



HVAC Systems

Building Condition Assessments



Assessment Steps (1)

- Retrieve & assemble documentation
 - Building age
 - Mechanical drawings
 - O & M manuals
 - Past Reports



Assessment Steps (2)

- Interview:
 - Occupants
 - Service companies
 - Engineering/maintenance staff



Assessment Steps (3)

- Walk through the facility:
 - Occupied spaces
 - Ceiling spaces
 - Service areas
 - Mechanical rooms



Assessment Steps (4)

- Summarize & Prioritize:
 - Financial
 - Risk
 - Follow up steps:
 - Tests
 - Studies
 - Recommissioning



DIY Assessment

- Equipment casings
- Leaks
- Noises
- Maintenance records



Ask the experts

- Internal condition
- Destructive testing
- Specialized measurements



What type do you have?

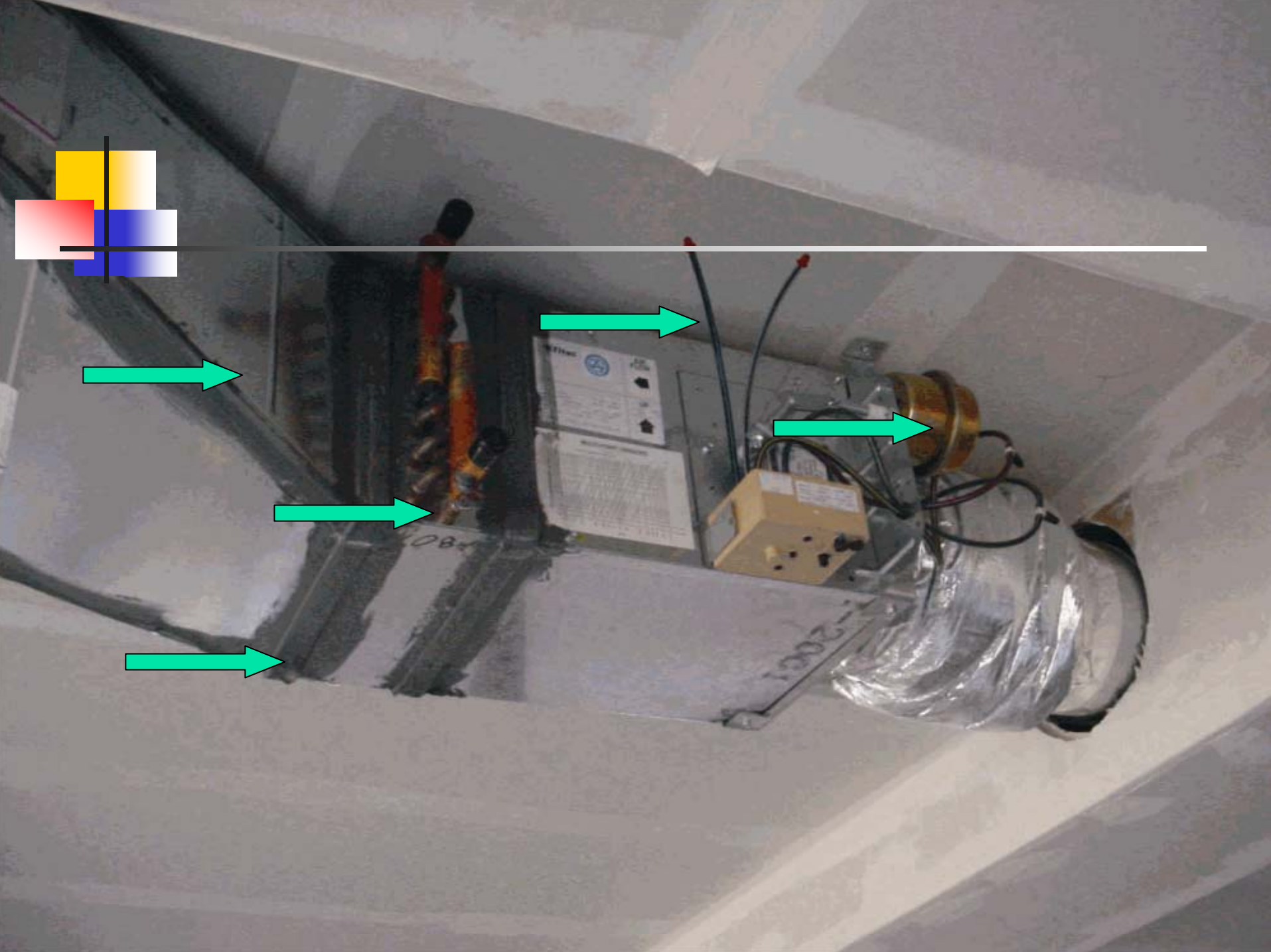
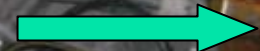
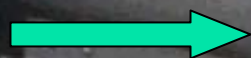
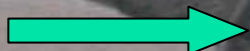
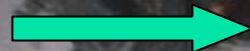
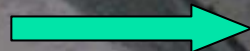
System Type:	Single Zone Rooftops
Ceiling Spaces:	Only ducts
Mechanical Rooms:	Only plumbing
Roofs:	Roof top units
Walls:	Nothing to do with HVAC





