



# USP CERTIFICATE

USP PREDNISON TABLETS RS

Lot Q1L136

(10 mg nominal prednisone content per tablet)

FOR DISSOLUTION PERFORMANCE VERIFICATION TEST (PVT)

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**Period of validity:** This certificate of USP Prednisone Tablets Lot Q1L136 is valid through December 31, 2013.

The USP Prednisone Tablets RS is provided for use in the *Performance Verification Test* for USP Apparatus 1 and 2 in the USP General Test Chapter on DISSOLUTION <711>. Do not expose the tablets to excessive humidity. Store the tablets at controlled room temperature not exceeding 25°.

**Dissolution Medium:** We recommend preparing the medium as follows:

Heat a suitable amount of water, while stirring gently, to about 41-45°. Filter under vacuum through a 0.45- $\mu$ m-porosity filter into a suitable filtering flask equipped with a stirring device. Seal the flask and continue to apply vacuum while stirring for an additional five minutes. Measured vacuum should be less than 100 mbar. The temperature of the *Dissolution medium* should not fall below 37° prior to the initiation of the test.

**Procedure** [See DISSOLUTION <711> in the current USP]: Determine the quantity of prednisone,  $C_{21}H_{26}O_5$ , dissolved at thirty minutes, in each vessel, expressed as percent of the labeled amount. Use 498.0 g of *Dissolution Medium* (which corresponds to 500 mL), where possible the medium should not be stirred prior to the initiation of the test for the purpose of equilibration, and conduct the test at 37°. Operate each apparatus at 50- rpm speed. Withdraw an aliquot of sample solution at thirty minutes and filter immediately. Measure the amount of prednisone dissolved from filtered portions of the sample aliquots at 242 nm in comparison with a solution of known concentration of USP Prednisone Reference Standard.

**Notes:** An amount of alcohol not to exceed 5% of the total volume of the standard solution may be used to bring the prednisone standard into solution. The filtering method must not cause adsorptive loss of drug. Bias introduced by automated methods is to be avoided. If equipment is dedicated for use with only one apparatus (basket or paddle), then performance verification is only required for that apparatus. At the time of use, peel back the paper-backed lidding to remove the tablets from the blister card.

**Test Interpretation:** Laboratory can choose either of the test schemes listed below.

## Single-Stage Test

The following are step-by-step instructions for the Single-Stage test.

1. For each position in the assembly, test one USP Prednisone Tablets RS, and record the percent dissolved at the sampling time point specified for that apparatus. Transform the percent dissolved results to the natural log scale, determine the mean and variance. For assemblies with 12 or 14 positions (12 or 14 dissolution vessels), no further testing is required.
2. For assemblies with fewer than 12 positions, repeat Step 1 with an additional set of tablets. Again after transforming the percent dissolved results to the natural log scale, determine the mean and variance.
3. Calculate the average of the two means and of the two variances obtained in Steps 1 and 2. (Use the results from Step 1 alone for assemblies that have 12 or 14 positions.)
4. Convert the results of Step 3 to a geometric mean (GM) and percent coefficient of variation (%CV). See calculation example below for more detail.
5. Compare the results of Step 4 to the **Single-Stage** acceptance ranges in table 1. The GM must not fall outside the limits, and the %CV must not be greater than the limit. If both meet the criteria, the assembly has passed the PVT.

### Optional Two-Stage Test

A laboratory may choose to implement the PVT as a Two-Stage test in case of assemblies with less than 12 positions. The Two-Stage test is a statistically valid means of allowing the possibility of stopping the test at the first stage with a penalty. The following are step-by-step instructions for the two-stage test.

1. For each position in the assembly, test one USP Prednisone Tablets RS, and record the percent dissolved at the sampling time point specified for that apparatus. After transforming the percent dissolved results to the natural log scale, determine the mean and variance.
2. Convert the results of Step 1 to a GM and %CV, and compare to the **1<sup>st</sup> Stage of Two Stages** acceptance ranges in Table 1. The GM must not fall outside the limits, and the %CV must not be greater than the limit. For calculation of the GM and %CV, see calculation example for more detail.
3. If results of Step 2 satisfy both acceptance criteria; the assembly has passed the PVT. Otherwise continue to Step 4. (see *note 1*).
4. Repeat Step 1 with an additional set of tablets and after transforming the percent dissolved results to the natural log scale determine the mean and variance for the data obtained at this step.
5. Average the two means and two variances obtained in Steps 1 and 4.
6. Convert the results of Step 5 to a geometric mean (GM) and percent coefficient of variation (%CV). For calculation of the GM and %CV, see calculation example for more detail.
7. Compare the results of Step 6 to the **2<sup>nd</sup> Stage of Two Stages** acceptance ranges in Table 1. The GM must not fall outside the limits, and the %CV must not be greater than the limit. If both meet the acceptance criteria, the assembly has passed the PVT.

