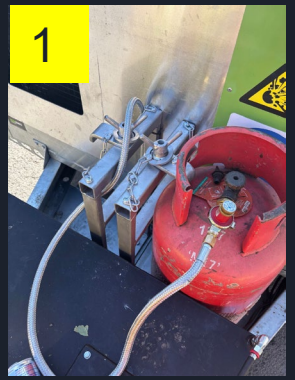
EVEN WITH THE MASTIC BURNER TURNED OFF THE MATERIAL WILL STILL INCREASE IN TEMPERATURE. This is something to be wary of.

Tool Heater Instructions

Once the material is up to temperature, complete the following steps:

1. Slowly turn on the gas bottle.
2. Turn the switch on, this will ignite the shoe heater.

If for any reason it doesn't ignite after 3 attempts, let it rest for 2 minutes and try again.







Tool Heater safety measures

- ALWAYS wear a hard hat, face protection and gauntlets when working around the tool heater.
- Always keep a safe distance and never stand directly in front of the tool heater when lighting it.
- If there is any sign of damage or the gas hose is beginning to perish, replace immediately.
- Take care when removing tools from the tool heater as they will be HOT.

Tools









- Mastic shoes are to be heated in a tool heater before use. Always have 2 shoes - one in the process of laying and one in the tool heater keeping hot. Rotate as the repairs go on. The mastic will start to stick to the shoe once it cools and will make the repair look untidy. Approx every 10 buckets change over to a hot shoe.

- We recommend you heat mastic shoes for up to 5 minutes.
  DO NOT OVERHEAT the shoes as this will cause smoke and break the weld on the shoe

- Floor scraper to clean up any excess Elastomac.

VIDEO LINK: TRAINING 1: Roadmender Elastomac 'Toolkit'



Step by step patch laying

- When inspecting a defect, check to see if any residual water or moisture is present in or around the defect. If there is, use the propane torch to dry in and around the patch. (*Any moisture trapped underneath the Elastomac will stop the Elastomac from adhering properly to the defect and may cause it to fail prematurely as the moisture expands and contracts underneath the repair*).
- Clear any debris from the defect with at least a brush but we would highly recommend using a leaf blower or battery powered sweeper *(any mud or dirt could leave air pockets underneath the mastic causing it to fail prematurely).*
- Make sure that the tool heater is turned on with the desired shoe
- Use tape around the defect to create a outer edge of the patch you are going to be laying.
- Base out any deep parts of the defect with EITHER paving grade asphalt with a 50-pen binder OR using Elastomac with 20mm or 10mm precoated chippings. Unlike basing with paving grade asphalt or 6mm mastic, basing with Elastomac does not require a bond coat or a tack coat.



Pre-filling the defect with either paving grade asphalt or Elastomac and 20mm/10mm precoated chippings

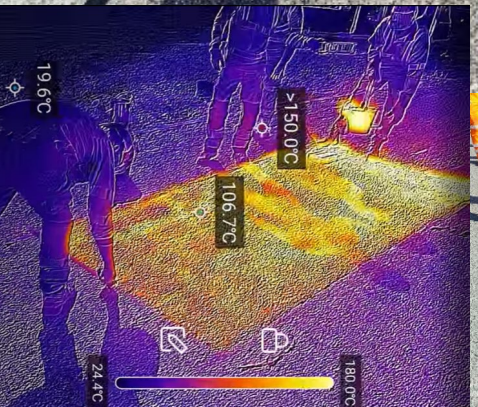
- First clean out any lose stone and debris.
- Clean out any water and dry with a gas lance.
- If basing with paving grade asphalt – give the patch a good coating with tack coat.
- ALWAYS use paving grade Asphalt (with a 50-pen binder). Never base patches with cold lay asphalt or soft 125 pen hand lay 6mm asphalt as they will go soft when sealed under the Elastomac. This will stop the patch from going off, cause the chippings to sink into the patch and ultimately the patch will rut when opened to traffic
- Add the asphalt, level and compact with a whacker plate.
- Dry off any excess water used when compacting.
- Lastly give the area a good sweep off.

- If basing with Elastomac and 20mm or 10mm precoated chippings, tack coat is not required.
- Simply fill the defect with Elastomac and 20mm or 10mm precoated chippings. Tap down to level with a hot iron and allow to harden prior to adding the surface layer of Elastomac.

- You have now pre-filled the defect with either paving grade asphalt or Elastomac and precoated chippings and are ready to complete the surface layer of the repair using Elastomac and 6mm chippings with a chipping roller.

