HalenHardy®

SMARTER SOLUTIONS

For The Outdoor Workforce

COFFERDAM GUIDE

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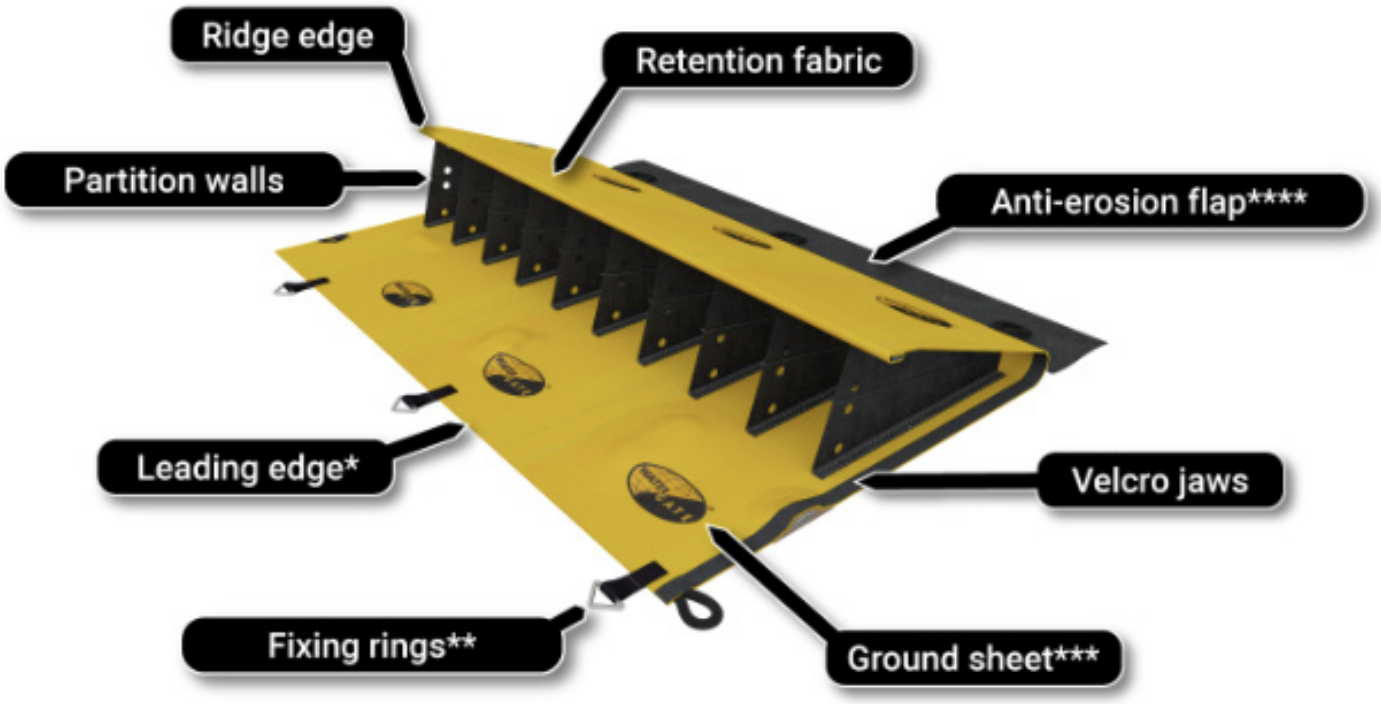
Assembly Detail



Features :

* Cofferdam designed without ballast: the flexible leading edge fits perfectly over uneven surfaces. Ballasts sold as separate accessory.

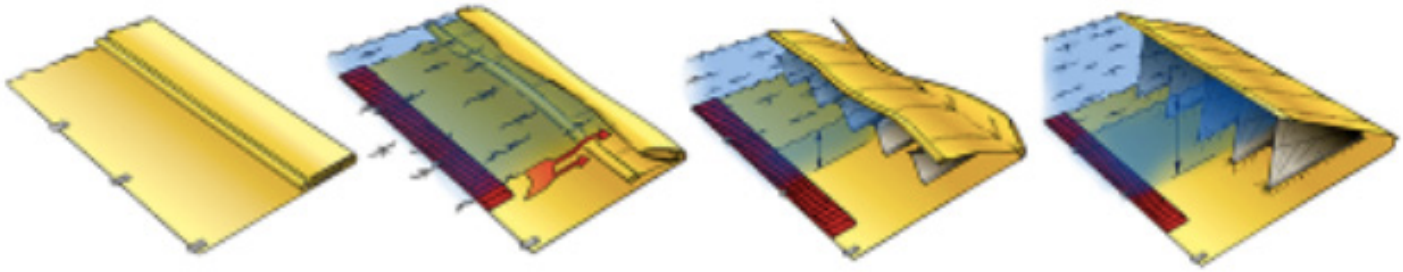
** Fixing rings only used for installation in standing water.

