

CPC™ Control System

The autoclaves components and sensors will be monitored and controlled by the CPC™ control system. CPC™, or Composite Processing Control, is the most widely used software for automated control of equipment in the composite processing industries.

CPC™ was originally developed by ASC in 1988 to be a single software control platform for all composite applications. Throughout the last 20 years of innovation and growth, CPC™ has been adopted by most US aerospace facilities as the specified software package for autoclaves, ovens, and other thermal processes.

Over 1,600 CPC systems are currently operating throughout the world at most of the major aerospace and military composite manufacturing facilities.

What Makes CPC™ The Standard?

CPC™ boasts the following advantages over other competitive control systems:

- Highest reliability
- Hundreds of features and capabilities designed to meet aerospace composites industries
- Largest installed base – over 1,400 pieces of equipment
- Cost effective solution
- Network friendly with client-server architecture
- Multi-equipment control capability
- Largest support staff of all competitive companies

Superior Control is Your Key to Performance

Most will agree that in the hi-tech world of advanced composites, the control system is a key component to assuring autoclave performance, usability, reliability, and overall part quality. Even the best autoclave will be crippled by a poor performing control system, especially when processing large and complex composite structures. Because of this fact, ASC has focused a large portion of our R&D efforts on our control software and the features/capabilities that can improve processing performance, reliability, and lean manufacturing in autoclaves and ovens.

CPC® Software – Features and Capabilities

The autoclave will be controlled by proven CPC™ (Composite Processing Control) software, configured in either a single PC or in a primary and backup architecture.

- Ease of use - Even though CPC™ is by far the most advanced control software product on the market, the software is still very easy to use. All screens and features are designed to maximize usability and increase operator efficiency. For example, part entry, leak-tests, and other pre-run operations have been stream-lined to reduce the "door open" times of equipment.
- Excellent reliability – CPC™ is designed as a client-server package with proven reliability in the field. It is unacceptable to ASC and to our customers to have control applications that "lock up", and that is why CPC® is designed and tested to meet stringent up-time specifications. Many of our CPC® single-PC systems are controlling multiple pieces of equipment for years without any major trouble incident. The production-time of CPC® is far better than all competitive products.
- Auto-Redundancy– CPC® supports 100% redundancy of operations and data by means of a second PC. In a CPC® Level II and III systems, two PCs are used for primary and backup control of the equipment. In the highly unlikely event of primary PC failure, the backup PC will take control and continue the run(s)

seamlessly. The backup PC will also have a complete backup copy of the data up until and after the primary PC failure. During normal operation, both PCs can be utilized for viewing and/or operation.

- Advanced Cure Control - ASC is the leader in design and implementation of advanced controls for the curing and bonding of composites in autoclaves and ovens. The CPC™ software contains hundreds of options designed specifically to enhance the part quality. These include advanced recipe control, control by part temperature, control by part gradient, control by load gradient, exothermic control, material modeling to determine viscosity, TQ, and other material properties, pro-active control, and many others. No other product offers this set of features.
- Automatic QA/QC – CPC™™ includes a Quality wizard that can act as a quality inspector for data. At the end of a run, the quality wizard inspects the data according to predefined quality cards. If the run data deviates from the predefined quality criteria, the system will automatically flag the run and the data for post-run analysis. Quality inspectors can also use the wizard to dramatically reduce inspection time, leaving the number-crunching to the software.
- Designed for “LEAN” – CPC™ is designed to take advantage of all the LEAN concepts in order to improve OEE of the equipment. These features include remote bar-coding using Pocket-PC terminals, automatic query and batch entry from remote databases, and many other tools and features that streamline the autoclave loading, running, and unloading process.
- Comprehensive Reporting - CPC™ has an extensive reporting capability that is far more powerful and flexible than those provided with other packages. You can select specific runs by database query and view and/or print trend data in color plot format, numeric logs, quality control reports, pass/fail reports, message logs, and a host of other formats. On-screen zooming and panning on the trend view is also supported.
- Remote Control/Viewing - CPC™ is the only package capable of being viewed and control by multiple PCs on a single customer network. Unlike other competing products which utilize PC-Anywhere to "take control" of the equipment PC, CPC™ allows concurrent operation and viewing of the process by operators, engineers, QA/QC personnel, and managers on the network. As many as 20 concurrent clients are supported.
- Multi-Media Features - CPC™ provides a host of multi-media features, including video maintenance training, drill-down maintenance images, part pictures, part diagrams, video chat and email, and other useful control features. These features allow ASC to build maintenance screens which provide images of each component on the equipment (ie. valve, motor, etc.), video of calibration and maintenance procedures for the components, and links to on-line or on-PC product documentation
- Expandable - Because of its multi-equipment features, CPC™ control systems can be expanded to control other equipment such as autoclaves and presses. Many companies add other equipment year to year and never have to purchase another system. No other company offers this advantage.

