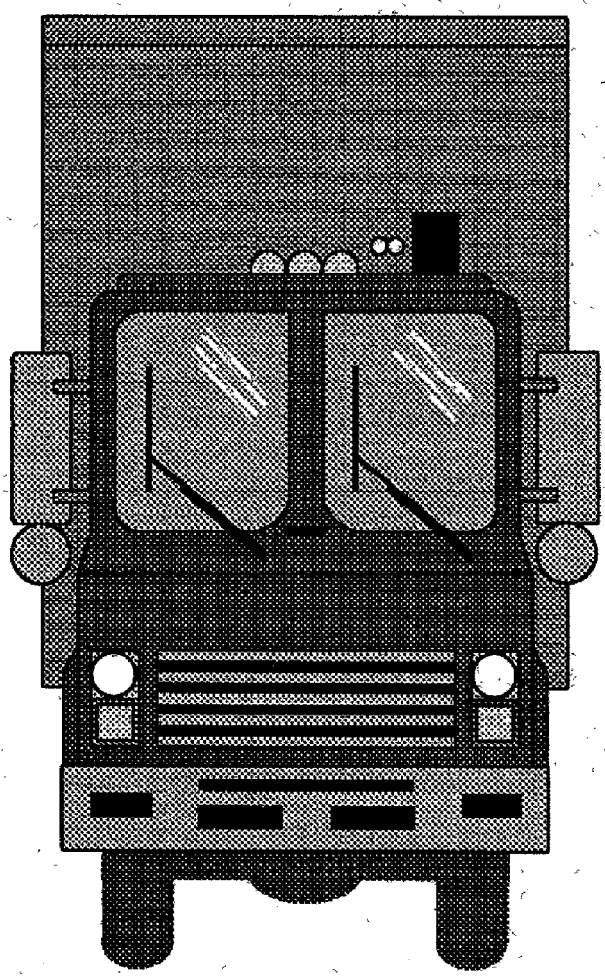
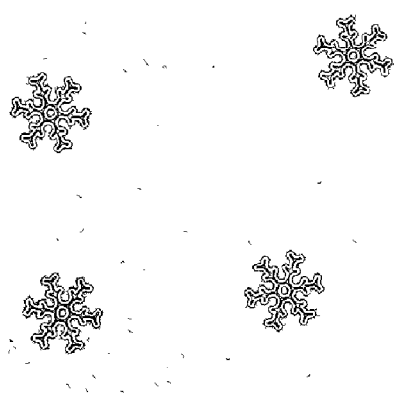
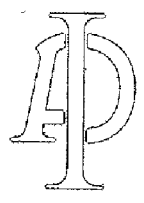


Winter Diesel

QUESTIONS & ANSWERS

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FOREWORD

This pamphlet was prepared at the request of a task force formed by Congressman William H. Zeliff, Jr. (R-NH) to respond to complaints of diesel fuel gelling in the North East during the '93-'94 winter season. The contents represent a team effort to provide important information on the low temperature performance of diesel fuel, why problems occur, and what can be done to prevent them. Representatives of the major fuel suppliers in the North East United States and public officials developed and reviewed the information presented.

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GLOSSARY

Additive	a chemical added to fuel to enhance one or more of its properties.
ASTM	"ASTM"(American Society for Testing and Materials) is a national voluntary consensus standards organization formed for the development of standards on characteristics and performance of materials, products, systems, and services (including petroleum products); and the promotion of related knowledge.
BTU	British Thermal Unit, a measure of the energy content of a fuel.
Cetane Number	a measure of the ignition quality of a diesel fuel. A high cetane number indicates a shorter ignition delay and could improve engine operation.
Cloud Point	the temperature at which a cloud or haze of wax crystals first appears in a liquid when it is cooled under standard test conditions as defined in the ASTM D 2500 test method.
Flash Point	the lowest temperature at which vapors from a fuel will ignite on application of a small flame under standard test conditions.
Gelling	a thickening of the fuel (similar to solidifying gelatin) caused by wax crystals which form as the fuel cools down. This gelled fuel containing wax crystals is difficult to pump and can plug fuel filters, preventing fuel from reaching the engine.
High Sulfur Diesel Fuel	contains greater than 0.05 weight % (500 ppm) sulfur.
Icing	the formation of ice crystals in a fuel containing free water when cooled to 32°F or below. These ice crystals will plug filters in the same manner as wax crystals. In fact, icing problems are often mistaken as fuel gelling.

