

Water-Gate© Anti-pollution river dams Fire defence



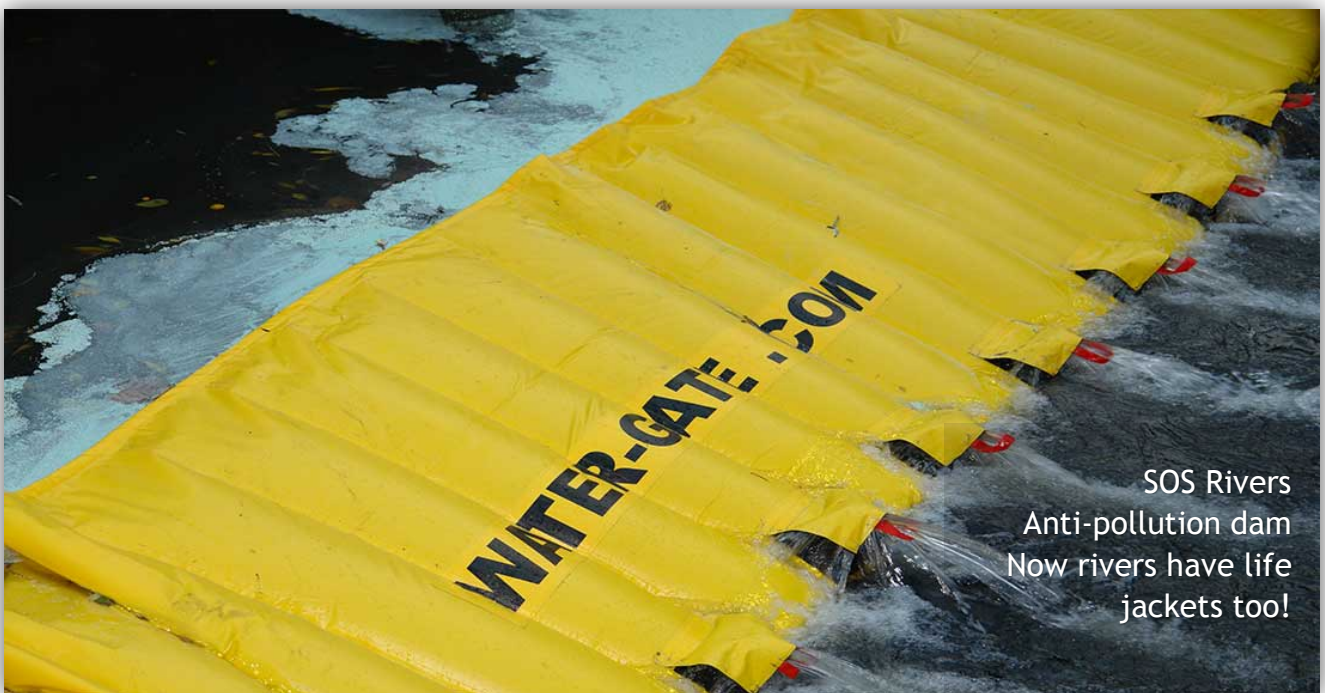


TABLE OF CONTENTS

1	FIRE DEFENCE.....	4
2	ANTI-POLLUTION.....	5
3	BENEFITS	6
4	WT: A FULL RANGE OF FLEXIBLE DAMS FOR RIVER AID.....	7
4.1	Release holes.....	8
4.2	Ridge edge with attachment line.....	8
5	RELEASE HOLES.....	9
6	HANDLING	11
7	WATER-GATE© ANTI-FLOOD PROTECTION.....	13
7.1	Prevent flooding in all circumstances	13
7.2	Introduction to the concept.....	13
7.3	General features.....	14
7.4	Make the junction between 2 cofferdams	16
7.5	Disposing of seepage water by pumping.....	17
7.6	Technical specifications of the fabric	18
7.7	Repairs	18
7.8	Certification.....	19
7.9	100% Recyclable	20
7.10	References.....	21
8	ATTACHMENTS.....	22
8.1	FM Approvals - Approval Standard for Flood Abatement Equipment - Extract	22
8.2	Installation videos / YouTube channel	25

How does it work?

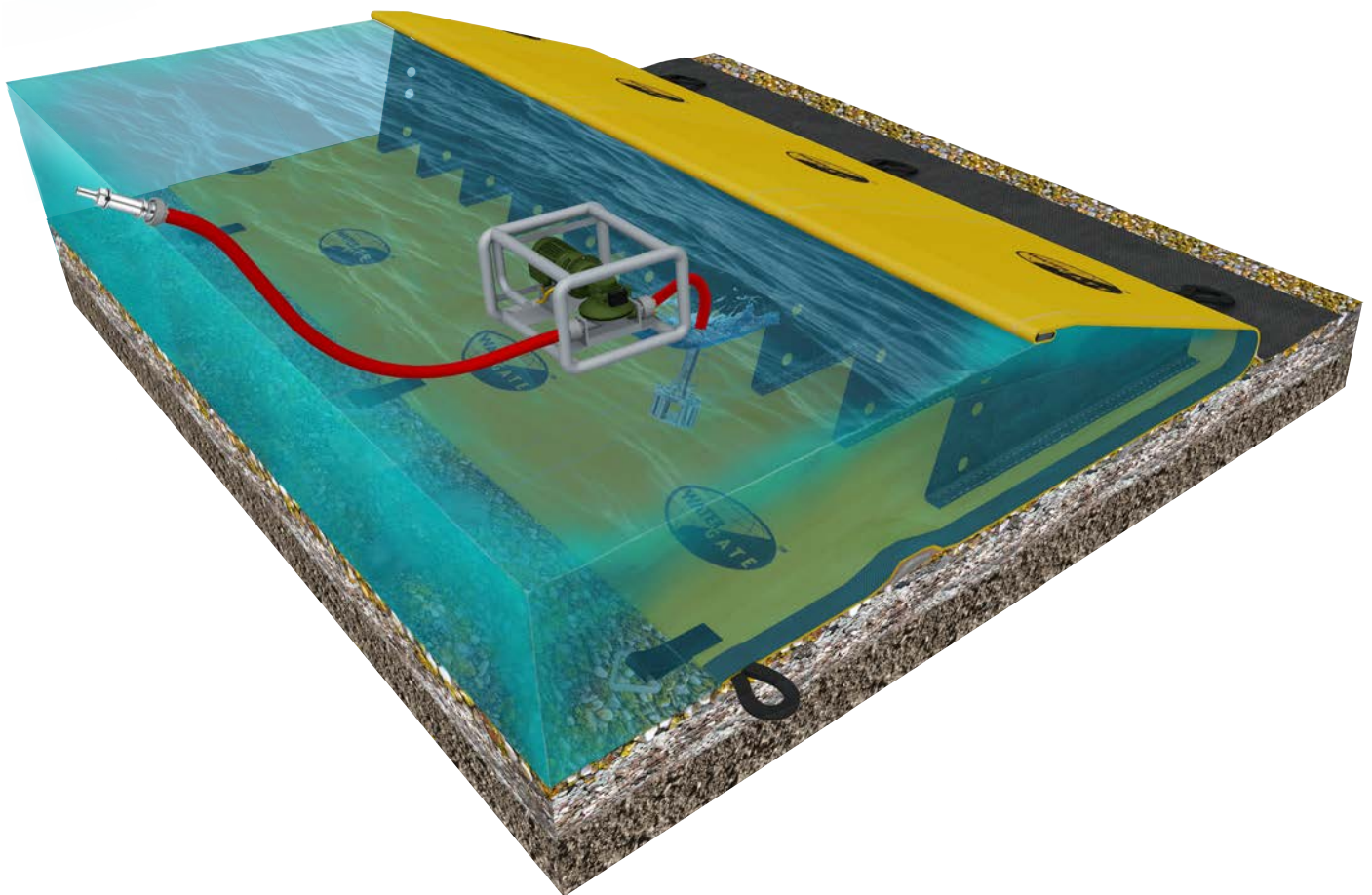
The flexible dams in our WT range are light and quick to install. They help to block pollution or create a mobile suction point, regardless of the river's profile.



