

Valve/Actuator Products & Services

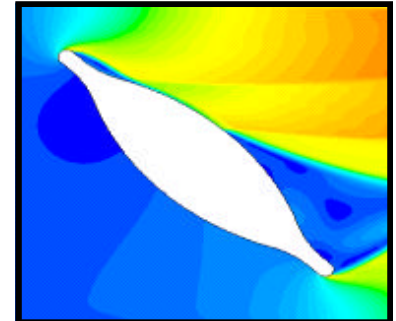
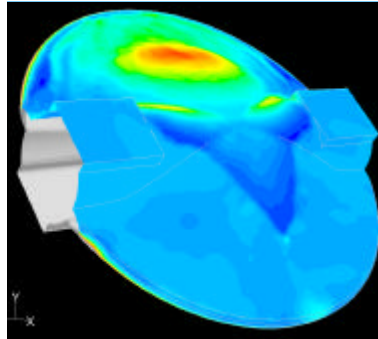
Improving reliability and margins throughout the industry

Background

Kalsi Engineering, Inc. has improved margins on AOVs, MOVs, and check valves for over 25 years by developing reliable models for predicting performance of all types of valves and actuators commonly used in nuclear power plants. First principles models and state-of-the-art technology developed by Kalsi Engineering supplement the latest industry information to more accurately predict valve operating requirements and actuator capabilities.

Analytical and Testing Services

- AOV/MOV design basis calculations
- Life Extension and Power Up-rate support based on enhanced actuator models
- JOG MOV Periodic Verification Program response to USNRC GL 96-05
- Failure root cause analysis
- Design modifications to improve reliability
- Independent third party reviews
- Pre-outage engineering evaluations to determine scope
- Self-assessment and development of valve programs
- 10CFR50 Appendix B Flow loop/Laboratory testing to develop valve and actuator specific data
- Comprehensive valve & actuator training seminars
- Computational Fluid Dynamics (CFD) analysis
- Finite Element Analysis (FEA)
- Implementation of INPO SOER 86-03 check valve program, Check valve equipment reliability improvement and ASME OM-22 condition monitoring programs
- Non-metallic bearing evaluation for butterfly valves using KEI custom laboratory test fixture



State-of-the-art analysis, flow loop, and testing facility



MOV Actuator Test Stand

- Over 12 years of plant experience demonstrates 10%-40% additional capability over calculated/published actuator output
- Guarantees functional replacement actuators for outages
- Performs actuator thrust & torque test before and after maintenance to determine actual output torque capability under various voltage conditions
- Identifies refurbishment problems and degradation before installation
- Enables torque settings for valves that close on torque or limit

Engineering Design, Analysis & Testing Services Since 1978

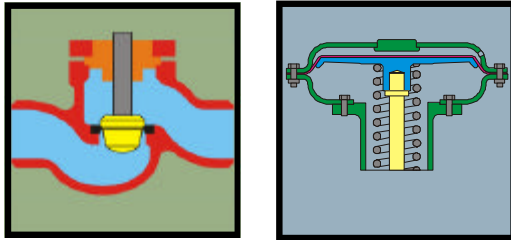
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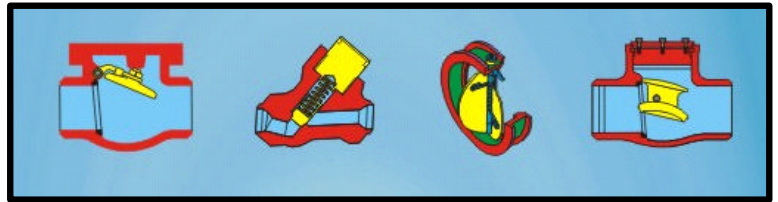
KVAP Software

- The Kalsi Valve & Actuator Program performs reliable design basis calculations for all common types of butterfly, globe, gate, ball, plug, and diaphragm valves as well as linear and quarter-turn actuators used in AOV and MOV applications.
- Includes a comprehensive database of 10CFR50 Appendix B test results for incompressible flow and compressible flow tests performed on all common types of quarter-turn valves (other industry software lack this feature and rely on un-validated, best available information).
- AOV Setup Window provides a bench set and supply pressure range that will ensure positive margin in the open and closing strokes.



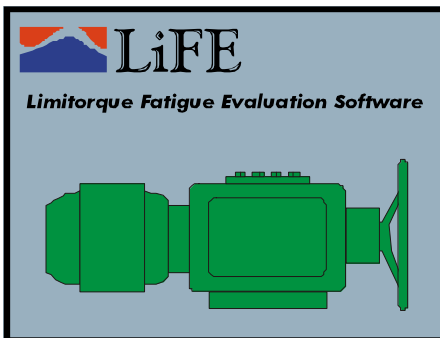
CVAP Software

- Check Valve Analysis & Prioritization software quantifies the rate of degradation of check valve internals for swing, tilt, double-disc, lift, and nozzle check valves.
- Based on rigorous testing and analytical research performed at Kalsi Engineering and reported in NUREG/CR-5159 & /CR-5583. It incorporates the technical guidelines provided by EPRI NP-5479 *Application Guide for Check Valves*.
- Can be used to prioritize valve maintenance, diagnose problems, and implement condition monitoring programs.



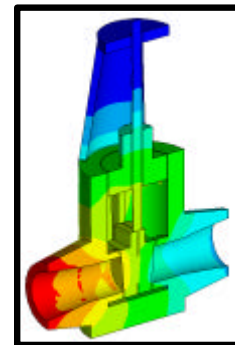
LiFE Software

- With over 12 years of plant application experience, *LiFE* (formerly *LTAFLA*) is a validated and proven software that computes the design life of Limitorque actuators operated at thrust and torque loads exceeding the published ratings. It is based on a comprehensive program to increase Thrust & Torque Ratings supported by industry wide participation.
- Increases torque/thrust capability and eliminates unnecessary actuator replacements and forced outages.
- Validated against the results of extensive testing of SMB Limitorque actuators performed at Kalsi Engineering to quantify the load cycle limitations for SMB, SB, and SBD class of actuators.



KPLTB Software

- Predicts unwedging thrust for gate valves including the *combined* effects of pressure locking, thermal binding & pressure induced binding.
- The only *validated* methodology to include a detailed modeling of body flexibility, pressure and temperature changes over the *entire stroke*, and the release of strain energy trapped in the yoke and the associated disk pinching (this phenomenon has caused significantly high opening thrust requirements in *even pressure equalized flexible wedge and solid wedge gate valves*).
- Based on coupled fluid flow, thermal, and structural analysis, and extensive testing.



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