EXPANSION JOINTS

SERIES 1100 GOODFLEX
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A COMPLETE RANGE OF EXPANSION JOINTS FOR BRIDGES AND OTHER STRUCTURES

Goodco Z-Tech expansion joints were developed to enable structures to move freely while ensuring the deck’s watertightness. The joints are designed to accommodate movements caused by thermal expansion, concrete shrinkage, as well as movements caused by passing vehicles, such as rotation and breaking. The technical solutions offered by Goodco Z-Tech will help maintain the flexibility of the structure at all times.

SERIES 1100 JOINTS

Series 1100 expansion joints have proven their efficiency with time on hundreds of installations. In fact, this joint system incorporating a bolted-down strip seal has been used in Canada since 1993. First introduced in Ontario, it is now approved by the Ministry of Transportation of Ontario under the Type A joint designation. These joints are provided with built-in nosing angles that protect concrete headers and resist damage often caused by snowplow blades, ensuring unparalleled durability. Series 1100 joints are designed for use on bridges, viaducts, overpasses or multi-level parking garages, among others, and can accommodate movements of up to 125 mm in some cases. When anticipated movements exceed 100 mm, the use of Goodco Z-Tech modular joints is recommended.

FEATURES

- Resistance to snow removal equipment
- Increased durability
- Strip seal held in place by a clamping system
- Simple installation and replacement of strip seals
- Total watertightness
- Custom designed anchoring system
- Protection against corrosion
- Available with epoxy injection system
CLAMPING PLATE DEVICE

Series 1100 joints use clamping plates to compress the extruded strip seal and ensure watertightness. This clamping system, protected against corrosion through a hot-dip galvanizing process, ensures increased durability under harsh operating conditions.

STRIP SEALS

A range of high-strength neoprene extrusions is available to make the system fully watertight. Their “V” shape allow free movement, while also avoiding fatigue problems encountered in the past using compression seals.

As the strip seal is held in place through tightening, no adhesive or sealant is required to ensure watertightness. Therefore, this type of seal can be easily installed or replaced on site.

ANCHORING SYSTEM

As Series 1100 expansion joints are custom made for each project, the design engineer can select or design the anchoring system best suited to the desired application.

You will find in this brochure various types of anchoring systems designed to offer good protection against damage caused by snow-plow blades.

INSTALLATION

Series 1100 expansion joints are delivered in factory preassembled sections, using temporary assembly devices. For rehabilitation projects, they are often provided in several sections, depending on the various concreting stages planned. It is recommended to secure the anchoring system to the reinforcing bars in the slab in order to immobilize the joint before pouring the concrete. This step is important during rehabilitation work in which the slab undergoes continuous movement caused when traffic is maintained. In such cases, it is very important to remove the temporary assembly devices before the concrete has completely set.

The seal must be installed in continuous lengths to ensure its watertightness. This operation can be done at the plant if the expansion joint is delivered in a single section. In cases where job site conditions require delivery of a joint in several sections, it is recommended to install the seal in continuous lengths after concreting of the joint has been completed.

We strongly recommend that the installation of seals be carried out by our team of specialized technicians. They will perform a complete inspection of the joints after concreting and ensure their proper working order and watertightness before leaving the job site.

Premoulded parts are also offered to accommodate 90-degree, angled, X-shaped or T-shaped transitions. To see our detailed installation procedure, visit our Web site at www.canambridges.com/jointsinstallation.
COMPONENTS

CLAMPING PLATE SYSTEM

Series 1100 joint clamping plates are factory-made using CNC equipment. This method provides high-precision manufacturing, as well as good control of the opening used to compress the strip seal, which contributes to ensuring perfect watertightness.

STRIP SEALS

The continuous seal can be installed at the plant or on the job site. Job site installation must be performed by our team of specialized technicians or by an authorized installer. Even if these seals are extremely durable, it may be necessary to replace them if an accident or an act of vandalism occurs. This operation can easily be done at any time on the job site, without any need for concrete demolition or complete replacement of the joint. Replacement is easily done if the opening between the profiles is equal to or greater than the minimum installation opening (see Table 1).

<table>
<thead>
<tr>
<th>Model</th>
<th>Minimum opening</th>
<th>Maximum opening</th>
<th>Movement capacity</th>
<th>Minimum opening for installation on site</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL-75</td>
<td>15</td>
<td>100</td>
<td>85</td>
<td>40</td>
</tr>
<tr>
<td>FL-125</td>
<td>15</td>
<td>140</td>
<td>125</td>
<td>40</td>
</tr>
</tbody>
</table>

Note: Data in the table are expressed in millimeters.