Kerosene

a class of light petroleum distillate fuels such as those used in aviation turbine engines, certain heating appliances, and for blending winter diesel fuel. There are two different grades: 1-K is a special low sulfur kerosene suitable for nonflue-connected applications; 2-K is a high sulfur kerosene suitable for flue-connected applications.

Low Sulfur Diesel Fuel

contains less than 0.05 weight % (500 ppm) sulfur and meets other EPA and IRS requirements for highway use.

Lubricity

lubricating-ability, is a measure of a diesel fuel's ability to prevent wear on contacting solid surfaces found in some fuel pumps and injectors. In the case of diesel engines, some fuel pumps and fuel injectors are lubricated by the fuel. So lubricity is a measure of a diesel fuel's ability to prevent wear in these parts.

Pour Point

the lowest temperature at which a sample of diesel fuel will flow when it is cooled under standard test conditions as defined in the ASTM D 97 test method.

No. 1-D Diesel Fuel

a lighter, kerosene based diesel fuel having a lower viscosity, density, cloud point, pour point, and less BTUs per gallon than No. 2-D Diesel Fuel. It is used for extremely low temperature operation and is commonly blended with No. 2-D Diesel Fuel to improve No. 2-D low temperature operation.

No. 2-D Diesel Fuel

the standard grade of diesel fuel used in heavy duty trucks and diesel passenger cars. No. 2-D Diesel Fuel is sometimes blended with No. 1-D Diesel Fuel to improve No. 2-D's cold temperature performance.

WINTER DIESEL FUEL

1.

Q. What is diesel fuel?

- A.** Diesel fuel is principally a blend of petroleum-derived compounds called middle distillates (heavier than gasoline but lighter than lube oil) and may contain additional additives.

2.

Q. How many grades of diesel fuel are there?

- A.** The American Society for Testing and Materials (ASTM) in ASTM Specification D 975 defines two grades of diesel fuel for on-highway use — low sulfur No. 1-D and low sulfur No. 2-D — and two grades of diesel fuel for off-highway use — high sulfur No. 1-D and high sulfur No. 2-D.

Grade No. 1-D is a lighter, kerosene based, more volatile diesel fuel generally recommended by engine manufacturers for extremely low ambient temperatures, while Grade No. 2-D is a less volatile fuel for moderate climates.

3.

Q. What is the difference between No. 1-D and Kerosene?

- A.** Grade No. 1-D and kerosene are very similar in their physical characteristics and, therefore, their names sometimes

have been used interchangeably, i.e., No. 1-D diesel fuel is sometimes called kerosene. However, according to ASTM D 975, Grade No. 1-D diesel fuel is defined for use in diesel engine equipment, whereas, kerosene is defined for use in heating appliances. Kerosene and No. 1-D have different specifications. Kerosene can be classified as either being a 1-K or 2-K kerosene. Neither 1-K nor 2-K kerosene should be assumed to meet No. 1-D diesel fuel specifications; nor does No. 1-D diesel fuel necessarily meet kerosene specifications. The appropriateness of interchanging these fuels needs to be checked with the fuel supplier.

The difference between No. 1-D and kerosene is important to the end user. Recently, the IRS issued regulations on the tax exemption of diesel fuels that may affect what product you select. In addition, the EPA has issued regulations regarding the sulfur content of these products that also could affect which product you select.

4.

Q. What is winter diesel fuel?

- A. A winterized diesel fuel is a Grade No. 2-D fuel that has been modified to permit its use at lower ambient temperatures. Typically, this improvement is accomplished by blending No. 2-D with No. 1-D. The final blend will have a lower cloud point and will, therefore, form wax crystals and start to gel at a lower temperature. Additives also can improve the low temperature performance of No. 2-D.

CAUTION: Gasoline should not be used to dilute diesel fuel because the mixture has much greater flammability and explosive potential than either gasoline or diesel fuel alone.

5.

Q. What is diesel fuel gelling?

- A.** Gelling is a thickening of the fuel (similar to solidifying gelatin) caused by wax crystals which form as the fuel cools down. This gelled diesel fuel containing wax crystals is difficult to pump and can plug fuel filters, preventing fuel from reaching the engine.

6.

Q. Why do I need winter diesel fuel?

- A.** When diesel fuel is produced at the refinery its ultimate destination is not known, so it is blended to meet a generic temperature requirement. For example, the maximum cloud point specification on the major pipeline connecting the Gulf Coast with the northeastern U.S. is +15° F. Since the winter temperature requirements vary significantly in different parts of the country, diesel fuel must be blended locally to meet the specific need of a region.