

Basic Guidance for the Production/Blending of Biodiesel Product and Complying with Applicable Code

Purpose

The purpose of this document is to provide you with an overview of Sarasota County ordinances and State of Florida statutes and/or administrative code that may apply to your planned entrance into the manufacture, storage, or usage of bio-diesel. In addition to state and local rules and ordinances, be aware that the United States Environmental Protection Agency (US EPA) also regulates this product/process and its resultant wastes. If it is your intention to produce bio-diesel for sale, we strongly recommend you access the following website for the guidance document produced by the US EPA.

http://www.epa.gov/region07/priorities/agriculture/biodiesel_manual.pdf

The National Fire Protection Association (NFPA), Florida Uniform Fire Code also applies to the manufacture and storage of this material. Rather than attempt to address all of the relevant sections, a page is appended listing these sections. We strongly recommend that you access this information, understand its contents and adhere to all requirements.

Background

The manufacture, or production, of bio-fuels from a primarily vegetable oil base is gaining interest and momentum throughout the country. The oils used in this manufacture are predominately plant based, such as soybean, canola, sunflower, corn, and other oils. In many cases the oils have been used as cooking oils and may contain animal fats as well.

These oils, in their raw state, or after filtering to remove solids or water, are not bio-diesel fuels and are not registered as such with the US EPA. Further, they are not legal for use as a fuel or as an additive or extender. Doing so, whether with or without modification of your diesel engine, is a violation of the US Clean Air Act, will likely cause damage to your diesel engine as well as create excess emissions and creates a strong probability of a voided engine warranty. It is also potentially a prosecutable violation.

For these reasons, this document will address only those practices and wastes generated by the conventional conversion of vegetable based oils, or those used oils containing some animal fats, into bio-diesel.

Manufacturing Materials

Methanol, wood alcohol, and carbinol are all names used to describe methyl alcohol, one of the prime ingredients in the manufacture of bio-diesel. This product is both toxic and highly flammable and storing quantities sufficient to manufacture bio-diesel at your home or place of business presents potential hazards to you, your property, your neighbor's property, and emergency workers in the event of a fire.

Sodium hydroxide and potassium hydroxide are highly corrosive toxic solids, only one of which would likely be used in the process. While neither is flammable, both are extremely corrosive, carrying a contact rating of 4 (highest) and a Poison rating of 3 and 4 respectively. Again, this equates to severe or extreme.

Vegetable oils, virgin or used, typically do not present a toxicity or flammability hazard, but do have the potential to present health risks due to decomposition of animal by-products contained in the oil. Leaks or other discharges may also attract vermin.

Dangers

In addition to operator risks for exposure to highly ignitable alcohol, severe toxics and extreme corrosives, adding these components of bio-diesel manufacture to a heated mixture presents a risk of ignition and fire.

Legal Issues

- Manufacturing this product in a residential environment may void your homeowners insurance. Check your policy and consult with your agent.
- If you manufacture 600 gallons or more per year, it may be necessary to acquire an air permit from the US EPA for the manufacture of a synthetic organic fuel.
- Pure bio-diesel is a fuel registered with the US EPA and is recognized as B-100. Unprocessed cooking oils, or used cooking oils, are not registered for use as a motor vehicle fuel, and using them as such, and or modifying an engine or its fuel delivery system to accommodate the use of such oils, is a violation of the Clean Air Act.
- Selling processed bio-diesel subjects you to all of the regulations applicable to large scale producers / refineries for quality control of the product and all applicable taxes for over the road vehicles.
- Storing quantities of pure bio-diesel, also known as B-100, is not currently regulated, but may be in the future. Any blend of bio-diesel and petroleum diesel subjects that product to full regulations as diesel fuel.
- Storage tanks exceeding 550 gallons and used to contain blended fuels are required to be permitted by the Florida Department of Environmental Protection Petroleum Storage Program.

Regulatory Concerns/Water Resources

Raw materials used in this process and resulting wastes are subject to the County's Pollution Control Code and must be stored properly to prevent any discharge to the waters of the state.

The Water Pollution Control Code, Chapter 54, Article VII of the Sarasota County Code has bearing on activities that may be related to bio-diesel production facilities:

Sec. 54-187(b) adopts all of the provisions of F.S. Ch. 373, and F.S. Ch. 403 that relate to the regulation of domestic wastewater facilities, pollutant storage tanks, contamination cleanup activities, and ground water and surface water quality standards.

Sec. 54-187(d) requires that all waters, at all places, at all times within the territorial limits of Sarasota County shall be free from, floating substances, settleable substances, deleterious substances, and toxic substances.

Sec. 54-187(e) protects the county-wide stormwater system. Sec. 54-187(e)(4) states, "No person shall spill, dump, or discharge, or cause to be spilled or discharged, into any stormwater conveyance, any materials other than those composed entirely of stormwater."