*** Deep ground sheet that facilitates pedestrian passage and safe pumping for chutes

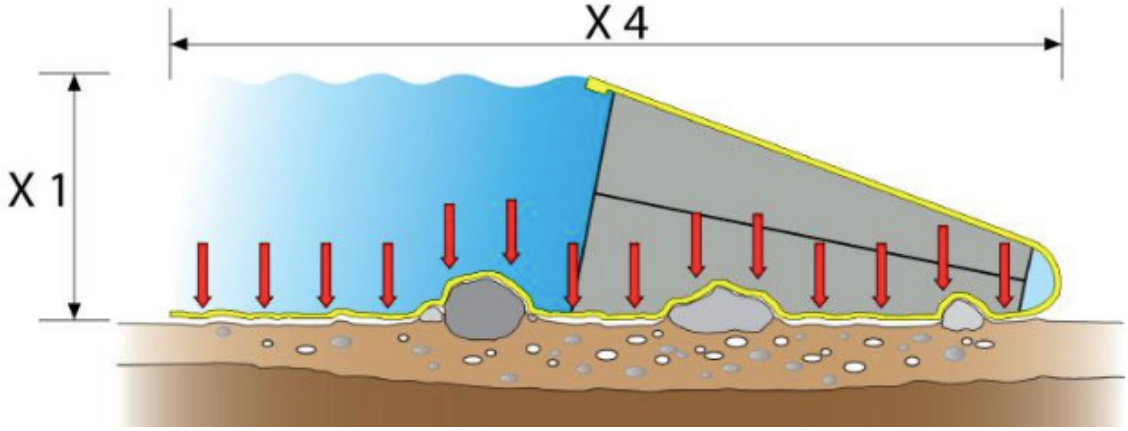
**** Limits the risk of erosion in the event of overflow, especially on sandy beds

How It Works

The principle is simple: Water accumulates inside the barrier and exerts pressure on the bottom of the fabric, which keeps the barrier in place. The speed or direction of the incoming water is not important, as it is the water pressure that causes the barrier to open up. Water holding back water.



The surface of the barrier on the ground is 4 times greater than its water retention height, which means it has 4 times more vertical thrust (toward the ground) than horizontal thrust, allowing for good adherence.



In order for water to be able to hold back water on most surfaces such as asphalt or grass, a ratio of 1 to 2½ is generally sufficient to ensure safety. With a ratio of 1 to 4, the barrier is obviously very safe and the chances of it slipping are very slim. The wider the barrier is, the less likely it is to slip. In short our barrier is 33% safer than required.

Fabric Specifications

SAFETY STANDARD

Cofferdams are designed and tested to remain 3 times more resistant than required for a minimum water retention period of 3 days. For example: if 2 out of 3 partitions fail when at full capacity, it will still retain its entire water volume for 3 or more days.

PRIMARY MATERIALS

- PVC coated polyester canvas is used for the top and bottom fabric.
- All partitions in each category are manufactured with woven polyethylene fabric.
- The sewing thread used is 100% polyester.

DURABILITY

Ultraviolet rays are the most harmful factor for the components of the water barrier. However, the polymer canvas has been treated to counter the harmful effects of ultraviolet rays.

Since the barrier is entirely made of polymer, there are no risks of damage by humidity. The barrier's materials resist temperatures of +50°C/+120°F to -40°C/-40°F. Even when stored for several years at these temperatures (maximum certification of 10 years depending on material manufacturers).

TECHNICAL FABRIC SPECIFICATIONS

The technical specifications in the chart below are minimum requirements for all specified properties. These specifications enable us to guarantee out durability standards, which are three times higher than required. You have our assurance that in the majority of cases, our fabrics are much more resistant than the specifications outlined in the following chart.

PVC Fabric	For models Up to 28" in height			Above 28" in height		
Properties	**Minimum Specifications**		****Certified**	**Minimum Specifications**		****Certified**
Weight	610 g/m2 - 18 oz/yd2		Yes	750 g/m2 - 22 oz/yd2		Yes
Base Fabric	Woven polyester scrim		-	Woven polyester scrim		-
Tension Resistance *	Warp 40 kg/cm 245 lbs/in	Fill*** 35 kg/cm 218 lbs/in	Yes	Warp 55 kg/cm 310 lbs/in	Fill*** 50 kg/cm 275 lbs/in	Yes
Tear Resistance	Warp 32 kg/cm 72 lbs/in	Fill*** 22 kg/cm 49 lbs/in	Yes	Warp 45 kg/cm 100 lbs/in	Fill*** 35 kg/cm 80 lbs/in	Yes
Adhesion	Warp 1.5 kg/cm 8 lbs/in	Fill*** 1.5 kg/cm 8 lbs/in	Yes	Warp 1.5 kg/cm 8 lbs/in	Fill*** 1.5 kg/cm 8 lbs/in	Yes
Heat Resistance	-30° +70°C / -22° +160° F		Yes	-30° +70°C / -22° +160°F		Yes
UV resistance	More than 80% strength retention after 2000 hours of exposure		No	More than 80% strength retention after 2000 hours of exposure		No
Flame resistance	Not applicable		No	Not applicable		No

Polyethylene	For models Up to 28" in height			Above 28" in height		
Properties	**Minimum Specifications**		****Certified**	**Minimum Specifications**		****Certified**
Weight	200 g/m2 - 6 oz yd2		Yes	300 g/m2 - 9 oz		Yes
Base Fabric	100% polyethylene			100% polyethylene		
Tension Resistance *	Warp 34 kg/cm 210 lbs/in	Fill*** 30 kg/cm 185 lbs/in	Yes	Warp 80 kg/cm 490 lbs/in	Fill*** 50 kg/cm 320 lbs/in	Yes
Tear Resistance	Warp 31 kg/cm 68 lbs/in	Fill*** 31 kg/cm 68 lbs/in	Yes	Warp 40 kg/cm 88 lbs/in	Fill*** 40 kg/cm 88 lbs/in	Yes
Resistance to cold temperature	-40°C / -40°F		Yes	-40°C / -40°F		Yes
UV resistance	More than 80% strength retention after 2000 hours of exposure		No	More than 80% strength retention after 2000 hours of exposure		No
Flame resistance	Not applicable		No	Not applicable		No

Lbs/in. = Pounds/inch = lbf
yd2 = square yard
g/m2 = GSM

* Tension resistance or grab tensile
** Certified = tested according to recognized standards
*** Fill or Weft

Chemical Resistance

The materials were tested by an independent professional chemist using commercial solvents. The table below shows the results of trials made with the materials constituting the barrier. If a single element (such as the sewing thread or other) proved unsatisfactory during the trials, the results as a whole were rejected.

