K100 fuel treatment

A big difference between a diesel engine and a gas engine is in the injection process. Most car engines use port injection or a carburetor. A port injection system injects fuel just before the inlet layer (outside the cylinder). A carburetor mixes air and fuel long before the air enters the cylinder. In a car engine, all the fuel is therefore loaded into the cylinder during the inlet layer and then compressed. The compression of the fuel/air mixture limits the compression ratio of the engine - if it compresses the air too much, the fuel/air mixture spontaneously ignites and causes knocking. Because it causes excessive heat, knocking can damage the engine. Diesel engines use direct fuel injection - the diesel is injected directly into the cylinder. Ad The injector on a diesel engine is the most complex component and has been the subject of a great deal of experimentation - in a particular engine it can be located in a number of locations. The injector must be able to withstand temperature and pressure inside the cylinder and still deliver the fuel in a fine fog. Having the fog circulated in the cylinder so that it is evenly distributed is also a problem, so some diesel engines use special induction valves, combustion chambers or other devices to swirl the air in the combustion chamber or otherwise improve the ignition and combustion process. Some diesel engines contain a glow plug. When a diesel engine is cold, the compression process may not increase the air to a high enough temperature to ignite the fuel. The incandescent plug is an electrically heated cord (think of the hot wires you see in a toaster) that heats the combustion chambers and raises the air temperature when the engine is cold so the engine can start. According to Cley Brotherton, a Journeyman technician is controlled for heavy equipment: All functions of a modern engine are controlled by ECM that communicates with an elaborate set of sensors that measure everything from R.P.M. to engine coolant and oil temperatures and even engine position (that is, T.D.C.). Incandescent plugs are rarely used today on larger engines. ECM detects the ambient air temperature and the retards the time of the engine in cold weather so that the injector sprays the fuel at a later date. The air in the cylinder is compressed more, which creates more heat, which helps to start. Smaller engines and motors that don't have such advanced data control use glow plugs to solve the cold start problem. Of course, mechanics are not the only difference between diesel engines and petrol engines. There is also the question of the fuel itself. In the second installment of Beside Great Leaders, FastCo Studios and Post-it® Brand takes you behind the scenes at Caribou Coffee, the second largest coffee house in the United States, to see how executive assistant Barb Pearson stays organized and on the task while collaborating every day Chief executive Mike Tattersfield. If you're skateboarding, surfing, snowboarding, BMX, motocross and/or wakeboarding, you probably already know what Fuel TV is and you're probably psyched to see a Fuel TV app coming to Android. For those who do not know, Fuel TV is a cable and satellite TV specialty channel based in the United States that covers extreme sports like those mentioned above. Programming features original series, exclusive events, licensed movies, music and more. Fuel TV app for Android promises nine video channels, live event streaming, news, TV show info, PhotoBlog, ringtones/wallpapers, and more, which would be great - but it just doesn't deliver. As a surf fan, I know that Fuel broadcasts many live surf competitions, and I was thrilled with the promise of being able to see them on my phone while I'm out and about. No such luck. The live events on offer are so few and far between it is comical. The news section is also pretty miserable, with a small selection of stories, and those who do it are added much later than they should be. One of the things I was most excited about (apart from live events) was the video section. This was again a huge disappointment. You get a handful of videos of the sport you choose, and when you click on one, you'll be greeted with grainy, low-resolution video that doesn't even use the full screen (on a Motorola Droid, running Android 2.1). It's just stupid. If you're just going to offer some videos, why not make them look gorgeous? There is no high-quality mode like in the YouTube app, and as a result, YouTube's video quality wipes it out to the Fuel TV app. Although I was very excited about this program, it is a nonstarter. While it's only version 1.0.0 now, when you're Fuel TV, people are going to expect much, much better. Hopefully Fuel will make some serious improvements. Note: When you buy something after clicking on links in our articles, we can earn a small commission. Read our Partner Link Link Policy for more information. A flawed app that fails to deliver on its pronounced features: everything it does does very badly. Diesel has a varying density depending on the type of diesel; For example, diesel 1D fuel has a density of 54.6 pounds per cubic foot. Other types of diesel, such as diesel 2D and diesel 4D, have different densities, though. Diesel 2D has a density of 53 pounds per cubic foot and diesel 4D has a density of 59.9 pounds per cubic foot. It must be noted that density calculations can vary greatly based on whether the unit of measure is an American gallon or not, or based on pounds or the metric system's unit of measurement of kilograms or grams. Gasoline will usually have a less density than diesel, too, because gasoline is ethanol-free gasoline fuel. It also certain densities for other types of fuel, such as different types of gasoline and coal. Standard petrol, for has a density of pounds per cubic foot while gas oil has a density of 52 pounds per cubic foot. Kerosene has the same density as gasoline at 44.9 pounds per cubic foot. Heating oil numbers one and two have their own respective densities of 54.6 pounds per cubic foot and 57.4 pounds per cubic foot, too. Heavy heating oil, however, has a slightly greater density of 58 pounds per cubic foot. Different litters have their own densities. Bituminous coal has a density of 43 to 50 pounds per cubic foot, so it can vary. Hardwood charcoal has a density of 9.3 pounds per cubic foot while