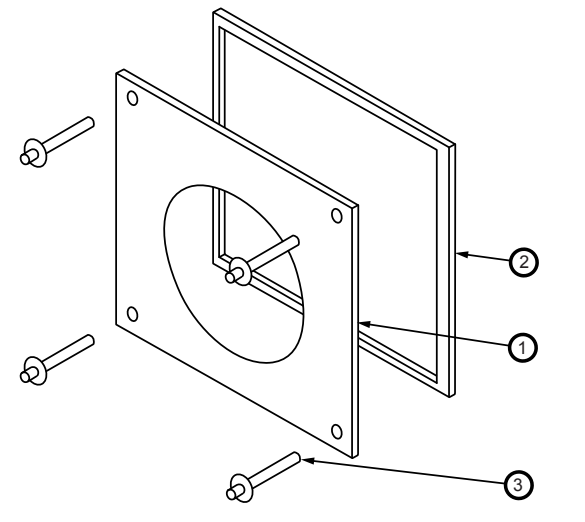
# Design Data

# Hydro-Brake® Orifice

## Precision Cut Orifice Plate Flow Control

**The Hydro-Brake® Orifice flow control is designed and manufactured in accordance with the applicable sections of BS EN ISO 5167-2:2003 to deliver precise, repeatable flow control.**

Ideally suited to sites where there are minimal on-site storage / attenuation constraints, generous discharge consents or the need for a low-cost, low-complexity flow control solution.




## Precision Engineered Orifice Plates

1. Precision cut stainless steel orifice plate (to applicable sections of BS EN ISO 5167-2:2003).
2. Neoprene gasket.
3. Fixing bolts.

The Hydro-Brake® Orifice is manufactured under strict Quality Assurance procedures to the stringent methods and tolerances set out in the international standard BS EN ISO 5167-2:2003.

Each Hydro-Brake® Orifice is manufactured to suit the precise hydraulic requirements of the individual application.

*Figure 1 - The Hydro-Brake® Orifice flow control is designed and manufactured to deliver precise, repeatable flow control.*

## Benefits

- Manufactured from high grade stainless steel.
- Configurations available to suit a wide variety of installations.
- Simple installation.
- Self-activating.
- No moving parts or external power requirements.
- Low-cost, low-complexity flow control.

## Custom Configured

At Hydro International, we pride ourselves on providing solutions that meet your requirements, rather than providing a standard solution and asking you to compromise on your project needs. The Hydro-Brake® Orifice is available in a wide variety of configurations to suit numerous applications – a selection of these are shown below. If you don't see a configuration that meets your requirements, contact our dedicated professional engineers, who would be happy to work with you to provide the best possible solution.

The Hydro-Brake® Orifice can also be supplied pre-fitted within in manhole to allow for simple plug-and-play installation on site.


*Integrated mesh guards*

*Curved mount pipe insert*

*Slide mounted*

*Push-fit spigot*


*Pivot mounted*

*Pipe end cap*

## Operating Principles

When it is not submerged, the lower edge of the orifice acts as a weir.

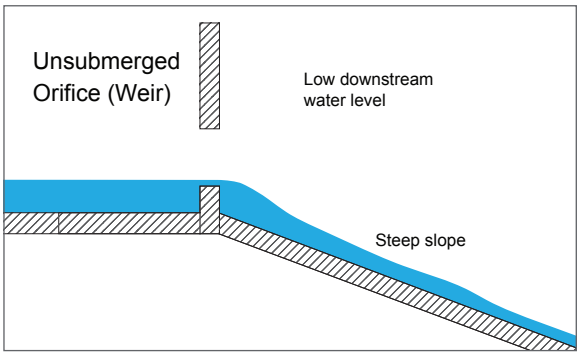



*Figure 2 - Typical unsubmerged orifice plate.*

Once the water level rises and submerges the orifice, the standard orifice equation governs the flow.

