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COLLISON NEBULIZER – INSTRUCTIONS

NSF Model – CN 31I

Notice: In the application and use of this instrument, you should be guided by the current NSF standard: NSF 49-1992. Copies may be ordered, for a fee, online at: www.nsf.org/standards.

There is also a European Draft Standard, prEN 12469, Document CEN/TC233/N356. Contact European Committee for Standardization. Central Secretariat, rue de Strassart 36, B-1050 Brussels, Belgium.

1. Introduction

The Collison Nebulizer was first described in the scientific literature by Collison in 1935, according to May⁽¹⁾. Over the intervening years, it has become the recognized technique for atomizing liquids and suspensions. The original version had 3 jets and BGI is responsible for the standardization and publication of the 6 jet version⁽²⁾. The National Sanitation Foundation adopted a special version of the Collison as a Standard, for challenging biohazard enclosures. The current version of that unit, CN-31 has been rendered obsolete by the unavailability of the special Pyrex jars utilized with it. In order to overcome this difficulty, the metal portion of the instrument has been lengthened and a shorter (crown glass) jar is now utilized. This new model is known as CN-31I. The need for replacement jars for the original CN-31 is supported by the availability of an adapter ring (CN-31/A) which will permit the use of the newer, shorter jars (CN-31/J).

Nebulization is taken to mean a refinement of two fluid atomization. In an atomizer, a gas is used to aspirate the liquid into a (usually) sonic velocity gas jet, wherein it is sheared into droplets. In a nebulizer, this liquid/gas jet is impacted against a barrier (the inside of the jar) to remove the larger fraction of the droplets.

The NSF type of Collison Nebulizer, is a modification of the MRE, which is manufactured by BGI. MRE stands for Microbiological Research Establishment, located in Porton, England.

The NSF Collison Nebulizer is manufactured from Nickel plated brass, with the exception of the stem and jet body, which are fabricated from 316 stainless steel. All "O" rings are buna N or silicone rubber. No flat gaskets are utilized.

2. Safety Precautions

While the recommended pressure to be applied to the nebulizer is 20 psig., it must be clearly understood that this pressure is expanded to just above atmospheric, inside the jar. **The glass jar is not to be subjected to pressures above 1 psig, under any circumstances!** Great care must be exercised at all times if connecting the nebulizer's output to other apparatus, to ensure that the flow of gas out of the nebulizer is not restricted in any manner that will cause significant back pressure.

The NSF Collison Nebulizer is intended to be utilized by trained scientific professionals. BGI will bear no responsibility for misuse.

3.0 Set up

3.1 Air. It is the responsibility of the investigator to supply a source of clean, compressed air. At the recommended pressure of 20 p.s.i.g. approximately 12 Lpm of free air is required.

It is recommended that a precision pressure gage be fitted to the plugged end of the “T”. This may be accomplished by removing the plug screw, by hand. A schematic diagram of the basic set up is shown in figure 1. All parts are shown in Figure 2.

3.2 Liquid Level

A specific liquid level of 2.70 cm. is recommended. The “T” stem should be set such that the bottom of the jet body is 1.75 cm. from the bottom of the jar. Filling the jar to a level of 2.70 cm. Results in a jet body immersion depth of 0.95 cm. below the surface. Deeper immersion will cause the surface of the liquid to interfere with the formation of the jet. For clarification of this point see Figure 3.

3.3 Cleaning

Basic cleaning functions can be performed by disconnecting the apparatus from the air hose and removing and emptying the jar. All components can then be immersed in a cleaning solution appropriate to the material being aerosolized. Ultrasonic cleaning is highly recommended. Sterilization, if required should be appropriate to the requirements of the work being carried out.

The nozzle may be removed from the “T” stem by hand (CN-31I only, *not* previous models). A small, custom made, “O” ring is fitted to the stem, in a groove above the threads, to seal the juncture.

If an internal jet becomes plugged, it may be cleared with the clean out drill (CN-11) supplied with all new units.

4.0 Further Information

The best “cookbook” reference of the application of the Collision Nebulizer is and remains the one by May⁽¹⁾. Because of the universal acceptance and use of this device, references in aerosol-related literature are constantly occurring and should be consulted when appropriate or necessary.

