

Heat Treatment Plants

For High-Speed Railway Wheels

高速火车车轮热处理设备



TENOVA LOI THERMPROCESS

Tenova LOI Thermprocess is one of the leading companies in supplying industrial furnace systems for the heat treatment of metals. Worldwide clients from the steel, aluminium and automotive industries rely on the technical solution competence and thousands of references backed by a history of over 100 years representing the entire know-how in the field of material properties and thermal processing. Tenova LOI Thermprocess is a global partner represented in all major markets throughout the world.

Being a driver in the transformation of the metals industry towards decarbonization and sustainability, we implement proven thermoprocessing solutions and focus on the development and implementation of fossil-free annealing technologies, especially Hydrogen, as well as electrical heating capabilities in new plants and revamps. The wide portfolio of technologies for reheating and heat treatment plants meets the most demanding market requirements. As digitalization is one of the key drivers in our business, all our processes are enhanced by our smart digital solutions.

Tenova LOI Thermprocess is a trademark of Tenova and LOI was identified as China well known trademark.

特诺恩-洛伊热工工程

特诺恩-洛伊热工工程有限公司（Tenova LOI Thermprocess）是一家为金属热处理提供工业炉系统解决方案的龙头企业。基于百年历史，数以千计的业绩，其技术能力赢得了来自钢铁、铝和汽车行业全球客户的信赖，展现了材料性能和热处理领域的整体技术诀窍。特诺恩-洛伊热工工程（Tenova LOI Thermprocess）是一家全球合作伙伴，在世界范围内所有主要市场都有其业绩产线。

作为金属行业向减碳和可持续发展转型的推动者，我们提供经验证的热处理解决方案，并专注于开发和实施无化石燃料退火技术，尤其是氢气，以及在新产线和改造项目中电加热的应用能力。加热和热处理产线上广泛的技术组合能够满足最苛刻的市场要求。由于数字化是金属行业的关键驱动因素之一，智能数字解决方案加强和推动了我们的所有工艺发展。

特诺恩-洛伊热工工程（Tenova LOI Thermprocess）是特诺恩的注册商标。其中洛伊（LOI）荣膺中国驰名商标。

FULLY AUTOMATED CONTROL OF HEAT TREATMENT PLANTS AND PROCESSES

Tenova LOI Thermprocess offers flexible heat treatment plants with state-of-the-art technology featuring

- high capacity,
- outstanding safety,
- top quality and
- a long service life.

The plants consist of hardening and tempering furnaces, the hardening table for quenching and the appropriate devices for transporting the wheels in the plant.

During heat treatment the wheels are fully automatically transported by a control system comprising several PLCs (programmable logic controls) for transportation and processes. Comprehensive visualization and documentation possibilities – ranging from the presentation of setpoints via furnace charging to actual wheel temperature – allow detailed control of the process.

IN-LINE WITH THE FORGING PRESS

Tenova LOI Thermprocess heat treatment lines for high-speed railway wheels are combined with

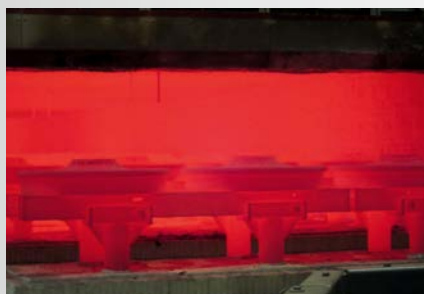
auxiliary transportation and quality assurance systems and are highly automated. Different furnace dimensions and numbers of hardening tables are possible, depending on the customer's needs.

The example below shows one furnace for austenitizing and two furnaces for tempering (with an overall length of approx. 100 m) combined with 8 hardening tables. It operates practically in-line with a forging press, which means that a typical output of 70 wheels per hour can be reached. Higher outputs can also be realized on demand.

