MEDISCA® NETWORK INC.
TECHNICAL SUPPORT SERVICES
FORMULATION CHEMISTRY DEPARTMENT
TOLL-FREE: 866-333-7811
TELEPHONE: 514-905-5096
FAX: 514-905-5097
technicalservices@medisca.net

Suggested Formula	Calcium Gluconate 10% Intravenous Injection (Solution, 50 mL)	FIN	F 002 192v4

SUGGESTED FORMULATION

Ingredient Listing	Qty.	Unit	NDC #	Supplier	Lot Number	Expiry Date
Calcium Gluconate (Anhydrous), USP	4.703	g				
Calcium Saccharate (Tetrahydrate), USP	0.23	g				
Benzyl Alcohol (Parenteral Application), NF	0.5	mL				
Sterile Water for Injection, USP	45.0	mL				
Sterile Water for Injection, USP	q.s to 50.0	mL				
Sodium Hydroxide 10% Solution	As required					

Note: Calcium Gluconate Injection, USP is labeled as containing a total amount of Calcium, from Calcium Gluconate and Calcium Saccharate. Each milliliter contains 94 mg of Calcium gluconate with Calcium D-saccharate tetrahydrate 4.6 mg in water for injection, providing 9.3 mg (0.465 mEq) of elementary calcium.

SPECIAL PREPARATORY CONSIDERATIONS

Ingredient-Specific Information

Light Sensitive *(protect from light whenever possible):* *Benzyl Alcohol*

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SPECIAL PREPARATORY CONSIDERATIONS

Suggested Preparatory Guidelines

☐ Non-Sterile Preparation ■ Sterile Preparation

Processing Error / Testing Considerations: To account for processing error, pH testing, sterility and endotoxin testing considerations during preparation, it is suggested to measure an additional **10 to 12%** 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 50 mL)

Weigh and / or measure the following ingredients when appropriate:

Ingredient Listing	Qty.	Unit	Multiplication factor (*): ____	Processing Error	Qty. to measure
Calcium Gluconate (Anhydrous), USP §	4.703	g			
Calcium Saccharate (Tetrahydrate), USP §	0.23	g			
Benzyl Alcohol (Parenteral Application), NF §	0.5	mL			
Sterile Water for Injection, USP §	45.0	mL			
Sterile Water for Injection, USP §	q.s. to 50.0	mL			
Sodium Hydroxide 10% Solution §	As required				

* 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.

2. **Powder-Liquid preparation:**

   A. In the given order, sequentially add the following ingredients to the Sterile Water for Injection (45.0 mL *plus* processing error adjustments):

   -Benzyl Alcohol (Parenteral Application)
   -Calcium Gluconate (Anhydrous)
   -Calcium Saccharate (Tetrahydrate)

   Specifications: Continuously mix.

   End result: Homogeneous liquid-like dispersion.

   Note: Add the next ingredient, once the previous one has been completely added and dispersed.

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3. **pH testing:**

A. Draw an appropriate amount of the mixture (Step 2A).

B. Test the pH of the sample. It should lie between 7.3 and 7.7.

C. If the pH < 7.3, carefully add, in a dropwise fashion, the Sodium Hydroxide 10% Solution to the mixture:

1. Draw and transfer 1 or 2 drops of the Sodium Hydroxide 10% Solution to the mixture.
2. Stir for at least 5 minutes to evenly disperse the Sodium Hydroxide 10% Solution.
3. Re-test the pH.
4. Continue to add the Sodium Hydroxide 10% Solution until the pH of 7.3 and 7.7 is obtained.

IMPORTANT: Do not allow the pH to rise above 7.7.

4. **Filling to volume:**

A. Add additional Sterile Water for Injection to the above mixture to fill to the required batch size (50.0 mL *plus* processing error adjustments).

Specifications: Continuously mix until all solid particles have completely dissolved.
If necessary, heat the mixture to 80~85°C to achieve complete dissolution.

End result: Homogeneous liquid-like solution.

5. **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 and endotoxin testing.

6. **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.

7. **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.

8. **Sterility and Endotoxin testing:**

Validate the Test sample for sterility and endotoxins, in accordance to current USP 797 regulatory guidelines.

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SUGGESTED PRESENTATION

Estimated Beyond-Use Date		24 hours controlled room temperature, 3 days refrigerated, or 45 days frozen, as per USP 797. BUD based on successful endotoxin test result.	Packaging Requirements		Sterile, tightly closed, light-resistant unit-dose injection vials.
Auxiliary Labels	1	Use as directed. Do not exceed prescribed dose.	6		Discard the container after use.
	2	Keep out of reach of children.	7		Protect from light.
	3	Keep at controlled room temperature (20°C – 25°C), refrigerated (2°C – 8°C) or frozen (-25°C to -10°C).	8		Hypertonic solution, inject slowly.
	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.	9		Precipitation occurs upon storage. Reheat the solution until clear
	5	Do not use if product becomes discolored.			
Pharmacist Instructions		Add any auxiliary labels specific to the API to the dispensing container as deemed necessary. **Important:** To be administered only by the prescribing physician.			
Patient Instructions		Contact your pharmacist in the event of adverse reactions.			

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REFERENCES

1. USP <797> Pharmaceutical Compounding – Sterile Preparations. US Pharmacopeial Convention, Inc. *United States Pharmacopeia XXVIII / National Formulary 23.* Rockville, MD. 2004: 2461.
2. Parenteral Preparations. In: Allen, LV, Jr. *The Art, Science and Technology of Pharmaceutical Compounding.* American Pharmaceutical Association; 1998: 251.
3. Benzyl Alcohol. In: Rowe RC. *Handbook of Pharmaceutical Excipients, 4th Edition.* American Pharmaceutical Association; 2003: 53.
4. Calcium Gluconate (Monograph). In: O'Neil MJ. *The Merck Index 13th Edition.* Whitehouse Station, NJ: Merck & Co, Inc.; 2001: Misc-32.
5. Calcium Gluconate (Monograph). In: O'Neil MJ. *The Merck Index 13th Edition.* Whitehouse Station, NJ: Merck & Co, Inc.; 2001: 280.
6. Calcium Saccharate (Monograph). In: O'Neil MJ. *The Merck Index 13th Edition.* Whitehouse Station, NJ: Merck & Co, Inc.; 2001: 284.
7. Chapter 18: Tonicity, Osmoticity, Osmolality and Osmolarity. In: Gennaro AR. *Remington: The Science and Practice of Pharmacy, 20th Edition.* Baltimore, MD: Lippincott Williams & Wilkins; 2000: 246~262.
8. Calcium Gluconate (Monograph). United States Pharmacopeia XXXV / National Formulary 30. Rockville, MD. US Pharmacopeial Convention, Inc. 2012: 2453.
9. USP<797>. United States Pharmacopeia XXXV / National Formulary 30. Rockville, MD. US Pharmacopeial Convention, Inc. 2012: 350.