

Airtec GmbH

CYPRES and CYPRES 2

Design and Test Report

All Models

in accordance with:

PIA TS-120: AAD Design and Testing Report Format

*Test report begins with chapter 3
TS120cV3b*

Document Revisions

<i>Date</i>	<i>Changes</i>	<i>Document Revision</i>
03/24/04	Minor changes: Added '>' to activation speeds in 'Technical Data' section for both CYPRES 1 and CYPRES 2. Changed verbiage from 'maint. Soon' to 'next maint. In' for Section 3.5 item 7 Changed description in Section 4.3 from 'was the diameter of a cigarette' to 'is approximately one-half the size of a cigarette.'	TS120cV3b
1/8/04	CYPRES 2 documentation	TS120cV3a
10/24/97	Initial Formal Release	TS120cV2
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1. Objective

The PIA AAD Design & Testing Report Format is regarded as fulfilled when the manufacturer releases the following test report about his product.

With the following report procedure, every manufacturer has their own choice to define the extent and kind of requirements concerning their particular unit. The requirement regarding quality of each product results from the self-defined test requirements. Each manufacturer is free to decide which of the actual tests and quality control parameters they want to use in the published test report.

The self-chosen quality requirements should be documented.

The form of the description should follow a general format. In each section, the manufacturer should describe:

- the goal of the test, e.g. recognizing of the correct activation altitude, checking of correct function under elevated temperatures, etc.
- how many units have been utilized to perform the test in question
- the test arrangement
 - what has been measured/tested?
 - how has it been measured/tested?
 - what test equipment has been utilized?

Each test report shall contain references to all sections, even if they are “not recommended”. All sections should be listed even when no data is presented. In this case a statement such as “not applicable”, “not recommended”, “not appropriate”, “not valid”, or “no statement on this point” should be included. In the event there is no reference to any particular section, the Para NewsBrief Editor will include the missing section with the notation “no statement supplied by the manufacturer” prior to publishing the report.

2. Reference documents

MIL-STD-810E	Environmental Test Methods
MIL-STD-45662A	Calibration System Requirements
RTCA/DO-160C	Environmental Conditions and Test Procedures
MIL-STD-331B	Procedure C1 for Temp. & Humidity Test
RTCA/DO-178B	Software considerations in Airborne Systems and Equipment Certifications
MIL-STD-461D	Requirements of the Control of Electromagnetic Interference, Emissions and Susceptibility
MIL-STD-331B	Appendix F Electrostatic Discharge (ESD)

3. Design description

3.1. Specific usage modes of the device

Airtec developed the CYPRES for:

- experienced skydivers (Expert model),
- beginners and students (Student model),
- tandem operation (Tandem model),
- military freefall personnel, HAHO, and HALO (Military Model),
- smoke-jumper and other custom versions,
- water jumps (with usage of optional Water Resistant Housing),
- Emergency / Air Crew parachutes.

The Expert CYPRES is suitable for:

- style,
- accuracy,
- RW,
- CRW,
- freestyle,
- skysurfing,
- freeflying,
- static/line students,*
- AFF students and/or jumpmasters.

The Student CYPRES is suitable for:

- Static/line students,
- AFF students.

The Expert CYPRES, the Student CYPRES and the Tandem CYPRES are not suitable for:

- low-altitude jumps, (1500 feet AGL for the Expert/Student CYPRES and 3000 feet for the Tandem CYPRES.)
- BASE jumping.

The MILITARY CYPRES is suitable for:

- HAHO, HALO,
- all EXPERT CYPRES and TANDEM CYPRES applications and for:
 - wide altitude range adjustment,
 - usage in widest temperature ranges,
 - multiple event activation (i.e. drogue release before reserve activation),
 - special applications like material drop.

All above listed CYPRES versions keep their qualities when the CYPRES Water Resistant Housing is installed. In addition they are water-resistant for 15 minutes up to a depth of 5m / 15 ft.



** usage of Expert CYPRES for static/line students may be a compromise and may not necessarily reflect the best possible device for the student's security. It should, therefore, be reserved for special applications.*

The Emergency / Air Crew CYPRES is suitable for:

- Pilots, navigator and other aircraft crew member.
- Load master, oxygen technician and others working on an open ramp.

CYPRES 2

During the years 2000 through 2003 Airtec developed the CYPRES 2 in its civilian and military version based on the design of CYPRES 1. Although more modern components were used and ergonomic aspects were improved, the core design was not modified. Specifically, the activation parameter of the different versions and the software algorithm are the same.

The above mentioned specific usage area for the different CYPRES versions are therefore all valid for CYPRES 2. The only exception is the need for a water-resistant kit can be dropped: all versions of CYPRES 2 except the Emergency / Air Crew CYPRES 2 are waterproof in their standard delivery form.

3.2. Principle of operation

The CYPRES initiates the reserve-container opening when a jumper descends to a specific altitude, in excess of a specific descent rate.

Airtec designed the CYPRES around a highly accurate pressure-sensing device, and a data processor.

The processor can determine when a jumper is:

- at a constant altitude (on the ground),
- in an ascending or descending aircraft,
- in freefall,
- in a belly-to-earth orientation,
- in a back-to-earth orientation,
- tumbling, (either controlled or uncontrolled), etc.

The data processor evaluates the jumper's altitude and descent-rate along with five other parameters. When ALL SEVEN parameters indicate that an activation is necessary, then the CYPRES activates the Release Unit that severs the reserve-container closing-loop, allowing the reserve-canopy to deploy.

