Anton Paar

Viscometry & Rheometry

Solutions for the adhesives industry

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We are confident in the high quality of our instruments. That’s why we provide **full warranty for three years**.

”

Anton Paar Certified Service

Effective January 1, 2020, all new instruments* include repair for 3 years.
You avoid unforeseen costs and can always rely on your instrument.
Alongside the warranty we offer a wide range of additional services and maintenance options.

*Due to the technology they use, some instruments require maintenance according to a maintenance schedule. Complying with the maintenance schedule is a prerequisite for the 3-year warranty.

Service and support directly from the manufacturer
Our comprehensive service provides you with the best individual coverage for your investment.
You benefit from:

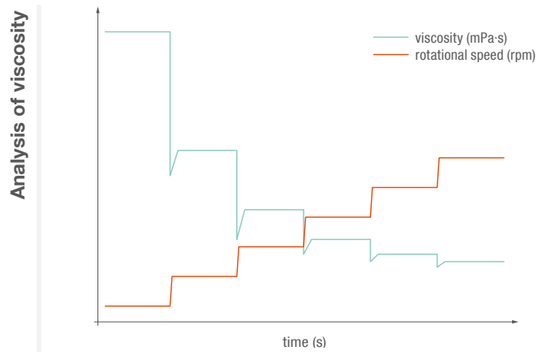
- Maximum uptime
- The shortest response time
- Certified service engineers
- A global service network

MASTER THE **FLOW**

Anton Paar offers a comprehensive portfolio of rotational viscometers and rotational/oscillatory rheometers for the adhesives industry. Besides common rheological tests, such as viscosity curves or the determination of materials’ viscoelastic properties, Anton Paar provides individual solutions, for example for dynamic mechanical analysis of films, the simulation of UV-induced curing, and for environmental conditions like humidity.

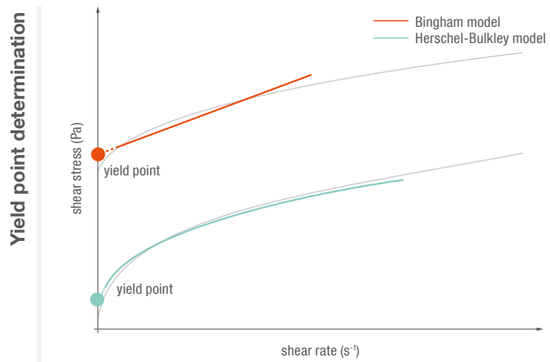
Analysis of viscosity (rotational)

Viscosity can be determined as a single point with a rotational viscometer, which is perfect for a quick check at the production line. To fully understand the flow behavior of your sample, a viscosity curve is needed. Viscosity curves include, both, low shear rates (or rotational speed), representing the sample’s viscosity at rest (e.g. when stored in its can or cartouche), and higher speeds representing the sample’s viscosity during flow (e.g. when being squeezed out of a tube or processed using a dosing system). Shear-thinning flow behavior reduces the energy required for pumping and brushing processes.



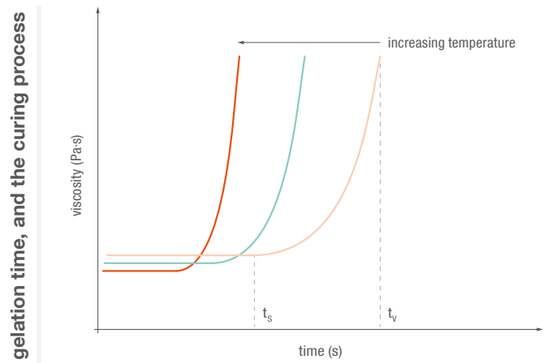
Yield point determination (rotational)

The yield point is of vital importance in quality control to figure out the force needed to start e.g. squeezing and pumping processes. The yield point is the point at which the sample starts to flow. It can be analyzed with different regression models. In quality control the yield point is determined by setting a shear rate ramp and observing the values in relation to the shear stress: The result is a flow curve.



