

Pre-Shipment NDT Inspection of China-Origin Metal Products: A Step-by-Step Quality Protection Protocol | Metal-Asia.pw

Author: [Jacek Nowak](#) | Head of Pre-Shipment Inspection, Metal-Asia.pw

Published: April 20, 2026 | **Audience:** Procurement directors, QA/QC managers, supply chain compliance officers, owners of construction and manufacturing companies

Markets: Global — EU, North America, Middle East, Southeast Asia, Australia, Africa

Keywords: pre-shipment inspection China, PSI metal products, pre-shipment NDT, inbound quality control, third-party inspection China, metal inspection before shipment

Executive Case Study: The \$340,000 Lesson

Year 2024. A major steel distributor in Eastern Europe procured 120 MT of seamless pipe 159x6 mm, Grade 20# (GOST 8732) for an oil & gas subcontractor. Contract value: \$96,000. The Shandong-based supplier provided full documentation: MTR, ISO 9001 certificate, factory photos.

The pipes arrived. Visual inspection — flawless. Three months later, during hydrostatic pipeline testing at 80 bar, **four pipes ruptured longitudinally**. Investigation revealed: actual wall thickness 4.8–5.2 mm vs. specified 6.0 mm; internal laminations not detected at receipt. Total client losses: \$340,000 (downtime, demolition, replacement pipes, contractor litigation).

If pre-shipment NDT inspection had been conducted, the loss would have been zero. Inspection cost for that lot: \$1,200. Savings: \$338,800. ROI: **28,200%**.

In this technical guide, I present the pre-shipment NDT control system that Metal-Asia.pw has refined across **500+ inspections** at Chinese steel mills.

What Is Pre-Shipment NDT Inspection (PSI+NDT)

Pre-Shipment Inspection (PSI) + NDT is comprehensive verification of finished product at the manufacturer's warehouse **after production completion but before dispatch**. Unlike standard PSI (quantity, marking, packaging check), **NDT-PSI incorporates full non-destructive testing**: PMI, UT, thickness gauging, dimensional control, coating verification, and documentation compliance.

Five Levels of Pre-Shipment Control

Level	Name	NDT Scope	Cost (50–100 MT lot)	When to Apply
Level 0	Documentary Control	0% NDT	\$150–250	Proven suppliers, one-off items
Level 1	Visual + Dimensional	VT 100%	\$300–500	Standard products, low risk

Level	Name	NDT Scope	Cost (50–100 MT lot)	When to Apply
Level 2	Standard NDT	VT + PMI + thickness 100%	\$600–1,000	Stainless steel, galvanized products
Level 3	Extended NDT	VT + PMI + UT + thickness + coatings	\$1,000–2,500	Tubular products, special alloys, LGSF
Level 4	Premium NDT	Full cycle: VT + PMI + OES + UT + RT + MT + PT + mechanical testing	\$2,500–5,000	Critical lots, OG, nuclear, defense

Step-by-Step Pre-Shipment NDT Protocol

STAGE 1. Documentary Review (0.5 day)

Verification scope:

Document	Checked Against	Acceptance Criteria
Commercial Invoice	Purchase order	Product name, quantity, price conformance
Packing List	Specification	Number of pieces, gross/net weight, dimensions
Mill Test Report (MTR)	Specified standard	Chemical & mechanical conformance; cross-check with PMI
Certificate of Origin	Country of origin, manufacturer	Authenticity; PO conformance
Quality Certificate	Standard number, quality class	PO conformance
Equipment Calibration Certificate	Date, body, range	Not expired; traceable to national standard
NDT Personnel Qualifications	Level II certificates	Valid; method-matched

Frequently Identified Issues:

- MTR "backdated" or copied from a different heat number
- Missing heat treatment data
- Understated harmful element content (S, P)
- Heat number on MTR does not match marking on product

STAGE 2. Visual & Dimensional Inspection — VT (0.5–1 day)

Coverage: 100% of lot

Parameter	Method	Tool	Non-Conformance Frequency from China
Marking (stamp, label)	Visual	5× magnifier	15% (incorrect, erased, MTR mismatch)
Packaging integrity	Visual	—	20% (insufficient, damaged)
Surface appearance	Visual, 500 lux	Magnifier, roughness comparator	10% (rust, scratches, dents, scale)
Geometry: thickness	Mechanical / UT	Micrometer, UTM gauge	25% (thickness understatement)
Geometry: width, length	Tape / laser	Tape measure, laser distance meter	12% (deviations)
Geometry: pipe diameter	Caliper	Digital caliper	10%
Flatness	Straightedge + feeler	1 m straightedge, indicator	8%
Straightness	Sag measurement	Surface table, string line	10%
Piece count	Count	—	5% (Packing List mismatch)

