OUR MISSION

THE PURSUIT OF A BETTER CUSTOMER EXPERIENCE

TABLE OF CONTENTS

Description ............................................................... 3
Features ................................................................. 4
Components ............................................................ 5
Applications: Bridges and Viaducts (Heavy Traffic) ............. 6
Applications: Parking Garages and Pedestrian Bridges (Light Traffic) ........................................... 8
Versatility ............................................................... 9
Typical Details ........................................................ 10
Achievements .......................................................... 12
Specifications ......................................................... 14
Quality Commitment ................................................. 15
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 creep and 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 1000 JOINTS

Series 1000 expansion joints have proven their efficiency with time on thousands of installations. Since 1985, this patented system of strip seal joints has been used across Canada. These joints are designed to resist damage frequently caused by snow-plow blades, thus ensuring outstanding durability. Series 1000 joints are designed for use on bridges, viaducts, overpasses or multi-level parking garages, among others, and can accommodate movements of up to 150 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
- Locked-in strip seal
- Simple installation and replacement of strip seals
- Total watertightness
- Custom designed anchoring system
- Protection against corrosion
STEEL PROFILES

The steel profiles of Series 1000 expansion joints were developed in collaboration with the National Research Council Canada to resist the high wheel loads imposed on our structures. Protected against corrosion using a hot-dip galvanizing process, these profiles ensure increased durability under severe operating conditions.

STRIP SEALS

A range of high-strength neoprene extrusion products lock into the profiles to ensure total watertightness of the system. Their shapes allow free movement, while avoiding fatigue problems encountered in the past using compression seals.

The seal is installed using a water soluble lubricant and requires no adhesive to ensure watertightness. Therefore, this type of seal can be easily installed or replaced on site.

ANCHORING SYSTEM

As Series 1000 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 1000 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

STEEL PROFILES

The profiles of Series 1000 joints are fabricated using the cold rolling process. This method ensures great precision during production, as well as good control at the opening used to lock in the seal, thereby contributing to ensuring perfect watertightness. The anchors can be welded directly onto the vertical wall of the Z-125 profile, ensuring it is deeply fastened into the concrete slab.

STRIP SEALS

The continuous seal can be installed at the plant or on the job site. This operation is carried out using a water soluble lubricant and appropriate tools. Even if these seals are extremely durable, it may be necessary to replace them if an accident or an act of vandalism occur. 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>Min. opening for installation on site</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZT-300HR</td>
<td>20</td>
<td>95</td>
<td>75</td>
<td>40</td>
</tr>
<tr>
<td>ZT-500HR</td>
<td>20</td>
<td>145</td>
<td>125</td>
<td>40</td>
</tr>
<tr>
<td>ZT-700HR</td>
<td>20</td>
<td>170</td>
<td>150</td>
<td>40</td>
</tr>
<tr>
<td>ZT-350HP</td>
<td>40</td>
<td>100</td>
<td>60</td>
<td>50</td>
</tr>
</tbody>
</table>

Note: All data shown in the table are in millimeters.  
Table 1
BRIDGES AND VIADUCTS

1. Type HSS expansion joint with anchoring plates measuring 100 mm x 300 mm x 13 mm at 300 mm centre-to-centre (c/c) and 20M longitudinal reinforcing bars. Superior quality model developed in collaboration with the Quebec Ministry of Transportation and used on most structures in Quebec. This joint was developed to eliminate the need for concrete headers, which frequently require maintenance and cause watertightness problems. HSS tubes measuring 76 mm x 125 mm x 10 mm are filled with non-shrink grout after concreting of the joint.

2. This system is also offered with a built-in trough providing a second watertightness barrier.

3. Type C joint approved by the Ministry of Transportation of Ontario (MTO). This joint is delivered preassembled with nosing-angles at each end of the concrete headers. An epoxy injection system is also available. In that case, the epoxy is injected after the concreting of the joint. This process allows to fill the voids under the angles, as well as the cracks that may have developed during concrete curing.
APPLICATIONS - HEAVY TRAFFIC

4. Expansion joint with anchoring plates measuring 150 mm x 300 mm x 10 mm at 300 mm centre-to-centre (c/c) and 20M longitudinal reinforcing bars. More economical model offering very good protection against damage caused by snow-plow blades.

![Figure 16: Joint with snow-plow protection plate](image1)

5. Expansion joint with more compact anchoring plates measuring 200 mm x 200 mm x 10 mm at 300 mm centre-to-centre (c/c), also offering protection against snow-plow blades.

![Figure 17: Joint with more compact anchoring plates](image2)

6. Economical model for structures submitted to light traffic, and where snow removal is performed at low speed, using studs measuring 13 mm in diameter x 150 mm staggered at 150 mm centre-to-centre (c/c).