- Configurable Screens – CPC™ has a built-in screen builder that is used by ASC's engineers and customers to customize the exact look and feel of the system. On installation you can request additional screens and display features, and we won't charge you anything for it. No other product can match CPC's™ screen building capabilities.
- Up to Date - CPC™ is maintained and updated regularly to provide the most up to date features and capabilities as requested by our users.
- Maintenance and Calibration - When we designed CPC™, we not only focused on operation, but also on the calibration and maintenance of the software and system. CPC™ features photo-maintenance screens, trouble-shooting screens, I/O forcing capabilities, automatic calibration, automatic certifications, maintenance database, custom PLC logic (scripting), and maintenance and calibration reports. No other software package has these standard features.

Other CPC resources

Please visit our web-site (www.aschome.com) for a detailed list of CPC™ capabilities, CPC™ manual, additional screen shots, specifications, and an interactive demonstration tour. *The Documentation section includes white-papers, detailed specifications, and other information.*

CPC Software and Control Systems (control + click to follow link)

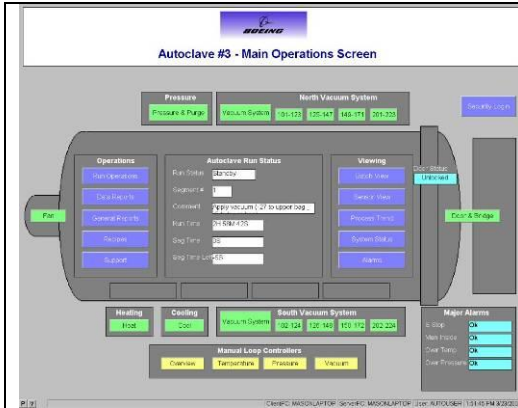
<http://www.aschome.com/CPCSelection.htm>

CPC Interactive Web-Tour and Demonstration (control + click to follow link)

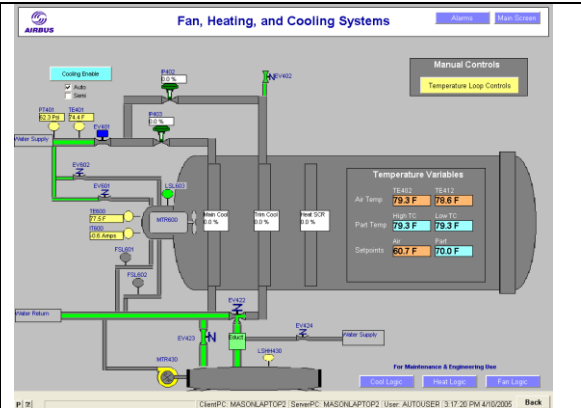
http://www.aschome.com/Tours/CPCNT_Hill_8x20/Index.htm

Sample Screen Images

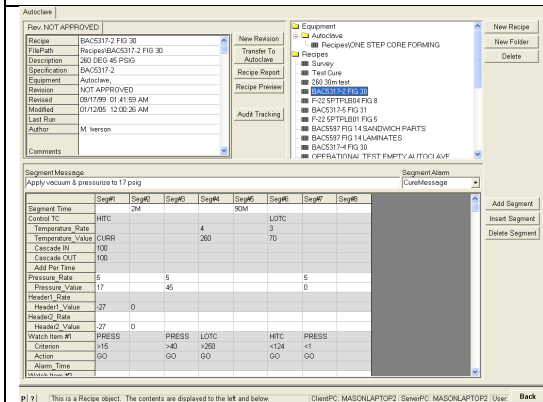
The following screen images are provided for a typical Econoclave implementation.



