

Compatibility Guidelines

Introduction

The purpose of this document is to provide guidance on the cleaning and usage of shared equipment in lubricating oil and grease blending plants. These guidelines should be considered when planning production, transfer and packaging sequences. This will allow blend plants to minimize the production of slop oil/slop grease and ensure all products meet specifications when multiple products are handled in the same equipment. It is applicable to all stages of manufacturing including blending, transfer, storing and packaging of lubricating oils and greases.

Products are manufactured for a wide range of applications; each product will have different tolerances to contamination depending on its composition and purpose. Degrees of allowable contamination are shown by dividing the products into groups with similar properties and showing the maximum percentage allowable contamination between these groups ([Compatibility Matrix](#)). The reasons why contamination should be minimized are outlined at the end of this document ([Reasons for Incompatibility](#)).

This document also provides a description of several general flushing procedures that may be used to meet these guidelines when different products are handled in the same equipment. The flushing procedures used will vary depending on the equipment available at each plant, specific procedures and the products' compatibility with each other.

Contamination of products should always be avoided if possible. The quoted allowable contamination between products in this document should not be interpreted as permission to deliberately allow contamination to occur. It is instead the maximum allowable contamination guideline where it is unavoidable, or inadvertent. If the allowable contamination guideline is exceeded guidance from Lubricants Product Life Cycle Management (Regional Manufacturing & Lab Support (MLS)) must be obtained.

Definitions

Terms used in this document and their meaning:

Previous product:	The most recent product that has passed through the process equipment.
Scheduled product:	The product that is scheduled to be passed through the process equipment next.
Compatible:	A scheduled product is considered compatible with the previous product if contamination of 1% of the previous product in the scheduled product will not create significant change in the characteristics and performance of the scheduled product.
Incompatible:	A scheduled product is considered incompatible with the previous product if contamination of less than 1% of the previous product in the scheduled product will create significant change in the characteristics and performance of the scheduled product.
Compatibility group:	A grouping of similar products (e.g. zinc containing engine oils or gear oils). For a specific product the compatibility group it belongs to can be found in Global Product Information Management System (GPIMS).
Retained Product Volume:	The amount of a product left in process equipment after it has been drained, purged or pigged.

Instructions

Instructions for the use of these guidelines to determine the compatibility between a previous and scheduled product and to determine the correct flushing procedures are as follows:

1. Determine the compatibility groups for both the scheduled product and the previous product. The compatibility groups for products can be found in the GPIMS.
2. Determine the percentage allowable contamination using the compatibility groups and the Compatibility Matrix (Table 1) in section [Compatibility Matrix](#).
3. Perform necessary cleaning/flushing of equipment determined in [Flushing Guidelines](#).
4. Proceed with the use of the process equipment with the scheduled product.
5. Retain sufficient documentation for the scheduled product. This documentation should include the product name, packaging/loading/storing information, inspection data (viscosity or penetration, appearance, trace metal checks, etc.) and the previous product that was in the equipment.

Grouping of Products

Lubricants

Group Number	Description
1	Zinc Containing Engine Oils
2	Compressor / Circulating / Hydraulic Oils
3	Turbine & R&O Turbine oils and similar rust and oxidation inhibiting oils.
4	Automotive Gear Oils
5	Transmission Fluids
6	Ashless Engine Oils Gas engine and other ashless oils.
7	Zinc Free Engine Oils Railroad oils and other zinc-free oils.
8	Dark Oils with Tackifier Dark Oils that contain tackifier and/or tallow.
9	Light Oils with Tackifier Light Oils that contain tackifier and/or tallow

- 10** **Metalworking Fluids (Active Sulfur)**
Metalworking fluids with active sulfur.
- 11** **Metalworking Fluids (Inactive Sulfur)**
Metalworking fluids with Inactive sulfur.
- 12** **Base oils with or without VII, PPD**
Base oils with or without viscosity index improver and pour point depressant
- 13** **Metalworking Fluids (Chlorine Free)**
Chlorine-free metalworking fluids.
- 14** **Low SAPS PCMO**
Passenger car motor oils with low sulfated ash, phosphorus and sulfur.
- 15** **Marine Engine Oils**
Oils for trunk piston engine oils, diesel cylinder oils, and system oils.
- 16** **Soluble Oils**
Fluids that form stable emulsions with water, usually for metal working.
- 17** **Dexron / Mercon ATF**
Automatic transmission fluids that must meet Dexron /Mercon standards.
- 18** **Biodegradable Oils**
Oils based on rape seed or synthetic oils with high biodegradability.
- 19** **Specialties / Miscellaneous**
Products incompatible with other groups and other products from this group.
- 20** **Industrial Gear Oils**
Emulsion sensitive Industrial gear lubricants.

