



## **CONSTRUCTION SPECIFICATION FOR COLD IN-PLACE RECYCLING**

---

### **TABLE OF CONTENTS**

<b>333.01</b>	<b>SCOPE</b>
<b>333.02</b>	<b>REFERENCES</b>
<b>333.03</b>	<b>DEFINITIONS</b>
<b>333.04</b>	<b>DESIGN AND SUBMISSION REQUIREMENTS</b>
<b>333.05</b>	<b>MATERIALS</b>
<b>333.06</b>	<b>EQUIPMENT</b>
<b>333.07</b>	<b>CONSTRUCTION</b>
<b>333.08</b>	<b>QUALITY ASSURANCE</b>
<b>333.09</b>	<b>MEASUREMENT FOR PAYMENT</b>
<b>333.10</b>	<b>BASIS OF PAYMENT</b>

#### **333.01 SCOPE**

This specification covers the requirements for cold in-place recycling of existing hot mix asphalt (HMA) pavement, sizing, adding active filler if required, adding and mixing emulsified asphalt, and spreading and compacting the cold in-place recycled (CIR) mix.

#### **333.02 REFERENCES**

This specification refers to the following standards, specifications, or publications.

##### **Ontario Provincial Standard Specifications, Construction**

OPSS 313      Hot Mix Asphalt - End Result

##### **Ontario Provincial Standard Specifications, Material**

OPSS 1103      Emulsified Asphalt  
OPSS 1301      Cementing Materials

## Ministry of Transportation Publications

Compaction Measurement of Cold In-Place Recycled Pavements Using Nuclear Moisture and Density Gauges

MTO Laboratory Testing Manual:

- LS-282 Quantitative Extraction of Asphalt Cement and Analysis of Extracted Aggregate from Bituminous Paving Mixtures
- LS-300 Preparation of Marshall Specimens for Cold In-Place Recycled Mixtures
- LS-306 Bulk Relative Density of Compacted Bituminous Mixtures Using Paraffin Coated Specimens
- LS-602 Sieve Analysis of Aggregates
- LS-804 Practice for Mix Design of Cold Recycled Mixtures with Emulsified Asphalt

Ontario Traffic Manual (OTM):

OTM Book 7 - Temporary Conditions

- SP-027 Manual for Assessment of Surface Defects of In-Place Recycled Pavement Mats

## ASTM International

- D5/D5M-20 Standard Test Method for Penetration of Bituminous Materials
- D6752/D 6752M-11 Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method

## AASHTO Publication

- PP 86-17 Standard Practice for Emulsified Asphalt Content of Cold Recycled Mixture Designs

### 333.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

**Active Filler** means substances added to the reclaimed existing asphalt pavement that chemically alter the mix properties.

**Cold In-Place Recycled (CIR) Mix** means the in-place mixture of existing reclaimed HMA pavement, emulsified asphalt, and water.

**Hot Mix Asphalt (HMA)** means as defined in OPSS 313

**Quality Assurance (QA)** means as defined in OPSS 313.

**Reclaimed Asphalt Pavement (RAP)** means as defined in OPSS 313.

**Target Density** means the average bulk relative density for the lot established according to LS-300 by the QA testing laboratory, and used to determine the per cent compaction.

### 333.04 DESIGN AND SUBMISSION REQUIREMENTS

#### 333.04.01 Design Requirements

For mix design purposes, prior to commencing the work, the Contractor shall obtain samples representative of the material that is produced during the milling operation. These samples shall be used to establish the design rate of emulsified asphalt as a percent by mass of the RAP. The design rate of the emulsified asphalt shall be a minimum of 1.2%.

The mix design shall be completed by a laboratory with Canadian Council of Independent Laboratories (CCIL) Type A certification or equivalent equipped to carry out CIR mix design. Where the existing pavement significantly changes composition, a separate mix design shall be completed.