Chipping method







- Fill the sieve(s) with the 6mm precoated chippings from the plastic tub(s).
- Have a water tray ready to wet the roller(s) to prevent sticking Wet the roller(s) ready.
- Sweep the site
- Tape around the patch to produce a good edge to the patch.
- Begin to lay the material
- Once the first material is out of the screed shake the sieve over the hot material patch covering it with a uniform layer of chippings.
- Aim to apply at least 4kg of pre-coated chippings per square metre of surface
- The finished layer of chippings should cover the patch, you can add more whilst rolling is taking place if any areas not covered initially are identified.
- The chips should cover the entire patch shoulder to shoulder without any significant gaps.
- Remember to Peel up the tape while the mastic is still hot, pulling the tape away from the patch.
- Once the first few drags of the screed have started to cool you can then start rolling the chips into the mastic.
- You will soon get a feel for exactly when to start rolling in the chips based on the look and feel of the material rather than temperature
- Roll the 6 mm pre-coated chippings while the material remains elastic/ soft,
- However, if you are using a Laser thermometer or IR imaging camera the chipping and rolling process should commence at approximately 110–130°C and be completed while the layer is at 90°c or above.
- Once the process is established during the first patch of the day this should become second nature to your team.



Chipping method – larger patches

- Refer to the general guidance provided above
- On larger patches (more than 10 m2), start with 2 operatives on the buckets, one operative on the shoe and one operative on the pre-coated 6mm chippings.
- Once approx. 5 m2 have been covered, take one operative off the buckets and have them start rolling in the 6mm chippings.
- Make sure the mastic is cool enough that it does not fat up when rolling in the 6mm chippings. If it does, the mastic is still too hot to roll.
- Once the patch is covered, the operative on the shoe can move over to rolling in the chippings.
- You can now start sieving additional chips on any areas that are not fully covered with chips and may look unchipped.
- If you have left behind any loose chippings that have not been rolled in, sweep them up to leave a tidy patch.

WINTER/COLD WEATHER WORKING: In winter when the weather is cooler you must commence rolling far sooner as the material will cool significantly faster and the chips will not embed correctly.

AFTERCARE: Once the patch is fully chipped and rolled, wait for it to fall below 70°C before finally spraying it with cold water using a watering can, do this too soon and you will flash cool the material potentially compromising its performance.

Make sure to sweep and shovel up any lose aggregate that has been swept out of the defect that you are repairing. It is also essential to make sure there are no chipping materials left on the road around the patch as this could cause a slip or skid hazard.

Make sure the surrounds to every patch are thoroughly swept post completion before the traffic management is removed and the site is reopened to traffic.

VIDEO LINK: TRAINING: Elastomac 4.0

Curing times

When outdoor temperatures are below 20°C, the Elastomac should cure at roughly 1mm per minute before you can open a patch to traffic. In hot weather we would suggest you take 4 x 25L bowsers full of cold water to help cool down the patches. Once a patch is below 70°C you can cover it with water (don't add water to patches while over 70°C as this could flash cool or strip the material.)
This should then be swept off and repeated till the patch is cold enough to open to traffic. Note- you can drive over patches sooner than you can park on them. If you know a fresh laid patch is going to be parked on soon after it is completed, please leave it a little longer before opening to traffic.

Ensure the TM operatives are made aware of and understand this.



Joint repairs

- We complete joint repairs with different size shoes depending on how wide or deep the defect may be.
- We have a grind on the back of the shoe to allow the material to pass out at a consistent depth when laying in a single continuous direction.
- If the joint is deep, then mastic or paving grade asphalt can be added to pre-fill to add speed when laying.
- White and yellow thermoplastic lines can be added once the Elastomac has cooled.

Problem solving

- On occasion, small amounts of previously overcooked, carbonised material can remain in the boiler and fall into the product. This is very rare and because the material is only a 5mm down product and it's very easy to spot. If there are a small number of lumps, the operatives should literally scrape away any oversize and discard the lumps.

- Before leaving our yard, the burner was tested and run for 40 minutes without issue. In field conditions, occasional over-fuelling can happen if the towing vehicle encounters uneven roads or potholes, which may knock the burner slightly out of sync. This may then cause the magic eye to over fuel the burner and cause smoking. In this case, please contact us at Roadmender and we will arrange an engineer to repair the machine.

End of the shift

Cleaning of tools

All metal tools i.e. shoes, scrapers and irons should be placed into the tool heater to burn off any residue from the mastic. Do not overheat the tools as this will cause smoke and break the weld on the tools

Cleaning of Machine & Equipment

If the mastic level is 25% (1 quarter) or less, it may be left overnight and reheated the next day.

If any material is left in the machine, the cooldown procedure must be followed as described below:

Turn off the burner but keep the paddles rotating for at least an hour. This will keep the aggregate suspended in the bitumen and prevent segregation, allowing the material to be reheated the following day.

