DOWNLOAD PDF CHASSIS DYNO CORRECTION FACTOR

Chapter 1 : Corrected Horsepower

This time consider the SAE J correction standard which has a correction factor of According to the SAE 15% standard it took Hp (/ - =) to overcome the friction from ring drag, bearings, valve train, etc.

Rototest Research Institute has scientific demands on all published measurements and the chassis dynamometer has to produce correct and non-disputable results. Dynamometer Calibration All tests are performed with a calibrated dynamometer using a standardized procedure of dead weight calibration. Without a calibration there is no reference to the measured values. Without a reference there is nothing to assure consistency and ensure that measurements are compatible with those made elsewhere. For instance if power is measured and presented in bhp imperial horsepower a calibration will ensure that the values presented are compatible with the general definition of bhp, i. For more information about the dynamometer equipment please visit www. Controlled test conditions To produce comparable and repeatable measurements it is of importance that the test conditions are kept within acceptable tolerances. Rototest Research Institute has a strict demand on test cell cooling capacity. Dedicated electrical fans are used for intercoolers. There should always be a difference between the two due to engine performance variations and transmission losses. Comparing the graphs claimed performance and actual performance for power and torque is a good way to see if promised performance exists over the whole speed range and not only at the maximum points. For more information see the white paper "Why powertrain performance measurements". The physical relationship between Torque, Speed and Power is that torque times speed results in power. The equation using SI units is: The equations will introduce a small error as they are using a limited number of decimals and should not be used other than when approximate values are enough. Performance Graphs torque and power always have the relations above. These parameters are almost impossible to make constant during laboratory tests. Because of that there are standards for correction of the atmospheric conditions. There are several standards for correction of engine performance in the "automotive society". All standard corrections give approximate results. This is an important quality factor to allow others to judge the significance of the presented corrections. Modern computer controlled engines have the possibility to self-correct for ambient conditions increase, decrease power. This is especially true for forced induction turbo, compressor, etc equipped engines where the boost can be controlled to absolute levels instead of relative. Applying a correction on engines with a self-correction feature is incorrect and not allowed depending on which standard that is used. Stated engine performance during Steady State conditions is in some cases presented for comparison. Power and torque corrections for spark ignition naturally aspirated gasoline engines are made according to ISO standards. Unless otherwise stated all tests are conducted at Steady State, i. While the engine manufacturer states peak power and peak torque for the engine at the flywheel this requires the engine to be tested separately in an engine dynamometer. Test point times at Steady State less than approx. A longer test point time gives more information about engine cooling capacity. The measurement points are joined by a spline only for display purposes. At Steady State there is no performance influence due to the inertia of the powertrain e. Steady State measurements are generally not comparable with measurements during acceleration conditions! Performance measurements during acceleration with varying acceleration rates are not comparable in any way results from rolling roads, hub dynamometers and engine dynamometers with no accurate speed control for constant acceleration rates There are also, in many cases, a lack of correction methods for minor fluctuations in the acceleration rate. Torque presentation The sum of the torques measured at each wheel hub is presented as total drive wheel torque divided by the total transmission reduction i. The source of the stated engine performance is always declared. The source is commonly the auto manufacturer, a respected motor magazine, or specified otherwise. Engine inlet temperature The engine inlet temperature is measured in the inlet duct to the engine before the air filter. Ambient temperature is only as information of the test cell temperature and may not be representative and therefore not valid for correction. Low octane fuels used in knock sensitive engines is also a factor to be aware of. Use of higher octane fuels in knock in-sensitive engines most standard engines does not influence the engine performance. Total reduction The total transmission reduction total transmission reduction is the ratio between engine speed and wheel speed. In most cases there is a gearbox ratio and a final drive ratio. In some cases for 4WD there is a different total transmission reduction between the front axle and the rear axle. In these cases the total transmission reduction is presented as the average transmission ratio. Selected gear The gear with closest relation to 1: The transmission losses vary with torque input, speed and number of gears involved in the transmission. For test vehicles with automatic gearboxes with slipping torque converters the average wheel power and engine speed is used for the torque calculations. The two groups can be further divided depending on the type of differential or coupling.

Chapter 2 : Mustang Dyno Correction Factor?

Chassis & Suspension not the how of this correction factor. In practice, if the dyno cell were actually degrees with 0-percent humidity and an absolute pressure of inHg, the engine.