	Fluid	Resistance
Inorganic Acids	Hydrochloric Acid	12 hours resistant
	Hydrofluoric Acid	12 hours resistant
	Hydrobromic Acid	12 hours resistant Decoloration
	Nitric Acid	Not Recommended
	Phosphoric Acid	12 hours resistant
	Sulfuric Acid	Not Recommended
Bases	Sodium Hydroxide	12 hours resistant Major Repairs
Hydrocarbons	Gasoline, Diesel, Oil	12 hours resistant
Non-Polar Solvents	Petroleum Ether	12 hours resistant Major Repairs
	Hexanes	12 hours resistant Major Repairs
	p-Xylene	12 hours resistant
	Toluene	12 hours resistant
	Chloroform	Not Recommended
	Dichloromethane	Not Recommended
Polar Solvents	Aceton	Not Recommended
	Acetic Acid glacial	12 hours resistant
	Ethanol	12 hours resistant
	Methanol	12 hours resistant Inspection
	Formaldehyde	12 hours resistant Inspection
	Methyl Ether Ketone	Not Recommended
	Tetrahydrofuran	Not Recommended
Others	Ethyl Acetate	Not Recommended
	Acetic Anhydrous	12 hours resistant
	Paint Thinner	12 hours resistant Inspection
	Ammonium Hydroxide	12 hours resistant
	Hydrogen Peroxide	12 hours resistant
	Calcium Hydroxide	12 hours resistant
	Ferric Chloride	12 hours resistant
	Sodium Hypochlorite (5%) [Bleach]	12 hours resistant
12 hours resistant:	**Will resist 12 hours**	
Not Recommended:	**Not resistant to this fluid**	
Inspections:	**Check for possible alterations to the fabric (appearance, rigidity)**	
Major Repairs:	**Degredation of the fabric**	

Tying Together Two Barriers

1) The first step consists of 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 hook and loop by laying them one on top of the other from the back.

5) Keep closing up the hook and loop 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.

IMPORTANT NOTES

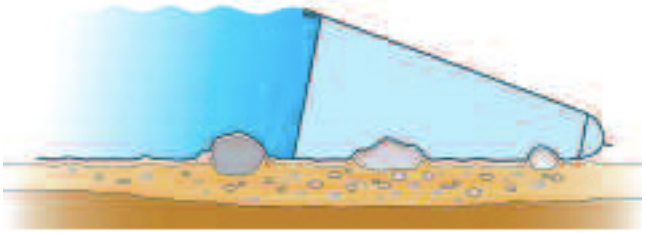
- Both barriers must be completely unfolded at the joints, prior to connecting the barriers.
- All barriers, regardless of category or size (water retention), can be tied together, except for the smallest 6"/15 cm model, which can only be tied to barriers of the same size.
- Tie together the barriers prior to placing in moving water.

Application Guide

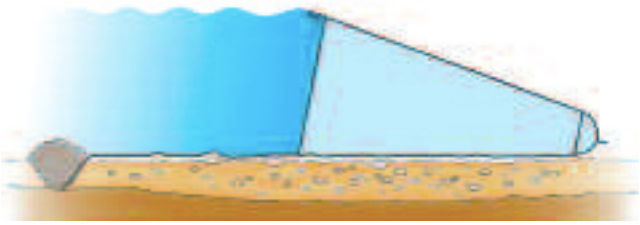
The pressure of the water on the bottom fabric of the barrier makes the barrier stick closely to the uneven bottom of the stream. The more the bottom of the stream is uneven, the better the barrier adheres.

The barrier will adhere very well in the great majority of streams and rivers. However, the bottom of some streams may cause problems if they mainly consist of sand or hard and smooth clay. Here are 3 types of bottoms that you are likely to come across:

1.



2.



1. GRAVEL BOTTOM STREAM:

This type of bottom is found in the majority of streams and rivers. It consists of small gravel and/or big rocks. The barrier responds very well in this case. However, if the gravel is very thick, water infiltrations are likely to occur. To keep water from flowing under the barrier, make a trench across the stream and bury the front flap of the barrier.

2. SAND BOTTOM STREAM:

This type of ground is rarely found in streams. The barrier adheres well to a sandy bottom, but you have to make sure that there are no water infiltrations under the barrier during installation. If this occurs, what may start out as a small leak can become difficult to control and especially to stop. After some time, the leak can become so big that the barrier will sink into the hole made by the water and end up slipping. This phenomenon is called piping. Setting up the barrier in this type of stream is not recommended. However, if it has to be done, the following precautions should be taken:

- Bury the front flap of the barrier in the sand at a depth of more than 15 cm / 6 inches.
- Place sandbags along the entire length of the front flap of the barrier.
- Insert a plastic tarp under the joints if 2 barriers have to be tied together in order to prevent infiltrations that could lead to piping. (Continued next page...)

