4. POLIDIL TYPE EXPANSION JOINTS CATALOGUE

POLIDIL

MAT EXPANSION JOINTS

POLIDIL GENERAL INFO

Polidil is elastomeric segment expansion joint system designed for bridges, roads and ramps, designed and developed in cooperation with certification body Institute IGH from Zagreb, who provided quality control during the production and testing stages, and issued quality certificates, and Croatian technical approval for Polidil expansion joints.

BASIC PRODUCT FEATURES

- ✓ 1100 mm long elements
- ✓ assembly using only bolts
- ✓ better fitness to structure with different thicknesses (44 mm, 55 mm, 60 mm, 84 mm)
- ✓ easy installation
- ✓ simplified maintenence (partial replacement possibility)
- ✓ guaranted watertightness
- ✓ can withhold all movements as result of :
  - temperature imposed structure deformations
  - load imposed angular deformations and rotations

POLIDIL joint system ensures the load bearing ability for traffic loads and watertightness of movable joints within the scope of 50-165 mm. That is why four types of Polidil expansion joints are produced:

POLIDIL 50 - total movement 51 mm (±25,5 mm)

POLIDIL 75 - total movement 75 mm (±37,5 mm)

POLIDIL 100 - total movement 101 mm (±50,5 mm)

POLIDIL 165 - v 165 mm (±82,5 mm)

The choice of expansion joint depends on the total expected movements, temperature changes, rotation, bearing deviations, braking forces etc.

In relation to the other expansion joint types, POLIDIL system is significantly improved in the transfer from the pavement to the footpath.

Namely, special parts are produced in the factory according to the accurate surwey measurement. They correspond to the bridge geometry precisely (profile and inclination). This enables the engineers to avoid rough cover plates on most of inclined bridges.

DESIGN CONCEPT

In bridge design, there is a watertightness requirement in order to protect the structure against corrosion caused by surface waters contaminated with salt and various chemicals. Full hydroisolation covering is needed across all expansion joints. The expansion joints must be able to resist the following:

1. Traffic load
2. Cumulative movements due to:
   - shrinking and expanding
   - expandings and contractions from temperature deformations of structure
   - rotation caused by structural bending under loads
   - elastic shortening of structure due to shrinkige and creep

Through bridge monitoring engineers have determined that water leaking occures through damages on expansion joints. Therefor european guidelines ETAG 032-5 recommend that this type of expansion joint is to be aditionaly hydroisolated by adding flexible membrane.

In order to meet this requirement, Polirol is equiped with neoprene menbrane benieth expansion joint, which, aided with drenaige pipe guides excess of water from bridge.

POLIDIL BRIDGE EXPANSION JOINTS

The design of the Polidil bridge expansion joints is so robust that they can withold all traffic loads required in the bridge design. Low expansion and contraction resistance was achieved by neoprene shear deformation, which minimizes the transfer of the load through bolts fixing the junction to the structure. Corrugated aluminum road surface provides a durable and long-lasting surface. Polidil system of continuous joints provides a permanent waterproofing and drivability of the surface across movable joints between 51mm and 165mm.

The required dimension is chosen from the list according to total expected movements, taking into consideration various factors such as temperature, rotation, shrinking, bearing deformations, breaking loads and elastic contraction.

Significant development with regard to other expansion systems was achieved by prefabricated parts exactly following the profile and the inclination of the bridge. These parts are produced by joining under the required angle, and welding into an aluminum road surface and steel reinforcement grid. This eliminates the need for rough cover plates on most inclined bridges.

Polidil expansion joints are placed 3-5mm below the upper line of the bridge transversal section. In this way, they are protected against impact by random traffic loads and impacts from snowplouhg.

MATERIALS

POLIDIL is a state of the art elastomeric system of joints developed for bridges, ramps and roads. It was designed as a long-lasting and durable system to take heavy traffic loads.
The latest enhancement in connection to the transfer devices of this generic type is the integration of an aluminum plate to the driving part of the device. It is resistant to wear, tear and UV influences, which significantly prolongs its life cycle.

SKID RESISTANCE

Resistance to sliding is achieved by integration of corrugated aluminum HD plate. This reduces the big rubber surface exposed to traffic. Side drainage grooves on the transfer device enable the surface water to drain quickly.

