EXPANSION JOINTS

Expansion joints are structural components that allow controlled movement due to temperature variations, loads, or seismic activity, ensuring structural continuity.

EXPANSION JOINTS

The expansion joints of SOMMA are the following:

- SM – MAT expansion joints
- MEG – Big MAT expansion joints
- PT – PTW – Cantilever expansion joints
- SPS – Under-pavement expansion joints
- TS 80-100 – Nosing expansion joints
- Ts – Modular expansion joints
- RAILWEJ – Railway expansion joints

Expansion joints are designed to ensure continuity between two structural elements and to accommodate the movements of the structure itself, generally due to:

- Hygrometric shrinkage of concrete
- Thermal expansion of the deck
- Braking actions
- Seismic actions

The expansion joints of SOMMA have a range of movements from 25 to 1200 mm.

Their performance is guaranteed even in case of high traffic density and constant exposure to external agents.
All joints are equipped with a water drainage system and are designed to minimize traffic noise while ensuring maximum comfort for passengers in transit.
The expansion joints of SOMMA comply with the EAD 120-00-0107 standard.

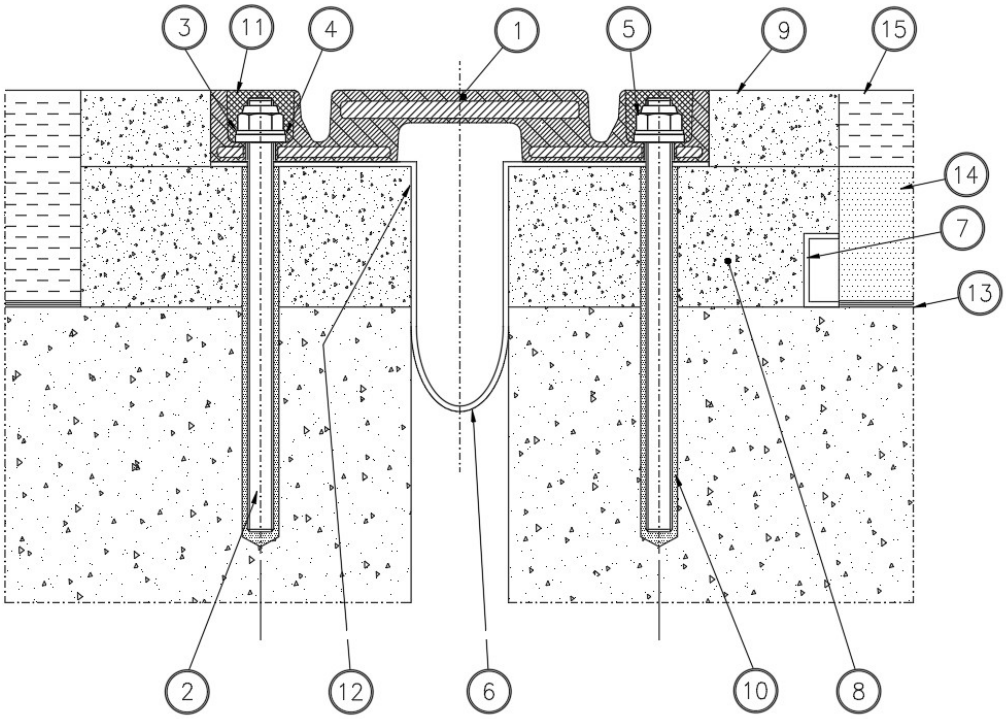
MAT Expansion joint
SM series

“SM” type is a MAT expansion joint according to EAD 120110-00-0107 with ETA and CE Mark – Declaration of Constancy of Performance. “SM” joints allow longitudinal and transversal displacements in a range from ±25 mm to ±300 mm.

The joint is made of vulcanized rubber with steel plates. The plates are protected against corrosion. There is a central bridging plate with a succession of lateral hollow parts that allow movement of the joint. The movement of the joint takes place by deformation of the rubber.

These joints are made of the following elements:

- **Bridging plate**: a rubber-coated steel plate providing vertical load capacity, supported by deformable rubber elements.
- **Lateral plates**: two steel plates covered and protected by rubber. The plates have the same structural function as the bridging plate, but they are only in joints with four hollow parts.
- **Rubber elements**: Prismatic elastomeric blocks between the bottom plates and the bridging/lateral pplates, allowing shear deformation and displacement.
- **Hollow parts**: two or four at the top, one or three at the bottom, enabling movement by opening or closing and assisting rubber deformation.
- **Anchorages**: elastomeric blocks with holes for anchor bars and cavities for nuts and washers, reinforced with L-shaped steel plates. Anchors are Class 8.8 threaded bars with self-locking nuts or, upon request, AISI 316 steel.
- **Waterproofing system**: a “C”-shaped aluminium profile drains water to a gutter, fixed with epoxy adhesive.



The MAT expansion joints “SM” type are widely used due to some of their characteristics:

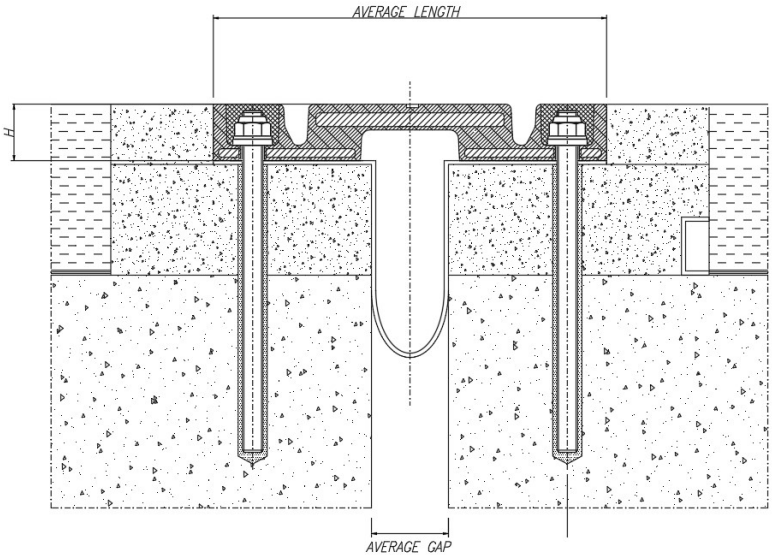
- Reduced thickness enables easy installation by simply drilling holes, lowering replacement costs and speeding up execution.
- “SM” joints allow large transverse and longitudinal displacements, ideal for seismic applications.
- Prefabricated elements are assembled on-site; damaged sections can be replaced individually for cost savings.
- Waterproofing is ensured by the male-female side configuration and by the gutter along the length of the joint.
- The grooved running surface improves drainage and vehicle grip, while minimizing vibrations and noise during vehicle passage.

The “SM” joints can be installed with a skew angle β up to 45° and on roads with a slope up to 7%.
From fatigue tests performed in compliance with Annex B of the EAD 120109 the **working life** of the joints is **10 years**.