3. CLAY BOTTOM STREAM:

Certain streams are completely covered with clay. The clay can be either solid and very slippery or unsteady and viscous. This type of bottom is rather rare, but when encountered, caution should be taken by better insulating the front of the barrier. The water barrier adheres to this type of ground. However, as soon as the water level reaches the full capacity of the barrier, the danger of slipping is increased because of the slippery surface. The following precautions should be taken in these conditions:

- Place stakes behind the barrier so that it can lean against these stakes if it starts to slip.
- Put ballast weights along the full length of the front flap to prevent water infiltrations under the barrier or bury the front flap.

OVERFLOW & BACKFILLING

Water over the barrier:
The situation shown is unlikely to occur because there is no accumulation of water behind the barrier. In this case, the barrier can hold a surplus of water of up to about 33% on top. This approximate percentage represents the point at which the barrier will slip.

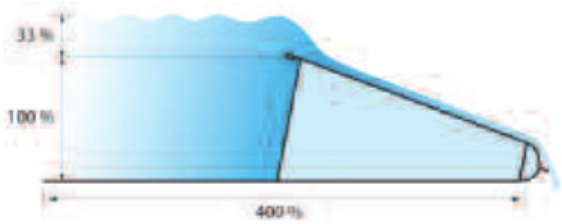


Fig : 1

Surplus of water at the back of the barrier:
The situation shown is the opposite of that in the previous figure. However, the risk of slipping is the same. The maximum acceptable amount of water behind the barrier is also ± 33%.

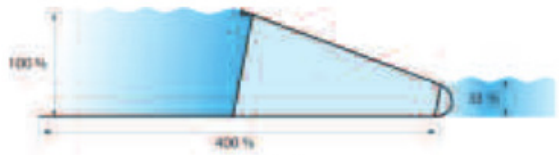
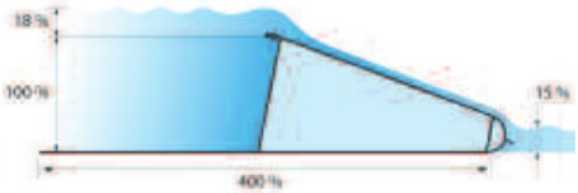


Fig : 2

Water over the barrier with a surplus of water behind it:
The water over the barrier added to the water behind it adds up 33%. Based on the slope and the flow of the stream, the surplus upstream can vary but the total amount of excess water cannot exceed 33%.

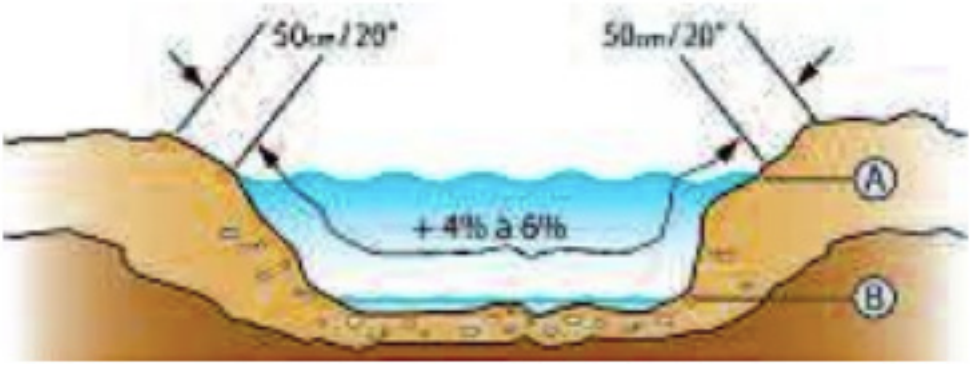


Identifying the Minimum Barrier Length for a Stream

Before deploying and installing the water barrier in a stream, it is important to determine the required barrier length.

Start by identifying the maximum water level (A) that can be reached by the water as it accumulates where the barrier will be installed.

(B) Is the water level before the installation of the dam. Add an additional distance of about 50 cm / 20 inches on each side. When the distance is determined, add another 10% to your initial measurement. This additional length will compensate for the fact that the fabric is stretched over an uneven surface and has to go around the large rocks at the bottom of the stream.

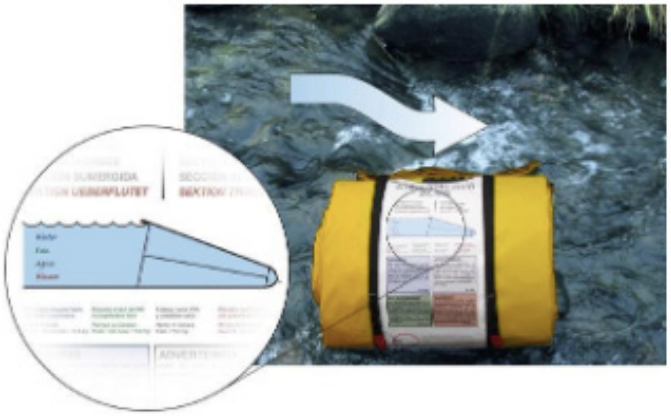


The barrier must be long enough to prevent the water from flowing out at the sides. Otherwise, it is almost sure to slip. On the other hand, it can't hurt if the barrier is longer than required. The opposite illustration shows the perfect efficiency of the half deployed barrier in this situation.

Deployment

SAFETY NOTE: Personal flotation devices (PFDs) should be worn during the use of the Instant Cofferdam.

1) Make sure that the barrier is facing in the right direction based on the pictogram and instructions on the barrier.