DELAMINATION AND BENDING RESISTANCE

Aluminum plates are „V“ shaped and thus asured to prevent delamination and increasing bending resistance. Steel corner reinforcement is made os S235JR or better steel and thus forms reinforcement of expansion joint segment structure.

REDUCED CONTACT PRESSURE

Approx. 40% larger adhesion area in comparison to similar products significantly reduces the transfer of unwanted pressure to the structure and minimizes the tendency for lasting plastic deformation when the device is stretched during the winter

STEADY DRIVING

The entire structure (Transfer from asphalt to neoprene, aluminum, neoprene...) ensures steady and safe traffic.

EASY INSTALLATION

During the installation of the device, the expansion and the constriction force are significantly reduced with regard to adjustments to temperature changes.

RELIABILITY

The production material ensures the reliability of the device. It is neoprene, produced according to european guidelines ETAG 032-5,, defining the following parameters:

- elastomere density
- elastomere hardness
- tensile strength
- elongation at break
- otpornost na paranje
- compression set
- resistance to ageing
- resistance to chemical/deicing agents
- ozone resistance
- resistance to hot bitumen

KERBSTONES AND CONVEXITY

Custom-made expansion joint elements, i.e. the transfer from the road to footpath, are welded under specified angle, in order to follow the bridge inclination precisely.

INSTALLATION HEIGHTS

It is recommended to install the transfer devices 3-5 mm beneath the asphalt level, since the experience has shown that the asphalt erosion would expose the device to wear and tear in the long run, and especially to damage caused by snow plowing.

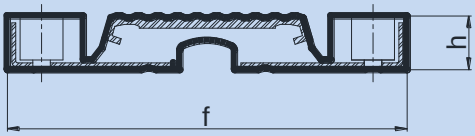
POLIDIL EXPANSION JOINT MECHANICAL CHARACTERISTICS

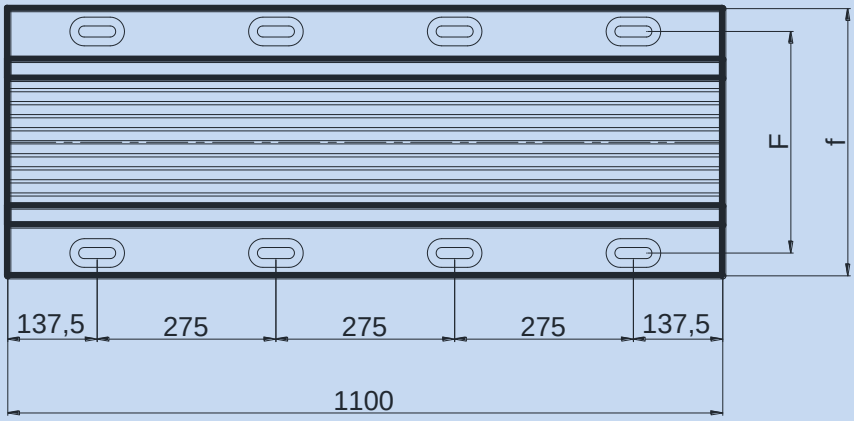
POLIDIL type	50	75	100	165
Total movement (mm)	51	75	101	165
Forces required for contraction and extension od expansion joint (kN/m)	22,5	43	28	35

