

**Expansion Joint Guide Specifications**

Specifier Note: The purpose of this guide specification is to assist the specifier in correctly specifying expansion joint products and incorporating quality assurance measures to ensure a successful installation. The specifier needs to edit the guide specifications to fit the needs of specific projects.

Contact an MM Systems Expansion Joint Specialist to assist in appropriate product selections and specification development.

Email Contact: ProductSpecialist@mm-usa.com or Phone: 706-824-7500

MM SYSTEMS

50 MM Way

Pendergrass GA 30567

Attn: National Product Specialist

Throughout the guide specification, there are Specifier notes to assist in editing of the file.



To view non-printing **Editor's Notes** that provide guidance for editing, toggle the “Paragraph” button to open and close.

The specifier needs to select project specific requirement where Brackets [ ]; “AND/OR”; and “OR” have been used to indicate when a selection is required.

SPECIFICATION

**Sections 07 71 29**

 **RX Series - Roof Expansion Joint**

# PART 1 – GENERAL

* 1. WORK INCLUDED
1. The work shall consist of furnishing and installing horizontal metal roof expansion joints capable of accommodating thermal and seismic movement in accordance with the details shown on the plans and the requirements of the specifications. The roof joint assembly shall consist of a metal slide plate with specified finish and of appropriate width to satisfy the specified movement requirements. Slide plate is secured utilizing wind-load engineered self-centering bar resisting vertical uplift.
2. Related Work
* Section 07 71 29 Roof Expansion Joints
* Section 07 91 00 Preformed Joint Seals
* Section 07 95 13.13 Interior Expansion Joint Cover Assemblies
* Section 07 95 13.16 Exterior Expansion Joint Cover Assemblies
* Section 07 95 13.19 Parking Expansion Joint Cover Assemblies
	1. DEFINITIONS (specifier can add actual joint gap values in A through E below)
1. Nominal Joint Width – the width of the linear opening based on an average mean temperature of 60 degrees Fahrenheit (15 degrees Celsius).
2. Maximum Thermal Joint Width – widest linear structural joint opening expected for normal thermal contraction of the structure.
3. Maximum Seismic Joint Width – widest linear structural joint opening expected during a seismic event.
4. Minimum Thermal Joint Width – narrowest linear opening expected for normal thermal expansion of the structure.
5. Minimum Seismic Joint Width – narrowest linear opening expected during a seismic event without damaging the structure.
6. Total Movement Capability – value obtained from the difference between the widest and narrowest joint opening expressed in inches (or millimeters).
	1. ACTION SUBMITTALS
7. Standard Submittal Package – submit typical expansion joint placement drawing(s) indicating pertinent dimensions, general construction, expansion joint locations, joint opening dimensions, and product information.
8. Sustainable Design Submittals
9. Recycled Content – provide product data for recycled content indicating post-consume and pre-consumer recycled content.
10. Samples – submit 3D virtual samples demonstrating expansion joint movement and its functioning components thereby fostering an eco-friendly alternative that complies with US Green Building Council initiatives.
11. Independent Third-party Analysis – submit independent analysis from a licensed professional engineer in State of [list state] confirming compliance with the following: (professional engineer should be licensed in the state where the project is located)
12. Provide stamped wind load analysis test report for each product validating structural uplift capability including forces transferred to the structure, maximum anticipated wind speeds, and dead load forces.
13. Provide independent stamped ASTM E1399 cycling test report along with minimum and maximum specified joint movement capability.

## Quality AssurancE

1. Pre-construction Meeting – the General Contractor, Engineer/Architect, Concrete Subcontractor, Manufacturer’s Representative and Certified Contractor, will conduct a pre-construction meeting to discuss joint gap construction, joint gap settings, construction phasing and quality assurance.
2. Joint Opening Adjustment – the General Contractor shall consult with the Project Engineer to adjust the nominal joint opening the day of substrate construction. Provide a temperature adjustment table with expansion joint openings calculated in five (5ºF) degree increments based on a temperature range of [-20ºF to 120ºF / adjust for project] to allow for proper joint sizing.
3. Pre-installation Inspection – the General Contractor, Engineer, Architect, Manufacturer’s Representative and Certified Installer, will conduct a pre-installation project site inspection. The General Contractor shall provide a field report that summarizes the project conditions and any remedial action necessary to correct field conditions (substrate, joint size, non-parallel sidewalls, vertical offsets, etc.) that may affect expansion joint system performance.
4. Mockups – build one mockup for each expansion joint style as specified herein to demonstrate aesthetic standards and to set quality standards for materials and execution. Minimum 10-feet for each. Approval of mockups does not constitute acceptance of deviations. Use step-by-step layering method thereby exposing individual components to establish the quality standard for specific joint type installation. Subject to compliance, approved mockup may become part of completed work. (Mockups should remain in place until the end of the project to allow installers to reference proper substrate preparation, proper joint opening dimensions, and acceptable tolerances)
5. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
6. Review Contract Document requirements and approved submittals.
7. Review inspection and testing requirements.
8. Evaluate environmental conditions and procedures for managing unfavorable site conditions.
9. Resolve deviations or differences between existing site conditions, Contract Documents, and the Manufacturer's Specifications.
10. General Contractor to document deviations and remediation agreements and then prepare and issue a Quality Assurance Field Report to all parties.
11. Experience – the installer shall provide proof of certification from manufacturer and proof of participation in manufacturer’s continuing education program.

