

- Item coverage
- (a) trial areas and trials;
 - (b) making good after sampling and testing;
 - (c) protection of material in transit and while awaiting tipping;
 - (d) designing and verifying mixes;
 - (e) grading, measuring, reclaiming, mixing and depositing materials;
 - (f) air entrainment;
 - (g) spreading and compaction;
 - (h) cutting back, saw cutting, cleaning, preparing and working on or up to existing surfaces and features;
 - (i) edge support;
 - (j) reinforcement (as Series 1700 paragraph 26);
 - (k) waterproof and separation membranes;
 - (l) chippings;
 - (m) surface texturing;
 - (n) formwork (as Series 1700 paragraph 15);
 - (o) making joints;
 - (p) forming or sawing grooves, cleaning, grit blasting, priming, caulking, temporary and permanent sealing of joints;
 - (q) longitudinal, expansion, contraction, warping and construction joint assemblies, including joint filler and crack inducers, tie and dowel bars, dowel bar cradles, caps and sheaths and inspection of dowel bars and corrosion protection to tie bars and coating to transverse reinforcement;
 - (r) shaping to cambers, falls and crowns;
 - (s) forming sockets, recesses, openings, and bays;
 - (t) curing and protection;
 - (u) protection and masking and unmasking of kerbs, drainage channels, chamber covers, gully gratings, expansion joints, and the like;
 - (v) maintenance of surface;
 - (w) taking measures to protect and maintain the pavement from deterioration by the use of constructional plant and the ingress of water and other materials;

- (x) anchorages including excavation and disposal, steel beams, ground beams and thickening of slab;
- (y) measures required for aftercare and opening the road to traffic;
- (z) protective system to steel beams (as Series 1900 paragraph 4);
- (aa) slurry sealing, surface dressing, bituminous spray, resin based treatment and tack coat forming integral parts of the pavement;
- (bb) admixtures and additives;
- (cc) retarders, brushing and other measures necessary to provide exposed aggregate textured surface including disposal of surplus mortar arising;
- (dd) saw cutting and sealing bituminous overlays;
- (ee) bond-breaker tape.

- (ff) Construction of longitudinal and transversal joints (edge rolling, joint cutting, blade cutting; hot bitumen)

Regulating Course

Units

10 The units of measurement shall be:

- (i) bituminous regulating course tonne, cubic metre, or square metre.
- (ii) cement bound regulating course tonne, cubic metre or square metre.

Measurement

11 The measurement of bituminous regulating course by tonne shall be calculated from the tonnage of material certified by the Overseeing Organisation.

The tonnage certified by the Overseeing Organisation shall be only that material included on delivery tickets which is incorporated in the Permanent Works in the locations and to the extent and thickness required by the Contract. Material in excess of the requirements of the Contract and material used for any other purpose shall not be included within the certified tonnage.

The measurement of bituminous regulating course by cubic metres or square metres shall be the volume of material or layer thickness measured to the outlines required by the Contract.

12 The measurement of cement bound regulating course shall be the volume of material measured to the outlines required by the Contract.

Itemisation

13 Separate items shall be provided for bituminous regulating courses and cement bound regulating courses in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Each group or type of bituminous regulating course.
	2 Each group or type of cement bound regulating course.
II	1 Lower base course.
	2 Upper base course.
	3 Base course.
	4 Binder course.
	5 Surface course.

Bituminous and Cement Bound Regulating Course

14 The items for bituminous and cement bound regulating course shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) base, lower base, upper base, binder course, surface course and concrete slab (as this Series paragraph 9);
 - (b) weighing, tickets and copies;
 - (c) material not laid as regulating course.

Surface Treatment

Units **15** The unit of measurement shall be:

- (i) surface treatment square metre.

Measurement **16** The measurement of surface treatment shall be calculated using the width of the top surface to be treated as described in paragraph 7.

17 Surface treatment shall only be measured separately when the Contract requires a separate or additional surface treatment to be applied to the pavement. Surface treatment forming an integral part of any specified group or type of pavement shall not be separately measured. No deductions shall be made for openings of 1 square metre or less.

Itemisation **18** Separate items shall be provided for surface treatment, in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Slurry sealing.
	2 Surface dressing.
	3 Bituminous spray.
	4 Resin based surface treatment.
II	1 Different types.
III	1 Different colours.
IV	1 Different rates of spread.

Surface Treatment

19 The items for surface treatment shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) trial areas and trials;
 - (b) spreading and rolling deposited materials;
 - (c) tack coat (as this Series paragraph 24);

- (d) in the case of resin based surface treatment certification of spraying equipment and supplying copy of certificate at monthly intervals to the Overseeing Organisation;
- (e) measures required for aftercare and opening road to traffic.

