
Committee D02 on PETROLEUM PRODUCTS AND LUBRICANTS

Chairman: W. JAMES BOVER, ExxonMobil Biomedical Sciences, 1545 Route 22 East, PO Box 971, Annandale, NJ 08801-0971, (908) 730-1048, Fax: (908) 730-1151, e-mail: w.j.bover@exxonmobil.com
First Vice Chairman: KENNETH O. HENDERSON, Cannon Instrument Co., 30 Doe Dr., Port Matilda, PA 16870, (814) 353-8000, Fax: (814) 353-8007, e-mail: kenohenderson@worldnet.att.net
Second Vice Chairman: SALVATORE J. RAND, 1299 Middle Gulf Dr., Sanibel Island, FL 33957, (239) 481-4729, Fax: (239) 481-4729, e-mail: salrand@earthlink.net
Secretary: MICHAEL A. COLLIER, Petroleum Analyzer Co. LP, PO Box 206, Wilmington, IL 60481, (815) 458-0216, Fax: (815) 458-0217, e-mail: macvarlen@aol.com
Assistant Secretary: JANET L. LANE, ExxonMobil Research & Engineering, 600 Billingsport Rd., PO Box 480, Paulsboro, NJ 08066-0480, (856) 224-3302, Fax: (856) 224-3616, e-mail: janet.l.lane@exxonmobil.com
Staff Manager: DAVID R. BRADLEY, (610) 832-9681, Fax: (610) 832-9668, e-mail: dbradley@astm.org

August 1, 2007

Reply to:

Donald T. Bartlett

The Lubrizol Corporation

29400 Lakeland Blvd.

Wickliffe, OH 44092

(440) 347-2388

(440) 347-2878 (FAX)

ASTM D02.B0.03 L-37 Surveillance Panel

Members and Guests:

Attached for your review and comment are the unconfirmed minutes of the:

- o June 27, 2007 L-37 Surveillance Panel Meeting minutes at Dana, Maumee, Ohio. Part 2 - Attachments 6 through Attachment 11.

Please direct any corrections or comments to my attention.

