



Elastomeric expansion joints

RAN - SIN
GPE
RAN P
series



ELASTOMERIC EXPANSION JOINTS

JOI

ELASTOMERIC MOVEMENT JOINTS

When bridges were designed with short spans and massive appearances, movement joints were not an essential mechanical item required, if they were required then simple joints would have been used.

But, once this old style of bridge design was substituted with a modern concept, mechanical movement joints became an important feature, hence extensive development in this field.

More recently, pre-stressing techniques, segmental construction methods and cable-stayed designs have further increased the demand and importance for performance and reliability in modern mechanical movement joints.

Since the research and development within FIP Industriale has been so productive, we are now in a positive position to boast a wide range of standard and non-standard elastomeric movement joints which are able to accommodate movements ranging from 50 mm to 800 mm, with non-standard movement joints accommodating movements beyond 800 mm.

By using over 40 years of design, manufacture, testing and installation experience, we have discovered an exclusive design that will allow the maintenance to be carried out after several years without the operation becoming arduous and costly.



In 1992, FIP Industriale secured CISQ-ICIM certification for its Quality Assurance System in conformance with EN 29001 European Standard (ISO 9001).

FIP Industriale is proud to be the first Italian manufacturer of structural bearings, aseismic devices and expansion joints boasting a Quality Assurance System certified at the highest level - from design to customer service assistance.

Certification has been achieved via rigorous evaluation by an internationally recognized Third Party Organisation, thus internationally validating the quality assurance system.



EXPANSION JOINTS

DESCRIPTION

FIP elastomeric movements joints come in a wide range of formats, each format having a certain movement range to accommodate, with only the types of materials used remaining constant. Based on a design of reinforced rubber modular elements, FIP movement joints provide for the following advantages:

- Simple installation
- Simple and cost effective inspections and maintenance
- Minimal noise and vibration
- Ultimate comfort for passengers passing over
- Smooth running surface
- Optimum functioning and durability of all components
- Minimal interference with the structure
- Format easily adjusted to many shapes to accommodate layout of structure or design engineers' preference
- Several different types of anchorage to suit client requirement

The series of standard movement joints available are labelled as follows

- RAN, SIN** movement range from 30 to 50 mm
- GPE** movement range from 50 to 250 mm
- RAN P** movement range from 300 to 800 mm



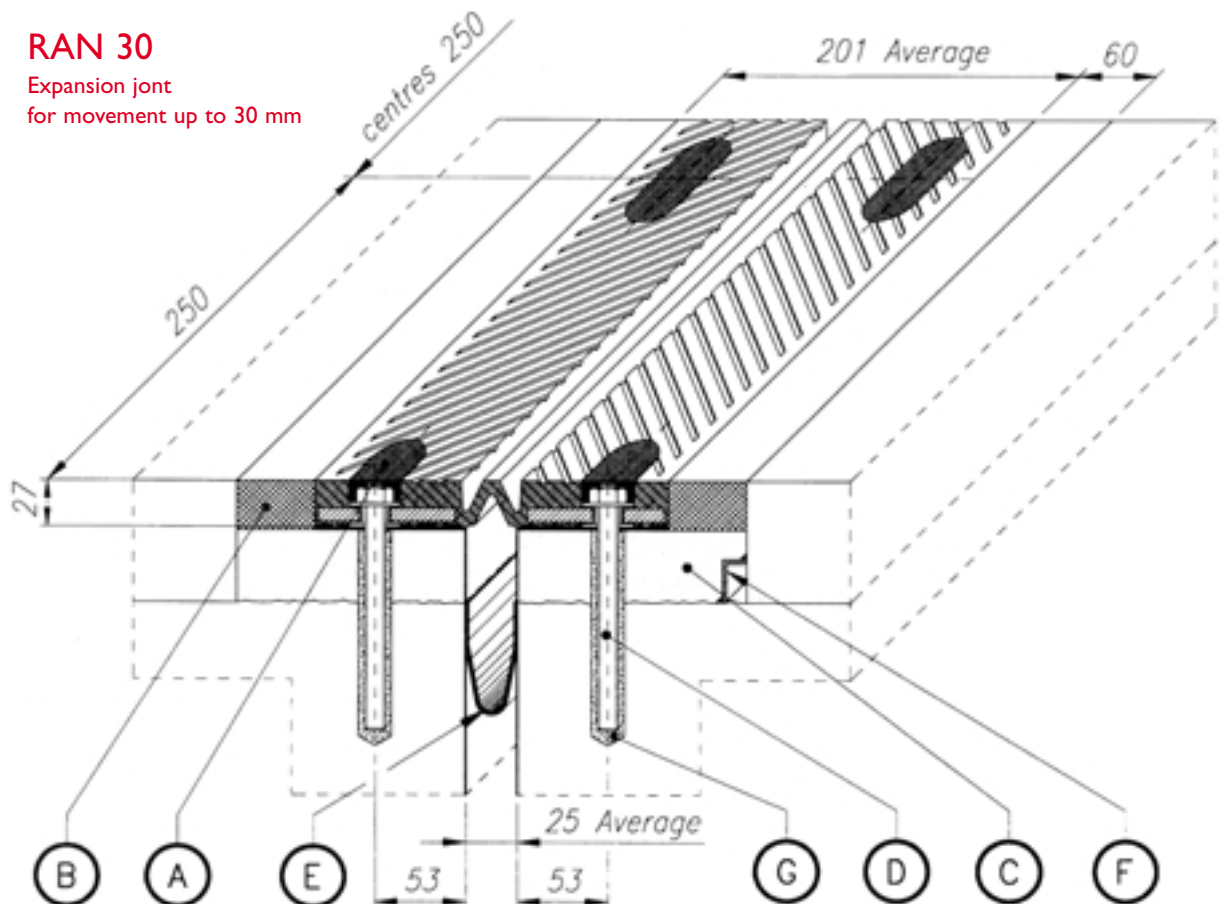
Expansion joint being tested at FIP laboratory

RAN and SIN type expansion joints are made of monolithic reinforced elastomeric pads with a central straight or sinusoidal profile to bridge the gap and accommodate the required movements. The elements are seated on a 3 mm bedding of epoxy mortar and are affixed to the deck by means of suitable anchor system. Two lateral stainless steel channels guide the water infiltrating through the wearing course and binder layers to a drainage outlet cast into the structure. A central gutter is also provided for further security in order to protect the internal vertical surfaces of the deck.

