

# Customised Chambers



Customised Test Chambers

# Special Purpose Test Chambers

Design Environmental was founded in 1985 and has since become a UK market leader. In 1998 the company became part of the German based Schunk Group who are committed to supporting the company and overseeing its continued success and expansion.

Our prime objective is designing, manufacturing and servicing a range of standard and customised environmental test chambers and rooms, which provide accurately controlled temperature and humidity test conditions.

Steady growth in the company has also meant a growth in the numbers employed. An apprenticeship scheme is in place to pass on knowledge from the skilled design and manufacturing staff to the workforce of the future. The company believes in growing talent from within wherever possible.

The customer base although mainly in the UK stretches through Europe, Scandinavia and to the Far East with the majority of equipment being supplied to Aerospace, Automotive and Electronics companies. As the company's reputation has spread, the customer base has expanded and become established in many more sectors including pharmaceuticals, food and education.

Although Design Environmental produces several ranges of standard test chambers we recognise that our customer's requirements are seldom standard.



Approximately 80% of our production is dedicated to the design and manufacture of customised testing solutions, which could be anything from a small bench top chamber to a large room.

Our flexible design and manufacturing system allows us to make design changes at very reasonable cost.

Our experienced sales managers and engineering staff adopt a consultative approach to ensure that our customers get the equipment they need with the most cost effective solution in the required timescale.

Wherever possible all special purpose test chambers are fully tested prior to installation. We do not believe development should be undertaken at our customer's factory.

**If you have a special requirement contact us for an affordable engineered solution.**

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# FS Series

## CUSTOMISED FLOOR STANDING TEST CHAMBERS

This efficient, economical and proven range of chambers adapts to provide various sizes, temperature ranges, rates of temperature change and humidity options.

Chambers feature high rigidity, non absorbent, closed cell foam insulation, which out performs conventional materials. In most cases they are also supplied with a full chamber height tangential fan, which provides excellent airflow and temperature distribution throughout the chamber.

Depending on the application refrigeration can be provided from a single stage or cascade compressor system, which is usually housed within the chamber frame. Where space is a problem or there is a need to remove noise or waste heat from the working area, remote plant or water cooled systems can be provided (see section remote plant).

If very fast rates of temperature change are required liquid Nitrogen or CO<sub>2</sub> cooling can be supplied either as the sole cooling medium or in combination with compressors.



125 litre temperature chamber with 5°C/min heating and cooling.



6,000 litre capacity chamber testing automotive roof liners and internal trim panels. Temperature range -40°C to +130°C with humidity 10-98%RH. A removable infrared lighting array can also be automatically linked to temperature.

# Climatic & Temperature Test Chambers



*Customised 610 litre chamber designed to initially remove large quantities of water from the test samples over a set time and then maintain temperature and humidity levels within a close tolerance.*

## FS Series

### CUSTOMISED FLOOR STANDING TEST CHAMBERS

*Temperature test chamber interfaced with automotive test rig. The chamber controls temperature to a close tolerance whilst counteracting heat input from the test item.*



### FS SERIES - TYPICAL CUSTOMISED FEATURES

- Temperatures from  $-70^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$  ( $-100^{\circ}\text{C}$  for liquid Nitrogen cooled).
- Average temperature rates of changes from  $0.1^{\circ}\text{C}/\text{min}$  to  $25^{\circ}\text{C}/\text{min}$  compressor cooled and up to  $80^{\circ}\text{C}/\text{min}$  liquid Nitrogen cooled. Linear rates of change also available.
- Variable air velocity.
- Humidity 5-98%RH.
- Sizes from 55 litres to approx. 6,000 litres with dimensions to suit.
- Various programming and logging options including touch screen interface.
- Communication links e.g. RS422, RS232, IEEE 488. Network facility.
- Independent over and under temperature alarms for product protection.
- Standard and customised entry ports including provision for rotating and moving shafts.
- Multi glazed heated windows.
- Low voltage internal lighting. Infrared, UV and full solar spectrum.
- Simulated rainfall.
- Chambers with safety heating for testing hazardous substances.
- Explosion relief ports.
- Chambers for testing products giving off corrosive fumes.
- Side hinged, lift up, automatic single or double doors.
- Interface with other test machinery e.g. force, torque and vibration actuators.
- Nitrogen purge.

Temperature and humidity chamber offering 5°C/min heating and cooling in a 1500 litre work space. A pneumatically operated top hinged door offers maximum access for large automotive components.



## Vibration Systems

### CUSTOMISED TEST CHAMBERS



Large rooms can be interfaced with vibration systems that provide single or multiple degrees of freedom.

