Installation Instructions

How to install

EasyFrit - Filter for EasySampler

1 Introduction

EasyFrit is a filter accessory for EasySampler 1210 and can be used with all existing EasySampler probes. The filter's primary use is to facilitate the exclusive solution-phase sampling of heterogeneous mixtures. EasyFrit's design and unique dynamic self-flushing mechanism prevents surface fouling. This allows unattended sampling over an elongated period under reaction conditions at scale.

This document contains a standard installation procedure and recommendations of best practices.

Please read the Operating Instructions of the EasySampler 1210 to be able to operate the device correctly.

Further information can be found on mt.com/EasySampler.

Scope of delivery EasyFrit

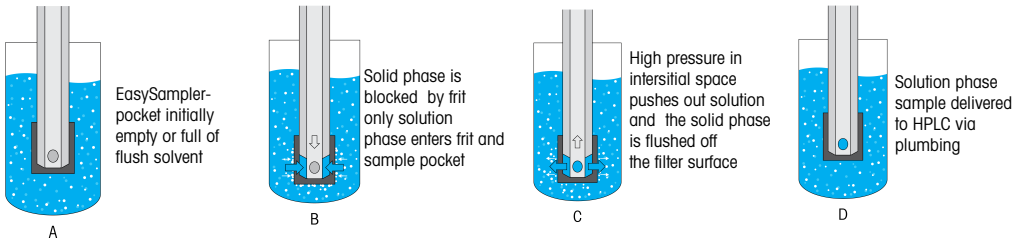
The EasyFrit Filter (Ordner number: 30811887) contains:

- EasyFrit - Filter, assembled
- Installation Instructions

The EasyFrit Kit (30811900) additionally contains the Installation Tool for EasyFrit.

2 Functioning Principle

Extending EasySampler probe head results in a low-pressure interstitial space between the sample head and EasyFrit, allowing the solution-phase to pass through the filter and fill the sample pocket. Subsequent retraction of the probe head results in expulsion of the solution phase through the filter, pushing away solids that may have accrued on the surface.



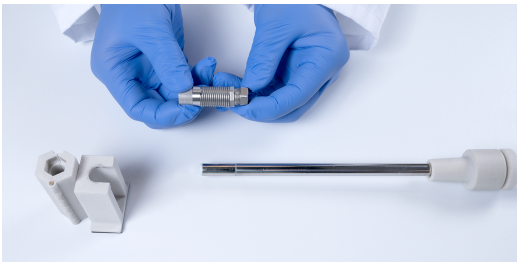
Sampling sequence for EasySampler with EasyFrit: A) empty 20 µL sample pocket with head retracted in probe and no interstitial space; B) EasySampler head extends into solution creating low pressure interstitial space, which pulls in solution phase and filters out solid phase; C) EasySampler head retracts, reducing interstitial space volume and creating high pressure which expels the solution phase from the filter, flushing its surface free of most solids; D) after retracting, the 20 µL solution phase sample is delivered through the lines with a precise solvent volume to the HPLC and the sequence repeats.

METTLER TOLEDO

3 Installation

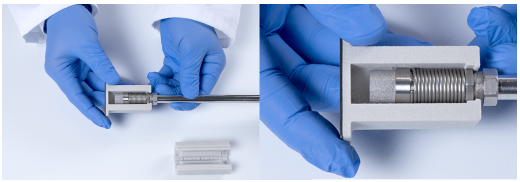
1 Make sure probe is clean. In doubt run **Clean** before installation. Install the adapter (19/22 PTFE 9.5 mm or 14/20 PTFE 9.5 mm) before installing the EasyFrit and make sure the probe fits to reactor lid.

2 Loosen the clamp nut at the backend of EasyFrit.



3 Slide EasyFrit onto probe tip. Push until the filter cup inside is flush against the end of the probe. Pushing EasyFrit over the sleeve might need a bit more force. Loosening the clamp nut might help if not change the sleeve.

4 Place the probe tip with EasyFrit in the base of the installation tool. Make sure that the clamp nut remains outside of the tool while the filter main body sits well in its dedicated position.

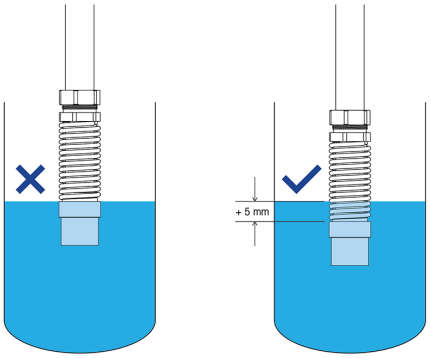


5 Place the probe vertical on a flat surface and push downward with the probe to extend and pre-load the spring.

6 Use the box wrench. Ensure that the filter frit is touching the bottom of the installation tool. Turn the box wrench clockwise to firmly tighten the clamp nut. The spring should have gaps between the coils when finished. It is not fully extended this is the closed position.

7 Proceed with **Prepare** step on EasySampler. Verify that filter remains submerged during stirring.

8 The filter cup has to be completely submerged in the reaction while the probe is retracted. It is recommended that at least 3 turns of the spring are also immersed.



4 Best Practices - Tips and Tricks

Verify correct installation before experiment

Press the Take Sample button while the filter frit is immersed in the blank reaction solvent. Remove the probe from the reaction solvent once the probe/filter is extended. Solvent should be dropping out of the filter when the probe retracts in the headspace of the reactor.