Each mix design shall include the following:

- a) Information on the type, manufacturer, and supplier of the emulsified asphalt.
- b) The percent by mass of emulsified asphalt in the CIR, referred to as the design rate, and all calculations performed to determine the design rate of emulsified asphalt.
- c) Emulsion information to confirm the particle charges (anionic or cationic) and cohesion properties of the emulsified asphalt and RAP to ensure material compatibility. Emulsified asphalt residue content and penetration shall be provided.
- d) The optimum fluid content, the mix design bulk relative density, and the air void for the CIR mix.
- e) The amount of water to be added to the mix.
- f) Maximum field rate adjustment allowed to the design rate without adverse effects to the mix properties.
- g) Recovered penetration for the binder of the existing pavement according to ASTM D5M.
- h) Type, source and quantity of active filler, if required.

The mix design shall be according to LS-804 and satisfy either the Marshall Stability or Indirect Tensile Strength requirements.

If Indirect Tensile Strength test is being used as the CIR mix design requirement, the mix design shall meet the following requirements:

Dry Indirect Tensile Strength	Minimum 225 kPa; and
Tensile Strength Ratio	Minimum 50%

If Marshall Stability test is being used as the CIR mix design requirement, the mix design shall meet the following requirements:

Unsoaked Marshall Stability	Minimum 5,560 N; and
Retained Marshall Stability	Minimum 60%

Regardless which mix design method was selected, the Unsoaked Marshall Stability, Retained Marshall Stability, Dry Indirect Tensile Strength and Tensile Strength Ratio shall be provided as part of the submission. The primary design method shall provide the full set of testing data, and for information purposes only, the secondary design method shall provide the testing data for one-point design only.

The Contractor can elect to perform additional testing by following AASHTO PP 86, for information only.

### **333.04.02 Submission Requirements**

A copy of the mix design document shall be submitted to the Contract Administrator a minimum of 7 Business Days prior to the start of the CIR production.

Proposals for the use of alternative emulsified asphalt material listed under OPSS 1103 shall be submitted in writing to the Contract Administrator a minimum of 7 Business Days prior to the intended use of the alternate product. The Owner may consider the use of other emulsified asphalt on trial basis, based on the documentation provided.

Within 4 Business Days after receiving the mix design, the Contract Administrator shall provide written confirmation of receipt of the submitted mix design and alternative emulsified asphalt material documents or of any non-conformance to the contract requirements.

Confirmation of receipt of the mix design documents does not constitute any guarantee that the mix can be produced or constructed or both to Contract requirements and does not relieve the Contractor of the responsibility for ensuring the specified quality of Materials and workmanship.

A new mix design shall be submitted when the emulsified asphalt design rate is adjusted by greater than 0.20%. Separate or new mix designs shall be submitted if the composition or layer thicknesses of the existing pavement changes significantly. Where more than one mix design is required, the area for which each mix design is to be used shall be clearly identified.

### **333.05 MATERIALS**

#### **333.05.01 Reclaimed Asphalt Pavement**

The gradation requirement for RAP shall be 100% passing the 37.5 mm sieve, and 95% to 100% passing the 26.5 mm sieve. The gradation shall be measured based on unextracted washed gradation according to the procedures in LS-602, with full range of gradation sizes provided for information purposes only.

#### **333.05.02 Emulsified Asphalt**

Emulsified asphalt shall be according to OPSS 1103 and be compatible with the process and materials used.

The Owner may consider the use of other emulsified asphalt on trial basis, based on the documentation provided.

#### **333.05.03 Water**

Water shall be clean and free from oil, acid, alkali, organic matter, or other deleterious substances.

#### **333.05.04 Active Filler**

When any of the strength requirements as specified in Subsection 333.04.01 Design Requirements are not met, active filler such as Portland cement, hydrated lime, or quick lime may be added into the CIR mix. Portland cement shall be according to OPSS 1301, and its quantity is limited to one-third the quantity of residual asphalt of emulsion by mass. The maximum quantity of hydrated lime, or quick lime is limited to 1.0% by dry mass of RAP.

