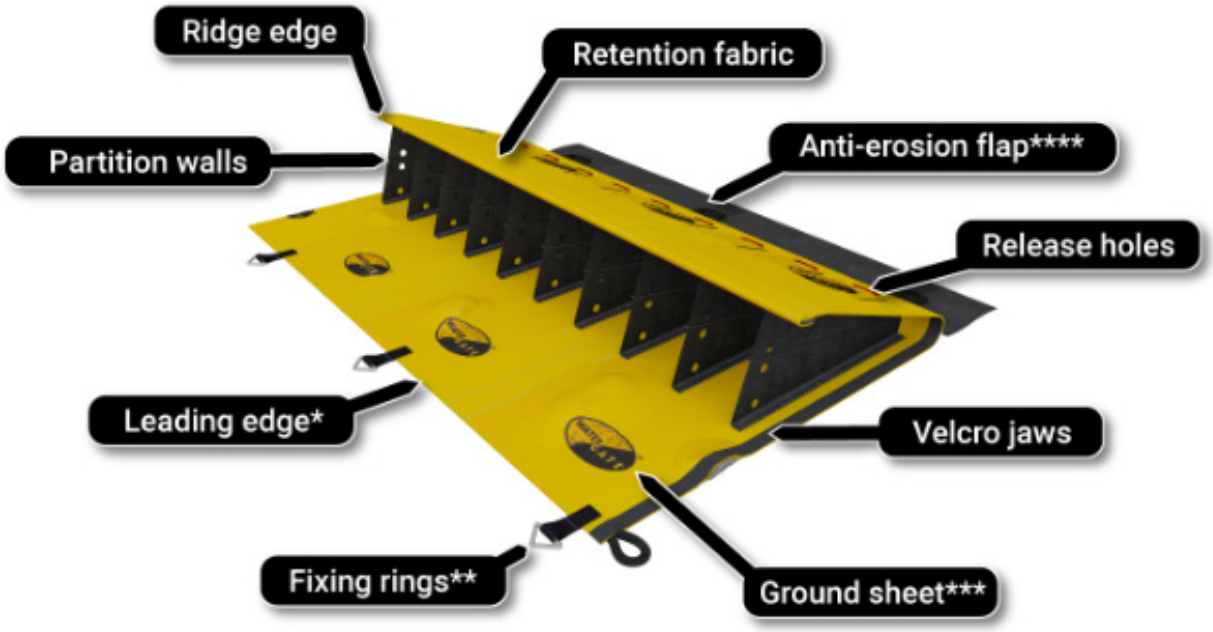
HalenHardy®

# USER GUIDE

## INSTANT UNDERFLOW DAM

## Table of Contents

# Assembly Detail




## Features :

Release Holes

- Diameter:  4.5” (11.4 cm)
- Flow:  Varies between 154 and 330 gallons per minute (gpm), depending on the retention height
- Operated by Velcro straps, allowing the holes to be opened and closed during use

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

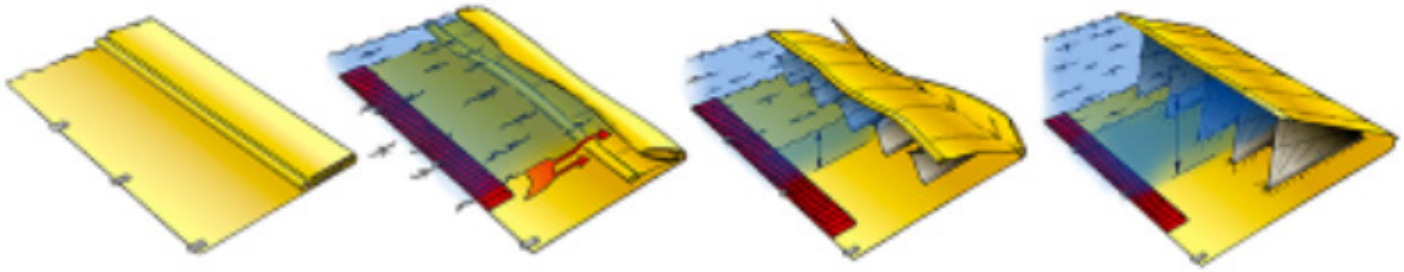
** Fixing rings only used for installation in standing water.