► **MOVEMENT JOINT
RAN AND SIN SERIES**

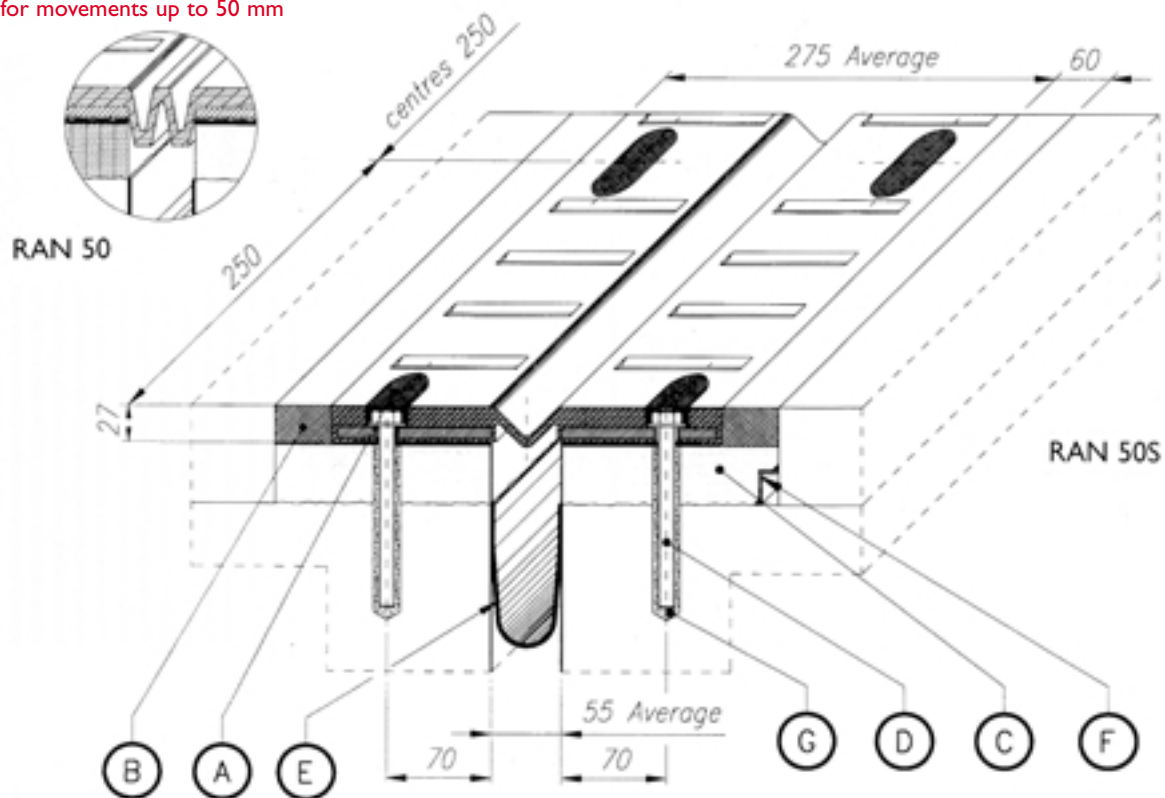
RAN 30

Expansion joint
for movement up to 30 mm



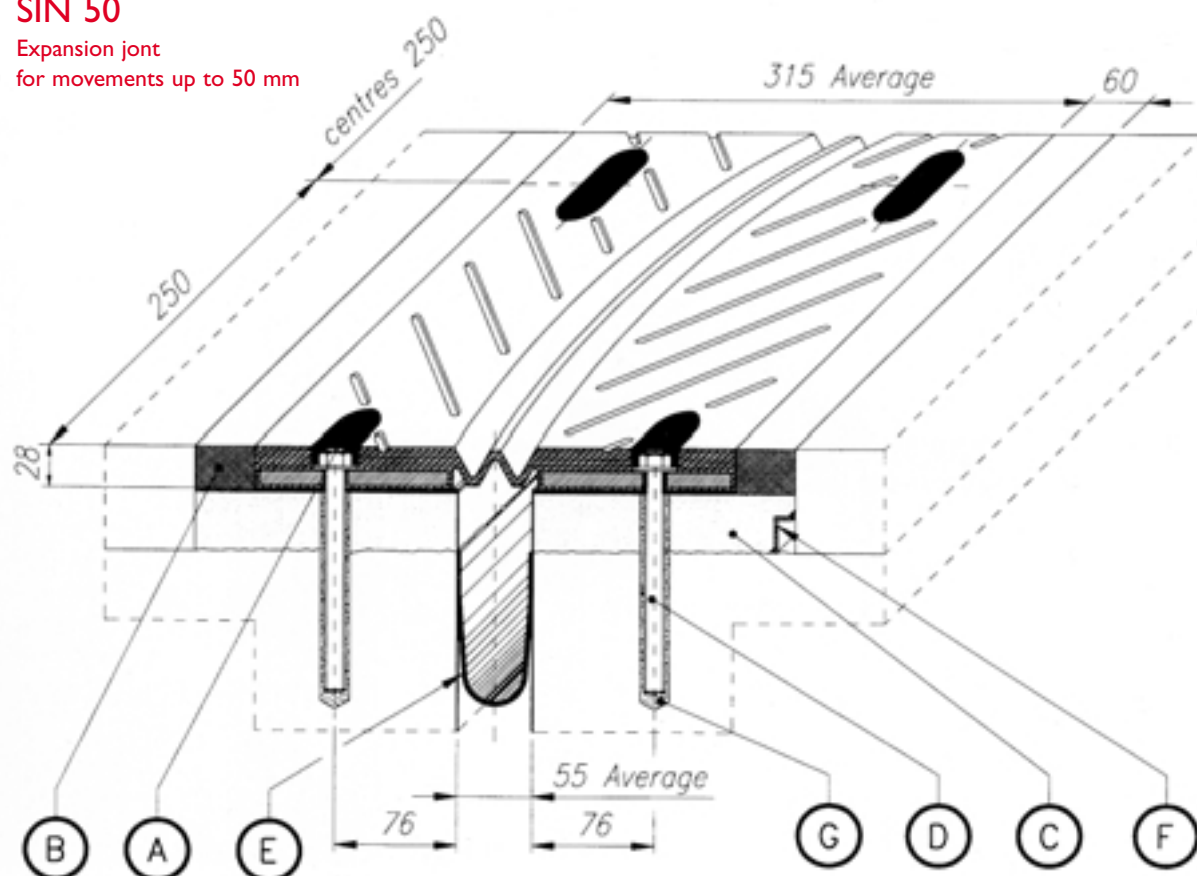
RAN 50S and RAN 50

Expansion joint
for movements up to 50 mm



SIN 50

Expansion joint
for movements up to 50 mm



POS.	DESCRIPTION	MATERIAL
A	Sealant	EPOBLOCK ME binder
B	Transition strip	EPOBLOCK ME 3C
C	Mortar bedding	Betonfip / EPOBLOCK ME 3C
D	M12 threaded bar or other	ASTM grade B7
E	Gutter	Hypalon
F	Water drainage channel	Steel UNI 8317-X5 CrNi 1810
G	Anchoring epoxy resin	Primer P150

