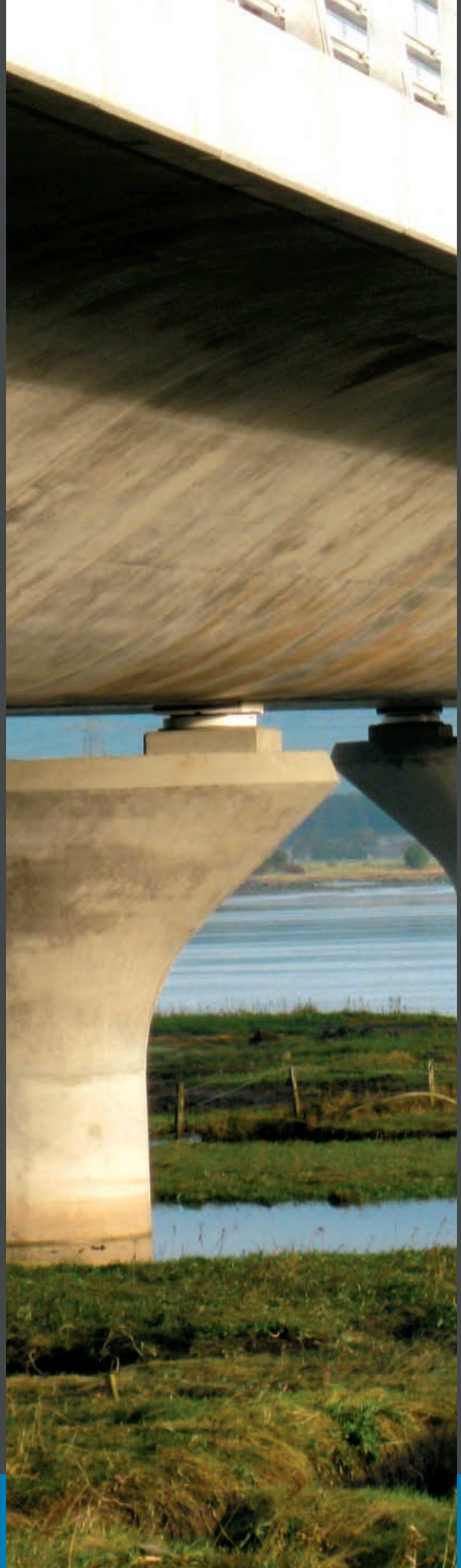
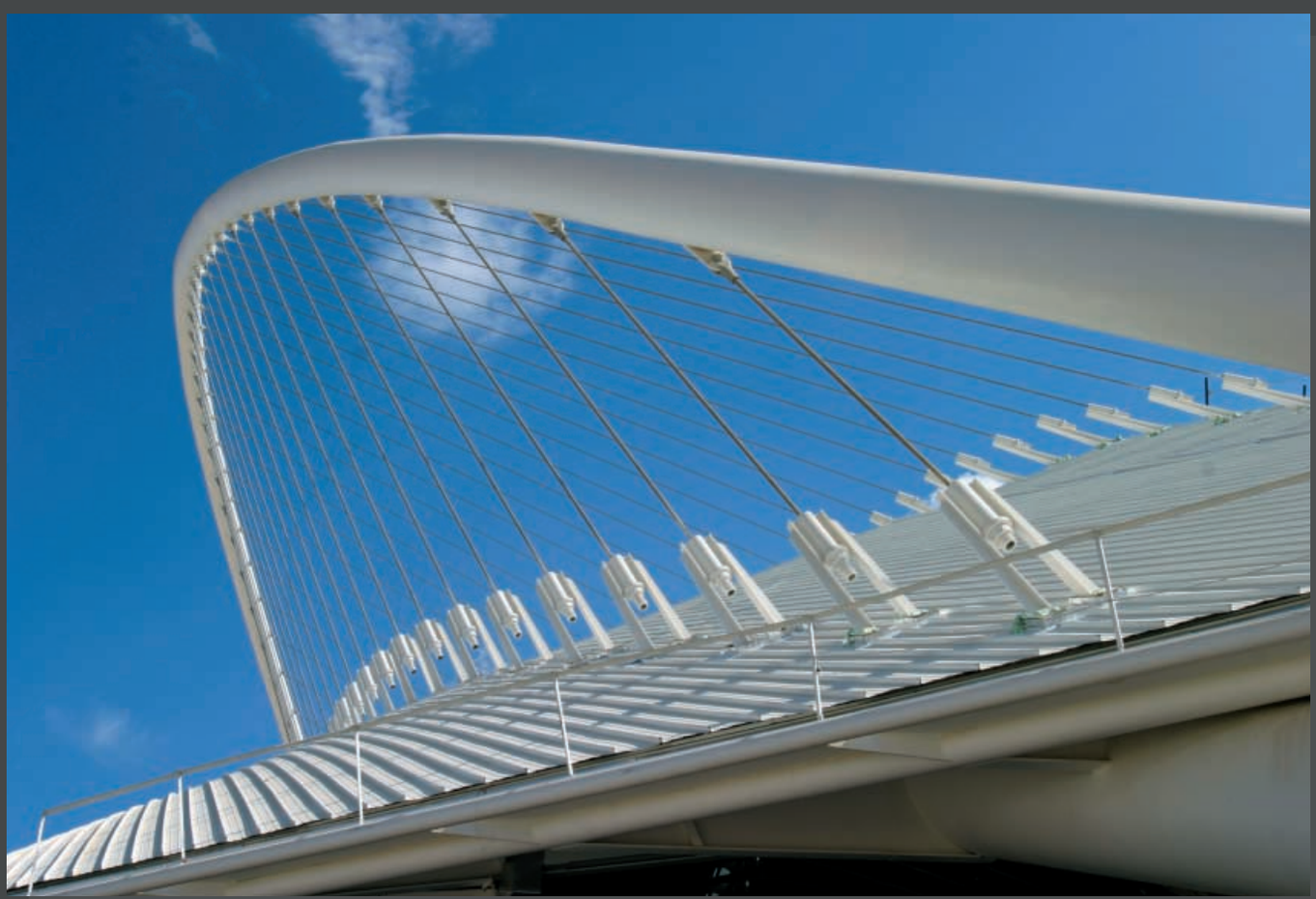


VASOFLON® BEARINGS

FIP INDUSTRIALE

VASOFLON® BEARINGS

B01



• ATHENS, GREECE -- VELODROME
pot bearings for the roof covering

Cover photo:

• U.K. -- KINCARDINE BRIDGE
pot bearings

FIP INDUSTRIALE

INTRODUCTION

PRODUCT

Vasoflon® are structural pot bearings, in which the rotations about any horizontal axis are ensured by the deformability of the elastomeric pad confined in a monolithic steel pot.

The elastomer behaves like a fluid that, under a tri-axial pressure, offers low resistance to deformations but high vertical stiffness.

In addition to vertical compressive loads, **Vasoflon®** bearings are capable of transferring forces and/or permit sliding in one or more directions of the horizontal plane depending on the different bearing types.