Never leave the machine unattended

The use of diesel as a cleaning or release agent is strictly prohibited

NOTE: NEVER LEAVE THE BOILER MORE THAN 25% FULL AT THE END OF A SHIFT AS THE MASTIC WILL SOLIDIFY IN THE BOILER AND HAVE TO BE DUG OUT. THIS NEEDS TO BE AVOIDED AT ALL COSTS AS IT IS A TIME CONSUMING AND EXPENSIVE PROCESS.

EVEN IF THE MACHINE BREAKS DOWN, TRY TO ENSURE IT IS NEVER LEFT MORE THAN 25% FULL EVEN IF THE MATERIAL HAS TO BE REMOVED, COOLED DOWN AND REHEATED AT A LATER DATE

Servicing

Manufacturer’s recommended service intervals for both the Mixer and Trailer are:

6 monthly
(minor service including filter changes)

12 monthly
(full service including gas system overhaul)


Questions?
MADE WITH RECYCLED TYRES
RoadMender
ElastoMac

Have you been paying attention?

- Q. What temperature do we want the material to be at?
- Q. Why don't you want to go hotter than 200°C?
- Q. Do you rely on the boiler thermostat?
- Q. What is a good tell tale sign you might have burned the material?
- Q. What PPE must be worn when getting material out of the mixer?
- Q. What do we need to put around the machine to stop unauthorised personnel from entering?
- Q. Why must you leave the machine paddles turning if you have material in your boiler left over at the end of the day
- Q. What is the maximum amount of material you can leave in the mixer overnight?
- Q. Where should you never stand when close to a mastic mixer?
- Q. How much should you open the discharge outlet when the boiler is full and the material is hot?
- Q. How long should you wait before looking inside the mixer?
- Q. What should you ALWAYS do before opening the mixer?
- Q. When should you use tack coat?
- Q. When should you NOT use tack coat?
- Q. If roads are wet or dirty, why is it important to dry and clean them prior to installing the Elastomac repairs?
- Q. Why must you roll in 6mm precoated chippings into the patches with a chipping roller?
- Q.What should you check before Traffic Management is removed and the site is re-opened to traffic?
- Q. What is the maximum load in the mixing drum?
- Q. If the road surface is anticipated to be above 45°C, how should you change your work plan?

RoadMender
We Recycle Roads

Have you been paying attention?

Q. What temperature do we want the material to be at?
A. Target temperature = 195°C to 200°C
Q. Why don't you want to go hotter than 200°C?
A. Because you will damage the material
Q. Do you rely on the boiler thermostat?
A. No – always make sure you have a working laser thermometer to check the material as it comes out of the discharge outlet.
Q. What is a good tell tale sign you might have burned the material?
A. If the material seems too liquid, or you can smell bitumen.
Q. What PPE must be worn when getting material out of the mixer?
A. Gauntlets & face visor
Q. What do we need to put around the machine to stop unauthorised personnel from entering?
A. Barriers and hot work signs
Q. Why must you leave the machine paddles turning if you have material in your boiler left over at the end of the day
A. it stops the stone sinking to the bottom allowing it to be heated the next day
Q. What is the maximum amount of material you can leave in the mixer overnight?
A. less than 25% (1 quarter) full (i.e. below the A frame)
Q. Where should you never stand when close to a mastic mixer?
A. Directly in front of the discharge outlet.
Q. How much should you open the discharge outlet when the boiler is full and the material is hot?
A. No more than halfway.
Q. How long should you wait before looking inside the mixer?
A. At least 10 seconds
Q. What should you ALWAYS do before opening the mixer?
A. Stop the paddles turning
Q. When should you use tack coat?
A. When basing defects with paving grade asphalt.
Q. When should you NOT use tack coat?
A. When basing defects with Elastomac and 20mm chips.
Q. If roads are wet or dirty, why is it important to dry and clean them prior to installing the Elastomac repairs?
A. Any mud, dirt or water trapped under the material will impede the mastic's ability to adhere properly to the surface and may cause the repairs to fail prematurely.
Q. Why must you roll in 6mm precoated chippings into the patches with a chipping roller?
A. To ensure surface texture, skid resistance and make them safe.
Q.What should you check before Traffic Management is removed and the site is re-opened to traffic?
A. Make sure any loose aggregate or chipping materials have been swept up and removed from the repair area, and the patch is at a cool enough temperature to be trafficked.
Q. What is the maximum load in the mixing drum?
A. 700kg
Q. If the road surface is anticipated to be above 45°C, how should you change your work plan?
A. Go out at night or very early morning to avoid laying mastic in the midday sun

RoadMender
We Recycle Roads

Training Completion

Once you have completed Roadmender Mastic Training, sign and date the **Roadmender Mastic Training Completion Confirmation document and hand it to your trainer.**

This will be used to issue a Training Certificate