

Competitive Advantage: Quality Control

Quality is essential. The quality of steel is heavily dependent on purity, which is defined by several factors, including the amount of non-metallic inclusions. Inclusions can develop while alloying and manufacturing the steel, and affect the steel's forming, fatigue strength, and corrosion resistance.

THE STEEL MARKET

With global annual production at over 1.5 billion tons, steel is the most manufactured and processed material in the world. Competition in the steel market is fierce, which results in quality control playing an increasingly important role.

REPRODUCIBLE ANALYSIS WITH LEICA STEEL EXPERT 2.0

In the past, visual comparison charts were used to characterize non-metallic inclusions. This was an inaccurate, time-consuming, and expensive method and results were difficult to reproduce. Today, automated microscopic analyses of the inclusion content is used to determine the purity of steel. Leica Steel Expert 2.0 software works in combination with a Leica microscope and camera to automatically determine the purity of steel alloys with exact, fast, and reproducible results.

Using the automated image analysis functions of Leica Steel Expert 2.0, both single and multiple samples can be analyzed regardless of your Leica microscope model and degree of automation. Leica Steel Expert 2.0 also enables simultaneous comparison of results in accordance with various existing industry standards – including ASTM E45 A, D, and E, ISO 4967 A and B, DIN 50 602 (K and M methods), EN 10 247, as well as JIS G0555, GB/T 10 561 (in progress).



In addition to traditional types of non-metallic inclusions, sulfides, silicates, aluminates, and globular oxides, Leica Steel Expert 2.0 also classifies nitride or carbonitride inclusions, which can emerge from recycling and modern alloying elements such as titanium. These classifications are based on the respective criteria of existing international standards for non-metallic inclusion rating.



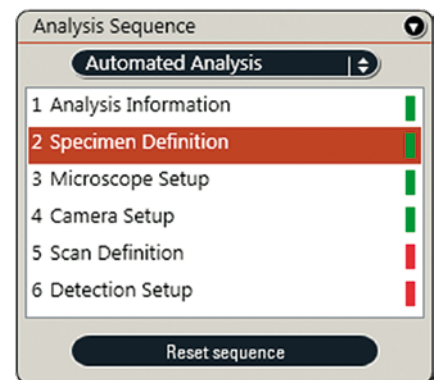
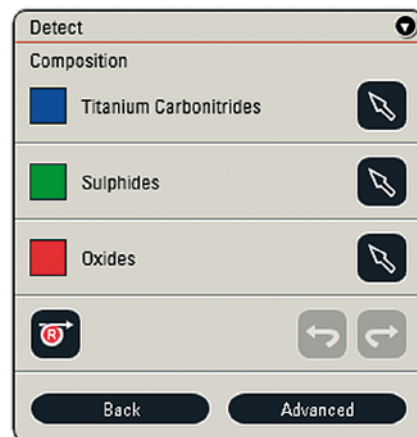
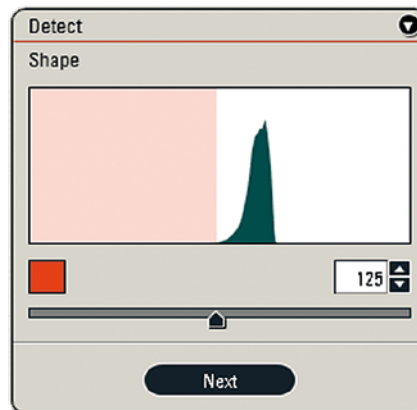
Getting Results Effortlessly

- › Clearly arranged design
- › User-friendly handling
- › Fast training
- › Guided analysis

Leica Steel Expert 2.0 features simple menu-guided controls and a clearly structured user interface. Users are guided by the intuitive, easy-to-learn workflow, which allows you to start operating the software after a brief orientation period. The input screens are designed for efficiency so that you can quickly access analysis parameter definitions and results that can be reproduced at any time. Threshold values for detecting the various inclusions can be easily defined with elements such as the pipette tool.

SEVERAL REPORTS PER WORK STEP

Leica Steel Expert 2.0 allows you to create reports in almost no time at all. These reports meet all implemented international industry regulations and standards – all generated in a single work step.



Efficient Work

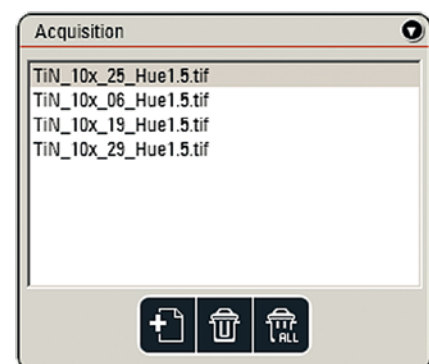
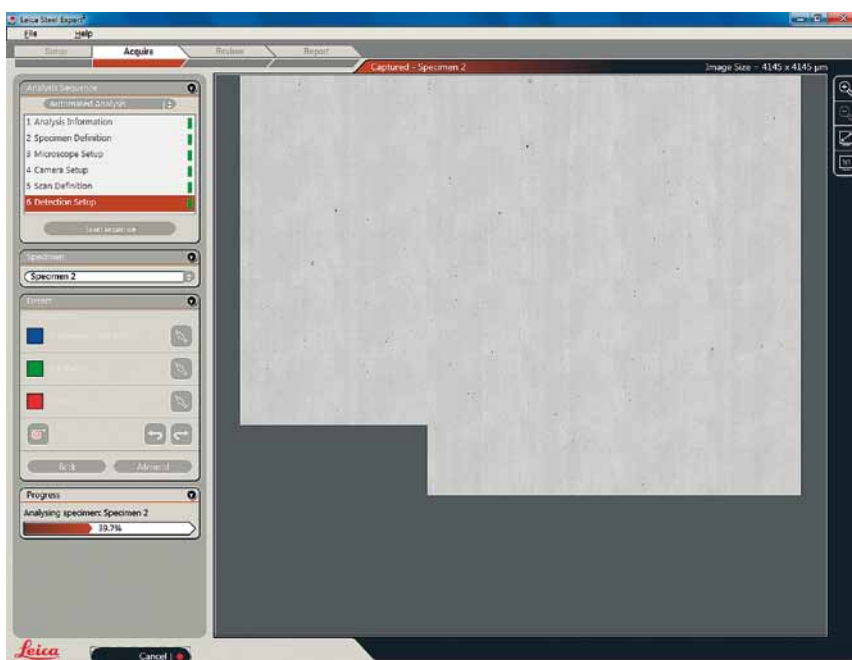
- › Multiple samples
- › Batch processing
- › Simultaneous analyses
- › Time savings