The superflow system uses something called eddy brakes to use inertia against the rear drum to simulate the road. One of the arguments I have heard is that while the superflow may be a more realistic number of hosepower on the pavement its not very good for engine horsepower readings. The thing that superflow has been doing lately is adding the "dyno jet" comparison to the software so customers can see the difference. But as I said if the original number is off due to calibration making additional calculations will only make it worse. Machine has nothing to do with horsepower since HP is a not based on machine but a firm simple means of measuring power and is based on torque relationship to speed RPM as far as dealing with mechanical HP. Now what is the standard for mechanical HP depends on which variation is used in regard to regulating bodies or standards institutes. In Europe it DIN German based but used allot for many European countries, but newer European is EC this is due to using Newtons instead of pounds for measurment of torque and a few other factors. All that said, regardless of the Dyno used, when the proper correction factor is put in for the proper standard, in our case to SAE J, the HP should be the same if you run it on a DynoJet or Superflow. How the torque is measured in relationship to the speed is where the variables come in Dyno machines, but still numbers should in theory be the same if properly calibarted and correction factors or used. To expand, typical DynoJet used a inertia roller, HP is able to be calculated by how fast a known roller of a certain weight can be spun up. Since the weight is known and fixed, by doing the calcs, one is able to obtain the troque needed to spin such from a certain speed and acceleratation to upper limits based on time factor and that can all be calculated to give the HP and when cf are applied to whatever standards are used, this provides a good number. On the Superflow they have a roller also, but have attached a brake on some Dynoflow also offers this options. In the case with a brake say a eddy current type , a force is being applied to the roller which has to beovercome to make it roll, this directly relates to force torque and with the speed, the HP can be calcualted and with cf added, an accurate number is given. Now an eddy current brake is basically a simple generator that is taking the output and running it against and electrical load which resist the turning thus creating the brake forces. Great now we have a variable load that can be applied to the rollers and can control the loads and thus measure such over a speed, in steps, etc and see exactly how much force is being applied to something at say RPM and this will be able to calculated to give HP. Now the only problem is that that eddy current generator will generate heat which has a direct relation to resistance and thus it changes. Eddy Current Brakes take this into effect, however due to the need to disipate the heat, eddy current can only run for so long before the heat is not disipated enough and thus the accuracy goes south. Also using such in many case require longer periods on non-use to allow for proper cooling. The classic type of dyno and what is considered the most useful in tuning and is used by most engine builders and other that need consistent results, ability to conduct multiple runs or to be able to run a prolonged series, is a water brake dyno. Water Brake dynos use water as the resistance load and be control the flow of the water and thus pressure, the load can be adjusted, maintained, etc. The water is then ran though a large cooler that is able to maintained the set temp of the water or is some case in a continuing supply of new water and discharge of used not commong since water can get expensive. Water Brake dynos are the type that engine builders use for they can set up a run that can simulate hundreds of hours with simple program to run the engine under various loads, speeds, etc. I know too much shit, but the bottom line is HP is not realted to the Dyno, it is a measurement of power derived from torque and speed calculations and such information is corrected by various means to obtain a set standard such as SAE. This allows for accurate dyno to give a known baseline regardless of the temp, altitiute, humidty, etc. As far as Dyno Jet verse Superflow, if done right and done with proper cf following proper operation, they should give you damn close to the same number in theory same-but there is small variables such as drag on the rollers, tire pressure, intrestic loss, heat, etc. All said though since it is a number game, any dyno can be wrong, made to give high or low, etc. Sometimes it is simple as not throwing in all the proper calculations and doing a good cf, or insufficient heating, over-inflated or under inflated tires, un calibrated ancillary guages such inaccurate barrometer of not taken a psycromoter manual and making sure that nice electronic is right since few shops will take the time and expense to send their gauges out yearly and have them calibrated. My suggestion is that if you want a simple baseline to give an idea, Dynojet is fine, but regardless ask questions and look at the cell. See if they have a simple set up with the base Dyno and PC or do they have manometers that are set, is there a barometer, is there inside and outside accurate temp gages not the nice HD shop clock and temp type , altimeter or a known accurate alitutute and not something they pulled based on the local airport unless they are at the local airport-BTW altitute is minor unless great difference of few hundred feet , do they have wet bulb and dry bulb temps, do they pull out the sling psychrometer, etc. Naturally the more detail and accurate the cell is, the higher the cost and time to run.

Chapter 3 : racedaydvl.com - Dyno Correction Factors

Dyno Correction Factor Calculator. This Correction Factor Calculator determines the dyno correction factor which is to be multiplied by the actual dyno data in order to correct for the effects of temperature, barometric pressure, humidity, and altitude.

