

MATERIAL TEST **i30**

Flexural Strength Test on Automatic Pencil Leads with Shimadzu Autograph



Consumer goods should, fundamentally, have a certain minimum level of quality and performance appropriate to their respective uses. If consumers buy goods and find them inadequate to their needs in quality and performance, consumer assessment of the products suffers accordingly. Standards of qualities are determined by the Japan Industrial Standards (JIS), which specify the details of respective quality specifications for cooking utensils, furniture, interior goods, footwear, stationery, office supplies and other daily necessities.

The following presents the results of a quality evaluation test performed on stationery using the Shimadzu High Performance Universal Testing Machine, Model Autograph.

Flexural strength test of automatic pencil leads (in accordance with JIS-S-6019)

Ten random samples of each hardness of lead were taken from automatic pencils packaged for retail sale, then tested on a holder with a load applied to the center of the two supports at a loading rate of 1mm/min using the Shimadzu Autograph as shown in **Fig.1**. The load was measured when the specimens were broken.



Fig.1 An Automatic Pencil Lead Placed on a Holder

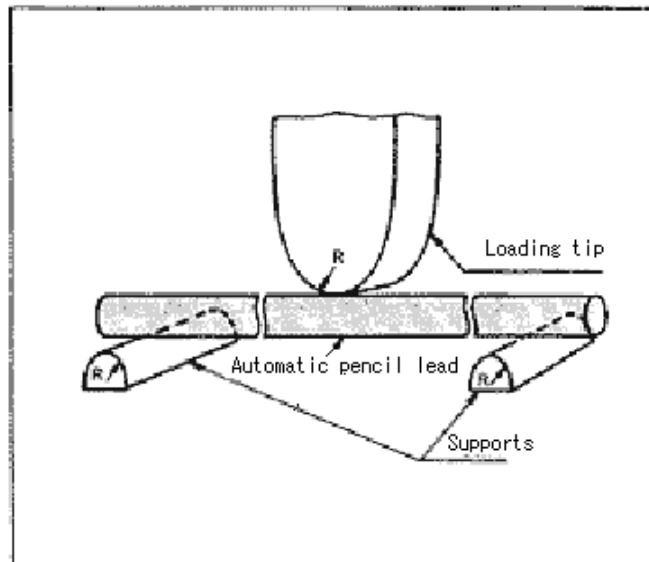


Fig.2 Schematic of Specimen Installation

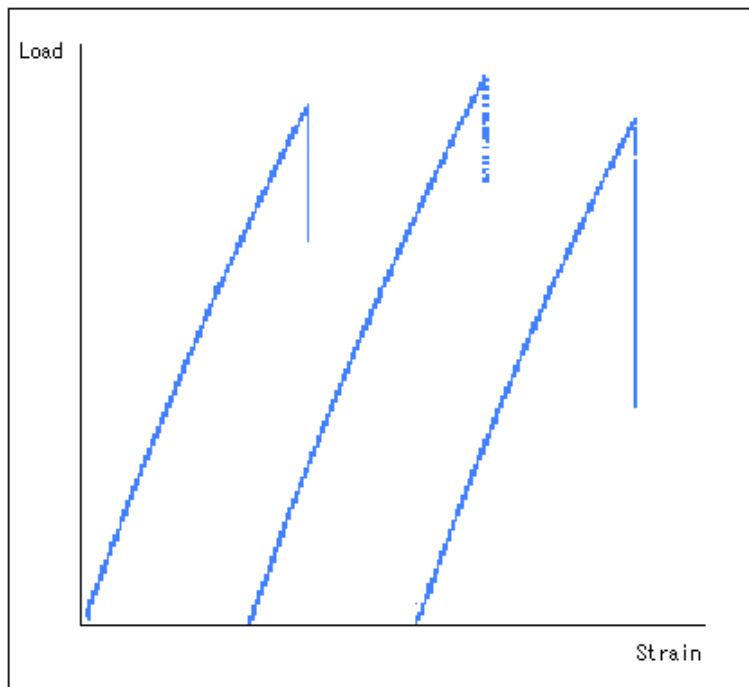


Fig.3 Flexural Fatigue Strength Test of Automatic Pencil Leads

Fig.3 shows the results of data processing of flexural strengths calculated from the average of the measured values, excluding the max. and the min. values.