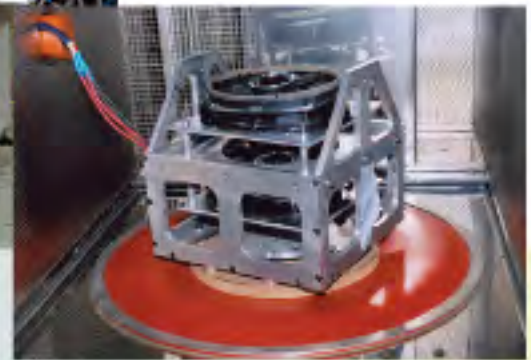
Interfacing a chamber and vibrator as a single test system can be problematic unless the requirements of both elements are understood and taken into account.

How the vibrator table enters the chamber will affect both cost and performance.

Most chamber floors are around 100mm thick and to bring the vibrator table into the chamber will require an extension to the table height of at least 150mm. The weight of the extender, which incorporates a thermal barrier to prevent the chamber conditions being transmitted into the vibrator, now becomes part of the vibration test load. This means more force will be required from the system to drive it to a given acceleration level. The amplifier may need to be increased in power, a bigger more powerful vibration system altogether may be necessary, or there will be less spare capacity in the system than first calculated. In spite of the above this may still be the only practical and acceptable solution. See example 1 & 2 overleaf.



Having the vibrator and chamber floor easily withdrawn from the chamber affords good access for attaching large test loads to the vibration table without working in the confines of the chamber. When the vibrator with the test load attached is reunited with the chamber a simple pneumatic clamping system locks and seals the floor into position for the duration of the test.



## Vibration Systems

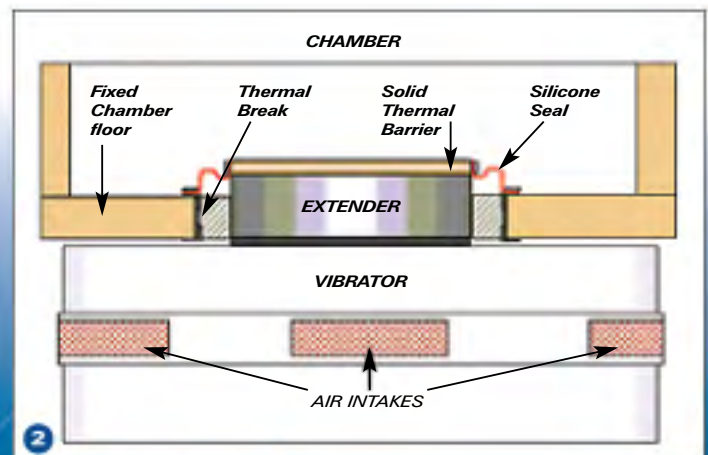
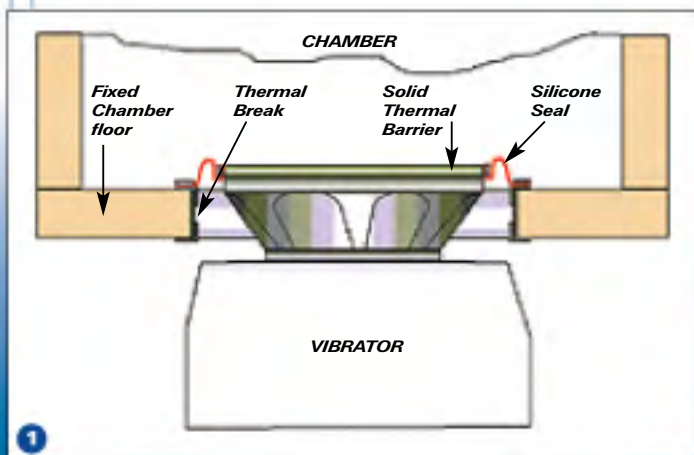
### CUSTOMISED TEST CHAMBERS

With the extender interface method the vibrator can be positioned under the chamber easily and the table extender or expander attached through the port in the chamber floor once in position.

The alternative to an extender is to bring the vibrator body into the chamber floor area making the table slightly higher than the inner chamber floor. A thermal barrier must be added, which could be a solid disc or a lightweight foam barrier used with raised attachment inserts. See examples 3 & 4.

A silicone membrane connects the chamber to the vibrator table and forms a sealed environment in the chamber.

Eliminating the extender reduces the force requirements from the vibration system but the chamber must have a floor area able to accommodate the vibrator body, so in some cases the chamber may have to be increased in size, which might also increase the cost. This interface method means the chamber must be raised for the vibrator to be positioned and then lowered again.