Sincerely,



Donald T. Bartlett, Chairman

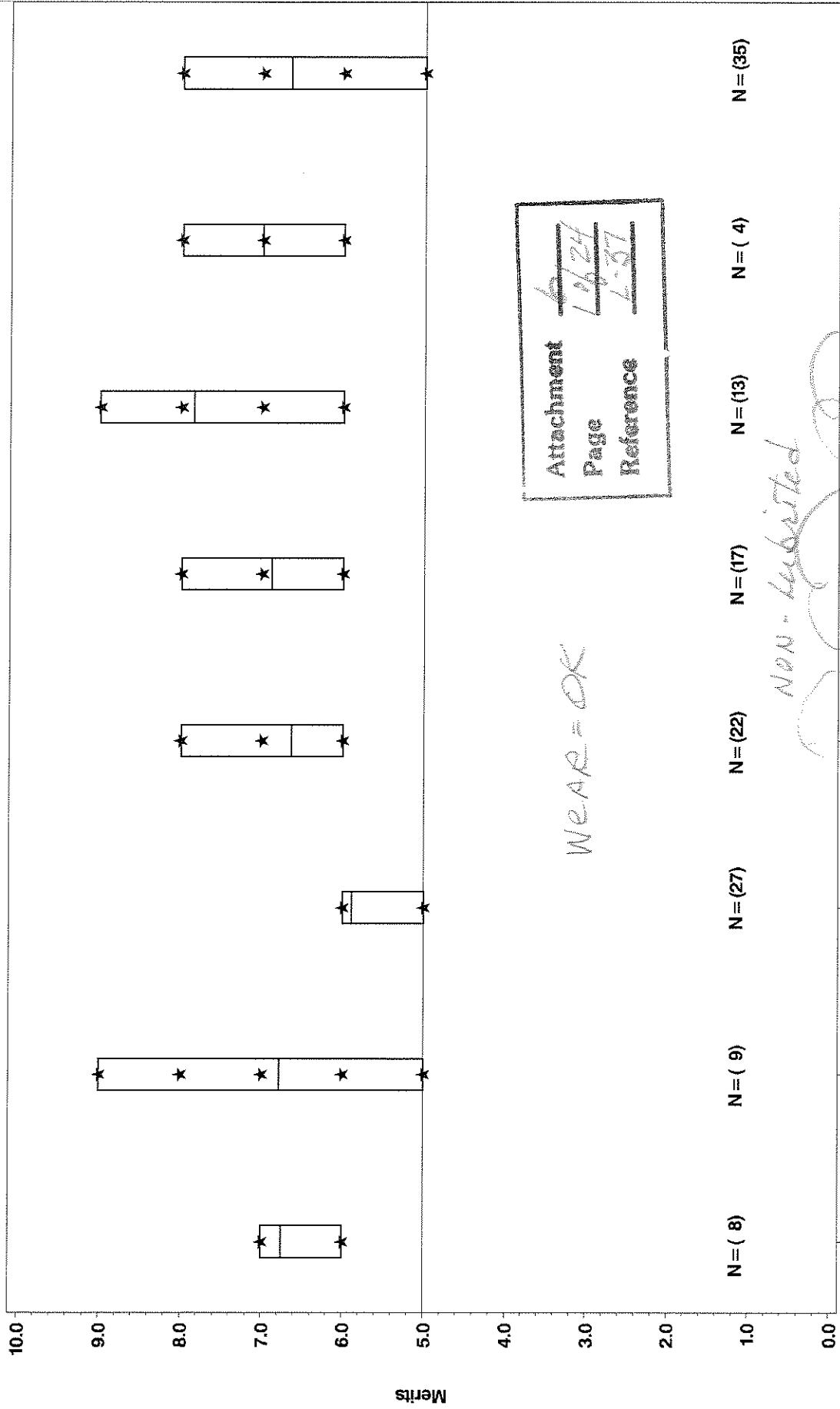
L-37 Surveillance Panel

Attachments

L-37 Reference Oil Performance by Pinion Batch

Wear -- LUBRITED

Reference Oils 151 & 155



WEAR = OK

Attachment 6
Page 10/24
Reference L-37

Non-Lubricated

B6L566

C1L426

L247

NLV1L176

NLV1L351

NLV1L417

V1L303

V1L586

2006

1996

2003

2002

2004

2005

1997

1999

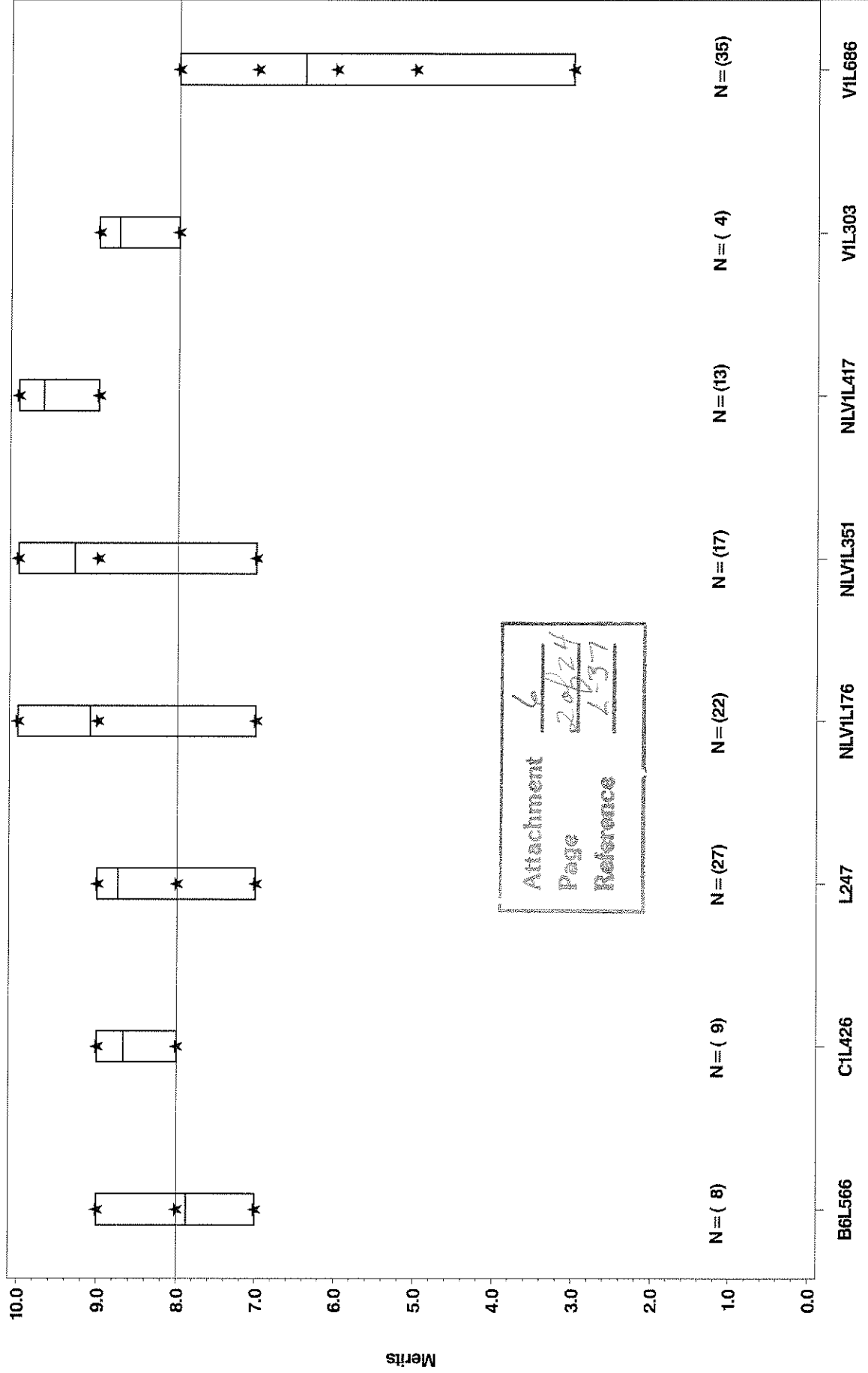
2000

YEAR
PRODUCED

L-37 Reference Oil Performance by Pinion Batch

Ridging - LUBRITED

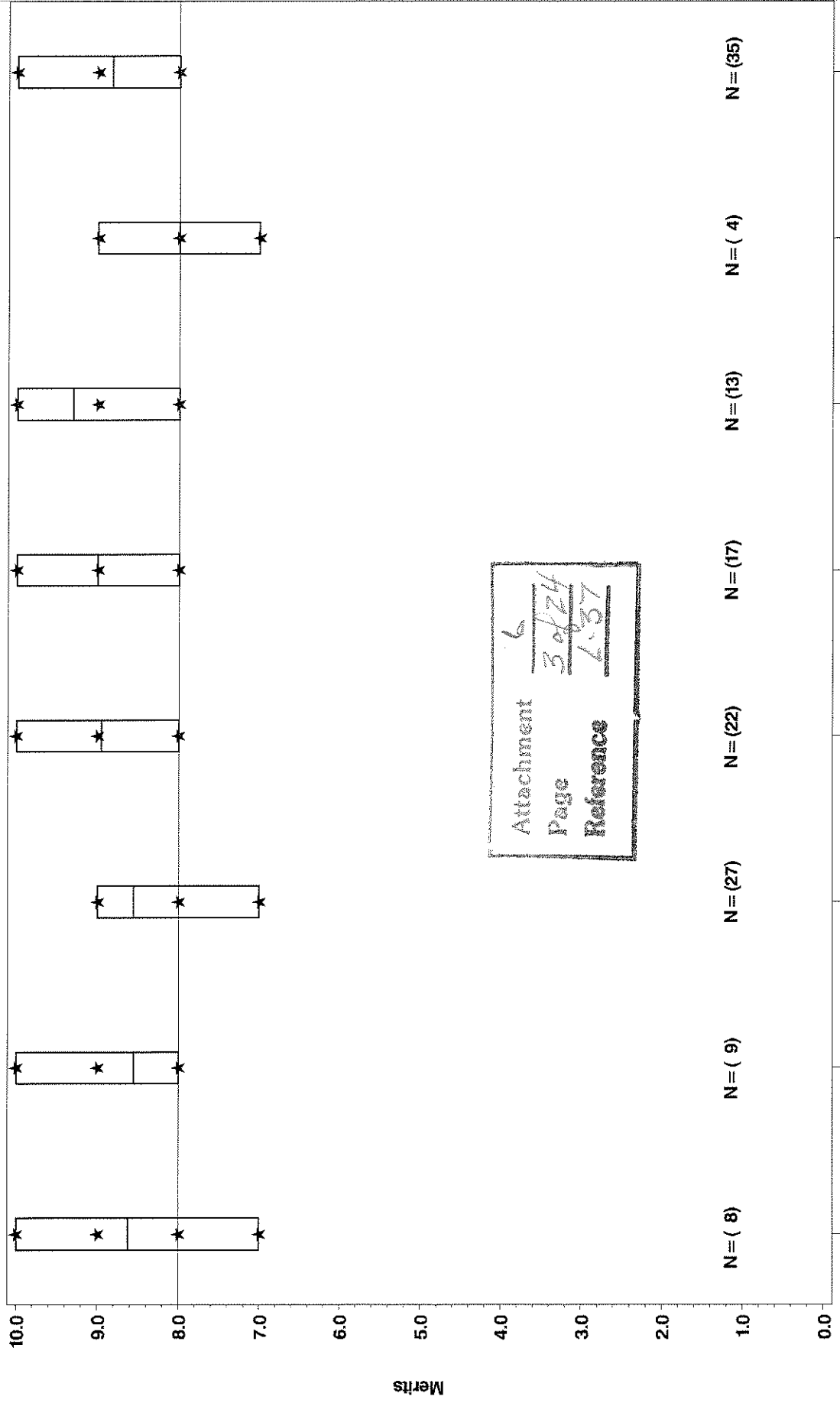
Reference Oils 151 & 155



L-37 Reference Oil Performance by Pinion Batch

Rippling - LUBRITED

Reference Oils 151 & 155

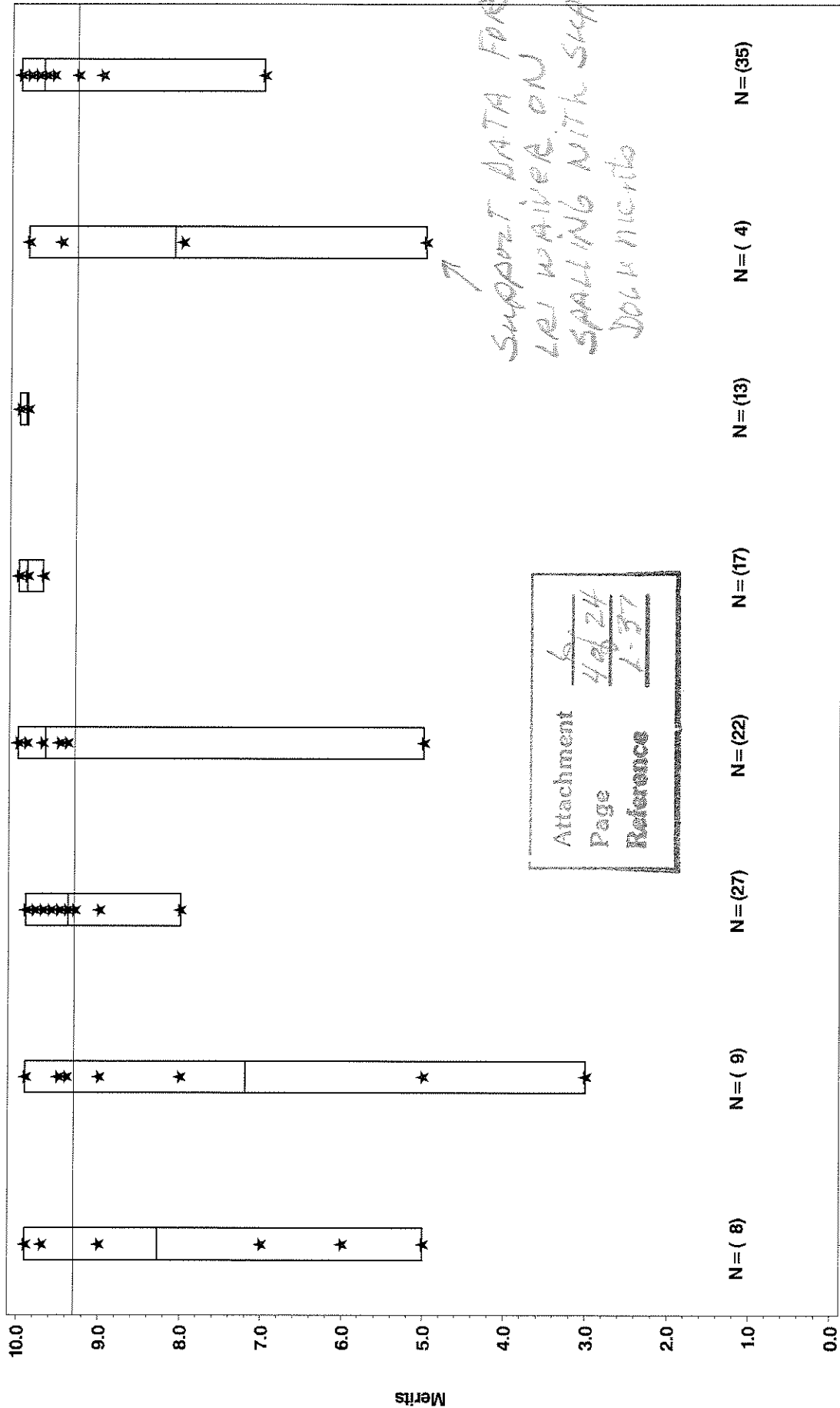


Attachment 6
Page 3 of 24
Reference L-37

L-37 Reference Oil Performance by Pinion Batch

Spitting -- LUBRICATED

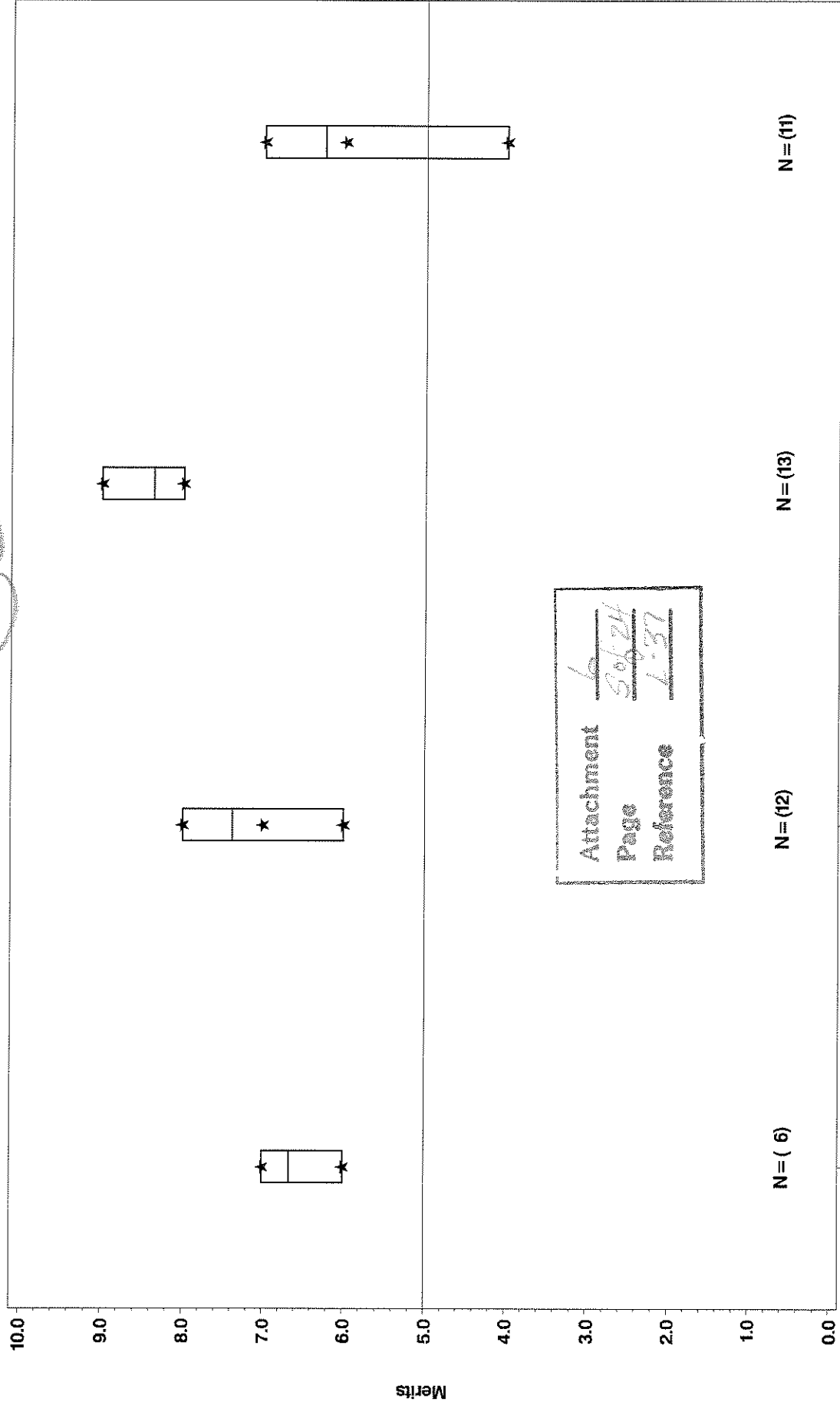