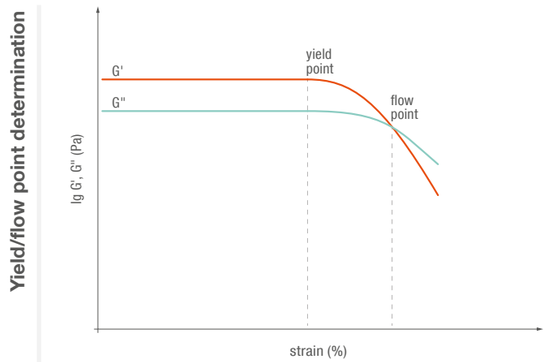
Analysis of pot life, gelation time, and the curing process (rotational)

Gel time and pot life are very important process parameters for adhesives. The viscosity is rather constant until the chemical curing reaction starts (t_S). The sample solidifies and can no longer be considered workable as soon as the viscosity approaches infinity (t_V). A time-dependent test is performed at a constant low shear rate or rotational speed to analyze pot life, gelation time, and the curing process.



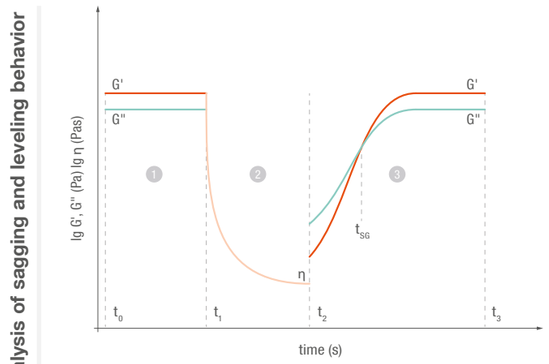
Yield/flow point determination (oscillatory)

To figure out e.g. the force needed to start squeezing and pumping processes the yield point is of vital importance in quality control. Compared to rotational tests the yield point can be determined more easily in oscillatory tests. These tests also show if a sample tends to fracture when it starts to flow.



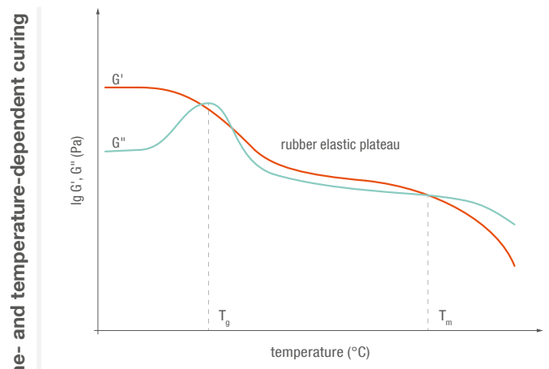
Analysis of sagging and leveling behavior (rotational and oscillatory)

Sagging and leveling behavior of adhesives can be determined with the three interval thixotropy test (3iTT). This test can be performed in rotation, oscillation, or as a combination of both, depending on the instrument type and your needs. The test results predict how the adhesive recovers its inner structure (3) after application (2) compared to the initial sample properties (1) to ensure ideal leveling and wet layer thickness, thereby preventing sagging.



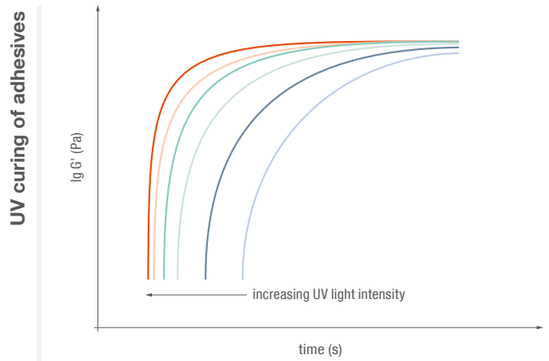
Time- and temperature-dependent curing (oscillatory)

In oscillatory tests, the material can be characterized during the entire process: as liquid adhesive before application, to monitor the curing process, and to rate the final cured product. Here, the elastic and viscous moduli (G' and G") are used to describe the sample behavior, both for isothermal tests and temperature ramps. The heating ramp of a partially crystalline hotmelt adhesive shows a glass transition temperature (T_g), a rubber-elastic plateau, and finally a melting point (T_m) above which the adhesive turns liquid and can be applied.



