



MECHANICAL SEAL PIPING PLANS

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WORLD WIDE
SEALING
SOLUTIONS

SINGLE SEAL

SINGLE SEAL

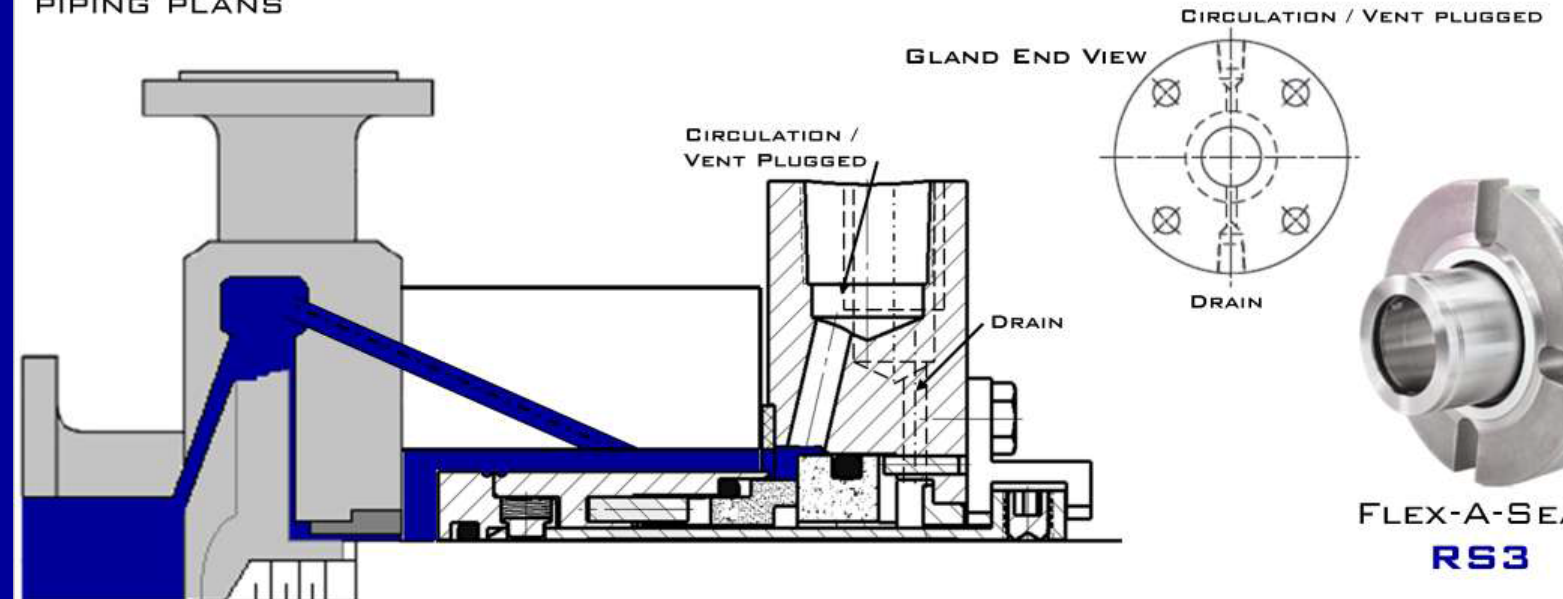
SINGLE SEAL

DUAL SEAL

CONTACT

PLAN - 01

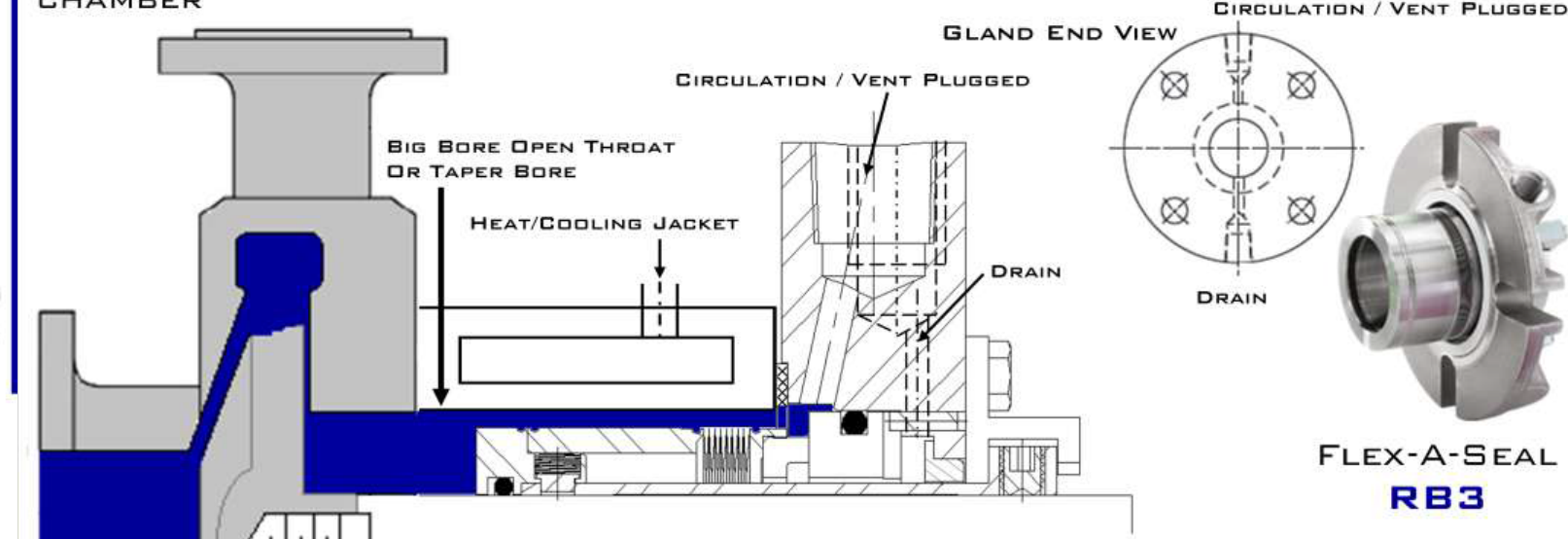
INTENT - FLUSH SYSTEM - HEAT REMOVAL - CLEAN PRODUCTS ONLY
BENEFITS - ALL INTERNAL PIPING - NO REPROCESSING OR CONTAMINATION OF PRODUCT - INTERNAL RECIRCULATION OF PUMP DISCHARGE TO THE SEAL CHAMBER
CONVENTION - HIGH VISCOSITY FLUIDS AT NORMAL AMBIENT TEMPERATURES TO MINIMIZE THE RISK OF FREEZING IF EXPOSED TO LOW TEMPERATURES IN EXTERNAL PIPING PLANS