If your dyno can repeat exactly for each test, then you can trust what when in does show a change from a modification, it is a true change. This is called repeatability, and is the goal of all dyno operators. A lot of things affect dyno repeatability, like engine temperatures, fuel type, weather conditions, how the test was run, engine condition and build like air cleaner type, spark timing etc. For those things which you CAN control, you want to do things exactly the same each test. For example, engine water and oil temperature can have a significant effect on engine power, and are things you have some control over. You can install coolers and have them hooked up to temperature controllers. Or you can make sure you start each test with the same temperatures. However, weather is something very difficult to control, and it has a large effect on the results. An engine makes power from the fuel it burns, the more fuel, the more power. What actually limits the power an engine can make is the amount of oxygen you can pump through the engine. Most race modifications are designed to get more air through the cylinder, like reducing flow restrictions, more cubic inches, supercharging, etc. Well, weather changes are much like supercharging. Superchargers make power by raising the density pressurizing of the air entering the engine. The same thing happens when the barometric pressure goes up, the air density and therefore oxygen density goes up. As the air temperature comes down, the air density goes up like what an intercooler does. This all may seem quite complicated, but fortunately a lot of work has been done to understand these effects. These conditions are much better for producing power than what most people would see driving their car. Say you measured HP in some actual weather that had weather conditions much worse than the standard day. Theoretically, if you ran this engine on a day with the Race Dyno conditions See the table below. If we had chosen the SAE correction factor, the trends would have been the same, just that the HP number would have been HP instead. The example data shows the dyno correction factor working perfectly. In the real world, it does not work perfectly. However, the corrected data is almost always more repeatable than observed data, providing the weather sensors are repeatable, and care is taken to eliminate all other testing variables. This shows the basic function of Dyno Weather Correction Factors. Because weather affects power, we factor the measured torque and HP up or down the proper amount to make it more repeatable from day to day. Because the Corrected data is more repeatable, when you DO see a change in Corrected Power, you can have more confidence the change is real. This entry was posted on Tuesday, May 26th, at 8: You can follow any responses to this entry through the RSS 2. Responses are currently closed, but you can trackback from your own site.

Chapter 4 : Superflow vs Dynojet vs other Dyno's | Big Dog Motorcycles Forum

The TC factor on a Dynapack dyno is a correction factor, with it being it will add 15% to the power measured at the hubs.

Interesting discussion, I have wondered about that percentage thing myself. Below is something I found on the web while searching: Dyno Thoughts and HP Losses After reading various articles in numerous publications on dynos and horsepower, I feel I should put forth a few observations: Chassis dynos are great tuning aids but they only give a approximation of power output as some of the important variables are not accurately controlled. Certain magazines seem to think that results obtained from chassis dynos are the gospel. One can only conclude that inaccurate moments of inertia and correction factors are being used. On intercooled, turbo cars, there is usually insufficient airflow to ensure accurate results due to charge temperature variation which can be substantial. Even coolant temperatures may not stay down during the run which can affect power outputs considerably. The rate of acceleration is also important on turbo cars to be sure that the boost is not lagging the engine rpm. With RPM climbing too quickly, the boost has not reached a peak value so the hp figure is again inaccurate. Turbo cars should therefore be tested in top gear. Without proper temperature stability and accurate moments of inertia on the rotating components, there CANNOT be accurate results as the scientific method is no longer being applied. When all things are kept the same between runs and you get a tangible gain, it is a gain at least. How much, is open for discussion. It is important to note that as the oil temperatures in the engine, transmission and differential increase, friction usually decreases. This manifests itself as an increase in power at the rollers on each subsequent test. This factor should be