![Figure 18: Joint with staggered studs](image3)
PARKING GARAGES AND PEDESTRIAN BRIDGES

1. Cast-in-place expansion joint enabling installation of the membrane and pavement on each side of the Z-50 profiles.

2. Commonly used cast-in-place model that can be installed in small spaces using studs measuring 13 mm in diameter x 150 mm at 150 mm centre-to-centre (c/c).

3. Joint bolted in place that can easily be installed on an existing slab where a concrete or asphalt wearing course will be added.

4. Wall to floor joint bolted in place using mechanical anchors measuring 13 mm in diameter x 95 mm at 300 mm centre-to-centre (c/c).
VERSATILITY

TRANSITIONS

Series 1000 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.

Figure 23: X-shaped transition
Figure 24: Angle-shaped transition
Figure 25: 90-degree transition
Figure 26: T-shaped transition

Parking garage joint transition – Quartier Dix30, Brossard, QC
TYPICAL DETAILS

PARAPETS AND SIDEWALKS

Series 1000 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.
TYPICAL DETAILS

CONNECTION

Due to the excessive width of structures, or in order to coordinate with rehabilitation 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 Figures 31 and 33.

These welded splices must then be ground, especially where the seal rests once it is locked in place, to ensure a constant opening. They must also be protected using two coats of zinc rich paint.

Figure 30: Connection of a type HSS joint with trough

Figure 31: Detail of weldings (seen from the end)

Figure 32: Connection of a type C joint

Figure 33: Detail of weldings (seen from the end)
ACHIEVEMENTS

Goodco Z-Tech manufactures this new generation of expansion joints used on several Quebec Ministry of Transportation bridges.

Goodco Z-Tech provided more than 5150 meters of strip seal expansion joints for these two projects carried out in 2000 and 2006.
ACHIEVEMENTS

During rehabilitation work on this bridge, Goodco Z-Tech provided both type HSS and modular joints.

Goodco Z-Tech manufactures many types of expansion joints for multi-level parking garages.

Watertightness test following the installation of a type HSS expansion joint.
SPECIFICATIONS

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

STEEL PROFILES
Meets the requirements of ASTM A1018 standard, grade 50 or equivalent, shaped using a high-precision cold rolling process.

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

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 our detailed installation procedure, visit our Web site at www.canambridges.com/jointsinstallation

PHYSICAL PROPERTIES OF NEOPRENE SEALS

<table>
<thead>
<tr>
<th>PROPERTIES</th>
<th>ASTM SPECIFICATIONS</th>
<th>PARAMETERS</th>
<th>UNITS</th>
<th>ASTM D5973</th>
<th>OPSS 1210</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength</td>
<td>D412 (method A)</td>
<td>Minimum</td>
<td>psi (MPa)</td>
<td>2000 (13.8)</td>
<td>(13.5)</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>D412 (method A)</td>
<td>Minimum</td>
<td>%</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Hardness</td>
<td>D2240 (modified)</td>
<td>Type A durometer</td>
<td>Points</td>
<td>60±5</td>
<td>55 +7/-5</td>
</tr>
<tr>
<td>Oven aging</td>
<td>D573</td>
<td>70 hrs at 212°F (100°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Tensile strength</td>
<td>D412 (method A)</td>
<td>Loss</td>
<td>%</td>
<td>Maximum 20</td>
<td>Maximum 20</td>
</tr>
<tr>
<td>- Elongation</td>
<td>D412 (method A)</td>
<td>Loss</td>
<td>%</td>
<td>Maximum 20</td>
<td>Maximum 20</td>
</tr>
<tr>
<td>- Hardness</td>
<td>D2240 (modified)</td>
<td>Type A durometer</td>
<td>Points change</td>
<td>0 to +10</td>
<td>Maximum 10</td>
</tr>
<tr>
<td>- Permanent set at break</td>
<td>D412 (method A)</td>
<td>%</td>
<td>Not required</td>
<td>Maximum 10</td>
<td></td>
</tr>
<tr>
<td>Oil swell</td>
<td>D471</td>
<td>70 hrs at 212°F (100°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Weight change</td>
<td>IRM 903 (ASTM Oil #3)</td>
<td>Maximum</td>
<td>%</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Ozone resistance</td>
<td>D1149 (modified)</td>
<td>70 hrs at 104°F (40°C)</td>
<td></td>
<td>No cracks</td>
<td>No cracks</td>
</tr>
<tr>
<td>- 20 % elongation, 300 pphm in air</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low temperature stiffening</td>
<td>D2240</td>
<td>7 days at 14°F (-10°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Hardness</td>
<td>D2240</td>
<td>Type A durometer</td>
<td>Points change</td>
<td>0 to +15</td>
<td>Maximum 15 points</td>
</tr>
<tr>
<td>Compression set</td>
<td>D395 (method B)</td>
<td>70 hrs at 212°F (100°C)</td>
<td>Maximum</td>
<td>35</td>
<td>Not required</td>
</tr>
</tbody>
</table>

Table 2
QUALITY COMMITMENT

QUALIFICATIONS

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

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

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

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

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
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.