TIME SAVINGS DUE TO BATCH PROCESSING

Working with high-precision motorized or scanning stages enables automatic scanning of large sample areas. This also includes a full recording of very large inclusions. Analysis of at least six or more samples, the number required for many international standards, can be carried out in a single run.

Even on completely manual systems, Leica Steel Expert 2.0 offers a one-of-a-kind speed advantage: Large sample areas are evaluated in accordance with all common international standards in no time at all by performing simultaneous analysis of individual images via batch processing.



Always an Accurate Result

- › Reliable
- › Precise
- › Pixel perfect accuracy
- › Reproducible

The accurate detection of existing inclusions is a prerequisite for a standard-compliant assessment in modern steel purity analysis. The fully automated image analysis of Leica Steel Expert 2.0 enables the highest precision and reproducibility of measurement results. You are always in control with analysis results displayed on the screen with pixel accuracy and easy validation with the click of a mouse.



Id	Type	Position
29	Oxide	664.30
203	Artifact	170.81
17	Oxide	1246.3
106	Sulphide	466.30
198	Artifact	306.19



Documentation Made Easy

- › Reports are one click away
- › Templates based on user specifications
- › Compatible with MS Office and OpenOffice



Leica Steel Expert 2.0 enables seamless documentation of results – whether it be an interim result or a final report. The one-click report function makes it possible to document your analysis quickly and easily. You can also create user-specific report templates that include company logos, for example.

You can also document all interim results simply by transferring them into your preferred office suite. Leica Steel Expert 2.0 is compatible with Microsoft Office and free office suites like OpenOffice.



Row	α column 1 to 5		γ column 1 to 5		β column 7 to 11		δ column 6		d _{max}	
Number	L _{max} μm	No. of inclusions	total length μm	No. of inclusions	total length μm	No. of inclusions	total length μm	No. of inclusions	total diameter μm	d _{max} μm
1	5.5							1	5.5	5.5
2	11	1	11					5	55	11
3	22	2	44			1	22			22
4	44			2	88					44
5	89					2	178			89
6	178			1	178	1	178			178
7	355					1	355			
8	710									
9	1420									
M _{ES}		3		3		5		6		
M _{ES} or M _{GS} in μm/field			55		266		733		60.5	
Magnification: H= 710 μm (1:1)					Total scanned area of the specimen		1,5123	mm ²		

Software Made to Order

Leica Steel Expert 2.0 is tailored to your requirements – whether you work with a manual or automatic microscope system. Do you need global reporting standards? Or just regional? Leica Steel Expert 2.0 provides individual software modules, so that you can choose a solution to precisely meet your requirements. Three modules with various standards are available:

CENTRAL EUROPEAN

Contains the DIN 50602 and EN 10247 standards, including the amendments to the rules and regulations from 2013.

INTERNATIONAL

Contains the ASTM E45 and ISO 4967 standards.

SELECTED REGIONAL (IN PROGRESS)

Contains the JIS G 0555 and GB/T 10561 standards.



The productive cooperative effort "with the user, for the user" has always been the basis for the innovative strength of Leica Microsystems. On this, we have developed our five corporate values: pioneering, high-end quality, team spirit, dedication to science, and continuous improvement. We call making these values reality "Living up to Life."

Leica Microsystems operates globally in three divisions, each of which ranks among the market leaders in its field.

LIFE SCIENCE DIVISION

Leica Microsystems' Life Science Division supports the imaging needs of the scientific community with advanced innovation and technical expertise for the visualization, measurement, and analysis of microstructures. Our strong focus on understanding research applications puts Leica Microsystems' customers at the leading edge of science.

INDUSTRY DIVISION

The Leica Microsystems Industry Division's focus is to support customers' pursuit of the highest quality end result by providing the best and most innovative imaging systems for their needs to see, measure, and analyze microstructures. Its solutions are used in routine and research industrial applications, in materials science and quality control, in forensic science investigations, and educational applications.

MEDICAL DIVISION

The Leica Microsystems Medical Division's focus is to partner with and support microsurgeons and their care of patients with the highest-quality, most innovative surgical microscope technology today and into the future.

Leica Microsystems – an international company with an experienced customer service network worldwide.

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