Fig.4 shows the relationship between the hardness and fatigue strengths of leads. Lead strength increases proportionally with hardness from the softest class B to the hardest class H. Hardness class 2H is an exception, where strength falls, supposedly due to the fragility of leads.

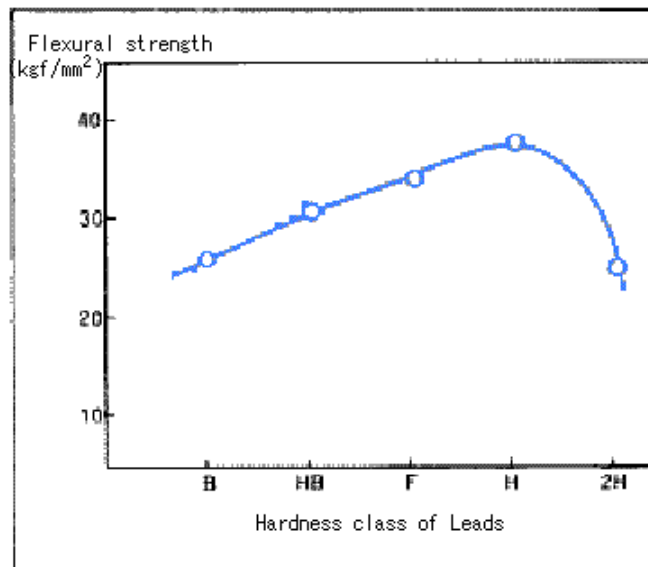


Fig.4
Relation between Hardness and Flexural Strength of Automatic Pencil Leads

* Please be advised that data obtained before the implementation of the current Weights and Measures Law may be presented in terms of gravimetric unit.



SHIMADZU CORPORATION International Marketing Division
3,Kanda-Nishikicho 1-chome, Chiyoda-ku,Tokyo 101-8448,
JapanPhone: 81(3)3219-5641 Fax: 81(3)3219-5710
Cable Add,;SHIMADZU TOKYO

SHIMADZU SCIENTIFIC INSTRUMENTS, INC.
7102, Riverwood Drive, Columbia, Maryland 21046, U.S.A.
Phone: 1(410)381-1227 Fax: 1(410)381-1222 Toll Free:1(800)477-1227

SHIMADZU DEUTSCHLAND GmbH
Albert-Hahn-Strasse 6-10, D-47269 Duisburg, F.R. Germany
Phone: 49(203)7687-0 Fax: 49(203)7666-25

SHIMADZU (ASIA PACIFIC) PTE LTD.
16 Science Park Drive #01-01,Singapore Science Park, Singapore 118227, Republic of Singapore
Phone: 65-778-6280 Fax: 65-779-2935

SHIMADZU SCIENTIFIC INSTRUMENTS(OCEANIA)PTY. LTD.
Rydalmere Business Park, Unit T, 10-16, South Street Rydalmere, N.S.W. 2116, Australia
Phone: 61(2)9684-4200 Fax: 61(2)9684-4055

SHIMADZU DO BRASIL COMERCIO LTDA.
Rua Cenzo Sbrighi, 25 CEP 05036-010 Agua Branca, Sao Paulo, BRAZIL
Phone: 55(11)3611-1688 Fax: 55(11)3611-2209

SHIMADZU (HONG KONG) LIMITED.
Suite 1028, Ocean Centre, Harbour City, Tsim Sha tsui, Kowloon, HONG KONG
Phone: 852(2375)4979 Fax: 852(2199)7438

Overseas Office
Istanbul,Beijing,Shanghai,Guangzhou,Shenyang,Chengdu,Moscow