Reference Oils 151 & 155



L-37 Reference Oil Performance by Pinion Batch

Wear - LUBRITED

Reference Oil 152 Standard Temperature



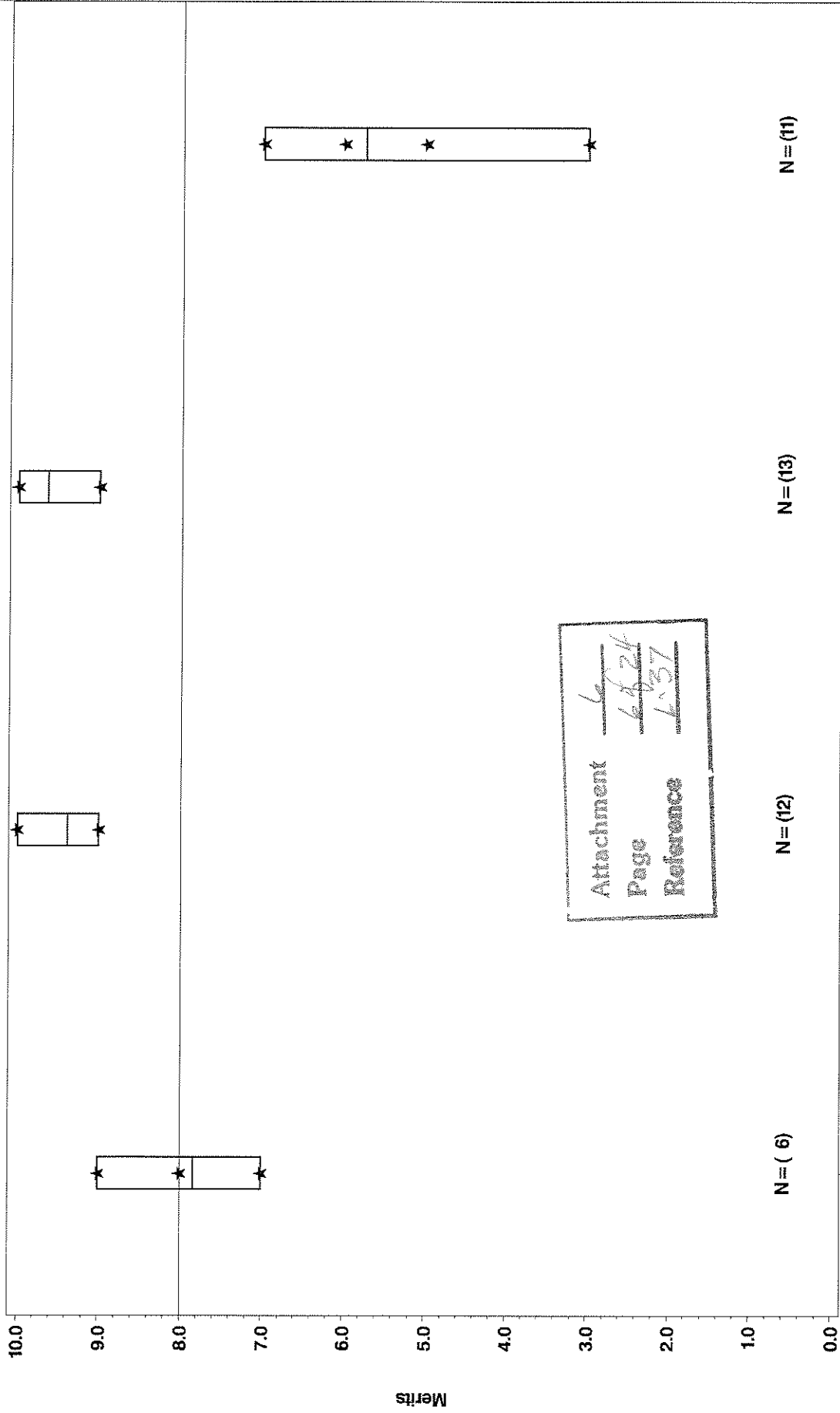
Attachment
Page
Reference

6
30624
1-37

L-37 Reference Oil Performance by Pinion Batch

Ridging -- LUBRITED

Reference Oil 152 Standard Temperature



Attachment L-37
 Page 6824
 Reference L-37

B6L566

NLV1L351

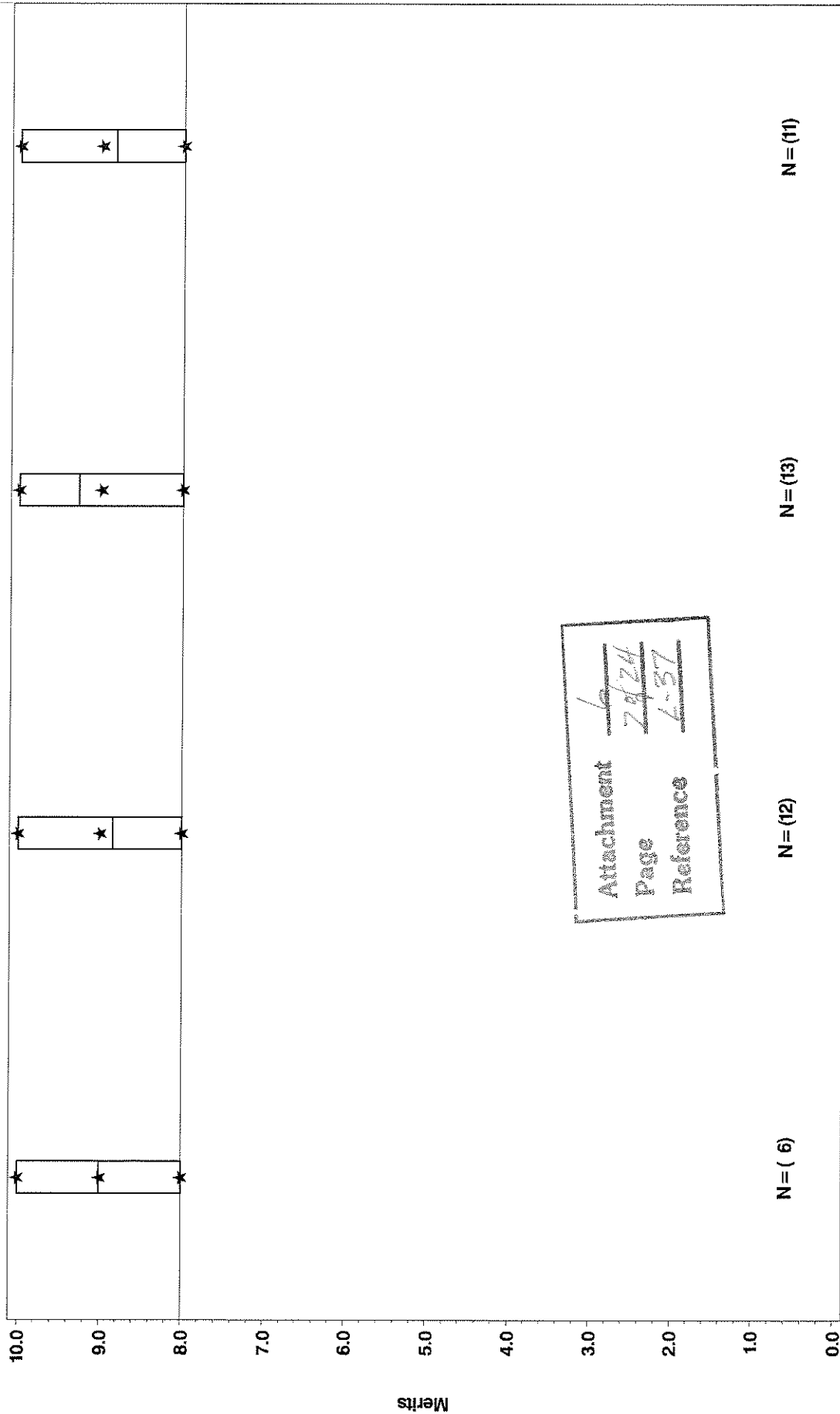
NLV1L417

VIL686

L-37 Reference Oil Performance by Pinion Batch

Rippling - LUBRITED

Reference Oil 152 Standard Temperature



Attachment 10/24
Page 24/24
Reference L-37

B6L566

NLV1L351

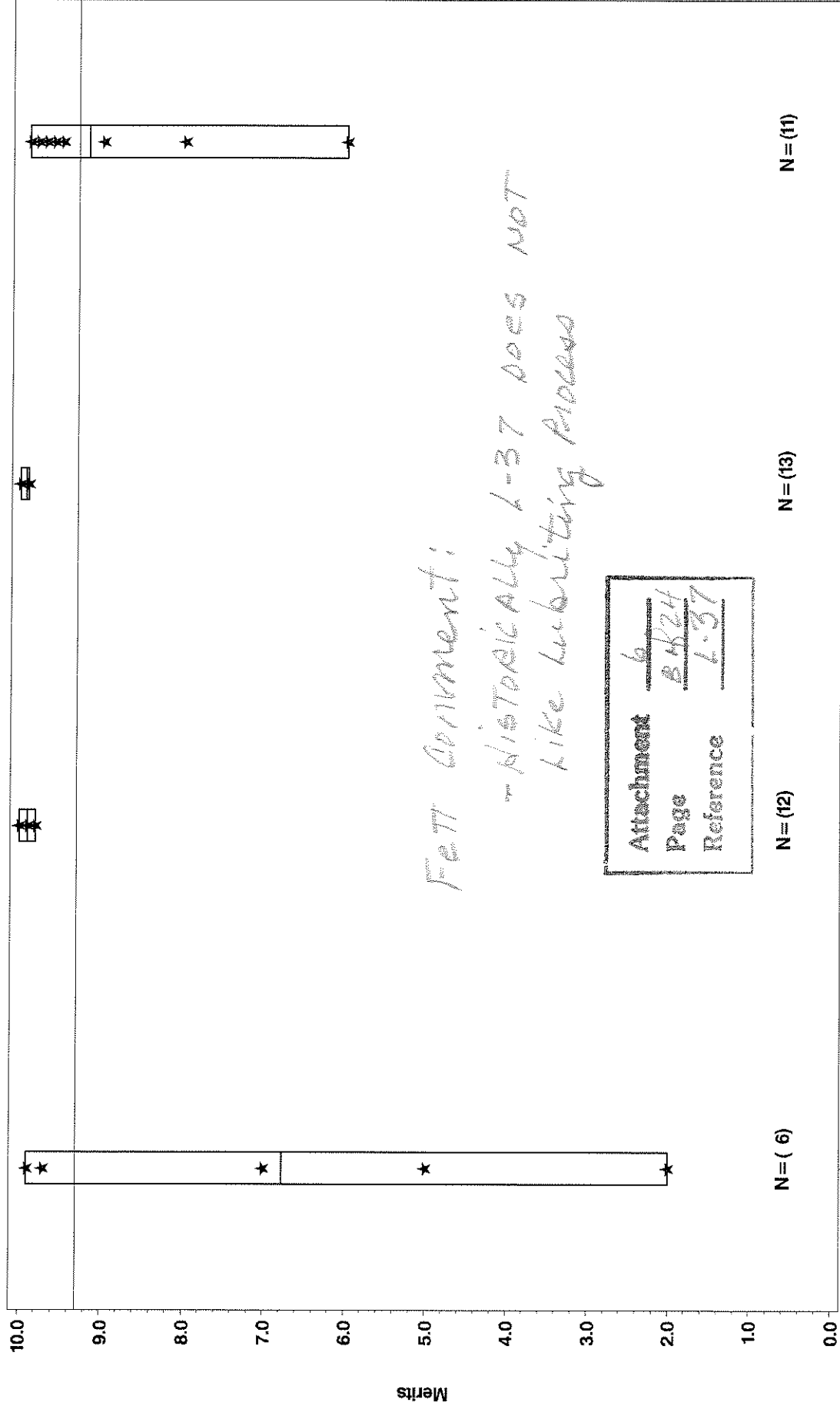
NLV1L417

V1L686

L-37 Reference Oil Performance by Pinion Batch

Spitting - LUBRITED

Reference Oil 152 Standard Temperature



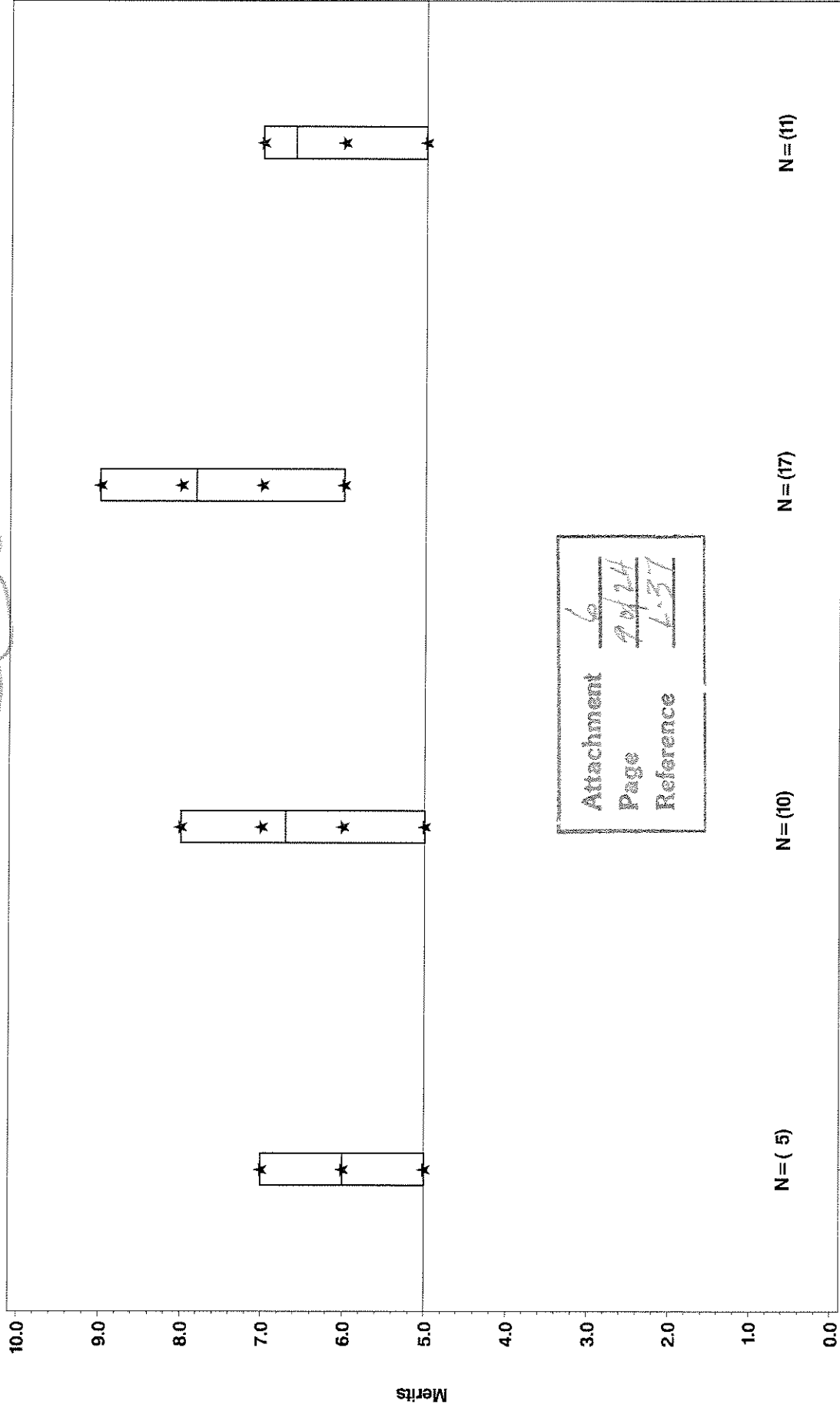
Fett Comment:
- Historically L-37 does NOT
like Lubrifying Process