INTERNAL SYSTEM

PLAN - 02

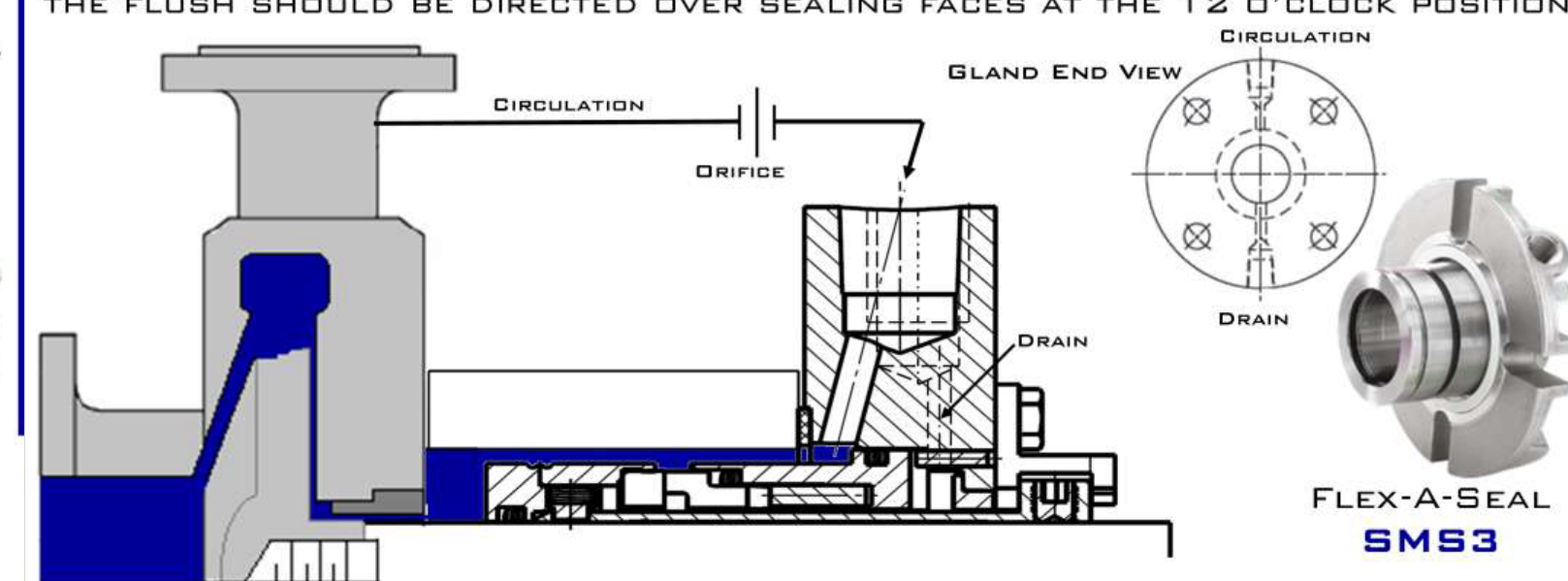
INTENT - SEAL-GENERATED HEAT IS REMOVED BY THE PROCESS FLUID, PUMP COMPONENTS AND SURROUNDING ENVIRONMENT
BENEFITS - NO EXTERNAL HARDWARE - SOLIDS AREN'T REINTRODUCED TO SEAL AREA - PUMP EFFICIENCY UNAFFECTED - NATURAL VENTING W/TAPER BORE BOX
CONVENTION - HOT OIL APPLICATION USED WITH PLAN 62 STEAM QUENCH AND/OR A COOLING JACKET - LOWER DUTY, CHEMICAL SERVICE PUMPS WITH TAPER BORE SEAL CHAMBER



INTERNAL SYSTEM

PLAN - 11

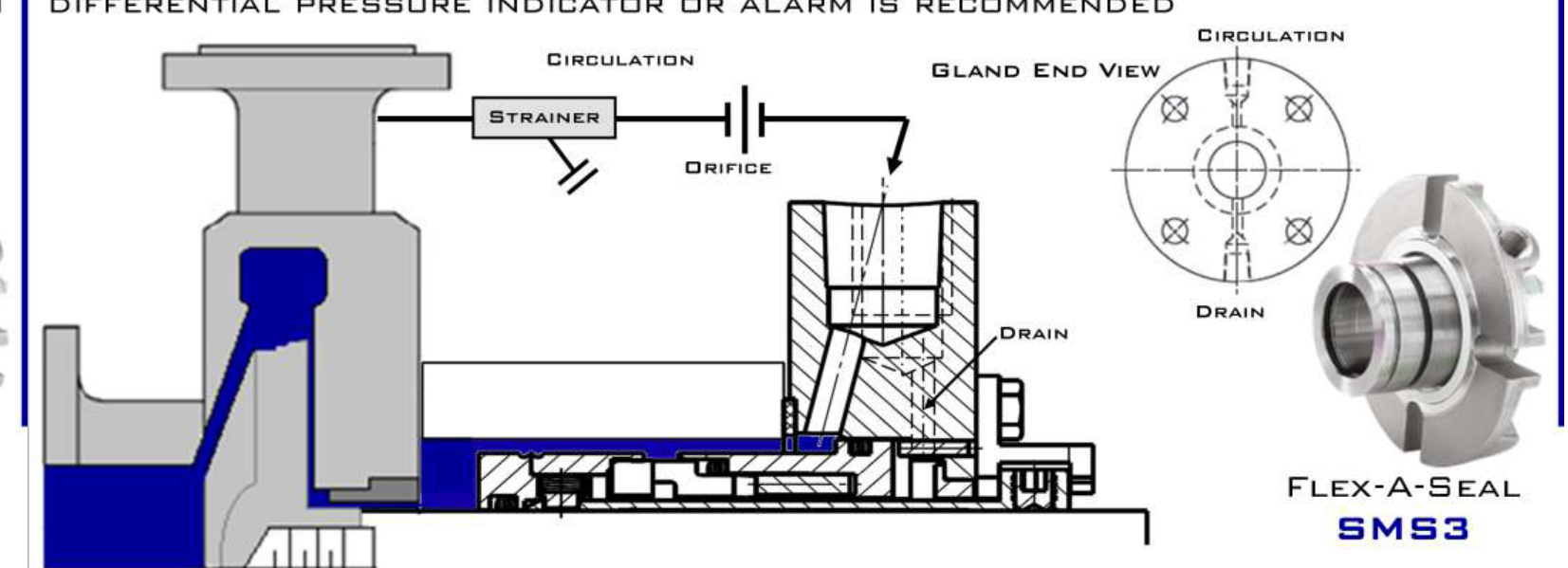
INTENT - FLUID FROM THE DISCHARGE OF THE PUMP PROVIDES COOLING AND LUBRICATION FOR THE SEAL FACE THRU A CONNECTION IN THE GLAND
BENEFITS - NO CONTAMINATION OF PRODUCT - NO REPROCESSING OF PRODUCT - SIMPLIFIED PIPING - DISSIPATES HEAT - CAN IMPROVE VAPOR PRESSURE MARGIN
CONVENTION - MOST COMMON FLUSH SEAL - CLEAN FLUIDS - RECOMMENDED THAT THE FLUSH SHOULD BE DIRECTED OVER SEALING FACES AT THE 12 O'CLOCK POSITION