Greases

Classified by Thickener type

- | | |
|-----------|--|
| 30 | Lithium |
| 31 | Lithium Complex |
| 32 | Aluminum Complex |
| 33 | Calcium |
| 34 | Calcium Sulfonate Complex |
| 35 | Sodium |
| 36 | Bentone (Clay) |
| 37 | Polyurea |
| 38 | Specialties/Miscellaneous
Products incompatible with other groups and other products from this group |

Compatibility Matrix

Table 1 – Lubricants

		Scheduled Product																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
Previous Product	1	1.00%	0.01%	0.00%	0.10%	0.10%	0.01%	0.01%	0.01%	0.10%	0.01%	0.01%	0.01%	0.01%	1.00%	0.10%	0.00%	0.01%	0.01%	0.01%	0.01%	0.00%
	2	1.00%	1.00%	0.10%	0.10%	1.00%	1.00%	0.10%	0.01%	0.10%	1.00%	1.00%	0.01%	0.01%	1.00%	1.00%	0.00%	0.10%	0.01%	0.01%	0.01%	0.10%
	3	1.00%	1.00%	1.00%	0.10%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	0.10%	1.00%	1.00%	1.00%	1.00%	0.10%	0.10%	0.01%	0.10%	0.10%
	4	0.01%	0.01%	0.00%	1.00%	0.01%	0.01%	0.01%	1.00%	0.01%	1.00%	0.01%	0.01%	1.00%	0.01%	0.10%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%
	5	0.10%	0.01%	0.00%	0.10%	1.00%	0.10%	0.01%	0.10%	0.01%	1.00%	1.00%	0.01%	0.01%	0.10%	1.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.00%
	6	1.00%	0.01%	0.00%	0.10%	1.00%	1.00%	1.00%	1.00%	0.10%	0.10%	0.10%	0.01%	0.01%	1.00%	1.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.00%
	7	1.00%	0.01%	0.00%	0.10%	1.00%	0.01%	1.00%	0.10%	0.10%	0.01%	0.01%	0.01%	0.01%	1.00%	1.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.00%
	8	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%	1.00%	0.10%	1.00%	1.00%	0.01%	1.00%	0.01%	0.10%	0.10%	0.01%	0.01%	0.01%	0.01%	0.00%
	9	0.10%	0.01%	0.00%	0.10%	0.01%	0.01%	0.01%	1.00%	1.00%	1.00%	1.00%	0.01%	1.00%	0.10%	0.10%	0.10%	0.01%	0.01%	0.01%	0.01%	0.00%
	10	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	1.00%	0.10%	0.01%	0.01%	0.01%	0.10%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
	11	0.01%	0.01%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	1.00%	1.00%	0.01%	0.01%	0.01%	0.10%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%
	12	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	0.10%	1.00%	0.01%	1.00%
	13	0.01%	0.01%	0.00%	1.00%	0.01%	0.01%	0.01%	1.00%	1.00%	1.00%	0.01%	0.01%	1.00%	0.01%	0.10%	0.01%	0.01%	0.01%	0.01%	0.01%	0.00%
	14	1.00%	0.01%	0.00%	0.10%	0.10%	0.10%	0.01%	0.01%	0.10%	0.01%	0.01%	0.01%	0.01%	0.01%	1.00%	0.10%	0.01%	0.01%	0.01%	0.01%	0.00%
	15	0.10%	0.01%	0.00%	0.10%	0.10%	0.01%	0.01%	0.01%	0.10%	0.01%	0.01%	0.01%	0.01%	0.01%	0.10%	1.00%	0.01%	0.01%	0.01%	0.01%	0.00%
	16	0.01%	0.00%	0.00%	0.10%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	1.00%	0.01%	0.01%	0.01%	0.00%
	17	0.01%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	1.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	1.00%	0.00%	1.00%	0.01%	0.01%	0.00%
	18	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	0.01%	1.00%	0.01%	1.00%
	19	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
	20	0.01%	0.01%	0.00%	1.00%	0.01%	0.01%	0.01%	1.00%	0.01%	1.00%	0.01%	0.01%	1.00%	0.01%	0.10%	0.01%	0.01%	0.01%	0.01%	0.01%	1.00%

