

Supporting Statement – Hydrogen Emergency Relief Vent

Unit 2, Stephenson Street, Newport, NP19 4XB

Prepared by: Hydroluminum Limited | Date: August 2026 | Revision: 2

1. Description of the Installation

The proposed development comprises a **DN100 stainless steel emergency relief vent pipe** serving a hydrogen generation system located within the building at Unit 2, Stephenson Street. The vent pipe exits the building and runs along the exterior wall, positioned at least 1 metre from the building, before terminating **3 metres above the highest point of the building** (total height above ground level: **11,873mm / 11.87m**) in a **PROTEGO® LH/AD-80-IIC-X3 flame arrestor** with a body diameter of approximately 295mm.

2. Purpose and Use

The vent is **solely an emergency pressure relief device**. It has no function during normal operations and does not form part of the routine production process.

The vent activates only in the event of overpressure or overtemperature within the hydrogen generation system, detected by onboard live monitoring sensors. In such an event, alarms sound and a burst disc rated at 4.5 barg activates automatically, directing the system contents through an internal knock-out vessel — which retains all liquid and solid material — before allowing hydrogen vapour to pass through the DN100 vent to atmosphere via the flame arrestor.

Under normal operations the vent is completely inactive. It is expected that activation events will be **extremely rare** — the system is designed and operated specifically to prevent the conditions that would trigger a relief event from arising. The installation is analogous to a safety valve on any industrial pressure vessel: it is present as a safeguard, not as a routine operational feature.

3. Technical Specification — Vent Pipe

The bespoke DN100 vent pipe has been fabricated by **S4 Stainless Industrial & Marine Limited** (Swansea Enterprise Park, Wales) using certified materials supplied by **Aalco Dyfed** (ISO 9001 registered). All materials are accompanied by EN 10204 3.1 mill test certificates and certificates of conformity.

Component	Specification	Material	Standard	Certification
Pipe	4" Schedule 10S (DN100), 30m	316L stainless steel	ASTM A312 / ANSI B36.19	EN 10204 3.1
Flanges	4" PN16 RF slip-on (×20)	316L stainless steel	EN 1092-1	ISO 9001
90° elbows	4" SCH10S long radius (×4)	316L stainless steel	ASTM A403 / ANSI B16.9	EN 10204 3.1
45° elbows	4" SCH10S long radius (×4)	316L stainless steel	ASTM A403 / ANSI B16.9	EN 10204 3.1

Equal tees	4" SCH10S (×4)	316L stainless steel	ASTM A403 / ANSI B16.9	EN 10204 3.1
------------	----------------	----------------------	------------------------	--------------

All pipework components are fabricated in Grade 316L austenitic stainless steel, conforming to the applicable ASTM and EN standards. Full material traceability is maintained throughout the supply chain.

4. Technical Specification — Flame Arrestor

The vent terminates in a **PROTEGO® LH/AD-80-IIC-X3 end-of-line deflagration flame arrestor**, manufactured by Braunschweiger Flammenfilter GmbH (Braunschweig, Germany), a specialist manufacturer of industrial safety equipment.

Parameter	Detail
Manufacturer	Braunschweiger Flammenfilter GmbH (PROTEGO®)
Model	LH/AD-80-IIC-X3
Serial number	025105045-0010-001
Product type	End-of-line deflagration flame arrestor
Gas group	IIC — the highest severity classification, covering hydrogen specifically
Flange connection	DN80 PN16 EN 1092-1
Body diameter	Approximately 295mm
Maximum operating temperature	200°C
Operating pressure	1.1 bar (abs.)
Manufacturing standard	EN ISO 16852 — international flame arrestor standard
ATEX certification	IBExU06ATEX2109X
CE marking	Yes (notified body 0637)
Material — housing	1.4408 (cast stainless steel)
Material — flame filter	1.4571 (316Ti stainless steel)
Material — weather hood	1.4301 stainless steel
Certification body	TÜV Rheinland (notified body No. 0035)
PED compliance	PED 2014/68/EU

The **IIC gas group classification** confirms the device is specifically rated and certified for hydrogen service. The **ATEX certification** (IBExU06ATEX2109X) provides formal third-party verification that the device is approved for use in potentially explosive atmospheres. The device has been independently inspected and certified, with full material traceability certificates (EN 10204 3.1) provided for all key components.