(proper training is the key to the process of understanding minimum substrate standards for a proper expansion joint installation)

## COORDINATION

##  (Expansion joints are typically one of the last purchases on a construction project. However, proper joint opening construction is one of the first quality control items on a project. By selecting the expansion joint manufacturer at the beginning of the project the necessary quality assurance measures can be implemented in a timely manner.)

1. General Contractor shall award expansion joint contract prior to substrate construction to allow quality control coordination as described in section 1.04.
2. Schedule for work in this section shall be planned to allow sufficient time for submittals to be approved and timely production and delivery by manufacturer.
3. General Contractor to coordinate installation of products and systems with interfacing and adjoining construction to provide a suitable and quality installation.
4. Installation Contractor working with the General Contractor shall ensure project wind load requirements are communicated to the expansion joint manufacturer prior to production.

## PRODUCT Delivery, Storage, and Handling

* 1. Deliver products to site in manufacturer’s original, unopened, labeled containers and store under cover in a dry location until installed.
	2. Inspect materials upon arrival. Notify manufacturer within two business days of any damage caused during delivery and handling.
	3. Store components in original containers off the ground in a clean and dry location. Ensure temperature or moisture sensitive components are stored in a tempered location.
	4. General Contractor to provide protective covering on all installed finished surfaces. Protection is required to guard against damage during construction.

## WARRANTY

1. The Manufacturer and Certified Installer jointly warrant to the Owner that the expansion joint system shall be free from manufacturing, material, and installation defects for a period of one (1) year from the date of installation, based on specified movements and design conditions and when installed in accordance with manufacturer’s guidelines and recommendations. The General Contractor assumes responsibility for deficiencies due to concrete and substrate defects.

## PART 2 – PRODUCT

* 1. MANUFACTURER
1. Furnish and install expansion joints as noted in specifications and as indicated on drawings as manufactured by MM Systems, 50 MM Way, Pendergrass, GA, 30567 Phone 800.241.3460 / www.designassist@mm.systems / Web www.mm.systems
2. Basis of Design (Product Standard) – Contract Documents are based on project specific designs by MM Systems as specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered for future projects.
3. Single Source Limitations – obtain all expansion joints from single manufacturer.

(single source responsibility provides essential coordination of loading, waterproofing and life safety fireproofing requirements)

* 1. GENERAL
1. Furnish basis of design RX Series Roof Expansion Joint (RX-H / roof-to-roof and RX-J / roof-to-wall) manufactured by MM Systems.
2. Metal horizontal roof expansion joint sealing system shall be be water resistant and provide necessary thermal movement requirements and multi-directional seismic movement capability.
3. System shall of accommodate [select 50% or 100%] cyclical movement without stress to system components.
4. Seismic Centering Bar with solid nylon spherical ball ends lock, slide and rotate freely in an extruded base frame. The device shall firmly secure the roof covers while allowing it to cycle and return to its natural position after a seismic occurrence.
5. System shall accommodate accelerated seismic inward and outward movement without evidence of fatigue or permanent deformation while continuously providing a secure connection between the roof cover and underlying base frame assembly.
6. Select the system size at each joint location based on the movement and design requirements that meet the project specification or as defined by the structural engineer of record.
7. The Certified Installer must provide written confirmation, utilizing manufacturer’s product data ensuring the model and size selected will comply with and accommodate expansion, contraction, displacement, and lateral shear throughout the full movement cycle.

(Historically, 80% of joint sizing problems are a result of the lack of coordination during the initial construction of the structural joint opening. The ideal time to measure the joint opening is at the coldest temperature when the joint is at its widest point. Confirming the as-built dimensions will allow for proper sizing of the expansion joint assembly.)