In the sliding bearings, translational movements are achieved through the mutual sliding of two flat mating surfaces, one of stainless steel and the other of PTFE.

CE MARKING

This catalogue covers CE marked pot bearings designed in accordance with standard UNI-EN 1337.

FIP Industriale also designs and manufactures bearings according to other applicable well known and widely used technical specifications such as AASHTO or BS.

ISO 9001 - Cert. N. 0057

CLASSIFICATION

Vasoflon® bearings are classified by two letters followed by two or three groups of numbers with the following meanings:

VF => Vasoflon® bearing, fixed type
VU => Vasoflon® bearing, guided type, longitudinally sliding
VU* => Vasoflon® bearing, guided type, transversally sliding
VM => Vasoflon® bearing, free sliding type

The first group of numbers represents the vertical load in kN/10 (t); the second group represents the total movement in mm (VU, VM), or the horizontal force in (kN/10) acting in the longitudinal direction (VU*) or in all directions (VF); the third group of numbers represents the total transverse movement in mm (VU*, VM) or the transverse horizontal force in kN/10 (VU). The loads and forces are at the Ultimate Limit State.

For example:

VF 3000-240 Vasoflon® bearing, fixed type, with a vertical capacity of 30000 kN able to transfer both longitudinally and transversally horizontal forces of 2400 kN.

VU 400/100-120 Vasoflon® bearing, guided type, longitudinally sliding, with a vertical capacity of 4000 kN, that permits longitudinal movements of ± 50 mm and is able to transfer transversally horizontal forces of 1200 kN.

VU* 600-180/50 Vasoflon® bearing, guided type, transversally sliding, with a vertical capacity of 6000 kN able to transfer longitudinally horizontal forces of 1800 kN and permit transverse movements of ± 25 mm.

VM 1500/550/50 Vasoflon® bearing, free sliding type, with a vertical capacity of 15000 kN that permits longitudinal movements of ± 275 mm and transverse movements of ± 25 mm.

DESCRIPTION

VASOFLON®
FIXED TYPE

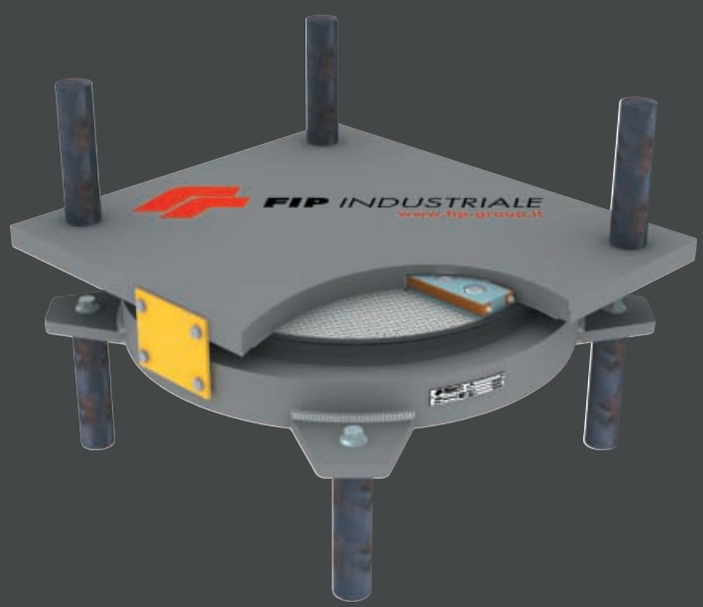
This bearing comprises:

- a lower steel element with a cylindrical recess (pot);
- an elastomeric pad contained in the pot;
- an upper steel element (piston) that is inserted into the pot.

VASOFLON®
GUIDED SLIDING TYPE

This bearing comprises:

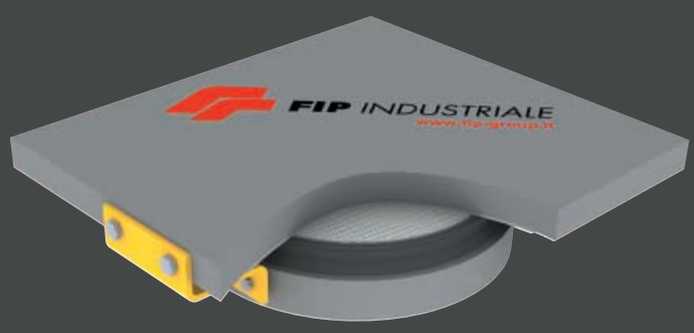
- a lower steel element with a cylindrical recess (pot);
- an elastomeric pad contained in the pot;
- an intermediate circular steel element (piston) that is inserted into the pot. Its upper side has a machined recess to house a dimpled PTFE sheet and a centrally arranged key (guide) capable of resisting forces perpendicular to it and determining the sliding direction of the bearing. Two CM1 type composite low friction material strips are bonded to the sides and screwed to the front ends of the guide to assure smooth sliding in the keyway of the upper sliding element covered with stainless steel;
- an upper sliding element, whose underside is covered with a pair of stainless steel sheets, which also cover the sides of the central keyway for the guide.



VASOFLON®
FREE SLIDING TYPE

This bearing comprises:

- a lower steel element with a cylindrical recess (pot);
- an elastomeric pad contained in the pot;
- an intermediate circular steel element (piston) that is inserted into the pot. Its upper side has a machined recess to house a dimpled PTFE sheet;
- an upper sliding element, whose underside is covered with stainless steel sheet.



ANCHORING SYSTEMS

Applicable construction codes permitting, and if the ratio between the horizontal forces and the concurrent vertical loads is low enough, a mechanical anchoring system is not required; the friction itself is enough to secure the bearing to the super and/or substructure. In this case, the surface of the bearing in contact with the concrete is provided with grooves to enhance bonding with epoxy resin.

It should be noted that “In case of dynamically stressed structures where extreme load fluctuations can occur, e.g. railway bridges and earthquakes, the horizontal forces shall not be resisted by friction (EN 1337-1 §5.2)”.

If mechanical anchoring is required in order to transfer the horizontal forces, the different types of upper and lower anchoring systems indicated below represent the most commonly adopted configurations.

