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Validity

Users of any Agrément certificate should check its status: all currently valid certificates are listed on the website. In addition, check whether the certificate is [Active](#) or [Inactive](#).

The certificate holder is in possession of a confirmation certificate attesting to his status.

Subject:
**HONEL E80 Bridge Deck
Expansion Joint**

Certificate holder:
HONEL Structural Products (Pty) Ltd

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Description and use

The HONEL E80 is a single gland and claw bridge deck expansion joint. The joint is manufactured in South Africa in accordance with the original designs by Glacier Bearings (Pty) Ltd. Where possible all materials are sourced locally.

The joint is assessed as being suitable for use in concrete bridge structures in all climatic regions of South Africa and in all types of corrosive environment.

This certificate and Agrément South Africa's assessment set out in detail in Part 2, Table 1, apply only to HONEL E80 bridge deck expansion joints manufactured by HONEL Structural Products (Pty) Ltd and installed as described and illustrated in this certificate, and where the terms and conditions of certification are adhered to.

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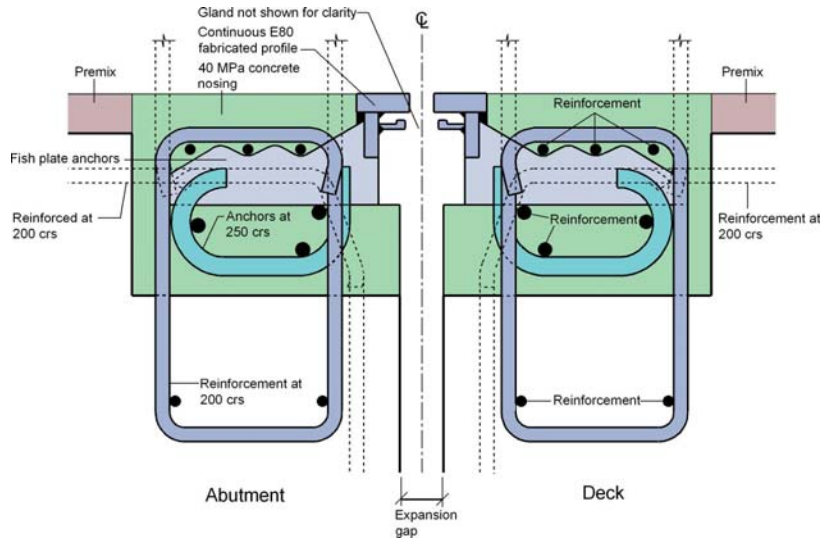


Figure 1: Typical section through the HONEL E80 bridge deck expansion joint (new installation)

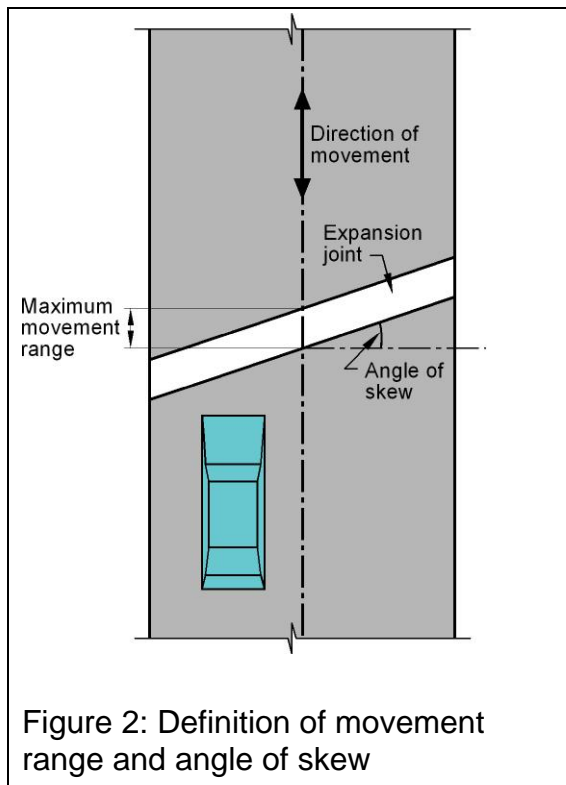


Figure 2: Definition of movement range and angle of skew

Criteria for application of the HONEL E80 bridge deck expansion joint

Movement range - combination of contraction and expansion in the direction of movement.