List of components of MAT expansion joints SM series

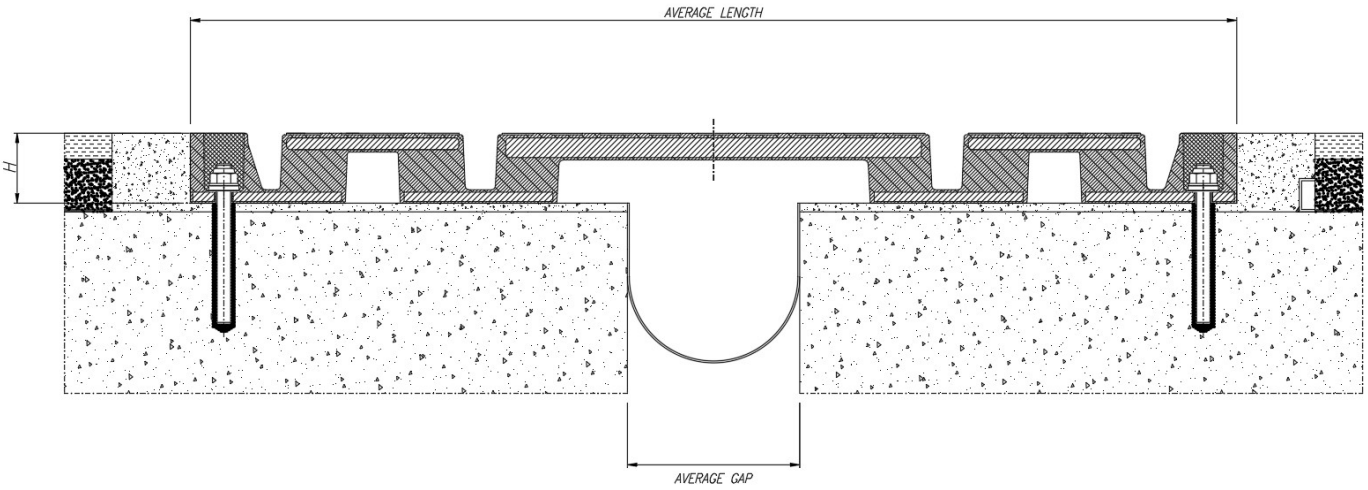
Pos	Description	Material
1	Modular element	Vulcanized Rubber 60±5 Sh/A ISO 48
2	Anchor bar	Class 8.8 galvanized
3	Washer	ISO 7089
4	Oval washer	C40 - Zn
5	Selflocking nut	Class 8 EN 20898 EN 10083
6	Water drainage gutter	EPDM/polyethilene + PVC reinforced with nylon net
7	“C” shaped steel drainage profile	Aluminium
8	Concrete cast	Anti-shrinkage rheoplastic grout
9	Transition strip	Anti-shrinkage rheoplastic grout
10	Mixture for anchor fixing	Epoxy resin
11	Elastic sealant	Three-component epoxy-bitumen
12	Epoxy stick	Thixotropic epoxy adhesive
13	Waterproofing of the deck	
14	Binder	
15	Wear layer	

MAT Expansion joints for small movements SM series



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Transversal movement [mm]	Vertical movement [mm]	Type of anchoring
SM 50N	230	33	160	45	± 25 (total 50)	± 25 (total 50)	± 30 (total 60)	M12x200
SM 80N	282	35	160	60	± 40 (total 80)	± 40 (total 80)	± 30 (total 60)	M12x200
SM 100	299	47	160	70	± 50 (total 100)	± 50 (total 100)	± 30 (total 60)	M12x200
SM 120N	355	47	160	80	± 60 (total 120)	± 60 (total 120)	± 30 (total 60)	M14x200
SM 150N	440	64	160	95	± 75 (total 150)	± 75 (total 150)	± 30 (total 60)	M20x200

MAT Expansion joints for medium movements SM series



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Transversal movement [mm]	Vertical movement [mm]	Type of anchoring
SM 200N	772	57	160	120	± 100 (total 200)	± 100 (total 200)	± 30 (total 60)	M20x200
SM 300N	1019	69	160	170	± 150 (total 300)	± 150 (total 300)	± 30 (total 60)	M20x200
SM 400N	1335	89	160	220	± 200 (total 400)	± 200 (total 400)	± 30 (total 60)	M20x200

Seismic MAT Expansion joints SM series

Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Transversal movement [mm]	Seismic movement [mm]	Vertical movement [mm]	Type of anchoring
SM 300/500	1219	69	160	270	± 150 (total 300)	± 150 (total 300)	± 250 (total 500)	± 30 (total 60)	M20x200
SM 400/600	1535	89	160	320	± 200 (total 400)	± 200 (total 400)	± 300 (total 600)	± 30 (total 60)	M20x200

MAT Expansion joints for big movements
MAT series

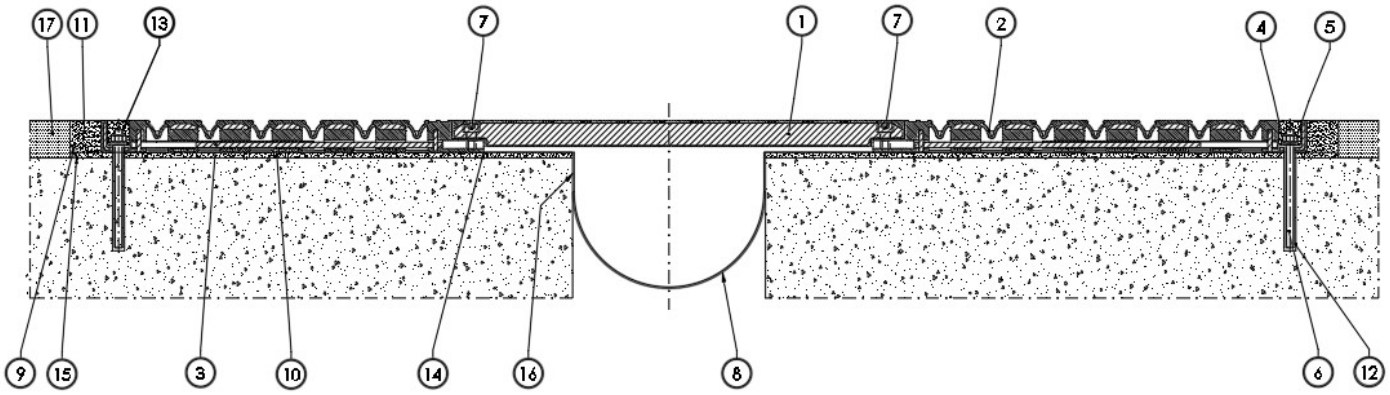
“MEG” MAT expansion joints consist of a central steel bridging plate vulcanized with rubber that covers it. The plate supports the vertical load. On one or both sides, there are deformable elements that allow movement through their deformation.

The movement is guaranteed by the presence of deformable rubber modules, vulcanized to steel plates and containing stainless steel anti-lift bars. The sliding capacity of the joint depends on the quantity of rubber modules it is made of.

The joint panel is 1.5 m long. It is supplied with a rubber gutter for collecting water and with the fixing system, consisting of anchor clamps, washers and self-locking nuts.

It can be supplied with a water drainage system thanks to the insertion of a “C”-shaped aluminium profile.

