

The most frequent questions about SAS “SURFACE AIR SYSTEM” samplers.

1. What is the “SAS Surface Air System”?

“SAS” is a self-contained, portable, battery operated microbiological air sampler to evaluate the indoor and outdoor bio – aerosol level. The name “SAS” is a registered trade mark of International pbi.

2. How many “SAS” air samplers are available?

Several models are available: SAS Super 100, SAS Super 180, DUO-SAS-360, SAS-BIO, SAS pcr, SAS DUST. The first four models work with the same impact on agar principle. The model “SAS pcr” is based on the principle of micro-organisms captured in liquid. The model “SAS Dust” is based on the principle of micro-organisms captured by filtration on membrane.

3. What is the difference between “SAS Super 100” and “SAS Super 180”?

“SAS Super 100” has an air flow of 100 litres of air per minute .

“SAS Super 180” has an air flow of 180 litres of air per minute.

“SAS Super 180” is suggested in the low contamination environments (e.g.: Clean Rooms) where it is necessary to aspirate a higher volume of air to have more probability of capturing the “few” present micro-organisms.

4. What is the difference between “SAS Super 100”, “SAS Super 180” and “DUO-SAS-360”?

“SAS Super 100” has an air flow of 100 litres of air per minute.

“SAS Super 180” has an air flow of 180 litres of air per minute.

“DUO-SAS-360” has an air flow of 360 litres (180+180) of air per minute.

5. What’s the reason of “DUO-SAS-360”?

“DUO-SAS-360” has two separate aspiration heads. It is therefore possible to use two different media for different micro-organisms (e.g.: total bacterial count and fungi) or two identical media to obtain a more representative result from a statistical point of view, considering the micro-organisms are not evenly distributed in the air.

6. What is the working principle of “SAS Super 100”, “SAS Super 180”, “DUO-SAS-360”, “SAS-BIO”?

“SAS” samples 100 or 180 litres of air per minute through a detachable head with holes over the agar surface of a Contact plate or Petri dish. The air flow is set in a pre-set sample volumes from 10 to 1800 litres. After incubation, the number of CFU per 1000 litres of air (=1 cubic meter) is calculated. The result is finally evaluated.

7. How is the air aspirated in the “SAS”?

The aspiration is obtained with a vacuum produced by an electric turbine, battery operated.

8. How is the “SAS air sampler classified?

Impaction method on agar or Anderson type method.

9. How long it takes to sample 1000 litres of air?

Just ten minutes for “SAS Super 100” and “SAS-BIO”, about six minutes for “SAS Super 180” and about three minutes for “DUO-SAS-360”.

10. What about battery autonomy?

The instrument can work for more than 7 hours (one typical shift) and then must be recharged.

11. What is the instrument autonomy in terms of aspirated air?

More than 40.000 litres of air

12. Which type of battery is “SAS” using?

The “SAS” air samplers use the new generation of NM Hydrade battery.

13. What is the difference between Nikel-Cadmium and NM Hydrade battery?

The NM Hydrade battery has no “memory effect” and therefore it has a longer life.

14. What about the battery charging time?

The time is approximately 3,5 hours using the fast battery charger and one night using the normal battery charger.

15. What about the aspirating head disinfection / sterilization ?

The stainless steel or aluminium head may be sterilised by the traditional autoclaving (121°C per 20 minutes) or by dry heat (160°C per 60 minutes).

16. What about the chamber disinfection?

The aspirating chamber may be disinfected under laminar flow using a disinfectant spray with the aspirating motor on for a few minutes.

17. What about disinfecting the body of the “SAS” ?

Using a mild detergent or disinfectant with a wipe or swab.

18. Which volume of air can the “SAS” sample?

The “SAS” has 8 fix volumes of air (10, 20, 30, 50, 100, 200, 500, 1000) and 8 programmable volumes that are selected by the operator.

19. Which volume of air should be sampled?

The number of collected CFU on the agar surface, after incubation, should be easily countable (up to 200 CFU). Therefore, the most common volumes are 100-300 litres in normal environments (high contamination) and 1000 litres in Clean Room (low contamination).

20. What is the maximum volume of air to be aspirated?

1.800 litres of air.

21. Is it possible to delay the starting of the sampling cycle?

Yes, it is possible by programming the “Delay Starting” .

22. Why “Delay Starting”?

It is a typical application of Clean Room or high risk environment because staff presence is the highest source of potential contamination.

23. What about interval sampling?

Yes, it is possible programming the ”interval sampling” .

24. Why “interval sampling”?

Interval sampling is used to obtain a representative sample “in operation” conditions. More than one air sample, on the same Contact plate or Petri dish, in sequential order.

25. What about a remote control?

An infrared remote control can be used to turn on the unit.