### **333.06 EQUIPMENT**

#### **333.06.01 Recycling Train**

The recycling train shall include the following:

- a) A self-propelled cold milling unit with a cutting drum capable of reclaiming a full lane width of asphalt pavement to the depth specified in the Contract Documents in one pass.
- b) A screening and sizing unit capable of processing the RAP.
- c) An aggregate feed system that measures and regulates the mass of RAP being added into the mixing unit prior to the addition of the emulsified asphalt. The scale shall be calibrated to the manufacturer's tolerance prior to the start of the work and when requested by the Contract Administrator.

- d) An emulsified asphalt control system equipped with a flow meter calibrated in litres per tonne and a total delivery meter calibrated in litres to continuously maintain the required amount of emulsified asphalt added to within 0.2% by mass of the reclaimed material feed.
- e) A means of monitoring and controlling the addition of water.
- f) A mixing unit capable of producing a uniform and thoroughly blended CIR mix.

#### **333.06.02                      Placing Equipment**

A mechanical paver capable of spreading the mix evenly in front of the screed in one continuous pass to the specified crossfall and grade shall be used to place the CIR mix. The paver shall be equipped with distributing augers for the full width to be paved. The paver shall have a vibratory screed capable of vibrating the full width of mix placed.

#### **333.06.03                      Compaction Equipment**

Compaction equipment for control strips shall have a minimum static weight of 11,000 kg.

#### **333.06.04                      Straight Edge**

The straight edge shall be 3 m in length, metal, and have a level recessed in its upper edge parallel to the lower edge.

### **333.07                              CONSTRUCTION**

#### **333.07.01                      General**

HMA pavement in areas inaccessible to the reclaiming equipment shall be removed and replaced with acceptable binder course HMA. The HMA shall be placed to the CIR depth specified in the Contract Documents in compacted lift thicknesses between 40 and 75 mm in depth.

The overlap between successive passes of the recycling train shall be a minimum 100 mm.

#### **333.07.02                      Operational Constraints**

The work shall not be carried out when the ambient temperature is less than 10°C or when the overnight low is forecast to be less than 2°C. Cold in-place recycled mix shall not be placed after September 1st without the written approval from the Contract Administrator. The work shall be carried out when the roadway is clean and free of standing water. The work shall not proceed during periods of rain or when the surface is in a saturated condition.

All traffic, including construction traffic, shall be kept off the freshly placed CIR mat until it is able to carry traffic without damage. Any damage to the CIR mat shall be repaired.

The wearing surface shall not be placed on the CIR mat until the following requirements have been met:

- a) The CIR mat has been opened to traffic and allowed to cure for a minimum of 14 Days.
- b) The specified moisture content has been achieved according to the Acceptance Criteria section.
- c) The specified density has been achieved according to the Compaction subsection.
- d) All defective areas in the CIR mat have been repaired to the satisfaction of the Contract Administrator.

The wearing surface shall be placed within 30 Days of placing the CIR mat. The 30 Day requirement may be waived by the Contract Administrator if the CIR mix does not meet the requirements of this specification and is subject to repair.

### **333.07.03 Cold In-Place Recycling Trial Section**

Prior to carrying out CIR, the ability to successfully carry out CIR according to this specification shall be demonstrated to the Contract Administrator by placing a trial section within the Contract limits.

In lieu of a trial section, the Contract Administrator may accept evidence that the ability to successfully mix, handle, place, and compact CIR with the same equipment, placing crew, and methodology to meet the Contract requirements for placing CIR has been demonstrated on any Contract within the last 12 months.

The trial section shall be one lane width and 500 m in length. The location of the trial section shall be proposed to the Contract Administrator for approval. A minimum of 48 hours notice shall be given to the Contract Administrator prior to placing the trial section.

The Contract Administrator shall allow the CIR work to continue based on an acceptable visual assessment of the trial according to the requirements of the Surface Appearance subsection. When the CIR is rejected by visual assessment, the trial section shall be repaired or removed and replaced until the CIR meets the requirements of the Surface Appearance subsection.

### **333.07.04 Surface Preparation**

When specified in the Contract Documents, milling prior to CIR work shall be carried out to achieve the specified crossfall and grade.

