

Test procedure of pH for brake linings, pads and clutch facings of automobiles

1. Scope

This standard specifies the test procedure of pH for automotive brake linings, disc brake pads, and clutch facings (hereinafter called linings, pads, and facings respectively).

2. Purpose of establishing the standard

The purpose of this standard is to establish a uniform test procedure for measuring pH value, which is one of the alternative characteristics for evaluating bonding derived from generation of rust in mating materials for linings, pads and facings, and the rust preventive characteristics for bonded surfaces with back plates with regard to pads.

3. Definitions

Definitions of primary terms used in this standard are as follows.

- (1) **pH**: The pH value, (read in Japanese as "Pii-Ecchi") of a sample solution of friction material, which is measured by a glass electrode pH meter, using the pH values of the pH standard liquid of neutral phosphate and of the pH standard liquid of borate as the references, out of the pH standard liquids in **JIS Z8802** (Methods for determination of pH of aqueous solutions).
- (2) **pH standard liquid**: The pH standard liquid and adjusted pH standard liquid as defined in **JIS Z8802**.

4. Apparatus and instruments

The apparatus and instruments used for measurement shall be as follows.

- (1) A pH meter of type 0, I or II defined in **JIS Z8802** shall be used as the measuring apparatus.
- (2) A glass container, which can be covered by a lid and is large enough to contain the sample, 100 mL of distilled water and a glass electrode of the pH meter, shall be used as the measuring vessel.
- (3) The stirring rod shall be made of glass.
- (4) A weighing scale with a sensitivity of 10 mg or higher shall be used.
- (5) A hot air circulating dryer shall be used.
- (6) A desiccator using dried calcium chloride or silica gel shall be used.
- (7) A 100 mL-measuring cylinder shall be used.

5. Reagent

The reagent shall be as follows.

- (1) First class grade methanol or ethanol.
- (2) Neutral phosphate pH standard liquid (pH of 6.86 at 25 °C).
- (3) Borate pH standard liquid (pH of 9.18 at 25 °C).
- (4) Distilled water

6. Sample

The sample shall be as follows.

- (1) Ground powder which has been obtained by drilling with a drilling machine from the specimen.
- (2) Three specimens shall be prepared.

Normative reference: **JIS Z8802** Methods for determination of pH of aqueous solutions

7. Measuring method

7.1 Preparation before test

The sample shall be placed in a dryer and dried for 2 hours at 105 ± 5 °C, and then shall be cooled in the desiccator to room temperature.

7.2 Procedure

The procedure for measurement shall be carried out in the sequence below.

- (1) 3.0 g of the sample cooled in the desiccator shall be weighed out and placed in a measuring vessel.
- (2) Several drops of methanol or ethanol shall be added to the sample placed in the measuring vessel to make it wet.
- (3) 100 mL of distilled water shall be measured with the measuring cylinder, poured into the measuring vessel and stirred sufficiently with the glass rod.
- (4) The measuring vessel shall be covered by the lid and left in a measuring room. The time that the vessel is left in the measuring room shall be 16 to 24 hours.
- (5) Zero calibration and span calibration shall be performed for the pH meter according to **7.2.2 of JIS Z8802**.
- (6) The lid of the measuring vessel shall be removed, and the sample which is being precipitated and the dipping liquid shall be stirred sufficiently with the glass rod. The liquid shall be left for 2 to 3 minutes to let the sample precipitate and then shall be used as the sample solution.
- (7) The measurement of pH of the sample solution shall be started immediately with the electrode of the pH meter, which shall have been rinsed. The pH value shall be read to 2 decimal places while lightly moving the vessel once the pH value has stabilized. Then the value shall be rounded off to one decimal place. At the same time, the liquid temperature shall be read to one decimal place. At this time, the temperature difference between the standard liquid, on which zero calibration and span calibration have been made, and the sample solution shall be no more than 2 °C.

8. Records

The following items shall be recorded on the record form shown in the Attached Table.

- (1) Type of material
- (2) Temperature of the sample solution
- (3) Measured values and average value
- (4) Quality of pH standard liquid used (See **Table 2 of JIS Z8802**.)
- (5) Name of pH meter (manufacturer name, model No.)
- (6) Average temperature in the measuring room (This temperature shall represent the temperature from when the sample was left in the measuring room to the completion of measuring.)
- (7) Date of measuring
- (8) Person taking measurement
- (9) Other necessary matters

Attached Table 1 Record form for pH measurement

Type of material	Date of measurement
Type of specimen	Record No.
Sensitivity of weighing scale	Average temperature in the measuring room
Name of pH meter	Measured by
Model of pH meter	
Quality of pH standard liquid	

Sample No.	pH value	Temperature (°C) of sample solution
1		
2		
3		
Average		
Notes		