Extended Tire Testing
Calspan Corporation
November 1983

EDC Library Ref. No. 1092

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TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 6871-V-1	2. Government Accession No. PB85 103604	3. Recipient's Catalog No.
4. Title and Subtitle: Extended Tire Testing		5. Report Date: November 1983
		6. Performing Organization Code
7. Author(s): George A. Tapia		8. Performing Organization Report No. 6871-V-1
9. Performing Organization Name and Address: Calspan Corporation, 4455 Genesee Street, Buffalo, NY 14225		10. Work Unit No. E42 series
		11. Contract or Grant No. DTNH22-81-C-07100
12. Sponsoring Agency Name and Address: U. S. Department of Transportation, National Highway Traffic Safety Administration, Washington, DC 20590		13. Type of Report and Period Covered: Final Report, 22 April 1981 - Nov. 1983
		14. Sponsoring Agency Code
15. Supplementary Notes		

16. Abstract

A test program was performed at the Calspan Tire Research Facility (TIRF) to derive the tire force and moment characteristics of a representative sample of current passenger car tire designs. Several tire selection categories were defined to include high and low performance, standard original and after-market equipment, spacesavers, runflat, all weather, size and low rolling resistance tires. The initial test phase included a free-rolling cornering/camber test and a separate braking traction test on each of fifty tire types. Testing was performed on the flat, dry road surface. Twenty-five tires were further selected from the original fifty tire sample for additional testing to include inflation pressure variations, wet roadway, rolling resistance and combined cornering and braking traction tests on new and shaved tires. The report describes the test program details, includes summaries of test results and provides some brief observations of current tire performance characteristics.

17. Key Words: Passenger Tires, Performance Coefficients, Cornering, Braking, Rolling Resistance, Flat Roadway		18. Distribution Statement	
19. Security Classif. (of this report): Unclassified	20. Security Classif. (of this page): Unclassified	21. No. of Pages	22. Price

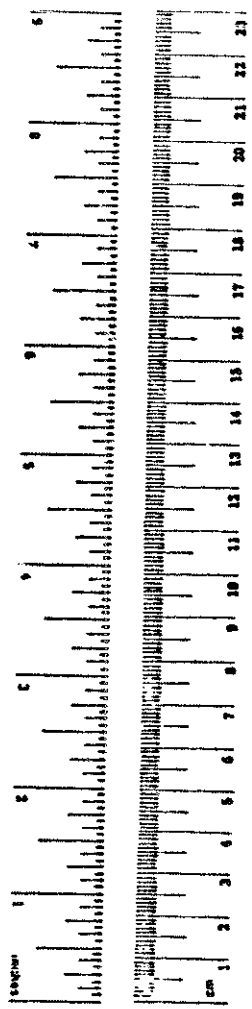
Form DOT F 1700.7 (8-69)

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

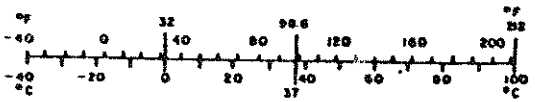
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



PREFACE

The stability and control performance of a vehicle are significantly affected by tire characteristics through their kinematic interactions with the road and vehicle systems. Certain tire characteristics can produce effects on vehicle operation that have a direct safety impact by affecting vehicle cornering stability and stopping ability under the influence of wet road surfaces, tire tread wear, variations of load, inflation pressure and combined steering and braking operating conditions. It is of importance, therefore, to have a quantitative measure of the performance of these tires at their operational conditions.

The experimental effort described here was undertaken to establish a much needed data base on the force and moment properties of current passenger car tires. These properties were accurately measured at Calspan's indoor Tire Test Facility. The test results were put into forms suitable for use in studies of vehicle handling and braking research.

The study reported herein was performed by the Advanced Technology Center of Calspan Corporation for the Department of Transportation, Office of Traffic Safety Research of the National Highway Traffic Safety Administration, under Contract No. DTNH22-81-C-07100, dated April 8, 1981. Work was performed during the period April 22, 1981 through June 1983 with laboratory testing commencing during May 1981. Mr. Lloyd Emery was the DOT Contract Technical Manager. Mr. George Tapia of Calspan was the Principal Investigator for the program.

A comprehensive review of the work accomplished under this contract shows that no innovation, discovery, improvement or invention was made.

