

VERTICAL MULTISTAGE VS. HORIZONTAL COMPARISON OF FEATURES

FEATURE	VERTICAL	HORIZONTAL
(A) Seal Replacement	<ul style="list-style-type: none"> The Fisher Vertical Pump has a single stuffing box Only one cartridge removed and replaced directly through a spacer gap in the rigid coupling. Estimated down time – 4 hours 	<ul style="list-style-type: none"> Two stuffing boxes Two cartridge mechanical seals require removal of bearing housings Double seal repair/replacement cost Estimated down time – 48 hours
(B) Coupling Alignment	<ul style="list-style-type: none"> With the Fisher Vertical Pump, driver and driven shafts are permanently aligned during initial assembly. Temperature changes and foundation settling do not affect alignment. 	<ul style="list-style-type: none"> Alignment must be constantly monitored for the effects of thermal growth and foundation settling.
(C) Low NPSH Available	<ul style="list-style-type: none"> The Fisher Vertical Pump can be arranged for zero NPSHa as in hydrocarbons at bubble point. Generous NPSHr margins can be provided for widely varying process conditions. 	<ul style="list-style-type: none"> Requires expensive booster pump installations or increasing elevation of suction vessel to prevent poor performance and mechanical damage due to cavitation.
(D) UPSTAGING/DESTAGING	<ul style="list-style-type: none"> The Fisher Vertical Pump has excellent upstaging capabilities often required by unforeseen process changes. Many times additional stages can be added without lengthening the pump. Unlimited de-staging capabilities due to modular inner casing design. 	<ul style="list-style-type: none"> No upstaging ability unless the pump is purchased initially de-staged. Limited de-staging capabilities. Pumping through blank volute stages results in much lower operating efficiency.
(E) Casing Repair/ Replacement	<ul style="list-style-type: none"> The Fisher modular inner casing design allows repair or replacement of individual stages when damaged by wear or corrosion. 	<ul style="list-style-type: none"> Single casing design requires repair of complete casing.
(F) More Stages VS. Increased Rotating Speed	<ul style="list-style-type: none"> Fisher Vertical Pumps can be staged to meet head requirements at standard motor speeds, reducing wear. 	<p>Limited staging availability frequently requires expensive speed increasers and higher operating speeds to meet head requirements. Seal and bearing life is shortened by high rotational speed. Higher internal velocities coupled with wear concentrated on fewer stages adds to maintenance costs.</p>

<p>(G) Rotor Support</p>	<ul style="list-style-type: none"> • In the Fisher Vertical Pump the rotating element is suspended vertically. The shaft does not sag due to gravity as in a horizontal pump causing wear parts to rub at startup. • API bearing spacing dimensions in conjunction with hydraulic dampening forces assure rotor stability. 	<ul style="list-style-type: none"> • Rotor is suspended horizontally by its ends causing it to sag under its own weight. • Wear on casing and wear rings and inter-stage bushings is increased due to contact at startup and shutdown.
<p>(H) Diffuser VS. Volute</p>	<ul style="list-style-type: none"> • Fisher Vertical Pumps multi-vane diffuser volute achieves radial thrust balance under all performance curve conditions resulting in less wear on bearings and rings and lower overall vibration levels. 	<ul style="list-style-type: none"> • Single volute design allows radial thrust from the cutwater vanes to force the rotor directly against bushings and rings. • Dual volute configuration is better but still allows unbalanced radial loads due to casting variations in locating the cutwater vanes.