AUSTENITIZING/TEMPERING FURNACES COMBINED WITH HARDENING TABLES

- ▼ Wheels that have been heated extremely uniformly leaving the austenitizing furnace

在奥氏体化炉内经高度均匀加热正在出炉的车轮



- ▼ Fully automated transfer to the heat treatment line

全自动运输至热处理线



全自动化控制的热处理设备和工艺

特诺恩-洛伊热工工程提供灵活的、最先进的热处理设备，具有以下特点：

- 高产能
- 高安全性
- 高质量
- 使用寿命长

整条生产线由淬火炉、回火炉、淬火台及整个生产车间适当的车轮输送装置等设备组成。在整个热处理过程中，车轮

由一套含有多个负责输送和工艺的PLC自动化系统全程自动运送。控制系统具有极强的显示和信息处理能力—从显示设定值，经由炉子上料，到实际车轮温度-实现整个工艺过程的精准控制。

与锻压机配套

特诺恩-洛伊热工工程用于高速铁路车轮热处理线与辅助运输和质量保证系统相结合，高度自动化。根据客户的需求，可配置不同尺寸的炉子和不同数量的淬火台。

下面的示例展示了一台用于奥氏体化的炉子和两台用于回火的炉子（总长度约为100m）与8台淬火台组合。它与锻机高度匹配，生产节拍绝对一致，这意味着每小时可以达到70个车轮的产量。也可以按需实现更高的产量。

奥氏体化/回火炉与8台淬火台设备完美匹配



▼ Hardening tables operating in-line with the forging press
与锻压机同步操作的淬火台



▼ Dedicated nozzle system spraying water onto the wheel
车轮喷水淬火专用喷嘴系统



OUR PLANTS AND PROCESSES

我们的设备和工艺

► Exceed all international safety standards

We guarantee an extremely uniform heat treatment process exceeding all international standards (e.g. EN 13262).

超过所有国际安全标准

我们保证极其均匀的热处理工艺，其超过所有国际标准(例如EN 13262)。

► Enable adaption to each individual wheel type

In order to reach a long service life, railway wheels must have a fine perlitic structure over a certain depth under the contact surface with the rails. A highly complex process with a dedicated system of nozzles spraying water onto the wheel with different flows depending on the position of the wheel and time is indispensable. LOI's mathematical model MQM® adapts the quenching process to each individual type of wheel.

能适应各种类型的车轮

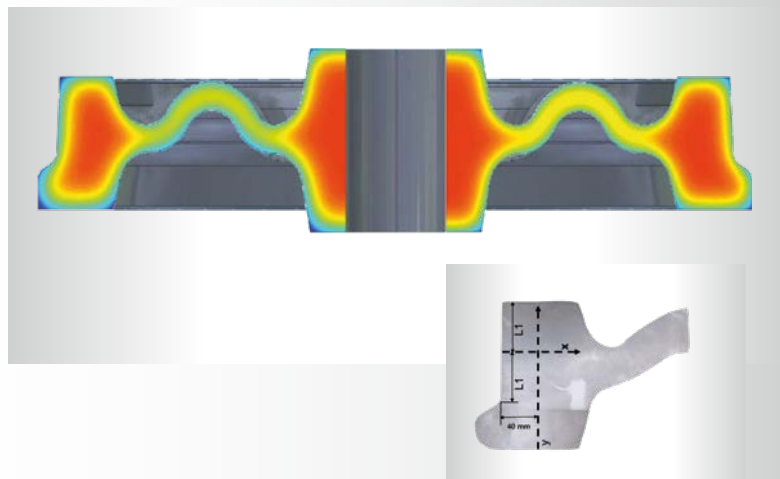
为了达到较长的使用寿命，铁路车轮必须在与钢轨接触表面下有一定深度的良好珠光体结构，这是一个非常复杂的淬火过程，有一个专用的喷嘴系统，根据车轮的位置和时间向车轮喷射不同流量的水。洛伊的数学模型MQM®适用于各种型号车轮的淬火工艺。

► Guarantee highest quality and productivity

Fully automated handling ensures high process stability and maximum use of production capacity. Comprehensive presentation of setpoints, furnace charging and the actual wheel temperature allow detailed control of the process.

保证最高的质量和生产能力

全自动装卸可使过程高度稳定，最大限度地利用生产能力。通过对设定值、炉子装料及实际车轮温度的综合图解，实现精准的过程控制。



Sustainable solutions for a green transition of metals

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