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Temperature and humidity chamber, which moves both vertically and horizontally, to align with either the vibration table or with the slip table. In this case a removable section in the chamber roof allows heavy test items to be positioned in the chamber by an overhead crane.

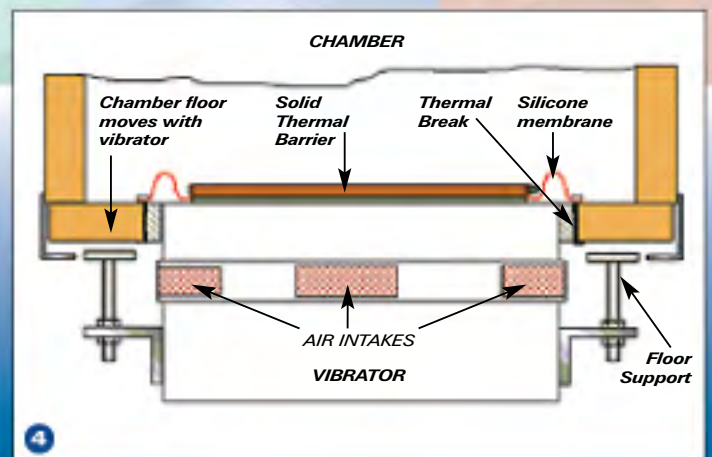
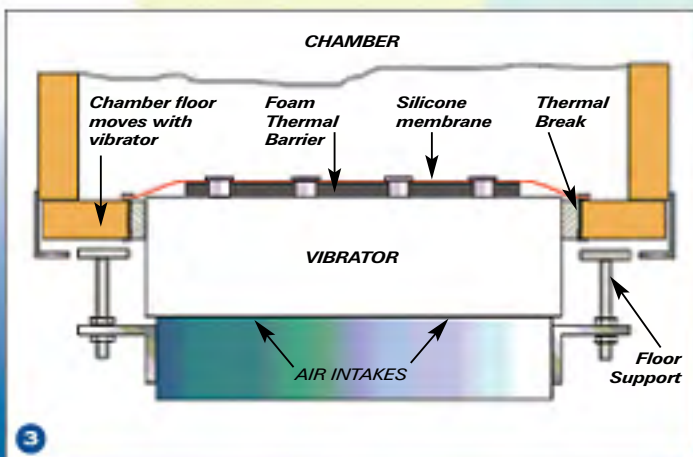
Mobile temperature chamber and vibrator with a head extender interface offering a cost-effective solution.



This is an expensive method and very seldom used. It is more cost effective for the chamber floor, or a segment of it to be removable. See example 4. The vibrator or the chamber can be fitted with a mobility system.

It is worth remembering that vibration generators are a standard design with fixed dimensions but test chambers of this type are made to order and can be customised accordingly. Therefore Design Environmental has the ability to make the interface work.

*Note:* For Sigma Halt/Hass combined temperature and multi axis vibration systems please request separate brochure.



# Climatic & Temperature Test Chambers

# Walk-in Rooms

## CUSTOMISED TEST CHAMBERS

The WIR range of walk in or drive in rooms employs a flexible and cost effective sectional panel build technique. This allows Design Environmental engineers to utilise a series of standard insulated panels to assemble virtually any size or shape of room to suit customer requirements. Sectional build technique also allows the room to be dismantled and re-assembled on an alternative site a limited number of times.

Depending on size, rooms are usually built in our factory for test prior to installation, then taken apart and re-assembled in their final location. They can also be constructed directly on site. The panels feature tongue and groove joints, which are vapour sealed and then pulled together with camlocks.

The high density rigid foam insulation employed in the room panels is more efficient than mineral wool and allows the use of lighter gauge inner skins, which in turn improves efficiency and reduces power consumption.



*Drive in temperature and humidity controlled room capable of testing vehicles up to 16 tonnes for the evaluation of the vehicle air conditioning system.*

*The installation includes separate plant and control rooms and has engine exhaust extraction, oxygen monitoring and forward motion simulation by variable velocity airflow. Adjustable infrared lighting, linked with chamber temperature, simulates the heating effect of the sun on the cabin interior.*



*Multiple rooms used to verify the performance of domestic appliances. Very close tolerance of temperature and humidity is achieved along with low velocity vertical air circulation.*

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Special room to condition and study the effects of temperature and humidity on the human body. It also has the feature of being able to simulate low oxygen levels such as those found at altitude. This is achieved by introducing a measured quantity of Nitrogen into the atmosphere, which lowers the percentage of oxygen present.