This report has been reviewed and approved by:

Saverio M. Pugliese, Head
Vehicle Sciences Section
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TABLE OF CONTENTS

Section		Page No.
	PREFACE	iii
1.0	INTRODUCTION	1
2.0	CONCLUSIONS	3
3.0	RECOMMENDATIONS	5
4.0	DEFINITIONS AND SYMBOLS	8
	4.1 Cornering and Braking Tests	8
	4.2 Rolling Resistance Testing	13
5.0	TIRE SELECTION	16
6.0	TEST PROGRAM	19
	6.1 Part I: Basic Testing	20
	6.1.1 Free Rolling Cornering	20
	6.1.2 Braking Traction	24
	6.2 Part II: Extended Tire Testing	25
	6.2.1 Inflation Pressure Testing	26
	6.2.2 Wet Roadway Testing	26
	6.2.3 Rolling Resistance Testing	26
	6.2.4 Combined Cornering and Braking Traction Testing	27
	6.2.4.1 Combined Testing on New Tires	27
	6.2.4.2 Combined Testing on Shaved (50%) Tires	28
7.0	TEST PROCEDURES	30
	7.1 Free Rolling Cornering Runs	30
	7.2 Straight-Ahead Braking Traction	32
	7.3 Combined Lateral and Braking Traction	33
	7.4 Rolling Resistance Tests	33

TABLE OF CONTENTS (cont'd)

Section		Page No.
8.0	TEST RESULTS AND DATA PRESENTATION	34
	8.1 Test Results	34
	8.2 Data Presentation	43
	8.2.1 Part I: Data Summaries	43
	8.2.1.1 Cornering and Braking	44
	8.2.1.2 Rolling Resistance	50
	8.2.2 Part II: Raw Data	50
9.0	REFERENCES	55

TABLE OF CONTENTS (cont'd)

Section		Page No.
	APPENDICES	
A	TEST SCHEDULE FOR 286 RUNS	A-1
B	TIRE IDENTIFICATION SCHEDULE	B-1
C	TIRF DESCRIPTION	C-1
D	TEST DATA SUMMARIES FOR THE FIFTY TIRE TYPES	D-1
	o TITLE PAGE: TEST/TIRE CONDITIONS	
	o FOOTPRINTS	
	o COEFFICIENTS AND MODELLING CONSTANTS	

LIST OF ILLUSTRATIONS

Figure No.		Page No.
4-1	TIRE FORCES AND MOMENTS ACTING AT THE CENTER OF TIRE CONTACT	8
4-2	ROLLING RESISTANCE OF A FREE ROLLING TIRE ON A FLAT ROADWAY	15
8-1	GRAPH OF ROLLING RESISTANCE COEFFICIENT VERSUS INFLATION PRESSURE	42
C-1	TIRE RESEARCH MACHINE	C-3
C-2	FACILITY VALIDATION RESULTS	C-8
D-1	FOOTPRINT, TIRE NO. 5	D-8
D-2	FOOTPRINT, TIRE NO. 7	D-24
D-3	FOOTPRINT, TIRE NO. 18	D-47
D-4	FOOTPRINT, TIRE NO. 17	D-70
D-5	FOOTPRINT, TIRE NO. 8	D-116
D-6	FOOTPRINT, TIRE NO. 67	D-128
D-7	FOOTPRINT, TIRE NO. 11	D-140
D-8	FOOTPRINT, TIRE NO. 72	D-152
D-9	FOOTPRINT, TIRE NO. 76	D-164
D-10	FOOTPRINT, TIRE NO. 15	D-175
D-11	FOOTPRINT, TIRE NO. 21	D-182
D-12	FOOTPRINT, TIRE NO. 65	D-189
D-13	FOOTPRINT, TIRE NO. 14	D-195
D-14	FOOTPRINT, TIRE NO. 59	D-202
D-15	FOOTPRINT, TIRE NO. 79	D-209
D-16	FOOTPRINT, TIRE NO. 20	D-215
D-17	FOOTPRINT, TIRE NO. 25	D-222
D-18	FOOTPRINT, TIRE NO. 28	D-229
D-19	FOOTPRINT, TIRE NO. 27	D-236

LIST OF ILLUSTRATIONS

Figure No.		Page No.
D-20	FOOTPRINT, TIRE NO. 12	D-276
D-21	FOOTPRINT, TIRE NO. 24	D-280
D-22	FOOTPRINT, TIRE NO. 22	D-284
D-23	FOOTPRINT, TIRE NO. 4	D-288
D-24	FOOTPRINT, TIRE NO. 6	D-292
D-25	FOOTPRINT, TIRE NO. 10	D-296
D-26	FOOTPRINT, TIRE NO. 9	D-300
D-27	FOOTPRINT, TIRE NO. 1	D-304
D-28	FOOTPRINT, TIRE NO. 3	D-308
D-29	FOOTPRINT, TIRE NO. 13	D-312
D-30	FOOTPRINT, TIRE NO. 16	D-316
D-31	FOOTPRINT, TIRE NO. 19	D-320
D-32	FOOTPRINT, TIRE NO. 29	D-324
D-33	FOOTPRINT, TIRE NO. 26	D-328
D-34	FOOTPRINT, TIRE NO. 30	D-332
D-35	FOOTPRINT, TIRE NO. 39	D-336
D-36	FOOTPRINT, TIRE NO. 38	D-340
D-37	FOOTPRINT, TIRE NO. 46	D-344
D-38	FOOTPRINT, TIRE NO. 40	D-348
D-39	FOOTPRINT, TIRE NO. 41	D-352
D-40	FOOTPRINT, TIRE NO. 2	D-356
D-41	FOOTPRINT, TIRE NO. 23	D-360
D-42	FOOTPRINT, TIRE NO. 61	D-364
D-43	FOOTPRINT, TIRE NO. 81	D-368