The HONEL E80 bridge deck expansion joint is suitable for use where:

- the movement range is not greater than 80 mm, and
- the skew angle of the joint is not greater than 45 degrees.

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PREAMBLE

This certificate is issued by Agrément South Africa in terms of the powers granted to it by the Minister of Public Works. This certificate:

- has been granted after a technical appraisal of the performance of HONEL E80 bridge deck expansion joints for the [uses](#) covered by the certificate
- is independent of any patent rights that may or may not subsist in the subject of the certificate
- does not relieve the certificate holder of the obligation to obtain the prior approval of the appropriate roads authority for the use of the subject.

Agrément South Africa considers that the quality and performance of HONEL E80 bridge deck expansion joints will be satisfactory provided that the requirements stipulated in this certificate are adhered to. However, Agrément South Africa does not on behalf of itself, or the State, or any of its employees or agents, guarantee such quality or performance.

Where required, guarantees for the product must be agreed between the client and the certificate holder.

Responsibility for the proper exercise of the quality-management system and compliance with the requirements of this certificate resides with the certificate holder.

No action for damages, or any other claim whatsoever lies against Agrément South Africa, its members, the State or any of its employees should the said components and materials fail to comply with the standard set out in the certificate issued by Agrément South Africa.

Interested parties who are in any doubt about any detail or variation should contact Agrément South Africa.

The validity of this certificate is reviewed every three years. The certificate shall remain valid for so long as Agrément South Africa is satisfied that:

- the certificate holder complies with the general and specific conditions of certification as stipulated in the certificate
- the performance-in-use of the subject is acceptable, and
- any changes in relevant standards or Agrément criteria have not invalidated the technical assessment which formed the basis of certification.

Agrément South Africa reserves the right to withdraw the certificate at any time, should reasonable cause exist.

Notices affecting the validity of this certificate will be published on Agrément South Africa's website and in the *Government Gazette*.

PART 1: CONDITIONS OF CERTIFICATION

This certificate covers only HONEL E80 bridge deck expansion joints that comply strictly with:

- the drawings, viz:
 - Single–Element Expansion Joint Type E80 (SP): GBM 424, Rev 1, dated 30/07/99
 - E80 Expansion Joint with ‘C’ Anchors: MS1232, Rev 2, dated 22/07/96
 - E80 Expansion Joint with ‘SP’ Anchors: MS1172, Rev 1, dated 30/07/91
 - E80 Expansion Joint with ‘G’ Anchors: MS1263, Rev 0, dated 14/09/04
 - GRS 121, Rev 0, dated 25/03/00, and
 - Bolted Connection Multi-Element GAM (II) Expansion Joint: GBM 504/2, Rev 0, dated 23/03/00
- HONEL Structural Products (Pty) Ltd’s specifications, technical manuals and quality management system, and
- the requirements of this certificate

and which are installed by

- the certificate holder, or
- a licensee appointed and trained by the certificate holder and registered as such with Agrément South Africa.

Licensee – any person or company appointed and trained by the certificate holder and registered with Agrément South Africa to manufacture and/or install HONEL E80 bridge deck expansion joints in accordance with the certificate, and authorised by him to claim compliance with the certificate. It is the certificate holder’s responsibility to ensure that a licensee carries out the work in compliance with this certificate and in accordance with the approved quality system.

This certificate does not apply to any other product marketed, manufactured or installed by HONEL Structural Products (Pty) Ltd or any other entity.

Any person needing to check on details of construction must refer to the documentation listed above, which is available from the certificate holder.

A change to any one aspect of the HONEL E80 bridge deck expansion joint could result in changes in the performance of installed joints. For this reason, no change may be made to HONEL E80 expansion joints unless any such change is approved in writing by Agrément South Africa before it is implemented.

General conditions

The validity of this certificate is subject to the continued participation of the certificate holder in Agrément South Africa’s post-certification quality-assurance scheme.

An identification plate having a minimum size of 65 mm by 100 mm, as illustrated below, must be attached to the bridge balustrade.

