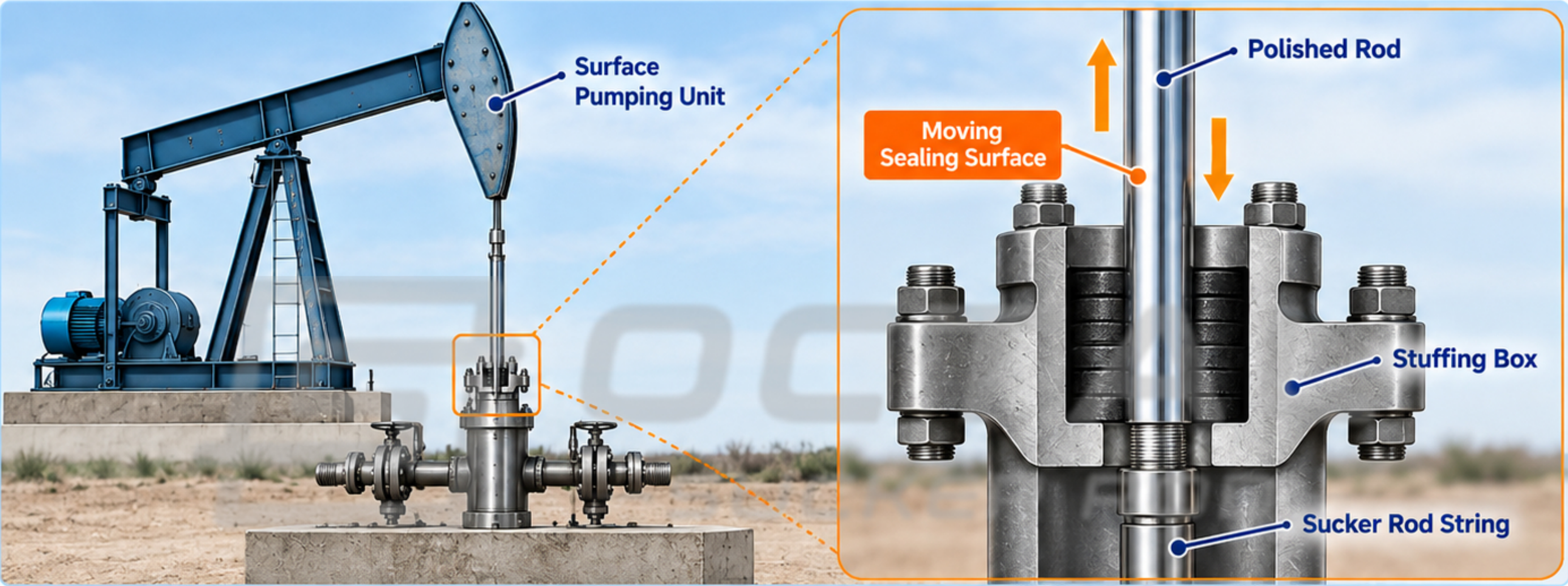


Polished Rod Surface and Sealing Performance



Why Surface Condition Matters

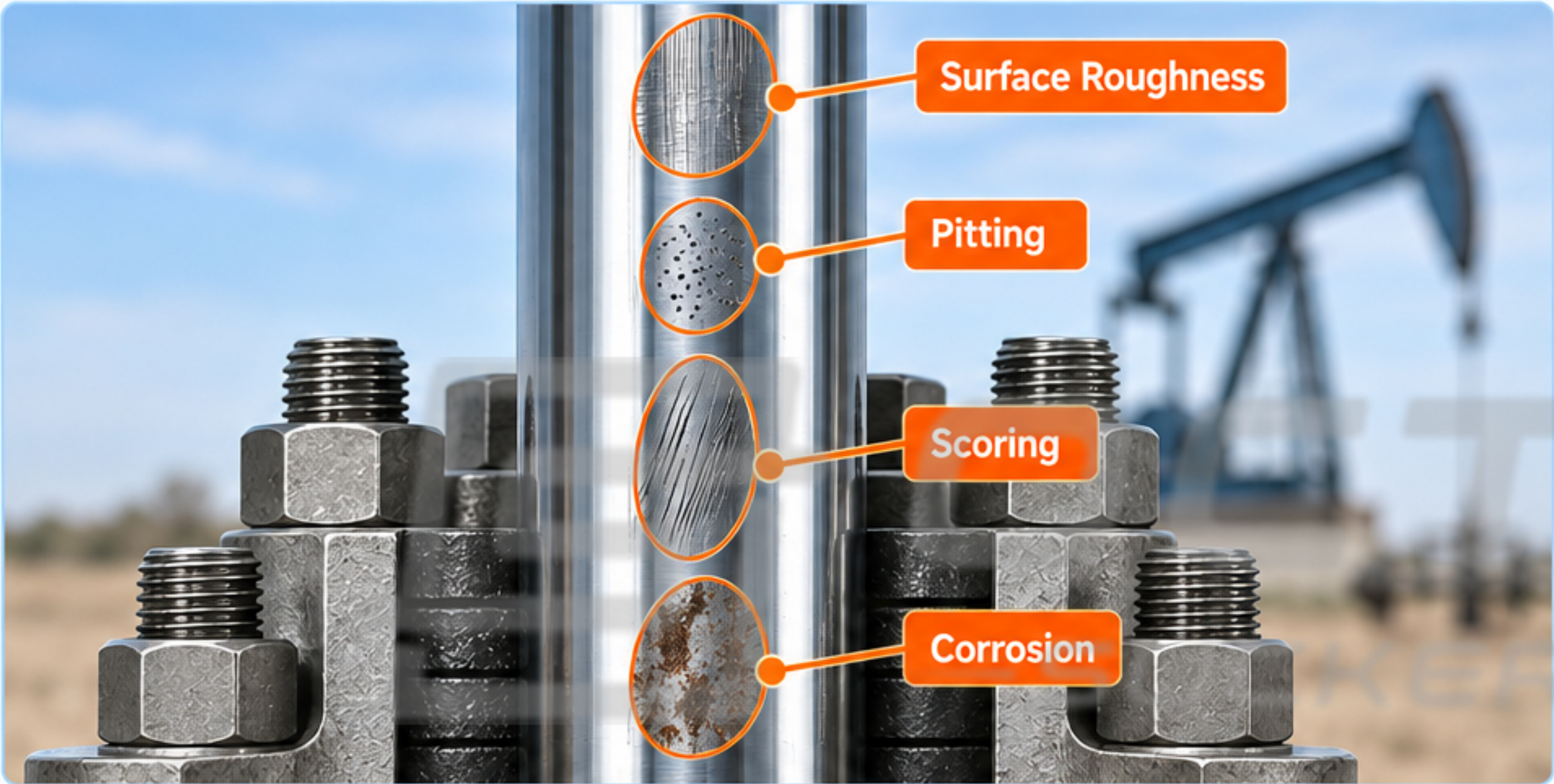
Polished rod operates at the interface between the surface pumping equipment and the well system. During every pumping cycle, the rod moves through the stuffing box while carrying axial load from the rod string.

Therefore, the polished section must maintain controlled surface finish, straightness and dimensional accuracy to achieve stable packing contact and minimize leakage risk.

Key Surface Requirements

Surface Parameter	Engineering Function
Surface Finish	Controls packing contact and friction
OD Accuracy	Maintains sealing pressure
Straightness	Prevents uneven packing wear
Surface Integrity	Reduces leakage paths and damage