Also, bio-diesel manufacturers are regulated under the National Pollutant Discharge Elimination System (NPDES) Multi-Sector Generic Permit for Stormwater Discharge Associated with Industrial Activity (MSGP), Sector "C" - Chemical and Allied Products Manufacturing. The trans-esterification of vegetable oils to produce fuels or fuel additives is assigned a North American Industry Classification System (NAICS) code of 325199. This corresponds to the Standard Industrial Classification (SIC) Code of 2869, which is regulated under Sector "C".

Sarasota County recommends the use of sealed containers in good condition, storage of containers and process equipment under cover (i.e. a roofed structure, or a sound tarp), impermeable secondary containment, prompt cleanup of spills and leaks with an absorbent material, followed by proper storage and disposal of waste materials and products.

Put simply, at all times all manufacturing materials and wastes must be properly stored and prevented from entering the environment whether by accident or design.

Regulatory Concerns/Emergency Services

Some of the materials used in the manufacture of bio-diesel and the bio-diesel itself are flammable. As such, they are subject to regulations contained in the National Fire Protection Association (NFPA) Florida 2000 Edition fire code, and you may need a permit to have these materials or manufacture bio-diesel. It is your responsibility to be knowledgeable of how the code applies to your activity and to be in compliance with that code.

An example of applicable code might help to illustrate.

- Methyl Alcohol (methanol) has a flash point of 54 degrees Fahrenheit. Methanol is therefore a Class 1 Flammable Liquid
- Bio-diesel fuels have a flash point of between 100 and 130 degrees Fahrenheit (depends on percent bio-diesel). Bio-diesel is a Class II Flammable Liquid.

The following is excerpted from the NFPA 1, Uniform Fire Code, Florida 2007 Edition Table 1.12.20(a) cross reference Section 66.1.5, Flammable and Combustible Liquids, items 2 & 3. A permit is required

“2. To store, handle, or use Class I liquids in excess of 5 gal (18.9 L) in a building or in excess of 10 gal (37.9 L) outside of a building.”

“3. To store, handle, or use Class II or Class III-A liquids in excess of 25 gal (94.6 L) in a building or in excess of 60 gal (227.1 L) outside of a building.”

Exceptions to these two items are vehicle fuels and home heating oil. Obviously a vehicles tank holds more than 5 gallons and a home heating fuel tank holds more than 60 gallons.

Therefore, if you are going to store or manufacture inside of a building and have 5 gallons or more of methanol, or 25 gallons or more of bio-diesel, you would need a permit from your local fire department for the activity.

The key here is that only you know what your plans are and it is your responsibility to ensure that you are in compliance with NFPA code.

Regulatory Concerns/Hazardous Waste

The conversion (trans-esterification) of waste vegetable oils and or animal fats into bio-diesel requires the oil to be blended with an alcohol and a catalyst followed by the application of heat and agitation. The process is never 100% complete, resulting in bio-diesel product and wastes of glycerin, filters, and solids removed from the used oils. Title 40 Code of Federal Regulations (40 CFR) Part 262.11 requires generators of wastes to determine if the wastes are hazardous.

The waste glycerin has the potential to contain sufficient quantities of unlinked methanol so that the glycerin itself would be a hazardous waste. This can only be determined through analysis by a certified laboratory. Disposal of this waste without a hazardous determination is potentially a violation.

Improperly processed components can result in a vessel full of gelled “soap like” material contaminated with a corrosive and flammable alcohol. While recoverable, it is not normally within the skill set of the average person to do so, and the material would be a hazardous waste that must be properly containerized, labeled, stored, and disposed of as such.

When the process has been reacted as far as the materials will allow, the bio-diesel is typically washed to remove excess methanol, soaps and unconsumed catalyst. This process produces waste waters that are not permitted to septic tanks, sanitary sewers, or to the soil. As a waste, it too would require a hazard determination and may require management as a hazardous waste.

If the bio-diesel is filtered instead of washed, the resulting filter cake is a hazardous waste that must be managed as such. These cakes are documented to have ignited spontaneously. Be very careful to ensure proper containerization and storage of this waste to avoid the potential for structure fires.

Recommended Best Management Practices

The manufacture of bio-diesel fuels from vegetable based oils, while seemingly simple is actually a complex chemical reaction involving health and safety risks, property damage and liability risks, waste accumulation and disposal, and storage of the finished product.

The following recommendations are not intended to be construed as complete or meeting all requirements of all situations at all times. Inclusion, or exclusion, of any item in this document does not imply it is or is not necessary to the safe manufacture of bio-diesel.

1) All storage and manufacturing should be conducted in a building constructed of non-flammable materials such as concrete block or poured concrete wall construction.

