

Price Sheet Educational Materials

Customer Version	omer Versie	on
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Literature Order Number	EM-ADV1
Date	October 2021
Supersedes	EM-ADV1 (June 2021)
Stocking Location	https://www.trane.com/bookstore

The most current version of this price sheet can be found on the Trane Web site (https://www.trane.com/bookstore).

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Minimum Order Policy

Minimum order amount is US\$25. Orders that do not total US\$25 will be billed at US\$25.

Shipping/Delivery

Literature orders shipped within the United States are shipped UPS Ground and are typically delivered within 3 to 6 business days (depending on the destination). A US\$10 shipping and handling fee is added to each order shipped within the United States. Literature orders shipped outside the United States are shipped UPS and are typically delivered within 4 to 7 business days (depending on the destination and local customs). A US\$30 shipping and handling fee is added to each literature order shipped outside of the United States.

Return Policy

All literature returns must receive prior authorization by calling 608.787.4153. There will be a 15 percent restocking charge on all literature returned. Literature returns will only be accepted up to 90 days after the ship date.

Tax Exempt?

If your company or organization is exempt from paying sales tax, fax or mail a copy of your tax exemption certificate along with the completed order form.

List prices are in U.S. dollars and subject to change without notice.

Air Conditioning Clinics

Purpose: Scripted training presentations used to educate on the fundamentals of heating, ventilating, and air conditioning (HVAC). Each clinic includes a student workbook, with corresponding quiz questions/problems.

Language/Units: All booklets are available in English only, unless specifically noted. All booklets are dual (I-P and SI) units, unless specifically noted.

Audience: The content is technical in nature and intended for individuals who want to learn the basics of HVAC (e.g. HVAC system designers and installing contractors, architects, system operators, servicing technicians, and owners).

Order Number	Title (Pub. Date)	Price	Abstract
Fundamentals Ser	ies		
TRG-TRC001-EN	 Psychrometry (2021) I-P units only SI version available to order TRG-TRC001-GB 	\$18.00	Discussion of the properties of air and the use of the psychrometric chart. Topics include: sensible and latent heat, heat and moisture change, elements of the psychrometric chart, sensible heat ratio (SHR), determining required airflow (cfm) and refrigeration (tons), analyses of basic systems at full and part load (modulating coil, reheat, face-and-bypass, variable volume).
TRG-TRC002-EN	Cooling and Heating Load Estimating (2021)Dual units (I-P/SI)	\$18.00	Presentation of cooling and heating load estimating procedures to use for accurate HVAC equipment selections. The clinic presents the ASHRAE Cooling Load Temperature Difference (CLTD), Solar Cooling Load Factor (SCL), and Cooling Load Factor (CLF) method. Topics include: human comfort, indoor and outdoor design conditions, cooling load estimation, conduction heat gain and loss, solar heat gain, internal heat gains, infiltration, ventilation, fan heat, heating load estimation, single-space psychrometric analysis (sensible heat ratio or SHR, supply airflow, supply air temperature, coil load), multiple-space psychrometric analysis (block load versus sum-of-peaks), plenum versus space loads, and benefits of computerized load analysis.
TRG-TRC003-EN	Refrigeration Cycle (2021)Dual units (I-P /SI)	\$18.00	Presentation of the basic principles of the vapor-compression refrigeration cycle. Topics include: principles of heat transfer, sensible heat, latent heat of vaporization, refrigerants, mechanical refrigeration cycle components (compressor, condenser, evaporator, expansion device), and pressure—enthalpy (P- <i>h</i>) chart (superheat, subcooling, refrigeration effect, and heat of compression).
TRG-TRC004-EN	 Refrigeration Compressors (2021) Dual units (I-P /SI) 	\$18.00	Introduction of the common compressor types used in air-conditioning applications, including scroll, helical-rotary (screw), and centrifugal. Topics include: review of the basic refrigeration cycle, open, semi-hermetic, hermetic, types of compressors, principles of compressor operation, methods of compressor capacity control (cycling, slide valve, inlet vanes, variable-speed), methods of system-level control (direct expansion versus chilled water, constant volume versus VAV), and preventing evaporator freeze-up (sensing suction temperature, hot gas bypass).
TRG-TRC005-EN	Refrigeration System Components (2021) • Dual units (I-P /SI)	\$18.00	Discussion of the components used in a vapor-compression refrigeration system. Topics include: review of the refrigeration cycle, condensers (air-cooled, water-cooled, evaporative) and their control, evaporators (finned-tube, shell-and-tube) and their control, thermostatic expansion valve, superheat and subcooling, solenoid valve, liquid line filter drier, moisture-indicating sight glass, suction line filter, hot gas muffler, shutoff valve, and access ports.
TRG-TRC007-EN	Fundamentals of HVAC Acoustics (2021) • Dual units (I-P /SI)	\$18.00	Discussion of the fundamental concepts of acoustics as it applies to buildings and HVAC systems. Topics include: sound wave, frequency, broadband sound, tones, octave bands, one-third octave bands, sound power and sound pressure, decibels, loudness, A-weighting, Noise Criteria (NC), Room Criteria (RC), acoustical analysis procedure, source-path-receiver model, computerized analysis tools, attenuation and regeneration, sound transmission, sound absorption, sound reflection, room effect, equipment sound rating, free field, reverberent field, semireverberent field, industry rating standards, reverberent room method, and AHRI Standard 260.
Equipment Series			
TRG-TRC010-EN	 Centrifugal Water Chillers (2021) Dual units (I-P /SI) 	\$18.00	Description of the components, operation, and application of a centrifugal water chiller. Topics include: centrifugal compressor, condenser, expansion device (orifice plates), economizer, evaporator, motor, starters, controls, the refrigeration cycle, purge system, compressor capacity control (surge, inlet vanes, multi-stage compressor, adjustable frequency drive or variable speed drive), maintenance considerations, and application considerations (condensing temperature control, constant or variable evaporator water flow, heat recovery, free cooling, and short water loops).

