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Preparing Activity: NASA Superseding
NASA-07920S (December 2005)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are NOT in agreement with UMRL dated 01 April 2006

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JOINT SEALANTS 04/06

NOTE: This guide specification covers the requirements for sealants for normal building construction.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

NOTE: This guide specification must be carefully modified if resealing or sealing of an addition to an existing building is required or if conditions require use of special sealing materials and designs such as high-rise curtain wall systems.

NOTE: On the drawings, show:

1. Joints in which each type of sealant will be used.
2. Typical scale or full-size details of sealant joints, indicating joint symbol or designation.

PART 1 GENERAL

1.1 REFERENCES

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 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 C 1311	(2002) Standard Specification for Solvent Release Sealants
ASTM C 509	(2000) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM C 570	(2000) Oil- and Resin-Base Caulking Compound for Building Construction
ASTM C 734	(2001) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering
ASTM C 834	(2001; R 2005) Standard Specification for Latex Sealants
ASTM C 919	(2002) Use of Sealants in Acoustical Applications
ASTM C 920	(2005) Standard Specification for Elastomeric Joint Sealants
ASTM D 1056	(2000) Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
ASTM D 1667	(2005) Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)

ASTM D 217

(2002) Cone Penetration of Lubricating Grease

ASTM E 84

(2005e1) Standard Test Method for Surface Burning Characteristics of Building Materials

1.2 SUBMITTALS

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation 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.

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" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation 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

Sealants

Primers

Bond breakers

Backstops

Manufacturer's descriptive data including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material.

SD-07 Certificates

Sealant

Certificates of compliance stating that the materials conform to the specified requirements.

1.3 ENVIRONMENTAL CONDITIONS

Apply sealant when the ambient temperature is between 4 and 32 degrees C 40 and 90 degrees F.

1.4 DELIVERY AND STORAGE

Deliver materials to the job site in unopened manufacturers' external shipping containers, with brand names, date of manufacture, [color,] and material designation clearly marked thereon. Label elastomeric sealant containers to identify type, class, grade, and use. Carefully handle and store materials to prevent inclusion of foreign materials or subjection to sustained temperatures exceeding 32 degrees C 90 degrees F or less than 4 degrees C 0 degrees F.

1.5 QUALITY ASSURANCE

1.5.1 Compatibility with Substrate

Verify that each of the sealants are compatible for use with joint substrates.

1.5.2 Joint Tolerance

Provide joint tolerances in accordance with manufacturer's printed instructions.

1.5.3 Mock-Up

Project personnel is responsible for installing sealants in mock-up [prepared by other trades], using materials and techniques approved for use on the project.

1.6 SPECIAL WARRANTY

Guarantee sealant joint against failure of sealant and against water penetration through each sealed joint for [five] [_____] years.

PART 2 PRODUCTS

2.1 SEALANTS

NOTE: Use Latex Sealant (ASTM C 834) for temporary,
low budget construction; interior sealing of joints

in wood or masonry, or in short joints between masonry, wood, or metal surfaces where maximum movement is anticipated not to exceed 15 percent of joint width.

Use elastomeric Sealants (ASTM C 920) for interior and exterior applications where maximum joint movement is anticipated to be between 25 and 50 percent of joint width.

Chemically curing sealants should not be used adjacent to or above membrane surfaces of asphaltic or bituminous materials; a sealant based on asphalt or bituminous materials similar to those in the membrane should be used.

Since all sealants meeting this specification are not suitable for all applications and substrates, specify applicable type, grade, class, and use(s) for each intended purpose:

Type S: Single-component

Type M: Multicomponent

Grade P: Pourable or self-leveling sealant for horizontal applications

Grade NS: Nonsag for vertical applications

Class 25: Withstands increase and decrease of at least 25 percent of joint width

Class 12.5: Withstands increase and decrease of at least 12.5 percent of joint width

Use T: Pedestrian and vehicular traffic areas such as walkways, plazas, decks, and parking garages

Use NT: Nontraffic areas, horizontal and vertical surfaces

Use M: Meets this specification when tested on mortar

Use G: Meets this specification when tested on glass

Use A: Meets this specification when tested on aluminum

Use O: Meets this specification when tested on substrates other than above. Specify substrate types in project specification.

