

EXPANSION JOINTS – LARGE MOVEMENTS

GRANOR ETIC® SFEJ SERIES STEEL FINGER JOINTS

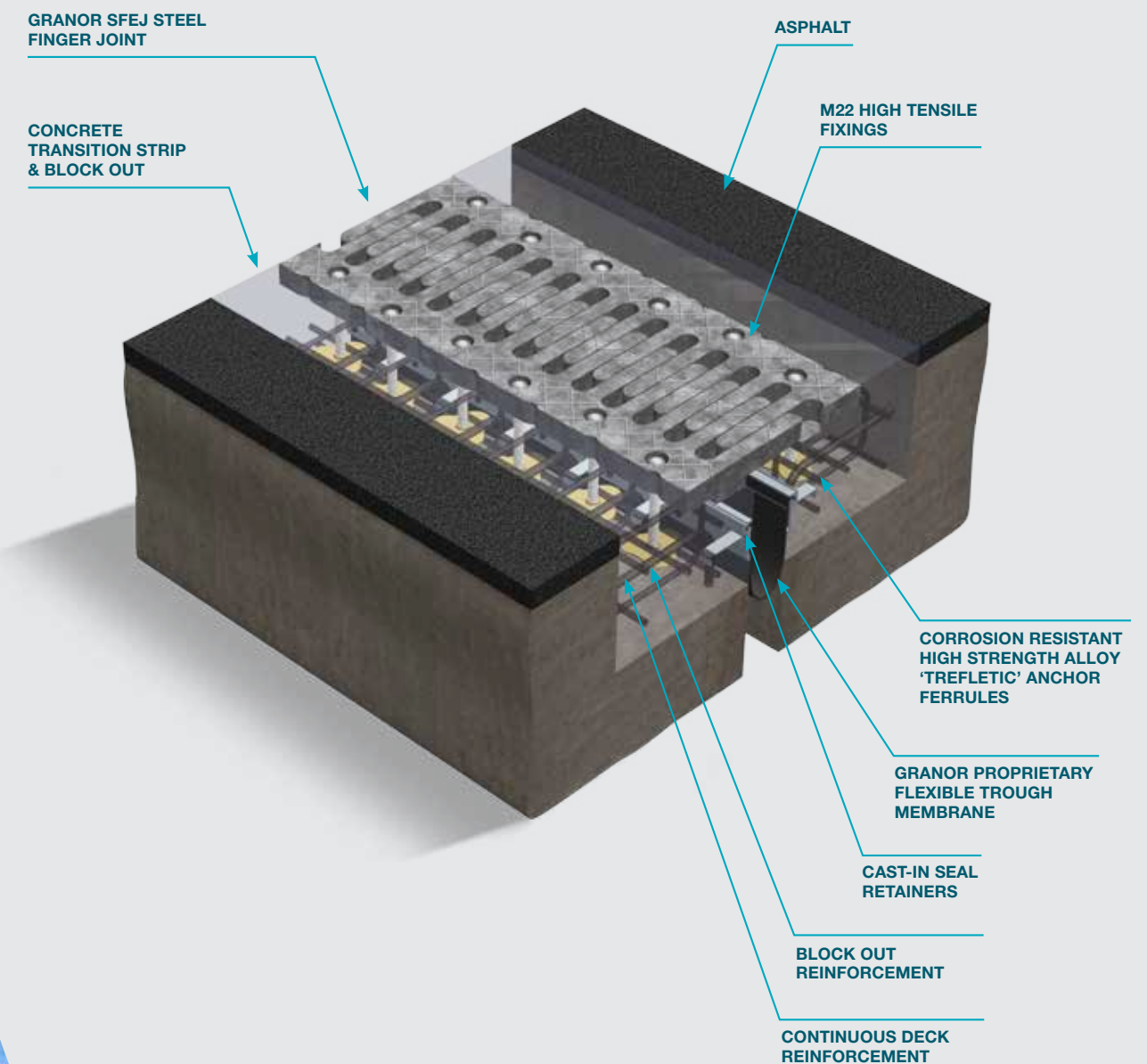
THE GRANOR ETIC® SFEJ SERIES STEEL FINGER EXPANSION JOINTS

These joints should be adopted where the structure gap will open beyond 85mm ULS, in which case the use of a 'stripseal' type single seal element joint will transgress the maximum 85mm open gap criterion nominated in AS5100.4

The SFEJ series joints are designed to AS5100.4 with RMS Position Paper Rev 4 modifications. Alternate designs can be generated for other design criterion such as AS5100.4 unmodified and NZTA. Joints with custom skew orientations are also available.

