

TECH STOP

DEW POINT TEMPERATURE & RACETRACK PREP.

by Robert Szabo

Dew point is the temperature at which dew (water) will form from the humidity in the air. This is an important value since much of the tire traction from a racing slick is essentially lost if this temperature is reached. The dew point temperature is provided by many local weather reporting agencies as well as Internet weather services.

EXAMPLE: Today, the local weather station showed a temperature of 63 deg. F at 10 AM. The dew point was 52 deg. F. There was no dew on the ground and traction was good. If a cold front is moving in, the temperature should be watched carefully when it is approaching the dew point temperature. The temperature can drop to the dew point and racing may be impacted.

EXAMPLE: Last year at one of my races, the regional temperature dropped to 65 deg. F in the evening. The dew point was 65 deg. F. Dew was everywhere and tire traction was a struggle.

RELATIVE HUMIDITY AND DEW POINT: The relative humidity of a region can be an indicator of how close the temperature is to the dew point. As the temperature changes throughout the day, the relative humidity varies. That can be seen in hourly forecasts from Internet sources. For example, in Epping, N.H. for Tuesday, May 22, at 5 pm, 60 deg. F and 41% humidity are forecasted. At 8 PM, a cooler 53 deg. F and a higher 53% humidity are forecasted. Relative humidity tends to go down with warmer temperature and up with cooler temperature. That change in relative humidity is not entirely indicative of the change in mass of humidity in the air. While there is a humidity change with temperature, the greater change is the amount of water saturation in the air. The air has an ability to hold a certain amount of humidity. The actual mass of humidity in the air may not vary throughout the day. However, the percentage of saturation does vary. The mass of humidity in Epping may be close to the same amount at 5 PM and 8 PM (or a small increase). However, the percentage of saturation does show a greater change with temperature. In coastal regions, I have seen 90 deg. days at 40% humidity followed by 60 deg. nights at 80% humidity. The air is more saturated in the cooler evening.

In addition, the dew point may change with the regional temperature. In Charleston, S.C., a temperature of 82 deg. F and a dew point of 62 deg. F are forecasted for Tuesday afternoon. A temperature dropping to 67 deg. F and a dew point rising to 65 deg. F are forecasted for early Wednesday morning. If the regional temperature reaches the dew point temperature, the air is saturated with humidity. In Charleston, S.C. early Wednesday morning, it is close. If the temperature drops further, the humidity condenses out and forms droplets. These droplets will coat a racetrack surface. If this condition were to occur during racing hours at Lowcountry Dragway in Charlestown, traction would be reduced or lost.

TREAD OR NOT: Highway vehicles can drive in these moist conditions because street legal tires have a tread pattern that cuts through the dew and grips the surface. Racing slicks do not have a tread pattern with ditches and grooves for the dew to be squeezed in as the tire goes over the surface. As a result, a racing slick will hydroplane on even a small amount of water. I know of two vehicles with bad experiences with racing slicks on the street. One case was a six month old modified 300 HP '63 Impala that was driven very carefully with racing slicks. Unfortunately one day the owner's parent jumped in to borrow the car for a jaunt to the store. The parent drove over some wet pavement and spun into a ditch destroying the Classic. In another case, a relative just finished dropping a Big Block into a brand new Corvette Stingray. During the maiden voyage on the street with racing slicks, a small patch of wet pavement sent that car barrel rolling down an embankment.

RACETRACK SURFACE TREATMENT: Almost all of the IHRA events use a race surface prepared with a spray-on treatment. As the sport of drag racing has evolved through the years, the higher power racecars seemed to evolve with an increasing need for more of a sticky track surface. While a liberal spray of surface treatment on the track does provide a sticky surface, there is a significantly greater benefit from this.

UNIFORMITY: A big advantage to a spray-on surface treatment is uniformity. While it may not be truly uniform from a hot afternoon to a cooler evening, it is much more uniform than having the track surfaces without this treatment. From time to time, we have taken our blown alcohol bracket racer out to an industrial parking lot to fire it up and do some burnouts. We found out quickly that the typical pavement in a public lot not only had a fraction of the traction of a racetrack surface, but it was incredibly variable. When we would return to the same location, sometimes we could do high gear burnouts at will (without any water). Other times, the car would hook-up somewhat with second gear launches. First gear launches were like a free rev. The engine would zing at one-quarter throttle regardless of the surface. Sometimes there was visible dust. Other times there was not. The value of a well-prepared racetrack surface became obvious after that alternative experience. At the prepared track, we hook up and can carry the front wheels on a launch.