Compatibility Matrix

Table 2 – Greases

		Scheduled Product									
		30	31	32	33	34	35	36	37	38	
Compatibility Groups	Grease Compatibility by Thickener Type	Lithium	Lithium Complex	Aluminum Complex	Calcium	Calcium Sulfonate Complex	Sodium	Bentone (Clay)	Polyurea	Specialties/Miscellaneous	
		Previous Product	30	Lithium	5%	5%	0.1%	5%	1%	0.1%	0.1%
31	Lithium Complex	5%	5%	0.1%	1%	1%	0.1%	0.1%	1%	0.01%	
32	Aluminum Complex	0.1%	0.1%	5%	0.1%	0.1%	0.1%	0.1%	0.1%	0.01%	
33	Calcium	5%	1%	0.1%	5%	1%	0.1%	0.1%	1%	0.01%	
34	Calcium Sulfonate Complex	1%	1%	0.1%	1%	5%	0.1%	0.1%	1%	0.01%	
35	Sodium	0.1%	0.1%	0.1%	0.1%	0.1%	5%	0.1%	0.1%	0.01%	
36	Bentone (Clay)	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	5%	0.1%	0.01%	
37	Polyurea	1%	1%	0.1%	1%	1%	0.1%	0.1%	5%	0.01%	
38	Specialties/Miscellaneous	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	

compatible
 borderline (need to test)
 incompatible

Remarks:

This table is applicable for blending only. Flushing guidelines for greases are described on item 1 of this document. 5% are normally the heel of the tanks, which means that the kettle do not need to be cleaned if the remaining amount of the compatible grease is less than 5%

Flushing Guidelines

There are several methods available to clean process equipment so that it will not contaminate scheduled products. Three methods of cleaning process equipment are outlined below. These are (1) The Drain/Pig/Purge & Flush Method (2) Displacement Flushing Method and (3) Recirculation Method.

1. Drain/Pig/Purge/Push and Flush Method

The initial step in this method involves first clearing the process equipment as much as possible followed by flushing.

There are 4 ways of clearing the system, which may be used individually or in combination:

- Draining - Allowing as much of the previous product as possible to flow from the system.
- Pigging - Sending a piece of equipment designed to clean pipes, a “pig”, down the line to remove as much of the previous product as possible. This method is only possible for piping.
- Purging - Sending air or an inert gas through the system. This may be from the process pump or some other source. This method is most effective for piping.
- Push- applicable for greases only. The previous grease will be pushed by the scheduled grease to be filled until it is (scheduled grease), visually shown in the filling line. It is also recommended that when the scheduled grease starts to show in the filling line, a sample of the scheduled grease is taken and spread in a tile to see if there is any remaining contamination of previous grease.

Note: The time between purging or pigging the system and flushing the system will affect the efficiency of the flushing. Flushing should be performed as soon as possible after the purging/pigging. The sooner the flushing occurs the more evenly the previous product will be distributed around the pipe. As time passes the product will drain down into the lower sections of the equipment making it more difficult to flush away.

When the system has been cleared by the above methods it can be flushed. The volume that will be required to flush the system depends on the compatibility of the products, equipment involved, and this will vary between all plants and equipment.

Flushing is usually done using the scheduled product. However, in the case of products that are very incompatible (0.01% for lubricants and 0.1% for greases) the system should be flushed with base oil.

As a guide to establishing the correct flushing volume the following steps may be used.

