

MANUAL

Safe Training Systems Ltd

STS Smart SPA6 Probe for 6150AD

Ionising Radiation Simulator



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Safe Training Systems Ltd

Thank you for purchasing a Safe Training Systems 800 Series simulator which we expect will give you many years of service.

Established in 1991 Safe Training Systems Ltd (STS) specialises in the design & manufacture of simulators for realistic training within industries using hazardous materials.

STS simulators are currently used by the following :-

- Nuclear Power Stations
- Nuclear Fuel Manufacturers
- Nuclear Research Laboratories
- Civil Defence Organisations
- Nuclear Weapon Manufacturers
- Military Services

in the UK, Benelux, Canada, France, Germany, Scandinavia and the USA.

The STS product range includes the following :-

STS 800 Series for training in surface contamination and de-contamination.

STS Safe Series for training in the use of Field Survey Instruments & Dosimeters.

STS will also design & manufacture to customers' specific requirements.

STS Customer Care

STS is strongly committed to customer care and after-sales service. Should you have any queries regarding your STS 800 Series simulator please contact our sales office

(Monday - Friday 9.00 am - 5.30 pm)

Telephone + 44 (0) 1344 483 563

Website: www.safetrainingsystems.com

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STS welcomes any questions you may have regarding the features, setting up or operation of your instrument.

STS relies on feed-back from customers to assist with its continuous development programme.

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SECTION 1

WARNING NOTICES

All Safe Training Systems Ltd products are designed to function safely in the hands of both trainers and trainees, however we wish, to enhance your safety, to draw your attention to the following points:-

1.1 Control of Simulators

STS aims to make simulators that are indistinguishable from real instruments, so that the person being instructed experiences the best possible training.

A consequence of this is that there is a possibility that the simulator could be mistaken for a real instrument, and then used for a real monitoring task, when, obviously, no readings would result.

To guard against this danger, simulators must be effectively managed so that they cannot be used for real monitoring.

1.2 High Voltage

The detector used in this instrument requires a 2KV supply which is provided by the electronics pack. Should it become necessary to open the probe or electronics, care must be taken to ensure that the instrument is switched off, and ideally the battery removed, before undertaking any adjustment.

1.3 Effect of Water on the Instrument

The detector in the probe of this instrument is of a robust design, suited to this particular application. If it is used in very wet conditions, entry of water into the detector or electronics may result in instrument failure, necessitating rectification by our Service Department.

1.4 Skin Irritation

The simulated radioactive source materials supplied with this system are of low toxicity and have no effect on the skin of most people. It is recommended that deliberate skin and eye contamination is avoided.

1.5 Intrinsic Safety

STS instruments are not designed to be intrinsically safe, and should not, therefore, be used in areas where there is a potential fire or explosion hazard.

1.6 Substitution of Source Materials

The source materials supplied by STS have been very carefully selected to ensure that they both comply with safety considerations and also perform well with the instruments.

Any substitution of other materials will both nullify the guarantee on the instrument, and also absolve STS from any responsibility for effects on the users.

SECTION 2

TRAINING WITH STS SYSTEMS

STS systems consist of simulated radiation sources, which may be powders or liquids, and a range of imitation probes. A further part of the system is a modified real ratemeter, or, for the more popular models, imitation ratemeters.

The systems are used for training staff who may become monitors or technicians; for flexible working training; for use in examinations and certification procedures; for developing and testing new procedures for safe working; and finally for staging very realistic exercises.

The instruments are designed to simulate all of the commonly used probes and ratemeters, with particular attention paid to factors which will improve the training aspects of the system.

In particular, STS systems allow the trainee to master the skill of probe manipulation and also to develop an understanding of the ease with which contamination spreads.

That system also allows realistic exercises to be conducted in the cleanup and disposal of spills, and in the handling of contaminated equipment, and in particular, accident victims.

2.1 Use of Radiation Simulants

These materials are supplied as part of the Safe Training Systems Ltd radiation simulation system, and must not be used for any other purpose, nor be substituted by any other material. Such substitution will render any guarantee null and void. Accidental skin contact by either LS1 or SS4 is very unlikely to result in any irritation or other effect, but it is recommended that it is not deliberately applied to the skin, especially the face and eyes, and that accidental splashes are washed off immediately.