LIST OF TABLES

Table No.		Page No.
4-1	LISTED DATA SYMBOLS	9
4-2	SYMBOL MATHEMATICAL DEFINITIONS	11
4-3	CONVERSION OF UNITS	12
5-1	SUMMARY OF SELECTED TIRES	17
6-1	GENERAL TEST MATRIX	21
6-2	SUMMARY OF OVERALL TESTING PROGRAM TIRE TYPES, TIRF TIRE NUMBERS AND TEST RUN NUMBERS	29
7-1	CORNERING TESTING TECHNIQUE	31
8-1	SUMMARY OF VARIOUS SELECTED CORNERING, BRAKING AND ROLLING RESISTANCE PERFORMANCE COEFFICIENTS	35
8-2	AVERAGE VALUES OF FIVE PERFORMANCE COEFFICIENTS	40
8-3	TIRE COEFFICIENTS	45
8-4	COEFFICIENT DEFINITIONS	46
8-5	TIRE COMPUTER MODEL FUNCTIONS AND COEFFICIENTS	47
8-6	OVERALL TIRE IDENTIFICATION AND TEST CATEGORY SCHEDULE	54
C-1	TIRF CAPABILITIES	C-2
C-2	BALANCE SYSTEM CAPABILITY	C-5
D-1	TIRE AND RUN IDENTIFICATION, TIRE TYPE 1	D-2
D-2	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 2	D-4
D-3	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 28	D-5
D-4	ROLLING RESISTANCE TEST DATA RESULTS, RUN 71	D-6
D-5	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 83	D-7
D-6	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 87	D-8

LIST OF TABLES (cont'd)

Table No.		Page No.
D-7	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 91	D-9
D-8	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 97	D-10
D-9	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 101	D-11
D-10	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 105	D-12
D-11	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 109	D-13
D-12	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 112	D-14
D-13	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 227	D-15
D-14	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 242	D-16
D-15	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 257	D-17
D-16	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 234	D-18
D-17	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 249	D-19
D-18	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 265	D-20
D-19	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 238	D-21
D-20	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 253	D-22
D-21	TIRE AND RUN IDENTIFICATION, TIRE TYPE 2	D-23
D-22	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 8	D-25
D-23	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 34	D-26
D-24	ROLLING RESISTANCE TEST DATA RESULTS, RUN 72	D-27
D-25	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 84	D-28
D-26	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 88	D-29
D-27	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 92	D-30

LIST OF TABLES (cont'd)

Table No.		Page No.
D-28	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 98	D-31
D-29	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 102	D-32
D-30	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 106	D-33
D-31	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 110	D-34
D-32	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 113	D-35
D-33	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 280	D-36
D-34	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 228	D-37
D-35	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 243	D-38
D-36	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 258	D-39
D-37	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 235	D-40
D-38	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 250	D-41
D-39	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 264	D-42
D-40	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 239	D-43
D-41	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 254	D-44
D-42	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 269	D-45
D-43	TIRE AND RUN IDENTIFICATION TIRE TYPE 3	D-46
D-44	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 5	D-48
D-45	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 31	D-49
D-46	ROLLING RESISTANCE TEST DATA RESULTS, RUN 75	D-50
D-47	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 85	D-51
D-48	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 89	D-52
D-49	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 93	D-53

LIST OF TABLES (cont'd)

Table No.		Page No.
D-228	TIRE AND RUN IDENTIFICATION, TIRE TYPE 22	D-248
D-229	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 166	D-249
D-230	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 183	D-250
D-231	ROLLING RESISTANCE TEST DATA RESULTS, RUN 198	D-251
D-232	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 219	D-252
D-233	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 209	D-253
D-234	TIRE AND RUN IDENTIFICATION, TIRE TYPE 23	D-254
D-235	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 164	D-255
D-236	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 181	D-256
D-237	ROLLING RESISTANCE TEST DATA RESULTS, RUN 215	D-257
D-238	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 226	D-258
D-239	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 223	D-259
D-240	TIRE AND RUN IDENTIFICATION, TIRE TYPE 24	D-260
D-241	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 163	D-261
D-242	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 180	D-262
D-243	ROLLING RESISTANCE TEST DATA RESULTS, RUN 200	D-263
D-244	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 218	D-264

LIST OF TABLES (cont'd)