Order Number	Title (Pub. Date)	Price	Abstract
TRG-TRC011-EN	Absorption Water Chillers (2021) Dual units (I-P /SI)	\$18.00	Discussion of the fundamentals of the absorption refrigeration cycle as it pertains to water chillers. Topics include: absorption refrigeration cycle (generator or concentrator, condenser, evaporator, absorber, heat exchanger), system fluids (water, lithium bromide), equilibrium chart, single-effect versus double-effect chillers, indirect-fired versus direct-fired chillers, chiller/heaters, capacity control methods (energy valve, AFD), causes of crystallization and methods of prevention, purge operation, general maintenance considerations (corrosion inhibitors), cooling-water temperature limitations, combination gas-and-electric plants, and special considerations for direct-fired chillers.
TRG-TRC012-EN	 Helical-Rotary Water Chillers (2021) Dual units (I-P /SI) 	\$18.00	Presentation of the components, operation, and application of a helical-rotary (screw) water chiller. Topics include: helical-rotary compressor, oil separator, air- and water-cooled condensers, expansion device, liquid/vapor separator, evaporator, starter, controls, the refrigeration cycle, refrigerants, compressor capacity control, slide valve operation, maintenance considerations, and a brief list of application considerations air- and water-cooled condensing, condensing temperature control, constant or variable evaporator water flow, and short water loops).
TRG-TRC013-EN	Air Conditioning Fans (2021)Dual units (I-P /SI)	\$18.00	Coverage of fan system performance, types of fans, and methods of control. Topics include: static pressure vs. velocity pressure, fan performance curves, fan—system interaction, basic types of fans (forward curved - FC, backward inclined - BI, airfoil - AF, vaneaxial, and variable-pitch vaneaxial - VPVA), methods of fan control (riding the fan curve, discharge dampers, inlet vanes, variable speed, and variable-pitch blade control), and fan applications considerations (static pressure control, system effects, non-standard conditions – altitude, and equipment certification standards.)
Systems Series			
TRG-TRC014-EN	 VAV Systems (2021) Dual units (I-P /SI) 	\$18.00	Summary of the variable air volume (VAV) approach to air conditioning. Topics include: explanation of VAV, components of a VAV system, terminal unit types (cooling only, reheat, parallel and series fan powered, dual duct), terminal unit controllers, diffusers, supply duct design, interior vs. perimeter spaces, system control modes, fan modulation, static pressure control, and system applications considerations (system- level ventilation, freeze protection for coils, part-load space humidity control, building pressure control.)
TRG-TRC015-EN	Water-Source Heat Pump Systems (2021) • Dual units (I-P /SI)	\$18.00	Discussion of the water-source heat pump (WSHP) system. Topics include: operation and components of a heat pump, types of heat pumps, components of a WSHP system, system benefits and issues, system configurations (cooling tower/boiler, ground- coupled, types of ground heat exchangers, hybrid systems), system-level control issues, maintenance considerations, application considerations (ventilation, acoustics, space humidity control, condensate management, airside and waterside economizers, building pressurization, equipment rating standards.)
TRG-TRC016-EN	Chilled-Water Systems (2021) • Dual units (I-P /SI)	\$18.00	Description of chilled-water systems. Topics include: vapor-compression and absorption chiller types, air- vs. water-cooled condensers, packaged vs. split components, ASHRAE Standard 90.1, equipment rating standards, components of a chilled-water system, coil control (3-way valves, 2-way valves, face-and-bypass dampers), constant vs. variable evaporator flow, chiller plant design concepts (parallel, series, and primary-secondary or decoupled), combined energy (hybrid) plants, low- flow systems, variable-primary-flow systems, heat recovery, sidecar arrangement, free cooling (plate-and-frame heat exchanger, refrigerant migration), and chilled-water system control (chiller sequencing, swing chiller, failure recovery, system optimization, and system-level control)

