

# Teadit TAGS the Future of Forensic Packing

While we have seen great advancements in regards to traceability and identification technology in numerous areas of life; when it comes to product tracing and identification in the realm of fluid sealing products, there remains very few viable options out there.

Motivated by these market needs, Teadit Style 2848 packing was engineered and designed to address the fugitive emissions requirements while providing a complete traceability pathway. This is accomplished through the development of a new technology called Teadit® TAGS™, which was recently awarded the Vaaler Award in Fluid Flow for 2021!

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Fugitive emissions from valves are one of the biggest environmental challenges faced by chemical and petrochemical plants. The use of secure and certified low emissions packings is one method used by many end users to mitigate that impact. However, when it comes to identifying and tracking the use of such products in the field, additional challenges emerge. Questions arise concerning how users can correctly identify a compression packing once installed, or even once it is out of the box? To address this issue Teadit has developed a progressive technology for its Teadit Style 2848 packing: Teadit® TAGS™.

## Unique Design

Style 2848, named after the fugitive emission standard ISO 15848, is braided with a yarn made from oxidation inhibited flexible graphite that is reinforced with an innovative PTFE

thread structure in a knitted jacket configuration. This innovative PTFE structure is embedded with Teadit® TAGS™, which are particles that carry the solution to identify the packing, assuring its full traceability. Figure 1 reflects this exclusive design.

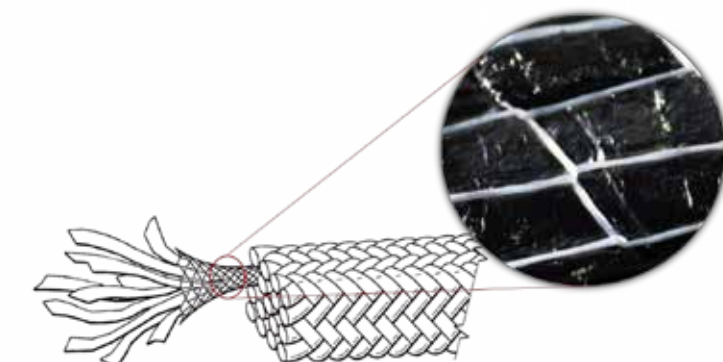


Figure 1: Packing design.

Teadit® TAGS™, in particular, are traceable particles that may have different forms, compositions, sizes, and may even be detected by distinct mechanisms. Nevertheless, they are designed to ensure traceability of the product before, or even after, it has been in service.

Examples of these particles include phosphors and microdots. Both of them can be excited with a specific wavelength to be identified using the right equipment. For example, phosphors can be illuminated with a portable laser pen or an ultraviolet flashlight, depending upon the selection of the phosphor.

These 'tags' can retain information on packing fabrication, creating a uniquely identifiable fingerprint for the warranted product that is invisible to the naked eye. Figure 2 shows this innovative product (US 10,989,304 B1), and its unique fingerprint.

Inseparable from the packing, Teadit® TAGS™ offer a permanent and much more reliable identification method that cannot be misplaced, switched off, or even lost. They can dramatically reduce complications from product misidentification and have no impact on the performance of the product itself.

The use of duet graphite-PTFE, simultaneously makes this novel compression packing a premium low emissions service product for valves that is capable of resisting high installation stresses. It is also ideal for sealing pump shafts, soot blowers, and similar machine elements, especially in applications that require a low-friction, traceable, low-emissions solution.

Style 2848 is positioned as a viable choice for any equipment or compression packing application, by combining features such as self-lubrication, non-hardening, dimensional stability, and strong resistance to operational conditions like heat, pressure, and chemical resistance/compatibility in different fluids such as solvents and thermal fluids. Plants can reduce overall inventory and benefit from having a single high-quality product that meets a variety of service requirements.



Figure 2: Style 2848 with Teadit® Tags™ (Patent No. US 10,989,304 B1).

