The Refrigeration Cycle

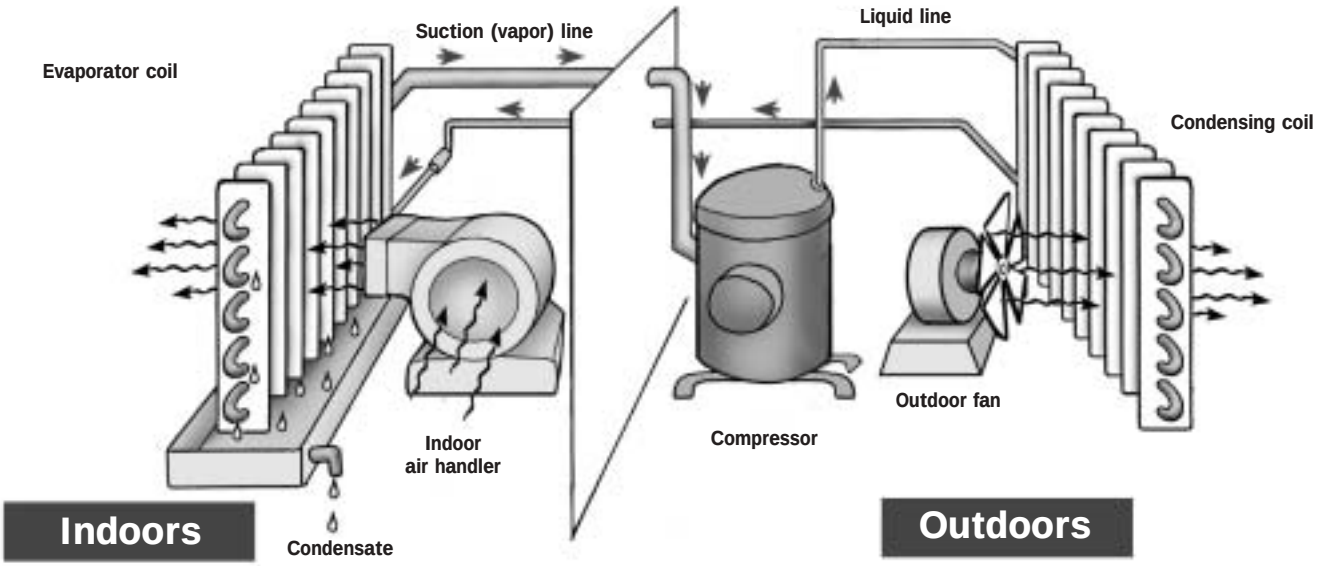


Fig. 9 • The Refrigeration Cycle

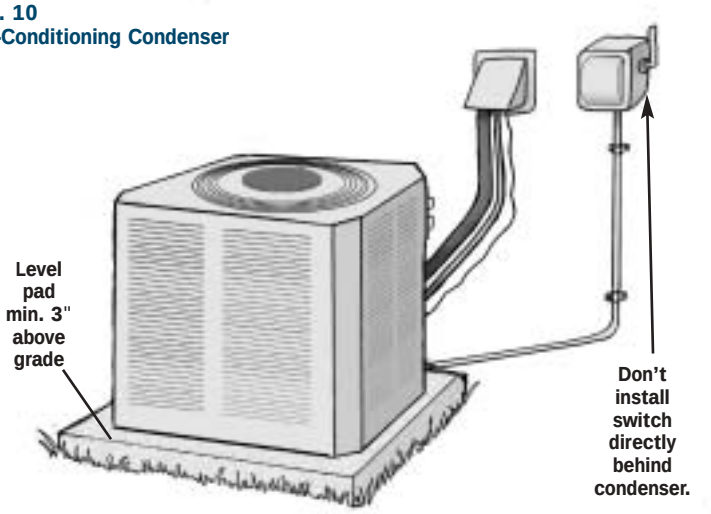
Heat Pumps & Air-Conditioning	IRC	UMC
☐ Heat-pump return air min. clear. area 6sq.in. per 1,000Btu output	T2 [1403.1]	{906.3}
☐ Air filter req'd	[1401.1]	{312.1}
☐ Outdoor unit on 3in.-thick raised pad sloped to drain defrost water	F10 [1403.2]	{1106.2}
☐ Horiz. air handler set level or slope to condensate drain	[manu.]	{manu.}
☐ No cooling coil upstream from heat exchangers	[1411.2]	{905.0}
☐ Refrigerant vapor (suction) lines insulated min. R4	[1411.4]	{manu.}
☐ Nail-plate protection for refrigerant piping closer than 1.5{1}in. of framing edge	[2603.2.1]	{313.9P}
☐ Condenser not next to dryer vent	[manu.]	{manu.}
☐ Heat pump w/ strip heaters needs two-stage thermostat	[manu.]	{manu.}