The gas or vapour generated by LS1 and SS4 when used as recommended is unlikely to pose a significant hazard to health or environment.

Please see the Safety Data Sheets for further information.

2.2 Liquid Source LS1

This liquid may be used in various ways to demonstrate the spread of radioactive contamination and to enable realistic training in the use of monitoring instruments to be undertaken. In addition, and equally importantly, it may be used to simulate decontamination processes. The liquid is dispensed from a small container with a pump-type dispenser, and will form droplets or patches on metal and fabric surfaces. These patches of contamination will be unobtrusive, especially if the surface is not in pristine condition.

It is suitable for use on soil, vegetation, vehicles and equipment, and also on staff who are wearing protective clothing, including emergency suits, laboratory coats, overalls, rubber gloves etc. The liquid will have no effect on these materials, but permeable clothing, wetted with the liquid should not be allowed to stay in contact with the skin.

Monitoring of contaminated equipment, plant and staff is carried out in the same way that it would be with real radiation instruments, and the use of a simulator embodying a real, or apparently real, ratemeter adds to this realism. Probes, of the same external form as the probes normally used, extend the realism considerably.

The simulation is particularly appropriate to alpha radiation, but training in the measurement of surface contamination levels of beta and gamma radiation may also be given.

To operate effectively the probe should be held within 1cm of the surface to be monitored. At or below 0.5cm a countrate of greater than 1000cps may be achieved, and this will diminish to zero when the probe has been moved to 3.4cm from the surface.

In addition, if the probe is brought in contact with LS1, it will become contaminated and emit a continuous signal, as a geiger or scintillator probe would when contaminated with a radioactive contaminant.

The discipline of good probe manipulation near surfaces is thus instilled by the system, resulting in good practice by the trainee when set to work.

Decontamination of equipment and protective clothing, vehicles, floors etc., may be demonstrated by washing with water or a water-detergent solution, and both will result in a reduction of countrate, but not necessarily complete cleaning.

Use of swabs also results in a reduction in countrate, and in this case it may be demonstrated that the swab has become contaminated during use.

Use of proprietary decontamination foaming sprays results in the complete removal of LS1 from both metals and fabrics.

Scenarios involving the monitoring and subsequent clean up of spills, of donning and doffing safety equipment and clothing, and of the spread of contamination by accidental contact with contaminated items and floors may be easily staged, and all will have considerable realism.

Depending on the quantity of LS1 spread, the surface texture, temperature and air movements, the apparent radiation will continue to be emitted for up to 2-3 hours. Evaporation of the liquid will cause the signal to reduce, and after 12hours no signal will be found, and the area will be completely clean of any residual contamination. This will then allow the training to be repeated in the same area without any problem of background signal.

2.3 Solid Source SS4

Solid source material, SS4, may be used in similar ways to liquid source LS1, in that it can be spread in the training area on the ground, equipment, protective clothing, etc. without having any effect on these items.

SS4 is free flowing powder which will not adhere to dry surfaces, so its use is limited to horizontal or near horizontal surfaces, in folds of cloth or clothing etc. Because it is more physically obvious than LS1, some consideration should be given to providing a suitable background against which its presence will not be immediately apparent - as SS4 is white in colour, a rough white surface is ideal, or use with sugar or salt for example, will mask the powder.

Monitoring is carried out as for LS1, and because of the increased surface area of the powder, a larger signal will be obtained. Decontamination may be demonstrated by washing, sweeping etc.

The useful training period by SS4 is about 2 hours for a 0.3g pile of material, after which the signal will decrease, reaching zero cps after about 4 hours. An inert powder will remain after the signal has completely disappeared.

2.4 Detector Cleaning

Where the detector is not heavily contaminated, it may be cleaned by washing in solvents. The detector should be placed in a 100ml beaker in a suitable fume hood, and washed several times in firstly, a hydrocarbon such as hexane, and then finally in acetone. Chlorinated solvents should not be used to clean this detector.

After washing, the detector should be dried for several hours at 50C in a ventilated oven.

Detectors which have bent or damaged central electrodes, damaged contacts or which are permanently stained within the electrode cavity must be discarded.

