Company Quality & Shipment Control Document

I. Raw Material Quality Control (IQC- Incoming Quality Control)

Key Control Focus: Material grade, hardness, dimension, surface condition, mechanical properties and incoming documents to avoid batch-level non-conformities at source.

1. **Document Verification** Check Mill Test Certificate (MTC), Heat No., Batch No., dimensions and applicable standards (JIS G4305, GB/T, etc.). Ensure Heat No. on MTC matches physical label. Isolate material under pending-inspection status and prohibit production if MTC is missing or information is inconsistent.
2. **Visual Inspection**

- **Steel Strip**: Surface scratches, shelling, rust spots, scale, indentations, creases, edge burrs, edge cracking, waviness, oil contamination; uneven end face, coil telescoping, impact damage.
- **Steel Wire**: Shelling, pitting, cracks, rust, scabs, bamboo-shaped defect, torsion, kinks, die marks, oil contamination, plating defects (for nickel-plated / zinc-plated products).

1. **Dimensional Inspection**

- **Steel Strip**: Thickness, width, camber, burr height, flatness; measured by caliper, micrometer, feeler gauge and straightedge.
- **Steel Wire**: Wire diameter, ovality; multi-point measurement with micrometer.

1. **Performance Sampling Inspection (Critical Item)** Test hardness (HV/HRC), tensile strength, elongation, torsion and reverse bending. Sample according to AQL or internal sampling plan. Hardness verification is mandatory for spring steel and high-hardness materials.
2. **Identification & Segregation** Classify incoming materials: Accepted, Pending Inspection, Non-conforming, Concession. Material label shall include material grade, dimension, Heat No., Batch No., supplier and receiving date.
3. **Non-conformance Disposition** Return to supplier / Rework / Concession (concession requires review, documentation and restricted scope of usage). Retain defective samples and drive supplier corrective actions.

Required Records: IQC Incoming Inspection Report, Filed Mill Test Certificates, Non-conforming Material Disposition Form

II. In- Process Quality Control (IPQC- In- Process Quality Control)

1. **First- Article Inspection (Mandatory)** First- article inspection shall be performed upon batch change, dimension change, tool / die replacement, machine adjustment and heat- treatment parameter modification. Inspect dimension, hardness, surface, burr and flatness. Mass production is allowed only after first- article acceptance; retain first- article samples.
2. **Routine Patrol Inspection** Perform periodic patrol inspection covering:

- Dimensional variation: slitting width, strip thickness tolerance, wire diameter;
- Surface condition: new scratches, indentations, oil contamination, heat- tempered discoloration, decarburization (special attention for spring steel);
- Edge condition: slitting burrs, edge tearing;
- Material performance: hardness uniformity after heat treatment; prevent excessive hardness deviation between coil head and tail;
- Coil shape: winding tightness, coil telescoping, mis- layer winding.

1. **Process Stop Mechanism for Non- conformities** When batch non- conformities are found (dimension out- of- tolerance, unqualified hardness, continuous surface scratches): isolate and label non- conforming lots, stop production, notify process / quality team, analyze root causes (tool wear, unstable tension, abnormal heat- treatment temperature zone, scratch caused by guide roller). Resume production only after rectification and re- verification.
2. **In- Process Protection** Keep rollers and guide rollers clean and free of hard particles. Avoid hard collision between product and metal racks. Use protective paper / plastic gaskets for semi- finished goods turnover. Separate materials of different grades and dimensions to prevent material mixing.
3. **Semi- finished Goods Identification** Label each coil / spool with material grade, dimension, Heat No., process step and status (Pending Inspection / Accepted / Rework). Flow without identification is prohibited.

Required Records: First- Article Inspection Record, IPQC Patrol Checklist, Process Non- conformance Report, Heat- treatment Parameter Log

III. Finished- Goods Inspection (FQC / OQC- Final / Outgoing Quality Control)

1. **Inspection Items**

- Identification: intact labels with information consistent with order (material grade, dimension, quantity, order No., Batch No.);
- Appearance: coil surface & edges free of rust, indentation, scratches and oil contamination;
- Dimension: thickness, width, wire diameter, cut-to-length;
- Performance: sample-check hardness, tensile strength and bending property per batch;
- Coil / spool appearance: neat winding, no coil telescoping, loose winding or collapsed coil; no wire tangling or wire jumping for steel wire spools;
- Cleanliness: special verification for oil-free products as required by customers.

