



LINDQUIST STEELS, INC.
TOOL STEEL SPECIALISTS
AN ISO 9001:2008 CERTIFIED COMPANY

Material Identification Methods **& Quality Control Measures**

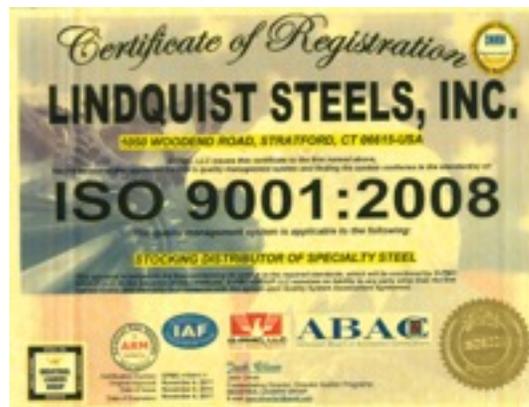
This document highlights just a few of the various Quality Control and Material Identification standardized methods and procedures utilized by Lindquist Steels Inc.

Lindquist has been an industry leader for over 70 years and we take extreme measures to ensure that the materials we distribute meet or exceed the standards of our founder and those that our customers have come to expect from us. Lindquist Steels is not a producing mill for specialty steels but rather we are a widely recognized master distributor for specialty steels and tooling materials.



ISO & Material Certification

Lindquist Steels is an ISO 9001:2008 certified company. We have successfully been certified since 2012 and continue to improve upon our quality scores every year.



Being an independent distributor we are able to source material from the producing mills of our choice. We have no obligations to a particular mill and therefore we are not forced into trying to distribute a product of questionable quality. Our obligation is to our valued clients - to only source the best material available. We meet personally with all our mills and inspect their quality control measures and standards and fully test any material from them before stocking any.





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Lindquist Steels only purchases from mills that are ISO certified and comply with various regulations and compliances such as Conflict Minerals, REACH, and RoHS. We also never purchase or receive materials from our mills without complete mill certifications. These certifications provide chemistry information, heat numbers, country of origins, production dates, and more.

Lindquist is compliant with the recent Dodd-Frank Act of 2010 Section 1502 “Conflict Minerals” provision. Please see our website for a copy of our letter regarding this compliance.

Material is also never sold before it has been inspected and all the mill certification has been entered into our system.

In addition to being ISO certified material much of our inventory is and many of our producers are DFARS (Defense Federal Acquisition Regulation Supplement, Department of Defense) compliant as well. Should your company require DFARS compliant material please be sure to specify this when ordering.





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Bar Coding & Custom Labeling

In 1996 Lindquist Steels implemented the use of our own custom designed bar code system company wide. Since its inception the system has proved to be a very valuable tool for eliminating material mix-ups, certification tracking, inventory control, as well as speeding up customer requests for order tracking and quoting purposes. *Our entire inventory is 100% bar coded.*





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Our system is easy to use and was created in a way that absolutely no material can be added or put back into our inventory without first generating a bar code. When material is received from the mill our purchasing department and Quality Control Department visually inspect the all the material and certifications, and lastly a positive material identification (PMI) with our Niton Alloy Analyzers. If everything passes inspection and is approved the material certifications and other pertaining information is loaded into our system and a unique bar code is generated and affixed to the material that will accompany it through its life in the warehouse. Any non-conforming material is segregated, quarantined, and labeled accordingly.



Anytime a piece of steel is cut in our facility it is first scanned to determine that the correct material has been selected. The steel is then cut to the customers required size, repainted to correspond with the correct color code, the material is measured (both the piece for the customer and the remaining material to be put back into stock), and a bar code is generated for both the put back material and the customers piece.

The order then goes to our shipping area where it is re-scanned, weighed, measured, cleaned of burrs and cutting fluid, and packaged. We re-scan every piece of steel to ensure once again that everything is correct before it is sent off. All this allows us to confidently identify and track all the material in our warehouse.



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Another benefit of our bar code system is that should there ever be an issue with a piece of material we can rapidly isolate and quarantine any remaining material and alert all customers that may have received any of the material.

Plus should there ever be a doubt about the grade from a customer we can quickly pull up the work order and scan the bar codes and re-check the material that was put back into inventory.

We welcome any customer to visit the plant for a demonstration.

*****Our system has been adopted by several large OEM's and has been overwhelmingly approved by the largest aerospace companies*****



Color Coding

Because just about all steel looks the same we apply a color code to all material. Our color code system is standard with our company but please be aware that there *is not* a standard color code system within the steel industry.



