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# Water-Gate© Flexible Containment Dams



29.03.2018

SARL au capital de 100 000 €  
RCS ARRAS 532 063 526 00018 | N° de TVA : FR 09 532 063 526



## TABLE OF CONTENTS

1	THE ADVANTAGES OF WATER-GATE© FOR THE CONTAINMENT OF POLLUTED LIQUIDS.....	4
2	THREE RETENTION METHODS WITH WATER-GATE© FLEXIBLE DAMS .....	6
2.1	Alongside openings .....	6
2.2	Next to buildings.....	7
2.3	Diverted retention using gravity flow.....	8
3	WL: A COMPLETE RANGE OF CONTAINMENT AND DIVERSION DAMS .....	9
3.1	Standards .....	9
3.2	Options .....	13
3.2.1	Release holes .....	13
3.2.2	Ridge edge with attachment line .....	15
3.2.3	Watertightness + .....	16
4	RAPID DEPLOYMENT BOXES .....	17
4.1	Wooden boxes.....	17
4.2	Galvanised steel rapid deployment boxes .....	18
4.3	20 ft rapid deployment containers .....	18
5	WATER-GATE© COFFERDAMS: CONCEPT AND GENERAL FEATURES.....	20
5.1	Introduction to the concept .....	20
5.2	General features.....	21
5.3	Make the junction between 2 cofferdams .....	23
5.4	Disposing of seepage water by pumping.....	24
5.5	Technical specifications of the fabric .....	25
5.6	Repairs .....	25
5.7	Certification.....	26
5.8	100% Recyclable .....	27
5.9	<i>References</i> .....	28
6	ATTACHMENTS.....	29
6.1	FM Approvals - Approval Standard for Flood Abatement Equipment - Extract .....	29
6.2	Installation videos / YouTube channel .....	32

## Soil pollution

Contain and divert towards  
a neutral zone in  
emergency situations

- Firewater
- Chemical pollution
- Contaminated liquids



**FM**

**APPROVED**

WL-39,50,60 series





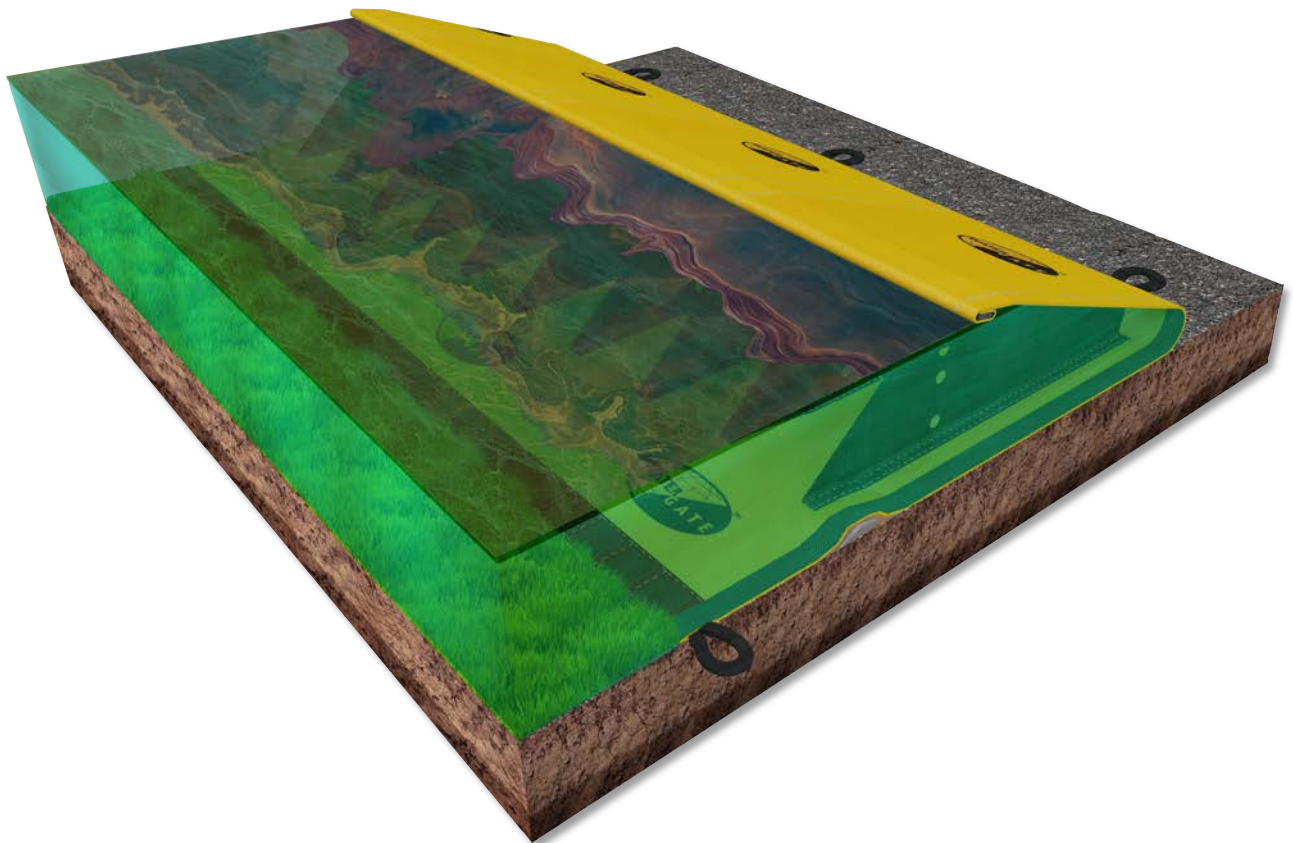
## Emergency containment of polluted liquids

Create a **containment dam** in record time: **firewater retention**, CDG accidents (carriage of dangerous goods), ERPs (emergency response plans), LPPs (local protection plans).

A light and flexible solution that fits all types of sites **with no anchorage**, whatever the surface (concrete, tarmac, earth, rubble, etc.) and relief (slopes, edges, obstacles, etc.).

Hydrodynamic ballast: the dam does not slip when faced with a sudden influx of water.

The Water-Gate© retention dam can be installed when the spill is already underway!