FIP MOVEMENT JOINTS AROUND THE WORLD



2nd Severn Crossing - UK



Coltano Viaduct - Italy



Bridge over the Po river - Italy



Scardon Viaduct - France

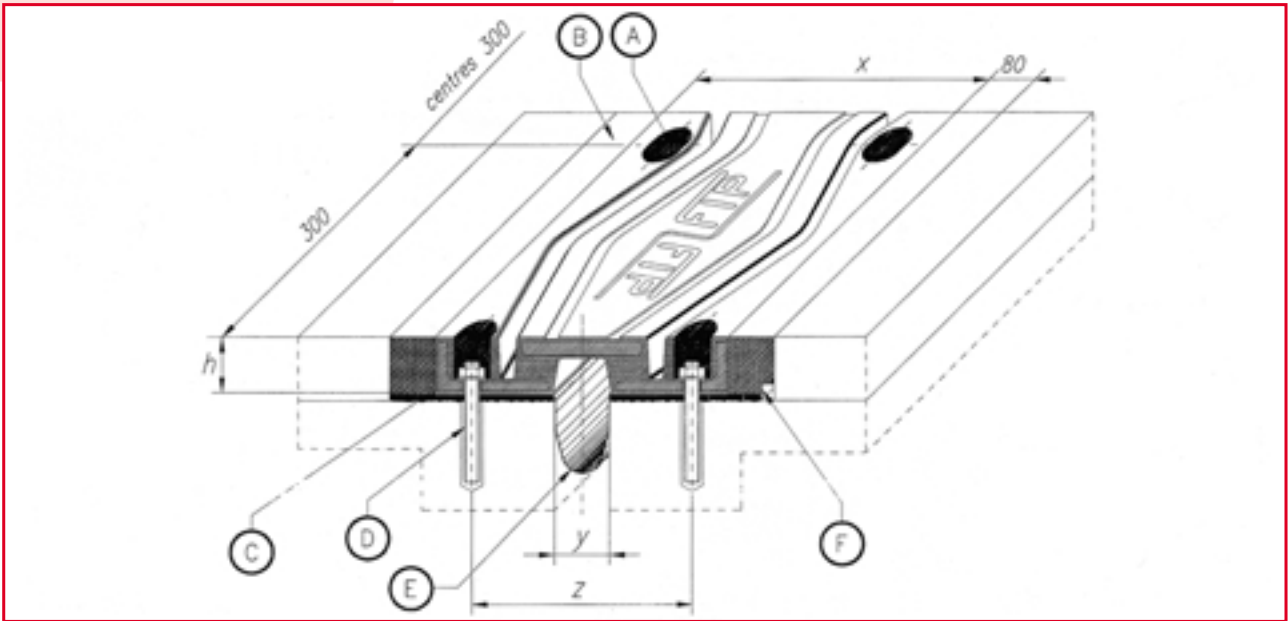
EXPANSION JOINTS

MOVEMENT JOINT GPE SERIES

GPE type expansion joints are made of monolithic reinforced elastomeric pads with a central plate bridging the gap. The movements are accommodated by a suitable number of grooves in the elastomer which is of a sinusoidal profile. The elements are seated on a 3 mm bedding of epoxy mortar and are affixed to the deck by means of suitable anchor system. Two lateral stainless steel channels guide the water infiltrating through the wearing course and binder layers to a drainage outlet cast into the structure. A central gutter is also provided for further security in order to protect the internal vertical surfaces of the deck.

JOINT TYPE	TOTAL MOVEMENT (mm)	HEIGHT	WIDTH	GAP	ANCHORS (center to center)
		H (mm)	X (mm)	Y (mm)	Z (mm)
GPE 50S/100	50	57	314	max 95	234
GPE 50S/175	50	57	389	max 170	309
GPE 50S/250	50	57	464	max 245	384
GPE 80	80	61	320	average 60	240
GPE 120	120	78	372	average 80	292

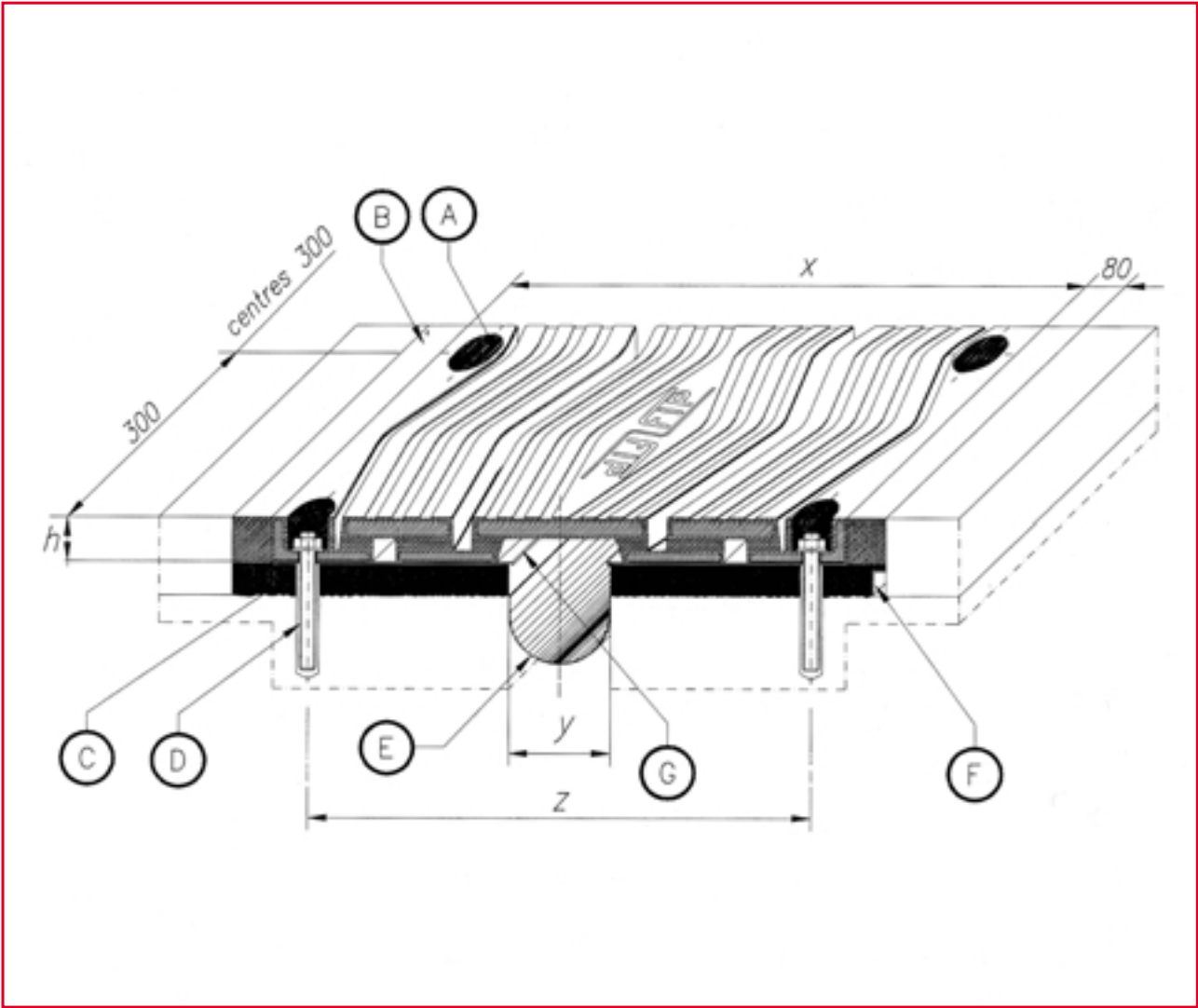
Rubber modulus is 900 mm long



POS.	DESCRIPTION	MATERIAL
A	Sealant	EPOBLOCK ME binder
B	Transition strip	EPOBLOCK ME 3C
C	Mortar bedding	EPOBLOCK ME 3C / Beton FIP
D	M16 threaded bar or other	ASTM grade B7
E	Gutter	Hypalon
F	Water drainage channel	UNI 8317-X5 CrNi 1810