Table No.		Page No.
D-245	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 208	D-265
D-246	TIRE AND RUN IDENTIFICATION, TIRE TYPE 25	D-266
D-247	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 167	D-267
D-248	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL COSNTANTS, RUN 184	D-268
D-249	ROLLING RESISTANCE TEST DATA RESULTS, RUN 201	D-269
D-250	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 220	D-270
D-251	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 210	D-271
D-252	TIRE AND RUN IDENTIFICATION, TIRE TYPE 26	D-272
D-253	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 168	D-273
D-254	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 185	D-274
D-255	TIRE AND RUN IDENTIFICATION, TIRE TYPE 27	D-275
D-256	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 13	D-277
D-257	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 44	D-278
D-258	TIRE AND RUN IDENTIFICATION, TIRE TYPE 28	D-279
D-259	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 4	D-281
D-260	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 30	D-282
D-261	TIRE AND RUN IDENTIFICATION, TIRE TYPE 29	D-283

LIST OF TABLES (cont'd)

Table No.		Page No.
D-94	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 237	D-99
D-95	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 252	D-100
D-96	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 267	D-101
D-97	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 241	D-102
D-98	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 256	D-103
D-99	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 271	D-104
D-100	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 272	D-105
D-101	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 277	D-106
D-102	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 283	D-107
D-103	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 273	D-108
D-104	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 278	D-109
D-105	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 284	D-110
D-106	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 274	D-111
D-107	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 279	D-112
D-108	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 285	D-113
D-109	COMBINED CORNERING AND BRAKING COEFFICIENTS, RUN 286	D-114
D-110	TIRE AND RUN IDENTIFICATION, TIRE TYPE 6	D-115
D-111	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 1	D-117
D-112	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 27	D-118
D-113	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 170	D-119
D-114	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 186	D-120

LIST OF TABLES (cont'd)

Table No.		Page No.
D-115	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 187	D-121
D-116	ROLLING RESISTANCE TEST DATA RESULTS, RUN 73	D-122
D-117	WET CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 152	D-123
D-118	WET BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 159	D-124
D-119	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 126	D-125
D-120	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 116	D-126
D-121	TIRE AND RUN IDENTIFICATION, TIRE TYPE 7	D-127
D-122	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 138	D-129
D-123	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 146	D-130
D-124	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 172	D-131
D-125	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 188	D-132
D-126	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 189	D-133
D-127	ROLLING RESISTANCE TEST DATA RESULTS, RUN 77	D-134
D-128	WET CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 153	D-135
D-129	WET BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 160	D-136
D-130	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 130	D-137

LIST OF TABLES (cont'd)

Table No.		Page No.
D-131	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 120	D-138
D-132	TIRE AND RUN IDENTIFICATION, TIRE TYPE 8	D-139
D-133	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 15	D-141
D-134	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 46	D-142
D-135	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 178	D-143
D-136	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 194	D-144
D-137	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 195	D-145
D-138	ROLLING RESISTANCE TEST DATA RESULTS, RUN 78	D-146
D-139	WET CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 156	D-147
D-140	WET BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 157	D-148
D-141	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 134	D-149
D-142	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 124	D-150
D-143	TIRE AND RUN IDENTIFICATION, TIRE TYPE 9	D-151
D-144	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 139	D-153
D-145	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 147	D-154
D-146	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 174	D-155

LIST OF TABLES (cont'd)

Table No.		Page No.
D-147	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 190	D-156
D-148	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 191	D-157
D-149	ROLLING RESISTANCE TEST DATA RESULTS, RUN 95	D-158
D-150	WET CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 154	D-159
D-151	WET BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 161	D-160
D-152	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 131	D-161
D-153	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 121	D-162
D-154	TIRE AND RUN IDENTIFICATION, TIRE TYPE 10	D-163
D-155	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 149	D-165
D-156	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 176	D-166
D-157	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 192	D-167
D-158	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 193	D-168
D-159	ROLLING RESISTANCE TEST DATA RESULTS, RUN 96	D-169
D-160	WET CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 155	D-170
D-161	WET BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 158	D-171
D-162	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 133	D-172

LIST OF TABLES (cont'd)

Table No.		Page No.
D-163	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 123	D-173
D-164	TIRE AND RUN IDENTIFICATION, TIRE TYPE 11	D-174
D-165	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 3	D-176
D-166	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 29	D-177
D-167	ROLLING RESISTANCE TEST DATA RESULTS, RUN 74	D-178
D-168	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 127	D-179
D-169	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 117	D-180
D-170	TIRE AND RUN IDENTIFICATION, TIRE TYPE 12	D-181
D-171	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 7	D-183
D-172	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 33	D-184
D-173	ROLLING RESISTANCE TEST DATA RESULTS, RUN 76	D-185
D-174	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 128	D-186
D-175	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 118	D-187
D-176	TIRE AND RUN IDENTIFICATION, TIRE TYPE 13	D-188
D-177	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 148	D-190
D-178	ROLLING RESISTANCE TEST DATA RESULTS, RUN 79	D-191
D-179	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 132	D-192

LIST OF TABLES (cont'd)