1.1 Determination of Flushing Volumes – Retained Product Volume

Calculate the retained product volume (i.e. the amount of the previous product remaining in the process equipment) as follows:

1. Calculate the total estimated **System Volume - SV**. Table 3 may be used to estimate the volume of piping and hoses. For pumps and meters use the internal volume if it is known, otherwise use 5 liters (1.3 Gal.) as an estimate.
2. Fill the system with product. **It is advisable to** test each viscosity grade since it will have an effect on draining and purging. If this is not feasible use the most viscous product.
3. Drain/Pig/Purge the system as per normal procedures and measure the **Drained Volume – DV**
4. Calculate the volume retained in the system following flushing. **Retained Product Volume $RV = SV - DV$**

1.2 Determination of Flushing Volumes – Flush Oil Volume

Once the Retained Product Volume (RV) has been determined, the flushing oil volume required can be determined. This is based on the compatibility of the previous and scheduled product as follows:

- **Same product name and same grade – No flushing required**
When the previous and scheduled product are the same no flushing is required, however the change over from one batch to another should be controlled to ensure batch identity is retained.
- **Same product name but different grade**
e.g. Rando HD 68 follows Rando HD 32
When two products have the same product name but a different viscosity grade, flushing is required. This is to ensure that the previous product does not change the viscosity of the scheduled product more than production specifications allow. Flush with a volume of scheduled product equal to the Retained Product Volume – **1 x RV**
- **Different product names, but the products are in the same compatibility group or the level of incompatibility is 1% from Table 1.**
e.g. Delo 400 SAE 40 follows Havoline Formula SAE 15W-40.
Flushing should ensure that contamination of the scheduled product by the previous product is less than 1%. Flush with a volume of scheduled product equal to twice the Retained Product Volume – **2 x RV**
- **Products from different compatibility groups**
Determine the level of incompatibility (0.1, 0.01, 0.00 %) from Table 1.
 - For 0.1 % flush with a volume of scheduled product equal to three times the Retained Product Volume – **3 x RV**

- For 0.01 and 0.00 % flush with a volume of base oil equal to three times the Retained Product Volume – **3 x RV** followed by a volume of scheduled product equal to the Retained Product Volume – **1 x RV**.

1.3 Verification of Flushing Volumes

Before this procedure is implemented, the amounts of flushing oil estimated above should be verified with product testing, following these steps:

- Conduct a test flush using an amount of flushing oil equal to the estimated flushing volume.
- Take a sample from the equipment outlet and have it tested in the laboratory. If the results are off specification increase the volume used to flush and repeat the test flush until the samples are on test.
- Record and document this volume in the plant quality management system and use it for future production.

1.4 Flushing Operations Using the Drain, Pig, Purge Method

Once the flush oil volume has been determined and verified as described in 1.1 – 1.3 above, the system may be flushed as a part of normal operation as outlined below:

1. Drain, Purge or Pig the equipment as normal.
2. Use the flushing volume determined above to flush the system.
3. If the compatibility matrix indicates that the products cannot be contaminated above 0% or 0.01% then a sample of flushing oil shall be taken when flushing is complete. This sample shall be tested in the laboratory to confirm the effectiveness of the flushing.
4. Equipment is now ready to be used with the Scheduled Product.
5. Deliver the Scheduled Product.
6. Sample the Scheduled Product first out of equipment and test. This is to ensure that the correct product has been transferred and that the product has not been contaminated by the previous product. As an indication of the tests that may be run consult [Reasons for Incompatibility](#) (Table 4). This section outlines the reasons for incompatibility between products. These reasons for incompatibility are the most likely way the product will become off specification as a result of contamination with the previous product. For example, if the reason for contamination is given as zinc and calcium, conduct tests on the zinc and calcium levels of the scheduled product to ensure that contamination limits have not been exceeded.

2. Displacement Flushing Method

Displacement flushing is flushing the system by pushing out the previous product with the scheduled product, without the use of draining, air blowing or pigging. This method results in a mixture where the two products meet. **Note:** *This method is only suitable when the scheduled and previous products are compatible and should only be used for piping and filling equipment.* The mixture is not to be sold as Chevron branded lubricant but may be segregated by compatibility group and worked off into

future blends of suitable products. Plants should seek guidance from PLCM's MLS teams on how the mixed oil is to be used in blends.

