



ROD-KNUCKLE™ ENVIRONMENTAL BOP STUFFING BOX

Through extensive research and comprehensive field testing, Nelgar Services Inc. has designed a patented **Rod-Knuckle™ Environmental BOP Stuffing Box**.

The **Rod-Knuckle™** features the following advantages over other major competitors’.

Features	Benefits
Dual packing	Superior environmental protection - the top (secondary) packing provides a positive seal when the bottom (primary) packing fails.
Alignment Tool	Reduce side loading on top packing - the top packing rotates with the polished rod when a temporary misalignment exists. Makes it easy to obtain perfect pump jack to wellhead alignment.
Check valve	Prevent costly blowouts – specially constructed for exceptional strength, the check valve closes in the event of a polished rod failure and provides a reliable shut-off.
Optional pressure shut-down switch	Early detection of bottom packing failure – utilize control chamber pressure resulting from a bottom (primary) packing failure.
Optional lubrication systems	Prolong packing life – self-contained Knuckle Buddy and Swedge lubrication systems.
Quick and easy maintenance (easiest in industry)	Reduce expenses and save time – wearable parts can be easily replaced without lifting any components of the Rod-Knuckle™ over the polished rod.
Low profile, light weight and rugged	Build to last, easy to install and maintain. “NOT YOUR WEAK LINK”

The **Rod-Knuckle™ Environmental BOP Stuffing Box** is tested to 10,500 psi. It withstands 42,000 lbs top load without crushing the top and bottom packing. The check valves are specially constructed for exceptional strength. Its unique **knuckle** design allows the top (secondary) packing to rotate with the polished rod when a misalignment exists. The **Rod-Knuckle™** can also be utilized as an alignment tool. It is suitable for regular, sour and high temperature services.



The **Rod-Knuckle™** is a cost effective and durable wellhead accessory designed to protect and preserve the environment. Its operation is simple and reliable.

SPECIFICATIONS

Size	polished rod:	1-1/2", 1-1/4"
	flow tee connection:	2-3/8" EUE, 2-7/8" EUE, 3-1/2" EUE, 3" API line pipe, 4"API line pipe, 5.5"LTC
	flange connection:	2-9/16"-5M-R27, 3-1/2"-3M-R31, 5 1/8"-3M-R41

Pressure (psi)	5,000 (tested to 10,500 psi)
Top load (lbs)	42,000 maximum (without crushing top and bottom packing)
Operating Temperature (°F)	-50 and up

Dimensions	16.5"H x 5.5"OD
Weight	45 lbs

Material	body	4140 HTSR steel (heat treated stress relief)
	check valve	regular services – Delrin® 511P NC010 acetal resin sour services – Delrin® 511P NC010 acetal resin high temperature services – 6061-T6 aluminum (solution heat treated and artificially aged) sour high temperature services – PEEK™ polymer
	brass rings	ASTM B505-08
	packing	available for different services and applications

- * Exceeded PSAC IRP Minimum Wellhead Requirements
- ** Passed ASTM A370 Standard Test for Mechanical Testing of Steel Products



