

**Report of Meeting
ASTM PM-2 Task Force
Automotive Gear Lubricants and Fluids
PRI Headquarters
Warrendale, PA
June 11, 2003**

CALL TO ORDER

Mr. Akucewich, Chairman, called the meeting to order at 9:30 am.

AGENDA

Task force reviewed the agenda. No changes were made. The agenda is shown as Attachment 1. The attendance list is shown as Attachment 2.

OBJECT OF THIS MEETING

The chairman outlined that the object of the first meeting is to establish a scope and objectives, discuss the proposed tests, establish membership of the group and determine an outline of the work to be done.

DEVELOPMENT OF TASK FORCE SCOPE

Next the task force scope was reviewed. The scope is shown as Attachment 3. Tom Boschert questioned the scope and objectives if aligned to SAE scope and objectives letter. Attachment 4 shows the SAE scope and objectives letter. The group accepted the scope as written. The next meeting will review the SAE letter contained in Attachment 4.

PROPOSED TESTS

Attachment 5 contains a list of proposed tests. The following changes were made to the table:

- Property: Shear stability: add SAE J306 to proposed requirement statement.
- Property: Corrosion (Fe): Change property name to L-33-1.

- The task force decided that only one Oxidation test was needed. Thus the proposed method CEC L-48-A-95 for the oxidation property was dropped. Also the property name of Oxidation was changed to Oxidation/Stability.
- Property: Elastomer compatibility: change proposed requirement by adding “test FL and PA only”.
- Property: Wear (General): Added possible new version of L-37 test. See general discussion section for details of this issue.
- Property: Pitting: Drop this requirement. Although testing for this property is desirable, a developed useable test in the near future is not probable. The task force will monitor developments in this area. If a viable test becomes available, it will be added to the specification.

GENERAL DISCUSSION

Attachment 6 shows a few of issues discussed below

Timing of Specification

It is up to the task force. The chairman is willing to meet as frequently as necessary. This will depend upon how fast and dedicated the members are to getting the job done.

Wear Test (general)

The group discussed which test to focus for this property. Going with the L-20 would require the test procedure to be elevated to an ASTM standard in addition to referencing for this test. Another possibility would be to run a modified L-37 test. Either using a different set of pass/fail ratings (no additional referencing) or running the test less than 24 hours. This test will require some work determining the test procedure and limits.

Pitting Test

The lack of availability of an acceptable pitting test was discussed. The CEC has stopped work on a pitting test. Other organizations are developing a pitting test, but the tests are not developed to the point of use by ASTM. Thus it was decided that although a pitting test is desired, no test is yet available and the pitting test requirement will be removed from our list of tests. The task force will monitor the development of a pitting test and when one becomes available it will be considered for inclusion into the specification.

Reference Oils

The group discussed the need for a category reference oil and not use a bunch of industry oils for each test procedure. The development of this specification will require two category reference oils. Required reference oils include a clear pass oil and one which is a borderline. The panel will investigate the use of existing CEC reference oils.

PM-1 Activities

This group will review the activities and experience of the PM-1 task force with the syncho test.

MEMBERSHIP

The Chairman polled the attendees for a commitment to become official members of the task force. Below are the organizations which will commit to being a member of the task force:

- Lubrizol
- Ethyl
- SwRI
- TMC (will check to confirm)
- ExxonMobil
- PARC

NEXT STEPS

All participants should go back and review test specifications and proposed tests. Prepare for the next meeting where the group will try to further define the specification requirements and develop an action plan.

ADJOURNMENT

The meeting was adjourned at 11:08 am.



