

180 Degree Adhesive Peel Tester

Sujit Gunjal¹, Abhishek Gunjal², Ashish Kadam³, Yash Khardikar⁴, Prof. Tushar Patil⁵

¹ *Sujit Ramnath gunjal, Mechanical, Matoshri college of engineering, Maharashtra, india*

² *Abhishek Balasaheb Gunjal, Mechanical, Matoshri college of engineering, Maharashtra, india*

³ *Ashish Digambar Kadam, Mechanical, Matoshri college of engineering, Maharashtra, india*

⁴ *Yash Vinit Khardikar, Mechanical, Matoshri college of engineering, Maharashtra, india*

⁵ *Prof. Tushar R. Patil, Mechanical, Matoshri college of engineering, Maharashtra, india*

ABSTRACT

Adhesive strength refers to the ability of an adhesive to stick to a surface and bond two surfaces together. It is measured by assessing the maximum tensile stress needed to detach or unstick the adhesive perpendicular to the substrate. To measure this adhesiveness there is a device called Adhesive adhesivness Tester. adhesivness tests are the practice of testing adhesion properties of film bonded to substrate, usually by tensile. The adhesivness strength determines the adhesive strength also called the adhesive fracture toughness. Physical testing of packaging products by adhesivness can tell us a lot about its properties and manufacturing process such as sealing consistency, bonding strength, adherence ability, cohesive properties of the interface, bond durability and other parameters. This device covers the measurement of the adhesivness adhesion of pressure sensitive tapes. adhesivness adhesion is the force required to remove a pressure sensitive tape from a test panel or its own backing at a controlled angle and at a standard rate and condition. A adhesivness test is performed between two substances bonded together with an adhesive. The substrates may be both flexible or one may be flexible while other is rigid.

KEYWORD- ADHESIVNESSTESTING, TESTINGMACHINE, PEELTESTING and DIFFERENTSURFACE.

1. INTRODUCTION

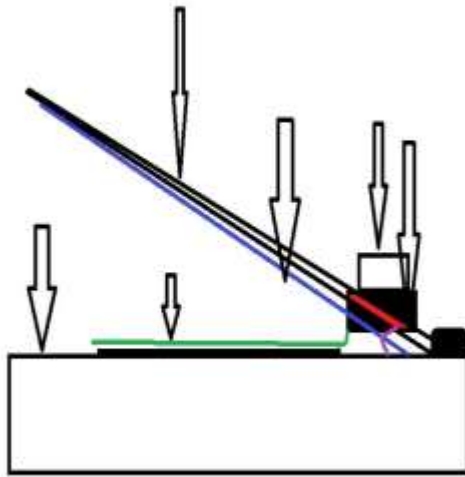
Adhesivness testing of adhesive and pressure sensitive tapes is used for quality assurance, and provides a means of assessing uniformity of the adhesion of a given type of tape. The assessment may be within a roll of tape, between rolls, or between production lots. Generally the goal of a adhesivness test is to determine the adhesive strength of the material or the strength of adhesive bond between two materials. This adhesive strength may be referred to as the “stickiness” of a material as it is a measure of the samples resistance to separation from one another after the adhesive has been applied. This measured value may then be used to determine if the adhesive bond is strong enough or too strong for the application and whether a different adhesive or bonding process is needed. A adhesivness test is performed between two substances bonded together with an adhesive and they may be both flexible or one may be flexible while other is rigid as mentioned above, so this flexible substrate often consists tape, film, thin plastic material, rubber or other polymers, whereas the rigid substrate is commonly but not limited to a type of metal, rigid plastic or composite.

1.1 OBJECTIVE

We Can measure the Accuracy of tape from 0 to 180 Degree. It Has low maintenance work. It is low in cost compared to original device and also with respect to price it gives more effective work and accuracy. It is very cheap in price so it can be used in furniture industry also to check the adhesiveness of Tape. We can also measure the adhesiveness of tape on different surfaces like wooden, metallic, stainless steel, mat or glossy etc. Compared to original this device is light in weight .

1.2 METHODOLOGY

First we make one wooden base on which we construct some wooden mechanism in that mechanism a one screw thread pipe is attached from one end to another on which we attached one wooden block this mechanism is connected to a 30 rpm motor when motor rotates the screw thread also rotates with 30 rotation per minute the block which is mounted on that screw thread is going from lower end to upper end. On that wooden block weight metre attached that pulls the tape upside which creates a stress between surface and tape that stress gives some number which is adhesiveness of that tape in units like kg/m.



2. DESIGN

First we create some rough diagram or design of our device after that we design the device in creo software with proper measurements. Total wooden base measurement after that how long screw thread we can adjust in that mechanism all that stuff we design first in that software that's why we get total concept of our project's design work.



