Appendix B

Patented Non-Bypassing Filtration:
A Better Way That Does Not Require High Crush Elements

In circuits where subjecting critical components to unfiltered oil is unacceptable, non-bypassing filters are used. The traditional non-bypassing filter does not include a bypass valve, providing assurance that the circulating oil is subjected to constant filtration. However, the continuous buildup of dirt particles on the filter element causes a steady increase in pressure drop. An extreme differential pressure across the element can crush it, sending dirt as well as fragments of the element downstream. High crush elements are used to solve this problem, but at a premium cost, since a high crush element costs significantly more than its standard counterpart. **Even more importantly, this system is not foolproof, because the possibility remains that someone may inadvertently replace a high-crush element with a standard element, which provides no protection against element collapse.**

There is a better way!

Schroeder's CFX30 series non-bypassing filters incorporate the use of a patented pressure drop limiting valve that maintains the differential pressure across the element below the element's collapse pressure rating. As the element accumulates dirt, the pressure drop increases across the element and, therefore, across the spool of the valve. At about 45 to 50 psi, the spool begins to move, restricting flow as needed to prevent the pressure drop from increasing further and compromising element integrity. As with a high crush element, the flow is eventually restricted to the point that the system will not function properly. However, the filter's dirt alarm® (change-element indicator) will be activated at an element pressure drop of about 30 psi, providing plenty of advance warning that the element is in need of replacement. **As with any non-bypassing filter, a system relief valve should be located upstream of the filter to provide protection in the event the element is not serviced.**

This design allows the CFX30 filters to safely use the lower cost standard elements, eliminating the need for expensive high-crush replacement elements. In addition, the initial cost of this filter and standard elements is less than a comparable blocked bypass filter with a high crush element.