CROSS BUSINESS LINE

TechSpan® Precast Arches

FUNICULAR SHAPE SERIES

OCTOBER 2018

REINFORCED EARTH

TERRE ARMEE

TIERRA ARMADA

Contents

Shapes

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Reinforced Earth SUSTAINABLE TECHNOLOGY

Terre Armee SUSTAINABLE TECHNOLOGY

Tierra Armada SUSTAINABLE TECHNOLOGY

OUR GROUP

We have been designing and supplying innovative geotechnical engineered structures and reinforced backfill solutions for more than half a century. With more than 100,000 structures completed around the world, our group sets the standard.

OUR VISION

Terre Armée rolls out its leading technologies to serve clients' projects, from the simplest to the most complex. Guided by our focus on innovation and our culture of excellence in client care, we offer suitable, durable solutions. We build on our global expertise, which is executed by our local companies, to develop new applications and to address the challenges of the future.

OUR BUSINESS LINES

Our technical solutions are defined by three functions corresponding to the application of the structure to be designed:
RETAIN, CROSS, PROTECT.

CROSSING STRUCTURES

To cross natural obstacles such as watercourses and valleys, or roads and railways, Terre Armée designs both overhead and underground crossing solutions. Our techniques are used to build all types of structures to meet the CROSS function, such as Reinforced Earth® bridge abutments for overhead crossings, as well as cut-and-cover TechSpan® tunnels, culverts and underpasses for below-grade crossings.

TECHSPAN® ARCHES OVERVIEW

TechSpan® is a buried precast concrete arch. It generally consists of half arch units that meet at the crown, supported by a footing sized for site specific conditions. The backfill around the arch contributes to the resistance of the entire structure, constraining lateral deflections of the arch under vertical loads (soil-structure interaction).

The span ranges from about 6m to more than 22m. Height ranges from about 30% to 70% of the span.

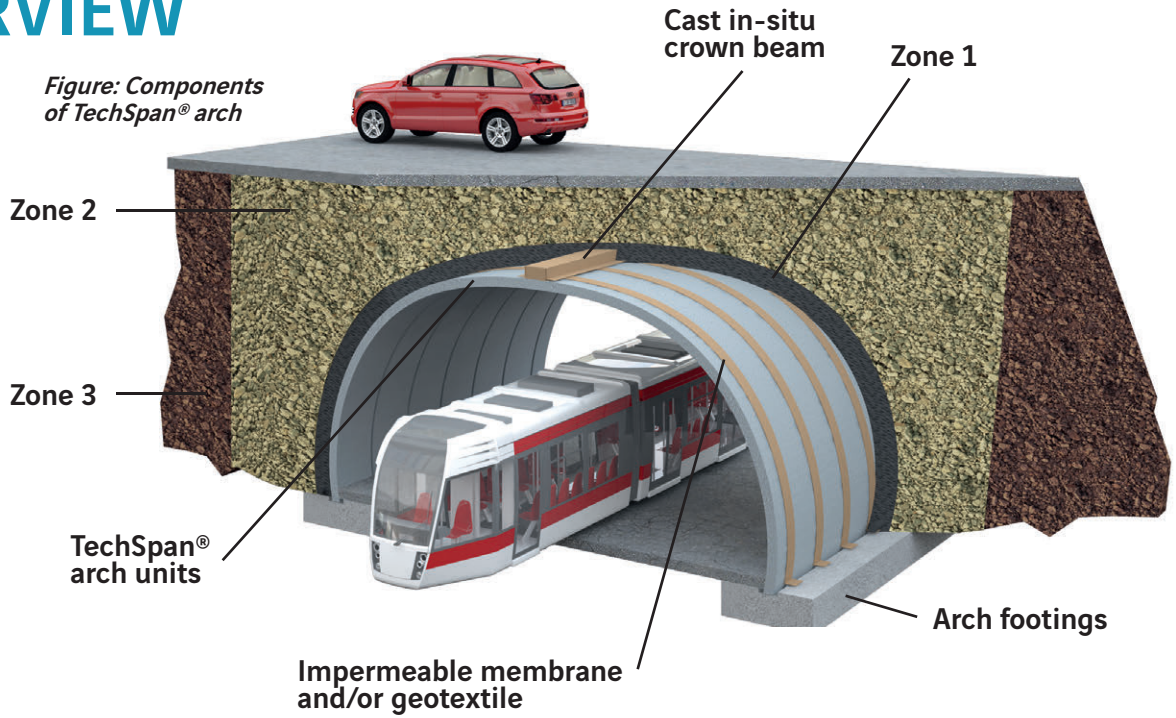
Its funicular curve minimizes the tensile forces in the arch, thus creating an axially compressed structure, leading to increased durability and costs savings.

TechSpan® technology results from decades of research and development. The system is designed to accommodate high fills, heavy live loads and altering loading conditions often associated with mining, industrial and railway applications.

This catalogue contains most of the common shapes suitable for roadways, railways and hydraulic applications.

With the support of sophisticated Finite Element Method (FEM) analyses, the loads on TechSpan® arches are verified for each step of construction including backfilling sequence.

Figure: Components of TechSpan® arch



The components defining a TechSpan® arch are the following:

- Arch footings (cast-in-place or precast);
- TechSpan® precast arch (male and female arch elements or single piece depending on the transportation limitations);
- Cast-in-situ crown beam (for longitudinal connection in the most cases, for stitching the crown in special cases where a 2 pin arch is required);
- Waterproofing whenever required or geotextile joint protection;
- The backfill (Zone 1, Zone 2 and Zone 3), placed and compacted in layers on both sides of the arch, complying with the Terre Armée Group specifications.

SCOPE AND USE OF THIS CATALOGUE

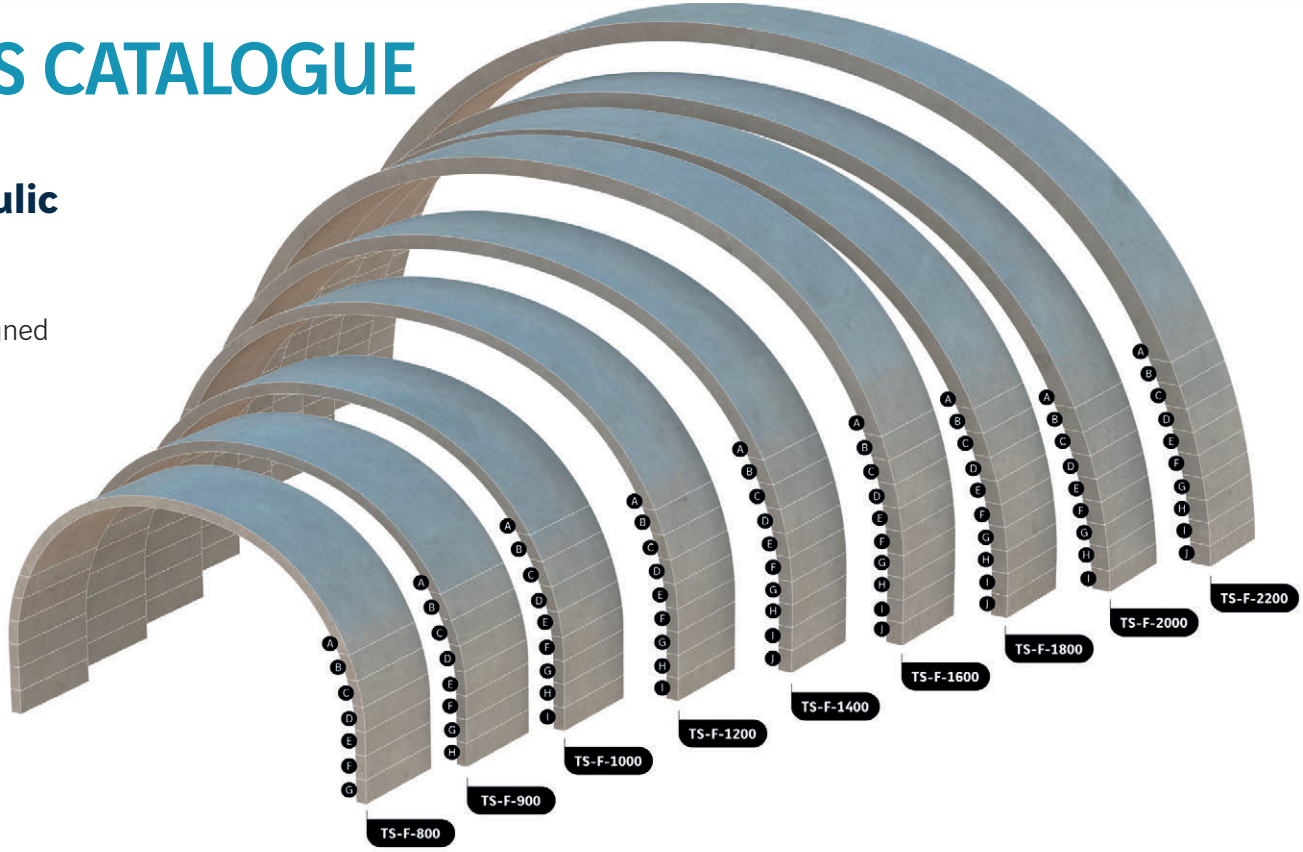
The present catalogue contains most standard shapes suitable for non-hydraulic and hydraulic applications.

All the shapes included in the catalogue have been pre-designed considering various parameters hereafter described.

The designs herein shall not be used for execution drawings.

There are 9 series of shapes, identified by TS-F_XXXX: TS for TechSpan arch, F for funicular shape, and XXXX refers to maximum span of each shape (in cm). For each TS-series, several heights can be identified using the subscript with letters from "A" (representing the minimum height of the arch) to "J" (maximum height of the arch).

For each product, the catalogue provides the main arch dimensions and the reactions at the footings for several load combinations and various backfill heights.



The reactions on foundation are given for the following load cases (refer to section Design Methodology):

- **Arch SW:** erection of the TechSpan® arch
- **BL:** permanent full backfill Load
- **LLA:** Live Loads axial
- **LLE:** Live Loads eccentric
- **SH:** 1.0 Seismic horizontal inertial load + 0.3 seismic vertical inertial load
- **SV:** 1.0 Seismic vertical inertial load + 0.3 seismic horizontal inertial load

These reactions, given with no load factor applied, can be used for a preliminary design of foundations. Except during for the erection stage, all reactions are given for 5 overfill heights over the crown (1m, 2m, 3m, 4m, 5m).

Hydraulic dimensions of TechSpan® shapes are given for the maximum flow rate.

In case you may not find an appropriate structure within presented shapes in this catalogue, contact our nearest office and we will assist you in developing the most optimal and tailor made structure for your project

DESIGN METHODOLOGY

This catalogue contains several pre-engineered series of shapes. Finite Element Model (FEM) analyses have been carried out for each shape using standard soil parameters for a preliminary evaluation of dimensions, internal stresses and reaction on footings.

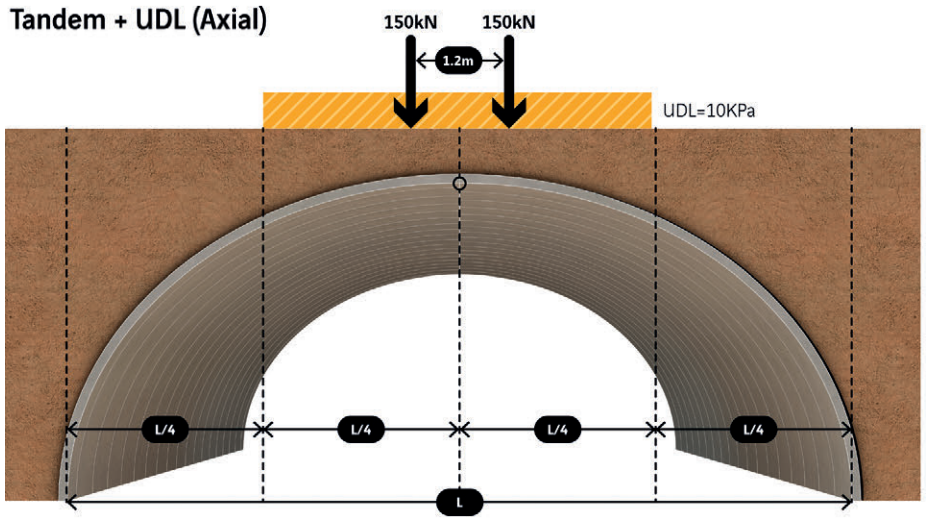
Calculations are carried out for different backfill heights over the crown (ie.: 1m, 2m, 3m, 4m, 5m) and a 5% maximum transverse grade of backfill. A soil density of 20kN/m^3 with a friction angle of 30° is considered.

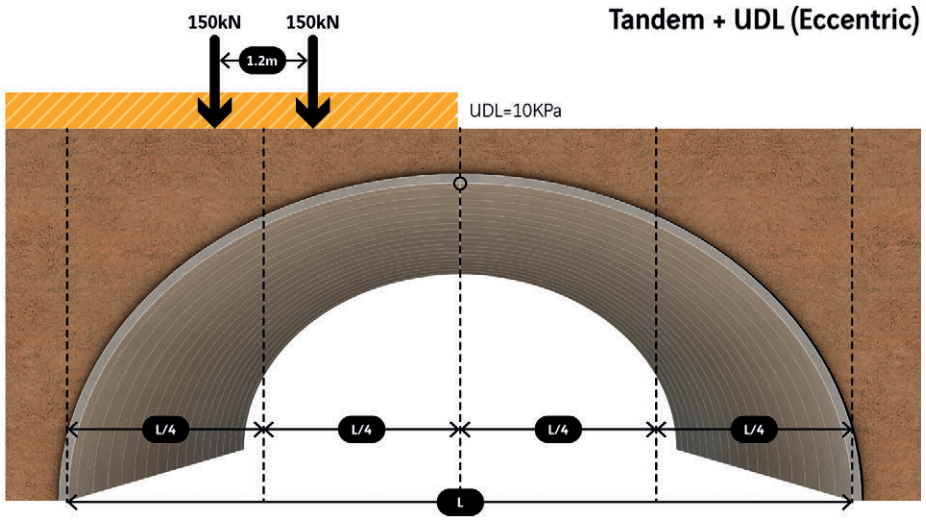
The analyses take into account all the construction stages, starting from the erection of the arch to full backfill height.

Two live load combinations are considered:
- an axial and eccentric tandem load
- an axial and eccentric distributed load (UDL)

Seismic loadings are considered with two combinations assuming a maximum design acceleration of 0.3g, the first combination with dominant horizontal inertial loads and the second one with dominant vertical inertial loads.

For the structural analysis, the following assumptions are taken:
- Concrete minimum characteristic cylinder/cube compressive strength of 30/37MPa
- Steel minimum yield strength 420MPa
- 40mm free cover





Further analysis needs to be carried out by the Terre Armée Group, for any other configuration, not covered in this catalogue.

Contact us to confirm compliance with local requirements

SYMBOLS AND DIMENSIONS

Span (S)

The span of the TechSpan® arch is the distance between the inner points of the legs at the base. The maximum span of each TS-series, expressed in cm, gives the name of the shape (for instance TS-F-800 series refers with the maximum span of 8 m).

Height (H)

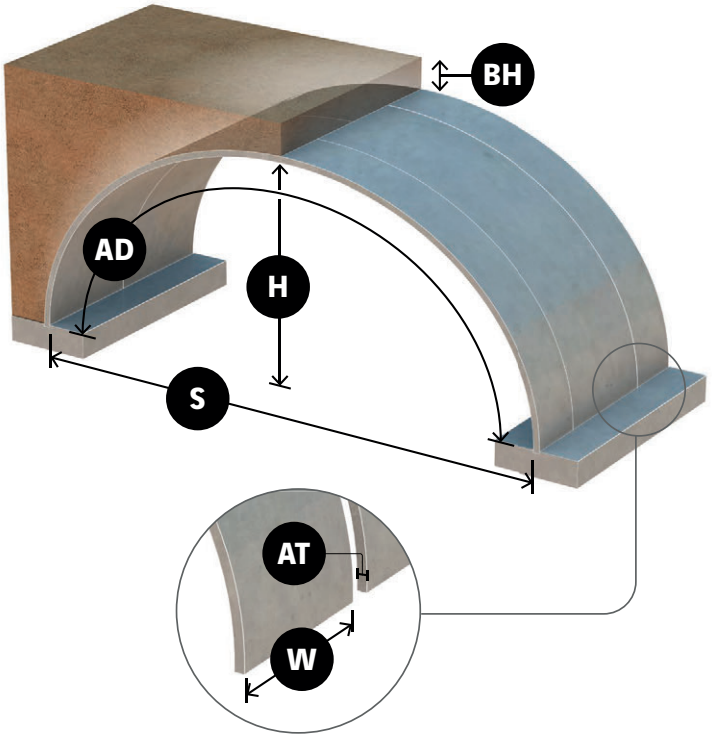
The height of the TechSpan® arch is the maximum vertical distance between the inner point at the crown and the base point of the legs. For each TS-series, the letters from "A" to "J" define different heights of the shape, with a difference in rise of 0,50m.

Arch Thickness (AT)

The thickness of the TechSpan® arch is constant along the arch development.

Width (W)

The weight of concrete elements is expressed in ton per unit width to easily identify the maximum weight and width of pieces according to local restrictions in terms of maximum dimensions and loads for regular transportation. Width is optimized on a project by project basis.

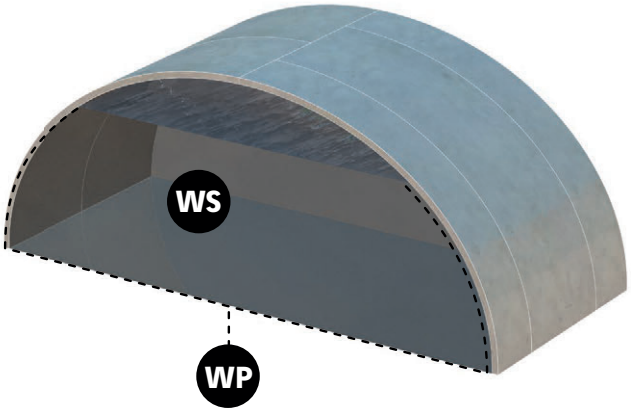


Arch Development (AD)

The arch development is the total length along a cross section from base to base of precast unit.

Backfill Height Over crown (BH)

The backfill height is the vertical distance between the finished grade and top of the crown at the centerline of the arch.
The catalogue covers heights from 1 to 5 meters.



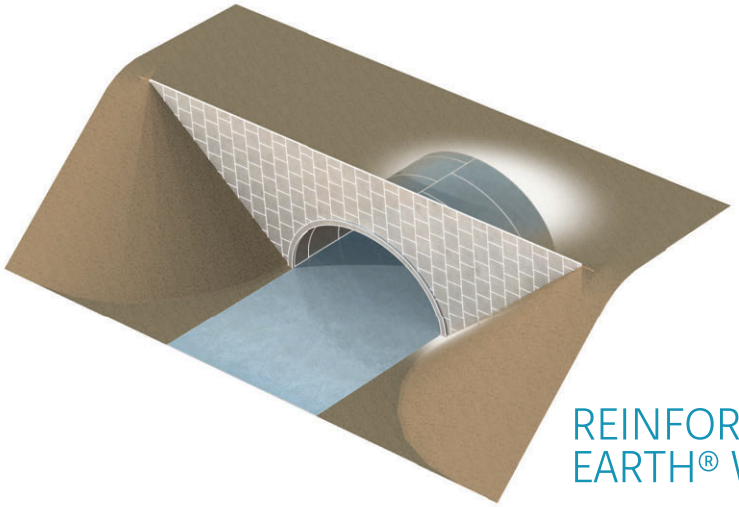
Wet Surface (WS)

Used for hydraulic application of TechSpan®, the wet surface is the cross sectional area of water flow delimited by the water table and the horizontal line connecting the 2 lower points of the arch legs. For the estimation of the wet surface, a minimum freeboard of 1m between the inner crown point and the water table is considered.

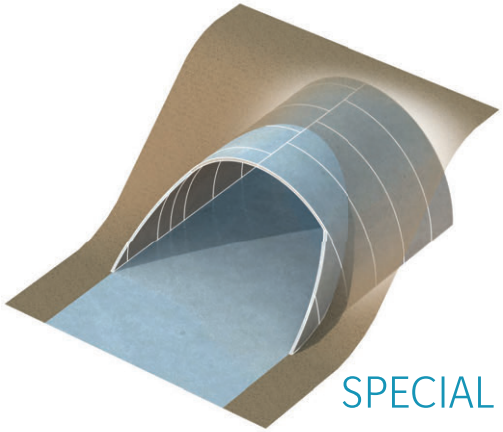
Wet Perimeter (WP)

Used for hydraulic application of TechSpan®, the wet perimeter is the sum of the lengths of each side of the wet surface, excluding the water table, inside of the 2 arch units, and the horizontal line connecting the base of those units.
For the estimation of the wet perimeter, a minimum freeboard of 1m between the inner crown point and the water table is also considered.

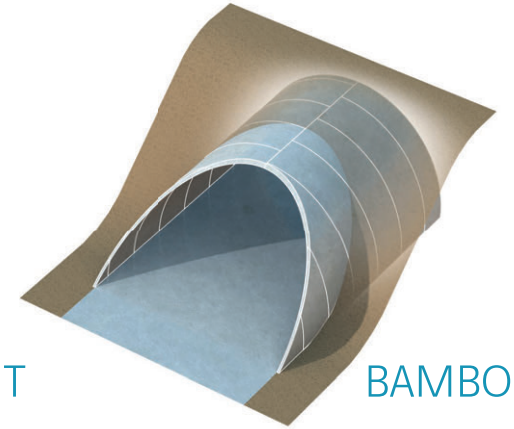
TECHSPAN® END CONFIGURATIONS



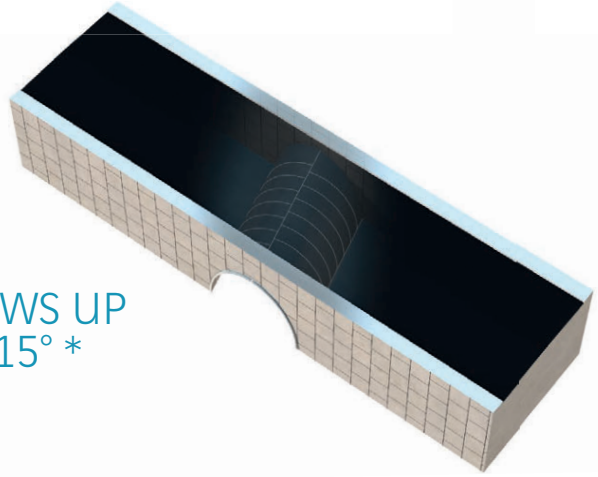
REINFORCED EARTH® WALL



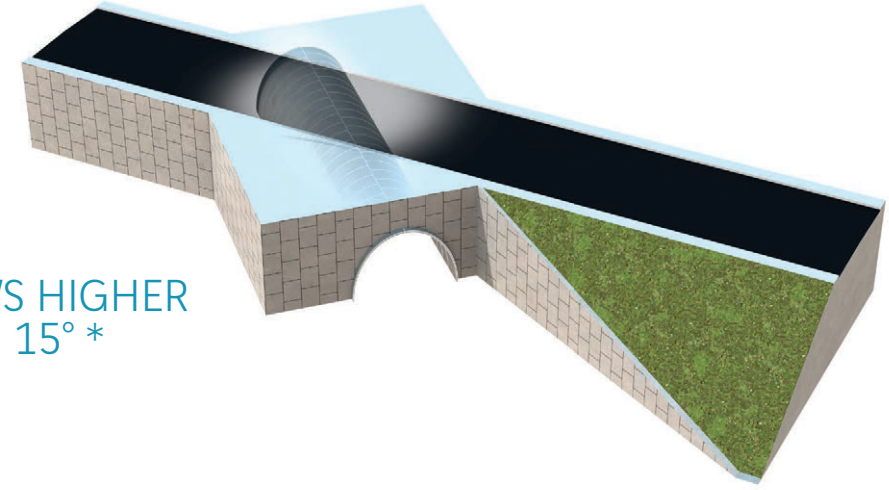
SPECIAL CUT



BAMBOO CUT



SKEWS UP TO 15° *



SKEWS HIGHER THAN 15° *

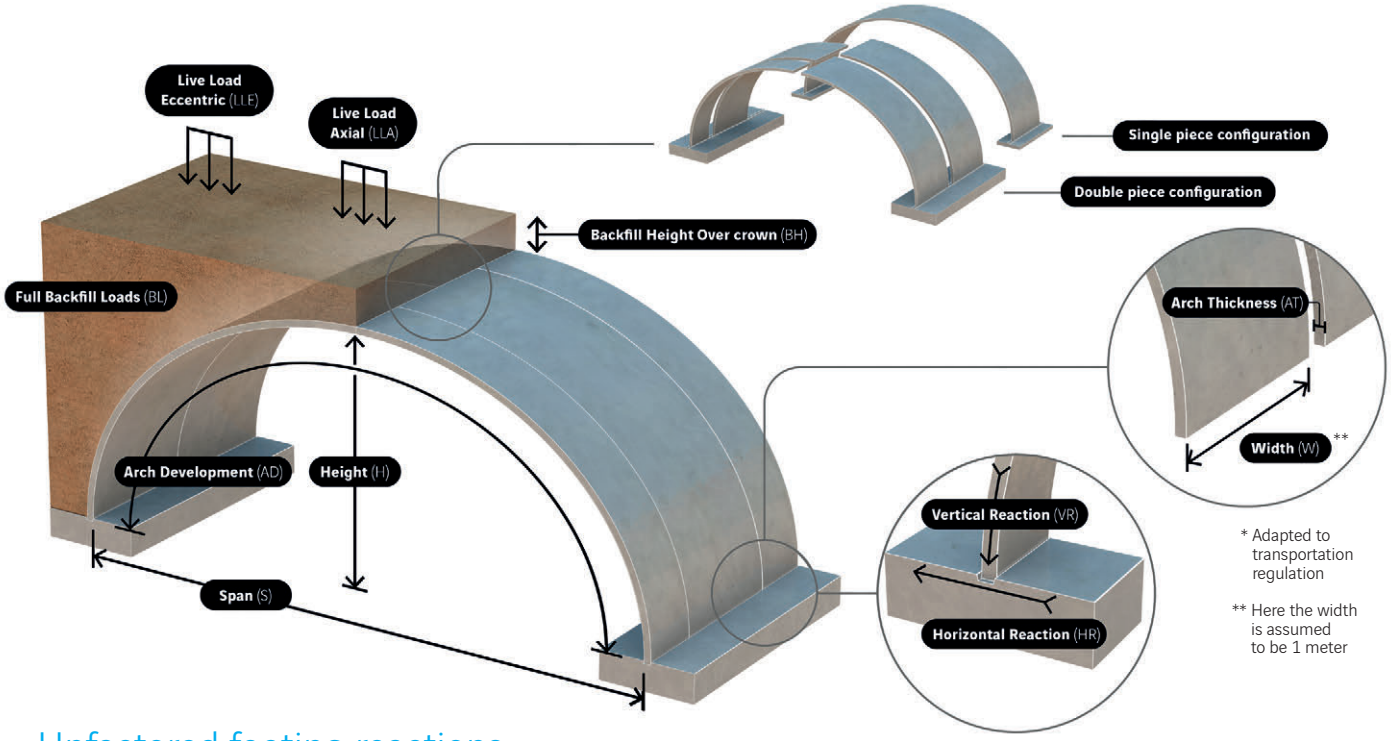
* This value depends on span and standard segment width.

Contact us to confirm compliance with local requirements

Shapes

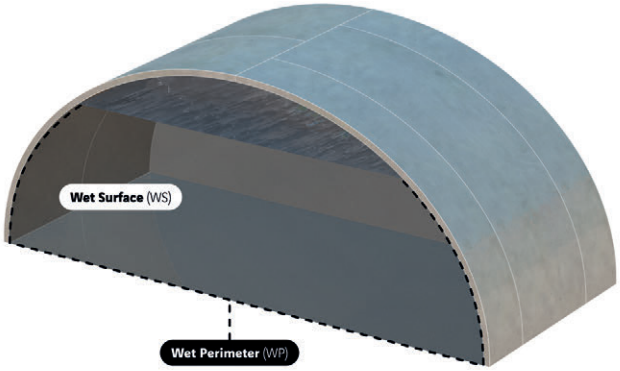
Main dimensions

Arch configuration (piece)	Single
Span - S (m)	7,35
Height - H (m)	2,15
Arch Thickness - AT (mm)	200
Arch Development - AD (m)	9,35
Element Weight per unit width (ton/m)	4,68



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	7,63
Wet perimeter* WP (m)	10,21

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_800/A reactions (kN/m)	Arch SW*	18	24	18	24	18	24	18	24	18	24
	BL	72	140	124	222	177	304	228	386	279	468
	LLA	210	297	245	359	274	415	303	474	336	537
	LLE	194	306	218	347	262	405	308	483	352	559
	SH**	97	161	178	265	252	367	326	469	398	573
	SV**	89	171	157	272	225	375	292	476	357	577

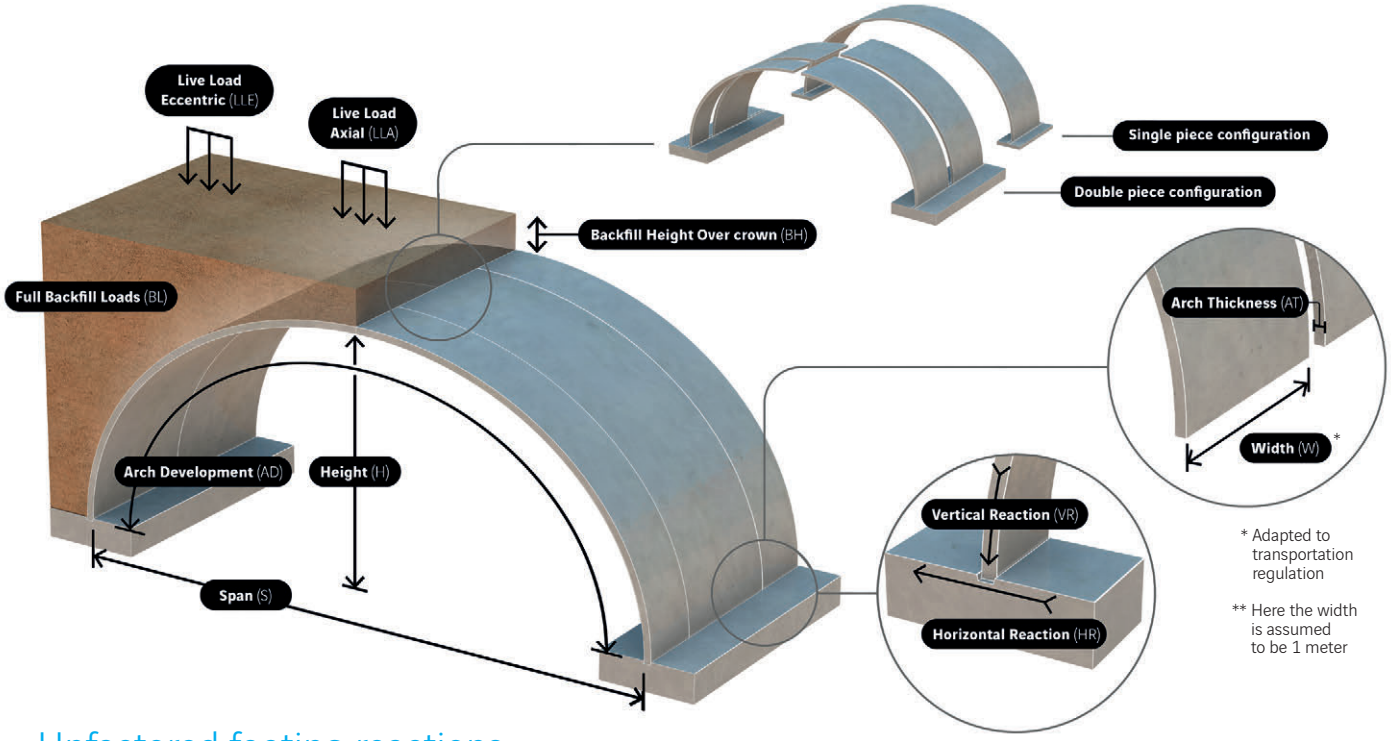
* Arch SW stands for arch self weight

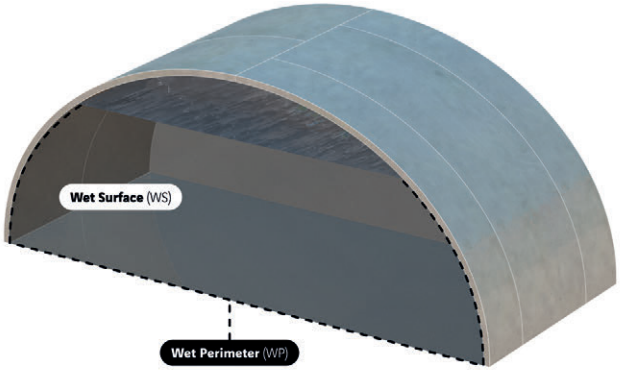
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Single
Span - S (m)	7,72
Height - H (m)	2,65
Arch Thickness - AT (mm)	200
Arch Development - AD (m)	10,41
Element Weight per unit width (ton/m)	5,21





Hydraulic waterways

Wet surface - WS (m^2)	11,41
Wet perimeter* WP (m)	11,64

* dimensions given for 1 meter freeboard

Unfactored footing reactions

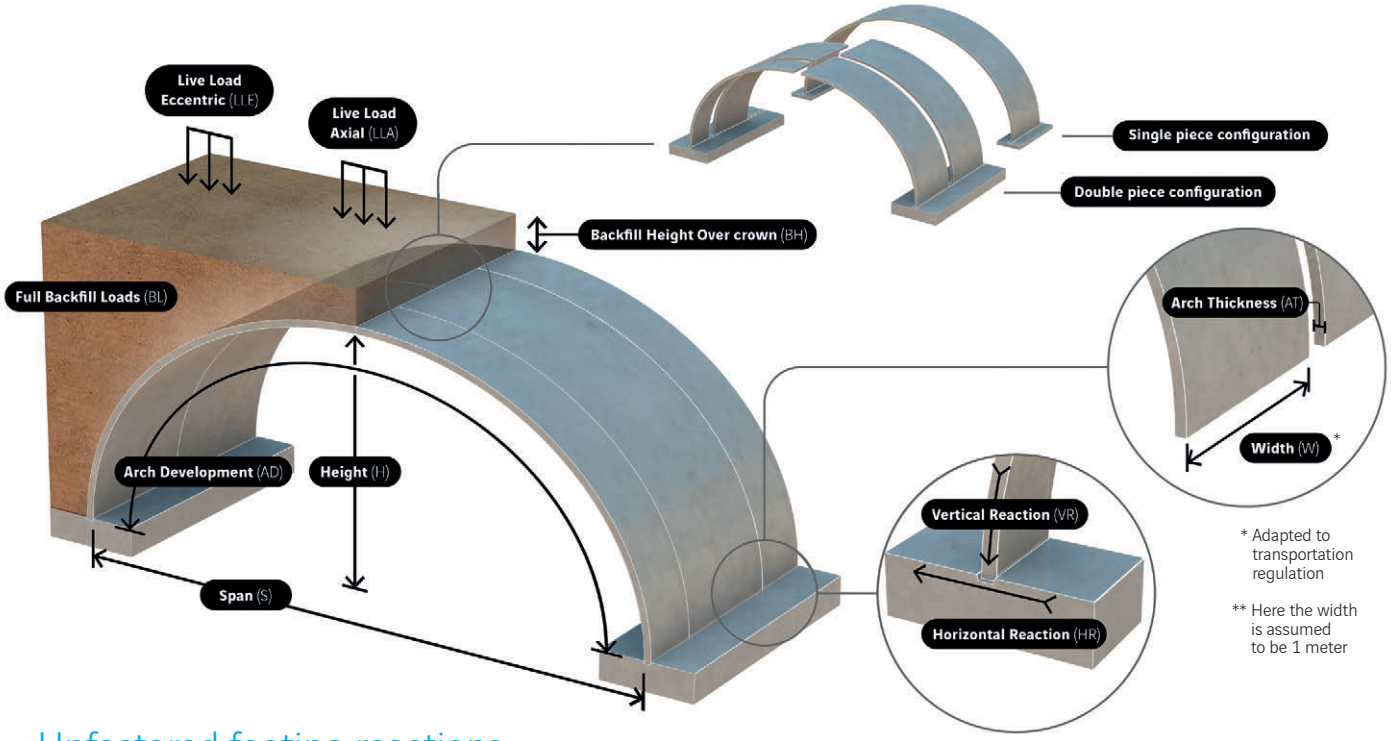
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_800/B reactions (kN/m)	Arch SW*	16	29	16	29	16	29	16	29	16	29
	BL	50	163	95	255	138	348	181	441	224	535
	LLA	155	321	187	396	214	464	242	535	271	609
	LLE	157	346	175	396	197	457	241	534	281	625
	SH**	75	180	136	290	197	402	260	518	317	627
	SV**	69	199	124	311	179	425	234	539	287	651

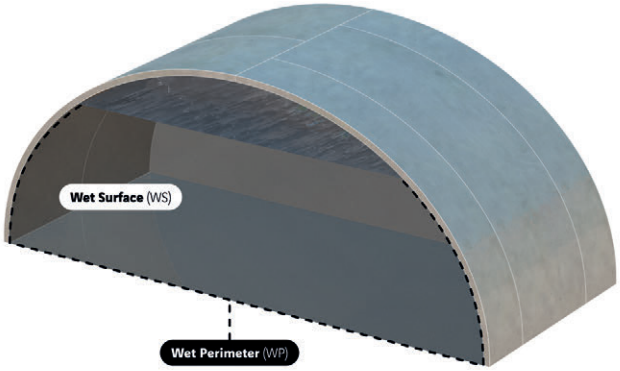
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	7,93
Height - H (m)	3,15
Arch Thickness - AT (mm)	200
Arch Development - AD (m)	11,43
Element Weight per unit width (ton/m)	2,86





Hydraulic waterways

Wet surface - WS (m^2)	15,33
Wet perimeter* WP (m)	12,88

* dimensions given for 1 meter freeboard

Unfactored footing reactions

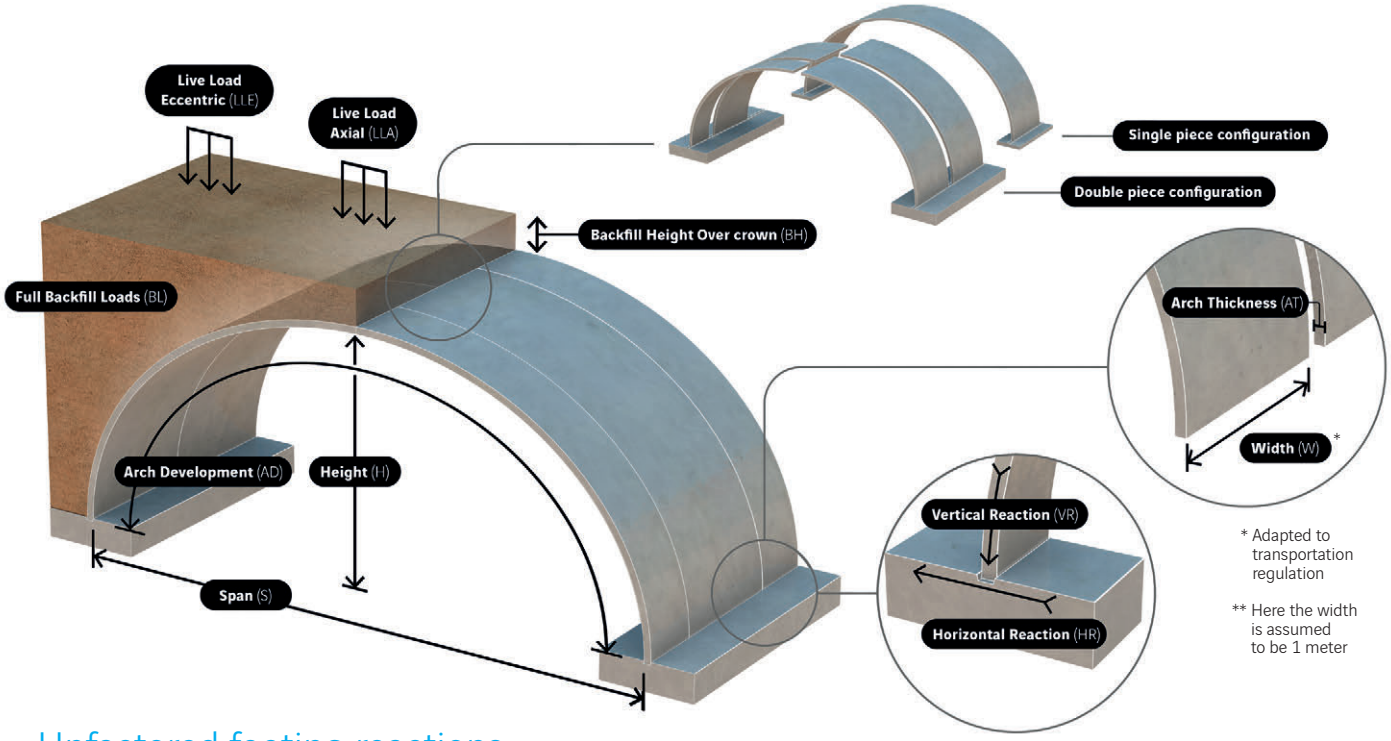
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_800/C reactions (kN/m)	Arch SW*	15	31	15	31	15	31	15	31	15	31
	BL	24	170	54	264	84	360	114	456	144	551
	LLA	94	321	116	396	138	472	159	550	181	631
	LLE	107	363	121	422	137	486	155	556	184	635
	SH**	38	179	82	287	126	398	173	516	215	628
	SV**	36	207	75	321	114	436	154	554	192	669

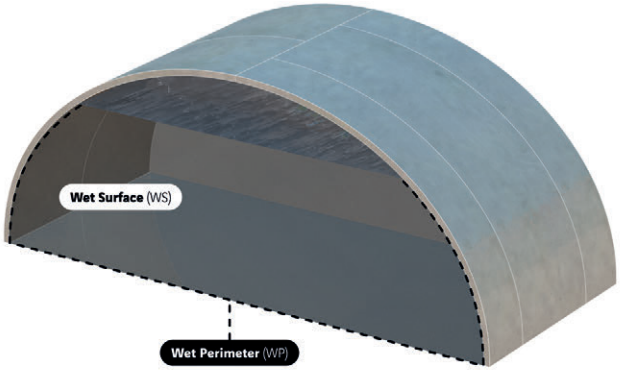
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	8,00
Height - H (m)	3,65
Arch Thickness - AT (mm)	200
Arch Development - AD (m)	12,44
Element Weight per unit width (ton/m)	3,11





Hydraulic waterways

Wet surface - WS (m^2)	19,32
Wet perimeter* WP (m)	13,95

* dimensions given for 1 meter freeboard

Unfactored footing reactions

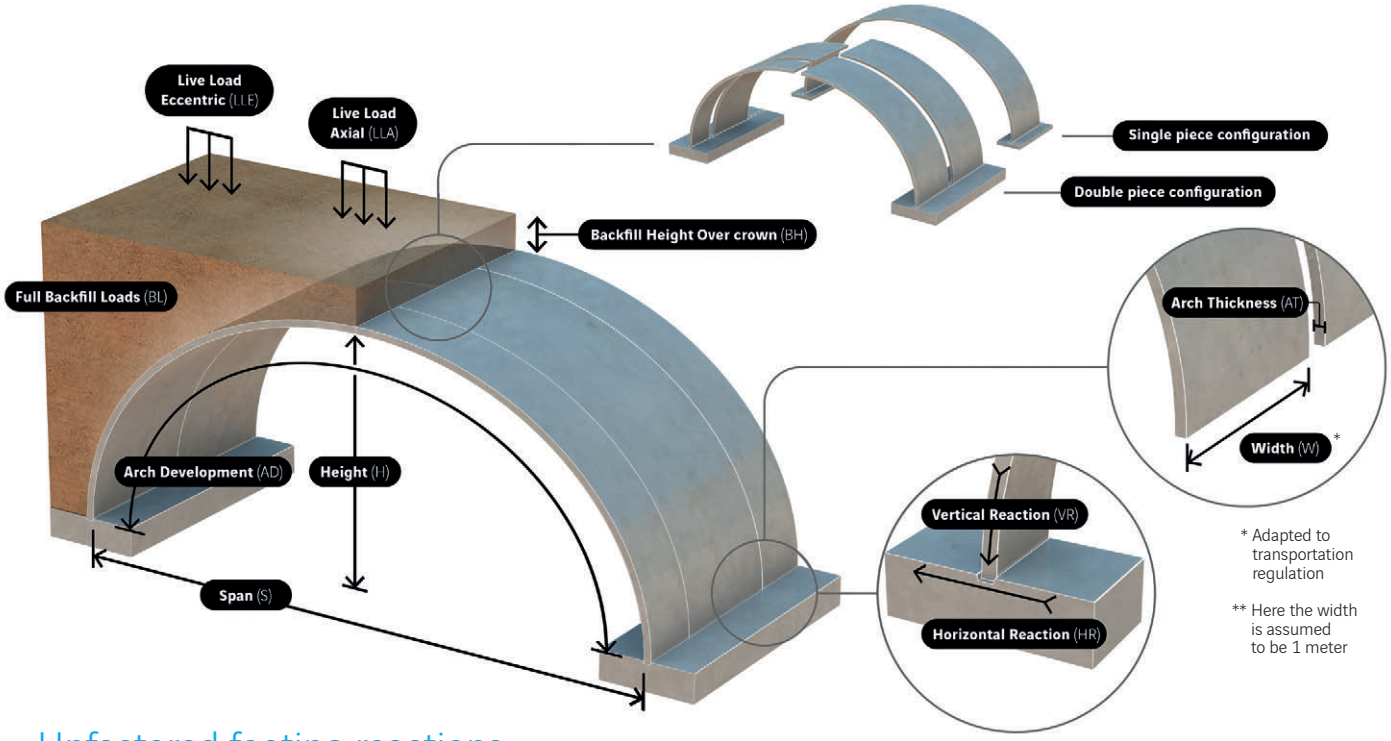
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_800/D reactions (kN/m)	Arch SW*	13	35	13	35	13	35	13	35	13	35
	BL	2	181	15	277	32	374	49	473	66	571
	LLA	38	322	51	402	63	482	75	565	87	649
	LLE	50	382	56	444	64	512	74	585	85	661
	SH**	32	208	24	303	62	397	93	513	117	625
	SV**	7	228	10	340	29	452	77	568	98	685

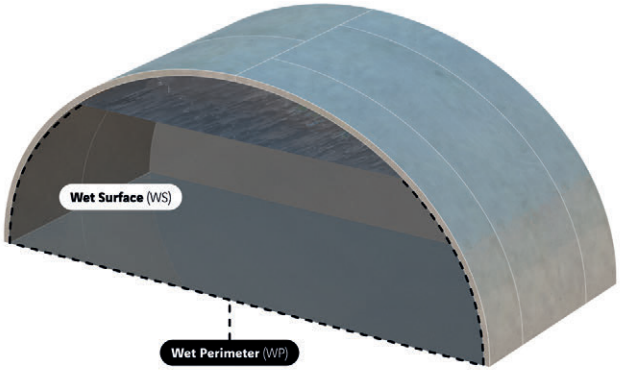
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	8,00
Height - H (m)	4,15
Arch Thickness - AT (mm)	200
Arch Development - AD (m)	13,44
Element Weight per unit width (ton/m)	3,36





Hydraulic waterways

Wet surface - WS (m^2)	23,32
Wet perimeter* WP (m)	14,95

* dimensions given for 1 meter freeboard

Unfactored footing reactions

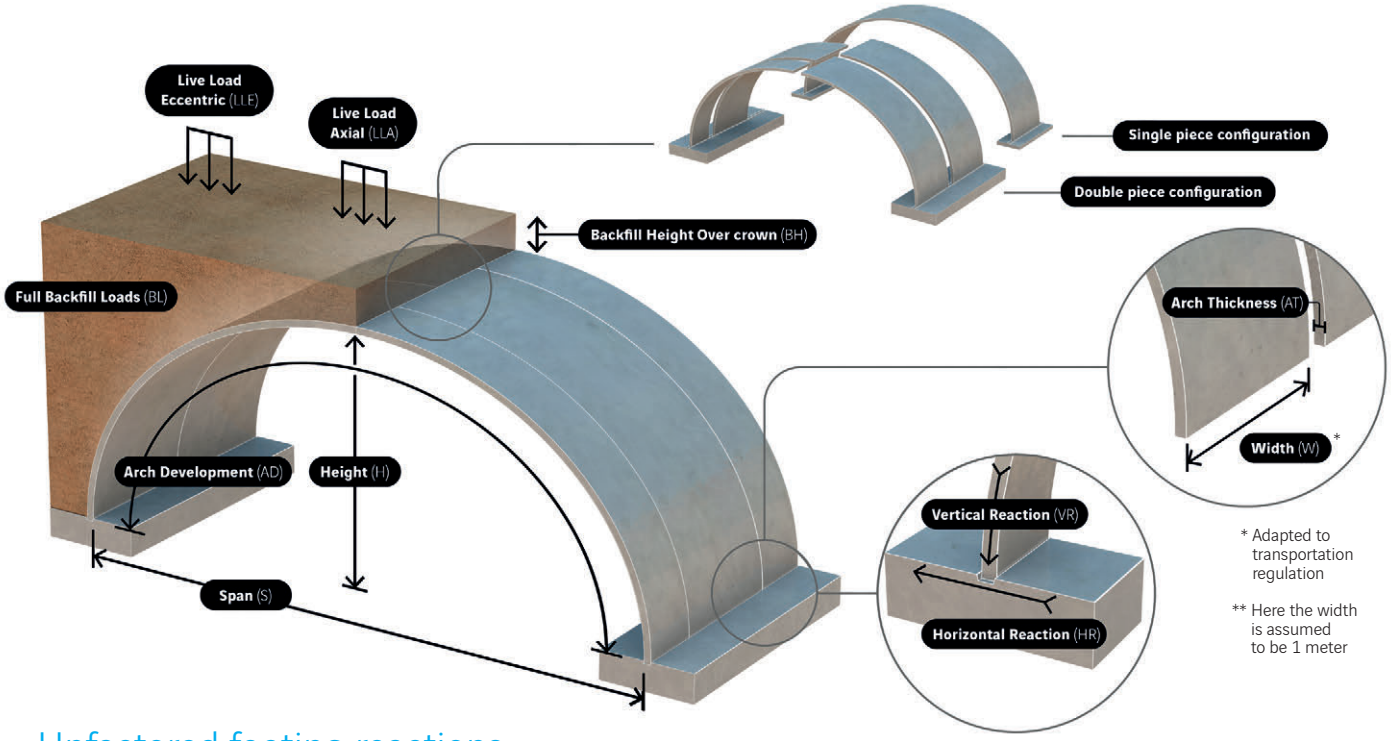
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_800/E reactions (kN/m)	Arch SW*	11	36	11	36	11	36	11	36	11	36
	BL	-22	185	-16	277	-10	373	-4	468	1	563
	LLA	-8	308	-2	386	3	468	7	550	11	633
	LLE	3	375	3	437	5	505	7	576	10	651
	SH**	-52	229	-49	323	-46	418	-43	515	-37	606
	SV**	-31	240	-25	348	-19	459	-12	570	-6	677