## APPLICATIONS

- Steady state temperature and humidity control e.g. ICH storage.
- Temperature and humidity cycling for product reliability testing.
- Environmental stress screening.
- Burn in.
- Low or high temperature storage.
- Temperature and humidity with solar lighting.
- Temperature and humidity with hypoxic conditions.
- Oxygen free storage environments.
- Plant growth.

## ENVIRONMENTAL CONDITIONS

Steady state or cyclic temperatures can be generated and controlled along with humidity from 5%RH to 98%RH. Lower temperatures are typically -65°, -40°C, -20°C or 0°C with upper temperature extremes of +50°C, +70°C, +130°C or +180°C.

In addition rooms where personnel are undergoing physical tests can be provided with replenishment breathable air and moisture extraction systems.

Altitude simulation can also be provided by reducing Oxygen content by the introduction of Nitrogen.

Refrigeration is provided by air or water cooled single or cascade compressors, liquid Nitrogen injection or a combination of both. Air circulation within the room is varied and optimised for each application to provide an even temperature and humidity distribution throughout.



# Walk-in Rooms

## CUSTOMISED TEST CHAMBERS

### STANDARD OPTIONS

- Variable temperature ramp speeds.
- Remote internal or external refrigeration plant.
- Access ports for cables, rotating or oscillating shafts etc.
- Hinged single or double doors, sliding doors or guillotine doors.
- Heated multi glazed viewing windows.
- Variable internal and external colours and finishes depending on application.
- Airlocks.
- Temperature and humidity programming systems with or without data logging. PC based or touch screen interface.
- Logging systems to conform to CFR 21 Part 11.
- Dry air or Nitrogen purge to limit condensation.



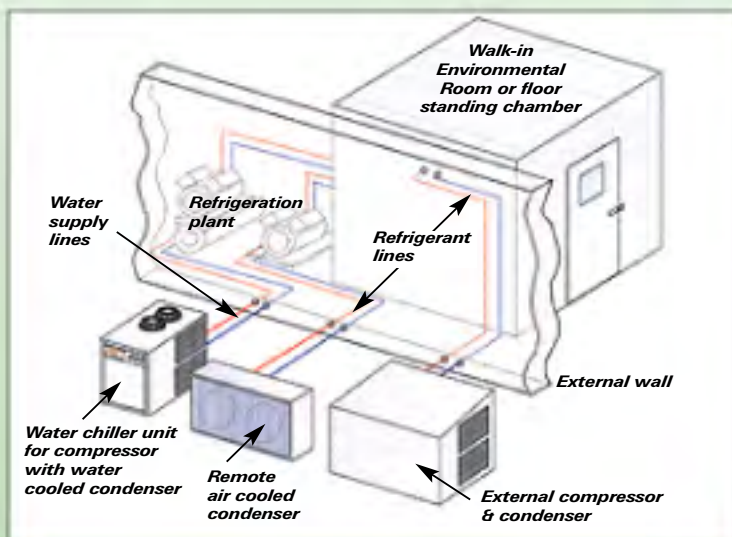
*Steady state, high temperature room with clean filtered air cooling. Designed for heat conditioning automotive electronic components as part of a high volume production process.*

### OTHER OPTIONS

- Lighting systems for infrared, UV or full sunlight spectrum.
- Interface with rolling roads, four post vibration rigs, multi axis and single axis vibration systems
- Vehicle exhaust extraction systems.
- Conditioned inlet air for engines.
- Zero air generators.
- Rainfall simulation.

## Remote Plant

### CUSTOMISED TEST CHAMBERS



In some locations it may not be desirable to eject waste heat and audible noise from the refrigeration plant into the area surrounding the chamber or room. Heat build up in a confined space may cause the maximum operating temperature of the plant to be exceeded. Although generally within factory limits, noise may affect personnel working in the vicinity.

### OPTIONS ARE AVAILABLE FOR:

- Total remote plant either in a plant room or external to the factory.
- Internal compressors with external condensers, taking the majority of waste heat away and some of the audible noise.
- Water cooled condenser and compressor fed by an external water chiller. Water cooled systems are very quiet and remove the heat from the factory.