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

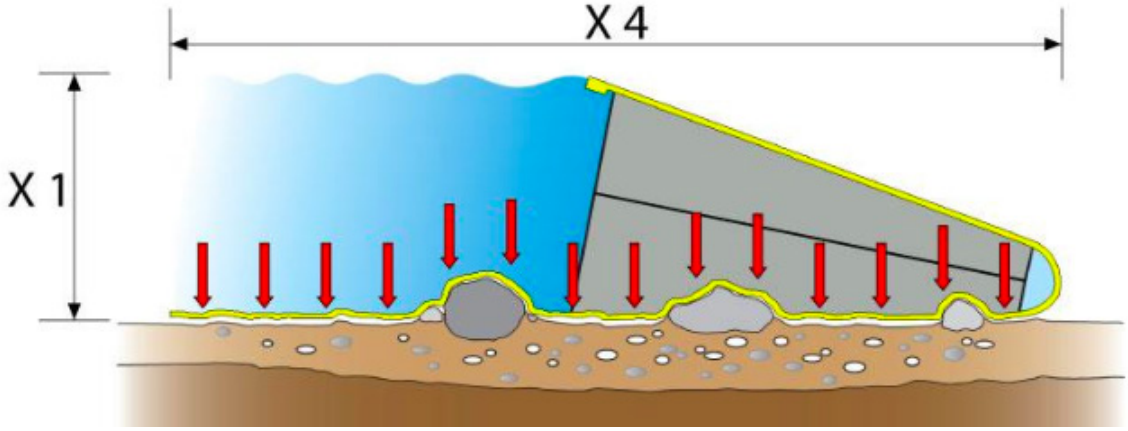
**** Limits the risk of erosion in the event of overflow, especially on sandy beds

# 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.



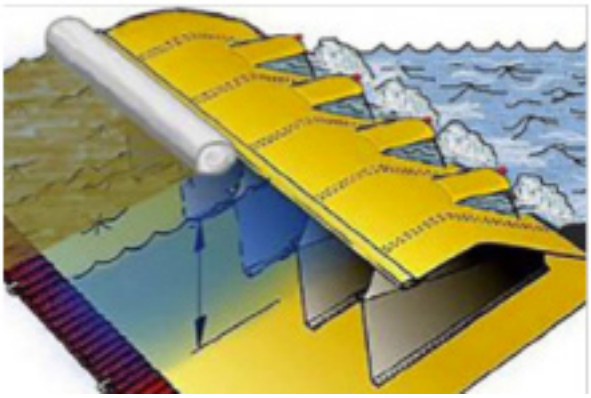

In order for water to be able to hold back water on most surfaces such as asphalt or grass, a ratio of 1 to 2½ is generally sufficient to ensure safety. With a ratio of 1 to 4, the barrier is obviously very safe and the chances of it slipping are very slim. The wider the barrier is, the less likely it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

## Release Holes

The Instant Underflow Dam is equipped with release holes on its downstream side. The main function of the release holes is to allow the dam to contain floating hydrocarbons, on the upstream side, while allowing clean "underflow" water to continue downstream.


As water begins to fill the dam, the stream flow will slow and the floating hydrocarbons will be contained on the upstream side of the dam. As the water rises, behind the dam, the release holes on the downstream side can be opened, in order to allow clean water to flow downstream. This also regulates the flow of water on the upstream side, ensuring that the spilled material does not breach the top of the dam.