## 1 THE ADVANTAGES OF WATER-GATE® FOR THE CONTAINMENT OF POLLUTED LIQUIDS



### Designed for emergencies

- ✓ All types of terrain
- ✓ Integrated ballast
- ✓ Rapid deployment box: 200 m in 10 minutes!
- ✓ Compact: 200 m of dam in less than 2.5 m<sup>3</sup> of packaging
- ✓ Leak rate: 1 l to 6 l per linear metre per minute
- ✓ Cascade retention thanks to a double-curtain system
- ✓ Can be crossed, facilitating emergency rescue efforts
- ✓ 12 hours of guaranteed chemical resistance

- Its flexibility allows it to form a snug fit with any type of terrain. The only real constraint is its ground coverage (1.4 m ground depth for a protection height of 35 cm).
- **Modular protection available in both 9 m and 15 m sections. These can be linked to form a barrier of any length**, and different heights can also be combined. Sections can be fastened to each other using the Velcro connectors.
- **Amazing watertightness:**  
Depending on the condition of the surface and the water level (hydrostatic pressure), the leak rate varies from 2 l to 6 l per linear metre per minute.  
Water seeps through, but the barrier's compartments hold back any sand and sludge.
  - **Watertightness +**  
In the case of dry installation, it is possible to reduce this leak rate by 5 to 10 times.
  - **Double retention curtain**  
Any water that has seeped through can be channelled and pumped back to the retention pond.



## Regulatory constraints

- ✓ Active barriers to limit the risk of pollution during a fire. Technical Document D9A for exterior fire protection and retention. Flexible dams make it possible to reach the required retention volumes by supplementing structural bodies or to replace mobile guillotine gates that fail.
- ✓ The French Environmental Liability Act (ELA) of 1st August 2008 stipulates that compensation must be paid for ecological damage. The severity of the damage caused is often linked to an inability to rapidly implement suitable retention methods.
- ✓ For ICPEs (a French category of facility requiring an environmental impact assessment) subject to authorisation: Article 26 of the Ministerial Decree of 4th October 2010 (modified) relating to the prevention of accident risk within facilities requiring an environmental impact assessment.

*The perfect tool to save time and preserve the environment while keeping costs low!*



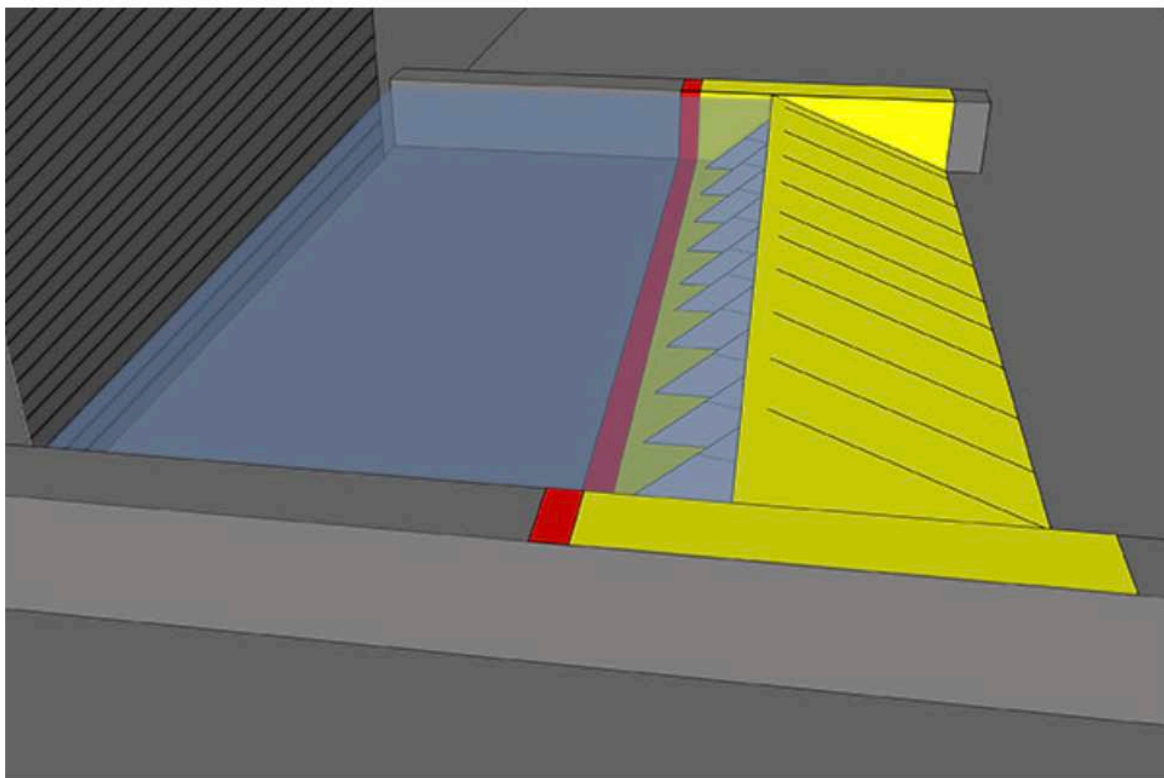
## 2 THREE RETENTION METHODS WITH WATER-GATE© FLEXIBLE DAMS

Water-Gate© flexible dams can be used in different ways adapted to the nature of the building in question (watertightness of walls, type of openings, underground areas to be protected), using the topography of the site (different levels, basins, natural slopes) and integrating the existing network structure (rainwater and wastewater).

### 2.1 Alongside openings

Fitted between 2 walls or supported by a facade

- No works necessary.
- Works even without electricity.
- Can be crossed by emergency services in both directions up to mid-axle height.
- Total retention volume = **Building surface x retention height.**



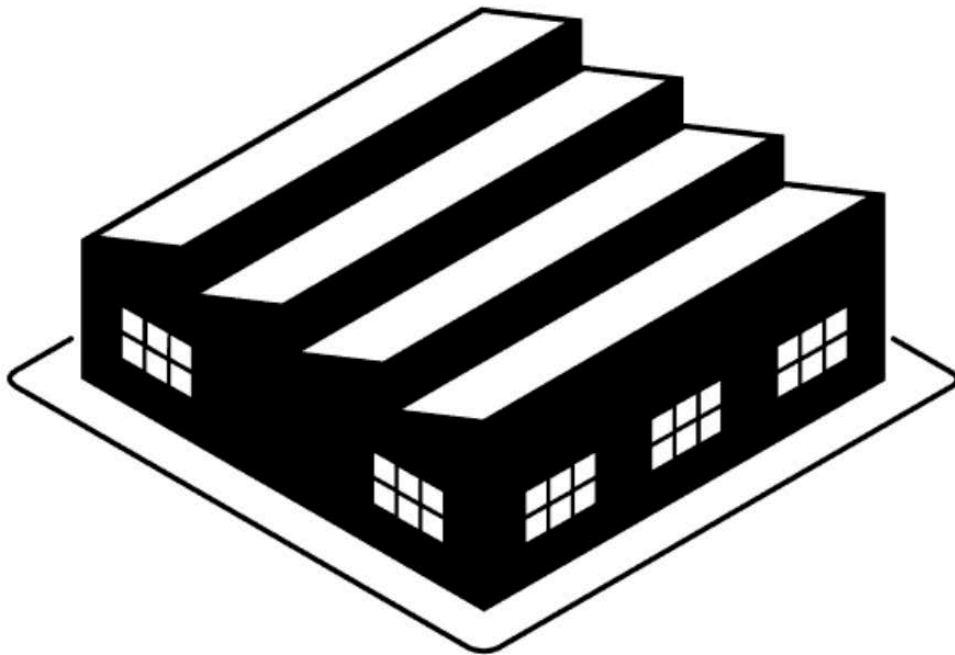
Alongside openings



## 2.2 Next to buildings

Retention around the building perimeter (360° or in sections)