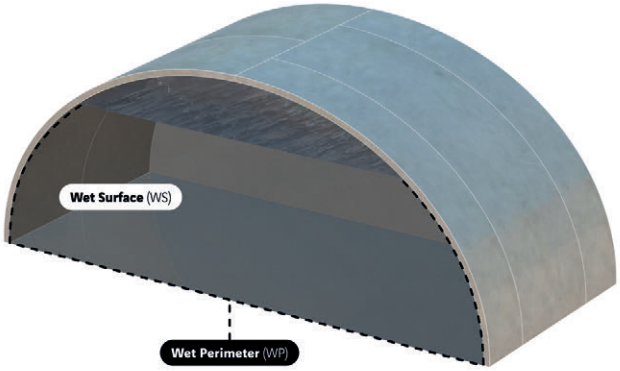
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	8,00
Height - H (m)	4,65
Arch Thickness - AT (mm)	200
Arch Development - AD (m)	14,44
Element Weight per unit width (ton/m)	3,61





Hydraulic waterways

Wet surface - WS (m^2)	27,32
Wet perimeter* WP (m)	15,95

* dimensions given for 1 meter freeboard

Unfactored footing reactions

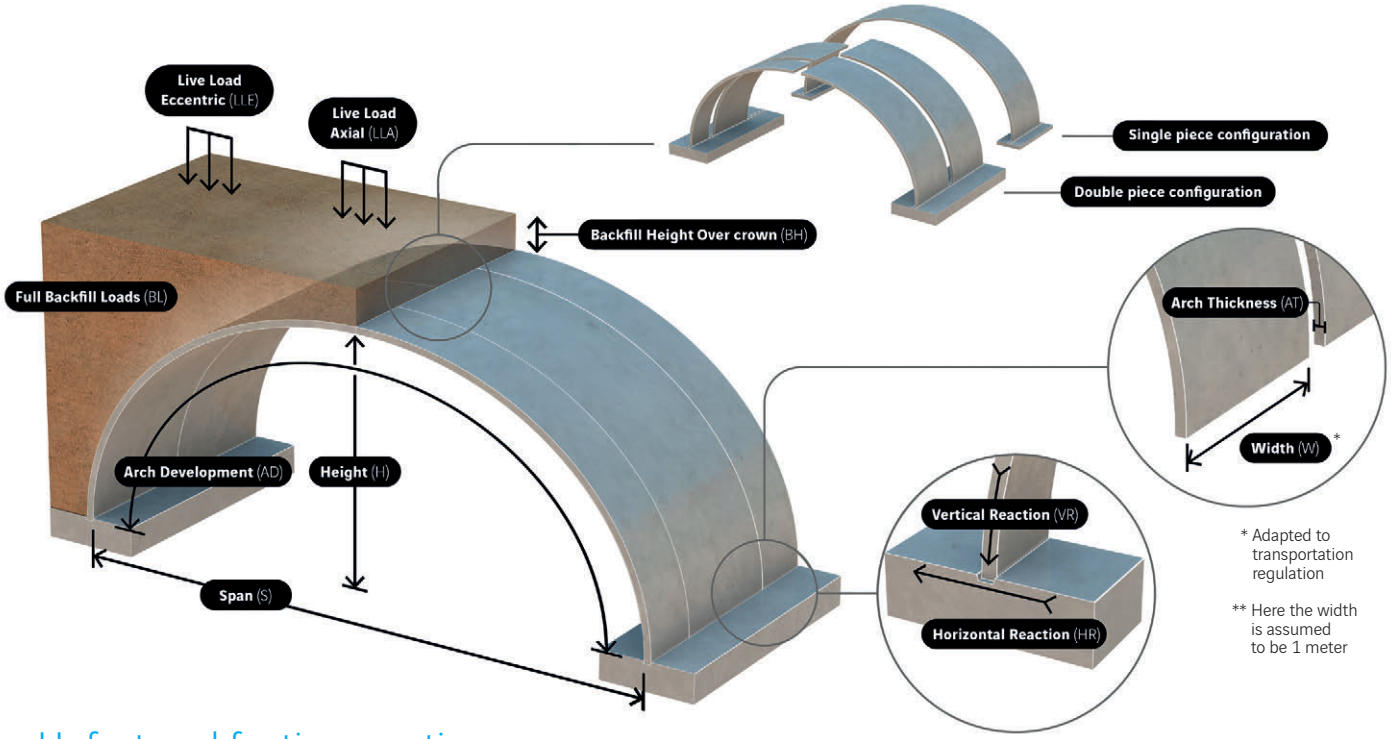
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_800/F reactions (kN/m)	Arch SW*	10	38	10	38	10	38	10	38	10	38
	BL	-29	179	-30	277	-30	375	-38	484	-39	583
	LLA	-35	308	-34	393	-34	476	-35	562	-36	651
	LLE	-21	379	-24	446	-26	515	-28	591	-30	668
	SH**	-64	245	-69	350	-71	454	-75	554	-77	654
	SV**	-41	246	-43	362	-44	478	-46	593	-47	706

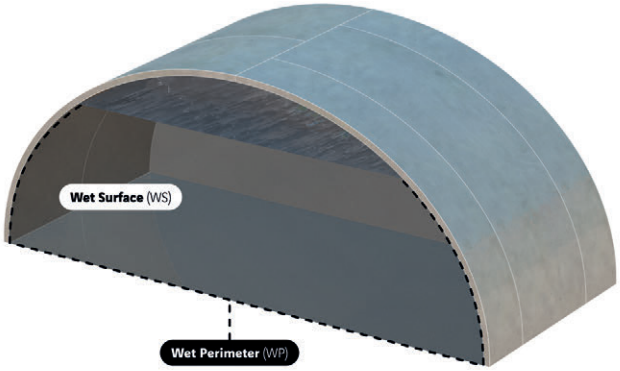
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	8,00
Height - H (m)	5,15
Arch Thickness - AT (mm)	200
Arch Development - AD (m)	15,44
Element Weight per unit width (ton/m)	3,86





Hydraulic waterways

Wet surface - WS (m^2)	31,32
Wet perimeter* WP (m)	16,95

* dimensions given for 1 meter freeboard

Unfactored footing reactions

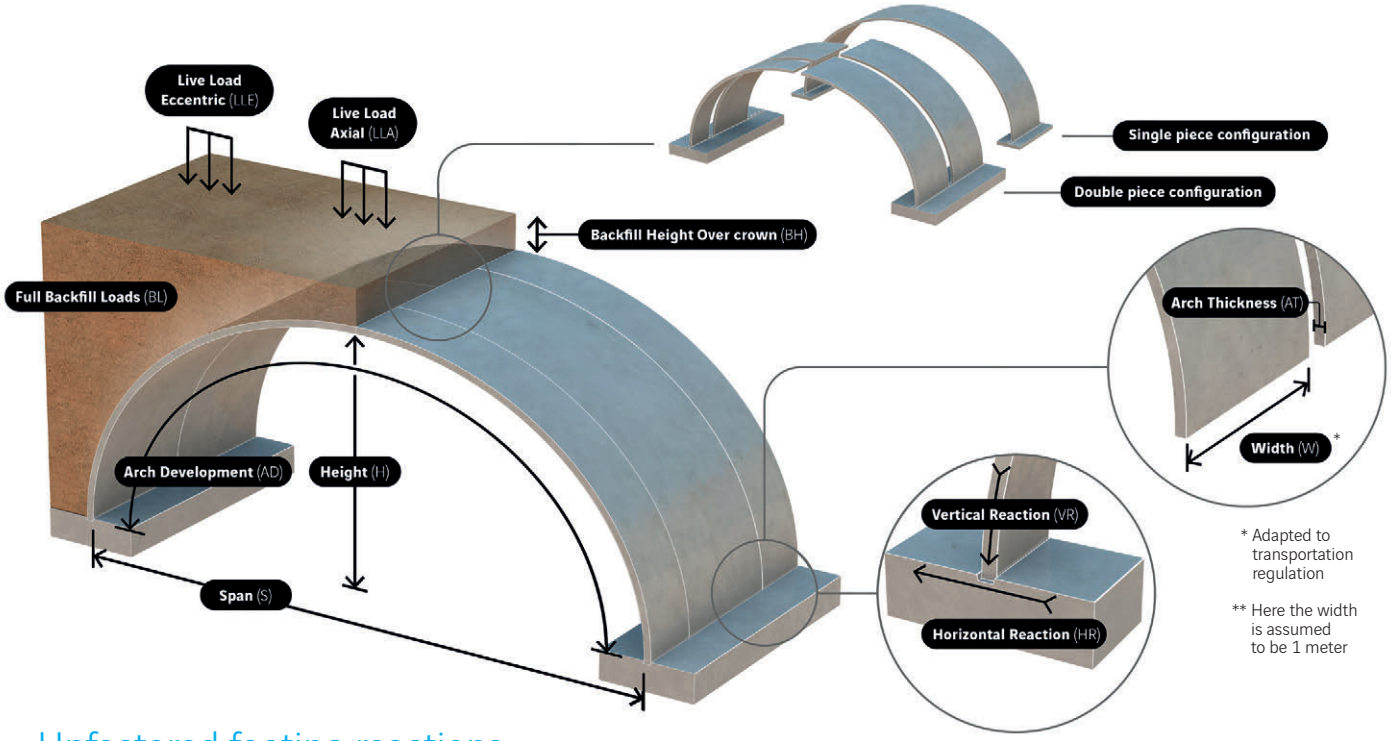
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_800/G reactions (kN/m)	Arch SW*	9	39	9	39	9	39	9	39	9	39
	BL	-46	203	-50	295	-53	391	-56	489	-59	588
	LLA	-50	308	-51	390	-54	474	-56	563	-59	652
	LLE	-42	379	-46	445	-50	516	-53	592	-57	671
	SH**	-82	271	-87	370	-92	473	-97	575	-99	675
	SV**	-57	262	-61	377	-66	491	-70	606	-73	720

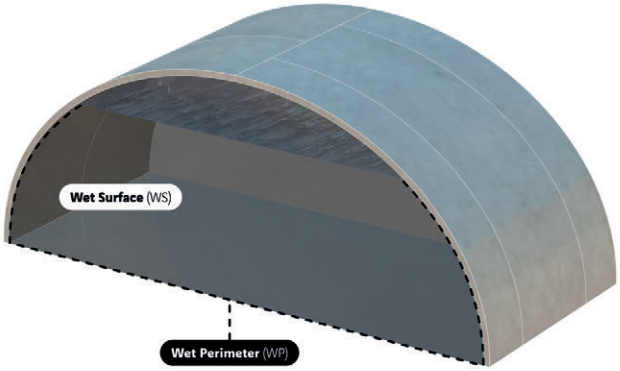
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Single
Span - S (m)	7,88
Height - H (m)	2,00
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	9,63
Element Weight per unit width (ton/m)	5,42





Hydraulic waterways

Wet surface - WS (m^2)	7,12
Wet perimeter* WP (m)	10,53

* dimensions given for 1 meter freeboard

Unfactored footing reactions

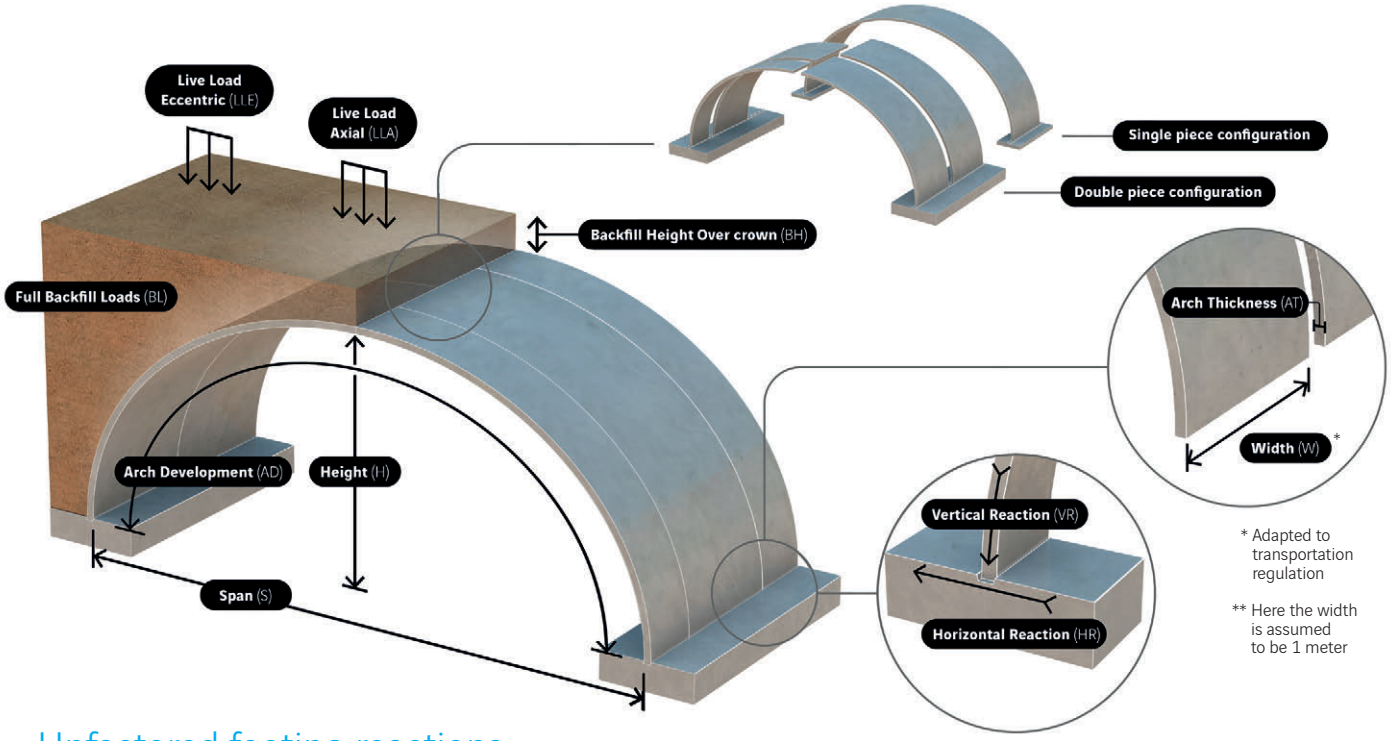
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/A reactions (kN/m)	Arch SW*	25	29	25	29	25	29	25	29	25	29
	BL	102	154	169	240	234	326	298	411	360	495
	LLA	281	321	322	383	362	446	401	510	439	575
	LLE	213	252	285	348	351	439	410	524	463	602
	SH**	150	181	249	292	344	401	435	506	522	608
	SV**	129	188	216	297	301	403	382	508	461	611

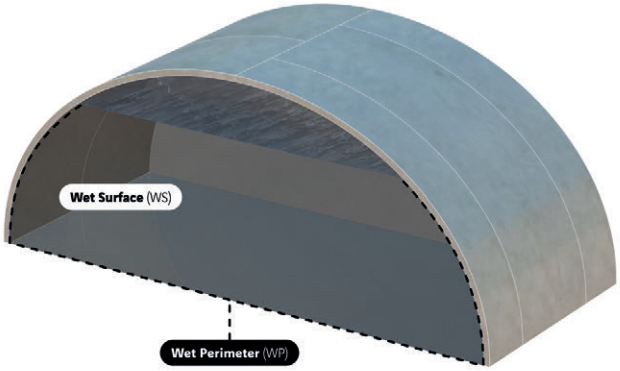
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Single
Span - S (m)	8,38
Height - H (m)	2,50
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	10,74
Element Weight per unit width (ton/m)	6,04





Hydraulic waterways

Wet surface - WS (m^2)	11,20
Wet perimeter* WP (m)	12,15

* dimensions given for 1 meter freeboard

Unfactored footing reactions

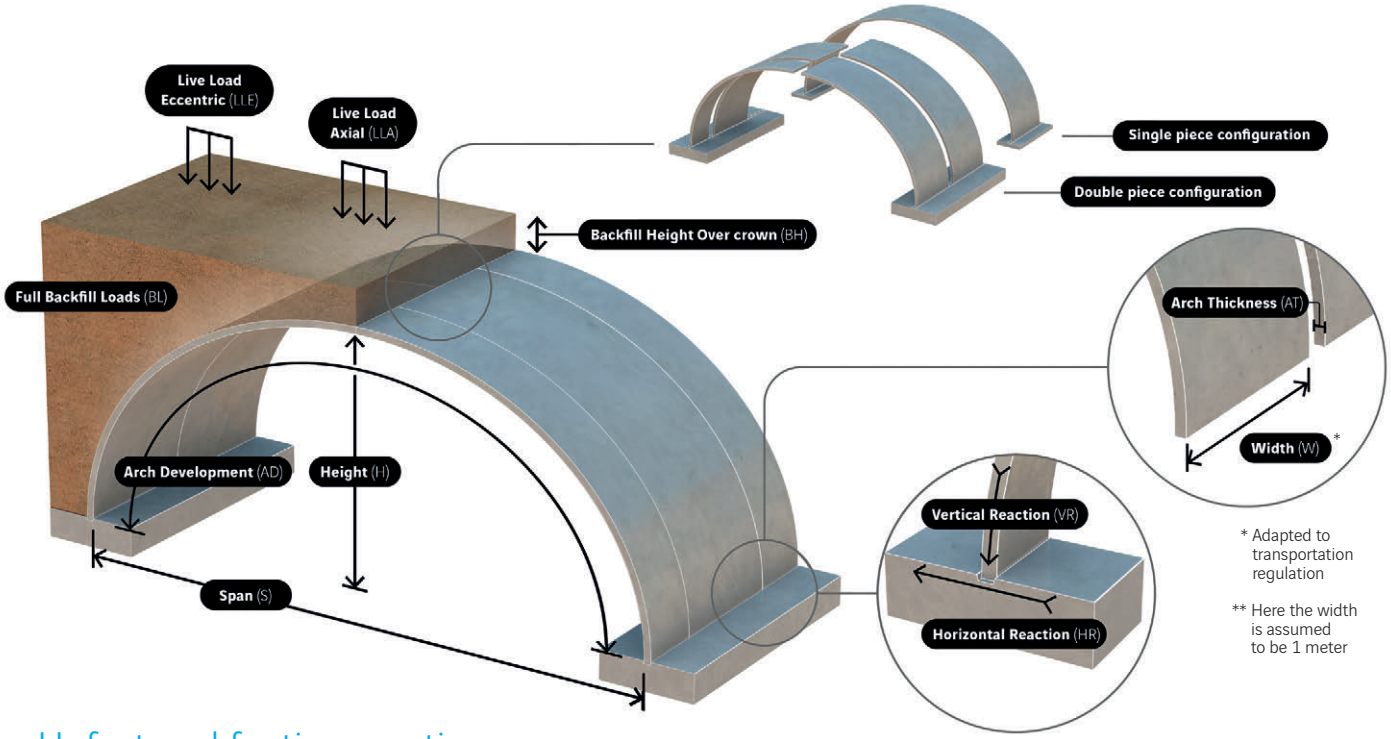
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/B reactions (kN/m)	Arch SW*	23	32	23	32	23	32	23	32	23	32
	BL	89	176	150	272	209	367	269	463	327	559
	LLA	232	343	276	419	318	494	358	569	395	644
	LLE	198	297	248	393	300	486	354	577	410	666
	SH**	122	196	210	317	296	437	380	554	462	670
	SV**	110	213	189	333	266	451	342	569	416	685

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

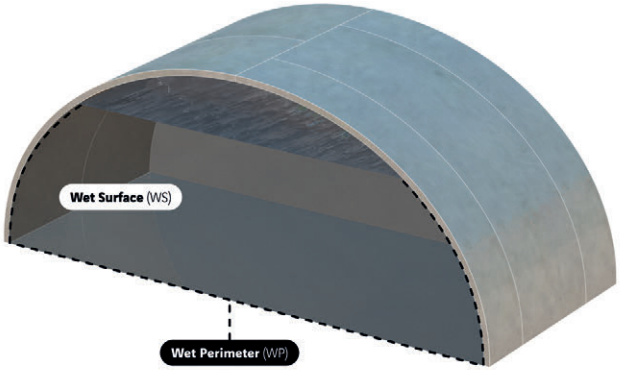
Main dimensions

Arch configuration (piece)	Single
Span - S (m)	8,73
Height - H (m)	3,00
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	11,80
Element Weight per unit width (ton/m)	6,64



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	15,48
Wet perimeter* WP (m)	13,55

* dimensions given for 1 meter freeboard

Unfactored footing reactions

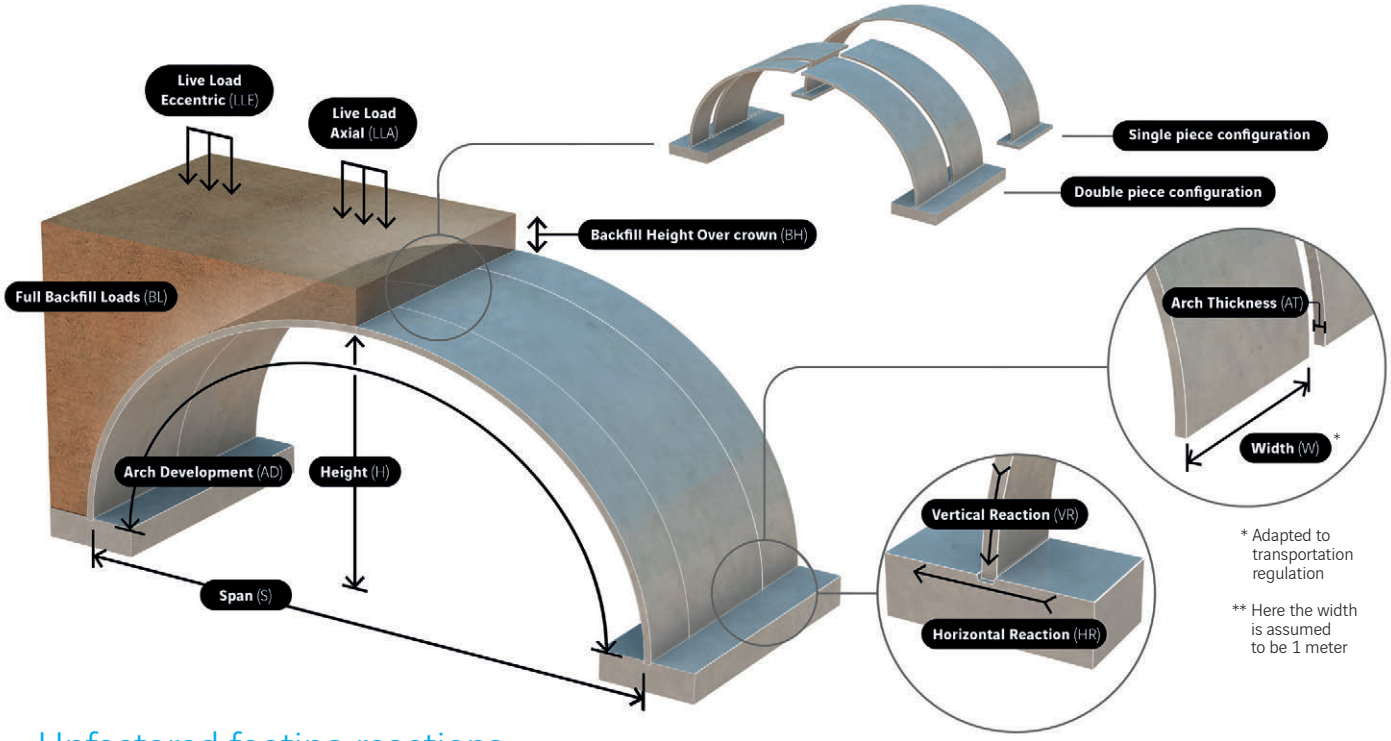
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/C reactions (kN/m)	Arch SW*	22	35	22	35	22	35	22	35	22	35
	BL	68	191	122	291	175	392	227	494	279	597
	LLA	177	344	220	429	261	513	300	598	338	682
	LLE	191	385	214	445	247	516	290	599	343	692
	SH**	89	201	163	321	235	443	308	567	379	691
	SV**	88	228	154	351	221	475	287	599	352	724

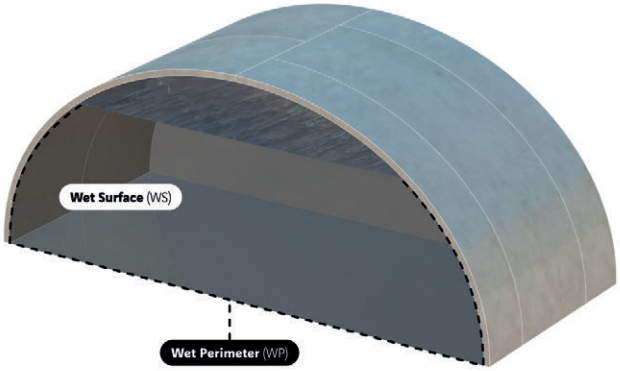
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	8,93
Height - H (m)	3,50
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	12,82
Element Weight per unit width (ton/m)	3,61





Hydraulic waterways

Wet surface - WS (m^2)	19,90
Wet perimeter* WP (m)	14,77

* dimensions given for 1 meter freeboard

Unfactored footing reactions

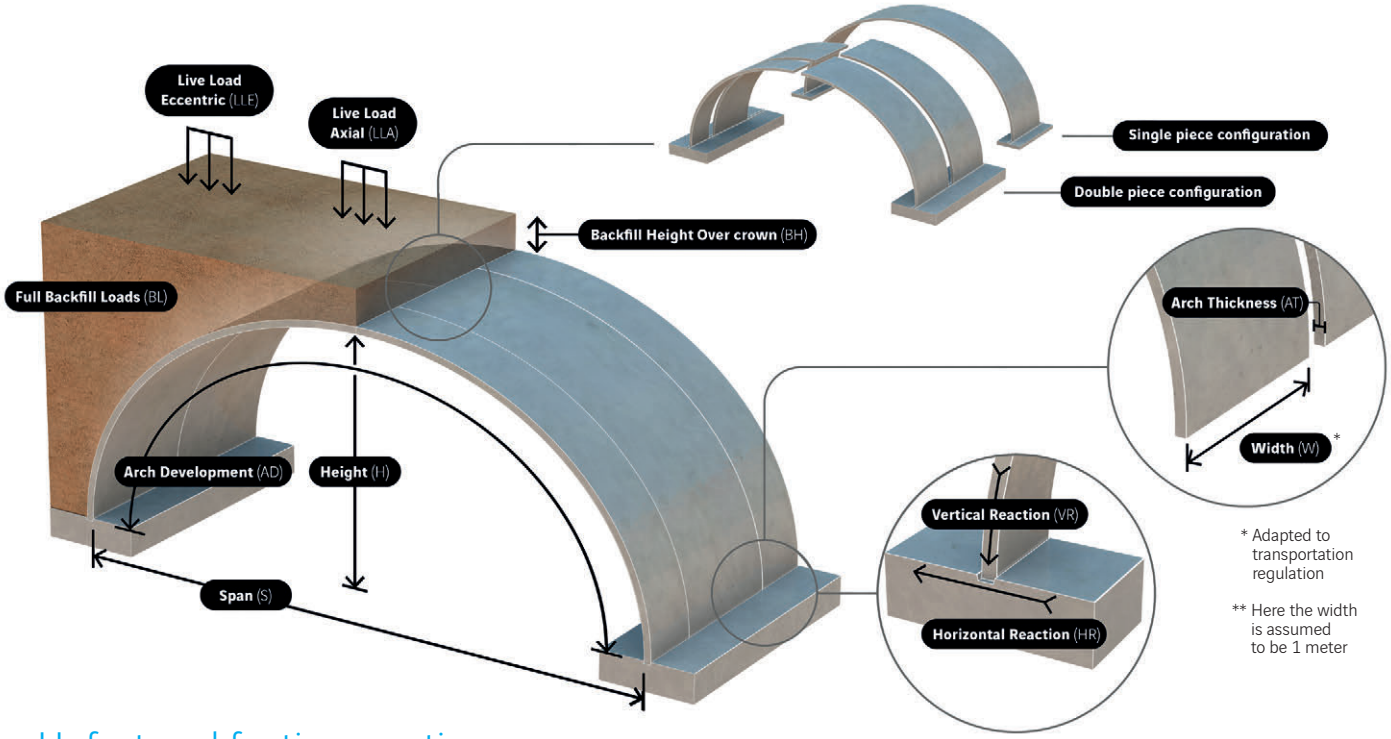
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/D reactions (kN/m)	Arch SW*	19	39	19	39	19	39	19	39	19	39
	BL	31	205	65	310	99	416	132	522	165	627
	LLA	102	354	129	444	155	534	181	625	205	715
	LLE	117	408	136	482	157	558	178	639	202	722
	SH**	-1	209	73	329	138	454	193	582	239	714
	SV**	43	245	86	373	130	502	173	631	216	760

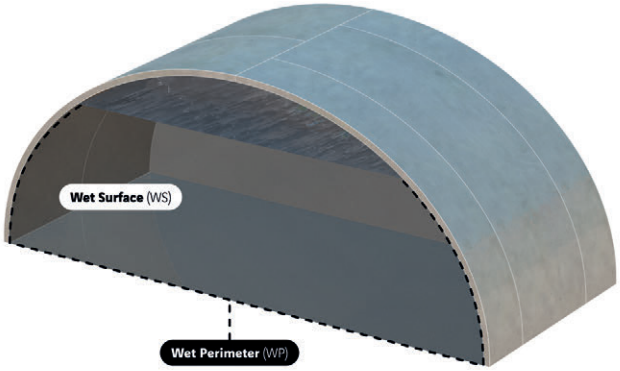
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	9,00
Height - H (m)	4,00
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	13,82
Element Weight per unit width (ton/m)	3,89





Hydraulic waterways

Wet surface - WS (m^2)	24,39
Wet perimeter* WP (m)	15,85

* dimensions given for 1 meter freeboard

Unfactored footing reactions

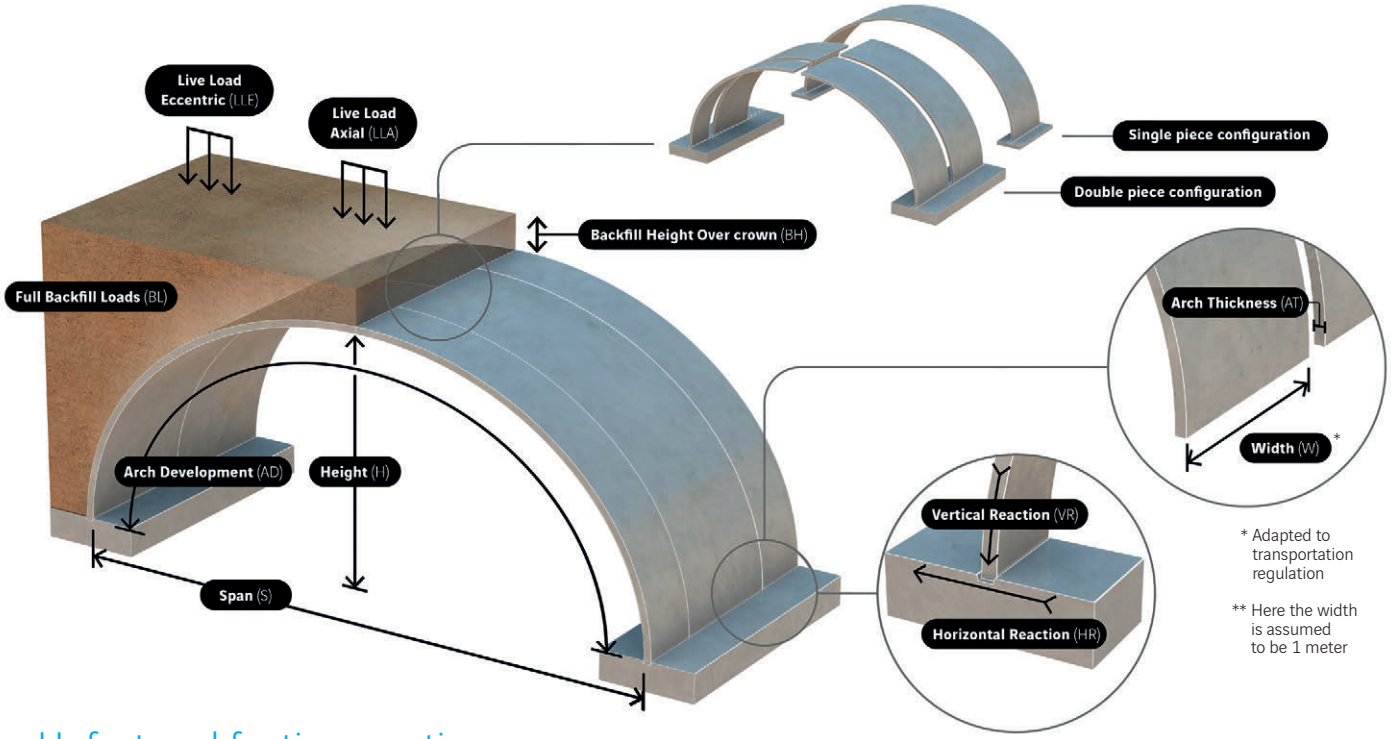
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/E reactions (kN/m)	Arch SW*	16	44	16	44	16	44	16	44	16	44
	BL	5	208	24	312	44	416	63	522	82	628
	LLA	46	343	62	434	77	526	92	617	107	710
	LLE	59	414	69	487	79	564	91	644	104	729
	SH**	-29	235	5	346	34	459	59	573	79	688
	SV**	3	262	27	385	51	508	74	632	97	757

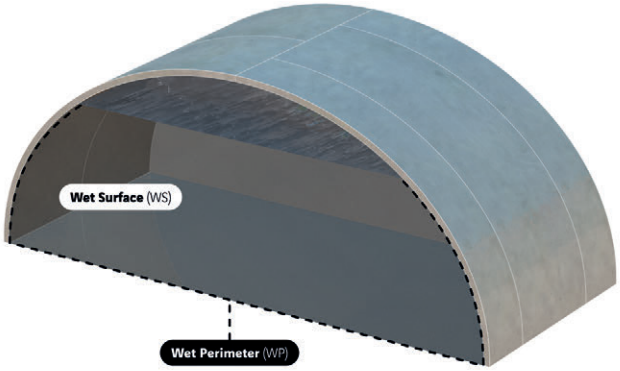
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	9,00
Height - H (m)	4,50
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	14,82
Element Weight per unit width (ton/m)	4,17





Hydraulic waterways

Wet surface - WS (m^2)	28,89
Wet perimeter* WP (m)	16,85

* dimensions given for 1 meter freeboard

Unfactored footing reactions

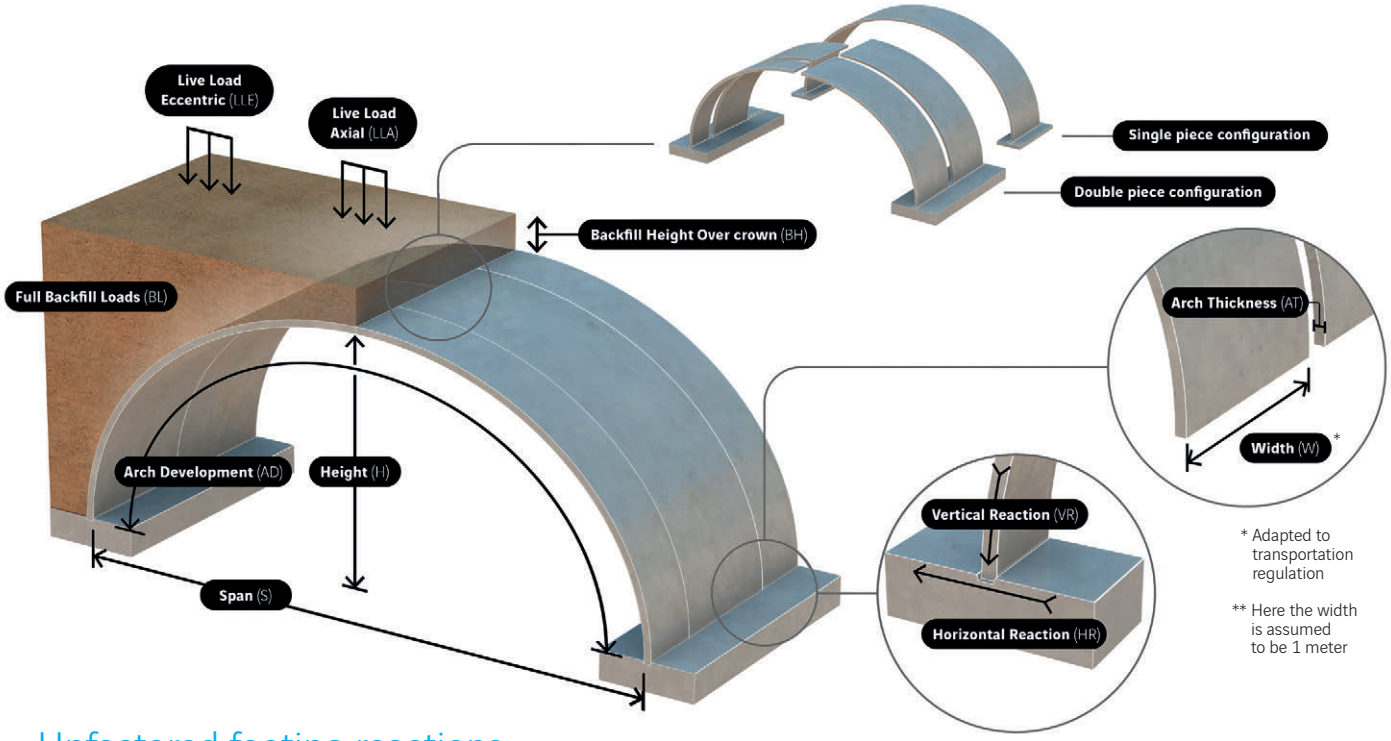
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/F reactions (kN/m)	Arch SW*	14	47	14	47	14	47	14	47	14	47
	BL	-16	215	-8	318	1	421	9	527	18	634
	LLA	2	337	10	430	17	523	24	617	31	711
	LLE	14	418	17	492	20	569	25	651	30	736
	SH**	-51	259	-43	367	-37	473	-32	580	-29	685
	SV**	-26	277	-16	397	-7	519	2	641	10	763

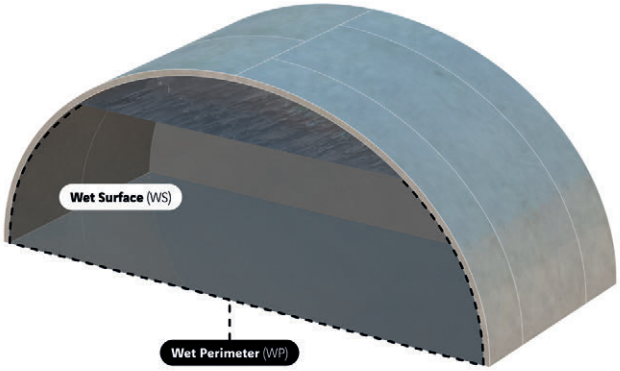
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	9,00
Height - H (m)	5,00
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	15,82
Element Weight per unit width (ton/m)	4,45





Hydraulic waterways

Wet surface - WS (m^2)	33,39
Wet perimeter* WP (m)	17,85

* dimensions given for 1 meter freeboard

Unfactored footing reactions

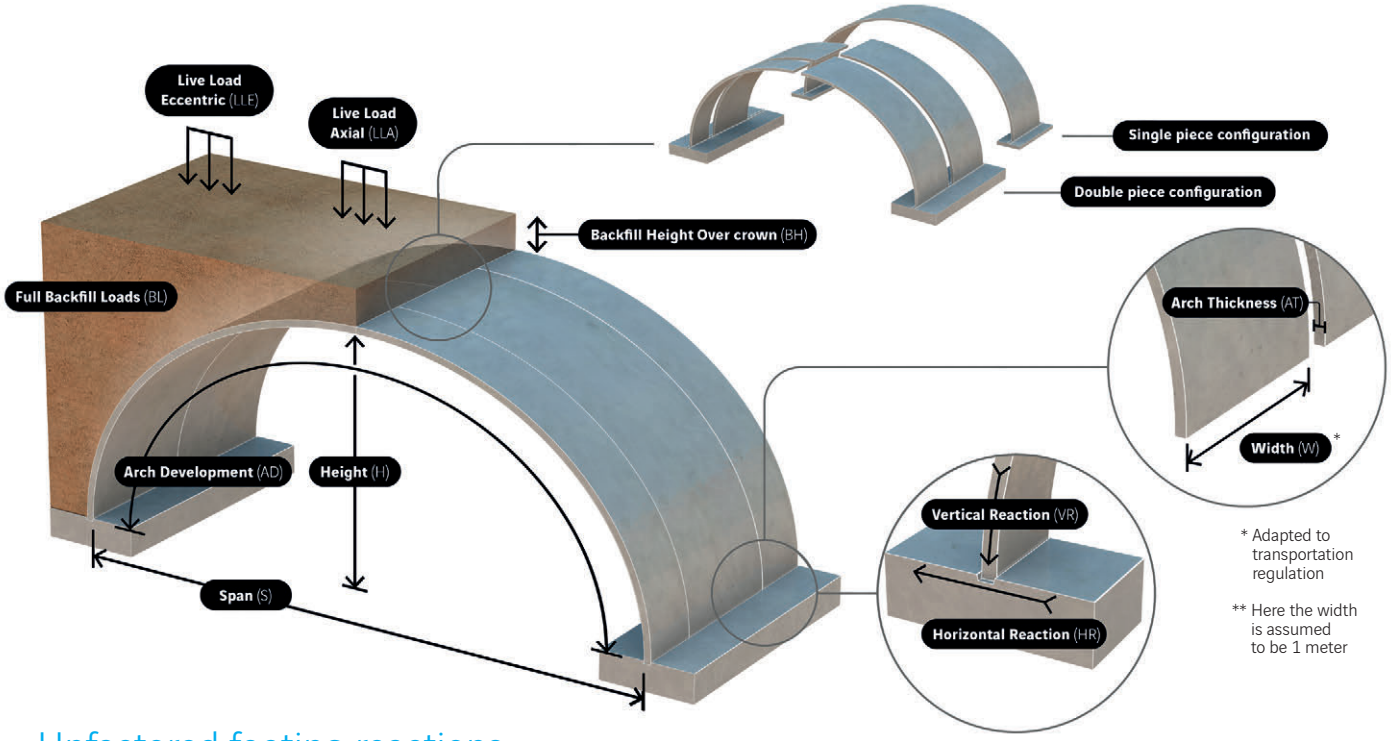
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/G reactions (kN/m)	Arch SW*	12	48	12	48	12	48	12	48	12	48
	BL	-33	225	-32	327	-30	432	-29	538	-28	646
	LLA	-28	336	-26	431	-25	527	-24	623	-23	719
	LLE	-18	420	-20	496	-21	576	-22	659	-22	745
	SH**	-66	282	-71	390	-76	497	-81	603	-85	707
	SV**	-44	288	-44	410	-44	533	-44	656	-44	780

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

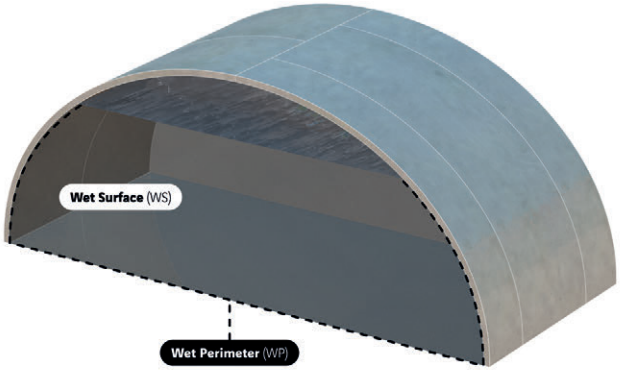
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	9,00
Height - H (m)	5,50
Arch Thickness - AT (mm)	225
Arch Development - AD (m)	16,82
Element Weight per unit width (ton/m)	4,73



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	37,89
Wet perimeter* WP (m)	18,85

* dimensions given for 1 meter freeboard

Unfactored footing reactions

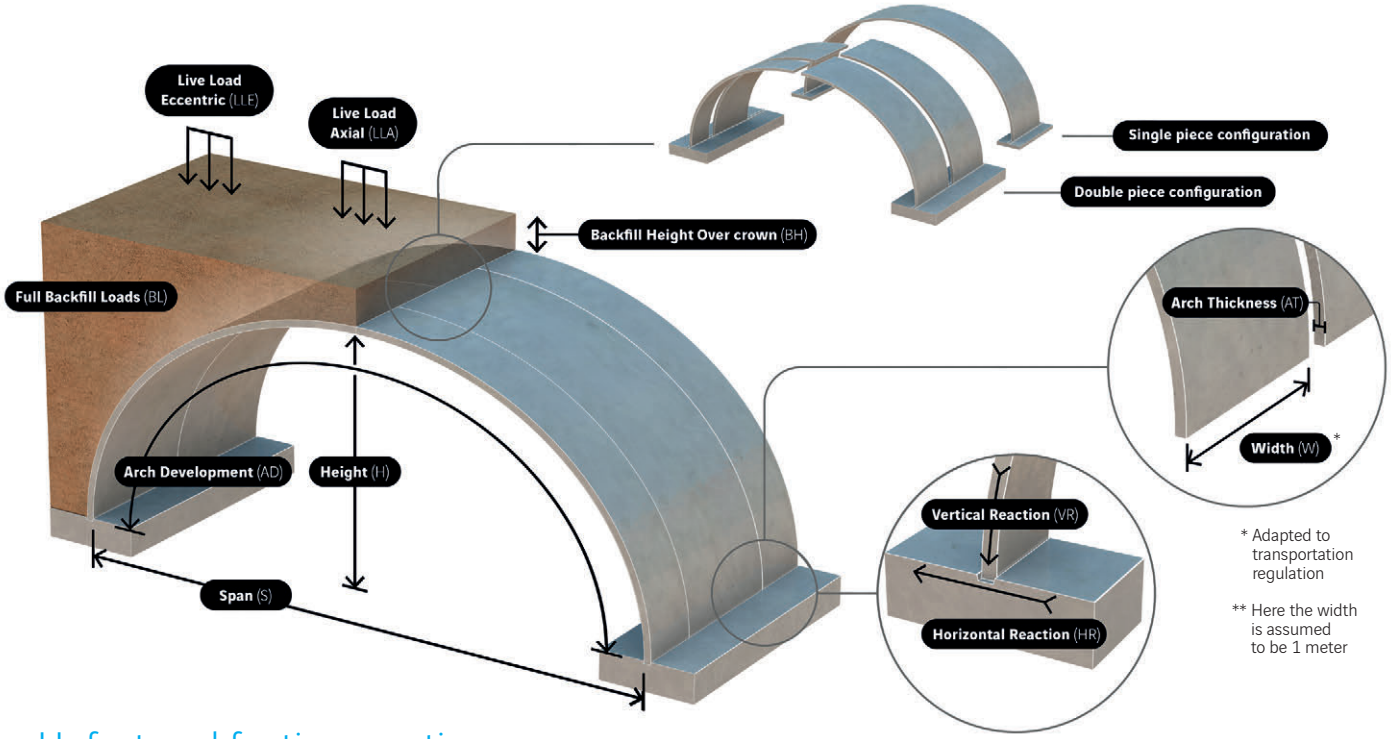
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_900/H reactions (kN/m)	Arch SW*	11	49	11	49	11	49	11	49	11	49
	BL	-45	237	-47	341	-50	447	-52	554	-55	663
	LLA	-45	340	-47	439	-49	537	-52	636	-54	734
	LLE	-36	419	-40	499	-44	582	-47	668	-51	755
	SH**	-74	302	-80	416	-84	530	-87	642	-89	754
	SV**	-53	297	-57	424	-60	551	-63	679	-66	807

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

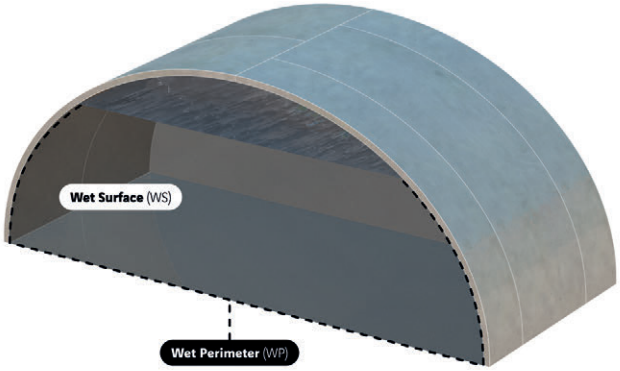
Main dimensions

Arch configuration (piece)	Single
Span - S (m)	8,44
Height - H (m)	2,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	10,15
Element Weight per unit width (ton/m)	6,34



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	7,60
Wet perimeter* WP (m)	11,18

* dimensions given for 1 meter freeboard

Unfactored footing reactions

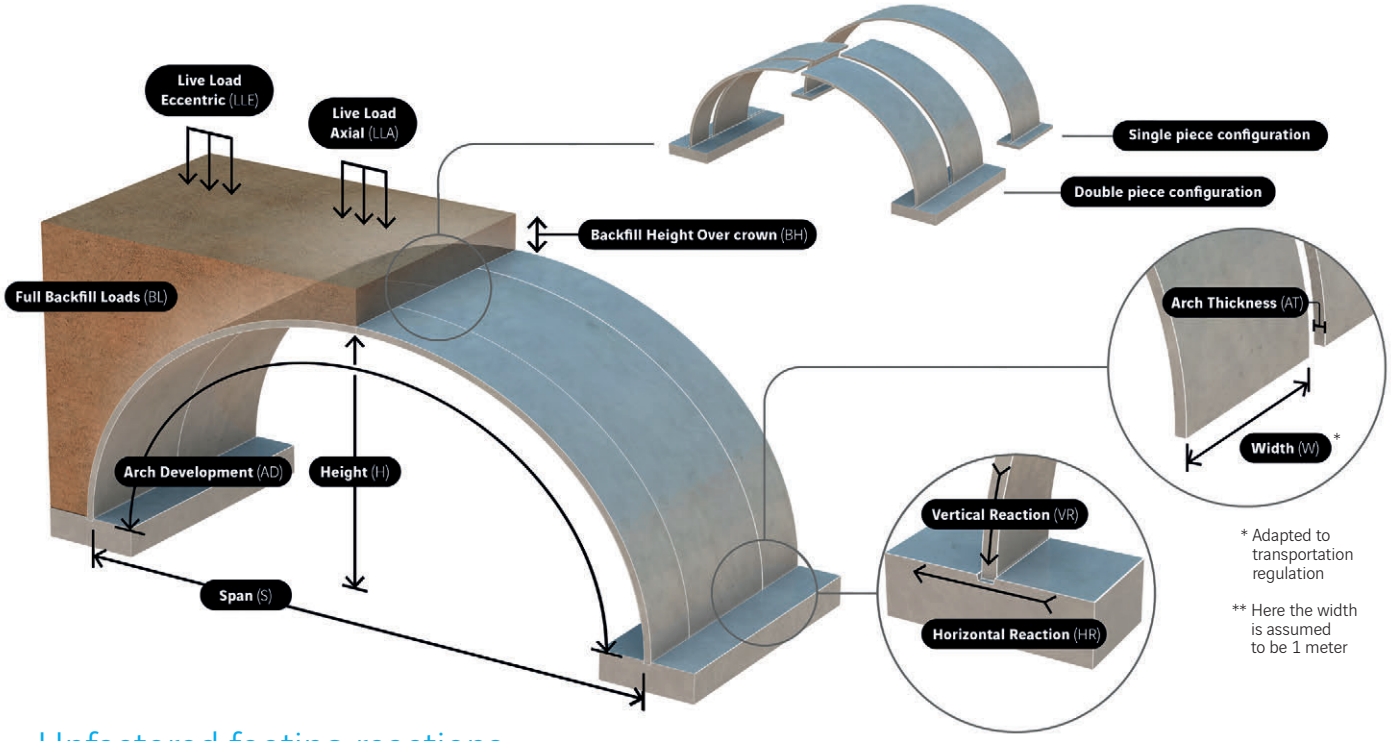
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/A reactions (kN/m)	Arch SW*	32	34	32	34	32	34	32	34	32	34
	BL	122	165	200	256	277	347	351	437	424	526
	LLA	325	335	380	405	423	469	467	536	516	608
	LLE	282	345	328	395	411	462	479	549	543	633
	SH**	178	197	294	311	405	428	510	538	612	648
	SV**	154	202	255	316	355	428	449	539	541	647