accounted for when doing back to back runs. It may look like you are gaining some power on each run by making other changes when in fact this is due to reduced oil viscosity. When using a chassis dyno, always use the same gear and tires and wheels and start the runs from the same speed or RPM. Re-baseline periodically to see what temperature increases have done to power output. Chassis dynos are quick and easy to hook up but have many of the above failings. They do not possess the accuracy of a properly calibrated engine dyno which has a more carefully controlled environment and condition set. Wheel HP As most people know, there are power losses through the drivetrain so wheel hp is always lower than flywheel hp. Front wheel drive cars with transverse engines tend to be more efficient than most rear drive configurations due to the layout of components. However most publications overestimate these losses considerably. Most rear drive cars have a 1 to 1, 4th gear which means that the power path goes directly through the mainshaft of the transmission. The only losses here are bearing drag which is less than 0. Indeed, published data indicates a transmission efficiency of 98 to Losses within the driveshaft account for about 0. The worst scenario case for a rear drive setup is on the order of On a hp engine, something on the order of 37, watts would have to be dissipated out of the transmission and differential housings. Obviously, this is not the case. Transverse, front drive transaxles usually have no direct lockup gears and no 1 to 1 ratio, however, since the torque path is never turned 90 degrees as in the rear drive setup and efficient helical gears are usually employed for the final drive set, losses are more on the order of 6 to 9 percent in the upper ratios. Tire pressure and wheel alignment can have very significant effects on losses at the rollers. Tire pressures should be set the same between each test. Tire rolling resistance varies inversely with speed, another factor not taken into account by most chassis dynos when applying phantom flywheel hp formulas. Comparing the Numbers Many novices are quick to compare hp numbers between chassis and engine dynos and come up with all sorts of wild conclusions about drivetrain losses. These comparisons are essentially meaningless. Inertial dynos are based on the sound scientific priciple of accelerating a certain mass with a known moment distance over a given time. The rate of acceleration of that mass and moment is a result of the force applied torque. On an inertial chassis dyno, it is virtually impossible to calculate the the moment of inertia of every tire, wheel, gear, joint , axle and shaft in the power train between the crankshaft and roller, therefore its results cannot offer an accurate HP figure. Even with coastdown drag measurements, these cannot be accurately calculated as different factors are affected in different ways. Some are proportional, some are inverse squared functions etc. Water brake or eddy current dynos generally measure force torque directly through a ram or strain gauge so moments of inertia are not important on these in fully loaded tests. Other things to watch are correction factors applied for altitude, barometric pressure and temperature. These factors are NOT the same for atmo and turbo engines. Using atmo factors inflates the true, corrected HP figures on a turbo engine. In fact, look at the correction factor applied on your dyno sheets and see if they make sense. Many shady dyno operators simply enter a phantom correction factor to make the customer happy. This is a case where the dyno sheet DOES lie. Chassis dynos are essentially for tuning purposes, they are not well suited to giving an accurate hp figure. Be aware that SAE correction factors do not apply to turbocharged engines! You are better off getting an idea of where you stand by looking at observed hp with a turbo engine. When a different vehicle weight is entered in the software for a pull, the computer spits out a dyno sheet with vastly different hp figures. This is complete BS and shows that the software package is just plain wrong. HP did NOT change on the pull simply because a different weight was plugged into the computer. Take all these figures with a grain of salt. I had an engineer from this company E-mail me and tell me their dynos were accurate. I never heard back. Another SDS customer had his drag car chassis dynoed. It showed a max hp of yet when the car weight, ET and trap speed were plugged in, these showed that around hp was required to achieve these results. The dyno figure was so far off, it was essentially useless. This is a result of poor software or mechanical measurement in the first place. Torque does not go up down, up down ft. Chassis dynos are essentially tuning aids, not true hp measurement devices.