Agrément South Africa’s logo, as shown in the lower part of the plate is to be printed on all HONEL E80 bridge deck expansion joint promotional material.

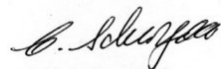
Reappraisal

- must be requested by the certificate holder prior to implementing changes to materials or the method of installation, and
- will be required by Agrément South Africa if there are changes to Agrément criteria or if deemed necessary for any other reason.

BRIDGE EXPANSION JOINT	
DATE	Nov. 2004
TYPE	E80
REF.No
TEL.No	031 7011355
Honel Structural Products	
Certificate 2004/311	
	

This certificate may be withdrawn if the certificate holder or a registered licensee fails to comply with these requirements.

On behalf of the Board of Agrément South Africa



Chairman

29 September 2004

PART 2: ASSESSMENT

Scope of assessment

Guidelines - Steyn, Silbernagl and Nordengen. *Guideline document for evaluation of bridge deck joints*. CSIR Transportek, May 2001

The assessment is based on guidelines for the evaluation of bridge deck joints adopted by Agrément South Africa, as applicable to modular bridge deck expansion joints with manufactured metal claws and single glands. The joint has been assessed as an integral part of a concrete bridge deck structure and road surface, as described and illustrated in this certificate. Aspects of the bridge deck or road surface affected by the installation or performance of this joint, where applicable, have also been assessed.

Assessment

In the opinion of Agrément South Africa, when the HONEL E80 bridge deck expansion joints are manufactured and installed by HONEL Structural Products (Pty) Ltd or one of their licensees in accordance with HONEL's:

- drawings, viz:
 - Single-Element Expansion Joint Type E80 (SP): GBM 424, Rev 1, dated 30/07/99
 - E80 Expansion Joint with 'C' Anchors: MS1232, Rev 2, dated 22/07/96
 - E80 Expansion Joint with 'SP' Anchors: MS1172, Rev 1, dated 30/07/91
 - E80 Expansion Joint with 'G' Anchors: MS1263, Rev 0, dated 14/09/04
 - GRS 121, Rev 0, dated 25/03/00, and
 - Bolted Connection Multi-Element GAM (II) Expansion Joint: GBM 504/2, Rev 0, dated 23/03/00
- specifications
- technical manuals, and
- quality-management system

they are suitable for the uses specified.

Agrément South Africa's comments on the properties of materials used and the various aspects of performance of the HONEL E80 bridge deck expansion joint are set out in Table 1 below. Each aspect of performance was assessed by experts in that field.

Table 1: Assessment

Aspect of assessment	Opinion of Agrément South Africa	Explanatory notes
<i>Maintenance plan</i>	Satisfactory	HONEL's maintenance plan for HONEL E80 bridge deck expansion joints is satisfactory and the specified inspection/maintenance interval of five years is considered adequate.
<i>Movement range</i>	Satisfactory	<p>HONEL E80 bridge deck expansion joints have been assessed as fit-for-purpose for applications where:</p> <ul style="list-style-type: none"> • the movement range in the direction of movement of the bridge structure is not greater than 80 mm, and • the skew angle of the joint is not greater than 45 degrees. <p>Vertical movements at the joint are not considered critical but a maximum of 5 mm is recommended.</p>
<i>Strength</i>	Satisfactory	<p>HONEL E80 bridge deck expansion joints have been designed to meet the loading requirements of the Austrian RVS guidelines adopted by Agrément South Africa, together with AASHTO, BS5400 loading codes for highway bridges. These requirements are as follows:</p> <ul style="list-style-type: none"> • Vertical: 140 kN • Horizontal: 42 kN <p>acting over a width of 500 mm. Loads are inclusive of a dynamic factor. Calculations show that the joints meet the required standard.</p>
<i>Fatigue</i>	Satisfactory	Calculations and in-service performance indicate that the fatigue resistance of all components of the joint is acceptable.

