

# Testing

## 'Tested by Me': Why Fastener Testing Strategies Have Evolved Beyond Testing Purely to Meet Various Standards

Producing fasteners that satisfy various standards is a "service qualifier" for fastener manufacturers. Every engineer in downstream original equipment manufacturer (OEM) end-users will assume that the fasteners they specify meet basic international standards. Increasingly, fastener manufacturers develop products to meet the specific performance characteristics laid down in their downstream customers' standards and are creating their own benchmarks. Ensuring fastener manufacturers can deliver products meeting demanding 'tested by me' criteria requires innovative testing strategies and flexible, modular and affordable testing equipment to implement them.

"Our Junker test benches are uniquely designed to enable fastener manufacturers to test their fastener and locking mechanism products under dynamic loading conditions," says **Morten Schiff**, CEO of **Vibrationmaster**. "They help manufacturers meet the requirements of *DIN 252011* as well as its predecessor, *DIN 65151*, plus emerging standards such as the new *ISO 16130* for the aerospace sector. However, our customers have their own specific fastener issues and require testing strategies and solutions that also comply with their own, and their customers', specific needs."

Schiff notes that meeting 'one size fits all' standards is becoming a routine process and that 'tested by me' concepts are increasingly higher up the testing agenda of fastener manufacturers.

"Of course ensuring fastener products meet international standards for specific applications is essential and, for many fastener manufacturers, delivers instant competitive advantage," he says. "'Tested by me' product development strategies result in improved products over the long term and a competitive edge that can be sustained."

### Whose Standard is it Anyway?

Schiff emphasizes that fastener manufacturers should have a clear idea of what their testing strategy is designed to achieve: "Certifying a new product to an established international standard can initially open up new markets. But that is only part of the testing story. Increasingly, end user OEMs are setting their own standards. This is a commonplace occurrence in the automotive and defense-aerospace sectors, and the practice is spreading into other verticals.

"When you look closer at the standards issued by these major fastener consumers, it becomes clear that many of the standards are simply adapted from the published international standard. Analyzing dynamic vibration test standards issued by some European automotive OEMs, for example, reveals that they are simplified and adapted versions of the *DIN 25201* standard. The OEM has adapted them to meet the needs of its proprietary production processes."

Fastener manufacturers can often be presented with a dilemma, particularly if they have limited testing resources. Should



**Morten Schiff,**  
CEO  
Vibrationmaster  
[www.vibrationmaster.com](http://www.vibrationmaster.com)



they test to the international standards, or should they focus on testing their fasteners and locking products according to the standards issued by their largest existing and potential customers?

### Testing to Standards or Testing for 'Real Life' Applications

There is a further layer of complexity, which Schiff has encountered when developing testing solutions to meet the needs of both standards and customers: "*DIN 25201* is one standard that stresses that dynamic vibration testing should be conducted on bolted joints in conditions that are as close to real life applications as possible.

"Fastener manufacturers, and in particular downstream OEMs, also want to test fastener performance under 'real life' conditions. I recently spoke to one Vibrationmaster customer, who asked me, 'I want to test the bolted joint in the sub-assembly. Do I need a Vibrationmaster vibration table or a Junker test bench to do that?'"

This is a customer who wants to test beyond what the standards require and who needs a testing solution that meets its needs, and not those dictated by the standard. A vibration table can very effectively simulate the real life conditions under which a fastener, as part of a bolted joint assembly, must perform.

But Schiff warns that a 'shake-table' will only provide the fastener manufacturer or end user with half the story: "It is possible to visually monitor the joint's performance under dynamic test conditions, but to accurately test performance a clamp load sensor in the joint is required."

### Which Testing Solutions are Best Suited to Implement Your 'Tested by Me' Strategy?

Fortunately, Schiff highlights that there are testing solutions that enable manufacturers to adopt a flexible 'tested by me' strategy and which can achieve testing to both standards and real life conditions.

"Testing can be expensive and time consuming, and few fastener manufacturers have the resources to run multiple test programs on an ongoing basis, so they need to get it right first time" says Schiff. "Although there is a very wide choice of testing laboratories to choose from—over 40,000 **International Laboratory Accreditation Cooperation (ILAC)** suppliers alone—many of these are focused on testing to established standards and do not have the equipment or flexibility to implement a bespoke 'tested by me' strategy. Or at least do so cost effectively."

