PT/503/0422 (April 2022)

Assessment Schedule for Hydro-Brake® Optimum devices as manufactured by Hydro International Ltd

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1. SCOPE

This schedule specifies requirements for the Hydro-Brake® Optimum S and C type vortex flow control devices manufactured by Hydro International Ltd. The S-type is primarily used for stormwater flow control and the C-type is used for combined sewer flows and high volume stormwater applications.

The S and C type stainless steel devices are applicable with a design flow rate between 1.0 and 60 litres per second and 3.0 and 60 litres per second respectively. Design head is between 0.4 m and 4.0 m and 0.25 and 4.0 m respectively. It is not applicable to devices with a design discharge greater than 60 litres per second.

2. PRODUCT DESCRIPTION

2.1 Introduction

The Hydro-Brake® Optimum device controls fluid flow by hydraulic effect without moving parts. At low flow rates the device does not restrict flow. As flow increases, hydrostatic pressure increases creating a vortex within the device. This results in a significant pressure drop between the inlet and outlet so restricting maximum flow to the design discharge rate.

The Hydro-Brake® Optimum devices are mounted on the outlet pipe within manholes and chambers, is self-activating, with no moving parts, is self-cleaning and has no power requirement.

The Hydro-Brake® Optimum device has a manual bypass door which can be operated via a wire rope from the inside of the manhole/chamber cover to clear blockages. This can be used as a rodding port if required.

2.2 Applicable standards

Performance: There are no performance standards applicable to this type of device.

Materials: Materials used shall comply with:

- BS EN 10088-1:2014(1)
- BS EN 10088-2:2014(2)
- BS EN 10088-3:2014(3)
- BS EN ISO 3506:2020(4)

2.3 Approval History

The Hydro-Brake® Optimum device was originally awarded WRc Approved™ certification in April 2012.

- PT/329/0412
- PT/409/0417

3. REQUIREMENTS AND TESTING

3.1 Type Testing

Mechanical resistance – The centre of the upstream-facing side and the centre of the curved volute of the device shall withstand the impact of a 3 kg test piece dropped directly onto its centre from a height of 2 m without causing permanent indentation greater than 10 mm.

Flow characteristics – The design procedure for the Hydro-Brake® Optimum device shall be verified by testing to achieve the specified discharge (±5%) at the specified head.

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3.2 Design Requirements

Flow characteristics – The Hydro-Brake® Optimum device shall be designed using the manufacturers design procedure.

3.3 Materials Requirements

Stainless steel sheet shall be grade 1.4307 (or 1.4404 where required) in accordance with BS EN 10088-1:2014 and shall comply with the requirements of BS EN 10088-2:2014.

Stainless steel nuts and bolts shall be grade A2 (or A4 where required) and comply with the requirements of BS EN ISO 3506:2020.

Rubber sealing material shall comply with the manufacturers specified requirements.

3.4 Manufacture

To ensure the quality and performance of the Hydro-Brake® Optimum device, the manufacturing process shall include appropriate systems for the:

- Specification of component materials;
- Verification component materials received are to specification;
- Handling and storage of all component materials and finished units;
- Detailed drawing / schedule for manufacture;
- Manufacture / assembly of Hydro-Brake® Optimum device;
- Fabrication and quality control of workmanship.

The production of the Hydro-Brake® Optimum device and related quality control procedures shall comply with requirements to ensure the stated performance of the product is reliably achieved.

Dimensional requirements – The vortex chamber of the Hydro-Brake® Optimum device shall be manufactured to dimensional tolerances of ±2%.

Appearance – The internal and external surfaces of the vortex chamber and the mounting plate/spigot shall be smooth, clean and free from scoring, cavities and other surface defects.

3.5 Installation

When installed in accordance with the installation documentation[5,6], the Hydro-Brake® Optimum device installation shall be practicable and suitable for conditions that could reasonably be expected on site.

4. APPROVAL

The Hydro-Brake® Optimum device has been audited and successfully met all the requirements stated within this assessment schedule

Signed:

Valid until - 31st March 2027

5. REFERENCES

1. BS EN 10088-1:2014 Stainless steels. List of stainless steels.

2. BS EN 10088-2:2014 Stainless steels. Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes.

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3. BS EN 10088-3:2014 Stainless steels. Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes.

4. BS EN ISO 3506:2020 Mechanical properties of corrosion-resistant stainless steel fasteners. Bolts, screws and studs with specified grades and property classes.

5. Hydro International Hydro-Brake Optimum® C Type Installation Instructions B/0719

6. Hydro International Hydro-Brake Optimum® S Type Installation Instructions B/0719

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