Order Number	Title (Pub. Date)	Price	Abstract
TRG-TRC017-EN	HVAC System Control (2021) • Dual units (I-P /SI)	\$18.00	Introduction to automatic control of HVAC equipment and systems. Topics include: control loops, types of control action (two position or on/off, floating, proportional, proportional-integral or PI, and proportional-integral-derivative or PID), pneumatic controls, analog-electric controls, microprocessor-based controls or DDC, unit-level control versus system-level control, example unit-level control loops for a VAV air handler (discharge-air temperature, ventilation, airside economizer, mixed-air temperature, static pressure, building pressurization), examples of system-level control (occupied versus unoccupied modes, morning warmup mode, changeover in a two-pipe system, water loop temperature control in a WSHP system), examples of system optimization strategies (fan-pressure optimization, optimum start, chilled-water reset, WSHP loop optimization), normally-open versus normally-closed actuators, common functions of a building automation system (responding to complaints, graphical user interface, time-of-day scheduling, centralized alarms and diagnostics, remote access, reports, preventive maintenance, integration with other systems, multiple-site support), network terminology, dedicated vs. shared networks, communication protocols, wired vs. wireless, interoperability, BACnet.
TRG-TRC018-EN	Introduction to HVAC Systems (2021) Dual units (I-P /SI) 	\$18.00	Introduction to HVAC systems that dissects the entire system into five subsystems, or "loops." Topics include: requirements for occupant comfort, five "loops" (airside loop, chilled-water loop, refrigeration loop, heat-rejection loop, controls loop), factors that affect decision to choose a chilled-water versus a direct expansion (DX) system, packaged versus split systems, common HVAC system types, single-zone versus multiple-zone systems, constant-volume versus variable-air-volume systems, packaged terminal air conditioner (PTAC), single-zone packaged DX rooftop, DX split system, chilled-water terminal system (fan coils, classroom unit ventilators, blower coils), two- pipe versus four-pipe systems, water-source heat pump systems, dedicated outdoor-air systems, single-zone VAV, multizone system, three-deck multizone system, changeover-bypass system, multiple-zone VAV system, rooftop VAV system, self- contained DX VAV system, chilled-water VAV system, double-duct VAV system, and factors that impact the selection of the HVAC system.
TRG-TRC019-EN	Ice Storage Systems (2021) • Dual units (I-P /SI)	\$18.00	Part of the Trane Air Conditioning Clinic series. This clinic focuses on glycol-based ice storage systems, which use an ice-chiller to cool a heat transfer fluid—often a mixture of water and antifreeze, such as glycol—to a temperature below the freezing point of water. This fluid is pumped through an ice storage tank, causing water inside the tank to freeze. Topics include: benefits of ice storage, on-peak versus off-peak, ice storage tank, full storage versus partial storage, ice-making chiller, heat transfer fluid, ethylene glycol versus propylene glycol, common system layouts (small versus large systems), retrofitting existing systems, control of ice storage systems (tactical control versus strategic control).
TRG-TRC020-EN	Variable Refrigerant Flow Systems (2021) Dual units (I-P /SI)	\$18.00	Variable Refrigerant Flow Systems focuses on VRF systems, which use a combination of zone-level indoor terminals and outdoor components to provide heating and air conditioning. Topics include: system component overview (outdoor units, indoor units, controls, refrigerant piping, heat recovery control units), air- and water-cooled heat rejection, ducted and non-ducted indoor units, system configurations (cooling only, heat pump, heat recovery), maintenance considerations, refrigerant safety, space humidity control, ventilation air delivery, cooling coil condensate, equipment rating standards, combination ratio, low ambient operation, defrost operation, lubrication and oil recovery.
Bundled Sets			
1-43.186	Set of all <i>Air Conditioning Clinic</i> booklets	\$215.00	Set of all Air Conditioning Clinic booklets
1-43.165	"Air Conditioning Clinic" bundle	\$240.00	 This bundle includes: Set of all <i>Air Conditioning Clinic</i> booklets (see pages 2-4) Ductulator duct sizing calculator (see page 13) Psychrometric Charts – pad of 25, standard altitude, I-P units (see page 13) <i>Note: The Trane Air Conditioning Manual is no longer included in this bundle.</i>