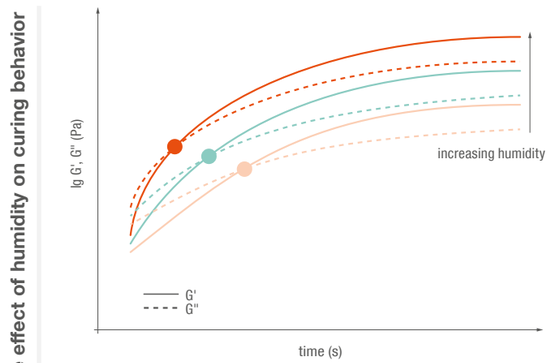
UV curing of adhesives (oscillatory)

Different UV light intensities can be applied to show the effect on the UV curing of a printing ink: the higher the applied UV light intensity, the faster the curing process advances and the higher the final stiffness (G') of the sample.



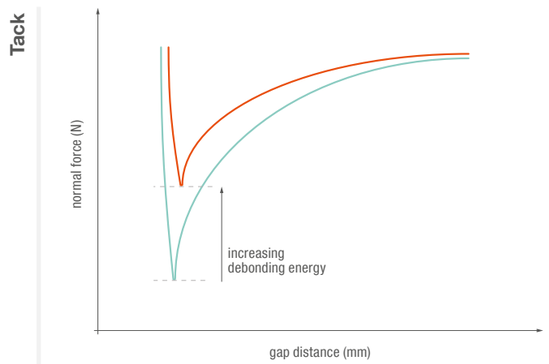
The effect of humidity on curing behavior (oscillatory)

Ambient humidity can strongly influence pot life, gel time, and the curing process. Here, increasing humidity accelerates the curing process with the gelation point being reached earlier for higher humidity.



Tack – debonding of adhesive tapes

With a tack test the peel strength (or peel adhesion) of adhesive tapes can be measured. The results provide information on the adhesive strength of a tape.



The whole world of viscometry and rheometry

	ViscoQC 100	ViscoQC 300	RheolabQC	MCR 72	MCR 92	MCR 102e, 302e, 502e	MCR 702e MultiDrive
Description	Single-point dynamic viscosity of high- to low-viscosity liquids for quick quality control	Multi-point dynamic viscosity of low- to high-viscosity liquids for quick quality control	Rotational rheological tests of materials ranging from low-viscosity to semi-solid samples for advanced quality control	Rotational rheological tests with cup-and-bob, plate-plate, and cone-plate measuring systems for liquid to semi-solid samples	Rotational and oscillatory rheological tests with cup-and-bob, plate-plate, and cone-plate measuring systems – for almost all kinds of samples	Investigations into the viscoelastic properties of raw materials, formulations, and final products from quality control to research and development	Complete material characterization in research and development
Toolmaster™* and magnetic/quick connect coupling**	✓	✓	✓	✓	✓	✓	✓
Common test methods	Single-point viscosity measurement +	Flow/viscosity curve Yield point determination Investigation of pot life/curing time +	Rotational test for yield point determination Rotational 3 interval thixotropy test (3iTT)	Rotational test for yield point determination Rotational 3 interval thixotropy test (3iTT) +	Amplitude sweep, frequency sweep, and oscillatory time sweep Oscillatory 3 interval thixotropy test (3iTT) +	Temperature sweep UV and humidity tests Chemical analysis with NIR, IR, ATR or RAMAN Powder rheology +	Advanced oscillatory and rotational tests with one or two drive units
Measurement geometries	Relative spindles (L/RH), DIN/SSA spindles, vanes, glass rod, disposable measuring system		Concentric cylinders and cups, stirrers, disposable measuring systems	Cone and plate, plate and plate, cylindrical geometries	Cone and plate, plate and plate, cylindrical geometries +	Solid fixtures for films, fibers, and bars, fixtures for extensional rheology +	Three-point-bending, cantilever
Standards	ASTM D1084, ASTM D1337, ASTM D1338, ASTM D2556, ASTM D4016, ASTM D4300, ASTM D4878, ASTM D4889, BS 5350, DIN EN 12092, DIN EN 15425, EN 15564, ISO 2555, ISO 10364 +		ASTM D3236, ISO 3219	DIN 53019, DIN spec 91143 +	DIN EN ISO 3219, DIN 54458 +	DIN EN ISO 3219, DIN 54458	

* for automatic tool recognition and configuration to ensure easy handling and minimize user errors
** for easy one-handed attachment/exchange of spindles, bobs, and measuring systems

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