

## Draft Guidance on Dapagliflozin Propanediol; Metformin Hydrochloride

This draft guidance, when finalized, will represent the current thinking of the Food and Drug Administration (FDA, or the Agency) on this topic. It does not establish any rights for any person and is not binding on FDA or the public. You can use an alternative approach if it satisfies the requirements of the applicable statutes and regulations. To discuss an alternative approach, contact the Office of Generic Drugs.

**Active Ingredient:** Dapagliflozin propanediol; Metformin hydrochloride

**Dosage Form; Route:** Extended-release tablet; oral

**Recommended Studies:** Two in vivo studies

1. Type of study: Fasting  
Design: Single-dose, two-way crossover in vivo  
Strength: EQ 10 mg Base/1 gm  
Subjects: Healthy males and nonpregnant females, general population  
Additional comments: 1) Females should practice abstinence or contraception during the study. 2) To avoid hypoglycemic episodes in healthy volunteers, the drug products should be administered with 240 mL of a 20% glucose solution in water, followed by 60 mL of the glucose solution administered every 15 minutes for up to 4 hours after dosing.

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2. Type of study: Fed  
Design: Single-dose, two-way crossover in vivo  
Strength: EQ 10 mg Base/1 gm  
Subjects: Healthy males and nonpregnant females, general population  
Additional comments: Same as comments above

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**Analytes to measure (in appropriate biological fluid):** Dapagliflozin and metformin in plasma

**Bioequivalence based on (90% CI):** Dapagliflozin and metformin

**Bioequivalence for other strengths:** EQ 5 mg Base/500 mg, EQ 5 mg Base /1 gm, and EQ 10 mg Base/500 mg strengths based on (i) acceptable bioequivalence studies on the EQ 10 mg Base / 1 gm strength, (ii) proportionally similar formulation across all strengths, and (iii) acceptable in vitro dissolution testing of all strengths.

**Dissolution test method and sampling times:** The dissolution information for this drug product can be found on the FDA-Recommended Dissolution Methods Web site, available to the public at the following location: <http://www.accessdata.fda.gov/scripts/cder/dissolution/>. Conduct comparative dissolution testing on 12 dosage units each of all strengths of the test and reference products. Specifications will be determined upon review of the abbreviated new drug application (ANDA).

In addition to the method above, for modified-release products, dissolution profiles on 12 dosage units each of test and reference products generated using U.S. Pharmacopeia (USP) Apparatus I at 100 rpm and/or Apparatus II at 50 rpm in at least three dissolution media (pH 1.2, 4.5, and 6.8 buffer) should be submitted in the application. Agitation speeds may have to be increased, if appropriate. It is acceptable to add a small amount of surfactant, if necessary. Include early sampling times of 1, 2, and 4 hours and continue every 2 hours until at least 80% of the drug is released, to provide assurance against premature release of drug (dose dumping) from the formulation.

Due to a concern of dose dumping of drug from this drug product when taken with alcohol, the Agency currently requests that additional dissolution testing be conducted using various concentrations of ethanol in the dissolution medium, as follows:

Testing conditions: 1000 mL, pH 6.8 phosphate buffer, Apparatus I (basket, 20 mesh) @100 rpm, with or without alcohol

Test 1: 12 units tested according to the proposed method (with pH 6.8 phosphate buffer), with data collected every 15 minutes for a total of 2 hours

Test 2: 12 units analyzed by substituting 5% (v/v) of test medium with Alcohol USP and data collection every 15 minutes for a total of 2 hours

Test 3: 12 units analyzed by substituting 20% (v/v) of test medium with Alcohol USP and data collection every 15 minutes for a total of 2 hours

Test 4: 12 units analyzed by substituting 40% (v/v) of test medium with Alcohol USP and data collection every 15 minutes for a total of 2 hours

Both test and RLD products must be tested accordingly, and data must be provided on individual unit, means, range, and %CV on both strengths.