In the SEET lab, technicians will put a heat pump system through 2,688 hours of continuous testing, watching for signs of weakness or unusual wear. Why do we only test heat pumps? Because if a Climatuff® compressor can withstand SEET as a heat pump, it will easily handle any stress it may encounter as an air conditioner. During the 16-week testing period, heat pump systems undergo two-week cycles of torture, eight consecutive times allowing engineers to measure and manage a system's quality and performance. Only the strong survive.

Round 1: Heating defrost with snow

Outside temp: 23° with snow
Inside temp: 105°
Objective: The heat pump's challenge is to heat and maintain an inside room at 105° while operating in sub-freezing conditions. The coil must be free of ice build-up in order to perform under these conditions. This test will require the compressor to work very hard and run almost continuously.

Round 2: Cooling

Outside temp: 100° with fan shut off
Inside temp: 75°
Objective: To cause the unit to cycle on overload by simulating outdoor fan failure.This test will also determine if the unit will restart after it cools down.
Note: When pressure builds too high, the internal pressure relief valve will open and discharge hot gases over the internal motor overload device, which in turn will open and shut down the compressor. The internal overload device is designed to take the compressor off-line on any combination of temperature and current that exceeds motor winding tolerances.

Round 3: Minimum load heating

Outside temp: 0°
Inside temp: 90°
Objective: With minimum refrigerant flow, the motor often seizes because there's not enough oil to lube the bearings to keep them from burning. The Climatuff® compressor has the velocity necessary to pull oil back through the lines and into the compressor to lubricate all bearing surfaces.

After each test period, each unit is disassembled and its compressor is cut apart and analyzed to locate signs of stress.

Round 4: Power shut off

Objective: After 12 hours of power outage, oil has drained or has been washed off bearing surfaces by refrigerant migration. The oil reservoir at the bottom of the sump has been floated above the oil pump opening by the heavier liquid refrigerant. On start-up, Trane's unique bearing plating will serve as a boundary lubricant until oil flow is established. This test simulates the effects of a power outage, giving engineers the opportunity to see if the compressor can withstand starting conditions with little or no oil pressure.

Round 5: Cooling maximum load #2

Outside temp: 135°
Inside temp: 100°
Objective: To remove excessive indoor heat, getting rid of it outdoors. The compressor is required to stay on-line in order to pass this grueling test.

Round 6: Cooling flood

Outside temp: 85° Inside temp: 80° with indoor blower off Objective: To subject the compressor to the mechanical stresses of liquid refrigerant flood back. Gross system overcharge or blocked indoor airflow could cause this condition.

Round 7: Cooling maximum load #1

Outside temp: 125° Inside temp: 80° Objective: To attempt to force the compressor to shut down under the stress of high load conditions.

Round 8: Power shut off

Objective: To produce a start-up situation that could seize most compressors due to low oil pressure across the bearings.