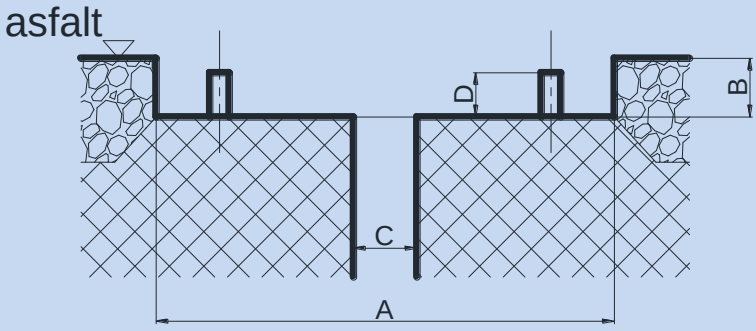
POLIDIL INSTALLATION SPECIFICATIONS

POLIDIL	type	50	75	100	165
Unit length	mm	1100	1100	1100	1100
Number of bolts per unit	pcs	8	8	8	8
Threaded rod MKT VA-A diameter	mm	12	16	20	24
Threaded rod MKT VA-A length	mm	140	160	200	24
Drilled hole in base diameter	mm	14	18	24	28
Drilled hole in base depth	mm	110	125	160	160
Length of bolt above base level	mm	25	30	35	40
Chemical anchor diameter	mm	12	16	20	24
Washer diameter	mm	26	40	50	52
Washer thickness	mm	3	4	6	6
Nut height	mm	10	16	15,5	19
Nut spanner size	mm	19	24	30	35,5
Nut prestressing torque	Nm	54	88	115	136
Neoprene membrane		1x295xL	1x445xL	1x630xL	1x770xL
Sealant	lit/m'	0,25	0,31	0,42	0,52
Degreasing spray	lit/m'	0,15	0,20	0,25	0,35
Filler for bolt holes	lit/m'	0,50	0,90	1,80	2,90
MATERIJAL ZA PODLOGU PO m' NAPRAVE					
Epoxy impregnation	kg	0,15	0,25	0,29	0,32
Levelling mortar (for 10 mm thickness)	kg	8	12	15	17
Expansion joint - asphalt filler (width acc to sketsh)	kg	10	24	27	38