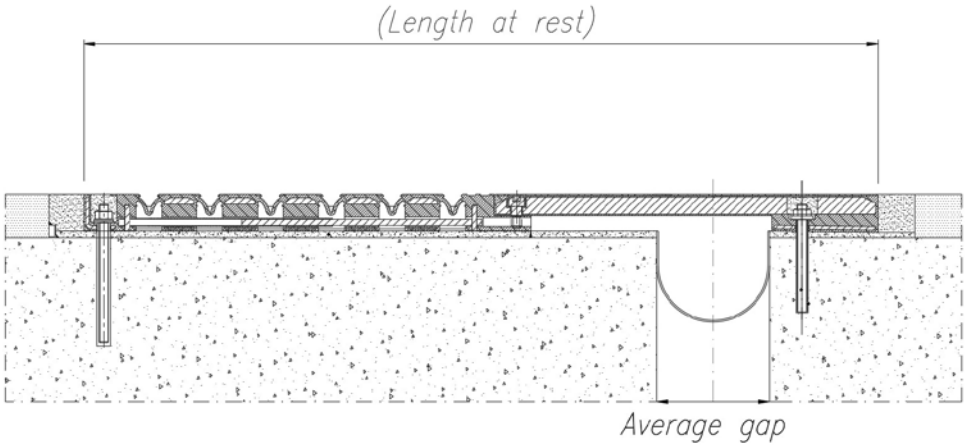
The “MEG” MAT expansion joints comply to EAD 120110.



List of components of MAT expansion joint MEG series

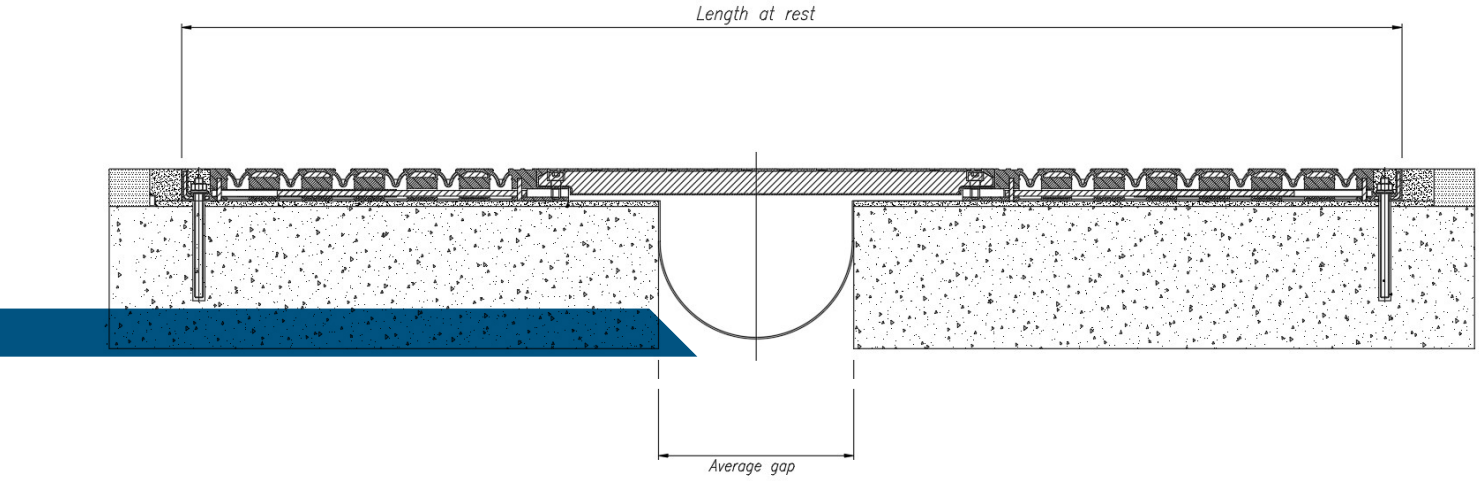
Pos	Description	Material
1	Steel plate	S355J2 EN 10025
2	Modular expansion element	Vulcanized Rubber 60±5 Sh/A ISO 48
3	Anti-lift bar	-
4	Oval washer M24	S275JR EN10025
5	Locknut M24	Class 8 EN 10083
6	Threaded bar M24x250	Class 8.8
7	Fixing bolt M16	Grade 8.8
8	Water drainage gutter	-
9	“C” shaped steel drainage profile	Aluminum (optional)
10	Concrete cast	Anti-shrinkage rheoplastic grout
11	Transition strip	Anti-shrinkage rheoplastic grout
12	Mixture for anchor fixing	Epoxy resin
13	Elastic sealant	Three-component epoxy-bitumen
14	Leveling with putty	Thixotropic epoxy adhesive
15	Bonding sealing with stucco	Thixotropic epoxy adhesive
16	Vertical stucco application	Thixotropic epoxy adhesive
17	Pavement	-

Asymmetrical MAT expansion joints MEG series



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Transversal movement [mm]	Vertical movement [mm]	Type of anchoring
MEG 320	1350	85	250	180	± 160 (total 320)	± 160 (total 320)	± 30 (total 60)	M24x250
MEG 400	1590	85	250	220	± 200 (total 400)	± 200 (total 400)	± 30 (total 60)	M24x250
MEG 480	1830	85	250	260	± 240 (total 480)	± 240 (total 480)	± 30 (total 60)	M24x250
MEG 560	2070	85	250	300	± 280 (total 560)	± 280 (total 560)	± 30 (total 60)	M24x250
MEG 640	2310	85	250	340	± 320 (total 640)	± 320 (total 640)	± 30 (total 60)	M24x250

Symmetrical MAT expansion joints MEG series



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Transversal movement [mm]	Vertical movement [mm]	Type of anchoring
MEG 720	2390	85	250	380	± 360 (total 720)	± 360 (total 720)	± 30 (total 60)	M24x250
MEG 800	2630	85	250	420	± 400 (total 800)	± 400 (total 800)	± 30 (total 60)	M24x250
MEG 900	2870	85	250	470	± 450 (total 900)	± 450 (total 900)	± 30 (total 60)	M24x250
MEG 1000	3250	85	250	520	± 500 (total 1000)	± 500 (total 1000)	± 30 (total 60)	M24x250
MEG 1100	3490	85	250	570	± 550 (total 1100)	± 550 (total 1100)	± 30 (total 60)	M24x250
MEG 1200	3730	85	250	630	± 600 (total 1200)	± 600 (total 1200)	± 30 (total 60)	M24x250

Cantilever Expansion joints
PT – PTW series

The “PT” and “PTW” type are cantilever expansion joints according to EAD 120111 with ETA and CE Mark-Declaration of Constancy of Performance.

“PT” and “PTW” joints allow longitudinal displacements in a range of ± 25 mm to ± 500 mm.

These expansion joints are made of structural steel (S355J2), to be protected against corrosion by painting or hot-dip galvanizing, or in self-protected steel against corrosion (S355J2W).

