



Test Monitoring Center

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L-37 Information Letter 13-1
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TO: L-37 Mailing List

SUBJECT: Correction factors for use in non-reference tests using V1L528 hardware

At its December 18-19, 2012 meeting, the L-37 Surveillance Panel approved the use of a combination of correction factors and tooth exclusions for use in non-reference tests using V1L528 hardware. A table on the following page summarizes the corrections and exclusions.

Sections 12 and A6.3.4 of D 6121-12 have been updated to incorporate these correction factors and exclusions. The revised sections follow the table.

These corrections and exclusions are in effect immediately for all non-reference tests using V1L528 hardware.

Chris Prengaman
Chairman
L-37 Surveillance Panel

Frank Farber
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Attachment

cc: ftp://ftp.astmtmc.cmu.edu/docs/gear/137/procedure_and_ils/il13-1.pdf

Distribution: Email

Summary of V1L528 Correction Factors and Exclusions

Component	Hardware	Conditions	Parameter	Transformation	Additive Correction	Effective Merit Correction	Spitting Exclusion ('spitting', abbreviation of spalling/pitting)
Pinion	Nonlubrited	Standard	RIDG	$-\ln(10.5-x)$	0.3365	1	
			RIPP	$-\ln(10.5-x)$	0.3365	1	
			SPIT	$-\ln(10.5-x)$			Report 4th lowest tooth
			WEAR				
Pinion	Nonlubrited	Canadian	RIDG	$-\ln(10.5-x)$			
			RIPP	$-\ln(10.5-x)$	0.7885	3	
			SPIT	$-\ln(10.5-x)$			Report 4th lowest tooth
			WEAR				
Pinion	Lubrited	Standard	RIDG	$-\ln(10.5-x)$	0.3365	1	
			RIPP	$-\ln(10.5-x)$			
			SPIT	$-\ln(10.5-x)$			Report 2nd lowest tooth
			WEAR				
Pinion	Lubrited	Canadian	RIDG	$-\ln(10.5-x)$	0.5878	2	
			RIPP	$-\ln(10.5-x)$	0.5878	2	
			SPIT	$-\ln(10.5-x)$			Report 2nd lowest tooth
			WEAR				
Ring	Lubrited	Canadian	RIDG	$-\ln(10.5-x)$	0.3365	1	
			RIPP	$-\ln(10.5-x)$			
			SPIT	$-\ln(10.5-x)$			
			WEAR				

(Revises Test Method D 6121-12 as modified by Information Letter 12-1)

Revise section 12 as shown below. Remove footnote 18.

12. Determination of Test Results¹⁵

12.1 *Pinion Bearing Rating*—Examine the bearings for wear, surface fatigue corrosion, and deposits in accordance with ASTM Distress Rating Manual 21.

12.2 Gear Rating:

12.2.1 Examine the tooth surfaces on the drive side of the pinion and ring gear for the following distresses in accordance with ASTM Distress Rating Manual 21 and Annex A9: burnishing, wear, pitting/spalling (abbreviated as ‘spitting’), ridging, rippling, scoring, discoloration, corrosion, and deposits. Rate the distress types of wear, rippling, and ridging using the ASTM Photographs for Gear Distress. The photographs shall be an ASTM item TMCGEARDISTRESS2010PR, issued on or after November 9, 2010.^{16,17}

12.2.2 Rate each distress by identifying its level of distress in accordance with Table A9.1. Four distress types (ridging, rippling, scoring, and wear) are assigned a numerical value between 0 and 10 corresponding to the rated level of distress, as shown in Table A9.1.

12.2.2.1 The spitting distress type is assigned a numerical value shown separately in Table A9.1.

12.2.3 Transform the rated test results according to Table 1. Add any applicable corrections outlined in 12.3 and then un-transform the value for final result reporting.

¹⁵ Supporting data have been filed at ASTM International Headquarters and can be obtained by requesting Research Report RR:D02-1415.

¹⁶ Available from the ASTM website, www.astm.org.

¹⁷ Training for individuals rating gear sets for gear distress level is coordinated through the ASTM Test Monitoring Center, 6555 Penn Avenue, Pittsburgh, PA, 15206.

Table 1 Transformations

Parameter	Transformation
Ridging	$-\ln(10.5 - \text{merit})$
Rippling	$-\ln(10.5 - \text{merit})$
Spitting	$-\ln(10.5 - \text{merit})$
Wear	none

Renumber Table 1 Reference Oil Test Precision Data as Table 2

Change Table 1 references to Table 2 in Sections 14.1, 14.1.1.1, and 14.1.2.1.

12.3 *Correction Factors and Exclusions:*

12.3.1 *C1L426/P4L415A nonlubrited gear set*—When using the nonlubrited hardware gear set C1L426/P4L415A, determine a numerical spitting value, excluding any spitting value between 9.3 and 9.9, inclusively, in the wear step area of the drive side pinion tooth, as per Annex A10.