Translated Air Conditioning Clinics – Spanish version

Order Number	Title (Pub. Date)	Price	Abstract
Fundamentals Seri	es		
TRG-TRC001-ES	Psychrometry (2021) • I-P units only	\$18.00	Spanish translation. See description above.
TRG-TRC002-ES	Cooling and Heating Load Estimating (2021) • Dual units (I-P/SI)	\$18.00	Spanish translation. See description above.
TRG-TRC003-ES	Refrigeration Cycle (2021) • Dual units (I-P /SI)	\$18.00	Spanish translation. See description above.
TRG-TRC004-ES	Refrigeration Compressors (2021) Dual units (I-P /SI) 	\$18.00	Spanish translation. See description above.
TRG-TRC005-ES	Refrigeration System Components (2021) • Dual units (I-P /SI)	\$18.00	Spanish translation. See description above.
Equipment Series			
TRG-TRC010-ES	Centrifugal Water Chillers (2021) Dual units (I-P /SI)	\$18.00	Spanish translation. See description above.
TRG-TRC012-ES	Helical-Rotary Water Chillers (2021) • Dual units (I-P /SI)	\$18.00	Spanish translation. See description above.
Systems Series			
TRG-TRC016-ES	Chilled-Water Systems (2021) • Dual units (I-P /SI)	\$18.00	Spanish translation. See description above.
TRG-TRC017-ES	HVAC System Control (2021) • Dual units (I-P /SI)	\$18.00	Spanish translation. See description above.
TRG-TRC020-ES	Variable Refrigerant Flow Systems (2021) • Dual units (I-P /SI)	\$18.00	Spanish translation. See description above.

Application Manuals

Purpose: Comprehensive reference guides to increase awareness and working knowledge of heating, ventilating, and air conditioning (HVAC) system design concepts, component combination possibilities, system operating/control concepts and characteristics, general industry issues, and HVAC fundamentals.

Audience: Intended audience is HVAC system designers, however, depending on the topic the manual may also be of interest to others in the industry.

Language/Units: All booklets are available in English only, unless specifically noted. All booklets are in IP units only, unless specifically noted.

