Preparing Activity: USACE Superseding
UFGS-32 13 73 (April 2008)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION TABLE OF CONTENTS

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 32 13 73.19

COMPRESSION CONCRETE PAVING JOINT SEALANT

11/19

PART 1 GENERAL

1.1 UNIT PRICES
1.1.1 Measurement
1.1.2 Payment
1.2 REFERENCES
1.3 SUBMITTALS
1.4 QUALITY ASSURANCE
1.4.1 Trial Joint Seal and Lubricant/Adhesive Installation
1.5 SAFETY
1.6 DELIVERY, STORAGE, AND HANDLING
1.7 ENVIRONMENTAL REQUIREMENTS

PART 2 PRODUCTS

2.1 SYSTEM EQUIPMENT
2.1.1 Joint Cleaning Equipment
2.1.1.1 Concrete Saw
2.1.1.2 Sandblasting Equipment
2.1.1.3 Waterblasting Equipment
2.1.2 Sealing Equipment
2.1.3 Test Requirements
2.2 COMPRESSION SEALS
2.3 LUBRICANT/ADHESIVE

PART 3 EXECUTION

3.1 PREPARATION OF JOINTS
3.1.1 Sawing
3.1.2 Sandblast Cleaning
3.1.3 Waterblast Cleaning
3.1.4 Rate of Progress
3.2 INSTALLATION OF THE COMPRESSION SEAL
3.2.1 Time of Installation

3.2.2 Sequence of Installation
3.3 SEALING OF JOINTS
3.4 CLEAN-UP
3.5 QUALITY CONTROL PROVISIONS
3.5.1 Application Equipment
3.5.2 Procedures
3.5.2.1 Quality Control Inspection
3.5.2.2 Conformance to Stretching and Compression Limitations
3.5.2.3 Pavement Temperature
3.5.3 Acceptance

-- End of Section Table of Contents --

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SECTION 32 13 73.19

COMPRESSION CONCRETE PAVING JOINT SEALANT
11/19

NOTE: This guide specification covers the requirements for polychloroprene compression seals used for sealing joints of rigid pavements for airfields, roads, streets, hardstands, and other areas.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

PART 1 GENERAL

NOTE: For U.S. Air Force pavements, specify the uncompressed width of the seals to be used, and the width of the saw cut reservoir including tolerances. The minimum sawed joint seal reservoir width is 13 mm 1/2 in. The specified uncompressed seal width is twice the specified nominal saw cut reservoir width, i.e., for a 13 mm 1/2 in wide joint seal reservoir saw cut, specify a 25 mm 1 in uncompressed width joint seal.

Consider total joint opening and movement when specifying the size of the joint and seal. Consider

factors affecting the proper sizing of the joint seal to assure the seal remains within the allowable compression range and that the working range of the proposed seal is greater than the total movement of the joints. Follow the computational procedures in UFC 3-250-08FA Chapter 7, Appendix C. Factors to be considered are saw cut reservoir width including tolerances, maximum pavement thermal expansion and contraction, pavement shrinkage during curing and pavement temperature limitations during joint seal reservoir sawing.

Show on the drawings or specify in this section the compression joint seal size, general shape and dimensional tolerances, especially uncompressed seal width. Manufacturer's literature is helpful in determining the seal size with the anticipated joint movement.

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1.1 UNIT PRICES

****

NOTE: Delete paragraphs MEASUREMENT and PAYMENT for lump sum bidding.

****

1.1.1 Measurement

Determine the quantity of each sealing item to be paid by measuring the length of in-place material that has been approved.

1.1.2 Payment

Make Payment at the Contract unit bid prices per unit length for the sealing items scheduled, including approved trail joint installation. Include in the unit bid prices the cost of labor, materials, the use of equipment, and tools required to complete the work.

