SIA GUIDANCE NOTE NO. 64

SAFE SAMPLING OF SOLVENTS

Many solvents are hazardous or can have harmful effects, so care must be taken in obtaining representative samples of solvents from vehicles, fixed storage tanks or during manufacturing processes.

The different methods of sampling covered in this Guidance Note will be:

1. From a road tanker
2. From a storage tank
3. Batch sampling (from a filling line or filled container)

1. General

Essentials for sampling are the following:

- Ensure that the sample taken is representative of the product
- Identify and eliminate any risk of contamination of both the product and the sample
- Check HSE specific aspects:
    - Know the Hazards associated with the product,
    - Wear the appropriate PPE
    - Apply the necessary controls to limit risks (of the product itself, and / or the way to handle it)
- Handling of the sample (labelling, storage and transport)
- Ensure that the sample bottle is compatible with the material being sampled

1.1. Representative sample

To ensure that the sample is representative of the product being collected, evaluate what type of product /container / system is in place, if flushing is required and if so, how much flushing is required?

Unless Quality Control requires sampling from different levels of the storage vessel (i.e. top, middle or bottom), samples taken must be homogeneous.

In order for a homogeneous sample to be taken, mixing can be carried out in a number of ways:

- Via a pump (with or without nozzle)
- Bubbling with nitrogen through the nozzle system
- Using a mixer (ensure that all equipment is intrinsically safe if used with flammable liquids).

Another way of ensuring that the material in the tank is homogeneous, it may be possible to take samples from the top, middle and bottom of the storage vessel. If the product in the tank is homogeneous, then each sample will be identical in composition following analysis.

1.2. Prevention of contaminants

To ensure that no contaminated samples are taken for analysis, ensure that the sampling equipment (e.g. sample bottle, syphon) is clean and dry or ideally dedicated to the product. If in doubt about the risk of contamination, sampling equipment should always be thoroughly rinsed with the product being sampled prior to use. Wherever possible use a new sampling container. The sampling container must be compatible with the product being sampled.

It is also important that the sample collection points are kept clean and free from contamination.

1.3. HSE aspects

The properties of the product should be observed when sampling. For example; toxicity, corrosiveness, flammability, explosivity, volatility etc. This information can be found in the Safety Data Sheet (SDS).

When taking samples, appropriate PPE should be worn. These include suitable gloves for chemical and thermal protection, eye protection such as goggles or a face shield and / or a face mask to prevent inhalation. Particularly aggressive products may require wearing a full chemical resistant suit.

Static discharges can be avoided when taking samples with the use of appropriate grounding or bonding as directed by site procedures. Further information on static electricity is available in other SIA Guidance Notes and safety films at www.solvents.org.uk

1.4. Handling of samples

1.4.1. Degree of filling

Sample bottles should be filled to a maximum 95% of capacity to allow for expansion and vapour space. This prevents the build-up of pressure inside the sample container.

1.4.2. Sampling

Samples drawn for quality control may be used for temporary testing or for retention. Some samples may be required for customer approval.

The receptacle used to hold the sample i.e. Stainless steel jar or glass bottle should be a new container that has not been used previously to eliminate the risk of cross-contamination. The container must also be compatible with the product being sampled to avoid degradation or chemical reaction.

Any equipment used to obtain the sample must also be thoroughly rinsed with the product to be sampled.

Always rinse or flush the sample point before sampling.

Ensure that sample label is complete, accurate, legible and securely attached to the bottle and has the following information:

- Source of sample
- Description of product and concentration
- Product Code
- Batch number
- Date and time of sampling

A Safety Data Sheet will accompany the sample when being presented to the end-user.

1.4.3. Transport

Packaging, transport and intermediate storage of samples must take place in such a way that the integrity of the product remains intact and no contamination from other materials can occur.

The transport of samples must take place in a separate cargo space (as approved by the haulier procedures and in line with ADR regulations) with adequate ventilation and free from sources of ignition.

2. Road Tanker Sampling

It is widely recognised within the chemical industry that samples from road tankers should be taken by the operator at ground level unless it is not possible to do so.

Road Tankers can be sampled from:

- From the top of the vehicle via the tank manway cover (not recommended due to working at height considerations)
- From the bottom discharge outlet
- The vehicle sampling point

If the tanker has been subject to movement of the product during transit, ensure that a static relaxation period of a minimum of 10 minutes has been allowed before sampling.