POLIDIL EXPANSION JOINTS PHISICAL CHARACTERISTICS

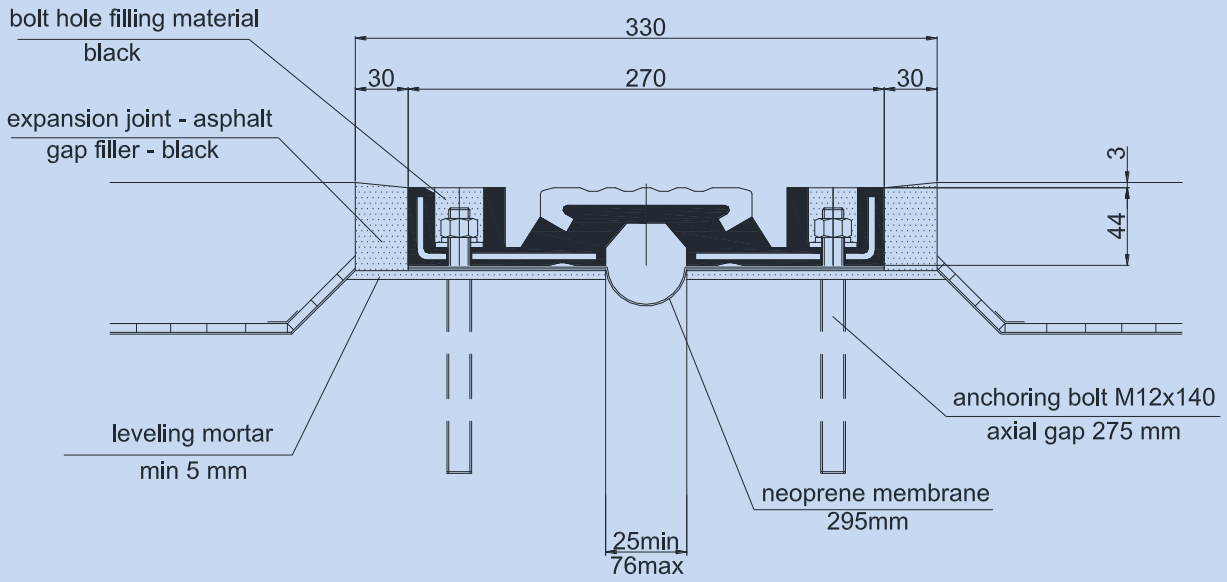




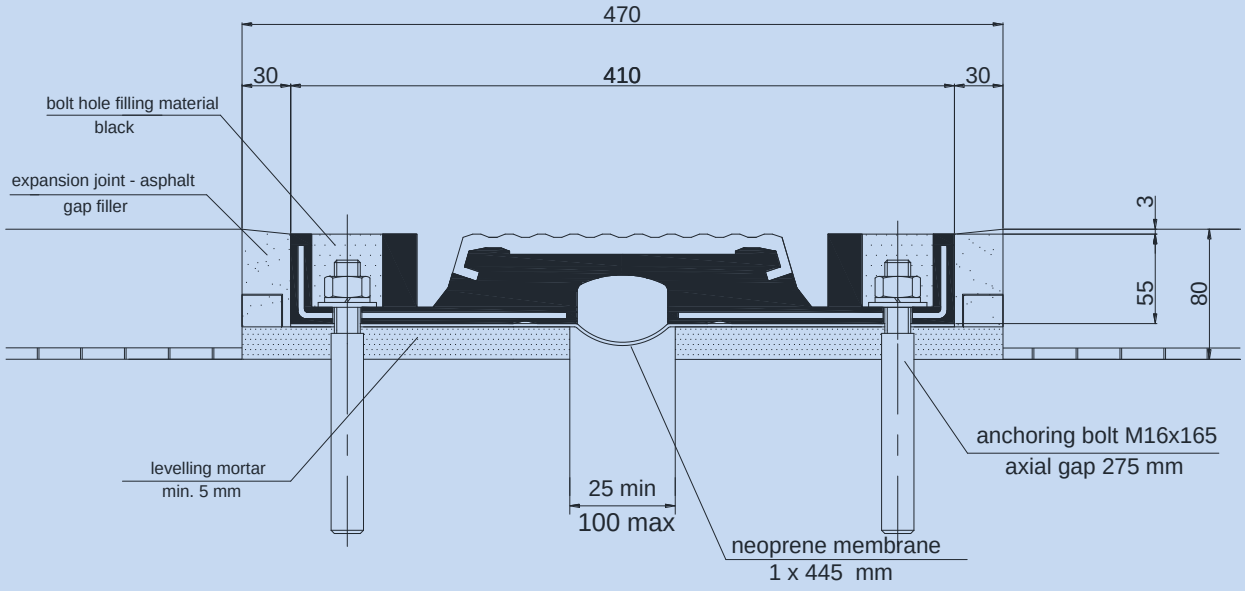


POLIDIL dimensions							Area required for instalation				
Type	Total movement	Length L	Width f	Height h	Bolt axes F	Weight piece	A	B	C		D
									min	max	
	mm	mm	mm	mm	mm	kg	mm	mm	mm	mm	mm
50	51	1100	270	44	212	24	330	49	25	76	25
75	75	1100	410	55	340	42	470	59	35	110	30
100	101	1100	580	60	492	61	640	64	25	126	35
165	165	1100	710	84	614	98	770	90	38	203	40

