AISI 4330M Sucker Rod

Chemical Composition and Alloy Function

Data-focused reference for Ni-Cr-Mo alloy steel used in high-load sucker rod service. The ranges below consolidate published 4330M / G43300 sucker rod datasheet values. Final acceptance should follow API 11B, project specification, MTC and heat-lot records.

Material identity

AISI 4330M / modified UNS G43300 is a nickel-chromium-molybdenum alloy steel route for high-load sucker rod service.

Strength direction

Typical HS / special-strength 4330M rod data commonly list about 115 ksi min. yield and 140-150 ksi tensile strength.

Acceptance logic

Composition proves alloy route. Finished rod review still needs heat treatment, tensile test, thread/coupling and traceability records.

Chemical Composition - Datasheet-Based Typical Range

Element	Typical range	Alloy function	Sucker rod review meaning
C	0.30-0.34%	Strength and heat-treatment response	Controls hardness and tensile response. Excessive carbon can reduce toughness and raise crack sensitivity.
Mn	0.70-1.10%	Strength contribution and steelmaking control	Supports hardenability and deoxidation; helps maintain stable mechanical response after heat treatment.
Si	0.15-0.35%	Deoxidation and secondary strengthening	Useful for clean steelmaking control; should remain within the MTC range.
Ni	1.65-1.85% typical; some references list to 2.00%	Toughness support and high-load service behavior	Key difference from Cr-Mo-only sucker rod routes; helps support impact behavior under heavy rod load.
Cr	0.90-1.10%	Hardenability and strength consistency	Supports through-section response after normalizing and tempering; important for rod body and upset-end uniformity.
Mo	0.15-0.30%; some routes use 0.20-0.30%	Temper resistance and hardenability	Helps strength stability after tempering and supports fatigue-sensitive service areas.
V	0.04-0.10% where specified	Microalloy strengthening / grain refinement	May support refined microstructure and mechanical stability in modified 4330M routes.
P	<= 0.030% typical max.	Residual control	High P can hurt toughness; keep within the certified heat chemistry.
S	<= 0.035% typical max.	Residual control	Lower sulfur helps reduce inclusion-related toughness and fatigue concerns.
Cu	<= 0.35% typical max.	Residual / incidental element	Generally reviewed as a controlled residual in the material certificate.

Note: Published 4330M/G43300 ranges vary slightly by grade route; final acceptance follows project specification, MTC and heat number record.

Alloy Function in Sucker Rod Service

From chemistry to heat treatment, mechanical strength, connection behavior and traceable records.

Element Function and Rod-Service Meaning

Alloy input	Metallurgical effect	Rod-service meaning
C + heat treatment	Creates strength and hardness response during normalizing / tempering or specified project route.	Supports finished rod tensile level, but must be confirmed by tensile test and heat treatment record.
Ni + Cr + Mo	Improves hardenability, toughness support, temper response and section consistency.	Useful in deep wells, high-load rod strings, PCP service and torque-sensitive applications when corrosion is controlled.
Mo + V	Supports temper resistance, microstructure refinement and mechanical stability where specified.	Helps control fatigue-sensitive areas such as pin end, thread root, shoulder and coupling interface.
Low P / S	Limits harmful residuals that can reduce toughness and fatigue behavior.	Important for consistent performance where repeated tensile load and bending/contact stress occur.

Material-to-Document Control Chain

4330M chemistry
C + Ni + Cr + Mo + V

→

Heat treatment
N&T / project route

→

Mechanical test
yield + tensile + elongation

→

Connection review
thread + pin end + coupling

→

Traceability
heat no. + MTC + marking

Mechanical Direction

Published high-strength 4330M/G43300 sucker rod references commonly list about 115 ksi minimum yield strength, 140-150 ksi tensile strength, 10% minimum elongation in 8 in., and about 40% minimum reduction of area. These are reference values; the actual MTC governs acceptance.

Engineering Takeaways

AISI 4330M is a material route, not the complete finished sucker rod identity. Nickel is the key alloying difference versus many Cr-Mo rod materials. Composition must be linked to heat treatment, mechanical test, thread inspection, coupling match and traceability.

Data Basis and Caution

This PDF consolidates public 4330M / G43300 sucker rod datasheet ranges and comparison-guide values. It is intended for technical communication. Final chemistry, mechanical properties and acceptance status must follow the applicable MTC, API 11B requirement, ITP and project specification.