In addition, by slowing the water, the dam allows for the introduction of spill clean up materials and equipment (sorbent booms, containment booms, skimmers, etc) to be introduced, in order to clean up the spilled material from the stream.



| 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<br>40 kg/cm<br>245 lbs/in | Fill***<br>35 kg/cm<br>218 lbs/in | Yes | Warp<br>55 kg/cm<br>310 lbs/in | Fill***<br>50 kg/cm<br>275 lbs/in | Yes |
| **Tear Resistance** | Warp<br>32 kg/cm<br>72 lbs/in | Fill***<br>22 kg/cm<br>49 lbs/in | Yes | Warp<br>45 kg/cm<br>100 lbs/in | Fill***<br>35 kg/cm<br>80 lbs/in | Yes |
| **Adhesion** | Warp<br>1.5 kg/cm<br>8 lbs/in | Fill***<br>1.5 kg/cm<br>8 lbs/in | Yes | Warp<br>1.5 kg/cm<br>8 lbs/in | Fill***<br>1.5 kg/cm<br>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<br>34 kg/cm<br>210 lbs/in | Fill***<br>30 kg/cm<br>185 lbs/in | Yes | Warp<br>80 kg/cm<br>490 lbs/in | Fill***<br>50 kg/cm<br>320 lbs/in | Yes |
| **Tear Resistance** | Warp<br>31 kg/cm<br>68 lbs/in | Fill***<br>31 kg/cm<br>68 lbs/in | Yes | Warp<br>40 kg/cm<br>88 lbs/in | Fill***<br>40 kg/cm<br>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

# 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.

## 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<br>Decoloration |
| | Nitric Acid | Not Recommended |
| | Phosphoric Acid | 12 hours resistant |
| | Sulfuric Acid | Not Recommended |
| Bases | Sodium Hydroxide | 12 hours resistant<br>Major Repairs |
| Hydrocarbons | Gasoline, Diesel, Oil | 12 hours resistant |
| Non-Polar Solvents | Petroleum Ether | 12 hours resistant<br>Major Repairs |
| | Hexanes | 12 hours resistant<br>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<br>Inspection |
| | Formaldehyde | 12 hours resistant<br>Inspection |
| | Methyl Ether Ketone | Not Recommended |
| | Tetrahydrofuran | Not Recommended |
| Others | Ethyl Acetate | Not Recommended |
| | Acetic Anhydrous | 12 hours resistant |
| | Paint Thinner | 12 hours resistant<br>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**

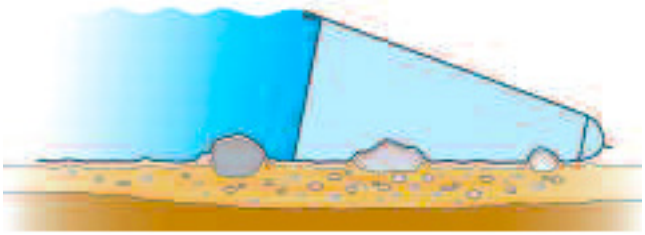
- Both barriers must be completely unfolded at the joints, prior to connecting the barriers.
- All barriers, regardless of category or size (water retention), can be tied together, except for the smallest 6"/15 cm model, which can only be tied to barriers of the same size.
- Tie together the barriers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

# Application Guide

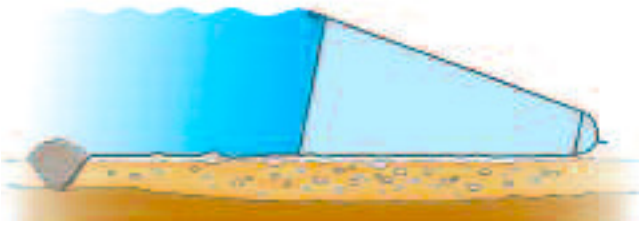
The pressure of the water on the bottom fabric of the barrier makes the barrier stick closely to the uneven bottom of the stream. The more the bottom of the stream is uneven, the better the barrier adheres.

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.