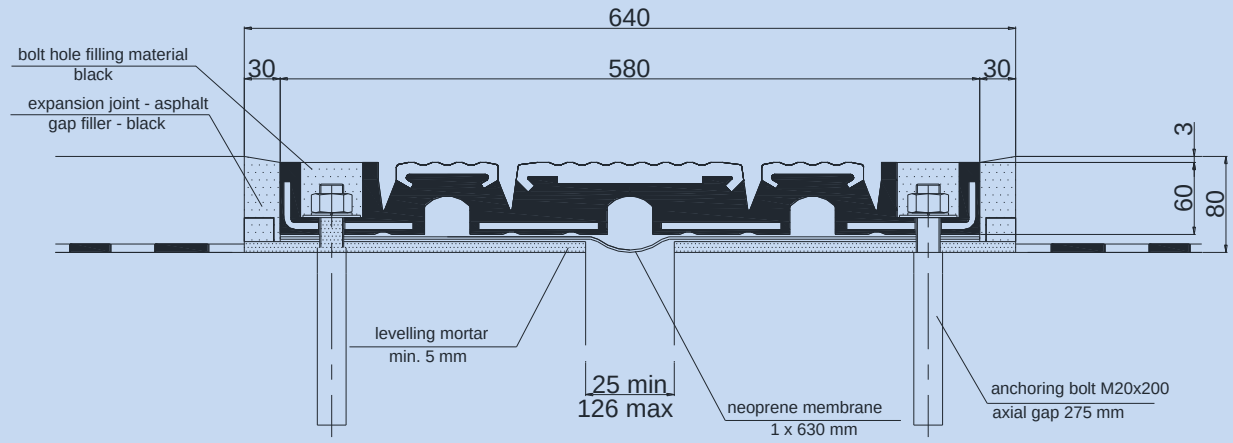
POLIDIL 50 - total movement 51 mm



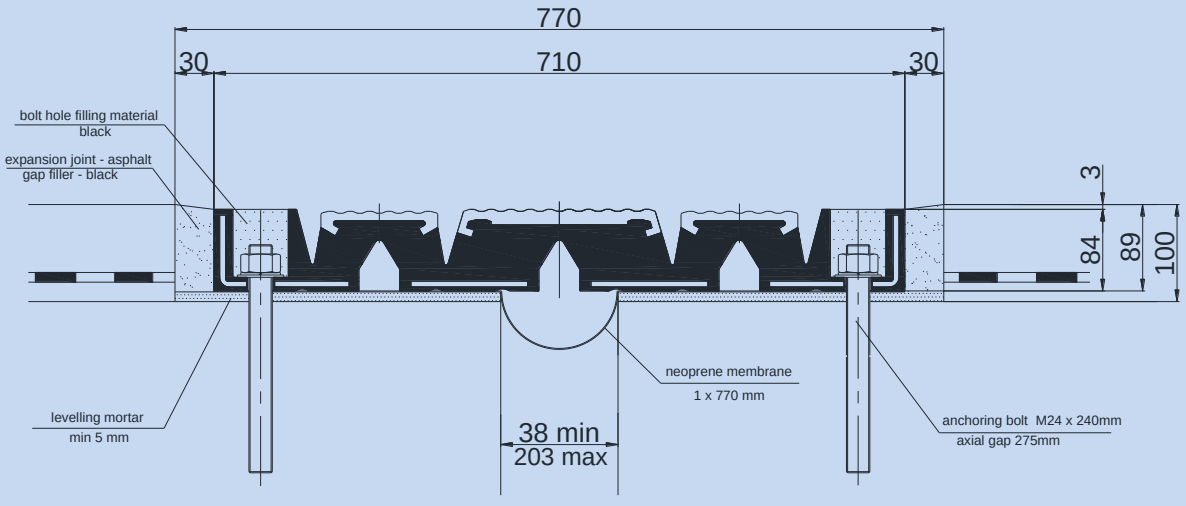
POLIDIL 75 - total movement 75 mm



POLIDIL 100 - total movement 101 mm

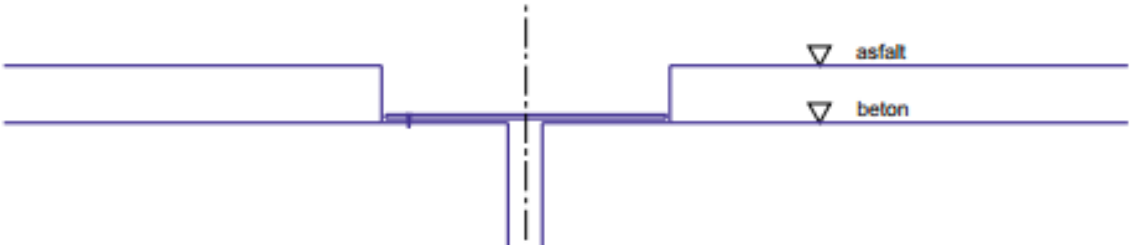


POLIDIL 165 - total movement 165 mm

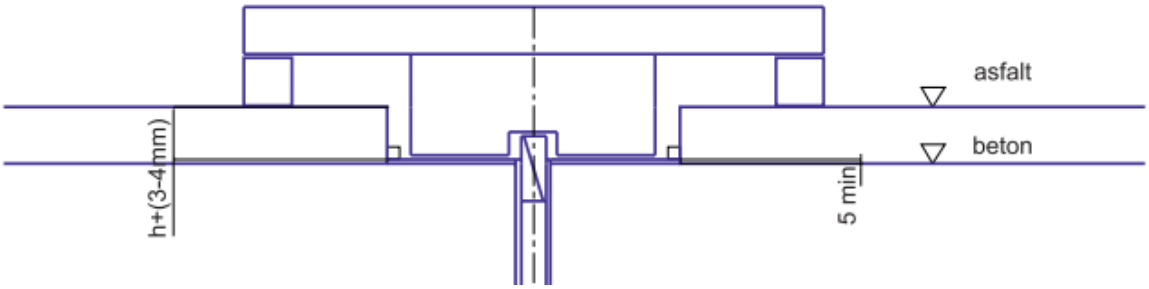


INSTALLATION

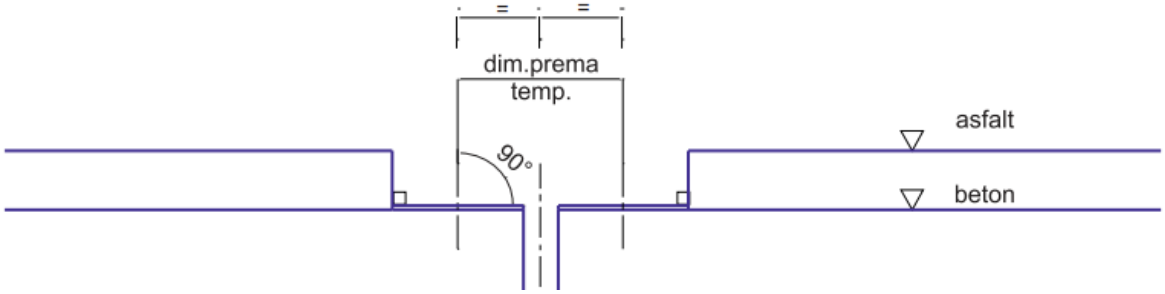