JOINT TYPE	TOTAL MOVEMENT (mm)	HEIGHT	WIDTH	GAP	ANCHORS (center to center)
		H (mm)	X (mm)	Y (mm)	Z (mm)
GPE160	160	64	730	100	640
GPE200	200	64	839	120	749
GPE250	250	74	914	145	824

Rubber modulus is 900 mm long



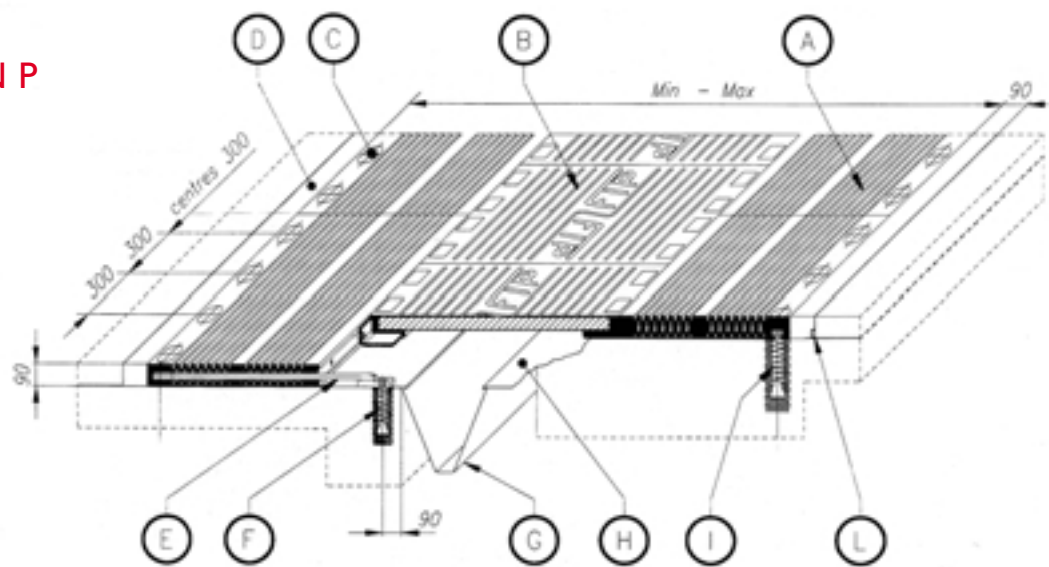
POS.	DESCRIPTION	MATERIAL
A	Sealant	EPOBLOCK ME binder
B	Transition strip	EPOBLOCK ME 3C
C	Mortar bedding	EPOBLOCK ME 3C / Beton FIP
D	M20 threaded bar or other	ASTM grade B7
E	Gutter	Hypalon
F	Water drainage channel	UNI 8317-X5 CrNi 1810
G	Sliding sheet	UNI 8317-X5 CrNi 1810

EXPANSION JOINTS

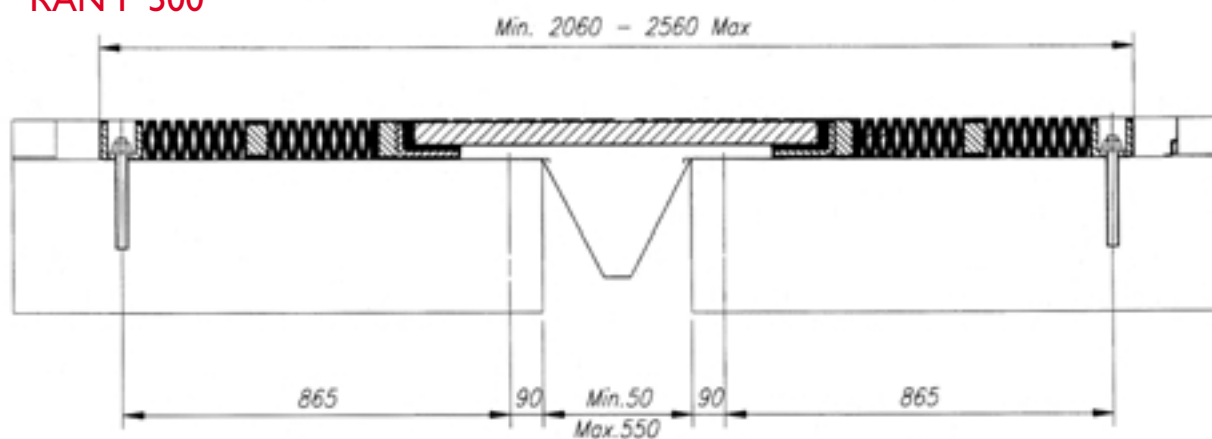
MOVEMENT JOINT RAN P SERIES

The RAN P type movement joint is of a modular reinforced pad design. The principal components are a central bridging plate comprising of elastomer blocks vulcanised to steel reinforcement plates. Either side of the bridge plate sets of elastomeric bellows are installed in order to accommodate the longitudinal movements. The whole system of bridge bellows and bridge plate slide ceremoniously on stainless steel sheets which are fastened down with epoxy resin. The anchorage system fixes the external elements i.e. the bridge bellows down into the deck, stainless steel anti-lift bars which also act as guides are inserted into the bellows and are also fixed into the deck. The bridge plate however is fastned by means of suitable bolts into the bellows to give an all round secure system. Two lateral stainless steel channels guide the water infiltrating through the wearing course and binder layers to a drainage outlet cast into the structure. A stainless steel central gutter is also provided for further security in order to protect the internal vertical surfaces of the deck.

RAN P

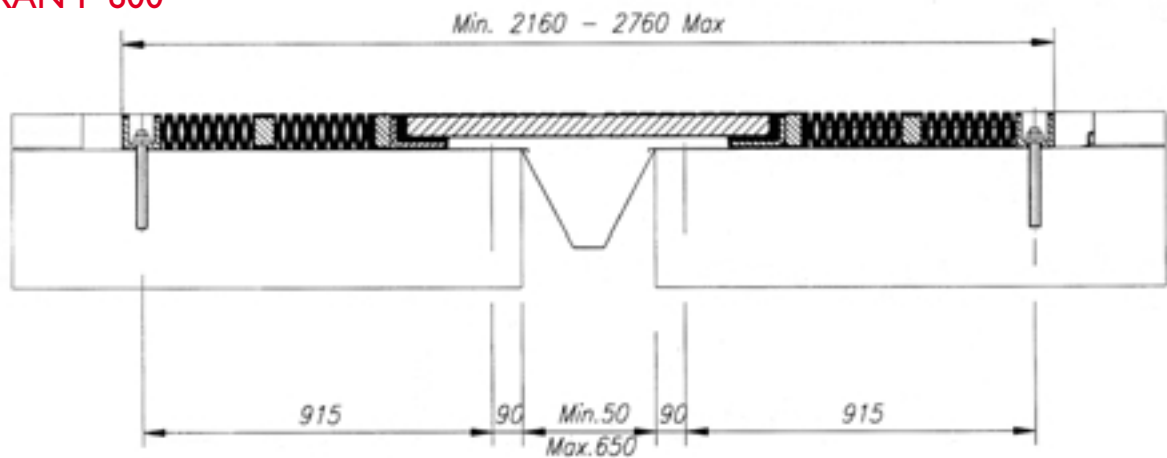


POS.	DESCRIPTION	MATERIAL
A	Bellow	Steel reinforced rubber
B	Central bridging plate	Steel reinforced rubber
C	Sealant	EPOBLOCK ME binder
D	Transition strip	EPOBLOCK ME 3C
E	Antilifting bar	UNI 8317-X5 CrNi 1810
F	M20 threaded bar or other	ASTM grade B7
G	Gutter	UNI 8317-X5 CrNi 1810
H	Sliding sheet	UNI 8317-X5 CrNi 1810
I	M24 threaded bar or other	ASTM classe B7
L	Water drainage channel	UNI 8317-X5 CrNi 1810

