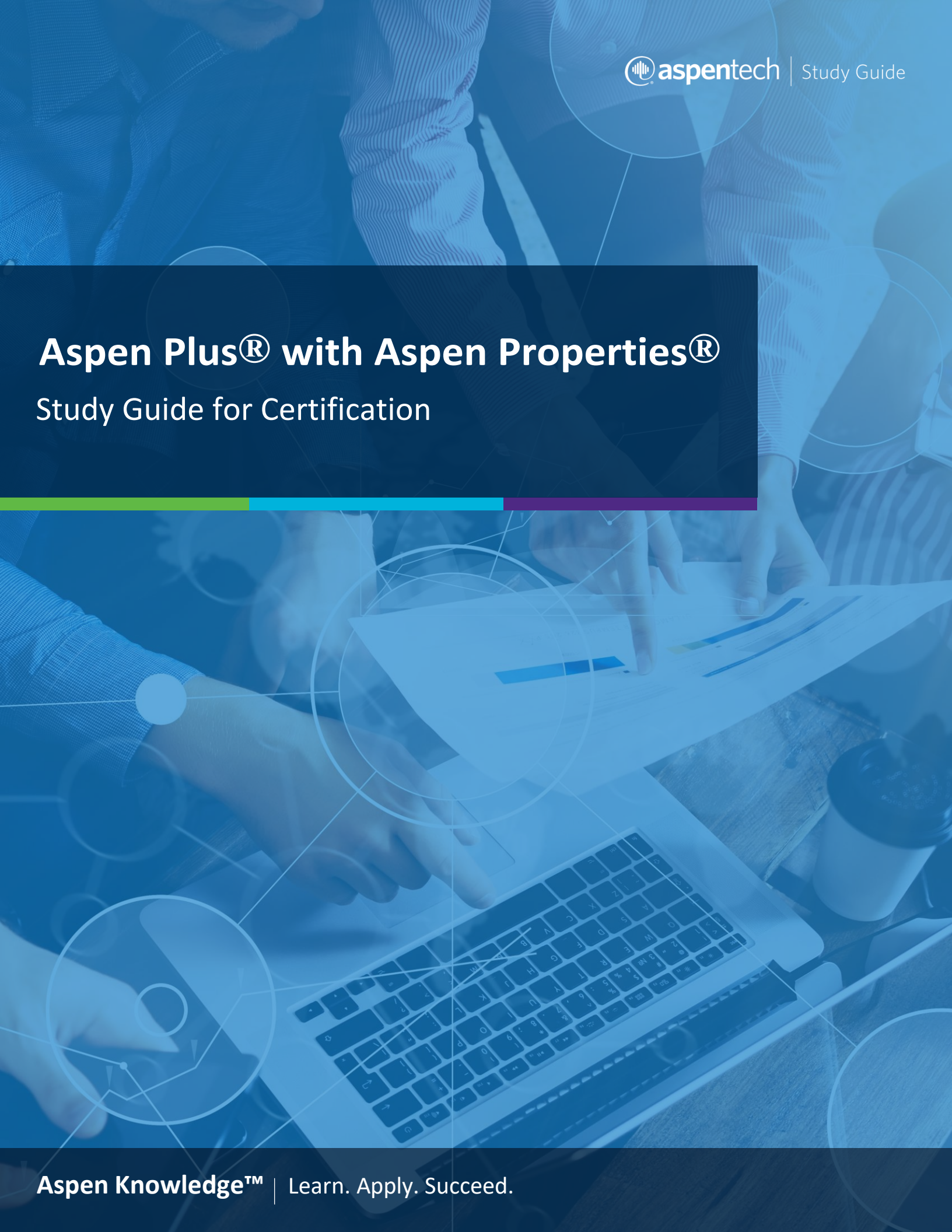

aspentech | Study Guide

Aspen Plus® with Aspen Properties®

Study Guide for Certification

Aspen Knowledge™ | Learn. Apply. Succeed.

Prove Your Credibility

An Aspen Plus Certified User demonstrates the skills required to build models and interpret results using Aspen Plus. This person also demonstrates fluency with some more advanced topics with Aspen Plus Properties including property methods, equations of state, component parameters, and data regression.

Exam Scope for Aspen Plus with Physical Properties

- ☐ Properties Environment
- ☐ Simulation Environment
- ☐ Convergence
- ☐ Reporting
- ☐ Physical Properties
- ☐ Ideal Gas and Liquid
- ☐ Physical Property Parameters
- ☐ Property Sets
- ☐ Activity Coefficient Models
- ☐ Equations of State
- ☐ Electrolyte Property Methods
- ☐ Data Regression
- ☐ Solid-Fluid Equilibrium
- ☐ And More….

Grading

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

AspenTech

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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 2-11).