Order Number	Title (Pub. Date)	Price	Abstract
APP-APM001-EN	Refrigerating Systems and Machinery Rooms: ASHRAE Standard 15-2019 (2021)	\$16.00	This application manual has been written to help readers understand the refrigerant use restrictions outlined in ANSI/ASHRAE Standard 15–2019, Safety Standard for Refrigeration Systems.
ISS-APM001-EN	Acoustics in Air Conditioning (2006)	\$16.00	Discusses the fundamentals of sound to aid in the design of quiet HVAC systems. Topics include: definitions, frequency, octave bands, sound power vs. sound pressure, sound ratings (A-weighting, B-weighting, C-weighting, noise criteria - NC, room criteria - RC, sone, phone), sound measurement methods, equipment sound rating and industry standards (ARI, AMCA, ASHRAE), source-path-receiver, sound paths, attenuation, transmission loss, regenerated noise, room effect, and fan-generated noise.
SYS-APM001-EN	Chiller System Design and Control (2020)Dual units (IP/SI)	\$16.00	Details basic multiple-machine chilled water systems. Topics include: components of a chilled water system, chillers in parallel, chillers in series, primary/secondary (decoupled) systems, effects of temperatures and flow, low flow system designs, distributed pumping, tertiary pumping, chiller plant controls, chilled water reset, chiller staging, variable-primary flow (VPF) systems, heat recovery, free cooling, sidestream arrangement, system design considerations, preferential loading, alternate energy sources, series-counterflow arrangement, redundancy, contingency planning, condenser water systems, and cooling tower control.
SYS-APM003-EN	Air-to-Air Energy Recovery in HVAC Systems (2020) • Dual units (IP/SI)	\$16.00	Discusses the various air-to-air energy recovery technologies and their application in HVAC systems. Topics include: why recover energy?, sensible- versus total-energy recovery, effectiveness, unbalanced airflow, outdoor-air preconditioning (or exhaust-air heat recovery), supply-air tempering (or reheat) in series or parallel, ASHRAE Standard 90.1, impact on first cost and operating cost, frost prevention methods, minimizing cross leakage, methods of capacity control, coil loops (or coil runaround loops), fixed-plate heat exchangers (or air-to-air heat exchangers), heat pipes, rotary heat exchangers (or heat wheels, enthalpy wheels, desiccant wheels), ARI Standard 1060, controlling energy recovery devices in dedicated outdoor-air systems and mixed-air systems (constant volume, VAV), economizer operation, active desiccant dehumidification systems, local versus centralized preconditioning.
SYS-APM004-EN	Dehumidification in HVAC Systems (2020) • Dual units (IP/SI)	\$16.00	Discusses the dehumidification performance of various, cold-coil commercial HVAC systems, particularly at part-load conditions. Topics include: why control humidity in buildings?, sources of moisture, cold coil versus active desiccant dehumidification, full-load versus part-load conditions, ASHRAE weather data, dehumidification performance of constant-volume systems (packaged direct expansion DX equipment, energy recovery, fanspeed adjustment, mixed-air bypass, return-air bypass, DX coil circuiting, dual path air handlers, supply-air tempering or reheat), dehumidification performance of VAV systems (minimum airflow settings, supply-air temperature reset, supply-air tempering at VAV terminals, colder supply-air temperatures), dedicated outdoor-air systems (neutral versus cold, to space versus to other units, reset control strategies), unoccupied humidity control, building pressure control, airside economizer control, ASHRAE Standards 62 and 90.1.
SYS-APM005-EN	Heating with Compressors in HVAC Systems (2021)Dual units (IP/SI)	\$16.00	This manual focuses on using compressor technology in a vapor compression cycle to produce heated water (or other fluid) which then satisfies heating loads such as building heating, process, domestic water and others. It describes concepts, equipment, system and mechanical implementation, energy use, and environmental emissions. The manual also identifies system-level characteristics for effective and reliable operation and control. We encourage you to familiarize yourself with its contents and to review the appropriate sections when designing an application that could benefit from using compressors to produce heated water.

