

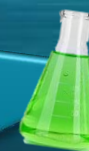


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# Compatibility of Antifreeze & P-80® Lubricants



No precipitation when antifreeze is exposed to 1% of any P-80® Lubricant.

The formation of insoluble complexes that precipitate out of solution is a tell-tale sign of incompatibility. This phenomenon was not observed with any P-80® lubricant and was confirmed by the patch test (modified ASTM D7670).

Typical patch test result – no solids deposited on filter paper.

Antifreeze Metal Compatibility			
	Aluminum	Copper	Stainless Steel
Initial			
Pure Antifreeze (2 weeks)			
1% P-80 (2 weeks)			
1% Grip-It (2 weeks)			
1% RediLube (2 weeks)			
1% Thix (2 weeks)			

- Appearance of metal coupons after being continuously exposed to antifreeze and 1% lubricant for two weeks at 80°C.

- Stainless steel appears to be compatible with antifreeze that has been mixed with lubricant. Copper and aluminum may become darkened or miscolored if exposed to antifreeze, even if it is not mixed with lubricant.

Acid Number	
Antifreeze with 1% lubricant:	$\Delta$ mgNaOH/g after 4 weeks at 80°C:
P-80® Emulsion	<0.5 mgNaOH/g
P-80® Grip-It	< 0.5 mgNaOH/g
P-80® RediLube	< 0.5 mgNaOH/g
P-80® Thix	< 0.5 mgNaOH/g

- The acid number titration, performed following a modified version of ASTM D974, measures the amount of sodium hydroxide required to neutralize the acid in one gram of oil<sup>1</sup>. Changes in acid number can be caused by multiple factors, including temperature, moisture, and the presence of particles<sup>2</sup>.

- Compared to pure antifreeze, a change in acid number of **0.5-1.0 mgNaOH/g** indicates that the antifreeze should be tested for impurities and changed soon; a change in acid number greater than **1.0 mgNaOH/g** indicates that the antifreeze should be inspected for excessive contamination and changed immediately<sup>2</sup>.

- P-80® Lubricant exposure should not cause any material degradation.

\* Antifreeze being mixed with 1% lubricant is unlikely to occur; an excessive amount was used for testing purposes.

\* All compatibility data is available upon request.

\* Customers should perform their own compatibility tests before using P-80® Lubricants.

1. "Clean Oil Guide." C. C. Jensen A/S, 2016. Web.

2. Fitch, James C. "The Lubrication Field Test and Inspection Guide." Noria Corporation, 2000. Web.



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## Compatibility of Automatic Transmission Fluid & P-80<sup>®</sup> Lubricants

No precipitation when automatic transmission fluid is exposed to 1% of any P-80<sup>®</sup> Lubricant.

The formation of insoluble complexes that precipitate out of solution is a tell-tale sign of incompatibility. This phenomenon was not observed with any P-80<sup>®</sup> lubricant and was confirmed by the patch test (modified ASTM D7670).



Typical patch test result – no solids deposited on filter paper.

Automatic Transmission Fluid Metal Compatibility			
	Aluminum	Copper	Stainless Steel
Initial			
Pure ATF (2 weeks)			
1% P-80 <sup>®</sup> Emulsion (2 weeks)			
1% P-80 <sup>®</sup> Grip-It (2 weeks)			
1% P-80 <sup>®</sup> RediLube (2 weeks)			
1% P-80 <sup>®</sup> Thix (2 weeks)			

- Appearance of metal coupons after being continuously exposed to automatic transmission fluid and 1% lubricant for two weeks at 80°C.  
- Aluminum and stainless steel appear to be compatible with automatic transmission fluid that has been mixed with lubricant. Copper may become darkened if exposed to automatic transmission fluid, even if it is not mixed with lubricant.

