

## ***Time Compression Systems™***





Six standard sizes of Time Compressor™ chambers are now available for order!

- |                |                 |                  |                 |
|----------------|-----------------|------------------|-----------------|
| • TC-1 Ocelot  | 12" x 12" table | • TC-1.5 Jaguar  | 18" x 18" table |
| • TC-2 Cougar  | 24" x 24" table | • TC-2.5 Panther | 30" x 30" table |
| • TC-3 Cheetah | 36" x 36" table | • TC-4 Tiger     | 48" x 48" table |

## The Company

HALT and HASS Systems Corporation™ was created by the inventor of HALT & HASS to offer competitive pricing, superior performance, lower noise levels and fully mature systems with lower capital and operating costs. This is a result of many years of field experience and the successful completion of HALT for world scale military and public sector organizations. If you are interested in the best HALT and HASS system in the world, please visit our website: [haltandhass.com](http://haltandhass.com), call 303-465-5988, or email us: [info@haltandhass.com](mailto:info@haltandhass.com).

## Product Line

The Time Compression Systems from HALT&HASS Systems Corporation are state-of-the-art equipment for simultaneously stimulating products with all axis broad-band vibration and high-rate, broad-range thermal

cycling. The performance of these systems exceeds that of all known systems of a similar type while also providing substantial cost advantages over other brands. Several performance enhancement options and additional features, which will further widen the gap from the competition, are under development. Updates and upgrades will be provided at our cost to our early customers. Patented vacuum hold-down fixtures and systems with product unique tuning characteristics are currently available. We can build any configuration to your specifications, including Metric sizes and threads. The TC-1, TC-1.5, and TC-2 have one door on the front and the TC-2.5, TC-3, and TC-4 have doors on each side. All are full width doors with very large windows. Bifold doors are optional for those with space limitations.

## Advanced Features

Time Compression Systems™ utilize commercial off the shelf (COTS) controllers, components and sub-assemblies where possible, minimizing system downtime exposure given that parts may be obtained from multiple local sources. Additionally, the systems utilize quick-change fittings to facilitate quick turn maintenance routines.

## Testing and Consulting Services

HALT and HASS laboratory services are offered by fully trained specialists with not only industry leading experience, but also with a complete education on HALT and HASS. This completely differentiates us from the competition.

Gregg K. Hobbs, Ph.D., P.E., originator of the HALT and HASS techniques, is one of our available consultants for in-house consulting or HALT on your product. This can be accomplished at our lab in Denver, Colorado, or at your location using your equipment. We can also provide a TC-1 or TC-2 with consulting for onsite HALT at your location.



TC-2.5 Panther

## TC-1 Product Evaluation: 24 May 2006 by John Lenss

"I received the chamber on April 24, 2006, at Tennant Company in Golden Valley, MN, where I was working as a contract Test Engineer. In less than 2 hours we had it hooked up to power and an air supply and we were running. This is definitely an improvement from previous HALT chambers I had purchased that took 3-5 days to commission and get running.

"In the four weeks I had the chamber, I was able to test 12 different products. I had to find time to fit this in amongst my other test duties. In the end I tested everything we had to test.

"I was pleasantly surprised at the amount of liquid nitrogen and compressed air used during a HALT. I hooked the chamber to a 3 HP compressor @ 140 PSI, through a 1/2 " hose and never ran out of air, including going up to 60 Grms. Previous chambers I have used up to a 20 HP compressor with a 500-gallon tank and we would still run out of air.

"Liquid Nitrogen. In all those tests over 4 weeks I didn't even use five 160 liter dewars. That includes one test even going to -90 C. In my past experience, five dewars wouldn't even get you through one HALT, much less 12."



Broader Vibr. Levels  
Faster cooling  
Faster heating

- Temperature ramp rates of +/-120°C/minute, higher available upon order. The highest in the industry.
- Vibration will start and run from 0.1 to 150 GRMS.
- X,y,z balance is near 1:1:1.
- Sound level is only 50 dBA at 30 GRMS, the lowest in the industry.
- Will operate on 110 volts, 50-60 Hz with reduced heating for trouble shooting.

More Tests  
More Low Freq.  
More Economical

Less LN<sub>2</sub>  
Less Compr. Air  
Less Elect. Power

## The TC-2 Cougar™ compared to industry standard chambers with 24" x 24" tables:

Company Model	Electrical <sup>2</sup> Volts/phase, Hz/FLA	Vacuum Hold-down with fixture tuning	Warranty Labor/Parts	LN gpm	HALT/HASS testing	Temperature Rate of Change	Dimensions w/d/h (in.)	Window w x d (in.)	Finish
SS <sup>1</sup> QRS™210	400/3Φ, 50/np*	No	np*	np*	Yes/No	-75/minute +110/minute	68/36/43	12 x 6*	Painted Steel
TC-2 Cougar™	230/3Φ, 60/32	Yes	1 year/ 3 years	4	Yes/Yes	+/-100/minute <sup>2</sup>	46/36/58	18 x 18	Stainless Steel
Therm. AST-20	230/3Φ, 60/75	No	1 yr. ltd.	np*	Yes/No	+/-50/minute	84/41/83	<10 x 10*	Painted Steel
QMark Typ 2.0	230/1Φ, 60/70	No	3 mo./ 1 yr. ltd.	np*	Yes/No	+/-60/minute	38/46/80	<12 x 15*	Painted Steel

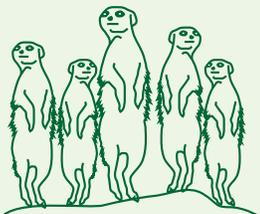
Category winners are highlighted in **blue**.

### Footnotes:

Specifications may change without notice. We can build any configuration to your specifications, including Metric sizes and threads. All information contained herein was obtained from public sources on June 20, 2005. HALT&HASS Systems Corp. cannot be held responsible for errors in other manufacturers' data that is displayed in this comparison. Other companies' data will be updated on a periodic basis, as will ours. \* Specifications not published by the manufacturer.

1 SS QRS™210 has a table size of 18 x 15.

2 In degrees C. On Time Compressors, any combination of voltage, frequency, and power can be ordered. Higher amperage will allow even faster heating rates of change. In addition, even faster cooling rates can be achieved by ordering a higher capacity liquid Nitrogen system.



### Service and Warranty

We believe in our motto, "Take care of your customers, your employees, and your vendors and they will take care of you." As such, we will do everything in our

power to keep your accelerated reliability testing operations up and running at all times.

Our industry leading coverage includes one full year of labor and three years for parts, if the equipment becomes inoperable or fails to operate within design specifications. Failures that are due to abnormal abuse such as forklift ramming, dropping off your loading dock, etc. are of course, not our responsibility.

### Control Systems

The Watlow F-4 2-channel controller used for temperature display, temperature profile, and vibration control and profile generation, features a guided 256 step, 40 profile ramp and soak programmable memory, high definition four-line LCD display and EIA 232 & 485 Modbus communications interface. The temperature controller features cascade control, which enables the user to control the system ramp rate by reacting to the temperature of the unit under test. The systems cooling and heating command algorithms respond to the rate of change for the UUT and make corresponding adjustments to vary the total power output for the heaters and cooling capacity for the liquid nitrogen delivery system.

An accelerometer signal is used to provide feedback control. An additional instrument displays the generated Grms level on the table structure to the system operator.



TC-1 Ocelot

TC-1.5 Jaguar

TC-2 Cougar

TC-2.5 Panther

TC-3 Cheetah

TC-4 Tiger

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