REGENERATION SIMPLIFIED

(A cheat sheet only – Not a substitute for the Operator’s Manual)

When you see this symbol below in your dash display:

![Symbol Image]

YOU MUST PERFORM A PARKED MANUAL REGENERATION!

(Do not ignore. Don’t pass it off to next shift. Stay with the vehicle during regen)

**Light is on solid:**
Regen as soon as you can. Probably ok to finish what you’re doing and do a parked regen back on the apron at the firehouse immediately upon returning, preferably without ever shutting off the engine. (We need all the exhaust heat we can get.)

**Light is flashing:**
Don’t mess around -- Find a safe place to stop and do a parked regen ASAP.

**Light is flashing and you now also have a “check engine” light:**
Same as above. Ignore this and you will have drivability issues very soon.

**Performing a parked regen:**
- Safe location, engine running and at operating temp, and parking brake set.
- Don’t touch the throttle, the brake pedal, or the “regen inhibit” or any other switches. (*Rescue, Hamer 1, and Truck 2, see “tips” section*)
- Press and hold the “DPF REGEN” switch (next page) for approximately five seconds.
- Engine will automatically increase RPM when the regen starts. Do not touch the high idle switch.
- The computer will monitor the regen, the engine will return to idle when the regen is complete. (See the tips and FAQ’s section)
- Idle for a few minutes to cool down until HEST light goes out. (See below)
When you see this symbol below in your dash display:

Don’t worry, this is a good thing. It indicates **High Exhaust System Temperature**. The “HEST” lamp means that a regen is either in progress or has recently completed and your exhaust temperatures are still very hot from the soot burning cycle. You could see this lamp during normal driving or even while pumping. No worries.

**If the HEST light is on during normal driving as you return to quarters:**
Stop on the apron, set the brake, and let the rig idle until the light goes out before backing in. The computer has automatically performed a regen. Simply let it finish its cycle and it will be one less thing to worry about later. *(This would also apply if you stop on a non-emergency call somewhere and the HEST light is on. Leave a member with the rig and let it idle if possible. Call it a “free” regen if you will.)*
These modern diesel emission systems are certainly not infallible. In fact, they are fragile and prone to having numerous glitches. But they are here and they are here to stay for the foreseeable future so we have to make the best of it. Problems can and will continue to occur even if the operator does everything 100% correct. With that however, we are seeing an increase in system failures that seem to be happening because of lack of information being shared and in some cases, incorrect information being shared. Hopefully we can correctly answer some questions that will be beneficial to all of us.

Rescue, Hamer 1, and Truck 2 only:
Detroit Diesel has two additional steps that must happen to make a parked regen initiate. After stopping in a safe location, you must cycle the transmission from “D” to “N” and then cycle the parking brake (release/reapply) before pressing the regen switch for at least five seconds. The rest of the process is the same. You just happen to have the last three, post 2007 emissions, Series 60 diesels in the fleet.

The “Regen Inhibit” switch:
Its purpose is to tell the computer “not” to regen. Regens create very high exhaust temperatures in the neighborhood of 1200 degrees. You may be in a situation where something within approximately five feet of the exhaust system could either burn, melt, or explode. The inhibit switch will keep the rig from going into a regen during that run cycle. Other than those and similar situations where you feel you need to inhibit a regen for safety reasons, DO NOT PUSH THIS SWITCH!

We have had multiple instances where regens had been inhibited over and over and the DPF plugged up to point of having significant drivability issues.

FAQ’s
Q: Aren’t fire apparatus exempt from all of these emission controls?
A: No. It’s a common misconception though. I have spoken directly to people at the EPA. The only tidbit of progress that the fire service gained over the years was language that gave us, “short-term relief from emission controls while operating in emergency situations.” This basically means that should a sensor fail or something similar while on scene, the computer will not throw the apparatus into “limp mode” and start cutting back engine power during that particular “key-on” cycle. It will continue to run until mechanically it simply can’t run anymore. You’ll need to monitor the apparatus and act accordingly. However, once you finish up and shut the truck off all bets are off. The next
time you start it up and depending on what caused the initial system malfunction -- You may now be in limp mode or in need of a tow.