Acid Number	
ATF with 1% lubricant:	$\Delta$ mgNaOH/g after 4 weeks at 80°C:
P-80 <sup>®</sup> Emulsion	< 0.5 mgNaOH/g
P-80 <sup>®</sup> Grip-It	< 0.5 mgNaOH/g
P-80 <sup>®</sup> RediLube	< 0.5 mgNaOH/g
P-80 <sup>®</sup> Thix	< 0.5 mgNaOH/g

- The acid number titration, performed following a modified version of ASTM D974, measures the amount of sodium hydroxide required to neutralize the acid in one gram of oil<sup>1</sup>. Changes in acid number can be caused by multiple factors, including temperature, moisture, and the presence of particles<sup>2</sup>.  
- Compared to pure automatic transmission fluid, a change in acid number of **0.5-1.0 mgNaOH/g** indicates that the automatic transmission fluid should be tested for impurities and changed soon; a change in acid number greater than **1.0 mgNaOH/g** indicates that the automatic transmission fluid should be inspected for excessive contamination and changed immediately<sup>2</sup>.  
- P-80<sup>®</sup> Lubricant exposure should not cause any material degradation.

\* ATF being mixed with 1% lubricant is unlikely to occur; an excessive amount was used for testing purposes.

\* All compatibility data is available upon request.

\* Customers should perform their own compatibility tests before using P-80<sup>®</sup> Lubricants.

1. "Clean Oil Guide." C. C. Jensen A/S, 2016. Web.

2. Fitch, James C. "The Lubrication Field Test and Inspection Guide." Noria Corporation, 2000. Web.





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## Compatibility of DOT-3 Brake Fluid & P-80<sup>®</sup> Lubricants

No precipitation when brake fluid is exposed to 1% of any P-80<sup>®</sup> Lubricant.

The formation of insoluble complexes that precipitate out of solution is a tell-tale sign of incompatibility. This phenomenon was not observed with any P-80<sup>®</sup> lubricant and was confirmed by the patch test (modified ASTM D7670).



Typical patch test result – no solids deposited on filter paper.

Brake Fluid Metal Compatibility			
	Aluminum	Copper	Stainless Steel
Initial			
Pure Brake Fluid (2 weeks)			
1% P-80 <sup>®</sup> Emulsion (2 weeks)			
1% P-80 <sup>®</sup> Grip-It (2 weeks)			
1% P-80 <sup>®</sup> RediLube (2 weeks)			
1% P-80 <sup>®</sup> Thix (2 weeks)			

- Appearance of metal coupons after being continuously exposed to brake fluid and 1% lubricant for two weeks at 80°C.

- Aluminum and stainless steel appear to be compatible with brake fluid that has been mixed with lubricant. Copper may become darkened if exposed to brake fluid, even if it is not mixed with lubricant.

Acid Number	
Brake fluid with 1% lubricant:	$\Delta$ mgNaOH/g after 4 weeks at 80°C:
P-80 <sup>®</sup> Emulsion	0.5 - 1.0 mgNaOH/g
P-80 <sup>®</sup> Grip-It	< 0.5 mgNaOH/g
P-80 <sup>®</sup> RediLube	< 0.5 mgNaOH/g
P-80 <sup>®</sup> Thix	< 0.5 mgNaOH/g

- The acid number titration, performed following a modified version of ASTM D974, measures the amount of sodium hydroxide required to neutralize the acid in one gram of oil<sup>1</sup>. Changes in acid number can be caused by multiple factors, including temperature, moisture, and the presence of particles<sup>2</sup>.

- Compared to pure brake fluid, a change in acid number of **0.5-1.0 mgNaOH/g** indicates that the brake fluid should be tested for impurities and changed soon; a change in acid number greater than **1.0 mgNaOH/g** indicates that the brake fluid should be inspected for excessive contamination and changed immediately<sup>2</sup>.

- P-80<sup>®</sup> Lubricant exposure should not cause any material degradation.

\* Brake fluid being mixed with 1% lubricant is unlikely to occur; an excessive amount was used for testing purposes.

\* All compatibility data is available upon request.

\* Customers should perform their own compatibility tests before using P-80<sup>®</sup> Lubricants.

1. "Clean Oil Guide." C. C. Jensen A/S, 2016. Web.

2. Fitch, James C. "The Lubrication Field Test and Inspection Guide." Noria Corporation, 2000. Web.



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## Compatibility of SAE 10W-40 Conventional Motor Oil & P-80<sup>®</sup> Lubricants

No precipitation when SAE 10W-40 Conventional Motor Oil is exposed to 1% of any P-80<sup>®</sup> Lubricant.

