MINI-TITRIERSET

Determination of the Acid Value and

calculation of the factor for thinning

PRODUKTBESCHREIBUNG

Flux control is of importance for a constant wave soldering process. The composition of the flux during its use in a foam fluxer can vary by solvent losses.

The chemical composition of the No-Clean fluxes, which are used in the electronic industry for wave soldering, is similar in many cases. The chemical activity of these fluxes is based on the content of organic acids. A characteristic value is the acid number or acid value. It indicates, how many equivalents of acidic substances are present in the flux, and this is expressed as mgKOH/g. An important representative of organic acids is the adipic acid. The acid number is 768 mgKOH/g. A flux, which contains 2% adipic acid therefore has an acid value of 15,4 mgKOH/g. If the acid content varies by evaporation of the solvent, the acid number changes accordingly.

The acidity of a flux can be determined quite simply, when it is titrated with a defined solution of a basic substance. An aqueous or aqueous-alcoholic solution of potassium hydroxide (KOH) is used for titration of a defined quantity of flux. During the addition of the titration solution the liquid changes its pH value which can be monitored with a pH-meter. A pH value of 8 indicates the end point. Alternatively the determination of the end point of titration can be seen with a colour indicator, which changes the colour at a certain pH value. The acid value can be calculated from the volume of KOH solution used for getting the end point of the titration. A laboratory method is described in **DIN EN 29455-3** (ISO 9455-3). If there is any doubt the standard method always applies.

For practical reasons the standard method is too laborious, so in most cases it is sufficient to use a simplified method, which works to the same principle. STANNOL offers a simplified method with the **STANNOL Mini-Titration-Set.** A mixing indicator facilitates the recognition of the end point of titration.

EQUIPMENT AND CHEMICALS OF THE MINI-TITRATION-SET

Contents	
Syringes	2 ml for Flux Sample **(5)** 10 ml for Titration Solution **(4)**
Analytic vessel	Erlenmeyer flask **(1)**
Chemicals	250 ml Test Solution **(2)** 125 ml Titration Solution **(3)**

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PROCEDURE

Fill about 30 ml Test Solution (Testlösung) into the Erlenmeyer flask (1). Then add exactly 2 ml flux using the small syringe (5). Charge exactly 10 ml Titration Solution (Titrierlösung) into the big syringe (4) without any air bubbles.

Discharge the big syringe slowly and carefully into the Erlenmeyer flask (Abb. 2) while swaying it gently, to get the solution thoroughly mixed.

At first, a bluish green to violet colouring occurs where the titration solution drops in. The dark colour disappears while swaying.(fig. 3). One further dropping, the whole solution changes is colour to pale-green (fig. 4-5).

This indicates that the end point of titration is reached soon. If the colour change finally goes into light blue (fig. 6), the end point is reached and one can read from the syringe the volume used of titration solution. Further addition results in a dark blue to dark-violet colour (fig. 7-8) indicating an over titration. In this case the result will be incorrect and the measurement must be repeated.

Abb. 2

Abb. 3

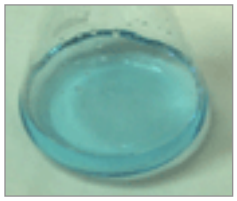

Abb. 6

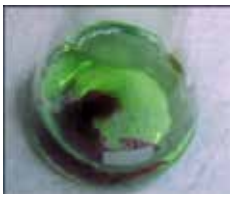

Abb. 4

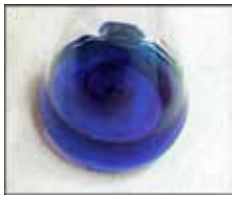

Abb. 7

Abb. 5

Abb. 8

Abb. 3-8: Farbenwechsel bei der Titration; bei Abb.6 ist der Endpunkt erreicht

CALCULATION

The **A**cid **V**alue is calculated with sufficient accuracy from the **volume** of consumed titration solution using following formula:

$$AV = c * v$$

v = consumed volume of titration solution (use only **STANNOL Titration Solution**)
c = a typical constant
For the **STANNOL Mini-Titration-Set c = 3,5.**

If the determined value does not deviate more than 15% from the given value, no measures must be carried out. If the deviation is larger, the proportional deviation indicates the dilution factor. Alternatively the enclosed file (MS-EXCEL) can be used, in order to determine the solvent quantity to be added to the flux. The flux has to be thoroughly mixed with the appropriate solvent quantity.

EXAMPLE

The acid value of the flux is mentioned in the technical data sheet, e.g. 15 mgKOH/g. If then the determined value is 18.75 mgKOH/g, the deviation is + 25%, i.e. the present flux quantity must be thinned with 25% (Vol%) of solvent, in order to adjust the flux to the original acid number of 15 mgKOH/g.

CONTROL

Now the operator can examine again the adjusted flux by determining the acid number again. As soon as the adjustment has been completed, the acid number should be like the data given in the technical data sheet and not deviate any more than 15%.

HINWEIS

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