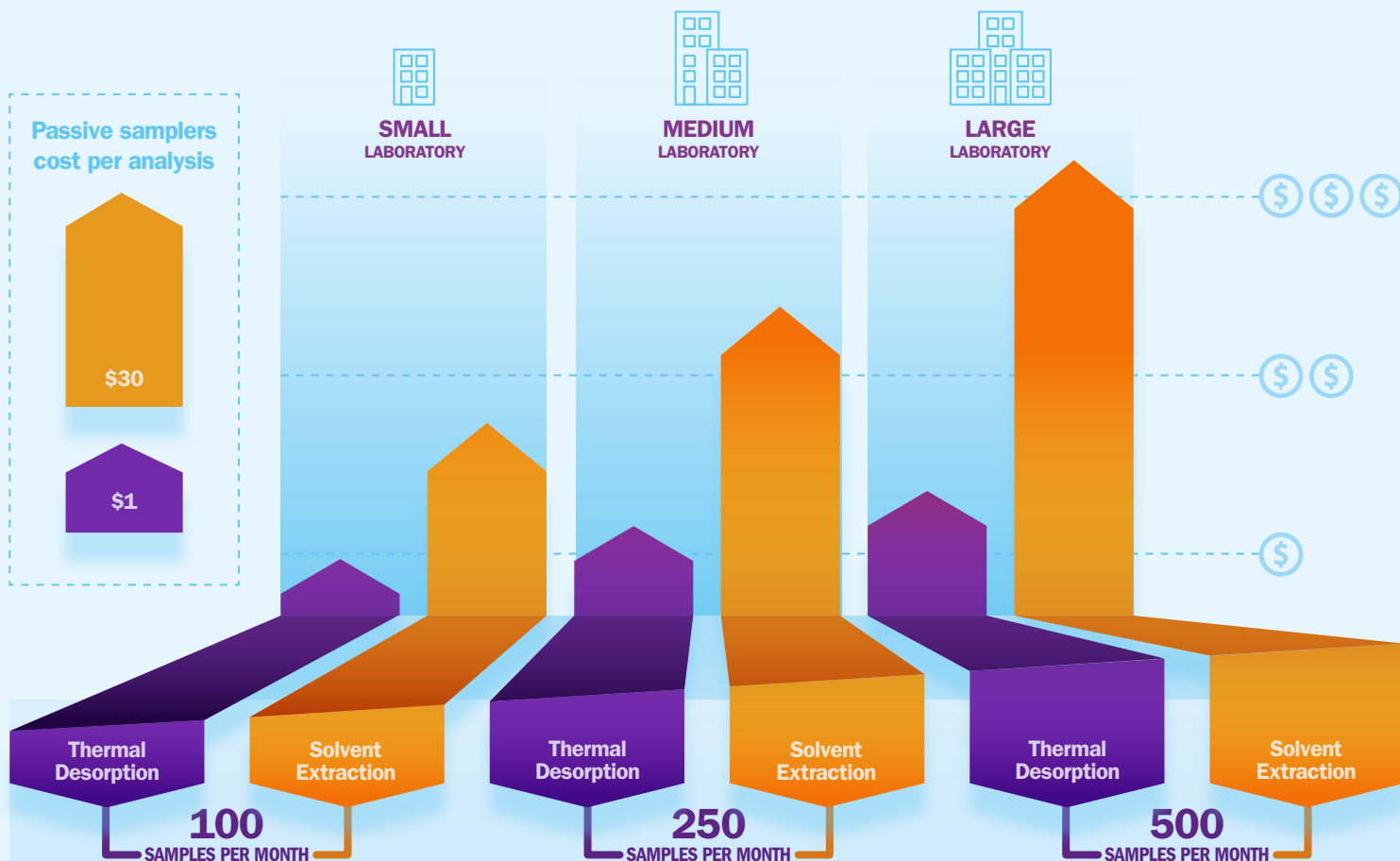


# Solvent extraction vs. thermal desorption

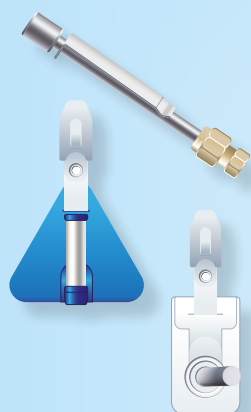
## Key considerations when looking to switch

Techniques for sampling VOCs (volatile organic compounds) often use sorbents. Back at the laboratory there are two main methods for extracting and analysing samples, both coupled to GC(-MS): solvent extraction (SE) or thermal desorption (TD). We compare the two techniques in terms of their cost and benefits to your data quality.

### COMPARISON OF PASSIVE SAMPLING CONSUMABLES



The difference in cost per analysis between Thermal desorption (TD) and solvent extraction (SE) is clear. For TD users an analysis costs as little as 1\$ to run. For SE users each sample will cost around \$30 due to single use consumables and solvent usage. <sup>1</sup> This converts to large savings as sample numbers increase.



Passive samplers offer a simple and robust sample collection method for work place and environmental monitoring. For environmental monitoring the sampling period at ambient levels will often determine the best sampler to use.

In workplace monitoring axial sorbent tubes are often the most suitable over the 4 – 8 hr working day. These dual purpose sorbent tubes can also be used with pumps if desired.

Samplers with a radial design like the POD and Radiello® are best suited to short term monitoring of 15 mins to 1 hr in the workplace.

