

General Aviation Modifications, Inc.
2800 Airport Road, Hangar A
Ada Municipal Airport • Ada, Oklahoma 74820 • (580) 436-4833

GAMI's LEAN TEST

Instructions for collecting “before” and “after” data, for customers using GAMI's *GAMIjector*® fuel injectors.

These instructions describe the correct way of collecting data so as to provide yourself and **GAMI** with the most useful information possible, depending on which instrumentation you have available to you in your aircraft.

Note: JPI users, please set your EDM instrument to 1° EGT resolution.

Normally Aspirated Engines

Aircraft with Single Probe EGT Only:

1. Set up cruise between 5,000 to 7,000ft, approx 65% (or some setting that keeps CHTS<400°F) with RPMs at your normal cruise setting. Please leave your cowl flaps open if you have them.
2. Find peak on the EGT.
3. Determine if the engine runs smooth to 50°F Lean of Peak.
4. Call GAMI with your findings. While we can't fine tune your injectors with these results, we will be able to talk to you about your options.

Aircraft with Multiprobe EGT Bar Display Only:

1. Set up cruise between 5,000 to 7,000ft, approx 65% (or some setting that keeps CHTS<400°F) with RPMs at your normal cruise setting. Please leave your cowl flaps open if you have them.
2. Find peak on the first cylinder.
3. Enrich the mixture to about 1 or 2 gph rich of that peak.
4. Record the FF and the number of EGT bars visible. It may be easier to place a sticky note halfway up the monitor face to reduce the number of bars you will need to count. Please note that if you are counting from the bottom you will need to count the “empty bar” also.
5. Lean in a small increment (0.2 or 0.3 gph with digital FF, ¼ gph estimates with analog).
6. Repeat steps 4 and 5 until you are lean of peak on all cylinders (all EGTs start dropping in temperature).
7. Send the data to GAMI to see if you need *GAMIjectors*® Balanced Fuel Injectors or if your current set of *GAMIjectors*® should be adjusted. Fax your results to 580-436-6622 and call us shortly afterwards or email them to comments@gami.com.

Aircraft with Multiprobe Digital EGT Display:

1. Set up cruise between 5,000 to 7,000ft, approx 65% (or some setting that keeps CHTS<400°F) with RPMs at your normal cruise setting. Please leave your cowl flaps open if you have them.

2. Find peak on the first cylinder.
3. Enrich the mixture to about 1 or 2 gph rich of that peak.
4. Record the FF and each EGT and CHT.
5. Lean in a small increment (0.2 or 0.3 gph with digital FF, ¼ gph estimates with analog).
6. Repeat steps 4 and 5 until you are lean of peak on all cylinders (all EGTs start dropping in temperature).
7. Send the data to GAMI to see if you need *GAMIjectors*[®] Balanced Fuel Injectors or if your current set of *GAMIjectors*[®] should be adjusted. Fax your results to 580-436-6622 and call us shortly afterwards or email them to comments@gami.com.

Turbocharged / Turbonormalized Engines

Aircraft with Single Probe TIT Only:

1. Set up cruise between 8,000 to 10,000ft, approx 65% (or some setting that keeps CHTS<400°F) with RPMs at your normal cruise setting. Please leave your cowl flaps open if you have them.
2. Find peak on the TIT.
3. Determine if the engine runs smooth to 75°F Lean of Peak.
4. Call GAMI with your findings. While we can't fine tune your injectors with these results, we will be able to talk to you about your options.

Aircraft with Multiprobe EGT Bar Display Only:

1. Set up cruise between 8,000 to 10,000ft, approx 65% (or some setting that keeps CHTS<400°F and TIT<1650°F) with RPMs at your normal cruise setting. Please leave your cowl flaps open if you have them.
2. Find peak on the first cylinder.
3. Enrich the mixture to about 1 or 2 gph rich of that peak.
4. Record the FF and the number of EGT bars visible. It may be easier to place a sticky note halfway up the monitor face to reduce the number of bars you will need to count. Please note that if you are counting from the bottom you will need to count the "empty bar" also.
5. Lean in a small increment (0.2 or 0.3 gph with digital FF, ¼ gph estimates with analog).
6. Repeat steps 4 and 5 until you are lean of peak on all cylinders (all EGTs start dropping in temperature).
7. Send the data to GAMI to see if you need *turboGAMIjectors*[®] Balanced Fuel Injectors or if your current set of *turboGAMIjectors*[®] should be adjusted. Fax your results to 580-436-6622 and call us shortly afterwards or email them to comments@gami.com.

Aircraft with Multiprobe Digital EGT Display:

1. Set up cruise between 8,000 to 10,000ft, approx 65% (or some setting that keeps CHTS<400°F and TIT<1650°F) with RPMs at your normal cruise setting. Please leave your cowl flaps open if you have them.
2. Find peak on the first cylinder.
3. Enrich the mixture to about 1 or 2 gph rich of that peak.
4. Record the FF and each EGT and CHT.
5. Lean in a small increment (0.2 or 0.3 gph with digital FF, ¼ gph estimates with analog).

6. Repeat steps 4 and 5 until you are lean of peak on all cylinders (all EGTs start dropping in temperature).
7. Send the data to GAMI to see if you need *turboGAMIjectors*[®] Balanced Fuel Injectors or if your current set of *turboGAMIjectors*[®] should be adjusted. Fax your results to 580-436-6622 and call us shortly afterwards or email them to comments@gami.com.

RESULTS:

It is sometimes helpful to repeat the test, to make sure the results are generally “repeatable”. Before repeating the test, make sure that you have gone back to the rich side of peak EGT and that all of the cylinders are under 400° F.

If you wish, you can plot the data on standard graph paper. Or you can enter it into a standard PC spreadsheet program and graph the data there.

There is a sample of what the data will look like included with this material. Note the fuel flow of the first cylinder to reach peak and fuel flow of the last cylinder to reach peak. This difference in fuel flow, is what GAMI refers to as the “spread, is the most important piece of information to be gained from these tests. When leaning this engine from a rich condition, leaner cylinders peak first and richer peak last.

While there is some variation from one engine type to another, typically, engines such as big bore TCM engines without *GAMIjector*[®] fuel injectors will have a fuel flow spread from 1.3 to 1.75 GPH, with some engines being well over 2.0 GPH.

Typically, after *GAMIjector*[®] fuel injectors have been installed - - and sometimes tweaked after a further test, that same engine will have a “spread” of under 0.7 GPH. We have seen some engines with truly spectacular results, going from over 2.0 GPH to under 0.5 GPH in their spread.

Lycoming engines and so called “tuned induction” TCM engines may have an initial spread of somewhere between 0.7 and 1.3 GPH, although we have seen some truly extraordinary examples of these engines in which the spread was much larger. Experience has shown that it is worthwhile to adjust the fuel injector fuel flows for these engines until we get them below 0.5 GPH in spread from the richest to the leanest cylinders.

Last, in any event, please send us a copy of the data, and we will include it in your file so that we might talk to you later about any problem that might arise.

