

Pulsation & Vibration Analyses

Pulsation & Vibration
Analysis
Piping Stress Analysis
Design solutions
Field service



www.cstfirenze.com



CST Design Solution

Machinery vibration is one of the main causes of damage and failures in industrial plants.

Reciprocating compressors are often affected by vibration problems, vibration being inherent in the design, as compressors generate alternating forces and pressure pulsations.

In many cases, vibrations are due to the interaction between the compressor and the whole plant system and the following CST design solutions specifically aim to minimize the vibrations of the complete plant.



Volume bottle design

Preliminary sizing and performance verification (calculation of shaking forces, residual pulsation, pressure drop, etc).



Optimized volume bottle design VS compressor cylinder arrangement.



Small bore connection design and analysis.



Optimized clamp design or review..



Upgrade of existing pressure vessels and piping system, to solve cases with high pulsations / vibrations.



Support for the best compressor valve selection based on dynamic analysis (by means of CST proprietary software Smart PV).

Standard Analyses

CST proprietary software 3->1D-Pulse makes it possible to supply pulsation and vibration studies, in full compliance with API 618, supporting plant designers and/or end users throughout the entire design process, from the earliest stage of a project to commissioning.



Damper verification

TM-Pulse CST provides an accurate acoustic pre-study, simulating the cylinder internal gas passages and the piping system, up to non-reflective line.

Results:

Optimized damper size;

- Pulsation level at cylinder valves and flange
- and residual pulsation;
- Shaking force and pressure drop;
- Valve dynamic response;
- Compressor capacity and power consumption.

than frequency domain analysis) including also non-linear fluid flow elements.

Results:

- Accurate estimation of pressure losses;
- Evaluation of resonances & Shaking Forces.



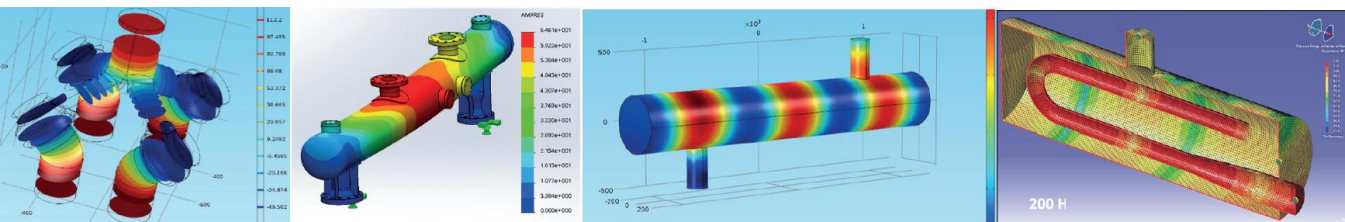
Pulsation analysis

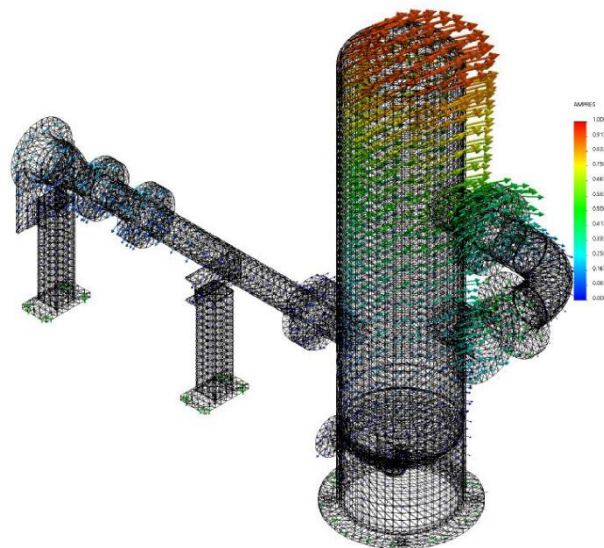
CFD-Pulse CST provides a complete fluid dynamic 1D time-domain analysis (more precise



Mechanical response study

CST can also carry out an evaluation of the Mode Shapes of the cylinder manifold, including the pulsation dampers and piping, obtain preliminary information about the principal mechanical frequencies of the entire structure and perform a complete Mechanical Analysis.





CST PLUS

Thanks to its long-standing experience in compression system design and service, CST can provide its customers with on-site service support and all round technical analysis, from stress calculation analysis to package or component design for specific applications.

So, what's our plus?



For new project

CST supports the packager matching the plant design with the pulsation & vibration analyses. This two-man job leads to a drastic time reduction preventing any future vibration problems on the plant.



For existing units

The CST service team can support the client with on-site vibration measurements and subsequent plant modifications based on a detailed mechanical analysis.



Multi disciplinary approach

CST analyses experts are plant designers and machinery specialists too. This is the key for providing effective solutions.

CST SERVICE PORTFOLIO

- Pulsation and Vibration Analysis
- Rotor-dynamic Analysis
- Torsional Analysis
- Field measurements
- Machinery upgrades
- Lubrication system
- Training
- Troubleshooting

C.S.T is a high technology design and maintenance engineering company, established
By a group of experienced engineers to support OEMs, Packagers, Main Contractors
And End Users in designing, assembling and servicing compression equipment.



Compression Service Technology

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C.S.T Proprietary information

The images contained in this document are only intended to illustrate the service:

The actual supply is defined in the proposal, which will be customized for each application.