#### <sup>1</sup> Assumptions used in our calculations

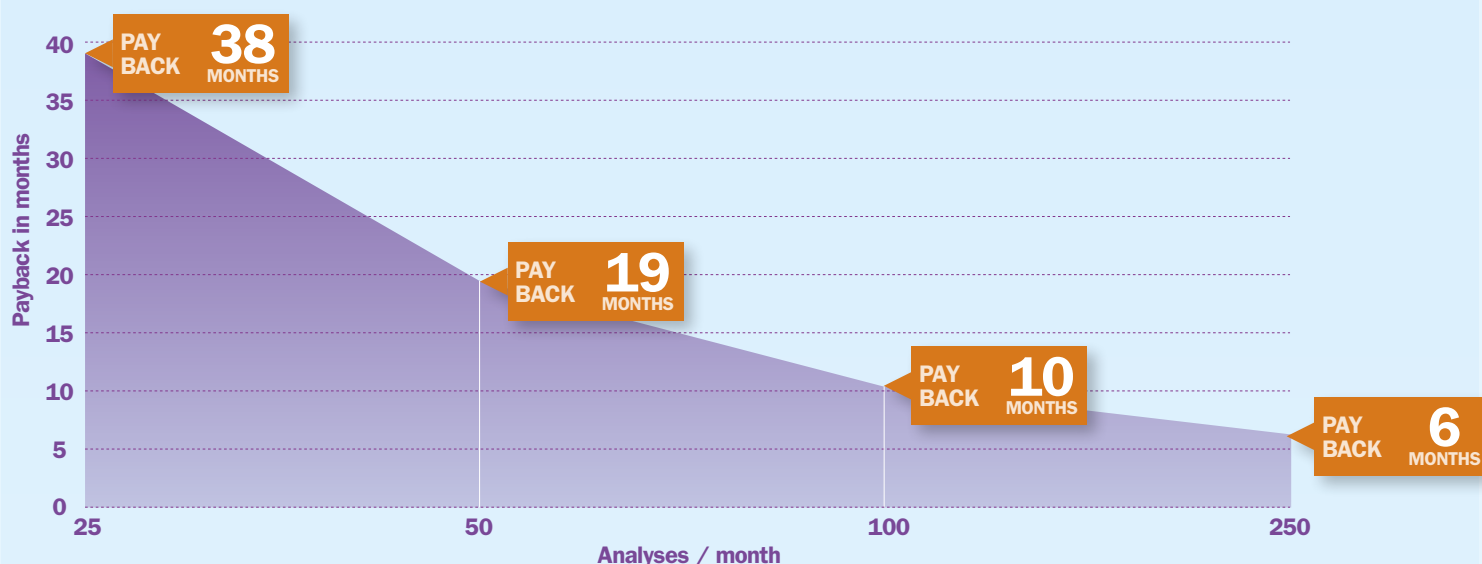
Each TD tube is conservatively estimated for a maximum of 50 uses. In reality TD tubes can be used hundreds of times so the savings would be higher than shown. Solvent usage was calculated based on OSHA 1005 method with 10% contingency.

# Solvent extraction vs. thermal desorption

## Key considerations when looking to switch

### FAST RETURN ON INVESTMENT

AN AUTOMATED TD INSTRUMENT PAYS FOR ITSELF, THROUGH SAVINGS IN AS LITTLE AS SIX MONTHS...



In the above graph we use the cost saving compared to solvent extraction to calculate how long it would take to pay off the cost of an automated TD instrument. Labs with 50 samples/month will have re-couped that cost in under 2 years and labs with 250 samples/month in as little as six months. This is without considering the additional revenue coming from the analysis.

**TD100-xr** automated thermal desorber for GC and GC-MS – a high-performance, high-throughput platform for the analysis of sub-ppt to percent levels of volatile and semi-volatile organic compounds in air and materials.

The perfect choice for labs who value productivity and a quick turn around time.



**UNITY-xr** delivers exceptional GC(-MS) performance and offers unmatched upgrade flexibility for tube, canister and on-line automation.

This manual system is perfect for labs who want to start using thermal desorption but don't have the samples to require an autosampler now and want flexibility for the future.



# Solvent extraction vs. thermal desorption

## Key considerations when looking to switch



**Solvent Extraction (SE)**  
ppm

VS.



**Thermal Desorption (TD)**  
ppm – ppt

### KEY CONSIDERATIONS

CS <sub>2</sub> is the most commonly used solvent for extraction. It is toxic with TWA exposure limits of 5ppm	<b>Health &amp; Safety</b>	No health and safety concerns
Low sensitivity (sample diluted during the extraction process)	<b>Sensitivity</b>	1000× better sensitivity (No sample dilution required)
~95%	<b>Desorption efficiency</b>	>99%
Samplers are Single use only. Solvents are expensive and need to be disposed	<b>Sustainability &amp; Costs</b>	TD tubes are re-usable >100 times and can be recycled
Solvent-related baseline disturbances	<b>Solvent Interference</b>	None
Complex extraction process (~60 min/sample)	<b>Sample Preparation</b>	No sample prep required. Significantly improves turn-around times for priority samples
CS <sub>2</sub> can react with certain amines and volatile chlorinated compounds	<b>Side Reactions</b>	No interactions
Yes, samples can be stored as extracts	<b>Sample Re-analysis</b>	Yes, samples can be re-collected on Markes TD systems
Yes	<b>Method Compliance</b>	Yes

To discuss how your analysis can be converted from solvent extraction to thermal desorption contact our specialists through [www.markes.com](http://www.markes.com) or at [enquiries@markes.com](mailto:enquiries@markes.com)

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