What type do you have?

System Type:	Variable Air Vol. (VAV)
Ceiling Spaces:	VAV boxes
Mechanical Rooms:	Variable speed drives
Roofs:	--
Walls:	--





What type do you have?

System Type:	Const. Volume Reheat
Ceiling Spaces:	Hot water pipes & reheat coils
Mechanical Rooms:	Boiler(s)
Roofs:	--
Walls:	--





What type do you have?

System Type:	Water Source Heat Pumps
Ceiling Spaces:	Uninsulated piping Heat pump units & ducts
Mechanical Rooms:	Small boiler plant
Roofs:	Cooling tower
Walls:	--





What type do you have?

System Type:	Hot Water Heating
Ceiling Spaces:	Hot water pipes
Mechanical Rooms:	Boiler plant
Roofs:	--
Walls:	Radiators (or ceiling panels)

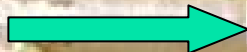
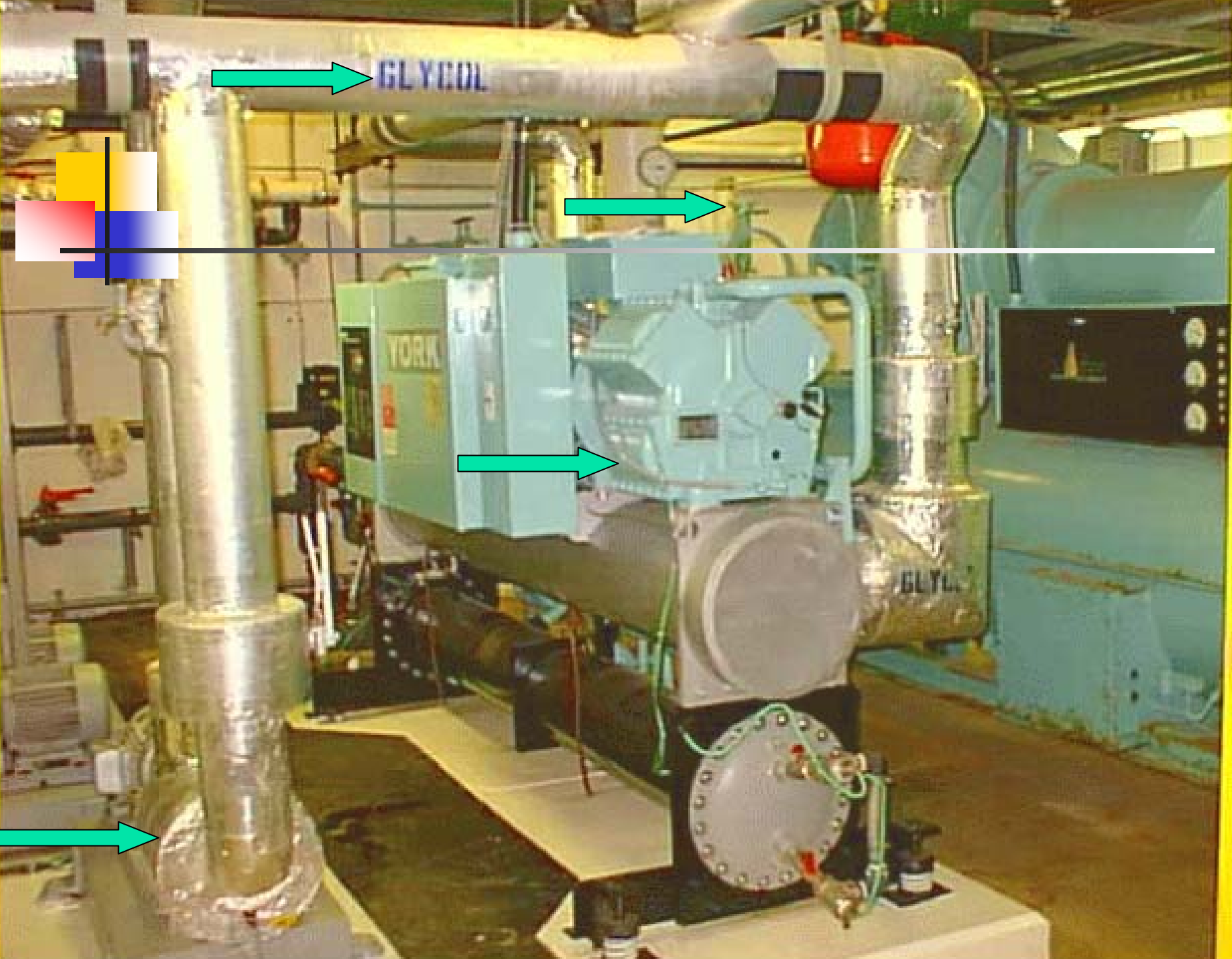