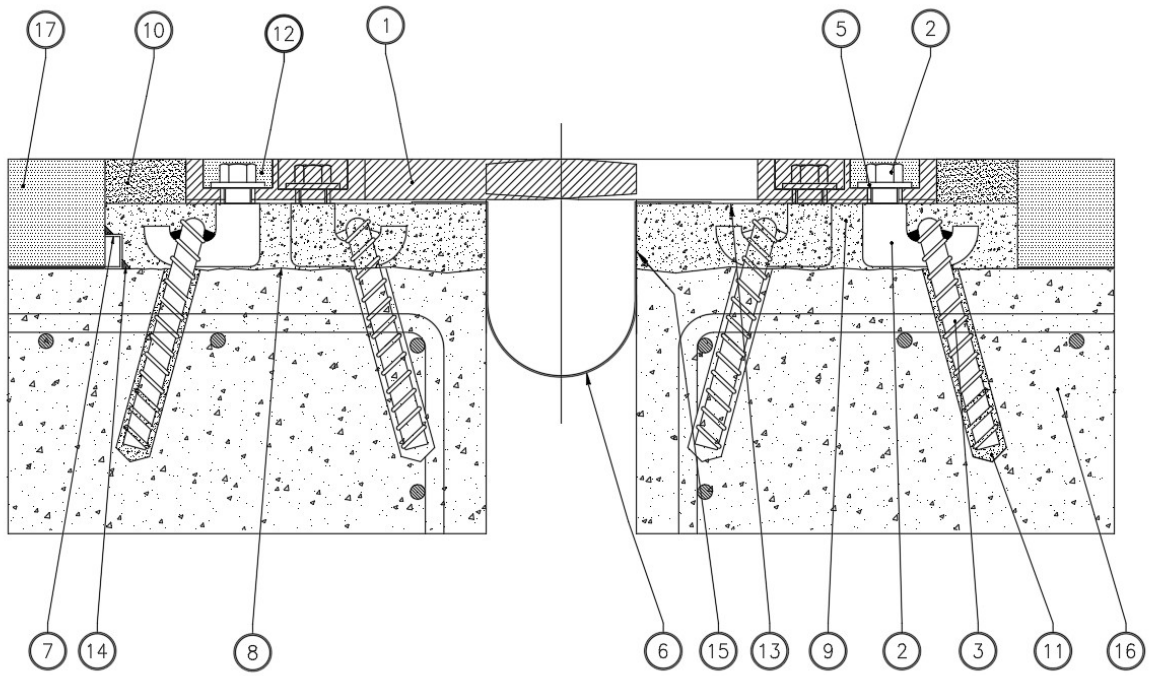
They are generally made of two cantilever steel elements shaped as a comb, with the possibility of penetrating each other to allow the required movements. Each element is anchored on one side of the deck joint gap, and both are flush with the running surface.

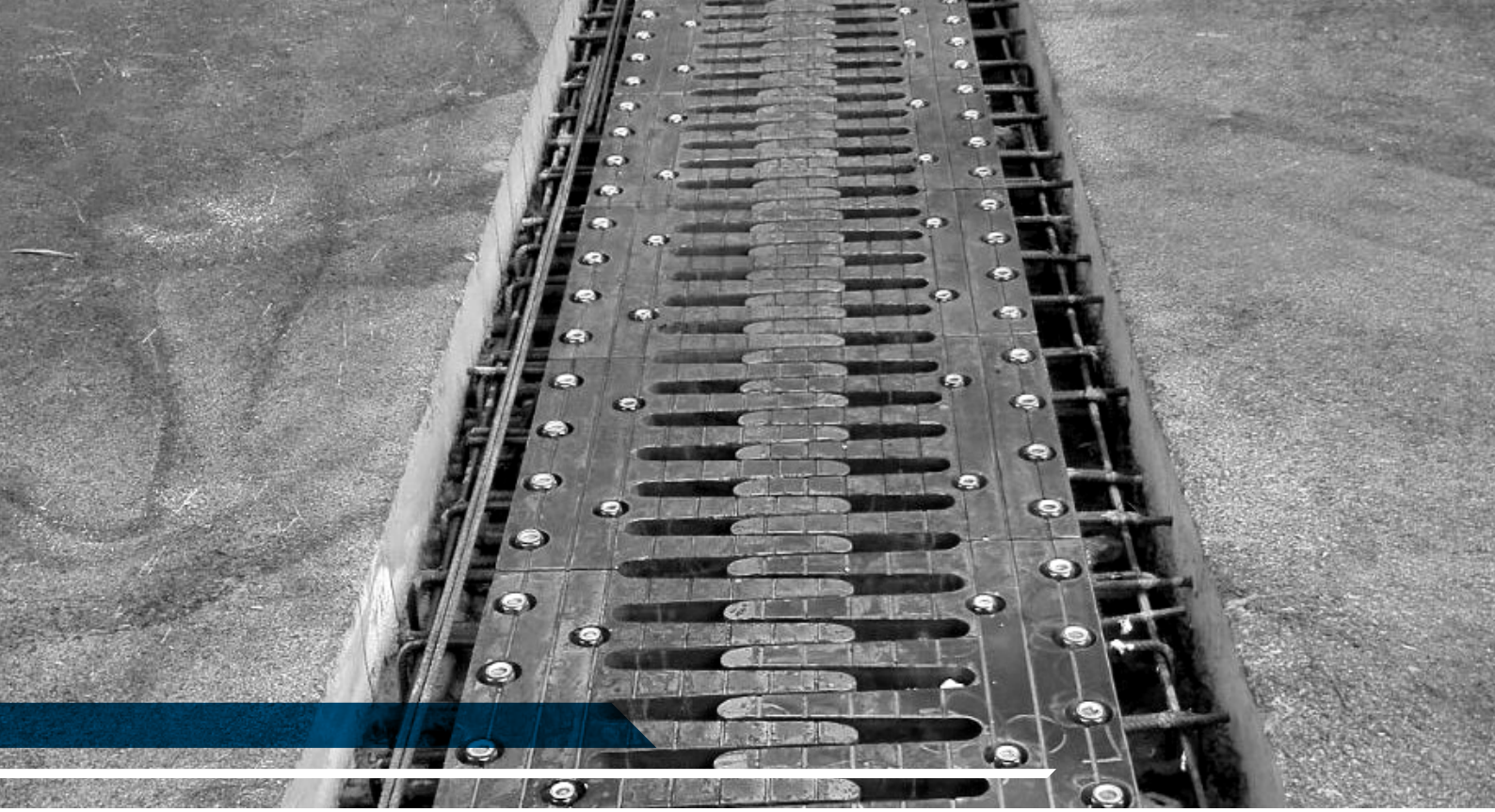
Waterproofing system: the water that infiltrates the pavement on the sides of the joint is drained by a “C”-shaped aluminium profile and conveyed into the gutter. The gutter is fixed with a specific epoxy paste.

If correctly installed, the “PT” and “PTW” joint guarantees the absence of excessive vibrations when vehicles pass and consequently the limitation of noise.

The “PT” e “PTW” type can be installed with a skew angle β up to 45° and on roads with a slope up to 7%.

From fatigue analysis in compliance with EAD 120109 the **working life** of the joints is .