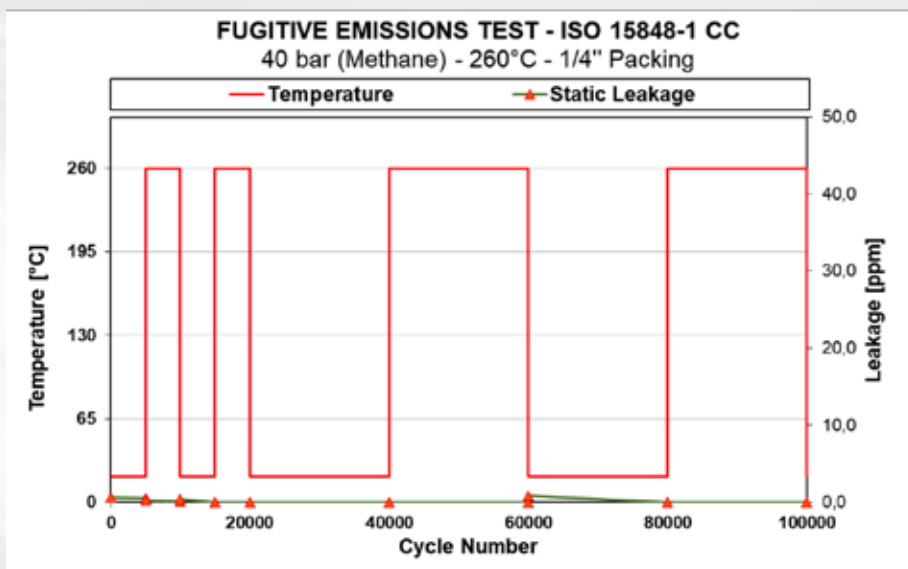


Figure 3: Fugitive emission test results according to ISO 15848-1.

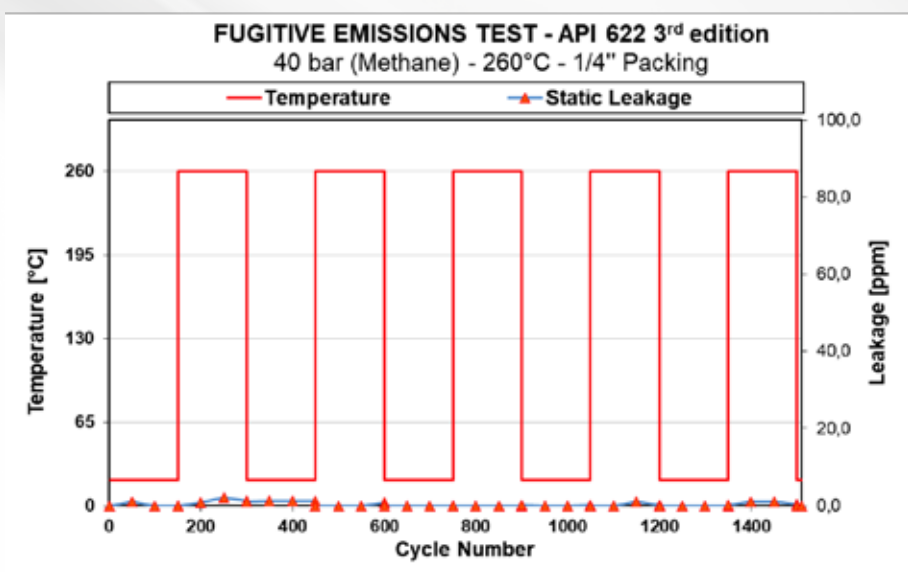


Figure 4: Fugitive emission test results according to API 622 3rd Edition.





## Certified Low-Emission Packing

Controlling and reducing fugitive emissions has become an area of focus for many countries around the world in the last few years. The increase of stringent environmental regulations requires industry segments to carefully evaluate their equipment and services. This, in turn, has led to more and more demand for manufacturers to meet specifications. Style 2848 development was indeed motivated by control valves, which are typically continuously actuated. Its development was aimed at improving the performance of fugitive emission style Ni-Cr jacketed graphite yarn packings without the use of the metallic portion, greatly reducing the potential for stem drag, scoring, and elevated friction.

Style 2848 meets the requirements of ISO 15848-1's most stringent mechanical cycling test, CC3, without any adjustments. To meet this assessment, the packing was evaluated on an ASME B16.34 size 2 inch, class 300 control valve pressurized with 40 bar of methane. The test consisted of the application of 100,000 mechanical cycles and 4 thermal cycles, up to the specified temperature of 260°C. Figure 3 depicts its results.

Style 2848 can easily meet the fugitive emissions requirements of API 622 3<sup>rd</sup> edition, which is another common standard used to test packings for low emissions service. This test consists of 1510 mechanical cycles and 5 thermal cycles, up to 260°C. Figure 4 shows the results.

