ACADEMIC

Bringing nuclear quality and standards to system simulation.

FLOWNEX® SIMULATION ENVIRONMENT

Flownex® SE determines pressure drop (flow) and heat transfer (temperature) for the connected components of a complete system in steady state and transient.

CLASSROOM MATERIAL

FLUID MECHANICS

Bernoulli's principle

A fundamental explanation of energy conservation in fluid flow and the causes and effects of pressure loss.

HEAT TRANSFER

Conduction

A fundamental explanation of heat transfer through flat and cylindrical geometries.

THERMODYNAMICS

Joule-Thomson effect

A fundamental explanation of fluid's change in temperature with pressure.

Flownex® is developed within an ISO 9001:2015 quality management system that is also ASME NQA-1 compliant.

UNIVERSITIES USING FLOWNEX

University of Notre Dame

Berkeley University of California

Loughborough University

İTÜ

Tianjin University (Peiyang University)

Technische Universität Berlin

University of Stuttgart

Tsinghua University

UST 과학기술연합대학원대학교 University of Science & Technology

The University of Texas at El Paso

University of Cape Town iYunivesithi yaseKapa • Universiteit van Kaapstad

website

www.flownex.com

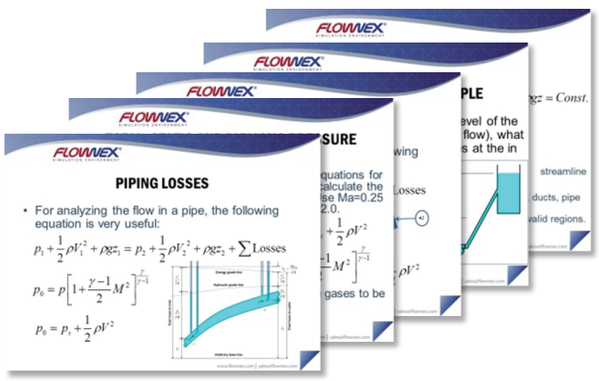
enquire@flownex.com

Find us on:

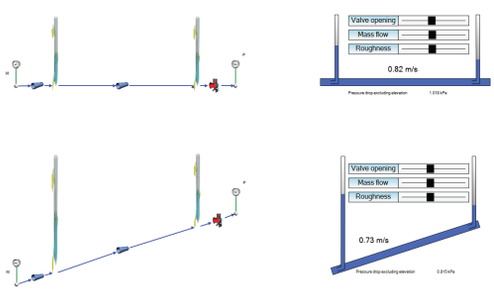
FLUID MECHANICS | BERNOULLI'S PRINCIPLE

THEORY

The theory includes conservation of mass, momentum and energy, static and stagnation property relations, Moody chart roughness and Bernoulli's principle.

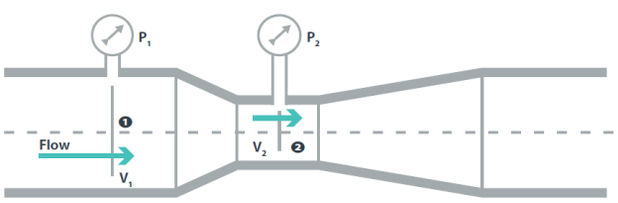


LECTURER'S EXAMPLE TO SHOW IN CLASS



The Flownex® SE network dynamically illustrates the effect of pipe roughness and flow velocity on the energy and hydraulic grade line. The example uses a short pipeline section with an elevation difference between the inlet and outlet (that holds pitot tubes and stand pipes) that indicates the pressure difference.

STUDENT PROJECT TO USE AS ASSIGNMENT



A student assignment with results memorandum evaluates the knowledge and understanding of the students using either hand calculations or Flownex® as software tool. The assignment expects the student to calculate the flow through a flow meter using specified pressure readings from the instrumentation.

TESTIMONIAL

NORTH-WEST UNIVERSITY

Charl Cilliers
M.Eng. Nucleear Engineering

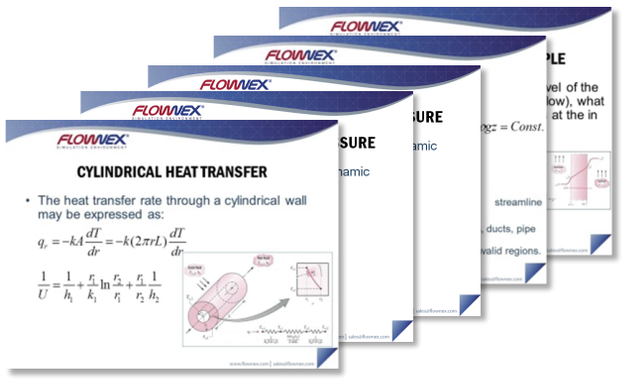
"

Flownex® is an invaluable tool with a multitude of useful features which makes the researcher's life a hundred-fold easier, without sacrificing a hundred-fold in accuracy.