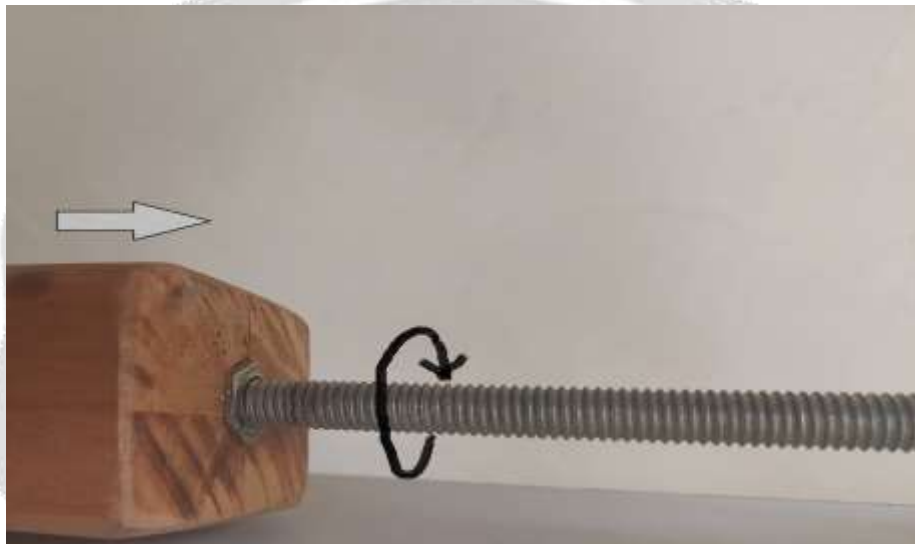
Structure of machine

The Structure of our machine is very simple first we make design of our project in creo software. on the basis of that design we make wooden base on which we construct our main mechanism on which we take our testings. on that mechanism screw thread is attach to one wooden block that moves upper side and lower side with the help of motor. so the with that block weightmetre is attached to take reading of the tape and many more all this mechanism is our structure as u shown in figure work.

2. Digital Weight meter
3. Bed for different surface
4. Wood upper frame
5. Wooden Block
6. Metallic Surface
7. Screw Thread

3. PROCESS OF WORKING

So now the process of working is when motor rotates about its own axis the shaft will be also rotate which is mounted on that motor. One wooden block is attached to that shaft with the help of bearing. So when the shaft rotates that wooden block is move upside and on that block we attached weightmetre which pulls up the tape with the help of hook when it pills the tape we get the measurements of that tapes adhesiveness. As u can see in the diagram given below work



Name of the chart

3.1 CALIBRATION

First we make one wooden base on which we construct some wooden mechanism in that mechanism a one screw thread pipe is attached from one end to another on which we attached one wooden block this mechanism is connected to a 30 rpm motor when motor rotates the screw thread also rotates with 30 rotation per minute the block which is mounted on that screw thread is going from lower end to upper end On that wooden block weight metre attached that pulls the tape upside which creates a stress between surface and tape that stress gives some number which is adhesiveness of that tape in units like kg/m work.

3.2 TESTING

Our machine is almost 9-10 times cheaper than actual machine so to maintain accuracy of machine we make technique to take multiple reading while doing operation .3 readings and it's average value give a perfect closest value .That's why minimum 3 time testing is must for better accuracy and we can also increase it to 5 or even 10 reading for best accuracy

3.3 CALCULATION

Taking reading in kg /lbs / pound with different angle usually between 10-120° give an different values and we also need to take 3 readings to get avarage and closest value to ideal .We also did some calculation regarding to overall length and width of machine and size of bed to make it more user-friendly as well as portable

4. CONCLUSIONS

The main goal of the peel test is to determine the adhesive strength of a material or the strength of the adhesive bond between tape and surface. From this experiment we get accurate values of the adhesiveness of the tape from which in furniture industries it is more useful to detect that strength so they get exact value of tape for stitching the laminates proper.

5. REFERENCES

- [1]. L H Sharpe, „Wettability and “adhesion” revisited“, Proceedings of Adhesion “99, Institute of Materials, 1999.
- [2]. J JBikerman, „The Science of Adhesive Joints“, Academic Press, 1968
- [3]. J R Huntsberger, Surface energy, wetting and adhesion, J Adhesion 12, pp3-12, 1981.
- [4]. A A Roche and J Bouchet, „Formation of epoxy/metal interphases“, Proceedings of Structural Adhesives in Engineering VI, Institute of Materials, 2001.
- [5]. L H Sharpe, The interphase in adhesion, Proceedings of Aspects of Adhesion 9, Transcripta Books, ed. D Alner and K Allen, 1973