1.2 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile

references in the publish print process.
****

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM D412	(2016; R 2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
ASTM D2628	(1991; R 2016) Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements
ASTM D2835	(1989; R 2017) Standard Specification for Lubricant for Installation of Preformed Compression Seals in Concrete Pavements

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 548	(1988) Standard Specification for Jet-Fuel and Heat-Resistant Preformed Polychloroprene Elastomeric Joint Seals for Rigid Pavements

1.3 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a “G” to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification

and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment

Manufacturer's Instructions

SD-04, Samples

Compression Seals; G[, [_____]]

SD-06 Test Reports

Test Requirements; G[, [_____]]

1.4 QUALITY ASSURANCE

1.4.1 Trial Joint Seal and Lubricant/Adhesive Installation

Prior to the cleaning and sealing of the joints for the entire project, prepare a test section at least 61 m 200 ft long at a designated location in the project pavement, using the specified materials and the approved equipment to demonstrate the proposed joint preparation and sealing of the joints in the project. Following the completion of the trial length and before another joint is sealed, the Government will inspect the trial joints to determine that the materials and installation meet the requirements specified. If materials or installation do not meet requirements, remove the materials, and reclean and reseal the joints at no cost to the Government. Do not seal other joints until the test installation has been approved. If the trial section is approved, permit the section to be incorporated into the permanent work. Seal other joints in the manner approved for sealing the trial joint.

1.5 SAFETY

****

NOTE: Delete this paragraph if liquid oxygen (LOX) equipment, storage, or piping is not within the project area and renumber subsequent paragraphs. If LOX equipment, storage, or piping is within the project area, use continuously reinforced concrete slabs within the 7.5 m 25 ft clear area of LOX to reduce the number of joints. If joints cannot be eliminated within the clear area, then clean the

joints in the area and seal with a LOX compatible sealant that has been approved by Headquarters, U.S. Army Corps of Engineers (CEMP-ET) or the appropriate Air Force Major Command. The Major Command or CEMP-ET will be contacted to obtain a list of approved materials.

A MIXTURE OF LOX AND ORGANIC MATERIAL IS EXTREMELY FLAMMABLE, AND MAY SELF-IGNITE OR EXPLODE.

****

Do not place compression joint seals within 7.5 m 25 ft of liquid oxygen (LOX) equipment, LOX storage, or LOX piping.

1.6 DELIVERY, STORAGE, AND HANDLING

Inspect materials delivered to the jobsite for defects. Unload and store materials with a minimum of handling to avoid damage. Provide storage facilities that protect materials from weather and maintain materials within temperatures recommended by the manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

Install materials only when the ambient temperature and the pavement temperature within the joint wall is at least 2 degrees C 35 degrees F and rising. Do not permit sealant installation if moisture or foreign material is observed in the joint.

PART 2 PRODUCTS

2.1 SYSTEM EQUIPMENT

Provide machines, tools, and equipment, for use in the performance of the work required by this section, approved before the work is started, and maintained in satisfactory condition. Submit list of proposed machines, tools, and equipment to be used in the performance of joint sealing, including descriptive data, [_____] days prior to use on the project.

2.1.1 Joint Cleaning Equipment

2.1.1.1 Concrete Saw

Provide a self-propelled power saw with water-cooled diamond saw blades for cutting joints to the depths and widths specified and for removing filler, existing old joint seal, or other material embedded in the joints or adhered to the joint faces.

2.1.1.2 Sandblasting Equipment

****

NOTE: Sandblasting equipment with a 6 mm 1/4 in nozzle requires at least 3880 L 137 cubic ft per minute of air to function efficiently. A larger nozzle would not serve a useful purpose in cleaning a joint.