DOWNLOAD PDF CHASSIS DYNO CORRECTION FACTOR

Chapter 5 : Dyno Correction Factors - Real Wheel Horsepower - GM High-Tech Performance Magazine

This video is for a viewer who requested i make a video explaining dyno correctuon factors. So here ya GO! Damn that's a rough thumbnail pic screw it, its staying.

The horsepower and torque available from a normally aspirated internal combustion engine are dependent upon the density of the air The relative horsepower, and the dyno correction factor, allow mathematical calculation of the affects of air density on the wide-open-throttle horsepower and torque. The dyno correction factor is simply the mathematical reciprocal of the relative horsepower value. Originally, all of the major US auto manufacturers were in or around Detroit Michigan, and the dyno reading taken in Detroit were considered to be the standard. Therefore, the SAE created J in order to convert or "correct" the dyno data taken in, for example, California or in Tokyo to be as if the data had been taken at standard conditions in Detroit. One common use of the dyno correction factor is to standardize the horsepower and torque readings, so that the effects of the ambient temperature and pressure are removed from the readings. By using the dyno correction factor, power and torque readings can be directly compared to the readings taken on some other day, or even taken at some other altitude. That is, the corrected readings are the same as the result that you would get by taking the car or engine to a certain temperature controlled, humidity controlled, pressure controlled dyno shop where they measure "standard" power, based on the carefully controlled temperature, humidity and pressure. If you take your car to the dyno on a cold day at low altitude, it will make a lot of power. And if you take exactly the same car back to the same dyno on a hot day, it will make less power. But if you take the exact same car to the "standard" dyno where the temperature, humidity and pressure are all carefully controlled on those different days, it will always make exactly the same power. Sometimes you may want to know how much power you are really making on that specific day due to the temperature, humidity and pressure on that day; in that case, you should look at the uncorrected power readings. But when you want to see how much more power you have solely due to the new headers, or the new cam, then you will find that the corrected power is more useful, since it removes the effects of the temperature, humidity and atmospheric pressure and just shows you how much more or less power you have than in your previous tests. There is no "right" answer If you want to know whether you are going to burn up the tranny with too much power on a cool, humid day, then go to the dyno and look at uncorrected power to see how exactly much power you have under these conditions. But if you want to compare the effects due to modifications, or you want to compare several different cars at different times, then the corrected readings of the "standard" dyno will be more useful. The Society of Automotive Engineers SAE has created a standard method for correcting horsepower and torque readings so that they will seem as if the readings had all been taken at the same "standard" test cell where the air pressure, humidity and air temperature are held constant. For more information about pressures and calculation of the vapor pressure, see Air Density and Density Altitude. The relative horsepower is simply the mathematical reciprocal of the correction factor. The AUG revision also makes it clear that this correction factor is not intended to provide accurate corrections over an extremely wide range, but rather that the intended range of air temperatures is 15 to 35 deg C, and the intended range of dry air pressures is to mb. Power is the rate at which work is done. When the engine torque is turning the crankshaft and power is being delivered, the resulting horsepower may be expressed as: Basically it says that if you can keep the same amount of torque, then the more rpm you can turn, the more horsepower you get! With a 2 liter about cubic inches engine, producing 1. That would be about 1. And at the other end of the rpm spectrum, one model of the cubic inch four cylinder Lycoming IO aircraft engine produces hp at rpm, which is 0. In general, production automobile engines that have a broad torque band will produce about 0. Highly tuned production engines, such as the Honda S or the Ferrari F50 are in the range of 1.