Attachment b
Page BK24
Reference L-37

L-37 Reference Oil Performance by Pinion Batch

Wear - LUBRITED

Reference Oil 153 Standard Temperature



Attachment 6
Page 24/24
Reference L37

B6L566

NLV1L351

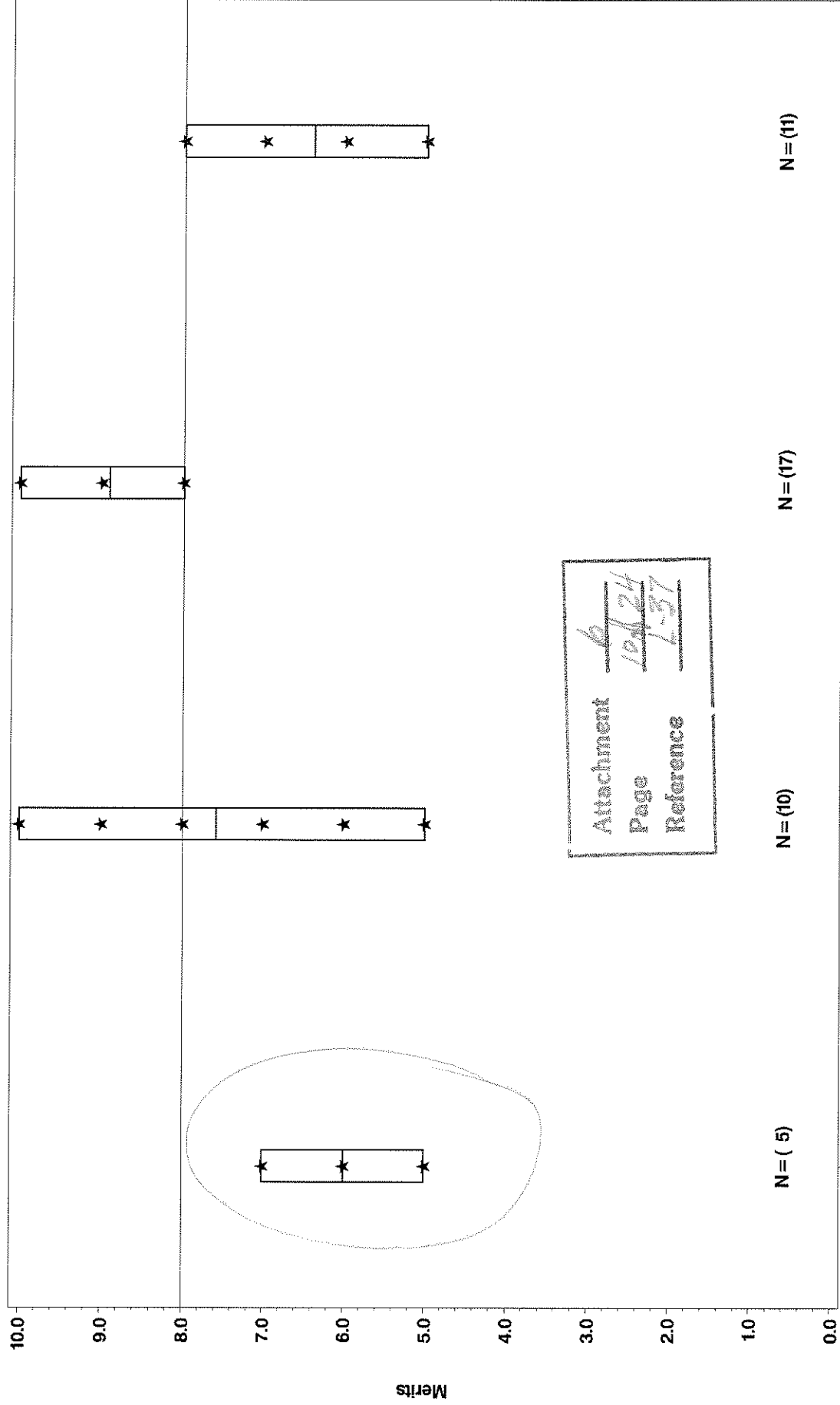
NLV1L417

V1L686

L-37 Reference Oil Performance by Pinion Batch

Ridging - LUBRITED

Reference Oil 153 Standard Temperature



Attachment 6
Page 10 of 24
Reference L-37

B6L566

NLV1L351

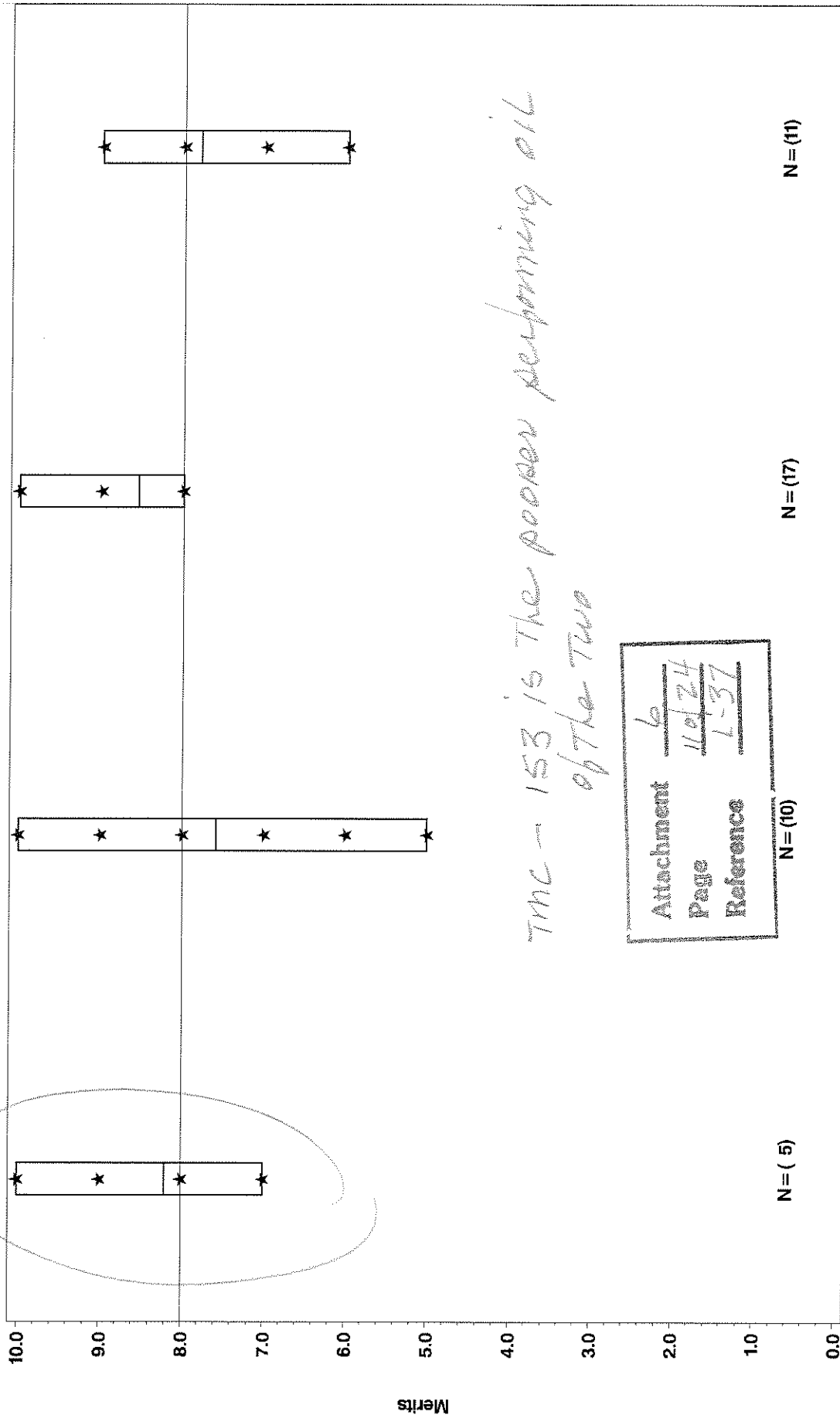
NLV1L417

V1L686

L-37 Reference Oil Performance by Pinion Batch

Rippling -- LUBRICATED

Reference Oil 153 Standard Temperature



B6L566

NLV1L351

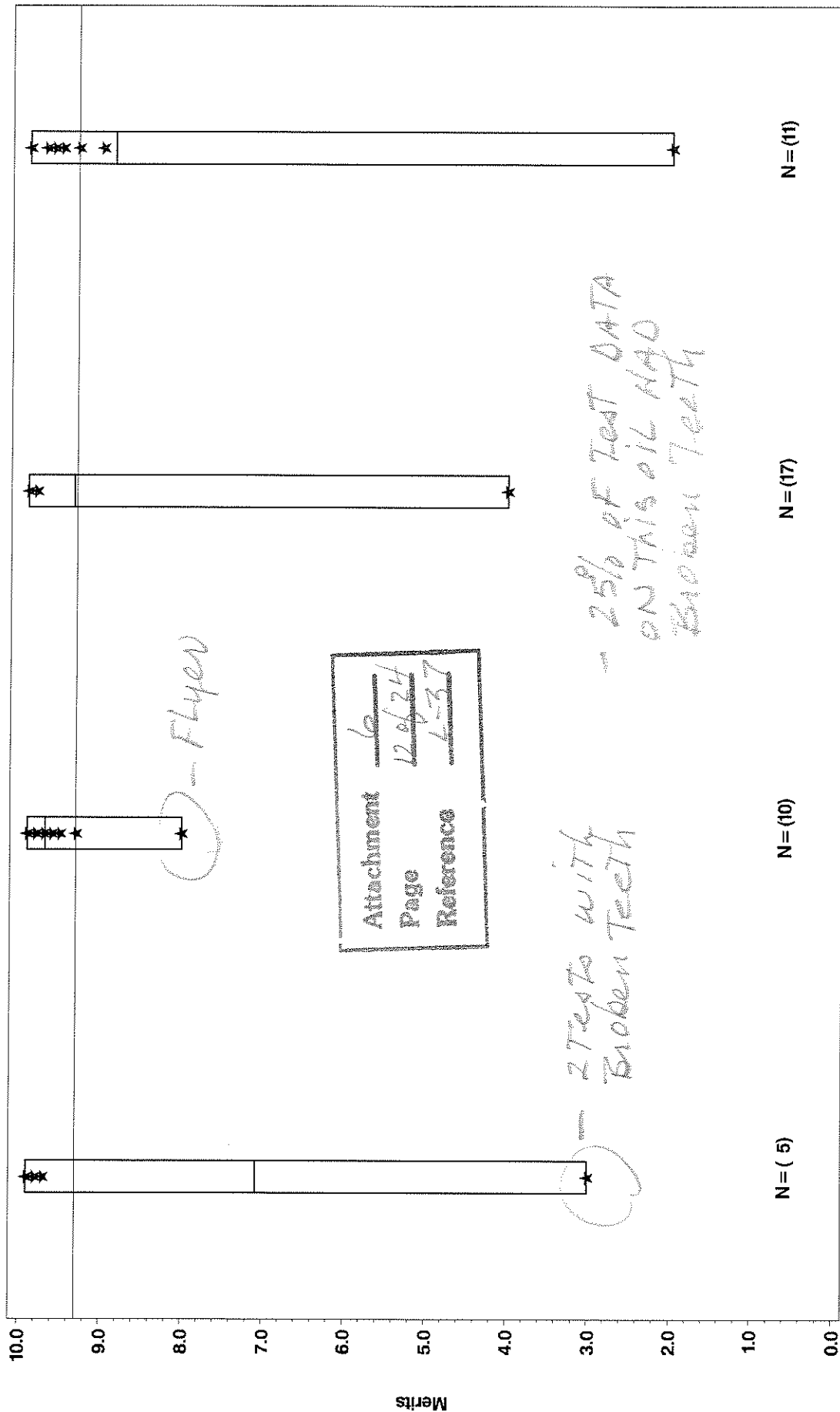
NLV1L417

V1L686

L-37 Reference Oil Performance by Pinion Batch

Spitting - LUBRITED

Reference Oil 153 Standard Temperature



B6L566

NLV1L351

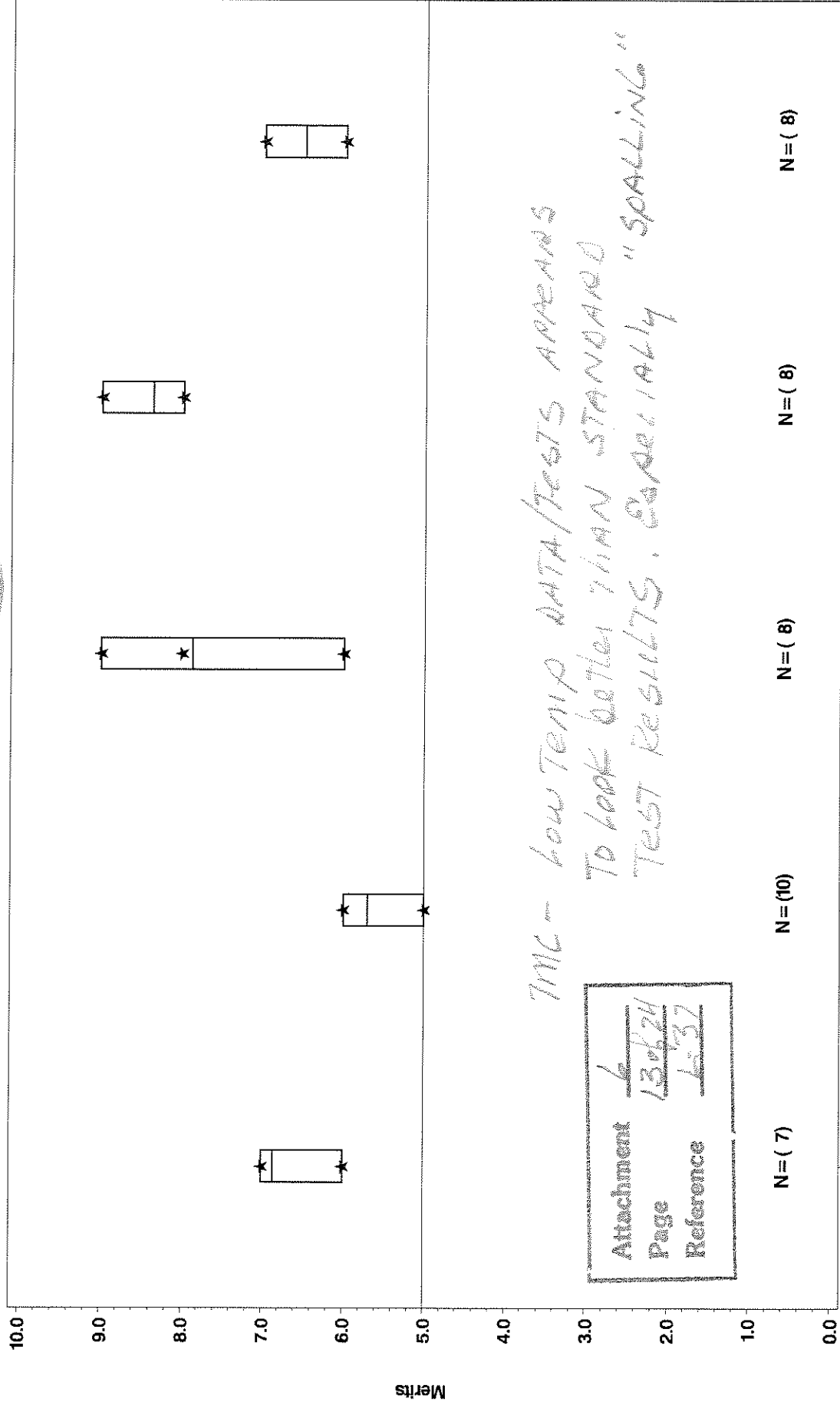
NLV1L417

V1L686

L-37 Reference Oil Performance by Pinion Batch

Wear -- LUBRITED

Reference Oil 152 Low Temperature



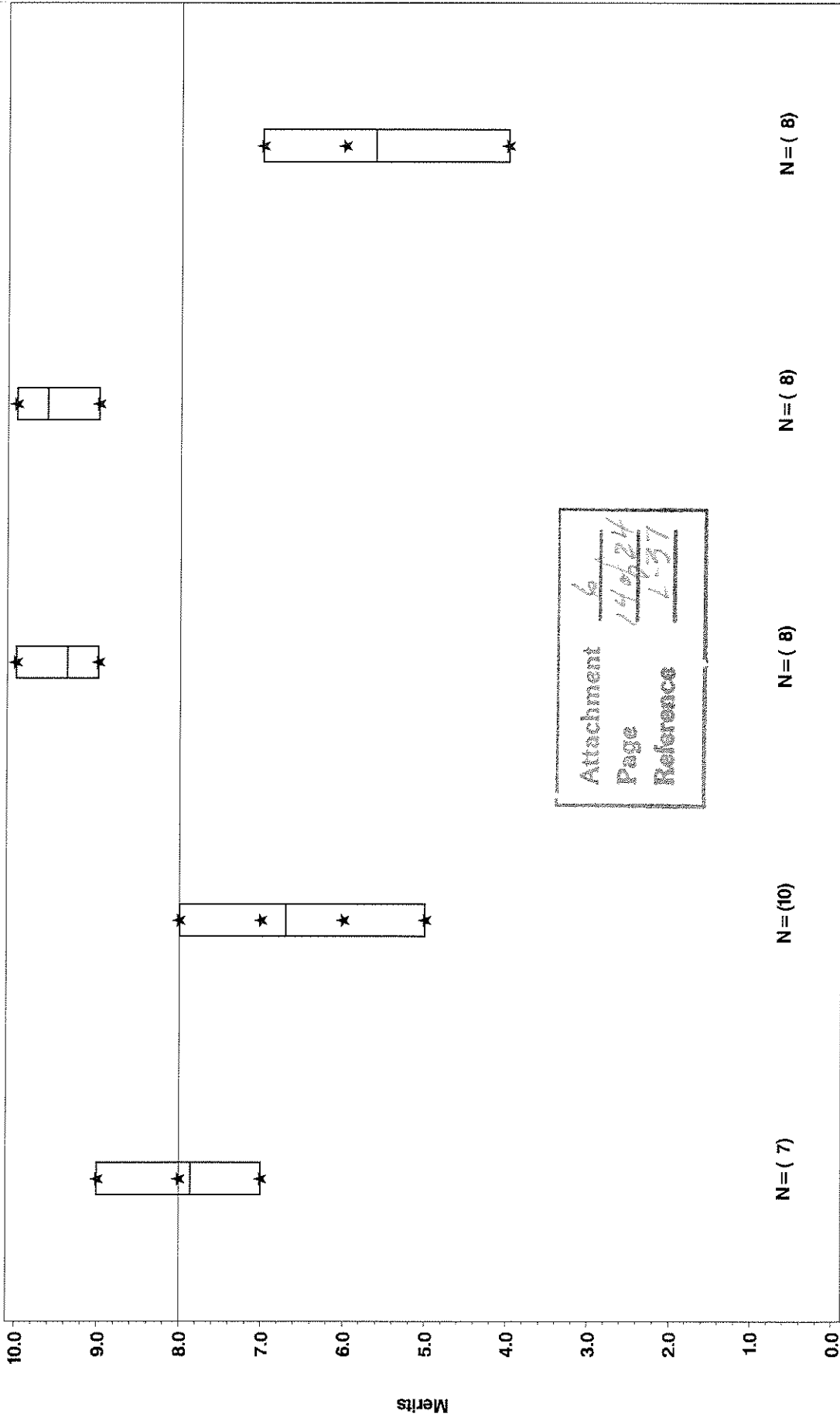
TMC - LOW TEMP DATA/TESTS APPEARS TO LOOK BETTER THAN STANDARD TEST RESULTS. ESPECIALLY "SPALLING"