All deleterious and loose milled material shall be removed from the milled surfaces, and longitudinal and transverse joints after reclaiming operations are completed and before placing CIR mix.

Existing crack sealant shall be removed and disposed of prior to CIR reclaiming operations.

### **333.07.05 Mixing**

The emulsified asphalt shall be added at the design rate. The rate of addition of emulsified asphalt shall be field adjusted as required to within 0.20% of the design rate and mixed to produce a uniformly coated CIR mix that can be compacted to the specified density. The emulsified asphalt added shall not be less than 1.2%.

Water may be added in a controlled manner to facilitate uniform mixing.

### **333.07.06 Compaction**

#### **333.07.06.01 Compaction Testing Target Density**

Compaction acceptance shall be according to the Acceptance Criteria for Compaction clause and shall be based on the target density. A control strip for the determination of the target density shall be constructed at the start of CIR mix production. The control strip shall be constructed according to Compaction Measurement of Cold In-Place Recycled Pavements Using Nuclear Moisture and Density Gauges. Levelling sand may be used to provide a flat surface for the nuclear moisture and density gauge when open coarse texture CIR mix is encountered. A minimum notice of 2 Business Days shall be given to the Contract Administrator prior to the construction of the control strip.

The Owner shall be provided access to complete the following tests according to the Compaction Testing clause:

- a) Compaction testing of the control strip.

- b) Establishment of the target density.
- c) Compaction acceptance testing.

Compaction acceptance testing shall be performed once compaction has been completed on the CIR mat. Compaction acceptance shall be achieved prior to opening to traffic.

#### **333.07.06.02 Target Density**

A new control strip shall be constructed, and a new target density established for every 100,000 m<sup>2</sup> of CIR mix production and whenever any one of the following situations arises:

- a) A different mix design is applied to the pavement section.
- b) The existing pavement material significantly changes in surface roughness, gradation, composition, or layer thickness as determined by the Contract Administrator.
- c) A different nuclear moisture and density gauge is to be used for the subplot testing.

The new target density shall apply to the calculations according to the Acceptance Criteria subsection for all sublots constructed after the establishment of a new target density.

#### **333.07.07 Surface Appearance**

The compacted CIR mat shall be smooth and constructed to the crossfall and grade as specified in the Contract Documents. The surface of the CIR mat shall be of uniform texture and free of severe segregation and longitudinal streaks, moderate to severe raveling, rutting and flushing, and free of fat spots, oil spills, roller marks, and other defects.

#### **333.07.08 Traffic Control with Pilot Vehicles**

Traffic shall be controlled with pilot vehicles according to OTM, Book 7.

The pilot vehicles shall guide one-way traffic through or around construction. The maximum speed of the moving vehicles shall be 30 km/h. Traffic control with moving vehicles shall be maintained until the CIR mat is able to carry traffic without damage.

#### **333.07.09 Longitudinal Joints**

For achieving continuity and integrity in the paved area, the minimum overlap between two successive lanes in longitudinal joints shall be 150 mm. In addition, the face of the joints shall be inspected between the milling unit and paving unit to make sure it is free of excessive loose material, or any built-up dust generated by the milling machine.

#### **333.07.10 Management of Excess Material**

Management of excess material shall be according to the Contract Documents.

### **333.08 QUALITY ASSURANCE**

#### **333.08.01 General**

Acceptance of the CIR mix shall be based on the following criteria:

- a) Surface Appearance
- b) Surface Tolerance

- c) Moisture Content
- d) Compaction
- e) RAP Gradation

Work that does not meet the acceptance criteria shall be repaired according to the Repairing and Re-Evaluating subsection.

### **333.08.02                      Sampling**

#### **333.08.02.01                      Lot Size**

The Contract Administrator shall determine the size and location of the lots and sublots after discussion with the Contractor and before CIR production starts. A lot shall typically represent 25,000 m<sup>2</sup> with 5 equal sublots of 5,000 m<sup>2</sup> in size.

#### **333.08.02.02                      Cold In-Place Recycling Material**

Samples of CIR material shall be packaged in non-absorptive materials to protect sample integrity and sealed in waterproof containers. Samples shall be transported in a manner that avoids stacking and extreme temperatures.