Chapter 6 : Relative Horsepower Calculator

Many shady dyno operators simply enter a phantom correction factor to make the customer happy. This is a case where the dyno sheet DOES lie. Chassis dynos are essentially for tuning purposes, they are not well suited to giving an accurate hp figure.

Dyno Tech Talk is a compilation of copyrighted material, however, web sites are welcome to link to our Dyno Tech Talk index page. What is Corrected Horsepower? However, this stated horsepower is almost never what the engine actually made for power. How can that be? The correction standards were developed to discount the observed horsepower readings taken at different locations and weather conditions. It is obvious that an engine builder in Colorado could not produce as much horsepower as a shop at sea level. There is just less oxygen for the engine to burn at the higher altitude. What are less obvious are the other weather condition effects on the engine. Most of you know about Atmospheric Correction Factors that are used to compare an engines power output for one day or location to another. However, these factors can be rather confusing and even deceptive. Excluding other factors like engine temperature and quality of fuel used, the engine output is very dependant on the amount of oxygen in the air. The most common are the SAE standards. Since very few engines are actually run in these conditions we apply these correction factors so that it is possible to compare the results taken on different days. First lets just look at the weather correction, we will see the second section dealing with mechanical efficiency later. If you had retested the engine in the same weather conditions it would have made Hp again. If you search around you will find the base values are different. Some will quote How can they all be correct? Well the calculations are done in KPa or millibars. These units are all true pressures, however inches of mercury, although considered a pressure unit, changes with temperature. This is because mercury expands as it gets warmer. Now this may sound confusing, but these formulas were developed to attempt to allow standardize advertised hp ratings and comparisons. The formulas are based on the amount of oxygen that is found in the air that the engine is breathing. The greater oxygen the more fuel can be burned and thus more horsepower. However, these formulas are not perfect. They were developed empirically and are a good approximation for the variables of humidity, temperature, and absolute pressure. However, internal combustion engines develop power on many other variables and although it is possible to have the same correction factor at high temperature and pressure as low temperature and pressure, the engine will make different power. The wetting effect and temperature differences are not perfectly compensated for. In a prefect world this would be true, but this would be ludicrous. The cost of building an environmentally standardized test cell is well beyond the capabilities and cost of even large OEM companies and would give rise to even more deception in horsepower advertising. Which is basically the amount of energy the engine got from the fuel versus how much energy actually was produced at the flywheel. This is a measure that includes the frictional torque, viscous effect, etc. This is another huge point of debate, but it does make sense. If we want to correct the observed horsepower to a standard condition, it make sense that the friction required to rotate the engine does not change with added oxygen in the air. So in the last example the engine produce Hp on that hot August day. This time consider the SAE J correction standard which has a correction factor of 1. Now if we want to compensate for the atmospheric condition then we should use the amount of energy that the engine got from the fuel supply. So we take the It is a compromise. In the example above we used a normally aspirated 4 stroke V-8 engine, but what if it were a two stroke V-8 outboard engine. It is quite obvious that the two stroke has much less frictional drag. It has no camshaft, timing chain, valves and springs, oil in the crankcase, etc. That is why some higher end dynoing software calculate the friction losses on many different variables, like the displacement, stroke for piston speed, type of aspiration, number of strokes, type of fuel, and RPM. Using this information will yield much greater accuracy in calculating a mechanical efficiency and therefore a much greater accuracy for in house comparisons between pulls. Just measure the amount of power it takes to drive the engine and then use those values for your own custom mechanical efficiency. Once again though, you will need a high-end software package that will easily allow you to use the new efficiency or else you will be doing a lot of tedious and time-consuming hand calculations. But once again, this solution is not perfect either. Many will argue correctly that motoring the engine is not the same because there was no heat, bearing loads, metal deformation, etc. Some companies who are working on a particular engine family will actually test the same engine under many different conditions and develop their own correction table. To these companies it is vital to know how their engines will perform under specific varying conditions. Consider snowmobiles that will operate at many different altitudes and temperatures, but they can pretty much discount the effects of humidity because the engine will almost always operate at temperatures below freezing. However, it is critical that their engines perform well at extremely different barometric pressures. An exhaust designed to run at sea level will not perform well at all in the mountains. Further, the opposite is true for marine engines. These engines are run most often at sea level, warm temperatures, and high humidity. Or a wastegated turbo engine that is pretty much impervious to even large barometric pressure changes. Thus the one size fits all SAE approach does not work well. The debate over the validity of correction factors still lingers on, but they are the only way to make realistic comparison of your engines on different days. There are, and always will be, unscrupulous competitors who advertise inflated horsepower gains by manipulating the correction factors, however they are eventually exposed at the races where it counts to the customer. Now that the importance of these correction factors is known they must be entered accurately for your test be to considered valid. Note that you must enter the absolute barometric pressure NOT the relative pressure based on altitude, this can also be a source of confusion. Unless you are at sea level the barometric pressure that the weatherman states has been altitude corrected and you must use the actual pressure. Once again, most dynoing software will be able to do the conversion for you. Also be sure to enter these values at the beginning of the test after the dyno cell has come up to a stable temperature. Failure to do this will show lower horsepower than your engine actually made. Once again you should consider finding a dyno that will automatically enter these values for you, because many times you will forget to write them down and that will invalidate the dyno pull that you just made and could even lead you to discounting a modification that did actually increase the power of you engine. Also, for advanced software that use more realistic mechanical efficiency you must enter the required information about the engine, such as bore, stroke, number of piston, type of engine, etc. It is also important that you use the same correction method for all testing and that your customer is shown the correction method used to calculate the horsepower. The customer may not understand all that went into the horsepower reading, but at least you will know that service was provided correctly and honestly. When considering a dyno you should research how the companies allow you to do your corrections. It may not be important now to be able to enter custom correct factor or even enter any at all, but it most likely will be later on down the road. The new SAE J is actually not a new set of correction factors, it is simply a new procedure for using the existing factors J and J used by automotive manufacturers. Power and torque certification provide a means for a manufacturer to assure a customer that the engine they purchase delivers the advertised performance. Document SAE J specifies the procedure to be used for a manufacturer to certify the net power and torque rating of a production engine according to SAE J or the gross engine power of a production engine according to SAE J