Edward S. Akucewich,
PM-2 Task Force Chairman

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Agenda

- Call To Order
- Objective of This Meeting
- Development of Task Force Scope
- Proposed Tests
- General Discussion
- Membership
- Next Steps
- Adjourn

PM-2 Task Force Meeting
 11-Jun-03
 Attendance Record

NAME	ADDRESS	TELEPHONE
Tom BOSCHERT	2000 TOWN CENTER SUITE 1750 SOUTHFIELD, MI 48075 TOM_BOSCHERT@ETHYL.COM	248-350-0640
CLAIRE WHITTON	P.O. Box 2158 Claire.Whitton@ethyl.com RICHMOND, VA 23218-2158	804-788-5052
Cory Koglin	Same address as Above Cory.koglin@ethyl.com	804-788-5305
Brian Koehler	Southwest Research Institute P.O. Drawer 28510 San Antonio, TX 78228	210-522-3588
Juan Butrago	100 Chevron Way, Room 71-7418 P.O. Box 1627 Richmond, CA 94802	510-242-1161
Don Lind	6555 Penn Ave Pgh. PA 15206	412-365-1034
Dale Smith	100 William Pitt Way Pittsburgh, PA 15238	412 826 5051
Bill Sullivan	ExxonMobil Chemical Co 2195 Lincoln Hwy Edison, New Jersey 08818	(+) 732-321-3354 (F) 732-321-6064
Ray Duckstein	PARE TECHNICAL SERVICES, INC. 100 WILLIAM PITT WAY PITTSBURGH, PA 15238	412 826 5115
Don Bartlett	Lubrizol	X 2388
Chris Scheutenbergs	Lubrizol	(440) 347-2927
Jerry Knopp	Lubrizol	440-347-1223

Proposed Specification

Synchronized Manual Transmissions for Commercial Vehicles

Scope

To create a specification using standardized tests and methods that will define a minimum acceptable level of performance for lubricants to be used in synchronized commercial vehicle manual transmissions.

Committee Correspondence

Name of Committee: Fuels and Lubricants
Division

Date: 12 June, 1998

Reply to:

J. A. Spearot
Fuels and Lubricants Dept.
GM Research & Development Center
30500 Mound Rd. - Box 9055
Mail Code: 480-106-160
Warren, MI 48090-9055
Phone: 810-986-1880
FAX: 810-986-2094

Mr. John Lauck
Chairman, API Lubricants Committee

Mr. Frank Duffey
Chairman, ASTM Subcommittee B

Gentlemen:

Subject: New Gear Category for Commercial Vehicle Synchronesh Manual Transmissions and Transaxles

SAE has been evaluating the need to develop a new service category for Commercial Vehicle Synchronesh Manual Transmission and Transaxles. SAE Technical Committee Three and SAE Division have completed their evaluation and have voted affirmative that the need exists. One note on the approach that the Task Force took was to address the needs on a global basis. This is reflected in the input of its members and the proposed tests included in the final recommendation as it contains both ASTM and CEC performance tests.

The performance requirements and proposed tests are as follows:

<u>Requirement</u>	<u>Proposed Test</u>
High Torque Low speed Axle	--
Corrosion Protection (wet/dry)	--
High Speed Shock Load	--
Anti Foaming Performance	ASTM D892
Storage and Compatibility	FTM 3440
Synchronesh Durability	--
Shift Quality	--
Coefficient of Friction	--
Oil Elastomer Compatibility	--

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Committee Correspondence

Shear Stability

Thermal/Oxidative Stability

Pitting Resistance

Tapered Roller Bearing

CEC L-4-T-93

CRC L-60 and/or CEC Oxidation Test

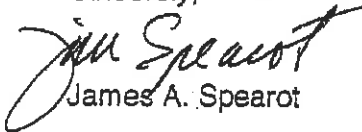
(CEC L-48-A-95)

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Accordingly, the SAE Fuels & Lubricants Division requests that the ASTM D02.B and the API Lubricants Committee take appropriate action to create this new category and to determine that appropriate tests and limits are established.

If there are any questions regarding the specifics of the recommendation, please let me know.

