



ENGINEERING

The engineers and technicians of our design office have extensive skills and knowledge in process and mechanical equipment design, manufacturing processes (machining, welding, heat treatment, surface treatment) and inspections (NDT, proof pressure test, bench test) in addition to thorough mastery of construction codes, standards and regulations.

Thanks to the capacity of our design office to work independently and the feedback we have acquired (in-house design and manufacture), we can assist you throughout the project and even right from the call for tender in adapting the requirements applicable to the product with respect to function / performance / cost / quality / lead time.

As a manufacturer, SPM carries out the conformity assessment using the European Pressure Equipment Directive 2014/68/UE (PED) and the conformity assessment (as manufacturer or as support for the manufacturer) with the French decree of December 30, 2015 on nuclear pressure equipment (ESPN).

- ◆ **Project management**
- ◆ **Process calculation**
- ◆ **Pressure strength calculations**
- ◆ **Finite-element analysis**
- ◆ **CAD**



◆ Project management

The versatility of our project managers as well as the structure of SPM ensure proactive management of your project to meet your evolving needs in terms of requirements and deadlines.

In addition to the project schedule defined according to MS Project, SPM creates and follows an in-house dynamic and visual schedule that is periodically updated with all the departments, to optimize the allocation of resources, efficiently coordinate all activities, and make sure that your requirements are totally fulfilled.

Documentation regarding the product and its manufacturing process is entirely produced by SPM, and has been checked and validated by competent persons to ensure compliance with the applicable requirements.

◆ Process calculations

SPM has developed in-house process sizing calculation tools to define the dimensional characteristics of the product:

- Flow measurement equipment as per standards NF EN ISO 5167-1 to -4, ISO/TR 15377, ASME MFC-14M, ASME MFC-3M, ASME PTC 19.5, ASME PTC 6, chosen according to the type of fluid, installation constraints, expected measuring accuracy and maximum allowable pressure drop
- Flow limitation equipment (simple orifice or multi-orifices) according to a sizing method specific to SPM with determination of the cavitation level and number of stages

Depending on the expected accuracy, test bench validation of equipment performance is carried out in a certified test laboratory to refine the discharge or pressure loss coefficient.



◆ Pressure strength calculations

Equipment pressure strength is tested using SPM's own calculation tools to validate the geometry, thickness and material grade of each component.

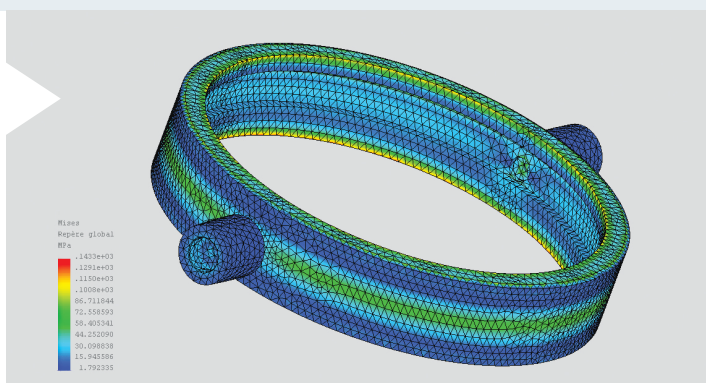
Analytical calculations are made as per the requirements of the construction codes used (RCC-M, NF EN 13480, ASME B31.1, ASME B31.3, CODAP, CODETI) and supplemented, if necessary, by finite-element calculations depending on the complexity of the geometry.

SPM also checks the pressure resistance of the tools used when proof testing the equipment.

◆ Finite-element analysis

When the analytical calculation does not ensure a complete validation of the pressure resistance, a finite-element calculation is carried out by SPM with CASTOR CONCEPT.

If the finite-element model becomes too big or when other specific constraints need to be taken into account, SPM entrusts this calculation to an external service provider qualified in the relevant sector of activity, in line with the specifications drafted by SPM.



◆ CAD

The 3D model of the geometry of each piece of equipment is created with Topsolid CAD software, and is then used by our methods department for CAD/CAM programming and, if necessary, for the different assembly phases.

Drawings are issued to ensure the manufacture (detail drawings), (assembly drawings), execution of the proof pressure test (tooling drawings), performance test (instrument line drawings) and installation on site (assembly and interface drawings).