- Allows for retention even if the walls are not watertight.
- Total retention volume = **Retention surface x retention height.**



Next to buildings





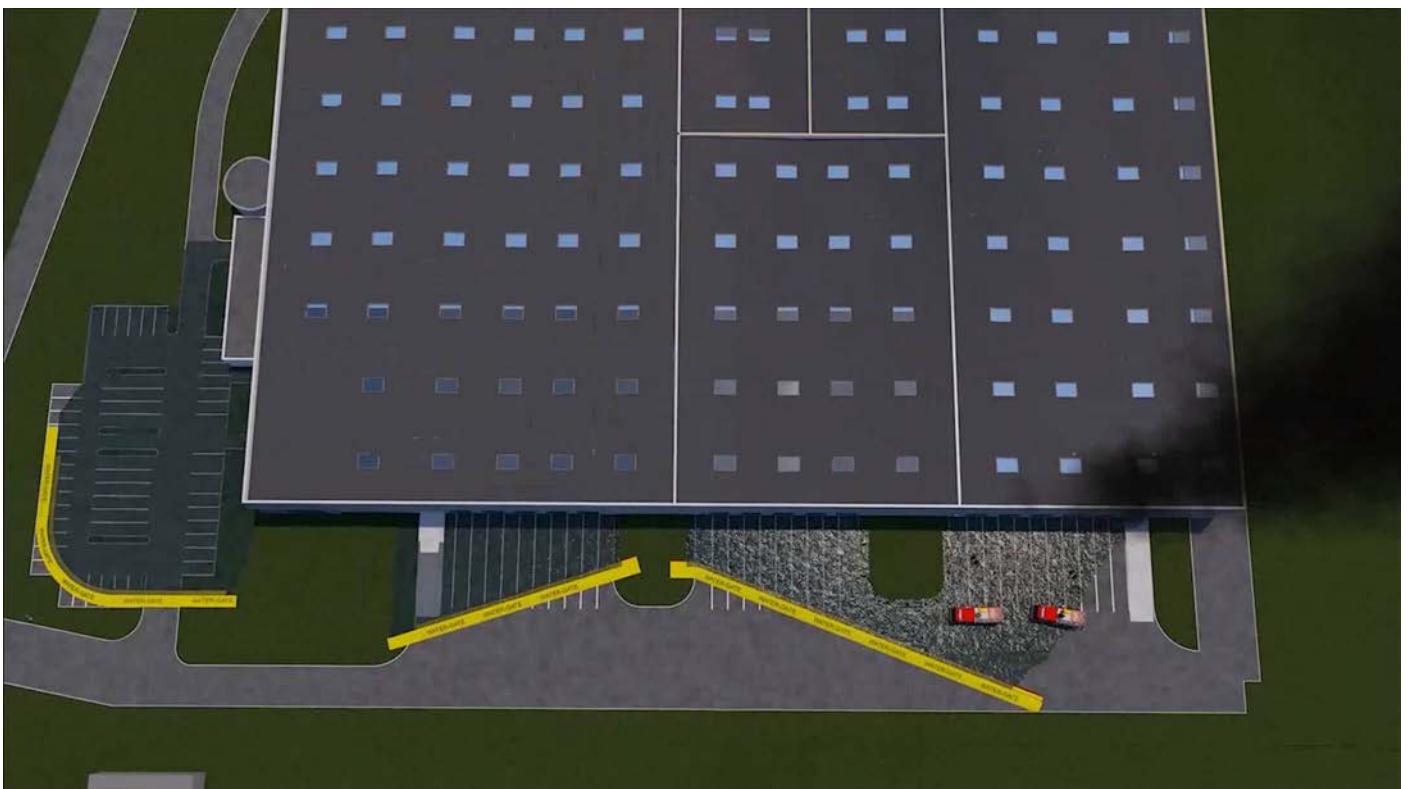
## 2.3 Diverted retention using gravity flow

### Emergency retention dam in diverted area

- Take advantage of the topography of the terrain.
- Avoid flooding the whole building by using existing networks.
- Prerequisites: gate valve or pneumatic dam.
- Facilitates emergency rescue efforts.



Diverted retention using  
gravity flow



### 3 WL: A COMPLETE RANGE OF CONTAINMENT AND DIVERSION DAMS

#### 3.1 Standards

*WL 0617 (15 cm x 5,2 m):*

- Maximum water retention height: 15 cm
- Protection length: 5.2 m
- Width (depth of ground surface): 60 cm
- Packaging: W 42 cm x L 28 cm x H 30 cm
- Weight: 11.0 kg

*WL 0630 (15 cm x 9,1 m):*

- Maximum water retention height: 15 cm
- Protection length: 9.1 m
- Width (depth of ground surface): 60 cm
- Packaging: W 40 cm x L 38 cm x H 28 cm
- Weight: 19.4 kg

*WL 0650 (15 cm x 15,2 m):*

- Maximum water retention height: 15 cm
- Protection length: 15.2 m
- Width (depth of ground surface): 60 cm
- Packaging: W 45 cm x L 75 cm x H 29 cm
- Weight: 29.8 kg

All Water-Gate dams can be connected to each other regardless of their height, with the exception of the WL0630 and WL0650 dams, which can only be connected to dams of the same height (15 cm).