Tack Coat

Units

20 The unit of measurement shall be:

- (i) tack coat square metre.

Measurement

21 For the purposes of measurement any reference to tack coat shall be deemed to include bond coats.

22 Tack coat shall only be measured separately when the Contract requires a separate or additional tack coat to be applied to an existing surface prior to the construction of the following course or treatment. Tack coat forming an integral part of any specified group or type of pavement or surface treatment shall not be separately measured.

Itemisation

23 Separate items shall be provided for tack coat in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Tack coat.
II	1 Different materials.
III	1 Different rates of spread.

Tack Coat

24 The items for tack coat shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) trial areas and trials;
- (b) making good after sampling and testing;
- (c) designing and verifying mixes;
- (d) grading, measuring, mixing and depositing materials;
- (e) making joints;
- (f) cleaning surfaces;
- (g) protection and masking and unmasking of kerbs, drainage channels, chamber covers, gully gratings, expansion joints, road studs, road markings and the like and obtaining clean markings;
- (h) cutting back, preparing and working on or up to adjacent faces, surfaces and features;
- (i) admixtures and additives.

In situ Recycling - The Remix and Repave Processes

- Units **29** The unit of measurement shall be:
- (i) reshape recycle process square metre
 - (ii) repave recycle process square metre.
 - (iii) remix recycle process square metre.

Measurement **30** The measurement of in situ recycle processes shall be calculated using the width stated in the Contract. No deductions shall be made for openings of 1 square metre or less.

Itemisation **31** Separate items shall be provided for in situ recycle processes in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Reshape recycle process.
	2 Repave recycle process.
	3 Remix recycle process.
II	1 Different thicknesses or depths.

In situ Recycling - The Remix and Repave Processes

- Item coverage **32** The items for in situ recycle processes shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- (a) milling (as this Series paragraph 28);
 - (b) heating and scarifying;
 - (c) base course, lower base course, upper base course, binder course, surface course and concrete slab (as this Series paragraph 9);
 - (d) make up to low areas and reprofiling;
 - (e) removal of surface dressing;
 - (f) removal of road markings;
 - (g) reports.

Reinstatement of Paved Areas

- Units **33** The unit of measurement shall be:
- (i) reinstatement of paved area square metre.

Measurement **34** The measurement of reinstatement of paved area shall be calculated using the width of the top surface to be reinstated excluding sides and edges.

No deduction shall be made for openings of 1 square metre or less. The top surface for the following features shall be the widths or areas described below:

- (a) for drains, sewers, piped culverts, service ducts and filter drains - the width shall be the internal diameter of the pipe plus 600 mm;
- (b) for kerbs, channels, edgings, combined drainage and kerb blocks, linear drainage channel systems and the like - the width of the foundations;
- (c) for chambers, gullies, traffic signs, traffic signals, road lighting columns and the like - the horizontal area of the base slab or where no base slab is required the area of the bottom of the excavation.

Itemisation

35 Separate items shall be provided for reinstatement of paved area in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Each type of paved area reinstatement.
II	1 Different thicknesses or depths.

Reinstatement of Paved Area

36 The items for reinstatement of paved area shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) determination of the extent of the reinstatement and agreement with the Overseeing Organisation;
- (b) sub-base (as this Series paragraph 5);
- (c) base course, lower base course, upper base course, binder course, surface course and concrete slab (as this Series paragraph 9);
- (d) bituminous and cement bound regulating course (as this Series paragraph 14);
- (e) surface treatment (as this Series paragraph 19);
- (f) kerbs, channels, edgings, combined drainage and kerb blocks and linear drainage channel systems (as Series 1100 paragraph 4);
- (g) footways and paved areas (as Series 1100 paragraph 21);
- (h) scarifying;
- (i) milling (as this Series paragraph 28);
- (j) drilling holes;
- (k) tack coat (as this Series paragraph 24);
- (l) bringing to correct levels and surface regularity following settlement.

Thin Bonded Repairs and Joint Repairs to Existing Concrete Carriageway

Units

37 The units of measurement shall be:

- (i) thin bonded repairs square metre.
- (ii) joint repairs linear metre.

- (iii) saw-cutting grooves linear metre.
- (iv) sealing grooves linear metre.

Measurement

38 The measurement of thin bonded repairs shall be calculated using the plan area of the top surface of each repair patch excluding areas of joint sealant.

39 Thin bonded repairs and joint repairs shall only be measured separately when areas and lengths to be repaired are stated in the Contract.

40 The measurement of saw-cutting grooves shall be the summation of the lengths of saw-cutting grooves stated in the Contract.