2) The building should not be connected to any other structure.

3) Raw materials must be stored properly a) Vegetable Oil – Minimally this should be stored in appropriate containers of plastic or steel. It should be stored on an impervious surface and ideally have secondary containment to prevent loss in the event of container failure. It should be protected from the elements and stored in compliance with current pollution prevention, zoning and Health Department code.

b) Lye – This is a highly corrosive material that should never be stored under any conditions where it might unintentionally come into contact with an incompatible material. Reactions can occur resulting in fires, fumes, toxic gasses, etc. Secure the Material Safety Data Sheet (MSDS) and follow all of the manufacturer's recommendations.

c) Methanol – Methanol is a highly flammable alcohol, typically made from wood waste and, in addition to being flammable is toxic as well. Again, secure the manufacturers MSDS and follow all guidelines. Store this material in compliance with NFPA 1, Uniform Fire Code, Florida 2007 Edition

4) Waste materials must be stored properly and disposed of consistent with controlling code. a) Used filters or cake may contain hazardous levels of residues from the methanol and or the lye, making it potentially corrosive and or toxic as well as potentially spontaneously combustible. Storage must preclude the possibility of fire if it spontaneously ignites. Keep it in fire proof containers. Prior to disposing of it, a hazardous waste determination must be completed. This requires analysis by a certified laboratory for the characteristics of ignitability, toxicity, and corrosivity. As the generator, you are responsible for ensuring the analysis is completed and the waste is disposed of properly.

b) Glycerin may also contain the residues of an incomplete reaction and must be analyzed for the same characteristics as filters and cakes.

c) Wash Water, often used to "clean" the finished bio-diesel, obviously has the potential to contain the same contaminants. Under no circumstances can this waste be discharged into a septic tank or onto surface soils. With written permission from the receiving wastewater/sanitary sewer operator, it may be discharged to the sanitary sewer. This disposal practice depends in large part on residual methanol and flammability characteristics. Analytical testing on the waste water, performed by a certified laboratory, would be required. Alternatively, it will be necessary to collect the waste water and dispose of it as hazardous waste.

5) Resulting product must be contained and stored consistent with prevailing code.

a) Volume – As stated previously, defined quantities of pure B-100 bio-diesel are not currently regulated due to it's not being a petroleum product. Being proactive at this point and ensuring that your storage conditions meet prevailing code for the storage of petroleum diesel may prevent you from being forced to upgrade in the future. Storage requirements are volume dependent. Information on tank requirements can be found at

<http://www.dep.state.fl.us/waste/categories/tanks/default.htm>

b) However, if the product is a blend identified by any designation other than B-100 such as B-5, B-10, etc., indicating it is a blend of petroleum diesel and bio-diesel, it is subject to full regulation under the petroleum storage rules found at the website noted in "a" above.

c) Subject 5 (a) and (b) above pertain primarily to fuels intended for commercial use. If your process/product is intended purely for your own use in your own vehicle and will be manufactured and stored on your property in a residential neighborhood, your homeowners insurance company should be consulted prior to undertaking any of these activities.

Additional Recommendations

1) Stay informed of continuing improvements in processes, materials and regulations governing the manufacture of this product.

a) Numerous web sites exist that are dedicated to this process/technology. If you use the internet as a resource, make sure to link to reputable sites with reliable information. One such site is <http://www.methanol.org/>. This is the home page for the "Methanol Institute".

b) The US EPA maintains a web site with information on bio-diesel production and current regulations. Connecting to this site and saving it as a "Favorite" to be checked routinely will keep you informed of rule changes. <http://www.epa.gov/OUST/altfuels/bfcompend.htm>

c) Several periodicals / magazines are published in print form and on the web that provide current and up-to-date information on emerging technologies in the bio-fuel industry. Recommend you consider subscribing to several of these publications.

Summary

As was stated in the beginning of this document, the intent was to give you an overview of some of the issues you will face when trying to manufacture bio-diesel fuel. There are safety issues, waste disposal issues, regulatory requirements, permitting requirements, quality control of the product to meet engine manufacturer's requirements, insurance issues and probably many others.

If your intent is to purchase bio-diesel rather than manufacture it, ensure that you do not store quantities that exceed the limits established by the previously noted NFPA code or secure the necessary permits for the quantity you intend to store on site. If your tank capacity exceeds 550 gallons, in addition to the NFPA permits, you will also be required to register the tanks with the Bureau of Petroleum Storage Systems and be in compliance with containment and monitoring requirements.

Many articles have been published both on paper and on the Internet promoting the personal manufacture of bio-diesel. Many of these portray the process to be simple and uncomplicated and rarely address proper management and storage, disposal of wastes, or legal requirements, they still exist. Design your process to ensure complete compliance with all applicable code.