MEDISCA® NETWORK INC.
TECHNICAL SUPPORT SERVICES
FORMULATION CHEMISTRY DEPARTMENT
TOLL-FREE: 866-333-7811
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technicalservices@medisca.net

Suggested Formula	Ipratropium Bromide 0.02% Inhalation Liquid (Solution, 100 mL)	FIN	F 000 333v2

SUGGESTED FORMULATION

Ingredient Listing	Qty.	Unit	NDC #	Supplier	Lot Number	Expiry Date
Ipratropium Bromide 1% Stock Solution †	2.00	mL				
Sodium Chloride, USP	0.90	g				
Sterile Water for Injection, USP	90.0	mL				
Sterile Water for Injection, USP	q.s. to 100.0	mL				
Hydrochloric Acid 1N Solution	As required					
† **Ipratropium Bromide 1% Stock Solution**						
Ipratropium Bromide, BP	TBD					
Sterile Water for Injection, USP	10.0	mL				

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SPECIAL PREPARATORY CONSIDERATIONS

Ingredient-Specific Information

Light Sensitive *(protect from light whenever possible):* *Ipratropium Bromide*

Suggested Preparatory Guidelines

☐ Non-Sterile Preparation ■ Sterile Preparation

Processing Error / Testing Considerations: To account for processing error, pH testing and sterility testing considerations during preparation, it is suggested to measure an additional **5 to 9%** of the required quantities of ingredients.

Special Instruction: This formula may contain one or more Active Pharmaceutical Ingredients (APIs) that may be classified as hazardous, please refer & verify the current NIOSH list of Antineoplastic and Other Hazardous Drugs in Healthcare Settings. At this time, **General Chapter <800> Hazardous Drugs – Handling in Healthcare Settings** is informational and not compendially applicable unless otherwise specified by regulators and enforcement bodies. For information on the scope, intended applicability, and implementation context for USP General Chapter <800>, see: https://www.usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare.

This formula must be prepared within the appropriate facilities under adequate environmental conditions, following the necessary guidelines and procedures as stated within *USP 797* and *USP 800* when handling hazardous drugs. Only trained and qualified personnel must prepare this formula.

All heat stable, reusable materials and equipment must be sterilized and depyrogenated by dry heat sterilization at 250°C for 2 hours prior to use.

Compounder needs to verify as per USP, if every batch of final product compounded using this procedure must be sterility and endotoxin tested before being dispensed.

All required personal protective equipment (sterile and hazardous if applicable), such as but not limited to, gowns, aprons, sleeves, gloves both inner and outer if applicable, shoe covers, hairnet, head cap, beard cover, eyewear, appropriate face mask, respirator and face shield, etc., where applicable must be worn at all times. In addition, proper personnel cleansing must be done before entering the buffer or clean area.

If applicable, follow all required procedures for hazardous drug handling including but not limited to procurement, transport, storage, preparation, dispensing, administration, clean up (spills) & disposal.

Filter integrity must be validated by performing a filter stress test. If the test demonstrates that the filter might be defective, the solution must be discarded and remade.

If you are a registered 503B facility, please refer to all relevant guidance documents including but not limited to the Code of Federal Regulations (CFR), Guidance for Industry (GFIs) and Compliance Policy Guides (CPGs).

This procedure requires the use of very small quantities of ingredients. All calculations and preparation techniques must be verified before dispensing the final product.

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SUGGESTED PREPARATION (for 100 mL)

Weigh and / or measure the following ingredients when appropriate:

Ingredient Listing	Qty.	Unit	Multiplication factor (*): ____	Processing Error	Qty. to measure
Ipratropium Bromide 1% Stock Solution † §	2.00	mL			
Sodium Chloride, USP §	0.90	g			
Sterile Water for Injection, USP §	90.0	mL			
Sterile Water for Injection, USP §	q.s. to 100.0	mL			
Hydrochloric Acid 1N Solution §	As required				
† **Ipratropium Bromide 1% Stock Solution**					
Ipratropium Bromide, BP §	TBD		---	---	
Sterile Water for Injection, USP §	10.0	mL	---	---	

* Takes into account increased batch size conversions and density conversions, if required.
§ Weigh / measure just prior to use.

Preparatory Instruction **IMPORTANT: All preparatory procedures must be performed using proper Aseptic Technique**	
1.	**Equipment sterilization:** Following the manufacturer's specifications, sterilize and depyrogenate all heat stable, reusable materials and equipment, then return to ambient temperature.