softwood charcoal has a density of 13.5 pounds per cubic foot. Dr. Richard Weir shows a prototype for one of his ongoing projects. It requires developing a mechanical finger that can be changed for a female hand using 3D printing technology. (Photo by Terri Rorke) VA researcher experiments with bloodsuckers to power prosthetics, implantable devices November 17, 2020 By Mike Richman VA Research Communications New technology a source of curiosity Read more Dr. Richard Weir is a self-described sci-fi geek. His favorite films include 21st-century science fiction thrillers. He has absorbed the readings of acclaimed sci-fi writers David Brin and Iain Banks. With a seemingly endless supply of curiosity, Weir does a lot of mental doodling and diagramming. He also likes to make things. We need to do engineering to put it in shape and shape so that it will work in the body. I can't help myself, said Weir, a prosthetic technology expert at the VA Eastern Colorado Healthcare System. I read so much science fiction. So maybe my ideas aren't quite weird to me. I guess you'll be exposed to ideas. Then you see if the idea has merit or not. You can work on it from there. A lot of times I get ideas, and it's like: Oh, I see pieces from different places, and I see how they go together. Today, Weir does just that. In his latest technological challenge, he is leading the development of an innovative power source for wearable devices such as prosthetics and implantable devices, such as pacemakers or deep brain stimulators, that will harvest electricity from bloodsuckers. If successful, the technology will be the first of its kind. In theory, the power source can be used for anything that is worn on the body and needs power, Weir says. He and his colleagues are confident that the components needed to make such a device are in place. They also believe that there is an opportunity to develop a system that optimizes and integrates these components to produce a viable system in size, power and efficiency. We have a lot to do It is due to the invention of a cloth-like membrane - an anion exchange membrane - which can generate in a high pH environment (acidity) as the body reaches the blood flows over and through the diaphragm. Human blood is full of glucose, which is a form of sugar and a source of fuel for the body. The membrane reacts with these sugars and creates electricity as a product of the reaction. This electricity can be stored in a battery for later use to provide power to both implanted and external devices, according to Weir. It's the membrane that allows us to work on these sugars, said Weir, who is also a professor of biotechnology at the University of Denver. In the body, things are on a certain acidity. So we thought, 'Let's take a look at these membranes and see if we can use them with bloodsuckers.' People have been trying to make implanted power systems that use blood sugar for a while, but they've always got into trouble. That's why we think our membrane is what will enable us to succeed where others don't. We need to do the engineering work, though, to put it in shape and shape so that it will work in the body, he adds. There is a big difference between moving a device from the worktop proof-of-concept to getting it into a form suitable for use even as an out-of-the-body type fuel cell and then moving from an external system to an implanted system. We have a lot to do to develop the membrane from a prototype system to a physically realisable system. It is important to maximize blood flow over and through the membrane, Explains Weir, to increase the amount of contact between the two and produce high levels of electricity. Glucose in the blood will react chemically with coating on the membrane, he adds. It makes the glucose give up some electrons that we can then use for electricity, he said. Electricity is nothing more than the power or movement of electrons, so the moment we have something that can create or generate electrons, we harvest them and use them to power devices, provided we can get enough. We have to deliver some oxygen for that, too. The reaction of oxygen and glucose with the membrane will produce electricity. It is basically a linear thing where the more blood we can have in contact with the diaphragm, the more power we can make. The device must be as light as possible Dr. Chulsung Bae, a professor at Rensselaer Polytechnic Institute in New York, supplies the anion exchange membrane. Bae is a colleague of Dr. John Pellegrino, a professor at the University of Colorado and a collaborator of Weir on the blood sugar project. They're working on the technology in Weir's lab at Rocky Mountain Regional VA Medical Center in Denver. Researchers in the lab specialize in building prosthetic hands for people with upper limb loss. Dr. Jacob Segil, a mentee of Weir, is also involved in the blood sugar project. He focuses on building sensors that fit into the prosthetic fingertips and give a sense of touch. Weight is an important factor in the success of prostheses and implantable devices. Weir and his colleagues always try to make prosthetic hands that are lightweight, compact and as powerful as possible. Their new technology, he says, could replace the batteries with a handkerchief-sized piece of fabric-like membrane that would provide continuous power. It lives in you, so you don't have to recharge the batteries again, he says. We'd reap power from your body continuously. The desire to produce small, light and powerful sources makes Weir and his team eager to figure out new and better ways to generate electricity and electricity. That led to some discussions with Dr. Pellegrino about this proposal, Weir recalls. He said: 'Why don't you go directly to the source and use blood sugar. Sugar has a very high energy content. So it's like, okay, it's interesting. Gasoline is a liquid in the fuel tank. It contains a lot of energy. It is then released when it enters the engine and ignites the spark plugs. Once stored, it is stored in liquid form, so it is a very compact type of energy. Sugar is the same way. Sugar beet and sugar cane are used as alternative biofuels because they have a real high energy content or what we call specific energy. It makes sugar an excellent fuel source. At least a year away weir and his team are at least a year away from testing a prosthesis that will demonstrate