RECIRCULATING SYSTEM

PLAN - 12

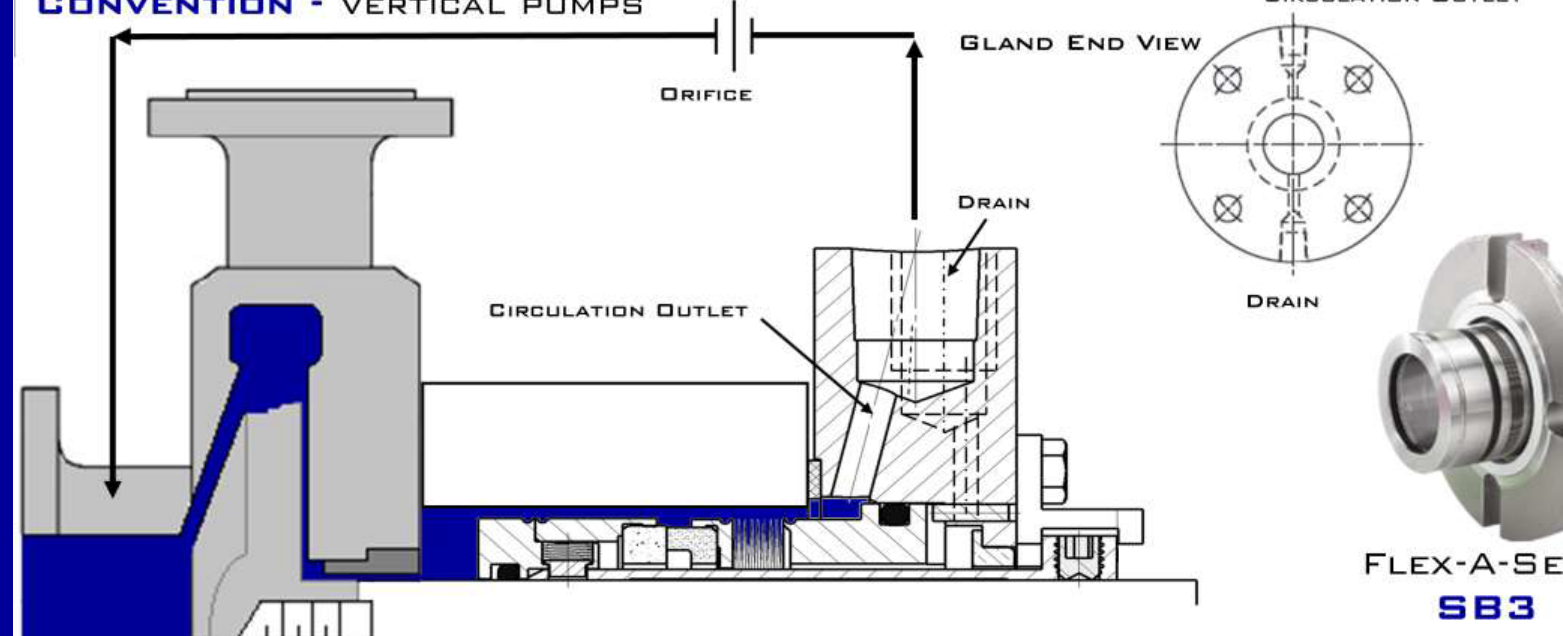
INTENT - SIMILAR TO PLAN 11 WITH A STRAINER TO REMOVE ABRASIVE PARTICLES
BENEFITS - NO CONTAMINATION OF PRODUCT - NO REPROCESSING OF PRODUCT - SIMPLIFIED PIPING - DISSIPATES HEAT - CAN IMPROVE VAPOR PRESSURE MARGIN
CONVENTION - CLEAN FLUIDS - FLEX-A-SEAL DOESN'T ADVISE DUE TO POTENTIAL BLOCKAGE OF STRAINER COULD LEAD TO FAILURE - IF USED, A FLOW INDICATOR, DIFFERENTIAL PRESSURE INDICATOR OR ALARM IS RECOMMENDED



RECIRCULATING SYSTEM

PLAN - 13

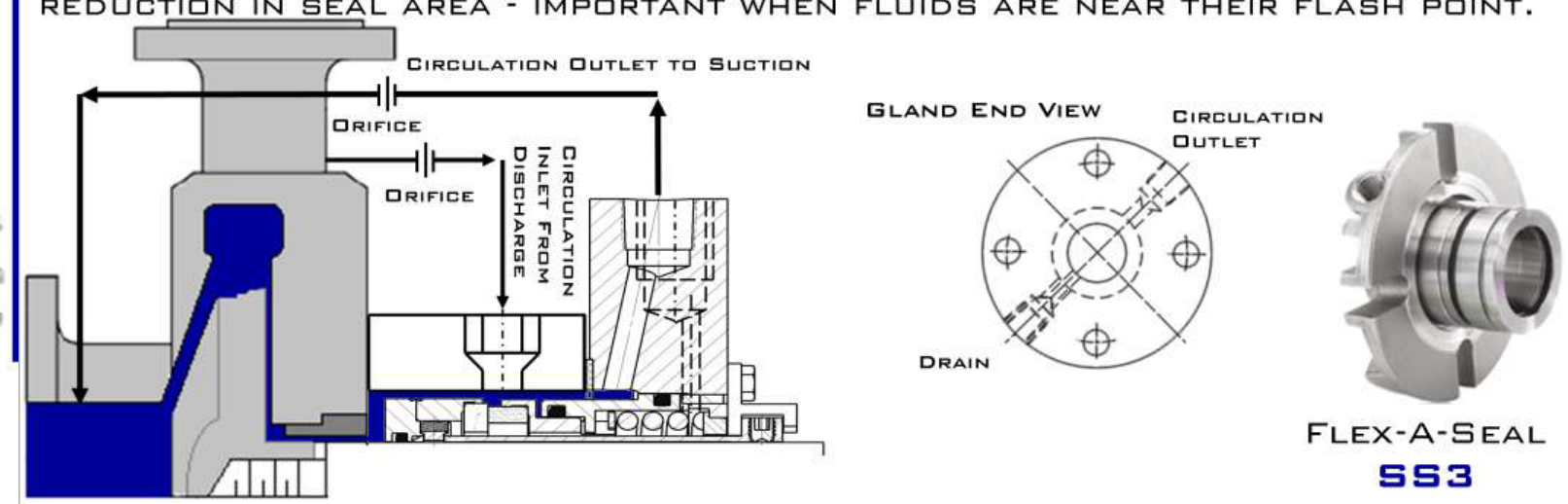
INTENT - FLUID CIRCULATED FROM SEAL CHAMBER BACK TO PUMP SUCTION - VENTS ALL GAS AND VAPORS OUT OF THE SEAL CHAMBER
BENEFITS - NO CONTAMINATION OF PRODUCT - NO REPROCESSING OF PRODUCT - POSSIBLE TO REDUCE SEAL CHAMBER PRESSURE - DISSIPATES HEAT
CONVENTION - VERTICAL PUMPS