Order Number	Title (Pub. Date)	Price	Abstract
SYS-APM007-EN	Rooftop VAV Systems (2021)	\$16.00	Discusses proper design and application of packaged rooftop, variable air volume (VAV) systems. Topics include: basic system operation, benefits and drawbacks of a rooftop VAV system, in-depth coverage of the components that make up the system (packaged rooftop unit, VAV terminal units, air distribution system, hot water heating system, controls), solutions to address common design challenges (zoning, ventilation, humidity control, energy efficiency, acoustics), several system variations (cold air distribution, single-zone VAV, air-to-air energy recovery), and common unit-level and system-level control functions (including system optimization strategies).
SYS-APM008-EN	Chilled-Water VAV Systems (2020)	\$16.00	Discusses proper design and application of chilled-water, variable air volume (VAV) systems. Topics include: basic system operation, benefits and drawbacks of a chilled-water VAV system, in-depth coverage of the components that make up the system (VAV air-handling unit, VAV terminal units, air distribution system, chilled-water system, hot water heating system, controls), solutions to address common design challenges (zoning, ventilation, humidity control, energy efficiency, acoustics), several system variations (cold air distribution, single-zone VAV, air-to-air energy recovery, dual-duct VAV systems), and common unit-level and system-level control functions (including system optimization strategies).
SYS-APM009-EN	Central Geothermal Systems (2020)	\$16.00	Discusses proper design and control of central geothermal bidirectional cascade systems that use borefields. Topics include system design considerations (borefield, ground water, water temperatures, chiller/heater selection, system piping, system design options (optimum efficiency design features, supplemental heat, auxiliary energy rejection, contingency cooling, chilled-water pump control), airside considerations (heating design, economizer control, freeze protection, ASHRAE Standard 90.1 compliance), system operation and control (heating only, cooling only and simultaneous heating and cooling). Printed in full color.
SYS-APM010-EN	Water-Source and Ground-Source Heat Pump Systems (2020)	\$16.00	Discusses proper design and application of water-source (WSHP) and ground-source heat pump (GSHP) systems. Topics include: basic system operation; benefits and drawbacks of a WSHP system; in-depth coverage of the components that make up the system (water- source heat pumps, water distribution system, heat rejection and heat addition, dedicated outdoor-air system); solutions to address common design challenges (thermal zoning, ventilation, humidity control, energy efficiency, acoustics); several system variations (ground-coupled, surface-water, and ground-water heat pump systems, as well as several hybrid system configurations); and common unit-level and system-level control functions (including system optimization strategies).
SYS-APM011-EN	Chilled-Water Terminal Systems (2020)	\$16.00	Focuses on chilled-water terminal systems, including fan-coils, blower coils, classroom unit ventilators, chilled beams, radiant cooling or heating, and sensible cooling terminal units. This guide discusses the advantages and drawbacks of these systems, reviews the various components that make up the system, proposes solutions to common design challenges, explores several system design variations, and discusses system-level control.
AM-SYS-6	Variable Air Volume Duct Design (2020)	\$4.00	Covers information pertaining to variable volume duct design with special attention given to the static regain method. Topics include: computerized duct design, round vs. rectangular ductwork, duct heat gain, fitting efficiency, duct design rules, typical duct layout errors, high-velocity duct fittings, and static pressure sensor location.
SYS-AM-7	Water Source Heat Pump System Design (1994)	\$16.00	Describes the water source heat pump system, including design, selection, installation, and controls. Topics include: components, basic operation, system design, control recommendations, typical system operation parameters, boiler, cooling tower and pump selection, piping design recommendations, water regulating valve and variable speed pumping, hybrid systems, condensate drain lines, freeze protection.
AM-SYS-9	Self-Contained/VAV System Design (2011)	\$5.00	Discusses the various aspects of self-contained/VAV system applications and to provide suggestions that will help the designer make the best possible design decisions when applying this equipment. Topics include: system components, VAV terminal unit types, equipment selection, zoning, interior vs. perimeter zones, cooling tower and condenser water pump and piping, freeze protection, system control, airside economizer, waterside economizer, building pressurization, system-level controls, and system optimization.
SYS-AM-10	Ice Storage Systems (1987)	\$5.00	Intended to aid designers in the design of ice storage systems using ethylene glycol. Topics include: types of thermal storage (chilled water, ice, eutectic salts), full storage vs. partial storage, ice storage selection and capacity, chiller selection, ice storage system design and control. NOTE: See also the "Ice Storage Systems" series of Engineered Systems Clinics (ISS-CLC-1, 2, 3, 4).

