CoSEIA SOLAR THERMAL CERTIFICATION EXAM
STUDY GUIDE

This is the study guide for the CoSEIA Solar Thermal Installer Certification Exam. The purpose of this study guide is to outline the possible subjects that will be covered on the exam. The reference documents have been used to assist in the generation of the certification exam. CoSEIA will continue to update this study guide as the exam evolves. If you have any comments or recommendations for the study guide, especially resources from the internet, please send them Jon.Klima@Gmail.com. Thank you, the CoSEIA Board.

TOPIC	SPECIFICS	RESOURCES
Basic Electricity	- Ohm's Law - Current - Resistance - Voltage - Power - Series circuits - Parallel circuits - Energy	*#22* www.qsl.net/aa0ni/lsn02.html www.qsl.net/aa0ni/lsn05.html www.allaboutcircuits.com/vol_1/chpt_5/2.html www.allaboutcircuits.com/vol_1/chpt_5/3.html and www.masstech.org/cleanenergy/energy/glossarygenenergy.htm
Solar Principles	- magnetic north/south - true south - solar declination - solar azimuth - peak sun hours - solar resource in Colorado - insolation, irradiance - optimal tilt angle - latitude - altitude	*#2* www.ngdc.noaa.gov/geomag/declination.shtml *#23* http://eosweb.larc.nasa.gov/sse/ *#24* www.nrel.gov/rredc
Site Assessment	- Effects of shading on a system - Array Orientation - Array Mounting Options - Determining the pitch of a roof - Energy considerations	*#8* www.solarpathfinder.com/ *#4* DOE/CE-0226, FS 111, 2nd Ed., Aug 1988 US DOE2 www.coseia.org/SG_USDOE2.pdf *#17* Study Guide – Energy considerations www.coseia.org/SG_Energy_Considerations.pdf
Solar Panels	- Understand how to compare various solar systems and panels and how they are rated by the SRCC	*#3* SRCC OG-300 Solar Water Heating System Design and Installation Guidelines www.solar-rating.org/education/og300education.htm *#21* Directory of SRCC Certified Solar Water Heating Systems www.solar-rating.org/ratings/OG300DIRECTORIES/OG300DIRFULL.pdf *#11* Directory of SRCC Certified Solar Collector Ratings www.solar-rating.org/ratings/OG100DIRECTORIES/OG100DIRFULL.pdf *#15* Solar Collector Thermal Energy Production www.solar-rating.org/solarfacts/energyproduction20011017.pdf *#5* Engineering Principles and Concepts for Active Systems.,

		pgs. 98 – 100. Available as a reference document at NREL and through www.Amazon.com.
Components	General Types used in Solar Thermal systems - Controller and sensors - Pumps - Collector panel surfaces - Heat collection fluids	#6 Study Guide - IE Sensor and Control Installation Tips www.coseia.org/SG_IE_Tips.pdf #7 Tekmar Application Brochure A 157 www.tekmarcontrols.com/literature/acrobat/a157.pdf #13 Study Guide – Pumps www.coseia.org/SG_Pumps.pdf #14 Study Guide – Coatings www.coseia.org/SG_Coatings.pdf #10 Study Guide – Heat Collection Fluids www.coseia.org/SG_Fluids.pdf
Installation Safety	- Working safely with Solar Thermal systems requires a fundamental understanding of electrical and plumbing systems coupled with common sense. To help keep a safe working environment it is recommended to do at least the following: - Reduce workplace clutter. - Be extra cautious and organized on sloped roofs. - Don't leave tools lying on a slope roof without being secured. - While working on a roof, be prepared for all elements, cold, sun, heat, wind etc… - It is essential when traversing an attic to support one's weight by stepping *only on the ceiling joists or trusses*.	*#20* Potable water temperatures www.coseia.org/SG_H2O_Temps.pdf CoSEIA safety workshops
System Maintenance	- Proper use of maintenance tools	*#18* Study Guide – Maintenance www.coseia.org/SG_Maintenance.pdf *#12* www.misco.com/ and www.misco.com/search.php?cat=29&app=14&q=+Search+by+Keyword&submit.x=123&submit.y=14
NEC CODE	- Understand all relevant information with respect to a solar thermal installation	*#16* National Electrical Code, 250.118(5), 250.119, 334.15(B)

GENERL REFRENCES

#1 Solar Water Heating, Bob Ramlow, available through www.Amazon.com

#5 Engineering Principles and Concepts for Active Systems. Available as a reference document at NREL and through www.Amazon.com.

#9 The Passive Solar Energy Book, Edward Mazria. Available via interlibrary loan from the Denver Public Library.
#16 National Electrical Code, available through www.Amazon.com
#19 PLANNING AND INSTALLING SOLAR THERMAL SYSTEMS A Guide for Installers, Architects and Engineers. Published by James and James (Science Publishers) Ltd in the UK and USA in 2005, available through www.Amazon.com