



Suggested Formula	Diltiazem Hydrochloride 90 mg Slow Release Oral Capsules (Powder Blend, 100 x Size #1 Capsules)	FIN	F 004 154
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**IMPORTANT:** This formula is for a slow release capsule. The rate of drug release may not be identical to the release rates of the commercial extended or controlled release capsules. As such, this preparation should be prescribed and monitored under the close supervision of the prescribing physician.

### SUGGESTED FORMULATION

Ingredient Listing	Qty.	Unit	NDC #	Supplier	Lot Number	Expiry Date
Diltiazem Hydrochloride, USP	9.000	g				
Hypromellose (4000 CPS) Methocel E4M, USP	TBD					
Cellulose (microcrystalline), NF	TBD					
Sodium Chloride, USP	As required					

### SPECIAL PREPARATORY CONSIDERATIONS

#### Ingredient-Specific Information

**Light sensitive** (protect from light whenever possible):

*Diltiazem Hydrochloride*

**Hygroscopic** (protect from moisture whenever possible):

*Hypromellose (4000 CPS) Methocel E4M,  
Cellulose (microcrystalline)*

#### Suggested Preparatory Guidelines

Non-Sterile Preparation     Sterile Preparation

#### Processing Error /

#### Testing Considerations:

To account for processing error considerations during preparation, it is suggested to measure an additional **5 to 9%** of the required quantities of ingredients.

#### Special Instruction:

Protective apparel, such as a lab coat, disposable gloves, eyewear and face-masks should always be worn.

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 Size #1 Capsules)**

Weigh and / or measure the following ingredients when appropriate:

Ingredient Listing	Qty.	Unit	Multiplication factor <sup>(*)</sup> : ____	Processing Error	Qty. to measure
Diltiazem Hydrochloride, USP §	9.000	g			
Hypromellose (4000 CPS) Methocel E4M, USP §	TBD				
Cellulose (microcrystalline), NF §	TBD		®		
Sodium Chloride, USP	As required				

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

Preparatory Instruction	
1.	<p><b><u>Excipient requirements for 100 x size #1 capsules</u></b></p> <p>A. Calculate the amount of Cellulose (microcrystalline) and Hypromellose (4000 CPS) Methocel E4M required for the batch. Refer to attached appendix for details.</p>
2.	<p><b><u>Powder preparation:</u></b></p> <p>A. Combine and triturate the following ingredients together to form a fine, homogeneous powder blend:</p> <ul style="list-style-type: none"> <li>-Diltiazem Hydrochloride</li> <li>-Cellulose (microcrystalline) (Quantity determined in appendix (J))</li> <li>-Hypromellose (4000 CPS) Methocel E4M (Quantity determined in appendix (L))</li> </ul> <p><u>End result:</u> Homogeneous powder blend.</p>
3.	<p><b><u>Product transfer:</u></b></p> <p>Fill each of 100 Size #1 capsules with the powder blend (Step 2A). Close each capsule tightly.</p> <p>Clean each capsule by placing the capsules in a container filled with Sodium chloride, and then gently rolling the container. Pour the container contents into a 10-mesh sieve, and allow the Sodium chloride to pass through. Finally, roll the capsules on a cloth-covered surface.</p>
4.	<p><b><u>Validation technique (average capsule weight):</u></b></p> <p>The final weight of each capsule (not including capsule shell) should fall between 90 and 110% of the theoretically calculated weight, in accordance to USP 795 guidelines. The theoretically calculated weight can be determined by adding the amount in appendix (D) + (H) + 0.090 g together.</p>
5.	<p><b><u>Product transfer:</u></b></p> <p>Transfer the final product into the specified dispensing container (see “Packaging Requirements”).</p>



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### SUGGESTED PRESENTATION

Estimated Beyond-Use Date	6 months, as per USP.	Packaging Requirements	Tightly closed, light-resistant vial.	
Auxiliary Labels	1	Use as directed. Do not exceed prescribed dose.	6	Do not take with alcohol, sleep aids, tranquilizers or other CNS depressants.
	2	Keep out of reach of children.	7	Keep at room temperature (20°C - 23°C).
	3	Cap tightly after use.	8	Protect from light.
	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	May impair mental and/or physical ability. Use care when operating a car or machinery.
	5	Keep in a dry place.		
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.			