Chapter 7 : SAE Dyno Correction Accurate?

In fact, look at the correction factor applied on your dyno sheets and see if they make sense. Many shady dyno operators simply enter a phantom correction factor to make the customer happy. This is a case where the dyno sheet DOES lie.

You can see, a single bike can have peak horsepower from And keep in mind that another dyno may produce a totally different set numbers for the same bike. Many dynos are enclosed in a room or "cell", while others are located in a large open room or even outside. For consistent, accurate results, a dyno needs plenty of fresh air as well as some way to remove the contaminated air. Exhaust contaminated air contains carbon monoxide which reduces the oxygen content in the air. Just like us, our bikes need to breathe. If you can smell the exhaust, the air is contaminated and power will likely be down. Not to mention the affect on the poor dyno operator! Our cell is designed to exchange the air in the room approximately 8 times per minute, ensuring that the air is always fresh and clean. Then, a 36" fan in the ceiling of the room draws the air up out the roof. Ideally, every dyno pull would be done under identical atmospheric conditions. This is seldom the case, so a power correction factor CF is applied to a measured power reading to compensate for changes in barometric pressure, temperature, and humidity. Lower correction factors also tend to be more accurate. A detail that the dyno operator has complete control over is the "smoothing" factor. This allows the operator to show more or less detail in the lines on the graph. Our Dynojet i has a smoothing scale from 0 to 5, with 0 showing the most detail. More detail generally produces higher output as the lines on the graph will show small spikes. If the bike is tuned well, there will be a smaller difference between 0 and 5 smoothing. See the first 3 and last 2 rows in the above chart to compare the results of different smoothing factors. Due to frictional and windage losses, oil plays a significant part in power readings. Cold oil will reduce power readings as will excessively hot oil. Another little known fact is that the type and weight of oil can affect the power as well. Regular maintenance items, such as the air filter and spark plugs can also affect performance. A clean air filter and properly gapped and indexed plugs make for a happier engine! Have you ever tried to push a bike with a flat tire? Under inflated tires rob horsepower! Always check the tire pressure before running a bike on the dyno. Finally, the mileage and amount of wear or break-in on an engine will also affect the performance. A well broken-in engine will have less power-robbing frictional losses than a new engine with relatively few miles on it. When we build an engine specifically for racing, it is assembled with greater tolerances - in a sense it is pre-worn and designed for shorter lifespan and more maintenance. It is almost at peak power right off the bench. In regular daily-driven bikes however, you want them to last so they are assembled tighter and allowed to slowly break-in. Do you still want to know more? Its method of measurement is a direct implementation of the definitions of power and torque. Correction factors assist in the comparison of these measurements under various test conditions, making computer hardware and software necessary to obtain, interpret, and display the data. Power Power in mechanical terms is the ability to accomplish a specified amount of work in a given amount of time. By definition, one horsepower is equal to applying a pound force through a distance of 1 foot in one second. In real terms, it would take 1 HP to raise a pound weight up 1 foot in 1 second. So to measure horsepower, we need to know force in pounds and velocity in feet per second. It measures velocity by measuring the time it takes to rotate a heavy steel drum one turn. The dyno measures force at the surface of the drum by indirectly measuring its acceleration. Acceleration is simply the difference in velocity at the surface of the drum from one revolution to the next. Power is coupled to the drum by friction developed between the driving tire of the vehicle and the knurled steel surface on the drum of the dynamometer. Torque When an object rotates around a point, its speed of rotation depends on both an applied force and the moment arm. The moment arm is the distance from the point of rotation to where the force is being applied. Torque is the product of the force and the moment arm. For example, if a rope, wrapped around a drum of 1 foot radius, is pulled with pounds of force, the resulting force is foot-pounds. However, engine torque is not equal to drum torque because the gearing through the drive train changes the moment arm. The change in the moment arm is proportional to the ratio of engine speed to drum speed. Therefore, tachometer readings are necessary to calculate and display engine torque. Correction Factor The calculation of horsepower or the accuracy of our dynamometer is not dependent on the location or conditions during the measurement. The performance of the internal combustion engine is, however, sensitive to atmospheric conditions, especially air density and air temperature. To compare power measurements taken at different times or places, it is necessary to compensate for differing atmospheric conditions. Correction Factors are used to compensate engine horsepower measurements for differences in operating conditions during engine testing. The typical correction factor CF is calculated based on the absolute barometric pressure, air temperature and water content of the air used for combustion by the engine under test. It attempts to predict the horsepower that would be developed if the engine were tested at sea level under standard pressure and temperature conditions. Absolute barometric pressure is a measure of how hard the air molecules are being pushed closer to one another. The unit of measurement is typically inches of mercury inches Hg. The more pressure, the more molecules there are in a liter of air and the more air the engine gobbles up during the intake stroke. Absolute barometric pressure is equal to Relative barometric pressure only at sea level. Relative barometric pressure is reported at airports and by weather barometers. A good approximation for converting relative barometric pressure to absolute barometric pressure is:

Chapter 8 : About AFR Correction Formulas

The dyno was applying a percent correction factor to the raw figures to arrive at its final numbers. After a minute cooling session, the second pull at Muscle Motors shed light on a common.

