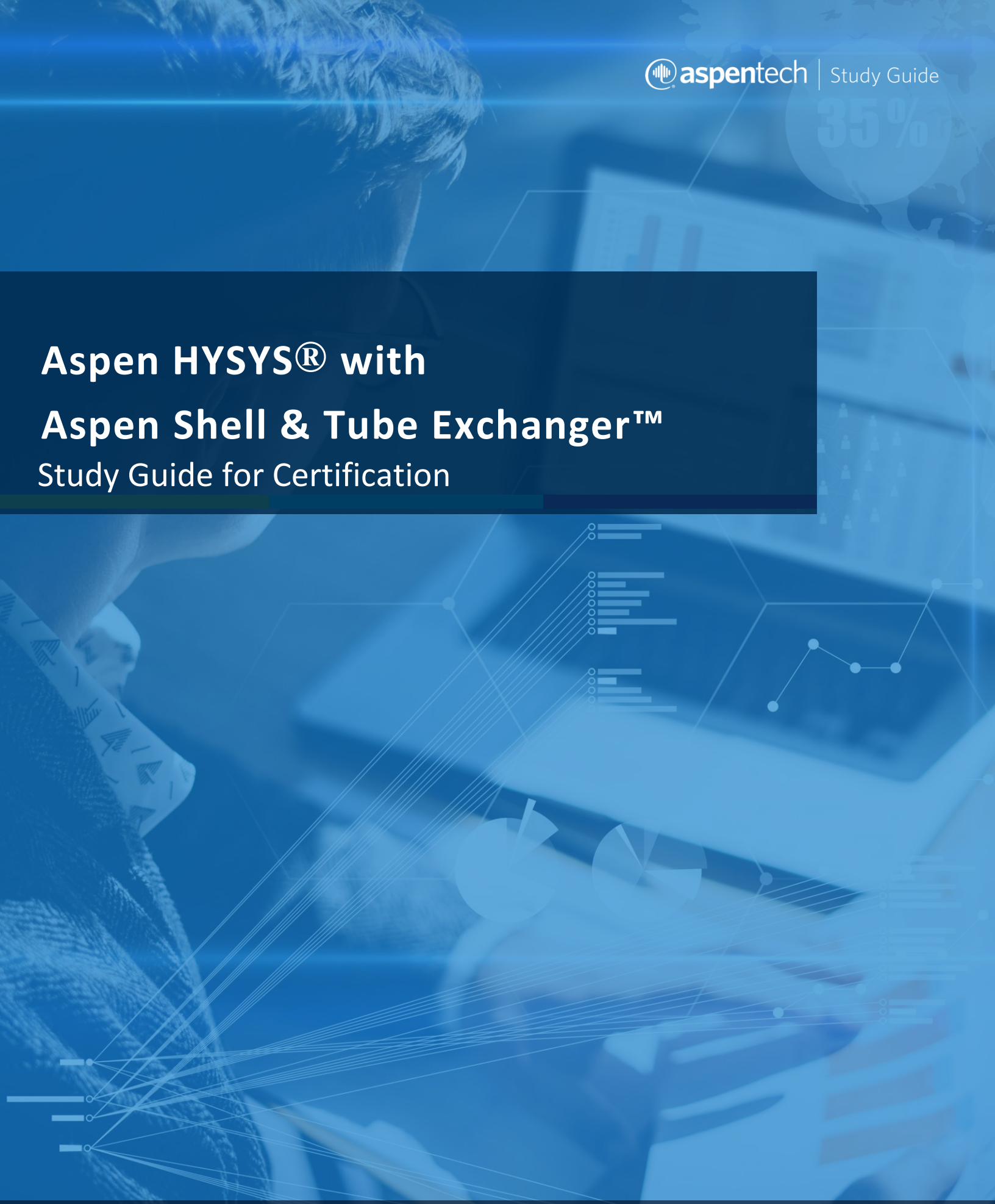
aspentech | Study Guide

Aspen HYSYS® with Aspen Shell & Tube Exchanger™

Study Guide for Certification



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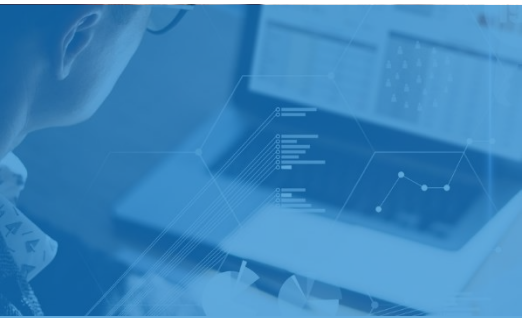

Exam Scope for Aspen HYSYS with Aspen Shell and Tube Exchanger (EDR)

- ☐ Properties Environment
- ☐ Simulation Environment
- ☐ Reporting
- ☐ Troubleshooting
- ☐ Documentation
- ☐ Calculation Models
- ☐ Physical Properties
- ☐ Geometry
- ☐ Results
- ☐ Documentation

Grading

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

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Prove Your Credibility

An Aspen Certified User in Aspen HYSYS demonstrates skills in building process simulations including defining the properties environment, developing flowsheets with unit operations, and utilizing available tools for analysis and reporting. This person also demonstrates fluency with some more advanced skills such as troubleshooting and modeling heat exchangers using the EDR interface.

Practice

AspenTech training is highly recommended though not required.

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

(read pages 2-10).

Get Certified

In-person and remote testing are available. Please make sure that you select the correct Location/Time Zone.