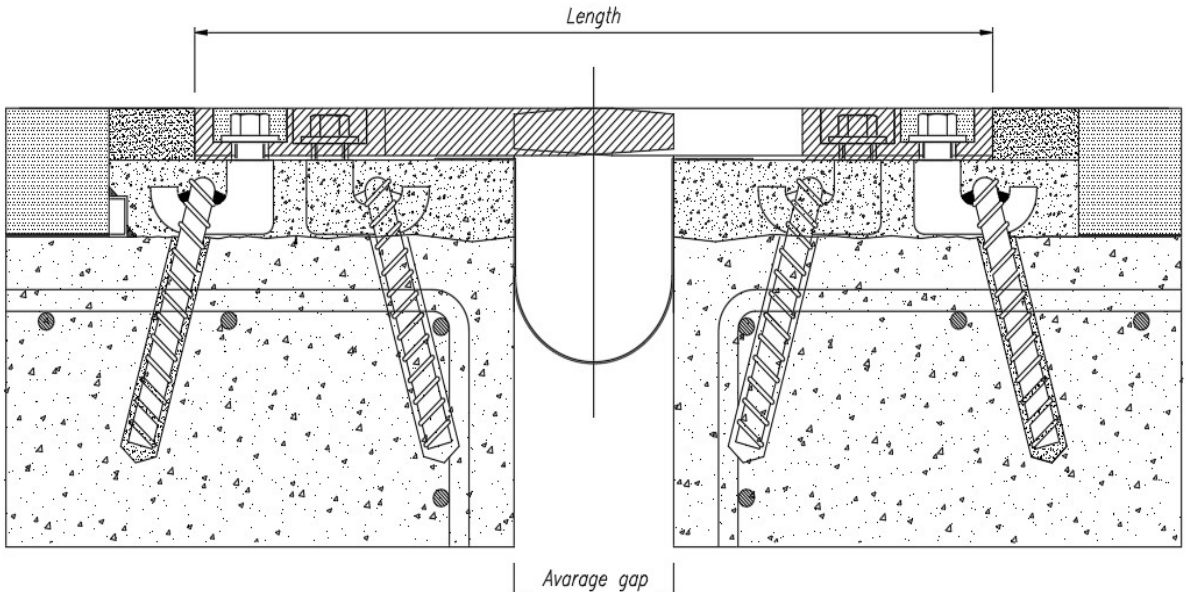




List of components of the cantilever expansion joint PT - PTW series

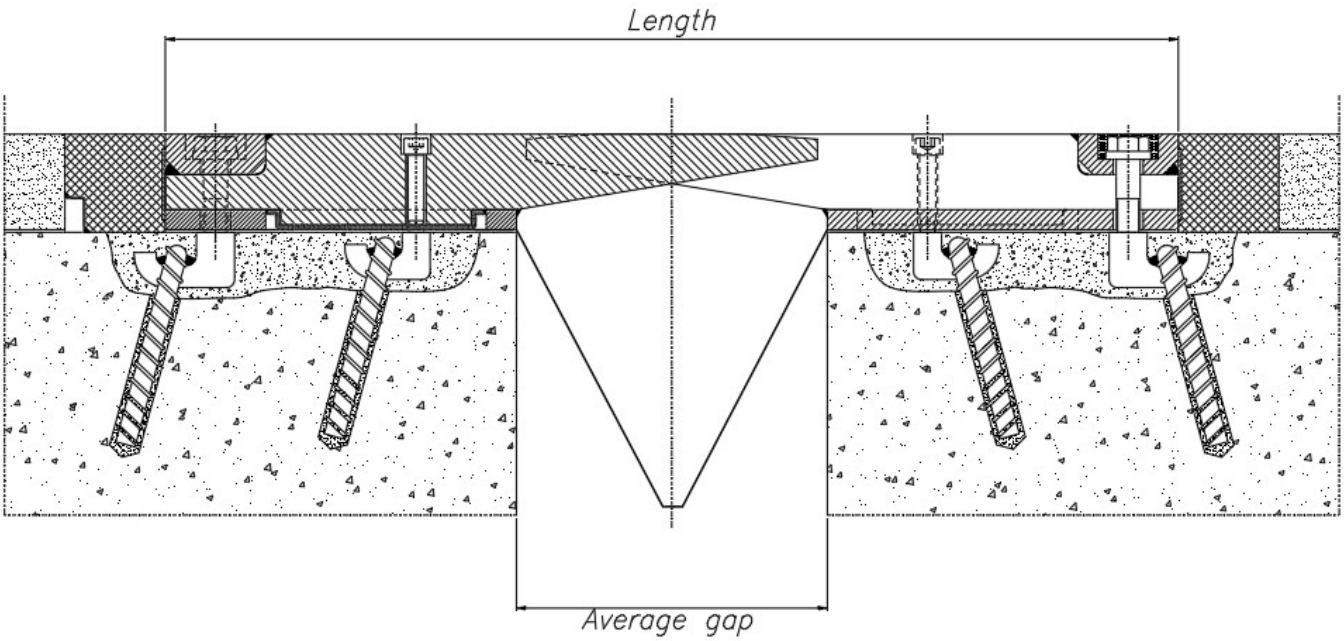
Pos	Description	Material
1	Finger element	S355J2/S355J2W EN 10025
2	Multidirectional anchorage	S355J2G3 EN 10025
3	Anchor bar Ø 20x200	B450C
4	Screw M24x60	Class 8.8 – Galvanized
5	Washer M24	ISO 7089
6	Drainage gutter	EPDM / polyethylene + PVC reinforced with nylon net / X5 CrNi 1810
7	“C” shaped steel drainage profile	Aluminium (optional)
8	Deck waterproofing membrane	-
9	Base casting	Anti-shrinkage rheoplastic grout
10	Lateral screed	Anti-shrinkage rheoplastic grout
11	Anchoring resin	Epoxy resin
12	Elastic sealant	Three-component epoxy-bitumen
13	Base grouting	Thixotropic epoxy adhesive
14	Waterproofing by epoxy resin	Epoxy resin
15	Vertical grouting	Thixotropic epoxy adhesive
16	Deck end	-
17	Pavement	-

Cantilever Expansion joints for small and medium movements
PT - PTW series



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Vertical movement [mm]	Type of anchoring
PT 50 PTW 50	400	25	200	55	± 25 (total 50)	± 30 (total 60)	M14x200
PT 100 PTW 100	500	30	200	80	± 50 (total 100)	± 30 (total 60)	M16x200
PT 150 PTW 150	550	35	200	105	± 75 (total 150)	± 30 (total 60)	M24 + Ø20x200
PT 200 PTW 200	650	40	200	130	± 100 (total 200)	± 30 (total 60)	M24 + Ø20x200
PT 250 PTW 250	690	45	200	155	± 125 (total 250)	± 30 (total 60)	M24 + Ø20x200
PT 300 PTW 300	720	50	200	180	± 150 (total 300)	± 30 (total 60)	M24 + Ø20x200
PT 350 PTW 350	800	55	200	205	± 175 (total 350)	± 30 (total 60)	M24 + Ø20x200
PT 400 PTW 400	850	60	200	230	± 200 (total 400)	± 30 (total 60)	M24 + Ø20x200

Cantilever Expansion joints for big movements
PT - PTW series



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Vertical movement [mm]	Type of anchoring
PT 500 PTW 500	857	95	200	310	± 250 (total 500)	± 30 (total 60)	M16/M24 + Ø20x200
PT 600 PTW 600	957	105	200	360	± 300 (total 600)	± 30 (total 60)	M16/M24 + Ø20x200
PT 700 PTW 700	1057	110	200	410	± 350 (total 700)	± 30 (total 60)	M16/M24 + Ø20x200
PT 800 PTW 800	1157	120	200	460	± 400 (total 800)	± 30 (total 60)	M16/M24 + Ø20x200
PT 900 PTW 900	1357	125	200	510	± 450 (total 900)	± 30 (total 60)	M16/M24 + Ø20x200
PT 1000 PTW 1000	1457	140	200	560	± 500 (total 1000)	± 30 (total 60)	M16/M24 + Ø20x200