2.5 Potential Interference with STS Systems

a) Chemical interference

A single case has been reported of signals resulting from a leaking air conditioning system, presumably the chemical was a freon.

Interference has also been traced to cleaning solvents, particularly the pressurised types used in instrument workshops for cleaning switches, and probably containing chlorinated solvents. These problems can usually be identified by moving the instrument to another location.

3.1 Technical Information



STS 800 Series Contamination Simulators

Instrument Name	STS SPA6	SPA6 for use with 6150AD
	<p data-bbox="469 367 596 394">Description</p> <p data-bbox="469 427 1474 607">The STS Model SPA6 consists of a simulated contamination probe containing a gas detection head which detects the presence of the simulant placed on surfaces and clothing, the resultant reading is displayed as counts per second on the 6150AD display</p>	

The STS SPA6 connects to the 6150AD and retains the same keypad controls and options as the real instrument.

Before switching on the 6150AD connect the cable from the SPA6 probe to the instrument.

Turning on the 6150AD will now also start the SPA6 probe.



It must be noted the STS probe requires a longer warm up period in order to initialise the gas detection system and to allow the fan a period of time to settle after start up. If you listen to the probe on start up you will notice that the fan starts up with a fast and noisier tone and then after a few seconds settles to a slower quieter tone. Ideally the instrument and probe should be left for 30 seconds before the instrument is used to monitor.

The probe head contains a very fine platinum wire detector (10 microns) and as such should be treated with respect, the grill over the front of the probe is to prevent items being pushed into the detector and is there for a reason, the gas sensor carries 2000Volts!!!

3.2 Response

To use the simulator, take the can of LS1 liquid simulant and spray a single squirt onto a surface (you only need a small amount). Passing the probe over the sprayed area will now pick up the simulant which produces a very small gas cloud near the surface. Cross contamination can be demonstrated by wiping the sprayed surface and applying to a 2nd surface, the probe will now pick up the contamination on the new surface and the wipe used.

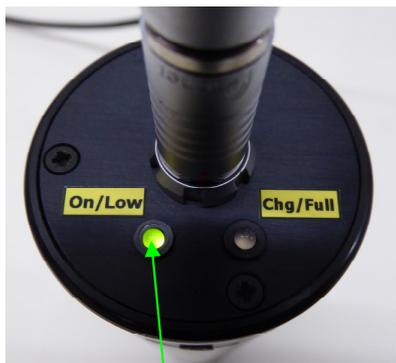
The spray evaporates over time and will disappear completely in 12 hours, depending on temperature and air circulation the spray is normally detectable for 2-6 hours approx.

3.3 Maintenance

This instrument does not contain user serviceable parts except for the detector point. Should an issue with the detector become apparent please contact STS for instructions on how to change the detector and for a replacement detection head.

The SPA6 Smart probe uses a 3.7V Lithium-Ion rechargeable battery housed within the probe body.

The Probe has two LEDs, the first shows the unit is powered on (green) and if the battery is low (red). The second LED illuminates when the USB charging cable is plugged in, when charging it is lit Red and when fully charged it is lit Green.



On (Green)
Low Battery (Red)



Charging (Red)
Fully Charged (Green)



Plug in supplied USB
charger before use

The Unit will require charging before use and will take approximately 6-8hrs to fully charge. Once charged the unit has a usable life of 8-10 hours before recharge is required.

The Probe is designed to work like a real instrument and so monitoring must be carried out slowly and close to the surface, moving too quickly or too far from a surface will result in little or no response from the instrument.

Gas detector behind this grill is very sensitive and carries high voltage, do not attempt to access or push anything through grill.



Environmental Conditions

The instrument is NOT waterproof and should not be used in wet or damp conditions, the unit should be maintained (stored) at between 0C and 40C and may be used in the same temperature range. It should be noted that the LS1 Simulant will evaporate more quickly in warmer conditions.

This unit contains a Lithium-Ion Cell and so must not be disposed of except for in the prescribed manor, the cell must not be Crushed, Heated or Incinerated, immersed in any fluid, short circuited or dismantled, doing so may cause venting or rupture.

3.4 Warranty

The instrument is supplied with a 12month Warranty on parts and workmanship from the date of receipt, this warranty is given subject to fair use and treatment of the probe. Excessive damage, wear or neglect will void any warranty provided.