---

*WL 1430 (35 cm x 9,1 m):*

- Maximum water retention height: 35 cm
- Protection length: 9.1 m
- Width (depth of ground surface): 140 cm
- Packaging: W 37 cm x L 106 cm x H 29 cm
- Weight: 24kg

*WL 1450 (35 cm x 15,2 m):*

- Maximum water retention height: 35 cm
- Protection length: 15.2 m
- Width (depth of ground surface): 140 cm
- Packaging: W 49 cm x L 108 cm x H 33 cm
- Weight: 39.7 kg



*WL 2030 (50 cm x 9,1 m):*

- Maximum water retention height: 50 cm
- Protection length: 9.1 m
- Width (depth of ground surface): 200 cm
- Packaging: W 44 cm x L 74 cm x H 29 cm
- Weight: 30.4 kg

*WL 2050 (50 cm x 15,2 m):*

- Maximum water retention height: 50 cm
- Protection length: 15.2 m
- Width (depth of ground surface): 200 cm
- Packaging: W 58 cm x L 76 cm x H 38 cm
- Weight: 50.2 kg



*WL 2630 (66 cm x 9,1 m):*

- Maximum water retention height: 66 cm
- Protection length: 9.1 m
- Width (depth of ground surface): 264 cm
- Packaging: W 44 cm x L 102 cm x H 31 cm
- Weight: 38.6 kg

*WL 2650 (66 cm x 15,2 m):*

- Maximum water retention height: 66 cm
- Protection length: 15.2 m
- Width (depth of ground surface): 264 cm
- Packaging: W 54 cm x L 106 cm x H 34 cm
- Weight: 62.9 kg

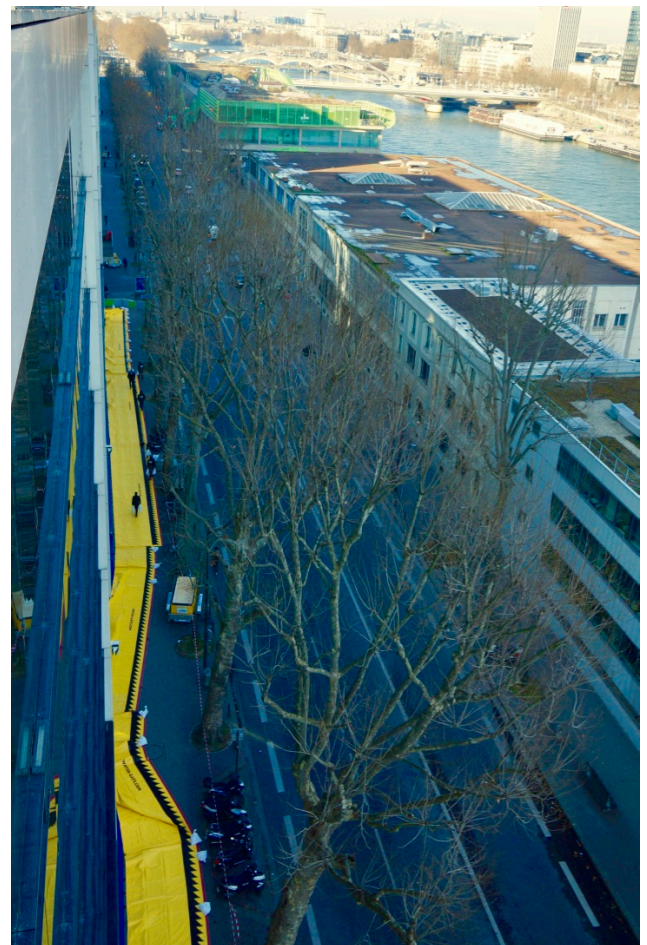


*WL 3230 (81 cm x 9,1 m):*

- Maximum water retention height: 81 cm
- Protection length: 9.1 m
- Width (depth of ground surface): 324 cm
- Packaging: W 56 cm x L 84 cm x H 41 cm
- Weight: 62.5 kg

*WL 3250 (81 cm x 15,2 m):*

- Maximum water retention height: 81 cm
- Protection length: 15.2 m
- Width (depth of ground surface): 324 cm
- Packaging: W 66 cm x L 84 cm x H 51 cm
- Weight: 104.0 kg



*WL 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: W 56 cm x L 116 cm x H 41 cm
- Weight: 76.8 kg

*WL 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: W 69 cm x L 116 cm x H 51 cm
- Weight: 126.8 kg



*WL 5030 (100 cm x 9,1 m):*

- Maximum water retention height: 127 cm
- Protection length: 9.1 m
- Width (depth of ground surface): 508 cm
- Packaging: W 66 cm x L 103 cm x H 53 cm
- Weight: 117.5 kg

*WL 5050 (100 cm x 15,2 m):*

- Maximum water retention height: 127 cm
- Protection length: 15.2 m
- Width (depth of ground surface): 508 cm
- Packaging: W 84 cm x L 103 cm x H 69 cm
- Weight: 187.7 kg







## 3.2 Options

### 3.2.1 Release holes

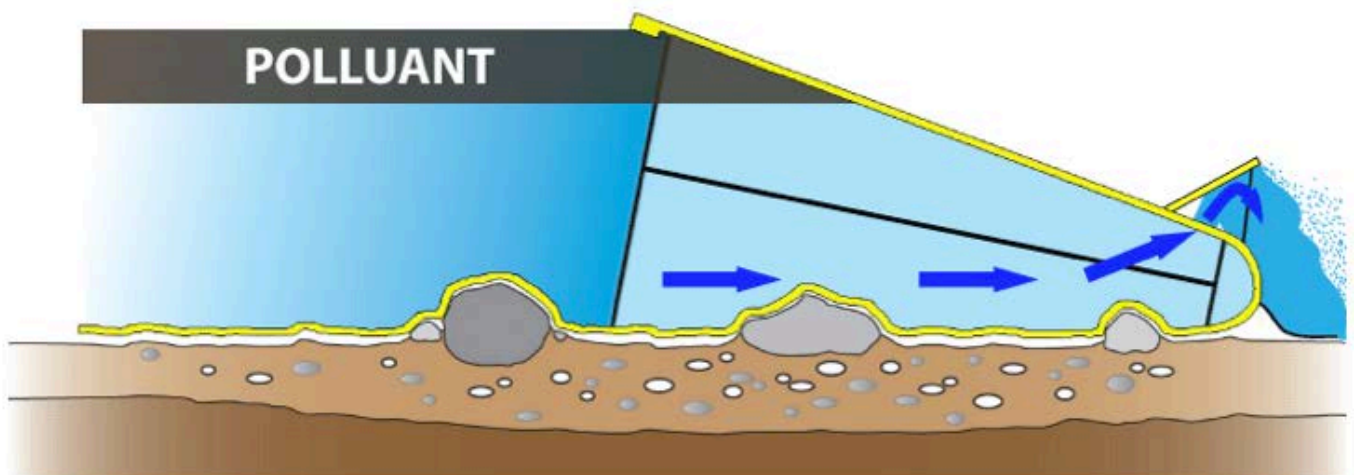
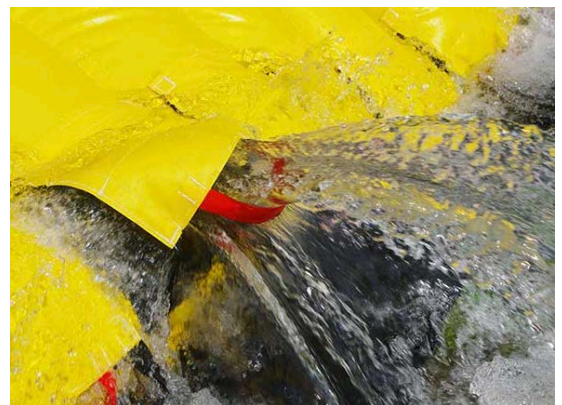
Hold back floating pollutants and let clean water pass through.  
Maximum release flow can be configured when ordering.