Under-pavement Expansion joint SPS series

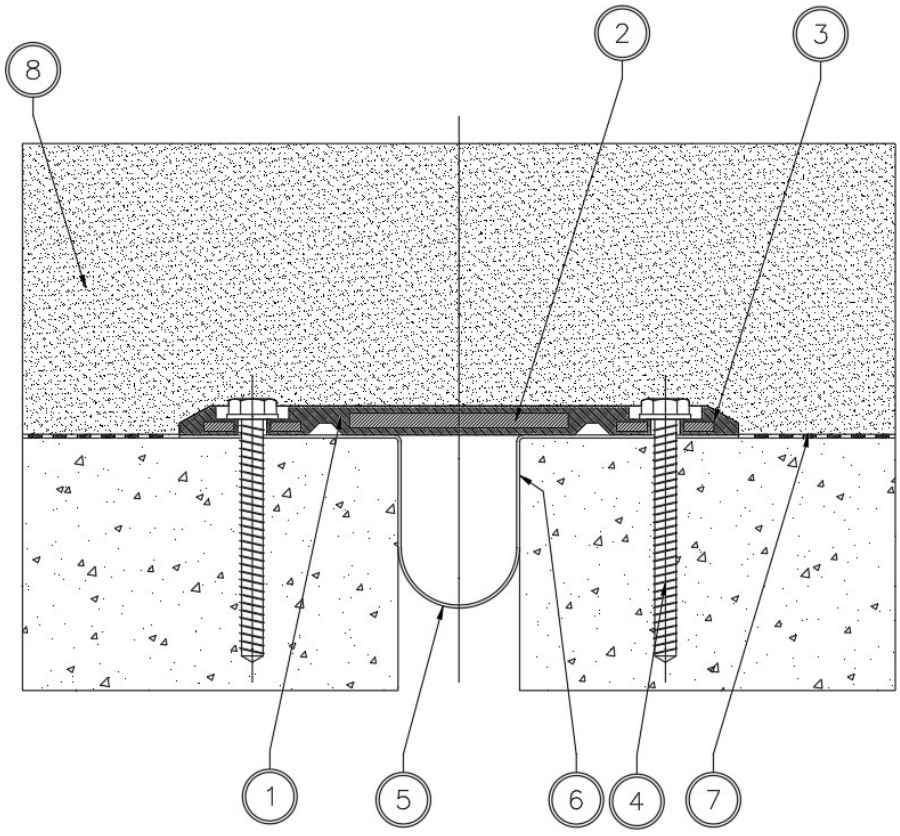
SPS type is an under-pavement joint that also serves as a bridge plate for flexible asphaltic plug expansion joint according to EAD 120093-00-0107.

“SPS” joint allows longitudinal displacements up to ± 15 mm and transversal displacements of ± 20 mm.

The joint is made of vulcanized rubber with steel plates.

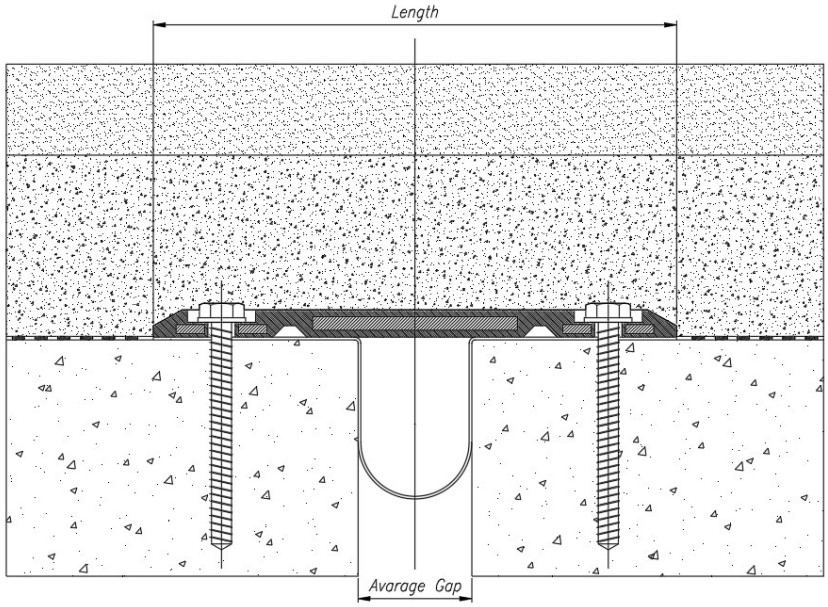
These joints are made of the following elements:

- **Bridging plate:** a steel plate covered and protected by rubber. The plate is useful for vertical capacity. It is supported by deformable rubber elements.
- **Hollow parts:** in the lower part of the joint there are two elements that allow, by opening or closing, the movement.
- **Anchorages:** two prismatic elastomeric elements on the side of the bridging plate or side plates. They have holes for anchor bars and cavities for screws and washers. Their function is to ensure the fixing of the joint to the structure.
- **Waterproofing system:** the water that infiltrates the pavement on the sides of the joint is drained by a “C”-shaped aluminium profile and conveyed into the gutter. The gutter is fixed with a specific epoxy paste.



List of components of the expansion joint SPS series

Pos	Description	Material
1	Modular element	Rubber
2	Bridge plate	S275 JR EN 10025
3	Steel plate	S275 JR EN 10025
4	Self-tapping screw	M8x100 cl. 8.8
5	Water drainage gutter	EPDM/Polyethylene + PVC reinforced with nylon net
6	Epoxy stick	R-SM EBOND
7	Deck waterprofing membrane	-
8	Pavement	-



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Longitudinal movement [mm]	Vertical movement [mm]	Type of anchoring
SPS 50	230	12	100	50	± 10 (total 20)	± 15 (total 30)	M8 x 200
SPS 200	400	16	100	200	± 15 (total 30)	± 20 (total 40)	M8 x 200

Nosing Expansion Joints
TS 80-100 series

“TS 80-100” type is a nosing expansion joint according to EAD 120109-00-0107 with ETA and CE Mark-Declaration of Constancy of Performance.

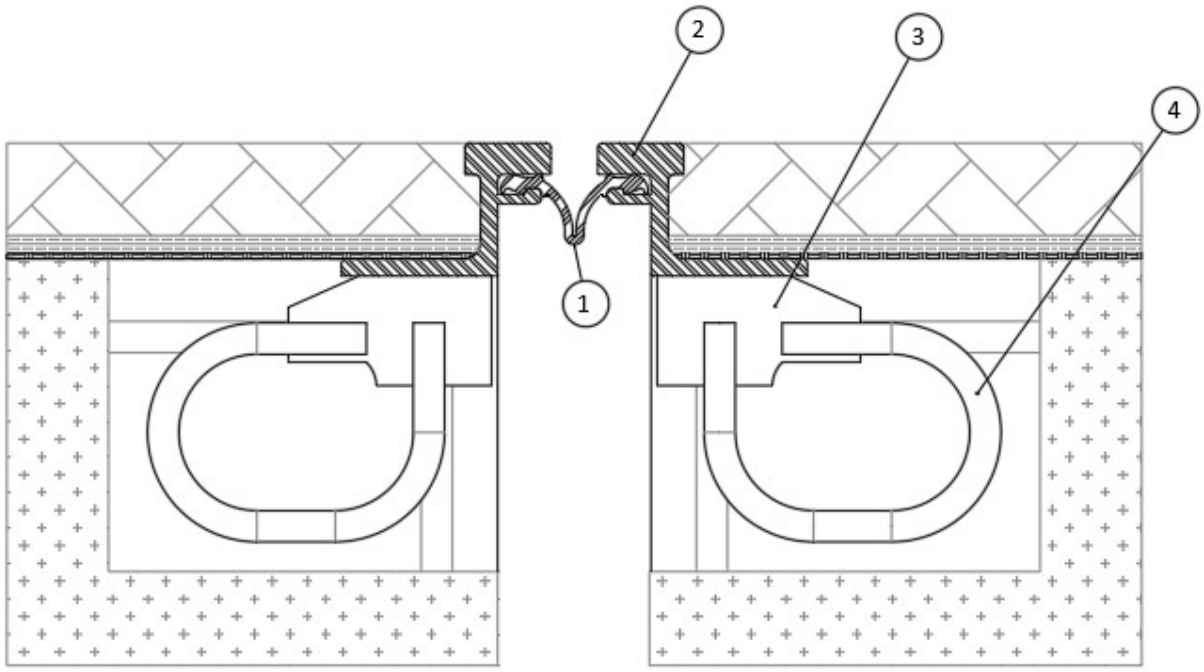
“TS” joint allows longitudinal displacements in a range of ± 40 mm to ± 50 mm and transversal displacements of ± 20 mm.