The steps for this process are:

1. Calculate the total estimated **system volume – SV**. Table 3 may be used to estimate the volume of piping and hoses. For pumps and meters use the internal volume if it is known, otherwise use 5 liters (1.3 Gal.) as an estimate.
2. Set the meter to short the (previous) product run by the transfer system capacity minus 10 Liters (3 Gallons). For example, if the transfer system holds 50 Liters (12 gallons), set the meter for 40 Liters (10 Gallons) short of the desired transfer amount. To deliver 10000 Liters of product, set the meter for 9960 Liters.
3. Transfer the (previous) product (9960 Liters in this example).
4. Set the intake manifold for the next (scheduled) product, leaving the outlet at the previous product. Set the meter stop for the remaining amount, 40 Liters in this example. Pump this quantity of the next (scheduled) product. This will displace the previous product, leaving the system almost full of the scheduled product – with a mixture of the two products near the end of the product hose.
5. Switch the outlet to the flush oil system or container and discharge 30 Liters to remove the mixture of the two products. The volume required to be flushed will vary based on the previous and scheduled products compatibility, viscosity, pipe diameter, pipe length.
6. Switch the outlet to the scheduled product system and deliver scheduled product.
7. Sample scheduled product first out of the equipment and test. This is to ensure that the correct product has been transferred and that the product has not been contaminated by the previous product. As an indication of the tests that may be run consult [Reasons for Incompatibility](#). This section outlines the reasons for incompatibility between products. These reasons for incompatibility are the most likely way the product will become off specification as a result of contamination with the previous product. For example, if the reason for contamination is given as zinc and calcium, conduct tests on the zinc and calcium levels of the scheduled product to ensure that contamination limits have not been exceeded.

3. Recirculation Method

The recirculation method is often used in filling lines as a fast and simple method of preparing the line for a scheduled product. This method requires a second line to be in place that returns from the end of the line delivering product to the storage vessel where the scheduled product is stored. Caution must be taken to ensure that contamination is not above the maximum allowable level.

To ensure that the maximum allowable contamination is not exceeded the amount of the previous product in the system should be calculated. The amount of the previous product in the system – **RV** can be determined as in section 1.1 above. If

the previous product was used to flush the lines of the product before it, then both the delivery and return lines will contain the previous product. The retained product volume should be calculated for both the delivery and return line.

Once the retained product volume is known, it should be used to calculate the amount of product in the lines as a percentage of the scheduled product in the tank. If this percentage does not exceed the maximum allowable contamination then this method may be used.

$$\text{Retained product as \% of tank volume} = \left(\frac{\text{RV}}{\text{Volume in Storage Tank}} \right) \times 100$$

To ensure the scheduled product meets specification it is important that the contaminated product that returns to the tank during flushing is mixed through the scheduled product prior to filling. If not properly mixed there will be locations within the blend of high contamination concentration that will lead to off specification products.

The recirculation method steps follow:

1. When the previous product has been delivered, drain, pig or purge the line as equipment permits.
2. Once the line is as clear as possible it is set to return product to the storage tank via the return line.
3. The scheduled product is sent through the line clearing any of the previous product and carrying it back to the tank.
4. Once flushing with the scheduled product has been completed the product is delivered as normal.

Table 3 - Volumes of pipes for given diameters

Pipe Inside Diameter	Volume Per Linear Foot	Pipe Inside Diameter	Volume Per Linear Meter
Inches	gals	cm	liters
2	0.16	5.08	2.03
3	0.37	7.62	4.56
4	0.66	10.16	8.11
5	1.03	12.7	12.67
6	1.48	15.24	18.24
7	2.02	17.78	24.83
8	2.64	20.32	32.43
9	3.34	22.86	41.5
10	4.12	25.4	50.68
11	4.98	27.94	61.32
12	5.93	30.48	72.98