RECIRCULATING SYSTEM

PLAN - 14

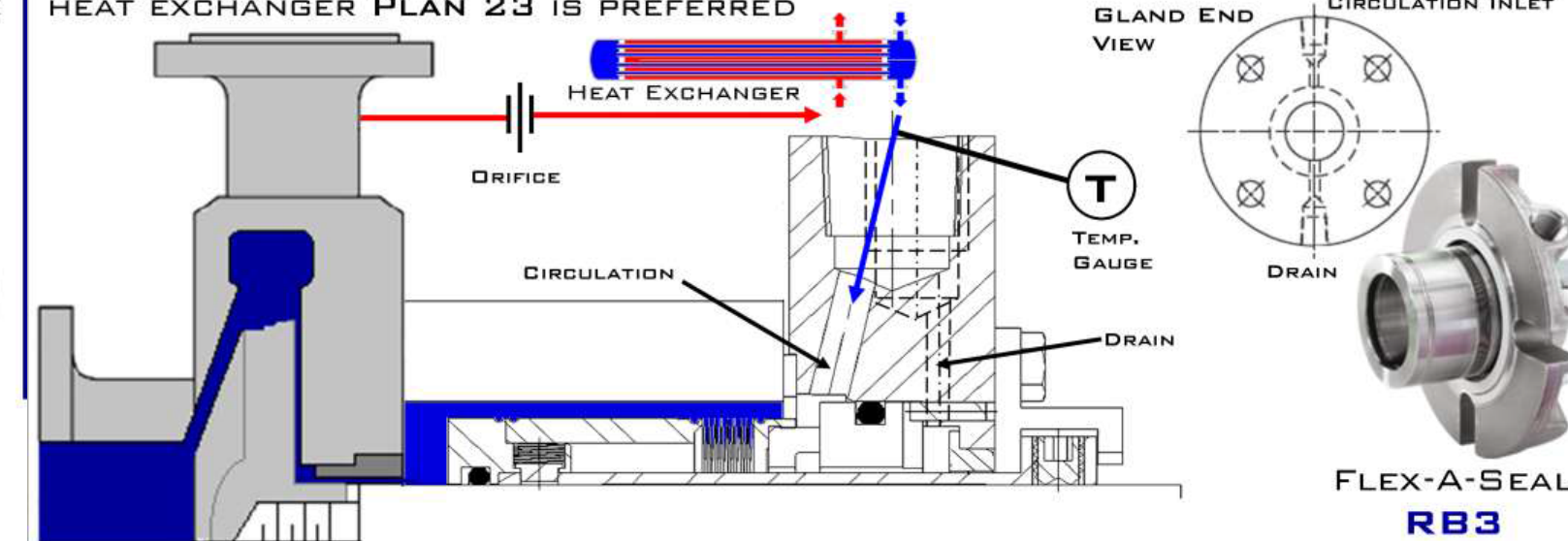
INTENT - COMBINATION OF PLANS 11 & 13 - FLUID TAKEN OFF PUMP DISCHARGE - SENT TO SEAL AND PIPED BACK TO PUMP SUCTION
BENEFITS - NO CONTAMINATION OF PRODUCT - NO REPROCESSING OF PRODUCT - POSSIBLE TO INCREASE SEAL CHAMBER PRESSURE - OPTIMIZED COOLING - ALLOWS COMPLETE VENTING OF THE SEAL CHAMBER
CONVENTION - COMMON ON VERTICAL PUMPS - ALLOWS COOLING AND FULL VENTING OF SEAL WITH PROPER LOCATION OF CIRCULATION OUTLET. HELPS MINIMIZE PRESSURE REDUCTION IN SEAL AREA - IMPORTANT WHEN FLUIDS ARE NEAR THEIR FLASH POINT.



RECIRCULATING SYSTEM

PLAN - 21

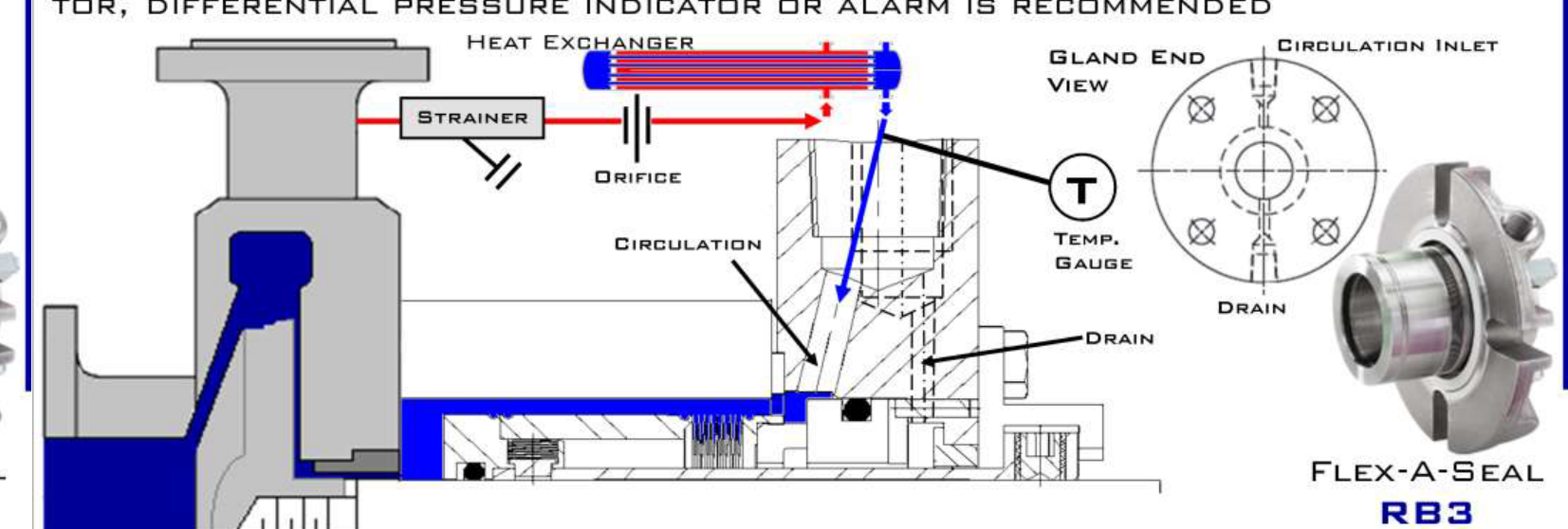
INTENT - COOLED VERSION OF PLAN 11 - PRODUCT FROM PUMP DISCHARGE IS DIRECTED THRU AN ORIFICE TO A HEAT EXCHANGER TO REDUCE TEMP, THEN TO SEAL
BENEFITS - PROCESS FLUID COOLS AND LUBRICATES SEAL - NO CONTAMINATION OF PRODUCT - COOLING IMPROVES LUBRICITY, REDUCES RISK OF VAPORIZATION AT SEAL
CONVENTION - FLUSH RECOMMENDED TO BE DIRECTED OVER SEALING FACES AT THE 12 O'CLOCK POSITION - DUE TO HIGHER ENERGY USE AND POTENTIAL FOULING OF HEAT EXCHANGER PLAN 23 IS PREFERRED