Flow Tee Connection Model



Flange Connection Model

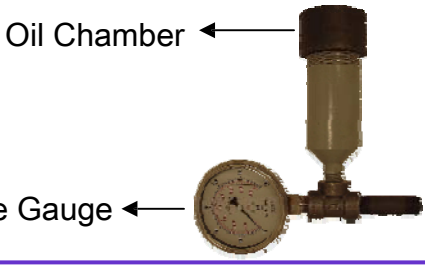
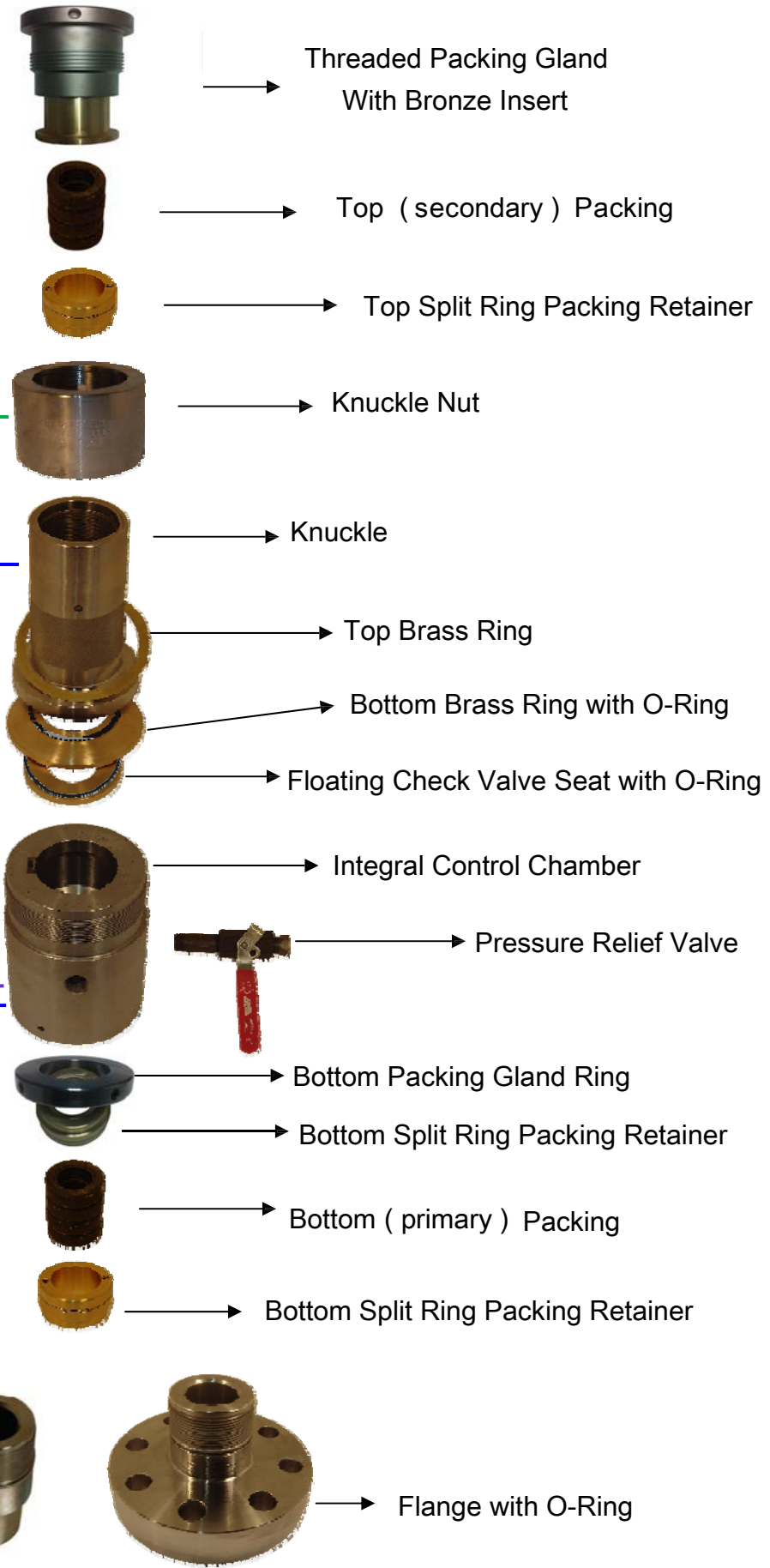


Rod Knuckle™ Operation Diagram

Two places to use spanner wrench for access to the packing.

Two thumb screws must also be loosened for access to the packing. They must be re-tightened after each service. (finger-tight only)

Set-screw is used to secure knuckle



Flow Tee Adapter with O-Ring

Flange with O-Ring



INDUSTRY AT A GLANCE

Feature	Nelgar Rod-Knuckle™	Red Wing Super B7	Opal HF	Dura PCCV	Hercules PCSB	Production Safety HT	Galaxy
Dual packing	Yes	Yes	Yes	Yes	Yes	No	Yes
Different packing required	No (same for both)	No	Yes (2 different types)	Yes (2 different types)	Yes (3 different types)	N/A	Yes (2 different types)
Maximum top load without damaging packing	42000lbs	40000lbs	100lbs***	40000lbs***	100lbs***	40000lbs	40000lbs***
Rotating top packing and side loading relief	Yes	No	No	No	No	No	No
Integral BOP (check valve incorporated)	Yes (1 piece)	Yes (1 piece)	3 pieces	2 pieces (sold separately)	Add-on required (sold separately)	Yes (1 piece)	None
Check valve causes damage to polished rod	No	Yes	Yes	Yes	Yes	Yes	Yes
Rated pressure (psi)	5,000	2,500	2,500	2,000	1,500	3,000	2,000
Testing pressure (psi)	10,500	5,000	4,000	4,000	N/A	N/A	4,000
Operating temperature (°F)	-50 and up	-40 and up	-15 and up	-15 and up	-15 and up	-40 and up	-15 and up
Pressure shut-down switch	Yes	Yes	No	Yes	No	No	Yes
Lubrication systems	Yes	No	No	No	No	No	No
Easy access to check valve and change parts	Yes	No	No	No	No	No	N/A
Height (in)	16.5	20.4	24	25	33	12	25
Weight (lbs)	45	85	7	65	112	45	65
Main body material	4140 HTSR** steel	4140 steel	ductile* steel	ductile* steel	ductile* iron	4140 steel	ductile* steel

* PSAC IRP 5.2.4 – Wellhead equipment manufactured from ductile iron is not suitable for use in western Canada when exposed to extremely low ambient temperatures.

** HTSR - heat treated stress relief

*** At temps above -15F (could fail below)