

# SANI-PAK®

## Toilet Deodorant

Sani-Pak toilet deodorant was initially developed over 40 years ago for military use. The Sani-Pak formulation has evolved over the years as technology has developed, and today is recognized worldwide as the benchmark in aircraft lavatory chemical deodorants. Its use has grown to multiple industries, including aviation, rail, motor coach, marine, recreational vehicle and portable toilet.

Sani-Pak's key features include a non-staining deep blue color, pleasant fragrance, and a unique additives package designed to control odors and reduce tar buildup in system lines and holding tanks. All Sani-Pak products have been the industry standard for the control of both inherent malodors and generated malodors (including ammonia generation), as well as maintaining components and mechanical parts free from tar buildup.

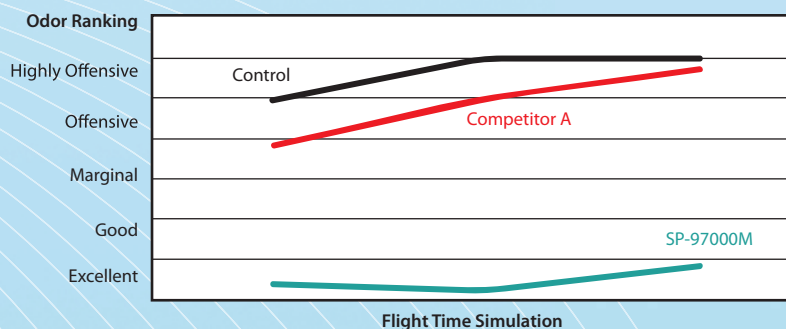
Unlike other products in the industry, Sani-Pak products are not based on quaternary ammonium technology (which contributes to organic tar buildup) or on high loadings of fragrance to cover or mask malodors. Instead, they are made up of a unique balance of properties that result in application performance that is both safe and effective for today's demanding users.

### Inherent Malodor

Odor/malodor testing is performed on a regular basis in the Celeste lab through simulations of actual aircraft toilet usage. Challenged test samples are stored at room temperature, coded to mask identity and ensure unbiased evaluation, and ranked by a panel. The odor/malodor is ranked on a scale ranging from "excellent" to "highly offensive".

Chart 1: Malodor Test

1 ounce per 5 gallon dose (30 ml per 19 liters)



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### Test References

AMS 1476B  
Boeing D6-17487  
Air Canada 3125-00-002  
Douglas Customer Service #3

*Above references apply only to aircraft.*

### Celeste PN:

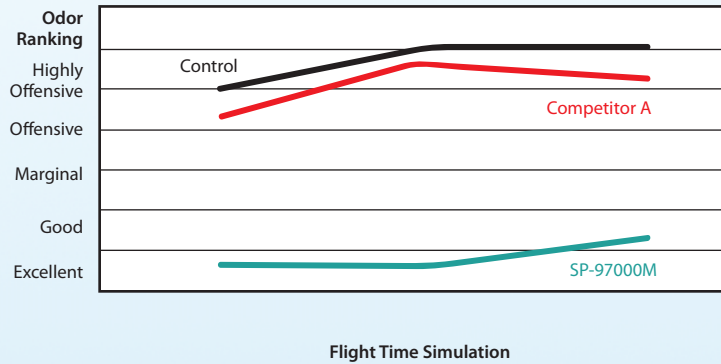
SP-77000 series (powder)  
SP-97000M series (liquid)  
SP-97000W series (liquid)  
SP-B77000 series  
(powder – bus formulation)

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The samples are evaluated at specific time intervals designed to reflect initial waste charge (start of flight), medium length flight (4 hours), and long haul flight (8+ hours). Charts 1 and 2 show Sani-Pak performance at two different dosing levels spanning normal industry practice.