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

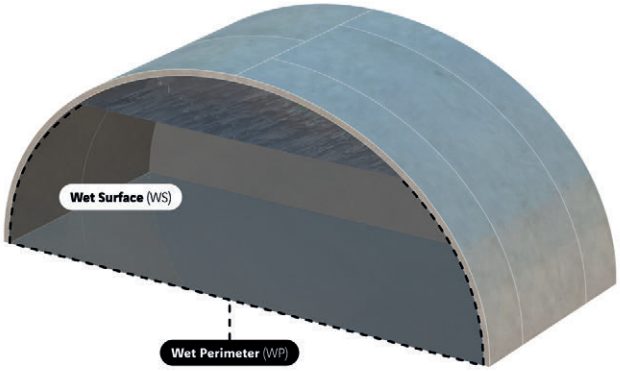
Main dimensions

Arch configuration (piece)	Single
Span - S (m)	9,02
Height - H (m)	2,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	11,30
Element Weight per unit width (ton/m)	7,06



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	11,97
Wet perimeter* WP (m)	12,92

* dimensions given for 1 meter freeboard

Unfactored footing reactions

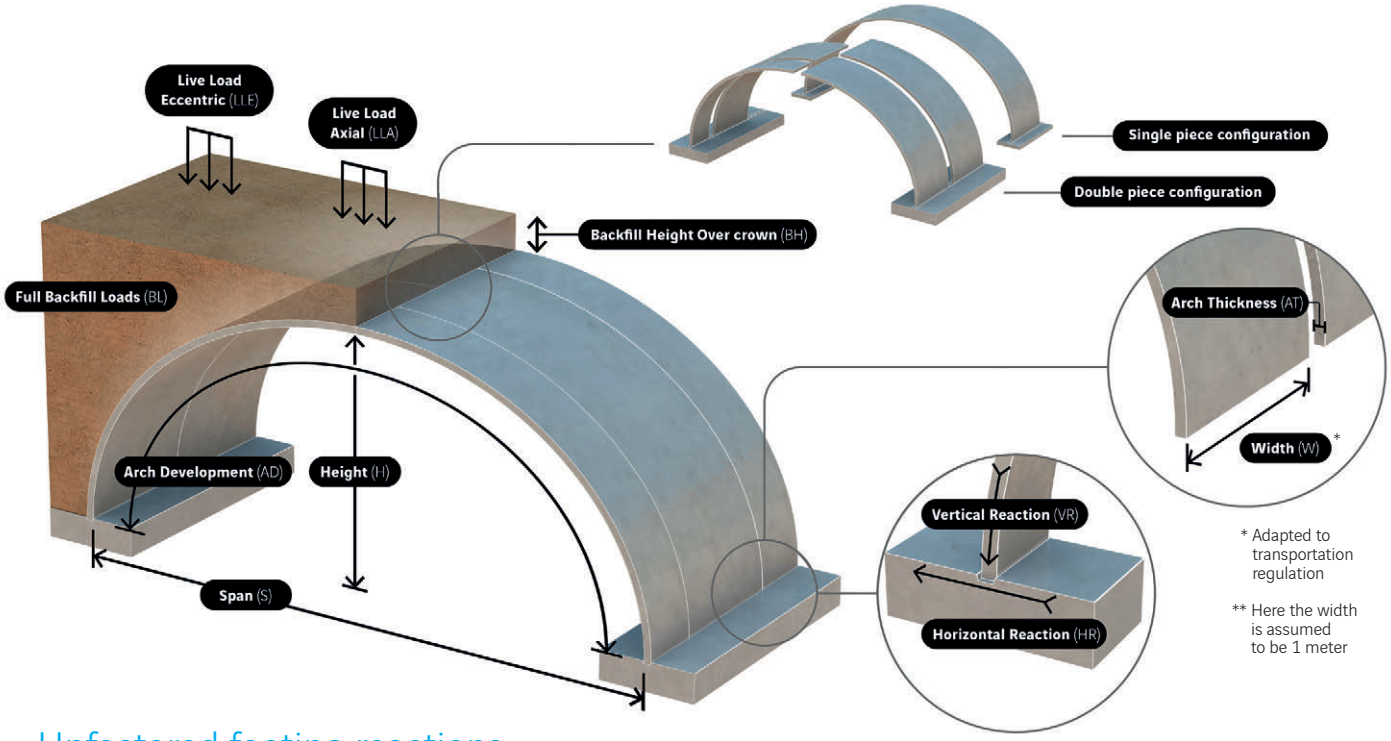
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/B reactions (kN/m)	Arch SW*	29	38	29	38	29	38	29	38	29	38
	BL	99	189	167	289	234	390	300	490	364	590
	LLA	260	357	311	439	355	518	399	598	443	679
	LLE	238	375	274	434	336	508	396	599	460	696
	SH**	144	216	244	340	341	466	433	589	524	713
	SV**	127	230	215	354	301	478	384	600	466	722

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

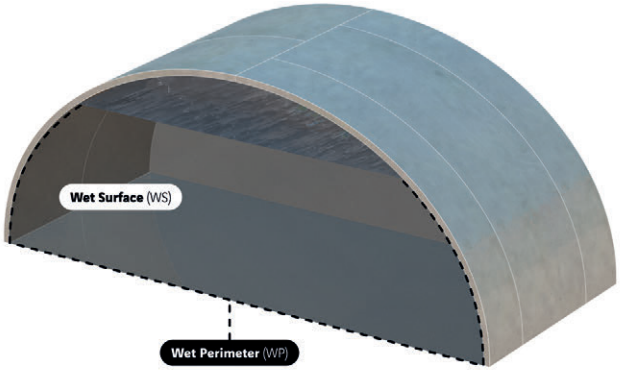
Main dimensions

Arch configuration (piece)	Single
Span - S (m)	9,45
Height - H (m)	3,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	12,38
Element Weight per unit width (ton/m)	7,74



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	16,60
Wet perimeter* WP (m)	14,44

* dimensions given for 1 meter freeboard

Unfactored footing reactions

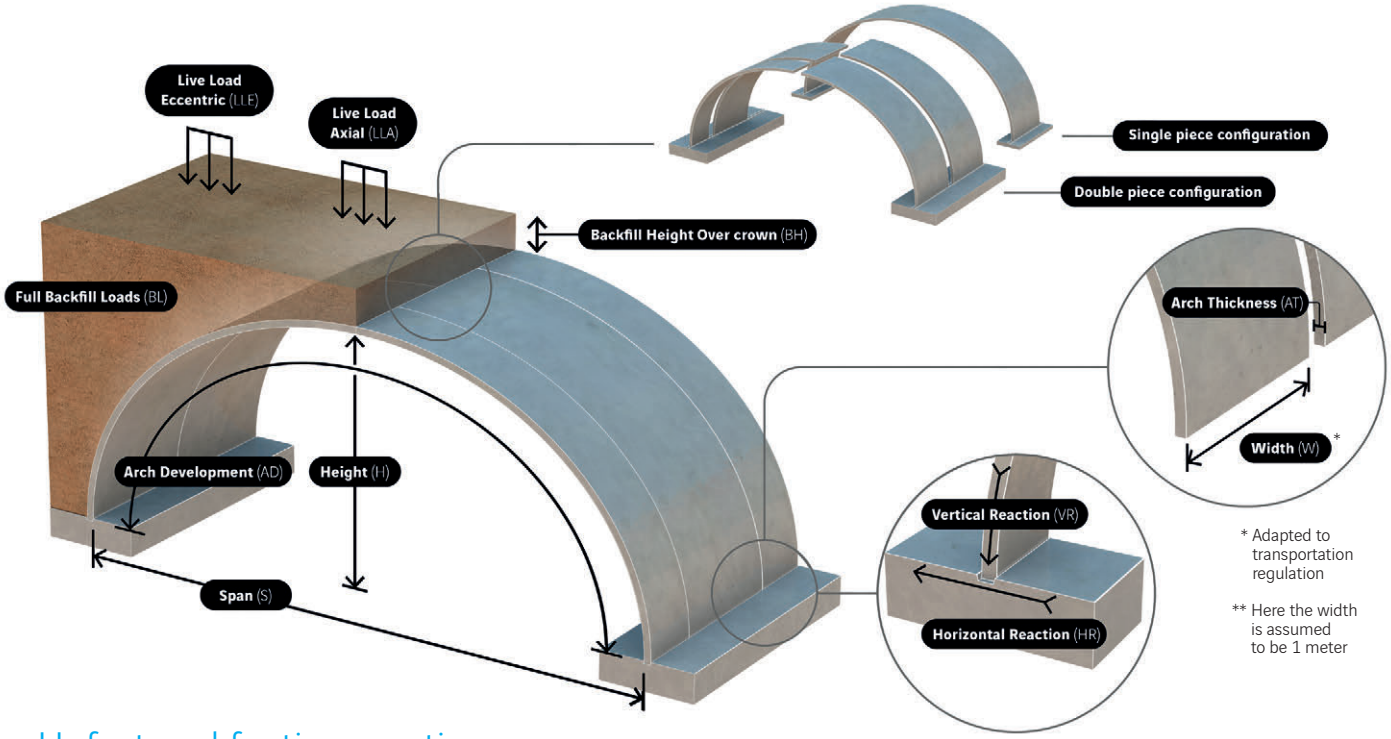
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/C reactions (kN/m)	Arch SW*	26	42	26	42	26	42	26	42	26	42
	BL	77	212	136	321	194	430	252	540	308	651
	LLA	200	378	247	472	292	564	335	655	375	745
	LLE	196	403	224	470	265	552	318	647	383	756
	SH**	112	234	197	368	280	502	361	638	440	774
	SV**	102	255	177	390	251	524	323	658	395	793

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

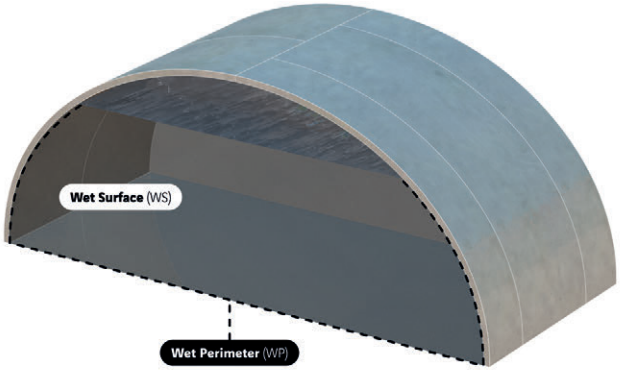
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	9,75
Height - H (m)	3,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	13,43
Element Weight per unit width (ton/m)	4,20



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	21,40
Wet perimeter* WP (m)	15,79

* dimensions given for 1 meter freeboard

Unfactored footing reactions

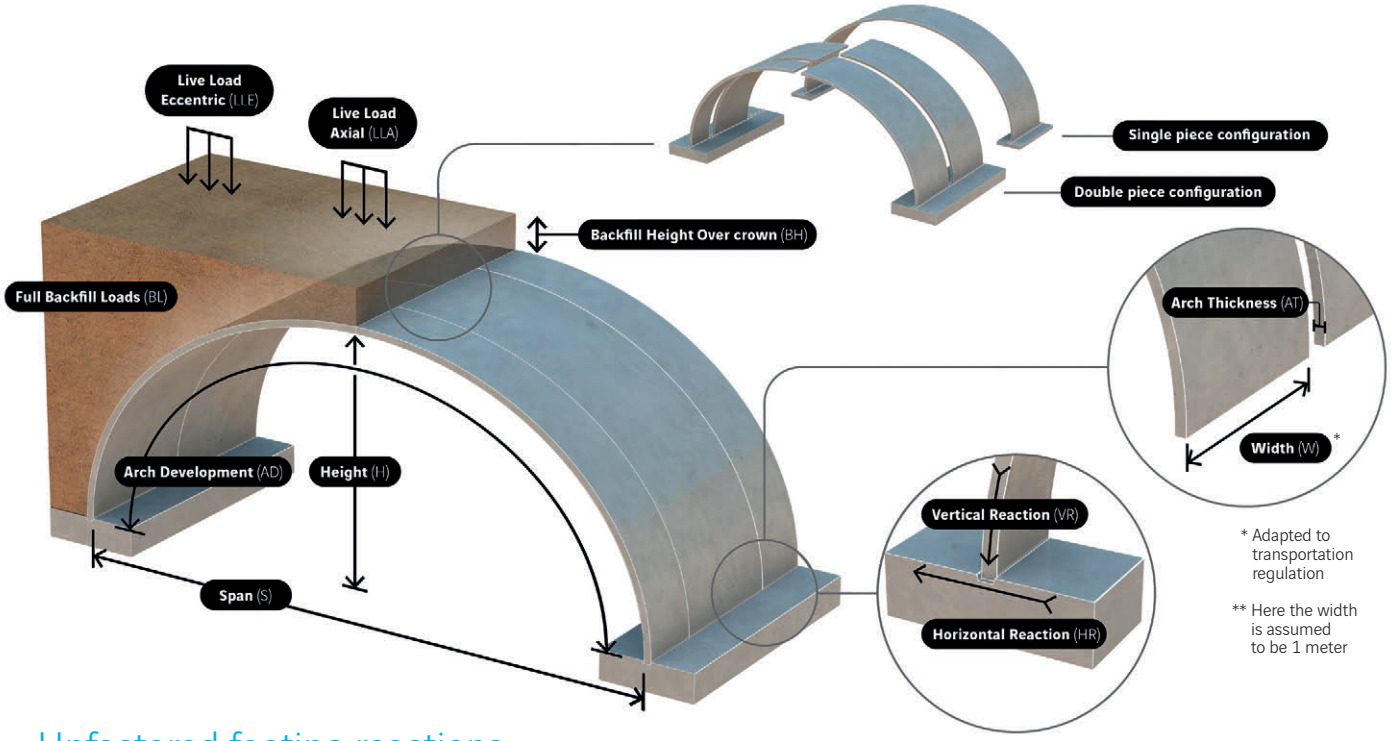
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/D reactions (kN/m)	Arch SW*	27	50	27	50	27	50	27	50	27	50
	BL	54	239	104	362	154	486	203	610	252	734
	LLA	159	418	200	525	239	631	277	737	315	843
	LLE	164	465	195	552	228	644	263	742	301	845
	SH**	12	257	124	402	220	551	300	704	364	860
	SV**	54	291	132	439	203	589	269	740	330	894

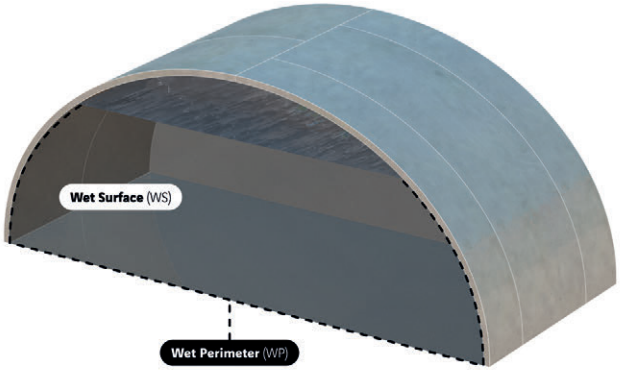
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	9,93
Height - H (m)	4,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	14,44
Element Weight per unit width (ton/m)	4,51





Hydraulic waterways

Wet surface - WS (m^2)	26,33
Wet perimeter* WP (m)	16,99

* dimensions given for 1 meter freeboard

Unfactored footing reactions

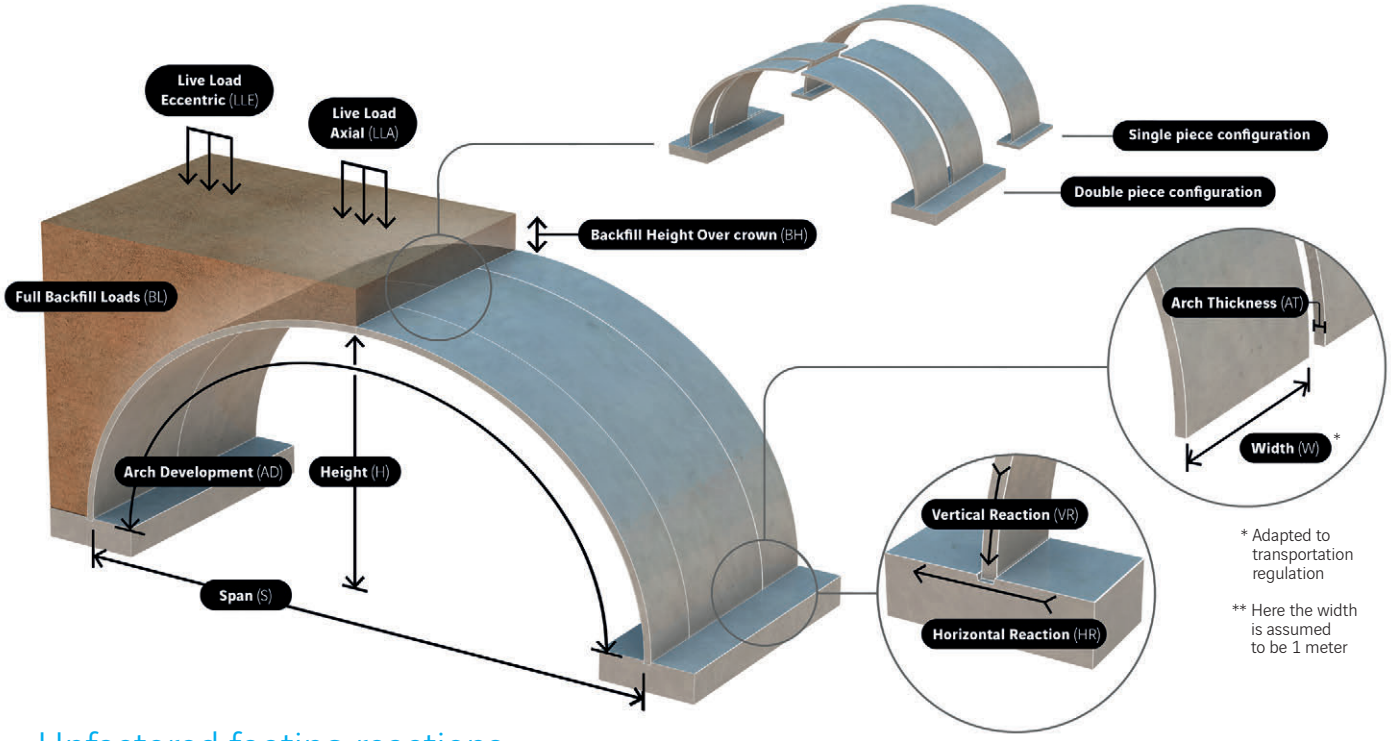
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/E reactions (kN/m)	Arch SW*	23	50	23	50	23	50	23	50	23	50
	BL	25	238	59	355	94	474	128	593	162	713
	LLA	93	395	123	500	150	602	178	705	205	811
	LLE	107	455	127	539	149	629	173	724	199	824
	SH**	-18	263	7	373	147	520	203	669	255	817
	SV**	21	294	58	429	132	568	178	716	223	864

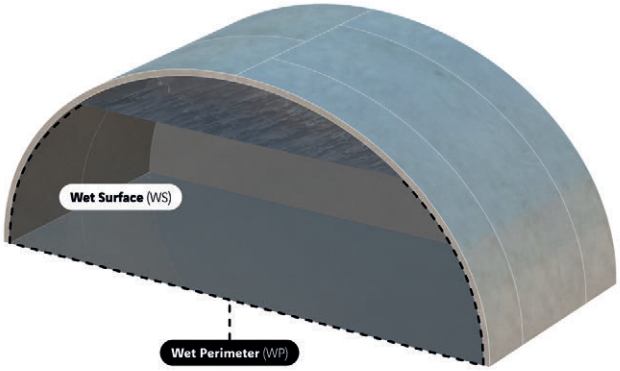
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	10,00
Height - H (m)	4,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	15,44
Element Weight per unit width (ton/m)	4,83





Hydraulic waterways

Wet surface - WS (m^2)	31,31
Wet perimeter* WP (m)	18,06

* dimensions given for 1 meter freeboard

Unfactored footing reactions

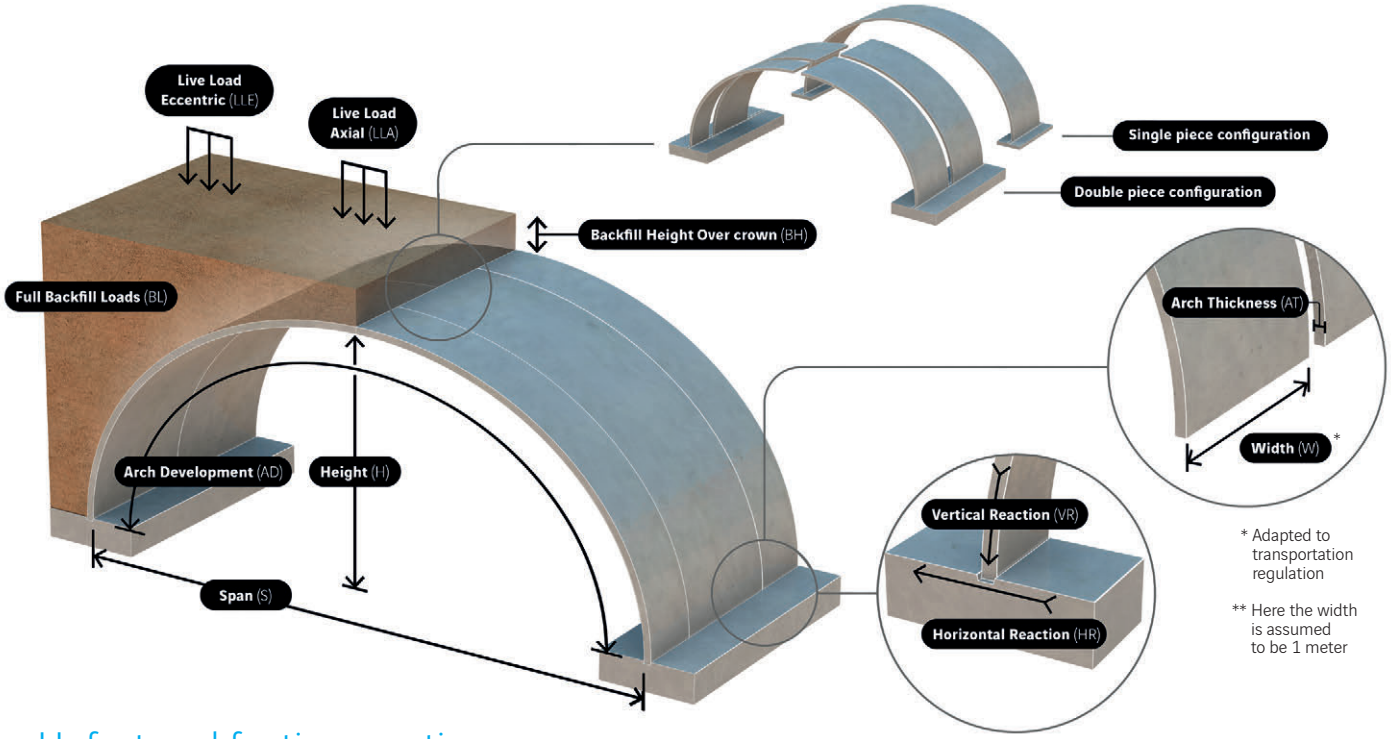
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/F reactions (kN/m)	Arch SW*	20	53	20	53	20	53	20	53	20	53
	BL	0	247	20	363	40	481	61	600	81	719
	LLA	40	385	58	493	75	599	91	705	108	811
	LLE	59	453	69	542	81	633	95	728	109	826
	SH**	-36	276	-29	394	35	526	61	659	87	789
	SV**	-3	299	14	437	54	576	86	719	122	863

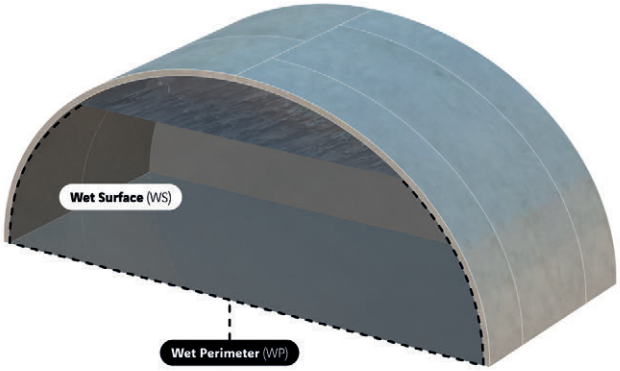
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	10,00
Height - H (m)	5,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	16,44
Element Weight per unit width (ton/m)	5,14





Hydraulic waterways

Wet surface - WS (m^2)	36,31
Wet perimeter* WP (m)	19,06

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/G reactions (kN/m)	Arch SW*	18	56	18	56	18	56	18	56	18	56
	BL	-21	257	-12	372	-2	489	8	607	18	726
	LLA	-2	380	7	490	16	598	24	706	32	813
	LLE	17	457	21	547	26	640	31	735	38	832
	SH**	-56	300	-52	423	-47	544	-41	665	-34	783
	SV**	-26	313	-19	452	-6	592	13	731	39	871

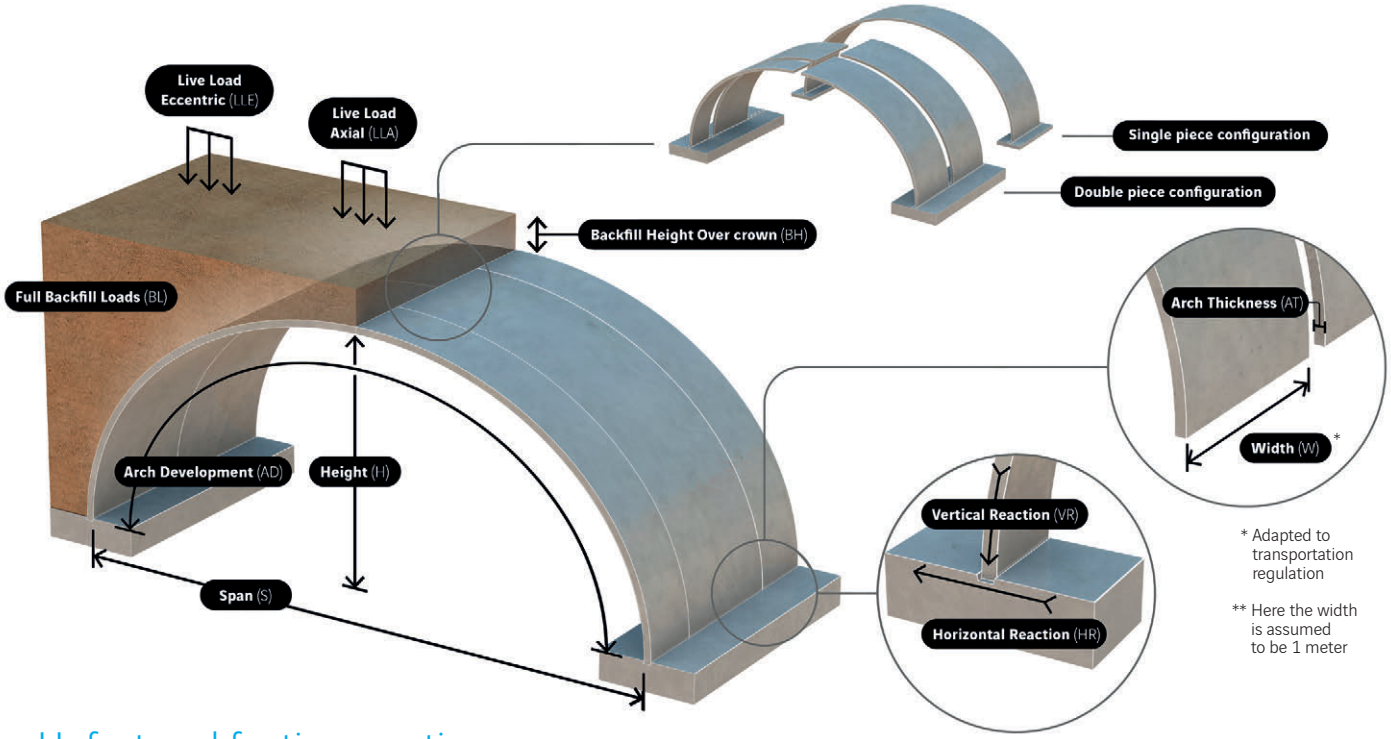
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

TS-F_1000/H

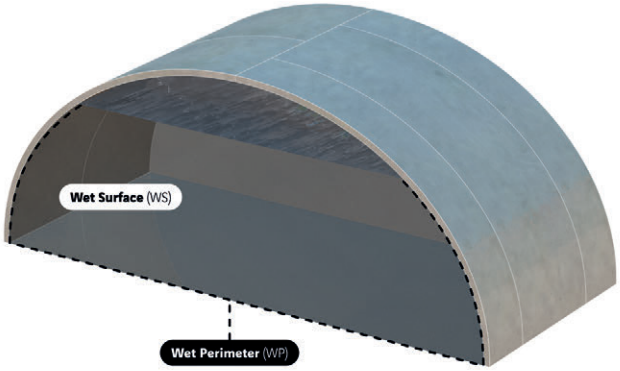
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	10,00
Height - H (m)	5,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	17,44
Element Weight per unit width (ton/m)	5,45



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	41,31
Wet perimeter* WP (m)	20,06

* dimensions given for 1 meter freeboard

Unfactored footing reactions

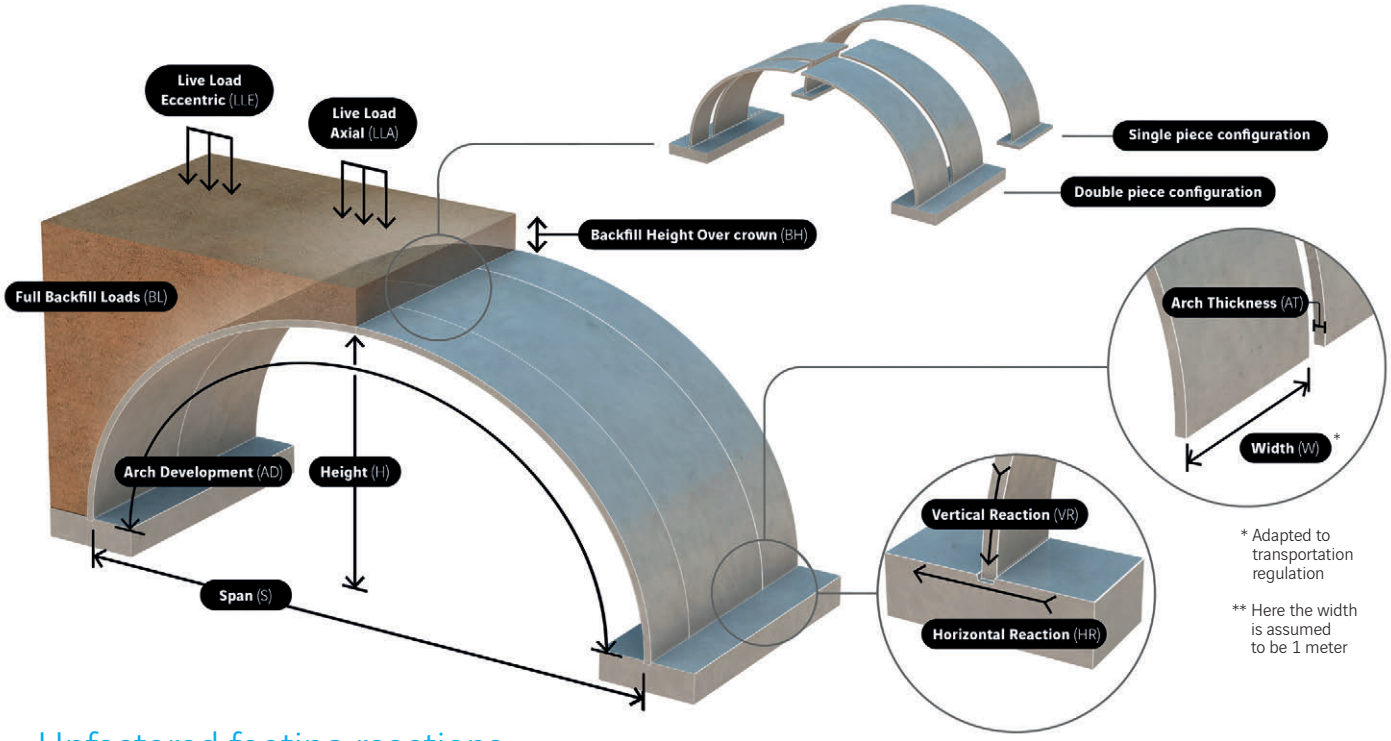
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/H reactions (kN/m)	Arch SW*	16	57	16	57	16	57	16	57	16	57
	BL	-39	265	-33	375	-31	490	-28	607	-25	724
	LLA	-34	376	-27	484	-24	591	-21	699	-18	807
	LLE	-20	466	-16	551	-16	644	-16	738	-15	836
	SH**	-83	334	-84	443	-72	566	-73	685	-73	804
	SV**	-51	341	-48	471	-40	607	-33	744	-22	883

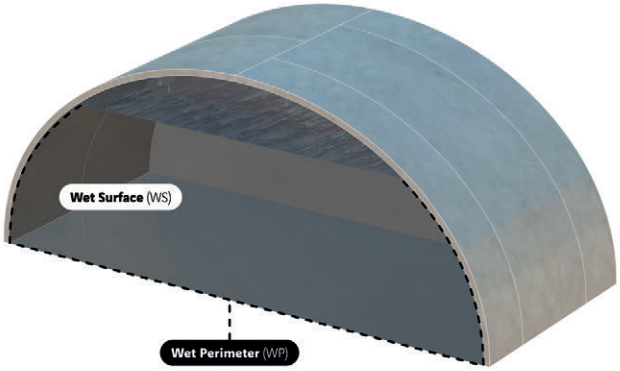
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	10,00
Height - H (m)	6,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	18,44
Element Weight per unit width (ton/m)	5,76





Hydraulic waterways

Wet surface - WS (m^2)	46,31
Wet perimeter* WP (m)	21,06

* dimensions given for 1 meter freeboard

Unfactored footing reactions

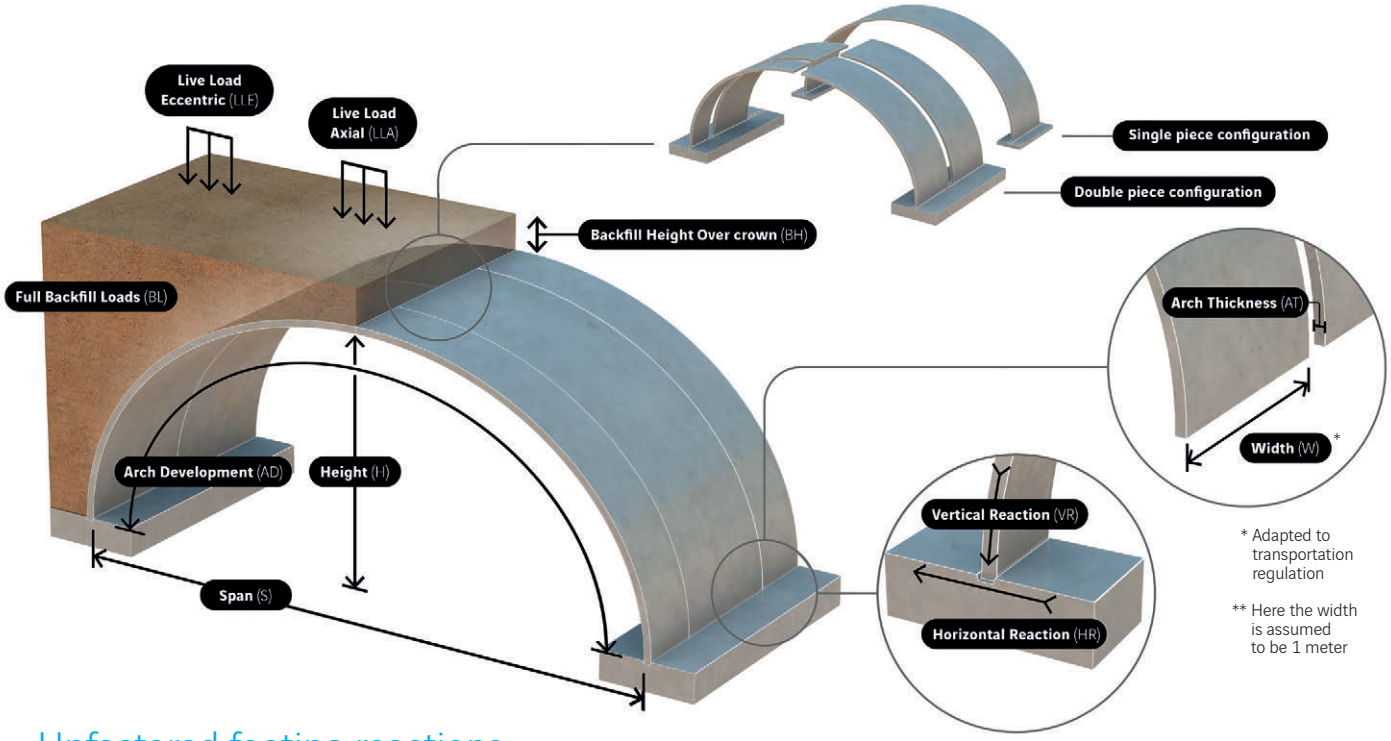
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1000/I reactions (kN/m)	Arch SW*	14	60	14	60	14	60	14	60	14	60
	BL	-54	277	-48	382	-49	497	-51	613	-52	731
	LLA	-54	379	-47	485	-48	593	-49	701	-50	810
	LLE	-49	482	-44	562	-46	656	-49	749	-51	849
	SH**	-109	378	-84	482	-86	606	-90	724	-95	846
	SV**	-74	377	-62	499	-64	635	-66	771	-69	910

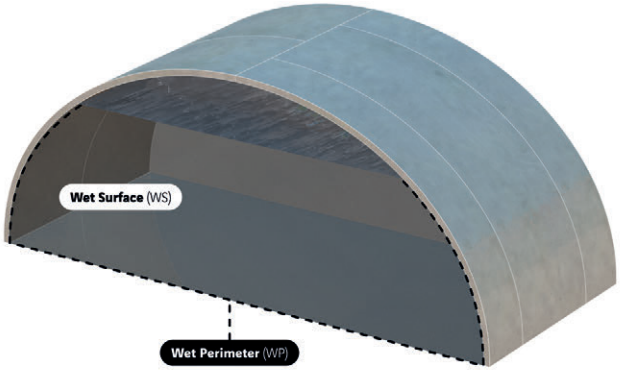
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Single
Span - S (m)	10,81
Height - H (m)	3,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	13,49
Element Weight per unit width (ton/m)	8,43





Hydraulic waterways

Wet surface - WS (m^2)	18,80
Wet perimeter* WP (m)	16,15

* dimensions given for 1 meter freeboard

Unfactored footing reactions

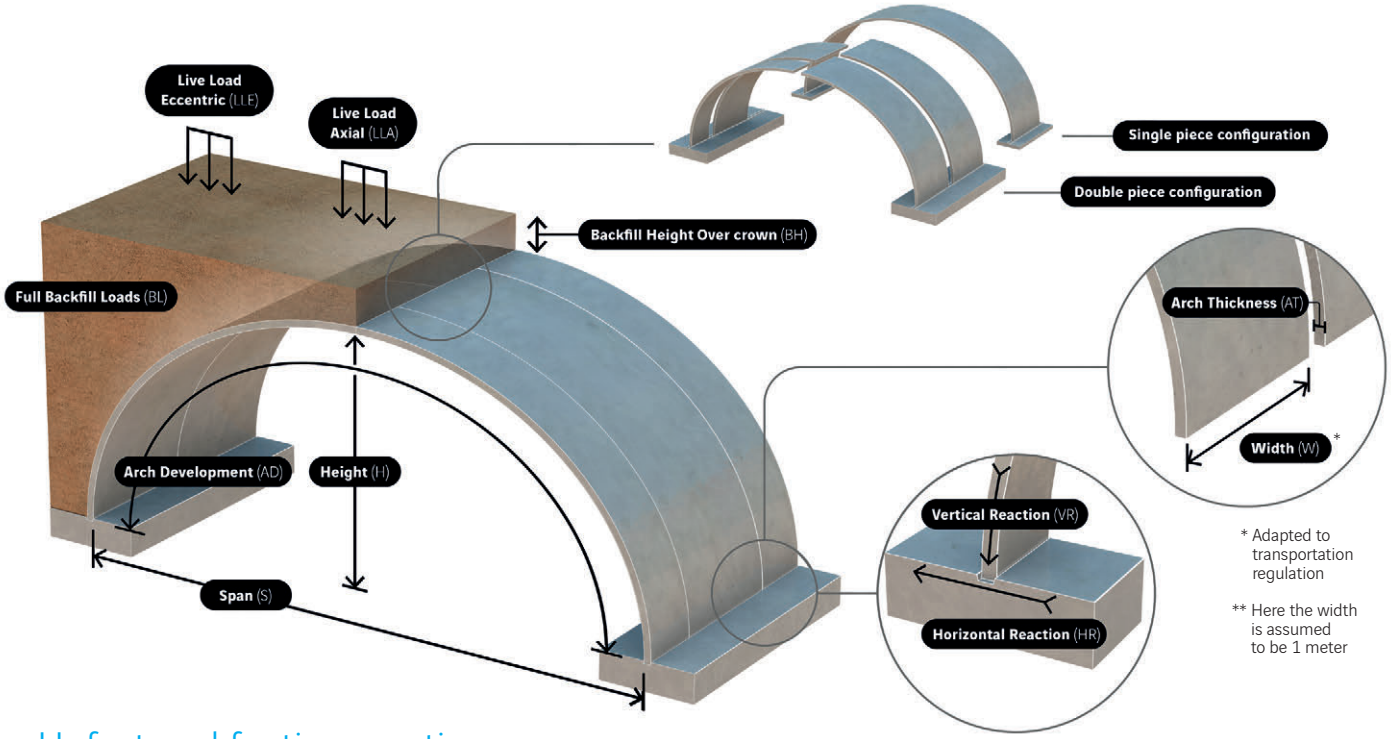
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/A reactions (kN/m)	Arch SW*	34	45	34	45	34	45	34	45	34	45
	BL	122	249	204	374	285	499	365	623	443	746
	LLA	277	425	348	540	414	649	476	756	539	862
	LLE	278	459	329	545	386	643	449	748	546	868
	SH**	165	271	274	419	384	575	488	725	592	877
	SV**	154	296	257	448	360	602	458	752	556	904

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

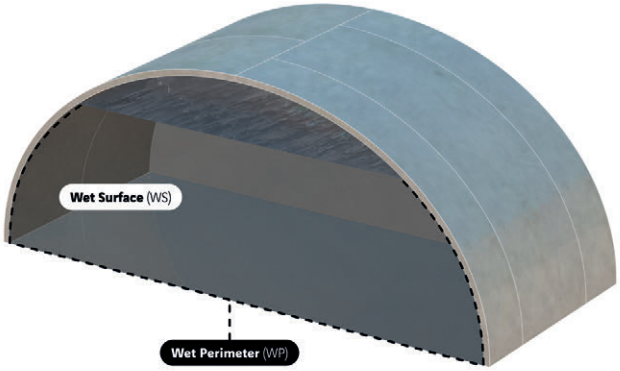
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	11,25
Height - H (m)	3,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	14,58
Element Weight per unit width (ton/m)	4,56



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	24,32
Wet perimeter* WP (m)	17,67

* dimensions given for 1 meter freeboard

Unfactored footing reactions

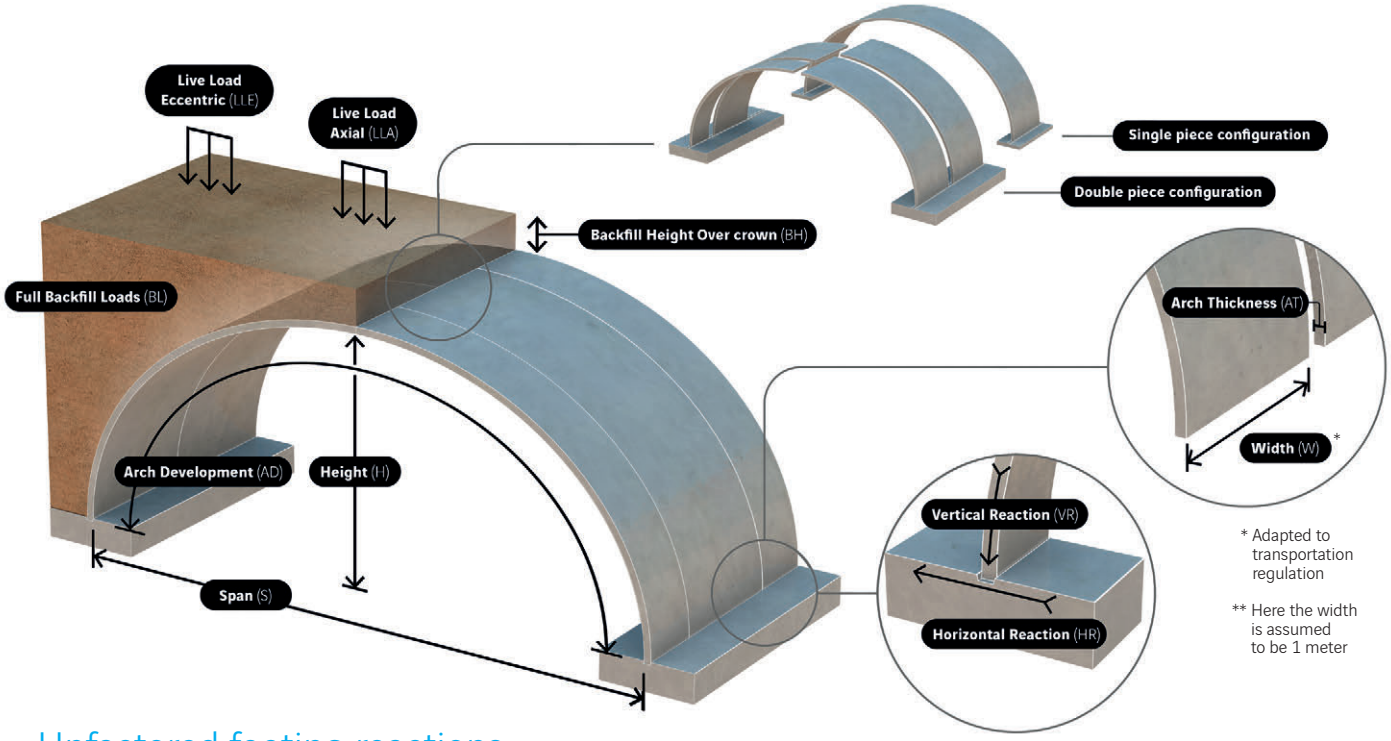
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/B reactions (kN/m)	Arch SW*	32	49	32	49	32	49	32	49	32	49
	BL	97	269	167	399	236	530	304	660	372	789
	LLA	222	439	282	559	341	675	398	789	455	903
	LLE	235	492	278	584	326	684	379	793	451	912
	SH**	99	293	213	439	319	594	416	751	504	914
	SV**	116	324	211	477	302	634	389	792	474	954

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

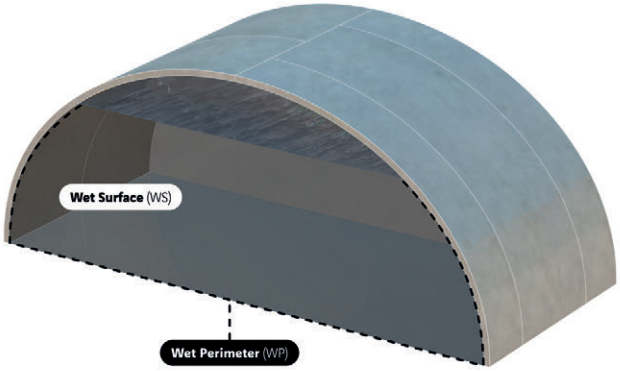
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	11,58
Height - H (m)	4,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	15,63
Element Weight per unit width (ton/m)	4,88



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	30,03
Wet perimeter* WP (m)	19,05

* dimensions given for 1 meter freeboard

Unfactored footing reactions

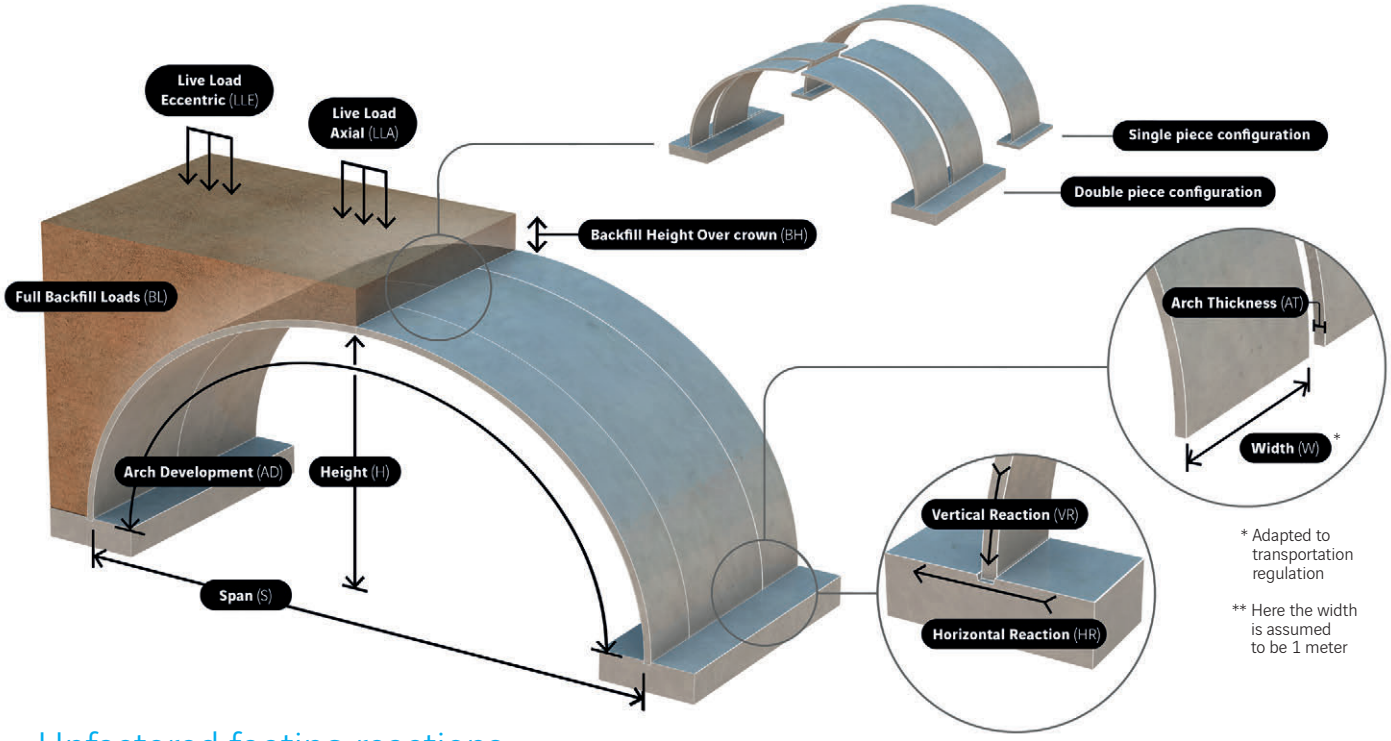
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/C reactions (kN/m)	Arch SW*	29	52	29	52	29	52	29	52	29	52
	BL	73	289	131	424	189	559	246	695	304	831
	LLA	168	452	219	577	270	700	322	822	375	942
	LLE	194	525	229	620	268	724	311	835	359	955
	SH**	35	315	154	459	257	612	346	776	419	950
	SV**	78	351	165	505	247	664	324	830	395	1003

