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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 7123.1-2015

**Determination of the working life of multi-component adhesives
(English Translation)**

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1 Scope

This Part of GB/T 7123 specifies the method for determination of the working life of multi-component adhesives.

This Part applies to the determination of the working time of multi-component adhesives.

2 Normative references

The following documents are indispensable for the application of this document.

For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 2790 Adhesives, 180° peel strength test method for a flexible-bonded- to-rigid test specimen assembly (GB/T 2790-1995, ISO 8510-2:1990, EQV)

GB/T 2791 Adhesives, T peel strength test method for a flexible-to-flexible test specimen assembly

GB/T 2794-2013 Determination for viscosity of adhesives - Single cylinder rotational viscometer method

GB/T 2943 Terms of adhesive

GB/T 7124 Adhesives - Determination of tensile lap-shear strength of rigid- to-rigid bonded

assemblies (GB/T 7124-2008, ISO 4587:2003, IDT)

GB/T 20740 Adhesive - Sampling (GB/T 20740-2006, ISO 15605:2000, IDT)

3 Terms and definitions

The terms and definitions defined in GB/T 2943 and the following apply to this document.

3.1

Working life determine the working life of the adhesive.

Method 6 - Bonding strength method: By measuring the time required for the adhesive bonding strength to drop to a specified value or a specified ratio, determine the working life of the adhesive. This method is not suitable for adhesives whose working life is less than 5 min.

6 Instruments and equipment

6.1

Balance

Method 1, Method 2, Method 5 and Method 6 require the weighing range of the balance to reach (500 ± 0.2) g. Method 3 and Method 4 require the weighing range of the balance to reach (100 ± 0.2) g.

6.2 Beaker: The material does not react with the test adhesive. The wall

thickness does not exceed 1 mm. Method 1 and Method 6 require a beaker capacity of 400 mL. Method 3 requires a beaker capacity of 250 mL. Method 4 requires a beaker capacity of 50 mL. Method 5 requires a beaker capacity of

50 mL and 200 mL.

6.3 Scraper: The material does not react with the test adhesive. The end

surface is flat.

6.4 Rotational viscometer: In accordance with the requirements of GB/T 2794-2013.

6.5 Water bath: In the temperature range of 15 °C~30 °C, Method 2, Method 3 and Method 4 require the temperature to be constant at ± 0.1 °C. Method 5 requires the temperature to be constant at ± 0.2 °C.

6.6 Stopwatch: Accurate to within ± 1 s.

6.7 Disposable plastic pipe: 47 mm in inner diameter and 210 mm in length. It can be

connected with threaded pipe fittings and pistons. The pipes and pistons do not react with the test adhesive.

6.8 Stirring paddle: With spiral stirring blades; it does not react with the test adhesive.

6.9 Stirrer: With electric or pneumatic motor. The speed is adjustable between 0 r/min~1000 r/min.

6.10 Extrusion nozzle: The nozzle material does not react with the test adhesive.

It can be connected to the front end of the disposable plastic pipe, to facilitate the uniform mixing of the components of the adhesive. The recommended aperture is 2 mm~4 mm.

USE the time of the first viscosity test after mixing as the starting time. The test value can be considered as the beginning of the apparent viscosity change representing the chemical reaction. According to the expected working life, conduct interval testing.

Note: The number of tests and the strength of mixing and stirring have an impact on the viscosity and operating time. Therefore, during the test, the appropriate time interval, mixing and stirring speed, and rotation speed shall be selected.

The working life of the adhesive is the time between the end of mixing and reaching the specified viscosity value. In general, the specified viscosity value is twice the initial viscosity.

8.3 Method 2 - Extrusion method

Under the specified test environment, use the specified water bath to adjust each component adhesive to the specified temperature. Usually, it is $(23\pm 2)^{\circ}\text{C}$.

According to the manufacturer's instructions, prepare the adhesive specimen.

Directly weigh the specimen into a disposable plastic pipe; USE a suitable mixer to mix it thoroughly. MIX $(60\pm 10)\text{s}$ at a mixing speed of $(600\pm 100)\text{r/min}$. The recommended mixing amount is 200 g.

Quickly remove the seal on the threaded end of the round pipe; SCREW on the extrusion nozzle and push in the piston; PUT the pipe into the extrusion gun.

Quickly set the required extrusion pressure.

Through a static mixer, quickly squeeze a certain amount of adhesive into the weighing aluminum pan, to exhaust the air in the pipe and the unmixed adhesive at the end.

TURN on the stopwatch; at the set pressure, within a specific period of time, squeeze the newly mixed adhesive into the aluminum pan; WEIGH the aluminum pan; RECORD the mass of the extruded adhesive.

At appropriate intervals, repeat the above steps, until the amount of extruded adhesive drops to an agreed amount. The time between turning on the stopwatch and reaching the

agreed amount is the working life.

8.4 Method 3 - Spreading method

In the test environment, adjust each component adhesive to the specified temperature in a water bath. Usually, it is $(23\pm 2)^{\circ}\text{C}$.

According to the manufacturer's instructions, mix a certain mass of adhesive in the beaker. The recommended mixing mass is 200 g.

working life.

Note: Before testing, it shall consider the heat generated by the multi-component adhesive during the curing process.

8.7 Method 6 - Bonding strength method

Under the test temperature of $(23\pm 2)^{\circ}\text{C}$, adjust all the components of the adhesive, to make the component temperature consistent with the ambient temperature. According to the proportion in the instructions for use, weigh a certain mass of the adhesive into a beaker. The recommended mixing mass is

200 g.

TURN on the stopwatch; USE a flat scraper to mix the test specimen for $(60\pm 10)\text{s}$. It shall make sure that, the specimens at the bottom and the edge areas of the beaker are mixed thoroughly.

The tensile lap-shear strength and peel strength can be in accordance with the requirements of GB/T 7124, GB/T 2790 and GB/T 2791, respectively.

When preparing the specimen, apply glue according to the manufacturer's instructions.

Determine the bonding strength of the newly prepared adhesive respectively;

the bonding strength measured after an appropriate time interval. The selected time interval shall be recorded in the test report.

Note: The choice of time interval refers to the working life specified by the adhesive manufacturer.

The working life is the time from just preparing the adhesive until the bonding strength is less than the predetermined value or percentage.

9 Result representation

The working life of the adhesive is expressed in hours (h) or minutes (min). USE the average of at least three measured values as the determination result.