

THERE ARE TWO KINDS OF PULSATION STUDIES. WHICH ONE IS RIGHT FOR YOUR RECIPROCATING COMPRESSOR?

Question from Packager: I am reviewing proposals for a pulsation/vibration study (per API 618) for my reciprocating compressor. What are the significant differences? Especially related to the mechanical analysis?



Answer: The short answer is that two classes of pulsation studies exist in the market:

1. Studies that meet the requirements of API 618 (5th edition is the current version)
2. Studies that loosely follow API requirements, but do NOT meet the technical requirements.

While Beta Machinery Analysis (Beta) offers services to meet either of these two classes, it is important for the packager and end user to understand the differences. No one wants to make a bad decision, so see what is included in each case – what you don't know *can* hurt you.

The terminology used in our industry is not as consistent as it should be. In many cases you have a difficult time determining if you are getting #1 or #2. Sometimes, companies use jargon that sounds “right,” creating the impression that their services, though cheaper and technically inferior, yield the same product in the end. Unfortunately, this is simply not the case.

You buy a study to reduce the risk of vibration problems*. But what degree of risk do you (and your customer) face? What level of accuracy do you want in the analysis? The answers will determine which type of study you purchase. The following table outlines the differences between the studies.

1. API 618 Pulsation/Vibration Study	2. Basic Pulsation Study
Meets technical requirements of API 618 guideline	Does NOT meet all API 618 requirements
Evaluates all operating conditions (often over 20 conditions), ensuring safe operation over the life expectancy of the unit.	Analyzes 1 or 2 conditions. Other conditions not analyzed (but will often be a problem in terms of high pulsation, vibration and/or pressure drop).
Accurately calculates static and dynamic pressure drop; necessary to avoid losses in the piping system and to understand impact on capacity.	Calculates static pressure drop only! Not able to calculate <u>dynamic</u> losses (which can be higher than static losses), so not able to evaluate and avoid losses in capacity and efficiency.
Accurate predictions of Mechanical Natural Frequencies (MNF) to identify resonance issues in the package. <i>Accurate predictions = accurate recommendations</i>	Limited accuracy of Finite Element models (software limitations, simplified technique). MNFs have wide variance from actual results. To compensate, a conservative recommendation is provided, or potential vibration areas are overlooked.
Calculates vibration and stress, and compares to guideline (requirement for DA3 Step 3b1 & 3b2 studies- M6 or M7 studies in 4 th edition)	Does NOT calculate stress and vibration amplitudes (and publish results). This is a requirement of DA3 scope (see separate example).
Cost: \$X	Cost: \$X – 15% (+/- depending on the compressor)

Beta generally recommends the API 618 Pulsation/Vibration Study (#1) because of the increased accuracy offered to the customer. However, if the risk is manageable, and the packager wants to save some money, we can provide the Basic Pulsation Study (#2) – which is equivalent to other suppliers providing this service. The packager and end user should make a decision based on risk and reliability factors.

What to include in the RFQ?

Without an accurate specification you will not get the right study! Ensure critical study components are written into the RFQ, including the scope, methodology, and deliverables. [Contact us](#) to see examples of specifications we have created to help you out.

*The API 618 study typically results in other benefits: reduced pressure drop, improved capacity and efficiency, reduced bottle costs, lower warranty exposure, lower maintenance costs, and fewer vibration problems due to future operating condition changes.