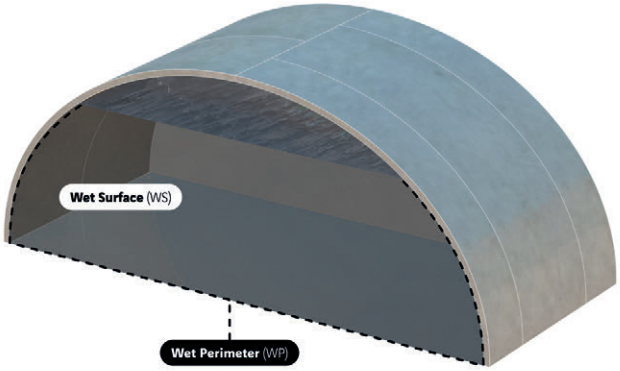
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	11,81
Height - H (m)	4,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	16,66
Element Weight per unit width (ton/m)	5,21





Hydraulic waterways

Wet surface - WS (m^2)	35,88
Wet perimeter* WP (m)	20,31

* dimensions given for 1 meter freeboard

Unfactored footing reactions

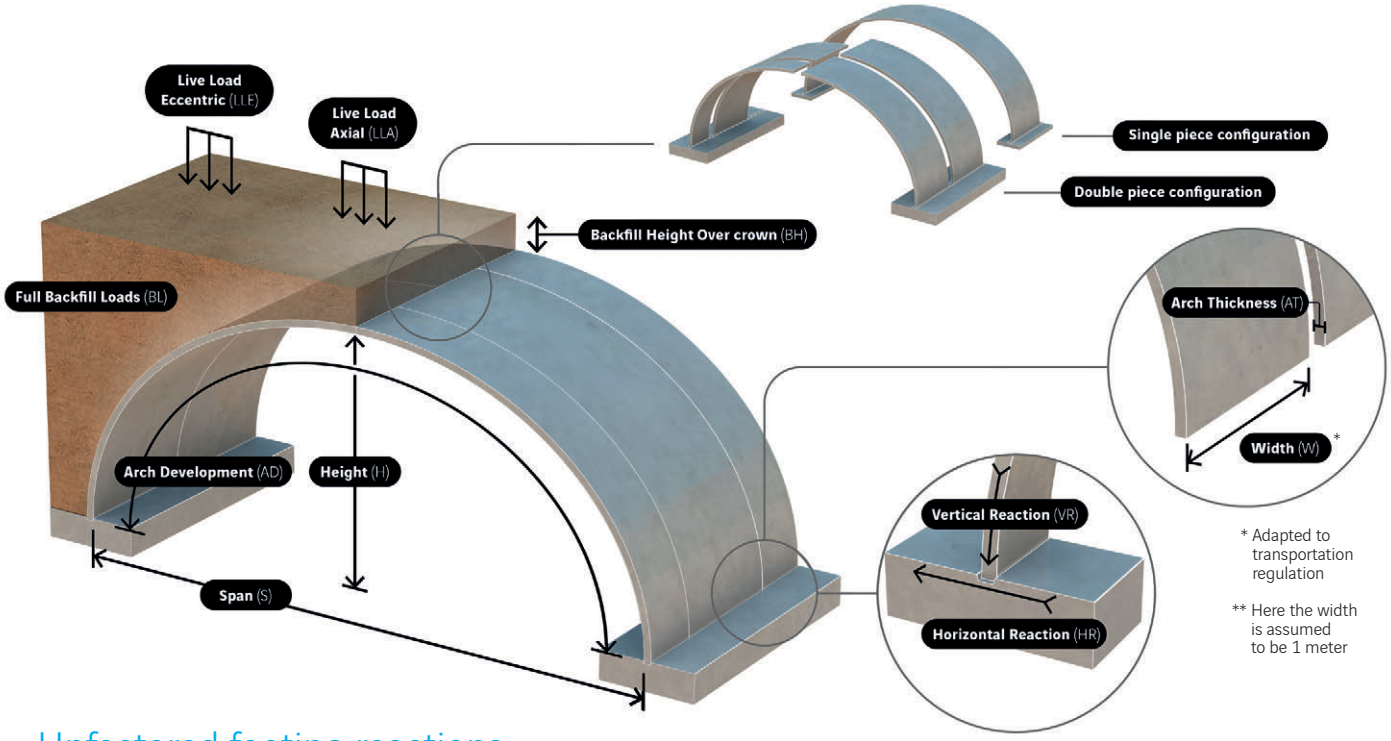
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/D reactions (kN/m)	Arch SW*	28	56	28	56	28	56	28	56	28	56
	BL	41	296	85	433	128	569	173	707	217	845
	LLA	110	452	154	587	191	709	229	834	266	956
	LLE	135	518	168	629	200	740	233	852	267	966
	SH**	8	312	120	450	179	611	255	790	317	956
	SV**	57	353	115	517	172	687	231	857	288	1026

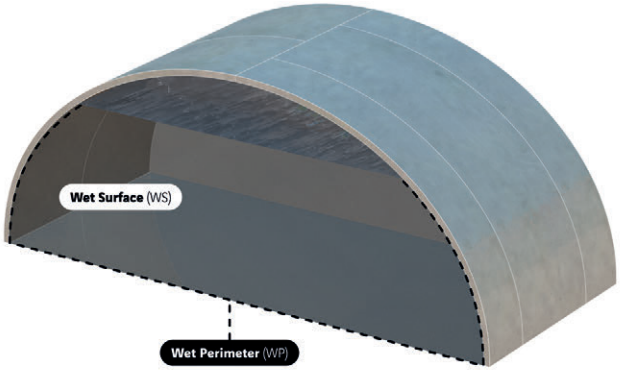
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	11,95
Height - H (m)	5,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	17,67
Element Weight per unit width (ton/m)	5,52





Hydraulic waterways

Wet surface - WS (m^2)	41,83
Wet perimeter* WP (m)	21,47

* dimensions given for 1 meter freeboard

Unfactored footing reactions

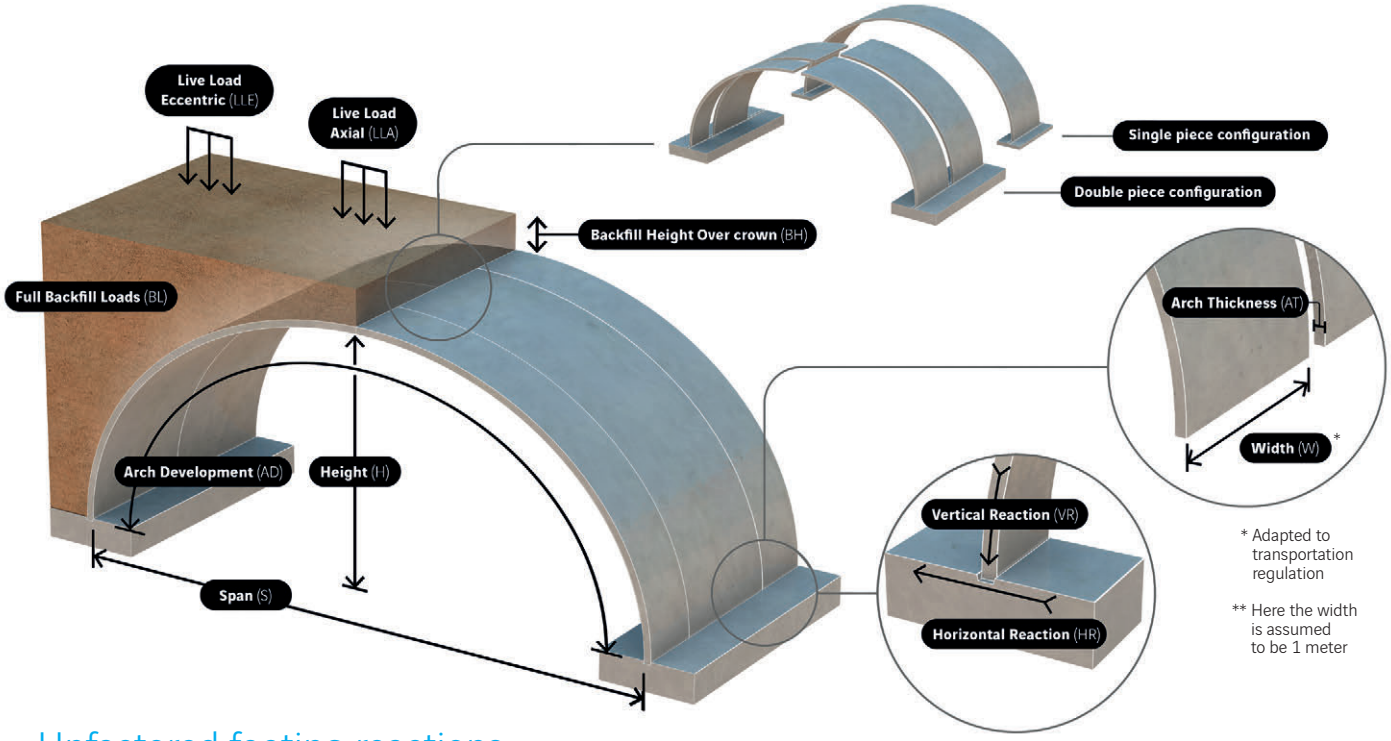
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/E reactions (kN/m)	Arch SW*	26	61	26	61	26	61	26	61	26	61
	BL	15	306	46	444	76	582	107	722	138	861
	LLA	61	452	91	589	119	717	146	845	172	969
	LLE	82	542	104	654	126	767	149	881	172	996
	SH**	-20	348	38	491	73	642	114	799	149	950
	SV**	18	382	57	546	95	702	133	879	170	1044

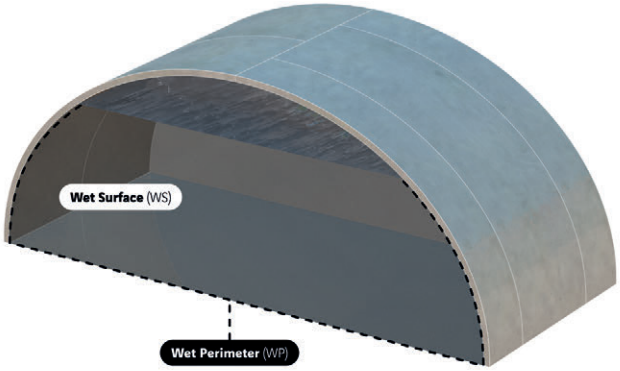
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	12,00
Height - H (m)	5,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	18,67
Element Weight per unit width (ton/m)	5,83





Hydraulic waterways

Wet surface - WS (m^2)	47,82
Wet perimeter* WP (m)	22,52

* dimensions given for 1 meter freeboard

Unfactored footing reactions

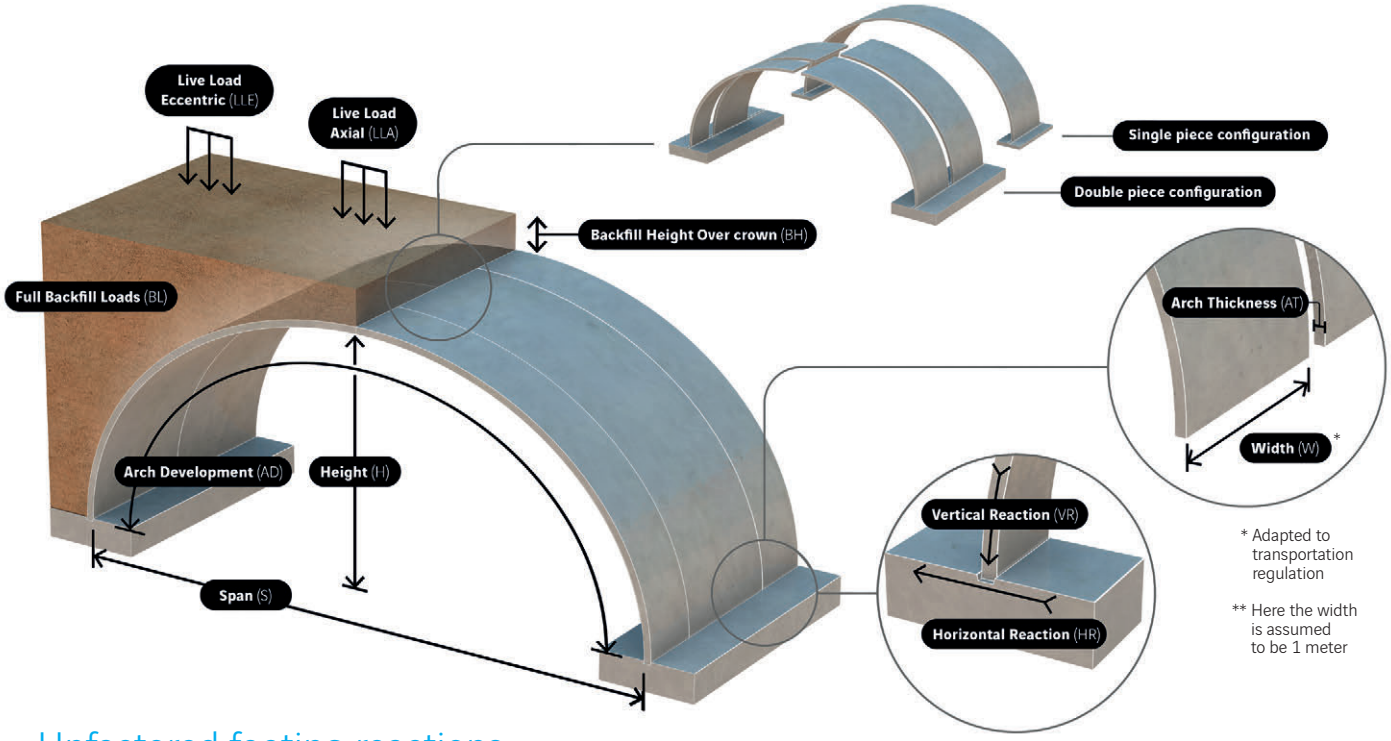
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/F reactions (kN/m)	Arch SW*	24	66	24	66	24	66	24	66	24	66
	BL	-9	316	11	454	30	593	50	733	69	874
	LLA	18	452	38	588	57	722	75	852	92	978
	LLE	37	556	50	669	64	784	78	900	92	1017
	SH**	-44	381	-25	528	-8	673	8	816	23	957
	SV**	-14	405	9	570	31	735	53	898	74	1061

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

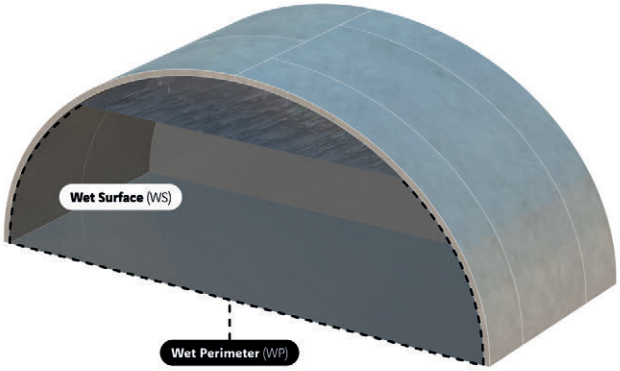
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	12,00
Height - H (m)	6,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	19,67
Element Weight per unit width (ton/m)	6,15



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	53,82
Wet perimeter* WP (m)	23,52

* dimensions given for 1 meter freeboard

Unfactored footing reactions

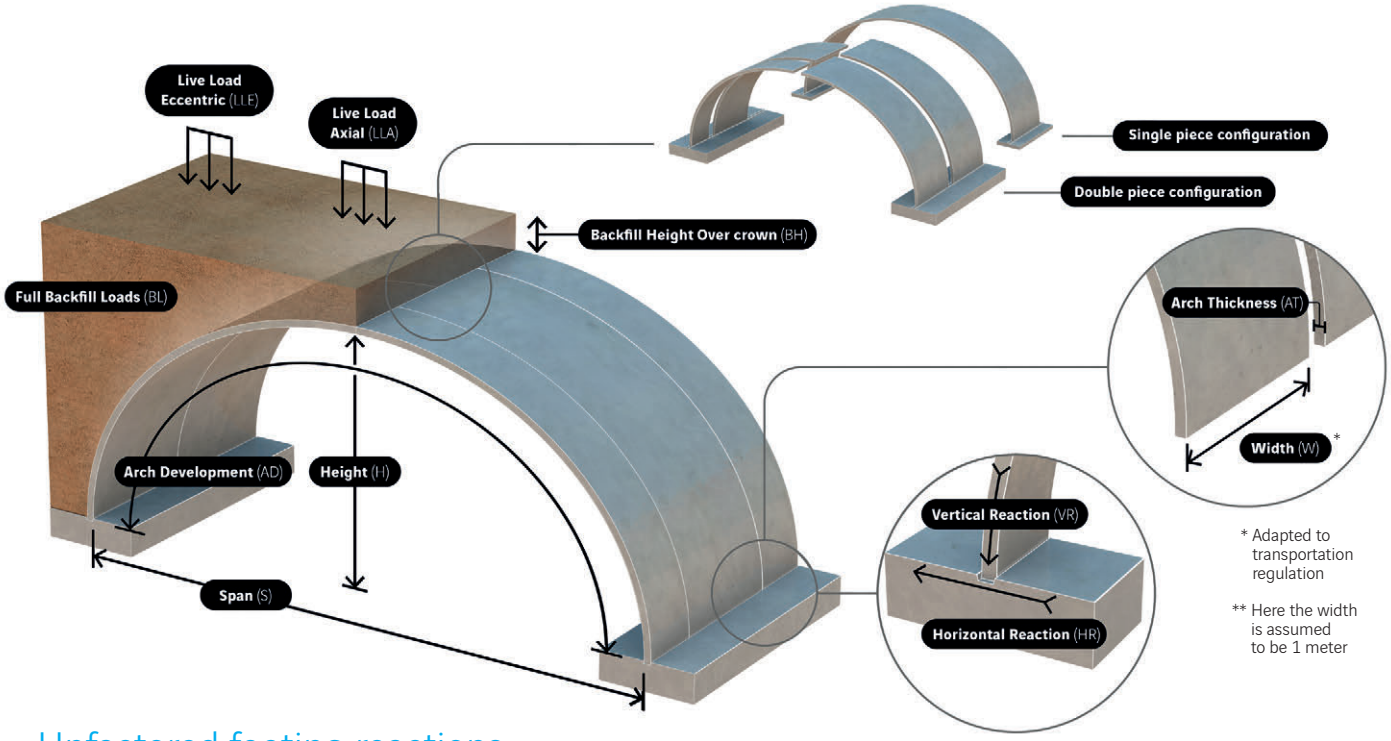
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/G reactions (kN/m)	Arch SW*	22	69	22	69	22	69	22	69	22	69
	BL	-30	325	-20	462	-9	601	1	742	11	883
	LLA	-17	450	-6	587	5	722	15	854	24	983
	LLE	0	560	5	675	12	791	19	909	26	1027
	SH**	-65	410	-70	560	-65	703	-65	840	-62	979
	SV**	-40	422	-29	588	-22	785	-10	915	0	1077

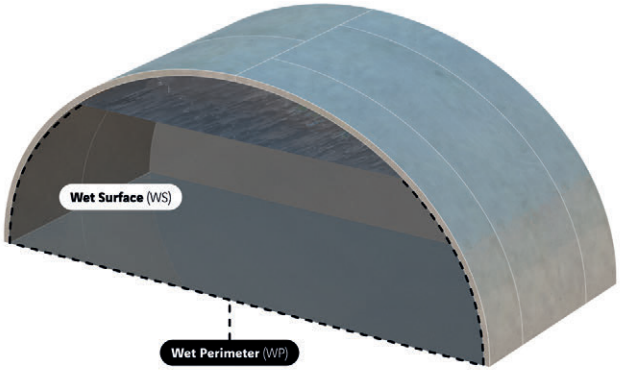
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	12,00
Height - H (m)	6,50
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	20,67
Element Weight per unit width (ton/m)	6,46





Hydraulic waterways

Wet surface - WS (m^2)	59,82
Wet perimeter* WP (m)	24,52

* dimensions given for 1 meter freeboard

Unfactored footing reactions

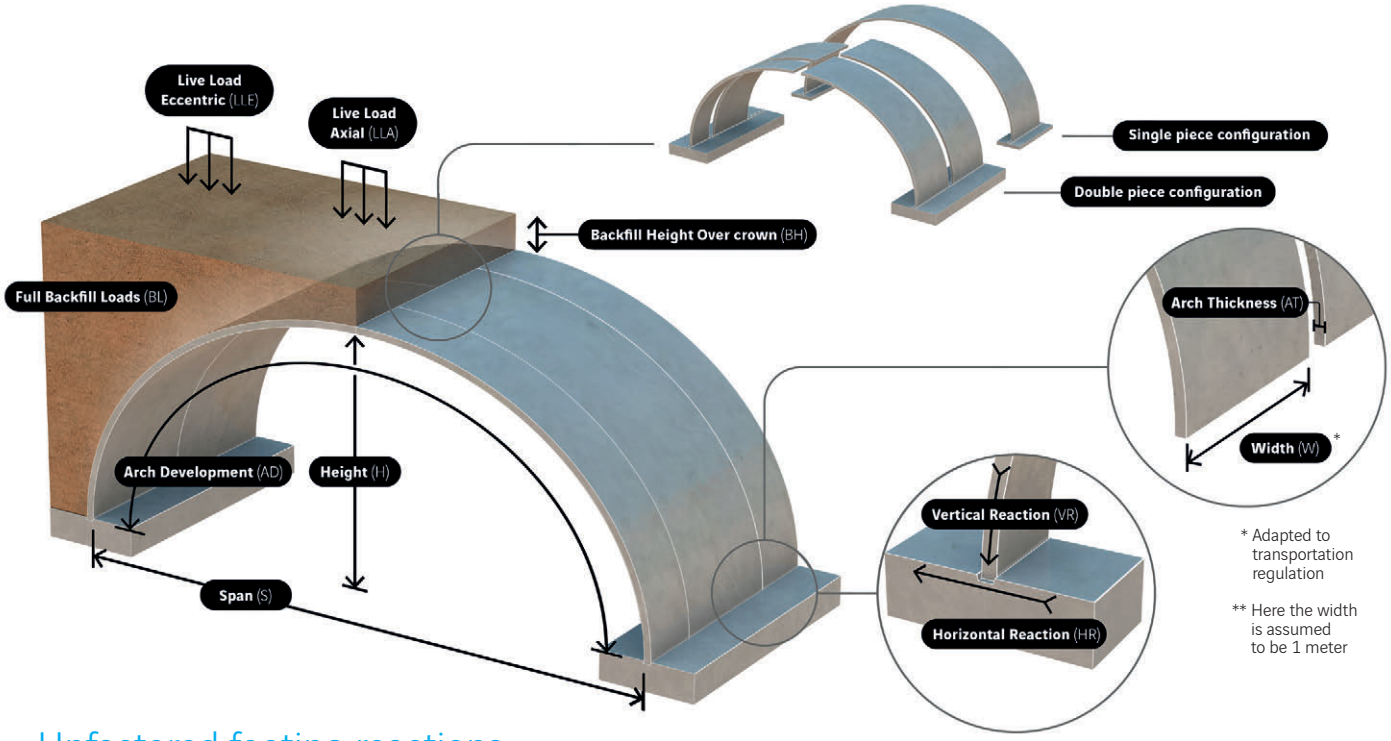
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/H reactions (kN/m)	Arch SW*	21	72	21	72	21	72	21	72	21	72
	BL	-49	334	-46	468	-43	606	-40	747	-37	889
	LLA	-46	447	-42	584	-38	719	-35	853	-32	984
	LLE	-31	554	-31	671	-30	788	-28	908	-26	1028
	SH**	-82	436	-97	589	-98	733	-104	873	-107	1014
	SV**	-59	433	-58	600	-65	853	-54	928	-53	1092

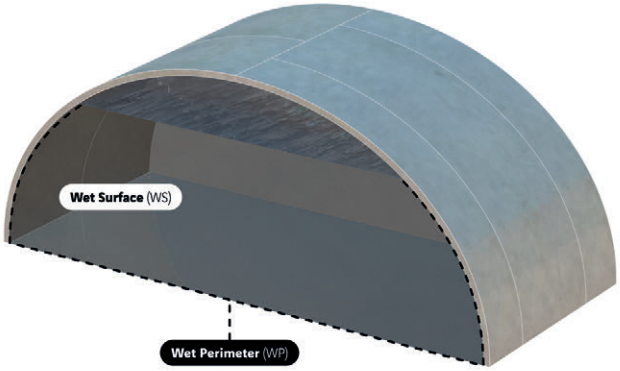
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	12,00
Height - H (m)	7,00
Arch Thickness - AT (mm)	250
Arch Development - AD (m)	21,67
Element Weight per unit width (ton/m)	6,77





Hydraulic waterways

Wet surface - WS (m^2)	65,82
Wet perimeter* WP (m)	25,52

* dimensions given for 1 meter freeboard

Unfactored footing reactions

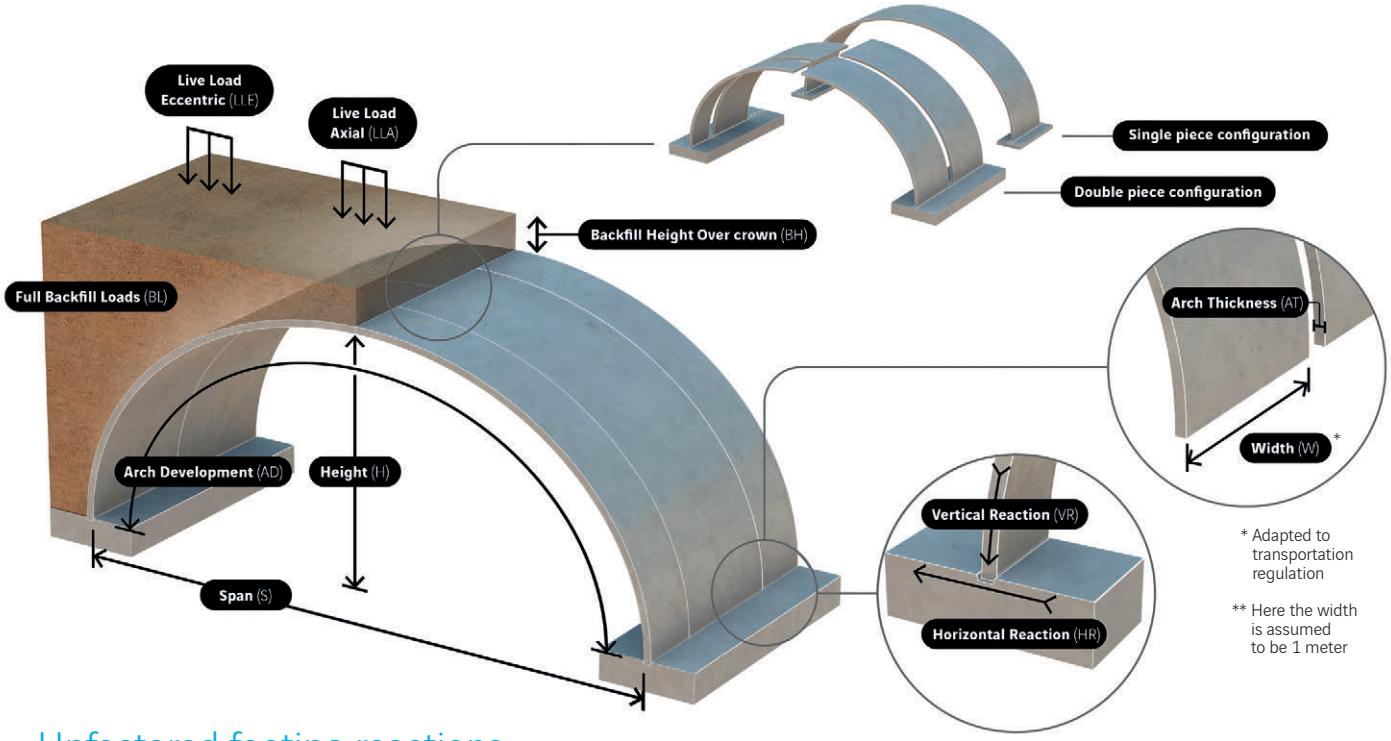
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1200/I reactions (kN/m)	Arch SW*	19	73	19	73	19	73	19	73	19	73
	BL	-66	342	-69	472	-71	609	-73	750	-75	892
	LLA	-68	443	-69	580	-71	713	-73	847	-75	981
	LLE	-54	539	-57	657	-60	775	-63	897	-66	1019
	SH**	-97	459	-105	614	-106	762	-110	913	-112	1063
	SV**	-72	439	-76	605	-97	938	-81	940	-84	1105

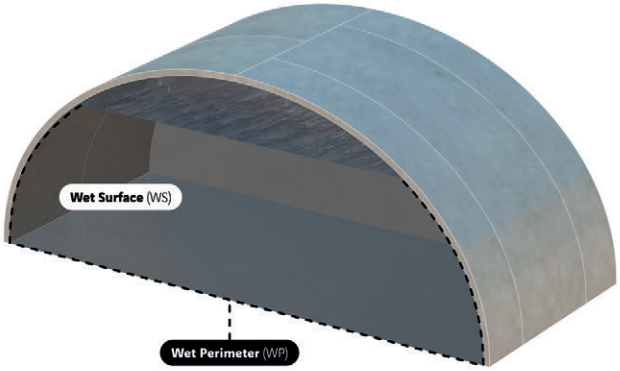
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	12,46
Height - H (m)	3,25
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	15,31
Element Weight per unit width (ton/m)	5,74





Hydraulic waterways

Wet surface - WS (m^2)	24,16
Wet perimeter* WP (m)	18,71

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/A reactions (kN/m)	Arch SW*	54	59	54	59	54	59	54	59	54	59
	BL	182	295	290	429	397	563	504	697	609	832
	LLA	365	464	463	589	558	714	645	833	732	952
	LLE	367	504	444	604	526	715	615	833	732	953
	SH**	241	317	389	480	539	650	686	819	833	990
	SV**	229	350	366	515	501	681	634	846	766	1012

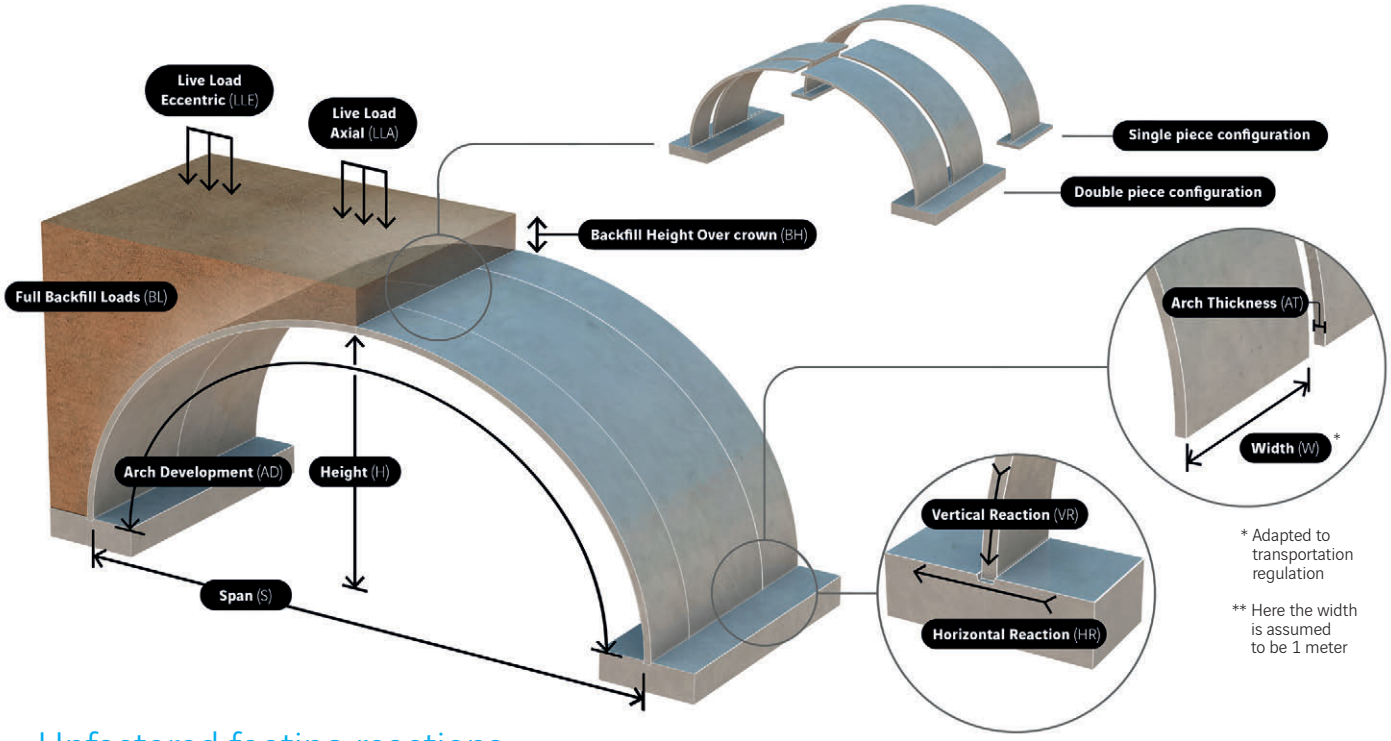
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

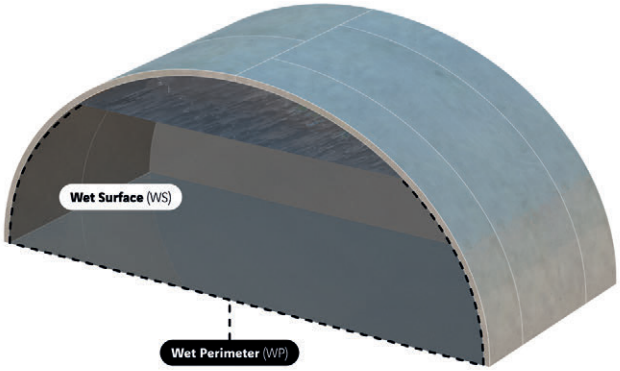
Contact us to confirm compliance with local requirements

TS-F_1400/B

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	12,94
Height - H (m)	3,75
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	16,42
Element Weight per unit width (ton/m)	6,16





Hydraulic waterways

Wet surface - WS (m^2)	30,51
Wet perimeter* WP (m)	20,3

* dimensions given for 1 meter freeboard

Unfactored footing reactions

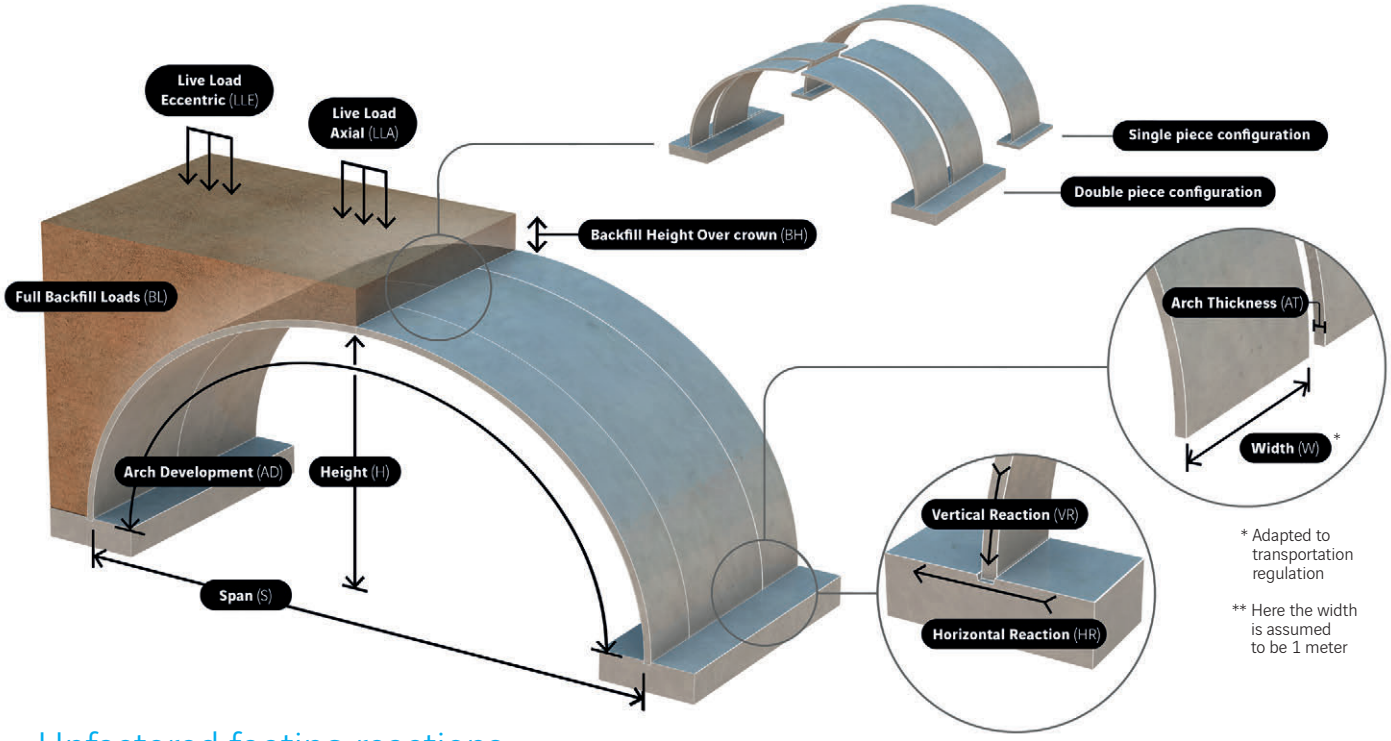
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/B reactions (kN/m)	Arch SW*	49	66	49	66	49	66	49	66	49	66
	BL	148	325	241	470	333	615	426	760	516	905
	LLA	300	495	385	632	468	769	545	899	620	1029
	LLE	311	546	378	658	450	778	525	905	621	1034
	SH**	169	344	313	517	453	696	584	877	710	1060
	SV**	187	386	306	564	423	743	538	921	653	1100

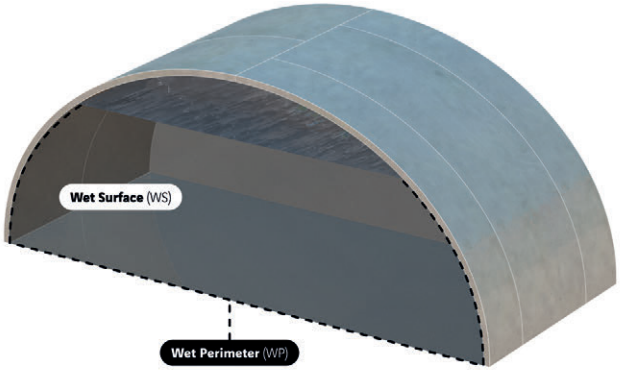
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	13,32
Height - H (m)	4,25
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	17,49
Element Weight per unit width (ton/m)	6,56





Hydraulic waterways

Wet surface - WS (m^2)	37,08
Wet perimeter* WP (m)	21,75

* dimensions given for 1 meter freeboard

Unfactored footing reactions

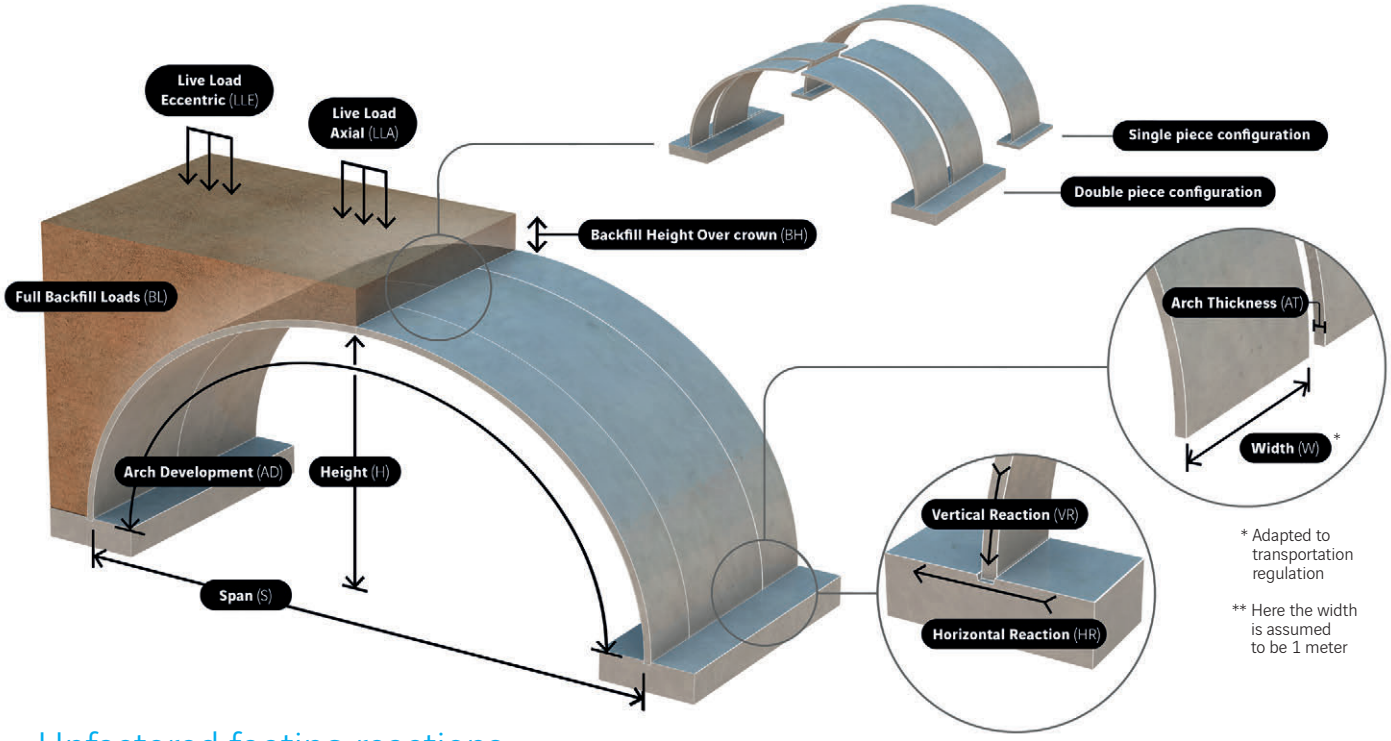
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/C reactions (kN/m)	Arch SW*	45	72	45	72	45	72	45	72	45	72
	BL	116	354	194	510	272	666	350	821	426	975
	LLA	237	524	311	674	381	821	448	963	513	1103
	LLE	258	588	315	710	375	839	439	973	514	1111
	SH**	100	369	240	552	369	740	486	932	592	1129
	SV**	147	420	248	612	348	803	446	994	544	1185

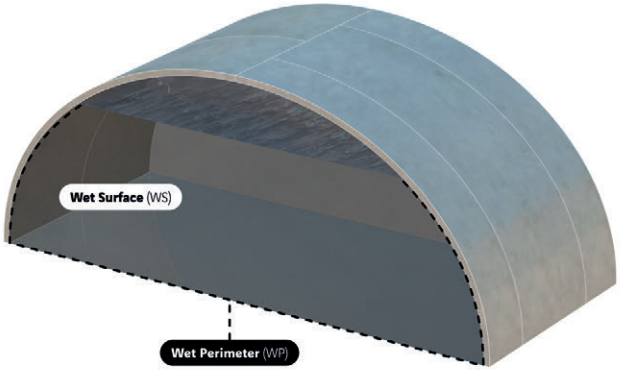
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	13,62
Height - H (m)	4,75
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	18,53
Element Weight per unit width (ton/m)	6,95





Hydraulic waterways

Wet surface - WS (m^2)	43,82
Wet perimeter* WP (m)	23,09

* dimensions given for 1 meter freeboard

Unfactored footing reactions

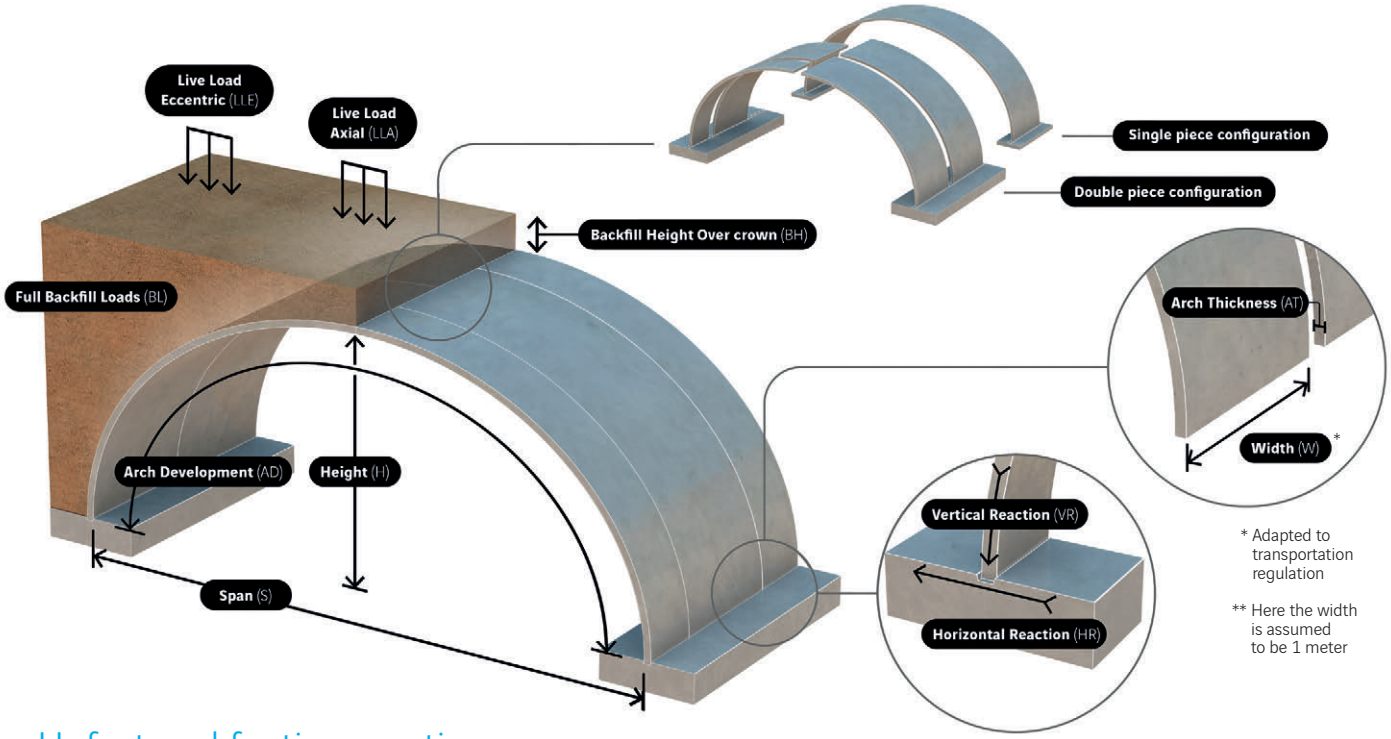
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/D reactions (kN/m)	Arch SW*	40	79	40	79	40	79	40	79	40	79
	BL	84	383	149	549	213	714	276	879	339	1044
	LLA	176	553	238	714	297	872	354	1026	408	1176
	LLE	206	628	254	761	303	898	355	1040	410	1187
	SH**	33	394	169	586	288	783	391	986	477	1195
	SV**	108	454	191	658	274	861	357	1064	438	1267

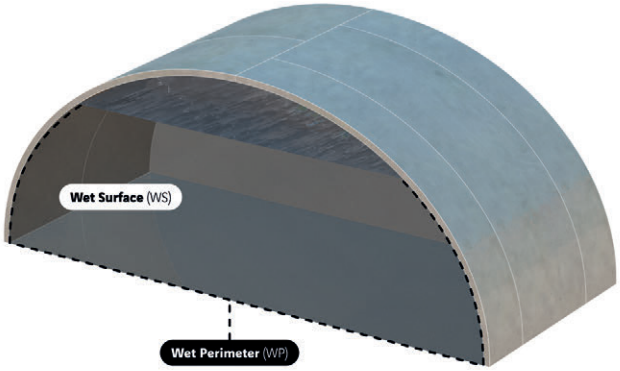
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	13,83
Height - H (m)	5,25
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	19,55
Element Weight per unit width (ton/m)	7,33





Hydraulic waterways

Wet surface - WS (m^2)	50,68
Wet perimeter* WP (m)	24,32

* dimensions given for 1 meter freeboard

Unfactored footing reactions

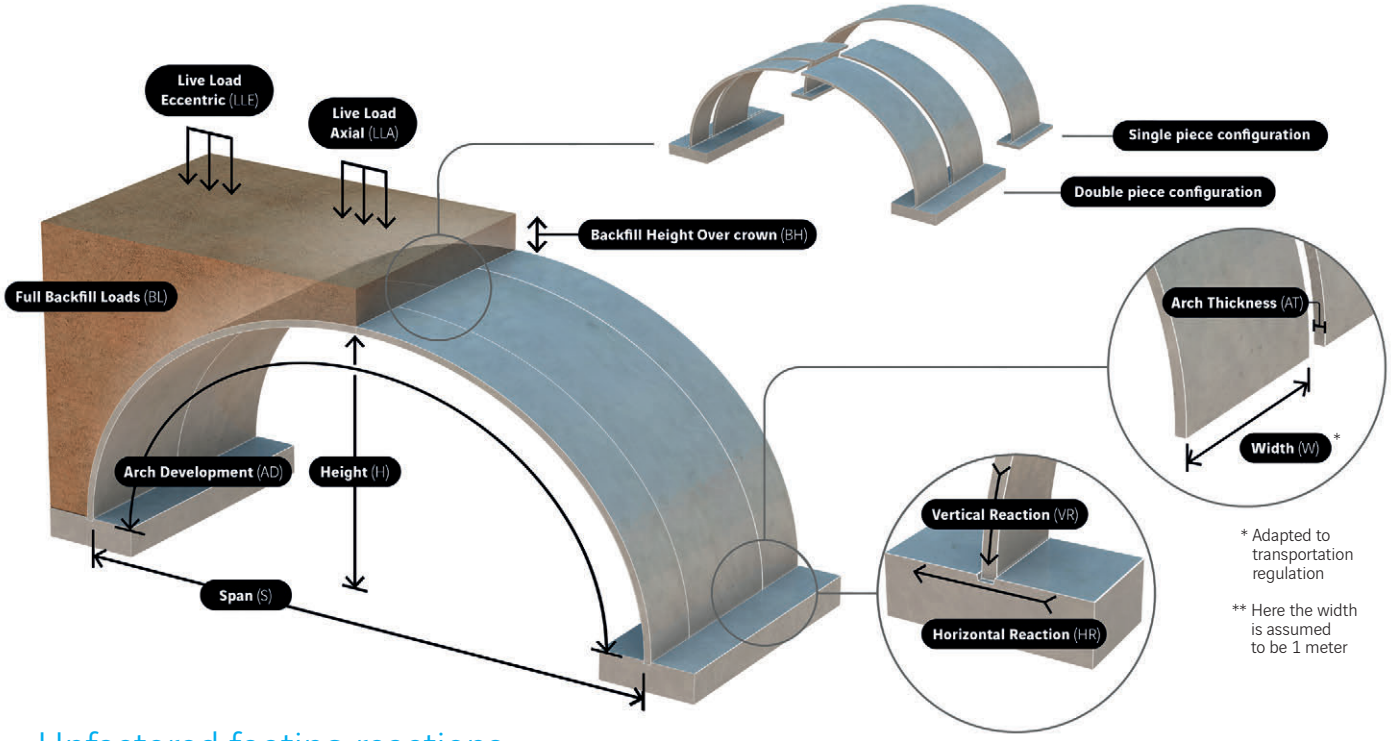
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/E reactions (kN/m)	Arch SW*	40	80	40	80	40	80	40	80	40	80
	BL	55	374	105	530	156	690	208	853	258	1013
	LLA	125	536	175	693	222	843	268	992	313	1139
	LLE	150	606	190	739	231	878	272	1018	313	1154
	SH**	16	396	65	556	213	737	290	938	366	1138
	SV**	75	448	139	634	205	829	272	1027	338	1228

