



IMPROVING PERFORMANCE WITH MODIFIED STEEL CHEMISTRIES

Discover how deep metallurgical expertise and precise process controls enable modification of steel chemistries, resulting in clean, strong steel engineered to meet the specific properties each component requires.

To produce safe and reliable products, many demanding applications have strict specifications for properties like tensile strength, hardness, fatigue and more. As such, manufacturers across a range of industries must hold their suppliers to high standards; if a component fails to perform as expected, rapid problem-solving and collaboration between suppliers and OEMs are key to ensuring production doesn't delay.

At Charter Steel, we lean on our extensive experience supporting automotive, industrial and other performance-critical sectors, working closely with OEMs and Tier 1 suppliers to fine-tune steel chemistries that keep production lines running smoothly and critical components performing reliably.

TAILORING STEEL CHEMISTRY THROUGH PRECISE MELT CONTROLS AND TECHNICAL LAB EXPERTISE

In industries like automotive, heavy equipment and energy, every component has a very specific job, and it needs to perform that job reliably. When customers are working on demanding applications, they often require steel with precise mechanical characteristics to meet those expectations. By fine-tuning the steel's internal makeup, our team can influence properties like strength, machinability and hardenability. This level of control ensures our customers receive steel that performs exactly as needed—consistently and predictably.

With strict quality and process control standards built over decades of work, our metallurgists begin with carefully controlled melting—this is the foundation that enables our team to make precise adjustments to the steel's chemistry. From there, we can refine the melted steel to provide customers with their desired performance characteristics. Once the chemistry and consistency are where they need to be, the steel is cast and later rolled into rod or bar, or drawn into wire. With the ability to test and trial batches, our lab validates that the steel's chemistry is accurate before it even leaves our facility and goes into production.





CUSTOM STEEL CHEMISTRIES THAT MEET YOUR UNIQUE NEEDS

In one scenario where F1554GR55 (ASTM F1554 Grade 55) steel was used, the original chemistry excelled in larger diameter SBQ bars; when this same chemistry was applied in the production of smaller diameter bars, the tensile performance failed to meet the required specifications for the component. To address these mechanical property challenges, the Charter Steel team modified the steel, creating a chemistry that improved the tensile strength for smaller bars without affecting other properties. Trials confirmed that our chemistry adjustments successfully resolved the issue, allowing production to continue with the smaller-diameter bars.

In another example, grade 15V52 size 7/8" was not consistently meeting the minimum yield strength requirement that the customer had for the part they were producing. The problem for the customer is that they would have to downgrade material that didn't meet spec but did not have enough business to support doing that regularly. For better consistency, and to ensure 100% compliance, we added a Carbon Equivalent calculation for the melt shop to work to where previously we did not have this built on the item. This chemistry modification increased the yield strength enough to ensure we would always met the customer minimum requirements.

Most recently, a customer ordered MM3 steel; but our initial batches failed to meet the customer's minimum yield expectations. After carefully reevaluating the steel

chemistry, the Charter Steel team modified the MM3 formula, creating a chemistry that led to our formal approval as a supplier of MM3 steel for this partner. This work demonstrated our commitment to being a trusted supplier, maintaining our role as a partner capable of supporting a significant portion of the customer's annual steel business.

CHARTER STEEL—YOUR SOLUTION-FOCUSED STEEL PARTNER

At Charter Steel, delivering clean, high-quality steel is our commitment to you. We collaborate both internally and with your team to align on every detail. The Charter Steel team regularly leans on one another's expertise, giving you the benefit of our full team's collective knowledge. As those conversations progress, our commercial team works closely with you to:

- Understand your unique application
- Identify opportunities and navigate challenges
- Conduct on-site reviews
- Run tests and trials
- Fine-tune steel chemistries that align precisely with your specifications

We're not just your steel supplier. We're your ally, working alongside your team to develop solutions that keep production on schedule and parts performing reliably.

Contact Commercial@CharterSteel.com today to see how we can help you enhance performance.