26. Why use a remote control?

It is typically used in Clean Room from the outside of the core to reduce contamination risk.

27. Is it possible to print the sampling data?

“SAS Super 100”, “SAS Super 180”, DUO-SAS-360” have download capability to transfer sampling data to a printer or PC according to cGMP and cGLP.

28. Which sampling data are printed?

Identification number, instrument model, instrument identification, operator identification, date, hour, sample location, and volume of aspirated air.

29. HAS “SAS” visible running motor LEDs?

Yes, two flashing red LEDs are visible from several metres informing the operator the sampler is aspirating air.

30. What about noisiness?

It is quite hard to hear the motor running!

31. Can “SAS” be fixed to a tripod?

Yes, the air sampler can be fixed to: (a) “table tripod”, (b) “floor tripod”, (c) wall support for stand alone use.

32. Why aluminium and stainless steel aspirating head?

The s/s head is used in Clean Room to avoid particle emission and for frequent sterilisation. The most commonly used aspirating head is made in aluminium because it is lighter.

33. Are aluminium and stainless steel aspirating heads traceable ?

YES, both heads are individually marked with numbers and delivered with “certificate of performance”.

34. What about “SAS” microbiological sampling efficiency?

The microbiology efficiency is tested inside the Microbiological Low Speed Wind Tunnel (LSWT) in the PBI R&D laboratory located in Via S.Giusto in Milan. According to the international scientific bibliography, SAS samplers are able to capture 100% of airborne micro-organisms of the sizes that are normally present in the environmental bio – aerosol.

35. Is it possible to use “SAS” inside an isolator?

Yes, the air sampler should be permanently left inside the isolator. Contact plates or Petri dishes triple packed, irradiated must be used.

36. Does the SAS need regular calibration?

Yes, if you are working in a pharmaceutical or biotechnology company under the FDA control.

37. “Official calibration” and “In House calibration”?

“Official calibration” is a test performed by a third part to produce an official document requested by official institutions like FDA or Health Ministry. “In House calibration” is a test performed by the company staff to control that the unit works properly and it is not damaged (e.g.: dropped, mishandles, battery worn out, etc.).

38. What is calibrated?

The calibration concerns the air flow. The “official calibration” is performed inside a wind tunnel with a certified anemometer. The “In House calibration” is performed with the “Pitot kit” or the “Politecnic system”.

39. How often should the “SAS” be calibrated?

The “Official calibration” should be performed by the producer or distributor every six or twelve months, depending from the frequency of use. The “In House calibration” should be performed at regular intervals, depending from the frequency of use.

40. Is it possible to monitor gas or compressed air?

The “Pinocchio Super” unit has been developed for this specific application. The funnel head is directly applied to the gas outlet.

41. Which media are suggested with “SAS”?

Tryptic Soy Agar (TSA) is the most popular medium for Total Bacterial Count (incubation 24-48 hours at 32°C). Sabouraud Dextrose Agar (SDA) is used for yeast and moulds (incubation 5 days at 25°C). Other media may be used. Pathogenic micro-organisms are frequently “stressed” and it is therefore necessary to capture them first on a non selective medium (sub-culture will follow).

42. Which plates is “SAS” using?

It is possible to use: (a) 55 mm Contact Plates (RODAC); (b) 84 mm Maxi Contact Plates; (c) Standard 90 mm Petri dishes.

43. When is it suggested to use large Maxi Contact Plates?

Maxi Contact Plates are suggested for fungi monitoring to avoid colonies overlapping due to the large size of moulds and yeast colonies.

44. Is it possible to use Contact Plates or Petri dishes of different producers?

Yes, in fact the plate holders are adjustable.

45. Which volume of agar in each plate?

55 mm Contact Plate should be filled with 14-16 ml of medium. Maxi Contact plate should be filled with 24-26 ml.

46. What is the shelf-life of the plates?

The Contact Plates or the Petri dishes should be stored at room temperature (15-25°C) for about 4-6 months. More the medium is fresh, better is the micro-organisms multiplication. The Plates should be stored upside down.

47. Why plate storage at room temperature?

If the plates are stored at +4°C there is the possibility of condensation on agar surface.

48. What needs to be done if the agar surface of the plate is wet??

Condensation should be cleared under sterile laminar flow.

49. Is the agar dried after 1800 litres of air sampling?

No, if the medium of the Contact plate or Petri dish is fresh and of good quality.

50. What is the standard for my environment?

Clean Rooms in the pharmaceutical industry have specific standards according to US or EU Pharmacopeia. Risk environments in Hospitals have Guide Lines suggested by the World Health Organisation (WHO). Suggestions are made by ACIGH for Indoor Air Quality.

