



NOTES:

* FOR DEEP WELL PUMPS WITH PUMPING LIFTS GREATER THAN 200', THE CHECK VALVE SHOULD BE LOCATED UPSTREAM OF THE FLOW METER TO PREVENT DAMAGE TO THE FLOW METER UPON PUMP SHUT DOWN.

** IF FLOW METER IS LOCATED DOWNSTREAM FROM CHECK VALVE OR BUTTERFLY VALVE, STRAIGHT RUN DISTANCE TO METER MAY HAVE TO BE INCREASED TO MINIMIZE THE EFFECTS OF TURBULENCE AT THE FLOW METER. FOLLOW FLOW METER MANUFACTURER'S RECOMMENDATIONS.

PUMP OUTLET DOGLEG

NOT TO SCALE

THIS DRAWING REQUIRES SUPPORTING TECHNICAL DOCUMENTATION PRIOR TO USE AND MUST BE ADAPTED TO THE SPECIFIC SITE.



PUMP OUTLET DOGLEG

Designed	R.M.	Date	05-12
Drawn	DDD	Date	05-12
Checked			
Approved	J.E. ANDREWS S.C.F.	Date	05-12

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DESIGN AND CONSTRUCTION NOTES

1. IT IS POSSIBLE THAT NOT ALL OF THE APPURTENANCES (FLOW METER, CHECK VALVE, PRESSURE GAGE, ETC.) SHOWN ON THE DRAWING WILL BE REQUIRED FOR EVERY PROJECT. THE NEED FOR EACH ITEM WILL HAVE TO BE DETERMINED FOR EACH INSTALLATION AND THE DRAWING REVISED AS NEEDED.

2. FLEXIBLE COUPLING: THERMAL EXPANSION AND CONTRACTION, VIBRATION, AND MISALIGNMENT ARE COMMON PROBLEMS IN EXPOSED PIPING SYSTEMS. PIPE MOVEMENT CAUSED BY CHANGE IN TEMPERATURE CAN PRODUCE EXTREMELY LARGE AXIAL FORCES ON THE PUMP DISCHARGE PIPE AND OTHER COMPONENTS, UNLESS THE PIPE IS PROPERLY ANCHORED. ISOLATING THE PUMP FROM THE PIPING WITH A FLEXIBLE (OR EXPANSION) JOINT CAN PREVENT DAMAGE FROM THERMAL MOVEMENT AND MISALIGNMENT AND AIDS IN ABSORBING VIBRATION. FLEXIBLE COUPLING SHALL CONSIST OF A FLEXIBLE JOINT WHICH PERMITS AXIAL MOVEMENT AND SOME MISALIGNMENT. AN EXAMPLE OF THIS TYPE OF JOINT WOULD BE A BOLTED SLEEVE-TYPE COUPLING (DRESSER STYLE) OR A RUBBER EXPANSION JOINT. WHERE RUBBER EXPANSION JOINTS ARE USED AS THE FLEXIBLE COUPLING, CONTROL RODS (OR TIE RODS) SHALL BE ADDED TO THE JOINT TO RESIST HYDRAULIC FORCES AND TO PREVENT UNRESTRAINED EXPANSION.

3. PRESSURE RELIEF VALVE: THE PRESSURE RELIEF VALVE SHALL BE DESIGNED IN ACCORDANCE WITH NRCS PRACTICE STANDARD 430, IRRIGATION PIPELINE. IT SHALL BE NO SMALLER THAN ¼ INCH NOMINAL SIZE FOR EACH DIAMETER-INCH OF THE PIPELINE, AND SHALL BE SET TO OPEN AT A PRESSURE NO GREATER THAN 5 PSI ABOVE THE PRESSURE RATING OF THE PIPE. IT SHALL BE INSTALLED ON THE DISCHARGE SIDE OF THE CHECK VALVE AND UPSTREAM OF ANY POINT IN THE PIPELINE WHERE THE PIPELINE HAS A METHOD OF COMPLETE SHUTOFF SUCH AS A GATE VALVE OR BUTTERFLY VALVE.