Step 2: Practice before exam

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

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 PLUS
Explore Properties Environment	Startup Template	**Select** a startup template to begin a new simulation
	Component List	**Create** a component list
		Identify the different component databases available
	Physical Property Method	**List** the steps to establish physical properties
		Identify issues involved in the choice of a property method
		Define a property method
		Identify the different property methods available
		Explain the need for Henry's components
	Reporting	**Summarize** the different types of physical property data
		List the built-in analyses used for reporting physical properties
		Retrieve pure component properties from built in property databases
Explore Simulation Environment	Unit Sets	**Recognize** the default unit sets
		Customize unit sets
	Manipulate Flowsheet	**Explain** how unit operation models are organized
		Add unit operations to the flowsheet from the model palette
		Connect material streams to unit operation blocks
		Configure and customize flowsheet user preferences, options and default settings
	Unit Operations	
	Mixer/Splitters	**Explain** when to use the **SSplit** block in a flowsheet
	Separators	**Identify** the key differences in the three separator blocks **Flash2**, **Flash3** and **Decanter**

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN PLUS
Explore Simulation Environment	Separators	**List** which unit operation blocks can be used to specify how the components split to the outlet streams
		Configure a component splitter to separate component steams based on split fractions specified
	Exchangers	**Identify** the heat exchanger model used to model convective or radiant heat transfer across a surface
		Select the heat exchanger model that can be integrated with Aspen Exchanger Design and Rating (EDR) tools
		Explain how to specify a Heater block outlet stream to the dew point condition
		Recognize how the use of a Heat stream connected to a Heater block affects the input specifications
		Perform rigorous heat transfer calculations using EDR
	Columns	**List** the column unit operations that incorporate shortcut methods for Vapor/Liquid calculations
		Identify which unit operation block is used for most distillation column models
		Determine parameters required to solve a column Identify different types of column specifications available in RadFrac
		Identify different types of column specifications available in RadFrac
		Explain the function of the Column Analysis tool
		List the types of rigorous vapor-liquid fractionation operations that RadFrac can simulate
		Build different types of column using RadFrac and manipulate the column specifications to meet the process objective
		Plot temperature and composition results vs stage for a column
		Explain how to account for non-equilibrium stages in Rad-Frac

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN PLUS
Explore Simulation Environment	Columns	**Describe** the difference between On-Stage and Above-Stage
	Reactors	**List** the classes of reactor unit operations available in Aspen Plus
		Describe the characteristics of balanced based reactor models
		Explain how heat of reaction is calculated in Aspen Plus
		Identify which reactor models allow both equilibrium and kinetic based reactions
		Identify the option in RGibbs to insure both vapor and liquid phases are considered
		Summarize the options for entering custom reaction kinetics
		List the options for entering reaction data for a reversible reaction
		Identify the reactor models that require a Reaction ID to describe reactions
		Recognize which reaction model type that allows a mixture of Power Law, Equilibrium, LHHW and Custom reactions
		Build a Reaction ID to be used in a kinetic based reactor
	Pressure Changers	**List** situations where pressure changer blocks need to be included in a flowsheet
		Explain the difference between design and rating specifications for pump and compressor
		Describe the options for entering performance curve data for pump and compressor models
		Build a simple flowsheet for an expander/compressor
		Identify the main difference between the pipe and pipeline unit operation

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN PLUS
Explore Simulation Environment	Manipulators	**List** unit operations models that manipulate streams
		Build a flowsheet the duplicates a feed stream that is processed in different types of process units
	User Models	**List** the options to write custom unit operation models
		Identify the unit operation block that is a container for simulation objects such as streams, unit operations, etc.
Convergence	Control Panel	**Analyze** error and warning messages
		Recognize simulation sequence
		Identify automatically generated convergence blocks
		Identify tear streams
		Explain the concept of error/tolerance
	Convergence Methods	**Configure** the default tear convergence settings to increase maximum number of iterations
		List the variables tested for tear stream convergence
		List the default convergence methods
		Describe the purpose of the Secant method bracketing strategy
	Tear Stream	**Specify** a tear stream for a convergence block
		Illustrate reconciling of a tear stream

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN PLUS
Convergence	Convergence Results	**Specify** a tighter global flash tolerance
		Analyze the pattern of the graphical convergence history using the convergence monitor
		Identify the number of iterations made to reach convergence
		Illustrate the reduction of simulation time by reconciling a block
	Troubleshooting	**Recognize** the various troubleshooting tips in the Help documentation
		Troubleshoot the prepared simulations using common methods
Documentation	General	**Use** the Help menu
Explore Simulation Environment	Analysis Tools	
	Sensitivity	**List** steps to create a new sensitivity
		Identify variables that can be defined as manipulated variables
		Analyze sensitivity results to find optimal operating conditions
		Identify if a design specification solution is feasible using sensitivity
		Recognize case studies
		Plot the results of a sensitivity block
		Explain tabulated Fortran expressions