Control the discharge flow of clean water.

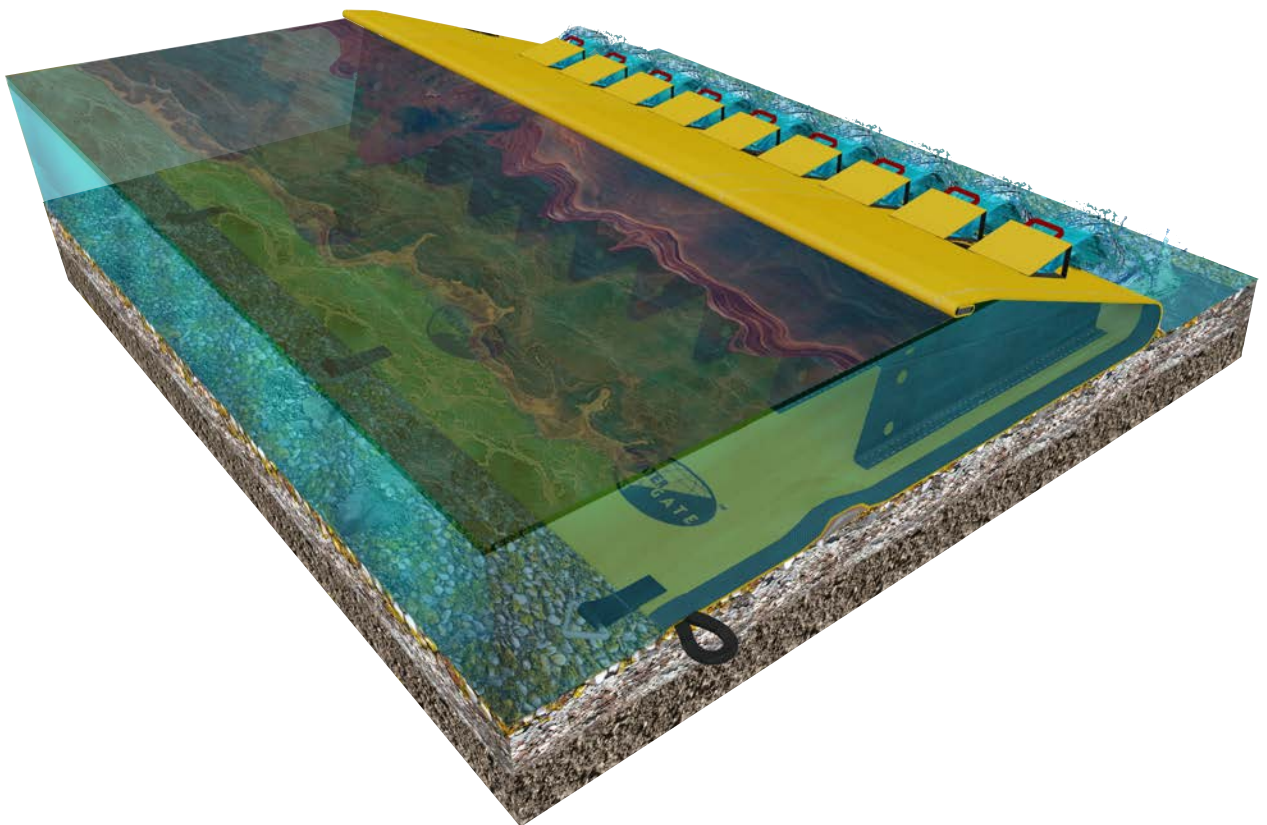
To avoid surface pollution overflowing, **a stable height** must be maintained upstream of the dam.  
Open the required number of release holes at the foot of the dam in order to maintain a stable level.  
It is possible to open and close the release holes during use by simply applying pressure to the 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 m<sup>3</sup> and 75 m<sup>3</sup>/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









### 3.2.2 Ridge edge with attachment line

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





### 3.2.3 Watertightness +

Improve the watertightness of the dam.  
Various solutions available based on the level of chemical risk.



## 4 RAPID DEPLOYMENT BOXES

Exclusive to Water-Gate: the dams are supplied in made-to-measure rapid deployment boxes.

- The boxes can be moved using an electric forklift truck or trailer.
- The smaller boxes can also be fitted with wheels.
- Simply pull out the first dam and lay it on the ground, then slide the box along the entire length of the dam.
- The sections are pre-assembled and accordion-folded inside the boxes.

Sample video: <https://youtu.be/B00GRo2MXDU>

When stored in the boxes, the dams are protected from bad weather, UV rays, rodents and vandalism.

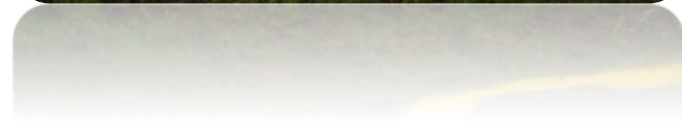
The colour of the boxes and the information panels can be personalised.

A series of signs on the outside of the box indicates the direction in which the dam should be deployed as well as the corresponding sections.

A copy of the user manual, the assembly instructions and the deployment plan are stored in an airtight box inside the container.

### 4.1 Wooden boxes

Any size (made to measure) up to:  
2.44 m Length - 1.2 m Height - 1.22 m Width



Example of box sizes for 200 metres of protection

Water-Gate protection height	Range	Number of barriers	Overall protection length	Number of boxes	Box dimensions	Total weight
51 cm	WL 2050	14	212,8m	1	2.44m Length 1.20m Height 0.92m Width	903 kg
66 cm	WL 2650	14	212,8m	1	2.44m Length 1.20m Height 1.22m Width	1081 kg
81 cm	WL 3250	2 x 7	212,8m	2	2.44m Length 1.00m Height 1.02m Width	2 x 978 kg



#### 4.2 Galvanised steel rapid deployment boxes



Any size (made to measure) up to:  
2.44 m Length - 1.2 m Height - 1.26 m Width

#### 4.3 20 ft rapid deployment containers

Each container is designed to allow for the safe deployment and repacking of the flood protection. There is a handling walkway with steps on either side of the container for easy operational access.