The SFEJ joints utilise as a standard detail an underside draped flexible 'trough' gland that locates into separate extruded aluminium retainers that are cast into the blockout during the joint systems installation process. This gland drains to a suitable underside of structure collection point at the low side of the joint.

**ROBUST BRIDGE DECK EXPANSION JOINTS
WHICH ACCOMMODATE LARGE MOVEMENTS
RANGING FROM 150MM UP TO 600MM
TOTAL CAPACITY.**

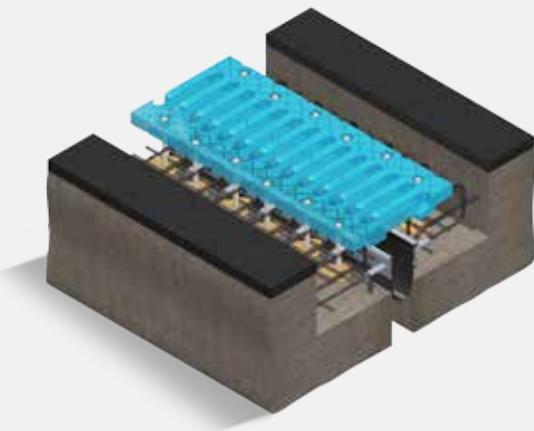


DESIGN FEATURES

The SFEJ series expansion joints consist of three main elements:

STANDARD FEATURES

GALVANISED STEEL FINGERPLATES



These manufactured galvanised steel elements have 'tooth comb' shaped slender fingers in plan, which interlock with the opposing element, thereby providing a smooth unencumbered transition over the large underside structure gap. Skid resistance on the steel finger plate joint elements is provided by the standard detailing of a raised X patterned surface or by the use of purpose applied high PSV grit epoxy coating, applied post galvanising.

TENSIONED – HIGH TENSILE FIXINGS



The joints metallic galvanised steel finger plate elements are strongly fixed to the structure by way of tensioned tie-bolts. This provides for a superior retention mode whereby fixings undergo minimal load fluctuation and do not suffer from fatigue based failure. The proprietary "Trefletic" anchor ferrules are fabricated using high strength alloy with extremely good durability.

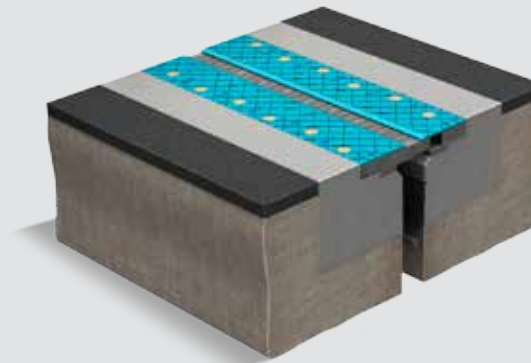
OPTIONAL FEATURES

SKUEW ORIENTATION



The SFEJ joint system is the large movement joint of choice for locations where skews are required and in particular where these skews are not conducive to using the Granor ETIC® EJ series cast aluminum saw tooth expansion joints. For extreme skew angles (within 25° degrees of longitudinal) please contact Granor for special advice.

CYCLIST COVER PLATES



When possible it is best to completely separate cyclist and vehicular traffic through use of separate bridge structures or with suitable demarcation barriers. In this scenario steel finger joints can be used for the vehicular traffic and cyclist friendly expansion joints with appropriate movement range used for cyclist traffic. For recommendations regarding cyclist friendly expansion joints to suit particular projects and movement ranges please contact Granor.

Where it is not possible to separate cyclist and vehicular traffic, it is possible to provide cover plates in the emergency lane / verge areas only. These are typically bolted directly to the steel finger joints and can be designed by Granor. The recommended design uses two separate cover plates bolted on each side of the joint and extended part way up the length of the fingers.

Note: cover plates should only be permitted in emergency lanes with low traffic count and should never be used in the main running lanes.

TROUGH SEAL

All the models in the SFEJ series utilise as standard a continuous central flexible 'trough' membrane, which locates into extruded aluminum retainer profiles. These elements are independent of the Finger plate joint elements and are located underside of the main joint system. The trough gland will need to drain to a suitable collection point at the low side of the joint.

