

Square Kelly Manufacturing, Inspection and Traceability Checklist

NEW-PRODUCT FACTORY ACCEPTANCE ONLY - USED-KELLY INSPECTION UNDER API RP 7G-2 IS OUTSIDE THIS CHECKLIST

Nine-step production route with the operation, key control, retained record and principal risk controlled at each stage.

1 Raw-material receipt and identification

MAIN OPERATION / KEY CONTROL

Verify steel grade, chemistry, heat number, bar/forging dimensions and surface condition.

RETAINED RECORD

Heat number | MTC | receipt log

RISK CONTROLLED

Wrong grade, mixed heat or unverified starting stock

2 Full-length quenching and tempering

MAIN OPERATION / KEY CONTROL

Control furnace lot, austenitizing/quench/temper sequence and identity transfer.

RETAINED RECORD

HT lot | furnace record | test linkage

RISK CONTROLLED

Unverified or non-uniform through-section properties

3 Straightening and initial alignment check

MAIN OPERATION / KEY CONTROL

Straighten the long bar and measure full-length and local runout before boring.

RETAINED RECORD

Runout record | traveler sign-off

RISK CONTROLLED

Bowing that later causes bore eccentricity or bushing interference

4 Deep-hole boring, gun drilling or trepanning

MAIN OPERATION / KEY CONTROL

Control bore diameter, axis position, exit location and remaining wall.

RETAINED RECORD

Bore inspection | wall map

RISK CONTROLLED

Restricted passage, eccentric bore or locally thin wall

5 Rough machining of body and ends

MAIN OPERATION / KEY CONTROL

Establish datums; machine body, upsets and transitions with controlled stock removal.

RETAINED RECORD

Machining traveler | in-process dimensions

RISK CONTROLLED

Lost datum, abrupt transitions or insufficient finish allowance

6 Square or hexagonal drive-profile milling

MAIN OPERATION / KEY CONTROL

Control across flats/corners, symmetry, twist, drive length and straightness.

RETAINED RECORD

Profile report | in-process check

RISK CONTROLLED

Poor bushing fit, uneven torque contact or one-flat loading

7 Upper and lower connection machining and gauging

MAIN OPERATION / KEY CONTROL

Confirm end position, designation, hand, pin/box form, standoff, shoulder and bore transition.

RETAINED RECORD

Gauge record | gauge ID | calibration status

RISK CONTROLLED

Wrong-end configuration, poor shoulder contact or mismatch

8 NDT and final dimensional inspection

MAIN OPERATION / KEY CONTROL

Apply specified UT/MPI scope and verify straightness, bore, profile and end geometry.

RETAINED RECORD

NDT report | dimensional report

RISK CONTROLLED

Undetected discontinuity or dimensional nonconformance

9 Marking, protection and packing

MAIN OPERATION / KEY CONTROL

Link permanent marking to release records; protect threads and support the full length.

RETAINED RECORD

Final release | packing list | photo record

RISK CONTROLLED

Lost traceability, handling damage, corrosion or bending in transit

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Heat treatment, deep-hole machining and heavy external milling can each change final geometry. Control is staged, not deferred to final inspection.

1 STRAIGHTNESS & RUNOUT

Long kelly supported at controlled points

Dial indicator



CHECK AFTER

Heat treatment

Initial straightening

Bore machining

Drive-profile milling

Connection machining

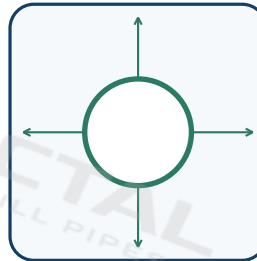
Final release

RISK IF MISALIGNED

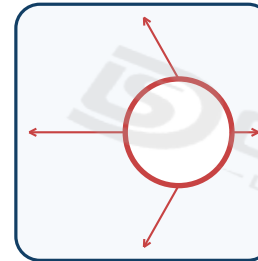
Binding in the kelly bushing, one-flat or one-corner contact, uneven wear and concentrated torque transfer.

2 BORE ALIGNMENT & WALL

Cross-section review at defined locations



CENTERED



ECCENTRIC

Confirm together:

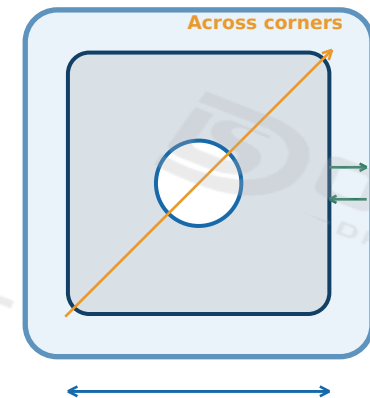
- Bore-axis position
- Wall at multiple clock positions
- Drive-flat and corner section
- Transition into each upset

ACCEPTANCE WARNING

An acceptable bore diameter does not independently confirm adequate remaining wall.

3 DRIVE PROFILE & BUSHING FIT

Square profile shown - the same control logic applies to hexagonal kellys.