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN PLUS
Explore Simulation Environment	Design Specification	**Develop** a design specification to get desired results
		Explain why design specification produces iteration
		List the approaches to view design specification results
		Analyze convergence issue caused by design specifications
		Troubleshoot convergence issue by changing default settings
	Calculators	**Develop** a calculator block with either Fortran syntax or Excel functions
		Recognize basic Fortran syntax and Excel functions
		Explain the use of parameters and local parameters
		Identify import variables and export variables
		Define location of a calculator block in an execution sequence
		Resolve errors caused by a calculator
Reporting	Stream Summary	**Customize** stream summary tables and save as new templates
		List steps to create new templates
		Explain how to add additional physical properties to the stream summary
		Explain the use for all options in Edit Stream Summary Template window
		Send stream summary to Excel and to Flowsheet (linked with Aspen Plus)
		Describe Import/Export user stream templates features

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR ASPEN PLUS
Reporting	Custom Tables	**Create** custom tables
		Use custom tables on the flowsheet (as icon)
	Global Data	**Display** global stream data on flowsheets
		Display user-defined global stream data on flowsheets
		Explain how to change global stream data displayed decimal digits
	Property Sets	**List** steps to create new property sets
		Explain the use of property qualifiers
		List where to use property sets
	Model Summary	**Customize** odel Summary table
		Send Model Summary table to Excel (linked with Aspen Plus)
	Miscellaneous	**Use** Check Status to check detailed information about errors or warning
		Report control panel messages in History file
		Report printable text file of input data and simulation results
Physical Properties	Properties required by unit operations	**Identify** physical properties required for a unit operation such as Heater block
	Navigation in user interface	**Select** components from databanks
	Specify base property method	**Select** physical property method method

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR PHYSICAL PROPERTIES
Ideal Gas and Ideal Liquid	Calculation of vapor phase enthalpy	**Identify** the parameters required for the calculation of vapor phase enthalpy (pure component)
	Calculation of vapor pressure	**Identify** the parameters required for the calculation of the liquid saturation pressure
	Calculation of liquid enthalpy	**Identify** the parameters required for the calculation of the liquid enthalpy (pure component)
Physical Property Parameters	Type of pure component parameters	**Identify** the two types of pure component parameters
	Entering parameters	**Modify** the parameters for a pure component and evaluate heat capacity of vapor and saturation pressure
	Reviewing parameters	**Retrieve** the parameters of pure components from the databanks
Property Sets and Property Analysis	Pure component analysis	**Create** a pure component analysis
	Mixture analysis	**Create** a mixture analysis to report mixture liquid density at constant pressure and temperature, vary the composition
Activity Coefficient Models	common non-ideal deviation	**Lis**t phenomena which demonstrate a mixture exhibits non-ideal behaviour
	enthalpy	**Explain** the relation b/w activity and excess enthalpy
	common models	**List** a few activity coefficients models commonly used for process simulation
	binary parameters	**Summarize** binary parameters and retrieve the temperature range of the experimental data used for the regression
UNIFAC	Basis	**Explain** the concept used for the development of UNIFAC method
	common models	**List** a few models like UNIFAC

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR PHYSICAL PROPERTIES
Henry's Law	Theory	**Explain** why Henry's law is required with activity coefficient models
	Application	**Evaluate** the liquid-vapor equilibrium for water/N2 at 25 C, 1 bar, 50%mol water / 50%mol N2 (total)
Equations of State	concept	**Explain** what an equation of state is (relation b/w temperature, pressure and molar volume/density)
	Binary interaction parameters	**Explain** how binary interaction parameters are used in equation of state
	common models	**List** a few commonly used equations of state models
Advanced Equations of State common models		**List** a few commonly used equations of state models
Selection of Physical Property Methods	specification	**Identify** the different places one can specify the property method for the calculation of a block
Electrolyte Property Methods	components	**Identify** the different component types typically present in electrolyte mixture
	chemistry	**Identify** the reaction types one can specify in a chemistry
Data Regression	objective	**Describe** what is the objective of data regression
	experimental data	**Identify** the purpose of the USAGE column in experimental data specifications
	regression	**Explain** the purpose of the "evaluation" mode
	results	**Explain** the points to check to validate the quality of a data regression run
	application	**Perform** regression of pure component data (saturation pressure with Antoine)
	application	**Perform** VLE regression of TXY data
Property Constant Estimation	purpose	**Explain** the purpose of parameter estimation
	methods	**Identify** the two main approaches available for estimation (PCES and NIST)

SCOPE	TECHNICAL CONTENT	COMPETENCY OBJECTIVE FOR PHYSICAL PROPERTIES
Property Constant Estimation	methods	**Identify** the two main approaches available for estimation (PCES and NIST)

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.