41 The measurement of sealing grooves shall be the summation of the lengths of the sealed grooves stated in the Contract.

Itemisation

42 Separate items shall be provided for thin bonded repairs and joint repairs in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Thin bonded repairs.
	2 Joint repairs.
	3 Saw-cutting grooves.
	4 Sealing grooves.
II	1 Each type.
III	1 Individual areas not exceeding 1 square metre on plan.
	2 Individual areas exceeding 1 square metre but not exceeding 2 square metres on plan and so on in steps of 1 square metre.
	3 In individual lengths not exceeding 1 linear metre.
	4 In individual lengths exceeding 1 linear metre but not exceeding 2 linear metres and so on in steps of 1 linear metre.
IV	1 Depth of cut not exceeding 50mm.
	2 Depth of cut exceeding 50mm but not exceeding 75mm and so on in steps of 25 mm.
V	1 Different thicknesses or depths.

Thin Bonded Repairs and Joint Repairs

43 The items for thin bonded repairs and joint repairs shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) determination of the area or length of the repair and agreement with the Overseeing Organisation;
- (b) base course, lower base course, upper base course, binder course, surface course and concrete slab (as this Series paragraph 9);
- (c) removal of any existing joint sealant and caulking material;
- (d) removal of unsound concrete and cutting back reinforcement within the repair area;
- (e) treatment of repair area and surrounds;
- (f) supply and application of clean water;
- (g) wetting and removal of excess water;

- (h) finishing repair material flush with the level of the surrounding concrete slab and brushing and applying surface texture to match existing;
- (i) reinstatement of sub-base;
- (j) disposal of material (as Series 600 paragraph 39).

Saw-cutting Grooves and Sealing Grooves

44 The items for saw-cutting grooves and sealing grooves shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) preparing;
- (b) cleaning;
- (c) drying;
- (d) bond-breaker tape;
- (e) recording details;
- (f) disposal of material (as Series 600 paragraph 39).

Full Depth Repairs and Bay Replacement Repairs to Existing Concrete Carriageway

Units

45 The units of measurement shall be:

- (i) full depth repairs, bay replacement repairs square metre.
- (ii) reinstatement of sub-base cubic metre, tonne or square metre.

Measurement

46 The measurement of full depth repairs and bay replacement repairs shall be the summation of the individual areas to be repaired as stated in the Contract.

Itemisation

47 Separate items shall be provided for full depth repairs and bay replacement repairs to existing concrete carriageway in accordance with Chapter II Paragraph 3 and 4 and the following:

Group	Feature	
I	1	Full depth repairs.
	2	Bay replacement repairs.
	3	Reinstatement of sub-base.
II	1	In unreinforced slabs.
	2	In reinforced slabs.
III	1	Different thicknesses of slabs.

Full Depth Repairs and Bay Replacement Repairs to Existing Concrete Carriageway

48 The items for full depth repairs and bay replacement repairs to existing concrete carriageway shall in accordance with the Preambles to Bills of Quantities General Directions include for:

- Item coverage
- (a) saw cutting and drilling to full depth;
 - (b) excavation of acceptable material (as Series 600 paragraph 18);
 - (c) excavation of unacceptable material (as Series 600 paragraph 19);
 - (d) excavation in hard material (as Series 600 paragraph 23);
 - (e) disposal of material (as Series 600 paragraph 39);
 - (f) completion of formation (as Series 600 paragraph 88);
 - (g) dowel bars and tie bars including drilling and supports, cleaning, plugging with resin mortar and de-bonding and compressive discs;
 - (h) sub-base (as this Series paragraph 5);
 - (i) separation layer;
 - (j) joint filler board;
 - (k) joint groove forming strip;
 - (l) concrete slab (as this Series paragraph 9).