5.0 Component Parts List – Fig. 2

CN 53/S	Lid
CN 25 J	Jet (6)
CN 31J	Bottle
CN 39	“O” Ring - Silicone
CN 43	Plug Screw
CN 44	“O” Ring
CN 48/S	“T” Stem
CN 49	“O” Ring
CN 50	Compression Nut
CN 51	Conical Ferrule
CN 52	Ferrule, Flat
CN 31/A	Adapter Ring

6.0 Disclaimer

The NSF Collision Nebulizer is subject to all the terms of the BGI Incorporated standard limited warranty. The nebulizer is a specialized article of research equipment intended for use by trained professionals. No liability is accepted by BGI Incorporated on account of misuse, misapplication or mishandling. BGI Incorporated specifically does not condone nor endorse any application or use which involves restricting emissions from the device and thus causing pressurizing of the jar. Further, BGI Incorporated accepts no liability for exposure to toxic, infectious or harmful substances resulting from the use of this apparatus.

Limited Warranty

BGI Incorporated warrants equipment of its manufacture and bearing its nameplate to be free from defects in workmanship and material. We make no warranty, express or implied, except as set forth herein.

BGI's liability under this warranty extends for a period of one (1) year from the date of BGI's shipment. It is expressly limited to repairing or replacing at the factory during this period and at BGI's option, any device or part which shall within one year of delivery to the original purchaser, be returned to the factory, transportation prepaid and which on examination shall in fact be proved defecting. BGI assumes no liability for consequential damages of any kind. The purchaser, by acceptance of this equipment, shall assume all liability for consequences of its misuse by the purchaser, his employees or others. This warranty will be void if the equipment is not handled, installed, or operated in accordance with our instructions. If damage occurs during transportation to the purchaser, BGI must be notified immediately upon arrival of the equipment. The Equipment will be returned via collect shipment.

A defective part in the meaning of this warranty shall not, when such part is capable of being repaired or replaced, constitute a reason for considering the complete equipment defective. Acknowledgment and approval must be received from BGI prior to returning parts or equipment for credit.

No representative of ours has authority to change or modify this warranty in any respect.

References:

1. May K.R. (1973) The Collison Nebulizer. Description, Performance & Application J. of Aerosol Science, Vol. 4, #3, P. 235.
2. Gussman, R.A. (1984) Note on the Particle Size Output of Collison Nebulizers, Am. Ind. Hyg. Assoc. J. (45).