Provide sealant that has been tested and found suitable for the substrates to which it will be applied.

2.1.1.1 Interior Sealant

Provide [ASTM C 834] [ASTM C 920, Type S or M, Grade NS, Class 12.5, Use NT]. Location(s) and color(s) of sealant for the following:

LOCATION	COLOR
a. Small voids between walls or partitions and adjacent lockers, casework, shelving, door frames, built-in or surface-mounted equipment and fixtures, and similar items.	[As selected] [Gray] [White] [_____]
b. Perimeter of frames at doors, windows, and access panels which adjoin exposed interior concrete and masonry surfaces.	[_____]
c. Joints of interior masonry walls and partitions which adjoin columns, pilasters, concrete walls, and exterior walls unless otherwise detailed.	[_____]
d. Joints between edge members for acoustical tile and adjoining vertical surfaces.	[_____]
e. Interior locations, not otherwise indicated or specified, where small voids exist between materials specified to be painted.	[_____]
f. Joints between bathtubs and ceramic tile; joints between shower receptors and ceramic tile; joints formed where nonplaner tile surfaces meet.	[_____]
g. Joints formed between tile floors and tile base cove; joints between tile and dissimilar materials; joints occurring where substrates change.	[_____]
h. Behind escutcheon plates at valve pipe penetrations and showerheads in showers.	[_____]
i. [_____]	[_____]

2.1.1.2 Exterior Sealant

For joints in vertical surfaces, provide ASTM C 920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C 920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows:

LOCATION	COLOR
a. Joints and recesses formed where frames and subsills of windows, doors, louvers, and vents adjoin masonry, concrete, or metal frames. Use sealant at both exterior and interior surfaces of exterior wall penetrations.	[Match adjacent surface color] [As selected] [Gray] [White] [_____]
b. Joints between new and existing exterior	[_____]

LOCATION	COLOR
masonry walls.	
c. Masonry joints where shelf angles occur.	[_____]
d. Joints in wash surfaces of stonework.	[_____]
e. Expansion and control joints.	[_____]
f. Interior face of expansion joints in exterior concrete or masonry walls where metal expansion joint covers are not required.	[_____]
g. Voids where items pass through exterior walls.	[_____]
h. Metal reglets, where flashing is inserted into masonry joints, and where flashing is penetrated by coping dowels.	[_____]
i. Metal-to-metal joints where sealant is indicated or specified.	[_____]
j. Joints between ends of gravel stops, fascias, copings, and adjacent walls.	[_____]
k. [_____]	[_____]

2.1.3 Floor Joint Sealant

ASTM C 920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows:

LOCATION	COLOR
a. Seats of metal thresholds for exterior doors.	[As selected] [Gray] [White] [_____]
b. Control and expansion joints in floors, slabs, ceramic tile, and walkways.	[_____]

2.1.4 Acoustical Sealant

NOTE: See ASTM C 919 for use of acoustical sealant.
The acoustical sealant described here is to be used
only in non-moving joints protected from abuse.
Other specified sealants may be used in acoustical
applications when appropriate.

[_____] Rubber or polymer-based acoustical sealant conforming to ASTM C 919 must have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E 84. Acoustical sealant must have a consistency of 250 to 310 when tested in accordance with ASTM D 217, and must remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C 734, and must be non-staining.

2.1.5 Preformed Sealant

Provide preformed sealant of polybutylene or isoprene-butylene based pressure sensitive weather resistant tape or bead sealant capable of sealing out moisture, air and dust when installed as recommended by the manufacturer. At temperatures from minus 34 to plus 71 degrees C 30 to plus 160 degrees F, the sealant must be non-bleeding and no loss of adhesion.