Table 1

Figure 2: The clamping system provides firm pressure to each important sealing point, thus ensuring perfect watertightness without the use of adhesives or sealants.

Figure 3: FL-75

Figure 4: FL-125
BRIDGES AND VIADUCTS

1. This superior quality joint is delivered preassembled at the plant with nosing angles at each end of the concrete headers. The main angles measuring 100 mm x 100 mm x 10 mm are fastened to the concrete using anchor plates with 15M looped reinforcing bars, spaced at 250 mm center-to-center (c/c). Studs measuring 19 mm in diameter x 200 mm, spaced at 200 mm center-to-center (c/c), are used to anchor the nosing angles measuring 75 mm x 75 mm x 10 mm. This model was developed in collaboration with the Ministry of Transportation of Ontario (MTO) and is widely used in other Canadian provinces (see Figure 5).

2. A more economical version without nosing angles is also available (see Figure 6).

3. Factory preassembly is typically done using temporary assembly angles measuring 75 mm x 75 mm x 10 mm bolted onto joint elements. Slotted holes in the angles facilitate adjustment of the joint opening on site based on installation temperature, when required (see Figure 7).
EPOXY INJECTION SYSTEM

1. An epoxy injection system is also available, and forms an integral part of the Type A joint approved by the MTO. Epoxy injection is performed seven days after concreting of the joint. This process helps fill voids under the angles and seal cracks that may have developed during concrete curing, making these concrete headers perfectly watertight. In Ontario, watertightness tests are required for all joints installed. These tests check watertightness of the joint and the concrete headers.

2. Epoxy injection is done in three steps:

   Step 1: The joint is delivered on site with protective plugs in the holes where epoxy will be injected.

   Step 2: The plugs are then removed and replaced by adaptors used for epoxy injection.

   Step 3: After injection, the adaptors are removed and the holes are sealed with epoxy.
1. Expansion joint with stop bars used to protect against snowplow blades. Superior quality cast-in-place model, using 100 mm x 100 mm x 10 mm angles and 13 mm x 150 mm anchoring studs staggered at 150 mm center-to-center (c/c).

2. A more economical version that can be installed in a confined space using 75 mm x 75 mm x 10 mm angles and 13 mm x 150 mm anchoring studs staggered at 150 mm center to center (c/c).

3. Wall to floor joint cast-in-place against the slab and bolted onto the wall using chemical anchors or 13 mm x 95 mm mechanical anchors staggered at 250 mm center-to-center (c/c).

Goodco Z-Tech offers a complete range of several types of expansion joints for multi-level parking garages.
VERSATILITY

TRANSITIONS

Series 1100 expansion joints can adapt to the different configurations found in a structure or in a multi-level parking garage. The system can be fitted to 90-degree, angle-shaped, X-shaped or T-shaped transitions. In such cases, premoulded sealing parts are proposed to eliminate vulcanization in areas most solicited by multidirectional movements. It is important to note that, due to their complexity, these parts must be installed by our team of specialized technicians.
TYPICAL DETAILS

PARAPETS AND SIDEWALKS

Series 1100 joint components offer great versatility during manufacturing. The joint can be manufactured so as to perfectly match the structure’s profile, enabling surface water to remain on the deck and be discharged from the drainage system designed for this purpose. Joint cover plate assemblies are also available to ensure continuity of sidewalks, curbs or concrete barriers.

JOINT COVER PLATES

It may be important to cover the joint using a plate in some applications, for example at pedestrian crossings or to preserve the continuity of sidewalks, curbs or concrete barriers.

In those situations, joint cover plate systems can be added to the expansion joints.

These plates are bolted in place to allow the installation and replacement of strip seals. Standard or safety plates (with non-skid patterns) are available.

Figure 18: 30° sidewalk upturn in the barrier with cover plates
Figure 19: Sidewalk upturn with cover plates
Figure 20: 30° sidewalk upturn with curb plates
Figure 21: Typical sidewalk cross-section with joint on the roadway level
Figure 22: Typical sidewalk cross-section with joint directly under the cover plate
Figure 23: Typical cross-section of a MTO sidewalk detail, with height and width adjustable plates

Non-skid plate for curbs
TYPICAL DETAILS

CONNECTION

Due to the excessive width of structures or in order to coordinate with repair work phases, joints are often provided in several sections. Bolted connections must be used between the sections.