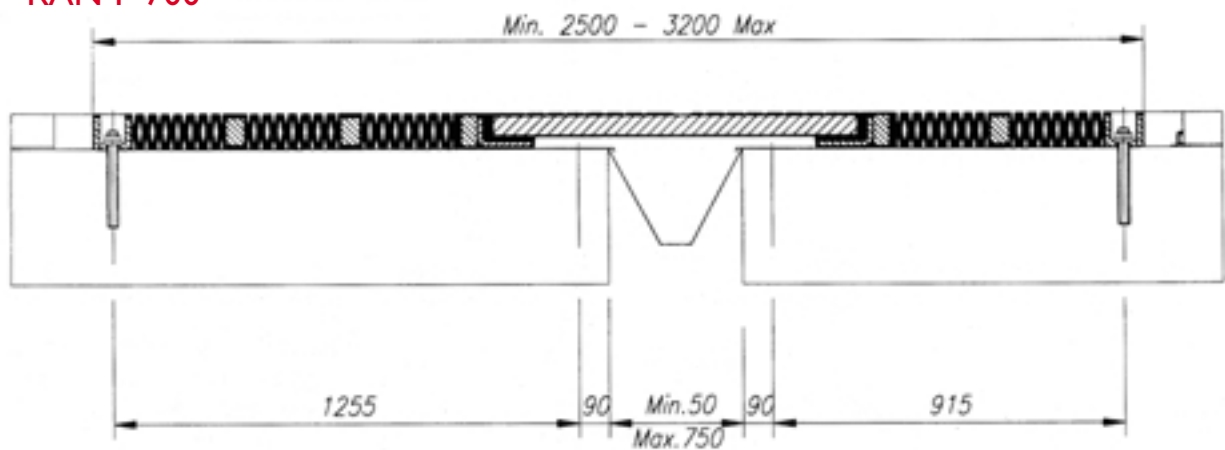


EXPANSION JOINTS

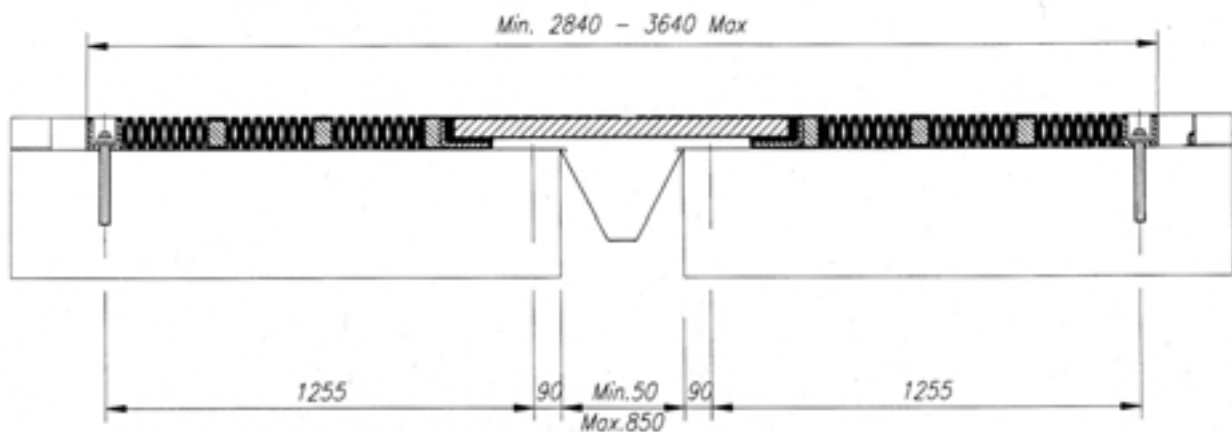
RAN P 600



RAN P 700



RAN P 800



The installation procedure for the elastomeric movement joints is a simple task owing to various factors such as:

- joint elements are supplied in easily accessible modules
- the thickness of rubber components is small
- fixing to the structure is simple as no special supporting device is required to be recessed into the deck slab

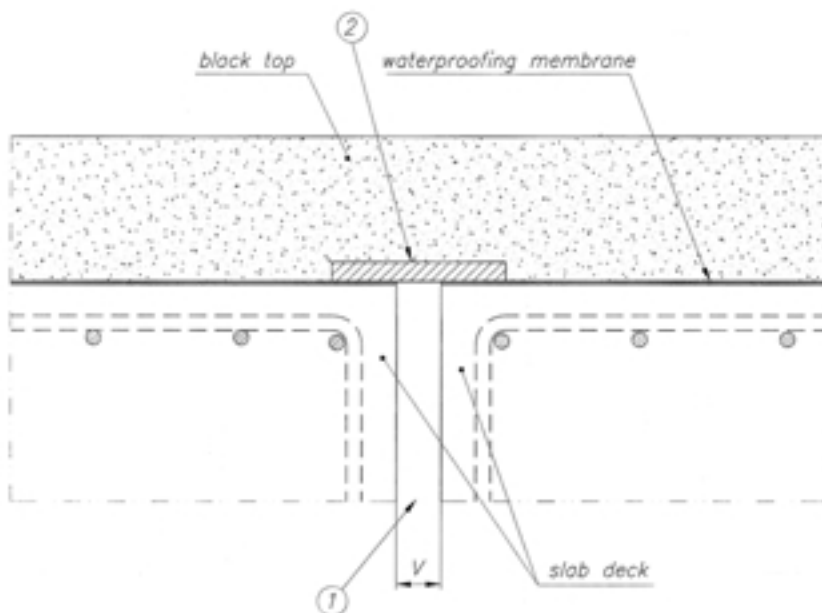
- various types of fixing methods are available to choose from