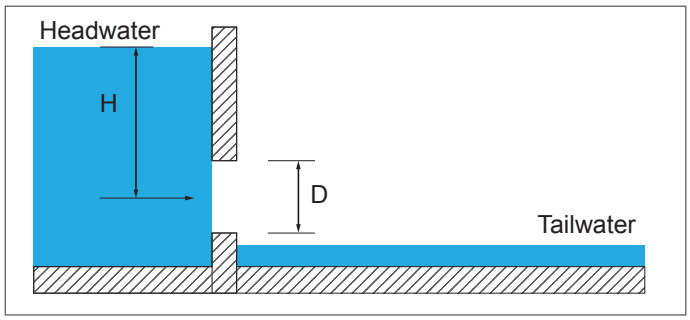



*Figure 3(a) - Free flow.*

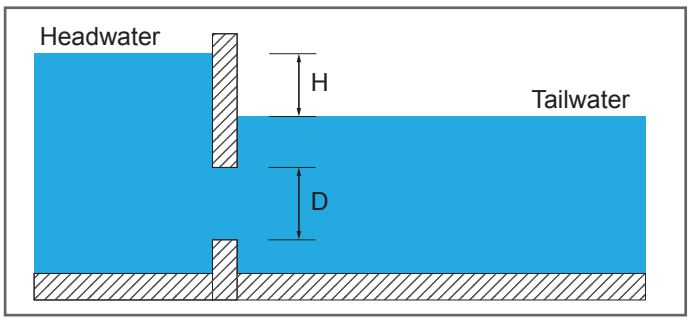



*Figure 3(b) - Submerged flow.*

**Note:** Where the orifice discharges as a free outfall, then the effective head, h, is measured from the centre of the orifice to the upstream (headwater) surface elevation (see Figure 3(a)).

If the outlet to the orifice is submerged, then a differential head is taken as the difference in surface elevation between the upstream (headwater) and the downstream (tailwater) (see Figure 3(b)).

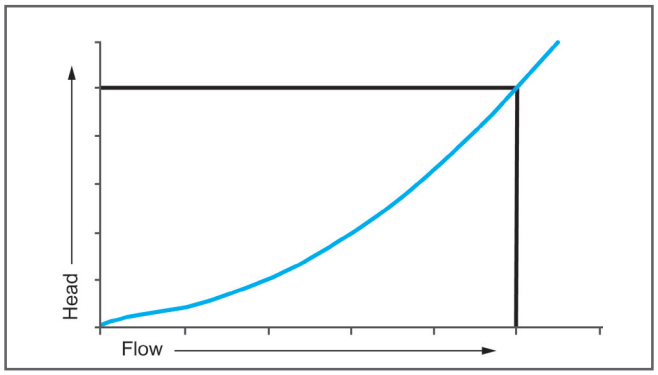



*Figure 4 - Typical head-discharge relationship.*

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# Hydro-Brake® Orifice
## Precision Cut Orifice Plate Flow Control

## Expert Design Support Services

Hydro International's professional engineers work with you to provide expert technical and aftersales support to ensure your projects meet exacting design requirements and deliver the very best hydraulic controls for your site.

With over 35 years' experience of flow control knowledge and experience, Hydro International's design support team is available to advise on any aspect of water flow management, including detailed modelling of orifice plates and composite oulet structures

## Resilience by Design

Hydro-Brake® Orifice plates can be supplied with integrated protection against the risk of blockages. Alternatively, the Hydro-Brake® Orifice can be mounted on moveable or removable structures to allow for manual intervention to drain the control chamber from surface level and clear any blockages that do occur. Our engineers will be happy to advise on the most appropriate protection or intervention structure(s) for your application.

## Technical Details and Further Information

Hydro International will supply detailed hydraulic data and dimensioned installation drawings for each unit. Example details are shown below.

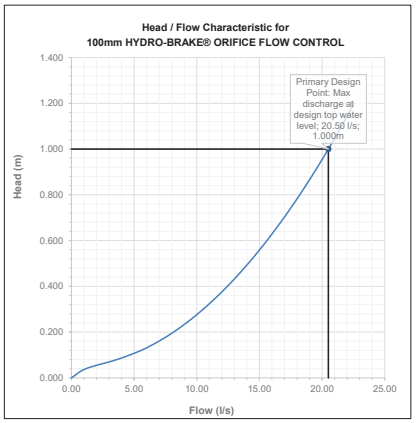
Hydro International

**100mm HYDRO-BRAKE® ORIFICE FLOW CONTROL SPECIFICATION SHEET**

| Project Information | | | |
|---|---|---|---|
| Date: | 08 October 2015 | Site Ref: | XX-XX-XXXX |
| Site Name: | Demo Site Test Town | | |

| Control Points | Flow (l/s) | Head (m) |
|---|---|---|
| Primary Design Point: Max discharge at design top water level | 20.50 l/s | 1.000m |