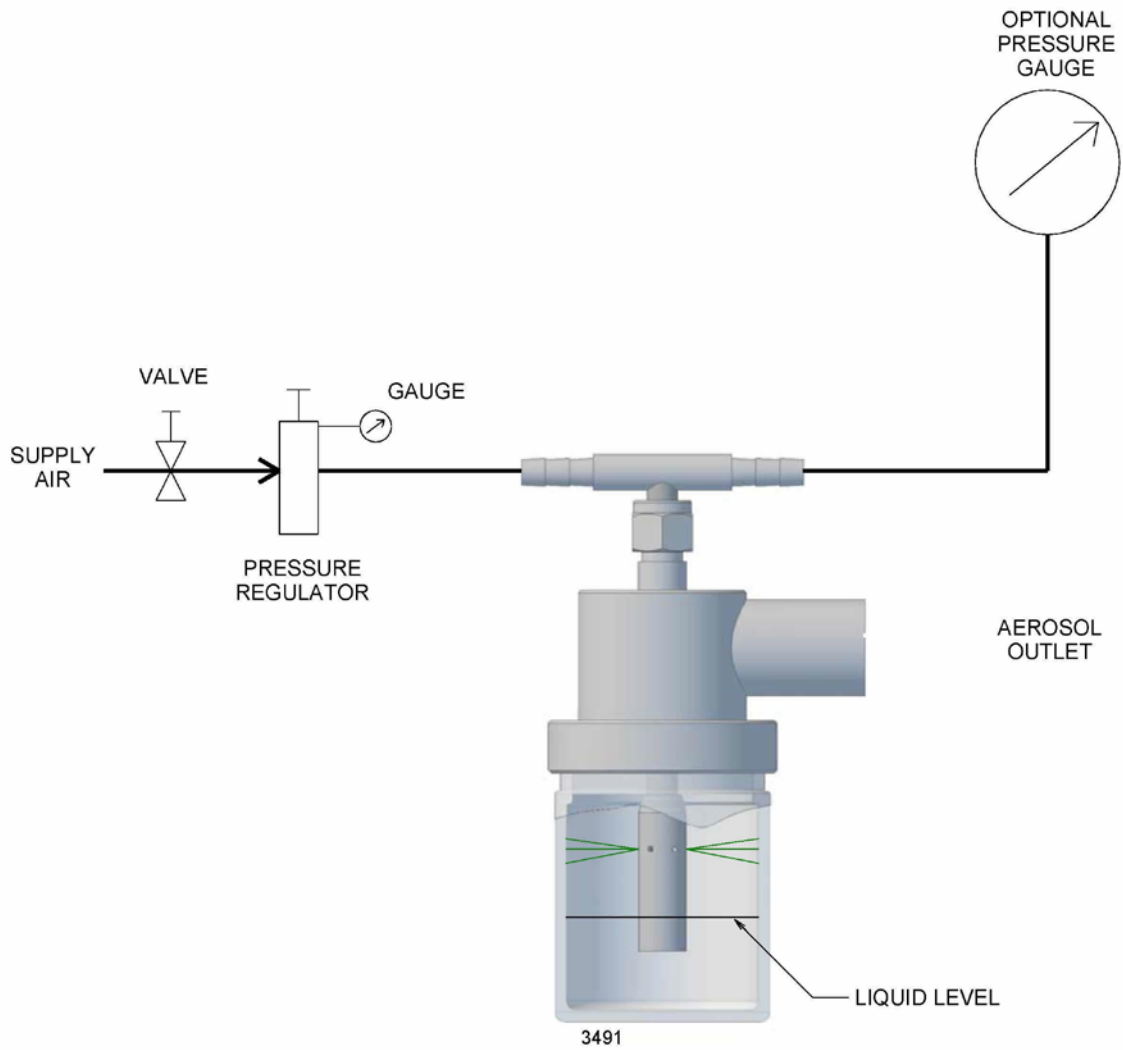


Figure 1. Schematic Diagram of NSF Collision Nebulizer

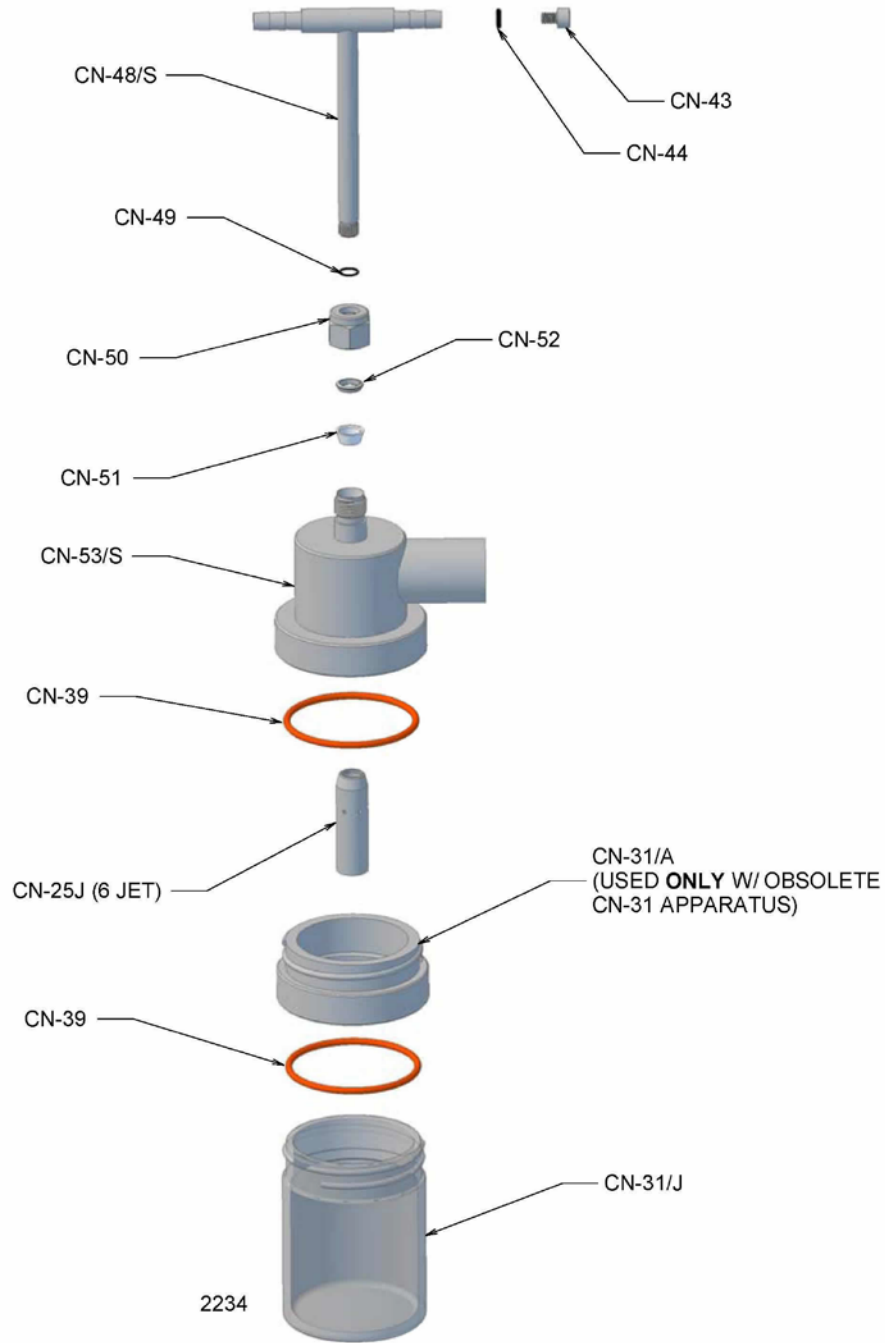