 THE PRESSURE RELIEF VALVE SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS AND SHALL BE MARKED WITH THE PRESSURE AT WHICH THE VALVE STARTS TO OPEN. ADJUSTABLE PRESSURE RELIEF VALVES SHALL BE SEALED OR OTHERWISE ALTERED TO PREVENT CHANGING OF THE ADJUSTMENT FROM THAT MARKED ON THE VALVE.

4. AIR VALVE AT PUMP DISCHARGE: AT THE PUMP OUTLET FOR VERTICAL TURBINE PUMPS, A WELL SERVICE AIR VALVE OR SLOW CLOSING AIR/VAC VALVE SHOULD BE USED NEAR THE PUMP DISCHARGE PIPE. OTHER PUMPS MAY NOT REQUIRE THESE TYPES OF VALVES UNLESS THERE IS A LARGE VOLUME OF AIR THAT NEEDS TO BE DISCHARGED FROM THE PIPE UPON PUMP START-UP. WELL SERVICE AIR VALVES ARE BASICALLY AIR/VACUUM VALVES DESIGNED TO DISCHARGE LARGE VOLUMES OF AIR UPON PUMP START-UP AND TO ALLOW AIR BACK INTO THE SYSTEM UPON PUMP SHUTOFF. THEIR SLOW CLOSING (NON-SLAM) FEATURE PREVENTS RAPID CLOSURE OF THE VALVE AND THE RESULTING SHOCK TO THE PIPE AND PUMP. THIS "SLOW CLOSING" FEATURE IS ALWAYS GOOD PRACTICE FOR ANY AIR/VAC VALVE AND SHOULD BE USED WHERE THERE IS DANGER OF SIGNIFICANT "SURGE" (E.G., FROM PUMP START-UP). AN AIR RELEASE VALVE MAY ALSO BE ADDED TO PROVIDE CONTINUOUS AIR RELEASE AFTER THE MAIN VALVE CLOSURE.

 ALL AIR VALVES SHALL BE DESIGNED AS REQUIRED TO EXHAUST AIR, ALLOW AIR INTAKE, AND, IF NECESSARY, CONTINUOUSLY RELEASE AIR IN ACCORDANCE WITH NRCS PRACTICE STANDARD 430, IRRIGATION PIPELINE.

5. LONG HORIZONTAL SECTIONS OF THE DOGLEG MAY REQUIRE VERTICAL PIPE SUPPORTS TO PREVENT SAGGING AND DISTRESS TO VARIOUS COMPONENTS (E.G., FLEXIBLE COUPLINGS, FLANGED JOINTS, ETC.).

6. BUTTERFLY VALVE: TO HELP PREVENT DAMAGE FROM SURGE PRESSURES (WATER HAMMER) THE BUTTERFLY VALVE SHOULD BE EQUIPPED WITH A SLOW-CLOSING, GEARED OPERATOR. HAND LEVER TYPE OPERATORS CAN ACCIDENTALLY BE OPENED OR CLOSED QUICKLY, THUS CAUSING HIGH SURGE PRESSURES AND DAMAGING THE SYSTEM. IF THIS IS A CONCERN, A GEARED VALVE OPERATOR SHOULD BE SPECIFIED.

7. CHECK VALVE: IN SYSTEMS UTILIZING CHEMIGATION, A BACKFLOW PREVENTION CHECK VALVE AND VACUUM RELIEF VALVE, ALONG WITH AN AUTOMATIC LOW-PRESSURE DRAIN (I.E., A CHEMIGATION CHECK VALVE) SHALL BE INSTALLED, IN LIEU OF A STANDARD CHECK VALVE, IN ACCORDANCE WITH THE RULES AND REGULATIONS PERTAINING TO THE ADMINISTRATION AND ENFORCEMENT OF THE COLORADO CHEMIGATION ACT - 8 CCR 1203-8. ALL OTHER REQUIREMENTS OF 8 CCR 1203-8 SHALL BE FOLLOWED.



NRCS

Natural Resources Conservation Service
United States Department of Agriculture

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