2) Identify the exact location for your installation. Remove any large obstructions that will be located where the front flap of the barrier will lay, and may cause infiltration of water. Obstructions include: large rocks, branches, tall grass, etc.

3) After identifying the exact location for your installation, begin to deploy the front flap and MAKE SURE THAT NO WATER ENTERS THE BARRIER by lifting up the front flap.

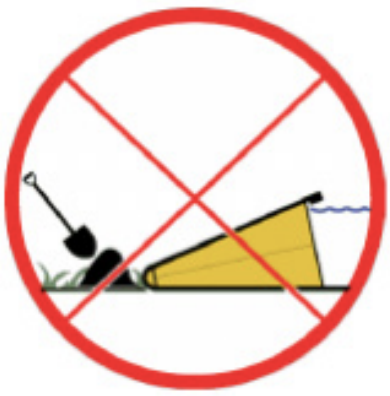
4) Quickly push the front flap of the barrier to the bottom of he stream. Once this step has been completed, no more adjustments can be made.

5) At the same time, place your feet on the front flap to weigh it down temporarily while you put your previously gathered ballast weight, rocks, or sandbags in place.

6)Continue to place other ballast weights along the entire front flap. It is easier to use rocks already available in the stream to place them on the front part of the front flap.

7) If water starts to run over the top of the unit, temporarily hold open the ridge edge, until water begins to fill the unit.

Caution!



DO NOT try to prevent water infiltration by placing rocks, dirt or sandbags in an effort to dam the downstream (back) side of the barrier.

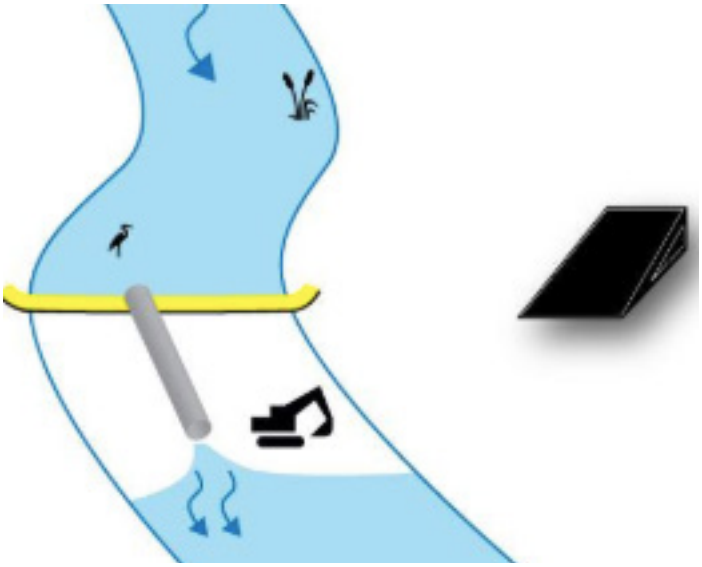
This will allow water to build up underneath and could cause the dam to slip or fail.

Deployment Scenarios

PERPENDICULAR INSTALLATION ON A STEEP SLOPE

This is the most common deployment scenario. Due to there being consistent water flow, the barrier will become inflated almost instantly.

For this scenario, follow the installation instructions, in the previous section.



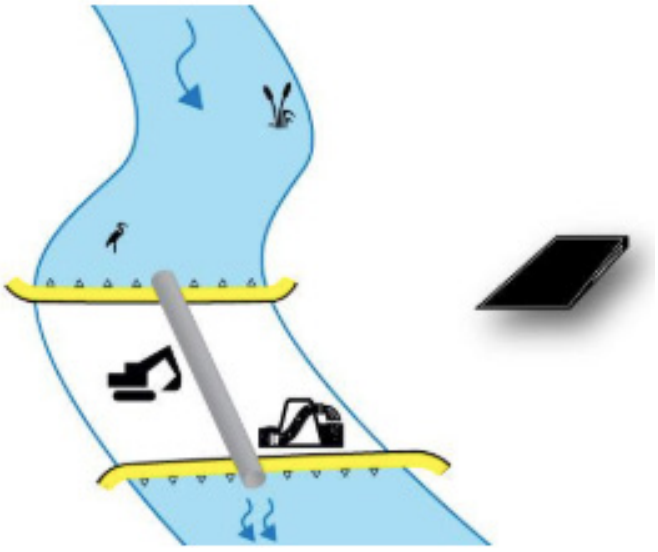
PERPENDICULAR INSTALLATION ON A SHALLOW SLOPE

In the case of a shallow slope, there will most likely need to be two dams, in order to prevent back flow on the downstream side of the dry area.

The downstream dam can generally be lower in height, since the back flow water is not nearly as much water as the stream flow into the upstream barrier.

If the flow is not very fast or non-existent, the barriers may need to be attached to the stream bottom, by means of stakes into metal rings on the leading edge, in order to prevent slippage until the dam is pressurized.