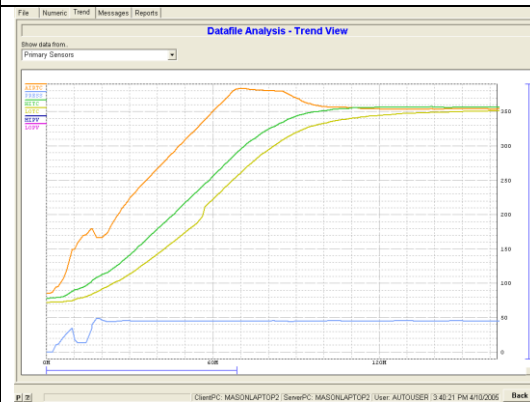
All screens are customized to each customer's requirements.



Graphic and animated process and instrumentation screens are standard with all Econoclaves.



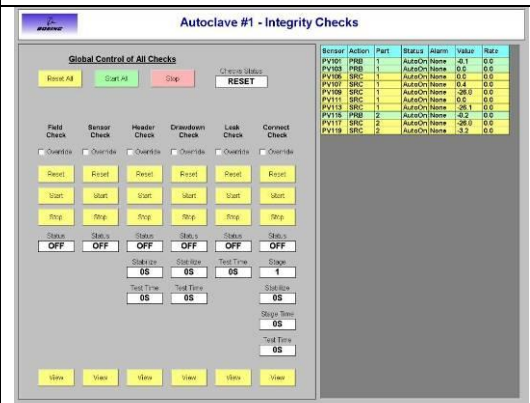
Recipe editing is via spreadsheet and includes audit-tracking, revision control, and complete sequencing of all aspects of a cure cycle.



Real-time and post-analysis trending includes panning, zooming, and other features.



Automatic quality system designed to analyze data per spec. and provide Pass/Fail results.



6-step pre-run integrity checks

Compliances

No Specification supplied

Assumptions

The following are assumed:

- Sanders composite is responsible for power enclosure and power components
- ASC assumes that the equipment listed in this quote are all in good working condition.
- ASC assumes Sanders composite will supply ASC with the electrical drawings for each system before ASC generates approval drawings. Labor for wire ring out is not included in the quote below.
- ASC assumes that there is enough space for the control panel and the breakers are rated to accommodate components listed below.

Control system

The following deliverables will be provided for the equipment.

Control Hardware

- NEMA 4 Controls enclosure
- Allen Bradley Compact Logix PLC
 - Ethernet processors
 - 120V digital output module(s), to control all aspects equipment
 - 120V digital input module(s), to monitor all relevant signals of equipment
 - Analog input module(s), to monitor all transducers of equipment
 - Note: ASC assumes the existing transducers are 0-5V or 4-20mA type. Change order will be required if they are 150mV type.
 - Thermocouple module(s), to monitor all part and air thermocouples on equipment
 - I/O to match the sensor count supplied in the SOW table

Clave	#of Thermocouples	# of vacuum source	#of vacuum sense
10x20	24+2	12	12
Small AC	10+2	10 manual	10

- Qty. (2) Hi-limit controllers
- Relays, terminals, wire-way, and wiring as required for interconnect.
- NEMA 12 enclosure house in the computer , monitor and printer.

- Qty. (1) Dell Optiplex 380
 - Pentium dual-core 2.0 Ghz
 - 2GB Ram
 - 160GB hard-drive
 - DVD/CRW drive
 - Integrated video
 - Windows 7 Professional operating system
- Hewlett Packard Color Laser
- Qty. (1) Monitors, 22"
- UPS, to power PC, PLC power supply, and instrumentation power supplies. UPS will provide 1 hour of backup power for each computer and the PLC.

Software

- CPC ® software, client and server upgrade license
- Pre-configured at ASC facility
- Windows 7 Professional operating system

Shipping

- Provide shipping of hardware from ASC to customer.

Installation

- ASC expects installation will require 2 weeks of down-time, including electrical, and engineering for startup, checkout, and training.
- Work based on 7am-5pm, Mon-Sat.

Startup, commissioning

- Provide ASC field engineer for startup services.
 - Configure software to meet equipment and customer requirements
 - Test and tune equipment system
 - Provide training of operators, engineers, calibration, and maintenance
 - Total of 5 days estimated.
- Costs for a travel, travel time included.

Pricing

Turnkey control system as described above)\$62,821.00

A) CPC Level II.

This option adds a second PC tower to the first computer system allowing for redundancy at the control system. If one PC fails, the other is capable of continuing the cure cycle uninterrupted via Ethernet connection
Shipping is included

Price\$6,500.00