1. Asphalt removal at the required width and depth (according to type of Polidil)



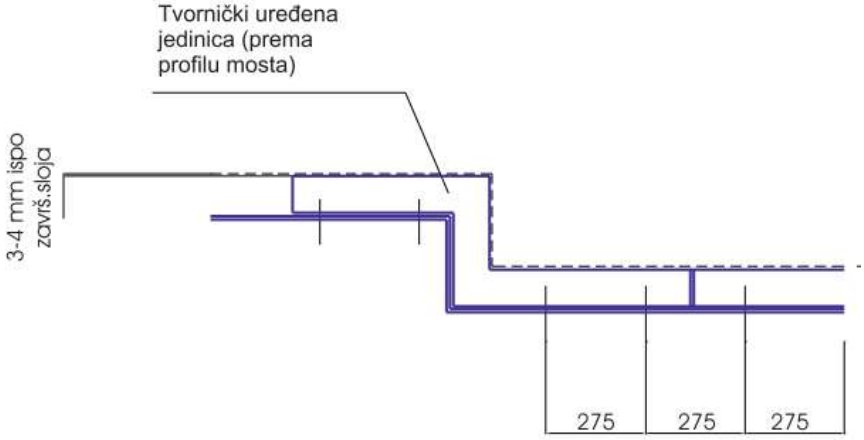
2. Base levelling using 3k epoxy mortar - thickness minimum 5 mm



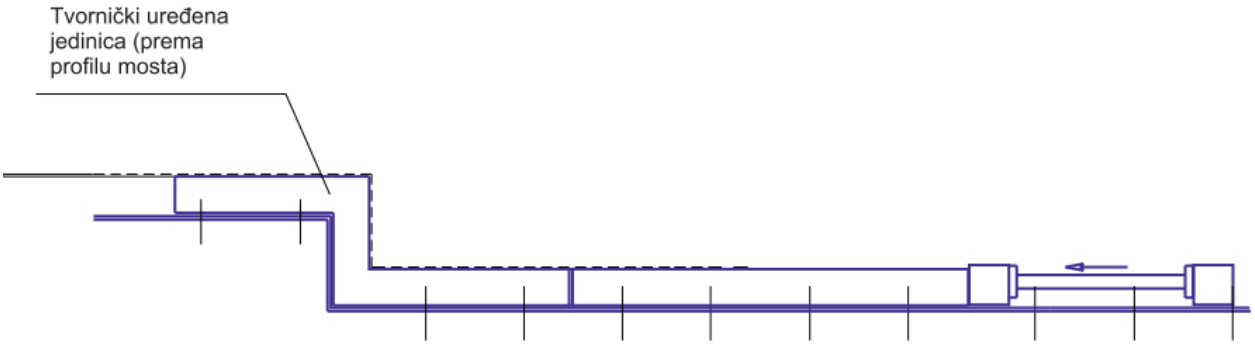
3. Hole drilling and installation of chemical anchored bolts (according to Polidil type and current temperature)