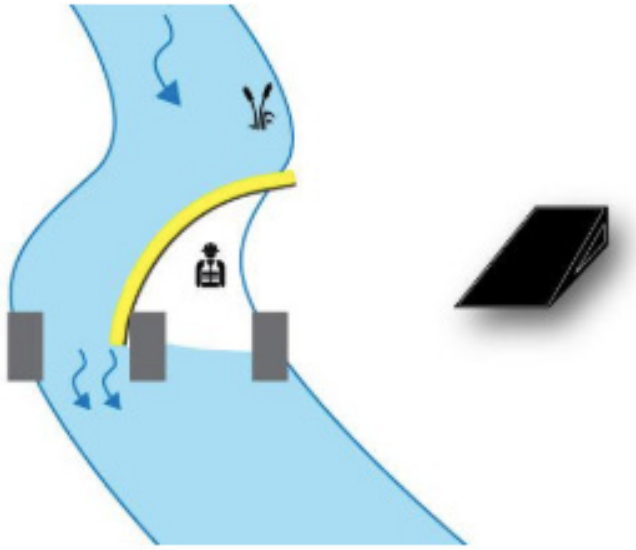
Once the barriers are set up, the dry space can be pumped dry.



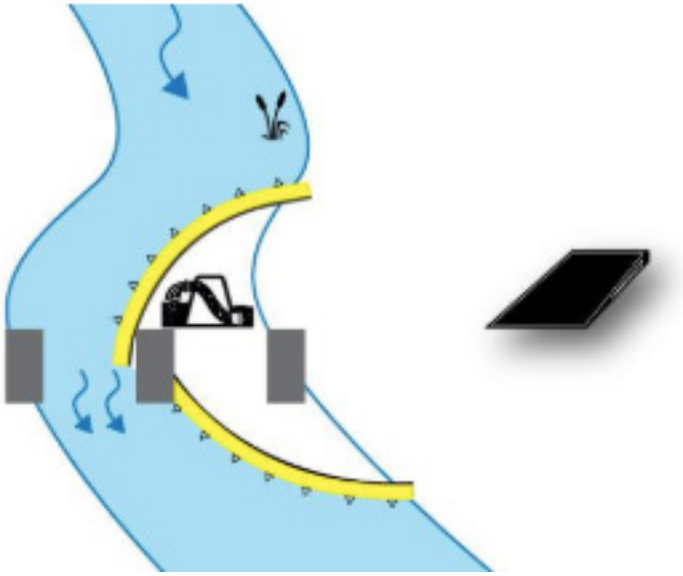
COFFERDAM SUPPORTED BY BRIDGE PIER

This is the typical installation for structures with one or more piers. Start from the bank and go around the pier upstream, ensuring that you have:

- A long enough barrier to ensure a watertight seal against the bridge pier.
- An opening between the supports wide enough for the dam to pass through.



Depending on the slope and the force of the current, it may be necessary to set up a second installation downstream of the bridge. In this case, do not go past the chosen pier. Attach the dam to the pier facing the starting bank.



U-SHAPED INSTALLATION – PARALLEL TO WATER FLOW

This is the preferred method of installation for riverbank construction or restoration work, and if the river/stream cannot be totally blocked off.

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

Positioning in the river
Pull the cofferdam across the water to the desired location, keeping the leading edge out of the water.

Position the cofferdam as desired (L-shape, U-shape, or diagonally).

Immersion
Immerse the leading edge to the river bed.

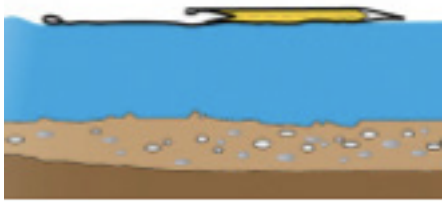
Stand on the leading edge and weigh it down with ballast.
Securing

Secure the metal rings on the leading edge using pegs to prevent slippage until the dam if pressurized.

Drainage
Begin pumping the area to be drained.

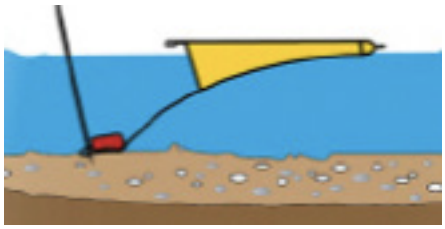
STAGNANT WATER INSTALLATION

Clear path of major obstacles under where the front bib of unit will sit. If large amounts of silt on bottom, remove from the front bib location prior to installation. Big rocks located on the middle and back portion can stay in place to provide additional grip.

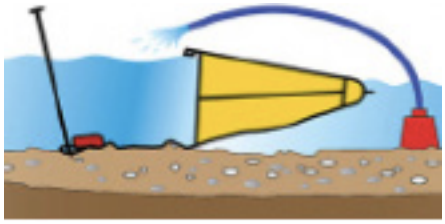


***Note: If large amounts of silt under the unit(s), make sure to remove it. Silt will cause a slippery surface for the unit(s) to sit, and allow large amounts of water infiltration underneath the units.

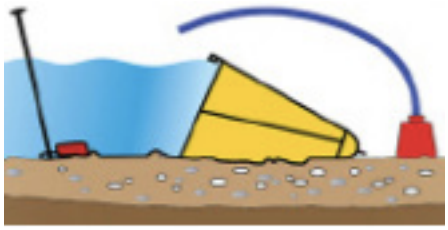
Deploy the unit by placing unit on the bank, above the height of water that you will dam. For example, if you have a unit that will dam up to 20”, you will want to make sure the unit is above 20” on the bank. Unroll unit across the body of water to opposite bank. Units will float, until ready to be submerged.



Submerge the unit, and put metal rebar in the rings on the bib and additional sandbags on bib if it cannot be buried. If the bib can be buried, bury it approximately 6".



Start pumping the dry space. If there is any infiltration coming under the unit, you can use a water filled hose, installed behind the barriers, to collect and direct leakage to a pumping location. This can also be accomplished by creating a small trench behind the unit to collect leakage and pump from.