2.1. Top Sampling

If this is the only way that a sample can be obtained, it is essential that this is undertaken using a designated access gantry and a full Risk Assessment is in place.
Once a sample can be safely obtained, open the manway cover on top of the vehicle carefully to avoid inhalation of any harmful vapours. Use appropriate PPE according to site procedures. Position yourself up wind of the dip-hatch and allow the tank to vent.
Use the appropriate sampling device (clean and dry stainless steel jar or valinch) to collect the product, ensuring that the receptacle is secured firmly to avoid dropping into the vehicle.
On completion secure the dip hatch firmly.

Advantages of Top Sampling

- A top sample can provide a true representation of the road tank contents.
- There is no product disposal from the rinsing of hoses or lines.

Disadvantages

- Working at height is not recommended and should be avoided if at all possible
- Accidents can occur if the product is dropped from the top of the vehicle onto other personnel or cause spillages.
- Can cause external damage to the road tank.
- Operators need to take extra care to not be exposed to harmful vapours

2.2. Bottom Sampling

Bottom sampling ensures that the operator does not need to work at height to obtain a representative sample.
To commence sampling, remove the hose cap from the tank bottom valves and slowly open the valves, ensuring that all spillage is collected. If the tanker barrel is not dedicated to the product being sampled, 5 to 10 litres of product should be safely collected and disposed of to ensure that no residual product from the previous load or tank wash liquids are retained in the valve, which can be a source of cross-contamination of the sample.

Once the operator is satisfied that the liquid being collected is truly representative of the material in the tank, then the sample bottle can be filled. Spillage should be kept to a minimum and ensure that suitable PPE is worn.
Upon completion, ensure that all tank valves are closed and hose caps are replaced.
The samples are then promptly submitted to the laboratory for analysis.
Ensure that sample label is complete, accurate, legible and securely attached to the correct bottle.

Advantages of bottom sampling

- Working at height is not an issue
- Liquid flow can be easily controlled through the valve
- Spillages and personal exposure can be kept to a minimum

Disadvantages

- A suitable quantity of product needs to be run off in order to obtain a representative sample
- Excess product from line flushing requires safe disposal
- The entire road tank contents are controlled only by the main outlet valve during sample operation
- This method is not suitable for top discharge road tanks

2.3. Tanker sampling point

In-line sampling points enable the product to be sampled at a point prior to loading of a tanker vehicle or package.

Advantages

- Ensures that a representative sample to easily be taken
- Reduces the amount of waste product to flush the lines
- Reduces personal exposure

Disadvantages

- The sample point needs to be flushed clear to allow a representative sample to be obtained
- Excess product from line flushing requires disposal (though a smaller quantity than through the bottom valve)
- Sample points can be contaminated from the prior vehicle cargo, or if left unblanked.

3. Storage or Blending Vessel

Samples taken from storage vessels can be drawn directly from a fixed sampling point at the base of the tank or discharge line. Ensure that the above procedures are followed to avoid personal exposure or cross-contamination. It should be reiterated that top sampling is actively discouraged to avoid working at height. However, if it is not possible to obtain a sample at ground level, ensure that a safe gantry is available. Use a clean stainless steel jar or valinch, secured to a safety chain to obtain the sample.

4. Line Samples

Line sampling is carried out to determine if a line wash has been successful, or to collect batch samples from a production run during a filling process. These samples can then be retained for future analysis if required.
Samples can be drawn directly from the filling line through a purpose-built sampling system, complete with a suitable valve, where flow can be easily controlled and exposure to the operator can be minimised. A filled container can be retained for later analysis.

Drums and IBCs can be sampled using a stainless steel valinch on a chain, a dip pipe or a siphon made of compatible materials (check with the syphon manufacturer for compatibility with solvents).

Care must be taken with all methods of sampling, to ensure that splash filling is avoided and that suitable earthing is present and utilised. If buckets are used in the sampling process, then these should be made of stainless steel and be earthed.

Further Guidance Notes and Safety Films are available via the Solvents Industry Association Website:

https://www.solvents.org.uk/sia-information-centre/
https://www.solvents.org.uk/sia-guidance-notes/
https://www.solvents.org.uk/sia-safety-films/