

KLW R&D PROJECTS 2016



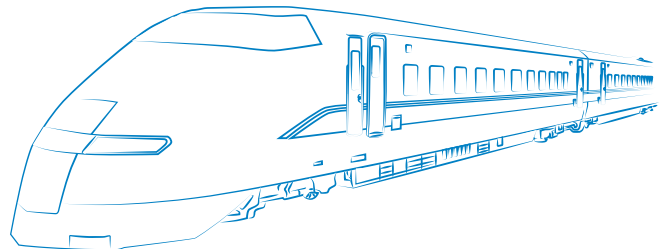


“KLW is becoming more experienced and flexible producer than ever. Along with development of the production capacities, we strengthen our engineering and R&D team.

We understand well the new challenges given by railway industry and strive to offer the best solutions to the customers.

This year we are focusing on improving the life cycle cost and usage performances of KLW products. The objective of our works is to enhance mechanical properties of products in order to offer to our customers longer lifespan, lighter products and high safety.”

Cyril Duhamel, Head of R&D and product policy



INNOVATIVE STEEL GRADE FOR HEAVY HAUL

THE HEAVY HAUL MARKET IS ONE OF KLW'S PRIORITIES. INCREASING AXLE LOAD IS INDEED A STRATEGIC OBJECTIVE TO IMPROVE COMPETITIVENESS OF FREIGHT WAGONS.

KLW is involved in the AAR project to develop an innovative steel grade that supersedes current Class D. Developing steel grade with a better resistance to RCF and extreme usage conditions is a significant industrial challenge.

	Hardness, HB	Yield strength, H/mm ²	Ultimate strength, H/mm ²	Elongation, %
Class D	341-415	At +20°C: ≥758,4	At +20°C: ≥1082,5	At +20°C: ≥14,0
Innovative Class D	380-420	At +20°C: ≥896,0 At -40° F: ≥827,0	At +20°C: >1103,0 At -40° F: >1190,0	At +20°C: 15,0-23,0 At -40° F: 15,0-18,0

Alexander Kriger, Project manager, Railway R&D Department:

"We are developing a new chemical composition of steel and heat treatment mode. KLW cooperates with leading research institute. The first heat is planned to be produced in October. In cooperation with our partners from the USA and AAR authorities, we have scheduled a field test to prove the advantages of this innovative steel compared to existing ones."



ER7 AND ER8 EVOLVE

INCREASING WHEELS' LIFESPAN FOR WAGONS AND PASSENGER COACHES IS A KEY OBJECTIVE.

KLW engineers strive to increase mechanical properties of ER7 and ER8 steel grades to improve RCF and thermal resistance. At the same time, wheel material characteristics remain within the limits of European standard EN13262.

Mechanical properties, namely yield strength, ultimate strength, elongation, impact resistance, hardness, fracture toughness, will reach the optimal values.

	Hardness, HB	Yield strength, H/mm ²	Ultimate strength, H/mm ²	Elongation, %
ER7 (Requirements of EN 13262)	≥235	≥520	820-940	≥14
ER7 Evolve (average)	250	560	890	18

	Hardness, HB	Yield strength, H/mm ²	Ultimate strength, H/mm ²	Elongation, %
ER8 (Requirements of EN 13262)	≥245	≥540	860-980	≥13
ER8 Evolve (average)	270	600	960	17

Alexander Kriger, Project manager, Railway R&D Department:

“The work has been carried out in 2 steps. First of all, we tested numerous heat treatment modes to check whether current steel grades can achieve the target results. The second stage consists of developing a new steel compositions for ER7 and ER8 by adding alloying elements. We plan to achieve the results of this second stage by the end of the year”.



EUROPEAN STANDARD FREIGHT AXLE

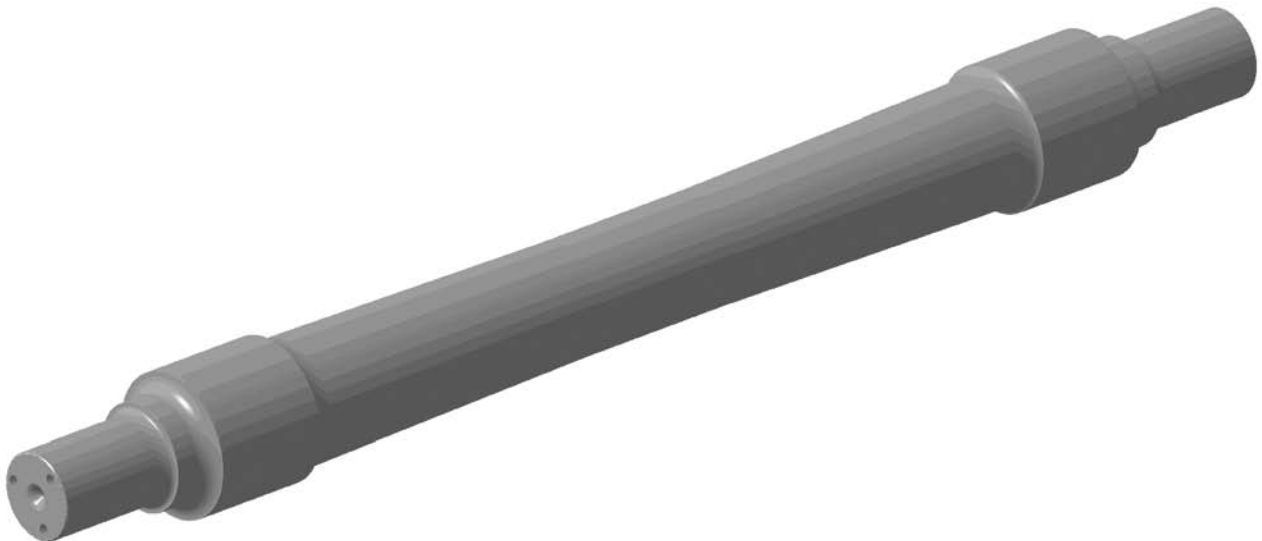
THE EUROPEAN STANDARD FREIGHT AXLE WILL PROGRESSIVELY REPLACE EXISTING AXLES. IT OFFERS INDEED A BETTER SAFETY RATE AND REDUCES THE MAINTENANCE COSTS.

