

A Q&A

MarvelXACT: A Worry-Free Fitting System for Liquid Chromatography



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Chromatographers need and want repeatable, reproducible results. A key aspect of ensuring such reproducibility is avoiding guess-work when tightening fittings. To learn more about a recent innovation in liquid chromatography connections called MarvelXACT, LCGC recently spoke with Eric Beemer, senior development engineer at IDEX Health & Science.

LCGC: Why did IDEX develop MarvelXACT and what kind of field feedback led to it?

Beemer: At IDEX, we've done a lot of Voice of the Customer (VOC) analysis in the field and have had close communication with customers to understand the pain points of chromatography users and to develop a set of criteria from which to work. We also have significant chromatography experience from our internal lab work and incorporated that knowledge into the MarvelXACT specifications.

We wanted to develop a “worry-free” fitting. By “worry-free,” I mean no carryover, no peak broadening, or any kind of tailing—just repeatable chromatography. I think that's what all chromatographers want. The leaks that we tend to see with fittings currently available on the market have a big impact on troubleshooting time and chromatography results.

We also wanted to create a fitting that is highly re-usable. Ultra high-performance liquid chromatography (UHPLC) is typically run at very high pressures, and there's very few tubing material and fitting technology out there that lends itself to such pressure. If fittings are highly re-usable, labs don't have to discard items every time they change columns or connections, thereby increasing the value of our new technology.

Ease of use is also important. Although we have some existing finger-type connections that don't require tools, concerns about whether they are properly assembled still exist. With MarvelXACT, the connection is not a concern anymore because it enables an exact, proper connection every time.

LCGC: What are the key features of MarvelXACT?

Beemer: One key feature is its torque-limiting mechanism. Torque is important because if you don't have enough torque, leaks can develop—and with leaks come bad chromatography.

By applying enough torque, you maximize the fitting's sealing potential. If you have too much torque, you can damage the port or the tubing itself. Once the tubing is damaged, an increase in back pressure usually occurs, which can be detrimental for achieving the flow rates that might be required by the analysis.

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With MarvelXACT, by having a torque-limiting “click” mechanism, the proper amount of torque is provided to maximize the seal while preventing too much torque, which can limit the tubing’s re-usability and the functionality. The click also provides good feedback; you know it has been properly assembled. It’s like your automobile’s gas cap. When you hear the click, you know that you’ve assembled it properly and that it will seal every time.

Another key feature is face-sealing. Face-sealing is basically how the end of the tubing seals at the bottom of the port. No cones, ferrules, or other components are needed. A load is applied to the back of the seal to create the seal on the front end. MarvelXACT connections are available in either stainless steel or all PEEK flow path options, the latter providing a flow path that is smooth and very inert, which is important for “sticky” applications like protein separations.

LCGC: IDEX launched a new connection about a year ago called MarvelX. What are the similarities and differences between MarvelXACT and MarvelX?

Beemer: MarvelXACT is really just the advanced version of MarvelX. It still utilizes the same tubing and face-sealing

element, but MarvelXACT builds upon MarvelX by adding the torque-limiting mechanism to make it easier to use. Nonetheless, much of the mechanism for creating a seal and the resulting chromatographic results are the same as those previously obtained on the proven MarvelX technology. MarvelXACT has been extensively tested to verify a superior product incorporating these new elements.

LCGC: Is MarvelXACT a patented technology?

Beemer: Yes; both the torque mechanism and the fitting have been granted patents. The tubing itself and the face sealing element is patent pending.

LCGC: What is IDEX’s vision on MarvelX technology? What should users expect for the near future?

Beemer: IDEX Health & Science is committed to the growth of the MarvelX product family as evidenced by the expansion of the face-sealing MarvelX technology used in MarvelXACT. We’re looking at ways we can use different tubing internal diameters and are experimenting with different materials such as a new fused silica flow path to try and open up other applications of the technology.

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