RECIRCULATING SYSTEM

PLAN - 22

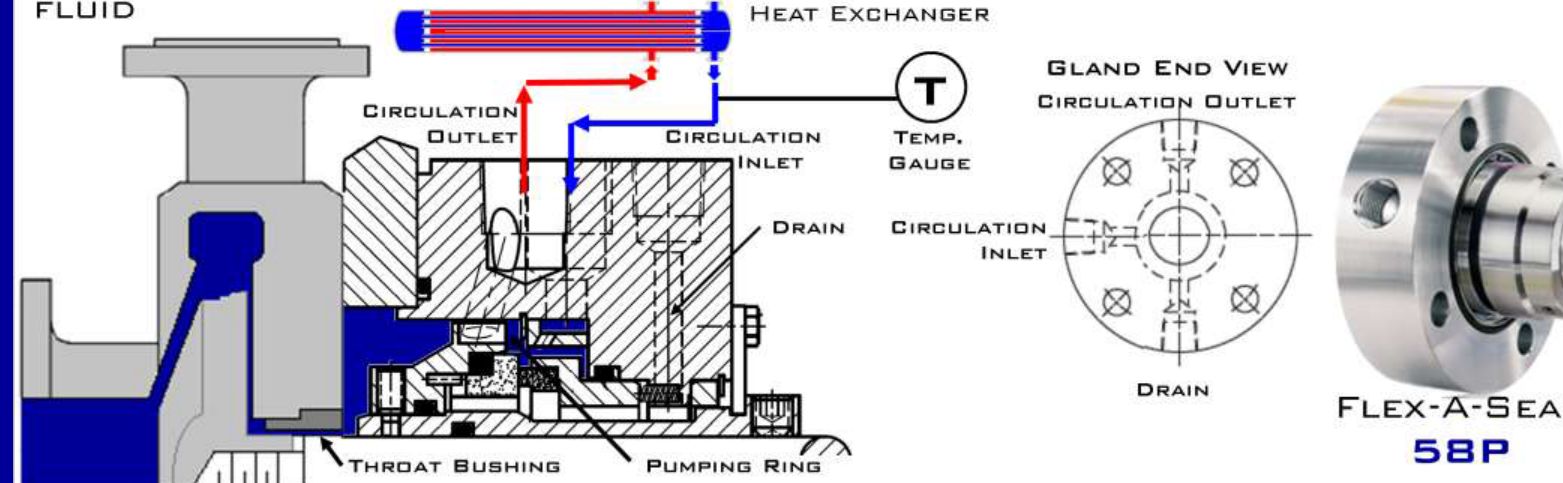
INTENT - SIMILAR TO PLAN 21 WITH A STRAINER TO REMOVE ABRASIVE PARTICLES DIRECTED THRU AN ORIFICE TO A HEAT EXCHANGER TO REDUCE TEMP, THEN TO SEAL
BENEFITS - PROCESS FLUID COOLS AND LUBRICATES SEAL - NO CONTAMINATION OF PRODUCT - COOLING IMPROVES LUBRICITY, REDUCES RISK OF VAPORIZATION AT SEAL
CONVENTION - CLEAN & COOLS FLUID - FLEX-A-SEAL DOESN'T ADVISE DUE TO POTENTIAL BLOCKAGE OF STRAINER COULD LEAD TO FAILURE - IF USED, A FLOW INDICATOR, DIFFERENTIAL PRESSURE INDICATOR OR ALARM IS RECOMMENDED



RECIRCULATING SYSTEM

PLAN - 23

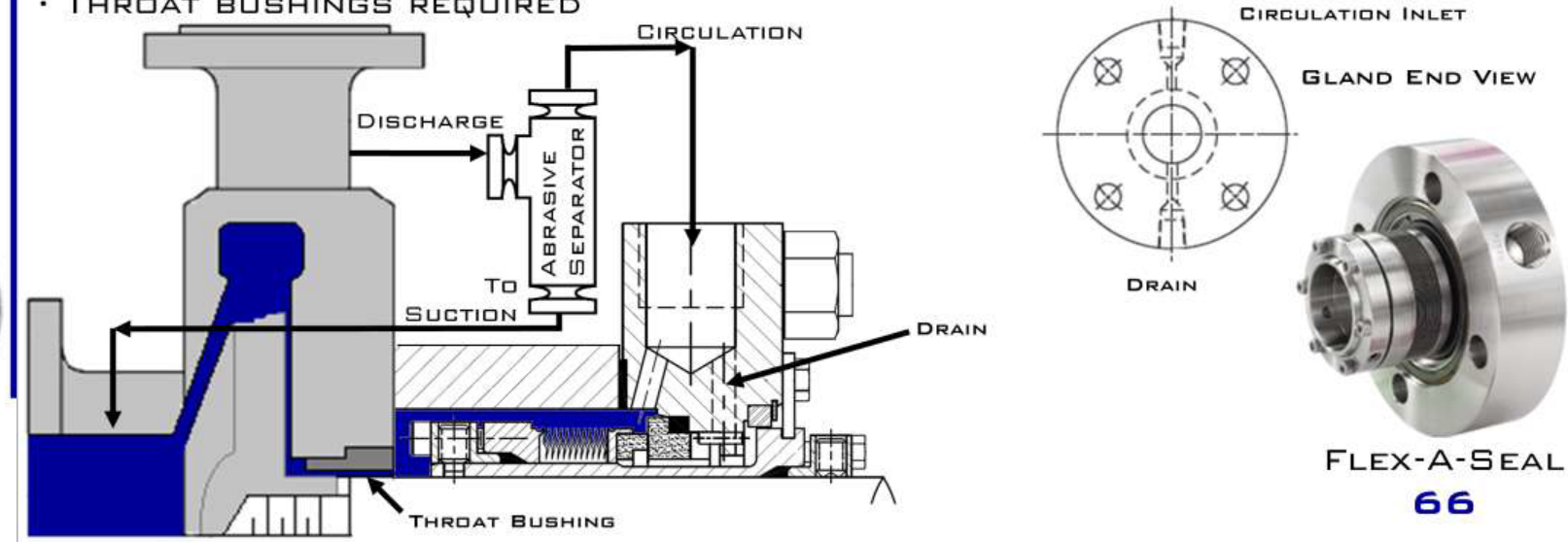
INTENT - CLOSED LOOP CIRCULATION SYSTEM - A PUMPING RING TO CIRCULATE PRODUCT THROUGH A HEAT EXCHANGER BACK TO THE SEAL
BENEFITS - NO DILUTION OF PROCESS STREAM - IMPROVED LUBRICITY, LOWER RISK OF VAPORIZATION IN THE SEAL CHAMBER - MORE ENERGY EFFICIENT THAN PLAN 21 - COOLER IS LESS LIKELY TO SCALE/FOUL - IDLE PUMP PIPED CORRECTLY CAN MAINTAIN COOLED SEAL CHAMBER BY THERMOSYPHON
CONVENTION - PREFERRED PIPING PLAN FOR BOILER FEED WATER AND HOT HYDRO CARBON APPLICATIONS - THROAT BUSHING ISOLATES SEAL CHAMBER FROM HOT PUMP FLUID