“TS 80-100” expansion joint is supplied with the following components:

- Flexible elastomeric sealing element made of EPDM (replaceable), for both concrete and steel bridges.
- Steel edge profile to hold the sealing element, steel grade S235J0 in combination with 1.4571 or 1.4404 or 1.4301 (hybrid profile), for both concrete and steel bridges.
- Anchorage made of S235JR steel anchor plates.
- S235JR round steel bar stirrups Ø20, for anchoring in concrete.
- S355J2 steel angle profile L 120x15, only for steel bridges.

The “TS 80-100” joint can be installed with a skew angle 45°≤ β ≤135° and on roads with a slope in traffic direction less than 4% and a slope in direction of the expansion joint is less than 8%.

From fatigue tests performed in compliance with EAD 120109 the **working life** of the joints is **50 years**.



List of components of the expansion joint TS 80-100 series

Pos	Description	Material
1	Modular element	Rubber
2	Profile	S235 J0 EN 10025
3	Anchorage 70x150x15 mm	S235 JR EN 10025
4	Bar Ø 20 mm	S235 JR EN 10025

Movement capacity of product – declared

Type	Allowed movement [mm]			Type of anchoring
	Longitudinal	Vertical	Transversal	
TS 80-100	± 50 (total 100)	± 6 (total 12)	± 20 (total 40)	70x150x15 mm

Modular Expansion joints
Ts series

The “Ts” type is a modular expansion joints according to EAD 120113-00-0107.

“Ts” modular joints are designed as single or multiple support bar joint systems, depending on the required range of movement and the intended application. They are designed to accommodate structural movements by the arrangement of adjacent connecting seals, featuring a self-adjusting gap system, designed to ensure that all seals open uniformly. Ts modular joints significantly reduce road traffic noise and vibration to a minimum, and the design approach also results in a continuous watertight connection at both minimum and maximum opening, extremely strong and fatigue-free connections and maintenance-free components.

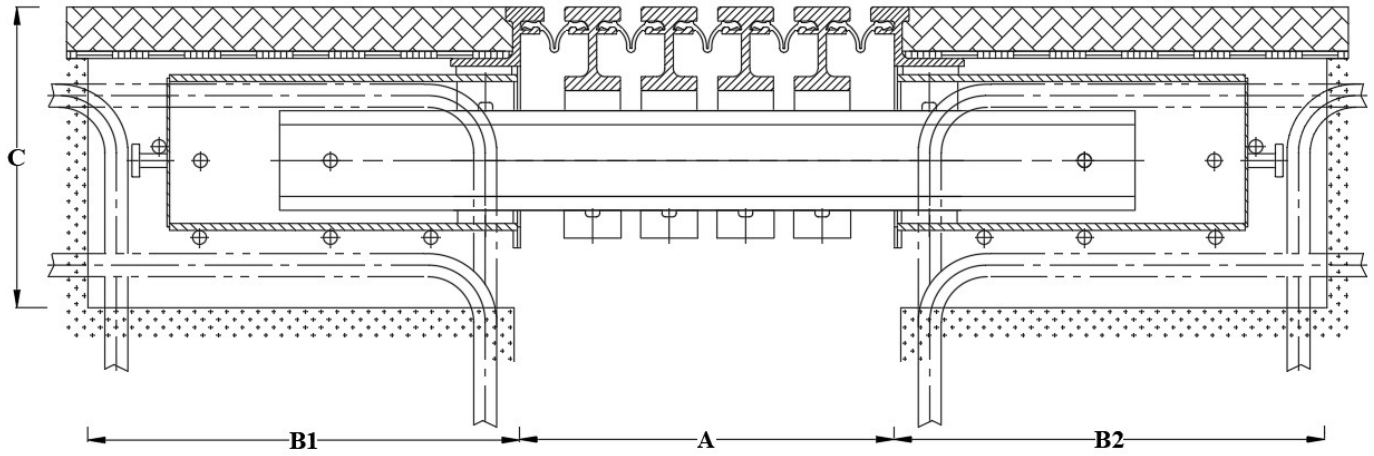
“Ts” joints allow longitudinal and transversal displacements in a range of ± 80 mm to ± 600 mm.

These expansion joints are made of structural steel (S355J2), to be protected against corrosion by painting or hot-dip galvanizing, or in self-protected steel against corrosion (S355J2W).

Ts EXPANSION JOINTS include the following components:

- **Centre beam:** guided movement-controlled steel beam providing a road surface with adequate traffic bearing resistance and supported by crossbeams, pantographs etc. (also called “lamella”). The centre beam carries the vertical and horizontal traffic loads with sufficient evenness and skid resistance. The traffic loads are transferred to the crossbeams. Further, it supports the sealing elements between the centre beams and between the centre beams and the edge beams.
- **Edge beam:** it carries both vertical and horizontal traffic loads and transfers the loads into the main structures such as abutment and bridge. Further, it supports the sealing elements.
- **Crossbeam or support beam:** it is also called “traverse”. It transfers the loads from the centre beams to the main structures.
- **Pantograph or lazy tong:** it acts as a crossbeam with a variable length with the rotation of its parts.
- Joist box or crossbeam box: it supports the crossbeams and is embedded in the main structure.
- **Sealing element:** a flexible element which ensures the watertightness of the expansion joint and protects it against debris and does not carry traffic loads.
- **Bearing:** it transfers the loads from the centre beam to the crossbeam and/or to the main structure, accommodating translations and rotations.
- **Prestress element:** it prevents uplift of the centre beam to crossbeam connection and/or uplift in the crossbeam to main structure connection.
- **Control element:** it ensures that the centre beams are approximately equally spaced at various modular joint opening positions.
- **Anchorage system:** steel bars and/or rods that connect the modular expansion joint to the main structure or the abutment.
- **Additional surface elements:** noise reducing elements.

From fatigue tests performed in compliance with Annex B of the EAD 120109 the **working life** of the joints is **50 years**.