1 FIRE DEFENCE

A better way to use natural water points

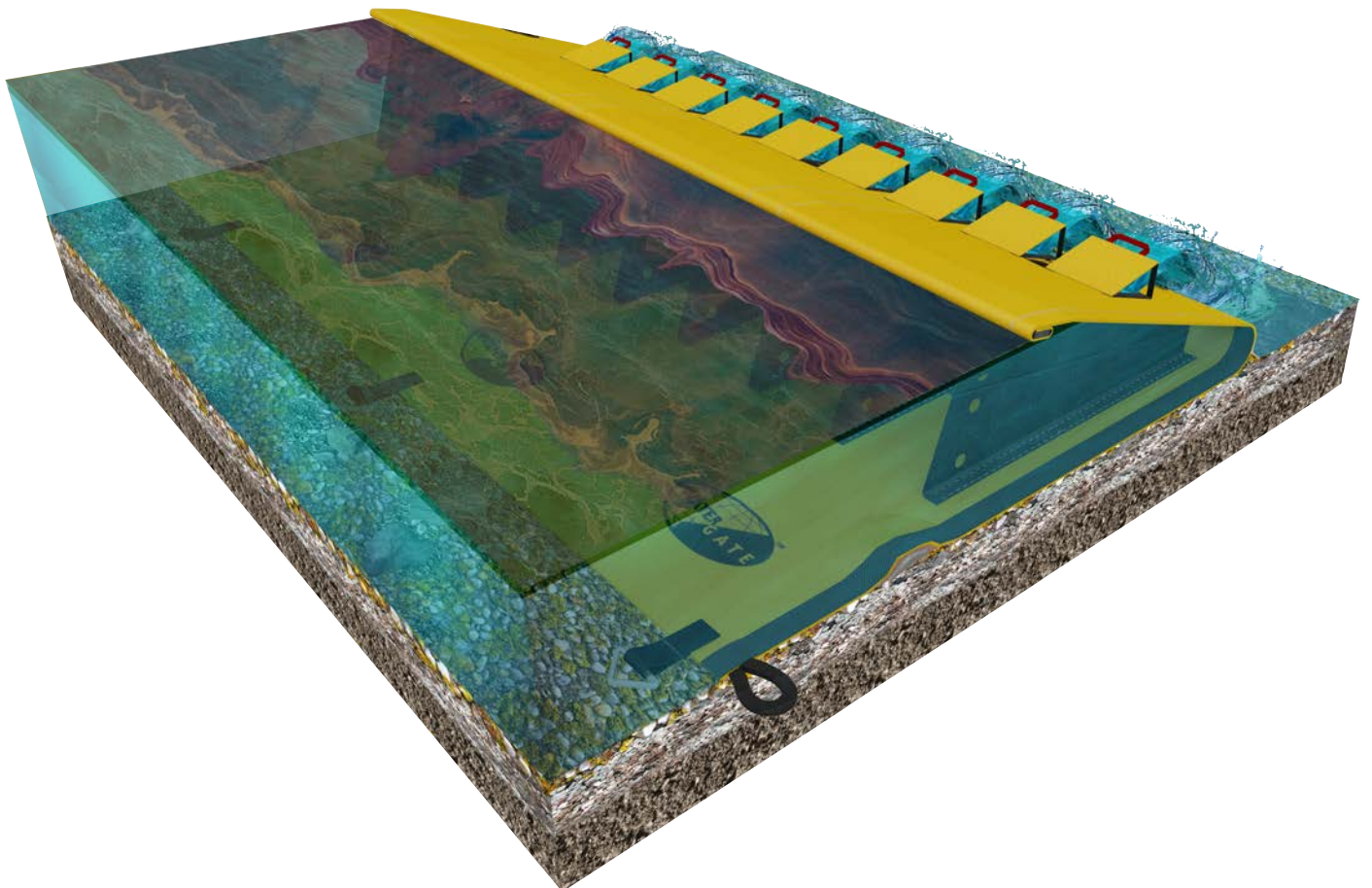
Our flexible dams allow pumps to draw from the entire hydrographic network: rural areas, mountains, and even around forest fires. The smallest brook, stream or river becomes a firefighting reserve that can be mobilised by firefighters. A 10 l/s trickle of water is enough to quickly supply 2 fire hoses.