RECIRCULATING SYSTEM

PLAN - 31

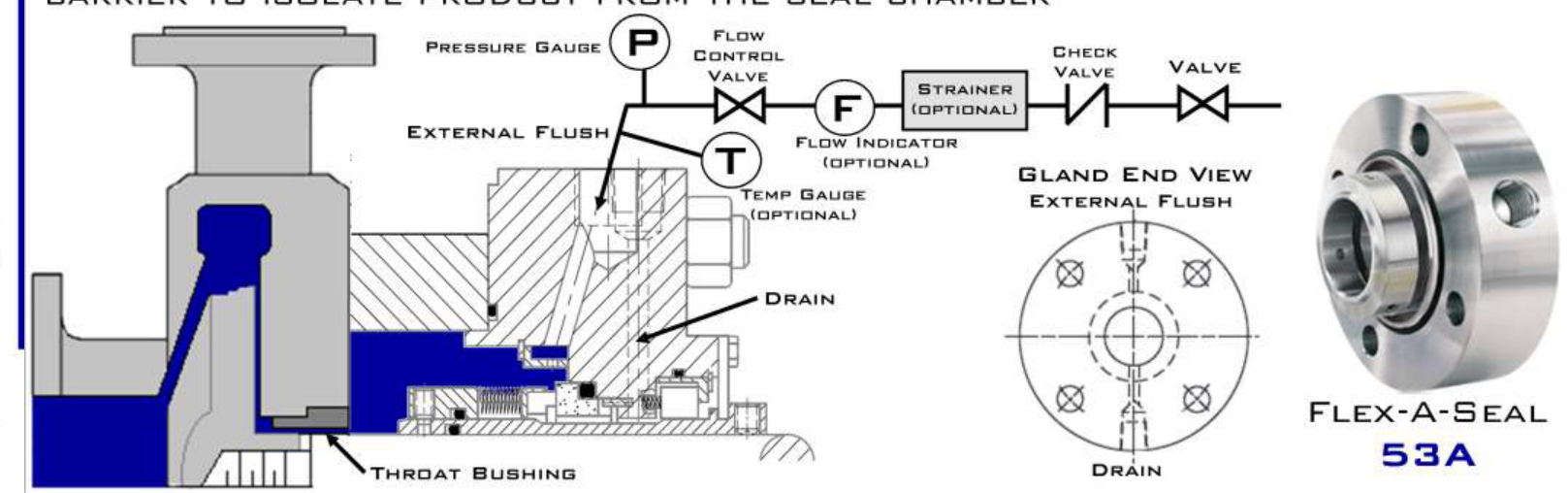
INTENT - SIMILAR TO PLAN 11 - ABRASIVE SEPARATOR ADDED TO THE FLUSH LINE - PRODUCT FROM THE DISCHARGE OF THE PUMP IS FED TO THE ABRASIVE SEPARATOR
BENEFITS - SOLIDS REMOVED FROM PRODUCT STREAM, RETURNED TO PUMP SUCTION - KEEPS SEAL CLEAN, COOL - ABRASIVE SEPARATOR DOESN'T HAVE TO BE CLEANED
CONVENTION - APPLICATIONS WITH SOLIDS LIKE SAND OR PIPE SLAG WITH A SPECIFIC GRAVITY AT LEAST TWICE THAT OF THE PROCESS FLUID WORK BEST - THROAT BUSHINGS REQUIRED



RECIRCULATION SYSTEM

PLAN - 32

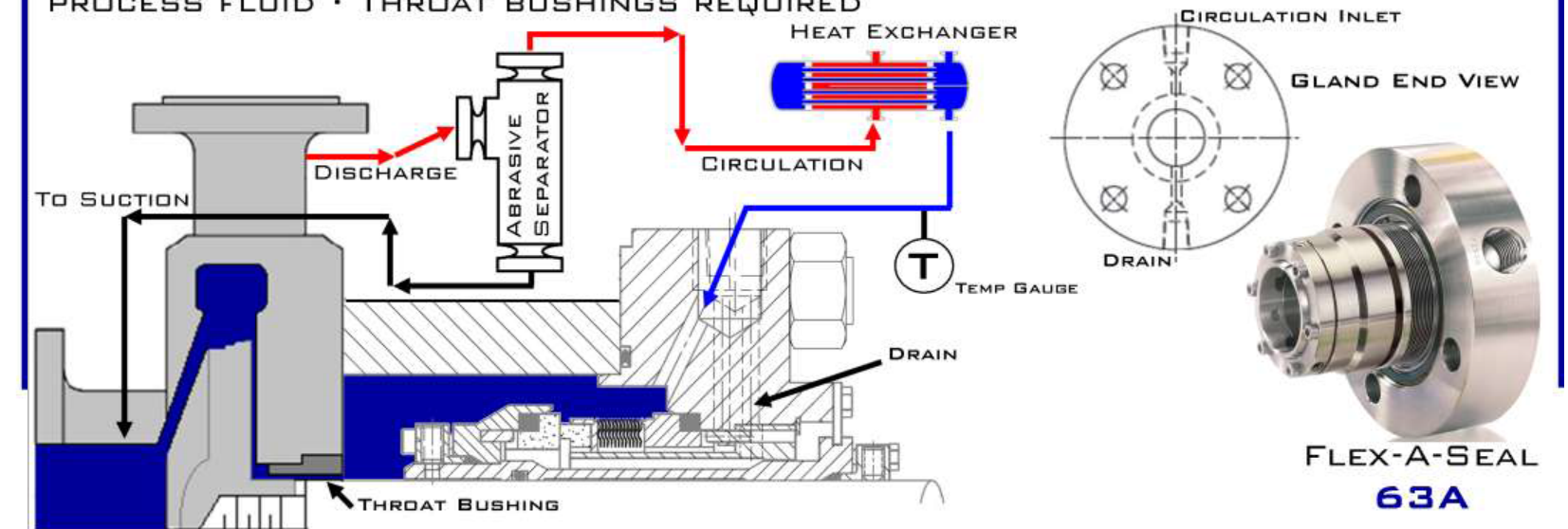
INTENT - USED IN SERVICES CONTAINING SOLIDS OR CONTAMINANTS, WHERE A CLEAN COOLER COMPATIBLE FLUSH AT A HIGHER PRESSURE WILL IMPROVE THE SEAL ENVIRONMENT - PRODUCT DILUTION WILL OCCUR
BENEFITS - CLEAN, COOL EXTERNAL FLUSH FLUID EXTENDS SEAL LIFE BY REMOVING HEAT AND KEEPING ABRASIVE AWAY FROM SEAL FACES
CONVENTION - APPLIED WITH A CLOSE-CLEARANCE THROAT BUSHING THAT FUNCTIONS AS A THROTTLING DEVICE TO RAISE SEAL CHAMBER PRESSURE OR ACT AS BARRIER TO ISOLATE PRODUCT FROM THE SEAL CHAMBER