Table No.		Page No.
D-180	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 122	D-193
D-181	TIRE AND RUN IDENTIFICATION, TIRE TYPE 14	D-194
D-182	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 19	D-196
D-183	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 49	D-197
D-184	ROLLING RESISTANCE TEST DATA RESULTS, RUN 80	D-198
D-185	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 135	D-199
D-186	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 125	D-200
D-187	TIRE AND RUN IDENTIFICATION, TIRE TYPE 15	D-201
D-188	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 136	D-203
D-189	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 144	D-204
D-190	ROLLING RESISTANCE TEST DATA RESULTS, RUN 82	D-205
D-191	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 129	D-206
D-192	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 119	D-207
D-193	TIRE AND RUN IDENTIFICATION, TIRE TYPE 16	D-208
D-194	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 150	D-210
D-195	ROLLING RESISTANCE TEST DATA RESULTS, RUN 204	D-211
D-196	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 225	D-212

LIST OF TABLES (cont'd)

Table No.		Page No.
D-197	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTNATS, RUN 214	D-213
D-198	TIRE AND RUN IDENTIFICATION, TIRE TYPE 17	D-214
D-199	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 14	D-216
D-200	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 45	D-217
D-201	ROLLING RESISTANCE TEST DATA RESULTS, RUN 203	D-218
D-202	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 224	D-219
D-203	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 213	D-220
D-204	TIRE AND RUN IDENTIFICATION, TIRE TYPE 18	D-221
D-205	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 23	D-223
D-206	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 41	D-224
D-207	ROLLING RESISTANCE TEST DATA RESULTS, RUN 202	D-225
D-208	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 221	D-226
D-209	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 211	D-227
D-210	TIRE AND RUN IDENTIFICATION, TIRE TYPE 19	D-228
D-211	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 25	D-230
D-212	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 38	D-231
D-213	ROLLING RESISTANCE TEST DATA RESULTS, RUN 199	D-232

LIST OF TABLES (cont'd)

Table No.		Page No.
D-214	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 216	D-233
D-215	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 206	D-234
D-216	TIRE AND RUN IDENTIFICATION, TIRE TYPE 20	D-235
D-217	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 24	D-237
D-218	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 37	D-238
D-219	ROLLING RESISTANCE TEST DATA RESULTS, RUN 197	D-239
D-220	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 217	D-240
D-221	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 207	D-241
D-222	TIRE AND RUN IDENTIFICATION, TIRE TYPE 21	D-242
D-223	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 162	D-243
D-224	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 179	D-244
D-225	ROLLING RESISTANCE TEST DATA RESULTS, RUN 205	D-245
D-226	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 222	D-246
D-227	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 212	D-247

LIST OF TABLES (cont'd)

Table No.		Page No.
D-228	TIRE AND RUN IDENTIFICATION, TIRE TYPE 22	D-248
D-229	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 166	D-249
D-230	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 183	D-250
D-231	ROLLING RESISTANCE TEST DATA RESULTS, RUN 198	D-251
D-232	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 219	D-252
D-233	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 209	D-253
D-234	TIRE AND RUN IDENTIFICATION, TIRE TYPE 23	D-254
D-235	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 164	D-255
D-236	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 181	D-256
D-237	ROLLING RESISTANCE TEST DATA RESULTS, RUN 215	D-257
D-238	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 226	D-258
D-239	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 223	D-259
D-240	TIRE AND RUN IDENTIFICATION, TIRE TYPE 24	D-260
D-241	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 163	D-261
D-242	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 180	D-262
D-243	ROLLING RESISTANCE TEST DATA RESULTS, RUN 200	D-263
D-244	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 218	D-264

LIST OF TABLES (cont'd)

Table No.		Page No.
D-245	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 208	D-265
D-246	TIRE AND RUN IDENTIFICATION, TIRE TYPE 25	D-266
D-247	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 167	D-267
D-248	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL COSNTANTS, RUN 184	D-268
D-249	ROLLING RESISTANCE TEST DATA RESULTS, RUN 201	D-269
D-250	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 220	D-270
D-251	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 210	D-271
D-252	TIRE AND RUN IDENTIFICATION, TIRE TYPE 26	D-272
D-253	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 168	D-273
D-254	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 185	D-274
D-255	TIRE AND RUN IDENTIFICATION, TIRE TYPE 27	D-275
D-256	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 13	D-277
D-257	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 44	D-278
D-258	TIRE AND RUN IDENTIFICATION, TIRE TYPE 28	D-279
D-259	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 4	D-281
D-260	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 30	D-282
D-261	TIRE AND RUN IDENTIFICATION, TIRE TYPE 29	D-283

LIST OF TABLES (cont'd)