Table 1: Assessment (continued)

Aspect of assessment	Opinion of Agrément South Africa	Explanatory notes
<i>Durability and environmental resistance</i>	Satisfactory	Based on knowledge of the materials used in the manufacture of the joints and the in-service performance, the useful service life the HONEL E80 bridge deck expansion joints is assessed as being not less than 15 years.
<i>Watertightness</i>	Satisfactory	<p>When manufactured and installed as specified, and when tested as required below, joints will be within acceptable limits of permeability.</p> <p>In the workshop, a 10 % Na-Cl solution having a 30 mm head must be applied over a selected portion of joint for a period of 8 hours. Vulcanised sections of the seal must be included in the section of seal being tested. The seal is to be deformed, both along and across the joint, to 20 % more than the design deformation.</p> <p>On site, the complete installation must be flushed for half an hour, and each end of the joint ponded for a length of 1 m, with a head of 150 mm for 2 hours.</p> <p>In both tests no moisture may appear on the underside of the seal. In the case of an unsuccessful test result, appropriate remedial action must be taken in accordance with the quality-management system.</p>
<i>Quality management</i>	Satisfactory	<p>HONEL Structural Products (Pty) Ltd's factory in Pinetown, where joint components are manufactured, is certified to SANS 9001:2000.</p> <p>Installation is controlled by a quality system that complies with the requirements of Agrément South Africa. This system is based on the requirements of SANS 9001:2000.</p> <p>If these systems are properly followed quality will be consistently satisfactory.</p>
<i>Skid resistance</i>	Satisfactory	Given the wood-float finish applied to the cast-in-situ concrete nosings and the narrow width of the joint, skid resistance is not deemed to be an issue for concern.

SANS 9001:2000 *Quality management systems – Requirements*

Table 1: Assessment (continued)

<i>Practicality of installation</i>	Satisfactory	Observations of installations in progress indicate that - given adequate training of staff, the presence of suitable supervisory staff and suitable equipment, and adherence to established quality procedures - joints can be readily and successfully installed.
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PART 3: TECHNICAL DESCRIPTION

General description

The Honel E80 is a single gland and claw bridge deck expansion joint which may be installed in new concrete structures or replace damaged joints in rehabilitation projects.

The joint is intended for use in all climatic regions of South Africa and in all types of corrosive environment where:

- the joint movement range is not greater than 80 mm, and
- the skew angle of joint is not greater than 45 degrees.

Movement range - combination of contraction and expansion in the direction of movement.



Manufacture

The joint is manufactured in South Africa in accordance with the original designs by Glacier Bearings (Pty) Ltd. Where possible all materials are sourced locally.

Edge beams including claws are manufactured from plates meeting the requirements of BS4360 GR43A/SANS 1431 GD 300WA and shear connectors are manufactured from steel meeting the requirements of ASTM A108 GD.1020. The joint anchorage can be one of three options, as shown in Figure 3, as follows: Pre-cut 14 mm thick steel fish-plates (SP anchors), or cut plate anchors (G anchors) welded at 250 mm centres to the edge beam with continuous fillet welds, or 16 mm diameter shear connectors (C anchors) welded in two staggered rows at 150 mm centres to the edge beam.