EXTERNAL FLUSH SYSTEM

PLAN - 41

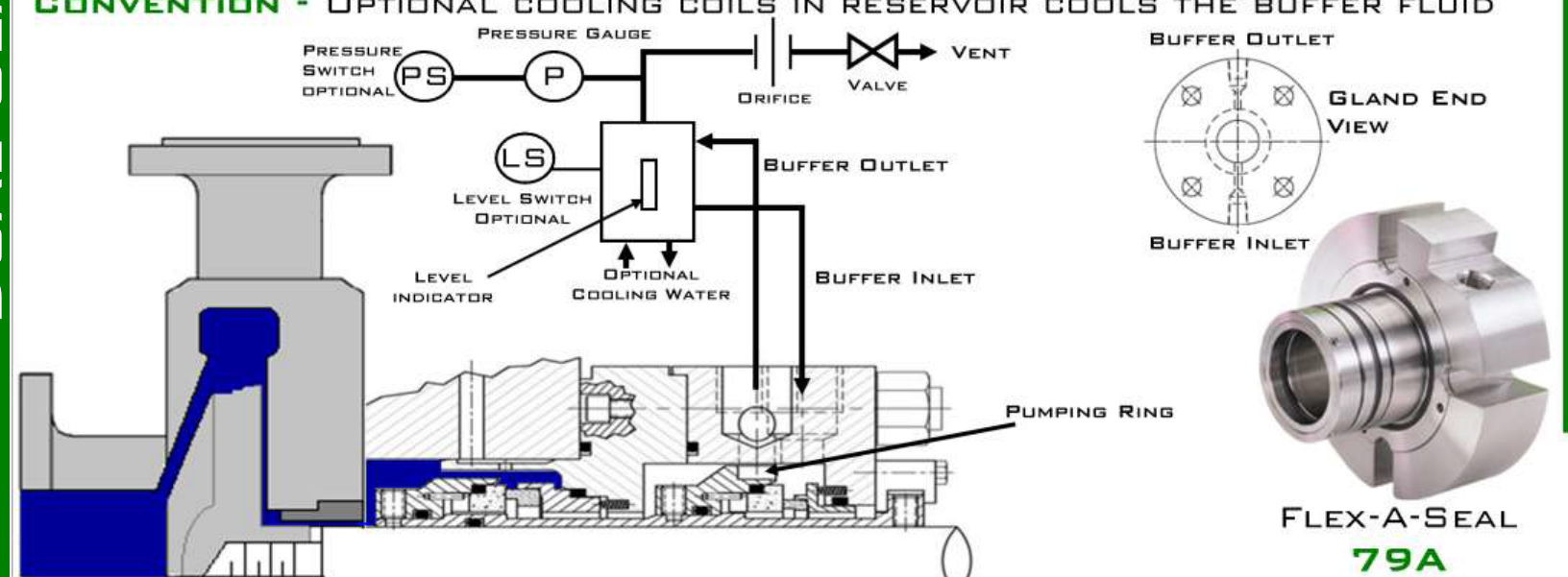
INTENT - PRODUCT FROM PUMP DISCHARGE IS FED TO AN ABRASIVE SEPARATOR TO ELIMINATE SOLIDS THEN TO A HEAT EXCHANGER TO LOWER PRODUCT TEMPERATURE
BENEFITS - SOLIDS REMOVAL AND TEMPERATURE REDUCTION ENHANCE SEAL ENVIRONMENT - ABRASIVE SEPARATOR DOES NOT HAVE TO BE CLEANED
CONVENTION - COMBINATION OF PLAN 21 AND PLAN 31 - TYPICALLY USED ON HOT SERVICES WITH SOLIDS HAVING A SPECIFIC GRAVITY AT LEAST TWICE THAT OF THE PROCESS FLUID - THROAT BUSHINGS REQUIRED



RECIRCULATION SYSTEM

PLAN - 52

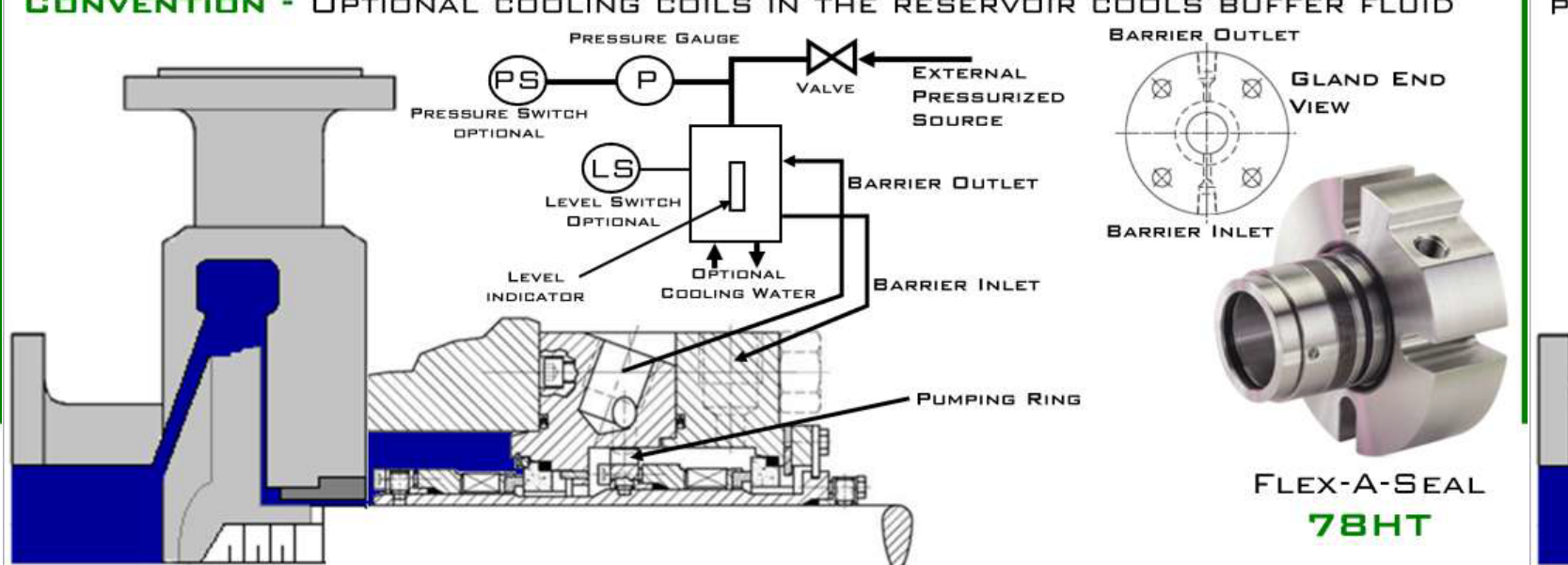
INTENT - USES UNPRESSURIZED RESERVOIR TO PROVIDE A BUFFER FLUID TO OUTBOARD SEAL - CIRCULATION MAINTAINED BY PUMPING RING
BENEFITS - ZERO TO VERY LOW PROCESS FLUID EMISSIONS - IF BUFFER FLUID PRESSURE OR LEVEL RISES OUTBOARD SEAL ACTS AS SAFETY WARNING SYSTEM THAT PRIMARY INBOARD SEAL HAS FAILED - CAN BE USED FOR VOLATILE PRODUCT
CONVENTION - OPTIONAL COOLING COILS IN RESERVOIR COOLS THE BUFFER FLUID