Table 4 - Reasons for Incompatibility

SCHEDULED PRODUCT GROUPS		INCOMPATIBLE PREVIOUS PRODUCT GROUPS		REASONS FOR INCOMPATIBILITY
Group	Product Group	Group	Product Group	
1	Zinc-Containing Engine Oils	4) 8) 9) 10) 11) 13) 15) 16)	Automotive Gear Oils Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Marine Engine Oils Soluble Oils	A/B & S Tac Tac Cl & A/B Cl & A/B S Ca & Zn A/B
2	Compressor / Circulating / Hydraulic Oil	1) 4) 5) 6) 7) 8) 9) 10) 11) 13) 16) 17)	Zinc-Containing Engine Oils Automotive Gear Oils Transmission Fluids Ashless Engine Oils Railroad Oils and Other Zinc-Free Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Soluble Oils Dexron / Mercon ATF	Ca & Dem A/B & S Dem, Dye Dem Ca & Dem Tac, A/B & Col Tac, A/B Cl & A/B Cl & A/B S Dem Dem & Dye
3	Turbine and R&O Oils	1) 2) 4) 5) 6) 7) 8) 9) 10) 11) 13) 16) 17)	Zinc-Containing Engine Oils Compressor / Circulating / Automotive Gear Oils Transmission Fluids Ashless Engine Oils Railroad Oils and Other Zinc-Free Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Soluble Oils Dexron / Mercon ATF	Ca, Zn & Dem Zn & Ca A/B & S Dye, Dem & Zn Dem Ca & Dem Tac, A/B & Col Tac, A/B Cl & A/B Cl & A/B S Dem Dem, Dye, Zn
4	Automotive Gear Oils	1) 2) 3) 5) 6) 7) 8) 9) 10) 11) 16) 17)	Zinc-Containing Engine Oils Compressor / Circulating / Turbine and R&O Oils Transmission Fluids Ashless Engine Oils Railroad Oils and Other Zinc-Free Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Soluble Oils Dexron/ Mercon ATF	A/B A/B A/B Dye & A/B A/B A/B Tac Tac Cl Cl Ba A/B & Dye
5	Transmission Fluids	1) 4) 8) 9) 10) 11) 13) 16) 17)	Zinc-Containing Engine Oil Automotive Gear Oils Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Soluble Oils Dexron / Mercon ATF	Vis A/B & S A/B & Tac A/B & Tac Cl & A/B Cl & A/B S A/B VI

SCHEDULED PRODUCT GROUPS		INCOMPATIBLE PREVIOUS PRODUCT GROUPS		REASONS FOR INCOMPATIBILITY
Group	Product Group	Group	Product Group	
6	Ashless Engine Oils	1) 4) 5) 7) 8) 9) 10) 11) 13) 16) 17)	Zinc-Containing Engine Oils Automotive Gear Oils Transmission Fluids Railroad Oils and Other Zinc-Free Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Soluble Oils Dexron/ Mercon ATF	Ca & Zn A/B & S Dye & Zn Ca Tac & A/B Tac & A/B S, Cl & A/B S, Cl & A/B S A/B Dye & Zn
7	Railroad Oils and Other Zinc-Free Oils	1) 4) 5) 8) 9) 10) 11) 13) 16) 17)	Zinc-Containing Engine Oils Automotive Gear Oils Transmission Fluids Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Soluble Oils Dexron/ Mercon ATF	Zn A/B & S Dye & Zn Tac & A/B Tac & A/B S, Cl & A/B S, Cl & A/B S A/B Dye & Zn
8	Dark Oils With Tackifier and/or Tallow	1) 2) 10) 11) 16)	Zinc-Containing Engine Oils Compressor / Circulating / Metalworking Fluid With Active Metalworking Fluid With Inactive Soluble Oils	A/B A/B S & Cl S & Cl A/B
9	Light Oils With Tackifier and/or Tallow	1) 2) 5) 6) 7) 10) 11) 16) 17)	Zinc-Containing Engine Oils Compressor / Circulating / Transmission Fluid Ashless Engine Oils Railroad Oils and Other Zinc-Free Metalworking Fluid With Active Metalworking Fluid With Inactive Soluble Oils Dexron/ Mercon ATF	A/B A/B Dye A/B A/B Cl Cl A/B Dye
10	Metalworking Fluid With Active Sulfur	1) 6) 7) 16)	Zinc-Containing Engine Oils Ashless Engine Oils Railroad Oils and Other Zinc-Free Soluble Oils	A/B, Ca & Dem A/B & Dem A/B, Ca & Dem A/B
11	Metalworking Fluid With Inactive Sulfur	1) 4) 6) 7) 10) 13) 16)	Zinc-Containing Engine Oils Automotive Gear Oils Ashless Engine Oils Railroad Oils and Other Zinc-Free Metalworking Fluid With Active Metalworking Fluids (Chlorine Soluble Oils	A/B, Ca & Dem S A/B & Dem A/B, Ca & Dem S S A/B
12	Base Oils +/- FI, VII, PPD	All		Must be Additive Free
13	Metalworking Fluids (Chlorine Free)	1) 2) 5) 6) 7) 10) 11) 16) 17)	Zinc-Containing Engine Oils Compressor / Circulating / Transmission Fluid Ashless Engine Oils Railroad Oils and Other Zinc-Free Metalworking Fluid With Active Metalworking Fluid With Inactive Soluble Oils Dexron/ Mercon ATF	A/B A/B Dye A/B A/B Cl Cl A/B Dye