► MOVEMENT JOINT INSTALLATION

TYPICAL INSTALLATION PROCEDURES

RAN AND SIN TYPE EXPANSION JOINT

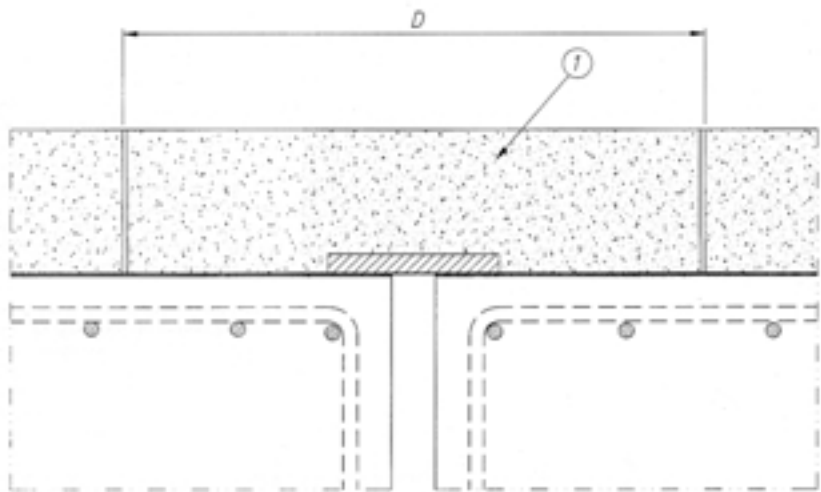
PHASE I (by others)



- Before the wearing course is applied, cover the gap ① with suitable steel plate ②
- The value of the gap is to be indicated by the engineer taking into account shrinkage, flange and temperature at time of installation, and the gap (V) at average temperature (see tab. I)

INSTALLATION PROCEDURES

PHASE 2

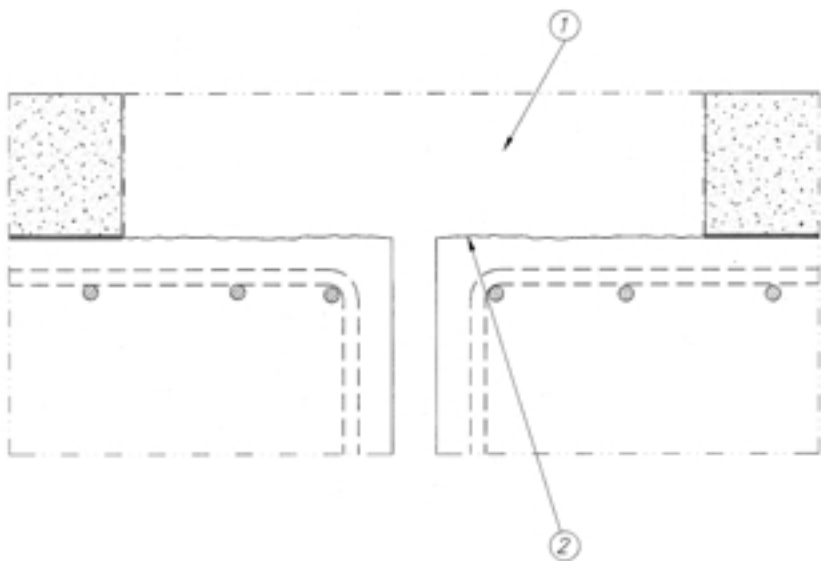


- Saw cut the black top ① in accordance with the required dimension "D" (see tab. I)

Table n. I

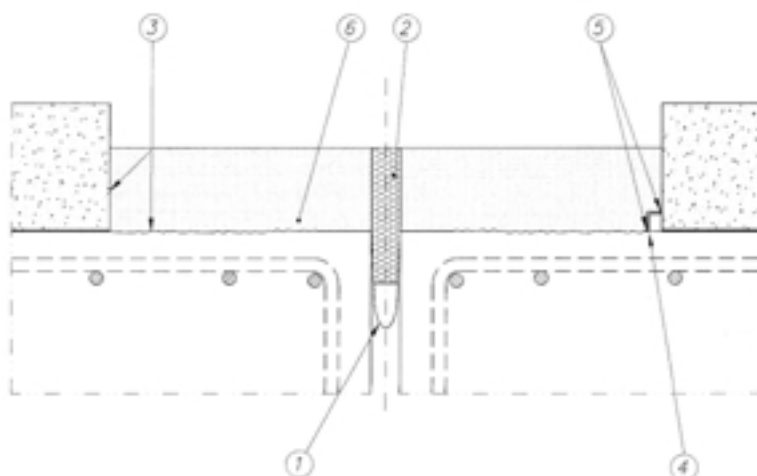
JOINT TYPE	D (mm)	V (mm at average temperature)
RAN 30	320	25
RAN 50 S	400	55
RAN 50	400	55
SIN 50	450	55

PHASE 3



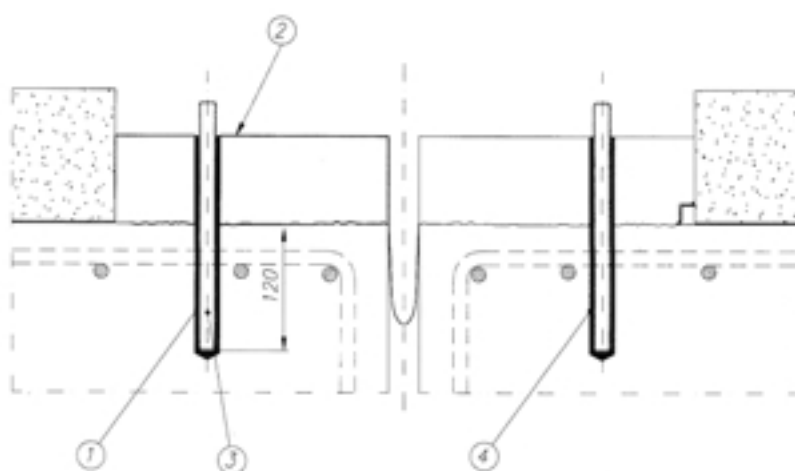
- Remove black top ②
- Lightly scabble the exposed concrete surface

PHASE 4



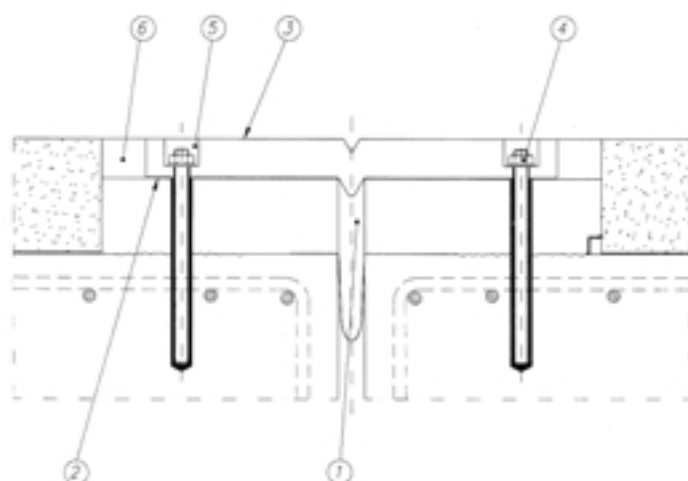
- Install the central gutter ①
- Insert polystyrene ②
- Apply primer P 150 on the exposed concrete surfaces ③
- Install the lateral drainage channels ④
- Seal lateral drainage channels with putty S FIP 180 ⑤
- Pour the reinforced fiber rheoplastic mortar bedding to correct height ⑥

PHASE 5



- Drill the anchoring holes in the deck slab ①
- Cleaning the surfaces with compressed air ②
- Insertion of the anchoring M12 threaded bars ③
- Filling of the holes with epoxy primer P 150 ④