Attachment 6
 Page 13 of 24
 Reference 6-37

L-37 Reference Oil Performance by Pinion Batch

Ridging -- LUBRITED

Reference Oil 152 Low Temperature



B6L566

L247

NLV1L351

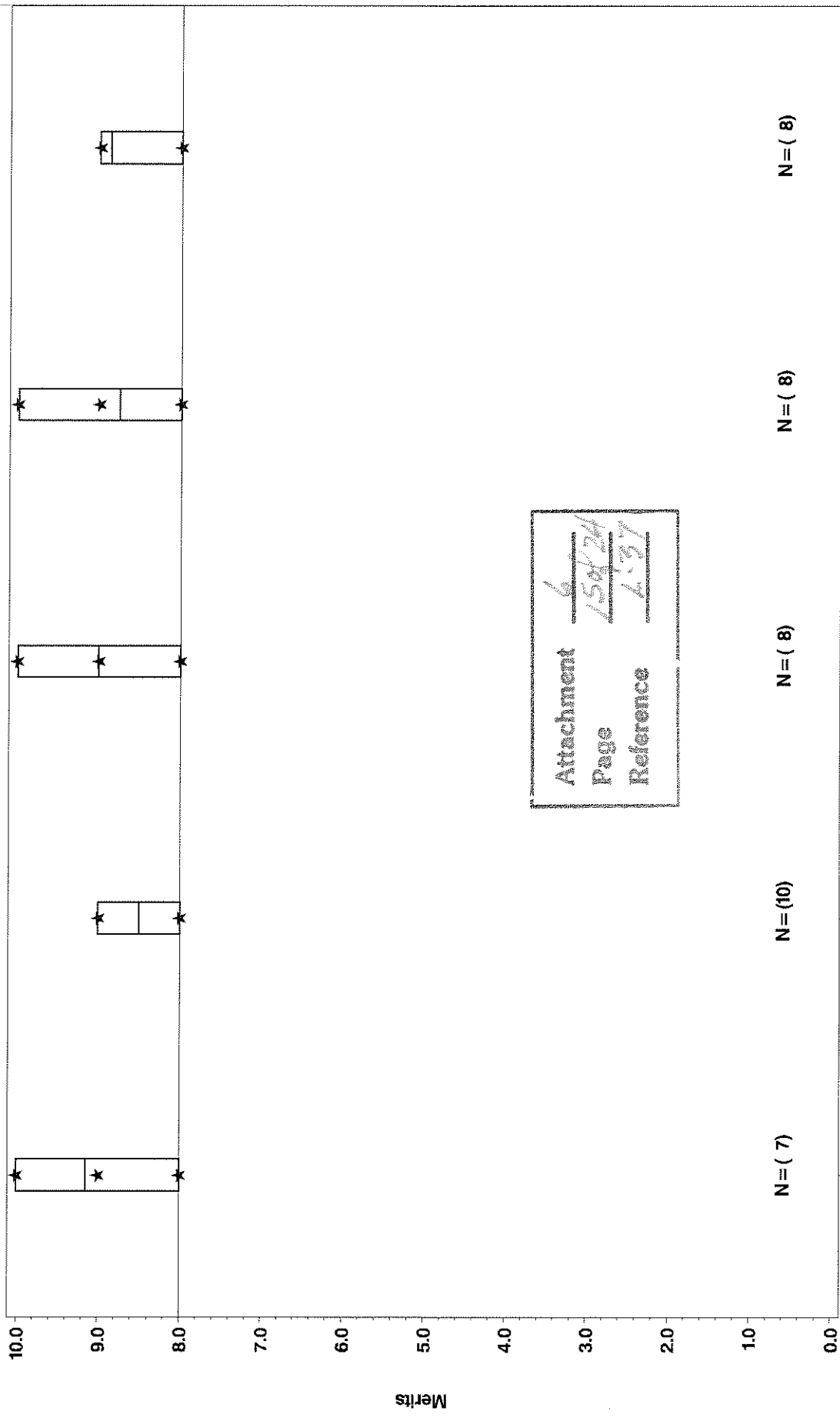
NLV1L417

V1L686

L-37 Reference Oil Performance by Pinion Batch

Rippling --- LUBRITED

Reference Oil 152 Low Temperature

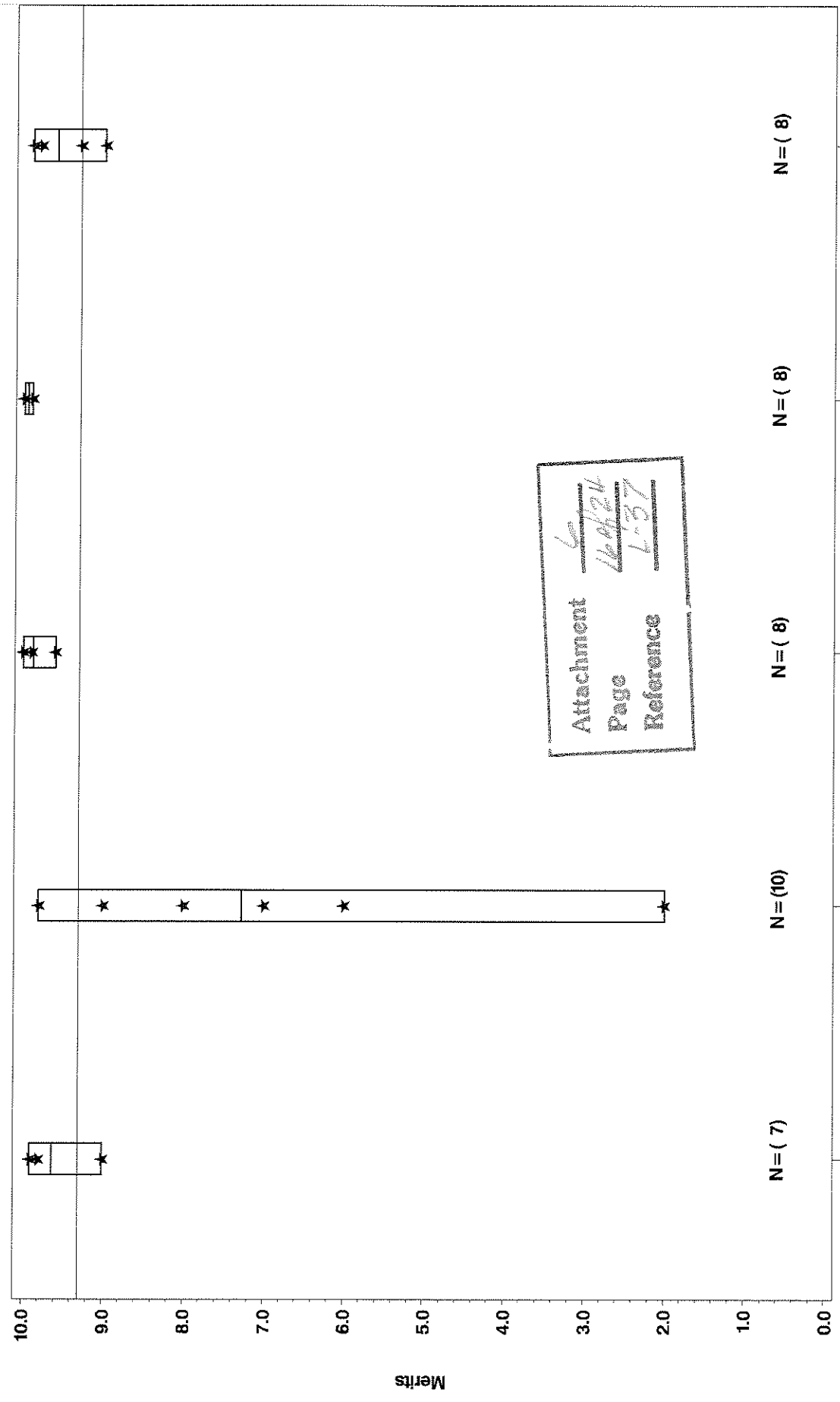


Attachment 6
Page 158/24
Reference 1.37

L-37 Reference Oil Performance by Pinion Batch

Spitting - LUBRITED

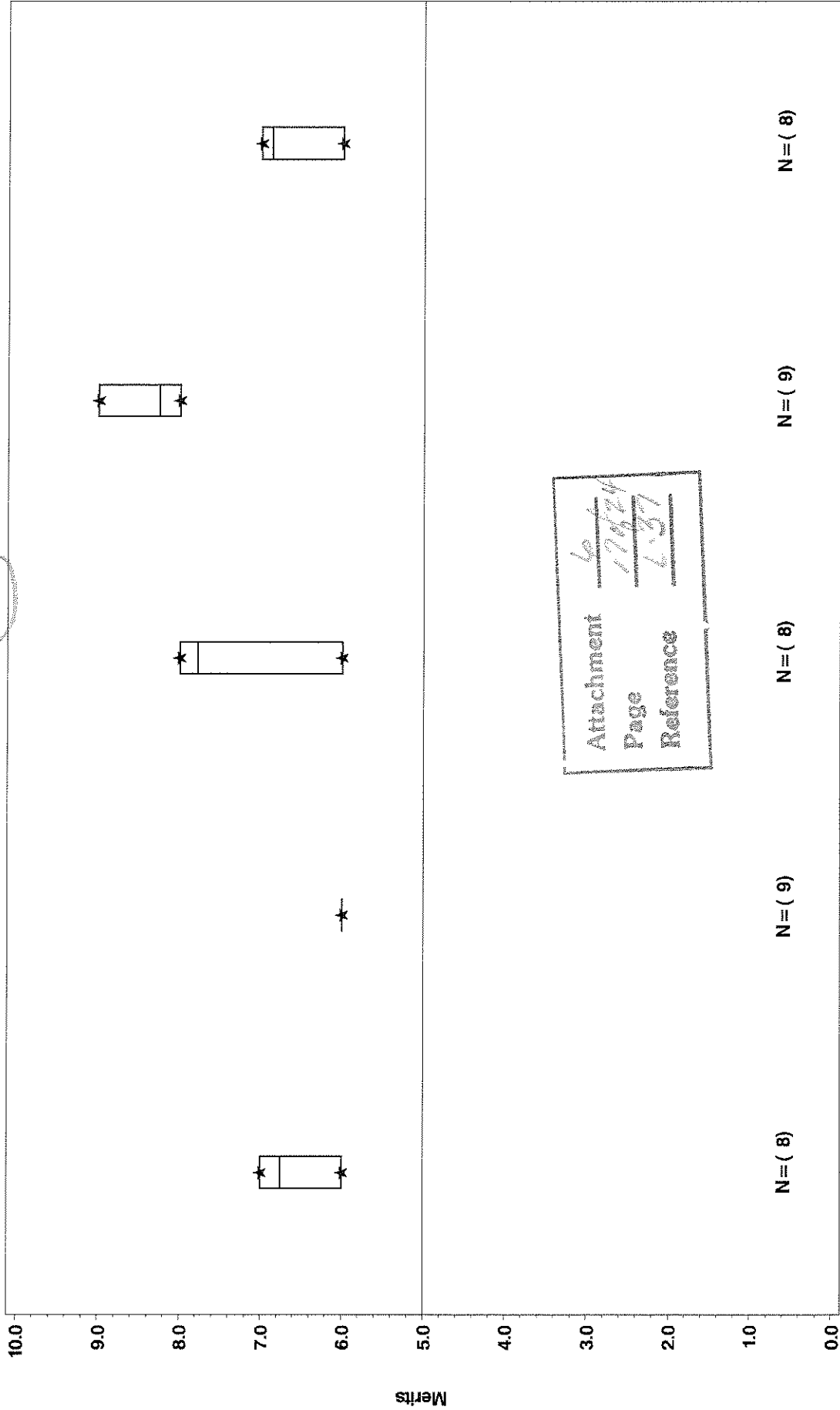
Reference Oil 152 Low Temperature



Attachment L-37
 Page 16/124
 Reference L-37

L-37 Reference Oil Performance by Pinion Batch

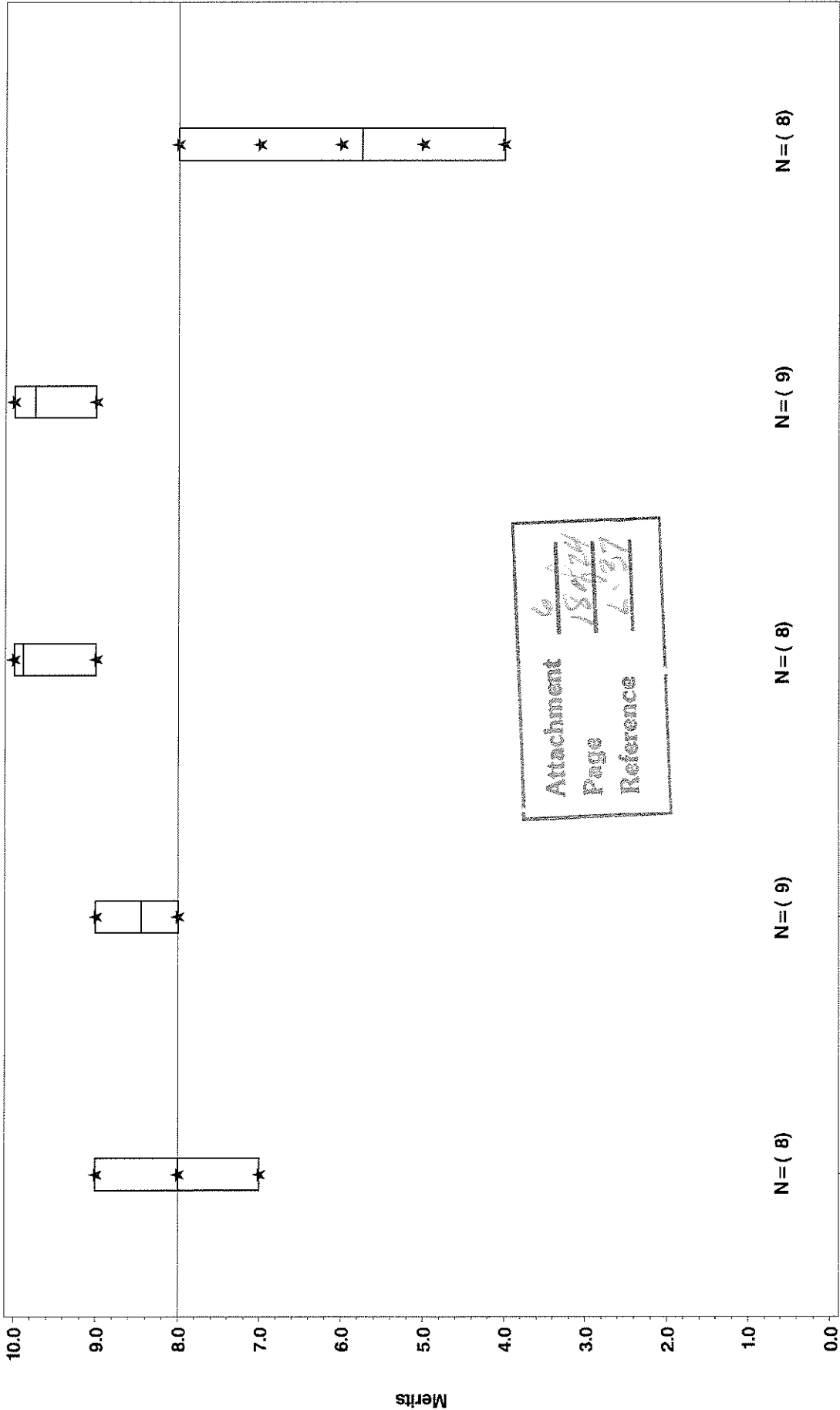
Wear - LUBRICATED
 Reference Oil 153 Low Temperature