****

Include with the sandblasting equipment an air compressor, hose, and a

long-wearing venturi-type nozzle of proper size, shape, and opening. Do not permit the maximum nozzle opening to exceed 6 mm 1/4 in. Provide a portable air compressor capable of providing not less than 4200 L 150 cubic ft per minute and maintaining a line pressure of not less than 620 kPa 90 psi at the nozzle while in use. Use a compressor equipped with traps that maintains the compressed air free of oil and water. Use a nozzle with an adjustable guide that holds the nozzle aligned with the joint approximately 25 mm 1 in above the pavement surface and directs the blast to clean the joint walls. Adjust the height, angle of inclination, and the size of the nozzle to ensure satisfactory results.

2.1.1.3 Waterblasting Equipment

Include with the waterblasting equipment a trailer-mounted water tank, pumps, high-pressure hose, a wand with safety release cutoff controls, nozzle, and auxiliary water resupply equipment. Use a water tank and auxiliary water resupply equipment of sufficient capacity to permit continuous operations. Use pumps, hoses, wand, and nozzle of sufficient capacity to permit the cleaning of both walls of the joint and the pavement surface for a width of at least 13 mm 1/2 in on either side of the joint. Use a pressure gauge mounted at the pump that shows the pressure in kPa psi at which the equipment is operating.

2.1.2 Sealing Equipment

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NOTE: Do not permit single-axle seal application equipment; this tool tends to cause excessive stretching and may cut or distort the seal. The following subparagraph may be added only for road, parking lot, and street pavements less than 1800 square m 2,000 square yds, and for airfield and tracked pavements less than 450 square m 500 square yds in area:

"Use a hand operated joint seal application equipment that is a two-axle, four-wheel machine that includes means for compressing and inserting the compression seal into the joint and a reel capable of holding one full spool of compression seal. Provide auxiliary equipment to coat both sides of the joint or the seal with lubricant/ adhesive just prior to the installation of the compression seal."

****

Install the compression seal by placing the compression seal to the prescribed depths and within the specified tolerances without cutting, nicking, twisting, or otherwise damaging the seal. Use equipment capable of placing the seal with not more than two percent longitudinal stretch or compression of the seal during installation. Use a machine that is an automatic self-propelled joint seal application equipment and engine powered. Use a machine that includes a reservoir for the lubricant/adhesive, a device for conveying the lubricant/adhesive in the proper quantities to the sides of the compression seal or the sidewalls of the joints, a reel capable of holding one full spool of compression seal, and a power-driven apparatus for feeding the joint seal through a compression device and inserting the seal into the joint. Include a guide with the equipment to maintain the proper course along the joint being

sealed. Operate the machine by an experienced operator.

2.1.3 Test Requirements

Submit certified copies of test results, [_____] days prior to use of material on the project. Sample, identify and test each lot of compression joint seal and lubricant/adhesive for conformance with the material specification.

a. A lot of compression seal consists of 1 day's production or 6,000 m 20,000 linear ft for each cross section, whichever is less. A lot of lubricant/adhesive consists of 1 day's production. [Submit samples of the compression joint seal and lubricant/adhesive material to be tested by the Government. Do not permit use of material at the project prior to receipt of written notice that the materials meet the laboratory requirements.

b. The cost of testing the samples from each original lot supplied will be borne by the Government. If the samples fail to meet specification requirements, replace the materials represented by the sample and the new materials tested. Charge a cost of [_____] for Government testing of each lot of replacement material to the Contractor] [Testing of the compression joint seal and lubricant/adhesive material is the responsibility of the Contractor. Perform testing in an approved, independent laboratory, and submit certified copies of the test reports for approval [_____] days prior to the use of the materials at the jobsite.

c. Submit samples of each lot of material to be retained by the Government for possible future testing if the materials appear defective during or after application]. Provide additional samples of materials, in sufficient quantity to be tested, upon request. Base final acceptance on conformance to the specified test requirements and the performance of the in-place materials with respect to slipping down the joint or material coming out of the joint..

2.2 COMPRESSION SEALS

****

NOTE: The first statement will be selected for projects except where the project is less than 1200 m 4000 linear ft of compression joint seal material. When the project requires less than this amount of seal material, the first statement can be deleted and the second statement used. The cost of testing can be obtained from U.S. Army Engineer Waterways Experiment Station.

