

Summary Comparison of Simulation Program Features

FEATURE	DOE2.2	eQUEST	TRANE TRACE 700	CARRIER HAP
Public/Proprietary	Public Domain	Proprietary	Proprietary	Proprietary
Simulation Method	8760 hours	8760 hours	8760 hours	8760 hours
Loads Methodology	Cst Wtg Factor	Cst Wtg Factor	Std Wtg Factor	Std Wtg Factor
Load Design Calculation	No	No	Yes	Yes
Max # of Zones	1024	1024	Unlimited	2500
Front End Type	text/command	Windows	Windows	Windows
Multiple Interface Views			•	
On-screen help	none	extensive	substantial	extensive
User-Selectable Hourly Output	extensive	extensive	limited	extensive
Graphic Results Summary		•		•
"3-D" Building Drawing		•		
Accepts CAD input files/gbXML		•	•	
Export Data back to CAD files			•	
Materials/Assemblies Library	•	•	•	•
Schedules Library	•	•	•	•
Graphic Schedule Input		•		•
Bldgs/Prototype Library		•	•	
Detailed Shading	•	•	•	•
Automatic Equip Sizing	limited	limited	•	•
Human Comfort Prediction				
Expression Inputs	•	•		
Multiple schemes / parametrics	•	•	•	•
# Terminal Systems Types	28	28	24	21
# Primary Equipment Types	27	27	24	22
Runtime (40 zones, 1.8MHz P4)*	20 sec	20 sec	2.3 min	2 min
Approximate Cost	freeware	freeware	\$1995+\$413/yr	\$1495+\$300/yr
Documentation	extensive	extensive	moderate	moderate
User modeling guide			included	
Telephone and Email Help	not available	\$450/10 hrs	extensive	limited
Minimum Hardware Recommended	Windows 9x+ 32 MB	Windows XP+ 32 MB	Windows XP+ 32 MB	Windows XP+ 32 MB

* Dependent on tool version

Comparison of LOADS Modeling Capabilities

	DOE2.2	eQUEST	TRANE TRACE	CARRIER HAP
Weather data				
Number of weather data days used	365	365	12/365	365
Statistical weather summaries available	•	•	•	limited
User-processing of custom weather data	•	•	•	
Calculation Time Step				
1-hour in LOADS	•	•	•	•
15 min or 30 min kW reporting	•	•		
Spaces and Zones				
Max # of Spaces / Zones	1024	1024	No max	2500
Spaces used as components of HVAC zones	•	•	•	•
Spaces/Zones named or numbered?	names	names	names	names
Floor and/or Space multipliers	•	•	•	•
Schedules				
Maximum number of seasons per schedule	52	52	12	8
Shading				
Overhangs	•	•	•	•
Fins	•	•	•	•
Setbacks (I.e., "Reveals")	•	•	•	•
Detached (e.g., adjacent building)	•	•	•	
Self-shading	•	•		limited
Shade transmittance schedulable	•	•	•	
Operable interior/exterior shading	•	•	•	•
Glazing Systems Input Methods				
Simple shading coefficient & conductance	•	•	•	•
Glazing library	•	•	•	•
User-definable layer-by-layer specification	•	•	•*	•
Lighting Systems Input Methods				
Simple lighting power and/or density	•	•	•	•
Luminaire characteristics and Count	•	•		
Desired illuminance (program calc's lighting power)	•	•	•	
Max Number of Lighting & Equipment Loads per Zone	5	5	unlimited	3
Daylighting Levels Predicted on Request	•	•	•	
Natural Ventilation	limited	limited	limited	

* Import from Windows 5 available

Comparison of Air-Side SYSTEM Modeling Capabilities

	DOE2.2	eQUEST	TRANE TRACE	CARRIER HAP
Air-Side SYSTEMS Types				
Single Supply Duct Types				
Packaged single-zone system	•	•	•	•
Single-zone fan system w optional sub-zone reheat	•	•	•	•
Constant volume reheat fan system	•	•	•	•
Single-zone induction fan system	•	•	•	•
Variable volume (VAV) fan system, optional reheat	•	•	•	•
Fan-powered VAV (powered induction unit) system	•	•	•	•
Packaged variable volume system	•	•	•	•
Ceiling bypass variable volume system	•	•	•	•
Packaged variable volume / variable temperature	•	•	•	•
Packaged total gas solid desiccant system	•	•	•	
Evaporative cooling system	•	•	•	
Underfloor air distribution systems			•	
Displacement ventilation systems			•	
Active chilled beam system			•	
Passive chilled beam system			•	
Air Mixing Systems				
Dual duct system	•	•	•	•
Dual fan dual duct system	•	•	•	•
Multizone system	•	•	•	•
Packaged multizone system	•	•	•	•
Terminal Unit Systems				
Packaged terminal air conditioner	•	•	•	•
Unitary hydronic ("California") heat pump system	•	•	•	•
Two-pipe fan coil system	•	•	•	•
Four-pipe fan coil system	•	•	•	•
Two-pipe induction system	•	•	•	•
Four-pipe induction system	•	•	•	•
Variable refrigerant volume system			•	
Ground-source heat pump system	•	•	•	•
Gas engine-driven heat pump system	•	•	•	
Residential Systems				
Packaged rooftop system	•	•	•	•
Split system	•	•	•	•
Variable volume / variable temperature system	•	•	•	•
Heating Only Systems				
Heating and ventilating system	•	•	•	•
Unit heater	•	•	•	