L-37 Reference Oil Performance by Pinion Batch

Ridging -- LUBRITED

Reference Oil 153 Low Temperature

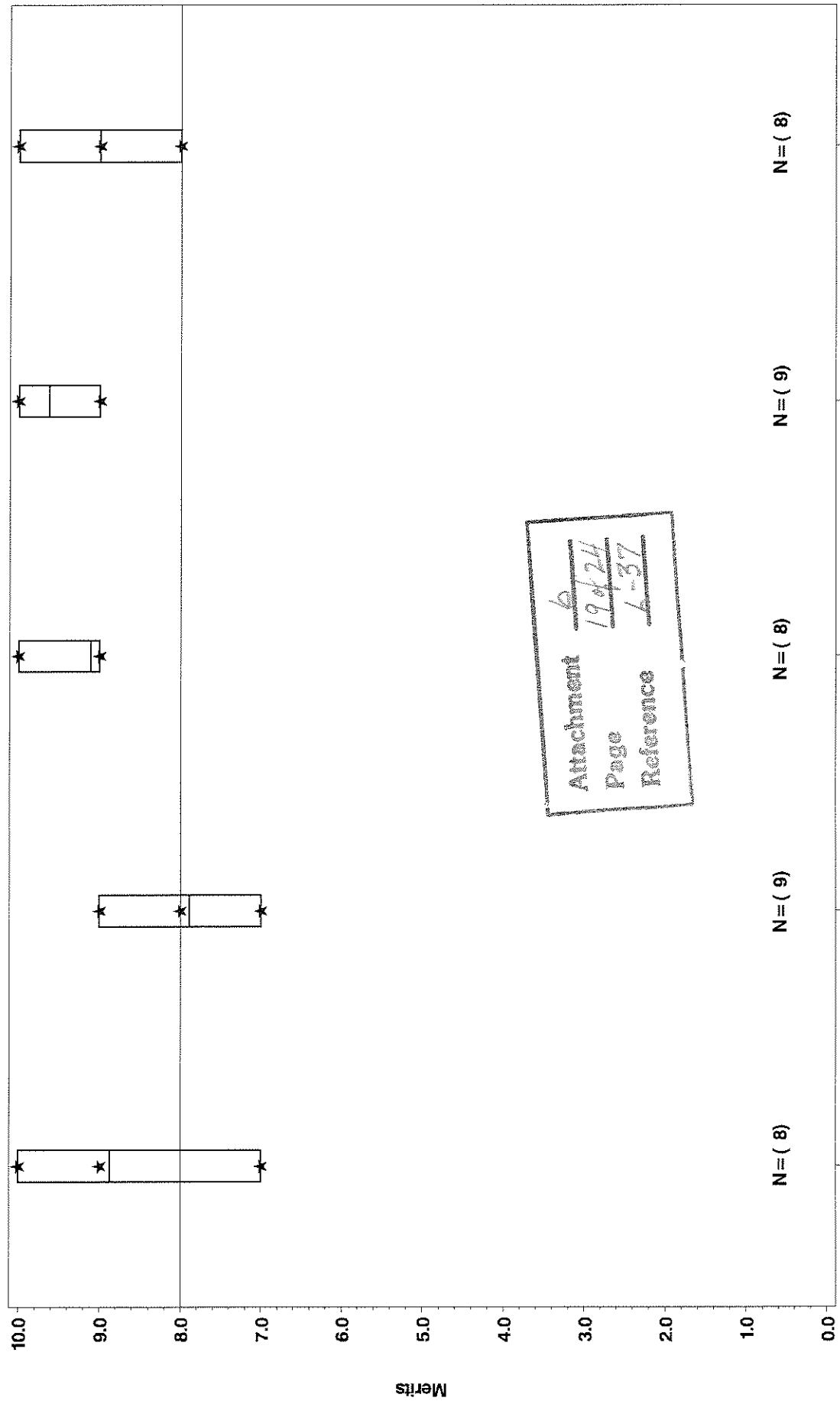


Attachment 6
Page 18 of 24
Reference L-37

L-37 Reference Oil Performance by Pinion Batch

Rippling -- LUBRICATED

Reference Oil 153 Low Temperature



B6L566

L247

NLV1L351

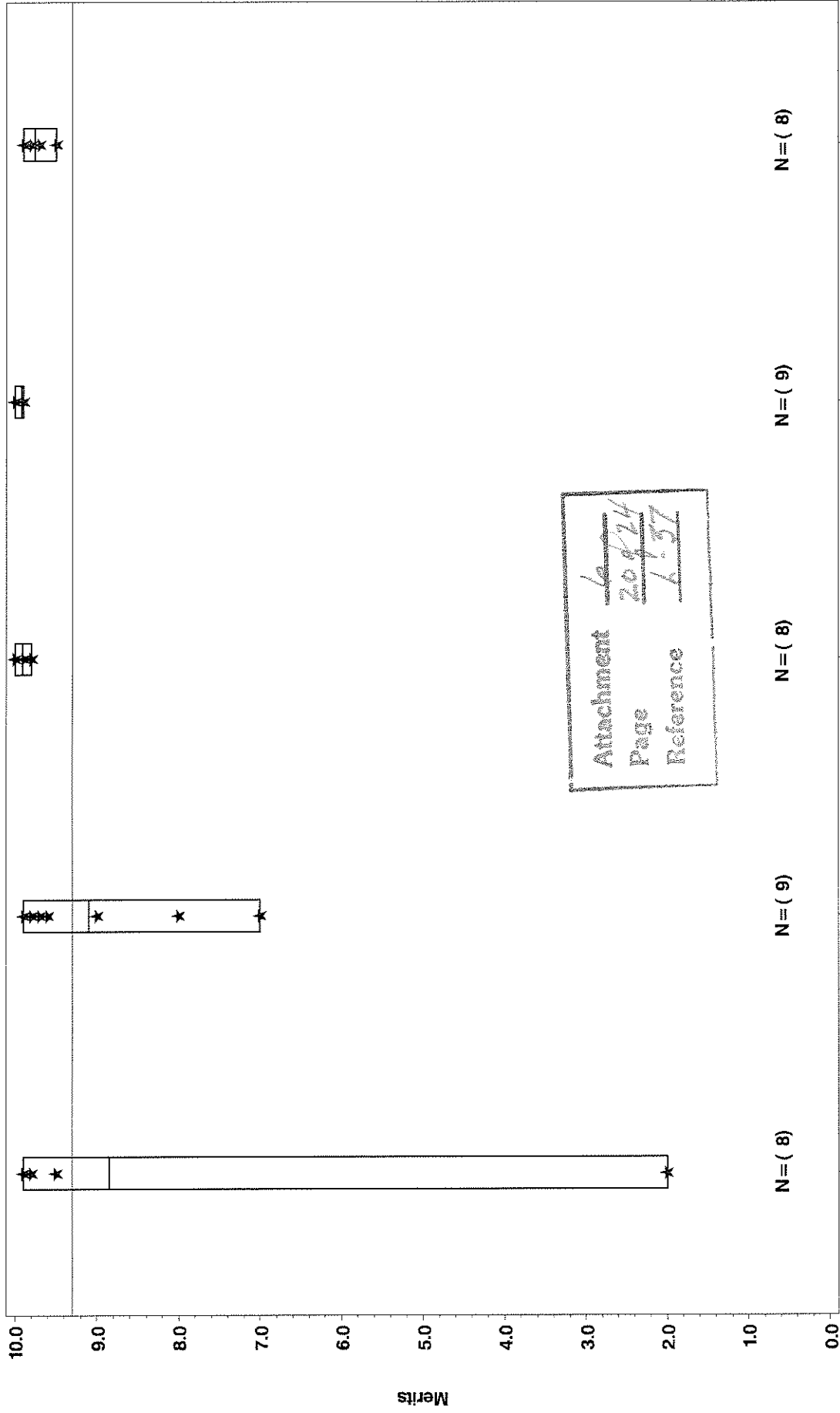
NLV1L417

V1L686

L-37 Reference Oil Performance by Pinion Batch

Spitting -- LUBRICATED

Reference Oil 153 Low Temperature

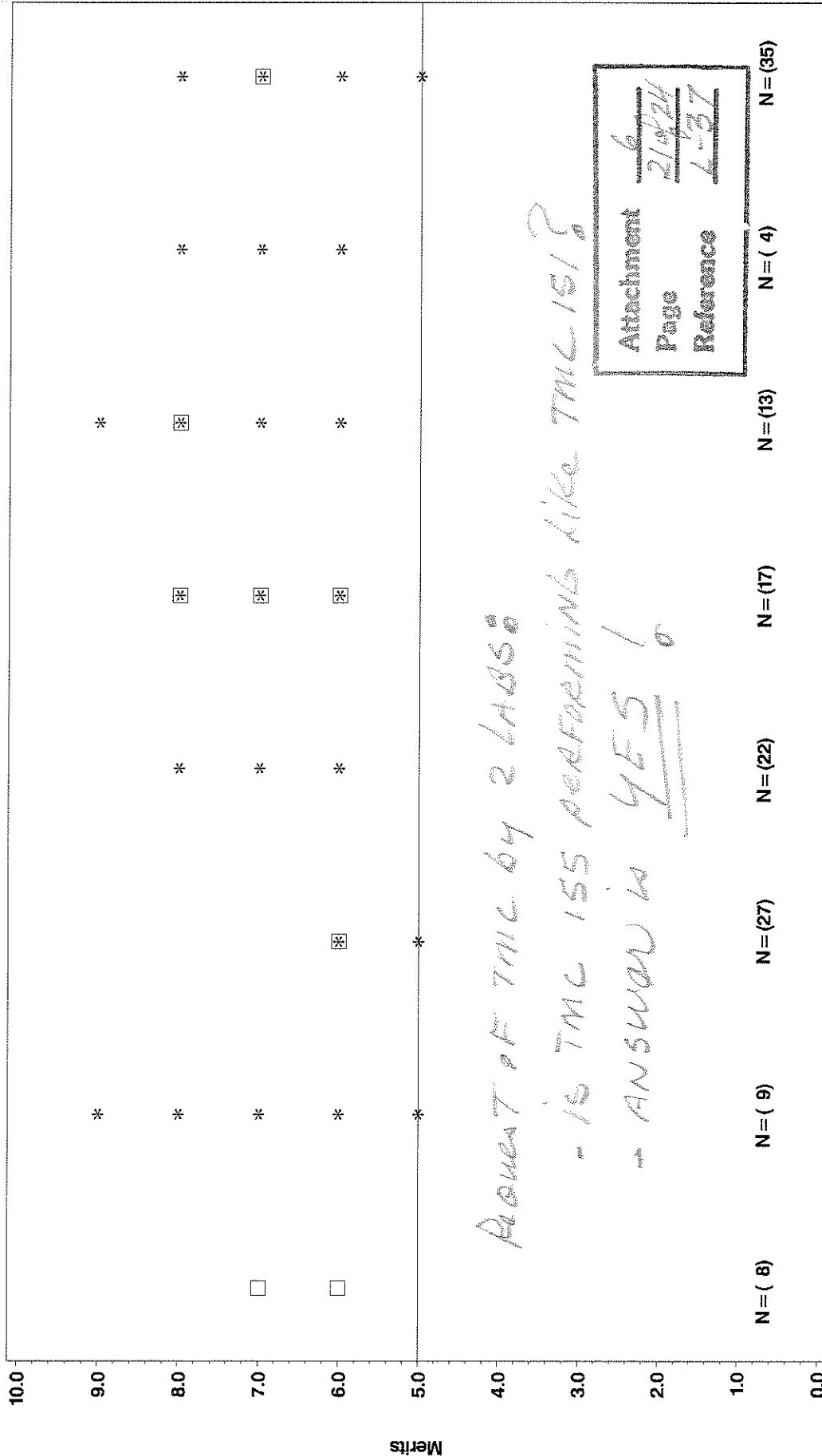


Attachment L-37
 Page 20 of 24
 Reference L-37

L-37 Reference Oil Performance by Pinion Batch

Wear - LUBRICATED

Reference Oils 151 vs 155



Attachment
Page
Reference

N = (35)

N = (4)

N = (13)

N = (17)

N = (22)

N = (27)

N = (9)

N = (8)

TMC OIL CODE * * * 151

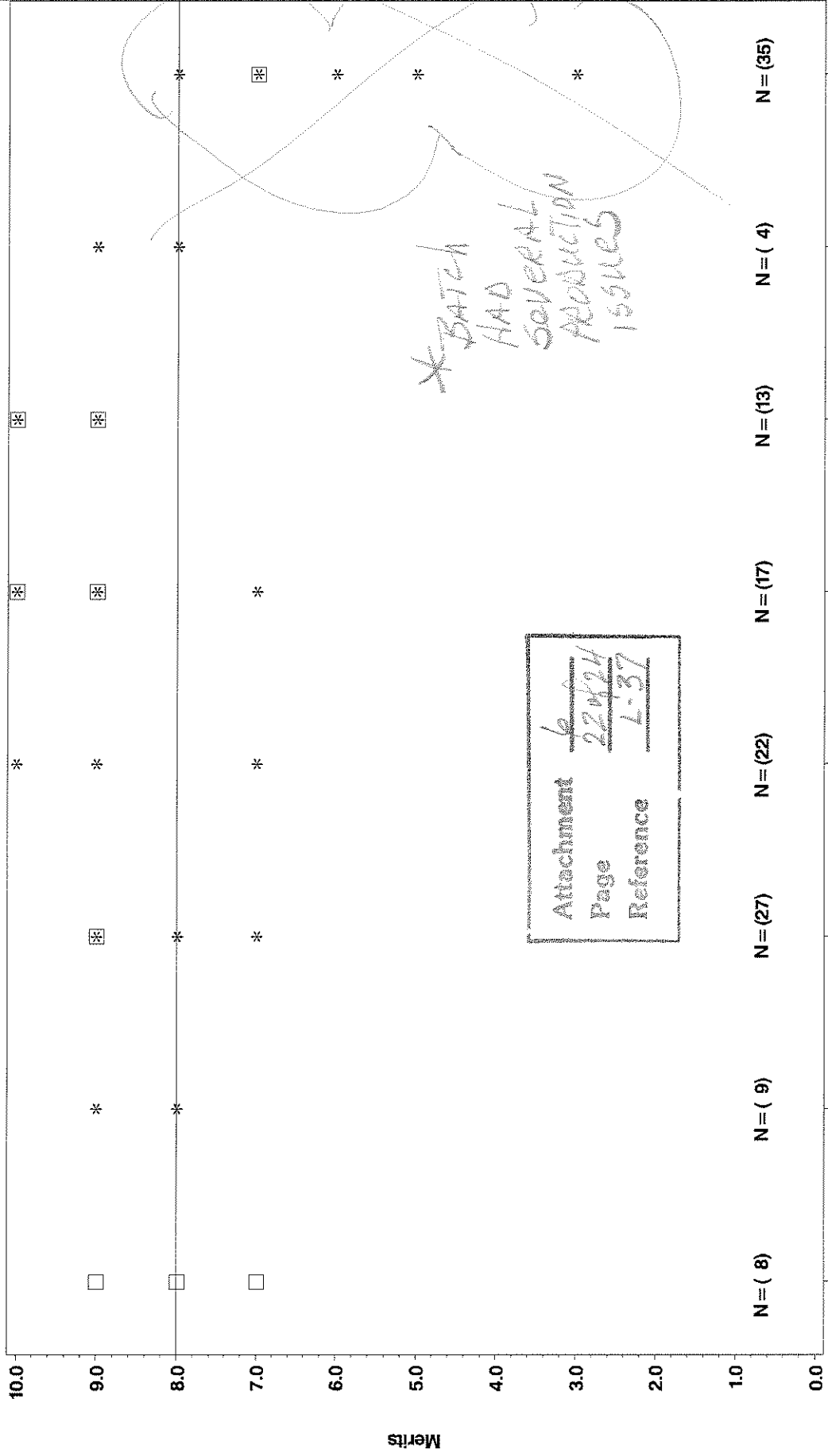
☐ ☐ 155

2006 1996 2003 2002 2004 2005 1997 1999/2000

L-37 Reference Oil Performance by Pinion Batch

Ridging – LUBRITED

Reference Oils 151 vs 155



*Batch
HAD
SOVEREIGN
PRODUCTION
ISSUES

Attachment	Page	Reference
6	22 of 24	L-37

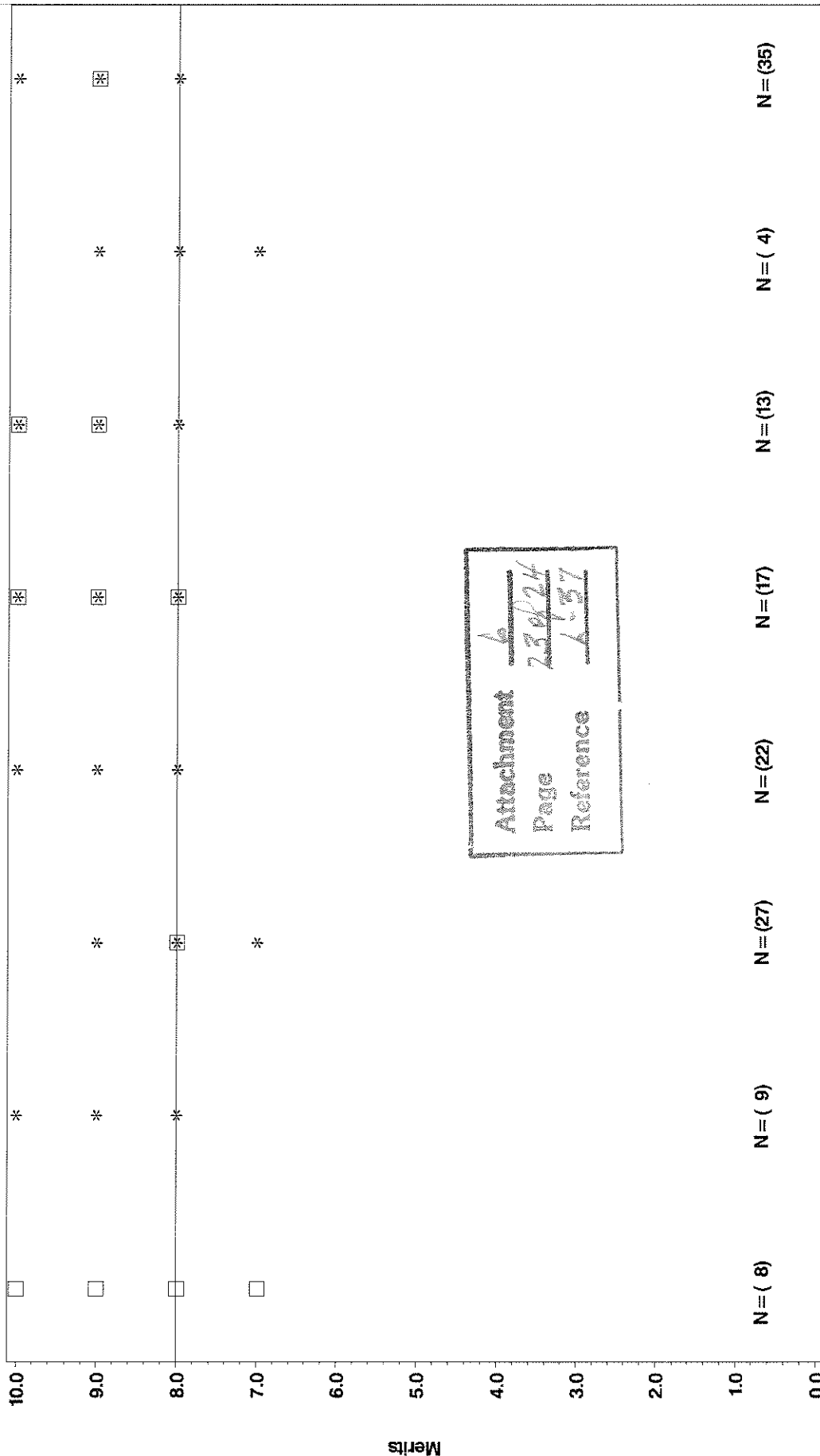
$N = (8)$	$N = (9)$	$N = (27)$	$N = (22)$	$N = (17)$	$N = (13)$	$N = (4)$	$N = (35)$
-----------	-----------	------------	------------	------------	------------	-----------	------------