Surface Damage Mechanisms and Failure Prevention



Damage Mechanism



How Surface Damage Leads to Failure

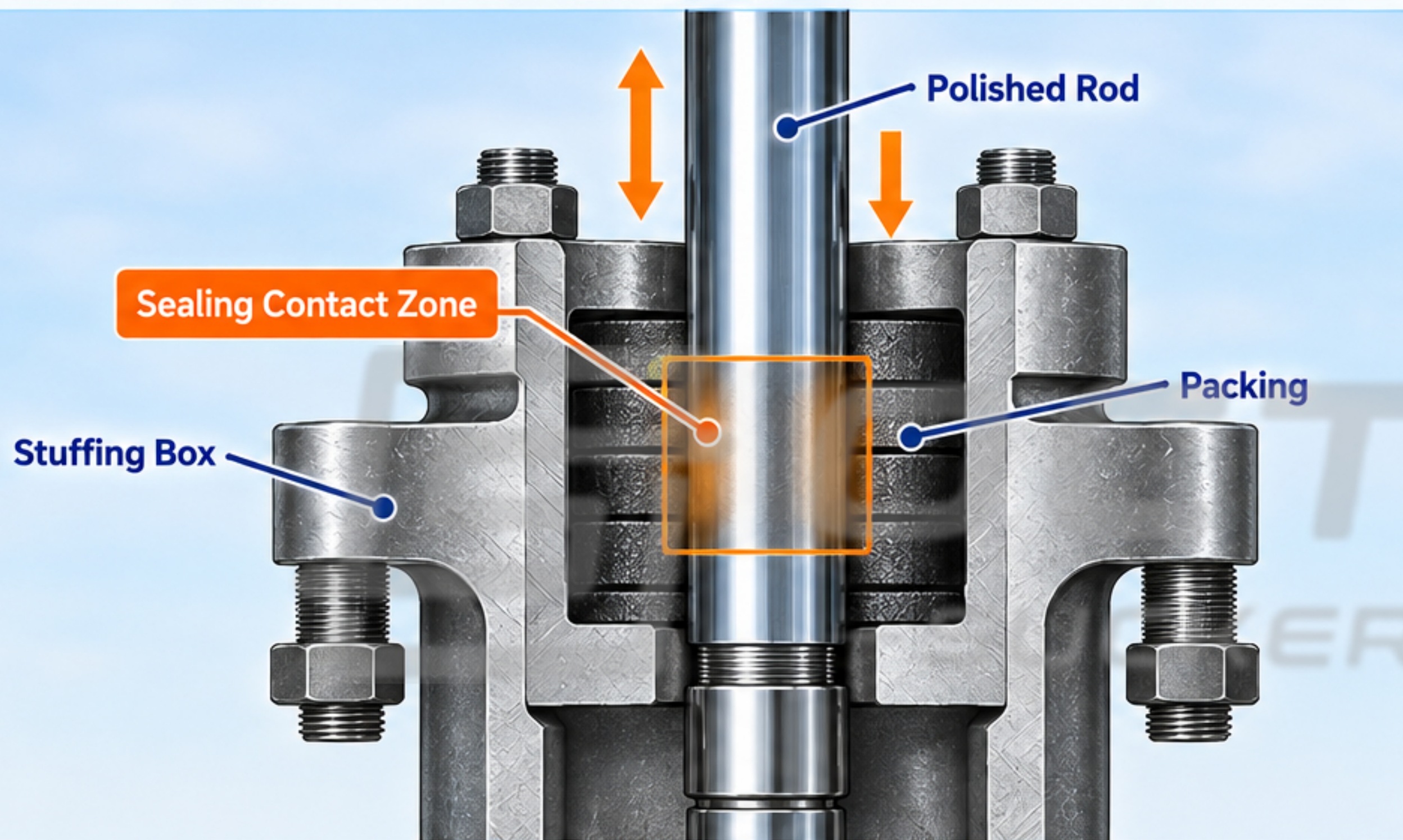
During service, the polished rod works as a moving sealing surface while carrying rod-string load. Surface roughness, pits, scoring marks and corrosion disturb packing contact, increase friction or leakage paths, and can accelerate localized wear.

Therefore, failure prevention depends on controlling surface finish, dimensional stability, alignment and surface protection according to service conditions.

