PT/529/0224-AS (February 2024)

Assessment Schedule for the VeriCure® curing monitoring system as Supplied by Vortex Technology Group LLC

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1. SCOPE

This schedule specifies the requirements for the VeriCure® curing monitoring system as supplied by Vortex Technology Group, LLC (including its affiliate Vortex Europe GmbH) for continuous monitoring of curing temperature during cured-in-place pipe (CIPP) liner installation.

2. PRODUCT DESCRIPTION

2.1 Introduction

VeriCure® is a curing monitoring system (CMS), built around fibre optic Distributed Temperature Sensing (DTS) technology, designed to improve the CIPP curing process.

The VeriCure® optical fibre cable typically runs along the invert of the host pipe (or is attached to the crown in pipes 60 inches [1,524 mm] diameter or greater). Note that the sensor cable can be installed before (for inversion) or during (for pull-in-place) lining installation. Once the CIPP lining has been installed and inflated inside the host pipe, the curing process is initiated.

With the optical fibre cable connected to the CMS control unit, the VeriCure® software continuously records the temperature profile along the length of the curing lining. It is compatible with circular pipes with internal diameters between 150mm and 2,000mm.

Optical fibre cables available include:

- RoundTemp 3mm diameter.
- FlatTemp 3mm by 6mm.

2.2 Applicable standards

There are no National or International standards applicable to this product.

2.3 Approval History

This is the first WRc Approved Certification for the VeriCure® curing monitoring system.

3. REQUIREMENTS AND TESTING

3.1 CIPP Liner Appearance

The internal surface of the CIPP liner shall be free from excessive wrinkles and other surface defects that would prevent the CIPP liner from meeting the general fitness for purpose requirement.

3.2 Type Testing

Temperature accuracy:

The Vericure® system was tested to ensure that it meets the manufacturer claims of recording the cure temperature of a liner to an accuracy of ±2ºC.

Mechanical Characteristics Testing:

Mechanical and physical testing requirements of the optical fibre cables are listed below in Tables 1 and 2 for the VeriCure® curing monitoring system.

Table 1 RoundTemp mechanical characteristics

Characteristic	Declared Value
Long-term crushing strength	3,500 Newtons/100mm
Short-term longitudinal tensile strength	450 Newtons
Long-term longitudinal tensile strength	200 Newtons

Table 2 FlatTemp mechanical characteristics

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Characteristic	Declared Value
Long-term crushing strength	400 Newtons/100mm
Short-term longitudinal tensile strength	400 Newtons

Quality control tests

Each new VeriCure® CMS unit is calibrated before being shipped to the client.

The sensor cable is supplied by a third-party company who provides acceptance test certificates.

3.3 Manufacture

To ensure the quality and performance of the VeriCure® CMS unit, 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.
- Unit manufacture records.
- Fabrication and quality control of workmanship.
- Inspection and maintenance of manufacturing equipment.

The production of the VeriCure® CMS unit and related quality control procedures shall comply with requirements to ensure the stated performance of the product is reliably achieved.

The RoundTemp and FlatTemp cables are sourced from a third-party company to an agreed specification and conformance process.

3.4 Installation

When installed and operated in accordance with the operation documentation[1]&[2], the VeriCure® curing monitoring system shall be reasonably expected to perform as described.

During operation the VeriCure® CMS unit should be protected from extreme environmental conditions.

4. APPROVAL

The VeriCure® curing monitoring system has been audited and successfully met all the requirements stated within this assessment schedule.

Signed:

Valid until: 1st February 2029

5. REFERENCES

1. VeriCure® curing monitoring system, Operator's Manual, REV. 11-29-2023.

2. VeriCure® curing monitoring system, Software Installation & Operations Manual, REV. 12-2-2023.

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