SPECIFICATION

**Wabo®MDM TransFlex**

**Model “MDM”**

**Multi-directional Movement Segmental Plate Expansion Joint Assembly**

**SECTION I –** **General**

1.01 Work Included

A. The work shall consist of furnishing and installing a multi-directional movement (MDM) segmental plate expansion joint assembly that will accommodate large differential displacements, rotations and service movements as well as seismic movements (if required). The multi-directional movement segmental plate expansion joint assembly shall consist of steel plates, welded channel assemblies. elastomeric segmental panels, anchorage devices, spring assemblies, sealants, antiskid / slip steel surface coating and elastomeric concrete. The assembly shall be designed, fabricated, inspected and installed as shown on the plans and approved working drawings and as specified in the standard specifications and these special provisions.

1.02 Acceptable Manufacturers

A. The multi-directional movement (MDM) segmental plate expansion joint assembly shall be the Wabo®MDM TransFlex– Model(s) MDM-XXXX supplied by:

Watson Bowman Acme Corporation,

95 Pineview Drive,

Amherst, New York 14228

(800) 677-4922

www.watsonbowmanacme.com

B. Only manufacturers who have successfully completed system testing validation and have a minimum five years installation history of multi-directional movement (MDM) segmental plate expansion joint assemblies will be considered.

1.03 Quality Control Program

A. Manufacturer shall be ISO-9001:2015 certified and shall provide written confirmation that a formal Quality Management System and Quality Processes have been adopted in the areas of (but not limited to) Engineering, Manufacturing, Quality Control and Customer Service for all processes, products and their components. Alternate manufacturers will be considered provided they submit written proof that they are ISO 9001:2015 certified prior to the project bid date.

B. The contractor shall submit a written Quality Control program for review and approval by the engineer. Fabrication of the expansion joint shall not be started until the quality control program has been approved. The Quality Control program shall include, but is not limited to, the following:

* Quality control procedures manual for the manufacturer’s in-house quality control group including manufacturing expansion joint dimensions and alignment.
* Methods and equipment for handling and transporting joint assemblies prior to final installation.

**SECTION II – Product Requirements**

2.01 General

A. Provide a multi-directional movement (MDM) segmental plate expansion joint assembly which can accommodate the structure’s service and seismic movements.

B. The design of the multi-directional movement (MDM) segmental plate expansion joint assembly shall consist of four main design components: the deck plate, the elastomeric segmental panels, the support plate and the welded channel/box assembly.

C. The deck plate shall be bolted to the welded channel/box assembly and include a neoprene sheet and flexible elastomeric washers while the other end is free to move. The deck plate shall be rigid with a minimum thickness of 2.0 inches to maintain minimal deflection and bending stress under live loads. The total length of the deck plate shall be determined by the seat/support widths and the service and seismic requirements (if required).

D. The top of plate shall receive an antiskid coating or machined pattern. Wabo®Silicone Seal, an ASTM C-920, Type M, Grade P, Class 100/50, Use T silicone sealant shall be used to seal the gaps between deck plates as well as the bolt hole cavities.

E. The elastomeric segmental panels shall be supplied by Watson Bowman Acme with a TransFlex-style model designed to accommodate the service movements.

F. The support plate shall be anchored into self-consolidating concrete (SCC) with shear studs. On the sliding side, the deck plate will be supported by the support plate. Use of SCC is specified to fill the blockout under the support plate in order to minimize voids and segregation while ensuring maximum effective bearing area.

G. A neoprene sheet shall be placed between the deck plate and channel assembly to improve bearing. The welded channel/box assembly shall also include steel stiffeners in the transverse direction. The welded channel/box assembly shall include 2 rows of high strength bolts with elastomeric springs to form the bolted connection. Each high strength bolt shall include elastomeric and steel washers and be locked in place with double nuts and a cotter pin. The size and configuration of the welded channel/box assembly shall be determined by the minimum access required.

H. Only manufacturer’s and MDM segmental plate joint designs that have successfully passed full scale accelerated load testing and 5-year installation history shall be allowed.

* 1. Design

1. The Contractor shall submit design calculations for the expansion joint for review and approval by the engineer at the time of working drawing submittal. Fabrication of the multi-directional movement (MDM) segmental plate expansion joint assembly shall not be started until the design calculations have been approved.
2. Engineer to submit system information as shown on Wabo®MDM design table.
3. The working drawings shall include complete details, information and drawings of the multi-directional movement (MDM) segmental plate expansion joint assembly and anchorage components including proposed materials. Fabrication of the expansion joint system shall not be started until the shop drawings have been approved.
4. Working drawings shall show plans, elevations and sections of the joint assembly for each movement rating and location as shown on the plans. All dimensions and design tolerances must be shown. Working drawings shall include at a minimum the following:

* Joint details at curbs.
* All ASTM or other material designations.
* Required blockout sizes to install the multi-directional movement (MDM) segmental plate expansion joint assembly.
* Fabrication plans for deck plates, support plates and channel assemblies.
* Recommended details of temporary supports for shipping and handling and installation.
* Instructions for the proper installation of multi-directional movement (MDM) segmental plate expansion joint assembly shall submitted with the working drawings.
* All weld details.