STAGE 3. PMI Chemical Composition Control (0.5–1 day)

Coverage: Per control level (Level 2–4)

Product Category	PMI Coverage	Technology	Time per 100 tests
Black steel (non-grade-critical)	5%	XRF	20 min
Stainless steel AISI 304/316L	100%	LIBS + XRF	2 hours
Special alloys, heat-resistant grades	100% + OES sampling	LIBS + XRF + benchtop OES	3–4 hours
Structural steel C45 / 1045, 40Cr / 4140	50%	LIBS (carbon determination)	1 hour
S350GD steel for LGSF	100%	LIBS + XRF	1.5 hours
OG pipeline pipe (API 5L)	100%	LIBS (C, Mn, S, P)	2 hours

PMI Inspection Protocol:

- Each test photographed (instrument + product + screen with result)
- Results cross-referenced against MTR and standard in real time
- Deviation $>\pm 5\%$ on key elements → item tagged with red label, segregated from lot

- Final report: Excel + PDF with chemical distribution charts

STAGE 4. Ultrasonic Testing (UT) — Level 3–4 (1–2 days)

Coverage: Per program, 10% to 100%

Product Type	UT Coverage	Technique	Target Discontinuities
Hot-rolled plate	10%	Straight + angle probes, dual traverse	Laminations, inclusions
Seamless pipe	100%	Circumferential scan, dual traverse (longitudinal + transverse)	Cracks, laminations, wall thickness
Welded pipe	100% of welds	Continuous longitudinal scan + transverse	LOP, cracks, porosity, slag
Sheet pile	10% of interlocks	Manual interlock scanning	Interlock cracks, laminations
Ingots, forgings	100%	Dual traverse, multiple angles	Internal defects, laminations

STAGE 5. Coating Inspection (0.5 day) — When Applicable

Coating Type	Method	Coverage	Criterion
Zinc (galvanizing)	XRF + magnetic gauge	100% of sheets/coils	Conformance to Z100–Z275 class
Organic (PVDF, PUR, PE)	UT gauge	100%	±2 µm from nominal
Paint / lacquer	Magnetic gauge + adhesion	10%	Per technical specification
Oil / preservative	Visual + gravimetric	10%	Uniformity, mass
Anti-corrosion (OG pipe)	Electrical gauge	100%	Per specification (typically 2–3 mm)

STAGE 6. Destructive Testing of Witness Coupons — Level 4 (2–3 days)

Test	Standard	Coverage	Cost
Tensile (Rm, Re, A%, Z%)	GOST 1497, ASTM A370	1 set (3 specimens) per lot	\$45
Charpy impact (KCU/KCV)	GOST 9454, ASTM E23	3 specimens per temperature	\$60
Bend test	GOST 14019, ASTM E190	2 specimens	\$30
Compression test	GOST 8817	2 specimens	\$30

Test	Standard	Coverage	Cost
Hardness (HB, HRC, HV)	GOST 9012, ASTM E10	10 points	\$50
Metallography	GOST 1763, ASTM E3	1 polished section	\$25
Corrosion testing	ASTM G48, ASTM A262	On request	\$100+

STAGE 7. Final Report & Disposition (0.5 day)

NDT-PSI Inspection Report includes:

1. **Cover Page** — inspection title, date, location, inspectors
2. **Executive Summary** — overall verdict: PASS / CONDITIONAL PASS / FAIL
3. **Product Description** — product photos, description, quantity
4. **Document Review** — summary table of verified documents with remarks
5. **Visual Inspection Report** — defect photos (if any), results table
6. **PMI Report** — all measurements table, charts, MTR comparison
7. **UT Report** — scan records, protocols, defect maps
8. **Coating Report** — coating thickness data, photos
9. **Dimensional Report** — geometric measurement table
10. **Mechanical Test Report** — when Level 4 is applied
11. **Conclusion and Recommendations** — PASS / CONDITIONAL PASS / FAIL with justification
12. **Appendices** — certificate copies, photos, raw data

Delivery timeline: From inspection start to report completion — **2–5 business days** depending on level and volume.