Challenger SRT Hellcat There has been a debate between both dynos, the Mustang dyno has been recognized by a lot of industry experts as more accurate between it and the Dynojet. Dynojet "A dynamometer is a device that measures force and power. I have an inertia-type chassis dynamometer. It measures the force and power that the spinning wheels of an automobile produce. It is not a "brake-type" dyno that measures the power that is actively absorbed by a water, oil, or eddy-current brake or by a generator. An inertia-type chassis dyno consists of two great big heavy drums hooked up to a computer. The wheels of an automobile spin the dyno drums, and the computer measures the speed. That is the actual mass of the rollers, much like the DynoJet. This is a number that represents how much horsepower it takes for the vehicle to push the air to maintain 50mph. This is used as the aerodynamic force. Think of a magnetic brake from a freight train. This magnetic brake can apply enough resistance to stall a big rig. Off one side of the eddy currant load cell, there is a cantilever with a 5volt reference load sensor strain gage. As the rollers are spinning this load sensor is measuring the actual torque being applied. So as the rollers spin, the load sensor is measuring the force being applied, sending that information to the dyno computer, taking into account the two constants entered earlier, computing the amount of resistance needed to be applied to the rollers to load the car so that the force of the rollers resistance is as close to the force the car sees on the street. The dyno is then able to calculate the total force being applied to the rollers in torque, and then taking the derivative of that torque curve to arrive at the horsepower curve. Since torque is an actual force of nature, like gravity and electricity, it can be directly measured. Horsepower is an idea that was thought up by man, and cannot be directly measured, only calculated. In the photos of the Dynojet, notice how the rear wheels are centered on the drums and there is one drum per wheel. This will become important later. The vehicle is typically run in the transmission gear closest to 1: This feature is ideal for forcing the vehicle to operate at certain loads for tuning. Mustang The Mustang chassis dyno uses an Inertia load as well as an eddy current brake load to simulate the "actual" load combined aerodynamic plus rolling frictional load that the vehicle would experience when in motion. Notice in the photos how the rear wheels sit between two smaller There has been some discussion about the tires getting "pinched" between the rollers and creating more rolling friction, but no substantial evidence of this could be found. However, Mustang has a dyno MD with a single inch diameter roller per wheel that alleviates the wheel-pinch concerns. The internals of the Mustang dyno are composed of an eddy current brake to provide a variable load and an inertial disc to provide a fixed load. Mustang claims because its dyno loads the vehicle as it would be on the road, you can perform mph, mph, and quarter-mile measurements on its chassis dyno. Speed Nation has obtained quarter mile times within 0. Correction Factors Correction factors are used by both dynos to account for varying atmospheric conditions such as temperature, pressure, and humidity. The measured horsepower and torque are multiplied by the correction factor to obtain the corrected values. This is similar to the corrected times and speeds provided by some quarter mile tracks. Theoretically, you can dyno on a hot day in the high altitude of Denver and on some other cool day at sea level and produce the same corrected horsepower even though the observed horsepower you are producing at each location is different. When testing was performed on the Dynojet, the correction factor was 1. The correction factor for the day when testing was performed on the Mustang dyno was 0. The correction factor when road-testing at Keystone Raceway was 0.

DOWNLOAD PDF CHASSIS DYNO CORRECTION FACTOR

Chapter 9 : Bishop's Performance - Dyno Info

Dyno Correction Factors. When you use the Dynojet software to graph dyno runs you get some options as to how you interpret the data. Because atmospheric conditions (ambient air temperature and pressure) affect air density they therefore affect power output.

What makes you think Mustang dyno numbers are more accurate than a dynojets? The article helps, but it leaves me with more questions about the Mustang dyno. Accordingly, they use an eddy-current brake in addition to a drum as an inertial load to simulate aerodynamic and rolling resistance losses. As the drag force goes as velocity squared and hence, power as velocity cubed , and since rolling resistance is typically modeled as a 3rd or 4th order polynomial, it stands to reason that the difference between a Dynojet and Mustang dyno would not be a fixed percentage as would be the case for, say, simple frictional losses. Including these two effects would certainly result in less net power recorded, however, so that explains why the Mustang dyno would report lower HP numbers in addition to the effect of electronic controls on timing, etc for varying loads. My first question is, since drag depends on the coefficient of drag and frontal area of the vehicle, how would the dyno know what these are for any given vehicle - does it have some set of look-up tables, or does it just use some default numbers for all cars? My second question is, since rolling resistance depends on vehicle weight, the weight distribution, tire pressure, etc, again how does the dyno know what these things are so it can know how much load to apply to the eddy-current brakes? Does anyone know how they deal with these things? Just curious and bored waiting for all the snow to melt! Originally posted by JT Are you saying that the Mustang dyno HP number is the power at the rear wheels minus the power to overcome rolling resistance and wind resistance to give the net power left to accelerate the car? If that is true, I can see why the Mustang dyno number is lower. As you point out, how would the dyno "know" these things? I want to know how much HP is put to the rear wheels, period, without any subtracting of arbitrary numbers. The fact that the load can be increased to better match the real world load on the engine seems to be a real tuning advantage. I would suspect that to result in a very slight decrease in HP. The only difference being the engine maybe reducing timing advance under the higher load. I would suspect that this small decrease in power would be offset by the fact that the increased load would have the rollers, and hence the drivetrain, accelerating at a lower rate. If the driveline is accelerated slower, the power lost accelerating the driveline should be lower. This scenario would have no power "lost" due to driveline acceleration. The only losses would be through the gears and friction in the bearings. The Mustang dyno is closer to that scenario than the dyno jet, so I am not sure why it does not have a higher HP reading? Further, why do dynojet numbers correspond to engine numbers better than the Mustang numbers? Anyway, that article raised more questions for me, too, than it answered. That the Mustang dyno effectively subtracts the aero and rolling losses by applying that extra load via the eddy-current brake. I guess I would have made that an "option" to subtract it or not. You make a good point about backing out the inertial losses of the driveline if they were to load the car so that the acceleration is zero. What do you think? I also agree that the Dynojet numbers seem to match manufactures specs better. Thanks for the feedback, and let me know if you come across anything else that helps explain how these things really work. I would like to know. Occupational hazard, I suppose!