2.03 Materials

A. All component parts for the multi-directional movement (MDM) segmental plate expansion joint assembly shall be supplied by the Manufacturer. The Manufacturer shall certify that the following components meet the listed requirements:

* Structural steel plates/beams and channel assemblies shall comply to the requirements of ASTM A709/A709M.
* High strength bolts shall comply to the requirements of ASTM A 449 Type 1.
* Pins shall comply to the requirements of ASTM A325.
* Elastomeric washers for spring assemblies shall be manufactured from a thermoplastic elastomer and comply at minimum to the requirements of

ASTM D412

* Anchor studs shall comply to the requirements of ASTM A108.
* All steel product materials shall meet the requirements of Buy America when applicable.
* Elastomeric Segmental Panel must meet project specified service requirements and consist of the following:

|  |  |
| --- | --- |
| PROPRIETARY PRODUCT | ADDRESS AND PHONE NUMBER |
| Wabo®MDM TransFlex Elastomeric Segmental Panel Model No xxxx | Watson Bowman Acme Corp 95 Pineview Drive Amherst, NY 14228 (800) 677-4922  www.watsonbowmanacme.com |
| Wabo®MDM Trelleborg Transflex Elastomeric Segmental Panel Model No xxxx | Watson Bowman Acme Corp 95 Pineview Drive Amherst, NY 14228 (800) 677-4922  www.watsonbowmanacme.com |

* Standard Elastomeric Segmental Panel must be tongue-and-groove edges for a snug joining of section joining.
* Two-part silicone sealant shall be Wabo®Silicone Seal, a cold applied, two component, self-leveling, low modulus silicone sealant manufactured by Watson Bowman Acme Corp., 95 Pineview Drive, Amherst, NY 14228, (800) 677-4922. Silicone sealant shall comply to the requirements of ASTM C-920, Type M, Grade P, Class 100/50, Use T
* Elastomeric concrete shall be Wabo®Crete II, a two-component polyurethane expansion joint header with specialty aggregate polyurethane manufactured by Watson Bowman Acme Corp., 95 Pineview Drive, Amherst, NY 14228, (800) 677-4922. Elastomeric concrete shall comply to the requirements of:

|  |  |  |
| --- | --- | --- |
| Elastomeric Concrete Binder and Aggregate | | |
| PHYSICAL PROPERTIES | ASTM TEST METHOD | REQUIREMENTS |
| Resilience @5% deflection | D695 | 90% min. |
| Compressive Strength | D695 modified | 2200 psi min. |
| Impact | See Note 1 |  |
| PCC Saturated Surface-Dry Bond Strength | See Note 2 | 400 psi min. |
| Notes:  1 - Specimens are cast discs with a 2.5" diameter and 0.375" thickness. Specimens are conditioned for four hours at test temperatures. A one-pound steel ball is dropped onto the center of the specimen through a plastic tube from an initial height of 5 feet. The drop height is increased by intervals until the specimen cracks.  2 - The briquette is sawed in half so that the cut surface area equals approximately 1 square inch. Surface is blasted and placed in a mold. Wabo®Crete II is cast against it. Specimen is submerged in water (seven days at room temperature). Using a riehle Briquette tester, failure of the specimen is considered to occur at either the bond interface or within one of the two materials. | | |

2.04 Fabrication

A. The expansion joint system shall be fabricated in accordance with the dimensions, designs and details shown in the approved shop plans.

B. All steel assemblies and hardware shall be galvanized to the requirements of ASTM A123.

C. All welding of channel assemblies, stiffener plates shall comply with AWS specifications.

D. All welds on the deck plate and support plate must be ground smooth. Welds must not protrude onto the sliding surface between the deck plate and support plate.

E. The flatness of the sliding surfaces between the deck plate and support plate must be within 1/32 inch in 12 inches in any direction and within 1/16 inch overall, measured before painting, including:

* Entire length of the bottom surface of the deck plate.
* Top surface of the channel assembly.
* Top surface of the support plate.

**SECTION III -** **Execution**

3.01 Installation

1. The multi-directional movement (MDM) segmental plate expansion joint assembly shall not be installed until the engineer has reviewed and approved in writing the working drawings and the inspection of the assemblies to be used. Each assembly shall be installed in accordance with the approved working drawings, and the recommendations of the manufacturer’s installation technician.
2. A qualified installation technician of the manufacturer shall be at the job site to assure proper installation of each multi-directional movement (MDM) segmental plate expansion joint assembly. Each multi-directional movement (MDM) segmental plate expansion joint assembly shall match the finished roadway profile and grades.
3. Installation plans shall include methods, materials, equipment, sequence, lifting mechanism and locations, installation details at curbs, elastomeric segmental panel installation details and other procedures that the Contractor proposes to use for installation of the multi-directional movement (MDM) segmental plate expansion joint assembly.
4. The contractor shall take precautions to protect the multi-directional movement (MDM) segmental plate expansion joint assembly concrete blockouts and support system from damage and construction traffic.

3.02 Inspection

A. WBA recommends a site inspection of the Wabo®MDM Transflex plate expansion joint assembly after 1 year of service or within a time period as stated in the special provisions.  This inspection should be done by a qualified WBA technician at the cost of the owner and/or contractor.   The inspection should cover system components and surrounding substrate and include owners relevant field performance of the expansion joint system.

3.03 Payment

1. The accepted quantity of multi-directional movement (MDM) segmental plate expansion joint assembly will be paid for at the contract unit price per lineal foot. Measurement of the joint seal assembly will be taken horizontally and vertically along the centerline of the joint system between the outer limits indicated on the contract plans. Payment will be made under:

PAY ITEM PAY UNIT

Multi-directional movement (MDM) segmental plate expansion joint assembly Lineal Foot

Payment will be full compensation for all work necessary to complete the items including furnishing and installing the multi-directional movement (MDM) segmental plate expansion joint assembly.