# Permeation Accessory for the Micro-Chamber/ Thermal Extractor (µ-CTE)

**August 2012**

## Description

Permeability is tested, typically at ambient or near-ambient temperatures, using a permeation accessory (see Figures 1–3) for both models of Markes' Micro-Chamber/Thermal Extractor (M-CTE120I(T) and M-CTE250I(T)). The permeation accessory consists of a membrane pan, membrane retainer and a septum.

## Mode of operation

A section of the test material is stretched over the membrane pan and secured in place with the membrane retainer (see figures). The perimeter of the test material is sealed in place with an O-ring seal. The surface area of the test material exposed is 6 $cm^2$.

A small droplet of test compound is placed in a well at the bottom of the permeation accessory by injecting through a septum. The test material does not come into direct contact with the test compound.

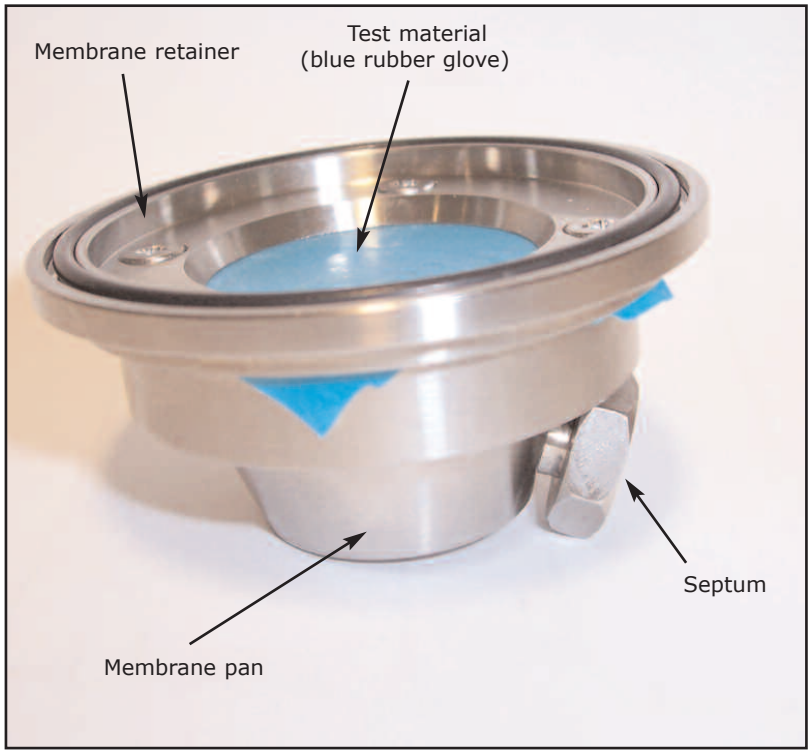


***Figure 1. The Permeation Accessory for the Micro-Chamber/Thermal Extractor depicting the key components and a typical test material***

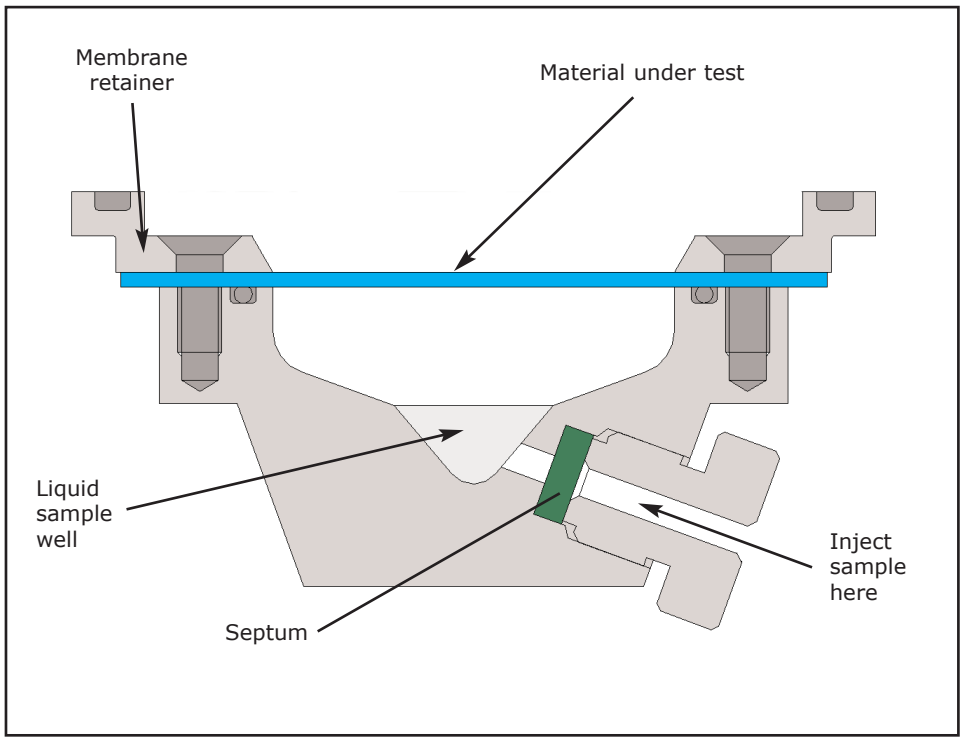


***Figure 2. Cross-section schematic of the Permeation Accessory for the Micro-Chamber/Thermal Extractor depicting the liquid sample well***

The complete assembly is then placed inside one of the µ-CTE micro-chambers. Depending on the model, the µ-CTE has capacity for up to four or six sample materials or test compounds to be tested simultaneously. Clean air is passed over the surface of the stretched material in each micro-chamber. Permeation of the test compound through the stretched material is assessed by monitoring the air exiting the micro-chambers using sorbent tubes and TD–GC/MS analysis in the normal way.