Removal

SAFETY NOTE: DO NOT STAND ON THE DOWNSTREAM SIDE OF THE BARRIER DURING THE REMOVAL PROCESS.

After removing the ballast weights, lift the corner of the front flap and let the water flow under the barrier.

Continue by lifting a wider part of the front flap until the barrier begins to slip.

Move forward with the slipping barrier and support the front flap to keep it out of the water. This precarious operation is recommended to prevent the barrier from rolling up and make it easier to take it out of the stream.

As soon as the barrier is stabilized, allow the water in the stream to flow normally.

To remove the water barrier, pull toward the back. Use the handles specially provided for this operation

Maintenance

CLEANING

It is strongly recommended to wash and dry the water barrier before storing it. This allows you to check for any damages that may have occurred during use. Cleaning the product with a pressure washer is recommended.

Pay close attention to the Velcro joints, ensuring these are cleaned with a pressure washer. The Velcro must be cleaned so that the barriers can be re-joined effectively.

DRYING

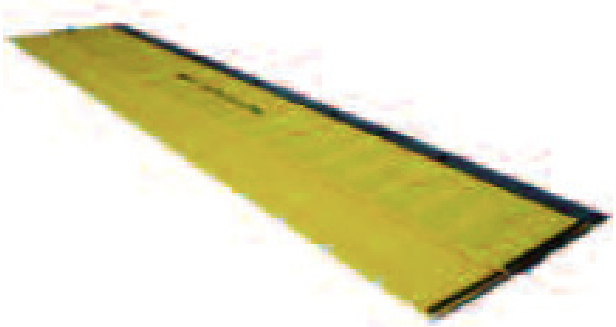
To prevent mold on a wet barrier, make sure it dries out thoroughly before storing it. To dry the barrier, hang it by the back straps. It is equipped with at least one rear strap every 5 feet.

REPAIRS

In case of tears, the barrier is easy to repair, even when in use. Simply insert a piece of PVC inside the barrier. The water pressure will exert a force and then seal the tear. In the event that your barrier is damaged, we suggest you get it repaired by a qualified professional who regularly works with this kind of material. For example: canopies, canvas truck covers, tents, tarps, etc.

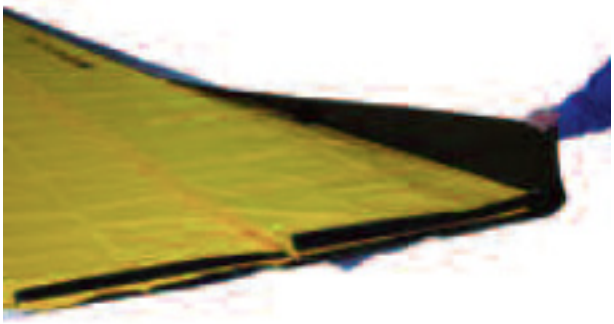
If there's a tear or perforation in the PVC canvas, several methods can be used. These include contact cement for PVC, ultrasonic or thermal gluing, or sewing to another piece of material.

FOLDING THE BARRIER FOR STORAGE



After cleaning and drying the barrier, lay it on a clean flat surface.

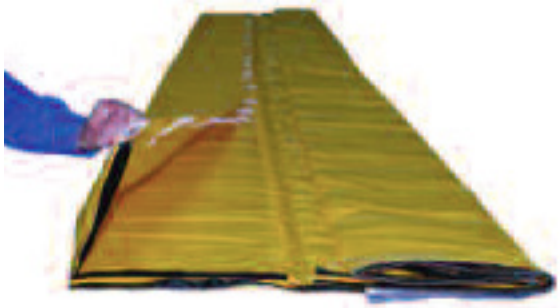
With the help of a stick, make sure that all the partitions of the barrier are smoothed out.



To begin, fold the anti-erosion flap upward and towards the barrier.

Fold a first part of the back of the barrier by following the folds already appearing in the fabric.

Depending on the model, a second fold is sometimes required.



Next fold a first part of the front flap following the folds on the fabric.

Finish folding the front flap by folding it over the back of the barrier as a whole.

Roll up the barrier on the opposite site of the banner/ velcro straps.

When properly rolled up, the barrier should look like this.

STORAGE

The units can be piled one on top of the other, upright or flat, without this hampering their deployment. However, storing the units in a vertical position is highly recommended to maintain its shape when rolled up. We don't recommend setting the unit(s) directly on a damp surface. It is best to lie on a wooden pallet.

If there is water trapped inside the unit during storage, this will not affect product longevity, as long as the water is dirt free. Fallen leaves and other waste material left inside the unit can damage and dry up the fabric, thus reducing the useful life. When properly washed and stored, it does not emit any odors. However, improper cleaning and storage may lead to some unpleasant odors when the it is redeployed.

Every unit should be kept in its storage bag or crate for protection against UV rays, dirt, and damages, as well as easier handling during transport.

Protection

UV rays remain the most damaging element for the barrier and its components. The material that is used in the manufacturing is the same as truck tarps and can resist heavy tough conditions. Extended exposure of the product will affect its longevity. Proper storage is important to limit exposure to UV rays.