### REFERENCES

1.	Capsules. In: Allen, LV, Jr. <i>The Art, Science and Technology of Pharmaceutical Compounding Third Edition</i> . American Pharmaceutical Association; 2008: 127.
2.	Cellulose, Microcrystalline. In: Rowe RC. <i>Handbook of Pharmaceutical Excipients, 6<sup>th</sup> Edition</i> . American Pharmaceutical Association; 2009: 129.
3.	Hypromellose. In: Rowe RC. <i>Handbook of Pharmaceutical Excipients, 6<sup>th</sup> Edition</i> . American Pharmaceutical Association; 2009: 326.
4.	Diltiazem Hydrochloride. In: Sweetman SC, ed. <i>Martindale: The Complete Drug Reference, 36<sup>th</sup> Edition</i> . London, England: The Pharmaceutical Press; 2009: 1265.
5.	Diltiazem (Monograph). In: O'Neil MJ. <i>The Merck Index 14<sup>th</sup> Edition</i> . Whitehouse Station, NJ: Merck & Co, Inc.; 2006: Monograph #3202.
6.	Diltiazem Hydrochloride (Monograph). <i>United States Pharmacopeia XXXII / National Formulary 27</i> . Rockville, MD. US Pharmacopeial Convention, Inc. 2009: 2159.
7.	Diltiazem Hydrochloride. In: Trissel LA. <i>Trissel's Stability of Compounded Formulations, 3<sup>rd</sup> Edition</i> . American Pharmaceutical Association; 2005: 146.
8.	USP <795>. <i>United States Pharmacopeia XXXII / National Formulary 27</i> . Rockville, MD. US Pharmacopeial Convention, Inc. 2009: 314.

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Appendix	Calculating quantity of excipients required for batch		
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Procedure																							
1.	<p><b><u>Capsule filling:</u></b></p> <p>a. For <u>each</u> ingredient powder below, determine the average capsule fill weight by filling and weighing five TARED CAPSULES. Do not forget to divide the total weight by 5 to obtain an <u>average</u> capsule fill weight. Also, triturate the ingredient powder first if required in formulation.</p> <p>Plug each amount into Step 2, column B.</p>																						
2.	<p><b><u>Volume Percent Occupied:</u></b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Ingredients</u></th> <th style="text-align: center;"><b>Column A</b> Quantity Required per capsule</th> <th style="text-align: center;"><b>Column B</b> Average capsule fill weight</th> <th style="text-align: center;"><b>Column C</b> A/B x 100 equals percent filled</th> </tr> </thead> <tbody> <tr> <td>a. Diltiazem Hydrochloride</td> <td style="text-align: center;">0.090 g</td> <td style="text-align: center;">_____ g</td> <td style="text-align: center;">_____ %</td> </tr> <tr> <td>b. Hypromellose (4000 CPS) Methocel</td> <td style="text-align: center;">_____ g (D) (0.4 x column B)</td> <td style="text-align: center;">_____ g</td> <td style="text-align: center;">40%</td> </tr> <tr> <td>c. Cellulose (microcrystalline)</td> <td></td> <td style="text-align: center;">_____ g</td> <td></td> </tr> <tr> <td>d. Total (add column C together)</td> <td></td> <td></td> <td style="text-align: center;">_____ % (E)</td> </tr> </tbody> </table>			<u>Ingredients</u>	<b>Column A</b> Quantity Required per capsule	<b>Column B</b> Average capsule fill weight	<b>Column C</b> A/B x 100 equals percent filled	a. Diltiazem Hydrochloride	0.090 g	_____ g	_____ %	b. Hypromellose (4000 CPS) Methocel	_____ g (D) (0.4 x column B)	_____ g	40%	c. Cellulose (microcrystalline)		_____ g		d. Total (add column C together)			_____ % (E)
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c. Cellulose (microcrystalline)		_____ g																					
d. Total (add column C together)			_____ % (E)																				
3.	<p><b><u>Calculate the quantity of Cellulose and Hypromellose required for the batch:</u></b></p> <p>a. Percent of Cellulose (microcrystalline) required = 100% – (E) _____ % (F)</p> <p>b. Average capsule fill weight of Cellulose (microcrystalline) (from column B, Step 2c): _____ g (G)</p> <p>c. Quantity of Cellulose (microcrystalline) required per capsule = [(F) ÷ 100 × (G)] _____ g (H)</p> <p>d. Total Quantity of Cellulose (microcrystalline) required for the batch = 100 capsules × (H) _____ g (I)</p> <p>e. Total quantity of Cellulose (microcrystalline) <i>plus</i> processing error = (I) x 1.05-1.09 _____ g (J)</p> <p>f. Total quantity of Hypromellose (4000 CPS) Methocel required for the batch = 100 capsules × (D) _____ g (K)</p> <p>g. Total quantity of Hypromellose (4000 CPS) Methocel <i>plus</i> processing error = (K) x 1.05-1.09 _____ g (L)</p>																						

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