STEEL STRUCTURE

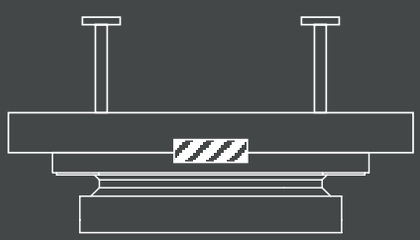
1. shear pin in counterplate
2. bolts connected to the structure or to counterplates

PRECAST CONCRETE STRUCTURE

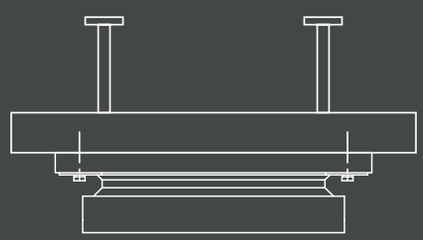
1. shear pin in counterplate
2. bolts connected to counterplates
3. bolts and dowels (with pre-formed pockets in the structure)

CAST *IN SITU* STRUCTURE

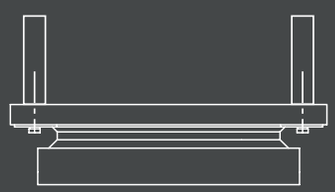
1. shear pin in counterplate
2. bolts connected to counterplates
3. bolts and dowels



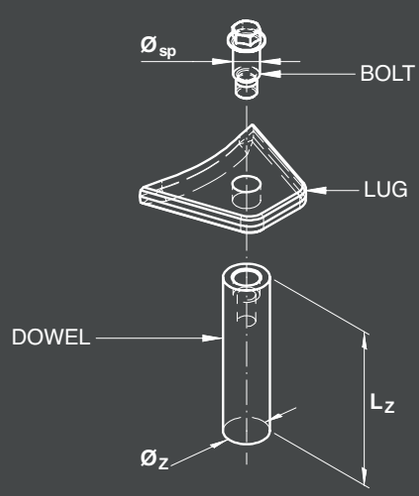
1. shear pin in counterplate



2. bolts connected to counterplates



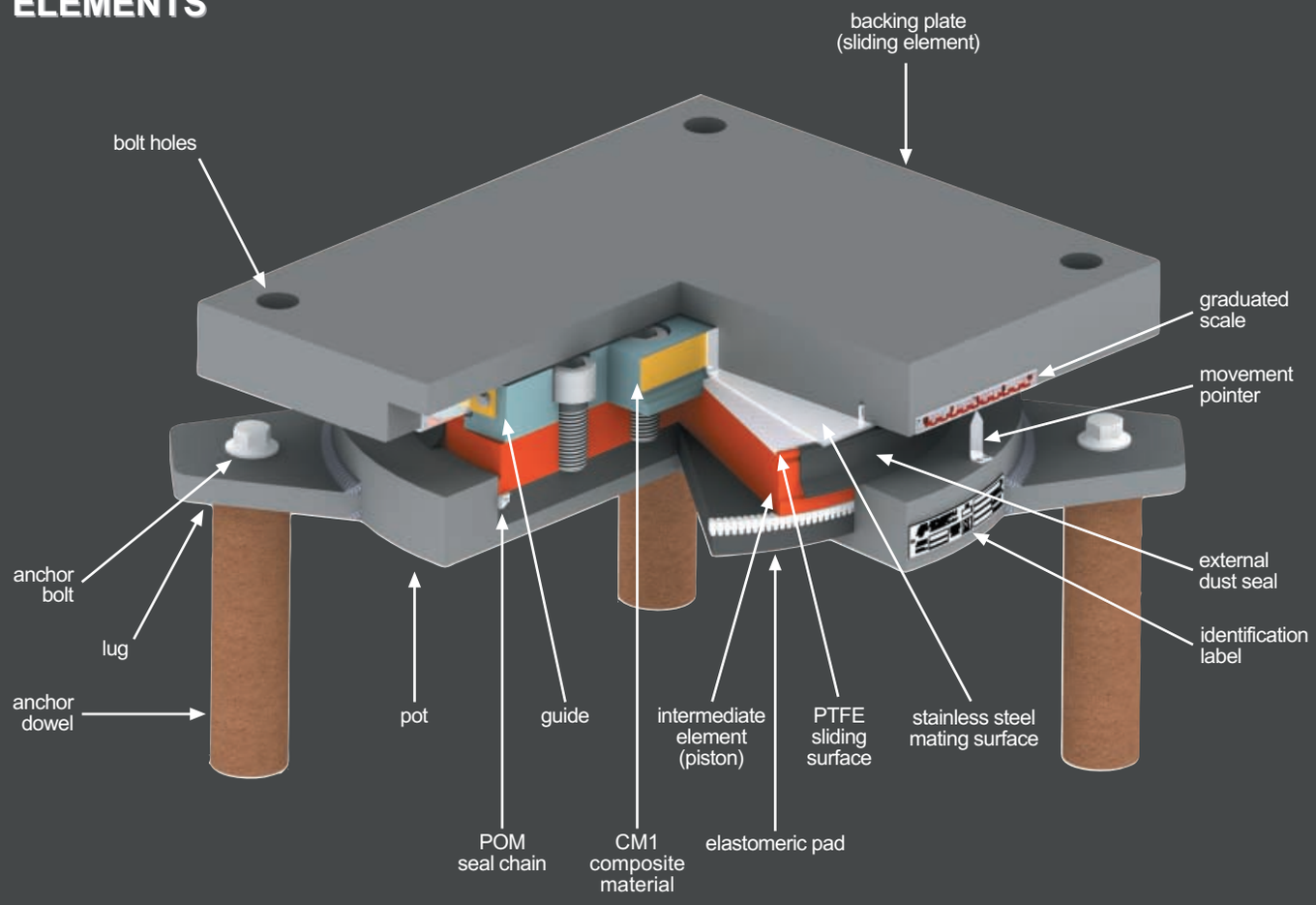
3. bolts and dowels



DOWEL TYPE	$Ø_{sp}$ (mm)	$Ø_Z$ (mm)	L_Z (mm)
1	14	25	100
2	20	35	140
3	30	55	220
4	54	100	400

BEARING COMPONENTS

ELEMENTS



MATERIALS

The materials used are in accordance with European standard EN 1337. In particular, the structural parts are made of S355 grade steel. Class X5CrNiMo 17-12-2 stainless steel with a minimum thickness of 2.5 mm is used for the sliding surfaces.

The elastomeric pad, with 50 ± 5 Shore A hardness, has a POM (polyoxymethylene) seal chain vulcanised to its upper rim that prevents the extrusion of the elastomer from the pot, in accordance with EN 1337-5, Appendix A, section A 1.2. This makes **FIP Industriale** bearings especially suited for roadway, highway, and railway bridges (EN 1337-5 Appendix G).

The flat sliding surfaces (sliding bearings) are made of sheets of pure PTFE (polytetrafluoroethylene) free sintered without regenerated or filler materials.

The protrusion from the recess and the total thickness of the PTFE sheet, minimum 5 mm, are in compliance with EN 1337-2. Two CM1 type composite low friction material strips are bonded to the sides and screwed to the front ends of the guide in accordance with the requirements of EN 1337-2 (guided sliding bearings).

ACCESSORIES

Every bearing is provided with an identification label showing its main technical information. Other accessories are the graduated scale and the movement pointer for the sliding bearings.

FIP INDUSTRIALE
Selvazzano (PD) • ITALY • **fip-group.it**

ANNO YEAR		TIPO TYPE	
CARICO VERTICALE kN ULS VERTICAL LOAD kN ULS			
N° COMMESSA ORDER NUMBER		SISTEMA QUALITÀ ISO 9001 / EN 3834	CE 1835
CARICO LATERALE kN ULS LATERAL LOAD kN ULS			
N° SERIALE SERIAL NUMBER		CERTIFICATO ICIM N. 0057/0941	
SCORRIMENTO TOTALE MAX DISPLACEMENT mm			

INDICATIONS

CORROSION PROTECTION

The corrosion protection follows the indications given in EN 1337-9. The bearings are finished with a light grey (RAL 7035) unless otherwise requested. The bearing devices are supplied with an external dust seal and a dust scraper for the sliding surfaces.