In non specific environment, and where history data are not available, each user should carry his data base evaluation because humidity, ventilation, HVAC, temperature, pressure, electrostatic characteristics, movement of staff, number of doors and windows, floor finish, ceiling and wall influence the micro-organisms growing and diffusion. The results of several air monitoring testings should be then reported on a graph for starting a statistical evaluation.

51. Is an Atlas for the most common environmental germs available?

Yes, a didactic colour wall poster is available with pictures and protocols of the micro-organisms typically present in air, surfaces, and hands.

52. Are SOP (Standard Operatine Procedure) available?

Yes, several SOP, to be used as a Guide Line, are available in agreement with cGMP and cGLP.

53. Are Application Notes available?

Yes, more than 100 Application Notes are available.

54. Why to use a statistical table for result evaluation?

If the number of micro-organisms in the air is very high, there are probabilities that more than one colony is overlapping in the same impact hole. For this reason, a probability table is used after counting. There is no reason to apply the statistical table in Clean Room because the number of micro-organisms we are looking for is very low.

55. How many litres of air there are in 1 cubic metre of air?

1000 litres of air are in 1 cubic metre.

56. How to convert the number of colonies counted on a plate to CFU/cubic metre?

It is applied a simple calculation: if "Y" are the CFU counted on a plate with "J" litres of air, "X" will be the colonies in 1000 litres of air.

57. CFU/cubic metre or CFU/cubic feet?

To express the final result in CFU/cubic feet or CFU/ cubic metre, multiply the CFU/litre value by 28,32 or 1000 respectively.

58. Which are the international references for "SAS"?

"SAS" was on board of the MIR international space station and it is used by NASA. The five largest pharmaceutical companies are using "SAS". Several thousands "SAS" air samplers are used each day worldwide.

59. In which international documents "SAS" is reported?

FDA, ACIGH, ASTM, USP, EU, CEN/TC 243.

60. Are I.Q, O.Q, P.Q documents available ?

Yes.

61. How to use "SAS" for hygiene staff training?

It is suggested to obtain at least 30 samples for a defined area, so that a more significant interpretation can be made from the results. The number of CFU/cubic metre of sampled air should be plotted on graph paper. The mean value for the group of tests is calculated and drawn on the

graph. “Alert level” and “action level” should be fixed on the graph. The graph paper should be discussed and explained to the staff at regular interval (e.g.: monthly). This immediately gives an indication of the level of hygiene in the sampled area.

62. How is it possible to determine that the holes of the aspirating head are not clogged or damaged?

The head should be visually inspected to verify if dirty, corrosion, and damages are present. Furthermore the agar surface of the plate, after impaction, should be checked to verify an uniform distribution of dimples.

63. Does the visual display indicate if the sampling cycle is completed?

The volume of air is shown in decreasing order on the visual display during the aspiration cycle. If “Low Battery” message appears, the cycle will be regularly finished.

64. When the “Low Battery” message appears on the visual display, what is it necessary to do?

It is necessary to recharge the battery.

65. What about the turbulence produced by the air outlet from the instrument?

The unique design is not disrupting the laminar flow.

66. Which ready to use plates with media are available?

Plate Count Agar medium for total count

Plate Count Agar medium for total count with inactive neutralising sanitisers

Trypton Soy Agar medium for total count

Trypton Soy Agar with medium for total count with inactive neutralising sanitisers

Sabouraud Dextrose Agar medium for yeasts and moulds count

Sabouraud Dextrose Agar medium for yeasts and moulds count with inactivant

Violet Red Bile Agar medium for Gram-negative bacteria count

Mannitol Salt Agar medium for staphylococci count

Certrimide Pseudomonas Agar medium for Pseudomonas count

Legionella Agar medium for Legionella count

67. What is the purpose of “SAS pcr”?

“SAS pcr” air sampler has been specifically developed for bio – terrorism risk to capture the germs in a liquid for a subsequent “PCR Real Time” test to obtain a fast identification of germs present in the air.

68. What is the principle of “SAS pcr”?

Aspirating bio – aerosol and a sterile fluid are re-circulating together through a spiral device and collected in a small container. The fluid is then delivered to a Real Time PCR equipment for micro-organisms identification (DNA molecular amplification method). The instrument is able to evidenciate viable and not-viable micro-organisms.

69. Is it possible to use the “SAS pcr” sampler for a traditional microbiological technique?

Yes, a liquid is used to capture the micro-organisms from a known volume of air in which are suspended.

70. What is the power supply of “SAS pcr” ?

24 Volt.

71. What is the use of the “SAS DUST”?

It is used by Indoor Air Quality Industrial Hygienists to capture mites, dust, pollens, etc. from floors, carpets, walls, etc.

72. What is the principle of "SAS DUST"?

The air is aspirated and the particles collected on a filter for a subsequent microscopic test.