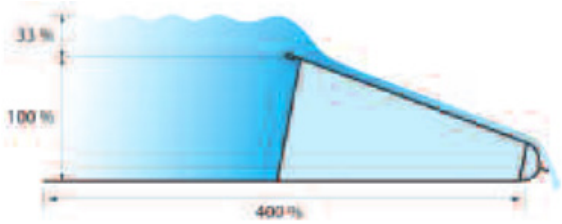


Fig : 1

**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%.

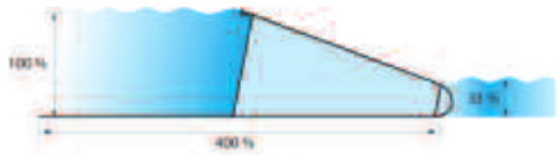
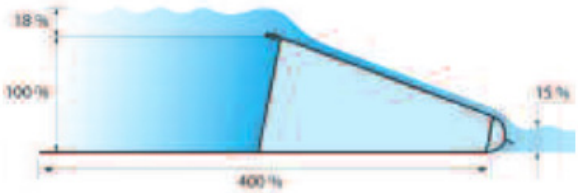


Fig : 2

**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%.

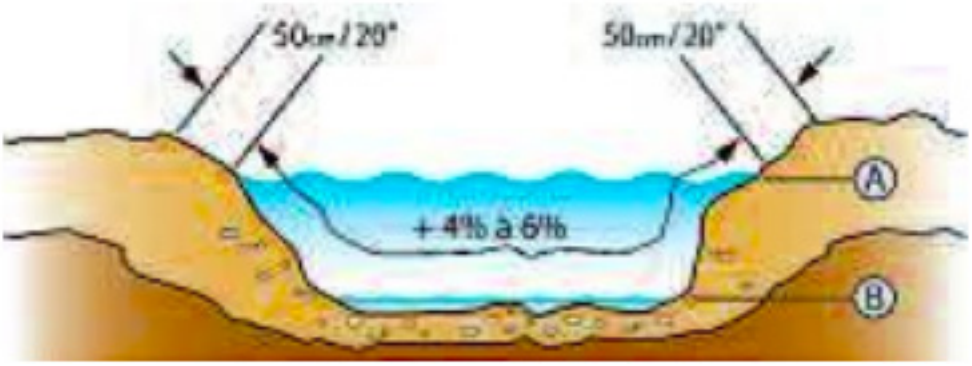


## Identifying the Minimum Barrier Length for a Stream

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.

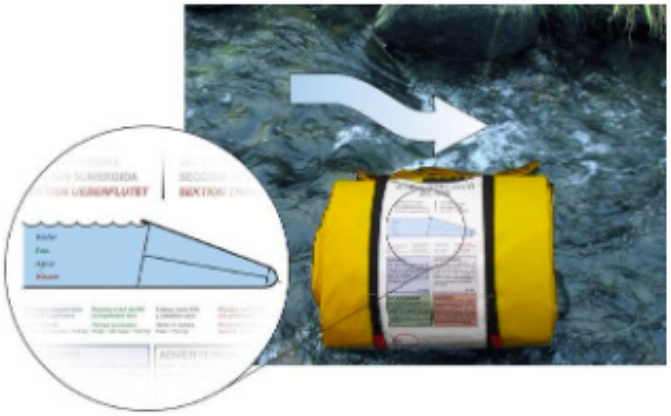



The barrier must be long enough to prevent the water from flowing out at the sides. Otherwise, it is almost sure to slip. On the other hand, it can't hurt if the barrier is longer than required. The opposite illustration shows the perfect efficiency of the half deployed barrier in this situation.

# 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) As the water rises inside the dam, open the release holes, on the downstream side, in order to make sure that the water does and/or floating hydrocarbons do not over top the dam.

## 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.

## 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

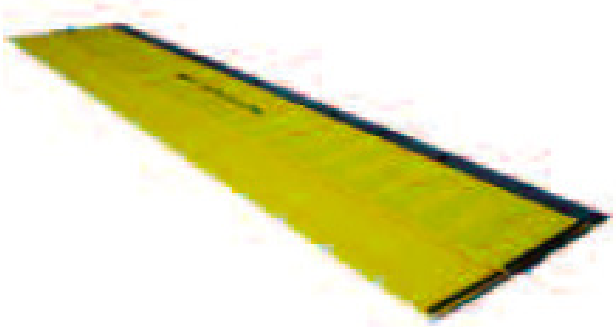
To prevent mold on a wet barrier, make sure it dries out thoroughly before storing it. To dry the barrier, hang it by the back straps. It is equipped with at least one rear strap every 5 feet.