PHASE 6

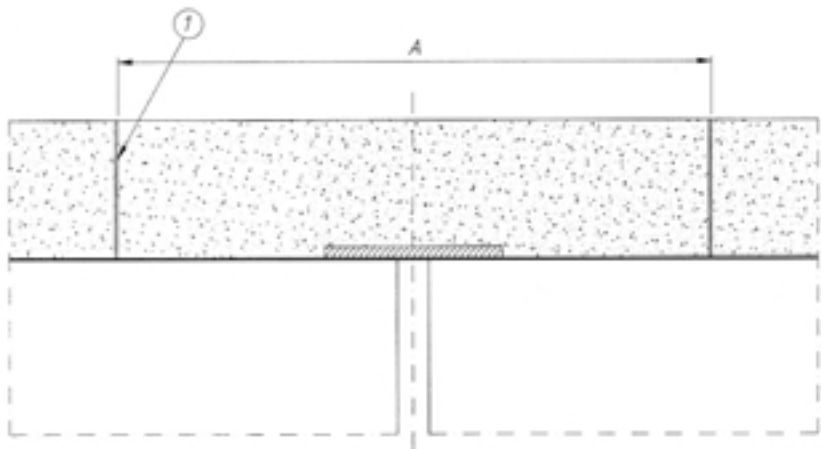


- Remove polystyrene and clean the gap ①
- Spread S FIP 180 putty on the contact surfaces ②
- Install and fix the joint modules ③ by tightening the nuts ④
- Seal the bolts head with EPOBLOCK ⑤
- Fill lateral nosing with EPOBLOCK ME 3C ⑥

INSTALLATION PROCEDURES

GPE TYPE EXPANSION JOINT

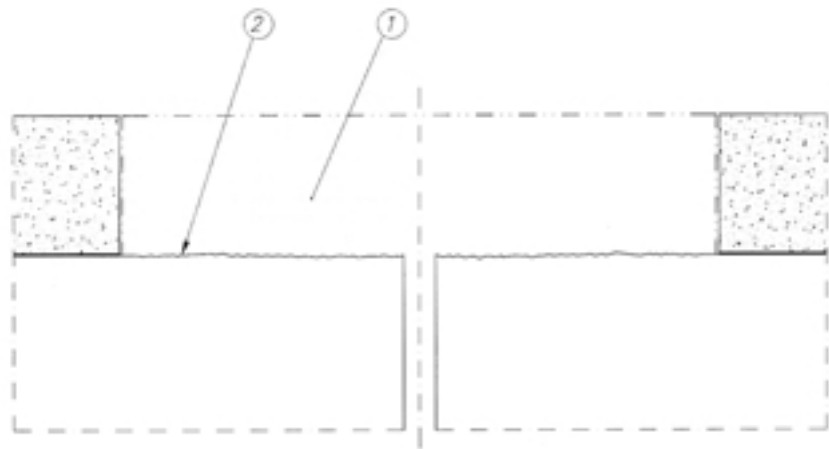
PHASE I



- Saw cut the black top ① according to dimensions indicated in table "A":

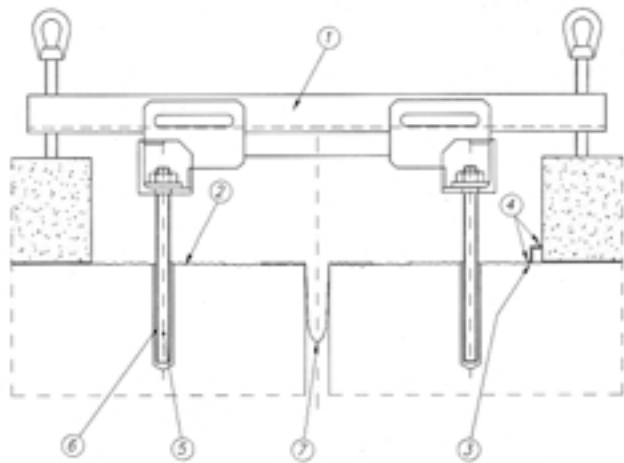
JOINT TYPE	A (mm)
GPE 50/100	400
GPE 50/175	500
GPE 50/250	600
GPE 80	480
GPE 120	550
GPE 160	890
GPE 200	1000
GPE 250	1100

PHASE 2



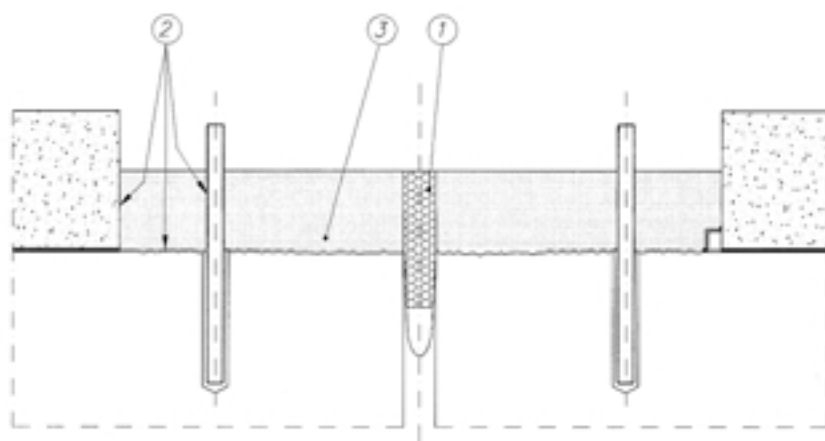
- Remove black top ①
- Scabble exposed concrete surface ②

PHASE 3



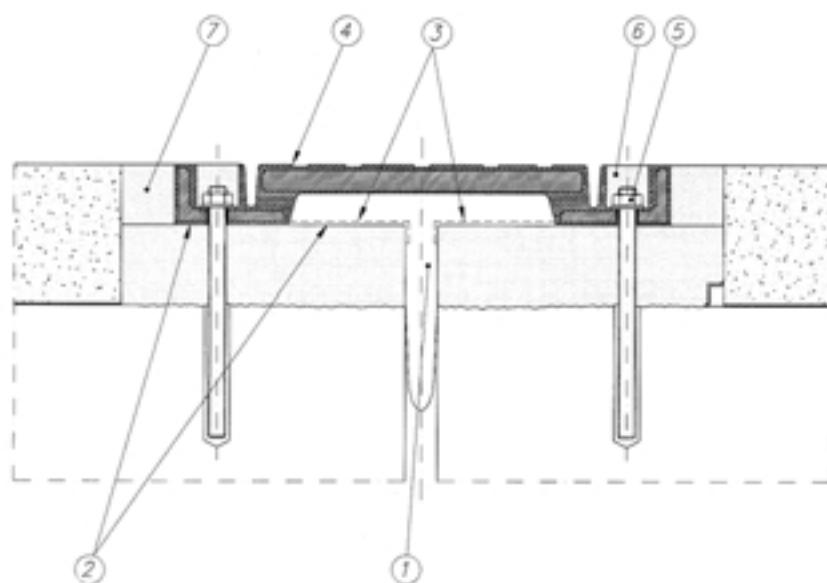
- Drill the fixing holes in the concrete slab by using a template ①
- Clean concrete surface with compressed air ②
- Install lateral drainage channels ③
- Sealing with putty S FIP 180 ④
- Insert the M16 anchoring bars ⑤
- Fill holes with primer P I 50 ⑥
- Install the central gutter ⑦

