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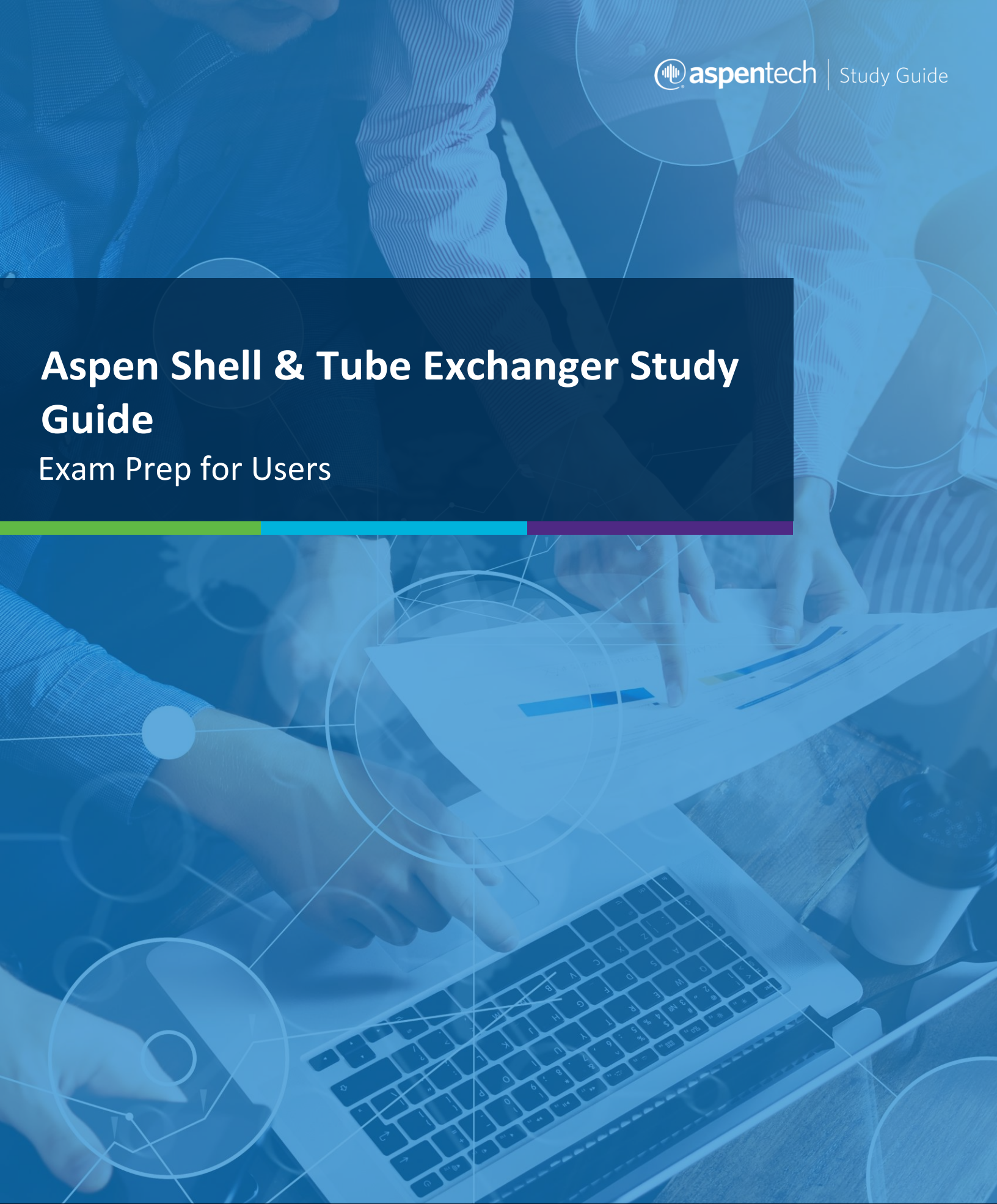
Aspen Shell & Tube Exchanger Study Guide

Exam Prep for Users



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Who can take this certification?

The certification is a must-have for any user new to Aspen Exchanger Design & Rating who has taken Design and Rate a Shell and Tube Heat Exchanger (EHX101).

Step 1: Take Class: Design and Rate a Shell and Tube Heat Exchanger (EHX101) – 2 Days

AspenTech offers a variety of delivery methods in which you can take training.

