

Appendix 1 – QLDC Guidance for sealing in cold temperatures

Revision 1 – 11/05/2020

CHIPSEAL

The objective of first coat sealing is to waterproof the surface to mitigate ongoing potholing and shoving. When sealing is undertaken outside of acceptable conditions then the consequences could result in:

- The residual binder providing the waterproofing need but at the expense of a significantly reduced expected life of the seal following repairs, and an ongoing risk of subsequent flushing
- A hazardous surface remaining over winter because of the loss of chip.

The key requirements that QLDC need to be assure they will have are highlighted below;

- Waterproofing - Bond to substrate and binder film thickness (binder application rate)
- Skid resistance – Chip PSV, chip retention and surface texture and provide a suitable surface for following reseal (2nd coat) – chip embedment and surface texture
- Achieves design life

The risks that QLDC believe need to be addressed are as follows;

- High Moisture - poor basecourse surface finish, soft basecourse surface causing chip embedment / flushing, poor chip retention
- Low Temperatures - binder viscosity leading to poor wetting of the chip affecting chip retention, poor drying of pavement and sealing chip
- Time Constraints - Insufficient chip embedment / binder rise (at 30% up the chip) to eliminate chip loss due to the onset of cold temperatures – leading to poor seal durability

In considering risk mitigation the Contractor is required to complete the following questionnaire:

- Proposed date for sealing
- Type of seal, i.e. single coat, 2 coat etc.
- Use of locking coats?
- Binder selection – including the addition of polymer modified binder- Base bitumen penetration grade
- What additives if any to the bitumen
- Hot binder or emulsion
- Calculated binder application rate.
- How the dosage rate for cutter and/or flux will be estimated if using any
 - Note - It is considered good practice to include some cutter with emulsions when used outside the sealing season
- Latest time of day for completing chip application
- Minimum working temperatures

- Maximum length of seal
- Length of time for active traffic control
- System use to forecast weather condition
- Minimum time period to start sealing after precipitation
- Any pre-coating of chip
- How to avoid using wet chip, e.g. heating and drying chip
- Actions that will be implemented if any unforeseen situations arise for example, the onset of rain during a sealing run

The mitigation proposal that should accompany a request to proceed with sealing outside of season must include specific details of actions that will be taken to mitigate the considerations above.

Examples of mitigations that is expected in a proposal could include statements such as:

- We will check the MetService long-range forecast immediately prior to starting work and will not proceed if there is a chance of precipitation
- A reduced time window will likely be available for sealing due to lower than expected ambient air temperature. We will start sealing once the shade air temperature reaches 10 degrees C and will re-check and record temperatures every hour on the hour ensuring sealing is ceased if the temperature drops below the specified temperature.
- The chip will be precoated
- Additional rolling
- Active traffic control for 24 hours if required
- Consideration on using emulsion rather than cutback bitumen if this is appropriate.
- If emulsion is used any change to the chip size need to be explained (note there will be a change in expected life if a smaller chip is proposed to align with a shift to emulsion and we need to be comfortable that the trade off in expected life is justified based on the reasons for out of season sealing)
- In the event that rainfall occurs before the emulsion has broken we will....., (we would expect a robust commitment to strategies to mitigate the environmental and safety risks)
- If the chip stockpiles are already wet and unlikely to dry naturally indicate the process undertaken e.g. cart the chip back to our asphalt plant and dry it in the plant at the same time pre-coating the chip.
- No resealing within 12 months to allow for the cutter to leave the seal

Asphaltic Concrete

All things being equal, asphalt is more difficult to compact at cooler temperatures. If the appropriate degree of compaction is not achieved there will be an increase in air voids with a consequent increase in premature failure. Therefore, extra effort must be applied in cooler condition to ensure the asphalt is well compacted.

The key requirements, for thin asphalt surfaces are similar to that of chipseal;

- Provides additional waterproofing and acceptable surface shape
- Durability – bonds to substrate, retains structural integrity
- Skid resistance – Chip PSV, surface texture
- Achieves design life

The risks that QLDC believe need to be addressed by the Developer are as follows;

- High Moisture - Poor bond to substrate
- Low Temperatures - poor compaction and water proofing, poor surface finish
- Time Constraints - short life to failure

The following areas should be considered. Many of these are applicable to all asphalt paving operations, and in the context of paving in cooler conditions the expectation is that the site controls tighten up.

Ensure the asphalt gets to site at a suitable temperature

- Use upper temperatures in the asphalt plant
- Use insulated trucks and suitable layers of tarpaulin

Ensure the asphalt is laid quickly when it gets to site

- Organise the timing such that the paver is ready to accept the asphalt as it arrives on site or soon after
- Establishing a consistent cycle will ensure the asphalt is kept at an appropriate temperature and the paver runs continuously.

Compact the asphalt quickly

- Rollers to be on the mat quickly
- Consider the weight of the rollers
- Consider using more rollers as appropriate

Consider the use of warm mix additives

- The use of warm mix additives can improve the compaction characteristics of the asphalt in lower temperatures which improves the efficiency of the rollers and can extend the time, rolling can be applied effectively.

In addition, to consideration stated above the Contractor should set out the following:

- Proposed date for Paving
- Type of AC
- Target mix thickness
- Restrictions based on mix types and layer depths
- Base bitumen penetration grade
- What additives if any to the bitumen (e.g. warm mix additives)

- Any heating / cutting joints
- A
- Minimum ground temperatures required to pave for specific mixes and designs
- Maximum area of paving
- Pavers – limit construction to high compaction pavers
- Cart distances
- System use to forecast weather condition
- Paving plans
- Minimum time period to start paving after precipitation

The mitigation proposal that should accompany a request to proceed with paving in cooler temperatures must include specific details of actions that will be taken to mitigate the considerations above.

Examples of mitigations that we might expect to see in a proposal could include proposals such as:

- We will check the MetService forecast immediately prior to starting work and will not proceed if there is any uncertainty about acceptable weather conditions prevailing for the expected duration of paving operations
- We will increase our temperature surveillance with more frequent monitoring of the mix immediately before it is tipped into the paver, and the mat immediately behind the paver..
- Our contingency plan to restore access through the site in the event that paving operations need to be stopped is (usually this is not thought through and we continue to pave even in the rain because nobody has thought through a TPM to cease work)