Accessories

Deployment Crates

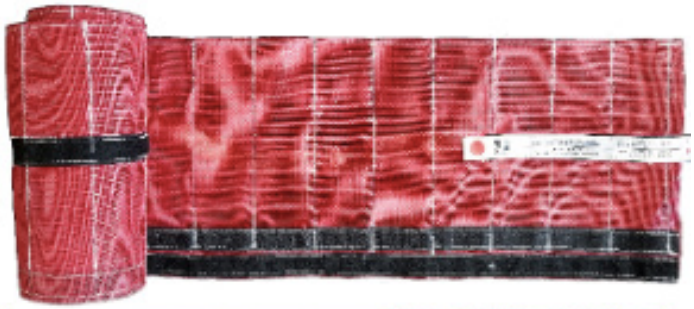
The crate enables covering long distances within few minutes. This low-cost solution is simply the perfect tool for dam deployment. Multiple units come pre-attached inside of the crate.

Equipped with wheels that facilitate barriers' transport and deployment, crates enable to cover on average, more than 300 ft. (100m) barriers. These crates can be set on a trailer, truck bed or lifted with forklift.

Ballasting Bags

The ballasting bag is designed to create a uniform weight throughout the length of the barrier. It enables the barrier to match the shape of the terrain on which it lays. This is needed to reduce infiltration of water underneath the barrier and prevent the lift of the ground tarp and potential fail.

A full ballasting bag weighs 30 lbs. (13.5kg). When laid on the ground, it covers a surface of 9'' x 10' (23cm x 300cm). When rolled up, the width is 9"x11" (23cm x 28cm). It is made of polyester mesh and can be handled hundreds of times.



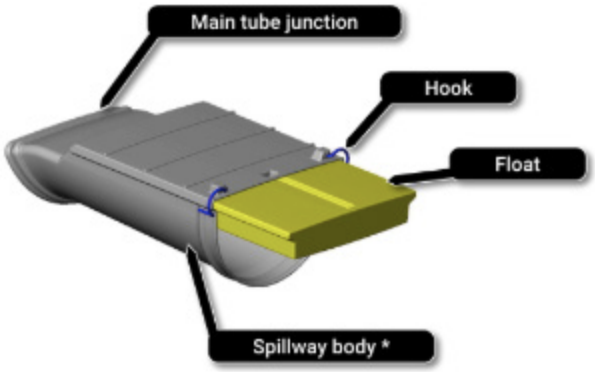
Lateral Handles

Lateral handles attached to the hook and loop on the barriers, and are a convenient way to extend upward or attach the extremities of the barriers to anchor points, when going up a wall or other supports.

Spillway Diverter and Tunnel

Spillway diverters are installed on top of the water barrier and allow you to divert the water downstream while creating a dry area.

This system is a replacement for pumps and removes up to 1,440 gallons/minute (5,400 liters/minute).



Diverter			
Item #	**Description**	**Dimensions**	**Weight**
DA-1200	Starter kit including the rigid polyethylene diverter and the main tunnel	22,9m / 75' Lg. (tunnel principal)	20,1 kg / 44.4 lb
DS-1200	Polyethylene diverter	66cm X 38cm X 97cm Lg. 26" X 15" X 38" Lg.	11,3 kg / 25 lb
DP-3075	Main tunnel made of polyethylene	22,9m / 75'	8,9 kg / 19.6 lb
DR-3025	Extension tunnel made of polyethylene	7,6m / 25'	3 kg / 6.6 lb
DR-3050	Extension tunnel made of polyethylene	15,2m / 50'	5,5 kg / 12.2 lb
DR-3075	Extension tunnel made of polyethylene	22,9m / 75'	8,1 kg / 18 lb

Spillway Installation Process

The spillway or transition pipe has two parts: the spillway itself, and the main flexible pipe.

Identify the discharge point downstream of the dam

Plan to lay the pipe beyond the area that needs to be drained to avoid back flow (ensure you have 5 feet of additional pipe). The terrain and the strength of the current will help you determine how far the pipe needs to be extended (if necessary).

Fix the tube to the spillway

The spillway is funnel-shaped to siphon and discharge as much water as possible.

The main tube fits the spillway outlet.

Unroll the tube to the discharge point

The main tube is equipped with handles to help you steer it and guide the water to the desired location. This 75 feet of flexible pipe adjusts perfectly to the terrain and the winding path of the watercourse. The pipe is made from a polyethylene, abrasion-resistant fabric.

Position the spillway on the dam

The float built into the spillway has a stabilizing effect. We recommend adding some large stones taken from the stream or sandbags on top of the spillway to maximize the suction effect and further improve stability.

NO MORE THAN 2 DIVERTERS PER BARRIER

Available Models

HalenHardy Item #	Height (inches)	Length (feet)	Weight (lbs)	Storage Size (inches)
HHCWA1515	15	15	16.5	12 x 12 x 20
HHCWA1525	15	25	28.2	14 x 25 x 11
HHCWA1550	15	50	54.2	19 x 42 x 13
HHCWA2125	21	25	38.6	16 x 16 x 19
HHCWA2130	21	30	45.4	16.1 x 16.1 x 19.6
HHCWA2150	21	50	73.8	20.4 x 20.4 x 19.2
HHCWA2825	28	25	53.2	15.3 x 14.9 x 24
HHCWA2835	28	35	75.2	18.5 x 18.5 x 24.4
HHCWA2850	28	50	103	25.5 x 23.6 x 18.5
HHCWA3930	39	30	143.6	20.8 x 37 x 14.9
HHCWA3950	39	50	239.6	27.1 x 37 x 18.11
HHCWA6030	60	30	233.6	25.9 x 50.7 x 18.8
HHCWA6050	60	50	384.2	33.8 x 50.7 x 24


HH
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