Sincerely,


James A. Spearot

cc:

J. Williams - API

R. Klein - Oronite

R. Cain - Lubrizol

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Committee Correspondence

Name of Committee: SAE Task Force
Commercial Vehicle Synchronesh
Manual Transmissions and Transaxles

Date: March 13, 1998

Reply to: Robert W. Cain
The Lubrizol Corporation
29400 Lakeland Blvd.
Wickliffe, Ohio 44092
Phone: (216) 943-1200
 x1958
Fax: (216) 943-5337
e:mail - rwca@lubrizol.com

Ms. Aleita Wilson
AE International
100 Commonwealth
Warrendale, PA 15096-0001

Dear Aleita,

SUBJECT: New Category for Commercial Vehicle Synchronesh Manual Transmissions and Transaxles

This is a summary to my report and follow-up to SAE Fuels and Lubricants Technical Committee 3 Gear Lubricants and Fluids meeting held October 15, 1997.

A valid and passing ballot was obtained for the creation of a new category for Commercial Vehicle Synchronesh Manual Transmissions and Transaxles. The initial ballot results are as follows:

F&L Division Ballot

11 Approvals, 0 Disapprovals, 1 No Reply

Technical Committee 3 Ballot

27 Approvals, 1 Disapproval, 1 Waive, 13 No Replies

Since the meeting, the one disapproval has been changed to a waive. The comments included with the ballot responses were reviewed and addressed at the Technical Committee 3 meeting.

Based upon the valid and passing ballots, the chairman of Technical Committee 3 should notify ASTM (tests and limits) and API (develop category designation and user language) to proceed with the new category.

Following are some of the key items to be considered by ASTM and API (additional details and supportive information are included in the ballot and comments reviewed at Technical Committee 3 Meeting):

Performance Requirements and Proposed Tests:

Gear Performance Requirement	Proposed Test
High Torque Low Speed Axle	--
Corrosion Protection (Dry/Wet)	--
High Speed Shock Load	--
Anti-foaming Performance	ASTM D892
Storage and Compatibility	FTM 3440

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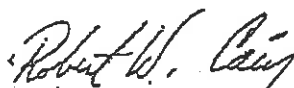
• Performance Requirements and Proposed Tests: (continued)

Gear Performance Requirement	Proposed Test
Synchronesh Durability > Shift Quality > Coefficient of Friction	--
Oil Elastomer Compatibility	--
Shear Stability	Taper Roller Bearing (CEC L-45-T-93)
Thermal / Oxidative Stability	CRC L-60-1 and/or CEC Oxidation Test (CEC L-48-A-95)
Pitting Resistance	--

- ASTM is encouraged to evaluate test methods developed by CEC and other standard groups for their applicability to this category.
- This new category provides performance that is not currently provided by API GL-4, API MT-1, or the proposed specification PM-1.
- This new "worldwide" category has international support from a wide variety of OEMs and is targeted at medium/heavy duty commercial vehicle synchronized manual transmissions and also transaxle applications.
- Axle only performance of API GL-4 could be addressed by API GL-5, or its successor performance categories.
- Upon successful completion of this new category, API GL-4 could be obsolete.

Very truly yours,

THE LUBRIZOL CORPORATION



Robert W. Cain, Chairman
SAE Task Force Commercial Vehicle Synchronesh Manual
Transmissions and Transaxles

RWCA:emb

cc: Dr. James A. Spearot
Mr. Richard M. Klein
SAE Task Force Members

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Overview

- Performance Properties Considered
 - Viscometrics
 - Shear stability
 - Corrosion (Fe and non-Fe)
 - Oxidation
 - Elastomer compatibility
 - Foaming tendency
 - Storage and compatibility
 - Wear (abrasive, scuffing, fatigue)
 - Synchronesh performance

Proposed Tests

<u>Property</u>	<u>Proposed Method</u>	<u>Description</u>	<u>Proposed Requirement</u>
Viscometrics	ASTM D445	Kinematic viscosity	Per SAE viscosity grade as defined by SAE J306
Viscometrics	ASTM D2983	Apparent (dynamic) viscosity	Per SAE viscosity grade as defined by SAE J306
Shear stability	CEC L-45-A-99	20 h laboratory bearing shear test	Stay in grade after 20 h shearing by J306