As the aluminum retainers and trough are independent from the finger joint plates installed above, they can be cast into the blockout at a steeper slope than the joint above in order to enhance self-drainage.

Alternatively for special projects the trough membrane can be produced in our workshop such that its invert is on a steeper incline than the joint to achieve an enhanced drainage outcome.

SEAL RETAINER

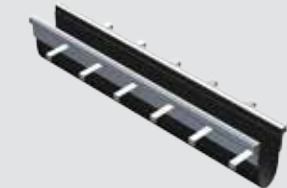


Standard

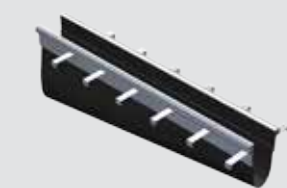


Removable

TROUGH SEAL



Standard



Special Tapered

SPECIFICATIONS

EXPANSION JOINT PERFORMANCE TABLE

TYPE	A		B		J*		S*		C*	L
	min.	max.	min.	max.	min.	max.	min.	max.		typ.
SFEJ-150	165	315	435	585	0	150	50	200	80	390
SFEJ-200	215	415	415	615	0	200	50	250	105	380
SFEJ-250	265	515	475	725	0	250	50	300	105	410
SFEJ-300	315	615	525	825	0	300	50	350	110	440
SFEJ-350	365	715	585	935	0	350	50	400	110	465
SFEJ-400	415	815	685	1085	0	400	50	450	120	520
SFEJ-450	465	915	735	1185	0	450	50	500	120	540
SFEJ-500	515	1015	785	1285	0	500	50	550	130	570
SFEJ-550	565	1115	835	1385	0	550	50	600	140	590
SFEJ-600	615	1215	885	1485	0	600	50	650	140	620

A* (min.)
Is when the fingers are fully closed up.

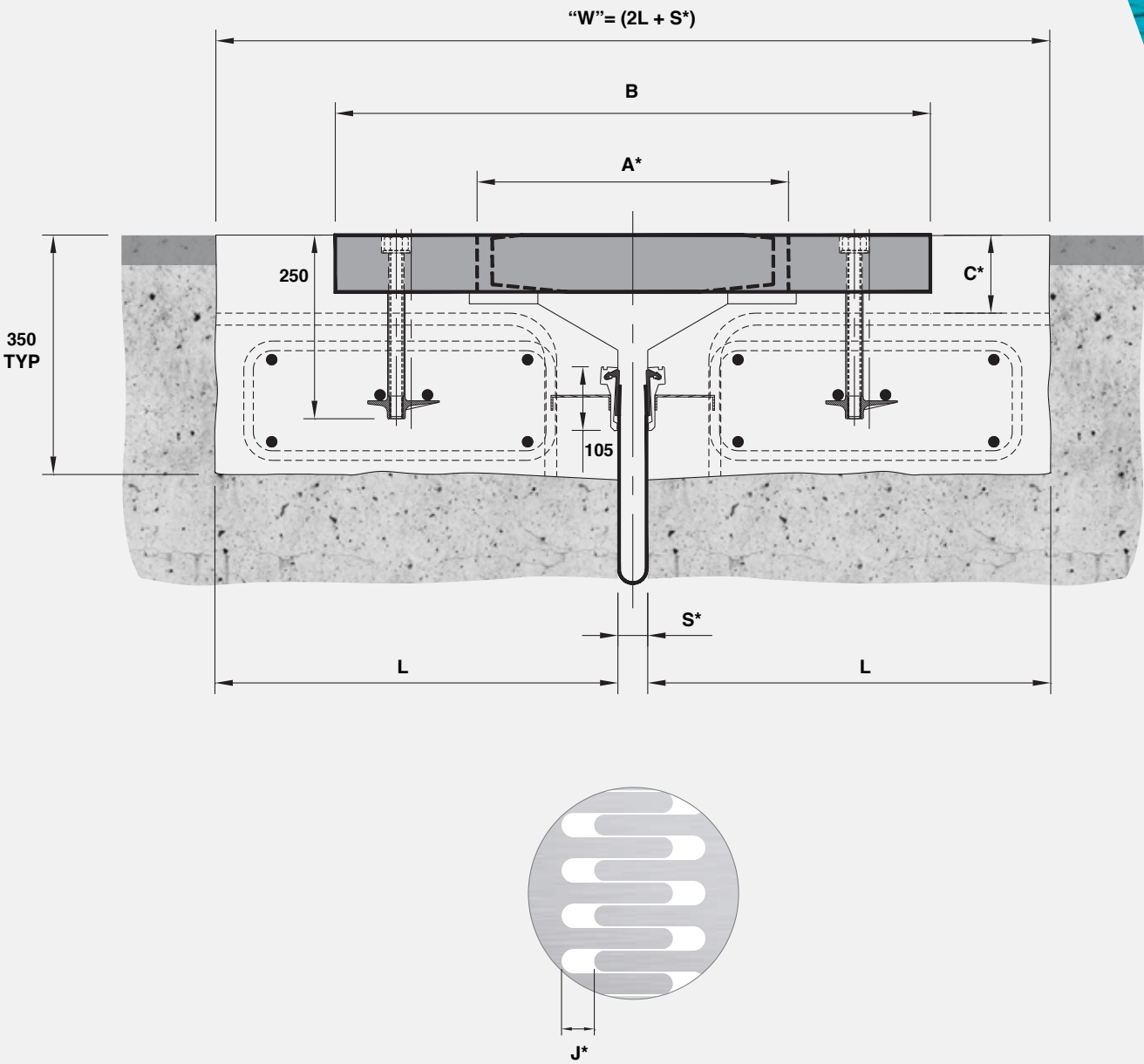
A* (max.)
Is when the fingers are fully open.