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2. **Ingredient quantification:**

A. Determine the potency of Ipratropium Bromide based on the certificate of analysis:

	100%
MINUS	
Water Content (from certificate of analysis)	_____ %
DIVIDED BY	100
EQUALS	
Quantity of water free Ipratropium Bromide, in decimal	_____
MULTIPLIED BY	
Assay on anhydrous basis result (from certificate of analysis)	_____ %
DIVIDED BY	100
EQUALS	
i. Potency of Ipratropium Bromide, in decimal	_____

3. **Ingredient quantification:**

A. Determine the quantity (in g) of Ipratropium Bromide to make a Ipratropium Bromide 1% Stock Solution, batch size (10 mL):

Quantity of Ipratropium Bromide required for 10 mL	0.100 g
DIVIDED BY	
Potency of Ipratropium Bromide, in decimal (Step 2Ai)	_____
EQUALS	
i. Quantity of Ipratropium Bromide needed for 10 mL	_____ **g**

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4. † **Ipratropium Bromide 1% Stock Solution preparation:**

A. Triturate the Ipratropium Bromide (amount determined in Step 3Ai) to form a fine, homogeneous powder.

B. Incrementally add the fine homogeneous powder (Step 4A) to the Sterile Water for Injection (10.0 mL).

Specification: Continuously mix until all solid particles have completely dissolved.

End results: Homogeneous liquid-like solution.

5. **API preparation:**

A. Incrementally add the Sodium Chloride to the Sterile Water for Injection (90.0 mL plus processing error adjustments).

Specification: Continuously mix until all solid particles have completely dissolved.

End results: Homogeneous liquid-like solution.

B. Incrementally add the Ipratropium Bromide 1% Stock Solution (2.00 mL *plus* processing error adjustments) to the homogeneous liquid-like solution (Step 5A).

Specifications: Mix until homogeneous.

End result: Homogeneous liquid-like solution.

6. **pH testing:**

A. Draw an appropriate amount of the mixture (Step 5B).

B. Test the pH of the sample. It should lie between 3.8 and 4.2.

C. If the pH > 4.2, carefully add in a dropwise manner the Hydrochloric Acid 1N Solution to the mixture:

1. Draw and transfer 1 or 2 drops of the Hydrochloric Acid 1N Solution to the mixture.
2. Stir for at least 5 minutes to evenly disperse the Hydrochloric Acid 1N Solution.
3. Re-test the pH.
4. Continue to add the Hydrochloric Acid 1N Solution until the pH of 3.8 to 4.2 is obtained.

IMPORTANT: Do not allow the pH to fall below 3.8.

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7.	**Filling to volume:** A. Add additional Sterile Water for Injection to the above mixture to fill to the required batch size (100.0 mL *plus* processing error adjustments). Specification: Continuously mix. End result: Homogeneous liquid-like solution.
8.	**Filtering and transferring:** Aseptically filter the solution through a 0.22-µm sterile filter into the recommended dispensing container (see Packaging requirements). Transfer the remainder into a separate dispensing container. This is to be used as the Test sample for sterility testing.
9.	**Filter integrity test:** Validate filter integrity by performing a filter stress test. If the test demonstrates that the filter might be defective, the solution must be discarded and remade.
10.	**Terminal Sterilization:** In relation to the chemical composition of the formulation, final packaging, etc., select and validate an end-stage sterilization method and follow the manufacturer's specification.
11.	**Sterility testing:** Validate the Test sample for sterility, in accordance to current USP 797 regulatory guidelines.

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SUGGESTED PRESENTATION

Estimated Beyond-Use Date		24 hours room temperature, 3 days refrigerated, or 45 days frozen, as per USP 797.	Packaging Requirements		Sterile, light-resistant single unit inhalation bottle, or similar single unit vial.
Auxiliary Labels	1	Use as directed. Do not exceed prescribed dose.		7	May impair mental and/or physical ability. Use care when operating a car or machinery.
	2	Keep out of reach of children.		8	Equilibrate to room temperature before use.
	3	Discard container after use.		9	Keep at controlled room temperature (20°C – 25°C), refrigerated (2°C – 8°C) or frozen (-25°C to -10°C).
	4	Consult your health care practitioner if any other prescription or over-the-counter medications are currently being used or are prescribed for future use.		10	Do not take with alcohol, sleep aids, tranquilizers or other CNS depressants.
	5	Discard in the presence of particulate matter.		11	Protect from light.
	6	Do not use if discolored.			
Pharmacist Instructions	Add any auxiliary labels specific to the API to the dispensing container as deemed necessary.				
Patient Instructions	Contact your pharmacist in the event of adverse reactions. **IMPORTANT:** The quantity of API administered is directly dependent on the quantity of product applied.				

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2. Ipratropium Bromide. In: Trissel LA. *Trissel's Stability of Compounded Formulations, 2nd Edition.* American Pharmaceutical Association; 2000: 197.
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4. USP <797> Pharmaceutical Compounding – Sterile Preparations. US Pharmacopeial Convention, Inc. *United States Pharmacopeia XXVII / National Formulary 22*. Rockville, MD: US Pharmacopeial Convention, Inc.