2.1.5.1 Tape

[_____] Tape sealant: Provide cross-section dimensions of [_____] .

2.1.5.2 Bead

[_____] Bead sealant: Provide cross-section dimensions of [_____] .

2.1.5.3 Foam Strip

NOTE: Untreated polyurethane foam can be used where
exposed to view or where staining of adjacent
surfaces is not acceptable.

Provide [_____] foam strip of polyurethane foam; with cross-section dimensions of [_____] . Provide foam strip capable of sealing out moisture, air, and dust when installed and compressed as recommended by the manufacturer. Service temperature must be minus 40 to plus 135 degrees C minus 40 to plus 275 degrees F. Furnish untreated strips with adhesive to hold them in place. Do not allow adhesive to stain or bleed into adjacent finishes. Saturate treated strips with butylene waterproofing or impregnated with asphalt.

2.2 PRIMERS

Provide a nonstaining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

2.3 BOND BREAKERS

Provide the type and consistency recommended by the sealant manufacturer to prevent adhesion of the sealant to backing or to bottom of the joint.

2.4 BACKSTOPS

Provide glass fiber roving or neoprene, butyl, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell and 40 to 50 percent oversized backing for open cell material, unless otherwise indicated. Make backstop material compatible with sealant. Do not use oakum [, [_____]] and other types of absorptive materials as backstops.

2.4.1 Rubber

NOTE: Class A is adequate for most applications.

Select Class B for petroleum oil or fuel resistance.
Select Class D for temperatures of minus 75 to 175
degrees C (minus 103 to 347 degrees F) with no oil
exposure.

Specify Type 2 closed cell when moisture may migrate
to the backing.

Conform to **ASTM D 1056**, [Type 1, open cell,] [or] [Type 2, closed cell,]
Class [A] [B] [D], Grade [____], [round] [____] cross section for [____]
cellular rubber sponge backing.

2.4.2 PVC

**NOTE: Do not use open cell vinyl foam in moist
areas or below grade.**

Conform to **ASTM D 1667**, Grade [VO 12] [____], open-cell foam, [round]
[____] cross section for [____] Polyvinyl chloride (PVC) backing.

2.4.3 Synthetic Rubber

**NOTE: Use Option I and Type I for most
applications. Select Option II only if flame
resistance is NOT required. Type II provides the
highest ozone resistance.**

Conform to **ASTM C 509**, Option [I] [II], Type [I] [II] preformed [rods] [or]
[tubes] for [____] Synthetic rubber backing.

2.4.4 Neoprene

Conform to **ASTM D 1056**, [closed cell expanded neoprene cord Type 2, Class
C, Grade [2C2] [____]] [open cell neoprene sponge Type 1, Class C, Grade
[1C3] [____]] for [____] Neoprene backing.

2.4.5 Butyl Rubber Based

Provide Butyl Rubber Based Sealants of single component, solvent release,
color [as selected] [____], conforming to **ASTM C 1311**.

2.4.6 Silicon Rubber Base

Provide Silicon Rubber Based Sealants of single component, solvent release,
color [as selected] [____], conforming to **ASTM C 920**, Non-sag, Type
[____], Grade [____], Class [25] [____].

2.5 CAULKING

**NOTE: The term "caulking" is limited herein to oil-
and resin-based caulking which should be used only
indoors and where there is little or no anticipated
joint movement. Use a sealant where joints may move.**

Conform to **ASTM C 570**, Type [____], for [____] Oil- and resin-based caulking.

2.6 CLEANING SOLVENTS

Provide type(s) recommended by the sealant manufacturer [except for aluminum and bronze surfaces that will be in contact with sealant].

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Clean surfaces from dirt frost, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Remove oil and grease with solvent. Surfaces must be wiped dry with clean cloths. When resealing an existing joint, remove existing calk or sealant prior to applying new sealant. For surface types not listed below, contact sealant manufacturer for specific recommendations.