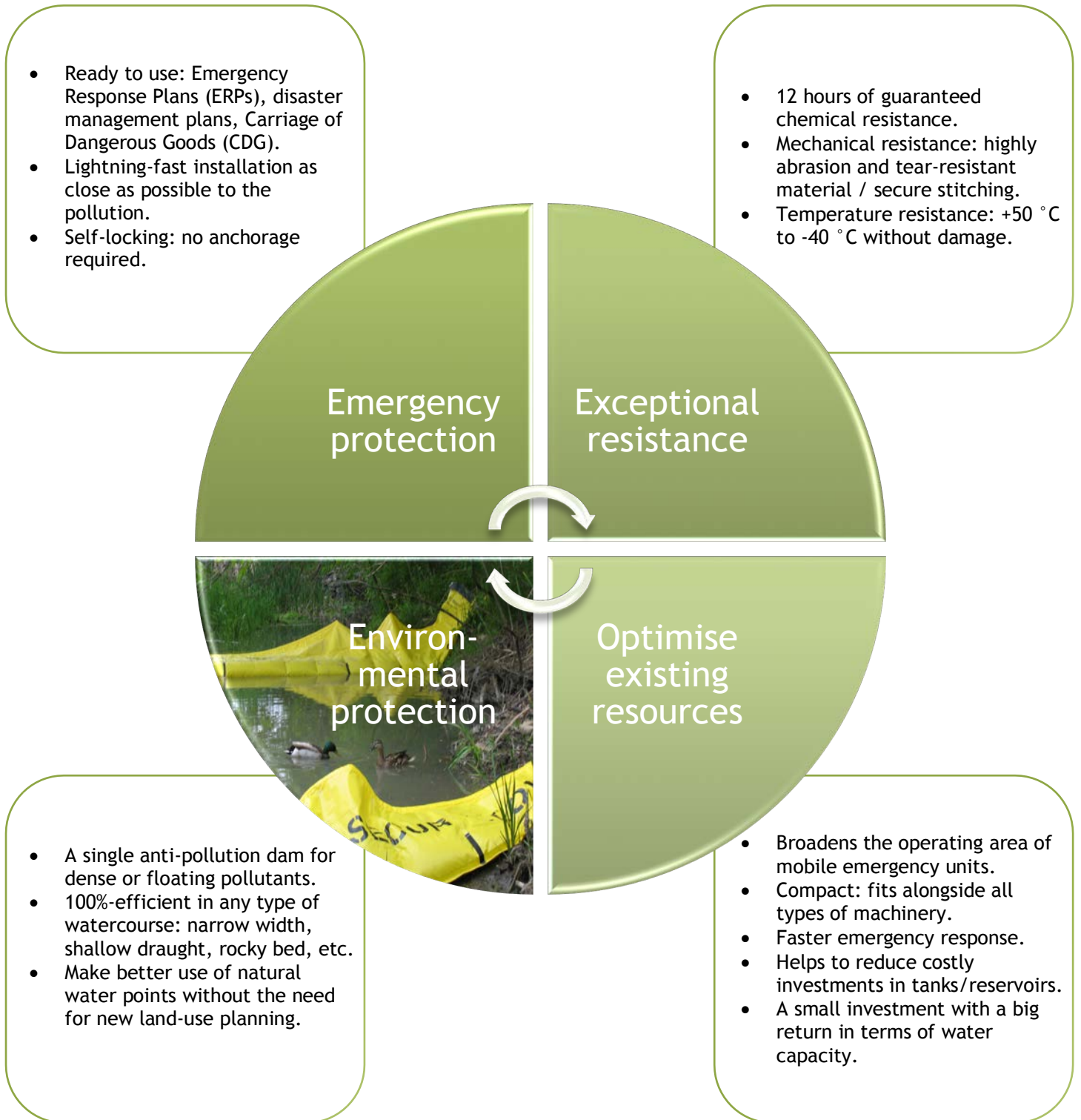
2 ANTI-POLLUTION

Trap pollution before it spreads

The Water-Gate© anti-pollution dam features openings at its base that can be operated to let clean water flow through. The pollutant is therefore confined to the surface, where it builds up for long enough to be treated. The release holes can be opened or closed during use.



3 BENEFITS



4 WT: A FULL RANGE OF FLEXIBLE DAMS FOR RIVER AID

WT 2115 (53 cm x 4,6 m):

- Maximum water retention height: 53 cm
- Protection length: 4,6 m
- Width (depth of ground surface): 212 cm
- Packaging: B 33 cm x L 33 cm x H 51 cm
- Weight: 13,4 kg

WT 2130 (53 cm x 9,1 m):

- Maximum water retention height: 53 cm
- Protection length: 9,1 m
- Width (depth of ground surface): 212 cm
- Packaging: B 41 cm x L 41 cm x H 50 cm
- Weight: 23,0 kg

WT 2150 (53 cm x 15,2 m):

- Maximum water retention height: 53 cm
- Protection length: 15,2 m
- Width (depth of ground surface): 212 cm
- Packaging: B 52 cm x L 52 cm x H 49 cm
- Weight: 37,0 kg



WT 2815 (71 cm x 4,6 m):

- Maximum water retention height: 71 cm
- Protection length: 4,6 m
- Width (depth of ground surface): 284 cm
- Packaging: B 34 cm x L 32 cm x H 68 cm
- Weight: 16,6 kg

WT 2825 (71 cm x 7,6 m):

- Maximum water retention height: 71 cm
- Protection length: 7,6 m
- Width (depth of ground surface): 284 cm
- Packaging: B 42 cm x L 42 cm x H 63 cm
- Weight: 26,5 kg

WT 2835 (71 cm x 10,7 m):

- Maximum water retention height: 71 cm
- Protection length: 10,7 m
- Width (depth of ground surface): 284 cm
- Packaging: B 47 cm x L 47 cm x H 62 cm
- Weight: 35,6 kg

WT 2850 (71 cm x 15,2 m):

- Maximum water retention height: 71 cm
- Protection length: 15,2 m
- Width (depth of ground surface): 284 cm
- Packaging: B 65 cm x L 60 cm x H 47 cm
- Weight: 50,0 kg

All Water-Gate dams can be connected to each other regardless of their height.





WT 3930 (100 cm x 9,1 m):

- Maximum water retention height: 100 cm
- Protection length: 9,1 m
- Width (depth of ground surface): 396 cm
- Packaging: B 53 cm x L 94 cm x H 38 cm
- Weight: 67,5 kg

WT 3950 (100 cm x 15,2 m):

- Maximum water retention height: 100 cm
- Protection length: 15,2 m
- Width (depth of ground surface): 396 cm
- Packaging: B 69 cm x L 94 cm x H 46 cm
- Weight: 111,4 kg



Options

4.1 Release holes

10 release holes per dam as standard.
Option to add more when ordering.

4.2 Ridge edge with attachment line

Attach the absorbent tubes. Optional attachment line.
Supply of specially designed oleophilic products.



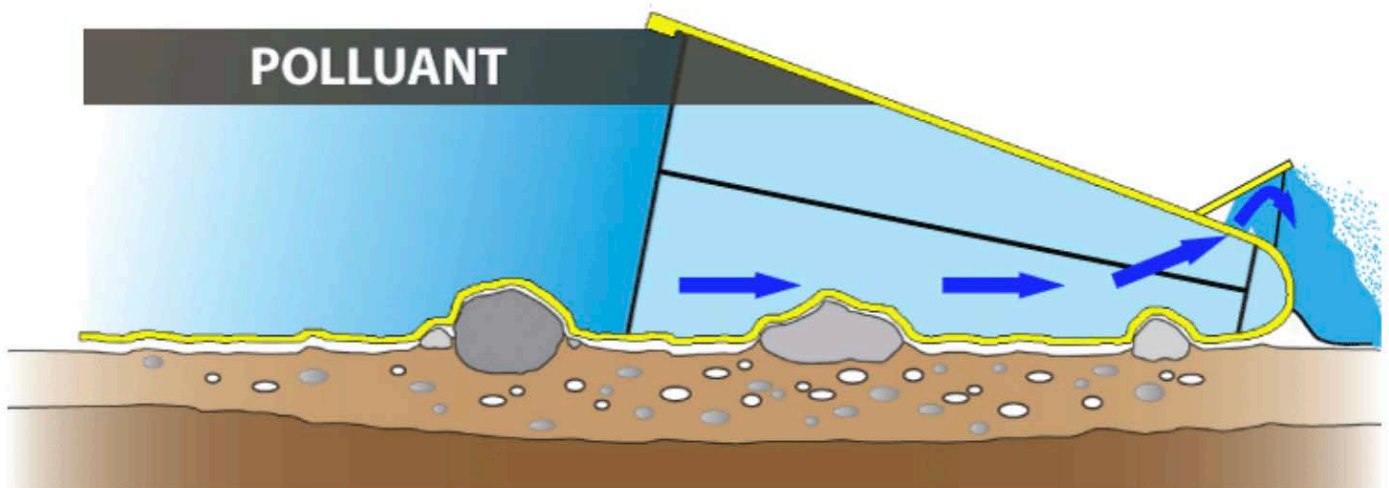
Water-Gate©
The world leader in self-securing flexible dams