Condensate	IRC	UMC
☐ Condensate may not drain to public way	[1411.3]	{310.1}
☐ Drainpipe min. win. with 8in./ft. slope	[1411.3.1]	{310.1}
☐ No PVC female thread fittings	[n/a]	{310.5}
☐ May drain to indirect receptor (lav. tailpiece, tub overflow)	F11 [n/a]	{310.1}
☐ No direct connection to waste or vent pipe	[1411.3]	{310.1}
☐ Secondary drain and/or pan req'd. for equip. above framing	[1411.3.1]	{310.2}
☐ Secondary drain to conspicuous point of disposal	[1411.3.1]	{310.2}
☐ Note: water level detection device in pan w/ cutout OK in lieu of pan drain	[1411.3.1(3)]	{n/a}
☐ No drilling (saddle fittings) of DWV pipes to accept condensate drain	[3003.2]	{311.2P}

Table 2 • Heat-Pump Return & Supply Main Duct Sizes						
Btu rating	24k	30k	36k	42k	48k	60k
Tons	2	2.5	3	3.5	4	5
Blower sq. in.	144	180	216	252	288	360
Round duct diameter	14"	16"	18"	18"	20"	20"

Central AC & heat pumps req. 6sq.in. per 1,000Btu/hr. output [1602.2] {906.3}.

Fig. 10
Air-Conditioning Condenser



Electrical Requirements	IRC	NEC
☐ Disconnect in sight of condenser	F10 [4001.5]	{440.14}
☐ Working clearance in front of disconnect	F10 [3305.1]	{110.26A}
☐ Thermostat wire not inside power conduit	F10 [4204.1]	{725-54a1}
☐ Size conductors and overcurrent per nameplate	[3602.11]	{440.4B}
Window and Through-Wall Units		
☐ Max. cord length 10ft. (120V), 6ft. (240V)	[4001.3]	{440.64}
☐ Cord plug OK as disconnect if controls ≤6ft. of floor	[4001.5]	{440.63}
☐ Max. load 80% of circuit rating for individual circuit	[3602.12.1]	{440.62B}
☐ Max. load 50% of circuit rating if circuit has other outlets	[3602.12.2]	{440.62C}

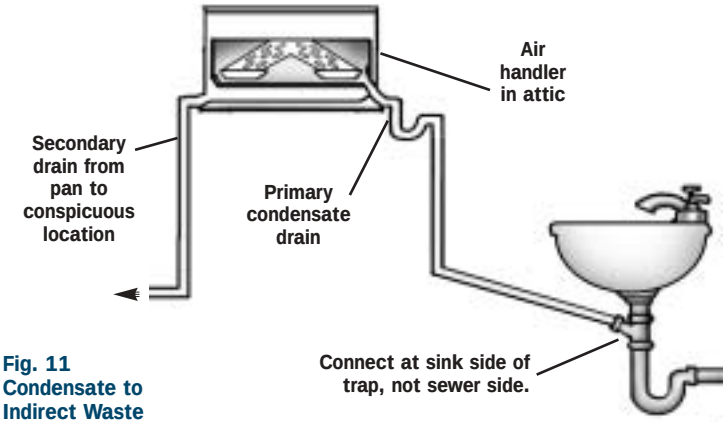


Fig. 11
Condensate to Indirect Waste

Evaporative (Swamp) Coolers

	IRC	UMC
☐ Ground-mounted unit on level base min. 3in. above grade	[1413.1]	{406.0}
☐ Platform-mounted unit min. 6in. above grade	{n/a]	{406.0}
☐ Support per manu. instructions	[1413.1]	{406.0}
☐ Flash any openings into building	[1413.1]	{406.0}
☐ Backflow protection on potable water supply	[1413.2]	{603.4.9P}

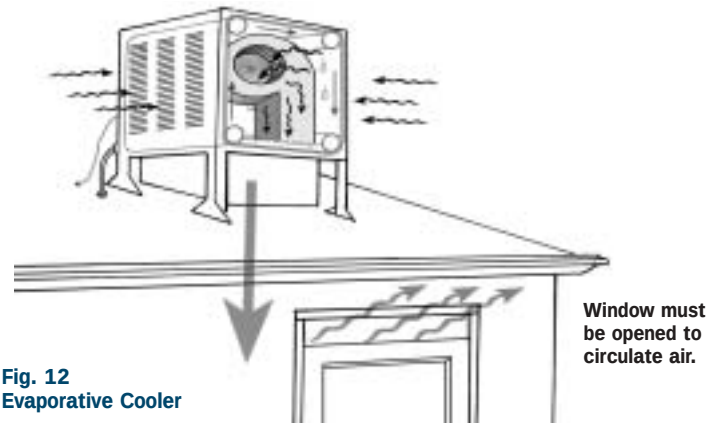


Fig. 12
Evaporative Cooler