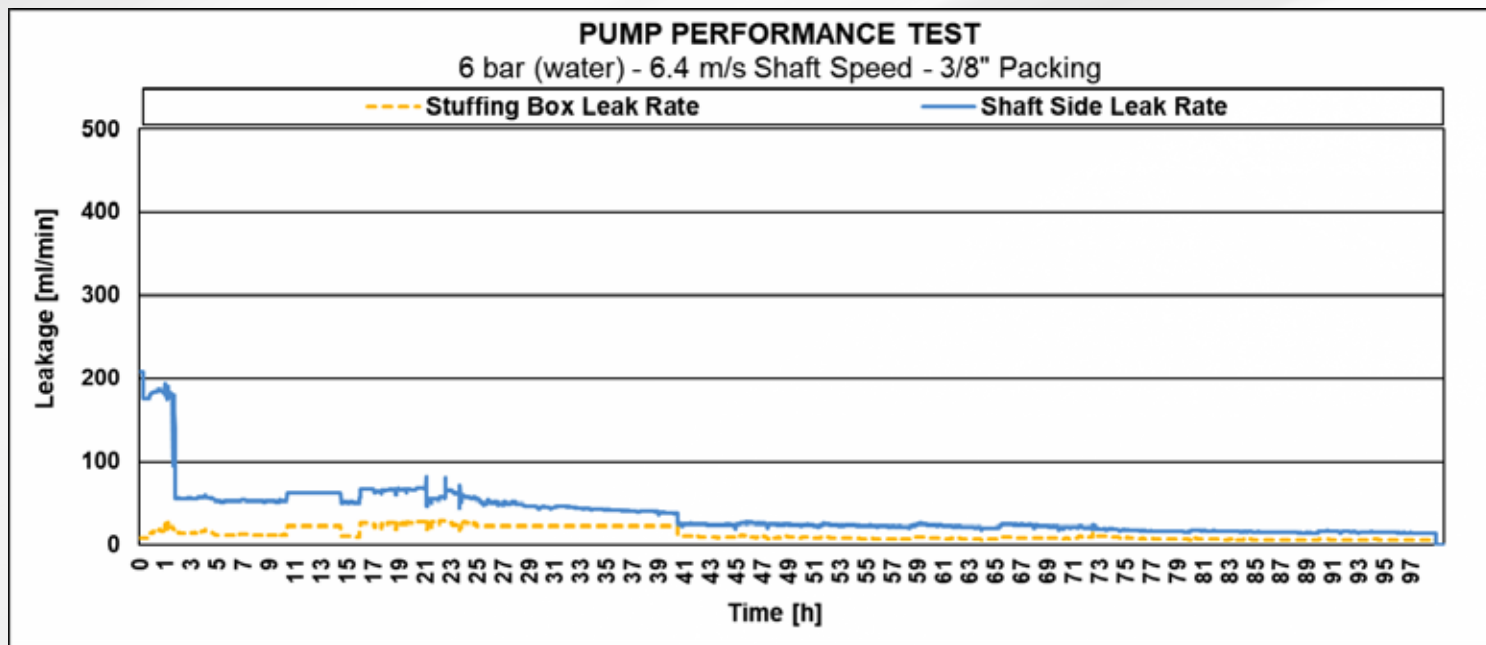


Figure 5: Performance test in pump application.



## Traceable in Any Situation

Teadit® TAGS™ can be traceable regardless of operational conditions. This is an outstanding innovation for environments with chemically aggressive fluids, abrasion, high pressures, and even elevated temperatures.

The products high chemical resistance was assessed in laboratory experiments consisting of two uniquely different environments for a period of three months each. In the first experiment, the packing was exposed to a 98% concentration solution of sulfuric acid ( $H_2SO_4$ ). The second experiment was conducted in a 50% concentration solution of sodium hydroxide (NaOH). In both scenarios, the packings maintained their structure and were still identifiable.

Its great resistance to high temperatures was also verified in laboratory experiments. Samples were exposed to 650°C, for 4 hours and the identification Teadit® TAGS™ remained intact.

## Very Flexible Solution

Unlike most low emissions packings, the lack of metallic reinforcement makes this innovative product a highly adaptable solution. Its soft exterior is not only suitable for control and isolating valves, but also makes it a good fit for pumps and other rotating equipment.

The performance of Style 2848 was evaluated on a test rig based on EN 16752:2014. The test consisted of subjecting the packing to water pressurized at 6 bar for 100 hours with a shaft speed of 1750 rpm (6.4 m/s). The fluid leakage was collected and measured separately for the shaft side and the stuffing box side. Figure 5 presents the results.

## Looking to the Future

As shown, the leakage was stabilized over the test to a very low value. This result, along with the results of the previously mentioned test, highlights the potential of Style 2848 as a universal, high-quality packing that combines low-emission technology with the versatility required for the wide range of equipment and applications that currently rely on compression packing sealing in the industrial sector. Its traceability pathway likewise gives it a unique advantage for the user.

## Teadit at a Glance

Teadit® Group is recognized worldwide as a leader in the development and manufacturing of innovative products for critical fluid sealing processes. The wide variety of sealing solutions developed by Teadit® have been important tools for many industries including the Oil & Gas, Chemical Processing, and Power Generation. Teadit® has helped a number of industries achieve the goal of an emission-free environment within their facilities. Teadit® is constantly investing in R&D to keep up with the evolution of the industry's needs.

Teadit® North America is located in Houston, Texas with worldwide locations in South America, Europe, and Asia. The variety of sealing solutions developed by Teadit® is fundamental in order to achieve the leakage-free goal in the many industries served.

The quality and effectiveness of these solutions are based on management and innovation, which are the basis for all products manufactured at any Teadit® plant. As a result of this continuous process of quality improvement, an ISO 9001 certification was obtained in Brazil, the United States, and Europe.

Every Teadit® product is developed and manufactured to achieve the goal of ensuring leakage control and environmental preservation.