5 RELEASE HOLES

Trap pollution before it spreads

Trap floating pollutants, let clean water pass through.

The Water-Gate© anti-pollution dam features openings at its base that can be operated to let clean water flow through. The pollutant is therefore confined to the surface, where it builds up for long enough to be treated. The release holes can be opened or closed during use.



Control the discharge flow of clean water.

To avoid surface pollution overflowing, a stable height must be maintained upstream of the dam.

Open the required number of release holes at the foot of the dam in order to maintain a stable level.

It is possible to open and close the release holes during use by simply applying pressure to the hatch.





Technical specifications:

- Quantity: **10 release holes per dam as standard. Option to add more when ordering.**
- Diameter: 4.5" (11.4 cm)
- Flow: varies between 35 m³ and 75 m³/hour depending on the retention height
- Operated by Velcro straps, allowing the holes to be opened and closed during use
- The directional valve held in place by straps directs the flow directly onto the anti-erosion flap to facilitate the operation and protect the river bed



6 HANDLING

HANDLING

Preparation on the bank

Unroll the flexible cofferdams, unfold them, and attach them to one another.

Positioning in the river

If a single cofferdam is long enough, unroll it directly across the watercourse and unfold it. Otherwise, pull the pre-attached cofferdams across the watercourse, keeping the leading edge out of the water. Centre the cofferdam, ensuring that the ends reach the banks.

Immersion

Immerse the leading edge to the river bed. Stand on the leading edge until the cofferdam becomes pressurized.

Ballast

Weigh down the leading edge with ballast bags or stones taken from the watercourse.

Securing the dam

If the banks are vertical, attach the ends of the removable cofferdam so that they do not fall back into the water.





7 WATER-GATE© ANTI-FLOOD PROTECTION

7.1 Prevent flooding in all circumstances

Water-Gate© is a flexible emergency flood dam that harnesses the power of floodwater or firewater to automatically fill, unfold and stabilise itself.

Water-Gate is sold by MegaSecur.Europe, the exclusive European importer of the Water-Gate dam, manufactured by the firm MegaSecur.International at its factory in Victoriaville, Quebec (Canada).

7.2 Introduction to the concept

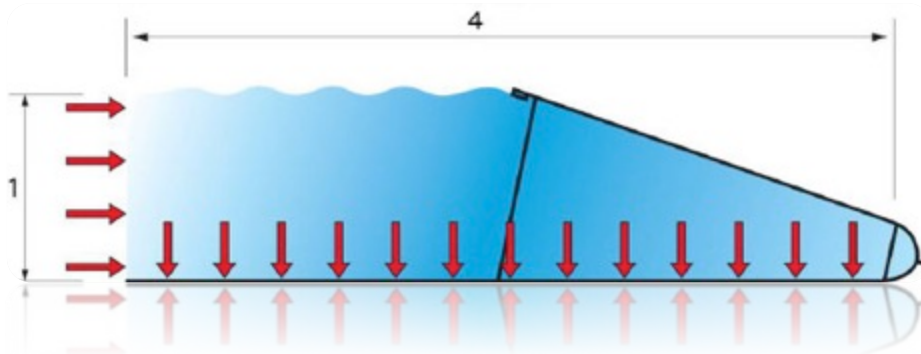
Water-Gate© is a very effective and safe form of emergency protection:

- Water-Gate can instantly replace thousands of sandbags
- Water-Gate remains stable regardless of its length, the direction of the current, and the gradient of the surface

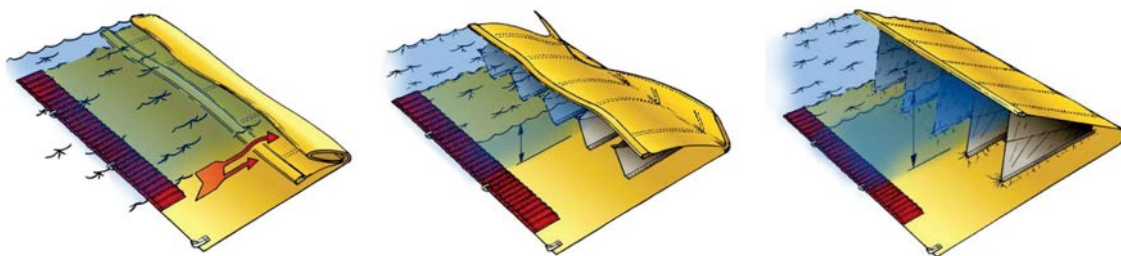
Water-Gate© can retain thousands of cubic metres of water without anchorage!

The design of the Water-Gate mobile anti-flood dam, with a height to ground depth ratio of 1:4 (1:3 for the WS urban range) guarantees perfect stability and grip on any kind of surface, regardless of the height of the protection.

The thrust acting on the ground section is 3 to 4 times greater than the horizontal thrust.



The Water-Gate anti-flood dam deploys automatically once the water begins to flow.