SANS 1431 Weldable structural steels

ASTM A108-03 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

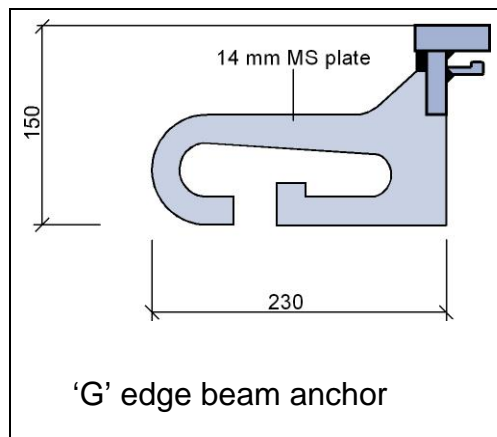
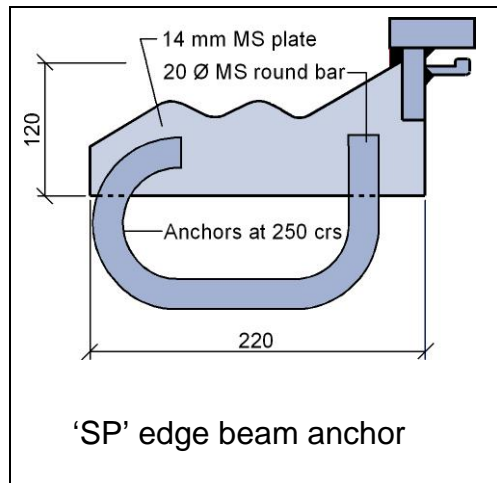
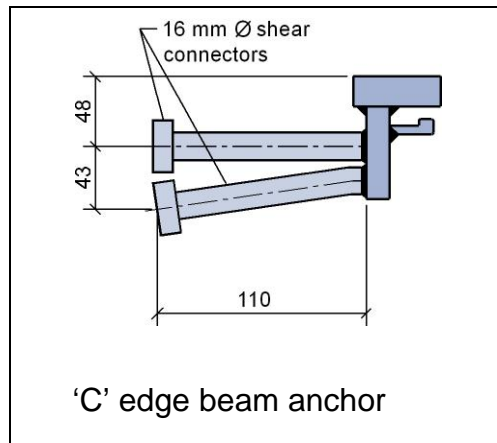
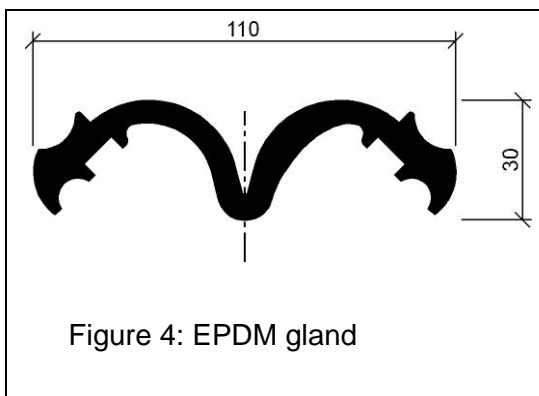


Figure 3: 'C', 'SP' and 'G' edge beam anchors

The joints are manufactured in lengths to suit available transportation and handling requirements. Where lengths of joint are to be joined on site, provision is made for connecting plates which are welded to the ends of edge beams. These connecting plates are bolted together to create continuous joints. Where necessary, joints are trimmed in length to suit as-built dimensions of bridge decks and abutments. However, care is taken to ensure that protective coatings are repaired as specified.

Where possible, the gland, as shown below, is installed during joint manufacture in the factory. The gland is manufactured from extruded vulcanised rubber with a base polymer consisting of 100% EPDM rubber. The EPDM, with one exception, must meet the requirements of ASTM D5973. The exception is the oil swell requirement, which for this application may be 100%.



SANS 1431 *Weldable structural steels*

ISO 1461:1999 *Hot dip galvanized coatings on fabricated iron and steel articles -- Specifications and test methods*

Steel cover plates for covering the expansion joint gap at bridge parapets are manufactured from Grade 300W steel to SANS 1431.

Cover plates and all exposed areas of the joint are hot-dip galvanized after the completion of welding, slotting and drilling, where appropriate. Galvanising is carried out in accordance with ISO 1461: 1999 to a 140 microns nominal thickness.

Joint dispatching from the factory and storage on site

The joint leaves the factory in a fully assembled condition, including the gland where possible, with transport brackets attached to the joint by means of bolts or welds. The joint has a standard preset gap of 35mm to allow an opening movement of 45mm and a closing movement of 35mm. This ensures that the gland, where not pre-installed, can be inserted.



Upon arrival on site the joint is lifted carefully, by means of the transport brackets provided at, approximately, quarter points along the joint. The joint is checked for any damage which may have occurred in transport and the necessary remedial action taken, if necessary.

Where the protective coating is damaged for any reason during offloading or subsequently during installation, and the affected area will not have at least 40 mm of concrete cover once the nosings have been cast, it must be repaired. Repairs are carried out by abrasive cleaning of the area and applying two coats of a proprietary brand zinc-rich galvanising repair coating (Galvaroid, Spanjaard Cold Zinc spray, or similar) in accordance with the manufacturer's specifications.