##### **333.08.02.02.01                      Slabs**

At least 4 Business Days prior to the planned overlay of the CIR mat, three slab samples of the CIR material shall be obtained from each subplot. The three slab samples shall be located side-by-side and taken at random locations as directed by the Contract Administrator. Each slab sample shall be dry cut 150 mm x 150 mm and removed intact from the CIR mat.

One slab sample shall be used to test for bulk relative density, one slab sample shall be used to test for moisture content, and another sample is retained for referee. The result of the moisture content will be used for both the moisture acceptance, and moisture adjustment for compaction calculation according to LS-306.

Additional slab samples for QA acceptance tests shall only be taken after the Contractor has carried out remedial work to improve moisture content and/or compaction in the rejected subplot. The Contractor shall be charged the cost of additional tests.

##### **333.08.02.02.02                      RAP Gradation**

For the purpose of determining the RAP gradation, 30 kg of RAP samples prior to application of emulsion shall be taken from each of five randomly selected sublots for every lot.

##### **333.08.02.02.03                      Sampling for Indirect Tensile Strength and Marshall Stability**

Two 15 kg samples of the CIR shall be obtained from each subplot, taken at random locations as directed by the Contract Administrator. One of the 15 kg sample shall be used to test for dry tensile strength and wet tensile strength according to LS-297, for information only. The other 15 kg sample shall be used to test for Marshall Stability according to AASHTO PP 86, for information only.

##### **333.08.02.03                      Emulsified Asphalt**

Samples of emulsified asphalt used in the mix shall be taken at the job site from the tankers according to the Contractor's health and safety plan at a frequency of three sets of samples per Contract randomly taken from three different lots. Each sample shall be taken either from a sampling spigot on the transfer line, if available, or from the end of the transfer line after a minimum of 4,000 kg has been drawn from the tanker. Each set of



samples shall be a minimum of 2 full four-litre containers. The Contractor's health and safety plan and procedure for sampling shall be reviewed at the pre-pave meeting.

The sample containers supplied by the Contractor shall be new triple tight epoxy lined pails or suitable leak-proof plastic containers. The sample labels shall be obtained from the Contract Administrator.

### **333.08.03                      Acceptance Criteria**

#### **333.08.03.01                  Surface Appearance**

Surface appearance shall be assessed by the Contract Administrator based on visual surveys after the CIR mat has been opened to traffic. The finished CIR surface shall have a uniformly smooth texture and shall meet the surface appearance requirements of ravelling, segregation and rutting as specified in Table 1 prior to placement of HMA overlay.

#### **333.08.03.02                  Surface Tolerance**

The surface tolerance of any CIR surface shall be such that when tested with a 3 m straight edge placed anywhere on the CIR surface, except across the crown, and in any direction on the surface, there shall not be a gap between the bottom of the straight edge and the surface of the CIR greater than 6 mm.

#### **333.08.03.03                  Moisture Content**

The QA laboratory shall test one sample from each subplot to determine the moisture content of CIR mix according to LS-282, and the test result of the moisture content shall be rounded to one decimal place according to LS-100. The test result for each subplot shall be used to compute the lot mean for moisture content of CIR mix.

The moisture content of CIR mix acceptance shall be based on the mean moisture content of the lot and the moisture content of the individual sublots. The lot is acceptable if the lot mean moisture content is equal to or less than 2% with no individual subplot's moisture content greater than 3%. The lot is rejectable if the lot mean moisture content of CIR mix is greater than 3%. Any subplot with its moisture content greater than 3% shall be deemed rejectable.

If the lot mean moisture content of CIR mix is less than 3% and greater than 2%, the Contractor may elect to accept a payment reduction or repair for the lot. The payment reduction shall be calculated according to Table 2. If the Contractor elects to repair the lot in lieu of a payment reduction, the lot shall be repaired according to the Repairing and Re-Evaluating subsection.

