

ADHESION DISK MODEL GS-365

The Adhesion Disk is used to show that there is a measurable attraction between surfaces in contact, such as the adhesion disk and water. That is to say, there is a noticeable effort required to separate the disk from the surface of the water. You will need a light-duty spring or balance arm scale to measure this effect. A typical WINSKO GS-365 Adhesion Disk weighs 35 to 40 grams, so a scale with a full range of 100 grams would be very suitable.

The first step in using this unit is to adjust the support threads so that the disk is level when supported by the ring. The twists in the threads are there on purpose and provide the friction to assure that the disk remains in the adjusted position. Put the disk on a level surface and hold it down with your left index finger in the center of the disk. Hold the support ring in your right hand and lift the ring to pull the threads taut. Then try lifting the disk to see if it remains level as it leaves the surface. If one side leaves first, repeat the procedure until the entire disk lifts free at the same time.

Now hang the adhesion disk from the scale hook and note the weight. Lower it until the bottom of the disk is in full contact with a water surface in a bowl or beaker. Slowly raise the scale to lift the disk free of the water, noting the maximum scale reading. It will be much higher than the weight of the disk in air.

What is happening is that the water clings or adheres to the disk as we try to raise it and we are actually lifting the water. There comes a point where the water is pulled so high that it is no longer equal to the stress, is pulled apart and separation occurs. Obviously there is a relationship here between the glass and the water and their willingness to cling together. What would happen if the glass were coated with liquid auto wax?



What would happen if the water had a liberal addition of laundry detergent? Will the reading be the same for cold and hot water? How about a mixture of alcohol and water? Each of these will have a significant effect on how tightly the water will cling to the glass and to itself. If the water doesn't stay together or cohere, we'll have a tough time lifting it. When we pull upwards on the disk, it tries to "pull a vacuum" on the water and air pressure surrounding the disk helps push the water up. If the water has no desire whatsoever to cling to the glass, the force necessary to raise the disk would only be equal to its weight.