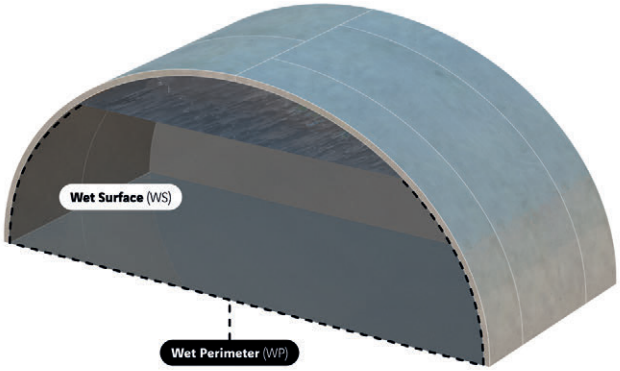
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	13,95
Height - H (m)	5,75
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	20,56
Element Weight per unit width (ton/m)	7,71





Hydraulic waterways

Wet surface - WS (m^2)	57,63
Wet perimeter* WP (m)	25,45

* dimensions given for 1 meter freeboard

Unfactored footing reactions

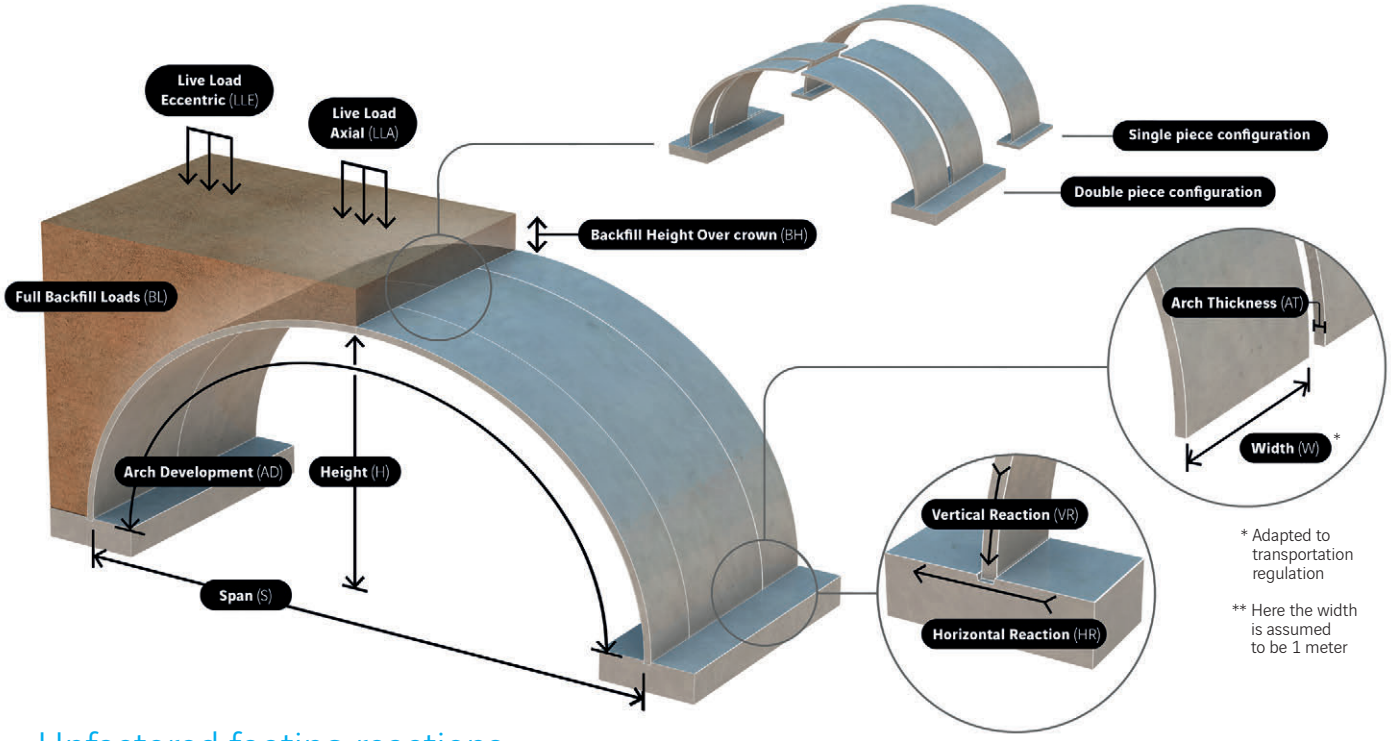
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/F reactions (kN/m)	Arch SW*	36	74	36	74	36	74	36	74	36	74
	BL	30	386	67	545	105	706	144	869	182	1032
	LLA	80	540	117	699	153	853	188	1005	222	1154
	LLE	104	632	133	769	162	908	193	1048	224	1188
	SH**	-20	445	16	609	91	780	138	957	183	1133
	SV**	33	483	80	672	126	864	172	1055	218	1246

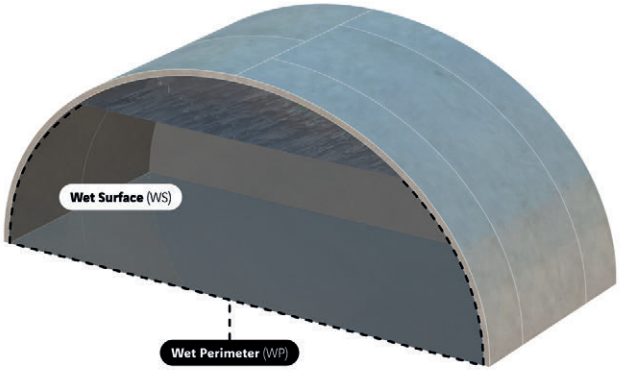
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	14,00
Height - H (m)	6,25
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	21,56
Element Weight per unit width (ton/m)	8,09





Hydraulic waterways

Wet surface - WS (m^2)	64,62
Wet perimeter* WP (m)	26,501

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/G reactions (kN/m)	Arch SW*	34	72	34	72	34	72	34	72	34	72
	BL	5	398	31	558	58	719	84	881	110	1045
	LLA	38	541	64	701	90	858	114	1013	138	1164
	LLE	59	651	79	789	99	929	120	1070	141	1211
	SH**	-52	488	-27	655	-3	820	21	983	43	1143
	SV**	-4	514	27	705	57	894	86	1080	115	1265

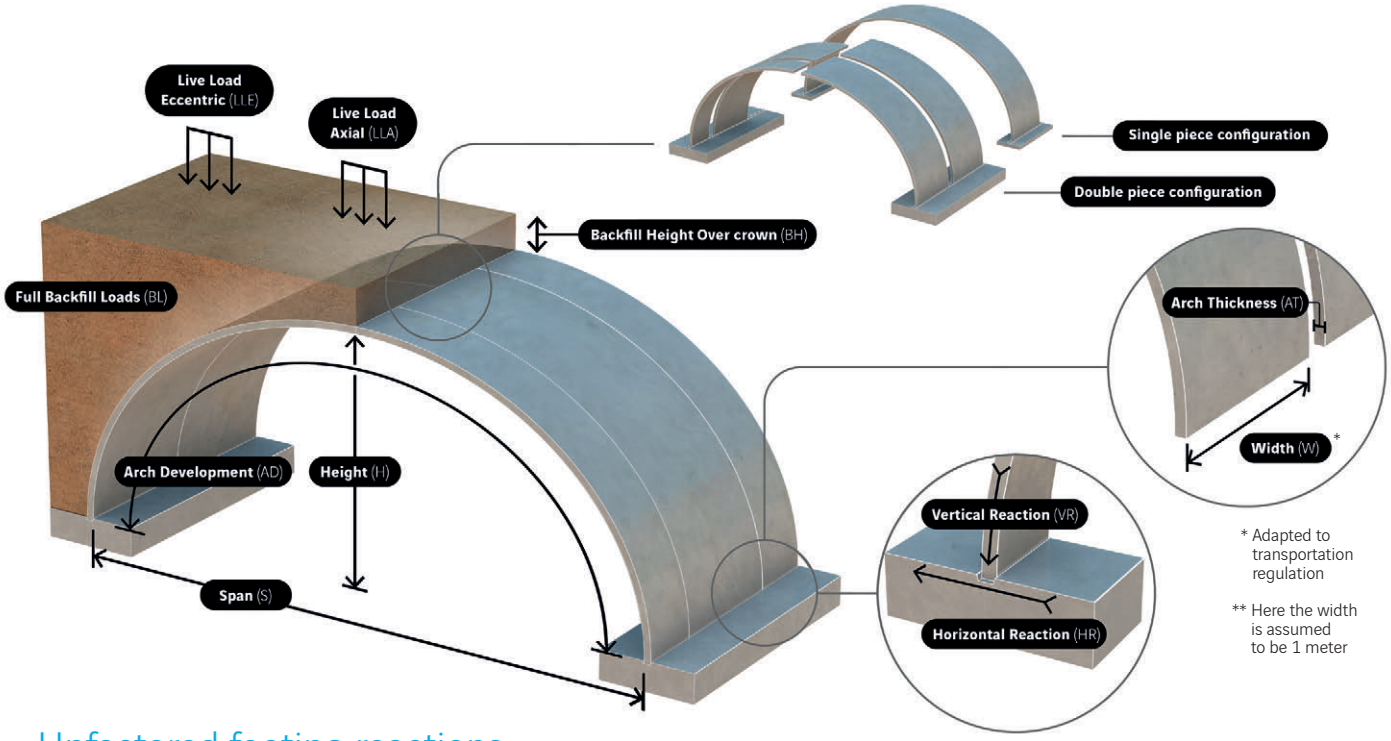
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

TS-F_1400/H

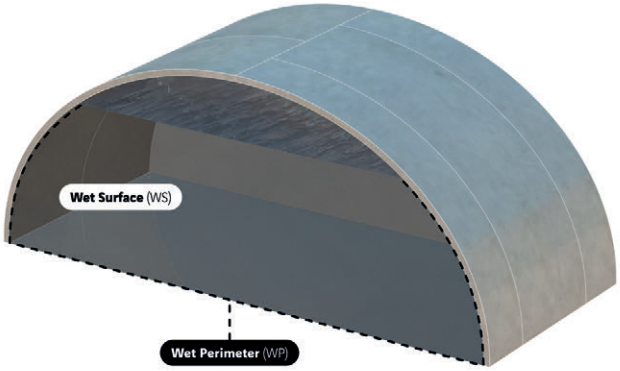
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	14,00
Height - H (m)	6,75
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	22,56
Element Weight per unit width (ton/m)	8,46



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	71,62
Wet perimeter* WP (m)	27,501

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/H reactions (kN/m)	Arch SW*	31	75	31	75	31	75	31	75	31	75
	BL	-20	409	-4	568	12	729	28	890	44	1054
	LLA	-1	541	15	701	31	860	47	1014	62	1167
	LLE	16	664	28	802	39	941	51	1082	64	1225
	SH**	-81	527	-66	697	-71	859	-62	1015	-56	1168
	SV**	-37	541	-19	732	-2	919	13	1104	28	1285

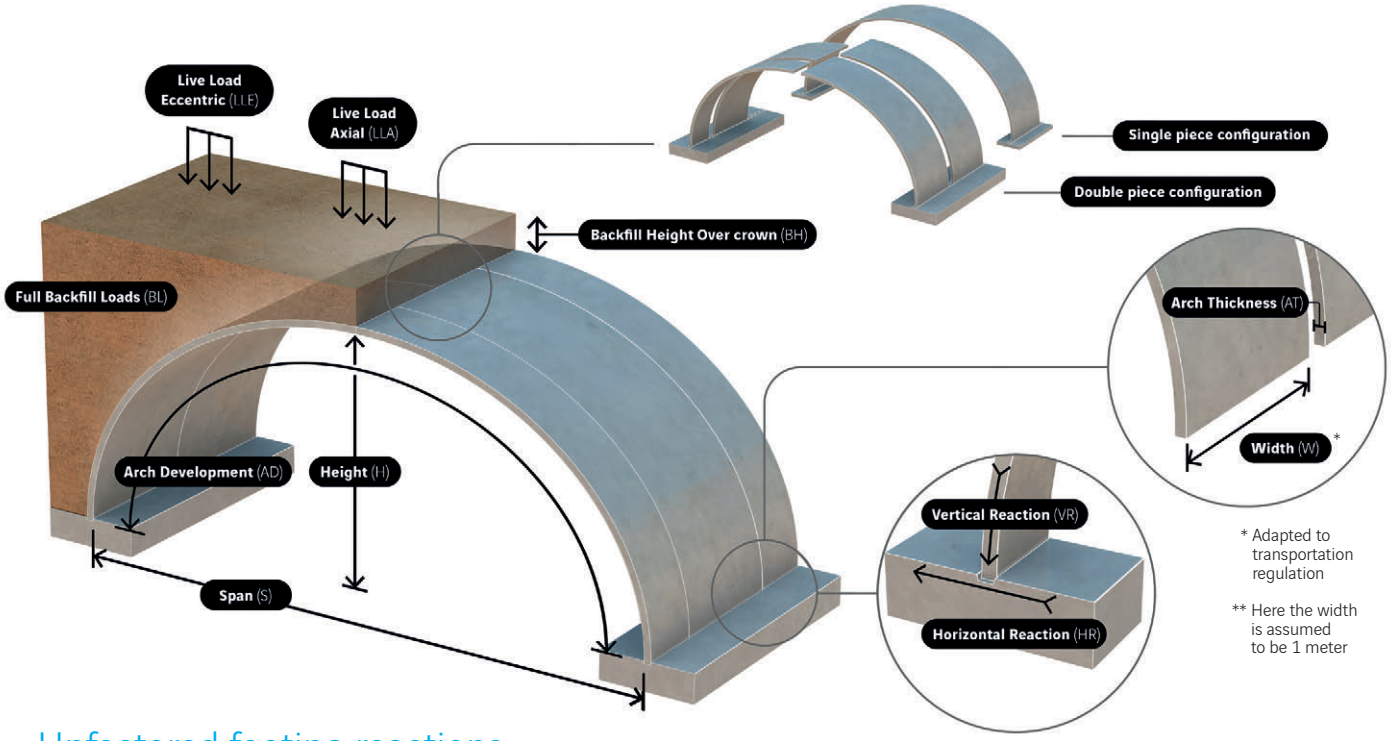
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

TS-F_1400/I

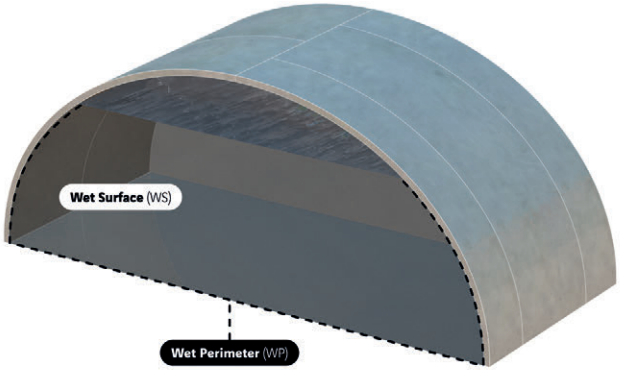
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	14,00
Height - H (m)	7,25
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	23,56
Element Weight per unit width (ton/m)	8,84



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	78,62
Wet perimeter* WP (m)	28,501

* dimensions given for 1 meter freeboard

Unfactored footing reactions

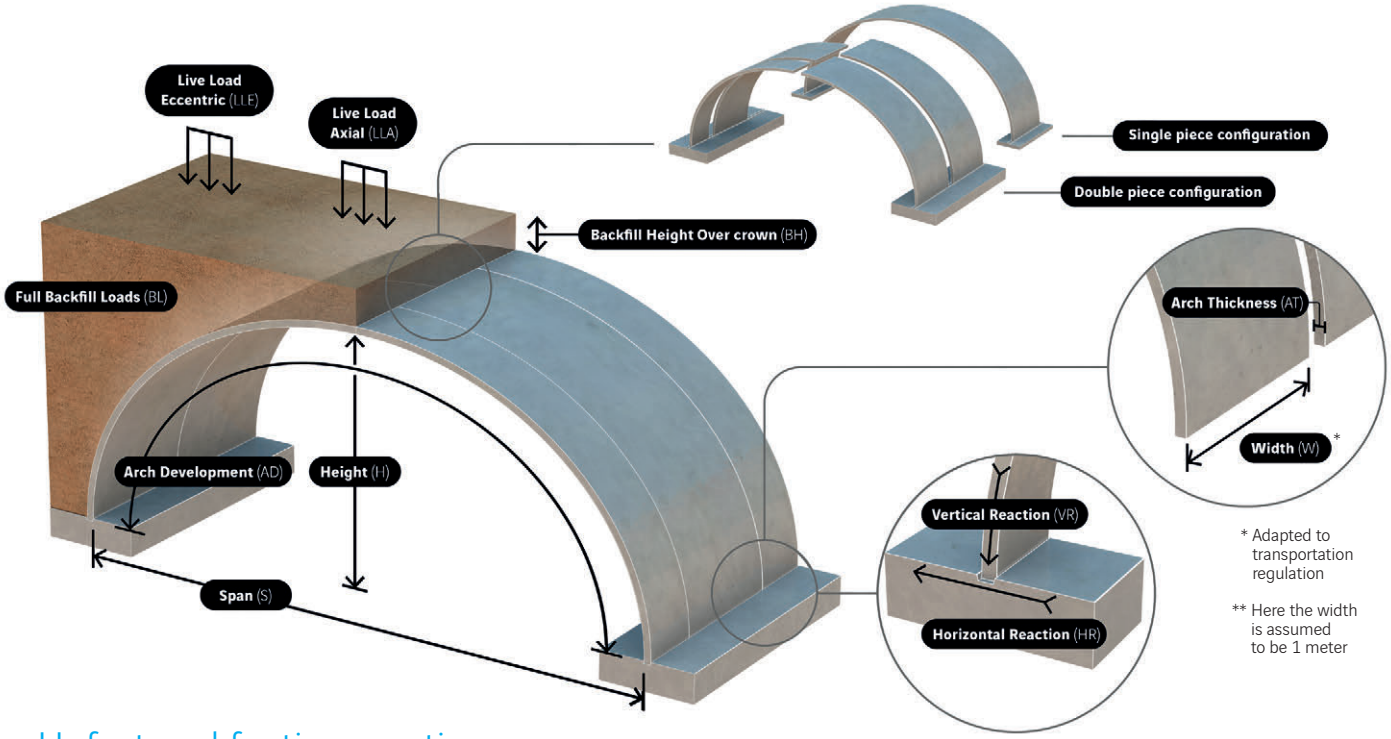
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/I reactions (kN/m)	Arch SW*	28	83	28	83	28	83	28	83	28	83
	BL	-45	420	-38	576	-31	735	-25	895	-18	1059
	LLA	-37	537	-30	698	-22	856	-16	1011	-9	1165
	LLE	-24	670	-21	806	-17	946	-12	1086	-7	1230
	SH**	-106	561	-100	734	-113	896	-112	1055	-116	1209
	SV**	-66	565	-59	754	-53	940	-47	1124	-42	1307

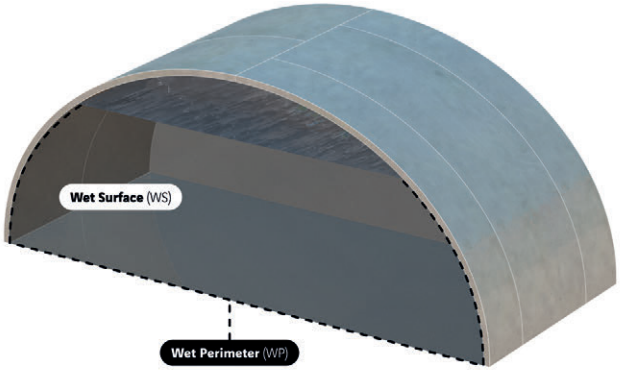
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	14,00
Height - H (m)	7,75
Arch Thickness - AT (mm)	300
Arch Development - AD (m)	24,56
Element Weight per unit width (ton/m)	9,21





Hydraulic waterways

Wet surface - WS (m^2)	85,62
Wet perimeter* WP (m)	29,501

* dimensions given for 1 meter freeboard

Unfactored footing reactions

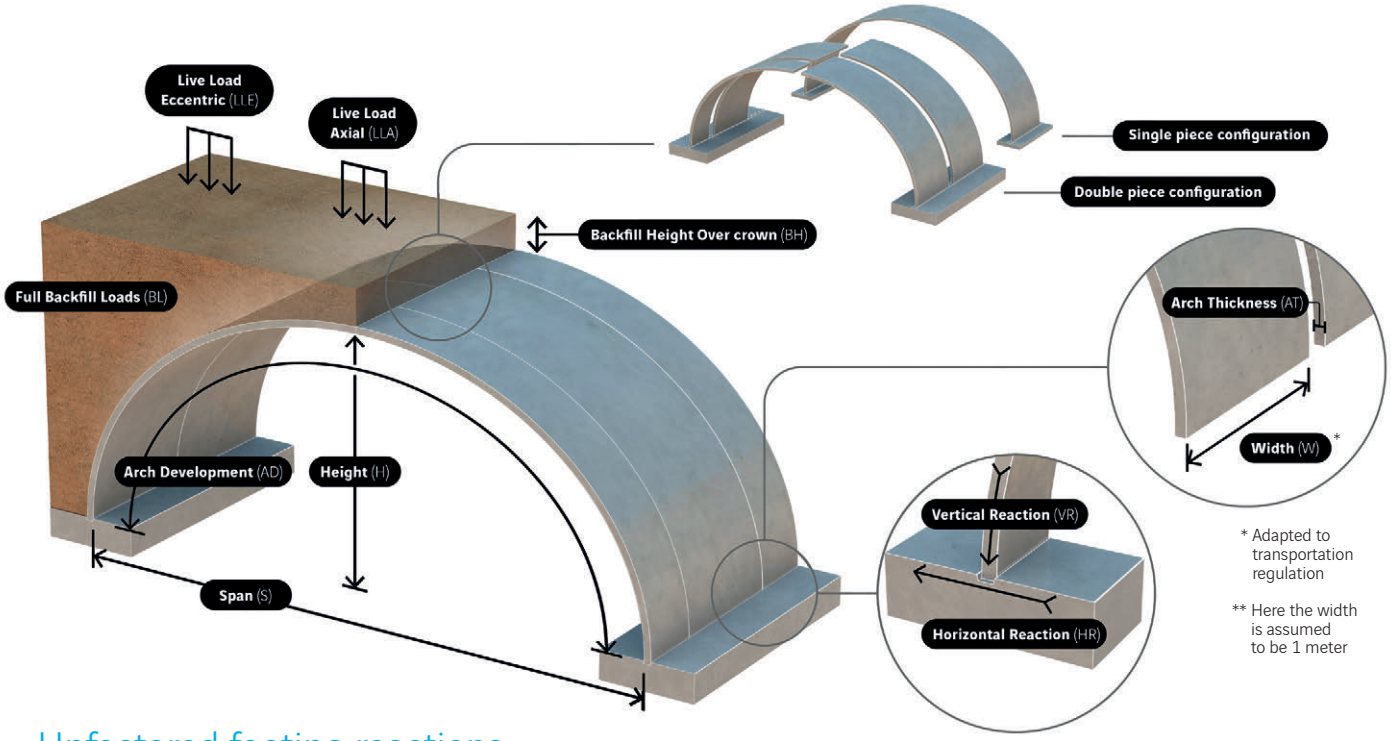
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1400/J reactions (kN/m)	Arch SW*	26	96	26	96	26	96	26	96	26	96
	BL	-70	431	-71	581	-72	739	-73	897	-74	1059
	LLA	-69	532	-70	692	-71	849	-72	1002	-73	1157
	LLE	-63	669	-66	802	-68	942	-70	1081	-72	1224
	SH**	-127	590	-130	766	-129	932	-127	1101	-135	1264
	SV**	-91	585	-93	771	-93	957	-94	1143	-97	1330

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

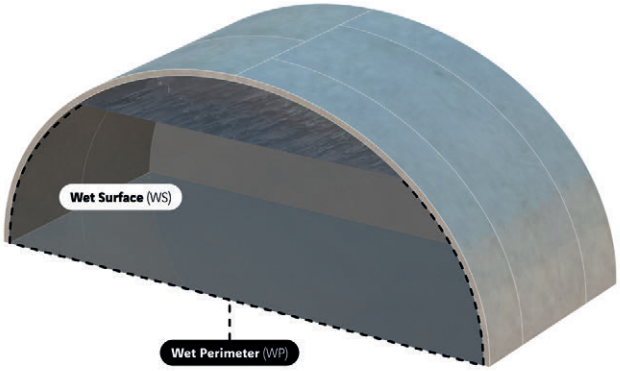
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	14,84
Height - H (m)	4,25
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	18,81
Element Weight per unit width (ton/m)	8,23



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	41,05
Wet perimeter* WP (m)	23,67

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/A reactions (kN/m)	Arch SW*	61	85	61	85	61	85	61	85	61	85
	BL	176	401	279	570	380	737	481	905	579	1071
	LLA	323	583	421	748	512	903	601	1059	689	1213
	LLE	333	634	413	772	493	915	579	1065	666	1216
	SH**	224	412	364	614	510	831	651	1043	796	1256
	SV**	187	474	301	668	475	874	604	1086	732	1293

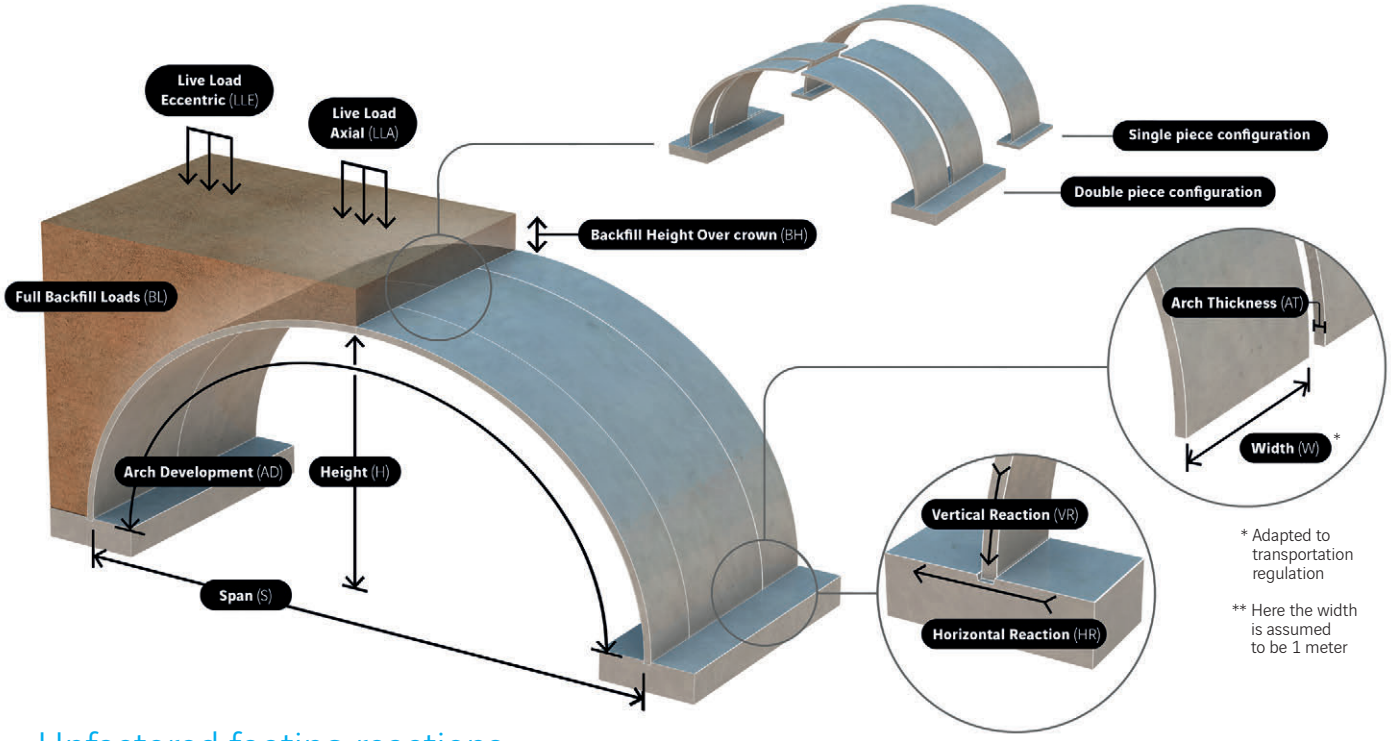
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

TS-F_1600/B

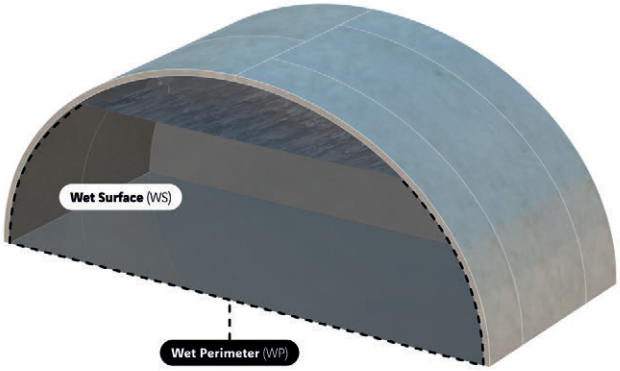
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	15,22
Height - H (m)	4,75
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	19,87
Element Weight per unit width (ton/m)	8,69



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	48,55
Wet perimeter* WP (m)	25,12

* dimensions given for 1 meter freeboard

Unfactored footing reactions

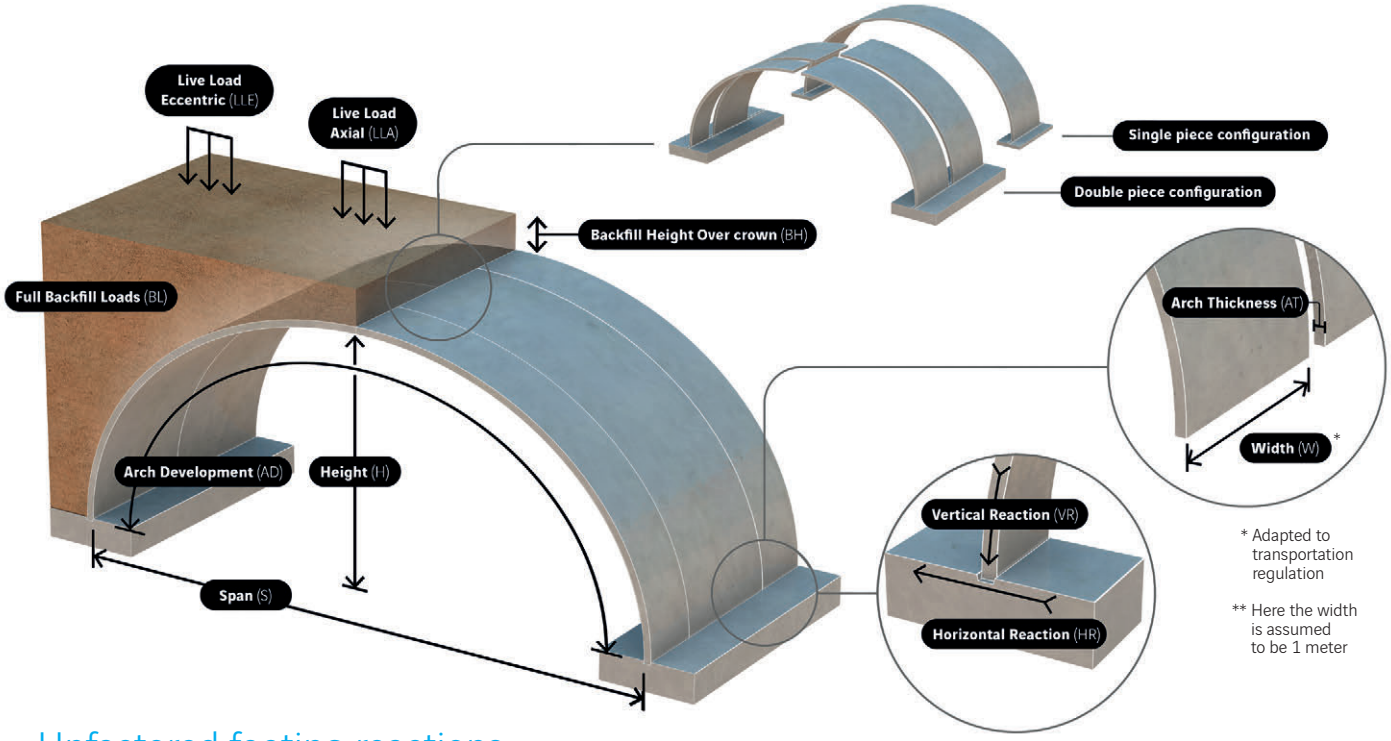
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/B reactions (kN/m)	Arch SW*	58	92	58	92	58	92	58	92	58	92
	BL	144	423	233	597	322	771	410	945	499	1120
	LLA	267	597	353	768	434	933	514	1096	593	1259
	LLE	287	662	356	806	427	955	502	1111	579	1269
	SH**	133	437	288	639	434	853	565	1069	686	1291
	SV**	165	501	270	707	406	920	520	1137	633	1352

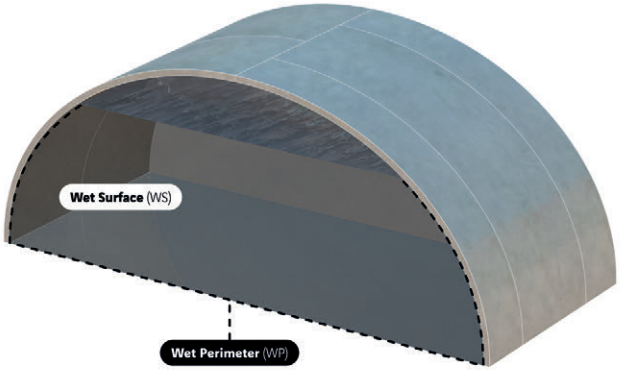
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	15,52
Height - H (m)	5,25
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	20,91
Element Weight per unit width (ton/m)	9,15





Hydraulic waterways

Wet surface - WS (m^2)	56,25
Wet perimeter* WP (m)	26,47

* dimensions given for 1 meter freeboard

Unfactored footing reactions

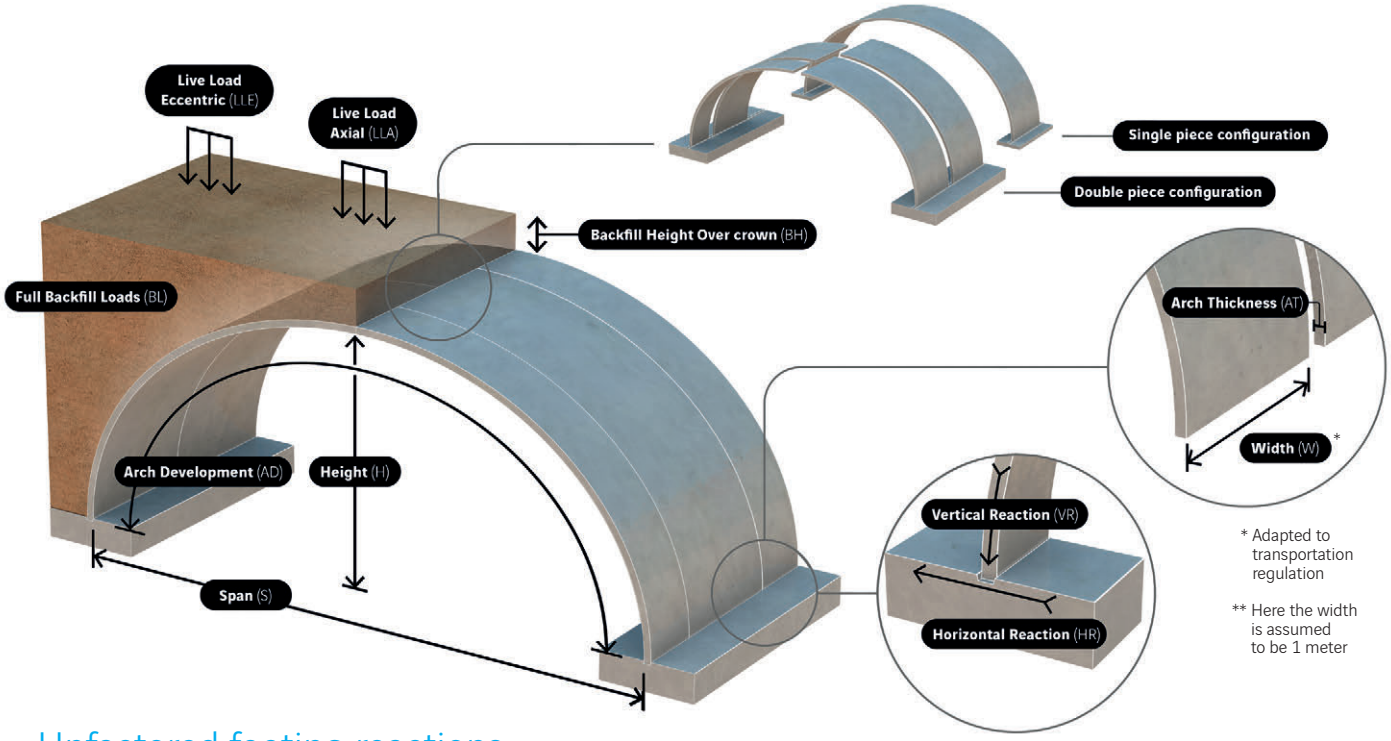
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/C reactions (kN/m)	Arch SW*	54	98	54	98	54	98	54	98	54	98
	BL	112	445	188	624	265	804	342	985	419	1167
	LLA	212	612	286	787	358	961	429	1133	498	1303
	LLE	241	690	301	840	363	995	427	1155	494	1321
	SH**	44	462	213	663	359	874	481	1095	579	1325
	SV**	143	527	241	745	339	965	437	1187	536	1411

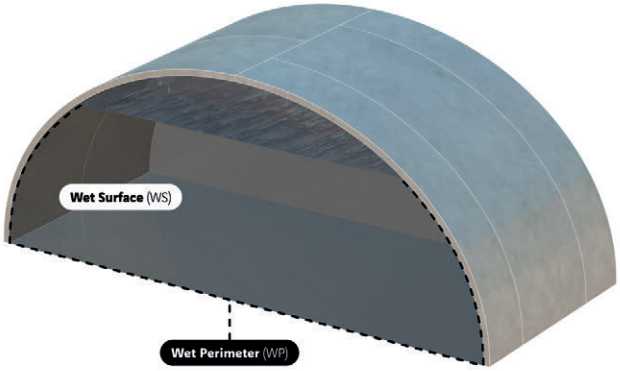
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	15,75
Height - H (m)	5,75
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	21,94
Element Weight per unit width (ton/m)	9,60





Hydraulic waterways

Wet surface - WS (m^2)	64,06
Wet perimeter* WP (m)	27,72

* dimensions given for 1 meter freeboard

Unfactored footing reactions

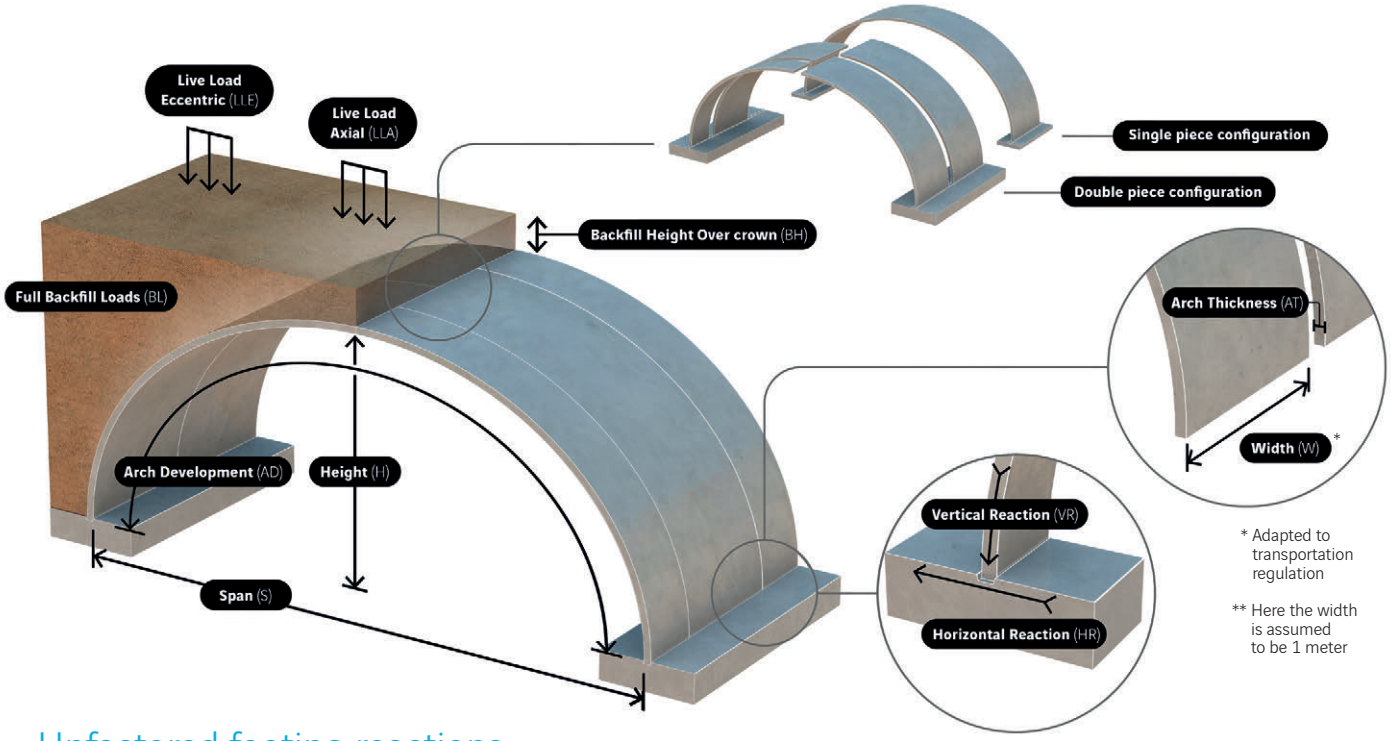
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/D reactions (kN/m)	Arch SW*	58	111	58	111	58	111	58	111	58	111
	BL	83	480	149	669	214	859	280	1052	347	1245
	LLA	169	653	235	847	298	1035	359	1219	417	1397
	LLE	196	767	250	932	305	1099	360	1270	417	1442
	SH**	13	549	39	718	126	917	272	1144	479	1401
	SV**	83	598	147	813	230	1036	331	1266	450	1502

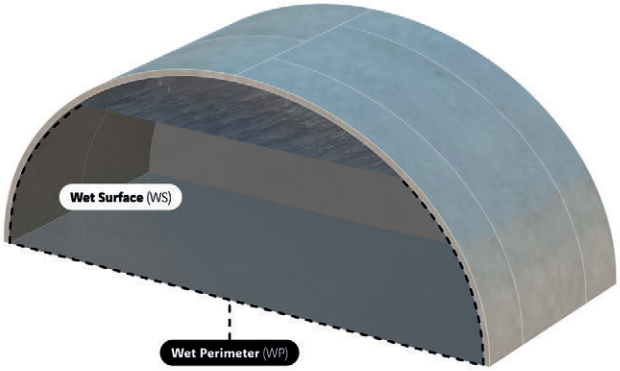
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	15,90
Height - H (m)	6,25
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	22,95
Element Weight per unit width (ton/m)	10,04





Hydraulic waterways

Wet surface - WS (m^2)	71,96
Wet perimeter* WP (m)	28,89

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/E reactions (kN/m)	Arch SW*	54	116	54	116	54	116	54	116	54	116
	BL	52	469	102	652	152	835	202	1019	252	1204
	LLA	114	630	164	816	213	998	259	1174	304	1346
	LLE	141	743	182	904	223	1066	265	1229	307	1393
	SH**	-6	545	16	724	86	915	205	1116	372	1329
	SV**	53	593	102	805	166	1018	244	1232	337	1447

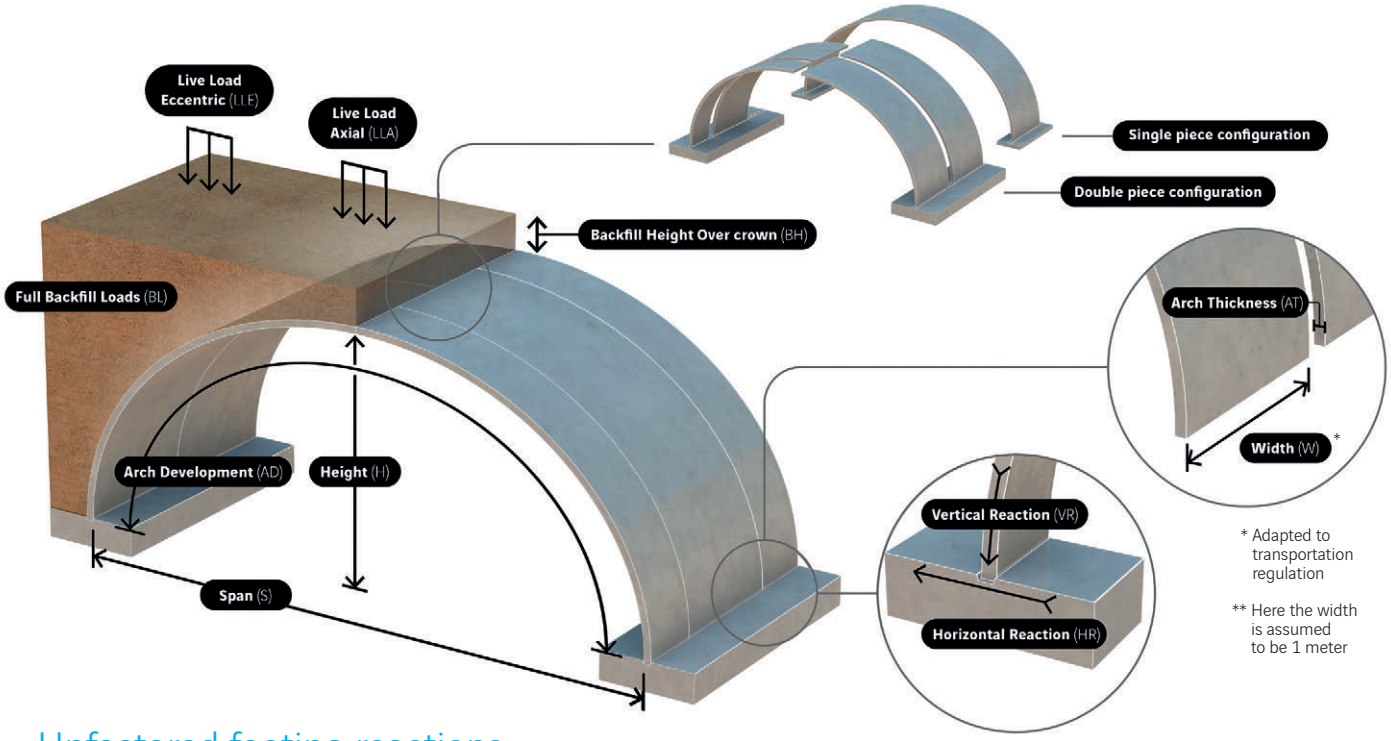
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

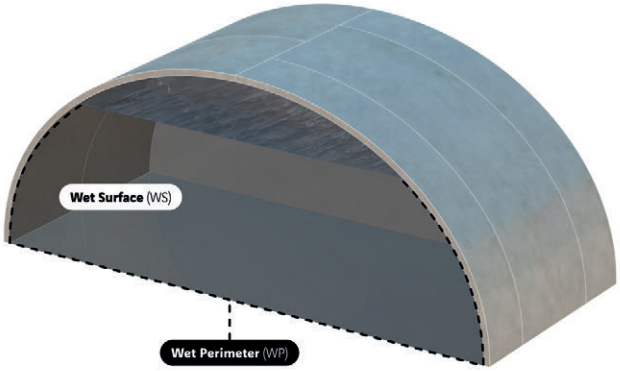
Contact us to confirm compliance with local requirements

TS-F_1600/F

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	15,99
Height - H (m)	6,75
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	23,95
Element Weight per unit width (ton/m)	10,48





Hydraulic waterways

Wet surface - WS (m^2)	79,93
Wet perimeter* WP (m)	29,97

* dimensions given for 1 meter freeboard

Unfactored footing reactions

Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/F reactions (kN/m)	Arch SW*	47	101	47	101	47	101	47	101	47	101
	BL	18	478	53	657	88	838	124	1021	159	1205
	LLA	60	626	95	808	130	988	164	1164	197	1337
	LLE	86	732	114	893	143	1055	173	1219	203	1385
	SH**	-46	563	-22	749	20	938	80	1131	158	1327
	SV**	12	599	49	811	92	1025	141	1239	195	1454

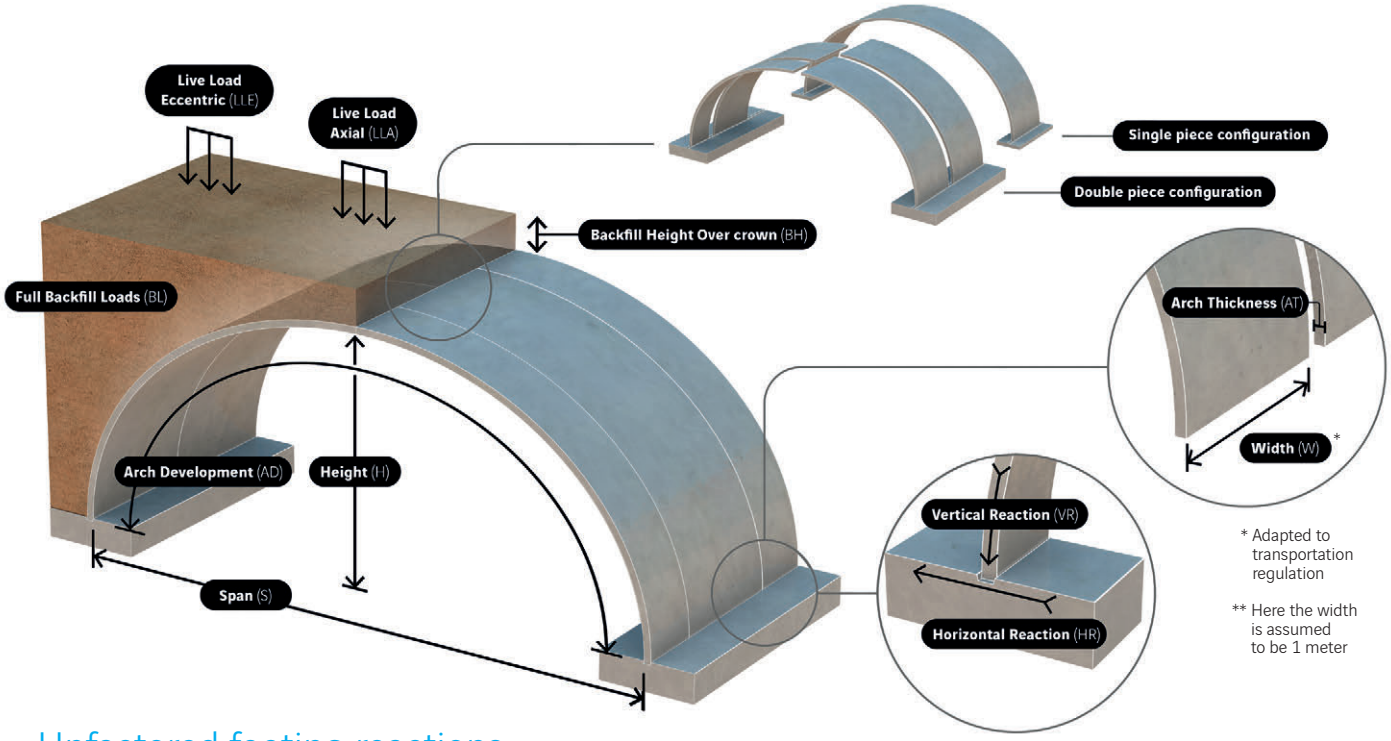
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