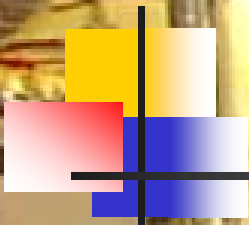
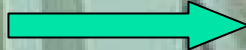


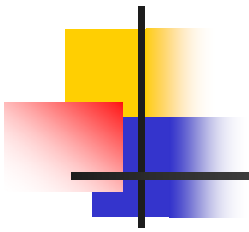
Components

- Fans
- Heating & Cooling coils
- Humidification systems
- Dampers
- Filters
- Pumps
- Boilers



GLYCOL





Exhaust Stack

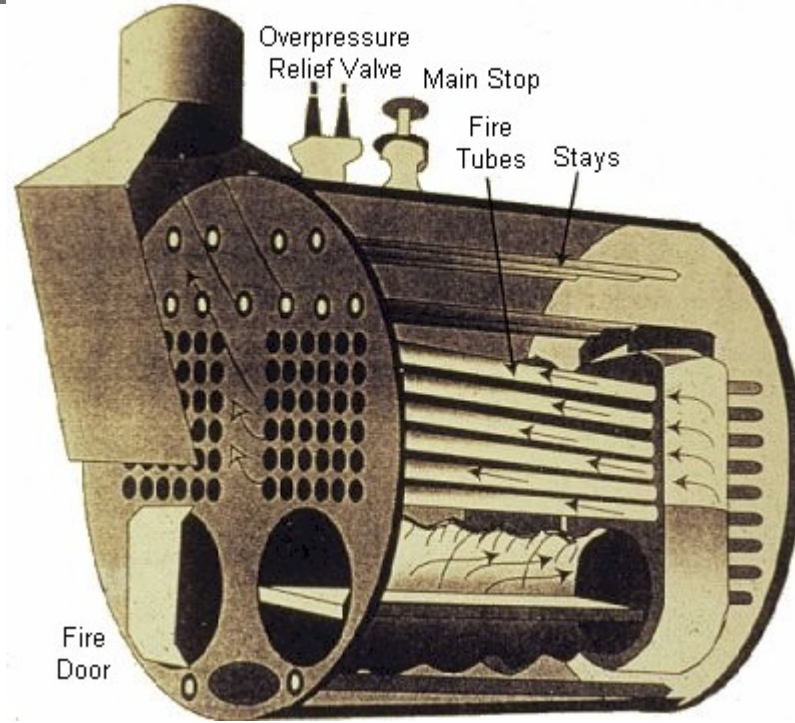
Overpressure
Relief Valve

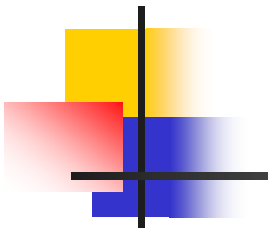
Main Stop

Fire
Tubes

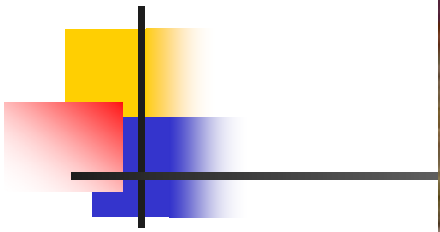
Stays

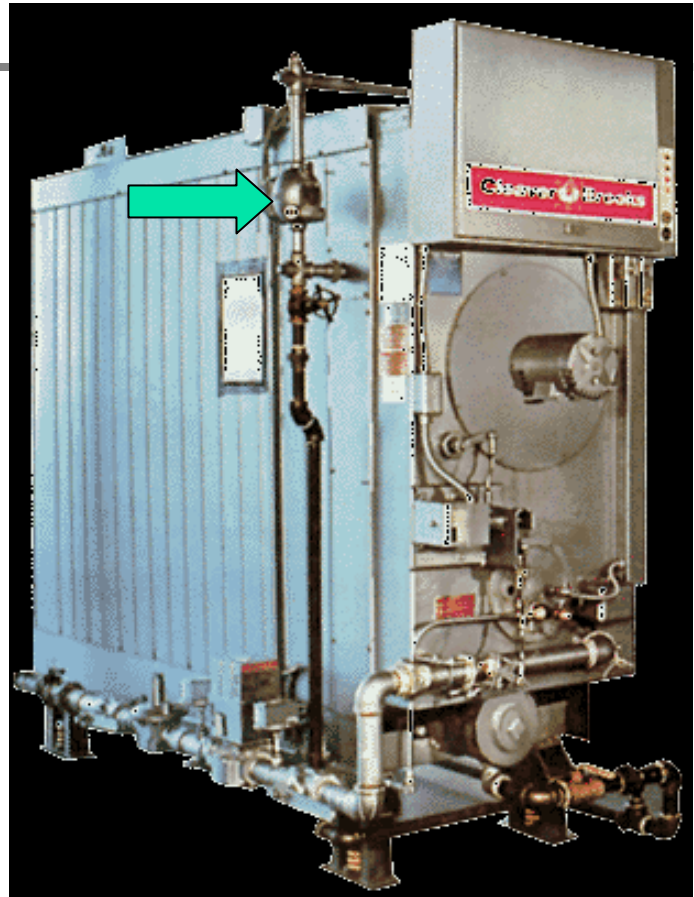
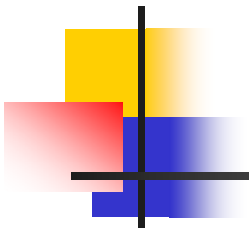
Fire
Door

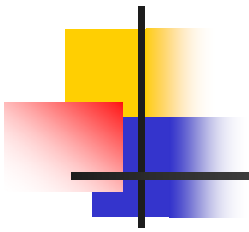




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HVAC Issues

- Indoor air quality
- Noise
- Thermal comfort
- Energy
- Seismic
- Longevity

Equipment Item	Median Years	Equipment Item	Median Years	Equipment Item	Median Years
AIR CONDITIONERS		AIR TERMINALS		AIR COOLED CONDENSERS	20
• window unit	10	• differs, grilles, registers	27	EVAPORATIVE CONDENSERS	20
• residential single or split pkg.....	15	induction and fan coil units.....	20	INSULATION	
• commercial through-the-wall.....	15	VAV and double duct boxes.....	20	• molded	20
• water cooled package	15	• AIR WASHERS	17	• blanket	24
