Today in order to answer to the high quality requirements of railways customers the **STANDARD** steel grades that fulfill the usual requirements are not enough.

Lucchini Sidermeccanica aims at satisfying Customer needs with two new families of steel grades:

The UIC 60 steel grades, that guarantee:

- Improved performances respecting UIC/EN/AAR standard specifications
- Straightforward replacement (no homologation required)
- Easier material choice by restricting and optimising ranges of chemical analysis and mechanical properties
- Performances improvement through the definition of several indices related to additional parameters

The SUPER UIC 60 steel grade, that proposes:

- Best performances in severe environmental and loading conditions
- Best solution when standard specifications are not mandatory
- Dramatic improvement of service performances
- Innovative materials in terms of chemical analysis and mechanical properties

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Rolling Stock Steel Grades

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HEADQUARTERS
ROLLING STOCK
RESEARCH & DEVELOPMENT CENTRE

During the last 150 years Lucchini Sidermeccanica has been devoted to the manufacture of high quality products particularly focusing on the design, production and assembly of every kind of wheels, tyres, axles and wheelsets.

Lucchini Sidermeccanica is one of the main European manufacturer that hosts in one site all the integrated facilities starting from the steel production to the finished products.

This peculiarity enables the Company to exercise the complete control through the production process. Sophisticated steel-making facilities capable of producing up to 200.000 metric tons per annum incorporate the latest melting technologies which, together with a ladle Furnace and an DEMAG Vacuum Oxygen Tank Degasser, enable the production of steel grades with a high degree of purity.

The exacting limits which Customers specify for elements such as Hydrogen, Carbon, Sulphur and Phosphorous, are all achievable with this extensive and flexible melting facility, which allows the implementation of a particular manufacturing technology, called "SUPER CLEAN", by virtue of the properties of micropurity and structural homogeneity conferred to the steel. This integrated approach enables Lucchini Sidermeccanica to improve existing steel grades, and design new materials.






UPLOS® wheels

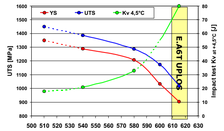
The “UPLOS” materials:

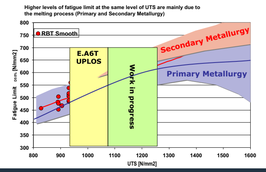
In the respect of UIC/EN/AAR standard specifications, Lucchini Sidermeccanica works with more restricted ranges of direct parameters, as chemical analysis and mechanical properties. Lucchini Sidermeccanica guarantees the indirect and not usually required physical and mechanical characteristics.In order to reduce in service damages UPLOS steel grades have a straightforward replacement. For UPLOS materials, no homologations are required. Hence the material choice is easier for the railways designer by restricting and optimising ranges of chemical analysis and mechanical properties. The performances improvement is obtained through the definition of special indices. The UPLOS steel grades can be applied to the most important Standards like AAR and UIC/EN specifications.

UPLOS® axles

E.A6T UPLOS is an alloyed high strength steel grade that provides an outstanding combination of high hardenability, high strength, very good mechanical properties, high fatigue resistance and good toughness.
This steel grade is usually supplied in quenched and tempered conditions and it can be heat treated at a variety of temperature, to develop a wide range of properties.
E.A6T UPLOS is employed in many technological fields: military, aeronautics, automotive, and, generally, in all the special components that need high mechanical properties, high toughness and high fatigue limits, like presses, tools, die casting dies, special parts.
E.A6T UPLOS steel grade has higher Full-Scale fatigue limits without reduction in the inspection intervals and is employed for railways axles since 1970. The main advantages of using E.A6T UPLOS compared to A1N steel grades are:

Higher mechanical properties
Higher Impact tests properties
Very low transition temperature
Higher fatigue limit
E.A6T UPLOS, in comparison with A1N guarantees:
Less stress levels of about ~ 49%
decreasing in weight of about: 30%

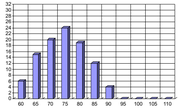




SUPERLOS®

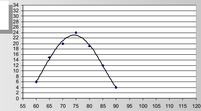
The new SUPERLOS steel grade for solid wheels and tyres is a peculiar pearlitic Silicon and Manganese Carbon steel with high rolling contact fatigue and wear resistance and high toughness also at low temperature. Usual applications are in strong and heavy environmental and loading conditions (low T, snow, ice).
Among others Railways and Constructors SUPERLOS has been supplied to Swedish and Finnish Railways for passenger and High Speed trains in order to reduce Rolling Contact Fatigue damages (shelling, spalling, wheel flats). SUPERLOS has also been tested in numerous different railway applications and considered to be very successful, thanks to the feedback from service.

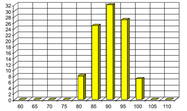
STANDARD UPLOS® SUPERLOS® steel grades comparison



KIC average: 74 MPa√m
Number of tested heats: 100

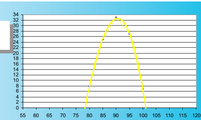
E. RST STANDARD

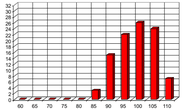




KIC average: 90 MPa√m
Number of tested heats: 100

UPLOS®





KIC average: 99 MPa√m
Number of tested heats: 100

SUPERLOS®