Tech Note

Next-Gen Condensing Units - June 2017

Condensing Unit Capacity

Question: Why is the capacity on the Next-Gen and Next-Gen II units different than the units they replace that use the same compressors? Condensing unit capacities are based on the capacity of the compressors, refrigerant, ambient and suction temperature. HTPG is taking a proactive approach ahead of upcoming industry regulations by rating our new units at more realistic return gas temperatures.

Most compressors are rated with 65°F return gas temperature (RGT). This is great for air conditioning applications, but not a good idea for refrigeration. Capacities published with 65°F RGT are significantly higher than true refrigeration operating conditions. Compressors operating in these conditions could see high discharge temperatures, oil degradation, and early failure. Also, operating envelopes of high glide refrigerants often have return gas and compressor super heat limitations or require liquid injection.

The maximum superheat of an evaporator is equal to the delta T of the enclosure. For example a -10°F box and a -20°F dew evaporating coil is 10°F maximum of useful superheat. At this point the gas temperature is -10°F. A well-insulated reasonable length suction line will gain some heat resulting in a 20-25°F total compressor superheat. The resulting return gas temperature would be 0-5°F. It is important to note superheat gained outside the enclosure is not useful work and does not help cool the contents. For comparison, a 65°F RGT would equate to 85 degrees of compressor superheat.

All Next-Gen condensing units are rated with return gas temperatures of 20°F above the saturated dew point temperature. Approximate factors for comparing against the 65°F RGT are 1.1 to 1.15 for low temperature and 1.05 to 1.07 for medium temperature applications (example below). Factors vary with operating conditions compressor model. When selecting a condensing unit you should ask "What is the RGT at the catalog capacity?"

Next-Gen II Capacity Data @ 95°F Ambient - Low Temperature R404A Discus - 60 Hz

SUCTION TEMPERATURE

MODEL	COMP. MODEL	0°F	-5°F	-15°F	-20°F	-25°F	-30°F	-35°F	-40°F
95°F Ambient									
W*DS15L4S**	4DHNF63KE	100,900	90,730	72,400	64,100	56,240	48,730	41,470	34,360
W*DS22L4S**	4DJNF76KE	123,410	111,290	89,110	78,840	68,990	59,460	50,160	40,990

Legacy D-Series/WD-Series Capacity Data @ 95°F Ambient - Low Temperature R404A Discus - 60 Hz

SUCTION TEMPERATURE

MODEL	0°F	-10°F	-15°F	-20°F	-25°F	-30°F	-40°F
95°F Ambient							
WD*D15L44	108,600	92,900	82,200	73,600	63,900	54,600	40,500
WD*D22L44	128,600	105,100	94,400	83,500	75,200	66,600	51,500

15 HP Next-Gen II capacity 64,100 BTUH: -20°F FST, 95°F Ambient and 0°F RGT:

64,100 x 1.1† = 70,510 BTUH

64,100 x 1.15† = 73,715 BTUH

† Return Gas Correction Factor

The 15 HP Next-Gen II condensing unit provides the same refrigeration capacity as the legacy or competitors model.

Return Gas Information by Copeland

A 65°F Return Gas Temperature is one of the parameters used for generating a compressor's rated performance. It may not represent actual operating condition of the compressor in a system.

High return gas temperature can significantly impact compressor capacity. Determination of appropriate return gas temperature should be made based on system design conditions including insulation, size, length of pipe runs, and environmental conditions.

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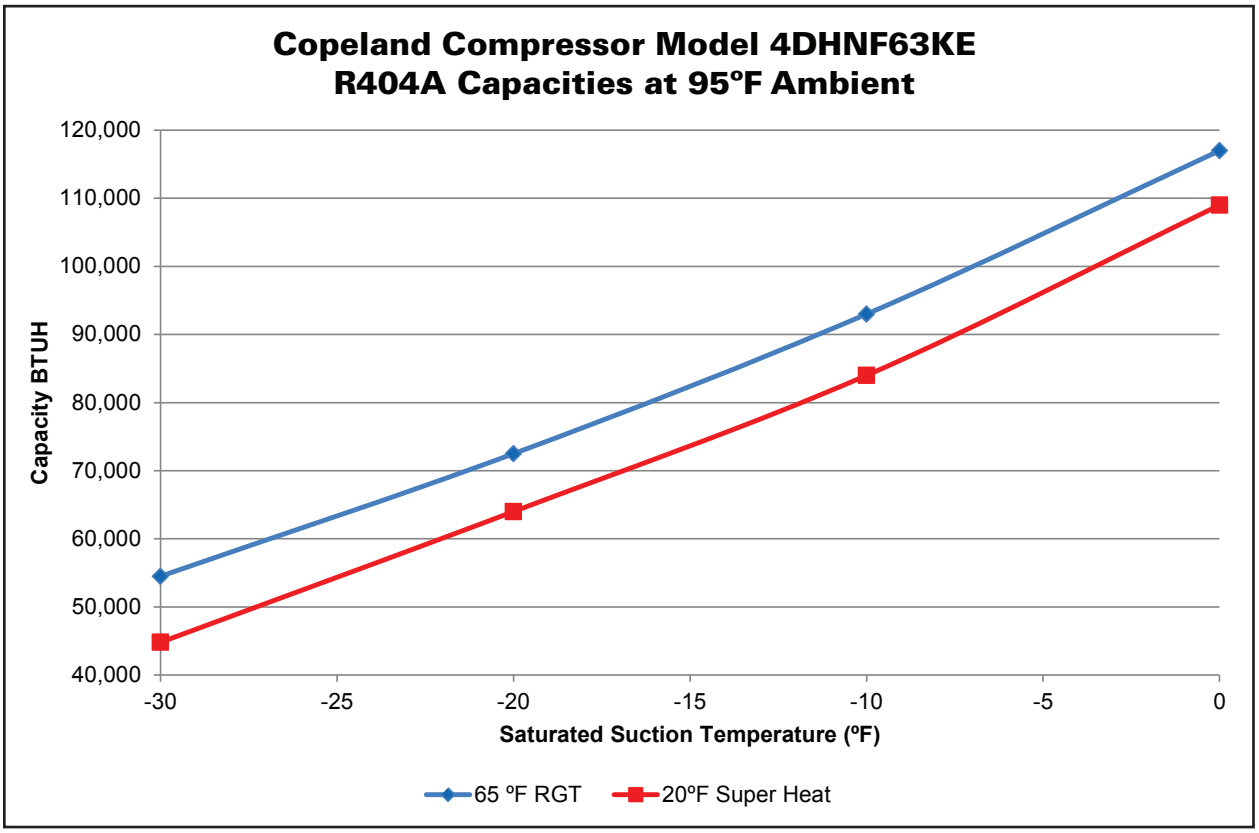