PRE-SETTING

The sliding plate of the sliding bearings can be pre-set in the workshop to cater for special construction requirements. The pre-setting values must be defined and communicated to **FIP Industriale** before the production process starts.

HANDLING

The bearings are delivered assembled. The yellow brackets must not be removed before the device is installed and in any case not before the Engineer deems fit.

Use pallets to move the packaged bearings. They shall be properly harnessed and lifted using suitable mechanical equipment (crane, forklift). To handle the individual bearing use eyebolts to be screwed into the threaded holes on the upper side of the bearing. Dismounting the bearing device on site is not permitted for any reason.

STORAGE

The bearing devices are delivered assembled and ready for installation. If they are not installed immediately, the Customer is responsible for ensuring that they are properly stored in order to prevent mechanical damages and harmful effects of dust, dirt, humidity, heat, pollutants, and other.

INSTALLATION

The bearing devices are supplied with drawings and installation instructions. Customers and Engineers should feel free to contact **FIP Industriale**'s Technical Department for information on the most appropriate installation procedure based on the type of structure and its construction phases.

• U.K. -- CHANNEL TUNNEL RAIL LINK
pot bearings

DESIGN CRITERIA

DIMENTIONING DATA

FIP Industriale shall be provided at least with the following data to prepare an adequate technical proposal:

- maximum axial force (vertical load) $N_{sd\ ULS}$
- axial force (vertical load) concurrent with the maximum horizontal force
- permanent axial force (vertical load)
- maximum longitudinal horizontal force $V_{long,\ ULS}$
- maximum transverse horizontal force $V_{trans,\ ULS}$
- horizontal force concurrent with N_{sd}
- maximum rotation due to permanent actions
- maximum rotation due to variable actions
- maximum longitudinal movement in the worst Limit State condition (VU and VM bearings)
- maximum transverse movement in the worst Limit State condition (VU* and VM bearings)
- type of deck (steel, cast *in situ* concrete, precast concrete)
- characteristic compressive cylinder strength of upper concrete (for cast *in situ* or precast concrete)
- characteristic compressive cylinder strength of lower concrete
- longitudinal slope to be compensated for by the bearing (if any)
- transverse slope to be compensated for by the bearing (if any)
- type of upper anchoring system
- type of lower anchoring system

Clarify finally whether the maximum horizontal force at ULS has to be considered seismic.

SLIDING MOVEMENTS

Standard EN 1337 requires that the total design movement be increased by 40 mm and establishes a total minimum movement of 100 mm in the longitudinal direction. Therefore, the sliding bearings in the tables below provide the following movements:

VU:	longitudinally = 100 mm (± 50 mm)	transversally = 0
VU*:	longitudinally = 0	transversally = 50 mm (± 25 mm)
VM:	longitudinally = 100 mm (± 50 mm)	transversally = 50 mm (± 25 mm)

ROTATIONS

Maximum design rotation due to permanent actions at ULS = 0.005 rad.
Maximum rotation due to variable actions at ULS = 0.005 rad.
Total maximum rotation, sum of the previous = 0.010 rad.

ANCHORING SYSTEMS

The bearings listed in the tables consider the following anchoring options:

- upper anchoring system: bolts and dowels;
  epoxy resin bonding for free sliding bearings.
- lower anchoring system: bolts and dowels for fixed and guided sliding bearings;
  epoxy resin bonding for free sliding bearings.

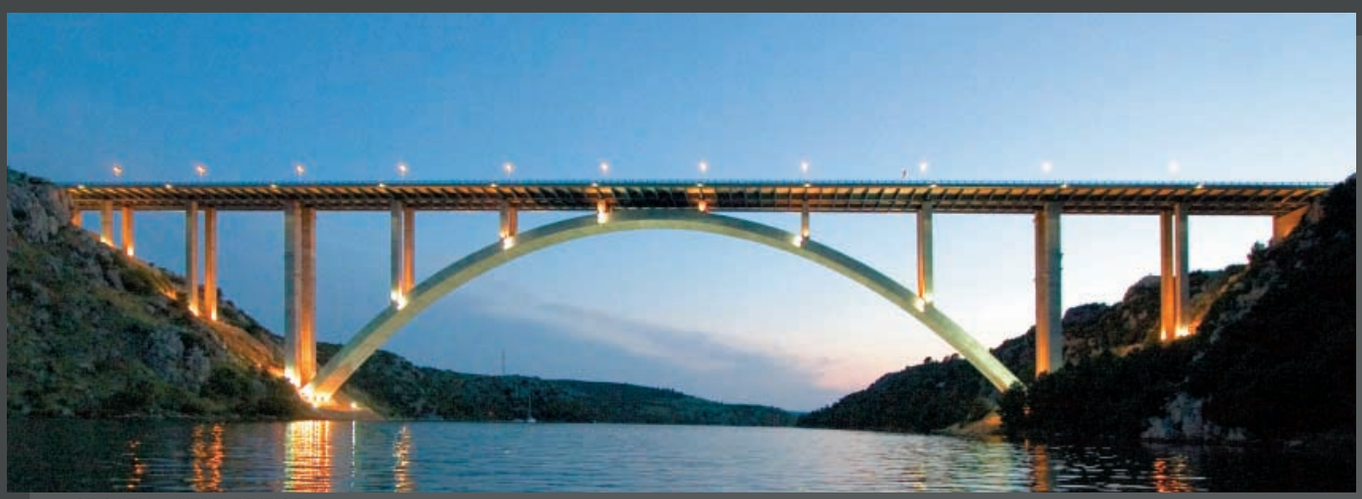
The choice of anchoring systems other than the assumed ones might require a change in the bearing dimensions.

SUPER AND SUBSTRUCTURE

Upper concrete class (if present) ≥ C45/55
Lower concrete class ≥ C35/45
$\sqrt{A_{c1}/A_{c0}}$ ratio = 2 where:

A_{c0} = circular area of concrete loaded by the bearing or by the lower/upper counterplate
A_{c1} = A_{c0} distribution into the upper/lower concrete

Permanent vertical load N_{Gd} = 0.6 N_{Sd}
Effective temperatures between -5°C and +30°C
No longitudinal or transverse slopes



• CROATIA -- KRKA BRIDGE
pot bearings with fuse restraints

FIP Industriale also designs and manufactures non-standard CE marked bearings, based on loads other than those tabulated.

In order to easily select the most appropriate bearings for a correct restraint system for the different types of structures, you can consult the following tables covering the “standard” fixed, longitudinally guided sliding, transversally guided sliding, and free sliding **Vasoflon®** bearings.

The position of the anchoring elements and the final overall bearing dimensions are to be considered as indicative and have to be confirmed when defining the final bearing device. To cover the greatest number of cases, the two bearing types that transmit horizontal forces have further been divided into **Normal** and **High**, which differ for the lower or higher horizontal forces resisted.