HEAT PUMPS		• DUCTWORK	30	PUMPS	
residential air-to-air.....	15 ^b	• DAMPERS.....	20	• base mounted.....	20
• commercial air-to-air	15	FANS		• pipe mounted.....	10
commercial water-to-air.....	19	centrifugal.....	25	• sump and well.....	10
ROOFTOP AIR CONDITIONERS		axial	20	• condensate	15
single zone	15	propeller.....	15	RECIPROCATING ENGINES	20
multizone	15	ventilating roof mounted.....	20	STEAM TURBINES.....	30
BOILERS, HOT WATER (STEAM)		COILS		ELECTRIC MOTORS.....	18
steel water tube	24 (30)	DX, water or steam.....	20	MOTOR STARTERS.....	17
steel fire tube.....	25 (25)	electric	15	ELECTRIC TRANSFORMERS	30
cast iron.....	35 (30)	HEAT EXCHANGERS		CONTROLS	
electric	15	shell and tube	24	• pneumatic.....	20
• BURNERS	21	• RECIPROCATING COMPRESSORS.....	20	electric.....	16
• FURNACES		PACKAGE CHILLERS		• electronic	15
gas or oil fired.....	18	reciprocating.....	20	VALVE ACTUATORS	
UNIT HEATERS		centrifugal.....	23	• hydraulic	15
gas or electric.....	13	absorption.....	23	pneumatic	20
hot water or steam.....	20	COOLING TOWERS		self contained.....	10
RADIANT HEATERS		galvanized metal	20		
electric	10	wood.....	20		