Calculation Changes from v16.0 to v16.1

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Several changes were made to calculations in version 16.1 that may change the results seen in v16.0 compared to v16.1. The magnitude of these differences depends on the following factors:

- devices in the piping system model
- liquid vs. gas applications
- presence of laminar flow for liquids
- proximity to sonic flow (choked flow) in flow meters in gas applications
- calculations that didn't converge in either version

The following changes to v16.1 contribute to the differences between results:

- modification to the first flow guess in the iterative solution method
- use of calculated static pressures in flow meter calculations

As a part of the extensive testing performed by Engineered Software, Inc. prior to releasing a software product, ESI compared and analyzed the differences between the two versions. Because users model piping systems that have a variety of configurations, devices, fluids, pipe sizes, boundary conditions, it is impossible to predict what changes a particular model may see. The following table summarizes the typical change that may be seen between the two versions for files without laminar flow conditions (low Reynolds Number), convergence problems, or sonic (choked) flow conditions.

parameter	Average change	Max change
calculated flow through all devices	0.006%	0.95%
pipe calculated flow	0.003%	0.9%
balancing orifice calculated flow	0.03%	0.9%
orifice meter calculated flow	0.08%	0.9%
nozzle meter calculated flow	0.09%	0.1%
venturi meter calculated flow	0.0004%	0.0004%

The results in v16.1 more accurately predict sonic flow through flow meters and balancing orifices in gas applications and in some edge cases where flow conditions were just under sonic flow conditions, v16.1 may throw a sonic flow warning that may not be thrown in v16.0. Users are highly encouraged to evaluate their particular models to evaluate the impact on their results.