J*
Is the critical metal to metal gap between the ends of respective assembled joint components, at the time of installation, as determined by the engineer after consideration of future opening and closing of the fingers.

S* (min.)
Is the minimum acceptable gap when fingers are fully closed up.

S* (max.)
Is the minimum acceptable gap when fingers are fully open.

C*
Is the minimum clearance to the uppermost deck reinforcement beneath the joint (subject to AS5100.5 clause 4.10). Reinforcement that is required adjacent to joint such as to reinforce the concrete transition strip is unaffected.




INSTALLATION PROCESS

A DETAILED INSTALLATION GUIDE IS SUPPLIED WITH EACH ORDER HOWEVER THE FOLLOWING PROVIDES A BRIEF SUMMARY OF THE OVERALL INSTALLATION PROCESS.


- 01 The SFEJ series expansion joints are cast into appropriately formed block-outs with minimum dimensions as per the performance table.
- 02 Removable formwork is placed underside in the expansion joint gap to the appropriate gap set "S" at the time of installation. To this formwork is connected the continuous aluminium extrusion profiles that eventually accommodate the draped flexible 'trough' membrane. It should be noted that the important dimension set at time of installation is the gap "J" at the top of the joint system between the end of the finger and the invert of the opposing plate's finger slot. The underside gap set "S" is set to the as found structure gap.
- 03 Form release is applied to the underside of the galvanised steel plates. The total system is preassembled above the blockout and suspended with purpose steel suspension arms and brackets (Granor Installation Kit) to the correct level and "J" gap set width.
- 04 The system's fixings are placed such that they locate perfectly normal to underside plane of the joint system and the required reinforcement is placed and tied.
- 05 The gaps between the fingers and counterbored bolt recesses are protected from concrete slurry ingress and the blockout infill concrete is placed with thorough vibration practices. The suspension brackets are loosened once the concrete has solidified in order to allow structure movement to occur without pulling and shifting the joint system prior to full concrete cure.
- 06 Upon achievement of minimum concrete strength the SFEJ steel plates are lifted and the formwork is removed exposing the cast-in aluminium retainers.
- 07 The trough seal membrane is installed.
- 08 The exposed concrete surface is cleaned and a suitable epoxy bedding paste is applied to the surface to fill any air voids and imperfections. This epoxy paste is applied just prior to the steel finger plates being reattached. The epoxy paste ensures full surface contact of the reinstated finger plates.
- 09 The joint fixings are then tensioned to the advised torque setting and re-torqued 24 hours later, after which an infill compound is installed into the bolt well recesses.
- 10 The joint is now ready for full trafficking.





**GRANOR ETIC®
SFEJ SERIES STEEL
FINGER JOINTS
ARE A ROBUST
LARGE MOVEMENT
SOLUTION**

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