TABLES VASOFLON® FIXED TYPE

VF
NORMAL

BEARING TYPE	DESIGN VERTICAL LOAD $N_{sd\ ULS}$	MAXIMUM HORZONTAL LOAD V_{ULS}	BASE ELEMENT DIAMETER D_o	DOWELS (UPPER/LOWER) n_b		UPPER ELEMENT DIAMETER B	UPPER OVERALL DIMENSIONS C	UPPER OVERALL DIMENSIONS D	LOWER OVERALL DIMENSIONS G	LOWER OVERALL DIMENSIONS F	BEARING TOTAL HEIGHT H_{tot}	BEARING WEIGHT (EXCEPT ANCHORINGS) W
	TRANSVERSAL	LONGITUDINAL					TRANSVERSAL	LONGITUDINAL				
	kN	*kN*	*mm*	*n*	*type*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*kg*
VF 50-5	500	50	160	2/2	1	150	150	250	160	270	69	9
VF 100-10	1.000	100	210	4/4	1	200	250	250	250	250	69	15
VF 150-15	1.500	150	245	4/4	1	235	270	270	280	280	73	22
VF 200-20	2.000	200	285	4/4	1	265	290	290	310	310	73	28
VF 250-25	2.500	250	320	4/4	1	295	320	320	330	330	77	38
VF 300-30	3.000	300	350	4/4	2	320	380	380	400	400	81	47
VF 350-35	3.500	350	380	4/4	2	345	400	400	420	420	86	59
VF 400-40	4.000	400	405	4/4	2	365	410	410	440	440	85	65
VF 450-45	4.500	450	430	4/4	2	385	430	430	460	460	89	77
VF 500-50	5.000	500	455	4/4	2	405	440	440	480	480	89	85
VF 600-60	6.000	600	495	2/2	3	440	500	730	440	670	103	116
VF 700-70	7.000	700	535	4/4	3	470	550	550	600	600	102	131
VF 800-80	8.000	800	580	4/4	3	510	580	580	630	630	106	171
VF 900-90	9.000	900	610	4/4	3	530	590	590	650	650	110	185
VF 1000-100	10.000	1.000	640	4/4	3	560	620	620	680	680	118	206
VF 1100-110	11.000	1.100	675	4/4	3	595	640	640	700	700	118	229
VF 1200-120	12.000	1.200	705	4/4	3	620	660	660	720	720	122	274
VF 1300-130	13.000	1.300	735	4/4	3	650	680	680	750	750	131	295
VF 1400-140	14.000	1.400	765	6/6	3	680	830	920	910	1.010	130	314
VF 1500-150	15.000	1.500	790	6/6	3	705	850	950	930	1.040	135	348
VF 1600-160	16.000	1.600	815	6/6	3	735	880	980	950	1.060	134	406
VF 1700-170	17.000	1.700	840	6/6	3	755	900	1.000	970	1.090	143	425
VF 1800-180	18.000	1.800	865	6/6	3	780	920	1.020	1.000	1.110	143	448
VF 1900-190	19.000	1.900	885	6/6	3	805	940	1.050	1.010	1.130	142	461
VF 2000-200	20.000	2.000	910	8/8	3	825	1.010	1.010	1.090	1.090	146	499
VF 2250-210	22.500	2.100	970	8/8	3	890	1.070	1.070	1.150	1.150	155	615
VF 2500-220	25.000	2.200	1.020	8/8	3	945	1.130	1.130	1.200	1.200	153	667
VF 2750-230	27.500	2.300	1.065	8/8	3	985	1.160	1.160	1.240	1.240	166	800
VF 3000-240	30.000	2.400	1.105	8/8	3	1.030	1.200	1.200	1.280	1.280	175	848
VF 3250-250	32.500	2.500	1.150	8/8	3	1.070	1.240	1.240	1.320	1.320	184	965
VF 3500-260	35.000	2.600	1.190	8/8	3	1.115	1.280	1.280	1.360	1.360	183	1.104
VF 3750-270	37.500	2.700	1.230	10/10	3	1.190	1.190	1.390	1.450	1.230	192	1.179
VF 4000-280	40.000	2.800	1.270	10/10	3	1.230	1.230	1.430	1.490	1.270	190	1.218
VF 4500-320	45.000	3.200	1.345	10/10	3	1.305	1.310	1.510	1.570	1.350	199	1.445
VF 5000-350	50.000	3.500	1.425	12/12	3	1.355	1.360	1.580	1.650	1.430	208	1.571
VF 5500-390	55.000	3.900	1.500	4/4	4	1.375	1.380	1.380	1.500	1.500	237	2.157
VF 6000-420	60.000	4.200	1.565	4/4	4	1.440	1.440	1.440	1.570	1.570	245	2.301
VF 6500-460	65.000	4.600	1.630	6/6	4	1.500	1.700	1.900	1.810	2.030	254	2.610
VF 7000-490	70.000	4.900	1.690	6/6	4	1.560	1.740	1.960	1.860	2.100	253	2.768
VF 7500-530	75.000	5.300	1.755	6/6	4	1.630	1.810	2.030	1.920	2.160	262	3.145
VF 8000-560	80.000	5.600	1.820	6/6	4	1.690	1.860	2.090	1.970	2.230	261	3.314
VF 9000-630	90.000	6.300	1.925	6/6	4	1.790	1.950	2.190	2.070	2.330	269	3.839
VF 10000-700	100.000	7.000	2.040	8/8	4	1.915	2.180	2.180	2.290	2.290	277	4.500