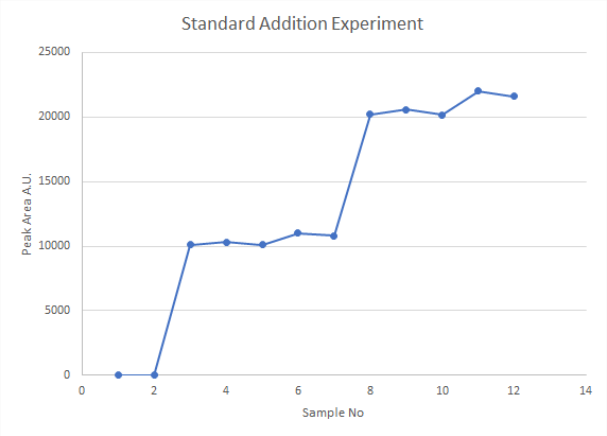
Priming of EasyFrit and reducing cross-contamination risk

We recommend ensuring proper wetting of the filter via a short sampling sequence (2-3 samples) before commencing the experiment. The blanks verify the condition of EasyFrit.

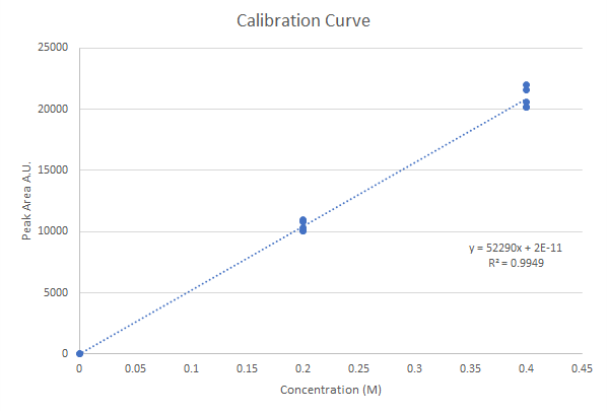
Standard addition improving data quality – On the fly calibration

We recommend calibrating EasyFrit for optimal accuracy under experimental condition via the method of standard addition for every experiment. Best results are obtained by taking solvent blank(s) followed by the addition of the analyte in not less than two small quantities. After each addition, at least three samples should be taken once the analyte is completely dissolved. This procedure results in an experiment specific calibration curve prior to the actual experiment. The graph below shows the result of standard addition with four addition steps and multiple repetitions for each addition.

Sampling frequency: We recommend to increase the sampling frequency compared to manual practice for optimal results.



Sample Raw Data



Sample Calibration Curves

Replacement of EasyFrit

We recommend changing EasyFrit if you experience inconsistent results, difficulties during installation, or signs of cross-contamination.

5 Troubleshooting

Filter tip does not slide onto sleeve

Due to slight manufacturing differences in the diameter of EasySampler sleeves, not all sleeves will be compatible with EasyFrit. Prior to installation on the probe, EasyFrit be tested by sliding on and off to the EasySampler probe tip. Replace the sleeve and retry, ensuring the fit is tight but movement does not require force.

Filter tip does not fully retract

First, remove EasyFrit and ensure the probe head has properly retracted. If so, the friction between filter tip and sleeve may be too high, overcoming the restorative force of the spring. Replace the sleeve with one that has a looser fit.

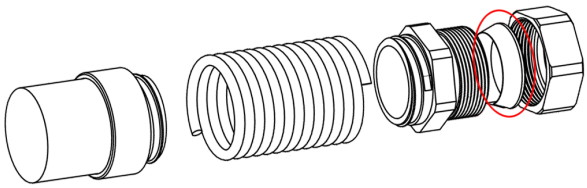
Samples obtained using the filter tip are inconsistent

If the filter tip has accrued solids in the spring/screw components or the fit with the sleeve is too loose, data obtained may not be consistent. Remove and thoroughly clean the filter tip, especially the spring component, and ensure the fit between the apparatus and sleeve is tight. The filter tip can safely be rinsed with solvent and scrubbed with a tissue. It is also possible to use an ultrasonic bath to clean it.

6 Cleaning the Filter Kit

For cleaning purpose, EasyFrit can be either subject to cleaning in one piece or disassembled completely in its individual components. The filter cup can be unscrewed from the main body/spring of the EasyFrit.

To re-assemble make sure the clamp ring faces as shown below:



Tip - to unscrew the filter cup and the nut from the spring

The spring grips the components, filter and clamp to stop them from coming loose through twisting. The pin is placed against the end of the spring to allow the unscrewing to expand the spring and release the grip.

- Installation tool needed

1 Place the end of the spring against the pin as shown in the image.

2 Press the end of the spring tightly against the pin.

3 Turn counterclockwise the filter cup or the spring collet to loosen it.

7 Technical Data

Material	Alloy C22/276 and FEP (O-ring)
Temperature Range	-20 to 140 °C, at ambient pressure
pH Range	1 to 14
Pocket Size	20 uL +/- 10%
Length	47 mm
Diameter	14.2 mm
Filter pore size	10 µm
Immersion depth	3 turns of the spring (probe retracted)

Mettler-Toledo GmbH
Im Langacher 44
8606 Greifensee, Switzerland
www.mt.com/contacts

30799234

30799234