- Register for public training (face to face or virtual)
- Register for private training (face to face or virtual)
- Subscribe to eLearning (on-demand)

Step 2: Review Scope and Objectives

This guide contains 100% coverage of all objectives for the Aspen Shell & Tube Exchanger certification exam. You can use as both a study tool and an on-the job reference.

Step 3: Take Aspen Shell & Tube Exchanger certification exam

The total time for the certification exam is four hours.

Exam Scope for Design and Rate a Shell and Tube Heat Exchanger (EHX101)

- ☐ Calculation Models
- ☐ Physical Properties
- ☐ Geometry
- ☐ Results
- ☐ Documentation

Grading

Grade	Weight
Multiple choice questions	40%
Lab task	60%
Total	100%

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SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE
Calculation Modes	General Options	**Identify** the available calculation modes
		Identify where in the UI to select/change the calculation mode
	Design mode	**Identify** required inputs and expected outputs
		Identify the two options for optimization (area or cost)
		Define area ratio
		Identify key variables considered in the design algorithm (area ratio, pressure ratio, TEMA limits for rho-V2 and unsupported length, vibration)
		Identify how to enter process and/or geometry limits
	Rating Mode	**Identify** required inputs and expected outputs
		Interpret area ratio results
	Simulation Mode	**Identify** required inputs and expected outputs
		Interpret area ratio results
	Find Fouling	**Identify** required inputs and expected outputs
		Interpret area ratio results
	Overall	**Identify**, for a given problem statement, the applicable calculation mode, and the required input
Physical Properties	Physical Property Packages	**Identify** the different physical property packages options (B-JAC, COMThermo, Aspen Properties, User Specified)
	Property Methods	**Identify** categories of property methods (Ideal, EOS, Activity models) and general application for each

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE

Physical Properties	Overall	**Explain** the importance of the temperature range/# of points and pressure levels in physical properties calculation
		Identify, for a given problem statement, the applicable physical property package, and the appropriate property method
Geometry	Basic configuration	**Identify** key options that are always selected by the user (not changed by EDR): TEMA type, hot fluid location, exchanger orientation, baffle type, etc.
		Identify applications for different shell types
		Identify arguments to be considered during hot fluid location selection (high pressure, hazardous fluid, fouling)
	Geometry	**Recognize** key geometry (tube ID/OD, shell ID/OD, # of tubes, # passes, tube pitch, pattern, tube length, baffle type)
		Recognize the types of tube layout available
		Identify EDR standards for geometry (TEMA, ASME, most common commercial dimensions)
		Identify Non-TEMA configurations (double pipe, hairpin)
Construction Specifications	Design Specifications	**Recognize** the Design codes available
Results	Warning/Messages	**Identify** the types of messages displayed by EDR and its importance (errors, warnings, advisories, notes)
		Interpret, given a particular file, the error/warning messages
		Develop, given your previous interpretation, some modifications that could potentially help fixing the error/warning messages
	TEMA sheet	**Recognize**, from a list of outputs, which could be found in the TEMA sheet
		Explain how to export TEMA sheet to Excel
	Thermal	**Interpret**, for a given simulation, area ratio value, heat transfer area of the unit

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE
Results	Thermal	**State**, for a given simulation, the effective mean temperature difference
		State, for a given simulation, the tube side and shell side overall film coefficients
		Interpret, given a simulation, which side represents the greater contribution to the overall HTC
		State, for a given simulation, the tube side and shell side resistance distribution
		Interpret, given a simulation, how much the fouling resistances from both sides contributing to the heat transfer resistance
Results	Hydraulic	**Identify** the three contributions to the overall pressure drop (frictional, momentum change, gravitational)
		State, given a simulation, pressure drop on each side
		Identify, given the same file, which pressure drop mechanism has the greater contribution on each side
		Identify, given the same file, which part of the exchanger represents the greater contribution to pressure on each side
		Identify on which part of the exchanger the highest velocity is achieved on each side
		Identify, given a simulation, if there are Rho-V2 TEMA limits violations
	Mechanical	**Identify** the two types of vibration analyzed and reported by EDR
		Identify, within a provided list, which factors or mechanisms can influence the vibration assessment
		Analyze, the vibration assessment in a given simulation and develop a plan to fix such vibration issues

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE
Results	Mechanical	**Identify**, within the tube layout of a given simulation, the tubes analyzed for the vibration assessment
		Identify, given a simulation, a geometry parameter calculated by the program (instead of being specified)
		State, given a simulation, the total cost of the unit (all shells)
Documentation	Help Guide	**State** the definition of a given concept by searching it in the Help Guide