Where it is necessary for the joint to be stored on site for a period before installation takes place, it is important that cleanliness of the joint be maintained, particularly around the seal claw area. Storage by placing directly onto soil is not acceptable. Where the joints are stored outside they must be kept off the ground by means of timber or similar packing and

must be covered. Joints must not be unduly stressed and cambers which may be built into the joint must be maintained.

Joint installation procedure (new installations)

Joint recesses for concrete nosings are to be accurately cast into the bridge decks and abutments to the dimensions specified. Provision must be made for the main reinforcement to protrude into the recess at approximately 250 mm centres or a distance stated by the Engineer. Protruding bars are to be bent below the level of the underside of the precast.

Temporary joint filling material is inserted into the expansion gap between the deck/abutment below the joint recess, over the full depth and width of the deck slab. The joint recess is filled to the underside of the precast with a well-compacted crusher run, sand or weak concrete. Care is taken to ensure that reinforcement will not be contaminated with bituminous agents.

Asphalt surfacing is laid continuously over the filled joint recess. The asphalt is then saw-cut and a strip of asphalt surfacing centred over the joint is removed. Saw cuts are straight and parallel, and extend into the parapet end block faces to form recesses to accommodate the joint turn-ups. Care is taken not to damage or break into the service ducts where provided.

The temporary recess filler material is then removed, using light pneumatic or electric chipping equipment to the full depth of the recess. At the faces of the recess, aggregate is exposed to leave a sound irregular laitance-free surface. Exposed reinforcement is cleaned of mud, oil, grease, bituminous agents, paint, loose rust, mill scale, concrete slurry or any other substance which could impair the bond or have an adverse chemical effect on the steel or concrete. Bars projecting into the recess are straightened. Additional bars are added at this stage should this prove necessary.

Prior to lowering the joint into the recess, the expansion joint gap width is adjusted, if necessary, in accordance with the written instructions of the engineer. The minimum allowable gap width at the time of installation is 35 mm.

Where joints are made up in short lengths they are bolted together by means of the factory-fitted connecting plates. A gasket is inserted between the connecting plates at the time of bolting to ensure water tightness of the connection. The joint is then lowered into position by crane, using the lifting points. Anchors are not cut off where these are found to clash with deck reinforcement without written instructions from the engineer.

Care is taken to ensure that the joint does not rest directly on any deck or abutment reinforcement. The joint is positioned both laterally and longitudinally. Where necessary, levelling jacks or wedges are positioned at quarter points to support the joint. Once the joint has been levelled, it is fixed in position by welding it to the anchor bars. Welding must not be carried out on the joint profile since this has a detrimental effect on corrosion protection. Welding must be completed along one

side of the joint before any welding can take place on the opposite side. As soon as the welds are completed on both sides of the joint, the transport brackets must be released and removed in order to allow the joint to begin functioning.

Additional longitudinal reinforcement is placed and tied in position in accordance with the approved drawings. The straightened R12 bars from the recess projecting vertically are bent down to form stirrups. Care must be taken to ensure that 40 mm of concrete cover to the reinforcement will be achieved once the concrete is cast. Pre-heating of reinforcing bars by means of a cutting torch or similar equipment to facilitate bending is not permitted.

A compressible vertical former is installed between the steel edges of the joint, extending down into the expansion gap. The vertical former is free of horizontal laps and joints. Grout leakage into the expansion gap during casting of the concrete nosings is thus prevented.

Prior to the casting of the concrete nosings, joint levels are checked. The recess is thoroughly washed to remove dust and deleterious material. All traces of surface water are removed and a wet-to-dry epoxy-resin concrete-bonding agent is applied strictly in accordance with the manufacturer's instructions.