the concept of membrane using sugar as fuel. It will be achieved on a bench system, he says, and sees that he and his colleagues will start with their hand because it is our comfort zone. For the future, it is possible to imagine a scenario in which the bloodsucker flows through a tube on the skin of an instrument associated with the prosthesis. But a fully implantable system where blood sugar drives something like a deep brain stimulator years away, he notes. VA RESEARCH TOPIC PAGES When surgery is needed to insert a device into someone, it takes a long time to get through human trials, Weir said. Case in point: He led a team that developed an implantable sensor system that measured muscle signals. The aim of the project was to obtain prosthetic control signals from all 18 forearm muscles through implantable myoelectric sensors (IMES). It took about a decade, he says, for the project to go from initial funding to initial testing in human trials. It takes a long time for these technologies to come to humans, he said. We insert an implanted membrane into the body and use bloodsuckers in a person. We have to go through animal experiments first and a bunch of other steps before it can get into people. Weir has long been a VA leader in prosthetic technology. More Ten years ago, he and his colleagues contributed to an effort funded by Defense Advanced Research Projects (DARPA) to build the world's most advanced prosthetic arm. They partnered with a private firm and applied physics lab at Johns Hopkins University in Baltimore to build a 15-engine hand for an arm system unveiled in 2007. The system is now being developed. Weir also consulted on the LUKE/DEKA arm, which was developed through the same DARPA initiative. VA researchers were key to testing and optimizing the LUKE/DEKA arm, the first prosthetic arm capable of performing multiple simultaneously driven movements. The U.S. Food and Drug Administration approved it in 2014. Technology would be a game changer His latest technological adventure, he says, is not an imaginative hope or plan. He thinks there's solid science behind the idea. Among the colleagues he has shared it with, no one has expressed direct skepticism. Not to my face, anyway, he says with a laugh. At the moment we can make a reasonable argument because the pieces are there. We can say, Oh, this can actually work. That's why we're pursuing it. So it's not quite pie in the sky because we know what's been going on before, and we base some of our first choices and designs on some kind of existing type of technology. This may sound like science fiction, but I think a lot of it is a logical extension of how we can improve some of the systems we see. I don't know. There are always naysayers, but there are also yeasayers, so you want to be positive in your view. The VA is funding the project with a small project in rehabilitation research (SPIRE), which is usually for pilot-level, high-risk, high reward endeavors. We have a peer-reviewed scholarship, so it's been legitimized in that sense, Weir said. It is very empowering to move forward with this idea and develop it further. A SPIRE award allows you to make innovative, high-risk types of projects, so you can explore the idea to see if you can get any preliminary data and find out if the idea works at all. In Weir's opinion, technology would be a game changer because we would be able to create and harvest power from people themselves, without having to charge anything out of the wall. You just eat your chocolate bar or something, and then it's good to go. This is just experimental, but it's high risk, high gain, he said. It has the potential to be very effective if we can make it work, even on a worktop or external system. It would be a new type of fuel cell technology. In a bench top set up for the bloodsucker-based fuel cell, the membrane is held by pieces of plastic that shrink together in the bolted device. In a bench top set up for the bloodsucker-based fuel cell, the membrane is held by plastic pieces that are together in the bolted unit. Like many technologies in their infancy, the idea of using blood sugar to fuel prostheses and implantable devices triggers its share of questions. After all, previous attempts to use bloodsuckers as a power source have come to a short end. But while much about the technology may be speculative, the core concept is in place. The goal is to promote it to physical reality. Dr. Richard Weir of VA Eastern Colorado, one of the researchers who led the project, addressed some of these questions: Drinking a lot of water and staying hydrated is known to improve blood flow in the body. Thus, can the volume of water consumed affect the amount of electricity he or she produces? To be honest, we don't know. Electricity-generating capacity with this type of fuel cells depends on the amount of glucose flowing through the system. So if drinking water increased the total blood flow through the body, then I suppose that maybe it is possible one can make more electricity. But if you drink more water also diluted the relative concentration of blood sugar in the blood, then it would reduce the fuel content of the blood and thereby reduce the power of electricity production. So maybe it would be a sink. These are the kinds of things we're going to explore. That's why this is groundbreaking research. I'm not sure that water will have a big effect, but we want to know. How about eating foods with a lot of sugar like candy bars? Will it generate more fuel to power the system? It's something we also had to explore. In theory, if you increase the concentration of sugar in your blood, you would have more fuel to harvest, so you can make more power. Would anyone who has diabetes be able to use this technology? High blood sugar levels are a serious problem for diabetics and must be kept at safe levels. First of all, I'm not necessarily sure we would use it with someone who has diabetes if it was shown to be a problem. Secondly, if this system uses and consumes blood sugar, it has potential if we set it up properly to regulate blood sugar because it would extract the blood sugar and use it. But it has not been shown or demonstrated. We can possibly foresee a program where the membrane can actually be used to regulate blood sugar. --- Mike Richman ⇑ VA Research Currents Archives || Sign up for VA Research updates