Over the years, these connections have often caused water seepage. This is why they should not only be bolted, but also welded on the job site. Watertight welding must be performed on the upper part of the profiles, as shown in Figure 25.

These welds must then be ground, especially where the seal rests once installed, and be protected with two coats of zinc-rich paint.

Figure 24: Series 1100 connection detail

Figure 25: Weld detail (end view)
ACHIEVEMENTS

Goodco Z-Tech provided 1,530 meters of Series 1100 expansion joints and four modular expansion joints during replacement of the deck on the Jacques-Cartier Bridge.

This bridge uses Series 1100 MTO Type A standard expansion joints, as well as finger plate expansion joints designed and manufactured by Goodco Z-Tech.
ACHIEVEMENTS

Goodco Z-Tech provided 834 meters of Series 1100 expansion joints for the repair of this bridge.

For this bridge rehabilitation, Goodco Z-Tech designed and manufactured 190 meters of Series 1100 expansion joints and 40 meters of sidewalk joints with a cover plate system.

Goodco Z-Tech provided four Series 1100 MTO Type A standard expansion joints, as well as structural bearings for this project.
SPECIFICATIONS

STEEL
Meets the requirements of CAN/CSA G40.21 standard, grade 300W or equivalent.

REINFORCING STEEL
Meets the requirements of CAN/CSA G30.18 standard, grade 400W ready for welding.

TIGHTENING BOLTS
Countsunk head bolts, meeting the requirements of ASTM F-835, Grade 8, with zinc phosphate antifriction treatment.

ANCHORING STUDS
Fusion welded, meeting the requirements of ASTM A108 standard, grades 1010, 1015 or 1020.

STRIP SEALS
Polychloroprene (neoprene) extrusion, meeting the requirements of ASTM D5973 or OPSS 1210. See Table 2.

GALVANIZING
Hot-dipped, meeting the requirements of ASTM A123/A123M.

MANUFACTURING
Certified by the Canadian Welding Bureau, Division 1, in accordance with the requirements of CAN/CSA W47.1 and CAN/CSA W59.

INSTALLATION
To see the detailed installation procedure, visit our Web site at www.canambridges.com/jointsinstallation

<table>
<thead>
<tr>
<th>PHYSICAL PROPERTIES OF NEOPRENE SEALS</th>
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<tbody>
<tr>
<td>PROPERTIES</td>
</tr>
<tr>
<td>Tensile strength</td>
</tr>
<tr>
<td>Elongation at break</td>
</tr>
<tr>
<td>Hardness</td>
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<tr>
<td>Oven aging</td>
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<tr>
<td>- Tensile strength</td>
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<tr>
<td>- Elongation</td>
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<tr>
<td>- Hardness</td>
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<tr>
<td>- Permanent set at break</td>
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<tr>
<td>Oil swell</td>
</tr>
<tr>
<td>- Weight change</td>
</tr>
<tr>
<td>Ozone resistance</td>
</tr>
<tr>
<td>- 20% elongation, 300 pphm in air</td>
</tr>
<tr>
<td>Low temperature stiffening</td>
</tr>
<tr>
<td>- Hardness</td>
</tr>
<tr>
<td>Compression set</td>
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</tbody>
</table>

Table 2
QUALITY COMMITMENT

QUALIFICATIONS

Our plant is certified according to ISO standards to provide you with the highest quality standards.

Our team of engineering and technical drafting professionals has in-depth knowledge of 3D software tools, such as SolidWorks and Tekla Xsteel.

Our stringent quality control process results in products that meet our clients’ highest expectations.

Our products are designed and manufactured using state-of-the-art equipment, handled by a skilled and experienced team.

Our teams of specialized technicians install strip seals on the job site. We also offer a comprehensive joints installation service.

QUALIFICATIONS

W59: Welded Steel Construction (Metal Arc Welding)

W47.1, Division 1: Certification of Companies for Fusion Welding of Steel Structures

W186: Welding of Reinforcing Bars in Reinforced Concrete Construction
BETTER
BUILDING BRIDGES

With more than 60 years of experience, Goodco Z-Tech is the leading Canadian fabricator of structural bearings and expansion joints. Relying on the knowhow of our highly skilled team and state-of-the-art equipment, Goodco Z-Tech designs and fabricates a broad range of products for highway and railway bridges, and other structures. Goodco Z-Tech works in close collaboration with Canam-Bridges, a North American leader in the design, fabrication and construction of steel bridges.