## 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.

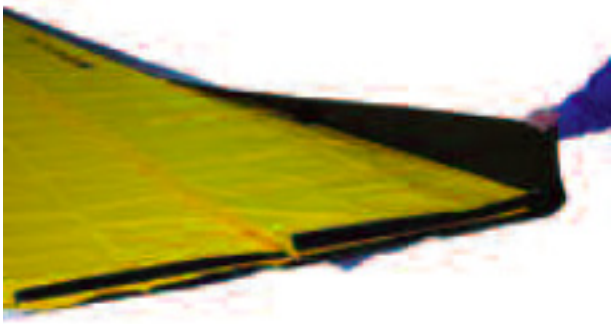
In the event that your barrier is damaged, we suggest you get it repaired by a qualified professional who regularly works with this kind of material. For example: canopies, canvas truck covers, tents, tarps, etc.

# FOLDING THE BARRIER FOR STORAGE



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

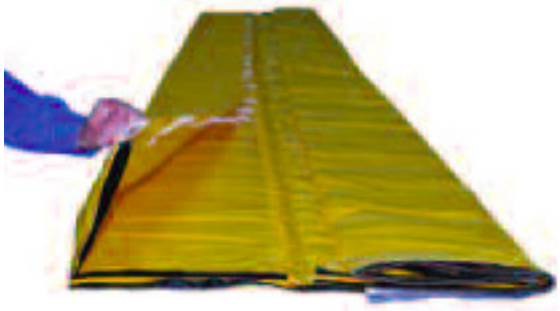
With the help of a stick, make sure that all the partitions of the barrier are smoothed out.



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.

## FOLDING THE BARRIER FOR STORAGE...

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

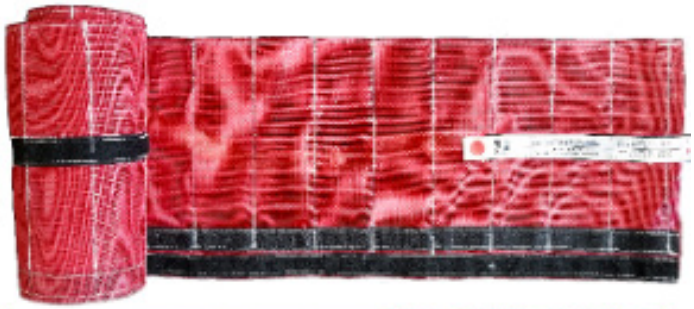
The crate enables covering long distances within few minutes. This low-cost solution is simply the perfect tool for dam deployment. Multiple units come pre-attached inside of the crate.

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.

# Available Models

| HalenHardy Item # | Height (inches) | Length (feet) | Weight (lbs) | Storage Size (inches) |
|---|---|---|---|---|
| DAM1515 | 15 | 15 | 20 | 12 x 12 x 20 |
| DAM1525 | 15 | 25 | 30 | 14 x 25 x 11 |
| | | | | |
| DAM2115 | 21 | 15 | 22 | 13 x 13 x 20 |
| DAM2125 | 21 | 25 | 37.4 | 16 x 16 x 20 |
| DAM2130 | 21 | 30 | 44 | 16 x 16 x 20 |
| DAM2150 | 21 | 50 | 72.7 | 20.4 x 20.4 x 19.2 |
| | | | | |
| DAM2815 | 28 | 15 | 37.4 | 13.3. x 12.5 x 26.7 |
| DAM2825 | 28 | 25 | 52.9 | 16.5 x 16.5 x 24.8 |
| DAM2835 | 28 | 35 | 74.9 | 18.5 x 18.5 x 24.4 |
| DAM2850 | 28 | 50 | 101.4 | 25.5 x 25.5 x 18.5 |
| | | | | |
| DAM3930 | 39 | 30 | 147 | 20.8 x 37 x 14.9 |
| DAM3950 | 39 | 50 | 258 | 27 x 37 x 18 |

HalenHardy®

www.halenhardy.com

814-822-2004

sales@halenhardy.com