The Release Unit is an electrically activated, piston/cylinder device. A knife-blade shape is machined into one end of the piston. When an electrical current is applied to the Release Unit, the propellant product forces the piston through the cylinder. When the knife-blade end of the piston reaches the reserve-container closing-loop, the knife-blade severs the loop, initiating the reserve-canopy deployment sequence.

3.3. Technical data

The CYPRES consists of:

1. Processing Unit
2. Control Unit
3. one or two Release Units
4. optional water resistant housing
5. closing-loop and washer
6. special closing-loop material
7. closing-loop silicon



Figure 1: The CYPRES Processing Unit containing the battery, the pressure-measurement system and the processing electronics.



Figure 1a: The CYPRES 2 Processing Unit



Figure 1b: The Emergency / Air Crew CYPRES Processing Unit



Figure 2: The CYPRES Control Unit consists of a LCD display, a LED and a push-button. The control unit is the interface between the user and the Processor Unit.



Figure 2a: The CYPRES 2 Control Unit consists of a 5 digit LCD display, a LED and a push-button (Ser.Numb. in display in this case).



Figure 2b: The Emergency / Air Crew CYPRES Control Unit



Figure 3: The CYPRES Release Unit (or "Cutter"). Release Unit is designed to sever the reserve-container closing-loop(s). A Release Unit may comprise of one or two "Cutters."



Figure 4: The CYPRES 1 Water Resistant Housing. Field retrofittable with existing CYPRES 1 units. This Water Resistant Housing is not necessary in conjunction with CYPRES 2.

In addition, we developed, designed, tested and manufactured the required reserve-container closing-loop with its' "Smilie" washer and silicon lubricant. Many people call this configuration "the industry standard."



Figure 5: The CYPRES closing-loop and “Smilie” washer.



Figure 6: A spool of CYPRES loop-material



Figure 7: A bottle of CYPRES silicon.

Further technical data can be found in the User's Guide.

Technical Data applicable to all CYPRES 1 MODELS:

Note: All temperature limits marked with an asterisk () indicate the temperature within the unit itself. **These temperature limits do not mean the outside (ambient) temperatures.** Therefore, these limits won't have any meaning until the unit itself has reached that specific temperature. These temperature limits rarely occur due to the insulating properties of the nylon pocket and its installation location.*

Length, width, height of the processing unit	approximately 88 x 57 x 28.5mm (approximately 3 ¹ / ₂ x 2 ¹ / ₄ x 1 ¹ / ₈ inch)
Length, width, height of the control unit	approximately 65 x 18 x 6.5mm (approximately 2 ¹ / ₂ x 3/ ₄ x 1/ ₄ inch)
Length, diameter of the release unit	approximately 43 x 8mm (approximately 1 ⁵ / ₈ x 3/ ₈ inch)
Maximum allowable humidity	up to 98% relative humidity, non-condensing
Functioning period	14 hours
Self-discharge rate of battery when stored at 20°C	approximately 1.5% a year
First maintenance	after 4 years

Special data for the EXPERT CYPRES 1:

Cable length of control unit	approximately 670mm (approximately 26 inch)
Cable length of the release unit	approximately 500mm (approximately 20 inch)
Volume	approximately 165cm ³ (approximately 10 cu. inch)
Weight	approximately 262 gram
Activation altitude	approximately 225 m (approximately 750 feet)
Activation speed	> 35m/sec (78mph)
Storing temperature	+71° to -25° centigrade (160° F to -13° F)
Working temperature	+63° to -20° centigrade * (145° F to -4° F *)
Altitude adjustment limits	±500m or ±1500ft from take-off.
Operating range above sea level	-500m to +8000m (-1600ft to +26000ft)
Battery life	maximum. 500 jumps or maximum. 2 years

Special data for the STUDENT CYPRES 1:

Cable length of control unit	approximately 1000mm (approximately 39 inch)
Cable length of the release unit	approximately 500mm (approximately 20 inch)
Volume	approximately 170cm ³ (approx. 10.37 cu. inch)
Weight	approximately 279 gram
Activation altitude	approximately 225 m (approximately 750 feet)
Activation speed	> 13m/sec (29mph)
Storing temperature	+71° to -25° centigrade (160° F to -13° F)
Working temperature	+63° to -20° centigrade * (145° F to -4° F *)
Altitude adjustment limits	±500m or ±1500ft from take-off
Operating range above sea level	-500m to +8000m (-1600ft to +26000ft)
Battery life	maximum. 500 jumps or maximum. 2 years

Special data for the TANDEM CYPRES 1:

Cable length of control unit	approximately 670mm (approximately 26 inch)
Cable length of the release unit	approximately 500mm (approximately 20 inch)
Volume	approximately 165cm ³ (approximately 10 cu. inch)
Weight	approximately 262 gram
Activation altitude	approximately 580m (approximately 1900 feet)
Activation speed	> 35m/sec (78mph)
Storing temperature	+71° to -25° centigrade (160° F to -13° F)
Working temperature	+63° to -20° centigrade * (145° F to -4° F *)
Altitude adjustment limits	±500m or ±1500ft from take-off
Operating range above sea level	-500m to +8000m (-1600ft to +26000ft)
Battery life	maximum. 500 jumps or maximum. 2 years

Data for the WATER RESISTANT HOUSING (CYPRES 1 only):

retrofit	Field retrofitable to most existing CYPRES 1 units. All units need to be made watertight for the 1 st time at Airtec or SSK.
watertight	Up to 15 minutes and down to 5 meters / 15 feet
delivery	The CYPRES Water Resistant Kit contains all necessary parts including all tools and accessories for preparing a CYPRES unit to be water resistant and ready for use including watertight performance testing.

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