



# KORF Hydraulics

## Version 3.4

### Overview

Korf Hydraulics is an advanced fluid flow application that is suitable for hydraulic calculations ranging from a single pipe to multi-case, two-phase piping networks.

### Benefits

Korf Hydraulics can significantly improve the efficiency and quality of hydraulic calculations. It ensures a uniform and consistent approach, and documents all hydraulic data necessary for pipe, equipment and instrument specs.

### Methodology

Korf is based on a very flexible methodology and only requires the user to specify sufficient flow rates, pressures, pressure drops and/or sizes (CV's, Beta ratios, etc) so that a unique solution is possible.

*For example, a single pipe has 3 possible specifications (pres in, flow, pres out). The user can specify any 2. This same methodology applies to complex networks of pumps, pipes, valves and other equipment, enabling Korf to accurately simulate most hydraulic problems.*

### Graphical Interface

Korf has a clear, uncluttered and advanced graphical interface. Equipment is selected from a palette, placed on the screen and connected with pipes using the mouse. The drawing resembles a simplified PFD, including a title block.

### Reporting Capabilities

Results can be:

- Shown on the drawing.
- Viewed on equipment dialogs.
- Saved in a report file.

The report file is presented in a professional format for review, approval and documentation purposes.

The Pressure Profile Report list the pipes and equipment in the same order as the major flow(s), making it convenient to trace the pressure through the system.

### Simulation Capabilities

- Includes pure component database.
- Supports multi-component, 3-phase flash calculations.
- Equation based mole and heat balance (HMB) for compositions and properties in complex piping networks.
- Import stream properties from Hysys/Aspen/Text file.
- Hydraulics and HMB can be run simultaneously or separately to improve convergence for difficult systems.

### Hydraulic Capabilities

**Multiphase calculations.** Korf supports:

- Liquid phase flow.
- Compressible flow (isothermal, adiabatic with HMB).
- Several two-phase flow methods and regime maps.
- Omega HEM + HNE methods (modified API 521).

**Pipe sizing/databases.**

- Three pipe databases (Steel pipe, Ductile Iron and PVC) are included and others can be added.
- Size can be in Nominal diameter or ID.
- Non-cylindrical flow sections are supported.
- Non-standard sizes can be ignored if required
- Flexible pipe sizing routine to determine the NPS or ID based on any combination of five criteria.

**Equipment/Instrument calculations.** Korf provides extensive support for equipment and instrumentation.

• **Instruments:**

- Instrument sizes can be specified.
- Preliminary sizing of all instruments.
- Support two-phase flow, valve characteristics, perforated plates, different orifice types, etc.

• **Equipment:** Korf has extensive support for vessels, pumps, compressors and T-pieces.

- Support different vessel elevations, fluid levels and densities (3 different levels), relative nozzle elevations and internal pressure drops (trays, etc).
- Support pump/compressor curves and NPSH calc.
- Support semi-rigorous approach for T-pieces to account for branch areas and relative velocities.

### Case Management

Korf supports a flexible and logical case management philosophy that allows all cases required for pump and instrument datasheets to be incorporated into a single Korf simulation.

For multiple cases, the user simply enters a semi-colon separated list of specifications, and indicates:

- Which cases to run.
- Order in which cases are run.
- Extent of reporting required for each case.

### Application Matrix

	Spreadshts	Korf	Simulators
Small system (non-flashing)	++	++	+
Multiple cases	+	++	
Complex piping networks		++	
Built-in flash calcs		+	++
Flashing flow		+	++
Specialty (non-newtonian, etc)	+		++

Legend: ++ Preferred, + Possible