3.1.1 Steel Surfaces

Remove loose mill scale by sandblasting or, if sandblasting is impractical or would damage finish work, scraping and wire brushing. Remove protective coatings by sandblasting or using a residue-free solvent.

3.1.2 Aluminum or Bronze Surfaces

Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive just prior to sealant application. For removing protective coatings and final cleaning, use nonstaining solvents recommended by the manufacturer of the item(s) containing aluminum or bronze surfaces.

3.1.3 Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, remove materials by sandblasting or wire brushing. Laitance, remove efflorescence and loose mortar from the joint cavity.

3.1.4 Wood Surfaces

Keep wood surfaces to be in contact with sealants free of splinters and sawdust or other loose particles.

3.2 SEALANT PREPARATION

Do not add liquids, solvents, or powders to the sealant. Mix multicomponent elastomeric sealants in accordance with manufacturer's instructions.

3.3 APPLICATION

3.3.1 Joint Width-To-Depth Ratios

- a. Acceptable Ratios:

<u>JOINT WIDTH</u>	<u>JOINT DEPTH</u>	
	Minimum	Maximum
For metal, glass, or other nonporous surfaces:		
6 mm (minimum)	6 mm	6 mm
over 6 mm	1/2 of width	Equal to width
For wood, concrete, masonry, stone, or [____]:		
6 mm (minimum)	6 mm	6 mm
Over 6 mm to 13 mm	6 mm	Equal to width
Over 13 mm to 50 mm	50 mm	16 mm
Over 50 mm	(As recommended by sealant manufacturer)	

<u>JOINT WIDTH</u>	<u>JOINT DEPTH</u>	
	Minimum	Maximum
For metal, glass, or other nonporous surfaces:		
1/4 inch (minimum)	1/4 inch	1/4 inch
over 1/4 inch	1/2 of width	Equal to width
For wood, concrete, masonry, stone, or [____]:		
1/4 inch (minimum)	1/4 inch	1/4 inch
Over 1/4 inch to 1/2 inch	1/4 inch	Equal to width
Over 1/2 inch to 2 inch	1/2 inch	5/8 inch
Over 2 inch.	(As recommended by sealant manufacturer)	

- b. Unacceptable Ratios: Where joints of acceptable width-to-depth ratios have not been provided, clean out joints to acceptable depths and grind or cut to acceptable widths without damage to the adjoining work. Grinding is not required on metal surfaces.

3.3.2 Masking Tape

Place masking tape on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Remove masking tape within 10 minutes after joint has been filled and tooled.

3.3.3 Backstops

Install backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide a joint of the

depth specified. Install backstops in the following locations:

- a. Where indicated.
- b. Where backstop is not indicated but joint cavities exceed the acceptable maximum depths specified in paragraph entitled, "Joint Width-to-Depth Ratios."

3.3.4 Primer

Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete masonry units, wood, and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.

3.3.5 Bond Breaker

Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for each type of joint and sealant used, to prevent sealant from adhering to these surfaces. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

3.3.6 Sealants

Provide a sealant compatible with the material(s) to which it is applied. Do not use a sealant that has exceeded shelf life or has jelled and can not be discharged in a continuous flow from the gun. Apply the sealant in accordance with the manufacturer's printed instructions with a gun having a nozzle that fits the joint width. Force sealant into joints to fill the joints solidly without air pockets. Tool sealant after application to ensure adhesion. Make [sealant](#) uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply sealant, and tool smooth as specified. Apply sealer over the sealant when and as specified by the sealant manufacturer.

3.4 PROTECTION AND CLEANING

3.4.1 Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

3.4.2 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

- a. Masonry and Other Porous Surfaces: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding.

- b. Metal and Other Non-Porous Surfaces: Remove excess sealant with a solvent-moistened cloth.

-- End of Section --