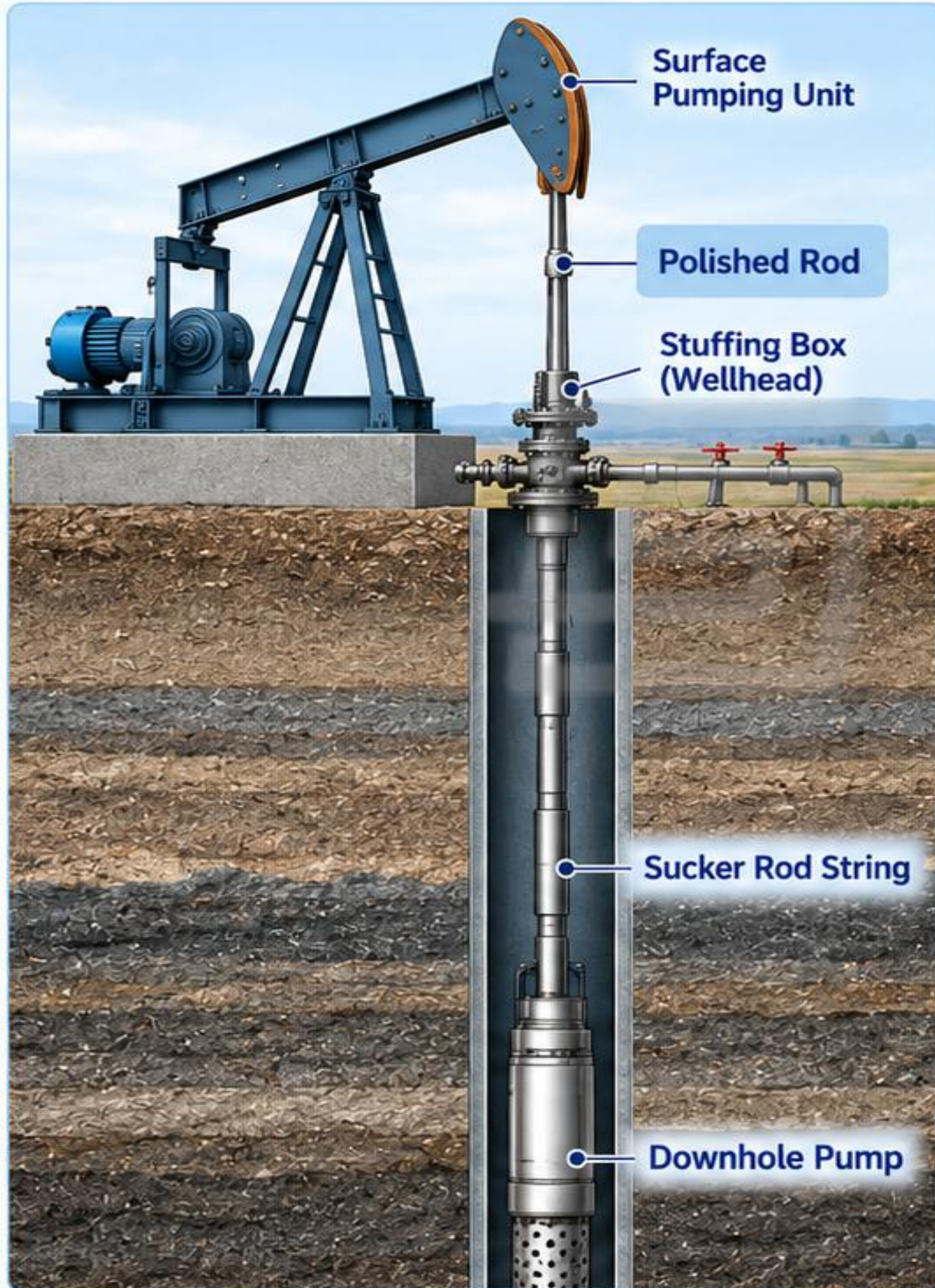


Polished Rod Selection Overview



Polished Rod in Rod-Lift System

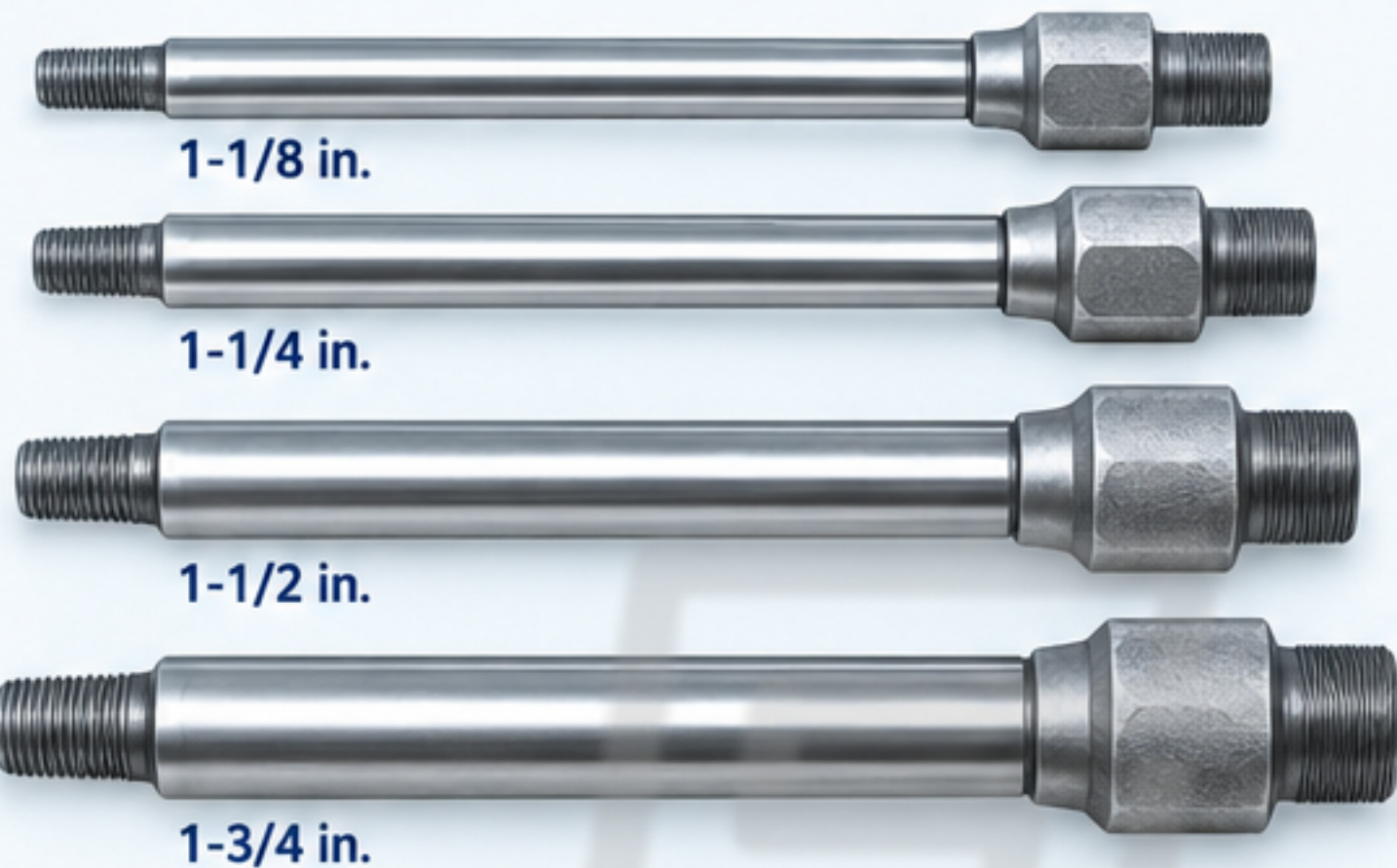
Polished rod is the surface-end load-carrying component in a sucker rod pumping system. It connects the surface pumping unit to the sucker rod string through the stuffing box at the wellhead, where dynamic sealing occurs.

During pumping cycles, the polished rod transmits axial load and reciprocating movement from the surface unit to the downhole sucker rod string. Proper selection requires consideration of diameter, material strength, surface condition, connection design and operating environment.

