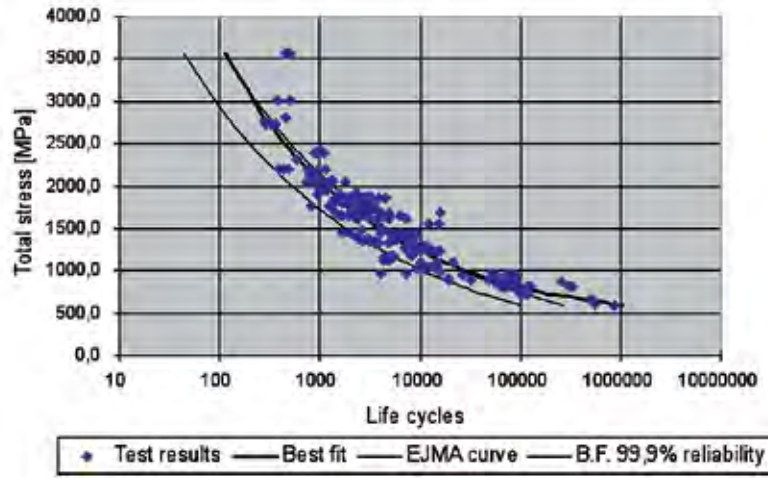


### Bellows Life Analysis



Characterisation of items operating under non standard conditions:

- *fatigue statistical management techniques set-up and verification (fatigue curve set-up);*
- *characterisation of items subjected to general external loads (theoretical evaluation and*



**Dynamic Test**

*experimental verification utilizing also extensometric techniques;*

- *defect insensitivity evaluation (capacity of the item to tolerate a defect without performance degradation).*

Characterization of bellows and structures subjected to dynamic environments and flow induced vibrations.

Exotic material characterization (Titanium, Inconel).

### Microscopic Controls (macrography/micrography)



Stampa: CAST Industrie Grafiche - Moncalieri (TO)

# IDROSAPIENS

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A company of WITZENMANN group

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# Aerospace Division Products

Ariane 5 ESC-A lines  
DN 40 axial/angular joint



**Idrosapiens** designs, produces and markets a wide range of components for fluidic systems: expansion joints, metal bellows, rubber and fabric joints, metallic hoses, nuclear and aerospace components, pipe supports.

Ariane 5 ESC-A lines  
DN 40 gimbal joint



The most important company strengths are:  
- capacity to "support" the customer in the definition of the product and system requirements deriving from the absolute knowledge of the proper product (typologies, applications, realization methodologies, testing and control, limit check, etc.);

**Capabilities:** design of a product (bellows expansion joint) fully responding to customer specifications through:  
- bellows optimization (specific company know-how);  
- structure design (CAD 2D and 3D);  
- FEM analysis;  
- functional analysis (thermal, dynamic, flow, etc.) and design limit prediction.



CAD 3-D studies

**Idrosapiens** is part of the **Witzenmann Group**, leader in Europe in its production field (HYDRA®).

A company branch, the Aerospace Division, is devoted to the realization of special projects for advanced applications (aerospace, nuclear, research, etc.).

A long tradition in the realization of items establishing the "status of the art" of the product in the main fields of the technology.

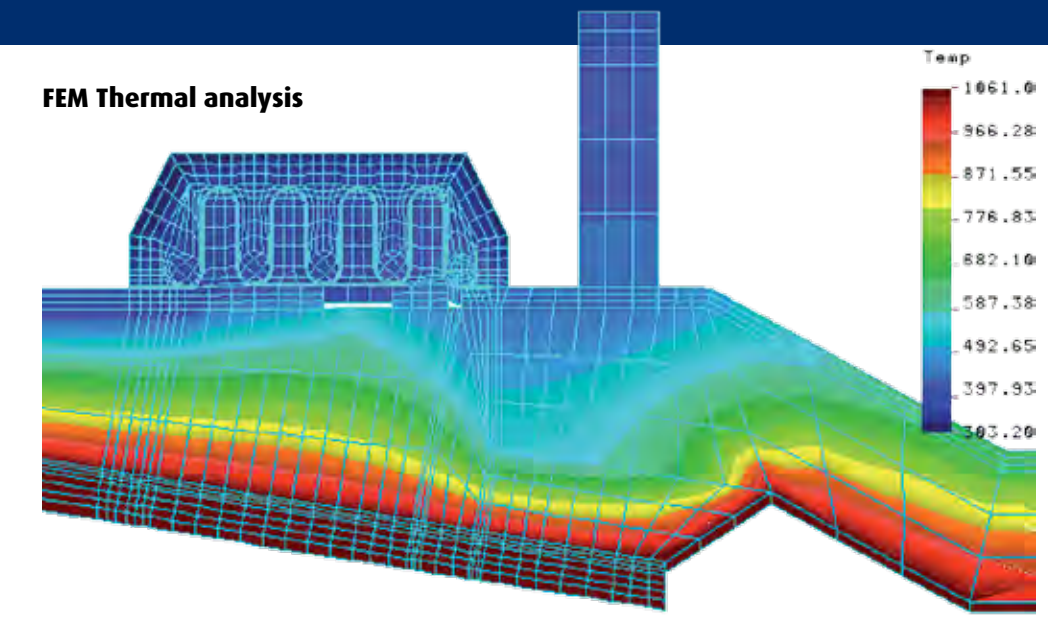
- capacity to "cooperate" at any level with the most important companies operating in the aerospace market establishing strict connections with them and, in some cases, operating as "qualified partners" for specific product branch;  
- utilization of powerful and technologically advanced design and testing methods: CAD



Ariane 5 ESC-A lines  
DN 60 universal expansion joint

and FEM programs, self-assembled programs allowing the core-product (bellows) automatic design and optimization, benches to test the designed items under environmental and load conditions simulating the real operations;  
- particular skill in the realization of components operating at cryogenic temperature deriving from its experience in the design and manufacturing of components for the European launcher Ariane 5.

FEM Thermal analysis



Bellows manufacturing range 10 to 3000 [mm].

Theoretical and experimental characterisation of expansion joints operating at temperatures ranging from 4 to 800 [K] through:  
- material selection (media compatibility, characterisation);  
- design techniques (stress and performance evaluation);  
- special process selection and set-up (welding);

- experimental performance verifications under real operating conditions (cryogenic or high temperature tests).

Cryogenic test



ATV module  
DN12 flexible hose



Titanium gimbal joints (4" - 6")  
AIRBUS spec. ABS 0736 DAN 481 (4" - 6")



Ariane 5 LBS lines  
DN 60/90 gimbal expansion joints