



# ThunderGuard

## SOLUTIONS

Lightning protection risk management calculations  
To BS EN 62305-2:2012 (Edition 2)

### Project summary

Project name: HS' New AD Plant, Structure #2 (Gas Bag & Sump Area)  
Project ref: ADH.24.031C.EE4  
Client: Haworth Scouring Company Ltd (HS)  
Prepared by: Dr. Andrew D. Hallgarth, Principal Process Safety Consultant, ADH Risk Ltd.  
ThunderGuard Solutions (A Trading Division of ADH Risk).  
Issue date: 05/09/2025

HS' New AD Plant, Structure #2 (Gas Bag & Sump Area)

### **Project details**

Project name: HS' New AD Plant, Structure #2 (Gas Bag & Sump Area)  
Client: Haworth Scouring Company Ltd (HS)  
Standard: BS EN 62305-2:2012 (Edition 2)  
Project address: Cashmere Works  
Birksland Street  
Bradford, West Yorkshire, ENGLAND, BD3 9SX.  
Project ref: ADH.24.031C.EE4  
Calculation ref:  
Calculation notes:  
Project author: Dr. Andrew D. Hallgarth, Principal Process Safety Consultant, ADH Risk Ltd.  
Created: 04/09/2025  
Modified: 04/09/2025

### **Case details**

Case name: Unprotected  
Case title: Haworth Scouring New AD Plant, Bradford, Structure 2 Only (Gas Bag & Sump Area)  
Case notes:

The following primary risks and their relevant tolerable risks have been taken into consideration as part of this risk management calculation

$R_1$  2.0993E-03 Risk of loss of human life in the structure.  
The tolerable risk of 1E-05 is exceeded, therefore protection measures (in addition to any listed below) must be instigated

### **Protection system design parameters**

Structural LPS Requirement for a structural lightning protection system (LPS) and where necessary the chosen Lightning protection level (LPL)

None

$I_{SPD}$  Maximum peak current of SPDs for each of the 4 lines considered (based on the simple current division concept).

NOTE: The worst case surge that could be expected on a two-wire telephone or data line is 2.5kA (10/350  $\mu$ s) per line (Category D test to IEC/EN 61643-21) to earth or 5 kA (10/350  $\mu$ s) per pair.

0 kA

### **Line 1**

#### **Line to/from Structure 1**

Service entrance SPD Requirement to protect Line 1 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs (mains 12.5kA 10/350 $\mu$ s, data/telecom 2.5kA 10/350 $\mu$ s), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20  $\mu$ s waveform)

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None

Coordinated SPD set Requirement to protect all internal systems connected to Line 1 with a coordinated set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

None

**Line 2**

**Line to/from Building A**

Service entrance SPD Requirement to protect Line 2 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs (mains 12.5kA 10/350µs, data/telecom 2.5kA 10/350µs), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20 µs waveform)

None

Coordinated SPD set Requirement to protect all internal systems connected to Line 2 with a coordinated set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

None

**Line 3**

**Line to/from Building B**

Service entrance SPD Requirement to protect Line 3 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs (mains 12.5kA 10/350µs, data/telecom 2.5kA 10/350µs), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20 µs waveform)

None

Coordinated SPD set Requirement to protect all internal systems connected to Line 3 with a coordinated set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

None

**Line 4**

**Line to/from Building C**

Service entrance SPD Requirement to protect Line 4 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs (mains 12.5kA 10/350µs, data/telecom 2.5kA 10/350µs), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20 µs waveform)

None

Coordinated SPD set Requirement to protect all internal systems connected to Line 4 with a coordinated

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set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

None

## **Zone 1**

### **Internal to Gas Bag & Sump Area Structure**

Fire protection system          None or risk of explosion

**Case details**

Case name: Protected - LPS LPL II + Coordinated SPD Set Level II (Enhanced Voltage Protection Level)

Case title: Haworth Scouring New AD Plant, Bradford, Structure 2 Only (Gas Bag & Sump Area)

Case notes:

The following primary risks and their relevant tolerable risks have been taken into consideration as part of this risk management calculation

R<sub>1</sub>      7.2278E-06      Risk of loss of human life in the structure.  
The tolerable risk of 1E-05 is not exceeded based on the application of the protection measures listed below.

**Protection system design parameters**

Structural LPS	Requirement for a structural lightning protection system (LPS) and where necessary the chosen Lightning protection level (LPL)  Lightning protection level (LPL) II
I <sub>max</sub>	Maximum peak current  150 kA
Probl <sub>max</sub>	Probability that lightning current parameters are smaller than the maximum value defined above  98%
I <sub>min</sub>	Minimum peak current  5 kA
Probl <sub>min</sub>	Probability that lightning current parameters are greater than the minimum value defined above  97%
r	Radius of rolling sphere  30 m
I <sub>SPD</sub>	Maximum peak current of SPDs for each of the 4 lines considered (based on the simple current division concept).  NOTE: The worst case surge that could be expected on a two-wire telephone or data line is 2.5kA (10/350 μs) per line (Category D test to IEC/EN 61643-21) to earth or 5 kA (10/350 μs) per pair.  18.75 kA

**Line 1**

**Line to/from Structure 1**

## HS' New AD Plant, Structure #2 (Gas Bag & Sump Area)

Service entrance SPD Requirement to protect Line 1 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs (mains 12.5kA 10/350µs, data/telecom 2.5kA 10/350µs), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20 µs waveform)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

Coordinated SPD set Requirement to protect all internal systems connected to Line 1 with a coordinated set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

## **Line 2**

### **Line to/from Building A**

Service entrance SPD Requirement to protect Line 2 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs (mains 12.5kA 10/350µs, data/telecom 2.5kA 10/350µs), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20 µs waveform)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

Coordinated SPD set Requirement to protect all internal systems connected to Line 2 with a coordinated set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

## **Line 3**

### **Line to/from Building B**

Service entrance SPD Requirement to protect Line 3 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs (mains 12.5kA 10/350µs, data/telecom 2.5kA 10/350µs), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20 µs waveform)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

Coordinated SPD set Requirement to protect all internal systems connected to Line 3 with a coordinated set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

## **Line 4**

### **Line to/from Building C**

Service entrance SPD Requirement to protect Line 4 at its entrance to the structure with an equipotential bonding SPD (rated to ISPD above) in accordance with BS EN 62305-2:2012 (Edition 2)

NOTE: Where SPDs are required but an LPS is not (ISPD = 0), protect overhead lines with Type 1 SPDs

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(mains 12.5kA 10/350µs, data/telecom 2.5kA 10/350µs), protect underground lines with overvoltage or Type 2 SPDs (tested with an 8/20 µs waveform)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

Coordinated SPD set

Requirement to protect all internal systems connected to Line 4 with a coordinated set of SPDs in accordance with BS EN 62305-2:2012 (Edition 2)

Lightning protection level (LPL) II\* (Enhanced voltage protection level)

**Zone 1**

**Internal to Gas Bag & Sump Area Structure**

Fire protection system          None or risk of explosion

HS' New AD Plant, Structure #2 (Gas Bag & Sump Area)