Comparison of Air-Side SYSTEM Options

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Air-Side SYSTEMS Options				
Coil Sizing based on:				
Coincident (building block) load	•	•	•	•
Non-coincident (sum of each zone) load	•	•	•	•
User-input	•	•	•	•
Thermostat Action Options				
Two-position	•	•	•	•
Proportional	•	•	•	•
Reverse-acting	•	•	•	•
Automatic start-up cycles	•	•	•	•
Coil Control Options				
Constant temperature	•	•	•	•
Reset by OSA	•	•	•	•
Reset by zone demand	•	•	•	•
User scheduled	•	•	•	
Fan Control Options				
Constant volume	•	•	•	•
Cycling	•	•	•	•
Two-speed	•	•	•	
Inlet vane	•	•	•	•
Discharge dampers	•	•	•	•
Variable speed drives	•	•	•	•
User-definable curve	•	•	•	•
Fan static pressure optimization			•	
Air-Side Economizer & Ventilation Options				
Dry-bulb economizer	•	•	•	•
Enthalpy economizer	•	•	•	•
Fixed volume VAV control	•	•		•
Schedulable OSA quantities	•	•	•	•
Indirect and direct evaporative cooling			•	
ASHRAE Standard 62.1 2004/2007			•	
Demand control ventilation			•	
Adjacent room air transfer			•	
Dedicated Outdoor Air Options				
Split dehumidification			•	
Dehumidification control			•	
Control optimization (DB and Dew Point)			•	
Active Dehumidification Controls				
Worst case room			•	

Mixed air bypass			•	
Return air bypass			•	
Variable speed fan			•	
Heat Recovery Options				
Multiple stages available			•	
Heat pipe			•	
Solid desiccant			•	
Liquid desiccant			•	
Type III desiccant			•	
Sensible wheel			•	
Total energy wheel			•	
Coil runaround loops			•	
Fixed plate heat exchanger			•	
Fixed membrane heat exchanger			•	
Duct losses				
Direct, plenum, and ducted return paths	•	•	•	•
CFM loss reduces air to zone	•	•	•	•
Thermal & air losses affect surrounding zone temp	•	•	•	

Comparison of Water-Side PLANT Equipment Modeling Capabilities

	DOE2.2	eQUEST	TRANE TRACE	CARRIER HAP
Water-Side PLANT Equipment Types				
Heating				
Electric HW or steam boiler	•	•	•	•
Fuel HW or steam boiler	•	•	•	•
Cooling				
1-Stage & 2-stage HW or steam absorption chiller	•	•	•	•
Direct-fired 2-stage absorption chiller	•	•	•	•
Open/hermetic centrifugal chiller (water/air-cooled)	•	•	•	•
Open/hermetic reciprocating (water/air-cooled)	•	•	•	•
Rotary screw chiller (water/air-cooled)	•	•	•	•
Double bundle chiller	•	•	•	
Engine-driven chiller	•	•	•	•
Central geothermal (cascaded or fully mixed)			•	
Heat Rejection				
Open cross-flow or counter-flow tower	•	•	•	•
Open cross-flow or counter-flow tower with HX	•	•	•	•
Ground loop	•	•	•	
Scheduled temperature (e.g., lake, aquifer)	•	•	•	•
Evaporative precooling for DX systems	•	•	•	
Chiller-tower optimization			•	
Thermal Storage				
Hot water storage	•	•	•	
Chilled water storage	•	•	•	
Ice or eutectic thermal storage	•	•	•	
Electric Generating Equipment				
Diesel engine	•	•	•	
Photovoltaic Modules	•	•		
Steam or gas turbine	•	•	•	
Water-Side Economizer				
Condenser water coils for DX systems	•	•	•	
"Parallel" plate&frame or strainer cycle	•	•	•	•
"Series" plate&frame	•	•	•	
Refrigerant migration			•	
Fluid cooler			•	
Load shedding			•	
Other				
Purchased steam or chilled water	•	•	•	•
Chilled water reset			•	

Condenser water reset			•	
Hot gas reheat for dehumidification			•	

Comparison of Water-Side PLANT Options

DOE2.2 eQUEST TRANE TRACE CARRIER HAP

Water-Side PLANT Equipment Options				
Plant Equipment Sizing based on:				
User-defined design day weather	•	•	•	•
Annual weather file data	•	•	•	
Heating and Cooling Equip Control Options				
mixed equipment types	•	•	•	•
lead-lag equipment control	•	•	•	•
seasonal equipment control	•	•	•	•
time-of-day equipment control	•	•	•	•
preferential equipment loading	•	•	•	
Cooling Tower Control Options				
Fixed leaving water temperature	•	•	•	•
Wet-bulb reset	•	•	•	•
One-speed fans	•	•	•	•
Two-speed fans	•	•	•	•
Variable-speed fans	•	•	•	•