12.3.2 *V1L303/P4L514A nonlubrited gear set*—When using the nonlubrited hardware gear set V1L303/P4L514A, determine a numerical spitting value, excluding any spitting value between 3.0 and 9.9, inclusive, in the wear step area of the drive side pinion tooth, as per Annex A10.

12.3.3 *V1L686/P4L626A lubrited gear set*—

12.3.3.1 When using the lubrited hardware gear set V1L686/P4L626A for non-reference oil tests, add 0.5186 to the pinion transformed ridging test result and add 0.9922 to the ring transformed ridging test result.

12.3.3.2 On the V1L686/P4L626A gear set, a thin polished line visible in the root heel of the pinion and on the crown of the ring gear might be evident. The polish line might vary in length and prominence due to the build position of the ring and pinion gears and manufacturing accuracy of the carrier. This condition is normal and not oil-related. Note this condition in the final test report comment section as *Root and Tip line polishing and a function of the gear set manufacturing process — V1L686/P4L626A*.

12.3.4 *V1L528/P4T883A nonlubrited gear set*—When using the nonlubrited hardware gear set V1L528/P4T883A for non-reference oil tests, add 0.3365 to the transformed test result of both pinion ridging and pinion rippling. Rate each pinion tooth for spitting and report the 4th lowest tooth rating for the final pinion spitting test result.

12.3.4.1 See A6.3.4 for L-37 Canadian Version test.

12.3.5 *V1L528/P4T883A lubrited gear set*—When using the lubrited hardware gear set V1L528/P4T883A for non-reference oil tests, add 0.3365 to the transformed pinion ridging test result. Rate each pinion tooth for spitting and report the 2nd lowest tooth rating for the final pinion spitting test result.

12.3.5.1 See A6.3.4 for L-37 Canadian Version test.

12.4 For a test rating to be valid, the gears shall be rated by an individual who has participated in an ASTM gear-rater calibration workshop within the previous twelve months¹⁷ and has been calibrated as outlined in the L-37 Rater Calibration Monitoring System (RCMS). The RCMS calibration period is every six months or as otherwise required by the RCMS. A copy of the RCMS document is available on the ASTM Test Monitoring Center web page at <http://www.astmtmc.cmu.edu/>, or it can be obtained in hardcopy format from the TMC.

12.5 *Test Validity*—The test is determined to be operationally valid if the percent deviation of the critical operating parameters and number of shutdowns are within the limits specified and defined in Annex A8.

12.6 Consider as non-interpretable any non-reference oil test that has not been run in a calibrated test stand or not conducted on approved hardware, or both. Indicate on the cover page of the test report that the test is non-interpretable and that it has not been conducted in a valid manner in accordance with the test method.

12.7 Consider as non-interpretable any reference or non-reference oil test that has one or more broken pinions or ring gear teeth. Note any broken teeth in the comment section of the test report.

12.8 Rate only the corrosion on the contact surface of the drive side of any pinion or ring gear tooth. Enter the corrosion rating in the rating section of the rating form. Note any corrosion on the pinion and ring in a non-contact surface area in the comment section of the rating form.

12.9 Round test results according to Practice E29.

NOTE 6—If non-reference oil test results are to be used as candidate oil test results against a specification, report the non-reference oil test results on the same standardized report form set and data dictionary as used for reference oil test results.

Delete footnote 18; it is redundant with 17.

Revise A6.3.4 as shown below.

A6.3.4 Correction Factors and Exclusions:

A6.3.4.1 V1L686/P4L626A lubrited gear set—When using the lubrited hardware gear set V1L686/P4L626A for non-reference oil tests, add 0.6065 to the pinion and ring transformed ridging test result.

A6.3.4.2 L247/T758A lubrited gear set—When using the lubrited hardware gear set L247/T758A for non-reference oil tests, add 0.5878 to the transformed pinion ridging test result and add 0.7340 to the transformed pinion spitting test result.

A6.3.4.3 V1L528/P4T883A nonlubrited gear set—When using the nonlubrited hardware gear set V1L528/P4T883A for non-reference oil tests, add 0.7885 to the transformed pinion rippling test result. Rate each pinion tooth for spitting and report the 4th lowest tooth rating for the final pinion spitting test result.

A6.3.4.4 V1L528/P4T883A lubrited gear set— When using the lubrited hardware gear set V1L528/P4T883A for non-reference oil tests, add 0.5878 to the transformed test result of both pinion ridging and pinion rippling. Rate each pinion tooth for spitting and report the 2nd lowest tooth rating for the final pinion spitting test result. Add 0.3365 to the transformed ring ridging test result.