## 5 WATER-GATE® COFFERDAMS: CONCEPT AND GENERAL FEATURES

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).

### 5.1 Introduction to the concept

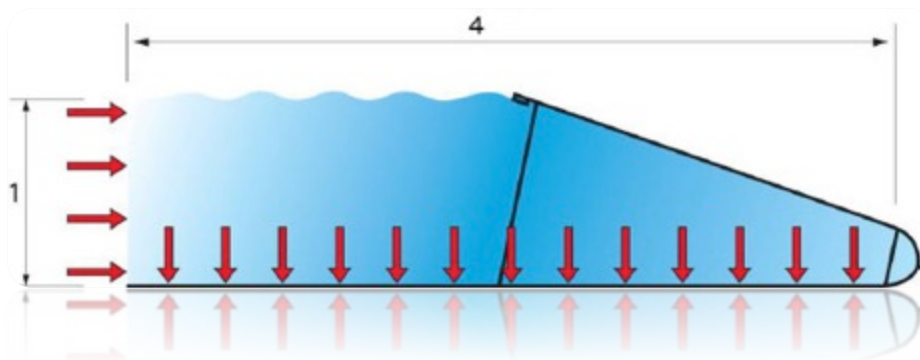
**Water-Gate® is a very effective and safe form of emergency protection:**

- 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

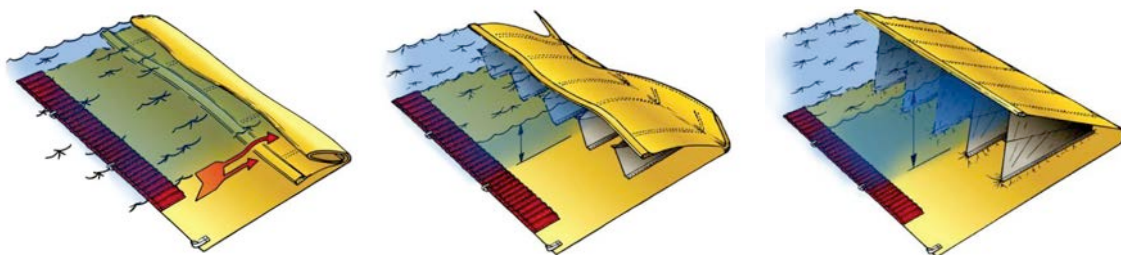
**Water-Gate® can retain thousands of cubic metres of water without anchorage!**

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.*

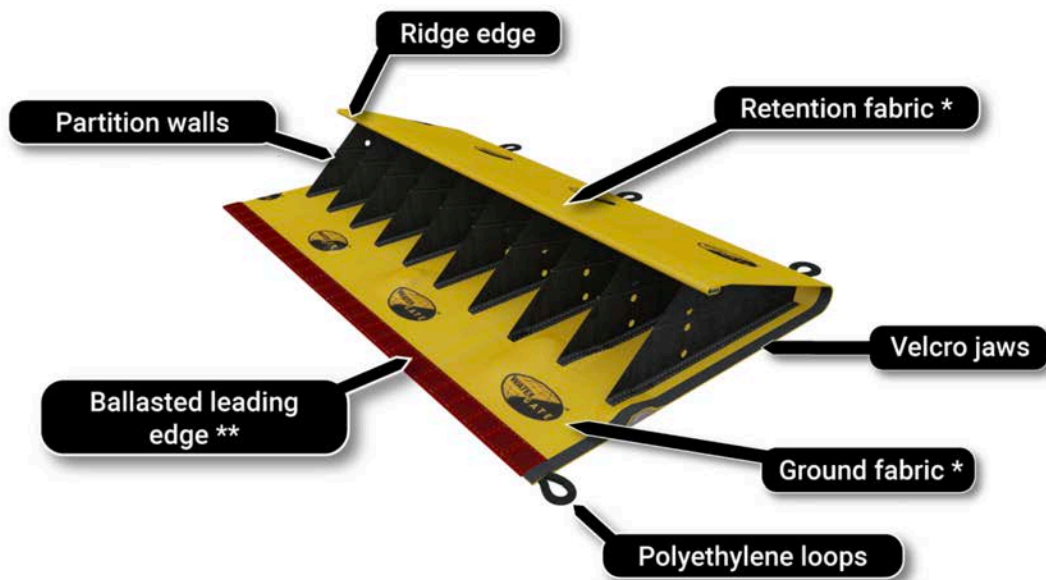


*Water-Gate® products have been winning accolades worldwide for their performance for over 15 years.*



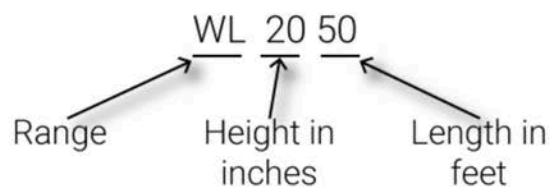
## 5.2 General features

Water-Gate© Flexible Containment Dam - WL Series



\* Ultra-rugged and abrasion-resistant PVC-coated polyester fabric. Can be installed on all types of surfaces.

\*\* Galvanised steel plates slotted into polyester mesh holders sewn onto the dam.



### 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.***

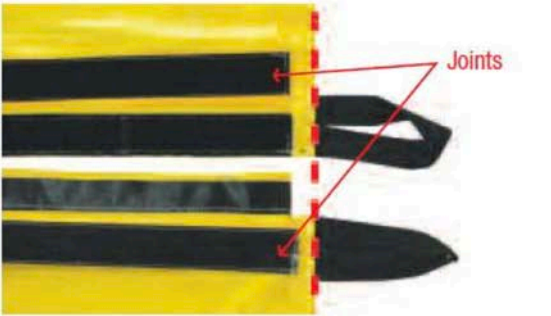





### 5.3 Make the junction between 2 cofferdams




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.



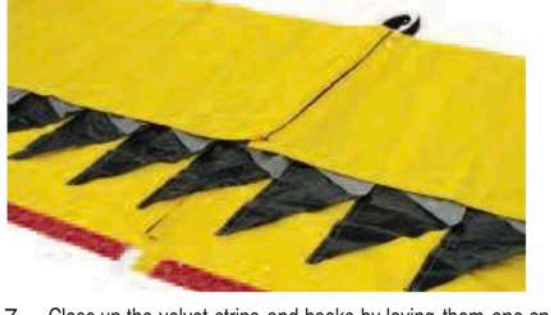
4. Close up the velvet strips and hooks by laying them one on top of the other from the back. Good dexterity is required to close up the back.



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.