VF
HIGH

BEARING TYPE	DESIGN VERTICAL LOAD $N_{sd\ ULS}$ kN	MAXIMUM HORZONTAL LOAD V_{ULS} kN	BASE ELEMENT DIAMETER D_o mm	DOWELS (UPPER/LOWER) n_b n	type	UPPER ELEMENT DIAMETER B mm	UPPER OVERALL DIMENSIONS TRANSVERSAL C mm	UPPER OVERALL DIMENSIONS LONGITUDINAL D mm	LOWER OVERALL DIMENSIONS TRANSVERSAL G mm	LOWER OVERALL DIMENSIONS LONGITUDINAL F mm	BEARING TOTAL HEIGHT H_{tot} mm	BEARING WEIGHT (EXCEPT ANCHORINGS) W kg
VF 50-15	500	150	160	4/4	1	150	210	210	220	220	69	8
VF 100-30	1.000	300	225	4/4	2	200	280	280	300	300	77	19
VF 150-45	1.500	450	280	4/4	2	255	320	320	350	350	76	29
VF 200-60	2.000	600	325	4/4	3	265	380	380	440	440	90	41
VF 250-75	2.500	750	365	4/4	3	315	530	530	470	470	89	53
VF 300-90	3.000	900	400	4/4	3	350	570	570	500	500	93	71
VF 350-105	3.500	1.050	440	4/4	3	385	600	600	530	530	92	85
VF 400-120	4.000	1.200	465	4/4	3	405	630	630	550	550	97	100
VF 450-135	4.500	1.350	495	6/6	3	425	600	650	670	730	96	110
VF 500-150	5.000	1.500	520	6/6	3	450	620	680	690	760	100	129
VF 600-180	6.000	1.800	570	6/6	3	500	670	730	730	810	108	178
VF 700-210	7.000	2.100	620	8/8	3	580	580	760	800	620	112	215
VF 800-240	8.000	2.400	670	8/8	3	630	630	810	850	670	111	246
VF 900-270	9.000	2.700	705	10/10	3	645	650	870	930	710	119	304
VF 1000-300	10.000	3.000	740	10/10	3	680	700	900	960	740	123	330
VF 1100-330	11.000	3.300	785	12/12	3	720	950	720	990	790	132	367
VF 1200-360	12.000	3.600	815	12/12	3	780	980	780	1.020	820	135	411
VF 1300-390	13.000	3.900	850	12/12	3	815	1.030	820	1.050	850	134	487
VF 1400-420	14.000	4.200	885	14/14	3	850	1.070	850	1.110	890	144	524
VF 1500-450	15.000	4.500	920	14/14	3	920	1.140	920	1.140	920	143	573
VF 1600-480	16.000	4.800	940	6/6	4	830	1.210	1.090	1.200	1.330	167	654
VF 1700-510	17.000	5.100	985	6/6	4	875	1.250	1.130	1.240	1.380	175	776
VF 1800-540	18.000	5.400	1.020	6/6	4	910	1.290	1.160	1.270	1.410	174	833
VF 1900-570	19.000	5.700	1.045	6/6	4	935	1.320	1.190	1.290	1.440	173	867
VF 2000-600	20.000	6.000	1.075	6/6	4	965	1.350	1.210	1.320	1.470	192	959
VF 2250-630	22.500	6.300	1.125	6/6	4	1.015	1.400	1.260	1.360	1.520	191	1.113
VF 2500-660	25.000	6.600	1.245	8/8	4	1.135	1.440	1.440	1.640	1.640	190	1.363
VF 2750-690	27.500	6.900	1.225	8/8	4	1.115	1.420	1.420	1.620	1.620	199	1.278
VF 3000-720	30.000	7.200	1.265	8/8	4	1.155	1.460	1.460	1.660	1.660	197	1.443
VF 3250-750	32.500	7.500	1.310	8/8	4	1.200	1.500	1.500	1.710	1.710	205	1.522
VF 3500-780	35.000	7.800	1.350	8/8	4	1.240	1.540	1.540	1.750	1.750	204	1.713
VF 3750-820	37.500	8.200	1.400	8/8	4	1.290	1.590	1.590	1.800	1.800	205	1.842
VF 4000-860	40.000	8.600	1.440	8/8	4	1.330	1.620	1.620	1.840	1.840	225	2.015
VF 4500-900	45.000	9.000	1.520	8/8	4	1.410	1.780	1.780	1.890	1.890	231	2.319
VF 5000-1000	50.000	10.000	1.605	10/10	4	1.495	1.870	1.870	1.980	1.980	240	2.556
VF 5500-1100	55.000	11.000	1.690	12/12	4	1.580	1.950	1.950	2.060	2.060	239	2.977
VF 6000-1200	60.000	12.000	1.765	12/12	4	1.655	2.030	2.030	2.140	2.140	247	3.207
VF 6500-1300	65.000	13.000	1.840	14/14	4	1.730	2.100	2.100	2.210	2.210	246	3.656
VF 7000-1400	70.000	14.000	1.905	14/14	4	1.795	2.170	2.170	2.280	2.280	254	3.867
VF 7500-1500	75.000	15.000	1.980	14/14	4	1.870	2.240	2.240	2.350	2.350	273	4.512
VF 8000-1600	80.000	16.000	2.055	16/16	4	1.945	2.320	2.320	2.430	2.430	272	4.800
VF 9000-1700	90.000	17.000	2.170	16/16	4	2.060	2.430	2.430	2.540	2.540	280	5.548
VF 10000-1800	100.000	18.000	2.275	18/18	4	2.165	2.540	2.540	2.650	2.650	288	6.306

TABLES VASOFLON® LONGITUDINALLY GUIDED SLIDING TYPE

VU
NORMAL

BEARING TYPE	DESIGN VERTICAL LOAD $N_{sd\ ULS}$	MAXIMUM HORZONTAL LOAD V_{ULS}	BASE ELEMENT DIAMETER D_o	DOWELS (UPPER/LOWER) n_b		UPPER OVERALL DIMENSIONS C	UPPER OVERALL DIMENSIONS D	LOWER OVERALL DIMENSIONS G	LOWER OVERALL DIMENSIONS F	BEARING TOTAL HEIGHT H_{tot}	BEARING WEIGHT (EXCEPT ANCHORINGS) W
	kN	*kN*	*mm*	*n*	*type*	*mm*	*mm*	*mm*	*mm*	*mm*	*kg*
VU 50/100-5	500	50	160	4/2	1	270	300	270	160	108	29
VU 100/100-10	1.000	100	245	4/4	1	270	360	280	280	98	42
VU 150/100-15	1.500	150	275	4/4	1	300	390	300	300	97	51
VU 200/100-20	2.000	200	310	4/4	1	325	415	330	330	104	66
VU 250/100-25	2.500	250	335	4/4	1	340	430	350	350	104	74
VU 300/100-30	3.000	300	370	4/4	2	375	465	420	420	108	91
VU 350/100-35	3.500	350	395	4/4	2	395	485	430	430	111	103
VU 400/100-40	4.000	400	420	4/4	2	415	505	450	450	120	127
VU 450/100-45	4.500	450	445	4/4	2	435	525	470	470	120	140
VU 500/100-50	5.000	500	480	4/4	2	470	560	500	500	1 4	165
VU 600/100-60	6.000	600	520	4/2	3	500	600	750	520	123	188
VU 700/100-70	7.000	700	570	4/4	3	510	660	630	630	122	218
VU 800/100-80	8.000	800	580	4/4	3	540	650	630	630	127	244
VU 900/100-90	9.000	900	610	4/4	3	560	670	650	650	136	270
VU 1000/100-100	10.000	1.000	640	4/4	3	590	680	680	680	134	278
VU 1100/100-110	11.000	1.100	675	4/4	3	625	705	700	700	149	339
VU 1200/100-120	12.000	1.200	705	4/4	3	650	730	720	720	153	393
VU 1300/100-130	13.000	1.300	735	4/4	3	660	750	750	750	177	479
VU 1400/100-140	14.000	1.400	765	6/6	3	690	900	910	1.010	176	551
VU 1500/100-150	15.000	1.500	790	6/6	3	710	940	930	1.040	176	588
VU 1600/100-160	16.000	1.600	815	6/6	3	730	960	950	1.060	175	655
VU 1700/100-170	17.000	1.700	840	6/6	3	750	980	970	1.090	184	686
VU 1800/100-180	18.000	1.800	865	6/6	3	770	1.000	1.000	1.110	184	720
VU 1900/100-190	19.000	1.900	885	6/6	3	790	1.020	1.010	1.130	188	761
VU 2000/100-200	20.000	2.000	910	8/8	3	910	1.110	1.090	1.090	187	871
VU 2250/100-210	22.500	2.100	970	8/8	3	970	1.130	1.150	1.150	201	1.030
VU 2500/100-220	25.000	2.200	1.020	8/8	3	1.020	1.140	1.200	1.200	200	1.101
VU 2750/100-230	27.500	2.300	1.065	8/8	3	1.065	1.160	1.240	1.240	214	1.268
VU 3000/100-240	30.000	2.400	1.105	8/8	3	1.105	1.170	1.280	1.280	223	1.327
VU 3250/100-250	32.500	2.500	1.150	8/8	3	1.150	1.190	1.320	1.320	252	1.724
VU 3500/100-260	35.000	2.600	1.190	8/8	3	1.190	1.180	1.360	1.360	256	1.913
VU 3750/100-270	37.500	2.700	1.230	12/10	3	1.230	1.250	1.450	1.230	265	2.043
VU 4000/100-280	40.000	2.800	1.270	12/10	3	1.270	1.270	1.490	1.270	264	2.135
VU 4500/100-320	45.000	3.200	1.345	12/10	3	1.345	1.310	1.570	1.350	278	2.489
VU 5000/100-350	50.000	3.500	1.425	12/12	3	1.425	1.340	1.670	1.430	287	2.711
VU 5500/100-390	55.000	3.900	1.500	4/4	4	1.305	1.385	1.500	1.500	286	2.887
VU 6000/100-420	60.000	4.200	1.565	4/4	4	1.360	1.440	1.570	1.570	298	3.131
VU 6500/100-460	65.000	4.600	1.630	6/6	4	1.420	1.970	1.810	2.030	307	3.993
VU 7000/100-490	70.000	4.900	1.690	6/6	4	1.460	2.040	1.860	2.100	306	4.216
VU 7500/100-530	75.000	5.300	1.755	6/6	4	1.520	2.100	1.920	2.160	325	5.120
VU 8000/100-560	80.000	5.600	1.820	6/6	4	1.580	2.170	1.970	2.230	324	5.716
VU 9000/100-630	90.000	6.300	1.925	6/6	4	1.660	2.270	2.070	2.330	332	5.803
VU 10000/100-700	100.000	7.000	2.040	8/8	4	2.040	1.985	2.290	2.290	340	6.539