Failure Effect

Damage	Result
Roughness	Packing wear
Pitting	Leakage risk
Scoring	Seal damage
Corrosion	Surface degradation

Stuffing Box Sealing Performance



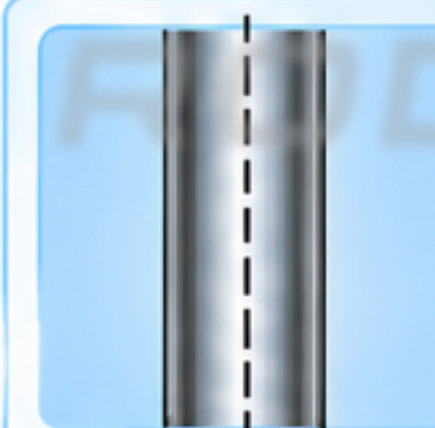
Surface Finish

Controls friction and packing contact stability



OD Accuracy

Maintains sealing pressure around the rod



Straightness

Prevents uneven packing wear and leakage risk

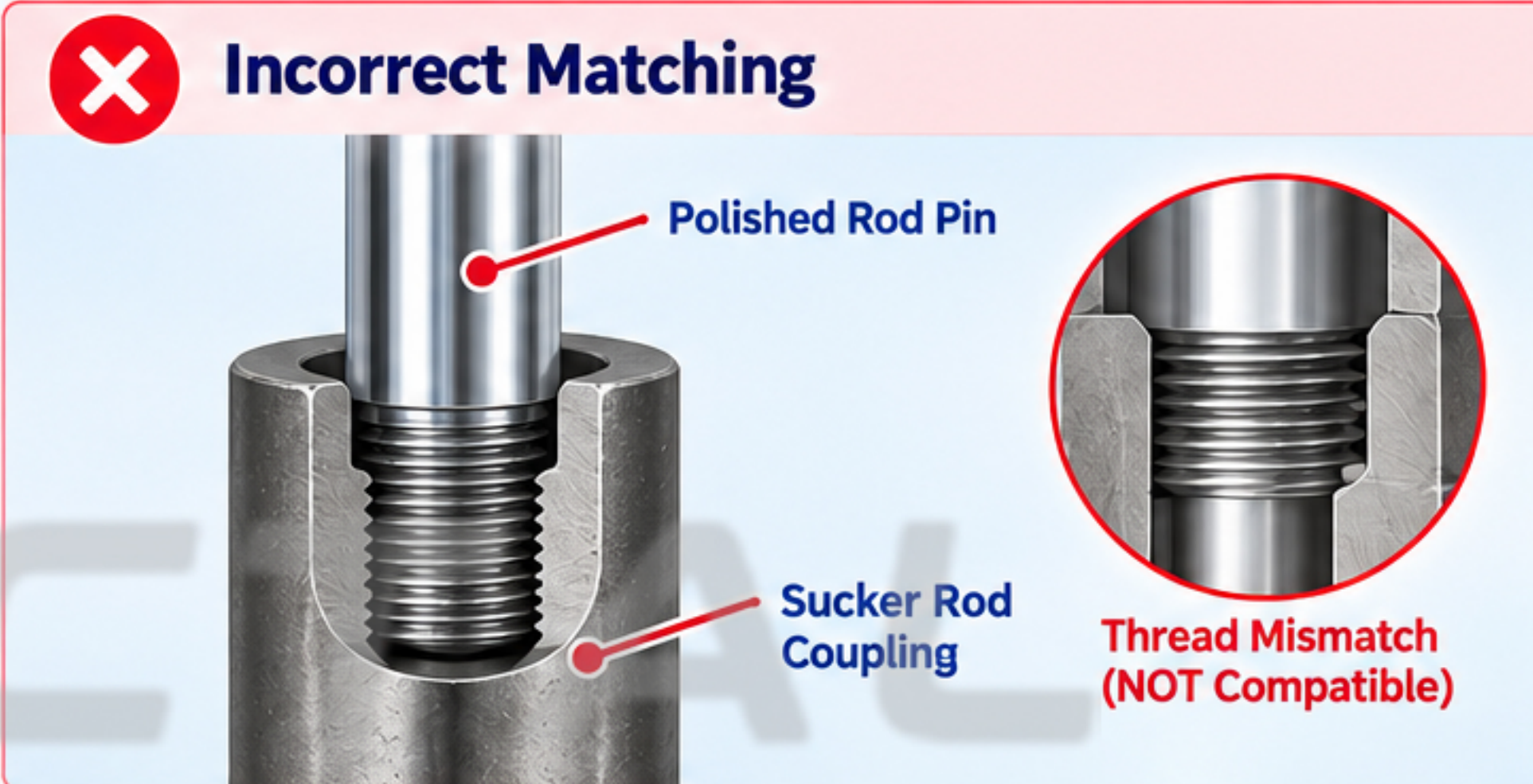
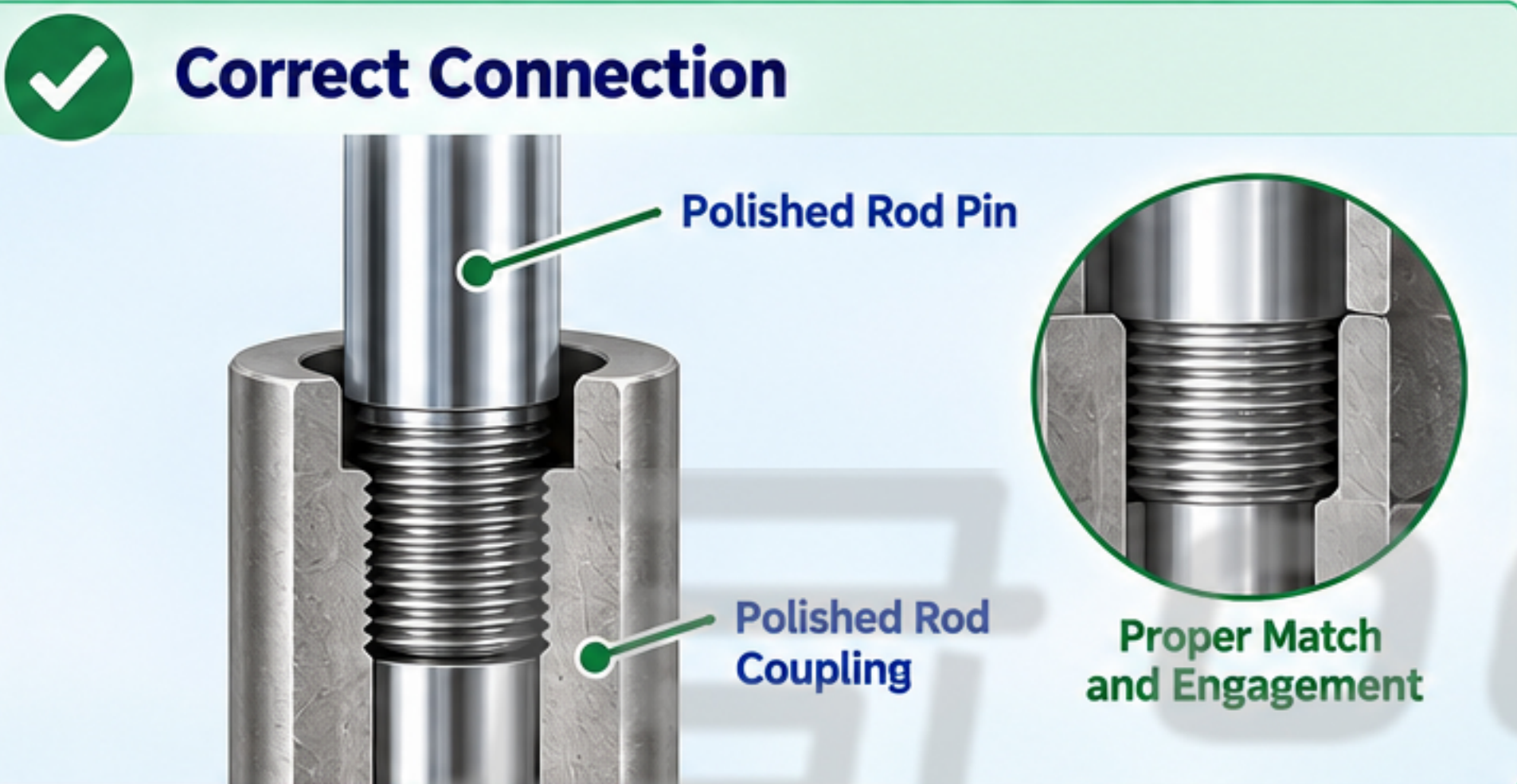
Why Sealing Performance Matters