#### 5.4 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)

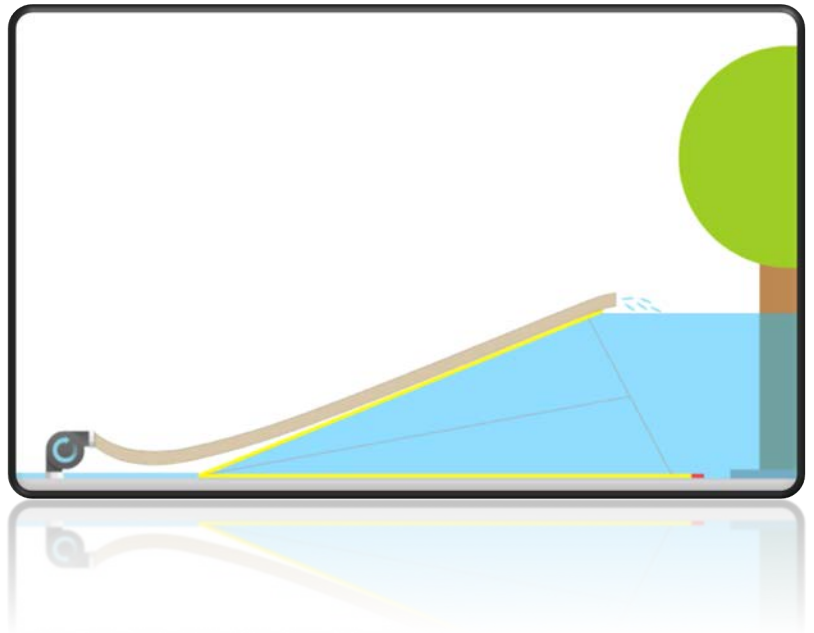
3.5 l/min/lm for 2 feet (61 cm)

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.





## 5.5 Technical specifications of the fabric

Outer layer - PVC fabric			
Property	Min. specification		Certified
Weight	750 g/m <sup>2</sup>		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 <sup>2</sup>		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

## 5.6 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).





### 5.7 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)



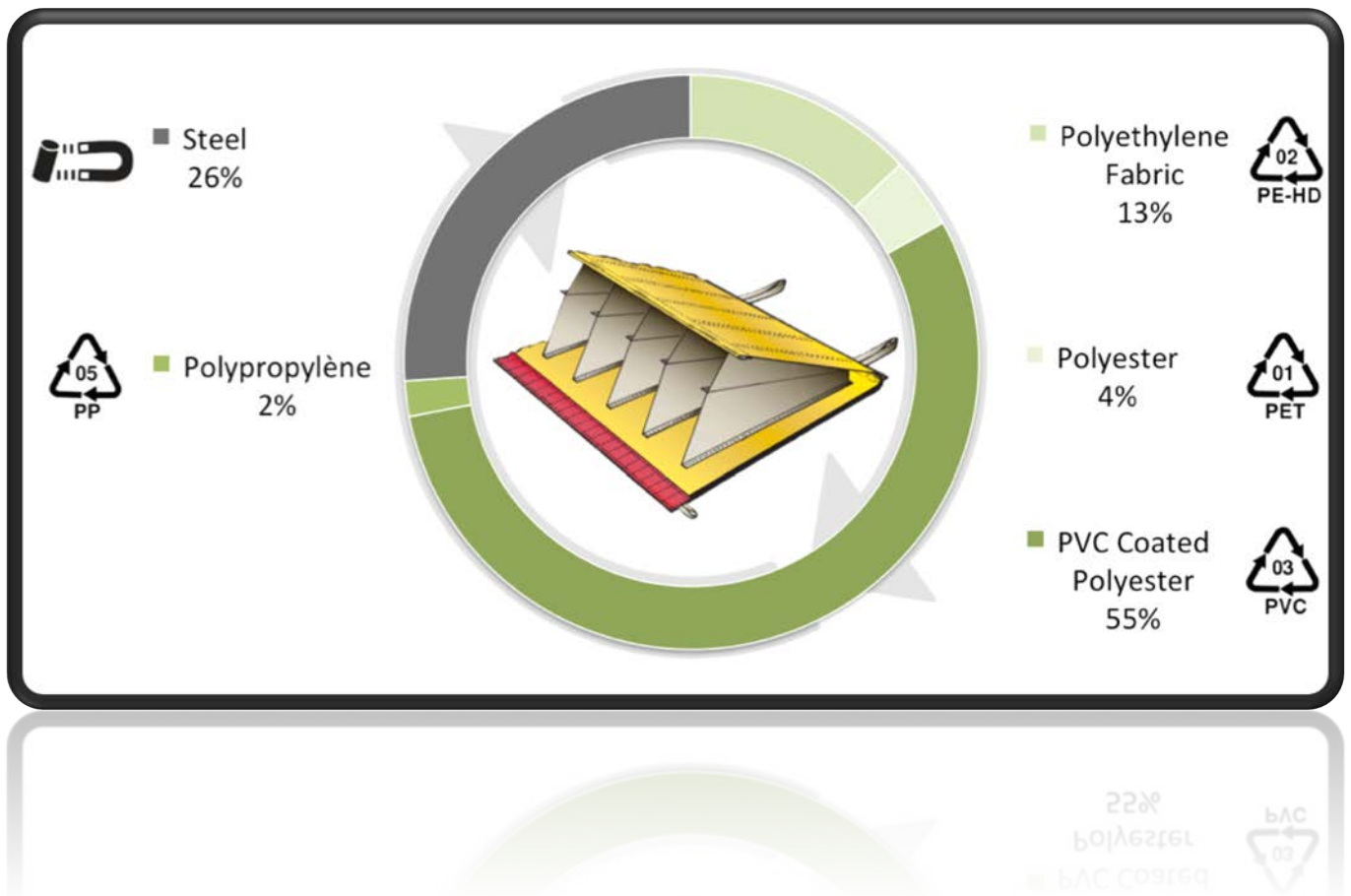
US Army Corps  
of Engineers®



### 5.8 100% 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.

## 5.9 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





## 6 ATTACHMENTS

### 6.1 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

<p><b>Prepared for:</b>                  MegaSecur Inc.                  145 Boulevard Jutras Est, Bureau 3                  Quebec G6P 4L8                  Canada</p>	<p><b>Manufactured at:</b>                  MegaSecur Inc.                  145 Boulevard Jutras Est, Bureau 3                  Quebec G6P 4L8                  Canada</p>
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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	≥1 in (25 mm) overflow	N/A	1 hr
	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
Debris Impact	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  $\pm$  0.5 in (0.30 m  $\pm$  13 mm)
- 2 ft  $\pm$  0.5 in (0.61 m  $\pm$  13 mm)
- 100 percent  $\times$  h  $\pm$  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  $\times$  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.