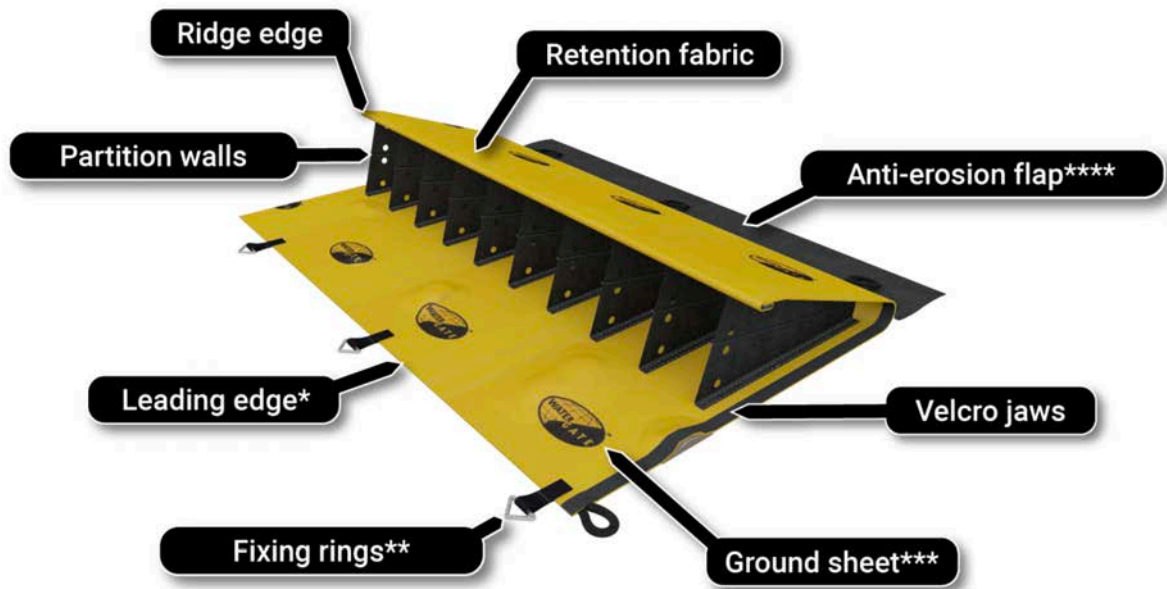


Water-Gate© products have been winning accolades worldwide for their performance for over 15 years.



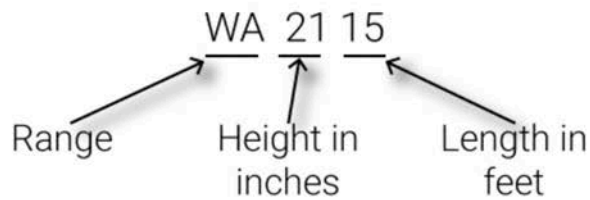
7.3 General features

Water-Gate© Flexible Cofferdam - WA Series



Features :

- * Cofferdam designed without ballast: the flexible leading edge fits perfectly over uneven surfaces
- ** Only for installation in standing water
- *** Deep ground sheet that facilitates pedestrian passage and safe pumping for chutes
- **** Limits the risk of erosion in the event of overflow, especially on sandy beds



Deployment

The mobile anti-flood dams are supplied in the form of rolls that can be unrolled on the ground. Alternatively, they are packaged in a box specially designed for rapid deployment.

Handling

Water-Gate anti-flood dams are manufactured in unit lengths of up to 15.2 metres, allowing them to be installed by just one or two people (depending on the height of the protection). This modularity also allows for intermittent flood protection that can be adapted to suit the situation.

Modular design

Our flood protection can be extended as needed with no reduction in efficacy.

Water-Gate flood protection can be lengthened by simply adding additional sections, even ones of different heights: they can be quickly connected without tools thanks to the double-Velcro system.

The opposite process is equally simple: components that are no longer useful, e.g. because the flood has died down, can be quickly removed without compromising the efficacy of the remaining flood protection.



Stability

Water-Gate© remains stable regardless of its length, the gradient of the land, and the direction of the current (face-on, from the side or backwards). There is no risk of slippage, so the dam requires no anchorage.

Flexibility for your chosen perimeter

Water-Gate flood protection can be curved at any point and in any direction in order to suit the situation (e.g. protection around the perimeter of a building). It is possible to create a right angle without any additional components by simply folding the barrier (method described in the user manual).

Adapts to all types of bottoms

The rougher the terrain, the greater the frictional forces on the ground. The dam follows the slightest crevice. **On concrete, we recommend using the WL© range with ballast integrated rather than the WA© range of cofferdams.**

Sandy bottom, it is imperative to bury the leading edge of the water barrier to limit the hydraulic piping erosion effect.

Fits over obstacles

Water-Gate flood protection can pass over obstacles/objects. The pressure of the water on the fabric forces it to cling to the object, thus avoiding leaks.

Shock-resistant

As it is made from flexible materials, the Water-Gate mobile anti-flood dam is particularly resistant to impacts (e.g. drifting objects). The dam easily absorbs the energy of impacts without breaking, tearing or losing stability.

The shock resistance tests carried out using tree trunks travelling at high speed are rather impressive.

See the FM Global certification & test video: <https://youtu.be/51ytObyMMVc>

Durability

The Water-Gate flood dam is an extremely strong and robust product. The dam is made of PVC-coated polyester fabric that is highly abrasion and tear-resistant. The secure lock stitching is done with 100% polyester thread. One broken lockstitch does not compromise the following stitch. The materials used to make the barrier can easily withstand temperatures of +50 °C to -40 °C, as well as most chemicals.

Since the Water-Gate flood dam is made exclusively of polymeric materials, it will last approximately 20 years if used 2 to 3 times a year.

Maintenance

Water-Gate© mobile dams require little maintenance. We recommend cleaning and drying the flood dams after each use (hooks are provided to hang up the dam for drying purposes). Dirt and moisture do not affect Water-Gate's quality and durability, but they may result in unpleasant odours the next time the dam is used.


Warranty

Each dam is manufactured and inspected in line with our stringent quality standards. A serial number can be found at either end of each flood barrier to ensure traceability.

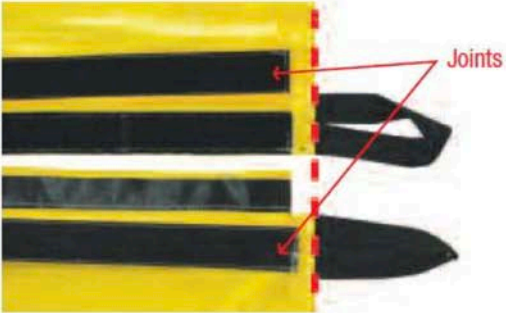
Our flexible barriers are guaranteed against design, material and production defects for a period of two years. This applies to the UV resistance, water tightness and mechanical strength of fabrics and technical materials stored in their original container.




7.4 Make the junction between 2 cofferdams




1. The first step consists in completely unrolling and unfolding the two barriers and laying them one next to the other.




2. Both barriers must be aligned at the back. Make sure the joints are open.




3. Open the top fabrics on each side to uncover the bottom joints and insert the barrier on the right into the one on the left.




4. Close up the velvet strips and hooks by laying them one on top of the other from the back. Good dexterity is required to close up the back.



5. Keep closing up the velvet strips and hooks from the back until you end at the front.



6. When you are done with the joint at the bottom, insert the partition of the barrier on the left in the partition of the barrier on the right and close off the top parts.



7. Close up the velvet strips and hooks by laying them one on top of the other, the same as you did for the bottom joint.