SCHEDULED PRODUCT GROUPS		INCOMPATIBLE PREVIOUS PRODUCT GROUPS		REASONS FOR INCOMPATIBILITY
Group	Product Group	Group	Product Group	
14	Low SAPS PCMO	4) 8) 9) 10) 11) 13) 15) 16)	Automotive Gear Oils Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Marine Engine Oils Soluble Oils	A/B & S Tac Tac CI & A/B CI & A/B S Ca & Zn A/B
15	Marine Engine Oils	1) 4) 8) 9) 10) 11) 13) 14) 16)	Zinc-Containing Engine Oils Automotive Gear Oils Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Metalworking Fluids (Chlorine Low SAPS PCMO Soluble Oils	Ca & Zn A/B & S Tac Tac CI & A/B CI & A/B S Ca & Zn A/B
16	Soluble Oils	1) 2) 4) 5) 6) 7) 8) 9) 10) 11) 17)	Zinc-Containing Engine Oils Compressor / Circulating / Automotive Gear Oils Transmission Fluids Ashless Engine Oils Railroad Oils and Other Zinc-Free Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Dexron / Mercon ATF	Zn & Ca Zn & Ca S & SEU Dye & Zn SEU Ca Tac & A/B Tac & A/B CI CI Dye
17	Dexron / Mercon ATF	1) 2) 3) 4) 5) 6) 7) 8) 9) 10) 11) 12) 13) 16)	Zinc-Containing Engine Oils Compressor / Circulating / Turbine and R&O Oils Automotive Gear Oils Transmission Fluid Ashless Engine Oils Railroad Oils and Other Zinc-Free Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Base Oils +/- FI, VI, PPD Metalworking Fluids (Chlorine Soluble Oils	Vis & Zn Vis & Zn Vis A/B & S VI & Ca Vis & VI Vis A/B & Tac A/B & Tac S, CI & A/B CI & A/B Vis & VI S Dem
18	Biodegradable Oils	All		Must be Additive Free
19	Specialties / Miscellaneous	All		May be contaminated by all groups.
20	Industrial Gear Lubricants	1) 2) 3) 4) 5) 6) 7) 8) 9) 10) 11) 16) 17)	Zinc-Containing Engine Oils Compressor / Circulating / Turbine and R&O Oils Automotive Gear Oils Transmission Fluids Ashless Engine Oils Railroad Oils and Other Zinc-Free Dark Oils With Tackifier and/or Light Oils With Tackifier and/or Metalworking Fluid With Active Metalworking Fluid With Inactive Soluble Oils Dexron/ Mercon ATF	A/B A/B A/B A/B, Dem Dye & A/B A/B A/B Tac Tac CI CI Ba A/B & Dye

KEY TO REASONS FOR INCOMPATIBILITY

A/B	Acid base reaction between products.
Ash	Ash formation
Ba	Where barium can be detrimental to the scheduled product.
Ca	Where calcium can be detrimental to the scheduled product.
Cl	Where chlorine can be detrimental to the scheduled product.
Col	Color may be detrimental to the scheduled product.
Dem	May cause emulsion problems.
Dye	Where dye may affect another product.
O	Oxidation concerns.
S	Where active sulfur can be detrimental to the scheduled product.
SEU	Special end use by the customer.
Tac	Where tackifier and/or tallow can be detrimental to the scheduled product.
VI	Viscosity index improver may be detrimental to the scheduled product.
Vis	Viscosity concerns.
Zn	Where zinc can be detrimental to the scheduled product.