* 1. Materials AND COMPONENTS
1. Aluminum Extrusions - Material to conform to properties of ASTM B221, alloys 6063-T5, 6005A-T6, 6061-T6.
2. Aluminum Plate – ASTM B209, alloys 6061-T6, 5052-H32.
3. Rubber Gutter – Flexible EPDM Rubber, Class I, ASTM D4637, 45 mils (minimum) adhered with Microwaterseal Waterproofing Tape.
4. Fasteners – provide manufacturer’s recommended fasteners required for assembly and installation designed to accommodate specified loads. Spacing determined by independent analysis.
	1. Life Safety – Fire Barrier Systems (as required)
5. Provide PyroFlex Fire Barrier Systems (PF Series), as manufactured by MM Systems. Supply fire-resistive barrier systems that have ratings equal to or greater than the rating of adjacent construction when tested in accordance with ASTM E1966 and ASTM E119. Provide specified (2, 3 or 4 hour) rated fire barrier expansion joint assembly.
6. Designed for specified dynamic structural movement without material degradation or fatigue when tested according to ASTM E 1399. Tested in maximum joint width condition with a simulated field splice.
7. Fire Barrier System shall have been tested to the maximum joint opening as defined by ASTM E1399 which meets or exceeds the maximum joint opening required by the project design requirements.
8. Must be tested and listed by a nationally accredited independent testing laboratory in accordance with UL 2079, or ASTM E1966. Include hose stream test where applicable.
	1. Fabrication
9. Aluminum Roof Cover – manufactured and shipped in 10-foot lengths. The installation contractor shall be responsible for field cutting metal profiles to obtain the proper roof joint profile. (all MM roof covers are engineered to accommodate specified wind uplift loads through utilization of various grades of metal, structural supports and tensioning devices)
10. Rubber Gutter - ship in the longest practical continuous length on manufacturer’s standard reel or in cartons. Microwaterseal Waterproofing Tape supplied in 50-foot rolls. (Microwaterseal Waterproofing Tape is uncured rubber with adhesives blended in and remains flexible throught it service life while providing a tenacious bond between surfaces)
11. Aluminum Mounting Frame - shipped in standard 10-foot lengths and cut to length at jobsite as required. All profiles shall be miter cut in the field to conform to directional changes unless otherwise contracted with expansion joint manufacturer.
12. Fire Barriers (as required) - ship manufacturer’s standard assembly for the required hourly rating with ends prepared for field splicing. Assemblies shall be miter cut in the field to accommodate changes in direction.
	1. Finishes [select A or B]
13. Aluminum Mill Finish Roof Cover:
	1. Mill-finish aluminum extrusions, AA-M10.
	2. Seismic Pan infill material to match surrounding finished floor material installed and supplied by flooring contractor.
14. High Performance Warranty Roof Cover with 20 Year Warranty:
	1. PVDF2 High Performance Finish (polyvinylidene fluoride coating system)
	2. MM Systems Super-Cote 1 Coating System:
15. Pre-treatment is a factory applied seven-step chromate conversion coating prior to application of high-performance coating.
16. Two-coat, shop-applied, baked-on 70% fluoropolymer coating system based on Elf Atochem, Inc., Kynar 500 or Ausimont U.S.A., Inc., Hylar 5000 resin  (polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by expansion joint manufacturer to meet AAMA 605.2-90.
17. Provide minimum 1.2 mil dry film thickness consisting of 0.2 to 0.4 mil primer and minimum 1.0 mil color coat, baked on at 450 degrees F. metal temperature.
18. Color:  selected by owner from manufacturer's standard color selection or approved custom color match formulated by expansion joint manufacturer.
	1. Powder coatings are not an acceptable alternate.

## PART 3 – EXECUTION

* 1. Installation
1. Preparation of the Work Area
2. The contractor shall provide properly formed and sized expansion joint openings constructed to the exact dimensions shown on manufacturer’s standard system drawings or as shown on the contract drawings.
3. The contractor shall insure that the joint opening sidewall interfaces run parallel to each other for the entire length of the joint. Sidewalls should be plumb, and interfaces must be continuously equidistant from each other across the joint width to accommodate the proper installation of the expansion joint sealing system.
4. The contractor shall provide proper and adequate adjacent construction to receive and support the horizontal roof expansion joint system. The supporting framework shall be of proper design to rigidly secure all anchors and hardware to insure proper installation and function of the joint system.
5. Installation of HORIZONTAL ROOF Expansion Joint System
6. Refer to Manufacturers Installation Guide for step-by-step installation instructions.
7. Uncoil the rubber gutter and allow it to relax to relieve any temporary coiling from shipment packaging. The gutter shall be cut to the correct length without pulling or exerting excess tension.
8. Attach rubber gutter to the structural substrate with double-sided Microwaterseal Waterproofing Tape.
9. Install aluminum base frame with fasteners at interval recommended by manufacturer as shown on placement drawings but not less than 3-inches from each frame segment end.
10. Shimming is NOT allowed. Provide continuous support for base frames to prevent vertical deflection when in service.
11. Insert vinyl anti-vibration weather seal into the snap-lock lugs of the aluminum base frames.
12. Install seismic centering bars and roof cover in strict accordance with manufactures installation instructions.
13. Field Seal Splices and Mitered Directional Changes shall be field fabricated by Installation Contractor.
	1. Clean and Protect
14. Protect the system and its components during construction by work from other trades.
15. Where required, remove and store expansion joint cover assemblies and install temporary protection over joints. Re-install prior to substantial completion of work.
16. Do not remove protective coverings until finish work in adjacent areas is complete.
17. Prior to project closeout, clean exposed surfaces with a suitable cleaner that will not harm or attack the finish of the concrete or system.

END OF SECTION