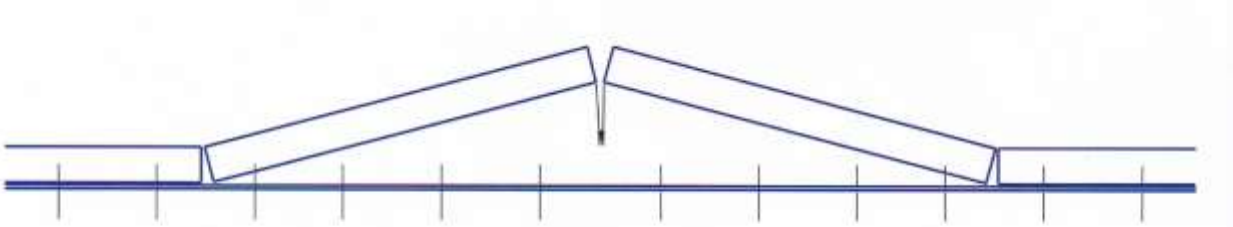
4. Installation od „custom made“ units on both kerbstone positions (manufactured according to bridge cross-section profile)



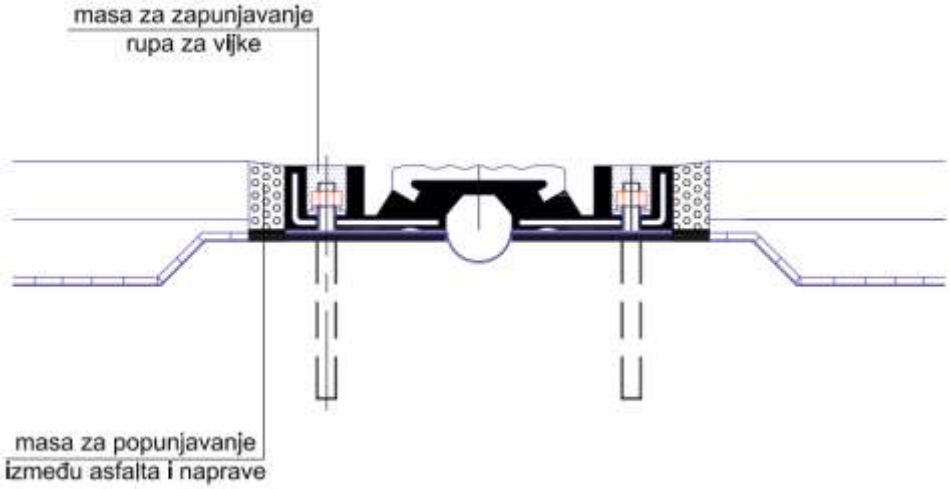
5. Installation of Polidil units (110 mm) on both sides of cross-section



6. Installation of final pair of Polidil units



7. Gap between expansion joint and aspfalt and bolt hole filling



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Produženje

TEHNIČKOG DOPUŠTENJA

Broj dopuštenja	:	**TD – 180-50/11**
Naručitelj i proizvođač	:	**POLIROL d.o.o.** **Remetinečka cesta 7** **10000 Zagreb** **Hrvatska**
Vrste i tipovi proizvoda	:	**Elastomerne prijelazne naprave POLIDIL (PD)** **PD 50, PD 75, PD 100 i PD 165**
Vrijedi do	:	**1. siječnja 2016.**

Tehničko dopuštenje usklađeno je sa:
- Smjernicom 89/106/EEC od 21. prosinca 1988. g. i dopunjeno Smjernicom 93/68/EEC od 22. srpnja 1993. g.
- Zakonom o gradnji (NN br. 175/03).

Tehničko dopuštenje gore navedenih proizvoda odobrava se na temelju provedenog ispitivanja prijelaznih naprava tipa POLIDIL u Laboratoriju za ispitivanje konstrukcija na Građevinskom fakultetu u Zagrebu (Izvješće o ispitivanju br. 180-46/11).

Svi tipovi POLIROL elastomernih prijelaznih naprava proračunavaju se, proizvode, kontroliraju i nadziru u skladu sa Smjernicom za europska tehnička dopuštenja za prijelazne naprave ETAG n°32 (Guideline for European Technical Approval of Expansion Joints for Road Bridges).

Tehničko dopuštenje prema hrvatskom propisu (NN 175/2003) vrijedi 5 godina.

Izradio:

Prof.dr.sc. Želimir Šimunić

Predstojnik Zavoda za tehničku mehaniku:

Prof.dr.sc. Mladen Meštrović

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