After passing the exam you will receive an email to post your certificate and digital badge on social media, which is a cross-industry recognition of technical skills you may share on LinkedIn, as well as in your email signature. View the instructions on how to post your credentials on LinkedIn profile.

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN HSYSYS
Explore Properties Environment	Component List	**Create** a component list
		Identify the different component databases available
		Add hypothetical components
	Physical Property Package	**Define** a fluid package
		Identify the different property methods databases available
		Assign component list to specific property method
	Petroleum Assays	**Identify** the methods available in Aspen HYSYS for characterizing crude assay
		List the necessary steps to characterize a crude assay
		Recognize the differences between the two methods available for characterizing crude assay
Explore Simulation Environment	Unit Sets	**Recognize** the default unit sets
		Customize unit sets
	Manipulate Flowsheet	**Connect** material streams to unit operations
		Illustrate flowsheet object color scheme
		Display stream labels
		Identify transferring process information and objects options
		Configure and customize user preferences, options and default settings
		Illustrate case management options
		Create and **install** a template file

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN HYSYS
Explore Simulation Environment	Mathematical / Logical Operations	**Identify** various logical operations available
		Optimize the simulation by using adjust operation and other logical operations
	Unit Operations	
	Separation Operations	**Identify** the key differences in the three separator operations
		Illustrate pressure drop specifications across the vessel
		Specify and calculate heat loss in the vessel
		Configure and calculate the carry over model in separator operations
		Define and specify geometry and orientation of vessel
		Configure a component splitter to separate component steams based on split fractions specified
	Heat Transfer Options	**Identify** various heat transfer operations
		Determine parameters required to solve a cooler
		Describe the different heat exchanger models
		Analyze the performance of the heat exchanger
		Identify the heat transfer operations that can be integrated with Aspen Exchanger Design and Rating (EDR) tools
		Perform rigorous heat transfer calculations using EDR

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN HYSYS
Explore Simulation Environment	Piping Operations	**Recognize** pressure drop correlation options for different phases
		Identify different heat transfer options for pipe segment
		Identify different flow assurance for pipe segment
		Build a piping network using pipe segments
	Column Operations	**List** the available column templates
		Determine parameters required to solve a column
		Identify different types of column specifications available
		Analyze the Degrees of Freedom (DOF) of different column templates
		Identify the side operations available to be added to a column
		Explain the function of column internal analysis
		Build different types of columns using column input expert and manipulate the column specification to meet the process objective
		Develop the column using Sides Ops input expert
	Rotating Equipment	**Identify** the rotating equipment in HYSYS
		List the different compressor operating modes in HYSYS
		Identify what kind of compressor curves can be added in the model
		Build a compressor flowsheet using compressor performance curves to simulate an existing compressor
		Illustrate linking compressors and expanders

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN HYSYS
Explore Simulation Environment	Attached Analysis Tools	
	Stream Analysis	**List** the different stream analysis types
		Identify the different ways to add the stream analysis
		Perform stream analysis to acquire more stream information
	Equipment Design	**Identify** the calculation type for pipe sizing
		Identify the available specification for vessel sizing
	General Analysis Tools	
	Case Study	**Identify** four case study types and their differences
		Identify case study reporting tools
		Monitor the key process variable response to other changes in process using case study
Reporting	Common Reporting Options	**List** the common reporting options
		Identify what kind of reports can be added to the flowsheet
	HYSYS Workbook	**Identify** the ways of exporting workbook reports
		Customize the workbook to view additional properties and add it to the flowsheet
	Report Manager	**List** what kind of reports can be exported by Report Manager and Datasheets
	Correlation Manager	**Identify** how to manage the properties/correlations displayed for a stream
		Customize properties/correlations for all streams using Correlation Manager
	Data Tables	**Monitor** the key process variables of any type in the simulation by using Data Table
		Identify the ways of using Data Table

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN HYSYS
Troubleshooting	Common Errors	**Recognize** the various troubleshooting tips
		Identify the methods of troubleshooting
		Explain the Consistency Error table
		Troubleshoot the prepared simulations using common methods
Documentation	General	**Use** the Help Menu

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR EDR
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)
		Identify external sources to import properties (PSF, HYSYS or A+, Aspen Properties file)
	Property Methods	**Identify** categories of property methods (Ideal, EOS, Activity models) and general application for each

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR EDR
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)
		Identify EDR standards for geometry (TEMA, ASME, most common commercial dimensions)
		Identify Non-TEMA configurations (double pipe, hairpin)
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

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR EDR
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
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
		Identify, within the tube layout of a given simulation, the tubes analyzed for the vibration assessment
		Identify, within the setting plan of a given simulation, the inlet and outlet nozzles for both sides

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR EDR
Results	Mechanical	**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)
	Calculation Details	**Interpret**, given a simulation, what information could be retrieved from the temperature profile of each side (in which region a phase change is taking place, slope close to zero)
Documentation	Help Guide	**State** the definition of a given concept by searching it in the Help Guide
	HTFS Research Network	**Navigate** to a HTFS Design Report and state the title

About Aspen Technology

Aspen Technology (AspenTech) is a leading software supplier for optimizing asset performance. Our products thrive in complex, industrial environments where it is critical to optimize the asset design, operation and maintenance lifecycle. AspenTech uniquely combines decades of process modeling expertise with machine learning. Our purpose-built software platform automates knowledge work and builds sustainable competitive advantage by delivering high returns over the entire asset lifecycle. As a result, companies in capital-intensive industries can maximize uptime and push the limits of performance, running their assets safer, greener, longer and faster. Visit AspenTech.com to find out more.