##### **333.08.03.03.01              Referee Testing**

A written request may be made to the Contract Administrator for referee testing within 3 Business Days of receiving a rejectable moisture test result. Referee testing shall be carried out by a laboratory designated by the Owner from a roster maintained for this purpose.

The results of the referee test shall be used for acceptance determination and shall be binding on both parties.

If the referee testing results in rejection of the moisture content, the referee testing shall be at no addition cost to the Owner. If the referee testing results in the material passing all test criteria, the referee testing charge shall be paid by the Owner.

#### **333.08.03.04                    Compaction**

##### **333.08.03.04.01            Compaction Testing**

Quality assurance for the compaction of CIR mix shall consist of taking five random field wet density and moisture content measurements from each subplot of compacted CIR mix and using them to calculate the Quality Index (Qi) according to Compaction Measurement of Cold In-Place Recycling Pavements Using Nuclear Moisture and Density Gauges.

##### **333.08.03.04.02            Acceptance Criteria for Compaction**

When Qi for a subplot is equal to or greater than 1.49, the subplot shall be accepted; otherwise, the subplot shall be rejected for compaction.

##### **333.08.03.04.03            Rejected Sublots**

If a subplot is rejected for compaction, the subplot shall be recompacted, with adjustment to the moisture content if required, until satisfactory compaction is achieved. The recompacted subplot shall be retested and the compaction re-evaluated according to the Acceptance Criteria subsection.

#### **333.08.03.05                    Reclaimed Asphalt Pavement Gradation**

If the RAP does not meet the gradation requirements, the Contractor shall submit an action plan of remediation to the Contract Administrator for approval within 2 Business Days after the delivery of the QA testing results.

#### **333.08.04                      Repairing and Re-Evaluating**

CIR mix that is rejectable based on the Acceptance Criteria subsection shall be repaired according to the requirements specified in Table 1.

Repairs shall be for the full lane width. For repairs due to surface appearance defects, the minimum repair length shall be sufficient for the repair to be carried out by the recycling train, or by the paving equipment, whichever is applicable. For other repairs based on the lot and subplot acceptance, the minimum length shall be according to the Repairing and Re-Evaluating clause of OPSS 313 and to the depth specified in Table 1.

The HMA required to repair unacceptable CIR shall be placed in compacted lift thicknesses between 40 and 75 mm. The HMA mix type and design used for repairs shall be approved by the Contract Administrator and shall meet the acceptance requirements for the HMA specified elsewhere in the Contract Documents.

All repairs will be re-evaluated and retested according to the Acceptance Criteria subsection.

When repairs are made to rejectable sublots or those sublots that the Contractor elects to repair due to the non-conformance of the moisture content requirements, the lot shall be re-evaluated and re-decided for payment reduction. The original lot shall be divided into two reconfigured lots in the following way: All acceptable sublots (with moisture content equal to or less than 2%) shall be grouped as one lot and shall receive the full Contract price. The remaining sublots shall be grouped as another lot and shall use the retest results of the repaired sublots to calculate the mean lot moisture content, and shall be accepted either at the full Contract price, or subjected to a payment reduction, or deemed rejectable.

### **333.09 MEASUREMENT FOR PAYMENT**

#### **333.09.01 Actual Measurement**

##### **333.09.01.01 Cold In-Place Recycled Mix**

Measurement of CIR mix placed shall be by area in square metres.

#### **333.09.02 Plan Quantity Measurement**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

### **333.10 BASIS OF PAYMENT**

#### **333.10.01 Cold In-Place Recycled Mix - Item**

Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment, and Material to do the work.

The addition of active filler or other additives to the mix, including any emulsion that is required due to the additives, shall be at no extra cost to the Owner.

HMA required to replace unacceptable CIR material shall be at no extra cost to the Owner.

Emulsified asphalt shall be included in the Cold In-Place Recycled Mix item.

Repair of an unacceptable CIR mat shall be carried out at no extra cost to the Owner.

HMA placed in areas inaccessible to the reclaiming equipment shall be included in the Cold In-Place Recycled Mix item.

Repair of areas of CIR damaged by traffic shall be completed at no extra cost to the Owner.