Allow the Contractor the option of the actual width of the joint seal. However, for guidance on unusual circumstances, or for resealing joints in existing pavement that have to be sawed out to an extra width, see UFC 3-250-08FA Chapter 7, "Standard Practice for Sealing Joints and Cracks in Rigid and Flexible Pavements."

****

Regardless of testing responsibility, submit 2.7 m 9 ft long samples of the materials, [60] [_____] days prior to use on the project. Provide

printed directions from the manufacturer on recommended installation criteria with the samples plus the manufacturer's certification that the selected seal is recommended for the installation on this project. Use compression joint seal materials that are vulcanized elastomeric compound using polychloroprene as the only base polymer. Use material and manufactured seal in accordance with [ASTM D2628] [ASTM D2628 and COE CRD-C 548 where jet fuel and/or heat blast resistance is required] as tested by ASTM D412. Use a labryinth seal for the joint seal. The uncompressed depth of the face of the compression seal (that is to be bonded to the joint wall) is greater than the uncompressed width of the seal, except that for seals 25 mm 1 in or greater in width, the depth need be only 25 mm 1 in or greater. The actual width of the uncompressed seal for construction and contraction joints is [21 or 25] [_____] mm [0.75 or 1] [_____] in and for expansion joints is [32][_____] mm 1.25 [_____] in. The tolerance on the seal is plus 3 mm or minus 1.5 mm plus 1/8 in or minus 1/16 in.

2.3 LUBRICANT/ADHESIVE

Use a lubricant/adhesive for the compression elastomeric joint seal that is a one-component compound conforming to ASTM D2835.

PART 3 EXECUTION

****

NOTE: Joint openings of uniform cross section are essential to satisfactory installation of the compression joint seal. Saw openings to provide smooth vertical faces of consistent width, within specified tolerances. Nonuniformity in width or roughness causes variations in resistance of the joint seal to insertion and results in irregular depth of insertion, stretching, and a tendency of the joint seal to twist so that the top of the seal is not at the surface.

The proper preparation of joints with respect to the size of joint opening, required cleanliness of vertical and parallel joint faces, and uniform contact between the seal and the joint face can not be overemphasized. The neglect of these operations can result and has resulted in poor performance of joint seals. For the repair of concrete pavements adjacent to the joints, refer to UFC 3-270-01, and Section 32 01 29.61 PARTIAL DEPTH PATCHING OF RIGID PAVING.

****

3.1 PREPARATION OF JOINTS

Immediately before installation of the compression joint seal, clean the joints to remove laitance, filler, existing sealer, foreign material and protrusions of hardened concrete from the sides and upper edges of the joint space to be sealed. Clean by sandblasting or waterblasting and extend along pavement surfaces at least 13 mm 1/2 in on either side of the joint. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave free of debris and water. Demonstrate that the selected cleaning operation meets the cleanliness requirements resulting in joint sidewalls that are clean and dry and

exhibit newly exposed concrete. Correct irregularities in the joint face which would prevent uniform contact between the joint seal and the joint face prior to the installation of the joint seal.

3.1.1 Sawing

****

NOTE: Requirements are based on giving the Contractor the option of using either nominal 21 mm 13/16 in or 25 mm 1 in wide compression seal. Select the required values from columns (3) and (4) of the following tables, based on the geographical area and the nominal sealant width to be used for this project.

The first table is metricated, followed by a similar tabulation in I-P units.