THE IHRA TRACK SURFACE SERVICE PROVIDER: One of the biggest benefits of an IHRA event is the track surface preparation. While there is more variability in non-National Events, the variability in National Events is reduced with the use of a significant amount of surface treatment. IHRA uses VHT from PJH Brands. PJH is short for P. J. Harvey, the founder. According to Jim Weinert (IHRA & PJH Brands representative), 6 to 10 drums of VHT are used at a typical National Event. The greater amount is used for cooler weather.

I have often heard the age-old argument: the racer says, "Fix the racetrack." and the racetrack preparers say, "Fix your racecar." Unfortunately racecar preparation has evolved to the point where an exceptional race surface is needed for exceptional runs. Keep in mind that the word "exceptional" has a somewhat different meaning from one race team to

the next. I cannot defend either side. I have done both racecar setup and racetrack preparation. My racecar setup is somewhat soft for the brackets. At the national event level, rolling the dice for a setup that is on edge has become part of the intrigue of the sport. Gearing and clutch engagement programs that push the limit of traction are common.

DEW POINT & HUMIDITY: That is where water in the air shows its ugly head. VHT is not water-soluble. According to Weinert, it does provide an exceptional track surface for low levels of moisture from dew. However, Jim, as well as other track personnel, constantly watch the track surface if that dew point issue occurs. Jim notes that at a certain level of heavier dew formation, VHT will not compensate. The track is slippery and racing may need to be halted.

RAIN: Water on the track surface comes from two main sources: rain or dew. When the dew point is reached at higher elevations, it rains even though the air at ground level may not be saturated.

DEW: Dew from the air at the ground level is another source. It can be a clear day with few clouds. Above the racetrack, the air is not saturated with water at any elevation. There is no rain in sight. The local food growers are disappointed. There is a relative humidity in the air. The air can only hold that moisture to a certain temperature. A cold front is approaching or simply a temperature reduction occurs from sundown. Weather stations are indicating a dew point temperature approach. You are in staging lanes and your windscreen has fog on it. You wipe it off and you can see. However, what is the track surface like from that dew?

The windscreen is cooler than the racetrack surface in the early evening. It has ambient air both outside and inside. Plus it is thin and not capable of storing much heat. The track is holding heat from the day's hot sun. In the early evening, I often measure a track temperature of 10 deg. F more than the air temperature. How do you do that? Using a hand held heat measurement gun, point to the track surface for a track temperature. Then point to a metal railing or bleachers support to get the air temperature. A metal strut in the air will be at air temperature. The ground will be warmer in the evening from heat soaking in during the day. The temperature of the air at the windscreen is at (or below) the dew point. Dew forms on the windscreen. Racecars are still flying down the track and hooking up. That is because (1) the VHT is helping for low levels of dew formation on the track surface and (2) the racetrack surface is warmer. The atmosphere near that surface is warmer. It is still above the dew point.

A LOT OF TRAFFIC: Royce Miller, Maryland International Raceway, reports that race traffic on the track also helps. The air washing from each race vehicle helps to blow away the humidity to keep it from forming.

INSPECTION: If the outside temperature approaches the dew point temperature, the racing surface must be checked. Miller says that feeling the pavement with your hand will reveal humidity on the surface. Twisting your foot on the starting line pavement to see if it is sticky may not reveal the moisture.

BACK TO THE STAGING LANES: It is fast approaching that point of no return. Weinert is watching his Altronics Portable Weather Station at the track. Several of the racers who are equipped with weather stations are watching as well. If the dew point is reached in the evening, it will most likely remain until sunrise the next day.

RACETRACK MATERIAL: Weinert reports there can also be a difference in temperature between concrete and pavement. He is watching both. Jason Peterson, US 131 Motorsports Park, Mich., as well as Miller both report that often the racing groove narrows under these conditions. Traction does get a little dicey on the edge of the track. If a car gets out of the groove during the day, it may be recovered OK. Good traction is across the track. However, with dew on the track on a cool evening, the groove may be as little as 10 feet wide, according to Peterson. Get out of that groove in a humid evening and the race is probably over for you. Weinert said weather patterns are one of the careful considerations for the National Event schedules and locations. They are chosen from a lot of analysis to best minimize dew point and other weather interruptions. •

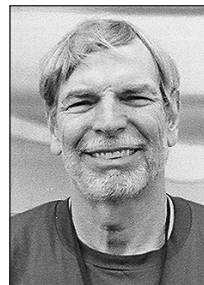
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