Type	Displacement [mm]	Elements [Piece]	A_{min} [mm]	A_{min} [mm]	B_1 [mm]	B_2 [mm]	C* [mm]
Ts-160	± 80 (total 160)	2	150	310	200	200	290
Ts-200	± 100 (total 200)	2	170	330	200	200	290
Ts-240	± 120 (total 240)	3	230	470	300	300	290
Ts-300	± 150 (total 300)	3	250	490	300	300	290
Ts-320	± 160 (total 320)	4	310	630	380	380	320
Ts-400	± 200 (total 400)	5	390	790	460	460	320
Ts-480	± 240 (total 480)	6	470	950	540	540	330
Ts-560	± 280 (total 560)	7	550	1110	620	620	330
Ts-640	± 320 (total 640)	8	630	1270	700	700	330
Ts-720	± 360 (total 720)	9	710	1430	780	780	350
Ts-800	± 400 (total 800)	10	790	1590	860	860	350
Ts-880	± 440 (total 880)	11	870	1750	940	940	370
Ts-960	± 480 (total 960)	12	950	1910	1020	1020	370
Ts-1040	± 520 (total 1040)	13	1030	2070	1100	1100	400
Ts-1120	± 560 (total 1120)	14	1110	2230	1180	1180	420
Ts-1200	± 600 (total 1200)	15	1190	2390	1260	1260	420

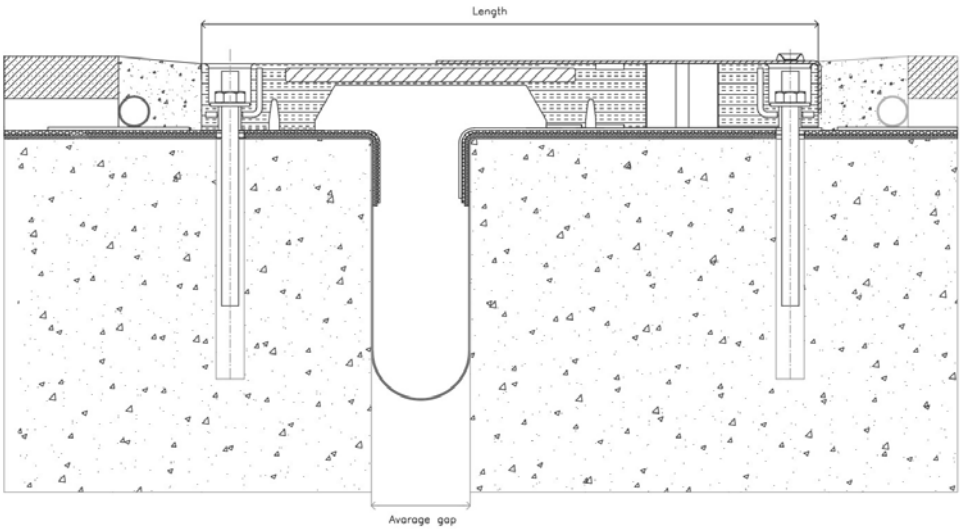
Railway Expansion joints
RAILWEJ series

The RAILWEJ series expansion joints are designed with special details to be suitable for the use in railway bridges. If required, the joints can be dielectric.

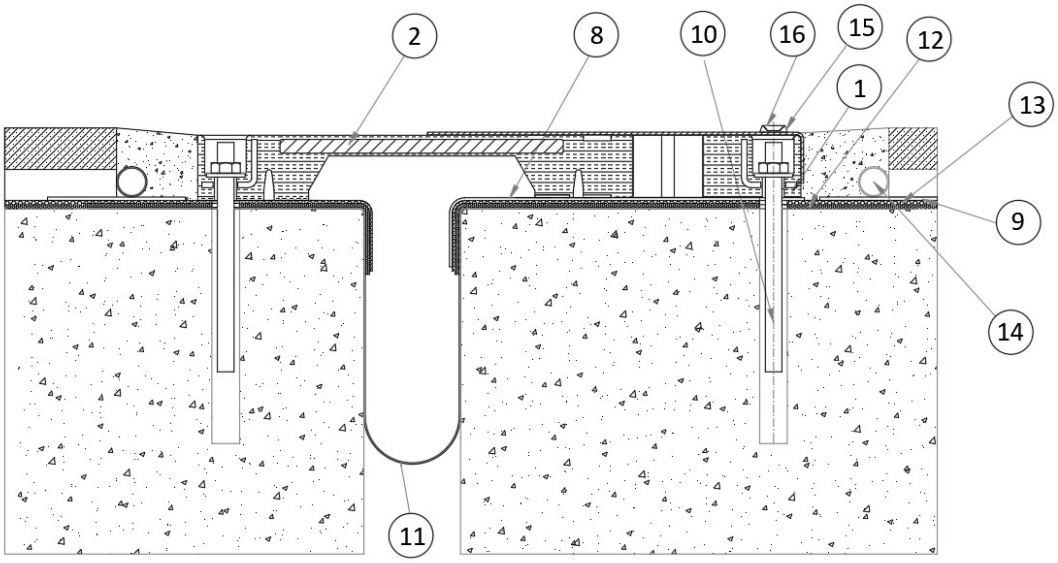
A stainless-steel plate is provided on the upper surface of the joint that prevents the ballast from penetrating inside. The anchoring is achieved by means of threaded rods, class 8.8 steel or, on request, in AISI 316.

The supply includes the gutter for the collection of the water and, if present, special lateral elements for covering the ballast containment walls.

The joints comply with the Italian RFI DTC SI PS SP IFS 002F regulation.



Type	Average Length [mm]	Height [mm]	Length of anchoring [mm]	Average gap [mm]	Movement [mm]	Vertical movement [mm]	Type of anchoring
RAILWEJ 100	438	45	165	70	± 50 (total 100)	± 50 (total 100)	M12x165
RAILWEJ 200	640	45	165	120	± 100 (total 200)	± 50 (total 100)	M12x165
RAILWEJ 300	828	45	165	170	± 150 (total 300)	± 50 (total 100)	M12x165
RAILWEJ 400	1030	45	165	220	± 200 (total 400)	± 50 (total 100)	M12x165



List of components of the joint RAILWEJ series

Pos	Description	Material
1	Anchoring angle bracket on fixed side	S275J2 EN 10025
2	Bridging plate	S355J2 EN 10025
3	PTFE	EN 1337
4	PTFE	EN1337
5	Rubber	Nr 60Sh/A EN 1337
6	Protection Steel Sheet	Aluminium EN 485/X5CrNiMo17-12 EN 10088
7	PTFE	EN1337
8	Sliding plate	Aluminium EN 485/X5CrNiMo17-12 EN 10088
9	Protection plate	Aluminium EN 485/X5CrNiMo17-12 EN 10088
10	Anchoring rod M12x165, Nut and Washer	Class 8.8 EN ISO 898-1/X2CrNi18/11 ISO 898
11	Gutter	EPDM/Polyethylene/Hypalon
12	Bottom waterproofing	-
13	Upper Waterproofing	-
14	Drainage	PVC
15	Countersunk washer M8	Class 8.8 EN ISO 898-1/ X5CrNiMo17-12 EN 10088
16	Countersunk screw M8x40	Class 8.8 EN ISO 898-1/ X5CrNiMo17-12 EN 10088

INFO &
CONTACTS

Headquarter
Viale Shakespeare, 47 - 00144 - Roma (RM)
Phone: +39 06 9337 9580
Phone: +39 06 4423 0270

Warehouse - Lab
Via Dei Colonizzatori - 04011 - Aprilia (LT)
Phone: +39 06 4576 9160

info@sommainternational.com
www.sommainternational.com