Area	(1) Expected Pavement Temperature Range in Service, Degrees C	(2) Nominal Uncompressed Sealant Width, mm	(3) Nominal Saw Cut, mm	(4) Allowable Pavement Temperature Range for Sawing, Degrees C
Southwest Desert Area	-12 to +71	20.6	12.7	+10 to +45
		25.4	14.3	+13 to +82
Southern U.S.	-18 to +57	20.6	12.7	-1 to +44
		25.4	14.3	-1 to +77
Other Contiguous U.S.	-35 to +57	20.6	12.7	-4 to +27
		25.4	14.3	-4 to +60
Alaska and Similar Areas	-57 to +44	20.6	11.1	+10 to +42
		25.4	12.7	+16 to +71
* Note in the project specifications to not install this seal in a saw cut less than 11 mm nor in an area if sawing at temperatures less than 10 degrees C.				

Area	(1) Expected Pavement Temperature Range in Service, Degrees F	(2) Nominal Uncompressed Sealant Width, in	(3) Nominal Saw Cut, in	(4) Allowable Pavement Temperature Range for Sawing, Degrees F
Southwest Desert Area	+10 to +160	13/16	8/16	+50 to +115
		1	9/16	+55 to +180
Southern U.S.	0 TO +135	13/16	8/16	+30 to +110
		1	9/16	+30 to +170
Other Contiguous U.S.	-30 to +135	13/16	8/16	+25 to +80
		1	9/16	+25 to +140
Alaska and Similar Areas	-70 to +110	13/16*	7/16	+50* to +105
		1	8/16	+60 to +160
* Note in the project specifications to not install this seal in a saw cut less than 71/6 IN nor in an area if sawing at temperatures less than 50 degrees F.				

The above tables are based on the following:

a. Tolerance from nominal specified width of uncompressed seal plus 3 mm 1/8 in and minus 1.5 mm 1/16 in.

b. Tolerance from nominal saw cut width plus or minus 1.5 mm 1/16 in.

c. Compress the compression seal at least 20 percent of its uncompressed width.

d. Do not permit compression seal to be compressed more than 60 percent of its uncompressed width (narrowest opening in hot weather is at least 40 percent of uncompressed seal width).

For unusual conditions and for resealing joints in existing pavements where the prepared joint is extra wide, compute values to insert in the blanks using the procedures given in UFC 3-250-08FA, Chapter 7, and the parameters given above. (Before the compression seal is used for resealing joints in existing pavements, it is common practice to resaw the joints, which provides a wider cavity. Hold the width of sawing to the same tolerance as specified for new pavements).

****

Clean and open joints to the specified width and depth by sawing. Immediately following the sawing operation, clean the joint faces and opening using a water jet to remove saw cuttings or debris remaining on the faces or in the joint opening. Install compression seal within 3 calendar days of the time the joint cavity is sawed. Provide a depth of the joint cavity in accordance with manufacturer's instructions. Where installation procedures are required in accordance with the manufacturer's recommendations, submit printed copies of manufacturers' instructions, [_____] days prior to use on the project. Center the saw cut for the joint seal cavity over the joint line. Provide the nominal width of the sawed joint seal cavity as follows:

a. If a nominal 20 mm 13/16 in wide compression seal is provided, the nominal width of the saw cut is [_____] mm in when the pavement temperature at the time of sawing is between [_____] and [_____] degrees C F. If the pavement temperature at the time of sawing is above this range, decrease the nominal width of the saw cut 1.5 mm 1/16 in. If the pavement temperature at the time of sawing is below this range, increase the nominal width of the saw cut 1.5 mm 1/16 in.

b. If a nominal 25 mm 1 in wide compression seal is provided, the nominal width of the saw cut is [_____] mm ins when the pavement temperature at the time of sawing is between [_____] and [_____] degrees C F. If the pavement temperature at the time of sawing is above this range, decrease the nominal width of the saw cut 1.5 mm 1/16 in. If the pavement temperature at the time of sawing is below this range, increase the nominal width of the saw cut 1.5 mm 1/16 in.

c. Measure the pavement temperature in the presence of the Contracting Officer. Make measurement each day before commencing sawing and when the temperature appears to be varying from the allowable sawing range.