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Positive Material Identification

Since January 2007, Lindquist took an industry leading step forward with our Quality Control measures and Material Identification. We adopted a:

Positive Material Identification Program

We use state of the art Niton Alloy Analyzers to inspect our incoming material to positively ensure that the material we are receiving is the correct grade with the correct chemistry.

Lindquist Steels is the first and only distributor of our kind that has made this major investment and effort in quality control.

The devices are fully certified, licensed, and used only by certified and trained operators. The Niton's offer laboratory quality results and are calibrated on a weekly basis and sent to the manufacturer for scheduled maintenance.



Our operators have all been trained using the Thermo Electron Niton certified course materials, and all receive annual re-training by the Lindquist XRF Officer.

Before any material can be received into our inventory it must first be scanned with the Niton to ensure positive material identification. If the paperwork from the mill indicates that the steel is AISI D2 or AISI H13 we check each and every piece, plate or round, to make absolutely certain that it is in fact that grade. If there is a discrepancy, we investigate further and



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contact the producing mill and quarantine the material until everything resolved. If the discrepancy cannot be determined we wrap the material up and ship it back to the producer. *It will not be entered into our inventory and quarantined until a resolution is made.*



Aside from using the Niton Alloy Analyzers internally we offer their capabilities to our customers as a value added service.

We can provide “positive material identification”, on a per piece instance complete with independent certification, full chemistry, and more. No one in the tool steel distribution business has taken such lengthy measures to ensure that the material our customers order is exactly what they ordered and that the material chemistry is what we expect.



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For an additional charge our customers can send samples of “mystery metal” to us for inspection under the premise that it is for informational purposes only. Lindquist Steels is not a metallurgical laboratory but we are willing to help solve material mix ups and material identification.

We always recommend that you first go to a certified metallurgical laboratory first for material ID and other issues. Please call the Lindquist location nearest you for a laboratory recommendation.

Material Certification

At Lindquist Steels material is never purchased without complete mill chemistry, physical/mechanical, and ultra sonic inspection certifications. We also only purchase from mill suppliers that are ISO certified and that have met our stringent qualifications.

All mill certifications are checked against all incoming material and then entered into our computer system and kept on file indefinitely.



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Chemical composition		Mechanical properties					
C	0.32%		+20°C	+200°C	+300°C	+400°C	+500°C
Si	0.6-1.1%	Tensile strength, R_m [MPa]	1450	1380			
Mn	0.8%	Yield strength, $R_{p0.2}$ [MPa]	1300	1200			
P	max 0.010%	Elongation, A_5 [%]	13	10			
S	max 0.003%	Compressive yield strength, $R_{p0.2}$ [MPa]	1250	1120	1120	1060	990
Cr	1.35%	- after 170 h soaking time				1060	910
Mo	0.80%	Impact toughness [J]	30	60	80	80	
V	0.14%	Hardness, [HBW]	450				
Ni	max 1%	Hardness, [HRC]	45				
CE _{tot}	0.92-0.96						
CET	0.55-0.57						

Inclusions		Physical properties				
Inclusion size (equiv. diam)	6µm		+20°C	+200°C	+400°C	+600°C
Area fraction	0.015%	Heat conductivity [W/m · K]	28	29	29	21
Aspect ratio	1:2	Thermal expansion coefficient [10 ⁻⁶ /K]	13.5	13.5	13.5	

To ensure that this and other information is kept safe and secure our computer system is continuously backed up every 30 minutes on our onsite servers. Our central onsite servers are then backed up by offsite secure servers at a major data bank.

In the event of a system failure our system will never be minus critical information such as emails, quotes, orders, material certifications for longer than a 30 minute period. Our system also continuously checks itself to ensure proper operation.

Precision Tools & Calibration





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All of the precision tools and measuring instruments we utilize on a daily basis at Lindquist are routinely calibrated in accordance to our stringent ISO standard.

The calibration records are kept on hand and any tools that are out of compliance are immediately replaced and the old ones properly disposed of.





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Packaging & Delivery

We understand that your material needs to arrive safely, securely, and promptly. Our shipping department takes pride in packing your order(s) in a way that ensures they will arrive to you in the best condition in the fastest time possible.