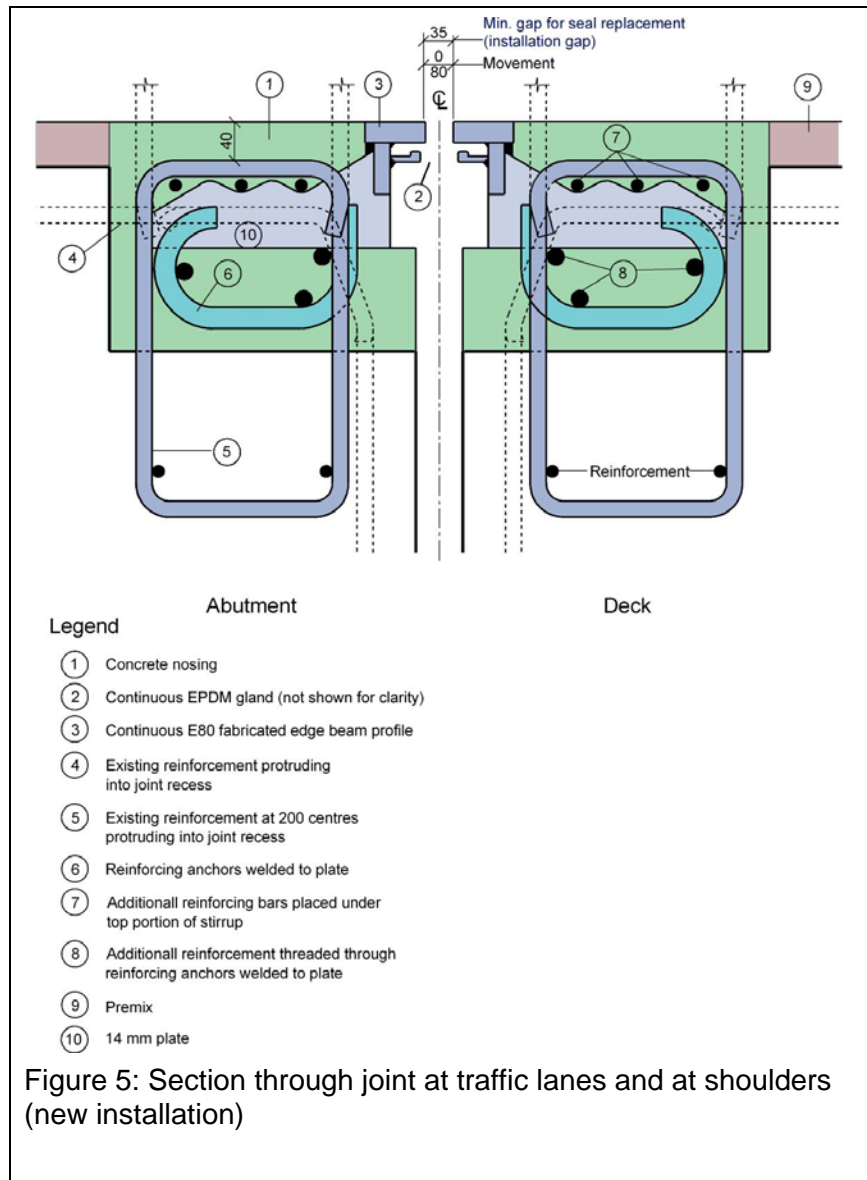
Concreting may be carried out on one side of the joint at a time, or may be carried out on both sides simultaneously. Concrete is compacted by internal vibrator (with a poker diameter not greater than 30 mm), ensuring that the concrete is well compacted around and under the expansion joint. Concrete work must be carried out in accordance with a relevant, nationally recognised specification. The surface of the nosing is screeded flush with the asphalt surfacing to a class U2 wood float surface finish. At least three test cubes must be made from the concrete used in each individual joint to establish the characteristic 28-day strength.