B6L566	C1L426	L247	NLV1L176	NLV1L351	NLV1L417	V1L303	V1L686
			TMC OIL CODE	* * *	151	☐ ☐ ☐	155

L-37 Reference Oil Performance by Pinion Batch

Rippling -- LUBRITED

Reference Oils 151 vs 155



Attachment 6
 Page 23 of 24
 Reference 151

B6L566

C1L426

L247

NLV1L176

NLV1L351

NLV1L417

V1L303

V1L686

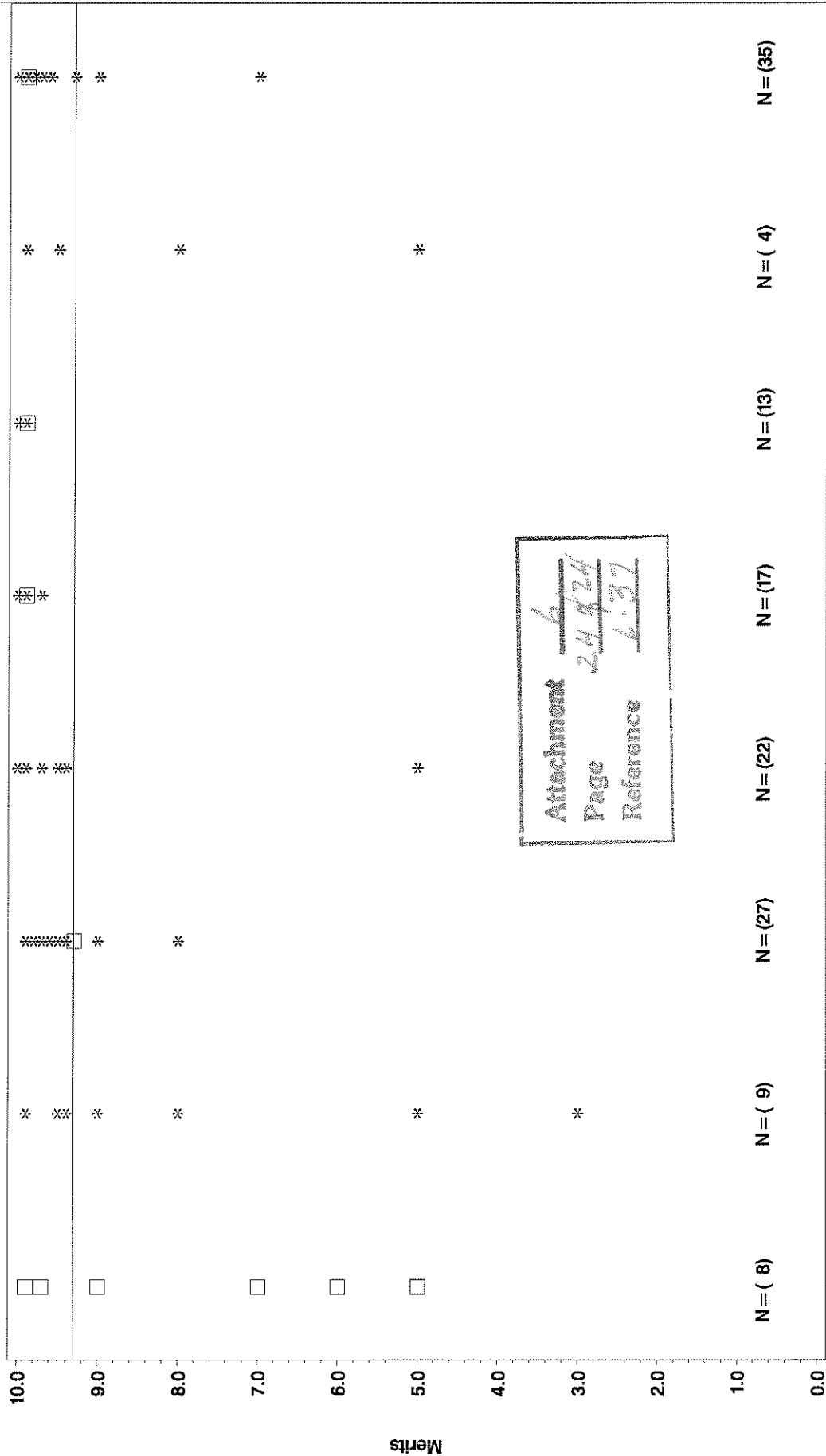
TMC OIL CODE * * * 151

☐ ☐ ☐ 155

L-37 Reference Oil Performance by Pinion Batch

Spitting - LUBRICATED

Reference Oils 151 vs 155



Attachment 6/24/24
 Page 24
 Reference 1.37

TMC OIL CODE * * * 151 ☐ ☐ 155

T758A/L247 Lubrified, 2004

LAB	STAND	STRUN	IND	PINBAT	RINGBAT	DTCOMP	WEAR	RIDG	RIPP	SPIT	LPCRAT	FPCRAT	WEAR	RIPP	RIDGR	SPIT
													RFNL	RFNL	FNL	RFNL
B	191	1849	128-1	L247	T758A	20030729	7	8	9	9.7	2	1	8	9	9	10
B	191	1850	128-1	L247	T758A	20030730	7	8	9	5	2	0	8	9	9	9.5
E	1	776	128-1	L247	T758A	20030731	7	9	4	9.8	2	0	8	9	9	9.9
E	1	778	128-1	L247	T758A	20030805	7	9	4	9.5	2	0	8	9	9	9.9
B	191	1847	151-3	L247	T758A	20030726	8	9	8	9.9	2	-1	8	9	10	9.9
B	191	1848	151-3	L247	T758A	20030728	7	9	8	9.9	2	0	8	10	10	9.7
E	1	775	151-3	L247	T758A	20030730	8	9	9	9.7	2	1	8	10	9	9.9
E	1	777	151-3	L247	T758A	20030801	8	9	9	3	2	0	8	10	10	9.9

Attachment
Page
Reference

7
1266
1-37

GEAR BATCH V1L417/P4L792

NON_LUBRITED HARDWARE MATRIX DATA

Standard Temperature Data

MIR	LAB	Std.	Run	OIL	Pinbat	Ringbat	DTCOMP	Pwear	Pridg	Pripp	Pspit	Rwear	Rridg	Rripp	Rspit	fpccrat	lpcrat	GUSA
9503	D	3A	464	127	V1L417	P4L792	20060114	8	9	8	9.9	8	10	10	10	0	3	
5001	B	191	2263	127	V1L417	P4L792	20060107	6	4	8	9.5	7	5	9	9.9	0	2	15143
4289	E	2	234	127	V1L417	P4L792	20060112	8	9	7	9.7	7	9	9	9.9	0	2	
9554	A	2	2917	127	V1L417	P4L792	20060113	7	9	5	9.7	7	9	9	9.9	0	2	
3444	D	3A	472	151-3	V1L417	P4L792	20060126	9	10	10	9.9	9	10	10	10	1	3	
3445	D	3A	515	151-3	V1L417	P4L792	20060403	8	10	10	10	9	10	10	10	0	2	15846
3556	B	191	2275	151-3	V1L417	P4L792	20060124	8	10	10	10	7	10	10	10	0	2	16354
5557	B	191	2301	151-3	V1L417	P4L792	20060325	8	10	10	9.9	9	10	10	9.9	0	2	15199
3460	E	2	240	151-3	V1L417	P4L792	20060124	6	9	8	9.9	7	10	9	9.9	0	2	
5506	E	2	251	151-3	V1L417	P4L792	20060330	8	9	8	9.9	7	10	9	9.9	0	2	15905
3356	A	2	2926	151-3	V1L417	P4L792	20060128	8	10	9	9.9	8	10	9	9.9	1	2	16083
4426	A	2	2980	151-3	V1L417	P4L792	20060412	8	10	9	9.9	8	10	9	9.9	0	2	15970
536	D	3A	491	152	V1L417	P4L792	20060224	8	10	10	10	9	10	10	10	0	2	15971
2274	D	3A	516	152	V1L417	P4L792	20060405	9	10	10	10	9	10	10	10	0	2	15842
4496	B	191	2284	152	V1L417	P4L792	20060214	9	10	10	9.9	7	10	10	10	0	2	15775
2289	B	191	2305	152	V1L417	P4L792	20060330	9	10	10	10	8	10	10	10	1	2	15519
3301	E	2	248	152	V1L417	P4L792	20060310	8	9	8	9.9	7	10	9	9.9	0	2	15777
302	E	2	252	152	V1L417	P4L792	20060331	8	9	8	9.9	7	10	9	9.9	1	2	15277
557	A	2	2940	152	V1L417	P4L792	20060217	8	10	9	9.9	8	10	9	9.9	0	2	15404
558	A	2	2941	152	V1L417	P4L792	20060218	8	10	9	9.9	8	10	10	9.8	0	2	15144
537	D	3A	493	153	V1L417	P4L792	20060227	9	10	10	9.9	9	10	10	10	0	2	15979
279	D	3A	523	153	V1L417	P4L792	20060416	9	10	8	9.9	9	10	10	10	1	2	15951
498	B	191	2286	153	V1L417	P4L792	20060217	6	8	8	9.8	7	8	9	10	-1	2	15467
293	B	191	2310	153	V1L417	P4L792	20060405	7	8	9	9.8	7	8	10	9.9	0	2	16342
555	E	2	245	153	V1L417	P4L792	20060301	8	9	8	4	7	9	9	9.8	0	2	15513
306	E	2	254	153	V1L417	P4L792	20060405	8	8	8	9.9	7	9	9	9.9	0	2	15597
560	A	2	2955	153	V1L417	P4L792	20060309	8	9	9	9.9	8	10	10	9.9	0	2	15904
562	A	2	2977	153	V1L417	P4L792	20060406	8	9	9	9.9	8	10	9	9.9	0	2	15844

Attachment 7
Page 2 of 6
Reference 1-37Attachment 4
Page 1 of 2
Reference 1-37

APPROVED 5/9/06

5/9/06

GEAR BATCH V1L417/P4L792

NON_LUBRITED HARDWARE MATRIX DATA

2005

Low Temperature Data

MIR	LAB	Std.	Run	OIL	Pinbat	Ringbat	DTCOMP	Pwear	Pridg	Prpp	Pspit	Rwear	Rridg	Rripp	Rspit	fpccrat	lpcrat	GUSA
3273	D	3A	498	152	V1L417	P4L792	20060306	9	10	10	10	9	10	10	10	0	2	15770
3276	D	3A	527	152	V1L417	P4L792	20060421	9	10	9	10	9	10	10	10	0	2	15943
3497	B	191	2285	152	V1L417	P4L792	20060215	9	10	9	10	7	10	10	10	0	2	15973
33290	B	191	2307	152	V1L417	P4L792	20060401	8	10	9	10	7	10	10	10	-1	2	15519
33300	E	2	246	152	V1L417	P4L792	20060302	8	9	8	9.9	7	10	9	9.9	0	2	15393
33303	E	2	253	152	V1L417	P4L792	20060404	8	9	8	9.9	7	10	9	9.9	0	2	15725
38559	A	2	2946	152	V1L417	P4L792	20060225	8	9	8	9.9	8	10	10	9.9	0	2	15200
33314	A	2	2981	152	V1L417	P4L792	20060413	8	10	9	9.9	8	10	10	9.9	0	2	15328
3538	D	3A	496	153	V1L417	P4L792	20060302	8	10	10	10	9	10	10	10	0	2	15979
33280	D	3A	512	153	V1L417	P4L792	20060327	9	10	10	10	9	10	10	10	0	2	15180
3499	B	191	2296	153	V1L417	P4L792	20060304	9	9	10	9.9	7	10	10	9.9	0	2	16226
3500	B	191	2311	153	V1L417	P4L792	20060407	8	10	10	9.9	8	10	10	9.9	0	2	16036
33307	E	2	247	153	V1L417	P4L792	20060309	8	10	9	9.9	7	10	9	9.9	0	2	15457
33308	E	2	255	153	V1L417	P4L792	20060406	8	10	9	9.9	7	10	9	9.9	0	2	15853
3561	A	2	2956	153	V1L417	P4L792	20060310	8	9	10	9.9	8	10	10	9.9	0	2	15456
3563	A	2	2979	153	V1L417	P4L792	20060411	8	10	9	9.9	8	10	9	9.9	0	2	15780

Attachment	17
Page	346
Reference	1-37

Attachment	4
Page	202
Reference	157

5/6/00

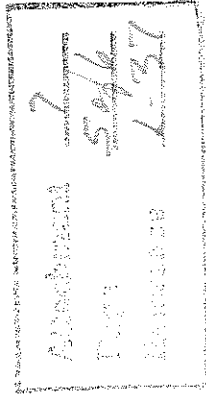
CMIR	Lab	Std.	Oil	Pinbat	Ringbat	DTCOMP	Pwear	Pridg	Pripp	Pspit	Rwear	Rridg	Rripp	Rspit	Test Type	Match #	ASMBDT	lpcrat	fpccrat
49553	A	2	127	V1L351	P4T771	20040909	5	3	7	9.9	5	4	9	9.9	STANDARD	0N	036-04-A	2	0
44307	D	3A	127	V1L351	P4T771	20040919	7	6	5	9.8	6	8	9	10	STANDARD	1C	233-04-B	2	0
45997	B	191	127	V1L351	P4T771	20040905	6	6	9	9.9	6	5	10	9.9	STANDARD		231-04-A	2	0
44288	E	2	127	V1L351	P4T771	20040917	6	7	7	9.9	7	8	9	9.9	STANDARD	2L	233-04-B	2	0
50083	E	2	151-3	V1L351	P4T771	20040924	7	9	9	9.9	7	10	9	9.9	STANDARD	2L	232-04-A	2	0
49558	A	2	151-3	V1L351	P4T771	20040929	8	9	8	9.9	8	10	9	9.9	STANDARD	2P	236-04-A	2	0
51847	B	191	151-3	V1L351	P4T771	20040930	6	10	9	10	8	10	10	9.8	STANDARD	7P	196-04-A	2	1
50181	D	3A	151-3	V1L351	P4T771	20041002	8	9	9	9.9	8	10	10	10	STANDARD	5H	233-04-A	2	0
51848	B	191	151-3	V1L351	P4T771	20041009	7	10	9	9.7	8	10	9	9.9	STANDARD	7T	243-04-B	2	0
49559	A	2	151-3	V1L351	P4T771	20041022	6	9	9	9.9	7	10	9	9.9	STANDARD	1J		2	0
50084	E	2	151-3	V1L351	P4T771	20041105	7	9	9	9.9	7	10	9	9.9	STANDARD	7P	232-04-B	2	0
50337	D	3A	151-3	V1L351	P4T771	20041202	6	10	9	9.9	9	10	10	10	STANDARD	7T	234-04-A	1	0
52417	D	3A	152	V1L351	P4T771	20041007	9	10	9	9.9	9	10	10	10	LOWTEMP	1A	233-04-B	2	0
52397	B	191	152	V1L351	P4T771	20041012	8	9	8	9.9	8	10	9	10	LOWTEMP	2L	232-04-B	2	0
52405	E	2	152	V1L351	P4T771	20041020	8	9	9	9.6	7	10	9	9.4	LOWTEMP	0V	231-04-A	2	1
53452	B	191	152	V1L351	P4T771	20041025	8	10	8	10	8	10	9	10	LOWTEMP	7J	232-04-B	2	0
52490	A	2	152	V1L351	P4T771	20041027	8	9	10	9.9	8	10	10	9.9	LOWTEMP	5N	236-04-A	2	0
52407	E	2	152	V1L351	P4T771	20041029	6	9	9	9.9	7	10	9	9.9	LOWTEMP	2X	232-04-B	2	0
53446	D	3A	152	V1L351	P4T771	20041101	8	9	10	9.9	9	10	10	10	LOWTEMP	2V	233-04-A	2	1
53486	A	2	152	V1L351	P4T771	20041119	8	10	9	9.9	8	10	9	9.9	LOWTEMP	0L	236 04 A	2	0
52396	B	191	152	V1L351	P4T771	20041010	8	9	9	10	8	10	10	10	STANDARD	0X	233-04-A	2	1
52398	B	191	152	V1L351	P4T771	20041015	7	9	9	9.9	8	10	9	9.9	STANDARD	5P	234-04-A	2	0
52418	D	3A	152	V1L351	P4T771	20041016	7	10	9	9.9	9	10	9	10	STANDARD	1L	236-04-A	1	1
52406	E	2	152	V1L351	P4T771	20041021	8	9	9	9.9	7	10	9	9.9	STANDARD	2P	236-04-B	2	0
52489	A	2	152	V1L351	P4T771	20041026	8	9	8	9.9	8	10	9	9.9	STANDARD	5A	236-04-A	2	0
52408	E	2	152	V1L351	P4T771	20041102	8	9	9	9.9	7	10	9	9.9	STANDARD	5A	232-04-B	2	0
53447	D	3A	152	V1L351	P4T771	20041108	8	10	10	9.9	9	10	10	10	STANDARD	0P	237-04-B	1	1
53485	A	2	152	V1L351	P4T771	20041113	6	10	8	9.9	7	10	9	9.9	STANDARD	1J	234-04-B	2	0
52403	B	191	153	V1L351	P4T771	20041014	8	10	9	10	8	10	10	10	LOWTEMP	1A	236-04-A	2	0
52412	E	2	153	V1L351	P4T771	20041022	8	10	9	9.9	7	10	9	9.9	LOWTEMP	1H	232-04-B	2	0
53457	B	191	153	V1L351	P4T771	20041027	6	10	9	10	8	10	10	10	LOWTEMP	7V	232-04-A	2	0
52422	D	3A	153	V1L351	P4T771	20041030	8	9	10	9.9	9	10	10	10	LOWTEMP	5T	236-04-A	2	1
53463	E	2	153	V1L351	P4T771	20041103	8	10	9	9.9	7	10	9	9.9	LOWTEMP	2J	232-04-B	2	0
52392	A	2	153	V1L351	P4T771	20041111	8	10	9	9.9	8	10	9	9.9	LOWTEMP	0H	192-04-A	2	1
53448	D	3A	153	V1L351	P4T771	20041116	8	10	9	9.9	8	10	10	10	LOWTEMP	1P	233-04-A	2	0
53489	A	2	153	V1L351	P4T771	20041130	8	10	9	9.8	8	10	9	9.9	LOWTEMP	5J	236-04-B	3	0
52402	B	191	153	V1L351	P4T771	20041013	6	7	6	9.3	7	9	9	9.5	STANDARD	2J	236-04-A	2	0
53455	B	191	153	V1L351	P4T771	20041026	6	7	8	9.8	7	8	9	9.9	STANDARD	5L	234-04-A	2	0
52413	E	2	153	V1L351	P4T771	20041027	8	8	9	9.5	7	9	9	9.9	STANDARD	0X	232-04-B	2	0
52391	A	2	153	V1L351	P4T771	20041028	8	9	10	9.8	8	10	10	9.9	STANDARD	0J	236-04-A	2	0
53464	E	2	153	V1L351	P4T771	20041104	8	9	9	9.9	7	9	9	9.9	STANDARD	0N	232-04-B	2	0
53449	D	3A	153	V1L351	P4T771	20041122	7	10	8	9.9	8	10	10	10	STANDARD	0C	233-04-A	2	1
52393	A	2	153	V1L351	P4T771	20041123	5	5	5	9.8	7	6	9	9.9	STANDARD	2L	234-04-A	2	0
53535	D	3A	153	V1L351	P4T771	20041206	8	9	9	9.9	7	10	10	10	STANDARD	0T	233-04-A	2	0