Table No.		Page No.
D-262	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 6	D-285
D-263	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 32	D-286
D-264	TIRE AND RUN IDENTIFICATION, TIRE TYPE 30	D-287
D-265	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 9	D-289
D-266	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 35	D-290
D-267	TIRE AND RUN IDENTIFICATION, TIRE TYPE 31	D-291
D-268	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 10	D-293
D-269	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 36	D-294
D-270	TIRE AND RUN IDENTIFICATION, TIRE TYPE 32	D-295
D-271	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 11	D-297
D-272	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 42	D-298
D-273	TIRE AND RUN IDENTIFICATION, TIRE TYPE 33	D-299
D-274	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 12	D-301
D-275	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 43	D-302
D-276	TIRE AND RUN IDENTIFICATION, TIRE TYPE 34	D-303
D-277	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 16	D-305
D-278	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 47	D-306

LIST OF TABLES (cont'd)

Table No.		Page No.
D-279	TIRE AND RUN IDENTIFICATION, TIRE TYPE 35	D-307
D-280	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 17	D-309
D-281	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 50	D-310
D-282	TIRE AND RUN IDENTIFICATION, TIRE TYPE 36	D-311
D-283	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 18	D-313
D-284	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 48	D-314
D-285	TIRE AND RUN IDENTIFICATION, TIRE TYPE 37	D-315
D-286	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 20	D-317
D-287	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 51	D-318
D-288	TIRE AND RUN IDENTIFICATION, TIRE TYPE 38	D-319
D-289	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 22	D-321
D-290	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 40	D-322
D-291	TIRE AND RUN IDENTIFICATION, TIRE TYPE 39	D-323
D-292	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 26	D-325
D-293	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 39	D-326
D-294	TIRE AND RUN IDENTIFICATION, TIRE TYPE 40	D-327
D-295	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 53	D-329

LIST OF TABLES (cont'd)

Table No.		Page No.
D-296	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 62	D-330
D-297	TIRE AND RUN IDENTIFICATION, TIRE TYPE 41	D-331
D-298	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 54	D-333
D-299	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 63	D-334
D-300	TIRE AND RUN IDENTIFICATION, TIRE TYPE 42	D-335
D-301	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 55	D-337
D-302	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 64	D-338
D-303	TIRE AND RUN IDENTIFICATION, TIRE TYPE 43	D-339
D-304	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 56	D-341
D-305	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 66	D-342
D-306	TIRE AND RUN IDENTIFICATION, TIRE TYPE 44	D-343
D-307	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 57	D-345
D-308	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 65	D-346
D-309	TIRE AND RUN IDENTIFICATION, TIRE TYPE 45	D-347
D-310	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 58	D-349
D-311	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 68	D-350
D-312	TIRE AND RUN IDENTIFICATION, TIRE TYPE 46	D-351

LIST OF TABLES (cont'd)

Table No.		Page No.
D-313	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 59	D-353
D-314	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 67	D-354
D-315	TIRE AND RUN IDENTIFICATION, TIRE TYPE 47	D-355
D-316	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 60	D-357
D-317	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 69	D-358
D-318	TIRE AND RUN IDENTIFICATION, TIRE TYPE 48	D-359
D-319	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 61	D-361
D-320	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 70	D-362
D-321	TIRE AND RUN IDENTIFICATION, TIRE TYPE 49	D-363
D-322	CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 137	D-365
D-323	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 145	D-366
D-324	TIRE AND RUN IDENTIFICATION, TIRE TYPE 50	D-367
D-325	BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS, RUN 151	D-369

1.0 INTRODUCTION

This report contains the results from an experimental program performed for the National Highway Traffic Safety Administration (NHTSA) by the Advanced Technology Center of Calspan Corporation. This program supports NHTSA's continuing research efforts to optimize vehicle braking performance as well as the emergency maneuver capability of present and future vehicle design. The common factors of all vehicle braking and handling performance are the force and moment characteristics developed at the interface between the tire and road.

The experimental study reported here was undertaken principally to evaluate the force and moment measurement of a selected sample of contemporary car tires. Fifty tires were initially selected to span the range of passenger car tire performance characteristics with respect to current tire designs. Two tests were performed on the dry, flat roadway to obtain free rolling cornering/camber and braking traction characteristics. The results from these tests were evaluated to determine which tires performed significantly different from the group. Twenty-five tires were chosen from this group for extended testing to examine the effect of wet road surface, tire tread wear, inflation pressure, normal load and combined cornering and braking traction variations.

The major objective of this program was to obtain a comprehensive data bank of current tire force and moment performance characteristics under a broad range of operating conditions. An in-depth analysis of the results was not intended nor included in this report. Only a brief correlation of the trends is discussed. All data were taken on a flat TIRF roadway and have been stored on magnetic data tape for further analysis.

Tire forces and moments measured on TIRF are essentially the same as would be expected on the road under similar conditions. A TIRF/road correlation study (Ref. 1) along with another previous round-robin study (Ref. 2) proved this to be true.

The force and moment measurements were processed into modelling constants and performance coefficients for the final data presentation. These data include rolling resistance results and are presented in the data summaries in Appendix D.