Order Number	Title (Pub. Date)	Price	Abstract
SYS-AM-13	Absorption Chiller System Design (1999) • Dual units (IP/SI)	\$16.00	Helps designers correctly apply absorption chillers into systems. Topics include: absorption refrigeration cycle, types of absorption chillers, gas cooling with absorption, economic analysis, chiller control, chiller plant design and control (heat recovery, thermal storage, heating applications), installation (exhaust stack, ASHRAE Standard 15, combustion air), and maintenance considerations.
SYS-AM-15	Managing Building Moisture (2020)	\$16.00	This manual helps HVAC system designers identify and quantify moisture sources in buildings. It also presents moisture-management techniques related to the building envelope, the occupied space and the mechanical-equipment room. Topics include: indoor air quality (IAQ), comfort, moisture sources, condensation, building envelope, dehumidification, equipment room moisture, ventilation air, moisture and equipment, drain pans, condensate traps, insulation, infiltration, vapor-pressure diffusion, design and control strategies, humid climates, and humidity control.
AM-CON-10	Hot Gas Bypass Control (2020)	\$1.25	Explains the hot gas bypass (HGBP) system by discussing what it is, why and when it should be used, how it is properly applied, and how to size/adjust a HGBP valve. Includes: hot gas bypass to evaporator inlet, hot gas bypass to suction line.
AM-CON-17	Building Pressurization Control (1982)	\$5.00	Reviews several key definitions and outlines these space pressure control systems: natural relief, barometric relief, constant volume return fan, constant volume exhaust fan, powered barometric relief, coordinated exhaust/supply fan control, coordinated return/supply fan control, volume reset of return fan, direct pressurization control, and sequenced control of multiple exhaust fans. Points out system performance characteristics and suggests control applications. Includes a general discussion, design considerations, system alternatives, and recommended equipment for the application.
ICS-AM-4	Control of Ice Storage Systems (1988)	\$5.00	Reviews ice storage controls as a part of a Trane Integrated Comfort system. Topics include: operating modes, control sequence development, demand-limiting vs. time-of-use, data gathering and monitoring and ice inventory, control of system components (chiller, pump, blending valve, bypass valve), system control and monitoring, load profiles, ice inventory, and points lists.
ED-FAN	Fans and Their Application in Air Conditioning (2021)	\$10.00	Provides a detailed overview of fan fundamentals intended to help system designers understand their performance, selection, application and control. Topics include: terminology, testing, fan performance curve, system resistance curve, fan surge, fan paralleling, types of fans (forward curved, backward inclined, radial, tubular, axial, fan laws, industry standards (AMCA), inlet and discharge conditions, transitions, drive and bearing losses, fan modulation devices (scroll volume damper, inlet and discharge dampers, inlet vanes, speed modulation, blade pitch variation), parallel and series operation, draw-thru vs. blow-thru, supply fans in systems, return fans, motors and controls, types of motor starters, power transmission, sound and vibration control, selection, specification, installation, maintenance, troubleshooting, and field measurement methods.

Engineers Newsletter Live programs ***Please note that DVD copies are no longer available***

Purpose: Engineers Newsletter Live is a series of programs focused on the design and control of heating, ventilating, and air conditioning (HVAC) systems. The content of each program is objective, technical and educational in nature. The series is produced and presented by the Trane Applications Engineering team. Each program is 60 to 90 minutes in length.

Audience: The intended audience for these programs is HVAC system designers. However, depending on the topic, the program may also be of interest to others in the industry.