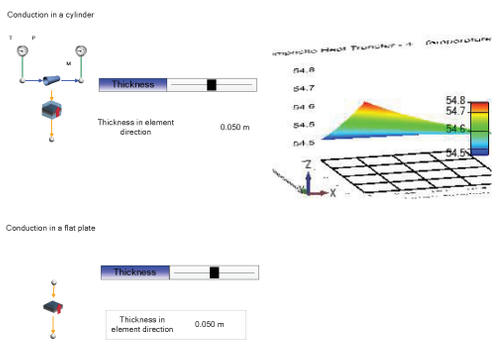
HEAT TRANSFER | CONDUCTION

THEORY

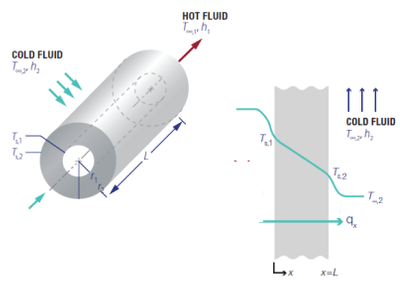
Theory includes conservation of energy as well as one-dimensional steady-state conduction relations through a plane wall and cylindrical pipe geometries.



LECTURER'S EXAMPLE TO SHOW IN CLASS



The Flownex® SE network with graphical interface dynamically illustrates the difference between plane wall and cylindrical wall heat transfer with varying wall thickness. The example uses a heat transfer element and pipe combination which either model a tube or plane wall with water flowing on the one side and air over the other.



STUDENT PROJECT TO USE AS ASSIGNMENT

A student assignment with results memorandum evaluates the knowledge and understanding of the students using either hand calculations or Flownex® as software tool. The exercise expects the student to calculate and compare the air side wall surface temperature of both the plane wall and tube scenarios using the same specified wall thickness.

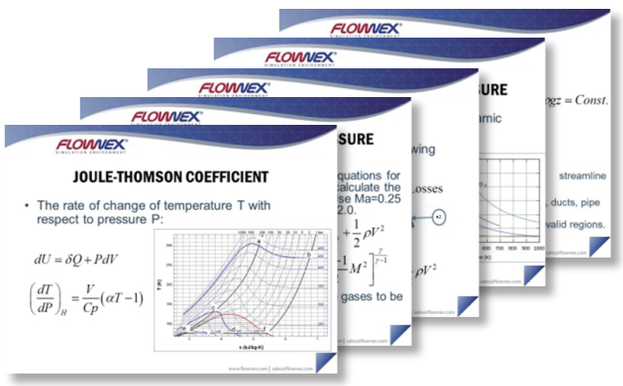
CONTRIBUTION

Equipping the lecturer to ease teaching of fundamental fluid mechanics, heat transfer and thermodynamics principles.

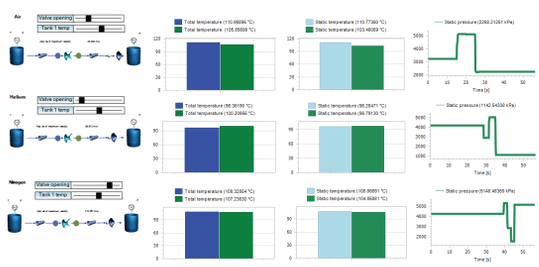
THERMODYNAMICS | JOULE-THOMSON EFFECT

THEORY

Theory includes first law of thermodynamics, fluid property diagrams, ideal gas law relations and the Joule-Thomson coefficient.

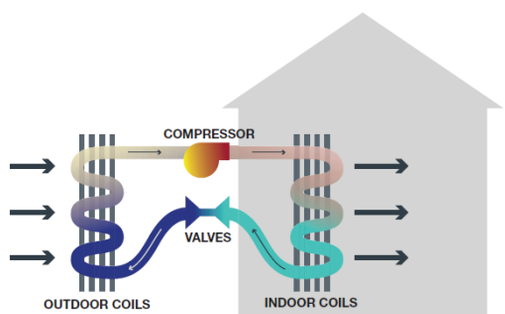


LECTURER'S EXAMPLE TO SHOW IN CLASS



The Flownex® SE network with graphical interface dynamically illustrates the effect of varying throttling and system temperatures on pressure-temperature relations of fluids. The example uses a pressurized tank blowing off to another reservoir through a short pipeline with a restrictor. Helium, Nitrogen and air are used as fluids.

STUDENT PROJECT TO USE AS ASSIGNMENT



A student assignment with results memorandum evaluates the knowledge and understanding of the students using either hand calculations or Flownex® as software tool. The exercise expects the student to calculate the pressures and temperatures of a basic heat pump system using a pump, valve and specified heat transfer requirement.

TESTIMONIAL

UNIVERSITY OF CAPE TOWN

Prof Wim Fuls
Associate Professor
Engineering Design

Flownex® is an ideal process modeling tool from an academic perspective. It solves the fundamental equations to the full degree - no shortcuts. This allows us to model real physical phenomena and understand the fundamental behavior. Furthermore, the documentation is of exceptional quality, showing each and every model used with proper references. It is certainly not a "black-box" tool like so many other process modeling software on the market.