Use a tolerance of plus or minus 1.5 mm 1/16 in for the actual width.

3.1.2 Sandblast Cleaning

****

NOTE: Delete this paragraph and paragraph entitled "SANDBLASTING EQUIPMENT" when sandblasting is prohibited.

****

Use a multiple pass sandblasting technique until the joint surfaces are free of dust, dirt, curing compound, or residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete.

3.1.3 Waterblast Cleaning

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NOTE: Waterblasting equipment varies considerably with respect to design of wand, nozzle, water pressure, and water volume depending upon the manufacturer. Consequently, the effectiveness of a particular set of equipment cannot be predicted. The joints may be waterblasted the previous day and cleaned with compressed air immediately prior to sealing. Inspect the joints to insure no foreign debris remains in the joint before sealing.

****

Use a multiple pass waterblast technique until the surfaces are free of dust, dirt, curing compound, or residue that might prevent ready insertion or uniform contact of the seal and bonding of the lubricant/adhesive to the concrete. After final cleaning and immediately prior to sealing, blow out the joints with compressed air and leave completely free of debris and water.

3.1.4 Rate of Progress

Limit sandblasting or waterblasting of joint faces to the length of joint that can be sealed during the same workday.

3.2 INSTALLATION OF THE COMPRESSION SEAL

****

NOTE: Temperatures of the pavement and the atmosphere are not as critical for the installation of compression joint seals as they are for poured sealants. Therefore, lower temperatures are acceptable, and under some conditions sealing can proceed satisfactorily at temperatures lower than 2 degrees C 35 degrees F. However, joints should be dry to obtain maximum cementing of the lubricant/adhesive to the concrete and contact manufacturers for special instructions under cold conditions.

Include the bracketed text in this paragraph on projects that the Contractor may not be familiar with this practice, predominantly OCONUS projects.

****

[Confirm a representative of the joint seal manufacturer is present at the trial joint installation to correct installation issues prior to full installation.
]

3.2.1 Time of Installation

Seal joints immediately within 3 calendar days of sawing the joint seal cavity and following concrete cure and the final cleaning of the joint walls. Provide open joints, ready for sealing that cannot be sealed under the specified conditions, with an approved temporary seal to prevent infiltration of foreign material. When rain interrupts the sealing operations, wash, clean with air pressure, and allow joints to dry prior to installing the lubricant/adhesive and compression seal.

3.2.2 Sequence of Installation

Seal longitudinal joints first, followed by transverse joints. Install seals in longitudinal joints so that transverse joint seals are intact from edge to edge of the pavement. Make intersections monolithic by use of joint seal adhesive and care in fitting the intersection parts together. Do not permit extender pieces of seal at intersections. Remove and replace seals falling short at the intersection with new seals at no additional cost to the Government. Require a poured sealant at the intersection where seals are required to change direction by more than 20 degrees. Provide poured sealant in accordance with compression seal

manufacturer's instructions.

3.3 SEALING OF JOINTS

****

NOTE: Do not permit stretching of the compression joint seal beyond the specified maximum, as breaks in the seal could occur later.

It is also possible that if the maximum is exceeded, when the longitudinal joints are cut to install the transverse joints that the joint seal material returns to its natural length leaving openings in the final product. Conversely, placing the seal so that the compression seal is compressed longitudinally is also undesirable, as this practice tends to cause unsightly undulations and may exceed depth of installation tolerances.

Use the minimum depth of the seal 6 mm 1/4 in below the surface of the pavement to prevent treads of tracked vehicles from damaging the compression seal if tracked vehicles are to use the pavement. Revise depth of installation to read "10 mm, plus or minus 3 mm" "3/8 in, plus or minus 1/8 in." On airfield pavements a shallower depth of installation may be desired by the using agency, to reduce the accumulation of dust and debris on top of the compression seal, which could be ingested by aircraft engines. In such cases, revise the depth of installation to read "5 mm, plus or minus 3 mm" "3/16 in, plus or minus 1/8 in", if requested in writing by the using service major command. It is also recommended when the compression seal in the longitudinal intersections are being cut that a knife blade be used to reduce the possibility of damage to the compression seal on either side of the intersection.