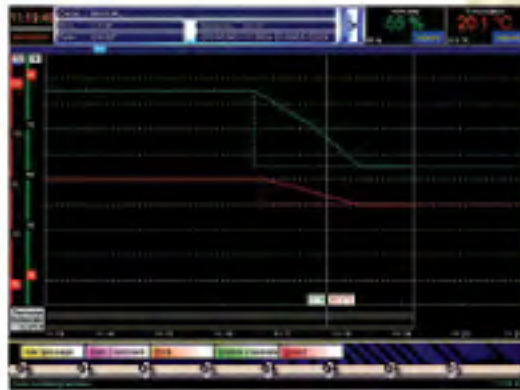
**Please ask for advice on the best solution for your application.**

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# Contour

## PROGRAMMING AND LOGGING SOFTWARE PACKAGE

Contour is a powerful but simple to use software package using state of the art technology for programming, logging and supervision of any temperature or temperature / humidity chamber. Contour can be supplied with an advanced LCD touch screen display or can be used with a standard PC to provide easy data entry and retrieval. An almost unlimited number of programmes of multiple segments can be stored to run both simple and complex test profiles.



### TAKE ADVANTAGE OF THE MANY FUNCTIONS, WHICH ARE STANDARD WITHIN CONTOUR:-

- Real time supervision.
- Graphic programming.
- Acquisition of test item temperature data.
- Chamber health monitor.
- Multi graph presentation.
- Program updates by the Internet.
- Password protected.
- Centralised control and monitoring of multiple chambers.
- Remote control via RS232/IEEE/Ethernet.
- Transfer of data to Excel.
- Delayed chamber start up.
- Selectable upper and lower abort limits.
- Test archiving.
- Chamber loading management.
- Produce customised reports.
- Graph zoom and cursor.
- Comprehensive help menu.
- Encrypted Software.

Contour has evolved as a result of 15 years experience and research into the user interface of test chambers. It is fitted as standard to all the Delta range chambers and is available as an option on any other chamber or room. Contour can also be expanded by additional hardware to provide data acquisition for multiple channels of any proportional voltage based signal.

### GRAPHICS INTERFACE

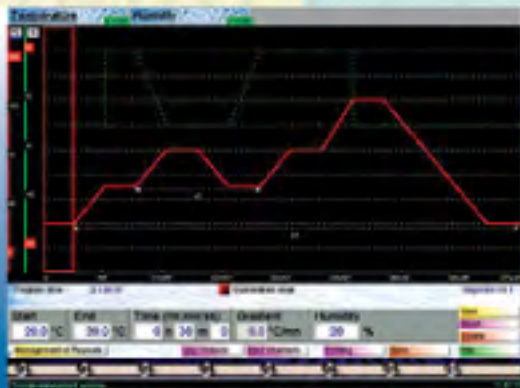
Contour is a 32 bit software package which operates on the whole Microsoft Windows range from 95 to Millennium and from NT4 to 2000.



- Scrolling information display.
- Temperature set and actual value.
- Chamber status display.
- Contour help.

Service schedule monitor.

Digital channel status display.



# Climatic & Temperature Test Chambers

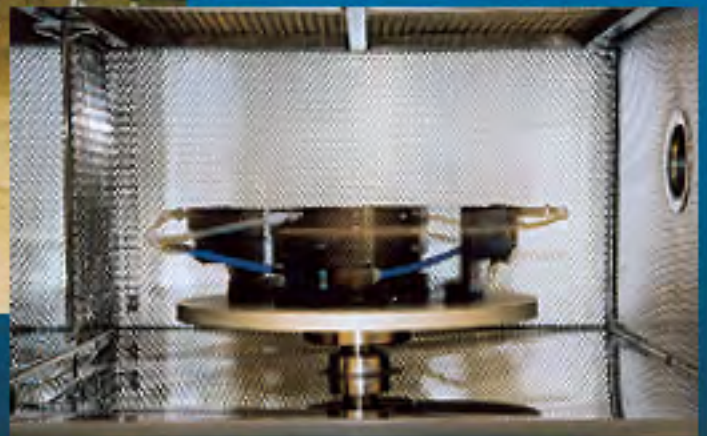
# Special Interface & Applications

## CUSTOMISED TEST CHAMBERS

In many instances temperature needs to be controlled around another process and in this case Design Environmental can provide a totally customised solution. For example chambers can be interfaced with various materials testing machines so that the sample is conditioned prior to initiating the test.

We have produced chambers around high speed rotating shafts and linear motion actuators to name but a few. We are also able to supply various conditioning ovens, either with sealed test spaces or with open entry and exit combined with driven conveyors.

**If you have any requirements for temperature or humidity control no matter how customised they may be, contact us and we will be pleased to offer a solution.**



This literature is for general guidance only. It does not constitute recommendations, representations or advice and nor is it part of any contract. Our policy is one of continuous product improvement and the right is reserved to modify the specifications contained herein without notice.

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