THATCH STRUCTURES
LIGHTNING PROTECTION
INNOVATION

ISOLATED LIGHTNING PROTECTION USING
HVI® CONDUCTORS

PREPARED BY:

LIGHTNING PROTECTION
CONCEPTS

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Introduction

The installation of a properly designed structural lightning protection to thatch structures is essential, this is due to the fact that these types of structures have a high risk of fire which often results in the complete destruction of the structure.

Traditionally thatch roofed structures have been protected from lightning by means of freestanding masts, these masts are often very unsightly and very expensive.

The main reason for the use of this method of protection is to ensure the separation distance between the thatching and the lightning protection system is large enough to prevent flashovers causing ignition of the thatching.

Besides being aesthetically unpleasing, freestanding masts pose a significant step and touch hazard especially when they are installed in public areas.

In accordance with the SANS standards, a minimum level 3 lightning protection system must be designed for thatch structures. The separation distance, angle of protection and rolling sphere methods of protection must therefore be applied to the lightning protection system.

Until recently the only method of effectively protecting thatch structures was by means of freestanding masts, but now with the technological advances in lightning protection there are alternative protection methods available.

The use of HVI technology allows Pontins to provide protection solutions for thatch structures that is aesthetically more pleasing and more cost effective than the conventional methods which use old methods of protection.
HVI Protection of Thatch Structures

The use of HVI conductors enables the installation of an ‘Isolated Lightning Protection System’ that is architecturally appealing and more cost effective.

Air Termination System

When designing the air termination system, the rolling sphere method is used to determine the protected zones. According to the standards, a rolling sphere radius of 45m must be used for level 3 protection systems. In the sketch below, the height of the air terminal is 2.30m, this height ensures that the dormer roof is located within the protected zone.

HVI Masts & Conductors

The top of the HVI mast is equipped with a 1m stainless steel finial and the supporting tube is made of GRP (glass-fibre reinforced plastic) which houses the insulated HVI conductor.

The lower end of the supporting tube is made of stainless steel to ensure stability. Unwanted sparking may occur at this point as a result of the induction effects on adjacent parts. To avoid this, no earthed parts or electrical equipment may be located at a distance of less than 1m around the stainless steel section of the supporting tube.

The HVI mast is fixed to the wooden rafters by means of a specially designed bracket and the HVI conductors are simply run inside or underneath the thatching, this is easily achieved during the construction phase of the structure.

HVI conductors are specifically designed to prevent creeping discharge and safe dissipation of a lightning current and therefore are suitable for the protection of thatch structures.
**Separation Distances**

The separation distances must be calculated in accordance with SANS / IEC 62305 Part 3. There are three different types of HVI conductors, each has its own equivalent separation distance:

- HVI light Conductor; Separation distance = 45cm (air), 90cm (solid material)
- HVI long Conductor; Separation distance = 75cm (air), 150cm (solid material)
- HVI power Conductor; Separation distance = 90cm (air), 180cm (solid material)

Once the separation distance has been determined, then the appropriate HVI conductor can be selected.

**Equipotential Bonding**

It is imperative that the semi-conductive sheath of the HVI conductor is equipotentially bonded, this can be performed at the building main earth bar.

All other equipotential bonding (electrical earthing system, water pipes etc) can also take place at the main earth bar.

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**Gallery**

![Opening in the fascia board](image1)

![HVI Conductor](image2)

![Thatched roof](image3)
Overview

This white paper highlights an alternative lightning protection method for the protection of thatch structures. The recommendations included in the report are in accordance with the latest revisions of the relevant standards.

The use of HVI conductors offers an aesthetically pleasing and cost effective alternative to the traditional lightning protection methods for the protection of thatch structures.

This method of lightning protection (HVI conductors) represents the latest and most up to date lightning protection technology available in the world today.

This white paper describes only one of many applications where HVI conductors can be utilised when the required separation distances (isolated LPS) are difficult to achieve. HVI conductors can for example be used in zoned and explosive environments if required.