*For the **transversally guided sliding type (VU*)** the characteristics shall be taken from the tables for VU, except for the length of the upper element "D", which shall be reduced by 50 mm.*

VU
HIGH

BEARING TYPE	DESIGN VERTICAL LOAD	MAXIMUM HORZONTAL LOAD	BASE ELEMENT DIAMETER	DOWELS (UPPER/LOWER)		UPPER OVERALL DIMENSIONS		LOWER OVERALL DIMENSIONS		BEARING TOTAL HEIGHT	BEARING WEIGHT (EXCEPT ANCHORINGS)
						TRANSVERSAL	LONGITUDINAL	TRANSVERSAL	LONGITUDINAL		
	$N_{sd\ ULS}$	V_{ULS}	D_o	n_b		C	D	G	F	H_{tot}	W
	kN	*kN*	*mm*	*n*	*type*	*mm*	*mm*	*mm*	*mm*	*mm*	*kg*
VU 50/100-15	500	150	290	4/4	1	320	400	310	310	102	59
VU 100/100-30	1.000	300	305	4/4	2	315	415	370	370	114	72
VU 150/100-45	1.500	450	350	4/4	2	370	450	400	400	121	100
VU 200/100-60	2.000	600	370	4/4	3	390	505	470	470	146	151
VU 250/100-75	2.500	750	385	4/4	3	370	535	480	480	145	151
VU 300/100-90	3.000	900	455	4/4	3	430	575	540	540	149	199
VU 350/100-105	3.500	1.050	485	4/4	3	435	605	560	560	148	211
VU 400/100-120	4.000	1.200	550	4/4	3	505	640	610	610	161	289
VU 450/100-135	4.500	1.350	570	6/6	3	530	770	730	810	160	339
VU 500/100-150	5.000	1.500	545	6/6	3	530	760	710	780	165	345
VU 600/100-180	6.000	1.800	600	6/6	3	550	790	760	840	168	402
VU 700/100-210	7.000	2.100	675	10/8	3	675	980	870	870	172	547
VU 800/100-240	8.000	2.400	705	10/8	3	705	990	900	900	191	675
VU 900/100-270	9.000	2.700	745	10/10	3	745	1.010	970	750	195	729
VU 1000/100-300	10.000	3.000	785	10/10	3	785	1.030	1.010	790	214	872
VU 1100/100-330	11.000	3.300	835	12/12	3	835	1.065	1.060	840	212	1.001
VU 1200/100-360	12.000	3.600	850	12/12	3	850	1.065	1.070	850	226	1.062
VU 1300/100-390	13.000	3.900	895	4/4	4	895	925	980	980	235	1.045
VU 1400/100-420	14.000	4.200	930	4/4	4	930	905	1.010	1.010	234	1.089
VU 1500/100-450	15.000	4.500	975	6/6	4	800	1.290	1.230	1.370	244	1.400
VU 1600/100-480	16.000	4.800	1.020	6/6	4	820	1.330	1.270	1.410	251	1.491
VU 1700/100-510	17.000	5.100	1.065	6/6	4	860	1.380	1.310	1.460	251	1.610
VU 1800/100-540	18.000	5.400	1.115	6/6	4	900	1.430	1.350	1.510	260	1.807
VU 1900/100-570	19.000	5.700	1.160	6/6	4	940	1.470	1.390	1.560	259	1.930
VU 2000/100-600	20.000	6.000	1.200	6/6	4	980	1.510	1.430	1.600	268	2.149
VU 2250/100-630	22.500	6.300	1.215	6/6	4	980	1.530	1.440	1.610	267	2.186
VU 2500/100-660	25.000	6.600	1.260	8/8	4	1.260	1.610	1.560	1.560	266	2.651
VU 2750/100-690	27.500	6.900	1.305	8/8	4	1.305	1.625	1.610	1.610	275	2.784
VU 3000/100-720	30.000	7.200	1.315	8/8	4	1.315	1.635	1.620	1.620	285	3.003
VU 3250/100-750	32.500	7.500	1.330	8/8	4	1.330	1.635	1.630	1.630	285	3.053
VU 3500/100-780	35.000	7.800	1.375	8/8	4	1.375	1.660	1.670	1.670	298	3.524
VU 3750/100-820	37.500	8.200	1.400	8/8	4	1.400	1.650	1.700	1.700	298	3.615
VU 4000/100-860	40.000	8.600	1.440	8/8	4	1.440	1.690	1.730	1.730	307	3.804
VU 4500/100-900	45.000	9.000	1.570	12/10	4	1.570	1.815	1.940	1.570	306	4.304
VU 5000/100-1000	50.000	10.000	1.650	12/10	4	1.650	1.835	2.020	1.650	333	5.093
VU 5500/100-1100	55.000	11.000	1.765	12/12	4	1.765	1.860	2.140	1.770	341	5.754
VU 6000/100-1200	60.000	12.000	1.840	12/12	4	1.840	1.890	2.210	1.840	349	6.391
VU 6500/100-1300	65.000	13.000	1.910	14/14	4	1.700	2.220	2.280	1.910	357	7.082
VU 7000/100-1400	70.000	14.000	1.990	14/14	4	1.750	2.300	2.360	1.990	376	7.695
VU 7500/100-1500	75.000	15.000	2.080	14/14	4	1.800	2.390	2.450	2.080	384	8.797
VU 8000/100-1600	80.000	16.000	2.195	16/16	4	2.195	2.455	2.570	2.200	393	10.358
VU 9000/100-1700	90.000	17.000	2.355	16/16	4	2.355	2.570	2.730	2.360	400	12.215
VU 10000/100-1800	100.000	18.000	2.370	20/18	4	2.370	2.730	2.740	2.370	409	12.736

