# AEROSPACE PNEUMATIC COMPONENTS AND CABIN AIR SYSTEMS TEST EQUIPMENT

FOR AIR CYCLE MACHINES,
AIR STARTERS,
HOT AND COLD AIR,
HIGH AND LOW
FLOW VALVES,
ACTUATORS,
MIXING VALVES,
DUMP VALVES,
FANS, ETC.

Testek INC.

## APPLICATION

*A view of the installation on the mezzanine above the air cycle machine test cell. In this installation, heat exchangers are air-to-outside-air. Liquid heat exchangers are also practical, depending upon local utility costs and supplies. The test system was under construction at the time of this photo.*

Testek designs and manufactures standard and custom pneumatic test equipment to suit the function of your pneumatic shop and the aircraft fleet to be supported. In most cases, universal test stands are the best solution to testing requirements, with test stand resources selected to cover the fleet of units to be tested. Test programs and adapters provide the interface between the universal test stand and each model/part number to be tested. In most cases, the test stand can be built to accommodate your expected fleet or product lines. Adapter/Test Programs can be individually supplied with the test stand or later, as shop expansions plans are implemented.

Testek pneumatic test stands are applicable to:

- **Airline shops for overhaul and return to service tests**
- **OEM production test equipment – high productivity and automation**
- **OEM overhaul and repair stations**
- **Military depot, intermediate, and organizational level testing**
- **OEM and airframe manufacturer developmental test and system integration/simulation**
- **Third party repair and overhaul stations**

## MAJOR FEATURES

Testek pneumatic component test stands are designed to maximize flexibility in application and adaptation. Air can be supplied by your existing utility, augmented by Testek supplied equipment, or by an entirely new air utility (compressors, heaters, dryers, receivers) designed and built by Testek's experts.

For some applications, one test stand may be called upon to test high temperature components. Another test stand can be cold air tests. Larger pneumatic shops may dedicate a specialized test stand for high speed test of specialized groups of components using rapid clamp/unclamp fixtures. Testek designs and builds the equipment to fit your shop's productivity, aircraft fleet,  and scale of operation.

Within this broad specialization, Testek utilizes expandable, modular designs wherever possible. This assures that our test stands make maximum use of proven successful components and subsystems. Much of the quality and reliability of your test equipment depends upon the expertise and experience of Testek engineers. Collectively, Testek engineers provide many decades of pneumatic test experience. No amount of effort or experimentation can replace those years of experience in providing test equipment you can rely upon for production and profitability.

*Interior view of air cycle machine test cell adapted to test Boeing 777 ACMs. Note use of cart for safe test part handling; this also increases test efficiency by allowing technicians to set up one cart/test unit while another is being run in the test cell.*

Testek provides your choice of manual or computer-aided test stands and test cells. For simple and/or low cost installations, manual test equipment may provide the maximum benefit, especially for highly specialized or relatively low production needs. Testek manual test stands are designed with the same care and attention to detail as more sophisticated test stands, with accuracy, durability, ease of operation, and calibration as key goals. Testek has manufactured many manual pneumatic component test stands over the past three decades.

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## COMPUTER-AIDED PNEUMATIC TEST STANDS

When desired, computer-aided testing adds a level of operator friendliness, productivity and speed to complex test requirements. Computer-aided test stands are also a good test tool for components requiring longer run-in periods. Testek computer-aided test stands allow continuous monitoring of test unit and test stand parameters. If any parameter moves into a range where safe operation is at risk, the test stand will warn the operator or shut down, preserving all test parameters. Computer-aided test is also a benefit to operators. New test stand operators require less training and experience to correctly and safely perform useful computer-aided testing. A major benefit of Testek computer-aided test stands and test cells is our use of easy to learn, easy to trust software.