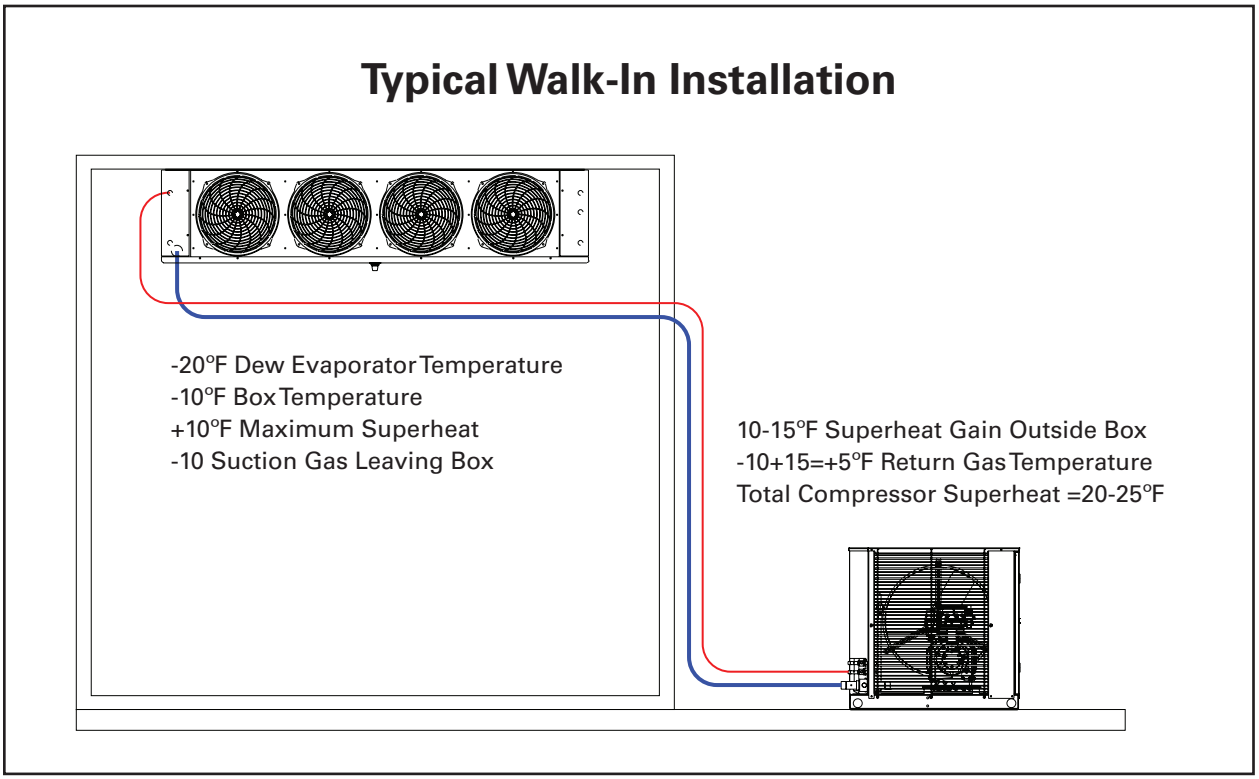

HTPG
A member of the Rheem family of brands
3885 Crestwood Pkwy., Ste. 500 • Duluth, Georgia 30096
www.htpgusa.com • Phone: **800-288-9488,** 256-259-7400 • Fax: 256-259-7478