7.5 Disposing of seepage water by pumping

No mobile flood protection system is totally watertight. Even the surface on which the dam rests is not 100% watertight.

Water-Gate barriers have been certified by FM Approvals for a height of 1 foot.

The leak rate of the FM Global protocol is 3.1 litres/min/linear metre (0.25 gpm) regardless of the height. This is a very strict requirement given the test conditions (shallow depth and powerful waves).

Here are the leak rate results for Water-Gate© barriers | consistent with our general observations.

1.6 l/min/lm for 1 foot (30.5 cm)

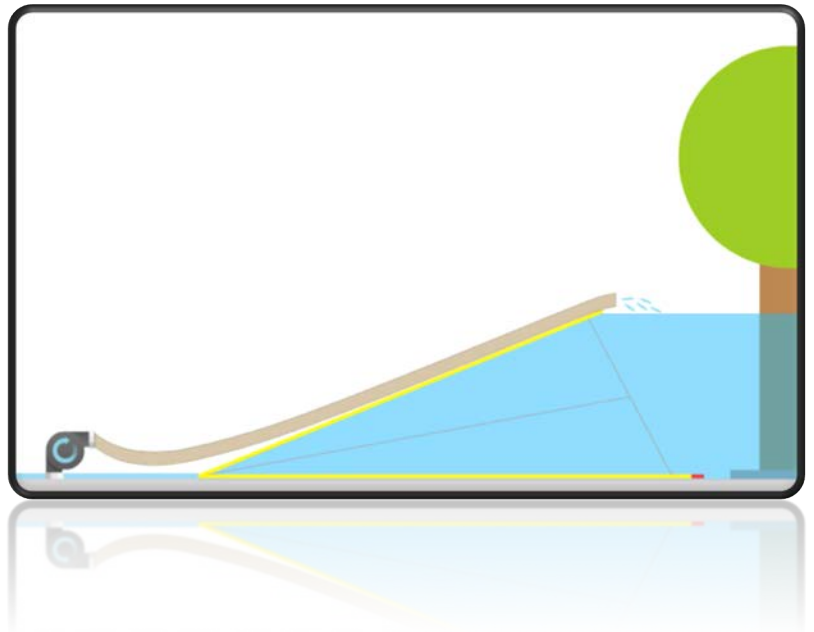
3.5 l/min/lm for 2 feet (61 cm)

6.8 l/min/lm for 3 feet (91.5 cm)

See the excerpt in the annex

FM Approvals - Approval Standard for Flood Abatement Equipment - Extract

We recommend that a pumping solution be put in place to collect water that has seeped through and discharge it beyond the dam.



7.6 Technical specifications of the fabric

Outer layer - PVC fabric			
Property	Min. specification		Certified
Weight	750 g/m ²		Yes
Base fabric	Woven polyester net		-
Tensile strength	Warp 55 kg/cm	Weft 50 kg/cm	Yes
Tear resistance	Warp 45 kg	Weft 35 kg	Yes
Adhesion	Warp 1.5 kg/cm	Weft 1.5 kg/cm	Yes
Temperature resistance	-30 ° + 70 °C		Yes
UV resistance			No

Inner partitions - Polyethylene fabric			
Property	Min. specification		Certified
Weight	300 g/m ²		Yes
Base fabric	100% polyethylene		-
Tensile strength	Warp 80 kg/cm	Weft 50 kg/cm	Yes
Tear resistance	Warp 40 kg	Weft 40 kg	Yes
Cold resistance	-40 °C		Yes
UV resistance	Resistance >80% after 2,000 hours of exposure		No

7.7 Repairs

In the very unlikely event of a tear developing while the dam is in water, simply slide a piece of canvas inside the dam (on the side facing upstream) to seal the breach (the pressure of the water on the canvas makes the seal watertight). The barrier can then be permanently repaired out of water using the provided repair kit (Zodiac polyurethane 2-part glue for flexible PVC (750 ml) and 5 m x 2 m strip of PVC fabric).



7.8 Certification

Water-Gate flood protection complies with European requirements.

Water-Gate barriers have successfully passed the testing and certification process conducted by FM Global, the world leader in property damage insurance.

The tests were carried out in collaboration with the US Army Corps of Engineers. Video excerpt of the tests: <https://youtu.be/51ytObyMMVc>

Three heights were tested: 100 cm, 127 cm and 152 cm.

Features tested (over 24 hours):

- Watertightness and stability at 30%, 60% and 100% of dam capacity
- Resistance to waves at 60%, 80% and 100% of dam capacity
- Resistance to parallel currents
- Shock resistance (impacts from tree trunks)
- Overflow resistance (120% of dam capacity)