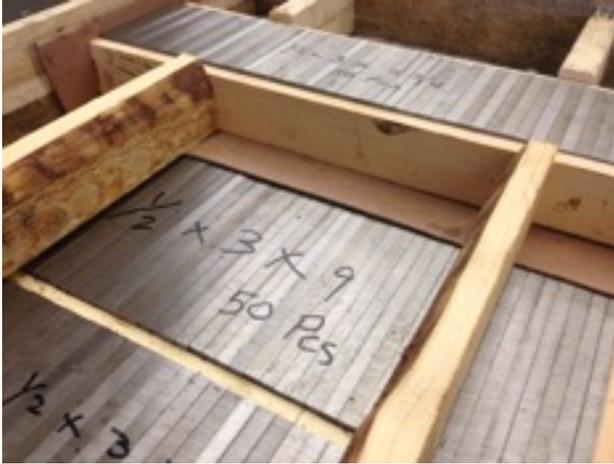
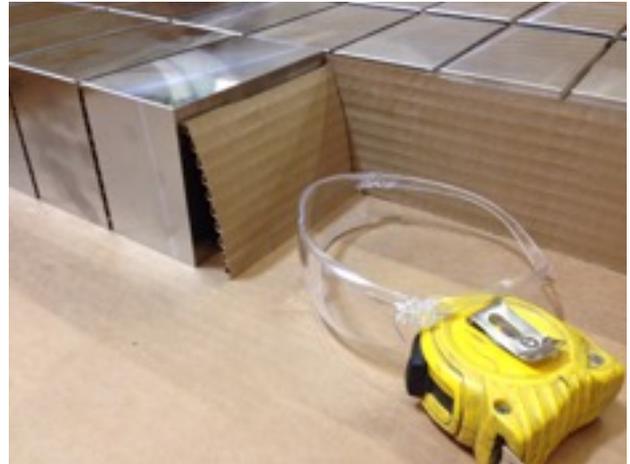
We ship on our own company vehicles, UPS & FedEx, and contracted common carriers. Customer pick is also available.





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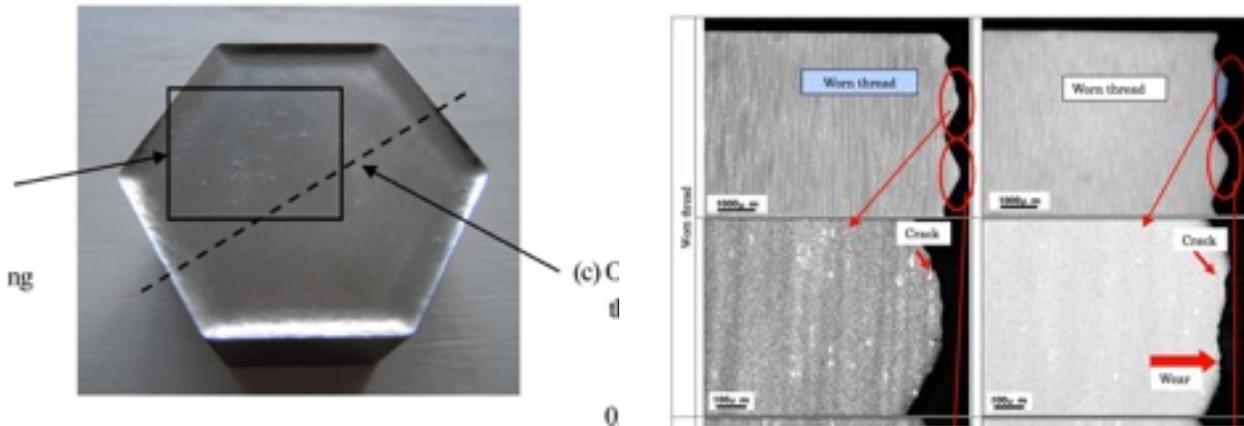
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Technical Support

As part of our commitment to Quality, Lindquist Steels offers unparalleled technical support on all the products and services we offer. This commitment to supporting our customers has earned us a great reputation for before and after sales support.

We offer material selection, machining, and heat treating advice. As well as Positive Material ID, Hardness testing, and full failure analysis testing.



Lindquist was the 1st Tool Steel company to come out with a Material Selection Guide application for handheld devices. Free on the Apple App Store.



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Conclusion

Lindquist Steels takes our responsibility to our clients as a valued and trusted source for specialty tooling and engineering materials very seriously. We take extreme measures to ensure that the material we distribute comes from only the finest sources worldwide and that the orders placed with us are fulfilled properly, quickly, and accurately.

We are continuously working to improve and streamline our approach to quality control and material identification and we welcome any and all feedback from our valued clients as to how we might be able to perform even better.

Should there be any questions or concerns about the information in this document or if you would like clarification on any of the points made please do not hesitate to contact us.

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