The stuffing box seals around the moving polished rod while the rod transfers axial load into the sucker rod string. Stable sealing depends on a controlled polished surface, accurate outside diameter and good straightness so the packing can maintain uniform contact during repeated reciprocating cycles.



Sealing performance depends on the combined control of rod surface condition, dimensional accuracy and packing contact.

Connection Integrity and Coupling Compatibility



Correct coupling selection is essential because similar nominal sizes do not always indicate identical thread geometry or load-transfer capability.

Why Connection Integrity Matters

The polished rod connection transfers axial load from the surface rod into the sucker rod string. Connection performance depends on thread engagement, shoulder contact and the compatibility of the mating coupling.

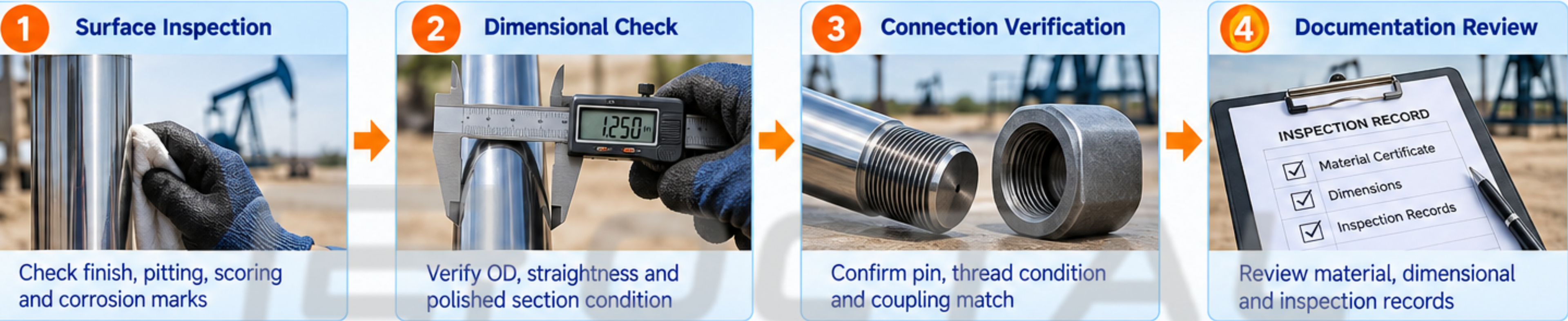
A dimensionally similar but incorrect coupling can reduce proper makeup quality and disturb the intended load path. For this reason, polished rod pin geometry and coupling selection should be verified together during supply and replacement.

Connection Risk Factors

Item	Effect
Thread Geometry	Load transfer
Shoulder Contact	Axial support
Coupling Match	Connection integrity
Thread Engagement	Makeup quality
Alignment	Stress distribution

Failure Prevention Checklist

Field Inspection Workflow



Inspection Control Points

Inspection Item	Verification Focus	Failure Prevention Purpose
Surface Condition	Finish quality, pits, scoring, corrosion	Reduce leakage risk and packing wear
Dimensional Accuracy	OD, straightness, sealing section	Maintain stable stuffing-box sealing
Connection Condition	Pin geometry, thread condition, shoulder contact	Protect load transfer integrity
Coupling Match	Correct polished rod coupling	Avoid mismatch and connection damage
Traceability Documents	Material certificate, inspection and test records	Verify product conformity before service



INSPECTION SUMMARY

Failure prevention depends on systematic inspection of surface condition, dimensions, connection fit and technical records before the polished rod is placed in service.