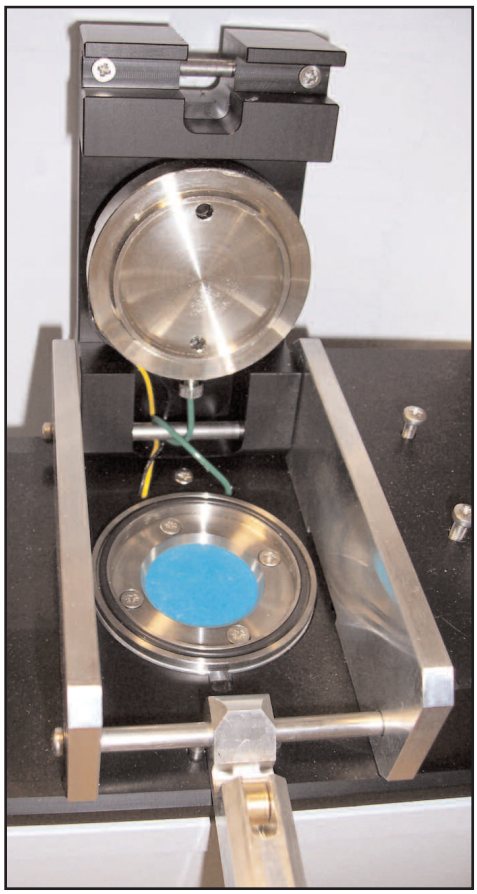

***Figure 3. Permeation Accessory positioned within a µ-CTE micro-chamber***

## Assembly instructions

Two Micro-Chamber Permeation Accessories are available. M-PRMIN-120 has six sets of parts, for use with the six-chamber µ-CTE. M-PRMIN-250 has four sets of parts, for use with the four-chamber µ-CTE.

### Part list for M-PRMIN-120 (for use with M-CTE120I(T))

| | |
|---|---|
| M-PRMINSS-120 | Permeation Accessory for MCTE120I, pk 6 |
| M-PRMINSS1-120 | Permeation Accessory for MCTE120I, pk 1 |
| M-PRO30-120 | O-Ring, 30 mm o.d., Permeation Accessory seal, pk 6 for MCTE120I |
| M-PRSPT-120 | Septa, ¼", for Permeation Accy injection port, pk 6 for MCTE120I |
| SERSSA-0127 | Membrane clamp, pk 6 |
| SERSSA-0128 | Membrane pan, pk 6 |
| SERSSA-0129 | Retaining screw, pk 6 |
| SERZ-SM306PCSS | Screw M3 x 6 Csk Hd St St, pk 24 |
| SERZ-SM308PCSS | Screw M3 x 8 Csk Hd St St, pk 24 |
| SERZ-SM312PCSS | Screw M3 x 12 Csk Hd St St, pk 24 |
| QUI-1028 | Instructions for Permeation Testing Inserts |

### Part list for M-PRMIN-250 (for use with M-CTE250I(T))

| | |
|---|---|
| M-PRMINSS-250 | Permeation Accessory for MCTE250I, pk 4 |
| M-PRMINSS1-250 | Permeation Accessory for MCTE250I, pk 1 |
| M-PRO30-250 | O-Ring, 30 mm o.d., Permeation Accessory seal, pk 4 for MCTE250I |
| M-PRSPT-250 | Septa, ¼", for Permeation Accy injection port, pk 6 for MCTE250I |
| SERSSA-0127 | Membrane clamp, pk 6 |
| SERSSA-0128 | Membrane pan, pk 6 |
| SERSSA-0129 | Retaining screw, pk 6 |
| SERZ-SM306PCSS | Screw M3 x 6 Csk Hd St St, pk 24 |
| SERZ-SM308PCSS | Screw M3 x 8 Csk Hd St St, pk 24 |
| SERZ-SM312PCSS | Screw M3 x 12 Csk Hd St St, pk 24 |
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1. Place a septum into the septum recess (see Figure 2) and secure by screwing the retaining screw into the septum recess. Tighten retaining screw until 'finger-tight'.
2. Position 30 mm o.d. O-ring into the recess on top of the membrane pan.
3. Cut out a section of the material to be tested and gently stretch across the top of the membrane pan.
4. Position membrane retainer over the test material and mark the position of the four screw holes in the membrane retainer onto the test material.

5. Remove membrane retainer. Remove test material and cut out the marks indicating the positioning of the screw holes.
6. Position the test material and membrane retainer over the membrane pan and align the screw holes.
7. Secure membrane retainer (and test material) onto the membrane pan with four screws. **Note** that screws of varying lengths (6, 8, 12 mm) are provided and are to be used according to the thickness of the test material.
8. Position O-ring (o.d. 47 mm) into O-ring recess on top of the membrane retainer
9. Using a syringe, inject the liquid test compound through the septum, taking care not to load the liquid sample well with too much test compound. The total volume of the pan well is ~ 4 mL.
10. Remove a conventional micro-chamber pan from the μ-CTE and replace with the assembled permeation insert.
11. Perform permeation testing as discussed in the mode of operation section (above).
12. After testing, remove the test material and any remaining test compound from the permeation insert and thoroughly clean: i) the membrane pan, ii) membrane retainer and the membrane pan O-ring (see section below for cleaning procedures).
13. Repeat steps 3–12 for a new test material.

## Cleaning instructions

Membrane pans and retainers (with O-rings removed) can be cleaned by rinsing in a suitable solvent (which will depend on the type of test compound employed) and allowing the components to dry. Components can be placed in a vacuum oven at moderate temperatures (~200–300°C) to enhance drying.

Clean O-rings by placing into a vacuum oven at 200°C for 1–2 hours.