Reference

non Lub VIL351/P4T771 2004

ADDITIONAL TESTS FOR MATRIX EVALUATION

CMIR	Lab	Std.	Oil	Pinbat	Ringbat	DTCOMP	Pwear	Pridg	Pripp	Pspit	Rwear	Rridg	Rripp	Rspit	Test Type	Match #	ASMBDT	lpcrat	fpccrat
53449	B	191	127	V1L351	P4T771	20050111	6	4	6	9.9	6	5	9	9.9	LOWTEMP	5C	231-04-B	2	0
52393	B	191	128-1	V1L351	P4T771	20050110	8	9	5	10	7	10	8	10	LOWTEMP	7X	232-04-B	2	0
53535	B	191	153	V1L351	P4T771	20041127	8	10	9	9.9	8	10	10	10	LOWTEMP	7T	232-04-B	2	0



V1L176/P4L741A RING DATA

2002

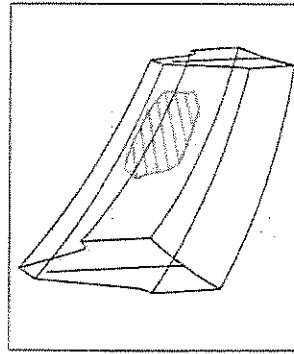
LAB STD	RUN	IND	PINB4T	DTCOMP	WEARRFNL	RIDGRFNL	TRIDGRFN	RIPPRFNL	TRIPPRFN	SPITRFNL	TSPITRFN
A 02	459	127	V1L176	20020502	6.0000	4.0000	-1.8718	9.0000	-0.4055	9.95000	0.0000
E 1	697	127	V1L176	20020503	7.0000	5.0000	-1.7047	9.0000	-0.4055	9.9000	0.5108
B 191	1613	127	V1L176	20020503	5.0000	6.0000	-1.5041	9.0000	-0.4055	9.6000	0.1054
D 3	785	127	V1L176	20020511	9.0000	10.00000	0.6931	10.0000	0.6931	10.0000	0.6931
E 1	711	127	V1L176	20020614	7.0000	8.0000	-0.9163	9.0000	-0.4055	9.9000	0.5108
A 02	2486	127	V1L176	20020703	7.0000	10.00000	0.6931	10.0000	0.6931	10.0000	0.6931
B 191	1661	127	V1L176	20020712	6.0000	4.0000	-1.8718	9.0000	-0.4055	9.7000	0.2231
D 3	816	127	V1L176	20020723	9.0000	9.0000	-0.4055	10.0000	0.6931	10.0000	0.6931
B 191	1614	128-1	V1L176	20020505	7.0000	9.0000	-0.4055	9.0000	-0.4055	9.8000	
E 1	698	128-1	V1L176	20020507	7.0000	8.0000	-0.9163	9.0000	-0.4055	9.9000	
A 02	2461	128-1	V1L176	20020507	6.0000	10.0000	0.6931	10.0000	0.6931	10.0000	
B 191	1616	128-1	V1L176	20020507	9.0000	10.0000	0.6931	10.0000	0.6931	10.0000	
D 3	782	128-1	V1L176	20020508	9.0000	10.0000	0.6931	10.0000	0.6931	10.0000	
E 1	699	128-1	V1L176	20020508	7.0000	8.0000	-0.9163	9.0000	-0.4055	9.9000	
A 02	2462	128-1	V1L176	20020508	7.0000	9.0000	-0.4055	10.0000	0.6931	9.9000	
D 3	783	128-1	V1L176	20020509	9.0000	10.0000	0.6931	10.0000	0.6931	10.0000	
E 1	712	128-1	V1L176	20020618	7.0000	8.0000	-0.9163	9.0000	-0.4055	9.9000	
E 1	715	128-1	V1L176	20020625	7.0000	8.0000	-0.9163	9.0000	-0.4055	9.9000	
A 02	2484	128-1	V1L176	20020628	8.0000	9.0000	-0.4055	10.0000	0.6931	9.9000	0.5108
A 02	2488	128-1	V1L176	20020710	9.0000	9.0000	-0.4055	10.0000	0.6931	9.9000	0.5108
B 191	1662	128-1	V1L176	20020713	7.0000	8.0000	-0.9163	9.0000	-0.4055	9.7000	0.2231
B 191	1664	128-1	V1L176	20020715	7.0000	8.0000	-0.9163	9.0000	-0.4055	9.9000	0.5108
D 3	818	128-1	V1L176	20020725	9.0000	9.0000	-0.4055	10.0000	-0.4055	10.00000	-0.9163
D 3	819	128-1	V1L176	20020726	9.0000	9.0000	-0.4055	10.0000	0.6931	10.0000	0.6931
E 1	696	151-3	V1L176	20020502	7.0000	9.0000	-0.4055	9.0000	-0.4055	9.9000	0.5108
A 02	2460	151-3	V1L176	20020503	7.0000	10.0000	0.6931	10.0000	0.6931	10.0000	0.6931
B 191	1617	151-3	V1L176	20020509	8.0000	9.95000	-0.9163	9.0000	-0.4055	9.9000	0.5108
D 3	784	151-3	V1L176	20020510	9.0000	10.0000	0.6931	10.0000	0.6931	10.0000	0.6931
E 1	716	151-3	V1L176	20020626	7.0000	10.0000	0.6931	9.0000	-0.4055	9.9000	0.5108
A 02	2487	151-3	V1L176	20020709	7.0000	10.0000	0.6931	10.0000	0.6931	10.0000	0.5108
B 191	1665	151-3	V1L176	20020717	8.0000	10.0000	0.6931	9.0000	0.6931	10.0000	0.6931
D 3	815	151-3	V1L176	20020722	9.0000	10.0000	0.6931	10.0000	-0.4055	9.9000	0.5108
									0.6931	10.0000	0.6931

Attachment 7
Page 6 of 6
Reference 1-37

Attachment 10
Page 2 of 2
Reference

INPUT FILE: S060586-3drive
 OUTPUT FILE: S060586-3driveout
 GEAR TORQUE: 3484.000 lb-ft
 06\26\2007 VERSION 8.07 time:02:18pm

V= -0.0030 in
 H= 0.0040 in
 G= 0.0000 in
 cmf= 0.9500
 Separation factor= 0.00025

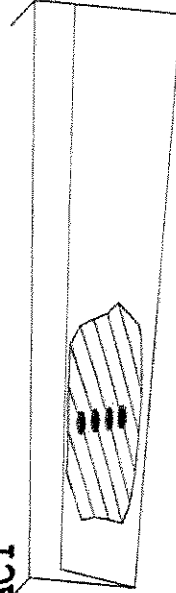


ISO-METRIC VIEW

BENCH CONTACT

TOE END

GEAR FLANK
 • PATH OF CONTACT



HEEL END

GEAR TIP

Attachment

Page

Reference

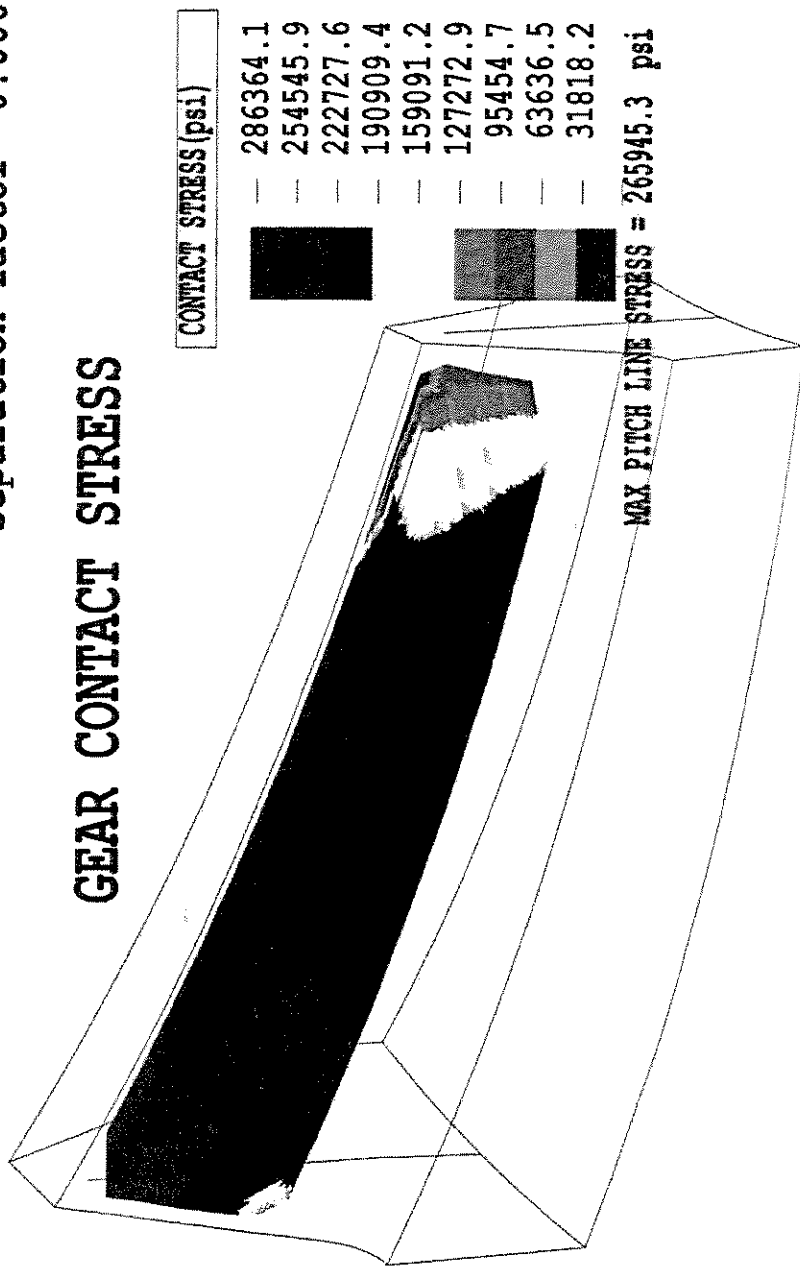
B

142

4-31

INPUT FILE: S060586-3drive
 OUTPUT FILE: S060586-3driveout
 GEAR TORQUE: 3484.000 lb-ft
 06/26/2007 VERSION 8.07 time:02:18pm
 V= 0.0030 in E= 0.01500 in
 H= 0.0040 in P= 0.00907 in
 G= 0.0000 in G= 0.00392 in
 A= 0.00157 ra
 Separation factor= 0.00025

GEAR CONTACT STRESS



L-37 Reference Oil Performance by Pinion Batch ③

Ridging — LUBRITED

Reference Oil 127 VS 153

10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0

Merits

*

*

*

*

*

*

N = (10)

N = (6)

N = (3)

N = (6)

N = (1)

B6L566

C1L308

C1L426

V1L303

V1L686

TMC OIL CODE *** 127 ☐ ☐ ☐ 153

Attachment 9
Page 191
Reference L-37

MODIFIED PROCEDURE

Testkey	Lab	STD	Run	Oil	VAL	Pinbat	DTCOMP	Pwear	Prldg	Prpp	Pspit	Rwear	Rridg	Rripp	Rspit	fpccrat	lpcrat	B/Lash	AVG
61845	B	191	2459	152-1	NN	B6L566	20070615	6	8	9	5	7	10	9	9.9	0	2	0.004	Short Test
63265	B	191	2462	152-1	NN	B6L566	20070619	7	8	10	9.9	8	9	9	9.9	0	2	0.006	Modified Test
59292	B	191	2465	127	LN	B6L566	20070623	6	7	9	9.9	7	7	10	9.9	0	2	0.009	Modified Test

Attachment	10
Page	141
Reference	237

Hardware	Gear Batch	Year	Facility			1-Step Carrier CNC Process	Specified Steel		Contact Pattern Length & Width	Finite Element Analysis Geometry Development	Production/ Testing phases	Surface Hardness HRC		Retained Austenite	Surface Carbon	Case Depth	Consider Correction Factor	44-test Matrix	Differential Gear Production Process	Grease Inner Pinion Bearing
			Production	Lubrite	Assembly		Ring	Pinion				Ring	Pinion							
Lubrited	C1L308/P4L309R	1995	Ft. Wayne	Ft. Wayne	Morganton	No	8625	8620H	Variable	No	1	58-62	58-62	Unk	Unk	0.025-0.045	No	No	Cut	Yes
Lubrited	C1L426/P4L404A	1996	Ft. Wayne	Ft. Wayne	Morganton	No	8625	8620H	Variable	No	1	58-62	58-62	Unk	Unk	0.025-0.045	No	No	Cut	Yes
Lubrited	V1L303/P4L514A	1997	Ft. Wayne	Ft. Wayne	Morganton	No	8625	8620H	Variable	No	1	58-62	58-62	Unk	Unk	0.025-0.045	No	No	Cut	Yes
Lubrited	V1L686/P4L626A	1999	Statesville	Ft. Wayne	Morganton	No	8625	8620H	Target L2F-1	No	3 with statistical differences	58-62	58-62	Changed to 15-20 %	Changed 0.85-0.90	Changed 0.050-0.065	Yes	Yes/eventually	Cut	Yes
Lubrited	L247T758A	2003	Glasgow	Glasgow	Statesville	Yes	8625	8620H	Target L2F0	Yes		58-62	was a 60 (not 61-63)	< 10 %	0.80-0.85 %	0.050-0.065 "	Yes	Yes/eventually	Cut	Yes
Lubrited	B6L586/P4L816	2006	Ft. Wayne	Ft. Wayne	Lugoff	Yes	8625	8620H	Target L2F0	Yes	1	58-60	61-63	<40 %	0.80-0.85 %	0.050-0.065 "	-	Yes	Not Forged	Yes
Non-Lubrited	C1L308/P4L318R	1995	Ft. Wayne	N/A	Morganton	No	8625	8620H	Variable	No	1	58-62	58-62	Unk	Unk	0.025-0.045	No	No	Cut	Yes
Non-Lubrited	C1L426/P4L415A	1996	Ft. Wayne	N/A	Morganton	No	8625	8620H	Variable	No	1	58-62	58-62	Unk	Unk	0.025-0.045	No	No	Cut	Yes
Non-Lubrited	V1L303/P4L514A	1997	Ft. Wayne	N/A	Morganton	No	8625	8620H	Variable	No	1	58-62	58-62	Unk	Unk	0.025-0.045	No	No	Cut	Yes
Non-Lubrited	V1L686/P4L626A	1999	Statesville	N/A	Morganton	No	8625	8620H	Target L2F-1	No	2	58-62	58-62	Changed to 15-20 %	Changed 0.85-0.90	Changed 0.050-0.065	No	No	Cut	Yes
Non-Lubrited	V1L176/P4L741A	2002	Statesville	N/A	Statesville	Yes	8625	8620H	Target L2F0	No	2	58-62	58-62	15-20 %	0.85-0.90	0.050-0.065	None	No	Cut	Yes
Non-Lubrited	V1L351/P4T771	2004	Ft. Wayne	N/A	Statesville	Yes	8822	8620H	Target L2F0	Yes	1	58-60	61-63	<40 %	0.80-0.85	0.050-0.065	None	Yes	Cut	Yes
Non-Lubrited	V1L417/P4L792	2005	Ft. Wayne	N/A	Lugoff	Yes	8625	8620H	Target L2F0	Yes	1	58-60	61-63	<40 %	0.80-0.85	0.050-0.065	??	Yes	Not Forged	Yes

Attachment 11
Page 107
Reference L-37