2.0 CONCLUSIONS

The common factor of all vehicle braking and handling performance are the force and moment properties of the vehicle tires. These properties, important to research and engineeering studies in vehicle performance were accurately measured on the Calspan Tire Research Facility.

The sample of 50 tire types were selected to represent a diversification of the population of passenger car tires in current usage. Certain considerations were paramount in the tire selection process. The so-called "high performance" tires that have been reported to exhibit outstanding characteristics with respect to cornering stiffness, peak lateral force, wet traction and low rolling resistance were prime candidates.

Under this program, the selected sample of fifty passenger car tires were tested and further screened to provide a smaller tire sample for additional extended testing.

The laboratory test phase of the program successfully achieved the two major objectives:

1. The collection of a large quantity of force and moment data under an extended testing format--
   - Free rolling tests under variable slip angle, camber angle, normal load, inflation pressure and wet/dry road surface.
   - Braking traction at the straight-ahead condition under variable inflation pressure, normal load and dry/wet road surface.
   - Combined cornering and braking traction under variable inflation pressure, normal load and tire wear.

2. The quantification of the cornering and braking data into a suitable format readily compatible to the IHVHP simulation tire model. The rolling resistance data results were also reduced and normalized.

These results are documented and organized in this report.

3.0 RECOMMENDATIONS

The wealth of tire data included in this report should be examined in detail to identify and correlate performance trends and patterns. Under this contract Calspan tested an array of current automobile tires to determine their general performance characteristics. Results of these tests, which include measurements of lateral and tractive traction properties under a variety of test conditions are now available for review and evaluation. Data analyses should include:

I. Improvement of the Mathematical Simulation Tire Model in the NHTSA "Improved Hybrid Vehicles Handling Program (IHVHP)" for Improved Representation of Tire Characteristics Over the Performance Range

One important ingredient for analysis of vehicle performance is comprehensive tire data near the limit of control. More comprehensive models are required due to the needs of vehicle dynamicist evaluations. The current IHVHP tire math model does not provide for recovery of the peaking and fall-off effects in the critical near-limit region. Thus, we need to review all features of the current model to identify potential and feasibility of revision for improving the accuracy of fit where high levels of force and moment exist. The emphasis should be on goodness of fit of the coefficients at high lateral forces.

The revision should also include the representation of performance characteristics of tires from the extended data set. The combined cornering and braking traction effects will increase model fidelity.

II. Determine the Relationship Among Tire Performance Characteristics

Review the test data for rolling resistance of passenger car tires. Search for indications of trends in correlating rolling resistance values with lateral and braking traction characteristics (wet and dry).

Tire characteristics which may correlate with rolling resistance include:

1. Braking traction
2. Cornering stiffness
3. Camber stiffness
4. Peak cornering force
5. Self aligning torque

An objective would be to identify the possible degradation (trade-off) of other characteristics which may be associated with reduced rolling resistance. A potential penalty in other performance characteristics due to reduced rolling resistance has previously been established with respect to the inflation pressure. As the inflation pressure increases, rolling resistance decreases. The smaller contact patch may result in reduced cornering (lateral force as well as self-aligning torque) capabilities. Such reduction in the aligning torque stiffness coefficient can deprive the automobile chassis designer of a significant amount of the understeer (a measure of lateral/directional stability) obtainable from aligning torque compliance effects.

III. Examine Earlier Data for Comparisons

To an extent that is practical, determine ranges of values for fundamental tire performance parameters from new data. It should be recognized that direct compatability of test conditions may be limited. The current study established the 100 percent operating condition to be the maximum pressure-load values.

Identify any changes in the maxima/minima of performance patterns. Correlate these changes to existing trends in previous studies. For example, evaluate the trade-off's evident in earlier data to the trends in current tire performance.

IV. Isolate Special Tire Sets (All Weather, Temporaries, High Performance, etc.) for Review

V. Evaluate the Nondimensional Approach

A new approach to characterize tire properties has been developed by Radt and Milliken (Ref. 3). This method is based on nondimensionalizing force and moment parameters as a function of operating conditions such as slip angle, load and friction-coefficient. This technique should be examined in-depth by applying it to the available tire data base because it offers two potentially significant advantages:

1. More accurate and efficient performance descriptions, and
2. Reduced testing requirements

VI. Evaluate the Camber Angle Influence at the High Slip Angle Test Conditions

The vehicle rollover criteria should be investigated to a significant depth. A closer look at the effects of camber angle at the large slip angle conditions is needed.

4.0 DEFINITIONS AND SYMBOLS

The tire and data nomenclature are summarized in this section.

4.1 Cornering and Braking Testing

Figure 4-1 shows the SAE tire axis system* and the quantities used in reducing and presenting the tire force data. Tables 4-1 and 4-2 list and explain all the symbols used in computer data recordings.

Data are usually given in customary English units. Sometimes the use of SI units is required; Table 4-3 facilitates unit conversion from one system into the other.