****

Cover the sides of the joint seal or the sides of the joint with a coating of lubricant/adhesive and the seal installed as specified. Coat butt joints and seal intersections with liberal applications of lubricant/adhesive. Immediately removed lubricat/adhesive spilled on the pavement to prevent setting on the pavement.

Provide the in-place joint seal will be in an upright position and free from twisting, distortion, and cuts. Adjustments will be made to the installation equipment and procedure, if the stretch exceeds 1 percent. Remove and replace seals exceeding 2 percent stretch. Place the joint seal at a uniform depth within the tolerances specified. Remove and replace in-place joint seals which fail to meet the specified requirements with new joint seal at no cost to the Government.

Place the compression joint seal to a depth of 6 mm 1/4 in, plus or minus 3 mm 1/8 in, below the pavement surface except when the joint is beveled or has a radius at the surface, or unless otherwise directed. For beveled joints or joints with a radius at the surface, install the compression joint seal at a depth of 3 mm 1/8 in, plus or minus 3 mm 1/8 in, below the

bottom of the edge of the bevel or radius. Do not permit the seal to project above the surface of the pavement or above the edge of the bevel or radius.

Install the seal in the longest practicable lengths in longitudinal joints and cut at the joint intersections to provide continuous installation of the seal in the transverse joints. Permit the lubricant/adhesive in the longitudinal joints to set for 1 hour prior to cutting at the joint intersections to reduce the possibility of shrinkage. For transverse joints, the minimum length of the compression joint seal is the pavement width from edge to edge.

3.4 CLEAN-UP

Upon completion of the project, remove unused materials from the site, remove lubricant/adhesive on the pavement surface, and leave the pavement in clean condition.

3.5 QUALITY CONTROL PROVISIONS

3.5.1 Application Equipment

Inspect the application equipment to assure uniform application of lubricant/adhesive to the sides of the compression joint seal or the walls of the joint. If equipment causes cutting, twisting, nicking, excessive stretching or compressing of the seal, or improper application of the lubricant/adhesive, suspend the operation until causes of the deficiencies are determined and corrected.

3.5.2 Procedures

3.5.2.1 Quality Control Inspection

Provide quality control provisions during the joint cleaning process to prevent or correct improper equipment and cleaning techniques that damage the concrete. Cleaned joints will be approved by the Government prior to installation of the lubricant/adhesive and compression joint seal.

3.5.2.2 Conformance to Stretching and Compression Limitations

Determine conformance to stretching and compression limitations. Mark the top surface of the compression seal at 300 mm 1 ft intervals in a manner clear and durable to enable length determinations of the seal. After installation, measure the distance between the marks on the seal. If the stretching or compression exceeds 2 percent, remove the seal and replace it with new joint at no additional cost to the Government. Remove the seal up to the last correct measurement. Inspect the seal a minimum of once per [30] [120] m [100] [400] ft of seal for compliance to the shrinkage or compression requirements. Make measurements at the same interval to determine conformance with depth and width of installation requirements. Remove and replace compression seal that is not in conformance with specification requirements with new joint seal at no additional cost to the Government.

3.5.2.3 Pavement Temperature

Determine the pavement temperature by placing a thermometer in the initial saw cut for the joint and record the reading. Pemrit the thermometer to remain in the joint for an adequate time to provide a stable control

reading.

3.5.3 Acceptance

Inspect the joint sealing system (compression seal and lubricant/adhesive) for proper rate of cure and bonding to the concrete, cuts, twists, nicks and other deficiencies. Remove, waste and replace seals exhibiting defects prior to final acceptance of the project from the joint.

-- End of Section --