TS-F_1600/G

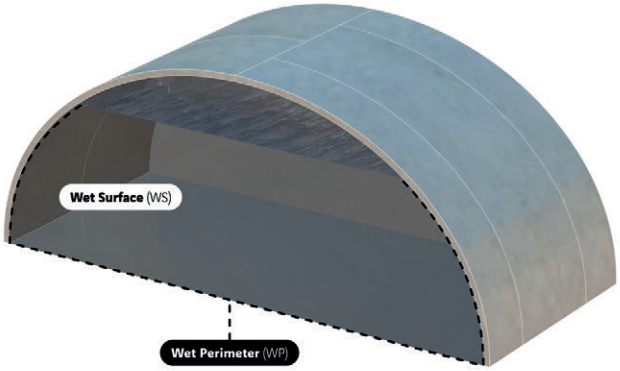
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	16,00
Height - H (m)	7,25
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	24,95
Element Weight per unit width (ton/m)	10,92



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	87,93
Wet perimeter* WP (m)	30,99

* dimensions given for 1 meter freeboard

Unfactored footing reactions

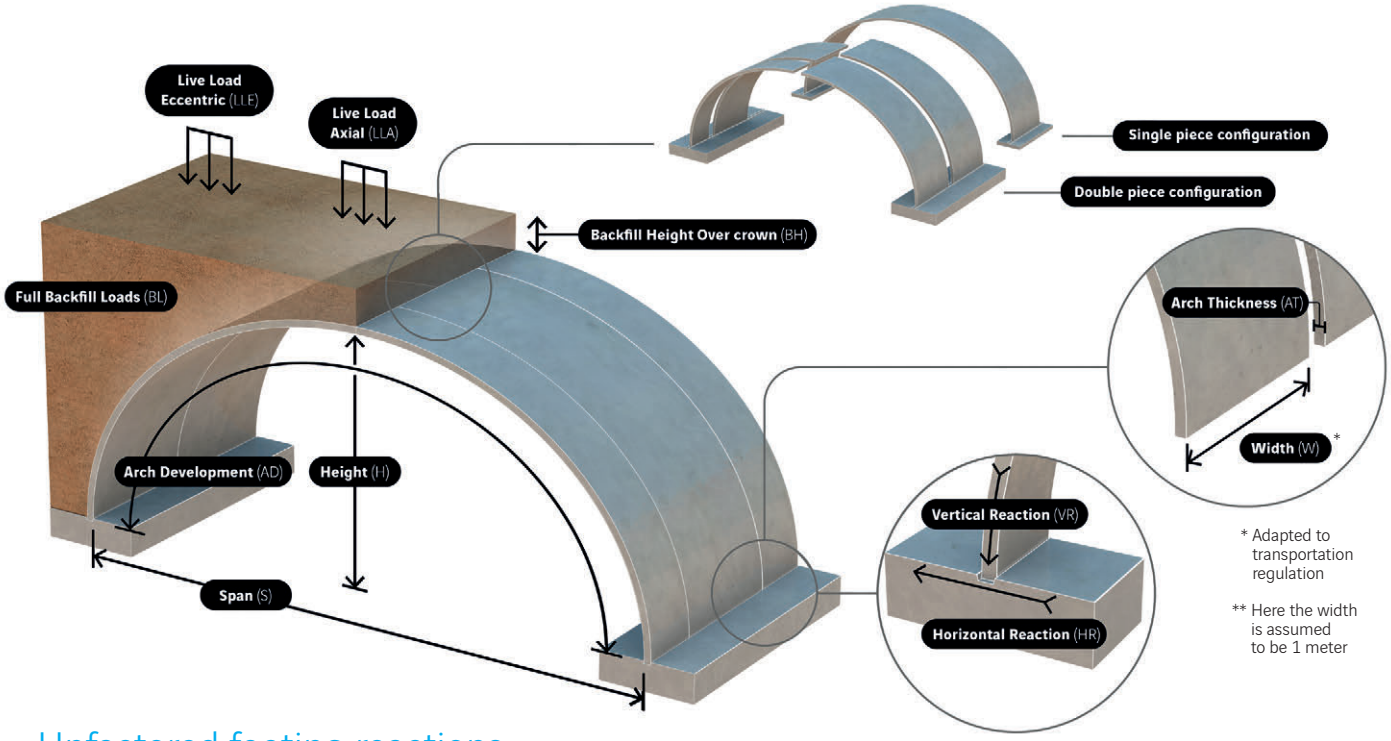
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/G reactions (kN/m)	Arch SW*	42	96	42	96	42	96	42	96	42	96
	BL	-15	488	8	665	31	844	54	1025	78	1208
	LLA	12	623	35	804	58	983	80	1159	102	1332
	LLE	36	727	53	887	72	1050	91	1215	111	1381
	SH**	-82	588	-59	779	-38	968	-19	1156	-1	1341
	SV**	-26	611	1	825	27	1038	53	1252	79	1466

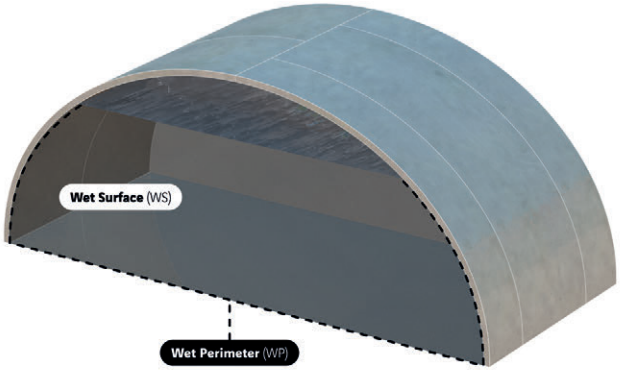
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	16,00
Height - H (m)	7,75
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	25,95
Element Weight per unit width (ton/m)	11,35





Hydraulic waterways

Wet surface - WS (m^2)	95,93
Wet perimeter* WP (m)	31,99

* dimensions given for 1 meter freeboard

Unfactored footing reactions

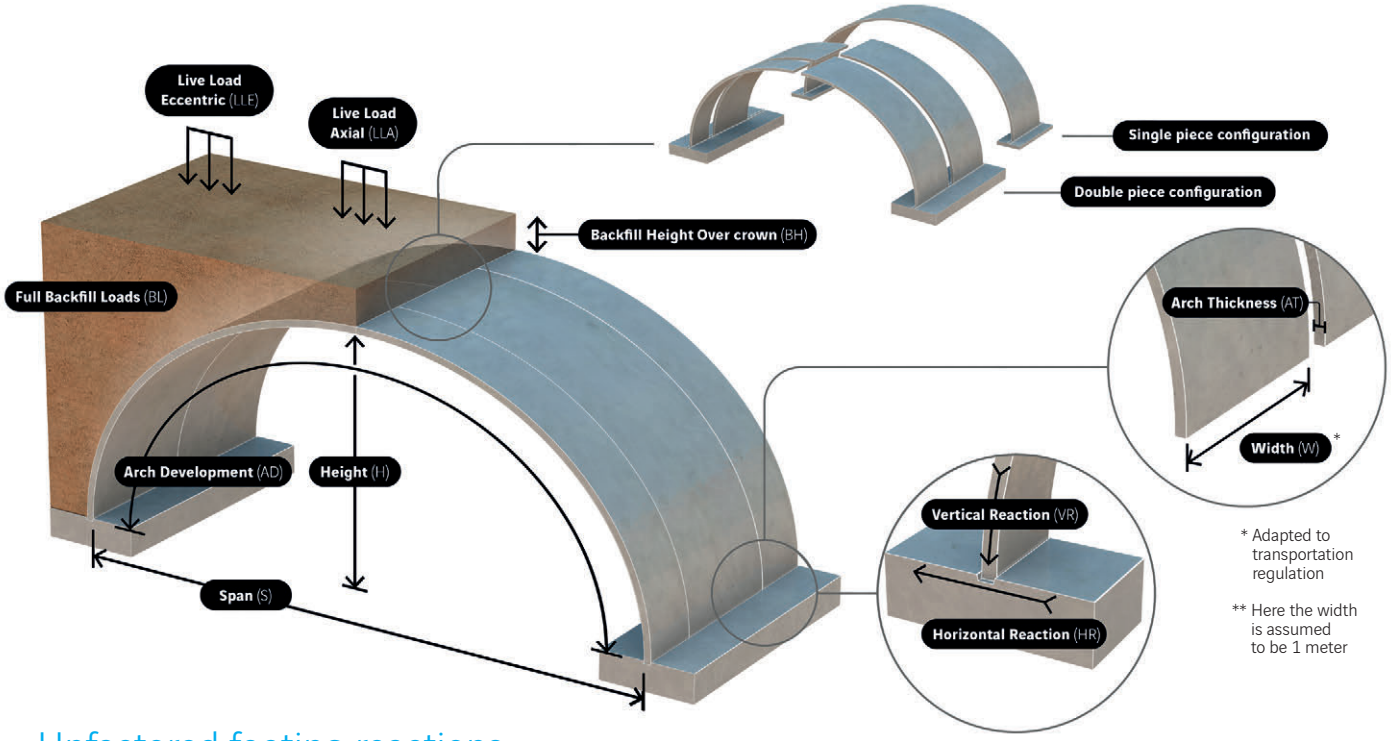
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/H reactions (kN/m)	Arch SW*	39	105	39	105	39	105	39	105	39	105
	BL	-43	496	-29	670	-16	847	-3	1025	9	1205
	LLA	-29	619	-15	800	-1	978	12	1153	24	1324
	LLE	-7	724	2	885	12	1047	22	1209	33	1373
	SH**	-107	618	-93	814	-82	1002	-74	1184	-69	1359
	SV**	-56	630	-41	843	-26	1054	-12	1263	0	1471

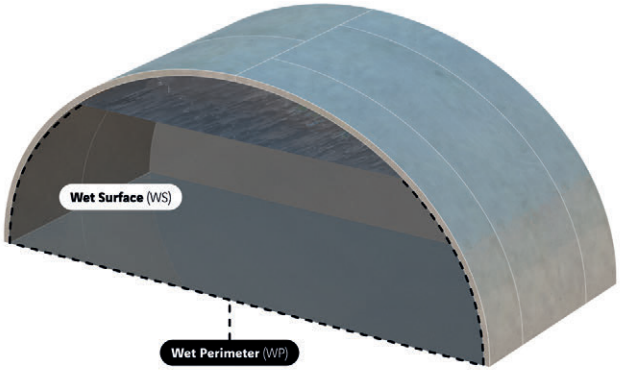
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	16,00
Height - H (m)	8,25
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	26,95
Element Weight per unit width (ton/m)	11,79





Hydraulic waterways

Wet surface - WS (m^2)	103,93
Wet perimeter* WP (m)	32,99

* dimensions given for 1 meter freeboard

Unfactored footing reactions

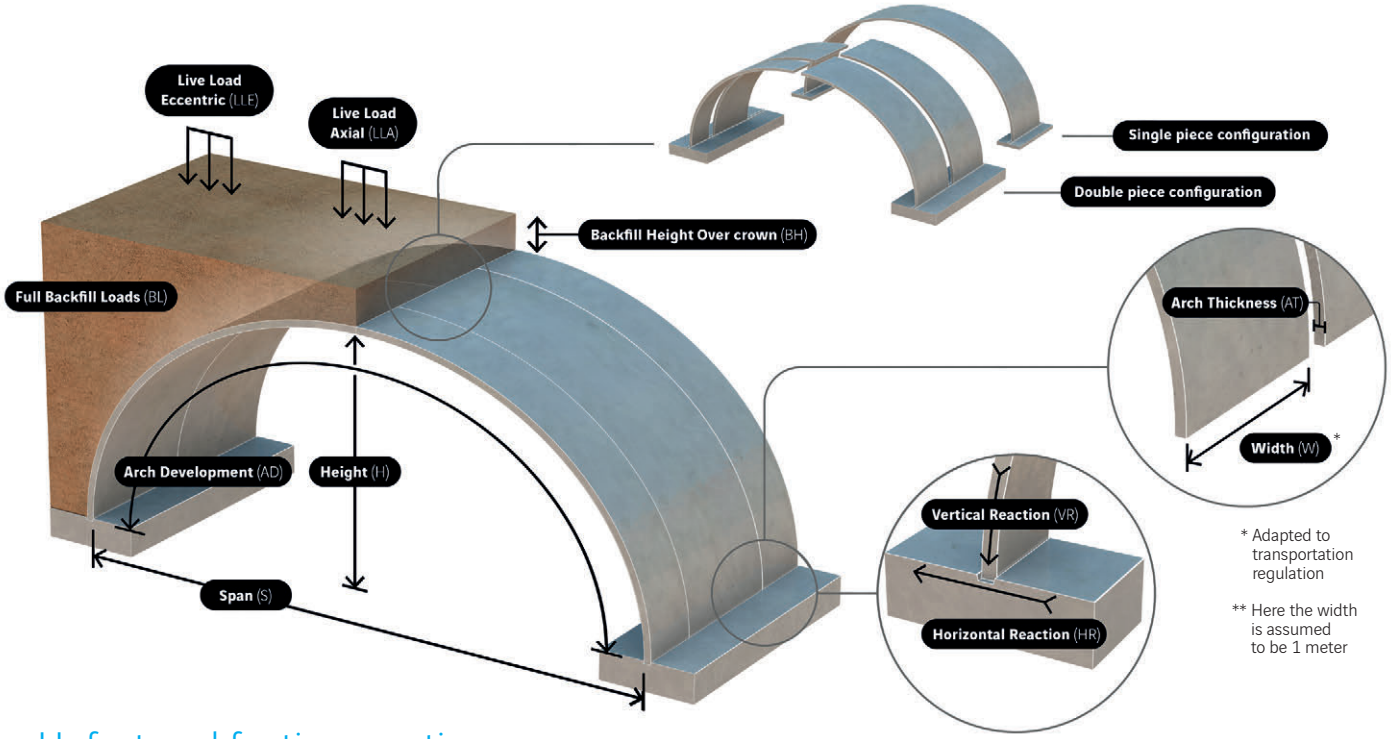
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/I reactions (kN/m)	Arch SW*	37	114	37	114	37	114	37	114	37	114
	BL	-72	512	-65	685	-59	860	-55	1038	-52	1218
	LLA	-66	623	-59	806	-53	985	-48	1161	-45	1333
	LLE	-47	730	-45	892	-42	1055	-39	1218	-35	1381
	SH**	-136	661	-131	859	-130	1050	-132	1233	-138	1410
	SV**	-88	657	-82	870	-77	1082	-74	1292	-71	1501

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

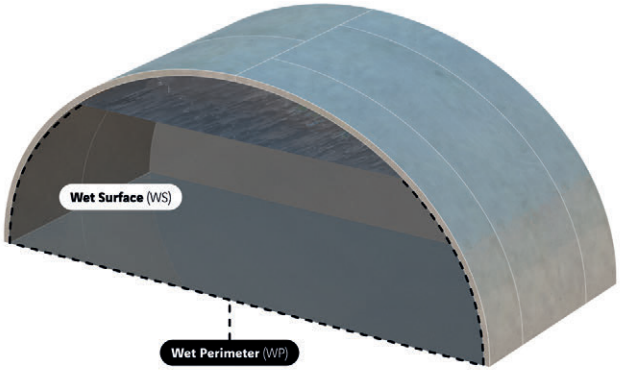
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	16,00
Height - H (m)	8,75
Arch Thickness - AT (mm)	350
Arch Development - AD (m)	27,95
Element Weight per unit width (ton/m)	12,23



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	111,93
Wet perimeter* WP (m)	33,99

* dimensions given for 1 meter freeboard

Unfactored footing reactions

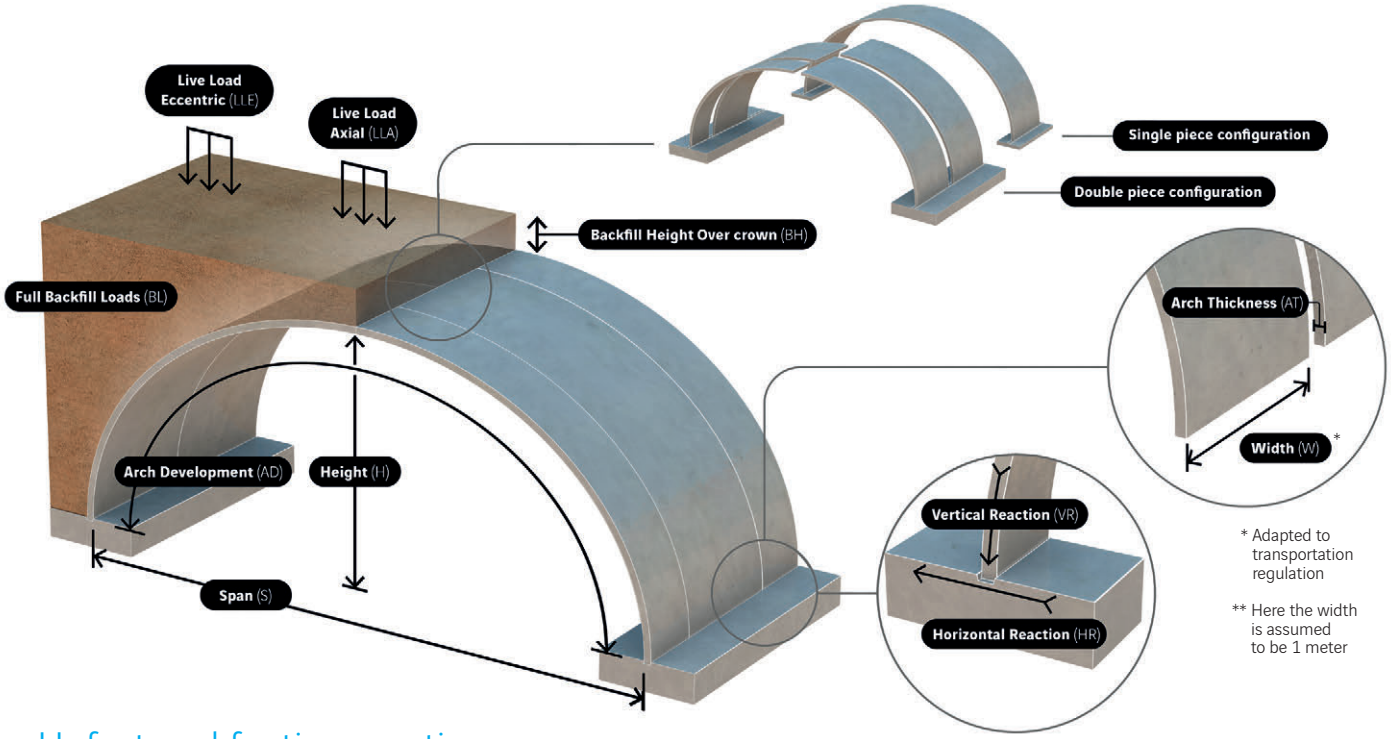
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1600/I reactions (kN/m)	Arch SW*	36	129	36	129	36	129	36	129	36	129
	BL	-98	532	-96	704	-96	880	-98	1057	-103	1237
	LLA	-97	631	-95	818	-95	1000	-97	1178	-101	1351
	LLE	-81	741	-85	906	-88	1070	-90	1234	-92	1397
	SH**	-164	713	-171	911	-174	1106	-174	1297	-170	1483
	SV**	-117	692	-121	905	-123	1118	-123	1330	-123	1541

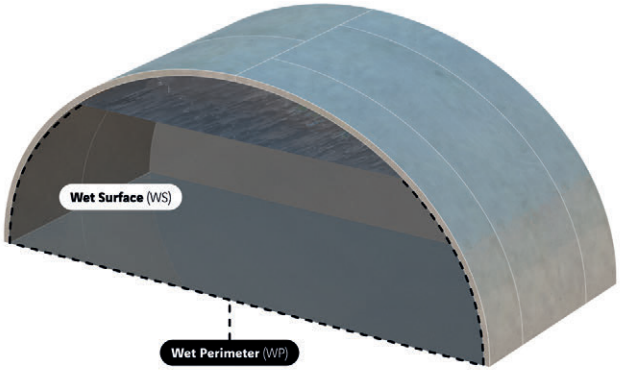
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	16,09
Height - H (m)	4,25
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	19,81
Element Weight per unit width (ton/m)	9,29





Hydraulic waterways

Wet surface - WS (m^2)	43,86
Wet perimeter* WP (m)	25,49

* dimensions given for 1 meter freeboard

Unfactored footing reactions

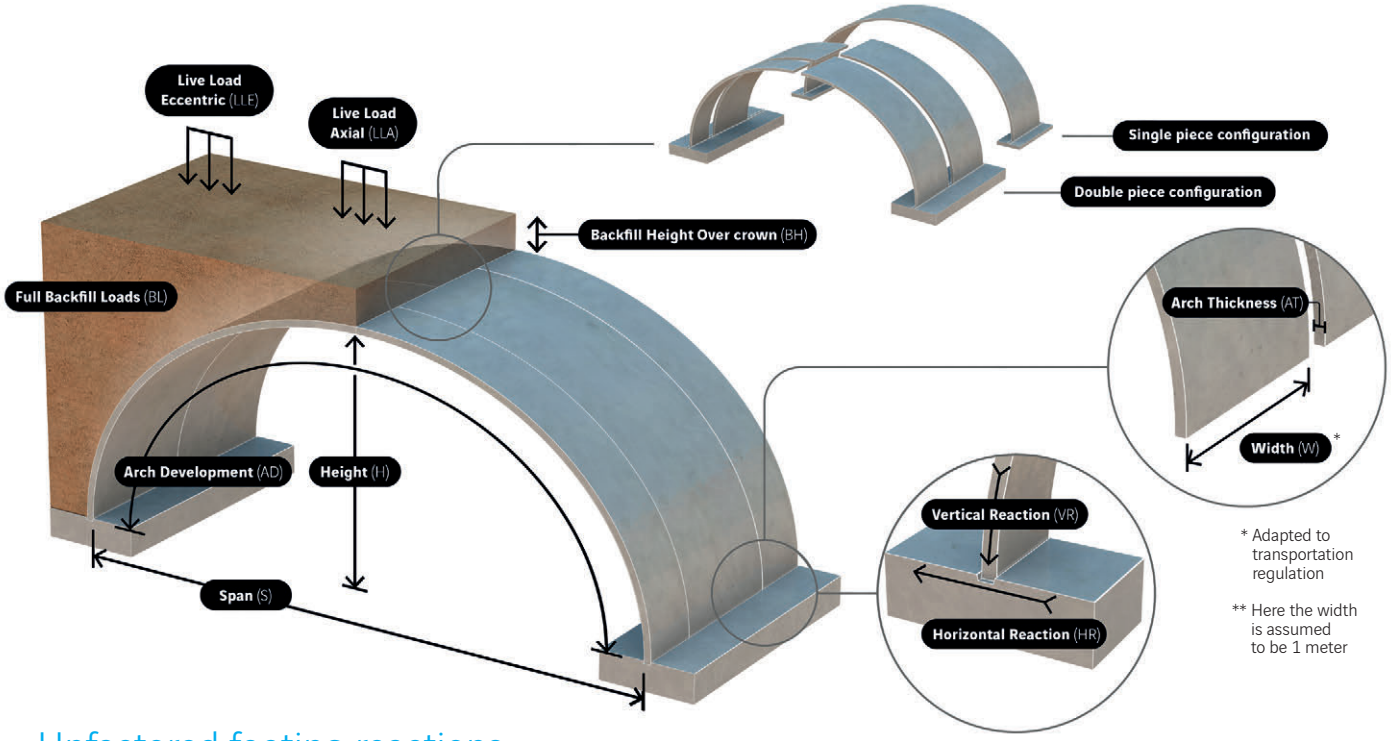
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/A reactions (kN/m)	Arch SW*	82	102	82	102	82	102	82	102	82	102
	BL	238	458	368	643	499	830	630	1016	761	1204
	LLA	419	647	547	829	670	1008	788	1183	902	1355
	LLE	434	712	535	864	640	1022	750	1187	865	1359
	SH**	304	479	492	710	678	943	863	1179	1046	1416
	SV**	254	539	450	769	634	999	804	1229	962	1459

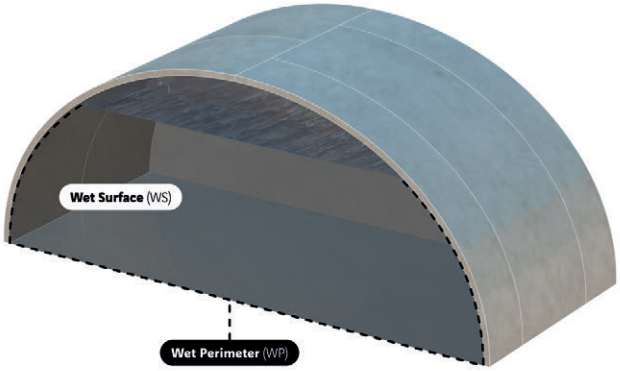
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	16,57
Height - H (m)	4,75
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	20,92
Element Weight per unit width (ton/m)	9,81





Hydraulic waterways

Wet surface - WS (m^2)	52,03
Wet perimeter* WP (m)	27,09

* dimensions given for 1 meter freeboard

Unfactored footing reactions

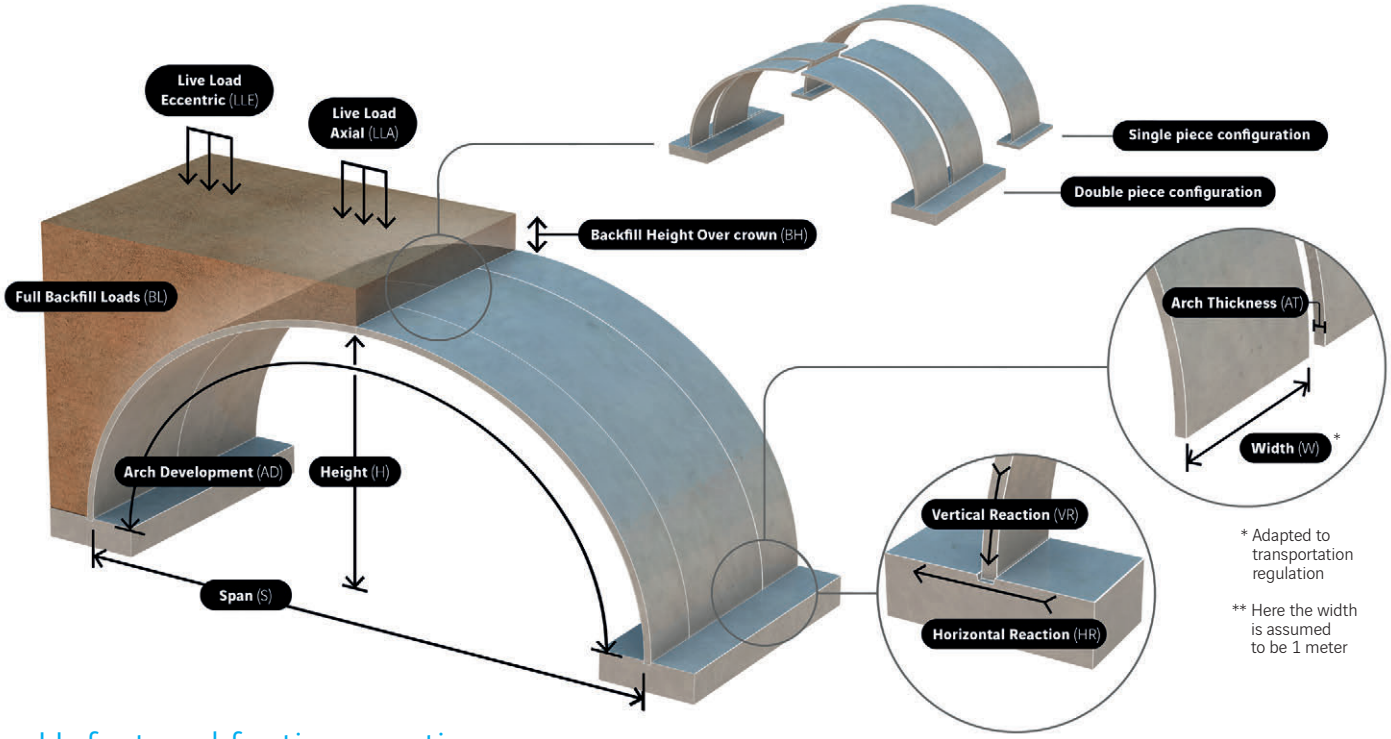
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/B reactions (kN/m)	Arch SW*	77	106	77	106	77	106	77	106	77	106
	BL	206	484	323	676	440	869	557	1061	674	1254
	LLA	362	668	477	857	587	1043	693	1224	796	1402
	LLE	384	746	474	905	569	1070	667	1240	770	1416
	SH**	222	513	407	728	582	952	750	1187	909	1433
	SV**	219	576	379	806	537	1038	692	1270	846	1503

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

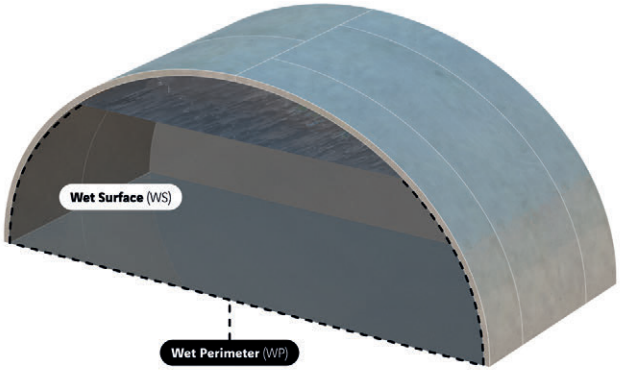
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	16,98
Height - H (m)	5,25
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	21,99
Element Weight per unit width (ton/m)	10,31



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	60,42
Wet perimeter* WP (m)	28,57

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/C reactions (kN/m)	Arch SW*	71	110	71	110	71	110	71	110	71	110
	BL	176	510	280	708	383	906	486	1104	589	1302
	LLA	307	688	409	884	507	1076	602	1264	693	1447
	LLE	335	778	416	945	500	1116	588	1291	678	1472
	SH**	144	546	325	744	490	961	641	1196	777	1449
	SV**	186	611	310	842	443	1075	584	1309	734	1545

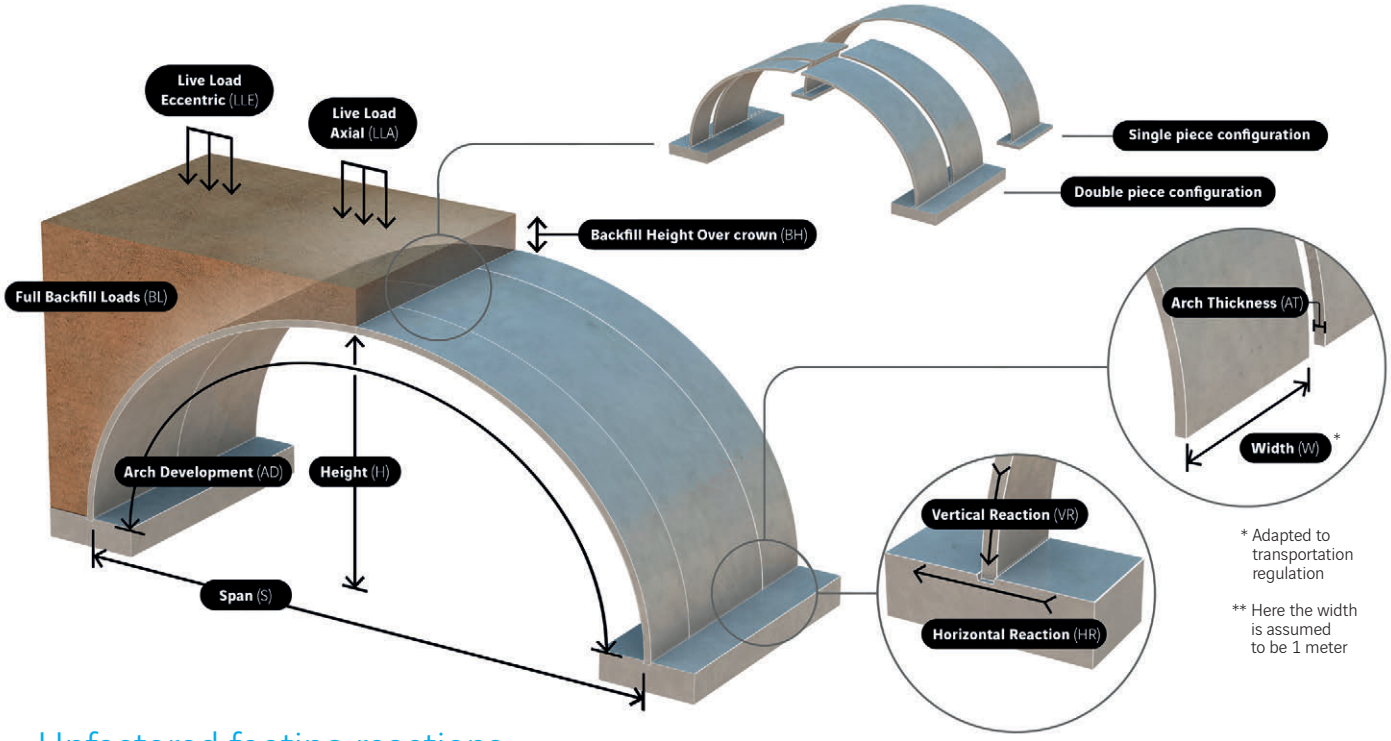
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

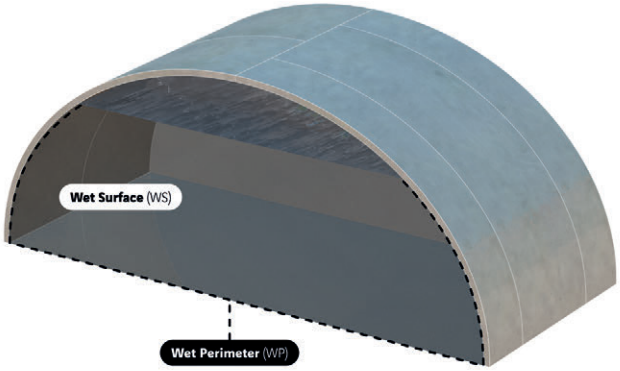
Contact us to confirm compliance with local requirements

TS-F_1800/D

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	17,32
Height - H (m)	5,75
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	23,04
Element Weight per unit width (ton/m)	10,80





Hydraulic waterways

Wet surface - WS (m^2)	69,00
Wet perimeter* WP (m)	29,96

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/D reactions (kN/m)	Arch SW*	66	114	66	114	66	114	66	114	66	114
	BL	146	535	237	740	328	943	417	1146	507	1349
	LLA	253	708	342	910	428	1108	512	1302	593	1492
	LLE	287	810	358	983	432	1161	509	1342	588	1527
	SH**	67	579	244	761	400	969	534	1204	647	1465
	SV**	153	646	243	878	351	1111	478	1347	624	1586

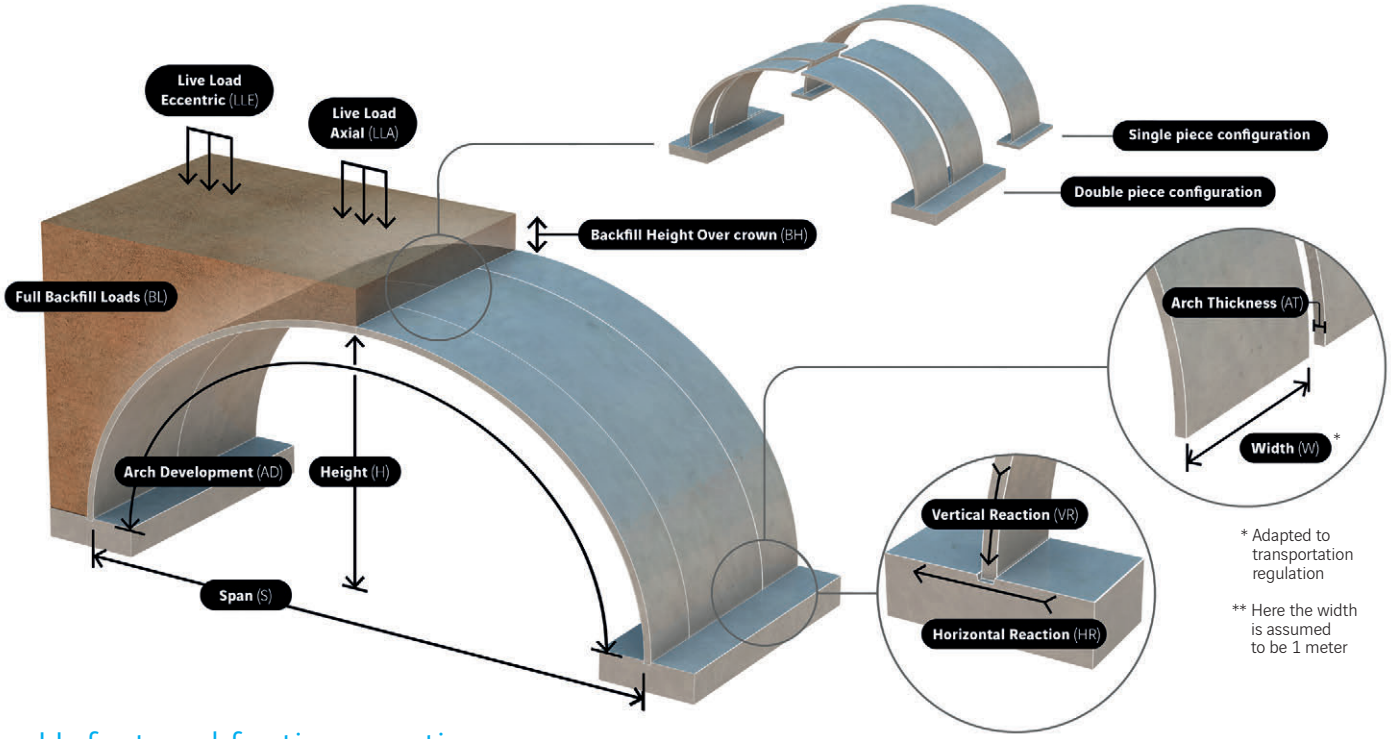
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

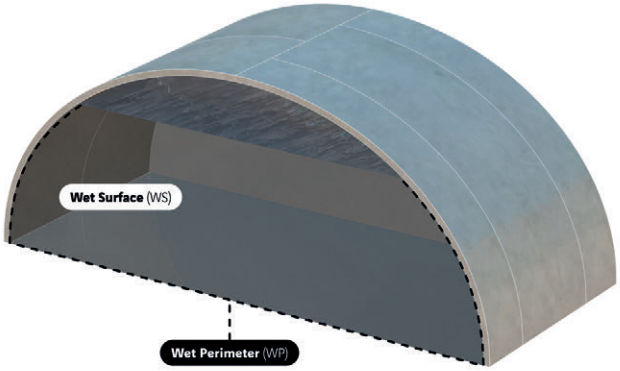
Contact us to confirm compliance with local requirements

TS-F_1800/E

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	17,58
Height - H (m)	6,25
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	24,08
Element Weight per unit width (ton/m)	11,29





Hydraulic waterways

Wet surface - WS (m^2)	77,73
Wet perimeter* WP (m)	31,27

* dimensions given for 1 meter freeboard

Unfactored footing reactions

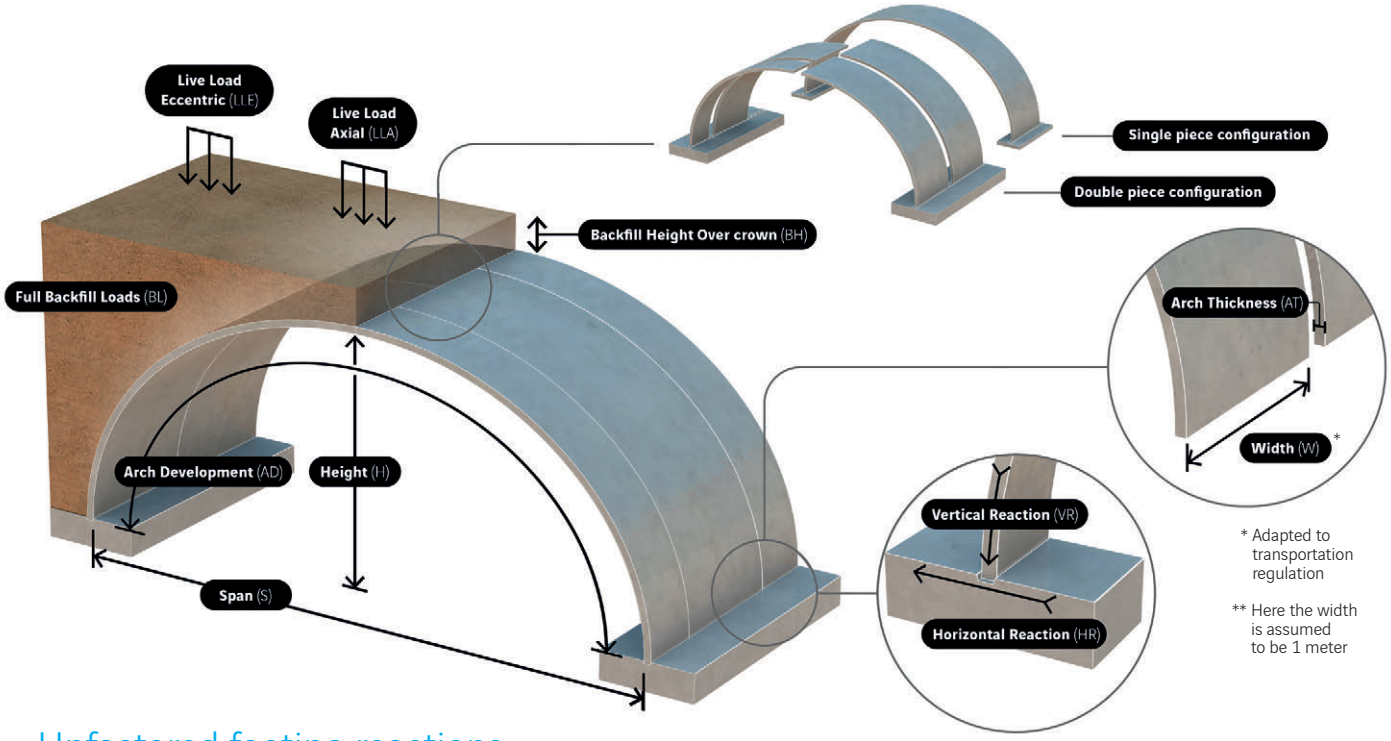
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/E reactions (kN/m)	Arch SW*	69	121	69	121	69	121	69	121	69	121
	BL	107	540	185	744	264	949	343	1154	421	1360
	LLA	197	707	277	915	354	1118	428	1316	499	1509
	LLE	230	824	297	1007	365	1190	433	1374	501	1559
	SH**	33	626	67	809	167	1014	334	1239	566	1486
	SV**	111	670	189	902	286	1139	405	1380	544	1625

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

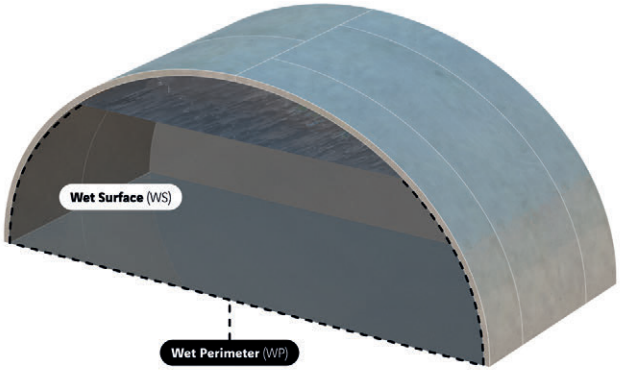
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	17,79
Height - H (m)	6,75
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	25,10
Element Weight per unit width (ton/m)	11,77



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	86,57
Wet perimeter* WP (m)	32,49

* dimensions given for 1 meter freeboard

Unfactored footing reactions

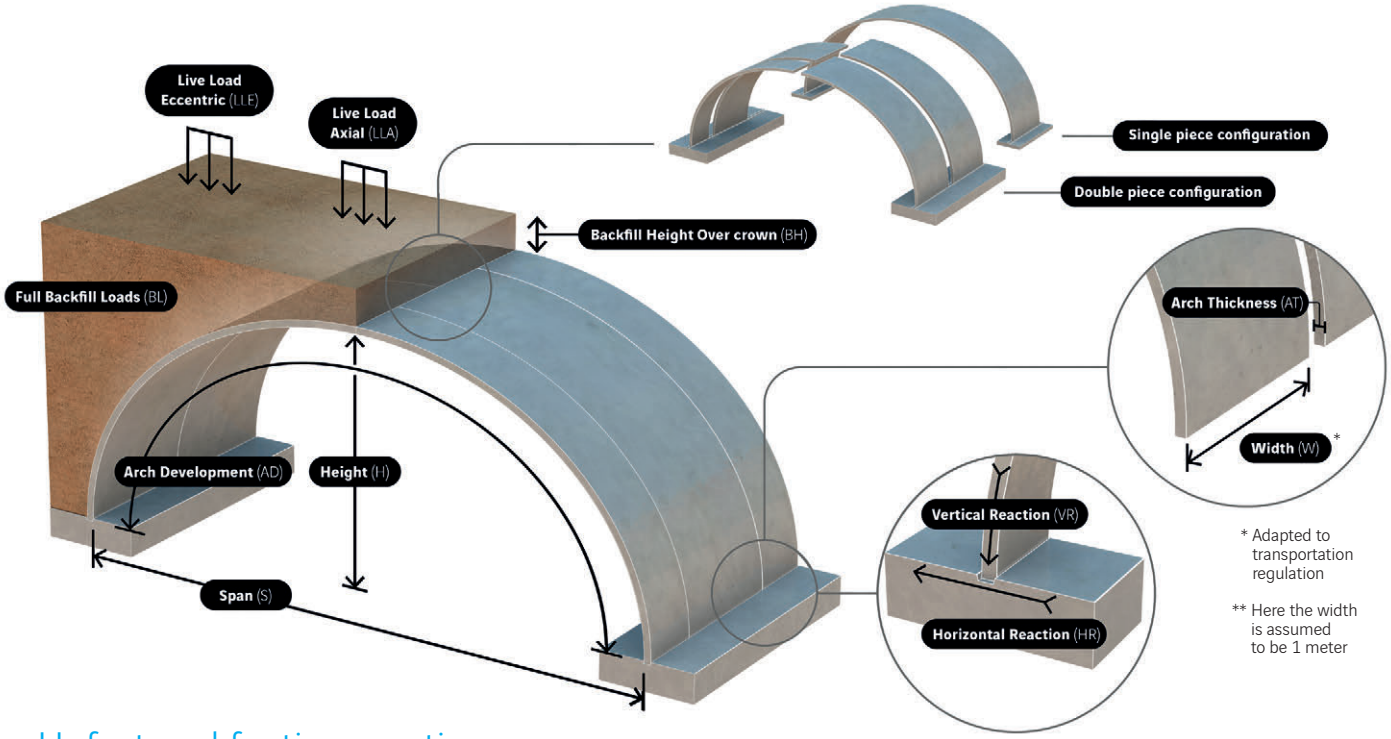
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/F reactions (kN/m)	Arch SW*	67	130	67	130	67	130	67	130	67	130
	BL	75	560	140	765	205	972	270	1181	336	1391
	LLA	148	722	214	931	277	1136	339	1338	399	1536
	LLE	178	854	233	1039	289	1225	345	1412	402	1601
	SH**	-11	665	33	862	110	1070	219	1289	361	1518
	SV**	72	714	141	951	219	1190	308	1431	407	1675

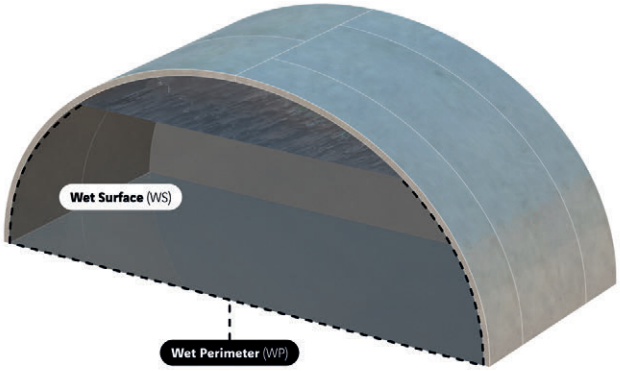
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	17,93
Height - H (m)	7,25
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	26,11
Element Weight per unit width (ton/m)	12,24





Hydraulic waterways

Wet surface - WS (m^2)	95,50
Wet perimeter* WP (m)	33,64

* dimensions given for 1 meter freeboard

Unfactored footing reactions

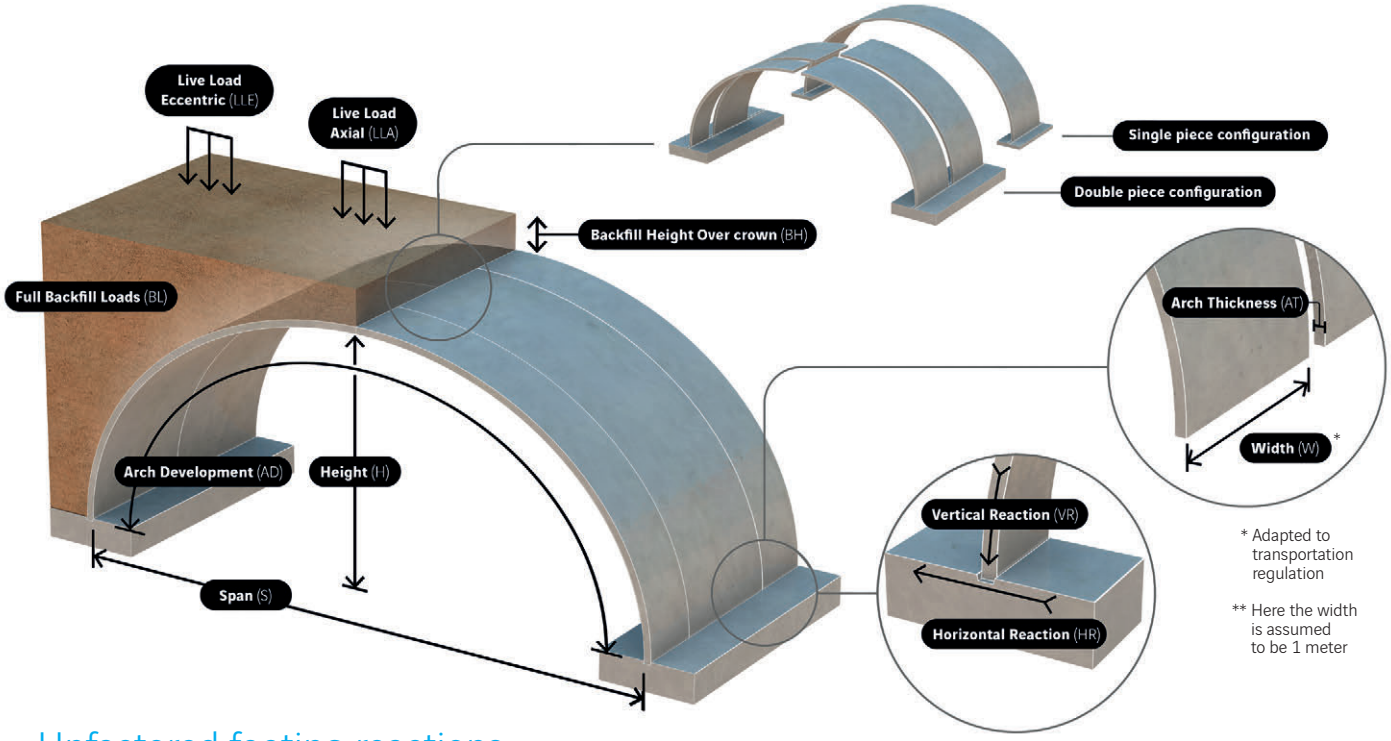
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/G reactions (kN/m)	Arch SW*	64	138	64	138	64	138	64	138	64	138
	BL	43	578	94	784	146	992	198	1203	251	1416
	LLA	99	732	151	942	202	1149	252	1354	301	1555
	LLE	127	873	170	1059	215	1247	260	1437	305	1630
	SH**	-50	702	-3	910	54	1122	119	1337	193	1555
	SV**	33	748	92	989	153	1230	217	1473	283	1716