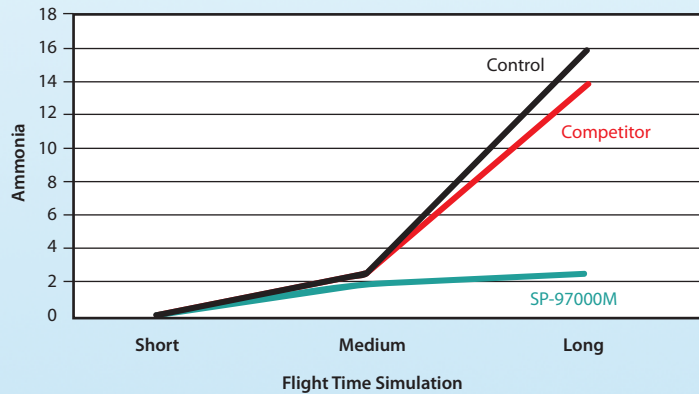
**Chart 2: Malodor Test**  
**1 ounce (30 ml) per 10 gallon (38 liter) dose**



**Ammonia Generation**

As waste products increase over the length of the flight, ammonia is generated from increasing bacterial action and acts as a driver for offensive malodor. As flight length is extended, ammonia release will be an increasing problem. Chart 3 confirms this with the control sample. This sample, which contains no toilet deodorant, starts with no ammonia and rapidly accelerates to high levels of ammonia, reaching in excess of 15 ppm for a long haul flight. On the other hand, SP-97000M maintained ammonia generation at a muted maximum level of 2.5 ppm.

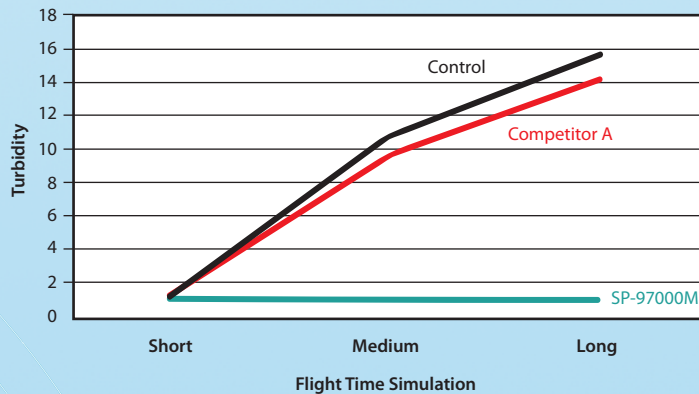
**Chart 3: Ammonia Generated During Flight Simulation**



**Turbidity**

Turbidity gives an indirect indication of bacteria growth that leads to malodors. Celeste has conducted testing of turbidity or opacity on test samples to confirm the link between bacteria growth and toilet malodors. As expected, turbidity levels change depending on the amount and type of toilet deodorant and the length of the flight. As bacteria formation goes unchecked, turbidity levels increase.

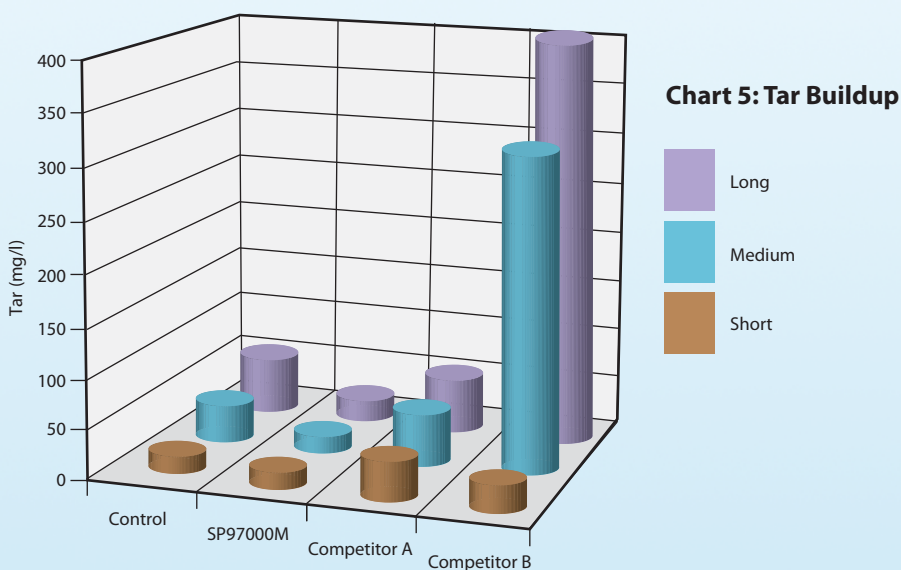
**Chart 4: Turbidity Generated During Flight Simulation**



## Tar Control

Tar buildup has a number of deleterious effects within the chemical toilet system, including residual malodors from tar and gunk in the toilet bowl and on the flapper valve. Additionally, tar buildup can damage sensitive instruments and valves in recirculating toilets, and coat sensors in the waste tank.