PHASE 4



- Insert polystyrene sheet ①
- Spread primer P 150 on all surfaces to be bedded ②
- Pour bedding to raise level ③ (if required)

PHASE 5

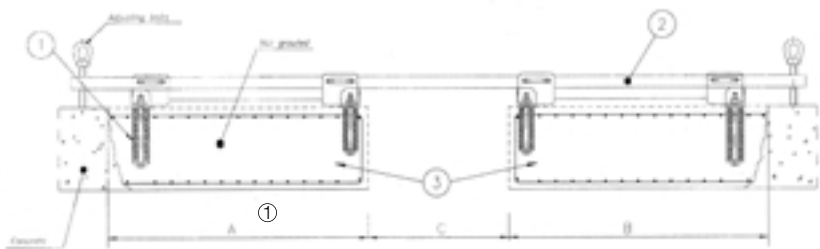


- Remove polystyrene and clean surrounding areas ①
- Spread S FIP 180 to the exposed surfaces ②
- Install stainless steel sheet (GPE160 - GPE200 - GPE250 only) ③
- Install and fix the joint modules ④ by tightening the nuts ⑤
- Seal the bolts head with EPOBLOCK ⑥
- Fill lateral nosings with EPOBLOCK ME 3C ⑦

INSTALLATION PROCEDURES

RAN P TYPE EXPANSION JOINT

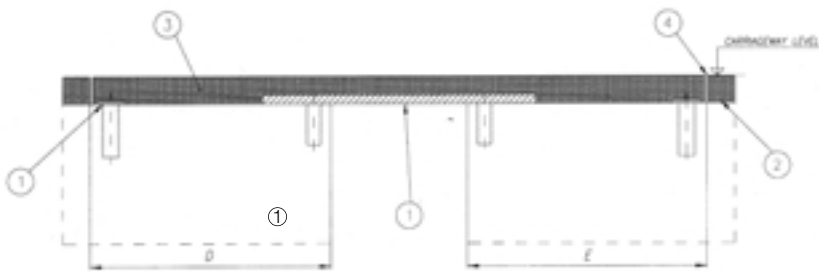
PHASE I



JOINTS	A (mm)	B (mm)	C (mm)
RAN P 300	855	855	200
RAN P 400	1195	855	250
RAN P 500	1195	1195	300
RAN P 600	1245	1245	350
RAN P 700	1585	1245	400
RAN P 800	1585	1585	450

- Position and install metal sleeves ① to create voids in the concrete deck by means of suitable template ②
- Pour concrete deck ③

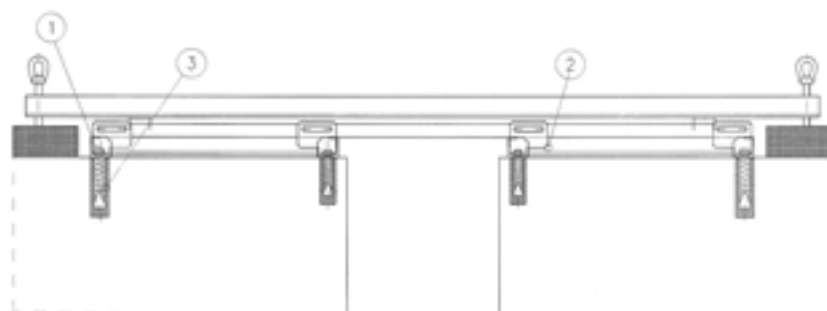
PHASE 2



JOINTS	D (mm)	E (mm)
RAN P 300	755	755
RAN P 400	1095	755
RAN P 500	1095	1095
RAN P 600	1145	1145
RAN P 700	1485	1145
RAN P 800	1485	1485

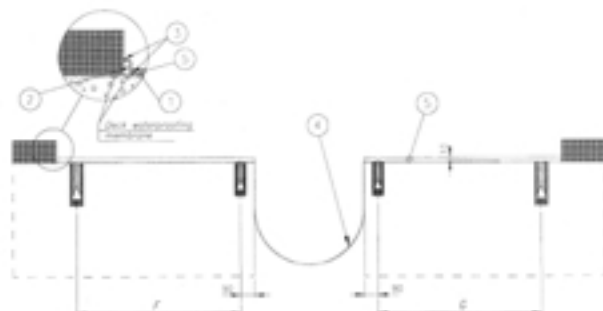
- Remove template
- Protect holes and central gap with steel plates ①
- Apply waterproof membrane ② and surfacing ③
- Saw cut surfacing course ④

PHASE 3



- Remove excess wearing course material from joint area
- Remove steel protective plates
- Install fixing sockets ① by means of template ②
- Fill holes with epoxy resin ③

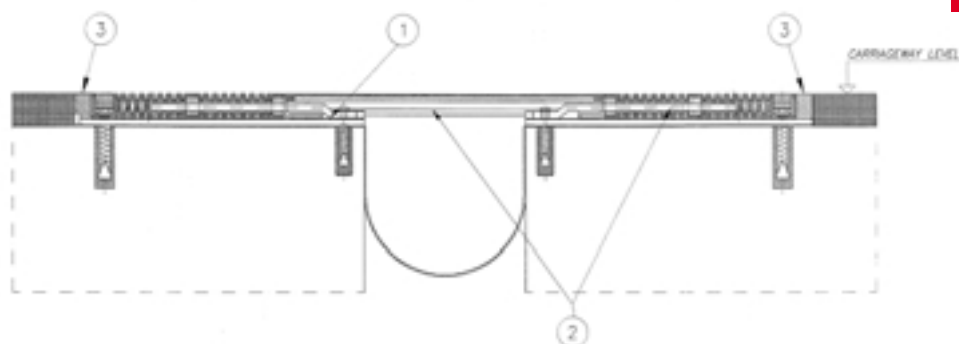
PHASE 4



- Once resin has cured remove template
- Lightly scabble exposed concrete surface
- Spread Primer P 150 on the concrete surface ①
- Install lateral draining profiles ② with putty ③
- Install central gutter ④
- Bedding with epoxy mortar ⑤

JOINTS	F (mm)	G (mm)
RAN P 300	525	525
RAN P 400	865	525
RAN P 500	865	865
RAN P 600	915	915
RAN P 700	1255	915
RAN P 800	1255	1255

PHASE 5



- Install the sliding stainless steel sheet ① using EPOBLOCK S FIP 180 epoxy
- Install the expansion joint components ②
- Fill the lateral nosings with epoxy mortar EPOBLOCK ME 3C ③



New Thelwall Viaduct - UK



Portimao Bridge - Portugal



FIP INDUSTRIALE
 Via Scapacchiò - 35030 SELVAZZANO (PD) - ITALY
 Tel +39-049-822 5511 Fax +39-049-638 567
 E-mail: fip@fip-group.it - Internet: <http://www.fip-group.it>

FIP INDUSTRIAL UK LTD
 Lincon House - The Paddocks
 347 Cherry Hinton Road - CAMBRIDGE CB1 4DH - U.K.
 Tel +44-1223-518286 - Fax +44-1223-518287