Key Selection Factors

Selection Factor	Engineering Influence
Rod-string loading	Determines required load capacity
Stuffing box compatibility	Controls sealing performance
Diameter selection	Affects cross-sectional area and nominal stress
Connection design	Ensures proper load transfer
Service environment	Determines material and surface requirements

Polished Rod Diameter Selection and Load Capacity



Larger diameter =
larger mechanical
section

Effect of Diameter on Mechanical Section

Polished rod diameter directly affects the available steel cross-sectional area. A larger diameter provides a larger load-bearing section and reduces nominal stress under the same axial loading condition.

Diameter selection should therefore be evaluated together with stuffing-box compatibility, connection design and overall rod-lift requirements.

Nominal Stress Comparison Under Different Axial Loads

Size	Cross-Sectional Area	Stress at 60 kN	Stress at 80 kN	Stress at 100 kN
1-1/8 in.	641.5 mm ²	93.5 MPa	124.7 MPa	155.9 MPa
1-1/4 in.	791.7 mm ²	75.8 MPa	101.0 MPa	126.3 MPa
1-1/2 in.	1140.1 mm ²	52.6 MPa	70.2 MPa	87.7 MPa
1-3/4 in.	1551.8 mm ²	38.7 MPa	51.6 MPa	64.4 MPa

Values compare nominal stress under the same axial loading and show the geometric effect of diameter increase.



KEY TAKEAWAY

At the same axial load, increasing polished rod diameter reduces nominal stress by increasing the effective steel section. Final size selection should also consider connection compatibility and stuffing-box requirements.

Material and Configuration Selection

Polished rod selection cannot be based on diameter alone. Actual selection must consider mechanical loading, sealing duty, produced-fluid conditions and service environment to ensure reliable operation and optimal service life.

Material Selection

Polished rods are available in different material routes according to mechanical loading and service conditions.

Material Route	Typical Characteristics	Suitable Conditions
Carbon Steel	Balanced strength and cost performance	Conventional rod-lift applications
Alloy Steel	Higher mechanical property requirements	Higher loading conditions
Stainless / Corrosion-Resistant Material	Improved corrosion resistance	Aggressive produced fluids

Common Polished Rod Configurations

Configuration	Main Feature	Typical Application
Regular Polished Rod	Standard polished section and connection	Conventional pumping systems
End-Upset Polished Rod	Increased connection section	Higher load and longer stroke operation
Spray-Metal Polished Rod	Wear-resistant surface protection	Abrasive or corrosive service
Corrosion-Resistant Polished Rod	Material-focused corrosion resistance	Severe corrosion environments

