



SLOVENSKI STANDARD
SIST-TP CEN ISO/TR 20491:2022

01-februar-2022

**Vezni elementi - Osnove o vodikovi krhkosti v jeklenih pritrdilnih elementih
(ISO/TR 20491:2019)**

Fasteners - Fundamentals of hydrogen embrittlement in steel fasteners (ISO/TR 20491:2019)

Mechanische Verbindungselemente - Grundlagen der Wasserstoffversprödung in Verbindungselementen aus Stahl (ISO/TR 20491:2019)

Fixations - Principes de la fragilisation par l'hydrogène pour les fixations en acier (ISO/TR 20491:2019)

Ta slovenski standard je istoveten z: CEN ISO/TR 20491:2021

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ICS:

21.060.01 Vezni elementi na splošno Fasteners in general

SIST-TP CEN ISO/TR 20491:2022 **en,fr,de**

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TECHNICAL REPORT

CEN ISO/TR 20491

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

December 2021

ICS 21.060.01

English Version

Fasteners - Fundamentals of hydrogen embrittlement in steel fasteners (ISO/TR 20491:2019)

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This Technical Report was approved by CEN on 29 November 2021. It has been drawn up by the Technical Committee CEN/TC 185.

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Contents	Page
European foreword.....	3

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European foreword

The text of ISO/TR 20491:2019 has been prepared by Technical Committee ISO/TC 2 "Fasteners" of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TR 20491:2021 by Technical Committee CEN/TC 185 "Fasteners" the secretariat of which is held by BSI.

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TECHNICAL
REPORT

ISO/TR
20491

First edition
2019-02

**Fasteners — Fundamentals of
hydrogen embrittlement in steel
fasteners**

*Fixations — Principes de la fragilisation par l'hydrogène pour les
fixations en acier*

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Reference number
ISO/TR 20491:2019(E)

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Published in Switzerland

Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Symbols and abbreviated terms.....	4
5 General description of hydrogen embrittlement.....	4
6 Hydrogen damage mechanism.....	4
7 Fracture morphology.....	5
8 Conditions at the tip of a crack.....	7
9 Conditions for hydrogen embrittlement failure.....	7
9.1 Root cause and triggers for hydrogen embrittlement failure.....	7
9.2 Material susceptibility.....	8
9.2.1 General.....	8
9.2.2 Defects and other conditions causing abnormal material susceptibility.....	10
9.2.3 Methodology for measuring HE threshold stress.....	10
9.3 Tensile stress.....	11
9.4 Atomic hydrogen.....	12
9.4.1 Sources of hydrogen.....	12
9.4.2 Internal hydrogen.....	12
9.4.3 Environmental hydrogen.....	13
10 Case-hardened fasteners.....	13
11 Hot dip galvanizing and thermal up-quenching.....	15
12 Stress relief prior to electroplating.....	16
13 Fasteners thread rolled after heat treatment.....	16
14 Hydrogen embrittlement test methods.....	17
15 Baking.....	17
Bibliography.....	19

ISO/TR 20491:2019(E)

Foreword

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This document was prepared by Technical Committee ISO/TC 2 *Fasteners*, Subcommittee SC 14, *Surface coatings*.

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2022

Introduction

High strength mechanical steel fasteners are broadly characterized by tensile strengths (R_m) above 1 000 MPa and are often used in critical applications such as in bridges, engines, aircraft, where a fastener failure can have catastrophic consequences. Preventing failures and managing the risk of hydrogen embrittlement (HE) is a fundamental consideration implicating the entire fastener supply chain, including: the steel mill, the fastener manufacturer, the coater, the application engineer, the joint designer, all the way to the end user. Hydrogen embrittlement has been studied for decades, yet the complex nature of HE phenomena and the many variables make the occurrence of fastener failures unpredictable. Researches are typically conducted under simplified and/or idealized conditions that cannot be effectively translated into *know-how* prescribed in fastener industry standards and practices. Circumstances are further complicated by specifications or standards that are sometimes inadequate and/or unnecessarily alarmist. Inconsistencies and even contradictions in fastener industry standards have led to much confusion and many preventable fastener failures. The fact that HE is very often mistakenly determined to be the *root cause* of failure as opposed to a *mechanism* of failure reflects the confusion.

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