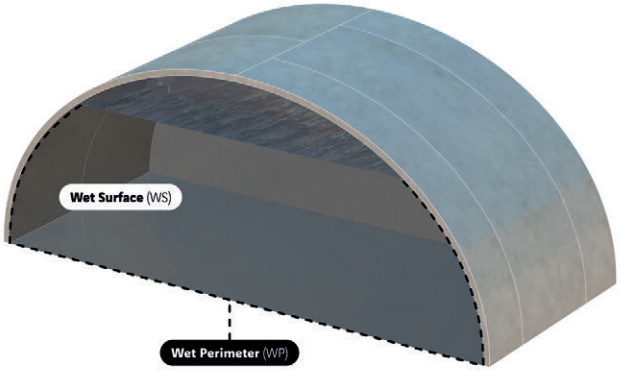
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	18,00
Height - H (m)	7,75
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	27,11
Element Weight per unit width (ton/m)	12,71





Hydraulic waterways

Wet surface - WS (m^2)	104,49
Wet perimeter* WP (m)	34,72

* dimensions given for 1 meter freeboard

Unfactored footing reactions

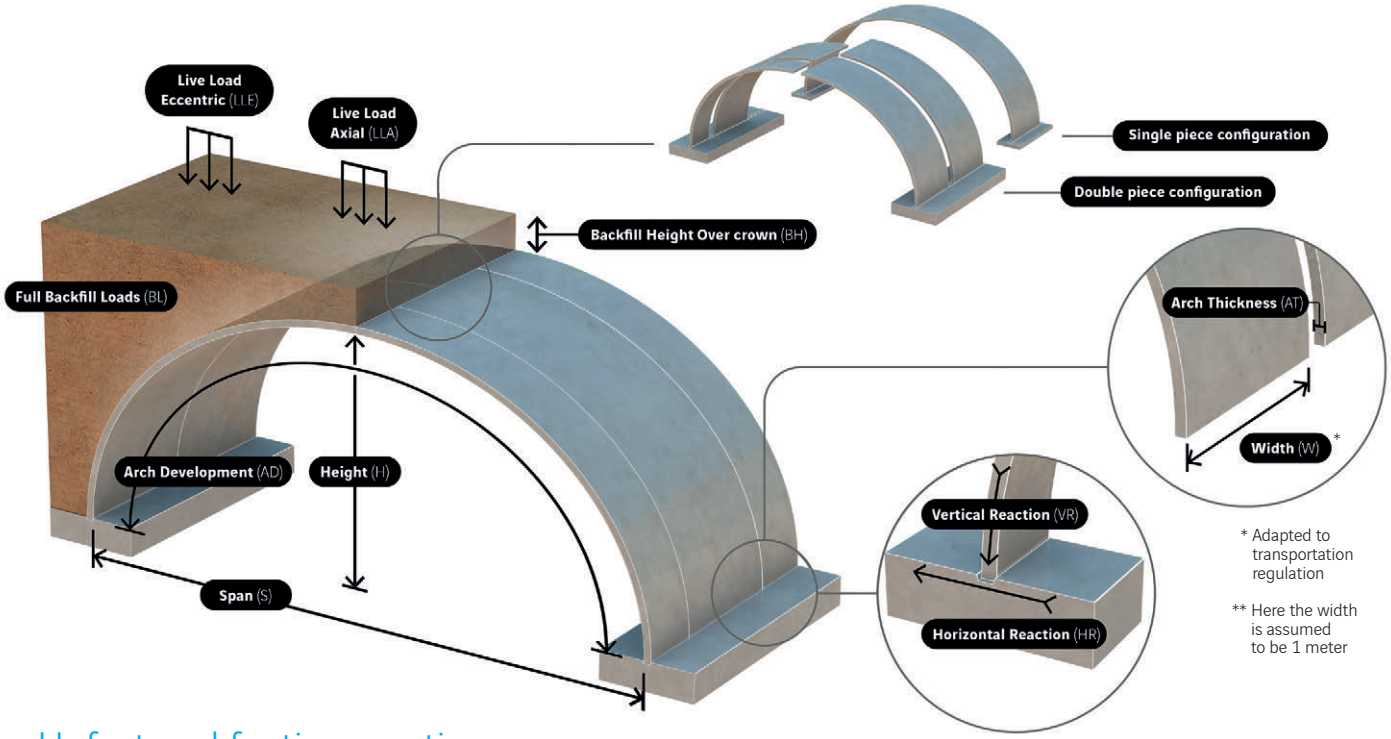
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/H reactions (kN/m)	Arch SW*	60	145	60	145	60	145	60	145	60	145
	BL	10	595	48	800	87	1008	126	1219	166	1434
	LLA	51	737	90	949	129	1158	166	1365	203	1568
	LLE	76	880	108	1068	141	1258	175	1450	209	1645
	SH**	-84	736	-41	953	-2	1169	33	1383	63	1596
	SV**	-4	773	42	1016	87	1260	130	1504	172	1748

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

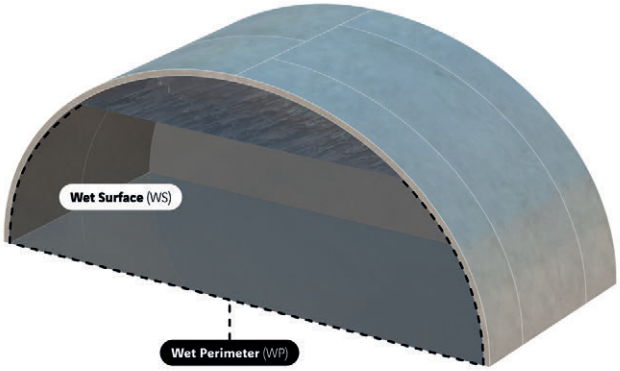
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	18,00
Height - H (m)	8,25
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	28,11
Element Weight per unit width (ton/m)	13,18



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	113,49
Wet perimeter* WP (m)	35,72

* dimensions given for 1 meter freeboard

Unfactored footing reactions

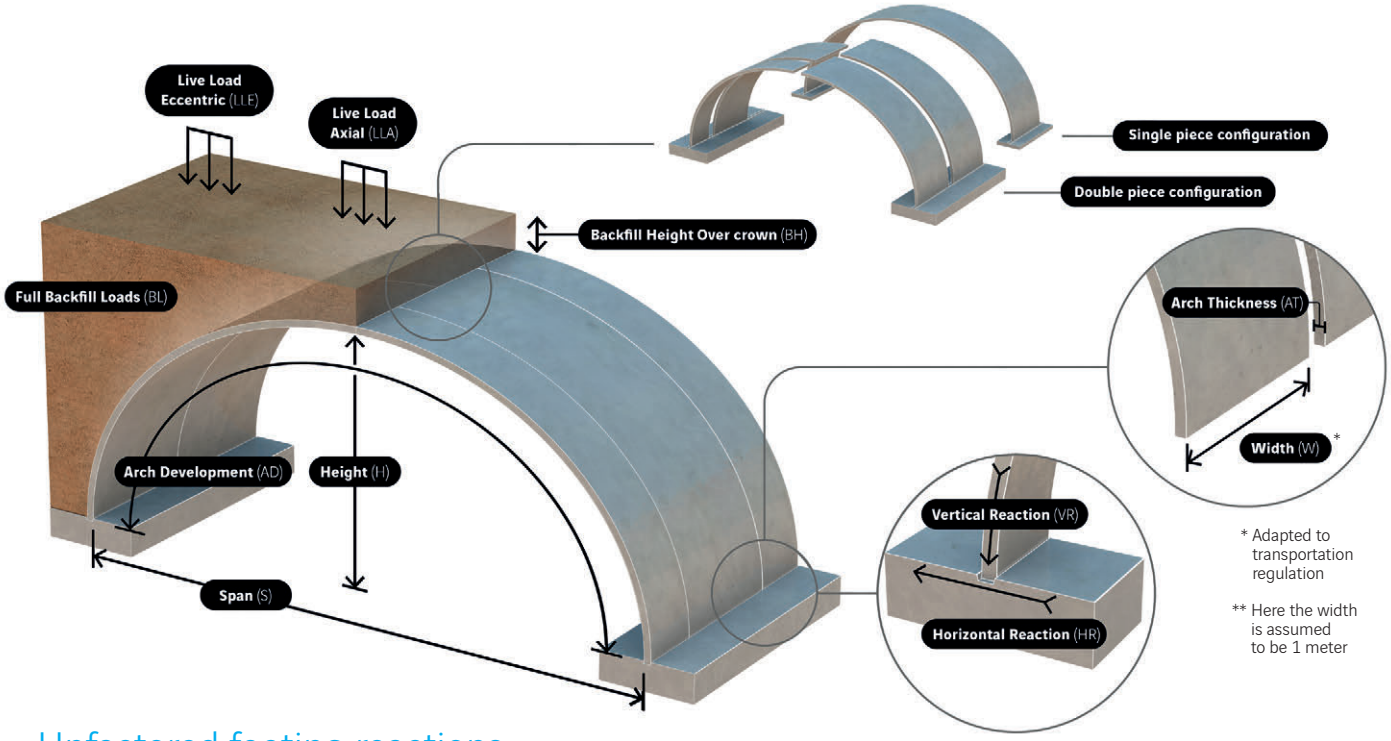
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/I reactions (kN/m)	Arch SW*	56	151	56	151	56	151	56	151	56	151
	BL	-24	610	1	813	27	1021	54	1232	81	1446
	LLA	3	738	29	952	55	1163	81	1370	106	1574
	LLE	25	876	47	1066	68	1257	91	1451	114	1647
	SH**	-113	767	-81	991	-56	1211	-40	1428	-32	1641
	SV**	-41	789	-9	1034	20	1279	47	1525	72	1772

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

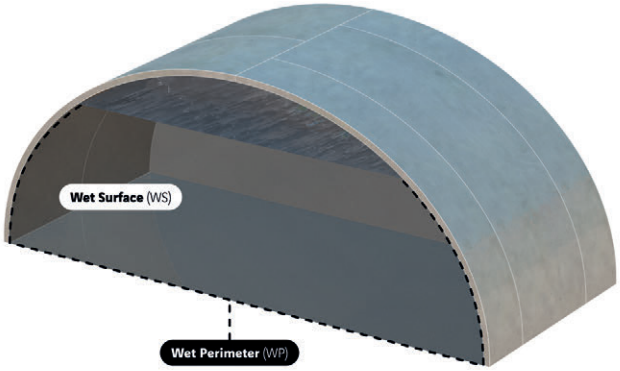
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	18,00
Height - H (m)	8,75
Arch Thickness - AT (mm)	375
Arch Development - AD (m)	29,11
Element Weight per unit width (ton/m)	13,65



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	122,48
Wet perimeter* WP (m)	36,72

* dimensions given for 1 meter freeboard

Unfactored footing reactions

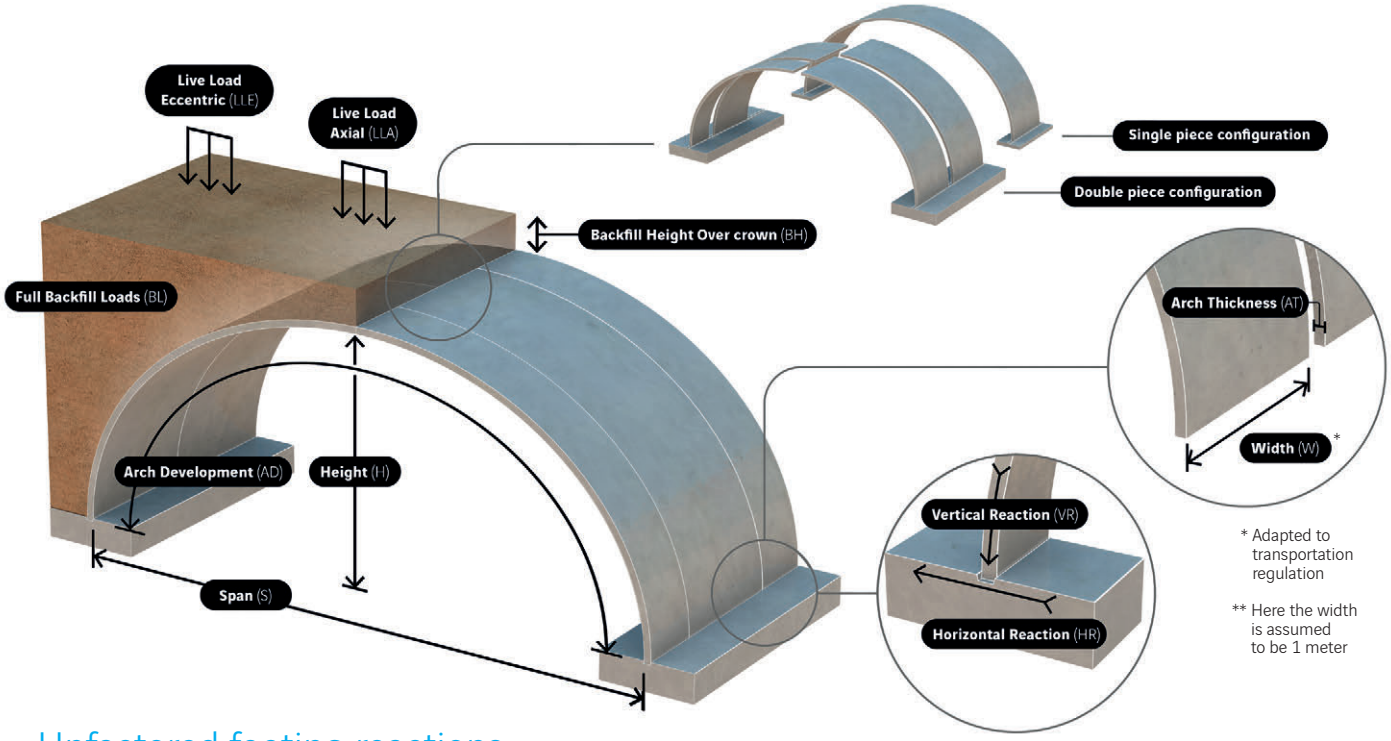
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_1800/J reactions (kN/m)	Arch SW*	51	156	51	156	51	156	51	156	51	156
	BL	-59	623	-46	824	-33	1030	-19	1239	-5	1453
	LLA	-45	735	-31	952	-17	1164	-4	1371	9	1574
	LLE	-25	861	-15	1053	-4	1246	7	1440	19	1636
	SH**	-138	796	-123	1024	-111	1249	-100	1471	-92	1691
	SV**	-78	796	-62	1042	-46	1289	-31	1537	-17	1787

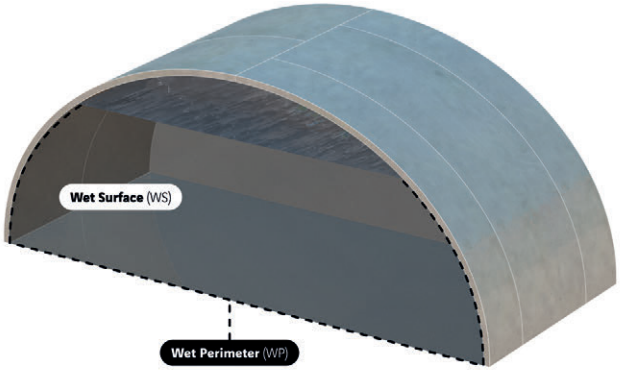
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	18,03
Height - H (m)	5,00
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	22,46
Element Weight per unit width (ton/m)	11,23





Hydraulic waterways

Wet surface - WS (m^2)	59,69
Wet perimeter* WP (m)	29,63

* dimensions given for 1 meter freeboard

Unfactored footing reactions

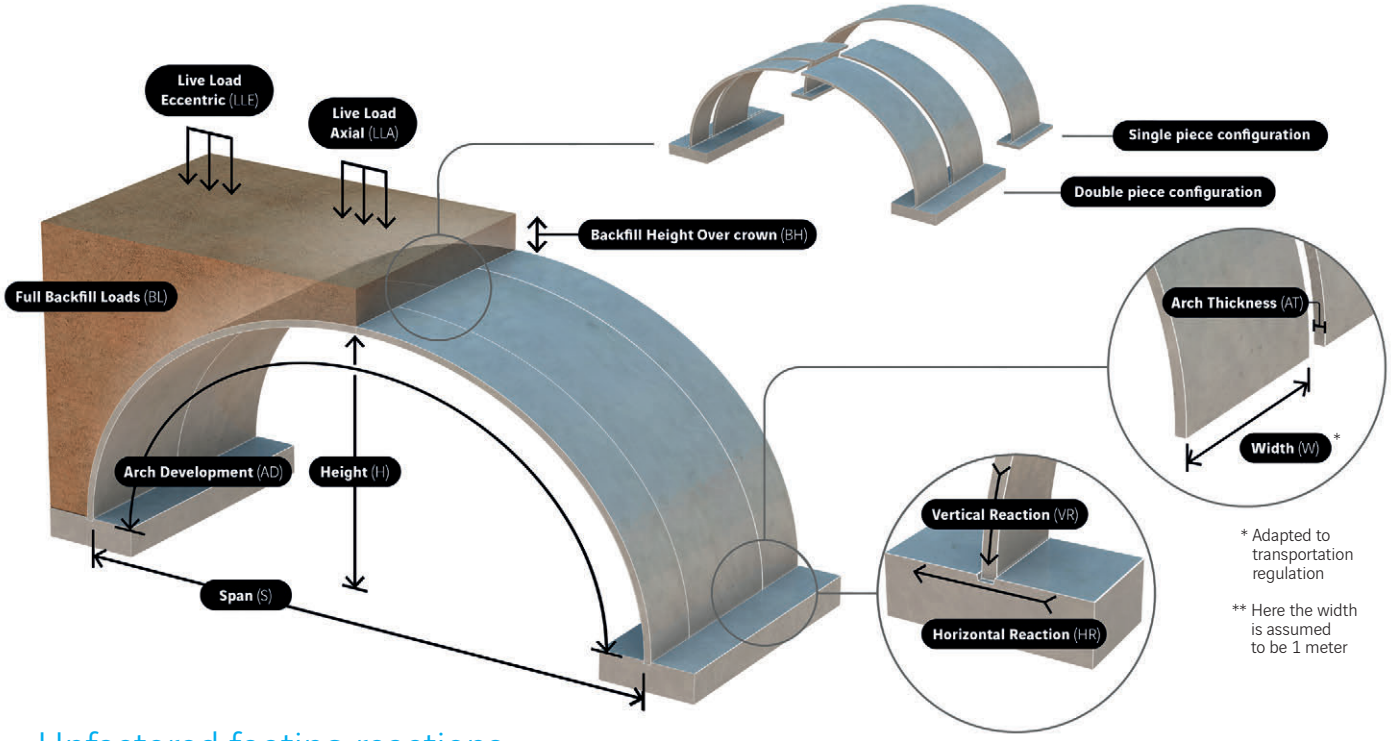
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/A reactions (kN/m)	Arch SW*	89	117	89	117	89	117	89	117	89	117
	BL	248	542	383	749	515	954	646	1159	774	1362
	LLA	412	730	540	932	666	1130	790	1324	912	1515
	LLE	428	787	542	970	657	1155	773	1343	890	1532
	SH**	309	565	486	805	664	1050	843	1302	1022	1559
	SV**	312	645	481	896	646	1145	808	1392	967	1637

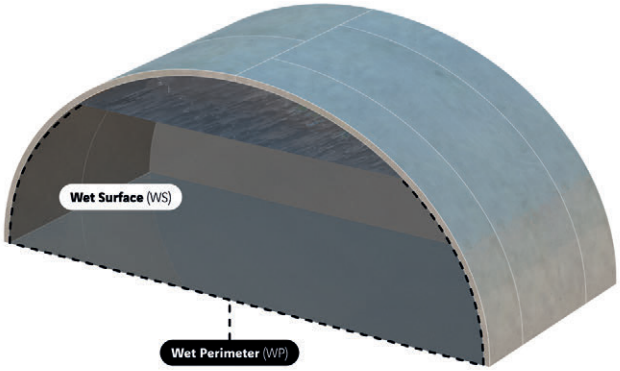
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	18,49
Height - H (m)	5,50
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	23,56
Element Weight per unit width (ton/m)	11,78





Hydraulic waterways

Wet surface - WS (m^2)	68,82
Wet perimeter* WP (m)	31,19

* dimensions given for 1 meter freeboard

Unfactored footing reactions

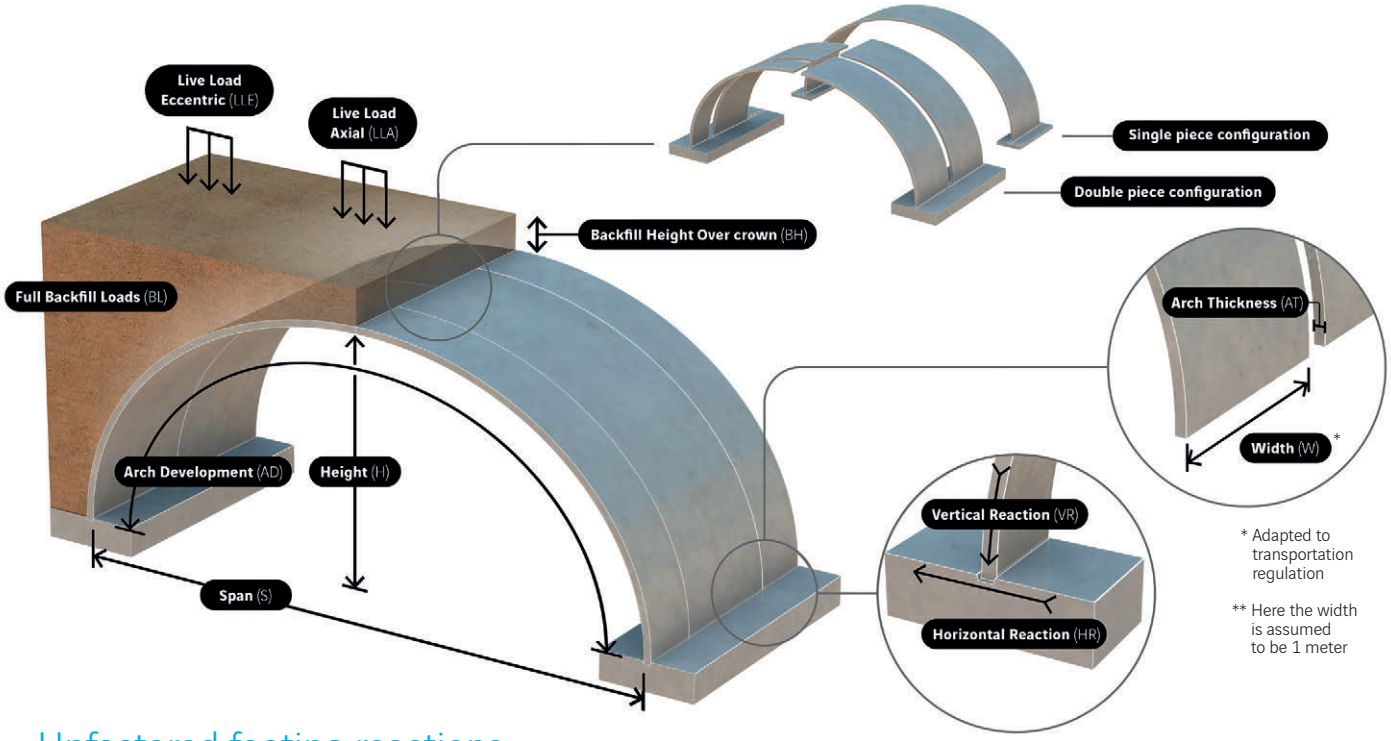
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/B reactions (kN/m)	Arch SW*	85	124	85	124	85	124	85	124	85	124
	BL	218	573	340	786	460	999	580	1212	698	1424
	LLA	362	757	479	966	594	1173	708	1376	820	1577
	LLE	383	822	486	1011	591	1204	697	1398	805	1595
	SH**	220	603	407	832	586	1075	757	1333	921	1604
	SV**	273	679	426	937	578	1195	728	1453	876	1711

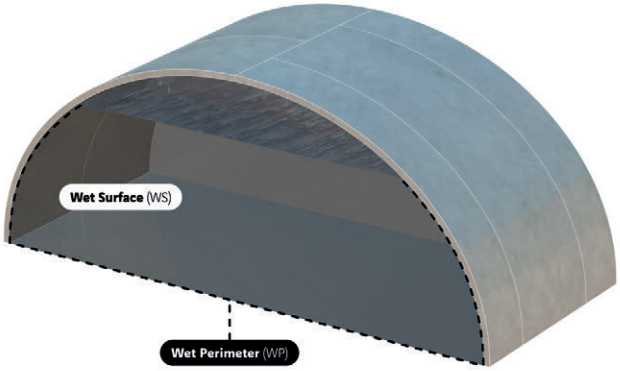
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	18,88
Height - H (m)	6,00
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	24,63
Element Weight per unit width (ton/m)	12,32





Hydraulic waterways

Wet surface - WS (m^2)	78,17
Wet perimeter* WP (m)	32,66

* dimensions given for 1 meter freeboard

Unfactored footing reactions

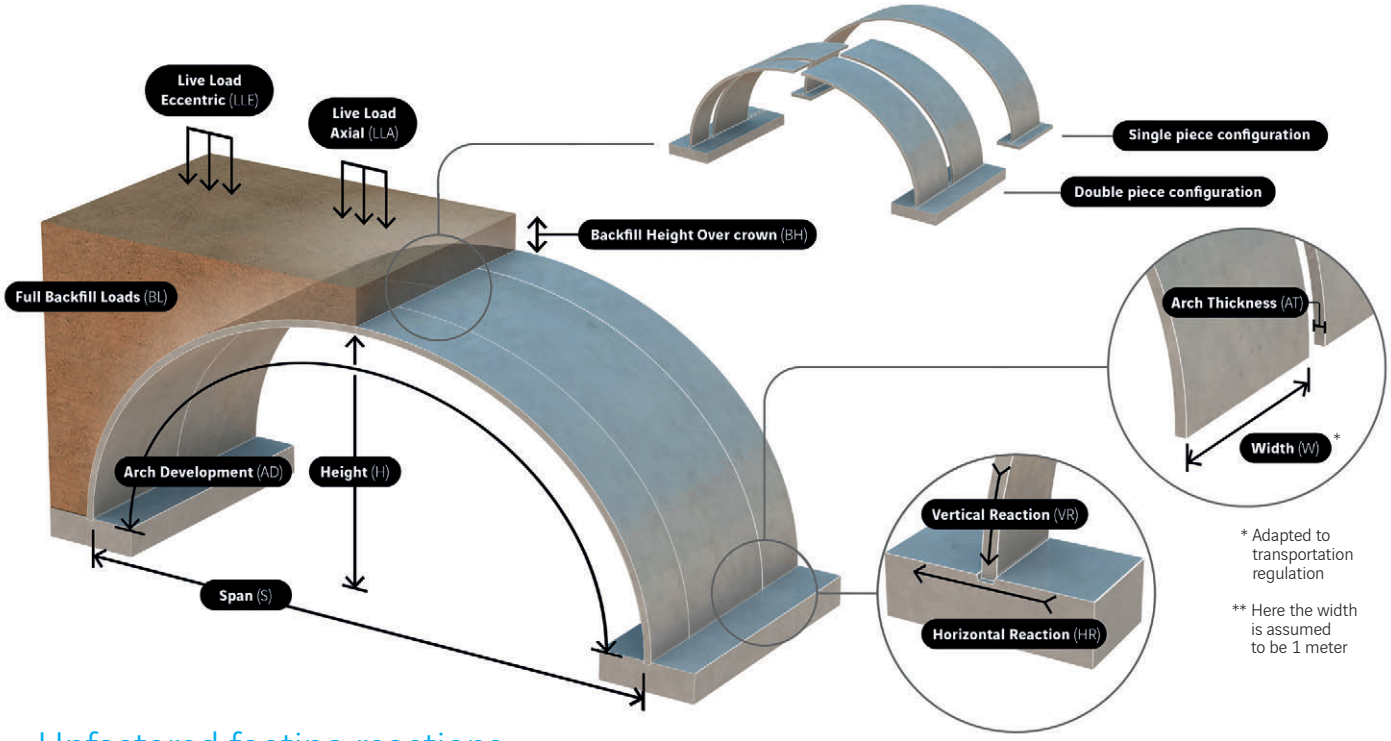
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/C reactions (kN/m)	Arch SW*	82	131	82	131	82	131	82	131	82	131
	BL	188	603	298	823	407	1043	516	1263	625	1484
	LLA	313	783	419	1000	524	1214	627	1427	730	1637
	LLE	339	856	432	1052	527	1250	624	1452	722	1656
	SH**	134	640	330	859	510	1100	674	1363	822	1648
	SV**	235	712	373	978	511	1245	650	1514	788	1784

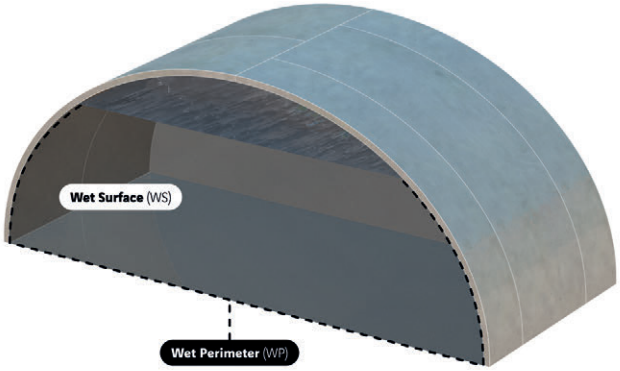
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	19,21
Height - H (m)	6,50
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	25,68
Element Weight per unit width (ton/m)	12,84





Hydraulic waterways

Wet surface - WS (m^2)	87,69
Wet perimeter* WP (m)	34,04

* dimensions given for 1 meter freeboard

Unfactored footing reactions

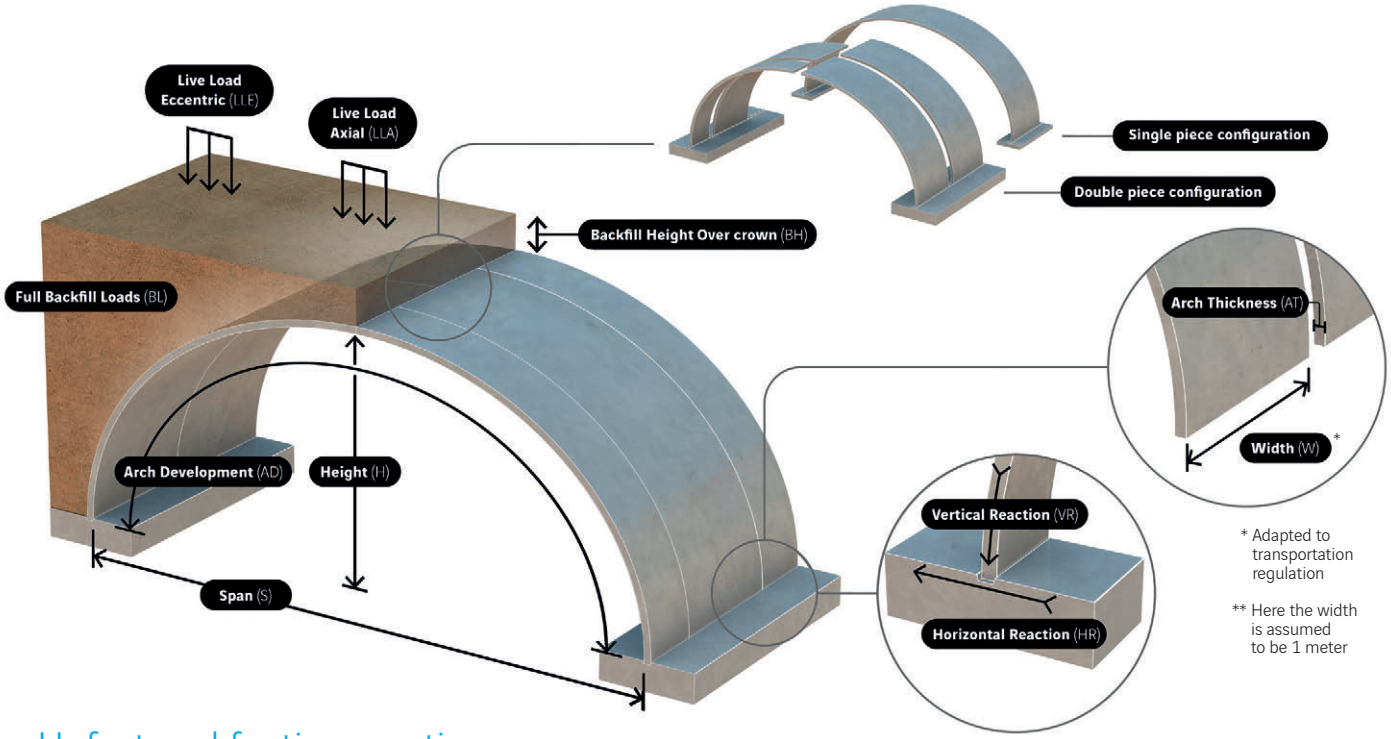
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/D reactions (kN/m)	Arch SW*	79	138	79	138	79	138	79	138	79	138
	BL	159	633	256	859	354	1086	453	1314	552	1543
	LLA	265	808	360	1033	455	1255	549	1476	642	1695
	LLE	296	890	379	1091	464	1296	551	1504	640	1715
	SH**	49	676	254	885	435	1124	593	1393	726	1691
	SV**	198	744	321	1017	446	1293	573	1573	701	1855

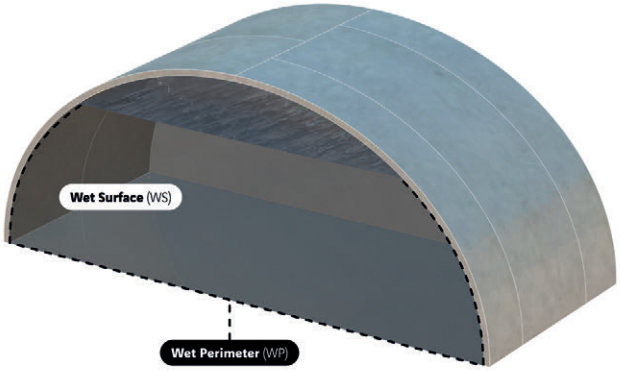
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	19,48
Height - H (m)	7,00
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	26,72
Element Weight per unit width (ton/m)	13,36





Hydraulic waterways

Wet surface - WS (m^2)	97,37
Wet perimeter* WP (m)	35,35

* dimensions given for 1 meter freeboard

Unfactored footing reactions

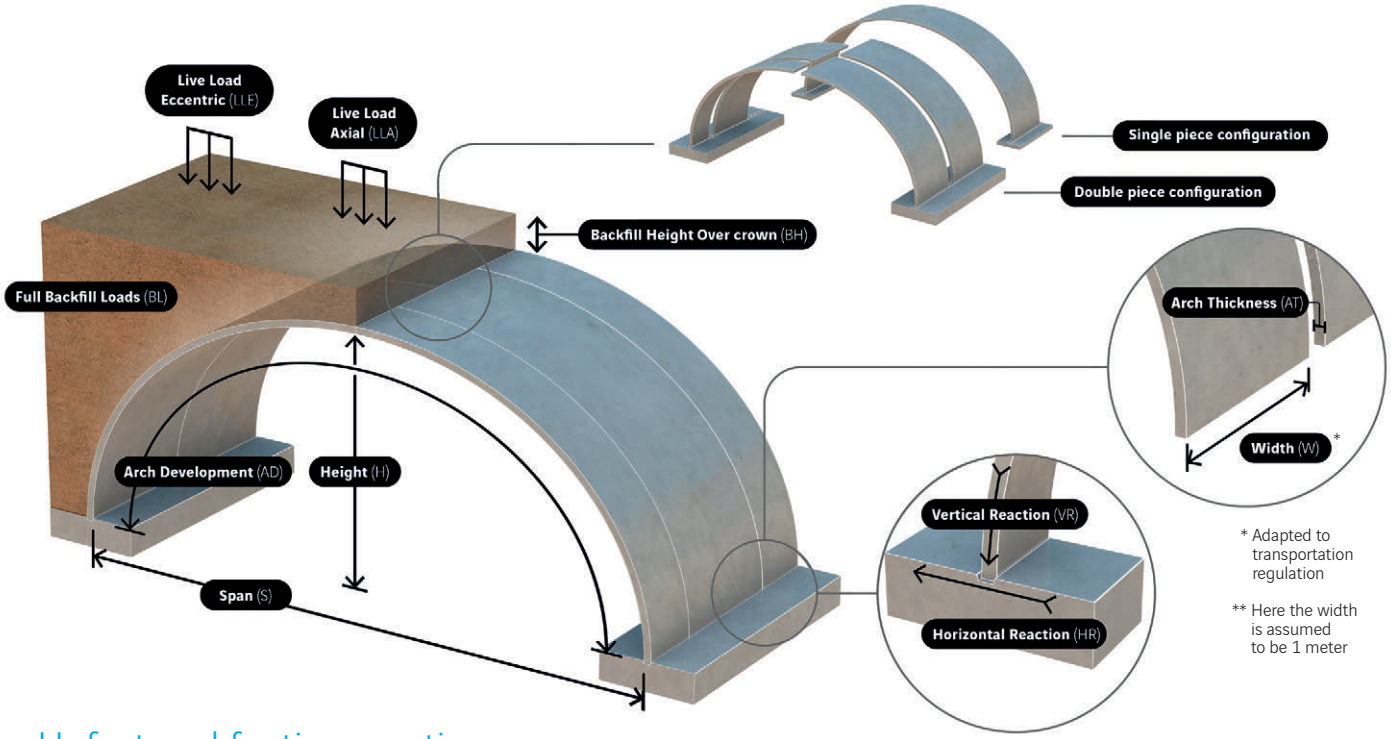
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/E reactions (kN/m)	Arch SW*	81	145	81	145	81	145	81	145	81	145
	BL	116	642	201	870	287	1100	372	1331	459	1563
	LLA	208	814	294	1048	378	1277	460	1501	540	1722
	LLE	241	916	317	1127	393	1339	469	1551	546	1764
	SH**	23	729	60	936	171	1168	357	1425	617	1708
	SV**	120	773	245	1034	366	1306	481	1589	592	1882

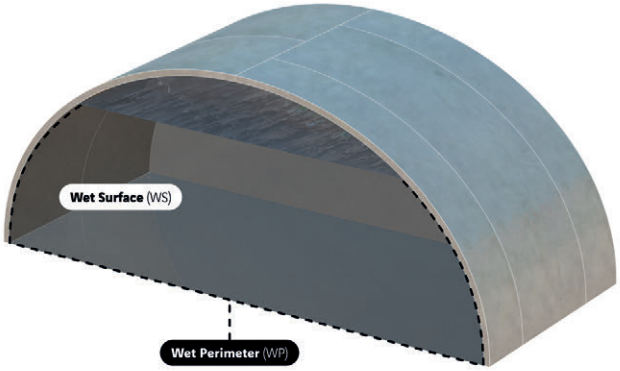
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	19,69
Height - H (m)	7,50
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	27,74
Element Weight per unit width (ton/m)	13,87





Hydraulic waterways

Wet surface - WS (m^2)	107,16
Wet perimeter* WP (m)	36,58

* dimensions given for 1 meter freeboard

Unfactored footing reactions

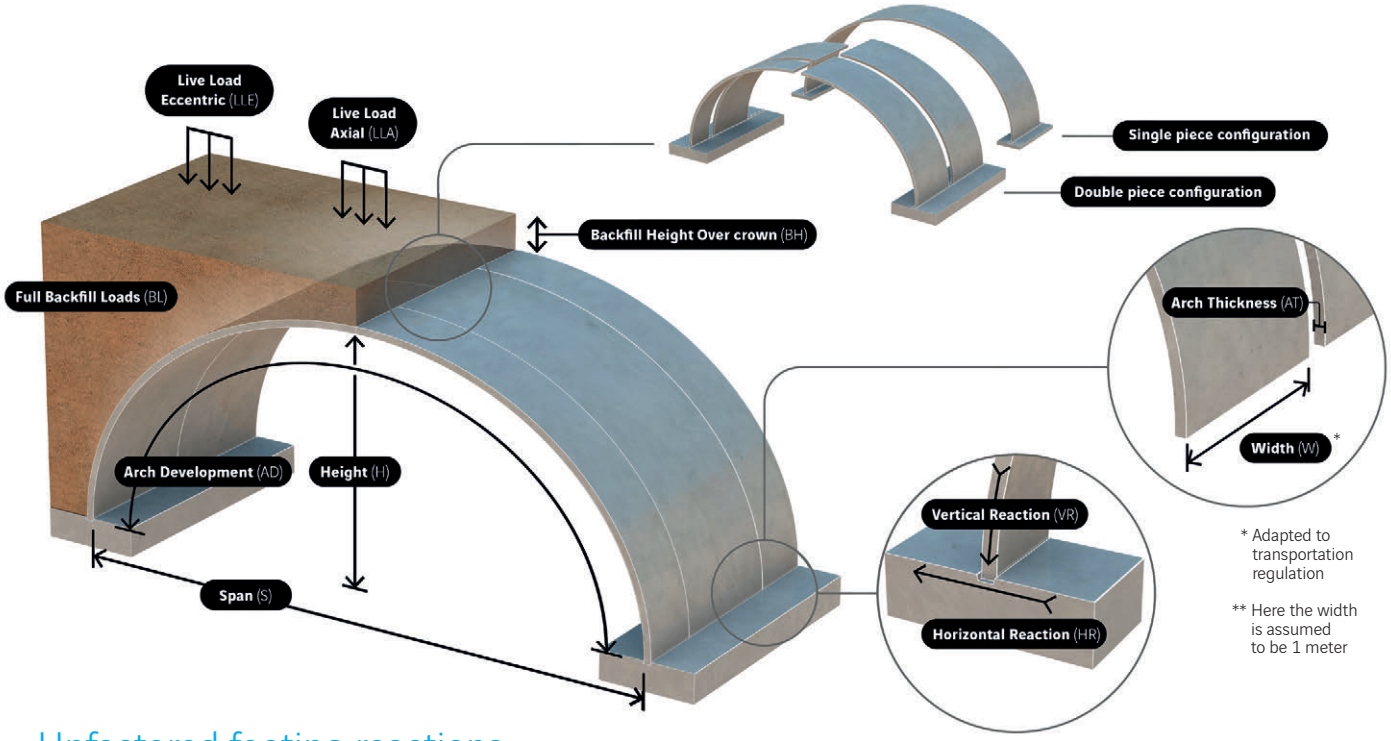
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/F reactions (kN/m)	Arch SW*	78	152	78	152	78	152	78	152	78	152
	BL	84	665	155	893	227	1123	299	1355	372	1590
	LLA	158	827	231	1063	302	1295	372	1523	439	1746
	LLE	191	963	253	1172	316	1383	380	1596	445	1812
	SH**	0	790	51	1017	128	1250	231	1488	360	1732
	SV**	87	839	179	1104	268	1373	355	1645	441	1921

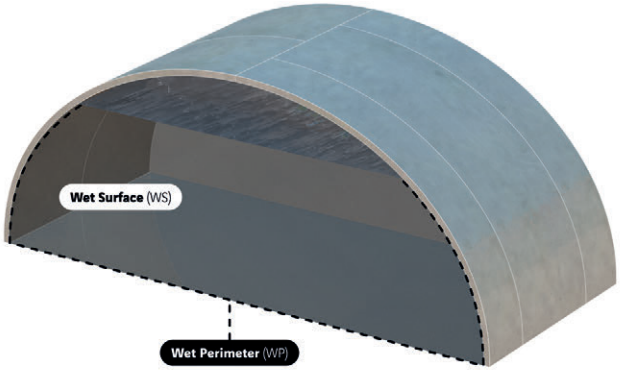
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	19,85
Height - H (m)	8,00
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	28,75
Element Weight per unit width (ton/m)	14,38





Hydraulic waterways

Wet surface - WS (m^2)	117,05
Wet perimeter* WP (m)	37,75

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/G reactions (kN/m)	Arch SW*	74	158	74	158	74	158	74	158	74	158
	BL	51	686	109	914	168	1145	227	1378	288	1615
	LLA	108	837	169	1076	228	1310	286	1540	342	1767
	LLE	141	989	192	1197	243	1409	296	1625	350	1843
	SH**	-30	838	25	1078	78	1313	128	1542	177	1766
	SV**	51	883	118	1151	184	1419	249	1687	315	1955

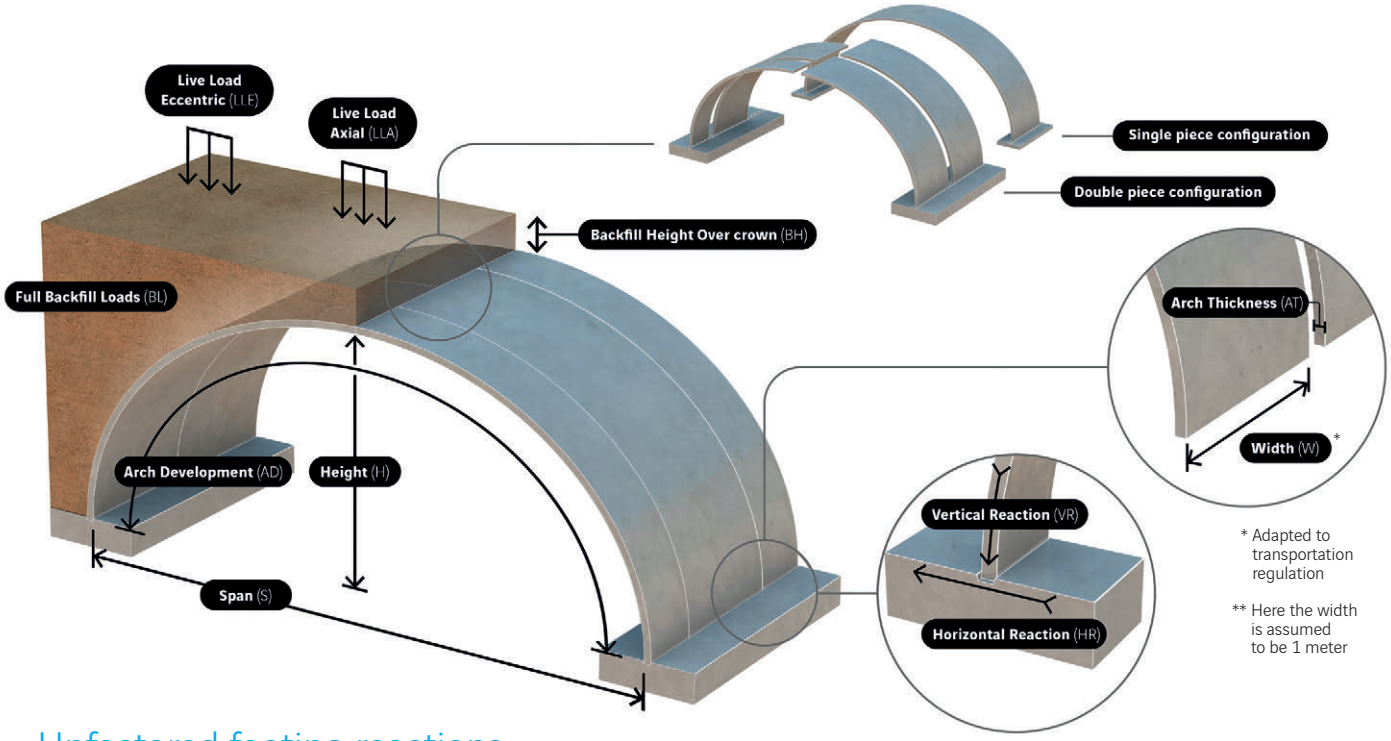
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

TS-F_2000/H

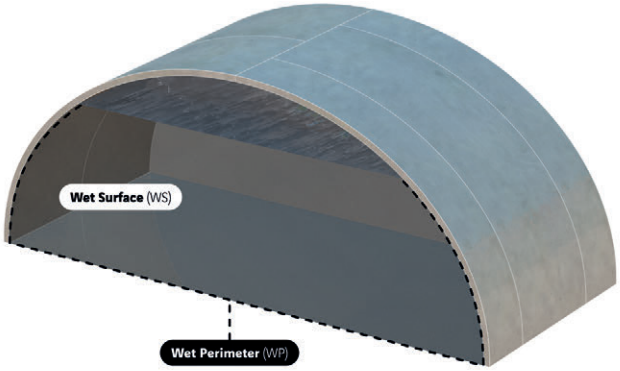
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	19,95
Height - H (m)	8,50
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	29,76
Element Weight per unit width (ton/m)	14,88



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	127,01
Wet perimeter* WP (m)	38,86

* dimensions given for 1 meter freeboard

Unfactored footing reactions

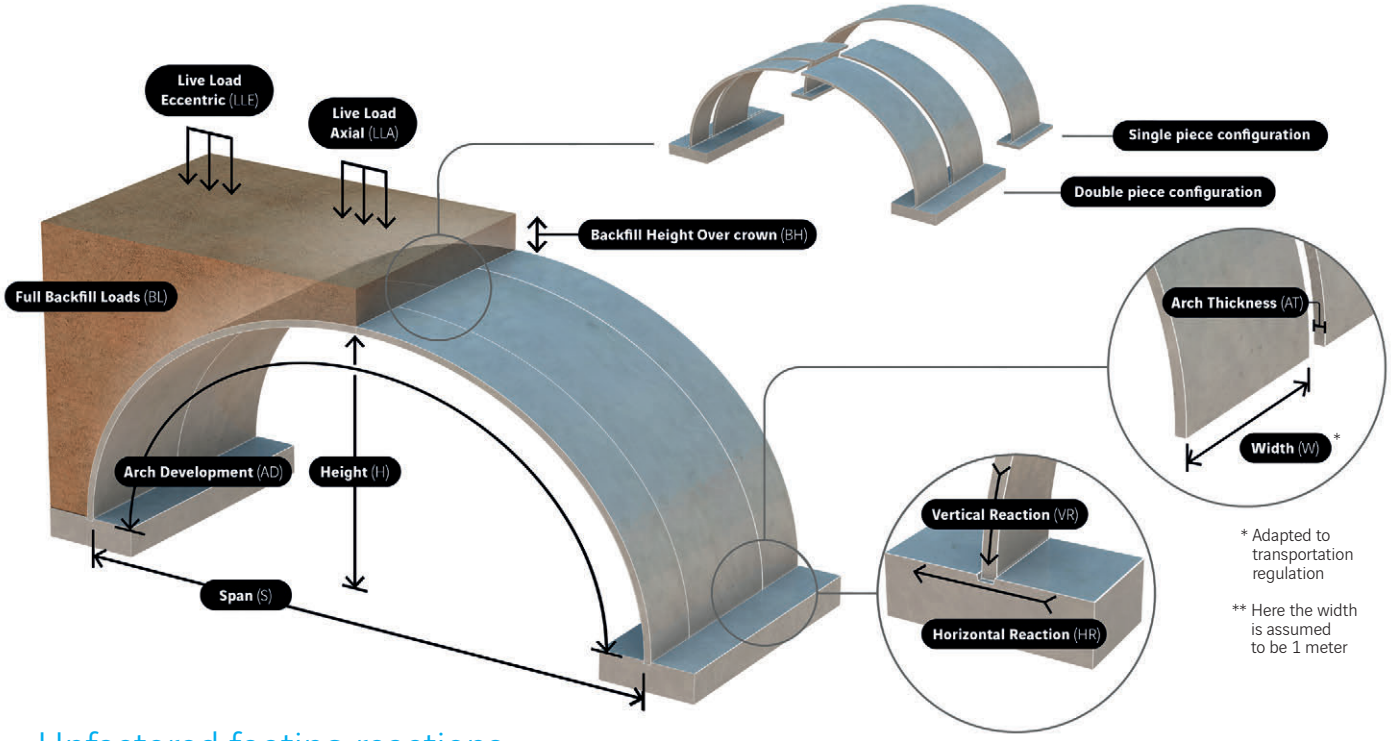
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/H reactions (kN/m)	Arch SW*	69	165	69	165	69	165	69	165	69	165
	BL	16	706	62	934	109	1165	157	1400	205	1638
	LLA	60	847	108	1086	156	1322	202	1555	248	1785
	LLE	92	994	132	1205	173	1419	215	1637	258	1857
	SH**	-67	873	-17	1119	21	1357	49	1589	65	1813
	SV**	12	906	61	1175	111	1444	162	1715	213	1987