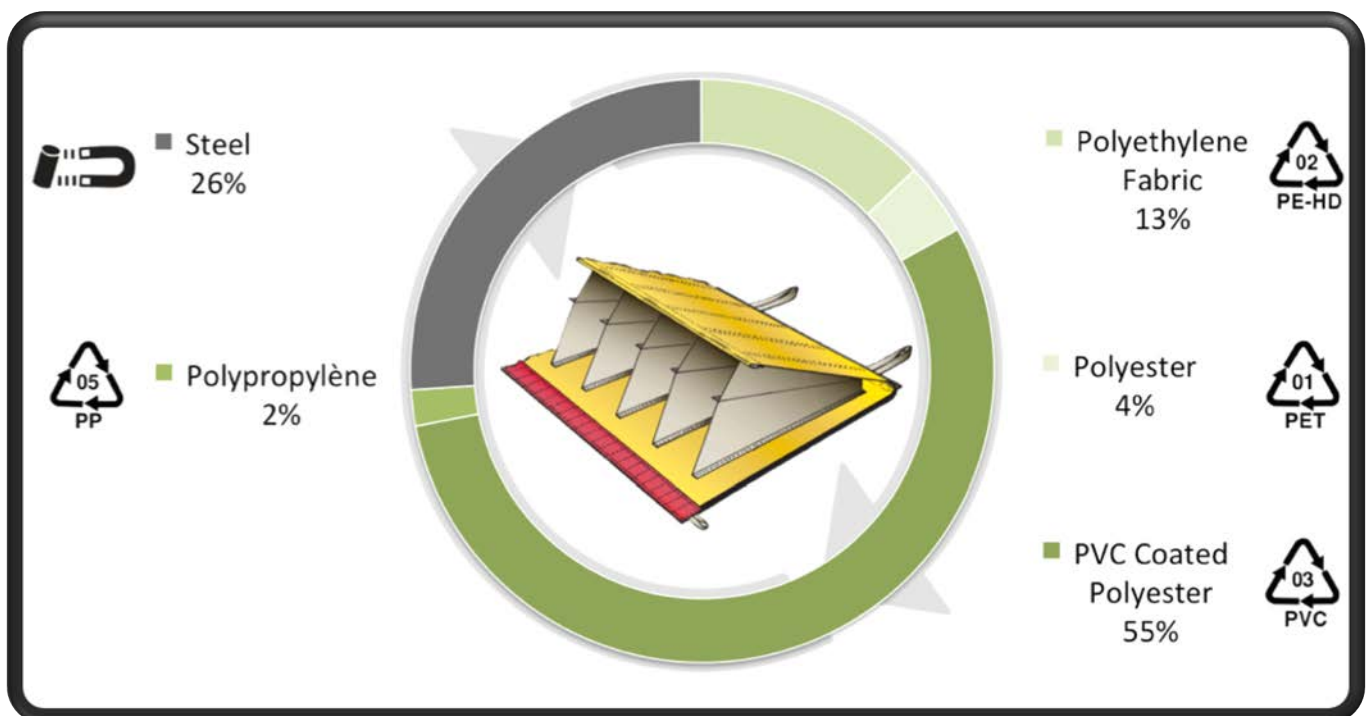
US Army Corps of Engineers®



7.9 100% Recyclable

Water-Gate products are made from recyclable materials.

Ground Sheet & Retention Tarp	PVC Coated polyester
Holding partitions	Polyethylene Fabric
Ballast	Steel plates
The sewing thread & velvet strips (Velcro®)	Polyester
Straps	Polypropylene



Picture 7 - Water-Gate WL 2050 Product composition

Our manufacturing process minimises waste production: all PE and PVC raw materials are reused in our low-lying barrier models. Unused PE is collected by a local company and recycled along with glass to produce composite paving stones for roads.



7.10 References

France

Airports, Transport networks

SNCF Paris Protection of RER C | EUROVIA

Civil Engineering, Nuclear Energy, Energy Transport, Environment

ARKEDIA | BOUYGUES | COLAS | EIFFAGE | ERDF | ORTEC | SPAC | Spie batignolles | VALERIAN | VINCI | HydroAlsace | VEOLIA

Industrial Environment, Logistics, Banking

BURGEAP | Natixis Paris

Europe

Airports, Transport networks

Copenhagen Airport | CPH

Army, Civil Protection, Fire and rescue services

Eppingen Fire Brigade - Germany | Gernsbach Fire Brigade - Germany | Furtwangen Fire Brigade - Germany

Civil Engineering, Nuclear Energy, Energy Transport, Environment

Sellafield Nuclear Power Plant - UK | Environment Agency of Nottinghamshire

Water Management and Treatment

Thames Water - UK

Cities, Towns, Parishes

Bergen - Norway | Chaudfontaine - Belgium | Frutigen - Switzerland | Greve Strand - Denmark | Milan - Italy | Mons - Belgium | Neufchatel - Switzerland | Tubize - Belgium | Aosta Valley - Italy

World

Worldwide Airports, Transport networks

Tokyo International Airport - Japan

Civil Engineering, Nuclear Energy, Energy Transport, Environment

National Grid, Natural Gas & Electricity, Syracuse, New York - USA | Exxon Mobil

ERP - Universities

Good Samaritan Hospital, New York, New York - USA | Battery Park City Parks Conservancy, New York, New York - USA

Cities, Towns

Bangkok - Thailand | Mexico City - Mexico | Montreal - Canada | Sydney - Australia | Tokyo - Japan



spie batignolles



8 ATTACHMENTS

8.1 FM Approvals - Approval Standard for Flood Abatement Equipment - Extract

Water-Gate Perimeter Flood Barriers have been tested within the FM Approvals Class 2510



Certificate of Compliance

This certificate is issued for the following:

Water Gate Perimeter Flood Barriers
WL-3930, WL-3950, WL-5030, WL-5050, WL-6030, WL-6050

Prepared for:

MegaSecur Inc.
145 Boulevard Jutras Est, Bureau 3
Quebec G6P 4L8
Canada

Manufactured at:

MegaSecur Inc.
145 Boulevard Jutras Est, Bureau 3
Quebec G6P 4L8
Canada

FM Approvals Class: 2510

Approval Identification: 3051603 Approval Granted: September 3, 2015

2510

March 2013

Table 4.2 *Perimeter Flood Barrier Performance Tests*

Test Description	Water Condition(s)		Duration
	Water Depth*	Other	
Deployment	N/A	N/A	Per Manufacturer's Specification
Hydrostatic Load	1.0 ft (0.30 m)	N/A	22 hr
	2.0 ft (0.61 m)	N/A	22 hr
	100 percent x h	N/A	22 hr
Wave-Induced Hydrodynamic Load	66.7 percent x h	low waves 2-3 in (51-76 mm)	7 hr
	66.7 percent x h	medium waves 6-8 in (152-203 mm)	10 min (3 times)
	66.7 percent x h	high waves 10-12 in (254-305 mm)	10 min
	80 percent x h	low waves 2-3 in (51-76 mm)	1 hr (min) - 7 hr (max)
	80 percent x h	medium waves 6-8 in (152-203 mm)	10 min (3 times)
Overtopping	80 percent x h	high waves 10-12 in (254-305 mm)	10 min
	≥1 in (25 mm) overflow	N/A	1 hr
Debris Impact	66.7 percent x h	12 in (30 cm) diameter log 610 lb (277 kg) weight at 7 ft/s (2.13 m/s)	N/A
	66.7 percent x h	17 in (43 cm) diameter log 790 lb (358 kg) weight 7 ft/s (2.13 m/s)	N/A
Current	66.7 percent x h	7 ft/s (2.13 m/s) current	1 hr
Post Hydrostatic Load	100 percent x h	N/A	1 hr (min) - 22 hr (max)

* The manufacturer's specified maximum water depth for the barrier is defined as "h".



4.2.2 Hydrostatic Load

4.2.2.1 Requirements

A perimeter barrier shall be capable of withstanding the hydrostatic loads created by floodwaters of various heights. The leakage rate shall not exceed 0.25 gallons per minute per foot length (3.10 liters per minute per meter length), where the barrier's length is measured along the center point of the barrier's seal to the ground.

In addition, the permanent deflection of the barrier shall be less than or equal to 6 in. (15 cm), as measured from the horizontal and vertical center of each wall.

4.2.2.2 Tests/Verification

Conduct three different hydrostatic load tests at the following water heights;

- 1 ft ± 0.5 in (0.30 m ± 13 mm)
- 2 ft ± 0.5 in (0.61 m ± 13 mm)
- 100 percent x h ± 0.5 in (13 mm)

Where h is the manufacturer's specified maximum water depth of the barrier. If this water depth is less than or equal to 2.0 ft, the water depths may be changed as deemed appropriate by FM Approvals.

Fill the river-side of the basin to the desired water level at a maximum rate of 2/3 ft (10.0 cm) per hour. The desired water level shall be held for a minimum of 22 hours for each test.