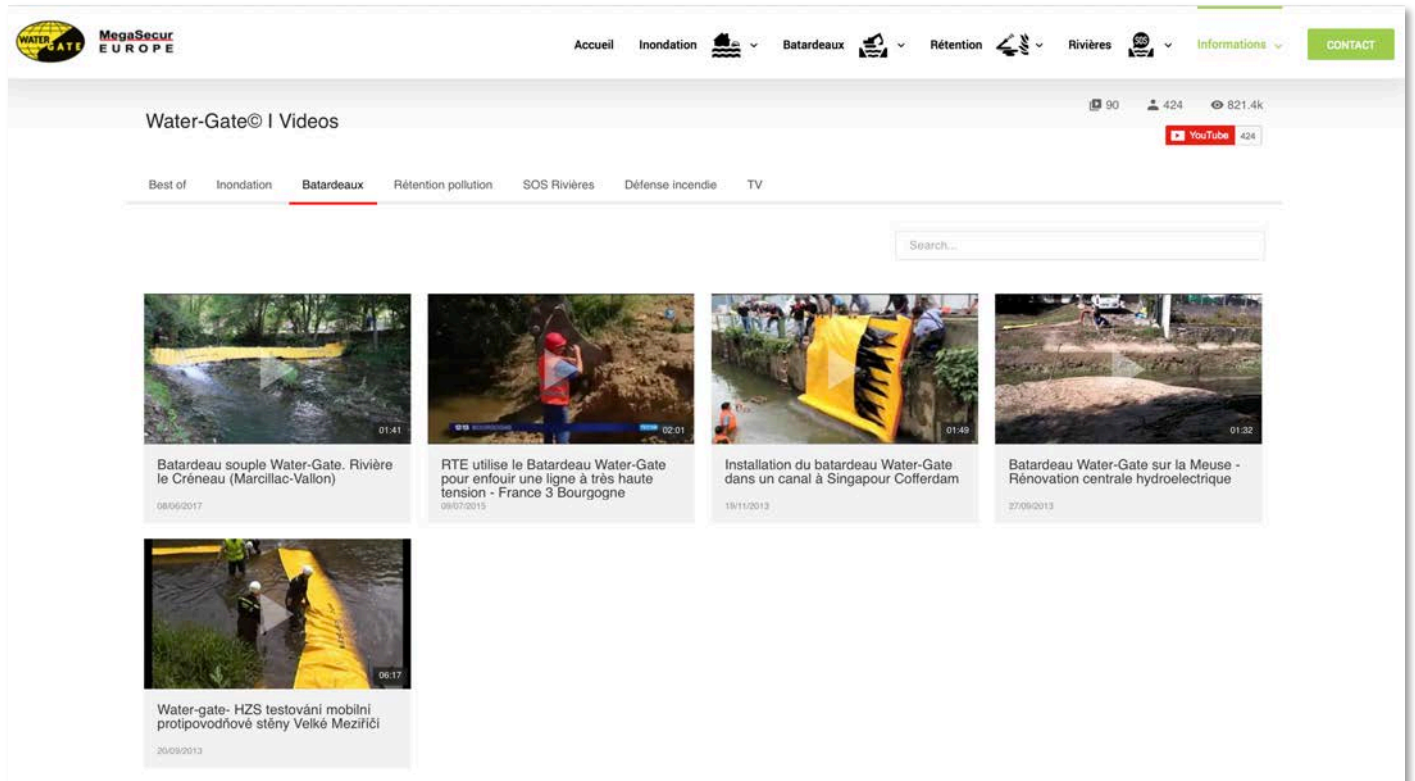
Measure the barrier’s deflection at the completion of each test from the horizontal and vertical center of each wall (three locations). Additional locations (up to 6 total) shall be required if deemed appropriate for the design of the barrier.





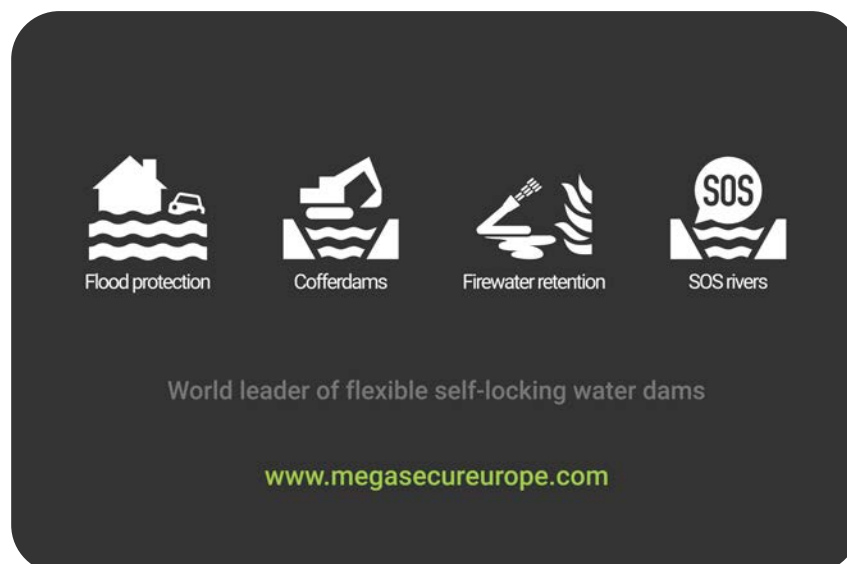
## 6.2 Installation videos / YouTube channel

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



The screenshot shows the YouTube channel page for Water-Gate. The channel name is "Water-Gate® | Videos" with 90 videos, 424 subscribers, and 821.4k views. The navigation menu includes: Accueil, Inondation, Batardeaux, Rétention, Rivières, Informations, and CONTACT. The "Batardeaux" category is selected. A search bar is present. Five video thumbnails are displayed:

- Batardeau souple Water-Gate. Rivière le Créneau (Marcillac-Vallon)** - 01:41 - 08/06/2017
- RTE utilise le Batardeau Water-Gate pour enfouir une ligne à très haute tension - France 3 Bourgogne** - 02:01 - 08/07/2015
- Installation du batardeau Water-Gate dans un canal à Singapour Cofferdam** - 01:49 - 18/11/2013
- Batardeau Water-Gate sur la Meuse - Rénovation centrale hydroélectrique** - 01:32 - 27/09/2013
- Water-gate- HZS testování mobilní protipovodňové stěny Velké Meziříčí** - 06:17 - 20/09/2013



The image shows 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.

Below the icons, the text reads: "World leader of flexible self-locking water dams" and the website address [www.megasecureurope.com](http://www.megasecureurope.com).