Q: **What is a “regen” and why do we need to do it?**
A: Google or YouTube “DPF REGEN” and it will give you tons of nice, short animations that show you how a DPF (Diesel Particulate Filter) works and why it needs to regen. I seriously recommend running a search and watching one. There are some very useful videos on the subject.

In a nutshell when everything is working properly, the DPF is designed to trap all of the soot that your engine produces. It can only trap “X” amount of soot before air flow across the DPF starts to get restricted. Before that air restriction gets to a point where it may cause a drivability issue (i.e. your engine can’t breathe properly);

- The computer will attempt to do an automatic regen by dumping a little diesel fuel into the exhaust pipe to help raise exhaust temperatures and “light off” the catalyst located in front of the DPF.
- As mentioned in a question/answer below, our drive cycles are not conducive to this burn cycle happening automatically. That is why we must do the parked manual regen.
- The catalyst will burn extremely hot and start the soot burning. As the soot burns off, it leaves a fine ash behind but your DPF will now breathe properly again.

Q: **What happens to all that trapped ash?**
A: Unfortunately, nothing. It stays inside the DPF. Most manufacturers design their DPF’s to catch the ash equivalent of running 5000 engine hours. At that point, the DPF must be disassembled and taken to a proper cleaning facility or simply replaced. Driving style can contribute greatly to the expected life of the DPF. Again, our driving styles do not promote long life.

Q: **What if I’m doing a parked regen and we get a run?**
A: Very simple. Get in your rig and take the run. You do not have to do anything unusual. **Do not** touch the regen inhibit switch to stop the regen. (This has been a common misconception) As soon as you touch the brake pedal or release the parking brake, the parked regen will stop all by itself. Depending on how far along your regen process was when you got the run, you may not have to do anything when you return to quarters, the lights will tell you. And because you didn’t hit that “inhibit” switch, your regen may reinitiate by itself while you drive since you’ve already got the catalyst temperature up where it needs to be.
Q: I’ve heard that if my DPF light comes on, I can just go drive the highway a little and the DPF will clean itself out. Is this correct?

A: In our fire truck world, this answer will almost always be, “absolutely not.” Our operational and driving model is just about the worst scenario for these modern diesel emission systems. The call for service comes in, we start up usually below normal operating temperature, we stick our foot to the floor, we make lots of soot that gets trapped inside the DPF, we speed up and slow down constantly, we get on scene, we probably idle for a while, we finish up, we stop and go until we get back to the firehouse, and then we shut the rig off. The problem is that we’ve not been able to get the catalyst up to temperature for a sufficient amount of time to get the soot burned out of the particulate filter. We’d have to run the highway for a long time under load to get our systems cleaned out.

In the over the road truck and light duty diesel worlds, driving down the highway is exactly what these systems need. Forced parked regens are “almost” unheard of and usually not even an option for Joe Q. Public. Emission requirements happen behind the scene with most drivers completely unaware that anything is going on. As it should be.

Q: What if I’m at a fire scene pumping and I need a regen?

A: Keep on pumping. Hopefully you won’t even know you need a regen. Most apparatus are designed to regen automatically while pumping if the right running conditions are present. A good, hard pumping scenario is one the most favorable operating conditions that our apparatus will ever see as far as an automatic regen is concerned. Just make sure to keep your discharge lines out of the exhaust path as a normal practice.

Additionally, this is one of those scenarios where the EPA will let the engine keep working regardless of the emission sensor readings. Pay attention to your rig.

Q: How long will this regen take?

A: Unfortunately, it’s not a set time. Depending on the amount of soot build up, the condition of the catalyst, and how well the previous shifts have paid attention to the DPF light, it could be as short as 15 minutes or close to an hour. We’re seeing about 30 minutes as a good ballpark average when things are working the way they’re supposed to work. If you happen to get one hour regens on back to back occasions, please give us a call. We may need to intervene with our software or with a mechanical repair.