Table1. Performance Verification Test (PVT) limits (values apply only to Lot Q1L136)

Apparatus	# of vessels	Single-Stage		Two-Stage			
		GM*	%CV	1 <sup>st</sup> Stage of Two Stages		2 <sup>nd</sup> Stage of Two Stages	
				GM*	%CV	GM*	%CV
1	6	55 - 75	12	58 - 72	9.2	55 - 75	12
	7				9.2		
	8				9.3		
	12			na			
	14			na			
2	6	26 -38	6.7	27 - 36	4.9	26 - 38	6.5
	7		6.5		4.9		6.3
	8		6.4		5.0		6.3
	12		na				
	14		na				

\* Percent of the labeled amount of prednisone dissolved at 30 minutes at 50-rpm

### Calculation example (expressed as Microsoft Excel<sup>®</sup> worksheet functions):

Run 1:  $x_1, x_2, \dots, x_n$  in natural log scale:  $\text{Ln } x_1, \text{Ln } x_2, \dots, \text{Ln } x_n$

Run 2:  $x_{n+1}, x_{n+2}, \dots, x_{2n}$  in natural log scale:  $\text{Ln } x_{n+1}, \text{Ln } x_{n+2}, \dots, \text{Ln } x_{2n}$

1st Stage of Two-Stage for n=6, 7, 8 and Single-Stage for n=12, 14:

$$\text{GM1} = \exp(\text{average}(\text{Ln } x_1 : \text{Ln } x_n))$$

$$\%CV1 = 100 * \sqrt{\exp(\text{var}(\text{Ln } x_1 : \text{Ln } x_n)) - 1}$$

Single-Stage or 2nd Stage of Two-Stage for n= 6, 7, 8:

$$\text{GM} = \exp(\text{average}(\text{average}(\text{Ln } x_1 : \text{Ln } x_n), \text{average}(\text{Ln } x_{n+1} : \text{Ln } x_{2n})))) = \exp(\text{average}(\text{Ln } x_1 : \text{Ln } x_{2n}))$$

$$\%CV = 100 * \sqrt{\exp(\text{average}((\text{var}(\text{Ln } x_1 : \text{Ln } x_n)), (\text{var}(\text{Ln } x_{n+1} : \text{Ln } x_{2n})))) - 1}$$

exp: exponential (e<sup>x</sup>)      var: variance      sqrt: square root      \*: multiply      100: conversion factor to percentage

*Note 1:*

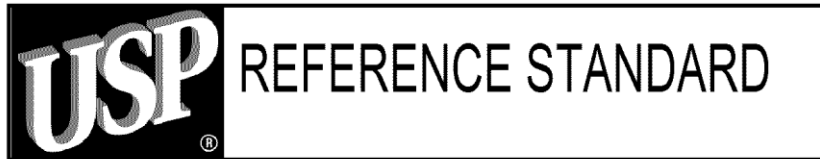
There are circumstances when the %CV after the first stage equals or exceeds the value in the **Futility Factor** table (without rounding), then it is impossible to meet the %CV criterion after the second stage. The lab can stop after the first stage (run). However, after any adjustments to equipment, test procedure, and so on, the PVT must be restarted with a new first run.

**Futility Factor**

(%CV at or above value given, second stage testing will not produce passing result)

Apparatus	No. of Vessels		
	6	7	8
1	17.0	17.0	17.0
2	9.2	8.9	8.9

**LABEL TEXT**



**PREDNISONE TABLETS    30 tablets**

**DANGER!** Causes damage to endocrine system through prolonged or repeated exposure. Suspected of damaging fertility or the unborn child.

The nominal weight of prednisone in each tablet is 10 mg. Use only whole tablets. See the certificate for additional information. Store in a dry place.

Store at controlled room temperature not exceeding 25°C. Unused or unopened blister strips should be kept in the secondary package.

USP, 12601 Twinbrook Pkwy, Rockville, MD, +1-301-881-0666  
CAT. NO. 1559505

For use with specified USP compendial tests.  
Not for use as a drug. MSDS available on  
www.usp.org.

LOT: Q1L136



*Alice Lia*

*Quality Assurance*

### **Calculation Value**

Unless otherwise stated on the Reference Standard label, a value of 100.0% should be used in the compendial applications for which the use of this Reference Standard is intended. Please refer to the specific Reference Standard label for further information.

### **Expiration**

Current lots are identified in the current USP Catalog. In some cases, the previous lot may still be considered valid for use. If so, it is identified in the column marked "Previous Lot/Valid Use Date."

It is the responsibility of each user to determine that this lot is current or valid when used. For the most up-to-date information, please refer to the USP Store at [www.usp.org](http://www.usp.org).

### **Instructions for Use**

Follow the instructions on the label of the USP Reference Standard and in the appropriate USP documentary standard(s).

### **Non-Monograph Use**

The suitability of this Reference Standard for use in non-compendial applications is solely the responsibility of the user.

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