Proposed Tests

<u>Property</u>	<u>Proposed Method</u>	<u>Description</u>	<u>Proposed Requirement</u>
Corrosion (Fe)	STP 5T2A L-33 L-33-1	7-day moisture corrosion test w/axle components	SAE J2360 limits
Corrosion (non-Fe)	ASTM D-130	Standard Cu strip test run at 3h/121°C condition	MT-1 limits
Oxidation/ STABILITY	ASTM D-5704	L60-1 bench test using 120 mL oil, Cu cat., and air	MT-1 limits
Oxidation	GEC L-48 A 95	Glassware bench oxidation test	TBD

Proposed Tests

<u>Property</u>	<u>Proposed Method</u>	<u>Description</u>	<u>Proposed Requirement</u>
Elastomer compatibility	ASTM D-5662	Seal immersion test using FL, PA, NI type elastomers	MT-1 limits USE FL & PA ONLY
Foaming tendency	ASTM D-892	Lab glassware test for tendency and stability at RT and 93°C	MT-1 limits
Storage and compatibility	FTM 3440	Compatibility w/other oils meeting same specification	MT-1 limits

Proposed Tests

<u>Property</u>	<u>Proposed Method</u>	<u>Description</u>	<u>Proposed Requirement</u>
Wear (general)	CRC L-20 or ASTM D4998 or Mod. Fied L-31	High torque, low speed hypoid axle test – 30 h at 93 – 121°C or FZG Wear Test	No xs wear + no ridging, rippling, scuffing damage
Scuffing	CEC L-084-02	FZG ½ tooth width step load test (A10/16.6R/120)	TBD
Pitting	Work Stopped by GEC	FZG pitting test (C/8.3/90 L S TBD)	TBD
Synchromesh	CEC L-066-01	FZG SSP180 durability test w/friction material TBD	TBD

**ASTM PM-2 Task Force
Proposed Test Methods
Synchronized Manual Transmission Fluid Specification for Commercial Vehicles**

<u>Property</u>	<u>Test Method</u>	<u>Test Description</u>	<u>Proposed Requirement</u>
Viscosity	ASTM D445	Kinematic viscosity	Per SAE Viscosity Grade as defined by SAE J306
Viscosity	ASTM D2983	Apparent (dynamic) viscosity using Brookfield viscometer	Per SAE Viscosity Grade as defined by SAE J306
Shear Stability	CEC L-45-A-99	20 hour bearing shear method	Stay in grade after 20 h shear
Wear (Gear)	CRC L20 or ASTM D4998	High torque, low speed hypoid axle test / FZG Wear test	No xs wear + no ridging/rippling/scuffing damage
Scuffing	CEC L-084-02	FZG 1/2 tooth width, double speed, reverse rotation, high temp step load scuff test	TBD
Pitting	CEC Stopped Work	TBD	TBD
Synchro Durability	CEC L-066-01	FZG SSP 180 Synchronizer durability test using prodn components	TBD
Corrosion	ASTM STP 512A L33	7 day moisture corrosion test with axle components	SAE J2360 limits
Corrosion	ASTM D-130	Standard ASTM Cu strip test run at 3h/121°C conditions	MT-1 limits
Thermal/Oxidative Stability	ASTM D 5704	Bench test using 120 mL oil, Cu cat, and air	MT-1 limits
Oxidation	CEC L-48-A-95	Glassware bench oxidation test	TBD
Elastomer Compatibility	ASTM D 5662	Seal immersion test using FL, PA, NI type elastomers	MT-1 limits
Antifoam	ASTM D 892	Lab method to determine foam tendency and stability (3 sequences)	MT-1 limits
Storage and Compatibility	FTM 3440	Compatibility with other oils meeting this specification	MT-1 limits

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Issues

- Timing of Specification
 - Is this something we can complete in a reasonable time?

- Abrasive Wear Test?
 - L-20 or ASTM D4998 (FZG based)

- Availability of a Pitting Test?
 - CEC Stopped Work
 - Alternatives
 - ◆ AGMA Pitting Test (FZG based / special gears)
 - ◆ Univ. of Munich Pitting Test (FZG based)