

Exhaust Gas Temperatures

EGT Maximums, Limits, & Guidelines

What are EGTs?

EGT is short for exhaust gas temperature, and are literally the temperature of the exhaust gases as they are being expelled from the cylinder. A sensor in the exhaust manifold or turbo up pipe sends EGT readings to a pyrometer, which is the gauge that displays them. Unlike gas engines, a diesel operates within a broad range of air-to-fuel ratios. When a diesel runs rich, combustion temperatures (and therefore EGTs) increase. Likewise, when a diesel runs lean, combustion temperatures decrease. Since your Cummins, Power Stroke, or Duramax does not operate at a single air-to-fuel ratio, having a pyrometer to monitor exhaust gas temperatures is extremely useful and gives drivers a sense of the conditions in which the engine is operating. When performing modifications to your engine that increase fuel delivery, the importance of monitoring EGTs becomes even more important. When EGTs are pushed beyond the limits of the turbocharger and vital engine components, catastrophic failure can occur.\

What is the maximum safe EGT?

The absolute maximum safe EGT is debatable. The universal rule of thumb (whether you have a Cummins, Power Stroke, Duramax, or even an older IDI) is to not exceed 1250 degrees F for extended periods of time, and not to operate in the 1250 - 1300 degree F range for more than a 5-10 second burst. Here at Diesel Power Network, we live by more conservative standards. We recommend you do not hold more than 1200 degrees for an extended period of time and back off the throttle anytime you see 1250+. You may have heard of competition vehicles logging up to 1800 degrees during a drag race of sled pull. These engines have been extensively modified in order to survive at these temperatures, do not try to replicate this in your truck.

Should EGTs be measured before or after the turbo?

Always measure exhaust gas temperatures before the turbocharger; the closer to the exhaust manifold, the better. The farther away you get from the exhaust manifold, the more diluted the reading will be (and therefore less useful).

How can I lower my EGTs?

If your having difficulty managing EGTs (keeping them within the recommend limits), you have too much fuel, not enough airflow, or a combination of both. Often times when fueling is increased (via injectors, tuning, etc) but airflow is not, drivers will find it difficult to keep EGTs at safe levels, especially while towing. In these situations, you will need to find a way to feed the engine more air, or feed it cooler air. Some remedies to high EGTs are: [Intercooler upgrades](#), a [more efficient turbocharger](#), [free flowing exhaust](#), [intake kits](#), and [water injection](#). Visible smoke under load is a sign that you have insufficient airflow for the amount of fuel your engine is receiving. It is very common for owners to increase the fueling of their vehicle without properly addressing airflow. A properly built high performance street engine should be able to maintain manageable EGTs under load or at WOT.

Do I need a pyrometer?

Even stock trucks will benefit from being able to monitor EGTs via a pyrometer. A pyrometer is cheap insurance against engine failure, especially for trucks that tow considerable amounts of weight. A pyrometer will tell you when you are overworking your engine or putting it at risk of failure. Installation is very straight forward for most mechanically inclined individuals, and a quality pyrometer is not an expensive item.

What happens if I exceed my engine's EGT Limits?

If you're lucky, the turbocharger will fail. If you're unlucky, you will burn up a piston and be rebuilding the engine. If you're very unlikely, the failure will have a domino effect and you will be looking for a new engine. To put it into perspective, a turbocharger can spin anywhere between 60,000 and 100,000 rpm. Imagine the same turbocharger spinning at these speeds while it is more than 1300 degrees F. Easier to imagine the dangers? Don't forget aluminum melts at just over 1200 degrees (in general, alloys used in pistons will have higher melting points). How long will your pistons last before they soak up enough heat to fail?



Would you rather be installing a \$200 pyrometer or rebuilding your engine?



In case you failed to notice, this turbocharger used to have fins on the turbine wheel.