5. Emissions

Emissions from the vent will only occur in the event of an emergency activation as described above. There will be **no routine or continuous emissions** from this installation.

In an emergency activation event, the discharge comprises:

- **Hydrogen vapour** — a colourless, odourless gas that is non-toxic and disperses rapidly in air due to its low density. At 3 metres above the highest point of the building (11.87m above ground level), any hydrogen released will disperse harmlessly to atmosphere well above ground level and away from occupied areas.
- **Steam** — water vapour, which condenses rapidly in open air and presents no environmental concern.

No particulates, chemical compounds, combustion products or harmful pollutants of any kind are emitted. The engineering study underpinning this installation (HLL-26-128-PRO-REP-02, Hydrogen Generation System Relief Study, Rev P1, July 2026) confirms that in the worst-case scenario the maximum discharge rate is approximately **1.69 kg/s** of hydrogen and steam vapour. Given the buoyancy and rapid dispersal characteristics of hydrogen at this discharge height, there is **no adverse impact on local air quality** anticipated.

The PROTEGO® LH/AD-80-IIC-X3 flame arrestor at the point of discharge prevents any ignition of discharged hydrogen and ensures safe termination of the vent. Its IIC gas group certification and ATEX approval confirm it is specifically rated and independently tested for hydrogen service.

6. Noise

There will be **no material noise associated with the operation of this vent**, either in normal conditions (when the vent is inactive) or during an emergency activation event. The release of gas through the DN100 pipe and flame arrestor in an emergency scenario is expected to produce negligible noise, consistent with a brief, low-pressure discharge through a relatively small-bore pipe. This would not be audible at the site boundary or to neighbouring occupiers.

7. Summary

Matter	Position
Frequency of use	Emergency activation only — not used during normal operations
Emissions	Hydrogen vapour and steam in emergency events only — no routine emissions
Air quality impact	Negligible — hydrogen is non-toxic and disperses rapidly at height
Noise	Negligible — no audible impact at site boundary
Pollutants	None
Total height above ground level	11,873mm (11.87m)
Height above roofline	3,000mm (3m)
External standoff from building	1,000mm (1m) minimum
Vent pipe	DN100, 316L stainless steel, SCH10S, ASTM A312
Flame arrestor	PROTEGO® LH/AD-80-IIC-X3, EN ISO 16852, ATEX IBExU06ATEX2109X, IIC gas group

The installation is a standard industrial safety feature designed to protect the hydrogen generation system and the building's occupants. All components are manufactured to applicable international standards, independently certified, and fully traceable. The applicant respectfully submits that the installation will have no meaningful impact on air quality, amenity or the character of the Stephenson Street industrial estate.

8. Supporting Technical Documents

The following technical documents are submitted in support of this application:

Document	Description
HLL-26-128-PRO-REP-02	Hydrogen Generation System Relief Study, Rev P1, July 2026 — engineering study establishing the basis for vent sizing
PROTEGO® Nameplate Drawing (025105045_10)	Flame arrestor nameplate and tag plate drawing
PROTEGO® Inspection Certificate 3.1 (I25003598)	EN 10204 3.1 inspection certificate for flame arrestor
PROTEGO® Material Traceability (000047653)	EN 10204 3.1 material traceability for all flame arrestor components
PROTEGO® Parts List (D-553081220007-07-P)	Complete parts list with material grades
PROTEGO® Mechanical Drawing (D-553081220007-07-D)	Dimensional drawing of flame arrestor
S4 Stainless — Aalco Dyfed Receipt SHP0042969DD	Conformity certificate — 4" PN16 316L flanges (EN1092), ISO 9001
S4 Stainless — Aalco Dyfed Receipt SHP0042980DD	Conformity certificate — 4" SCH10S 316L pipe (ASTM A312), elbows and tees (ASTM A403), with EN 10204 3.1 mill test certificates