



MACHINERY ANALYSIS

## Pulsation Bottle Sizing Service

### Features of Level 1 and 2 Service, Compared to Pulsation Study

Features	BETA Bottle Sizing Service		BETA Pulsation Study (API 618)
	Level 1 Basic Sizing	Level 2 Bottle Analysis	Includes Mechanical Analysis ( <i>Note 1</i> )
Risk level ( <i>Note 2</i> )	Medium Risk	Lower Risk	Lowest Risk
Bottle sizing algorithms <ul style="list-style-type: none"> <li>- API 618, 5<sup>th</sup> Edition; API 11P</li> <li>- BETA's bottle sizing formula</li> <li>- Acoustic model using Time Domain (MAPAK software)</li> </ul>	✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Operating conditions evaluated	Singe condition per run	Up to 20	Up to 1000
Filter design, if required (including sizing of choke tube, baffles, etc.)		✓	✓
Sizing of orifice plates		✓ (cylinder nozzle only)	✓
Utilizes BETA's extensive database of past projects		✓	✓
<b>Avoids any changes to bottle sizing;</b> allows packager to order material (without risk of size changing)		✓	✓
Calculates pressure pulsation and forces in bottles and cylinders		✓	✓
Calculates static AND dynamic pressure drop in choke tubes and orifice plates		✓ (cylinder nozzle only)	✓
Calculates static AND dynamic pressure drop in the piping system			✓
Calculates pressure pulsation and forces throughout the compressor package			✓
Detailed performance analysis of compressor package, including pulsation effects			✓
Minimizes bottle costs (optimized design) to reduce capital cost for packager			✓
Mechanical analysis of piping, scrubbers, vessels to avoid resonance (Design Approach 3 scope)			✓
Turnaround time for bottle size recommendations	Immediate	3 business days	5-8 business days for acoustical recommendations

See page 2 for notes.

## Notes

1. Pulsation/Vibration Study per API 618 requirements. Design Approach 3 (DA3) includes mechanical analysis of the compressor system. For more information of API pulsation and mechanical studies, or to obtain our FREE primer, refer to [www.BetaMachinery.com](http://www.BetaMachinery.com). For application assistance, call +1-403-245-5666.
  
2. Risk of inaccurately sized bottles:
  - If pulsation bottles are sized too large, the risks are:
    - More difficult mounting and supporting requirements for large bottles.
    - Higher capital costs for material and fabrication of large bottles.
  
  - If pulsation bottles are sized too small, the risks are:
    - Reliability concerns due to excessive pulsations and vibrations.
    - Reduced performance and higher operating costs caused by excessive pressure drop.
    - Higher capital costs if secondary volumes are required.

In rare cases, a mini pulsation study is not adequate to properly size bottles. Instead, a full pulsation study is required. This limitation could apply to specialty gas compositions (like hydrogen or CO<sub>2</sub>) and very high pressures.