1. **Sampling Plan** Follow customer specification or AQL. Tightened sampling shall be applied for high-requirement spring-grade steel wire & strip.
2. **Grading & Disposition** Accepted → Warehouse intake; Rework (minor oil stain, wrong label) → Rework and re-inspection; Non-conforming (wrong grade, hardness out-of-tolerance, batch edge cracking) → Isolation & review; prohibited from delivery to customers.
3. **Sample Retention** Retain finished-good samples for key orders, new-supplier lots and non-conformance batches; retention period complies with company regulation.

Required Records: Finished-Goods Inspection Report, OQC Outgoing Inspection Record

IV. Packaging Quality Control (Focus: anti-collision, anti-rust, anti-mix-up, anti-coil loosening)

4.1 Pre-packaging Preparation

1. Ensure product surface dry and free of sweat / water stain; verify no pre-rusting under humid conditions before packaging.
2. Verify dimension and batch for each coil / spool against label to prevent wrong-package.
3. Confirm packaging materials: anti-rust paper, VCI volatile corrosion inhibitor paper (preferred for sea freight / humid environment), stretch film, corner protector, wooden pallet, plastic film, strapping band, label. Packaging materials shall be clean without sand or sharp edges.

4.2 Steel Strip Coil Packaging Specification

1. Inner packaging: wrap coil body tightly with VCI anti-rust paper and protect end faces.

2. Outer layer: wind stretch film with proper tension; over-tight winding risks edge indentation while over-loose causes coil loosening.
3. Wooden pallet stacking: pallets shall be flat without protruding nails. Place coils vertically (preferred); avoid flat stacking which may collapse coil shape.
4. Apply padding under strapping bands; strapping bands shall not directly contact steel-strip surface.
5. Label on outer carton / pallet: product name, material grade, dimension, Batch No., quantity, order No., “Keep Dry”, “This Side Up”.

4.3 Steel Wire Spool Packaging Specification

1. Wrap spool with anti-rust paper and fix by stretch film to prevent wire tangling and jumping.
2. Use pallet for large spools; carton for small spools. Install partition inside carton to avoid scratch from spool-to-spool friction.
3. Protruding wire ends are forbidden to prevent tearing packaging and scratching other goods.

4.4 Packaging Patrol- Inspection Checkpoints

- Adequate anti-rust protection (VCI anti-rust paper mandatory for coastal / export orders);
- Presence of indentation or strapping-band bruising;
- Label adhesion and data correctness;
- Packaging tightness; shaking test for no coil loosening;
- Complete moisture-proof marking.

V. Warehouse & Shipment Quality Control

5.1 Warehouse Control

1. Warehouse shall be dry, well-ventilated, away from corrosive gas and floor dampness. Store goods on pallets off floor and wall. Monitor temperature & humidity; increase anti-rust patrol in humid seasons.
2. Zoned storage: segregate stainless steel and carbon steel to avoid iron-ion induced surface rust on stainless steel. Separate by dimension and batch; implement FIFO (First-In-First-Out).
3. Material handling: forklift operation at low speed; avoid fork impact against coils / spools. Use soft lifting slings; steel wire rope direct lifting on product is prohibited.
4. Periodic stock sampling: inspect long-term stored goods for rust and packaging damage.

5.2 Outbound & Shipment Control

1. Pre-loading truck inspection: truck compartment dry, no ponding, sharp protrusions or grit. Deploy rain tarpaulin for rainy-day loading.
2. Stacking: stable center-of-gravity; no over-height or over-weight. Prevent friction and collision under transit vibration.
3. Securing: fasten pallets tightly to avoid sliding under emergency braking or cornering.
4. Differentiate transport mode: land freight / sea freight. Sea freight requires enhanced VCI anti-rust treatment plus desiccant due to high risk of rust under salt-spray environment.
5. Loading verification: cross-check delivery note, label and physical batch; take photos for filing.
6. Contingency plan for delivery non-conformities: upon customer complaint of transit-induced rust, indentation or loose coil → collect photo evidence, determine responsibility (packaging / logistics) and launch corrective & preventive actions.

VI. Non-conformance & Traceability System (Applies to full workflow)

1. **Unique traceable identifier**: Heat No. + Batch No. establishes one-to-one linkage covering raw material → semi-finished goods → finished goods → packaging & outbound. Customer-reported non-conformities can be traced backward to raw material, heat-treatment shift and equipment.
2. **Non-conformity classification**: material-grade defect, dimensional defect, hardness defect, surface scratch, burr defect, rust, packaging-transit damage, material mixing.
3. **Corrective & Preventive Action (8D-Eight Disciplines)**: Develop improvement measures for recurring quality issues (e.g. guide-roller replacement, VCI packaging optimization, heat-treatment curve adjustment, handling training).
4. **Customer-requirement checklist**: List special customer requirements (oil-free, burr-free, specific anti-rust standard, no direct stretch-film contact with surface, etc.) on order card separately.