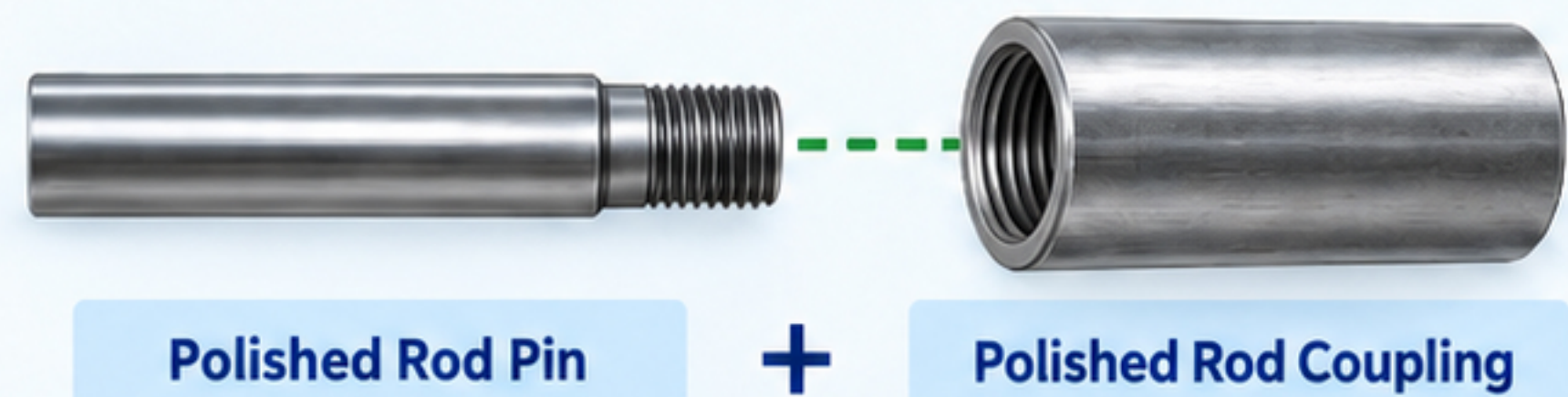


SELECTION SUMMARY

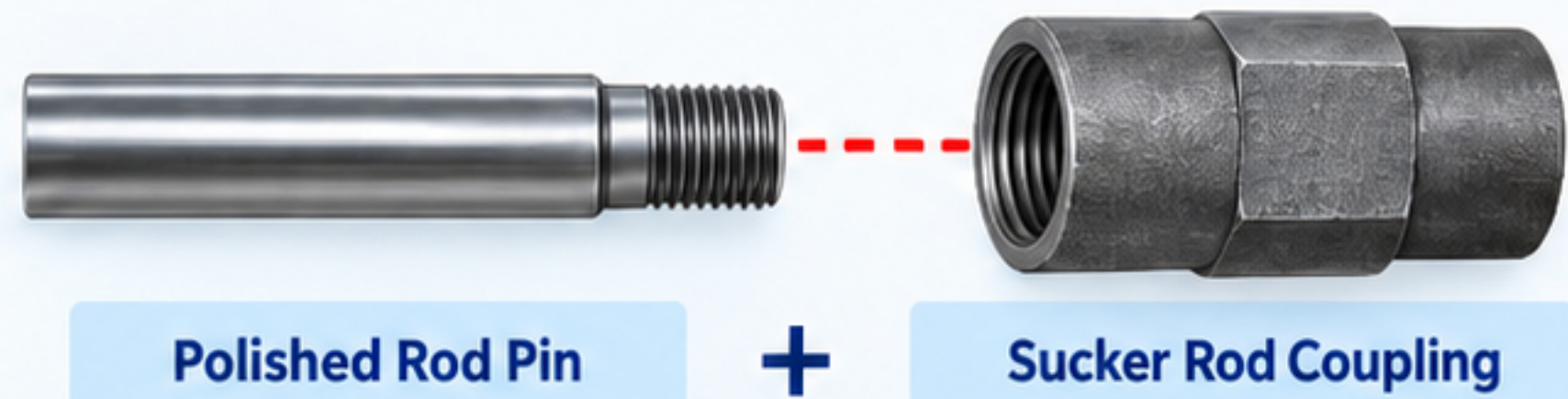
The selected configuration should match the combined requirements of mechanical loading, sealing performance and service environment rather than nominal diameter alone.

Main Visual

✓ **Correct**



✗ **Incorrect**



Connection Compatibility

The polished rod connection transfers mechanical load from the surface rod into the sucker rod string. Correct coupling selection is essential because similar nominal sizes do not always indicate identical thread geometry or load-transfer capability.

Connection Feature	Engineering Function
Thread profile	Provides mechanical engagement
Thread geometry	Controls connection fit
Shoulder contact	Transfers axial load
Coupling compatibility	Maintains proper load path
Alignment	Reduces uneven loading

Stuffing Box Section

Surface Sealing Requirements

Parameter	Effect on Operation
Surface finish	Controls packing contact
Straightness	Maintains uniform sealing
OD accuracy	Controls sealing pressure
Surface damage	May cause leakage or wear



Summary:

Reliable polished rod service depends on both correct connection matching and stable sealing performance at the stuffing box.

Polished Rod Selection Checklist

Before procurement, polished rod selection should be checked against the actual rod-lift system rather than a single nominal dimension. Diameter, length, material, connection compatibility and surface condition should all be verified together.

Engineering Checklist Before Purchase

Item	Confirmation Required
Diameter	Match required load and stuffing box
Length	Match pumping unit stroke
Material	Match service environment
Configuration	Select based on loading and wear conditions
Connection	Verify coupling compatibility
Surface Condition	Confirm sealing requirements
Inspection Documents	Material, dimensional and quality records

Required Documentation

Document	Purpose
Material Certificate	Verify steel grade and traceability
Mechanical Test Report	Confirm mechanical properties
Dimensional Inspection	Verify OD, length and geometry
Thread Inspection Record	Confirm connection accuracy



CHECKLIST SUMMARY

A reliable polished rod order should confirm size, service conditions, connection compatibility and required inspection records before production and shipment.