Program content, videos, and continuing education certification quizzes for past programs can be found in the <u>Trane Education Center</u> or on <u>YouTube</u> (video only). PDHs may not apply in all states, so please check your state board requirements (RCEP.net) or contact your local Trane office for more information. Courses are approved by AIA, however, your local board may have additional requirements for approval.

Order Number	Description
APP-CMC001-EN	The Low Dollar Chiller Plant
	(August, 1999)
APP-CMC003-EN	Lowering Supply Air Temperatures
	(May, 2000)
APP-CMC005-EN	Building Moisture and Humidity
	Management
	(August, 2000)
APP-CMC007-EN	Geothermal Heat Pump Systems
	(May, 2001)
APP-CMC009-EN	Split System Refrigerant Piping
	Design
	(December, 2001)
APP-CMC013-EN	Commercial Building
	Pressurization (April, 2002)
APP-CMC015-EN	Variable-Primary-Flow Chilled-
	Water Systems (May, 2003)
APP-CMC017-EN	HVAC and LEED
	(February, 2004)
APP-CMC019-EN	Small Chilled-Water Systems –
	Design and Application
	(September, 2004)
APP-CMC022-EN	Energy Analysis – LEED™
	Modeling (May, 2005)
APP-CMC024-EN	CO ₂ -Based Demand-Controlled
	Ventilation (November, 2005)
APP-CMC026-EN	HVAC Systems and Airside
	Economizers (May, 2006)
APP-CMC028-EN	Energy-Saving Strategies for
	Rooftop VAV Systems
	(November, 2006)
APP-CMC030-EN	Improving Dehumidification in
	HVAC Systems
	(September, 2007)
APP-CMC032-EN	Energy-Saving Strategies for
	LEED [®] and the Energy Policy Act
	(May, 2008)
APP-CMC034-EN	ASHRAE Standards 62.1 and 90.1,
	and VAV Systems
	(November, 2008)
APP-CMC036-EN	Ice Storage System Design and
	Application (May, 2009)
APP-CMC038-EN	Fans In Air-Handling Systems
	(March 2010)
APP-CMC040-EN	ASHRAE Standard 90.1-2010
	(October 2010)
APP-CMC042-EN	High Performance VAV Systems
	(June 2011)
APP-CMC044-EN	High-Performance Green
	Buildings: ASHRAE Standard
	189.1-2011 (March 2012)
	Air to Air Enorgy Decovery
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APP-CMC004-EN	Advanced System Control
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APP-CMC006-EN	Air-to-Air Energy Recovery
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	Cooling Towers and Condenser-
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HVAC System Design Tools

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94.24	Ductulator [®] (2011) • Dual units (IP/SI)	\$12.00	Hand held rotating calculator used for sizing supply and return duct systems using the equal friction design method. Includes scales for friction loss per unit length, air volume air velocity, round duct diameter, and rectangular duct diameters. One side uses I-P units, the other side uses SI units. Includes a protective sleeve with ASHRAE recommended design air velocities for system components/applications.			
1-43.190	Psychrometric Chart (1983) • standard altitude (29.921 in. Hg) • 11" x 17" pad of 25 sheets • I-P units • Includes "coil curves"	\$10.00	Chart used for determining properties of moist air and analyzing air conditioning processes.			
1-43.191	Psychrometric Chart (1983) • standard altitude (29.921 in. Hg) • (1) 11" x 17" laminated chart • I-P units • Includes "coil curves"	\$15.00	(see above)			
1-43.192	Psychrometric Chart (1983) • standard altitude (29.921 in. Hg) • 8.5" x 11" pad of 25 sheets • I-P units • Includes "coil curves"	\$7.50	(see above)			
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OSA 214 E	Psychrometric Chart (1996) • standard altitude (101 kPa) • 8.5" x 11" pad of 25 sheets • SI units • Includes "coil curves"	\$10.00	(see above)			
1-43.198	Equilibrium Chart for Lithium Bromide Solutions (1983) • (1) 11" x 17" laminated chart • I-P units	\$15.00	Chart used for determining properties of a lithium bromide solution used in the absorption refrigeration cycle.			

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