We are developing new axle design for axle load of 22.5 t and 25 t and for wheels of 840-920 mm. We included all requirements of UIC group about the axle development. Our team is also selecting the appropriate protective Class 1 coating. This combination will enable to improve operating properties of the freight axle and railroad safety and to limit maintenance costs.

Alexander Kriger, Project manager, Railway R&D Department:

“This project becomes possible due to the launch of our new production site of the finish machined axles. The axles will be machined at modern CNC lathes. The combination of the result of this project and the project of improved steel grades ER7 and ER8 will enable us to offer a new generation of freight wheelsets to our customers. It is promising area for searching of innovative design solutions.

An approval of the technical specification, a production of an experimental batch of axles with protective coating and a testing will be held in November.”



ULTIMATE... THE NEW K LW PRODUCT LINE OF LOW STRESS WHEELS

K LW IS LAUNCHING ITS OWN PRODUCT LINE, CALLED ULTIMATE, OF LOW STRESS WHEELS FOR EUROPEAN FREIGHT MARKET.

Alexander Ovchinnikov, Leading Engineer, Railway R&D Department:

“ULTIMATE has been developed in order to meet all European requirements for mechanical resistance, thermomechanical resistance during braking on the thread, a low noise level. The development was based on the modelling and the finite element analysis.”

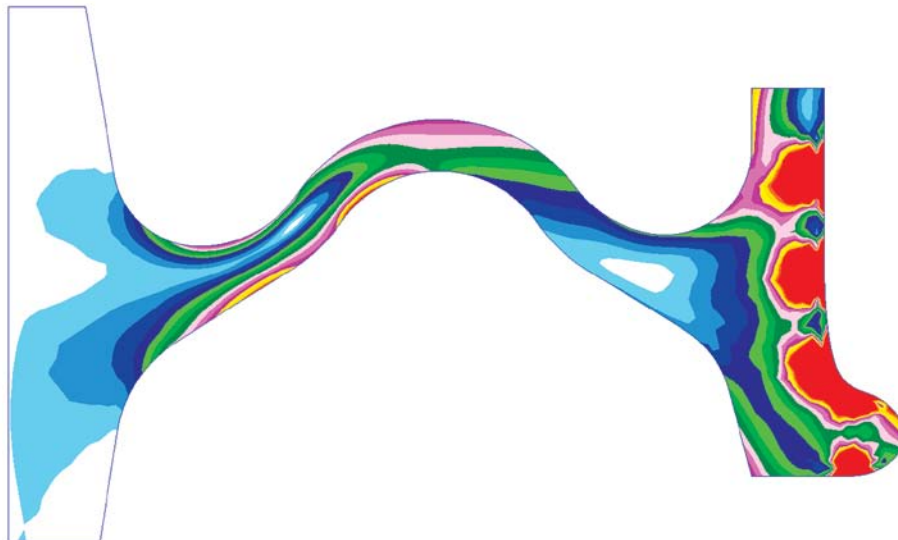
The design is developed in accordance with EN 13979, UIC 510-5 and with production standards EN 13262, BN 918 277 (Category 2). All main strength characteristics such as maximum equivalent stresses, dynamic stress range, the rim deformations after heating, the rim residual deformations after cooling-down, the residual stresses on the rim edge are significantly lower than permissible values.

The design of 920 mm wheel is now complete. We also initiated the development of 840 mm design. The production of the first trials and its testing is scheduled till October. By the end of the year the new product will be under TSI certification.

The next step is the development of another wheel size in this product line with the diameter of 1000 mm.

With the completion of our investment plan, ULTIMATE wheels will be delivered to customers with definitive painting. Upon customer request, we can also deliver them with finished bore. K LW will provide a 5-year guarantee to such wheels and its covering.

DYNAMIC STRESS RANGE IN ZERO SECTION





KLW

An Interpipe Brand

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