Repair, removal, or replacement of an unacceptable trial section shall be completed at no extra cost to the Owner.

#### **333.10.02 Payment Reduction for Moisture Content**

When test results show that the moisture content payment factor for the lot is less than 1.000 and the Contractor is not required to or does not elect to repair the lot, the payment reduction for the lot shall be as follows:

$(1.000 - \text{Payment Factor}) \times \text{item price} \times \text{lot quantity}$

For purposes of payment reduction, the term item price means the Contract price of the applicable tender item.

For purposes of re-decision after repairs, the lot quantity is the area of the reconfigured lot.

#### **333.10.03 Traffic Control with Pilot Vehicles**

Traffic control with pilot vehicles shall be included under the Temporary Traffic Control Signs item.

**TABLE 1**  
**Acceptance Criteria and Repair Requirements for CIR Mix**

Acceptance Criteria	Defect Type	Severity / Criteria	Acceptable / Rejectable	Repair Requirements
Surface Appearance	Ravelling/Coarse Aggregate Loss (Note 1)	Very Slight to Slight	Acceptable	No action required.
		Moderate to Severe	Rejectable	Mill 50 mm and replace with an acceptable binder course HMA (Note 2).
		Very Severe	Rejectable	Remove CIR to full depth and replace with an acceptable binder course HMA (Note 2).
	Segregation (Note 1)	Slight to Medium	Acceptable	No action required.
		Severe	Rejectable	Mill 50 mm and replace with an acceptable binder course HMA (Note 2).
	Rutting (Note 1)	Very Slight to Slight	Acceptable	No action required.
		Moderate to Severe	Rejectable	Mill 50 mm and replace with an acceptable binder course HMA (Note 2).
		Very Severe	Rejectable	Remove CIR to full depth and replace with an acceptable binder course HMA (Note 2).
Surface Tolerance	Non-conformance for surface tolerance as per the Surface Tolerance subsection of the Acceptance Criteria.	> 6 mm based on 3 m straight edge measurement	Rejectable	All deficient areas shall be re-profiled by milling or padded with the same hot mix type to be used in the overlying hot mix lift.
Moisture Content	Non-conformance for moisture Content as per the Moisture Content subsection of the Acceptance Criteria.	> 3% for Moisture Content of Lot or Individual Sublot	Rejectable	For rejected sublots, or sublots within the corresponding rejected lot: 1) Reprocess with a recycling train (Note 2), or 2) Remove CIR material to full depth and replace with an acceptable binder course HMA.
Compaction	Non-conformance for compaction as per the Compaction subsection of the Acceptance Criteria.	< 96% for Compaction of Lot; and < 95% for Compaction of Individual Sublot	Rejectable	For rejected sublots, or sublots within the corresponding rejected lot: 1) Recompact the CIR mat, if required, with reheating process, or 2) Reprocess with a recycling train (Note 2), or 3) Remove CIR material to full depth and replace with an acceptable binder course HMA.
<b>Notes:</b> 1) Defect and severity definitions according to SP-027. 2) Reprocessing with a recycling train may be considered as a repair method, upon submission of a proposal by the Contractor and approved by the Contract Administrator.				

**TABLE 2**  
**Moisture Content of CIR Mix Payment Factors**

Moisture Content Payment Factors Acceptance Criteria	Classification	Payment Factor ( PFT)
$MC \leq 2\%$	Acceptable	1.000
$2\% < MC \leq 3\%$	Payment Reduction	$1 - \text{TODRF} \times (MC - 2)/10$
$MC > 3\%$	Rejectable	N/A
Where: MC = the mean of the lot sample of moisture content of CIR Mix in percent calculated to one decimal place according to LS-100. PFT = the payment factor for moisture content calculated to three decimal places according to LS-100. TODRF = Tender Opening Date Reduction Factor according to Table 3.		

**TABLE 3**  
**Tender Opening Date Reduction Factor**

Year of Tender Opening	Tender Opening Date Reduction Factor
2015	0.65
2016	0.8
2017	1.0