Figure 2. Exploded View of NSF Collision Nebulizer

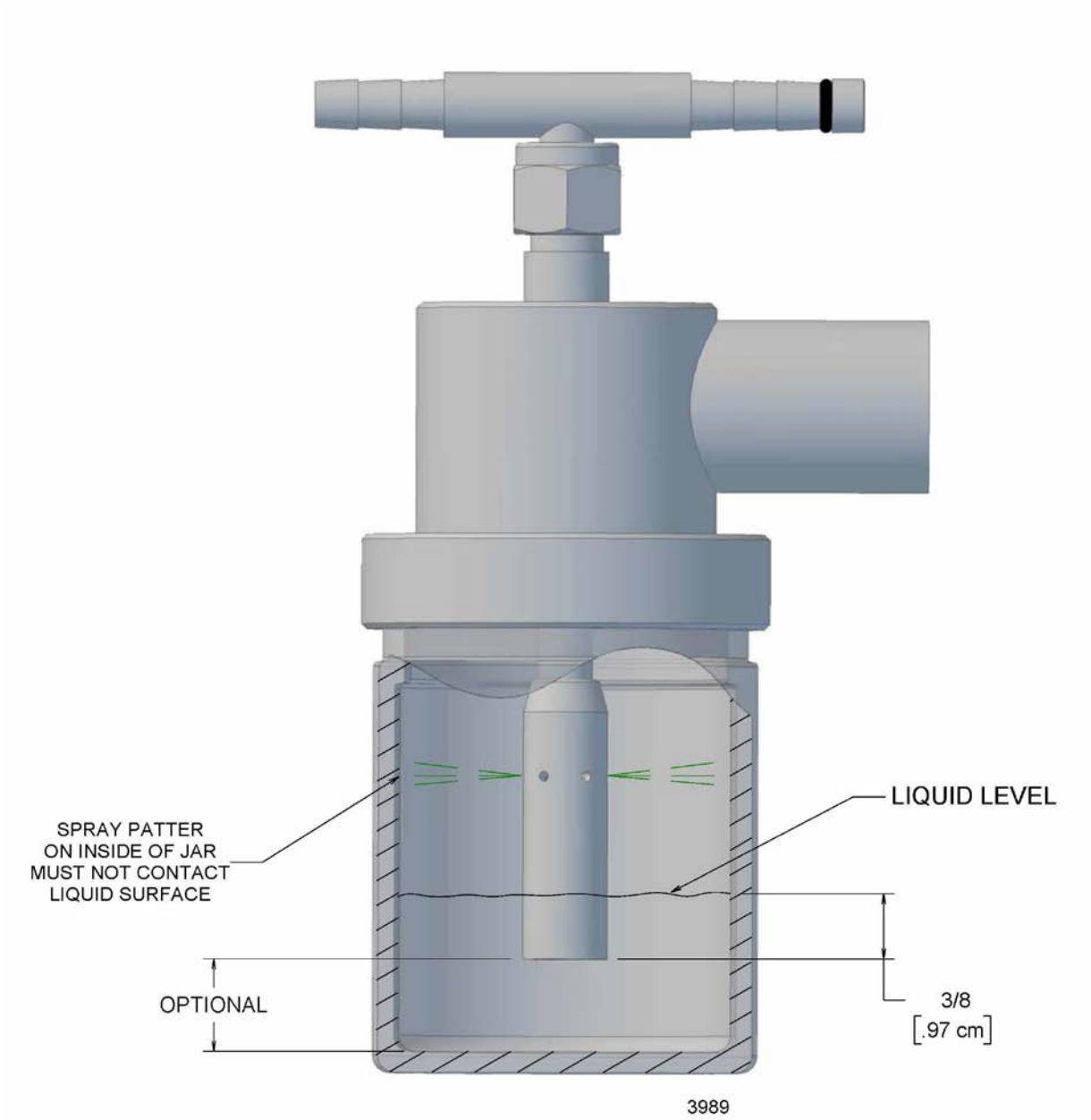


Figure 3. Submersion Depth of Nozzle Tip

Revision History

Initial composition

January 2001