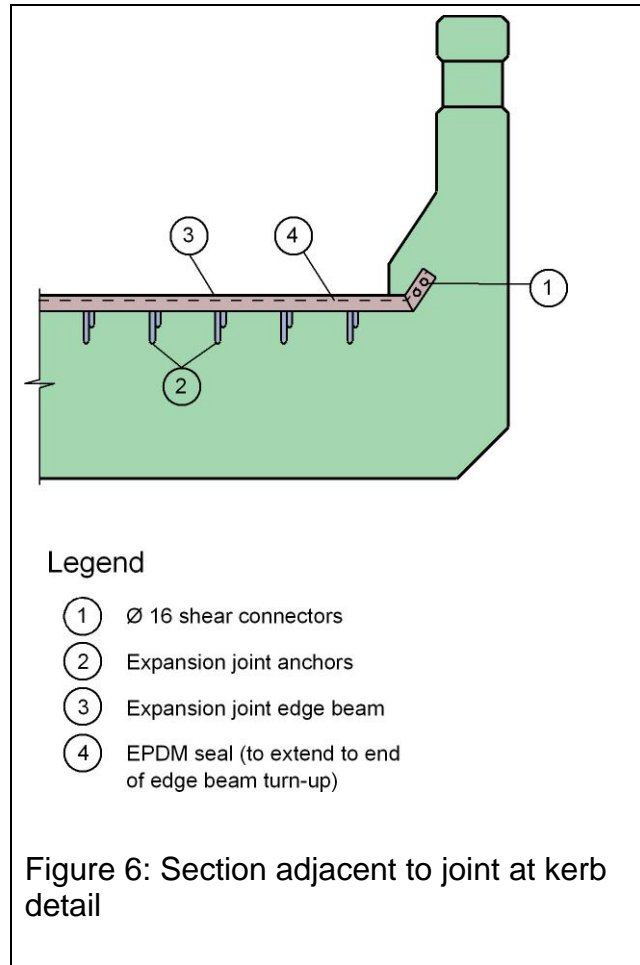
After the concrete has attained a characteristic strength of not less than 15 MPa, all the jointing and all foreign material is removed from the expansion gap for the full width and depth of the bridge deck and parapets. Care must be taken to ensure that the claw in the edge beam is kept clean.

A thin film of water-soluble soap is applied to the gland seal recess to facilitate gland installation. Where bolted connection plates have been used to make up longer lengths of joint, silicone sealant is inserted into the gland claw at joint positions just prior to gland installation to facilitate watertightness. The gland is installed in one continuous length, ensuring that the joint is watertight over the full length of the joint (only factory-bonded or fused glands are utilised). To facilitate easy fitment of the gland into the turn-up sections, the gland is fitted prior to the finishing of the balustrade concrete recesses.

All bolts securing the transport brackets to the expansion joint are removed and, where necessary, ground level with the top surface of the joint. The corrosion protection must be repaired as described above.

Traffic is not permitted to travel over the joint without the written authorization of the engineer and until the concrete has attained a characteristic strength of 30 MPa.





Joint installation procedure (existing joint replacement)

Existing expansion joint cover plates, where provided, are removed and the presence and depth of existing reinforcement within the confines of the proposed new concrete nosings is established.

A strip of asphalt surfacing and/or concrete, centred over the joint and corresponding to the widths and depths of the proposed new concrete nosings, is removed following saw-cutting. Precautions are taken to ensure that no damage occurs to existing reinforcement, structural members, service ducts, etc during the saw-cutting and concrete breaking process.

“Weak” concrete exposed in the joint recess is removed and/or repaired as described in the project specifications or as instructed by the engineer.

The expansion gap is cleared of all jointing and/or foreign material over the full width and depth of the deck slab.

Where the existing reinforcement exposed in the nosing recesses does not comply with the joint drawing details, extra reinforcing bars are installed so as to comply with the joint drawings. This procedure is as follows:

SANS 920 *Steel bars for concrete reinforcement*

- 16–18 mm diameter holes, 200 mm deep are drilled for Y12 anchor bars. Y12 bars must meet the requirements of SANS 920.
- Holes are cleared of drill spoil to ensure that they are free of any foreign material.
- Y12 pre-bent anchor bars are test-fitted in the pre-drilled holes and adjusted in length and/or shape where necessary.
- Holes are primed and sufficient epoxy grouting-compound is placed in each hole to ensure that the holes are filled to their full depths on installation of the Y12 anchor bars without subsequent topping-up. For bars not pre-bent, the grout shall be allowed to cure before bending to form stirrups.

The preparation of the recesses, installation of the expansion joints, concreting and curing of the concrete nosings and installation of the steel cover plates is proceeded with as described above for new installations.

In cases where open service ducts are present at sidewalks and the paving slabs extend over the expansion joint without edge beams, concrete nosings are provided, as specified, to form edge beams.

Where specified in the project specification the concrete nosings shall be protected with 25 mm thick bridging plates temporarily bolted to the bridge deck in order to accommodate traffic over the expansion joint. The cover plates are not be removed without the written authorisation of the engineer and until the concrete in the nosings has attained a characteristic strength of 30 MPa.