

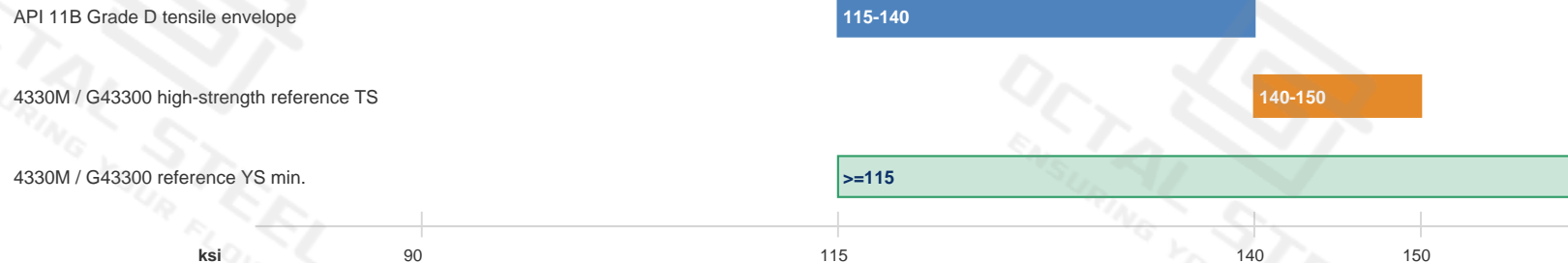
# API 11B Grade D and AISI 4330M Strength Control Sheet

Data-focused technical sheet for checking how API 11B Grade D strength, AISI 4330M material identity, heat treatment and finished sucker rod inspection should be read together. Values are reference ranges from public sucker rod datasheets; the actual MTC, current standard and project specification govern final acceptance.

API 11B Grade D	AISI 4330M / G43300	4330M High-Strength Reference	Acceptance Logic
<p><b>115,000-140,000 psi</b></p> <p>Finished rod tensile strength envelope commonly used for Grade D sucker rods.</p>	<p><b>Ni-Cr-Mo alloy route</b></p> <p>Material identity; chemistry and heat treatment do not replace finished rod testing.</p>	<p><b>YS <math>\geq</math>115 ksi; TS 140-150 ksi</b></p> <p>Public modified G43300 datasheets list this higher-strength control direction.</p>	<p><b>Material + Grade + Records</b></p> <p>Check API grade, tensile data, heat treatment, thread/coupling and traceability together.</p>

## 1. Strength Envelope: API Grade vs 4330M Material Route

AISI 4330M is a material designation. API 11B Grade D is a finished sucker rod strength category. When 4330M is used for Grade D Special or high-strength rod service, the tensile range may be controlled by project specification or manufacturer grade, so the mechanical record must be checked instead of relying on the alloy name alone.



Control Item	Reference Data / Range	What It Controls	Verification Record
<b>API 11B Grade D tensile strength</b>	115,000-140,000 psi	Finished rod strength category; applies to Grade D carbon, alloy or special-alloy routes.	Tensile test / MTC / API 11B reference
<b>AISI 4330M / modified G43300</b>	Ni-Cr-Mo alloy steel	Material route; supports hardenability and strength-toughness balance after heat treatment.	Chemical analysis / heat number / MTC
<b>4330M high-strength reference TS</b>	140,000-150,000 psi	Higher-strength 4330M / G43300 direction found in public sucker rod datasheets; may exceed standard Grade D upper limit.	Mechanical test / project specification
<b>4330M reference YS</b>	115,000 psi min. (2% offset)	Yield control used in public G43300 high-strength data; useful for load-path review.	Yield test result / MTC

## 2. Mechanical Property Review and Control Points

Property / Record	API 11B Grade D Baseline	AISI 4330M Reference Direction	Engineering Meaning
<b>Tensile strength</b>	115-140 ksi	140-150 ksi in public modified G43300 high-strength data	Defines maximum pulling/load capacity direction; check whether the rod is Grade D, D Special or high-strength.
<b>Yield strength</b>	Project / product record dependent	115 ksi min. (2% offset) in public modified G43300 data	Shows resistance to permanent deformation under rod string load.
<b>Elongation, 8 in.</b>	Per standard/product record	10% min. in public modified G43300 data	Ductility indicator for strength-toughness review.
<b>Reduction of area</b>	Per standard/product record	40% min. in public modified G43300 data	Fracture ductility indicator for mechanical behavior review.
<b>Heat treatment</b>	Required to meet finished grade	Normalized and tempered in many 4330M rod datasheets	Converts Ni-Cr-Mo chemistry into final strength and fatigue behavior.
<b>Thread and coupling check</b>	API/product requirement	Critical for 4330M high-load service	Connection fatigue may control service risk even when rod-body tensile strength is acceptable.

## 3. 4330M Strength Control Workflow

Step	Control Point	Required Evidence	Why It Matters
1	Define finished grade	API 11B Grade D / D Special / project grade	Avoids treating 4330M material as a finished strength grade.
2	Confirm material chemistry	C, Ni, Cr, Mo, Mn, Si, P/S on MTC	Confirms the AISI 4330M / modified G43300 material route.
3	Verify heat treatment	Normalized and tempered record where specified	Explains how chemistry was converted into final mechanical performance.
4	Check mechanical results	Tensile, yield, elongation, reduction of area	Confirms the finished rod matches the selected strength envelope.
5	Review thread and coupling	Thread inspection, coupling type, fit and marking	Protects pin end, thread root and coupling area under cyclic load.
6	Close traceability	Heat number, rod marking, MTC, packing list	Links material identity, testing and shipped rod bundles.

## 4. Common Misreadings to Avoid

Common Misread	Correct Strength-Control Reading
4330M automatically means API Grade D.	No. 4330M is material identity; API Grade D is a finished strength category.
140-150 ksi tensile can be treated as ordinary Grade D.	Check the project grade wording. 140-150 ksi may belong to Grade D Special or high-strength 4330M data, not the standard Grade D envelope.
Hardness alone proves strength.	Hardness is useful for heat-treatment consistency, but tensile/yield tests are the main strength evidence.
Rod-body strength is enough.	Thread root, pin end and coupling fit must be inspected because fatigue often concentrates at the connection.

## 5. Document Package for Strength Control

Document / Record	Strength-Control Purpose
Material Test Certificate (MTC)	Shows heat chemistry and mechanical test results; should connect to heat number and rod marking.
Heat treatment record	Confirms that normalizing / tempering or the specified route was applied to the correct lot.
Mechanical test report	Provides tensile strength, yield strength, elongation and reduction of area where required.
Thread inspection record	Supports connection quality review around pin end, shoulder and thread root.
Coupling specification / inspection	Confirms Class T, full size, reduced diameter, slim hole or project-defined coupling match.
Packing list and bundle marking	Closes traceability from tested rods to shipped bundles.

## Data Basis and Use Note

Reference values in this sheet are compiled from public API 11B sucker rod supplier tables and public modified G43300 / AISI 4330M sucker rod datasheets. They are intended for technical comparison and article support. Final acceptance must follow the current API 11B edition, the actual MTC, mechanical test report, heat treatment record, inspection records and the project specification.