Operating clearance between profile and bushing

CONTROL FIELDS

Twist

Local straightness

Flat-to-flat symmetry

Corner profile

Bore-to-body alignment

FINAL ACCEPTANCE

Use the approved manufacturing drawing and purchase requirements. Do not infer an unverified numerical tolerance.

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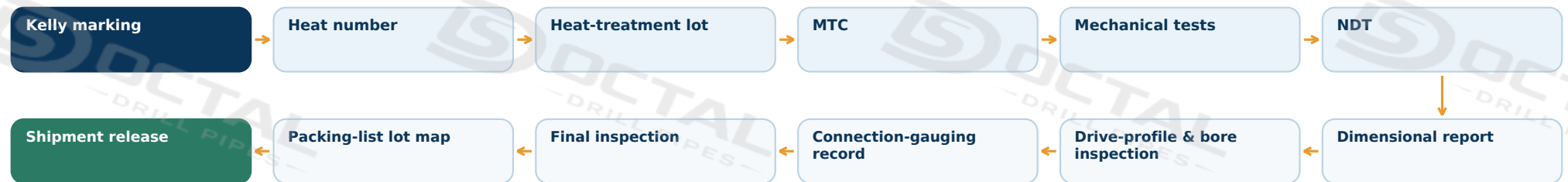
Each line identifies the inspection action, the evidence retained and the risk controlled. Acceptance values remain order- and specification-dependent.

Inspection or Record	How It Is Checked	What It Confirms	Risk Controlled
Material certificate	Match finished marking to the MTC heat number; review grade, chemistry and delivery condition.	Correct alloy-steel heat and traceability.	Material substitution or mixed heats.
Heat-treatment record	Verify furnace batch, quench and temper cycle records, HT lot identity and linked tests.	Full-length heat-treatment route and record continuity.	Unverified or uneven properties.
Tensile test	Machine the specimen from the specified location; record yield strength, tensile strength and elongation.	Required strength and ductility at the stated sampling basis.	Under-strength or low-ductility material.
Charpy V-notch impact test	Record specimen size, orientation, test temperature, sampling location, individual values and average value.	Impact toughness at the stated test condition.	Brittle response under shock or low temperature.
Hardness test	Take Brinell or approved equivalent readings at defined drive-body and end-section locations.	Heat-treatment consistency across the product.	Excessive hardness, soft zones or uneven treatment.
Ultrasonic testing	Calibrate to an approved reference standard and scan specified body/end zones; record indications.	Internal soundness within the approved scan scope.	Cracks, inclusions or subsurface discontinuities.
Magnetic-particle inspection	Magnetize specified flats, corners, transitions and connection zones; apply visible or fluorescent particles.	Surface and near-surface condition of critical machined areas.	Cracks or grinding/machining damage.
Straightness inspection	Support at controlled points and measure full-length and local runout with a calibrated setup.	Free passage through the matching bushing and aligned ends.	Binding, uneven contact and concentrated wear.
Drive-profile inspection	Measure across flats/corners, drive length, twist, symmetry and corner geometry.	Compatibility with the specified kelly bushing.	Interference, excessive clearance or uneven torque transfer.
Bore and remaining-wall inspection	Check bore diameter and axis; verify wall at multiple circumferential positions and transitions.	Continuous fluid passage and adequate remaining section.	Restricted bore, eccentricity or locally thin wall.
Connection gauging and shoulder inspection	Verify end position, designation, hand, pin/box form, gauge ID, calibration, standoff, shoulder and bore transition.	Correct upper/lower connection and controlled mating interface.	Wrong end, poor shoulder contact or incompatible component.
Final visual and release inspection	Review surface condition, permanent marking, protectors, records and packing readiness.	Product identity, documentation completeness and shipment condition.	Handling damage, corrosion or lost traceability.

UT/MPI coverage and acceptance: per applicable specification, approved manufacturing procedure and project ITP - not a universal 100% requirement.

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The finished kelly is released only when product identity, manufacturing records, inspection results and packing documentation remain linked.



BEFORE PRODUCTION

- ☐ Drive profile: square or hexagonal
- ☐ Nominal size
- ☐ Overall length
- ☐ Effective drive length
- ☐ Across flats and across corners
- ☐ Central bore
- ☐ Upper connection and thread hand
- ☐ Lower connection and thread hand
- ☐ Pin or box at each end
- ☐ Mating kelly bushing
- ☐ Saver-sub connection
- ☐ Material and heat treatment
- ☐ NDT scope and acceptance basis
- ☐ TPI / project inspection points
- ☐ Marking and packing method

BEFORE SHIPMENT

- ☐ Permanent marking
- ☐ Heat number and heat-treatment lot
- ☐ MTC and chemistry
- ☐ Tensile record
- ☐ Charpy record: size/orientation/temp/location
- ☐ Hardness record
- ☐ UT and MPI reports, where applicable
- ☐ Straightness report
- ☐ Bore and remaining-wall report
- ☐ Drive-profile report
- ☐ API Spec 7-2 gauge record
- ☐ Final inspection and thread protectors
- ☐ Packing-list lot map

PROJECT ITP POINTS - CONFIGURE BY ORDER

HOLD [H]

WITNESS [W]

REVIEW [R]

RELEASE [REL]

Order-specific - not universal.