**Any changes to the flow control design should be checked by the design engineer as there will be an impact on the overall network design**




| Head (m) | Flow (l/s) |
|---|---|
| 0.000 | 0.00 |
| 0.040 | 1.15 |
| 0.080 | 3.63 |
| 0.120 | 5.56 |
| 0.160 | 6.97 |
| 0.200 | 8.14 |
| 0.240 | 9.16 |
| 0.280 | 10.08 |
| 0.320 | 10.93 |
| 0.360 | 11.71 |
| 0.390 | 12.26 |
| 0.430 | 12.96 |
| 0.470 | 13.63 |
| 0.510 | 14.26 |
| 0.550 | 14.87 |
| 0.600 | 15.60 |
| 0.640 | 16.15 |
| 0.680 | 16.69 |
| 0.720 | 17.22 |
| 0.760 | 17.72 |
| 0.800 | 18.21 |
| 0.840 | 18.69 |
| 0.880 | 19.16 |
| 0.920 | 19.62 |
| 0.960 | 20.06 |
| 1.000 | 20.50 |
| 1.040 | 20.93 |
| 1.080 | 21.35 |
| 1.120 | 21.76 |
| 1.160 | 22.16 |
| 1.200 | 22.56 |

**If you would like details for an alternative flow control solution using our Hydro-Brake Optimum® that can offer savings on construction costs, then please contact us for a revised quote.**

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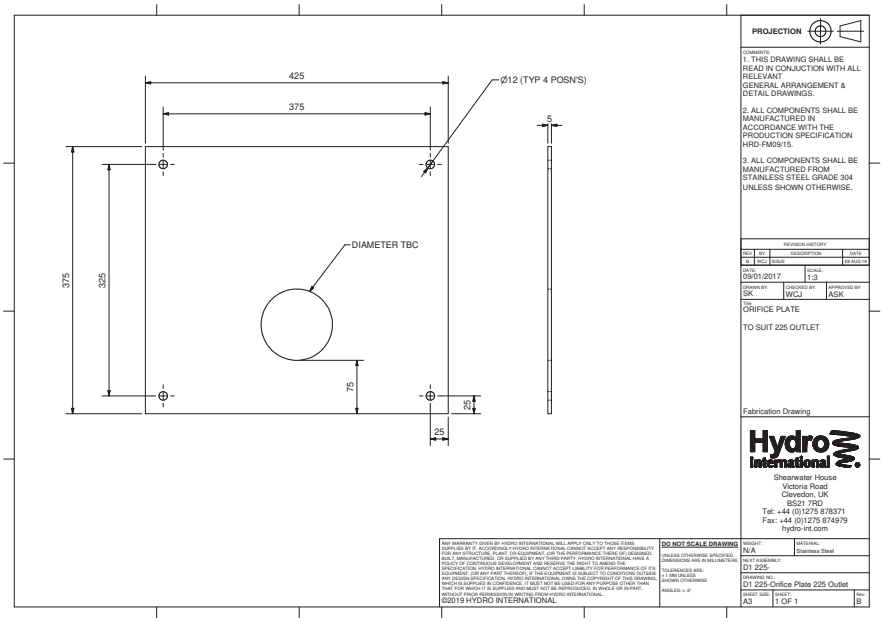


## The Hydro-Brake® Flow Control Series

As a brand leader for vortex flow controls for more than 30 years, Hydro International continues to set the standard in flow control management technologies.

At Hydro International, we pride ourselves on our engineering excellence and in developing a range of flow control solutions, we have invested in significant research and development to validate their performance.

### Hydro-Brake® Orifice

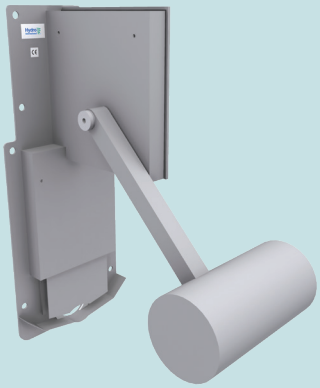

The low-cost option for unconstrainted sites (shown with optional screen).

### Hydro-Brake® Optimum

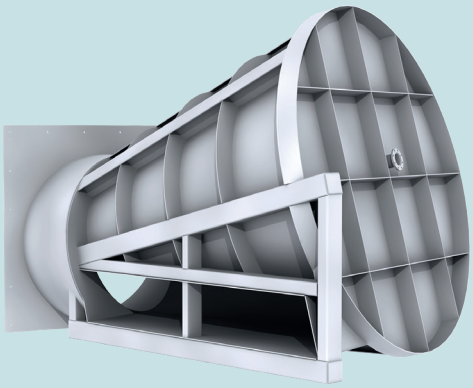

The vortex flow control with no equvalent, delivering Nature's Perfect Cuve with no moving parts and independently verified by the BBA and WRc.

### Hydro-Brake® Agile

Precision engineered flow control for highly constrained applications.



### Hydro-Brake® Flood Alleviation



The vortex controlled solution to watercourse flooding.



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