The leakage rate shall be calculated in intervals no greater than 15 minutes at the following times (at a minimum);

- During the filling process
- During the first hour
- During the last two hours

Measure the barrier's deflection from the horizontal and vertical center of each wall (three locations) at the completion of each test. Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.

The Hydrostatic Load Test at 100 percent x h water depth shall be repeated after the Current Test, as a post test to the Overtopping, Debris Impact, and Current Tests. The test duration for the post test shall be 1 hour, at a minimum. If negative effects (i.e. increased leakage rates or deflection measurements) are observed during the first hour of the post test, then the post test shall be conducted for a maximum of 22 hours.

4.2.3 Wave-Induced Hydrodynamic Load

4.2.3.1 Requirements

A perimeter barrier shall be capable of withstanding wave-induced hydrodynamic load conditions from various water depths and wave heights. The permanent deflection of the barrier shall be less than or equal to 6 in. (15 cm), as measured from the horizontal and vertical center of each wall.

In addition, during low wave conditions, the leakage rate shall not exceed 0.25 gallons per minute per foot length (3.10 liters per minute per meter length), where the barrier's length is measured along the center point of the barrier's seal to the ground.

There is no leakage rate requirement for medium and high wave conditions. However, during these wave conditions the barrier shall not fatigue, experience fill-loss, wall sliding, overturning, or deformation.

4.2.3.2 Tests/Verification

Six tests shall be conducted; consisting of three different size wave heights (low, medium, and high) at each of the following two still water depths:

- 66.7 percent x h
- 80 percent x h

Where h is the manufacturer’s specified maximum water depth of the barrier. If this water depth is less than or equal to 2.0 ft, the water depths may be changed as deemed appropriate by FM Approvals.

Drain the river-side of the basin to the desired water level, or fill the river-side of the basin at a maximum rate of 2/3 ft (10.0 cm) per hour, as applicable.

Impact the barrier with waves generated perpendicular to the face of the barrier as detailed in Table 4.2.3.2. At the end of each test condition, allow the waves to dissipate before starting the next test.

Table 4.2.3.2 Wave Spectrums

<i>Wave Description</i>	<i>Wave Height (Measured from trough to crest)</i>	<i>Mean Wave Period</i>	<i>Test Duration</i>
Low Waves	2-3 in (51-76 mm)	2 seconds	7 hr*
Medium Waves	6-8 in (152-203 mm)	2 seconds	10 min (3 times)
High Waves	10-12 in (254-305 mm)	2 seconds	10 min

* For a water depth of 80 percent x h, if no negative effects are observed during the first hour of testing (i.e. increased leakage rates or deflection measurements), the test duration may be reduced to 1 hour.

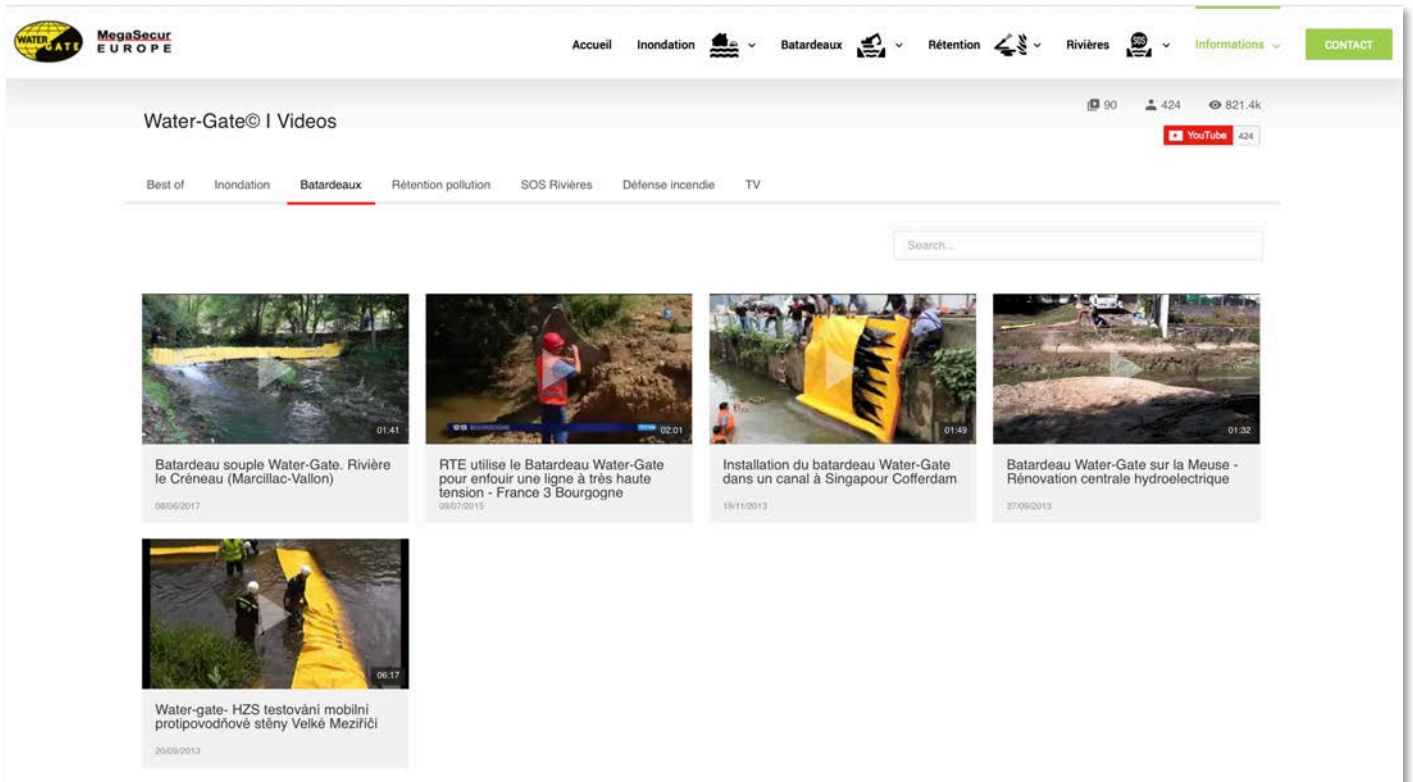
Measure the leakage rate for the duration of each low wave test at intervals no greater than 15 minutes.

Measure the barrier’s deflection at the completion of each test from the horizontal and vertical center of each wall (three locations). Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.



8.2 Installation videos / YouTube channel

Find all our videos on our website: <https://www.megasecureurope.com/videos/>




A dark grey rounded rectangle containing four white icons representing different applications of Water-Gate dams:

- Flood protection**: Icon of a house and a car above wavy water.
- Cofferdams**: Icon of a dam structure above wavy water.
- Firewater retention**: Icon of a dam structure with a flame above wavy water.
- SOS rivers**: Icon of a dam structure with a circle containing "SOS" above wavy water.

World leader of flexible self-locking water dams

www.megasecureurope.com