Saw Cutting, Cracking and Seating Existing Jointed Reinforced Concrete Pavements

- Units
- 49** The units of measurement shall be:
- (i) removal of existing bituminous overlay square metre.
 - (ii) main trial item.
 - (iii) re-assessment trial number.
 - (iv) saw cutting existing pavement square metre.
 - (v) cracking existing pavement square metre.
 - (vi) seating existing pavement square metre.
- Measurement
- 50** The main trial shall be measured once only for the main trial area stated in the Contract.
- 51** The re-assessment trial shall be measured once only for each time that the defined circumstances in the Contract require that such a trial be carried out as stated in the Contract.
- 52** The measurement of cracking and seating shall be the areas stated in the Contract to be cracked and seated. No deductions shall be made for openings of 1 square metre or less.
- Itemisation
- 53** Separate items shall be provided for saw-cutting, cracking and seating existing jointed reinforced concrete pavements in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature	
I	1	Removal of existing bituminous overlay.
	2	Main trial.
	3	Re-assessment trial.
	4	Saw-cutting existing pavement.
	5	Cracking existing pavement.
	6	Seating existing pavement.
II	1	Saw-cuts exceeding 50mm but not exceeding 70mm in depth.
	2	Saw-cuts exceeding 70mm but not exceeding 90mm in depth.
	3	Saw-cuts exceeding 90mm but not exceeding 110mm in depth, and so on in steps of 20mm.
III	1	Thickness not exceeding 50mm.
	2	Thickness exceeding 50mm but not exceeding 100mm.
	3	Thickness exceeding 100mm but not exceeding 150mm, and so on in steps of 50mm.

Note 1: Group II Features shall be applied only to Feature 4 of Group I.

Note 2: Group III Features shall be applied only to Features 5 and 6 of Group I.

Removal of Existing Bituminous Overlay

54 The items for removal of existing bituminous overlay shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) excavation of acceptable material (as Series 600 Paragraph 18);
- (b) excavation of unacceptable material (as Series 600 paragraph 19);
- (c) excavation in hard material (as Series 600 paragraph 23);
- (d) disposal of material (as Series 600 paragraph 39);
- (e) milling (as Series 700 paragraph 28).

Main Trial

55 The items for main trial shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) saw-cutting (as this Series paragraph 57);
- (b) cracking and seating existing pavements (as this Series paragraphs 58 and 59);
- (c) checking cracking;
- (d) checking saw cuts.

Re-assessment Trial

56 The items for re-assessment trial shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) main trial (as this Series paragraph 55);
- (b) lost time, standing time and disruption caused by re-assessment trials.

Saw-cutting

57 The items for saw-cutting shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) locating existing joints;
- (b) water supply;
- (c) monitoring and adjusting plant and equipment;
- (d) removal of loose material and debris;
- (e) disposal of material (as Series 600 paragraph 39);
- (f) taking measurements and calculations;
- (g) observations and examinations;
- (h) coring, reinstatement and compaction;
- (i) marking reference chainages and grid;
- (j) giving of notices, keeping records, completing and supplying reports and certificates;
- (k) lighting for core inspection.

Cracking

58 The items for cracking shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) supply and application of clean water;
- (b) monitoring and adjusting plant and equipment;
- (c) removal of loose material and debris;
- (d) disposal of material (as Series 600 paragraph 39);
- (e) taking measurements and calculations;
- (f) observations and examinations;
- (g) cleaning;
- (h) coring, reinstatement and compaction;
- (i) marking reference chainages and grid;
- (j) giving of notices, keeping records, completing and supplying reports and certificates;
- (k) providing and maintaining side restraint;
- (l) lighting for core inspection.

Seating	59 The items for seating shall in accordance with the Preambles to Bill of Quantities General Directions include for:
Item coverage	<ul style="list-style-type: none">(a) monitoring and adjusting plant and equipment;(b) removal of loose material and debris;(c) disposal of material (as Series 600 paragraph 39);(d) taking measurements and calculations;(e) observations and examinations;(f) rolling;(g) measures to rectify unstable seating;(h) giving of notices, keeping records, completing and supplying reports and certificates;(i) providing and maintaining side restraint;
	Cracking and Seating Existing Jointed Unreinforced Concrete Pavements and CBM Bases
Units	60 The units of measurement shall be: <ul style="list-style-type: none">(i) removal of existing bituminous overlay square metre.(ii) main trialitem.(iii) re-assessment trial..... number.(iv) crackingsquare metre.(v) seatingsquare metre.
Measurement	61 The main trial shall be measured once only for the stated area. 62 The re-assessment trial shall be measured once only for each time that the defined circumstances in the Contract require that such a trial be carried out as stated in the Contract. 63 The measurement of cracking and seating shall be the areas stated in the Contract to be cracked and seated. No deductions shall be made for openings of 1 square metre or less.
Itemisation	64 Separate items shall be provided for cracking and seating existing jointed unreinforced concrete pavements and CBM bases in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature	
I	1	Removal of existing bituminous overlay.
	2	Main trial.
	3	Re-assessment trial.
	4	Cracking.
	5	Seating.
II	1	Jointed unreinforced concrete pavements.
	2	CBM bases.
III	1	Thickness not exceeding 50mm.
	2	Thickness exceeding 50mm but not exceeding 100mm.
	3	Thickness exceeding 100mm but not exceeding 150mm, and so on in steps of 50mm.
IV	1	Transverse cracks exceeding 1.00m but not exceeding 2.00m centres.
	2	Transverse cracks exceeding 2.00m but not exceeding 3.00m centres.
	3	Transverse cracks exceeding 3.00m but not exceeding 4.00m centres.
	4	Transverse cracks exceeding 4.00m but not exceeding 6.00m centres, and so on in steps of 2.00m.

