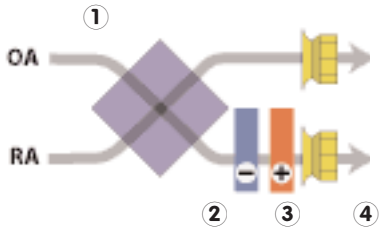
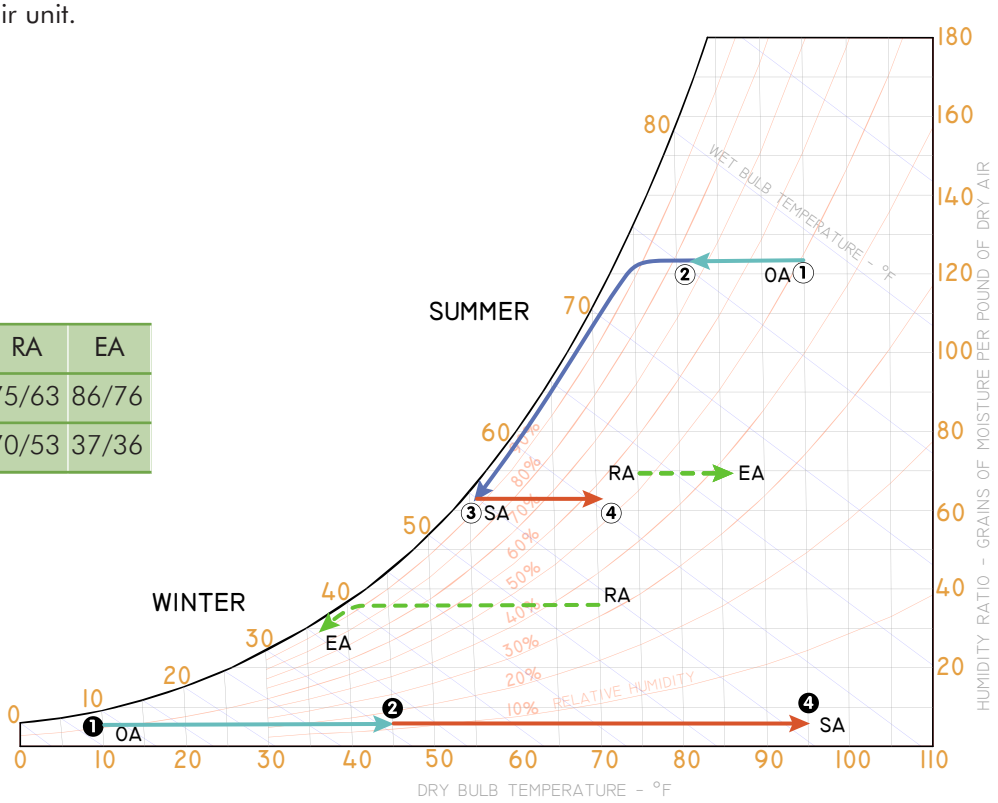
Process Sheet

Fixed plate unit with cooling and heating with reheat mode

This page shows a psychometric process for a typical 100% outdoor air energy recovery unit under standard design conditions. The numbers indicate different stages in the process where there is a transformation of the incoming air condition. The energy saving is compared to the energy needed to achieve the same supply conditions with a basic heating and/or cooling makeup air unit.



	①	②	③	④	RA	EA
S	95/78	83/75	55/55	70/61	75/63	86/76
W	10/8	45/32	–	95/57	70/53	37/36



Process Calculation (per 1000 cfm)

Summer Operation

Plate effectiveness 65%

The fixed plate pre-conditions the air reaching the cooling coil by cooling it. The air entering the cooling coil is at a closer temperature to the desired room air, thereby requiring less mechanical cooling . As a result the cooling coil can be downsized compared to a no-recovery process.

①-② pre-cool section
Qt=4.5x1000x(41.4-37.4)= 18 mbh (1.5 tons)

②-③ mechanical cooling section
Qt=4.5x1000x(37.4-23.2)=63.9 mbh (5.3 tons)

③-④ mechanical reheat
Qs=1.08x1000x(70-55)=16.2mbh

Winter Operation

Plate effectiveness 62 %

The fixed plate pre-conditions the air entering the heating coil by heating it. The air entering the heating coil is at a closer temperature to the desired room air, thereby reducing the amount of mechanical heating needed. As a result the heating coil can be downsized compared to a no-recovery process

①-② pre-heat section
Qs=1.08x1000x(45-10)=37.8 mbh

②-④ mechanical heating
Qs=1.08x1000x(95-45)=54.0 mbh

Savings gained by energy recovery

cooling :	1.5 tons/1000 cfm	heating :	37.8 mbh/1000 cfm

Energy required without energy recovery

cooling:	6.8 tons/1000 cfm	heating :	91.8 mbh/1000 cfm
reheat:	16.2 mbh		

annexAir