

Gaseous Nitrogen Thermal Conditioning Units

Dynavac Gaseous Nitrogen Thermal Conditioning Units (TCUs) are operating in aerospace facilities around the globe providing exacting control of thermal vacuum test environments.

Our suite of standard units enable user-defined test profiles over a wide operating range. Reliable and precise thermal profile are delivered using a highly optimized closed loop forced convection method.

Whether it's a cold plate or complete thermal vacuum test facility, Dynavac TCUs provide the thermal performance needed to prepare flight hardware for launch.



System highlights

- Controllable from -180C to 150C using a centrifugal blower and electric resistance heater to control the temperature of the gas stream
- Heat exchanger option for facilities with low-pressure delivery of liquid nitrogen
- Enables exceptional thermal control and uniformity of test hardware
- Adjustable blower speeds to reduce LN₂ consumption during steady state operation
- TCU-100-HP provides highly efficient operation for hardware with smaller extrusion and supply lines
- Onboard PLC-based control system enables setpoint control of test parameters and profiles
- Low maintenance, energy efficient operation
- Dynavac also offers thermal hardware design and manufacturing services

GN2 Thermal Conditioning Units

Performance Specifications	TCU-100	TCU-100-HP	TCU-400	TCU-500	TCU-1000	TCU-1500
Flow Rate	100 cfm	100 cfm	400 cfm	500 cfm	1,000 cfm	1,500 cfm
Differential Pressure (inches- H ₂ O)	40	220	40	80	80	80
Mass Flow (lbm/hr)	2,000	2,000	7,200	9,000	18,000	27,000
Refrigeration Capacity (kW@ -150)	14	14	30	50	80	130
Heater (kW)	12	4.5	21	45	60	90
Motor Size (hp)	3	6.5	5	15	25	40
Operating Pressure (psig)	5-80	5-80	5-80	5-80	5-80	5-80
Power Requirements	480V, 40A, 3ph, 60Hz	480V, 50A, 3ph, 60Hz	480V, 60A, 3ph, 60Hz	480V, 150A, 3ph, 60Hz	480V, 250A, 3ph, 60Hz	480V, 250A, 3ph, 60Hz
Size (in)	W: 30 H: 60 L: 48	W: 30 H: 60 L: 60	W: 30 H: 84 L: 82	W:42 H: 84 L: 88	W:42 H: 84 L: 88	W:42 H: 84 L: 88
Weight (lbs)	1500	2300	2000	2750	2750	2750

All Dynavac TCU Products have an operating range of -180 to 150C. The TCU-100-HP is also equipped with an auxiliary LN₂ zone for operation at -196C.

Utility Requirements	TCU-100	TCU-100-HP	TCU-400	TCU-500	TCU-1000	TCU-1500
Cooling Water	1.5 gpm nominal	Built-in Chiller	2.0 gpm nominal	2.0 gpm nominal	2.0 gpm nominal	2.0 gpm nominal
Compressed Air	80-100 psi @ 3 cfm	80-100 psi @ 3 cfm	80-100 psi @ 3 cfm	80-100 psi @ 3 cfm	80-100 psi @ 3 cfm	80-100 psi @ 3 cfm
GN ₂	80-100 psi @ 5 cfm	80-100 psi @ 5 cfm	80-100 psi @ 5 cfm	80-100 psi @ 5 cfm	80-100 psi @ 5 cfm	80-100 psi @ 5 cfm
LN ₂ - Low Pressure - Heat Exchanger	≤25 psi	≤25 psi	≤25 psi	≤25 psi	≤25 psi	≤25 psi
LN ₂ - High Pressure - Direct Injection	>90 psi	>90 psi	>90 psi	>90 psi	>90 psi	>90 psi

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