

# Manufacture Standards and Key Quality Indicators

## ASTM A671 Pipe

ASTM A671/A671M covers electric-fusion-welded steel pipe with filler metal added, fabricated from pressure-vessel-quality plate for atmospheric and lower-temperature service. For project release, the pipe should be reviewed as a finished welded pipe - including pipe body, pipe end, weld seam, marking and document consistency - not only as a plate-based material.

The table below converts the main dimensional and weld-quality items into buyer-facing acceptance points for ASTM A671 welded pipe review.

Quality Indicator	Typical ASTM A671 Review Point	Practical Value / Control Limit	Technical Meaning for Acceptance
<b>OD tolerance of pipe body</b>	Finished pipe outside diameter control	$\pm 0.5\%D$	Supports dimensional acceptance before spool fabrication, handling and field fit-up.
<b>OD tolerance of pipe end</b>	Pipe-end geometry for beveling and alignment	$\pm 0.5\%$	Pipe-end OD affects end preparation, alignment and later welding fit-up.
<b>Wall thickness tolerance</b>	Minimum wall condition against order and design	$0 / -0.25 \text{ mm}^*$	Confirms that the finished pipe does not fall below the specified wall review point.
<b>Straightness</b>	Line-up condition along pipe body	$\leq 3.2 \text{ mm} / 3 \text{ m}$	Reduces installation difficulty, rolling instability and rack/spool fit-up issues.
<b>Ellipticity</b>	Roundness of finished pipe body and pipe end	$\leq 1\%D$	Supports pipe-end preparation, fitting assembly and dimensional release.
<b>Unfitness of butt joint</b>	Weld-joint mismatch / high-low review	<b>Check per project specification / fit-up requirement</b>	Controls seam mismatch that may trigger repair review or visual acceptance dispute.
<b>Weld reinforcement</b>	Weld bead height and seam profile	$\leq 3.2 \text{ mm}$	Controls weld appearance, NDT review condition and local fit-up clearance.

\* Practical values are used as technical review points based on the supplied manufacture-standard reference image. Confirm final tolerance and release criteria against the current ASTM A671/A671M edition, purchase order, ITP and project specification.

# Dimensional Review Logic for Finished ASTM A671 Pipe

Pipe body - Pipe end - Weld seam - Document release

Indicator	What the Inspector Looks For	Possible Project Risk if Missed
<b>Pipe body OD</b>	OD measured at agreed stations; record should align with dimensional report.	Spool fit-up delay, field alignment issue, receiving dispute.
<b>Pipe-end OD</b>	Pipe-end control before beveling and fit-up; important for large-diameter welded pipe.	Bevel mismatch, alignment rework, delayed welding release.
<b>WT tolerance</b>	Wall thickness should satisfy order/design minimum and be reported with OD/length.	Pressure-design concern, weight mismatch, material re-check.
<b>Straightness / ellipticity</b>	Straightness along length and ovality / roundness at body and pipe end.	Handling issue, rack rolling instability, fit-up interference.
<b>Weld reinforcement / unfitness</b>	Visual and dimensional review of seam profile, mismatch and bead height.	Repair review, NDT interpretation difficulty, appearance dispute.

## Reference Comparison Snapshot

ASTM A671 is part of the EFW welded pipe family. The comparison below keeps the focus on acceptance indicators rather than turning the topic into a plate-only material review.

Standard / Index	OD tolerance of pipe body	OD tolerance of pipe end	Wall thickness tolerance	Straightness	Ellipticity	Weld / Fit-up Review
<b>GB/T 9711 2011</b>	When $D \leq 610$ : $\pm 0.75\%D$ ; but $\leq 3.2$ mm  610 < $D \leq 1422$ : $\pm 0.5\%D$ ; but $\leq 4.0$ mm	When $D \leq 610$ : $\pm 0.5\%D$ ; but $\leq 1.6$ mm  610 < $D \leq 1422$ : $\pm 0.5\%D$ ; but $\leq 1.6$ mm	+5.0 < $t \leq 15.0$ : +0.1t  $t \geq 15.0$ : $\pm 1.5$	Straightness $\leq 0.2\%L$ ; 1 m at pipe end $\leq 4$ mm/m	Pipe-body OD / pipe-end OD review by D and D/t condition	Unfitness and weld reinforcement controlled by wall thickness and distance from pipe end
<b>API Spec 5L (45th)</b>	Same dimensional concept as line pipe OD body tolerance per size range	Pipe-end OD tolerance based on D and specified order requirements	Wall thickness tolerance per API / order requirement	Straightness $\leq 0.2\%L$ ; 1 m at pipe end $\leq 4$ mm/m	Ellipticity controlled by pipe body / pipe end condition	Weld and seam acceptance linked with inspection and release records
<b>ASTM A671</b>	$\pm 0.5\%D$	$\pm 0.5\%$	<b>0 / -0.25 mm*</b>	$\leq 3.2$ mm / <b>3 m</b>	$\leq 1\%D$	Weld reinforcement $\leq 3.2$ mm; butt-joint unfitness per project review
<b>ASTM A672</b>	$\pm 0.5\%D$	$\pm 0.5\%D$	<b>-0.30 mm</b>	$\leq 3.2$ mm / <b>3 m</b>	$\leq 1\%D$	Weld quality review for moderate-temperature high-pressure service
<b>ASTM A691</b>	$\pm 0.5\%D$	$\pm 0.5\%D$	<b>-0.30 mm</b>	$\leq 3.2$ mm / <b>3 m</b>	$\leq 1\%D$	High-temperature service review; weld reinforcement $\leq 3.2$ mm / 1/8 in

Note: D = outside diameter of steel pipe; L = pipe length; t = wall thickness. Values may vary by edition, supplementary requirement and project specification.

# Hardness Control and Release Documentation

## ASTM A671 finished welded pipe review

ASTM A671 grade and class identify the finished pipe condition, while hardness testing is normally reviewed when required by the order, applicable code, supplementary requirement or project ITP. A useful hardness review should connect the test location with pipe marking, MTC and heat-number traceability.

Control Item	Typical Review Point	Why It Matters	Document Link
<b>Base metal hardness</b>	Reviewed when required by PO, design code, supplementary requirement or ITP.	Confirms heat-treatment condition and material consistency of the finished pipe body.	Hardness report + MTC + heat number
<b>Weld metal / HAZ hardness</b>	Checked when low-temperature service, repair welding or project specification requires it.	Helps control weld-area hardness risk, brittle behavior concern and acceptance dispute.	Weld map + NDT record + hardness report
<b>Test method</b>	HB / HV / HRC as specified by project document or inspection plan.	The method must match the acceptance basis; mixed methods without conversion note can cause review delay.	Inspection plan / ITP
<b>Sampling location</b>	Pipe body, weld seam and HAZ when specified.	Makes the result traceable to the actual acceptance scope instead of a generic material value.	Sampling sketch / report line item
<b>Release document</b>	Hardness report should be linked with standard, grade, heat number and pipe marking.	Keeps test results connected to finished pipe identity and shipment lot.	MTC + packing list + marking photos

## Shipment Release Chain

**PO / Standard → Grade & Class → OD / WT / Length → Weld & NDT → Hydrotest if required → MTC & Heat No. → Packing List → Shipment Release**

## Practical Buyer Takeaway

A671 pipe acceptance should not stop at grade name or plate basis. The release package should show that the finished pipe dimensions, weld seam profile, inspection records, MTC, heat number and packing list tell the same story before shipment.