Tests were conducted by Celeste to show how Sani-Pak performed compared to two competitive products, one of which was quat based. Chart 5 shows that Sani-Pak's unique formulations outperform all other products.



There are currently 3 products in the Sani-Pak family depending on individual needs:

**SP-77000 Series (powder)** – Sani-Pak powder is the grandfather of lavatory chemicals. Single use water soluble packets or larger tear open tubes offer an easily controllable and measurable way to deliver the power of Sani-Pak chemical. Unlike other competitive water soluble products, Sani-Pak uses two types of water soluble film for optimum solubility.

**SP-97000M Series (liquid)** – The SP-97000M Series was originally developed in 2005 as a more flexible alternative to the then commonly used SP-97000. Within one year, it had become the product of choice with a large number of airlines. While chemically speaking identical to the original SP-97000 formula, with all the same foundation elements, SP-97000M contains a more effective re-odorant with advanced malodor counteractant technology. Today, it is the product of choice among the vast majority of legacy airlines, and represents the new standard in the industry.

**SP-97000W Series (liquid)** – The SP-97000W series builds on the success of the original SP-97000 with an adapted package designed to meet the WHO specification as well as maintaining long term odor control.

## SANI-PAK® · Recommended Usage

Recommended usage can vary depending on individual needs of the airline including length of flights, passenger load, and time between recharging. The Celeste recommended dilution for optimum performance is 1:640, but can be increased or decreased according to need. The following chart shows how to adjust the amount to achieve the required dilution:

MIX RATIO REQUIRED		SP-97000M SERIES			SP-77000 SERIES
		ounces / 5 gallon precharge (19 liters)	mls / 5 gallon precharge (19 liters)	quarts / 250 gallons (946 liters)	grams / 5 gallon precharge (19 liters)
LONG HAUL, LONG TIME BETWEEN SERVICINGS	1:500	1.28	37.85	2 quarts (2 liters)	20 grams
LONG-MID HAUL, STANDARD SERVICING	1:640	1.00	29.57	1.5 quarts (1.5 liters)	16 grams
SHORT HAUL, FREQUENT SERVICINGS	1:800	0.80	23.66	1.25 quarts (1.2 liters)	12 grams
SHORT HOPS, FREQUENT SERVICINGS	1:1000	0.64	18.93	1 quart (1 liter)	8 grams
W SERIES LIQUID	1:400	1.60	47.30	2.5 quarts (2.5 liters)	Not applicable
COMPANION PRODUCTS	Sani-Tank®, Sani-Tank® N, Gly-Vak®, Biozyme® EX3				



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## SANI-PAK® · FAQs

**Q:** Can I use Sani-Pak in my vacuum toilets as well as my recirculating toilets?

**A:** Yes. Although odor control per se is not required in a vacuum tank, controlling the tar and soil buildup can be highly effective in reducing sensor failures in the waste tank. As tar and soil build up on the sensors, this will trigger a shut off of the toilet system. In addition, it is important to control ammonia buildup to prevent tank corrosion.

**Q:** Which Sani-Pak formulation is best for me?

**A:** The choice between product options depends on product preference, portion control requirements and/or W.H.O. requirements. The powder products offer optimum portion control, ease of freight and storage, while liquid products offer optimum concentration and dilution flexibility. Liquid products are extremely robust and perform well with extreme challenges. In particular, SP-97000W meets the W.H.O. performance requirements.

**Q:** How do I get Sani-Pak powder into my vacuum tank?

**A:** The best choice here is the foil tube option. Foil tubes can be torn open and the powder can be poured into the lav truck tank containing the precharge liquid. This can then be pumped up into the waste tank already precharged.

**Q:** Can I use the water soluble packets in my lav truck?

**A:** This is not advisable. While the packets are water soluble, a tank containing 100 gallons of precharge solution will require a minimum of 20 water soluble packets. Putting that many packets into the tank on a regular basis will eventually cause blockages. If powder is preferred to liquid, it is better to use the tear open tubes.

**Q:** What happens if I get blue stain in the aircraft?

**A:** If on a hard surface (such as a hard floor or cabinet), it can be cleaned using Celeste Interior Cleaner Complete and a cloth or brush. If on a soft surface (such as carpet or passenger seat), it can be cleaned using Celeste Interior Cleaner Complete with a color-safe bleach such as OxiClean®.