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

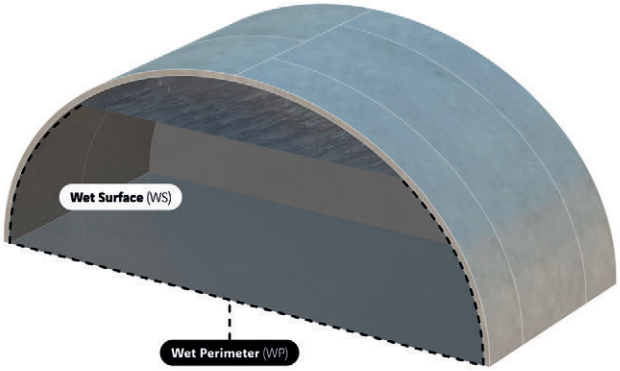
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	20,00
Height - H (m)	9,00
Arch Thickness - AT (mm)	400
Arch Development - AD (m)	30,76
Element Weight per unit width (ton/m)	15,38



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	137,00
Wet perimeter* WP (m)	39,91

* dimensions given for 1 meter freeboard

Unfactored footing reactions

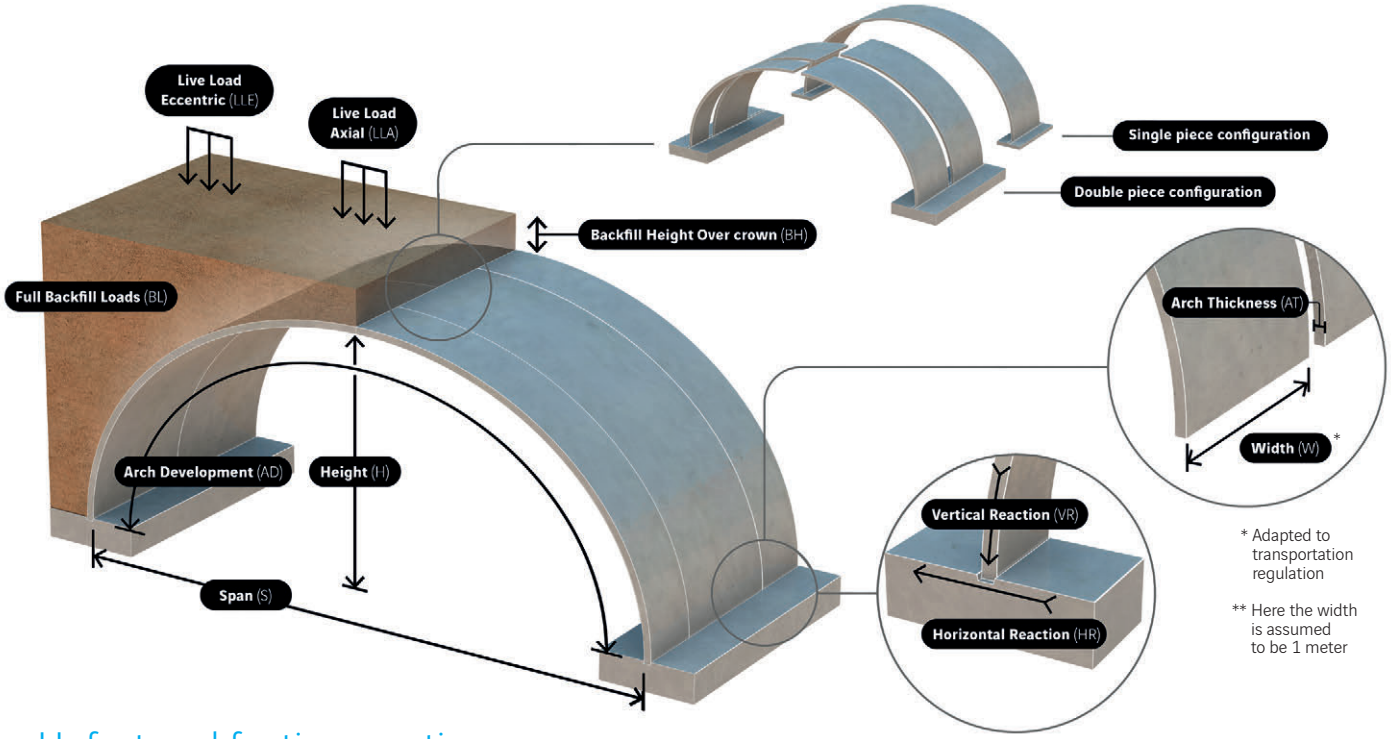
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2000/I reactions (kN/m)	Arch SW*	65	171	65	171	65	171	65	171	65	171
	BL	-19	725	15	953	51	1184	87	1420	124	1659
	LLA	12	854	49	1093	85	1330	121	1566	157	1800
	LLE	44	979	75	1194	106	1412	138	1632	171	1854
	SH**	-110	896	-76	1140	-42	1383	-8	1627	25	1870
	SV**	-29	909	10	1176	51	1450	93	1729	136	2015

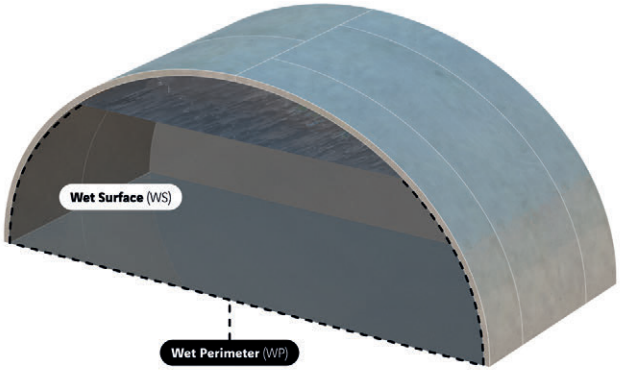
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	19,75
Height - H (m)	5,50
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	24,63
Element Weight per unit width (ton/m)	13,85





Hydraulic waterways

Wet surface - WS (m^2)	72,79
Wet perimeter* WP (m)	33,03

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/A reactions (kN/m)	Arch SW*	113	149	113	149	113	149	113	149	113	149
	BL	301	653	448	885	595	1116	739	1344	882	1571
	LLA	470	843	611	1069	752	1291	891	1509	1030	1724
	LLE	498	939	621	1140	747	1343	874	1550	1003	1760
	SH**	192	689	518	951	794	1222	1019	1501	1195	1789
	SV**	316	772	542	1045	750	1322	942	1602	1116	1884

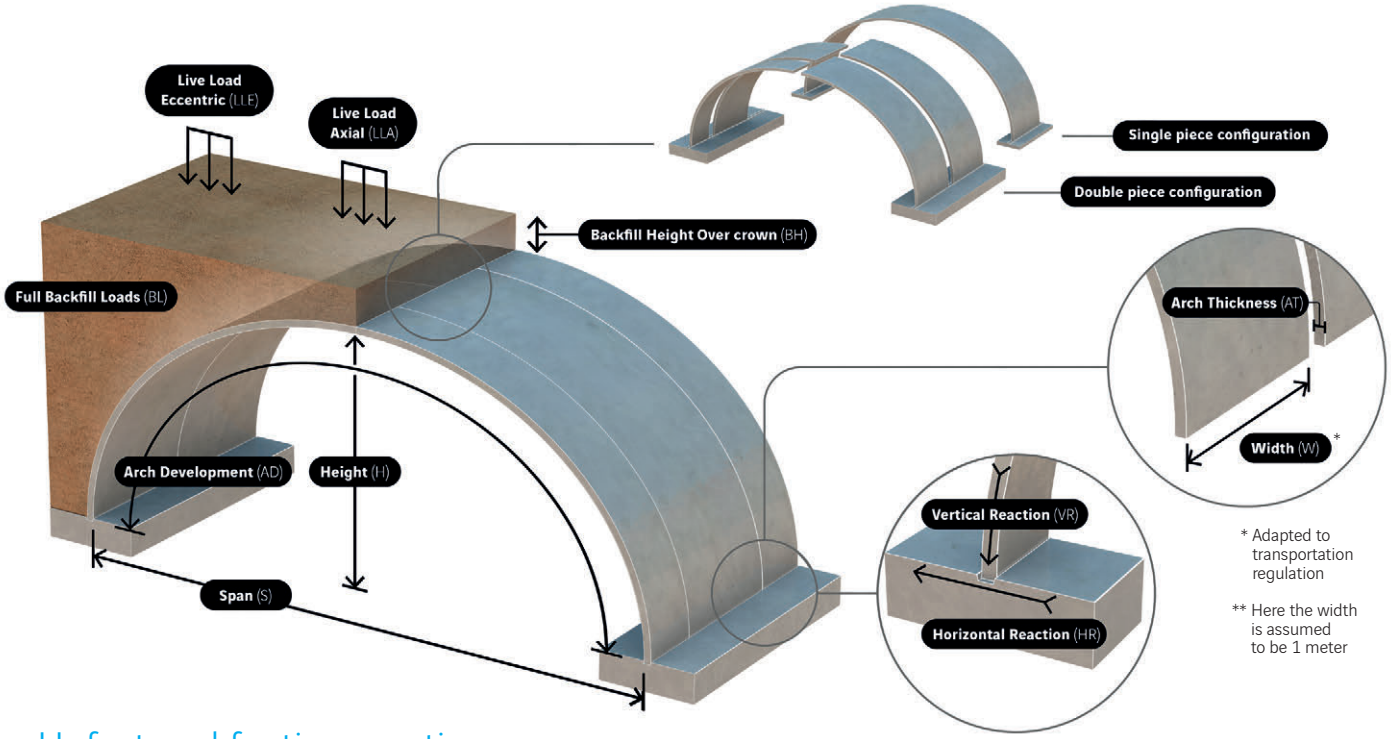
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

TS-F_2200/B

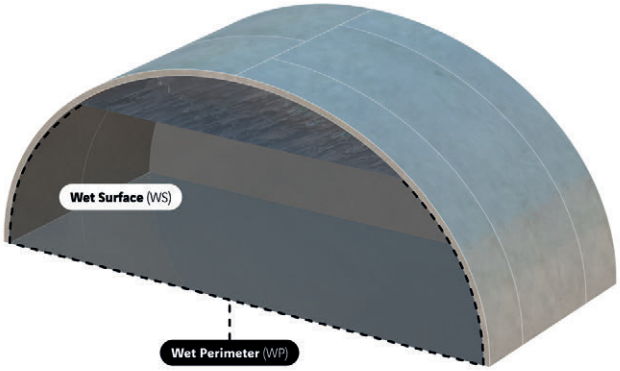
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	20,22
Height - H (m)	6,00
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	25,73
Element Weight per unit width (ton/m)	14,47



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	82,79
Wet perimeter* WP (m)	34,6

* dimensions given for 1 meter freeboard

Unfactored footing reactions

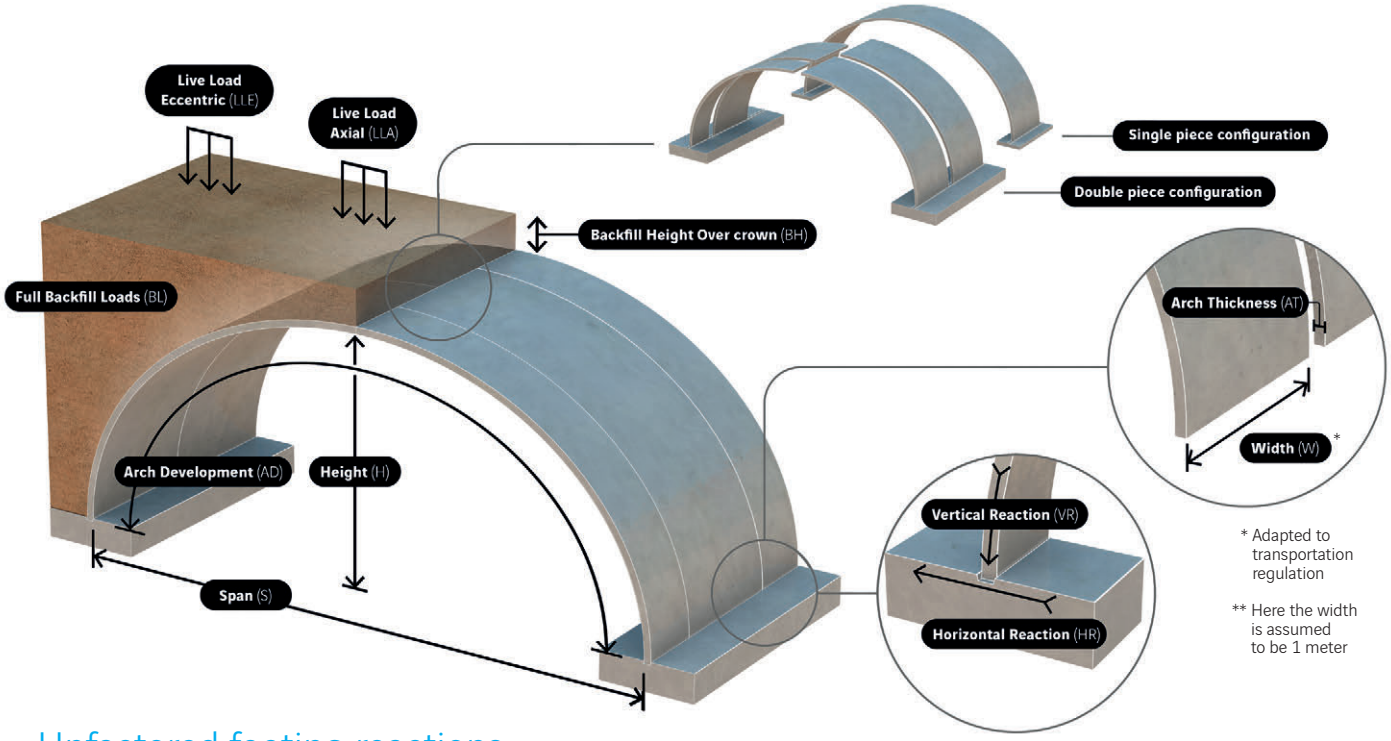
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/B reactions (kN/m)	Arch SW*	107	154	107	154	107	154	107	154	107	154
	BL	268	686	403	924	536	1161	669	1396	800	1629
	LLA	418	873	548	1105	677	1334	804	1559	930	1780
	LLE	449	969	563	1177	678	1388	795	1602	914	1819
	SH**	160	724	452	975	701	1241	906	1523	1067	1820
	SV**	281	808	484	1088	674	1372	849	1660	1010	1951

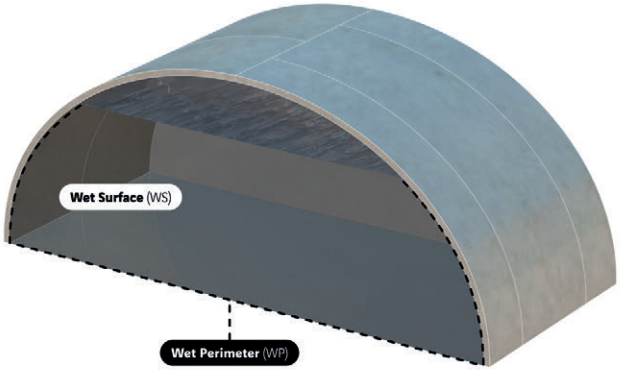
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	20,63
Height - H (m)	6,50
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	26,80
Element Weight per unit width (ton/m)	15,08





Hydraulic waterways

Wet surface - WS (m^2)	93,00
Wet perimeter* WP (m)	36,09

* dimensions given for 1 meter freeboard

Unfactored footing reactions

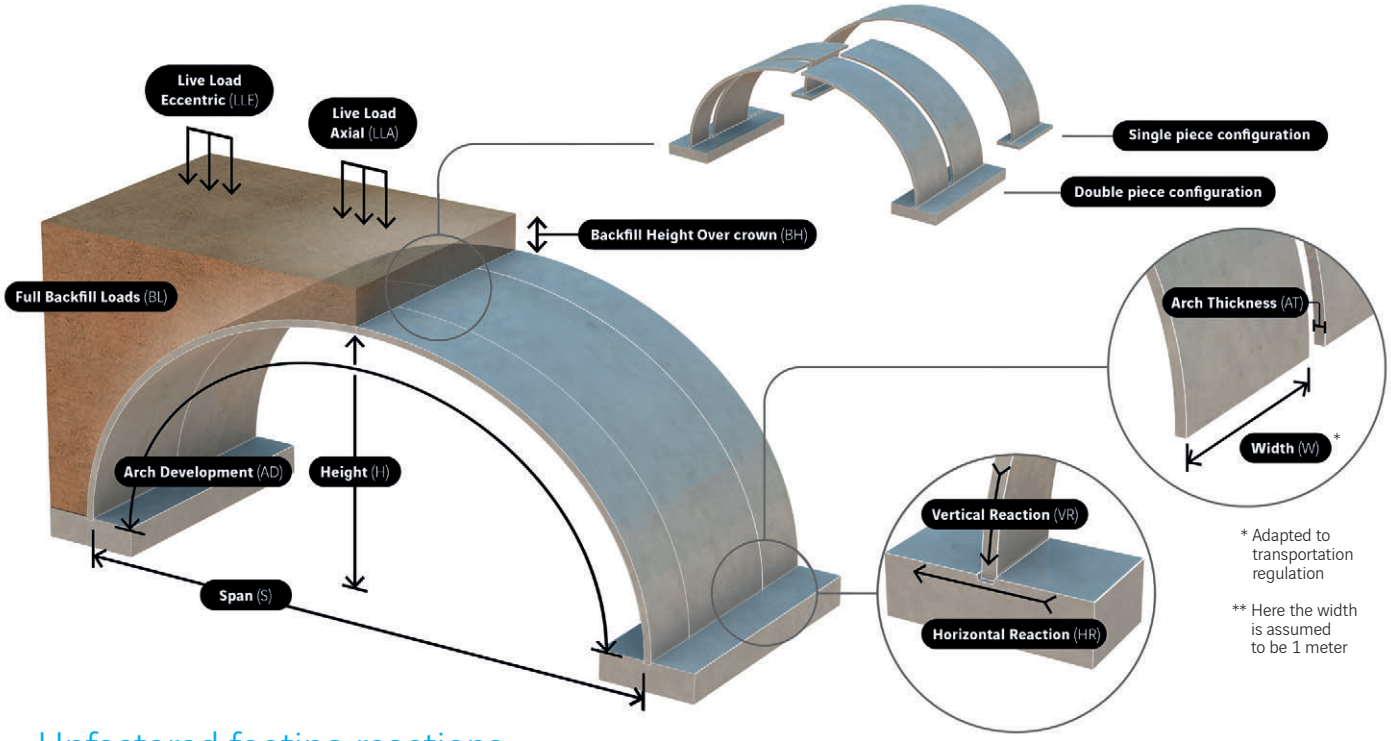
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/C reactions (kN/m)	Arch SW*	101	159	101	159	101	159	101	159	101	159
	BL	236	719	358	962	480	1204	601	1446	721	1686
	LLA	368	902	486	1141	604	1375	719	1607	834	1835
	LLE	401	999	506	1214	612	1432	719	1653	828	1876
	SH**	128	759	388	998	610	1260	795	1544	943	1851
	SV**	247	843	429	1129	599	1420	759	1716	908	2017

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

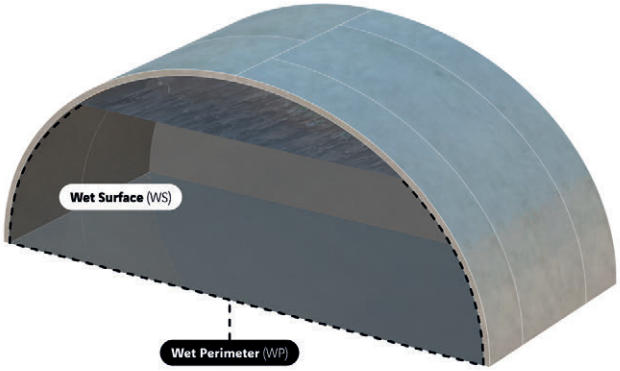
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	20,97
Height - H (m)	7,00
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	27,86
Element Weight per unit width (ton/m)	15,67



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	103,40
Wet perimeter* WP (m)	37,5

* dimensions given for 1 meter freeboard

Unfactored footing reactions

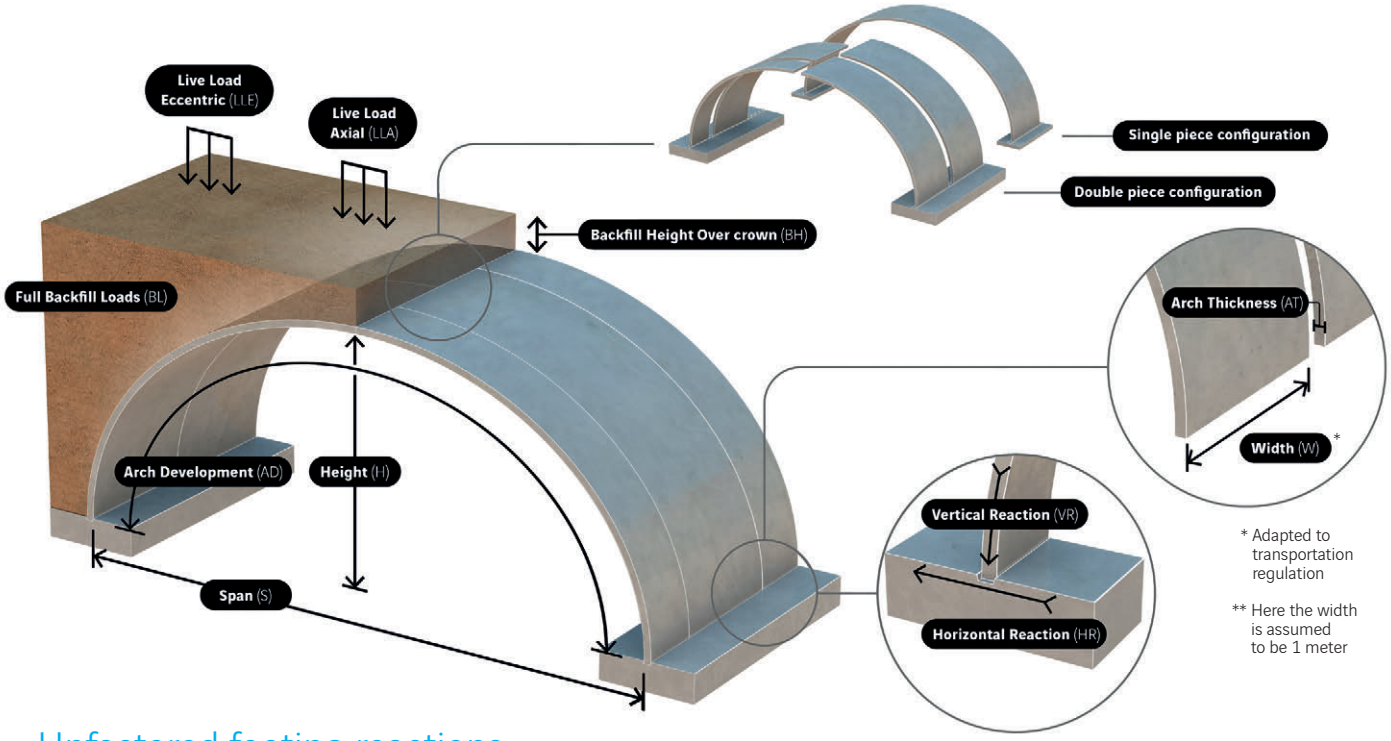
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/D reactions (kN/m)	Arch SW*	95	164	95	164	95	164	95	164	95	164
	BL	205	751	314	1000	424	1248	533	1495	643	1742
	LLA	318	931	425	1176	531	1417	635	1655	738	1889
	LLE	354	1028	449	1251	546	1476	643	1703	743	1932
	SH**	97	793	324	1021	520	1278	686	1565	820	1881
	SV**	213	877	373	1170	525	1468	670	1772	806	2081

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	21,27
Height - H (m)	7,50
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	28,90
Element Weight per unit width (ton/m)	16,26



* Adapted to transportation regulation

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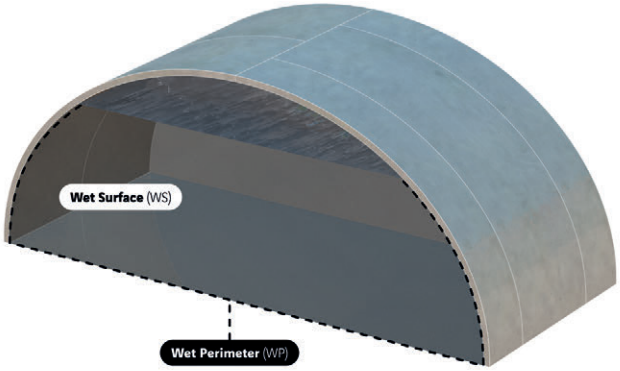


Hydraulic waterways

Wet surface - WS (m^2)	113,97
Wet perimeter* WP (m)	38,84

* dimensions given for 1 meter freeboard

Unfactored footing reactions

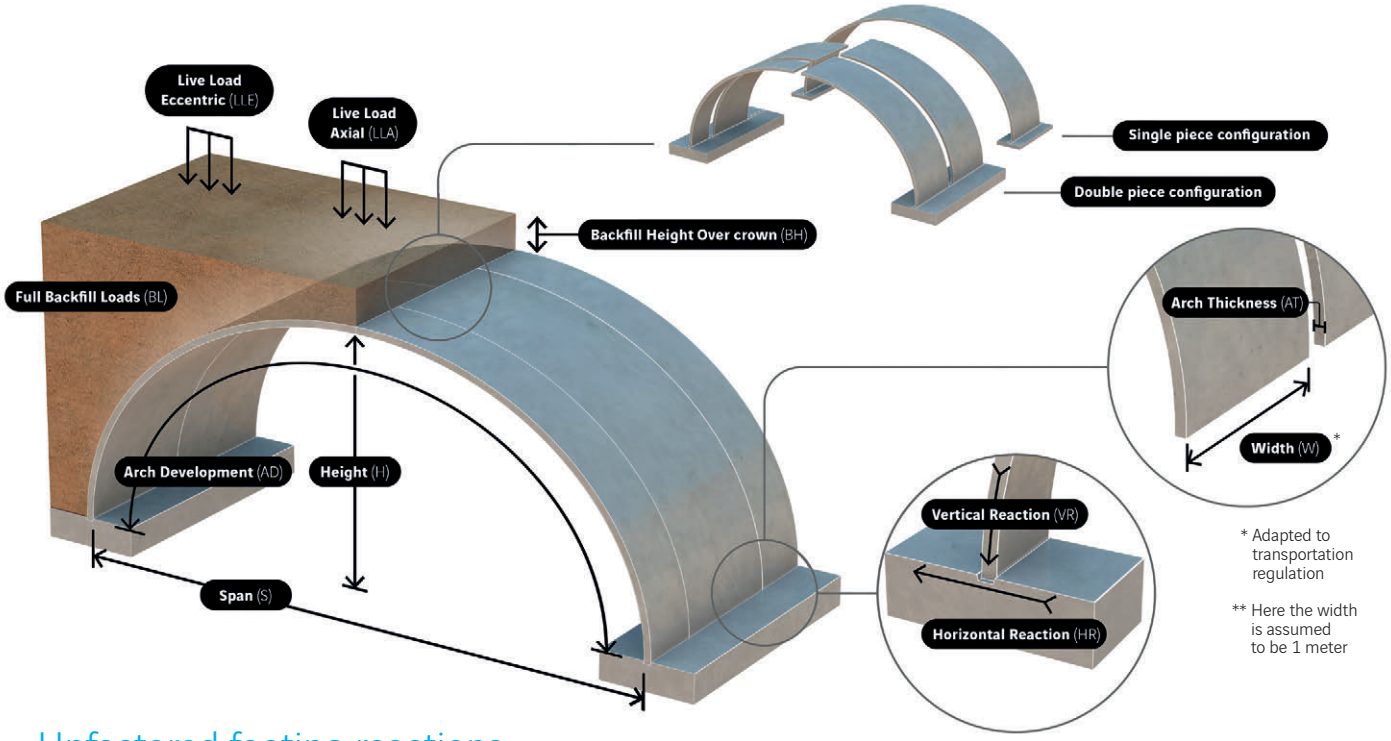
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/E reactions (kN/m)	Arch SW*	102	179	102	179	102	179	102	179	102	179
	BL	169	790	269	1043	369	1299	470	1556	571	1814
	LLA	271	959	372	1217	470	1472	567	1724	662	1972
	LLE	306	1102	394	1334	484	1570	575	1808	668	2050
	SH**	44	903	89	1148	218	1399	431	1656	728	1919
	SV**	172	978	280	1264	390	1554	503	1849	617	2149

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

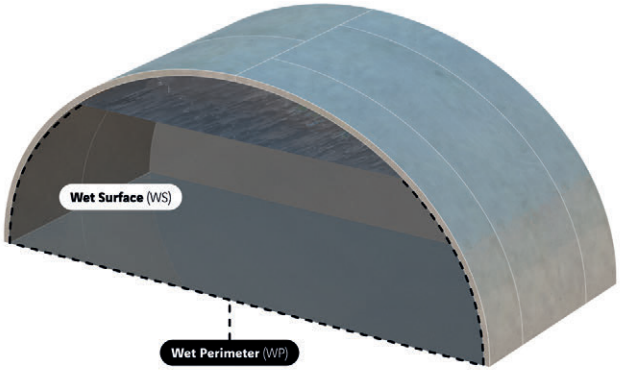
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	21,52
Height - H (m)	8,00
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	29,93
Element Weight per unit width (ton/m)	16,84



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	124,66
Wet perimeter* WP (m)	40,11

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/F reactions (kN/m)	Arch SW*	97	181	97	181	97	181	97	181	97	181
	BL	136	807	223	1059	311	1313	400	1570	491	1830
	LLA	221	965	309	1220	396	1474	483	1727	569	1979
	LLE	260	1097	338	1330	417	1566	497	1803	579	2043
	SH**	15	925	71	1175	171	1426	314	1678	501	1932
	SV**	137	981	233	1271	331	1563	430	1858	531	2157

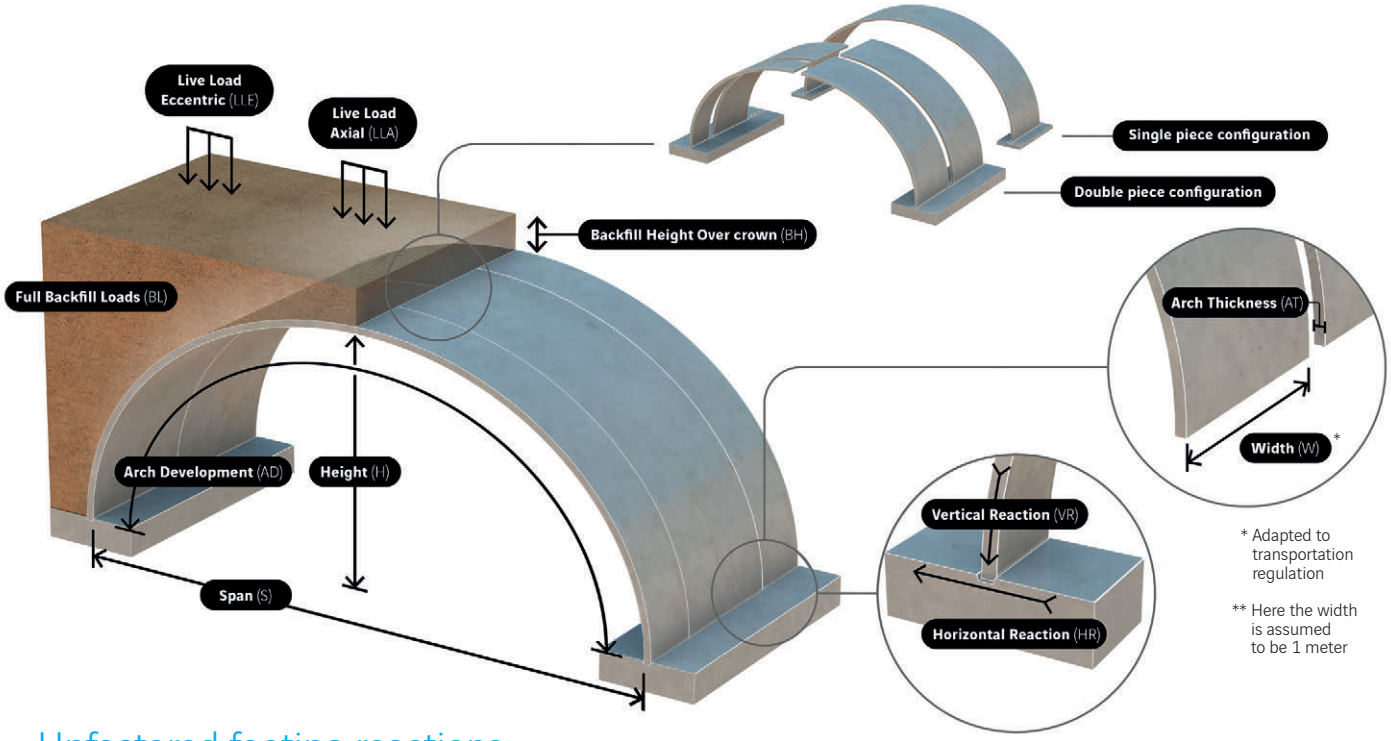
* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded. Live loads excluded

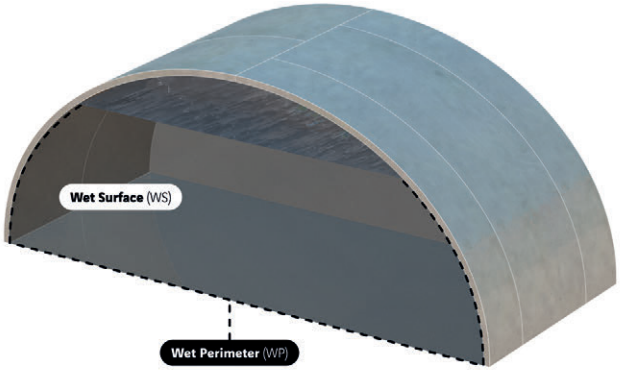
Contact us to confirm compliance with local requirements

TS-F_2200/G

Main dimensions

Arch configuration (piece)	Double
Span - S (m)	21,71
Height - H (m)	8,50
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	30,95
Element Weight per unit width (ton/m)	17,41





Hydraulic waterways

Wet surface - WS (m^2)	135,47
Wet perimeter* WP (m)	41,33

* dimensions given for 1 meter freeboard

Unfactored footing reactions

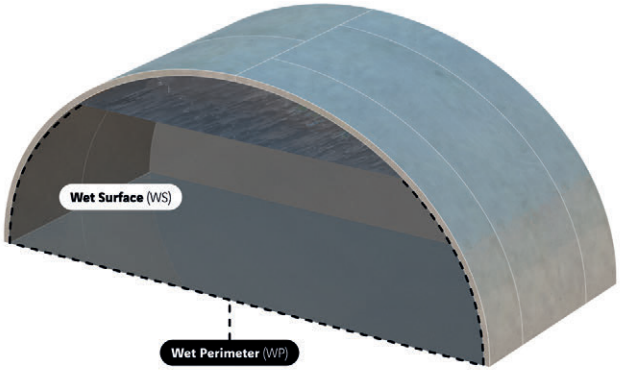
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/G reactions (kN/m)	Arch SW*	91	186	91	186	91	186	91	186	91	186
	BL	102	825	176	1077	252	1331	329	1588	409	1849
	LLA	171	974	246	1228	322	1482	398	1737	473	1991
	LLE	212	1105	279	1339	347	1575	416	1813	486	2052
	SH**	-18	958	43	1214	119	1468	211	1720	317	1969
	SV**	98	1002	183	1295	268	1590	354	1886	440	2184

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

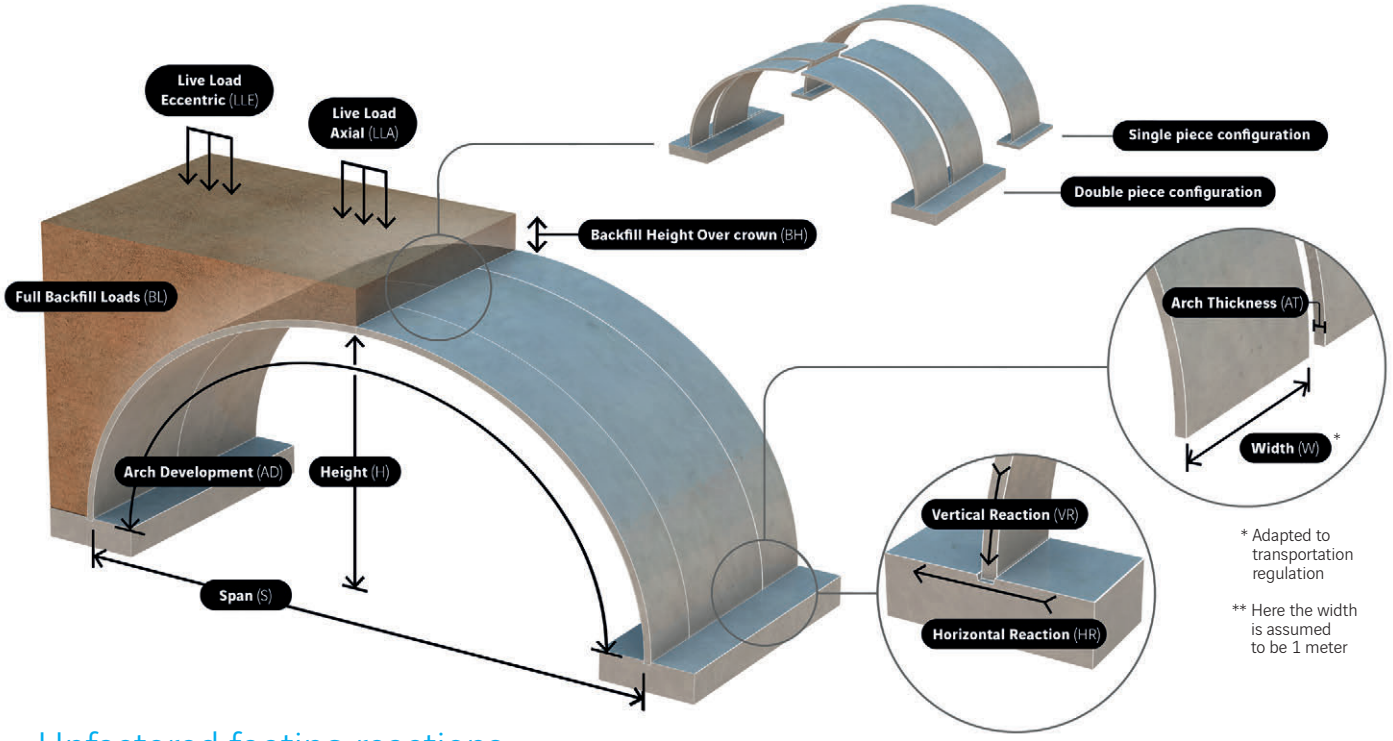
Arch configuration (piece)	Double
Span - S (m)	21,86
Height - H (m)	9,00
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	31,96
Element Weight per unit width (ton/m)	17,98



Hydraulic waterways

Wet surface - WS (m^2)	146,37
Wet perimeter* WP (m)	42,49

* dimensions given for 1 meter freeboard



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter

Unfactored footing reactions

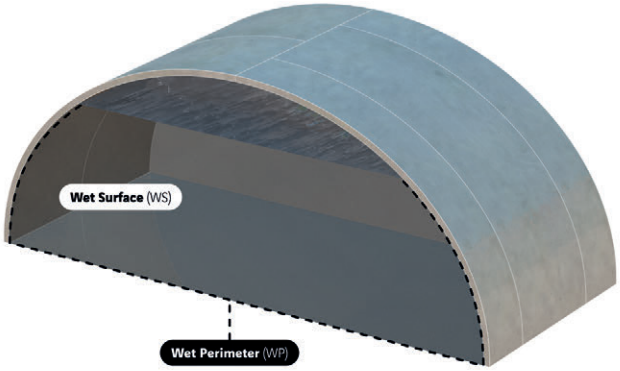
		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/H reactions (kN/m)	Arch SW*	86	191	86	191	86	191	86	191	86	191
	BL	66	846	128	1097	191	1352	256	1609	323	1870
	LLA	121	986	185	1241	248	1497	312	1752	376	2007
	LLE	161	1126	216	1360	273	1597	331	1835	389	2076
	SH**	-56	1004	4	1267	63	1525	120	1779	175	2029
	SV**	57	1042	129	1337	200	1634	272	1931	345	2230

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

Main dimensions

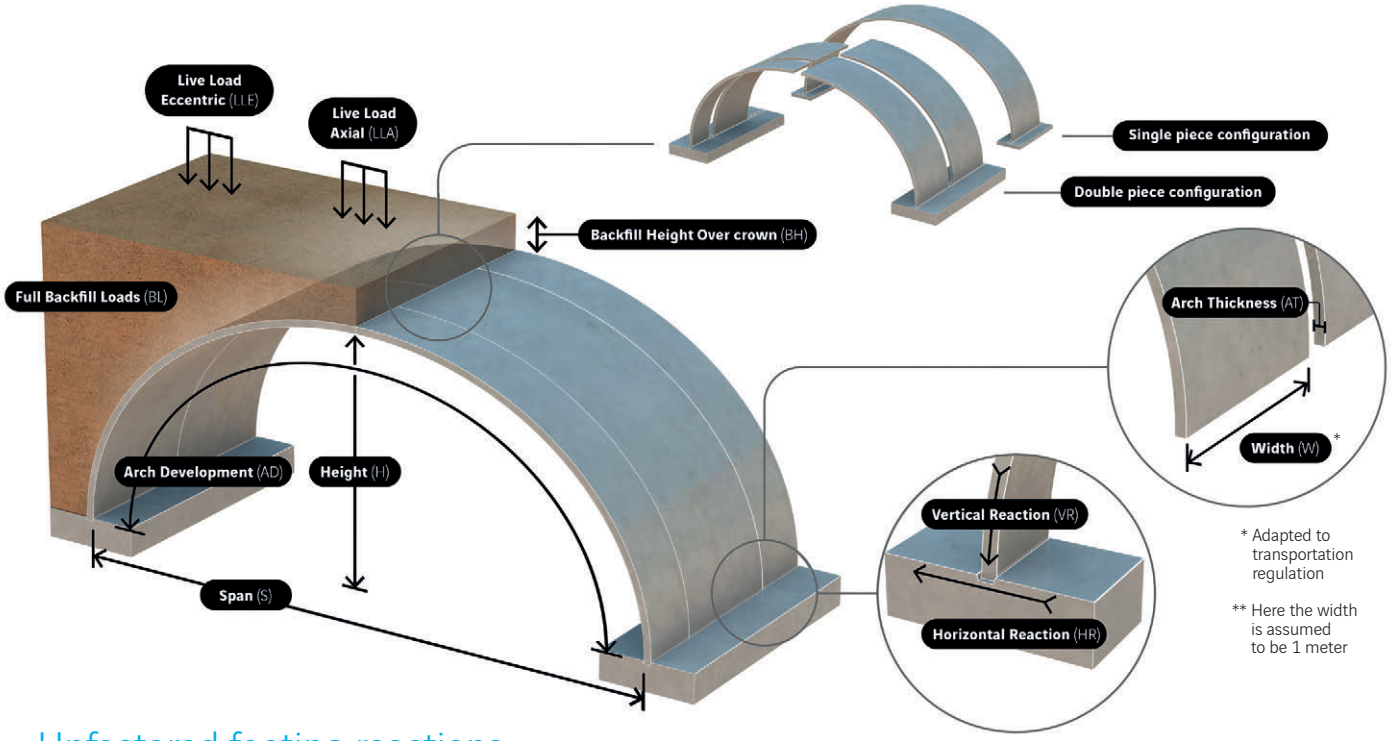
Arch configuration (piece)	Double
Span - S (m)	21,95
Height - H (m)	9,50
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	32,96
Element Weight per unit width (ton/m)	18,54



Hydraulic waterways

Wet surface - WS (m^2)	157,32
Wet perimeter* WP (m)	43,59

* dimensions given for 1 meter freeboard



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter

Unfactored footing reactions

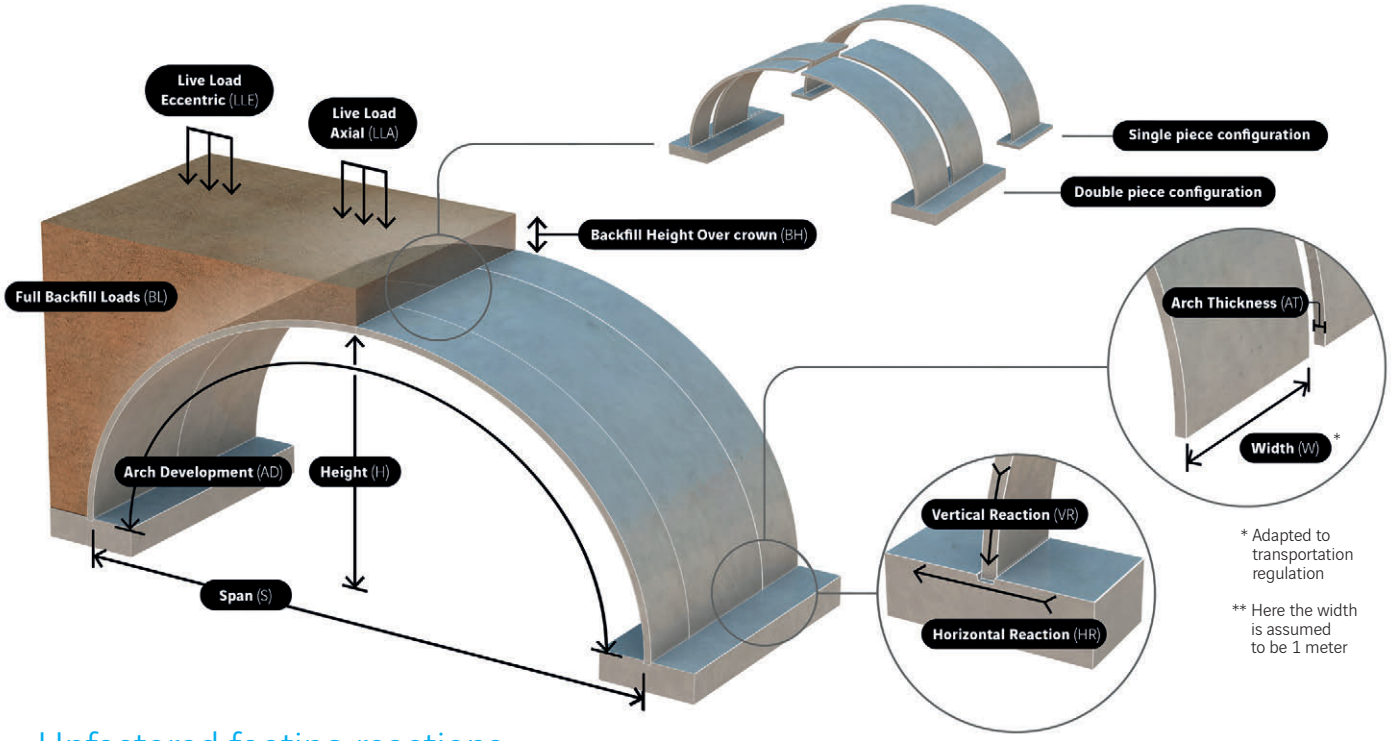
Backfill height over crown (BH) - BH ≥ 1 m											
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/I reactions (kN/m)	Arch SW*	82	199	82	199	82	199	82	199	82	199
	BL	29	869	79	1121	130	1375	182	1633	235	1894
	LLA	72	1002	124	1260	175	1516	226	1773	277	2028
	LLE	106	1158	151	1393	196	1631	242	1871	290	2115
	SH**	-97	1063	-45	1331	1	1596	40	1856	73	2111
	SV**	13	1098	71	1395	129	1694	187	1994	246	2295

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

Contact us to confirm compliance with local requirements

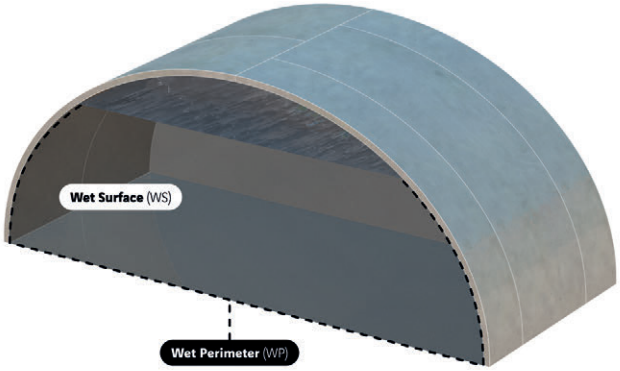
Main dimensions

Arch configuration (piece)	Double
Span - S (m)	22,00
Height - H (m)	10,00
Arch Thickness - AT (mm)	450
Arch Development - AD (m)	33,97
Element Weight per unit width (ton/m)	19,11



* Adapted to transportation regulation

** Here the width is assumed to be 1 meter



Hydraulic waterways

Wet surface - WS (m^2)	168,99
Wet perimeter* WP (m)	44,63

* dimensions given for 1 meter freeboard

Unfactored footing reactions

		Backfill height over crown (BH) - BH ≥ 1 m									
	Load combination	1 m		2 m		3 m		4 m		5 m	
		HR	VR	HR	VR	HR	VR	HR	VR	HR	VR
TS-F_2200/J reactions (kN/m)	Arch SW*	78	208	78	208	78	208	78	208	78	208
	BL	-9	895	28	1148	65	1403	103	1660	142	1921
	LLA	23	1022	62	1283	100	1542	137	1799	175	2054
	LLE	48	1203	81	1439	114	1678	149	1921	184	2169
	SH**	-144	1134	-105	1410	-67	1682	-29	1951	9	2217
	SV**	-34	1173	9	1472	52	1772	96	2074	141	2379

* Arch SW stands for arch self weight
** SH and SV stand for horizontal/vertical seismic inertial loads. Live loads excluded

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