*For the **transversally guided sliding type (VU*)** the characteristics shall be taken from the tables for VU, except for the length of the upper element "D", which shall be reduced by 50 mm.*

TABLE VASOFLON® FREE SLIDING TYPE

VM

BEARING TYPE	DESIGN VERTICAL LOAD $N_{sd\ ULS}$ kN	BASE ELEMENT DIAMETER D_o mm	UPPER OVERALL DIMENSIONS TRANSVERSAL C mm	UPPER OVERALL DIMENSIONS LONGITUDINAL D mm	BEARING TOTAL HEIGHT H_{tot} mm	BEARING WEIGHT (EXCEPT ANCHORINGS) W kg
VM 50/100/50	500	160	270	270	89	22
VM 100/100/50	1.000	210	280	320	89	31
VM 150/100/50	1.500	245	315	360	93	42
VM 200/100/50	2.000	275	345	385	93	50
VM 250/100/50	2.500	310	375	415	97	63
VM 300/100/50	3.000	330	400	440	98	71
VM 350/100/50	3.500	355	425	465	97	79
VM 400/100/50	4.000	380	445	485	105	94
VM 450/100/50	4.500	405	465	505	104	103
VM 500/100/50	5.000	425	485	525	104	112
VM 600/100/50	6.000	465	520	560	108	134
VM 700/100/50	7.000	505	550	590	117	172
VM 800/100/50	8.000	540	590	630	116	192
VM 900/100/50	9.000	570	610	650	121	228
VM 1000/100/50	10.000	600	640	680	125	246
VM 1100/100/50	11.000	630	665	705	129	275
VM 1200/100/50	12.000	660	690	730	138	314
VM 1300/100/50	13.000	685	710	750	143	362
VM 1400/100/50	14.000	710	735	775	147	394
VM 1500/100/50	15.000	735	755	795	157	417
VM 1600/100/50	16.000	760	775	815	152	437
VM 1700/100/50	17.000	780	795	835	155	453
VM 1800/100/50	18.000	805	815	855	160	533
VM 1900/100/50	19.000	825	835	875	170	554
VM 2000/100/50	20.000	850	855	895	169	579
VM 2250/100/50	22.500	900	900	940	173	651
VM 2500/100/50	25.000	955	945	985	186	793
VM 2750/100/50	27.500	1.000	995	1.025	191	886
VM 3000/100/50	30.000	1.040	1.020	1.060	198	994
VM 3250/100/50	32.500	1.085	1.060	1.100	212	1.105
VM 3500/100/50	35.000	1.125	1.105	1.135	211	1.179
VM 3750/100/50	37.500	1.165	1.140	1.170	215	1.360
VM 4000/100/50	40.000	1.210	1.175	1.205	225	1.442
VM 4500/100/50	45.000	1.280	1.235	1.265	239	1.633
VM 5000/100/50	50.000	1.355	1.295	1.325	248	1.894
VM 5500/100/50	55.000	1.425	1.355	1.385	252	2.119
VM 6000/100/50	60.000	1.485	1.410	1.440	261	2.395
VM 6500/100/50	65.000	1.545	1.470	1.490	269	2.679
VM 7000/100/50	70.000	1.605	1.510	1.540	278	2.978
VM 7500/100/50	75.000	1.660	1.570	1.600	277	3.163
VM 8000/100/50	80.000	1.730	1.630	1.660	285	3.711
VM 9000/100/50	90.000	1.825	1.710	1.730	304	4.011
VM 10000/100/50	100.000	1.935	1.785	1.815	321	4.788

SPECIAL VASOFLON® BEARINGS

To meet particular functional requirements, **FIP Industriale** also manufactures **Vasoflon®** bearings integrated with special elements and/or specially shaped. The main types are listed below. For further information see **FIP Industriale**'s website.

ANTI-LIFTING VASOFLON®

Also known as "negative load" or "double-acting" bearings. These devices are capable of resisting also vertical traction loads, commonly called "uplift forces".

VASOFLON® LOAD MEASURING BEARINGS

These permit *in situ* measuring of vertical loads acting on the bearings. Depending on the technology used, measurements can be read on the bearing itself or at a remote location at any time during the service life of the bearing.

VASOFLON® WITH DAMPERS

These combine a free sliding or guided sliding Vasoflon bearing and steel hysteretic (VEL, VEP) and/or fluid viscous (VOP, VOTP, VELOP, VELOTP) dampers into a single device. They are also called "flat surface sliders with dampers".

VASOFLON® WITH SHOCK TRANSMITTERS (VOT)

Sliding bearings coupled with shock-transmitters (also called lock-up devices). In case of sudden movements, such as seismic shocks, the shock transmitters prevent the relative movement of the bearing elements they connect, and thus temporarily transform the bearings from sliding into fixed in the direction desired.

VASOFLON® ELASTIC REACTION BEARINGS

Are fixed or guided sliding bearings, in which an elastomeric ring is placed between the outer circumference of the intermediate element and the pot wall, to reduce the horizontal stiffness of the bearing.

VASOFLON® FOR INCREMENTALLY LAUNCHED BRIDGES

Their design allows for the sliding of the bridge deck during launching operation by means of a supplementary special stainless steel sheet fixed to the specially shaped upper side of the bearing, which can be removed after completion of launching.

TEMPORARILY FIXED VASOFLON®

Sliding bearings with additional temporary restraints that permit them to be fixed in a first phase, e.g. during casting or launching of bridge decks, and subsequently become sliding after the removal of these temporary blocks.

TEMPORARILY SLIDING VASOFLON®

These bearings are initially free sliding, e.g. so as not to oppose displacements generated during the construction phase, and subsequently fixed or guided sliding after the addition of supplementary restraints or guides.

ott. 2010

FIP INDUSTRIALE

FIP INDUSTRIALE SpA
via Scapacchiò 41, Casella Postale 97
35030 Selvazzano (PD) • ITALY
T +39 049 8225511 • F +39 049 638567
fip@fip-group.it

FIP INDUSTRIAL UK LTD
PO BOX 504
Cambridge CB1 OAP • UK
T +44 1223 518286 • F +44 1223 518287
fip-uk@fip-group.it

fip-group.it