The formation of insoluble complexes that precipitate out of solution is a tell-tale sign of incompatibility. This phenomenon was not observed with any P-80<sup>®</sup> lubricant and was confirmed by the patch test (modified ASTM D7670).



Typical patch test result – no solids deposited on filter paper.

SAE 10W-40 Conventional Motor Oil Metal Compatibility

	Aluminum	Copper	Stainless Steel
Initial			
Pure Conventional Motor Oil (2 weeks)			
1% P-80 <sup>®</sup> Emulsion (2 weeks)			
1% P-80 <sup>®</sup> Grip-It (2 weeks)			
1% P-80 <sup>®</sup> RediLube (2 weeks)			
1% P-80 <sup>®</sup> Thix (2 weeks)			

- Appearance of metal coupons after being continuously exposed to SAE 10W-40 Conventional Motor Oil and 1% lubricant for two weeks at 80°C.  
- Aluminum and stainless steel appear to be compatible with SAE 10W-40 Conventional Motor Oil that has been mixed with lubricant. Copper may become darkened or miscolored if exposed to SAE 10W-40 Conventional Motor Oil, even if it is not mixed with lubricant.

Acid Number	
Conventional motor oil with 1% lubricant:	$\Delta$ mgNaOH/g after 4 weeks at 80°C:
P-80 <sup>®</sup> Emulsion	< 0.5 mgNaOH/g
P-80 <sup>®</sup> Grip-It	< 0.5 mgNaOH/g
P-80 <sup>®</sup> RediLube	< 0.5 mgNaOH/g
P-80 <sup>®</sup> Thix	< 0.5 mgNaOH/g

- The acid number titration, performed following a modified version of ASTM D974, measures the amount of sodium hydroxide required to neutralize the acid in one gram of oil<sup>1</sup>. Changes in acid number can be caused by multiple factors, including temperature, moisture, and the presence of particles<sup>2</sup>.
- Compared to pure SAE 10W-40 Conventional Motor Oil, a change in acid number of **0.5-1.0 mgNaOH/g** indicates that the SAE 10W-40 Conventional Motor Oil should be tested for impurities and changed soon; a change in acid number greater than **1.0 mgNaOH/g** indicates that the SAE 10W-40 Conventional Motor Oil should be inspected for excessive contamination and changed immediately<sup>2</sup>.
- P-80<sup>®</sup> Lubricant exposure should not cause any material degradation.

\* Motor oil being mixed with 1% lubricant is unlikely to occur; an excessive amount was used for testing purposes.

\* All compatibility data is available upon request.

\* Customers should perform their own compatibility tests before using P-80<sup>®</sup> Lubricants.

1. "Clean Oil Guide." C. C. Jensen A/S, 2016. Web.

2. Fitch, James C. "The Lubrication Field Test and Inspection Guide." Noria Corporation, 2000. Web.





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## Compatibility of SAE 10W-30 Synthetic Motor Oil & P-80® Lubricants

No precipitation when SAE 10W-30 Synthetic Motor Oil is exposed to 1% of any P-80® Lubricant.

The formation of insoluble complexes that precipitate out of solution is a tell-tale sign of incompatibility. This phenomenon was not observed with any P-80® lubricant and was confirmed by the patch test (modified ASTM D7670).



Typical patch test result – no solids deposited on filter paper.

SAE 10W-30 Synthetic Motor Oil Metal Compatibility

	Aluminum	Copper	Stainless Steel
Initial			
Pure Synthetic Motor Oil (2 weeks)			
1% P-80® Emulsion (2 weeks)			
1% P-80® Grip-It (2 weeks)			
1% P-80® RediLube (2 weeks)			
1% P-80® Thix (2 weeks)			

- Appearance of metal coupons after being continuously exposed to SAE 10W-30 synthetic motor oil and 1% lubricant for two weeks at 80°C.  
- Aluminum and stainless steel appear to be compatible with SAE 10W-30 synthetic motor oil that has been mixed with lubricant. Copper may become darkened if exposed to SAE 10W-30 Synthetic Motor Oil, even if it is not mixed with lubricant.

