Chrono Stuff to Do

How Far away is That Thunderstorm?

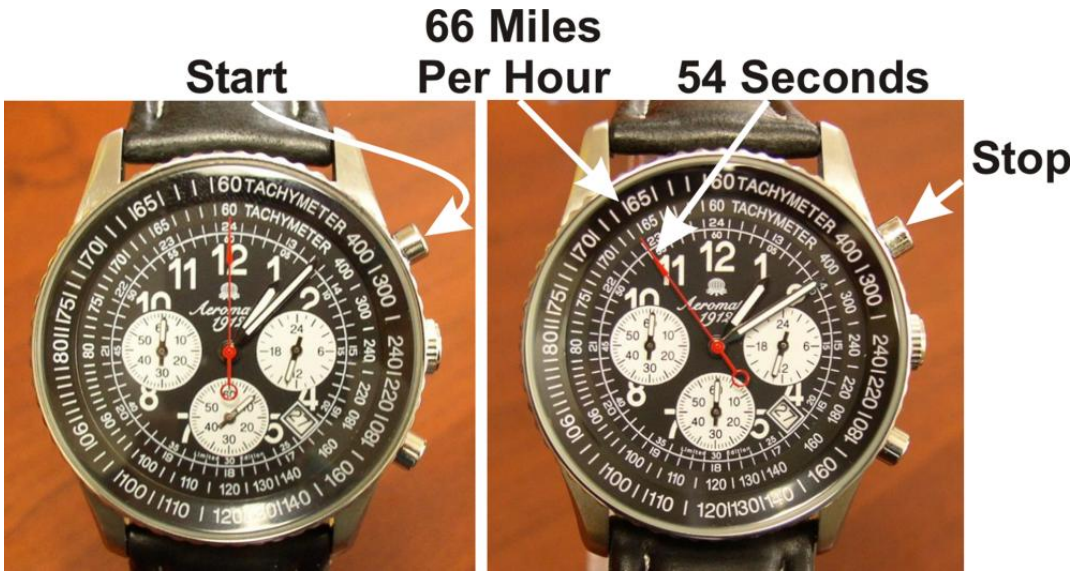
So you've got your chronograph, you do, don't you? If not, you should probably stop reading this and rush right over to **www.TheWatchPalceOnline.com** and buy one or even two. We'll wait….

OK, so **now** you've got your chronograph and you'd like to put it to good use. We've all heard that one can tell how far away a storm is by the number of seconds that pass between seeing a flash of lightning and hearing thunder. There is a fair amount of truth to this. Now at this point I am going to remind you all that I am an Engineer and that I am actively trying to keep the amount of mindless tedium in these emails to a minimum. You've been warned. The speed at which sound propagates (or travels from its source) is directly influenced by both the medium through which it travels and the factors affecting the medium, such as altitude, humidity and temperature for gases like air. Bad news for Star Wars fans—there is no sound in the vacuum of space because there are too few molecules to propagate a wave. It is important to note that sound speed in air is determined by the air itself. It is not dependent upon the sound's amplitude, frequency or wavelength. To calculate the speed of sound in dry air at sea level, use the following formula: **V = 331.4 + 0.6Tc** where V = velocity (m/s), Tc = temperature in Celsius. Had enough? For this example we are going assume that thunder moves at about one mile every five seconds.

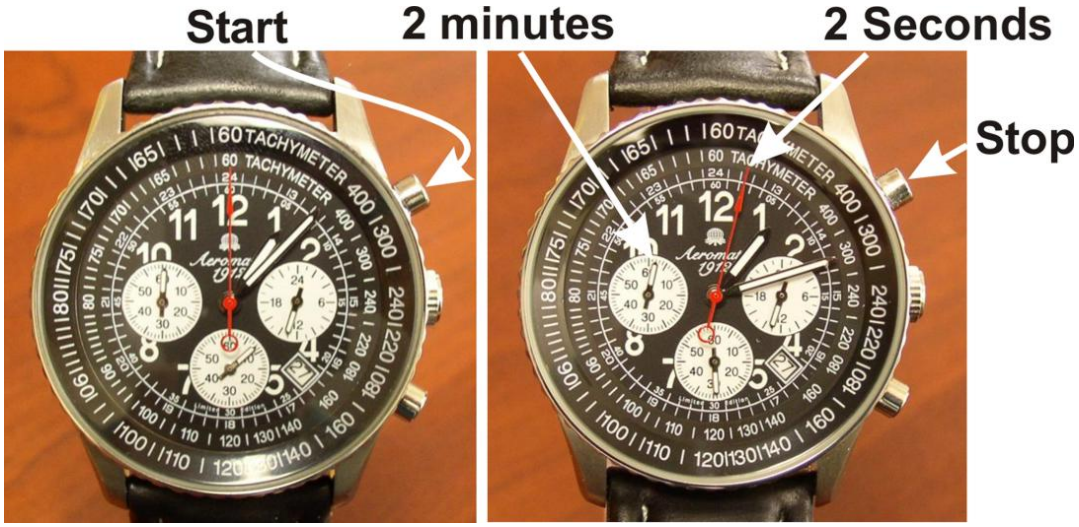
As pictured above, the chronograph is at zero and we start it when we see the flash of lightning and stop it when we hear thunder. As you can see, 27.2 seconds passed, which means the storm (*or at least the source of lightning*) is about 5 miles away. Now we reset or re-zero our chronograph and make sure the windows are closed at home.

Many chronographs have a tachymeter ring which is usually calibrated for miles per hour or kilometers per hour. This can be used to measure both fast and slow speeds. We'll start with my motorcycle.

Some motorcycle speedometers aren't all that accurate. I can check mine with a chronograph, a friend (*to operate said chronograph*) and a measured mile. These are to be found on lots of roads and used by air-patrols to catch speeders. These are usually younger people on motorcycles as those of us who are over 40 have much more sense than to be (*caught*) speeding. My friend stands near the end of the measured mile; I get up to speed, say 60 mph and hold it steady. When my front tire crosses the first marker of the mile, my friend starts the chronograph. When I cross the end marker, my friend stops the chronograph. In the example pictured below, 54 seconds have passed, so my speed over that mile was 66 miles per hour (*as indicated in the tachymeter ring*). I'm going to assume that my speedometer is 10% off…. NOT that I let the speed creep up to 66mph.



What about something a little slower like my scooter? This time we'll suppose that my friend is riding with me and has just purchased a chronograph with a tachymeter ring from www.TheWatchPlaceOnline.com , an altogether smart thing to do. We are coming up on a measured mile and he decides to try the watch out. As soon as we cross the first marker, the start plunger is pressed. As we cross the end marker, the plunger is pressed again to stop the watch. The tachymeter ring is close to 60, but we weren't going anything like that fast.



In the picture above, you will notice that a little over **2 minutes** have elapsed. The scale on the tachymeter ring must be divided by the number of minutes elapsed. As such, the speed of the scooter was about 30 miles per hour.

Now let's use the same picture to measure something really slow – me in a small sailboat. This time we will be using a shorter distance for the measurement, one-tenth of a mile. Let's suppose that there are two buoyed markers on the lake that are one-tenth of a mile apart. The chronograph starts when the bow of the sailboat passes the first marker and stops when it passed the second marker. Again, slightly over 2 minutes have elapsed, so we know we have to divide the tachymeter ring by two, but we also have to account for the distance and divide the result by ten (one-tenth of a mile distance). This means I was sailing at a speed of about 3 miles per hour. Anyone who has seen me trying to sail will tell you that this is fast for me.

That's about it for this time, thanks again for your support of our sites. We truly appreciate your comments and feedback.

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