Note 1: Group III Features shall be applied only to Features 4 and 5 of Group I.

Note 2: Group IV Features shall be applied only to Feature 4 of Group I.

Removal of Existing Bituminous Overlay

65 The items for removal of existing bituminous overlay shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) excavation of acceptable material (as Series 600 paragraph 18);
- (b) excavation of unacceptable material (as Series 600 paragraph 19);
- (c) excavation in hard material (as Series 600 paragraph 23);
- (d) disposal of material (as Series 600 paragraph 39);
- (e) milling (as this Series paragraph 28).

Main Trial

66 The items for main trial shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) main trial (as this Series paragraph 55).

Re-assessment Trial

67 The items for re-assessment trial shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) re-assessment trial (as this Series paragraph 56).

Cracking

68 The items for cracking shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) cracking (as this Series paragraph 58).

Seating **69** The items for seating shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage (a) seating (as this Series paragraph 59).

Overbanding and Inlaid Crack Sealing Repair Systems

Units **70** The units of measurement shall be:

(i) simple overbanding repair system linear metre.
(ii) fill and overbanding repair system linear metre.
(iii) inlaid sealing repair system linear metre.

Measurement **71** The measurement of simple overbanding repair system, fill and overbanding repair system and inlaid sealing repair system shall be the summation of the lengths stated in the Contract and shall be for the complete system.

Itemisation **72** Separate items shall be provided for simple overbanding repair system, fill and overbanding repair system and inlaid sealing repair system in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature	
I	1	Simple overbanding repair system.
	2	Fill and overbanding repair system.
	3	Inlaid sealing repair system.
II	1	Different stated materials.
III	1	Crack exceeding 5mm but not exceeding 10mm wide.
	2	Crack exceeding 10mm but not exceeding 15mm wide.
	3	Crack exceeding 15mm but not exceeding 20mm wide.
IV	1	Stated width of crack.

Note: Group III Features shall be applied only to Group I Feature 2.

Note: Group IV Feature shall be applied only to Group 1 Feature 3.

Overbanding and Inlaid Crack Sealing Repair Systems **73** The items for overbanding and inlaid crack sealing repair systems shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage (a) cleaning;
(b) drying;
(c) disposal of material (as Series 600 paragraph 39);
(d) priming;
(e) bond-breaker tape;
(f) recording details.

Maintenance of Arrester Beds

- Units **74** The unit of measurement shall be:
- (i) maintenance of arrester bed item.
- Itemisation **75** Separate items shall be provided for maintenance of arrester beds in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Maintenance of arrester bed.
II	1	Stated location.

Maintenance of Arrester Beds

76 The items for maintenance of arrester beds shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item Coverage
- (a) clearance of debris, litter and weed growth from granular material;
- (b) disposal of material (as Series 600 paragraph 39);
- (c) sweeping;
- (d) re-placing material on bed;
- (e) raking and levelling.

Repairs and Patching

- Units **77** The units of measurement shall be:
- (i) repairs to potholes, repairs to depressionskilogramme.
- (ii) patching square metre.
- Measurement **78** The measurement of repairs to potholes and repairs to depressions shall be the mass of specified material placed in the voids.
- 79** The measurement of patching shall be the area of the top surface of the patch.
- Itemisation **80** Separate items shall be provided for repairs and patching in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature	
I	1	Repairs to potholes.
	2	Repairs to depressions.
	3	Patching.
II	1	Different thicknesses.
III	1	Stated repair materials or system.
IV	1	In areas not exceeding 5 square metres.
	2	In areas exceeding 5 square metres but not exceeding 10 square metres.
	3	In areas exceeding 10 square metres but not exceeding 15 square metres and so on in steps of 5 square metres.

Note: Groups II & IV features shall be applied only to Group I feature 3.

Repairs and Patching 81

The items for repairs and patching shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) excavation of acceptable material (as Series 600 paragraph 18);
- (b) excavation of unacceptable material (as Series 600 paragraph 19);
- (c) excavation of hard material (as Series 600 paragraph 23);
- (d) disposal of material (as Series 600 paragraph 39);
- (e) milling (as this Series paragraph 28);
- (f) removing loose material and water;
- (g) tack coat (as this Series paragraph 24);
- (h) compaction and shaping;
- (i) forming joints and sealing.