EXTERNAL SYSTEM FOR UNPRESSURIZED DUAL SEAL

PLAN - 53A

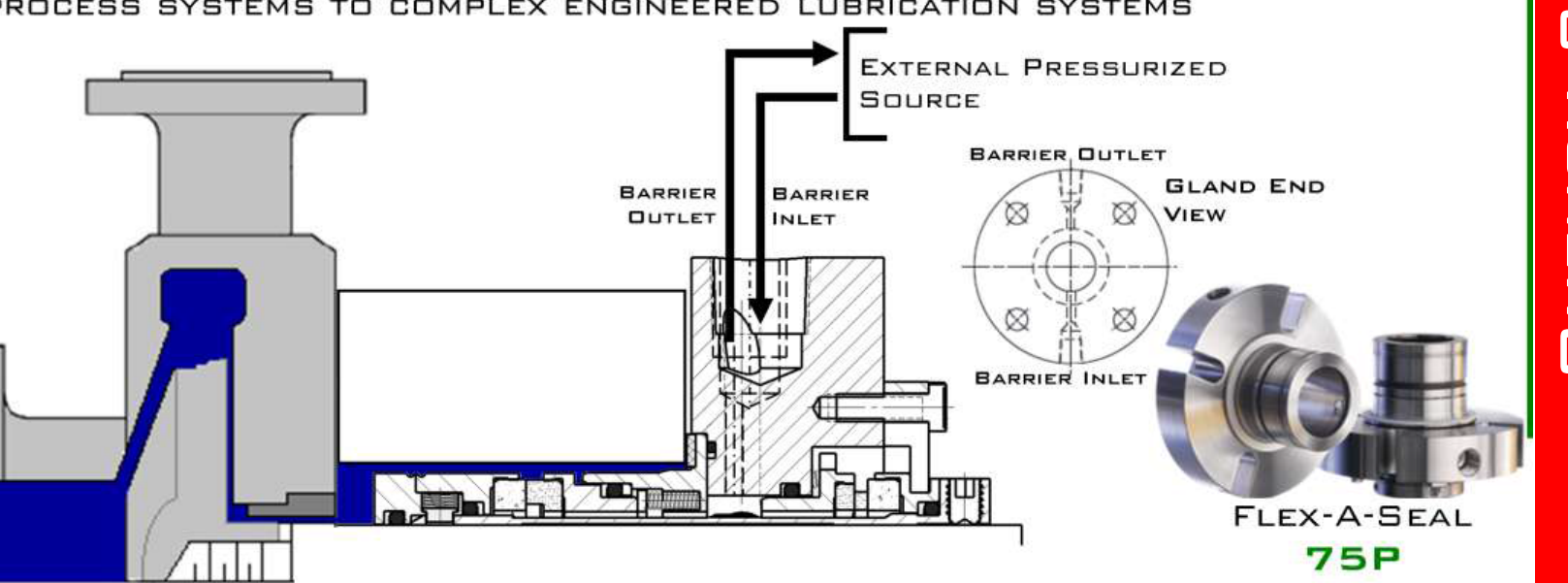
INTENT - USES GAS PRESSURIZED RESERVOIR TO PROVIDE A BARRIER FLUID BETWEEN INBOARD AND OUTBOARD SEAL - CIRCULATION MAINTAINED BY PUMPING RING
BENEFITS - USED IN HAZARDOUS/TOXIC SERVICES IF NO LEAKAGE TO ATMOSPHERE IS TOLERATED - BARRIER FLUID MUST BE COMPATIBLE W/PROCESS FLUID - EFFECTIVE ON DIRTY, ABRASIVE OR POLYMERIZING PRODUCT THAT WOULD DAMAGE SEAL FACES
CONVENTION - OPTIONAL COOLING COILS IN THE RESERVOIR COOLS BUFFER FLUID



EXTERNAL SYSTEM FOR PRESSURIZED DUAL SEAL

PLAN - 54

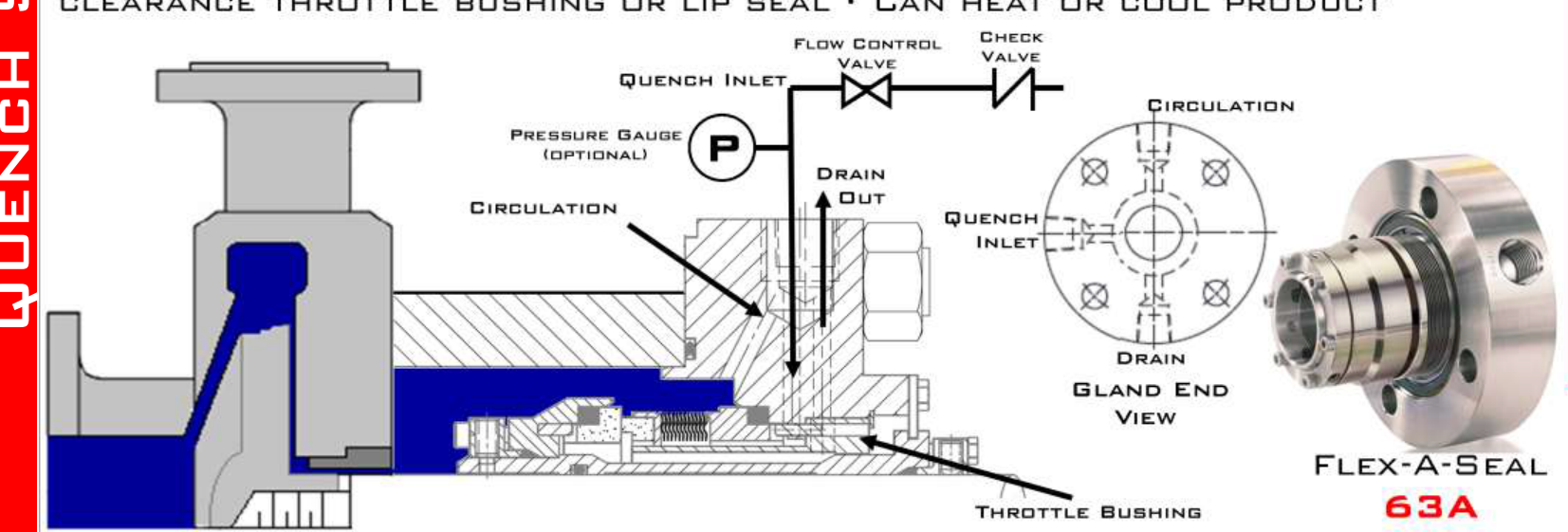
INTENT - CLEAN, COOLED PRESSURIZED FLUID IS CIRCULATED TO SEAL AS BARRIER FLUID TYPICALLY 20 PSI (1.4 BAR) ABOVE MAXIMUM SEAL CHAMBER PRESSURE
BENEFITS - ELIMINATES FUGITIVE EMISSIONS TO ATMOSPHERE - BARRIER FLUID SHOULD BE GOOD LUBRICANT, EXTENDING MTBF, MUST BE COMPATIBLE W/ PRODUCT
CONVENTION - SYSTEMS CAN RANGE FROM THE DIRECT CONNECTION FROM OTHER PROCESS SYSTEMS TO COMPLEX ENGINEERED LUBRICATION SYSTEMS



EXTERNAL SYSTEM FOR PRESSURIZED DUAL SEAL

PLAN - 62

INTENT - ATMOSPHERIC SIDE OF SEAL IS QUENCHED WITH LOW PRESSURE STEAM, NITROGEN, OR CLEAN WATER
BENEFITS - EXTERNAL QUENCH FLUID EXTENDS SEAL LIFE BY REMOVING/PREVENTING ACCUMULATION ON ATMOSPHERIC SIDE OF THE SEAL - PROVIDES HEATING/COOLING
CONVENTION - KEEPS OXYGEN AWAY FROM HOT HYDROCARBONS THAT WILL COKE - WASHES AWAY BUILT UP SOLIDS FROM PRODUCTS THAT SALT OUT - USED WITH CLOSE CLEARANCE THROTTLE BUSHING OR LIP SEAL - CAN HEAT OR COOL PRODUCT



EXTERNAL QUENCH SYSTEM

INTERNATIONAL HEADQUARTERS
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