Acid Number	
Synthetic motor oil with 1% lubricant:	$\Delta$ mgNaOH/g after 4 weeks at 80°C:
P-80® Emulsion	< 0.5 mgNaOH/g
P-80® Grip-It	< 0.5 mgNaOH/g
P-80® RediLube	< 0.5 mgNaOH/g
P-80® Thix	< 0.5 mgNaOH/g

- The acid number titration, performed following a modified version of ASTM D974, measures the amount of sodium hydroxide required to neutralize the acid in one gram of oil<sup>1</sup>. Changes in acid number can be caused by multiple factors, including temperature, moisture, and the presence of particles<sup>2</sup>.
- Compared to pure SAE 10W-30 Synthetic Motor Oil, a change in acid number of **0.5-1.0 mgNaOH/g** indicates that the SAE 10W-30 Synthetic Motor Oil should be tested for impurities and changed soon; a change in acid number greater than **1.0 mgNaOH/g** indicates that the SAE 10W-30 Synthetic Motor Oil should be inspected for excessive contamination and changed immediately<sup>2</sup>.
- P-80® Lubricant exposure should not cause any material degradation.

\* Motor oil being mixed with 1% lubricant is unlikely to occur; an excessive amount was used for testing purposes.

\* All compatibility data is available upon request.

\* Customers should perform their own compatibility tests before using P-80® Lubricants.

1. "Clean Oil Guide." C. C. Jensen A/S, 2016. Web.

2. Fitch, James C. "The Lubrication Field Test and Inspection Guide." Noria Corporation, 2000. Web.



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## Compatibility of Power Steering Fluid & P-80® Lubricants

No precipitation when power steering fluid is exposed to 1% of any P-80® Lubricant.

The formation of insoluble complexes that precipitate out of solution is a tell-tale sign of incompatibility. This phenomenon was not observed with any P-80® lubricant and was confirmed by the patch test (modified ASTM D7670).



Typical patch test result – no solids deposited on filter paper.

Power Steering Fluid Metal Compatibility			
	Aluminum	Copper	Stainless Steel
Initial			
Pure Power Steering Fluid (2 weeks)			
1% P-80® Emulsion (2 weeks)			
1% P-80® Grip-It (2 weeks)			
1% P-80® RediLube (2 weeks)			
1% P-80® Thix (2 weeks)			

- Appearance of metal coupons after being continuously exposed to power steering fluid and 1% lubricant for two weeks at 80°C.

- Aluminum and stainless steel appear to be compatible with power steering fluid that has been mixed with lubricant. Copper may become darkened if exposed to power steering fluid, even if it is not mixed with lubricant.

Acid Number	
Power steering fluid with 1% lubricant:	$\Delta$ mgNaOH/g after 4 weeks at 80°C:
P-80® Emulsion	0.5 - 1.0 mgNaOH/g
P-80® Grip-It	< 0.5 mgNaOH/g
P-80® RediLube	< 0.5 mgNaOH/g
P-80® Thix	< 0.5 mgNaOH/g

- The acid number titration, performed following a modified version of ASTM D974, measures the amount of sodium hydroxide required to neutralize the acid in one gram of oil<sup>1</sup>. Changes in acid number can be caused by multiple factors, including temperature, moisture, and the presence of particles<sup>2</sup>.

- Compared to pure power steering fluid, a change in acid number of **0.5-1.0 mgNaOH/g** indicates that the power steering fluid should be tested for impurities and changed soon; a change in acid number greater than **1.0 mgNaOH/g** indicates that the power steering fluid should be inspected for excessive contamination and changed immediately<sup>2</sup>.

- P-80® Lubricant exposure should not cause any material degradation.

\* Power steering fluid being mixed with 1% lubricant is unlikely to occur; an excessive amount was used for testing purposes.

\* All compatibility data is available upon request.

\* Customers should perform their own compatibility tests before using P-80® Lubricants.

1. "Clean Oil Guide." C. C. Jensen A/S, 2016. Web.

2. Fitch, James C. "The Lubrication Field Test and Inspection Guide." Noria Corporation, 2000. Web.