Testek has been producing computer-aided pneumatic test stands for over two decades. Using the highest rated **TestEx™** self documenting test programs, Testek pneumatic component test stands can run in four operational modes:

- **Fully Automatic** – test stand runs the entire component test automatically, printing and storing test results, monitoring safe test conditions, and stopping only on out-of-tolerance results or fault detection
- **Semi-Automatic** – same as fully automatic, except test stands runs operator selected test paragraphs, accumulating test results, and monitoring safe test conditions
- **Manual** – test stand is under operator control for each test sequence and test parameter. Default setpoints can be OEM specified test circumstances, if desired
- **Primitive Manual** – test stand can be operated without the test computer system – indispensable for diagnosing computer/test stand faults and for troubleshooting

## EQUIVALENCY AND TEST CORRELATION

The Testek pneumatic component test stands – especially computer-aided test stands – can simplify test equipment equivalency and test data correlation with OEM overhaul test specs. **TestEx** test programs are printable spreadsheets, with simple English language test process listings. All setpoints and test data are in the same units as the OEM recommended test procedure. The test programs – and therefore the test process – fully conform to the OEM test procedure, and can easily be read by shop personnel to verify equivalency and correlation to OEM manuals, Technical Orders, NAVAIRS, etc.

Many, if not most pneumatic components have previously been tested on Testek test stands. Testek has provided hundreds of pneumatic component test stands and we have previously performed the test data correlation with most pneumatic components. Testek equipment is in use throughout the world, probably already correctly testing the same part number components successfully in approved service.

***Typical computer-aided pneumatic test cell console, showing test unit behind the window. Twin color display screens allow the operator to see the test program and real-time data on one screen, test report generation and setup graphics on the second screen. User-friendly TestEx software constantly monitors operation of the test part and test cell for out of range or unsafe conditions.***

## ON TIME PROJECT COMPLETION

When needed, Testek can provide that special effort and project management to assure meeting expedited projects. We understand that some projects require a shorter design/build time to meet important program schedules. When advised in advance of the proposal, Testek will plan the project to meet your schedule requirements.

## COMMERCIAL AND MILITARY AIRCRAFT COMPONENTS SUPPORTED

Testek has substantial experience with military, as well as commercial airline aircraft components and systems. Pneumatic test stands and test cell can be optimized for your shop's specific work needs and future requirements. In many cases, a mix of military and commercial components can be supported. Testek pneumatic test facilities are custom designed to efficiently provide all of these needs.

## FAST CHANGEOVER OF TEST PARTS

Much valuable test stand and test cell time can be saved by providing universal test stands with "quick change" adapter parts. In many cases, Testek can provide adapter carts and/or assemblies to allow the simultaneous setup of one part, testing of another, and tear down of a previously tested part – all at the same time. This can save many hours of production time and labor every day.

*Testek Air starter test stand, in this case utilizing two flywheels and digital electric drive to accurately simulate inertia of several engines and light-off characteristics. This system utilizes TestEx software with internal data tables to simulate an entire fleet of engine/starter combinations. All tests conform to OEM test procedures.*

## LET TESTEK PROPOSE THE EXACT SOLUTION FOR YOUR NEEDS

To allow us to propose a solution for your specific needs, please provide the following information:

1. **Aircraft models to be supported, and all component part numbers**
2. **Presently available hot/cold air utility available capacity**
3. **Preferences for additional air utility capacity, if needed**
4. **Preferences for liquid vs. air heat exchangers**
5. **Available space limitations and entrance size limits**
6. **Preferred method of operation – manual, computer-aided fully automatic, semi-automatic, etc.**
7. **Special preferences for test cell, self contained test stand, etc.**
8. **Existing test equipment, including adapter types, you may wish to retain**
9. **Estimated date of service of the new test equipment**
10. **Other pertinent details and requirements**

Testek will respond with a proposal and, if desired, a presentation of the proposal at your site. We can provide various options and estimated costs to allow you to make your engineering and purchasing decision.

*An example of a much used Testek manual high flow valve test stand. Features allow quick connections and a safety shield (shown retracted). Note the test part is mounted on a cart to make transport and installation safer, easier and faster.*

## APPROVALS AND RECOMMENDATIONS

Testek pneumatic component test stands and test cells are in regular, daily service at approved repair stations and military repair/overhaul facilities in several locations, worldwide. As a result, we have successfully tested components by most of the OEMs in the world. Testek will provide user references related to your particular needs upon request. These references will include, wherever possible, names and contact information for existing users of similar equipment.

Testek will work with your shop people to achieve the correct correlation of test data with manufacturer test specifications, assuring you of useful, correct test results that correlate with the OEM specifications.