Before commissioning an external test laboratory to conduct a test program, fastener manufacturers must ensure the supplier has the right capabilities to perform both the tests for international standards and the 'tested by me' requirements. The latter may be close to the standards' requirements, or could need something quite distinct.

Schiff explains: "A test laboratory may have a range of test machines that can efficiently and cost-effectively test fasteners and bolted joints to common and widely accepted fastener standards. However, many test laboratories are unable to provide test services outside of the narrow confines of those required to ensure products meet fastener standards. And those that can deliver flexibility often charge a premium on the testing cost."

### Resourcing & Managing In-House Test Programs

An alternative is to implement 'tested by me' strategies in-house. For some organizations, taking testing in-house may represent a departure from their core competencies. However, user-friendly, flexible and modular test equipment is readily available for fastener manufacturers and downstream OEMs to acquire either as capital assets or on a lease and rental basis.

"Test laboratories fulfill a vital role by providing the testing skills, expertise, capabilities and equipment that manufacturers do not require or cannot afford on a full-time basis," says Schiff. "Those same drivers of competences and affordability, alongside the flexibility required to implement bespoke 'tested by me' strategies, can now be met by leased or rented test equipment that is easy to use, modular and customizable."

Whether the fastener manufacturer needs to test a bolted joint to a specific customer's standard, or to fulfill the requirements of an in-house product development program, the required test regimen can be plugged into a rented test machine with the right modules to secure accurate results. Highly trained technicians are not required to operate the equipment, and significant financial resources are not required to buy expensive capital items that may only be used for short periods.

"Another advantage of leasing or renting test equipment is that the user benefits from the latest technology and upgrades each time they rent the test equipment. We have even seen some customers add an additional revenue stream by offering test services externally. This can be difficult in some markets because the only obvious customers may be competitors, but we have seen it work in some verticals," adds Schiff.

### Flexibility & Scope for End-Users: Seeking the Optimal Solution

Fastener manufacturers can up their game by 'tested by me'

strategies. Downstream OEM end-users can benefit from equipment that can test joints which include many different fasteners. As Schiff explains, this is because modern test equipment, such as some of the latest Junker test benches, allows users to customize test adaptors. In turn, this allows bolts, nuts, studs, washers, lubricants and all the elements of a fastened joint to undergo testing.

"Downstream OEMs will examine a range of fastening solutions to determine the optimal fastener, so require test equipment which can cope with a wide variety of options," acknowledges Schiff. "For large OEMs, such as automotive or aerospace firms, the solution is to acquire a wide range of test equipment for their in-house test function.

"However, this may not be so practical for organizations that do not have the volume of final products or the margin of a global automotive OEM. The solution is to invest in multifunctional test machines, and for some, to lease the machines only during the testing periods of the product development cycle."

Schiff concludes: "Testing should pay for itself by underpinning a fastener manufacturer's or downstream end-user's source of competitive advantage. For this competitive advantage to be sustainable, manufacturers and OEMs must develop 'tested by me' strategies that go beyond simply meeting fastener standards and are supported by access to flexible and affordable test facilities."

[www.vibrationmaster.com](http://www.vibrationmaster.com)

#### Reference:

- <sup>1</sup> DIN 25201-4: 2010-03 Annex B Test specification for demonstrating the resistance to self-loosening of secured bolted joints, Deutsches Institut für Normung eV, Berlin 2010

### Core Elements of a 'Tested by Me' Strategy

- 'Service qualifiers': the fastener product must meet minimum international standards expected by downstream OEM end-users.
- Differentiators: what are the performance criteria sought by the manufacturer to satisfy end-user needs, and how can they be tested.
- Scope of testing: which 'real-life' scenarios must be tested and what bolted joint configurations should be used during each test.
- Type of test equipment: do existing off-the-shelf test machines provide the required range of tests.
- Acquisition policy: should the test equipment be acquired as a capital item or on a short-term basis.

#### About Vibrationmaster...

**Vibrationmaster** designs and manufactures advanced testing technology and delivers specialized test services. Our products include Junker Test machines to analyze and demonstrate the self-loosening behavior of fasteners and bolted joints to the toughest international standards and demanding customer requirements. With a head office and R&D function in Luxembourg and advanced manufacturing

facilities in Denmark, we operate globally. Our customers span the commercial, academic, research, public, government and not-for-profit sectors. We offer highly reliable test solutions to organizations seeking innovative, market-proven and cost-effective technology to test and prove the reliability, consistency and safety of their products.

[www.vibrationmaster.com](http://www.vibrationmaster.com)