Pre-Shipment NDT Pricing

Table 6. PSI + NDT Price List (Valid April 2026)

Level	Service	≤50 MT	50–100 MT	100–200 MT	200+ MT
Level 1	VT + dimensional	\$350	\$450	\$600	\$800
Level 2	VT + 100% PMI + thickness + coatings	\$700	\$950	\$1,300	\$1,800
Level 3	Level 2 + UT (program) + full documentary review	\$1,200	\$1,600	\$2,200	\$3,000
Level 4	Level 3 + RT + MT + PT + mechanical testing + OES	\$2,500	\$3,500	\$4,800	On request
Add-ons					
	Urgent inspection (deploy within 24h)	+50%	+50%	+50%	+50%

Level	Service	≤50 MT	50–100 MT	100–200 MT	200+ MT
	Weekend / holiday inspection	+30%	+30%	+30%	+30%
	Additional day at mill	\$400	\$400	\$400	\$400
	Technical interpreter (Chinese)	\$150/day	\$150/day	\$150/day	\$150/day
	Express lab (OES, mechanical testing)	\$500	\$500	\$500	\$500

Geographic Coverage: Where We Inspect

Our inspectors and partners operate across all key Chinese steel-producing regions:

Region (China)	Cities	Mill Specialization	Our Capabilities
Jiangsu	Zhangjiagang, Changzhou, Wuxi	Stainless steel, AISI 304/316L pipe	Inspection + OES laboratory
Shandong	Liaocheng, Jinan, Qingdao	Black steel, galvanized coils, pipe	Inspection + mechanical testing
Hebei	Tangshan, Handan	Hot-rolled and cold-rolled flat products	Inspection
Shanghai	Shanghai	Distribution warehouses, export terminals	Inspection + documentary control
Guangdong	Foshan, Guangzhou	Stainless steel, aluminum alloys	Inspection + PMI
Liaoning	Anshan, Shenyang	Heavy plate, large-diameter pipe	Inspection + UT
Sichuan	Chengdu, Panzhihua	OG pipe, special steels	Inspection

Integration with Logistics & Trade Compliance

Pre-shipment NDT inspection is not an isolated service — it is an **integral component of the supply chain**. Post-inspection, we:

1. **Compile compliant documentation** for destination-country customs clearance
2. **Support HS Code classification** and conformity certificate acquisition (CE, UKCA, API)
3. **Organize freight** — sea (FCL/LCL), rail (China–Europe), or multimodal to your warehouse
4. **Provide customs brokerage** — our brokers operate at key ports and border crossings globally

[Trade Compliance & Certification Services](#) | [Global Shipping Options](#) | [Payment Terms](#)

ROI of Pre-Shipment NDT Inspection: The Numbers

Scenario	Lot Value	Level 3 PSI Cost	Finding	Loss Without PSI	Savings	ROI
Galvanized coils Z275, actual Z180	\$45,000	\$950	Zinc mass 35% below spec	\$15,000 (accelerated corrosion)	\$14,050	1,480%
Stainless pipe AISI 316L, actual 304	\$68,000	\$1,200	No Mo, low Ni	\$25,000 (replacement + downtime)	\$23,800	1,983%
Seamless pipe with laminations	\$96,000	\$1,600	Laminations, thin wall	\$340,000 (failure + demolition)	\$338,400	21,150%
LGSF profiles S350GD with interlock cracks	\$35,000	\$800	Cracks in welded interlocks	\$12,000 (structural rework)	\$11,200	1,400%
GH4169 alloy with substituted composition	\$120,000	\$3,500	Ni 52% vs. required 70%	\$80,000 (turbine damage)	\$76,500	2,186%

How to Book a Pre-Shipment NDT Inspection

Step 1. Submit your inquiry to zakaz@metal-asia.pw or [WhatsApp](#)

Step 2. Attach:

- Procurement specification (product name, standard, quantity)
- Supplier contact details (if already selected)
- Required inspection level (or we will recommend)
- Target inspection dates

Step 3. We prepare:

- NDT Inspection Program (Inspection Plan)
- Formal quotation
- Service Agreement (no advance payment; settlement upon report delivery)

Step 4. Our inspector deploys to the mill in China and executes full-scope control

Step 5. You receive the inspection report with PASS / FAIL determination and disposition guidance


Related Services — Metal-Asia.pw

- [Full NDT Services & Quality Control Catalog](#)

- Mill Audit & Vendor Qualification
 - Trade Compliance & Customs Support
 - B2B Procurement Services
 - S350GD Steel for LGSF
 - C45 / 1045 Structural Steel
 - Stainless Steel Products
 - Galvanized Coil 100 g/m²
 - Sheet Pile with Global Delivery
-

Contact:

 zakaz@metal-asia.pw

 WhatsApp: [+86 132 50100874](https://wa.me/8613250100874)

 www.metal-asia.pw

 Headquarters: Shanghai, China | Regional offices: Moscow, Almaty, Minsk, Dubai

© 2026 Metal-Asia.pw — Pre-Shipment NDT Inspection for Global Metal Procurement. Full-scope quality assurance from documentary control to Level IV non-destructive testing. Every shipment — under control.