***Typical setup cart for a high flow, high temperature air valve. Testek can provide such carts to permit very efficient use of the test stand. One valve can be prepared for testing, while a second valve is being tested, and a third valve is being cooled and dismounted after testing.***

## STATE OF THE ART

Whether manual or computer-aided, Testek pneumatic component test stands are state-of-the-art in every way. We utilize only the most modern, tested transducing and metering equipment to measure pressures, flows, velocity, etc. In computer-aided systems using our acclaimed **TestEx™** test executive software, we have equipment in the field that can simultaneously measure up to 96 parameters while simultaneously maintaining over 20 PID control loops – this in addition to a virtually unlimited number of digital control channels. This provides more than sufficient capacity to test the most sophisticated air starter. Air cycle machine, valve, etc., without difficulty. To simplify the solution, all of these channels reside in a single computer, not relying on multiple outboard controllers. The result is an elegant, manageable solution to pneumatic component test needs.

Computer-aided test stands also can incorporate chart recording and test report printing as a part of the **TestEx** control program solution. The **TestEx** computer can be networked to other Testek test stands and/or a central management computer, if desired, to manage software updates and monitor test data (SPC) records. Larger installations can use **TestEx** to anticipate and control compressed air requirements.

Manual test stands are designed for ease of calibration, with facilities for inserting calibration facilities, flowmeters, etc. without complex and time consuming effort. Computer-aided test stands have built-in computer-aided calibration procedures to step through the calibration process, and to simplify the work of the calibrating technician. Computer-aided test stands also are provided with a built-in self test, which checks most of the test stand resources to be certain they are functioning correctly.

## SIMPLE TO USE, DIFFICULT TO ABUSE

Manual test stands are designed with logical control and instrument layouts to simplify operation, and to allow intuitive operator control.

Computer-aided test stands are especially simple and easy to understand. Most test parameters are continuously monitored by the **TestEx** safety system to notify the operator of any out-of-limits condition. The **TestEx** safety system will notify the operator, stop the test, or even shut down the test stand, as appropriate, if an unsafe condition develops. Additionally, operators can be guided in making any needed manual setups or adjustments – including the display of diagrams and photos where appropriate to show the correct operator actions.

**Testek is a recognized world leader in aerospace test equipment for the following components:**

| ELECTRICAL | FUEL | PNEUMATIC | HYDRAULIC | AVIONICS |
|---|---|---|---|---|
| IDG | Main Engine Fuel Controls | Air Cycle Machines | Flight Controls | GCU |
| AC & DC Generators | HMU | High/Low Temp. Valves | Servo Actuators | BPCU |
| CSD | Fuel Nozzles | High/Low Flow Valves | Servo Valves | ELCU |
| VSCF | Fuel Flow Transmitters | Fans | Pumps | APU-GCU |
| APU Generator | APU Fuel Controls | Waste, Dump Valves | Motors | ELMS |
| Electric Starter/Generator | Fuel Boost/Jettison Pumps | Engine Starters | Controls | ASCU |
| Variable Freq. Generators | Fuel Accessories | Air Motors, Actuators | Support & Supply Carts | PSEU |
| and Electro-Mechanical Rotary/Linear Actuators | | | | |

## TESTEK SERVICE AND SUPPORT

We service all of the equipment we have in the field, worldwide. Testek test equipment is in daily use on five continents. Our engineers and technicians are experienced in providing on site service, usually on 24-48 hour notice.

## REPLACEMENT PARTS AND SPARES

Throughout our over 32 year history, Testek has designed our test equipment for long term support. Quality, long life components and subsystems are employed to assure long term support. In those cases where parts have become obsolete, in most cases Testek engineers provide updated parts with assistance in making the substitution.

## CUSTOMER RECOMMENDATIONS

Testek relies on customer recommendations for its increasing equipment sales. Most of our equipment is sold by "word of mouth" from one satisfied customer to another. In most cases, we can provide prospective buyers with a listing of existing users of similar equipment, including telephone or e-mail contacts.

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## CONTACT INFORMATION

**Testek, Inc.**
**12271 Globe Road**
**Livonia, MI 48150 USA**

**Phone: (1) 734-591-2271 • Fax: (1) 734-591-3060 • e-mail: aerospace@testek.com • www.testek.com**

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