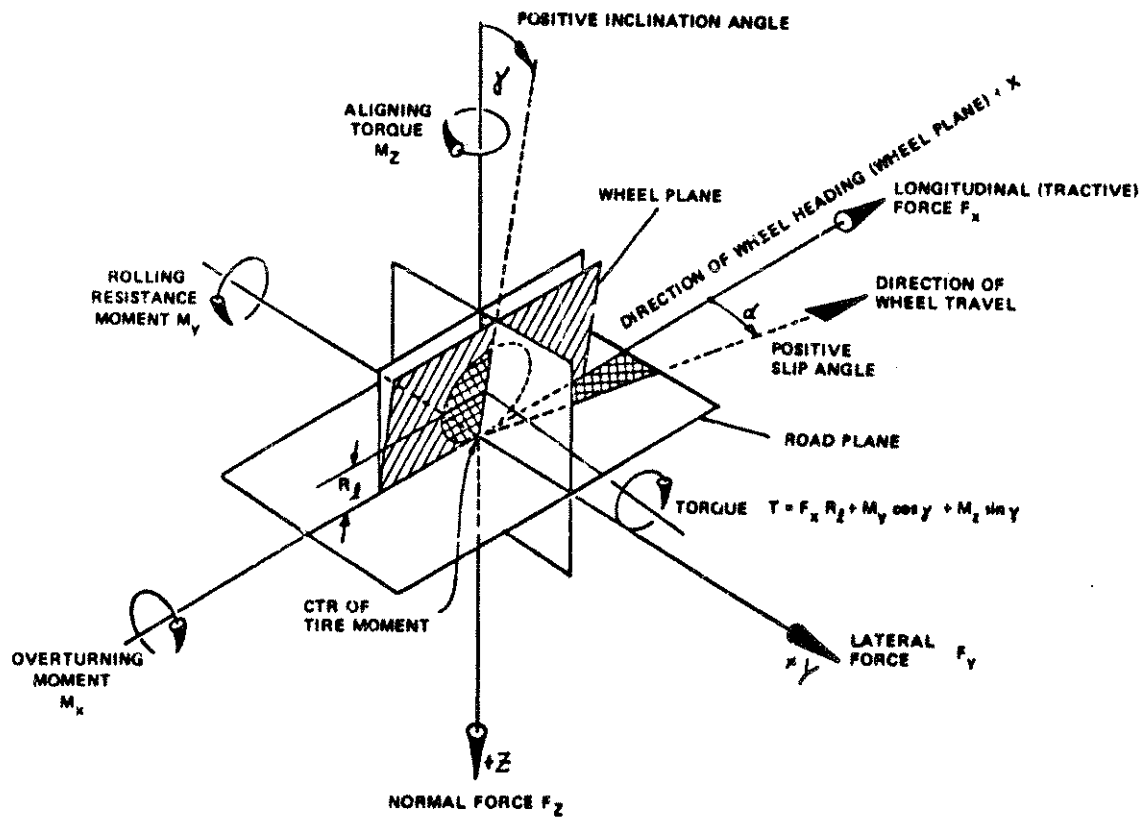


Figure 4-1 TIRE FORCES AND MOMENTS ACTING AT THE CENTER OF TIRE CONTACT (SAE CONVENTION)

*SAE Recommended Practice, "Vehicle Dynamics Terminology" SAE J670e.

Table 4-1
LISTED DATA SYMBOLS

SYMBOLS	PARAMETERS	DIMENSIONS	
		ENGLISH	S.I.
	FORCES AND MOMENTS		
AVL	ANALOG VERTICAL LOAD	lb	N
BFT	BEARING FRICTION TORQUE	ft-lb	N-m
FR	ROLLING RESISTANCE OF STRAIGHT FREE-ROLLING TIRE (DEF. 1)	lb	N
FX	LONGITUDINAL FORCE*	lb	N
FY	LATERAL FORCE*	lb	N
FZ	NORMAL FORCE*	lb	N
HT	DRIVE OUTPUT TORQUE (DEF. 3)	ft-lb	N-m
MX	OVERTURNING MOMENT*	ft-lb	N-m
MY	ROLLING RESISTANCE MOMENT*	ft-lb	N-m
MZ	ALIGNING TORQUE*	ft-lb	N-m
SFY	NEGATIVE LATERAL FORCE (-FY)	lb	N
T	WHEEL TORQUE*	ft-lb	N-m
	ENERGY LOSS		
ER	ENERGY LOSS OF STRAIGHT ROLLING, BRAKED OR DRIVEN TIRE (DEF. 2)	ft-lb/ft	N-m/m
	PRESSURE		
P	INFLATION PRESSURE	psi	kPa
	SPEEDS		
N	WHEEL ROTATIONS PER MINUTE	rpm	rpm
R	WHEEL ROTATIONS PER MILE (OR km) (DEF. 4)	rev/mi	rev/km
V	ROAD SPEED	mph	km/h
	LONGITUDINAL SLIP		
SL	SLIP - LONGITUDINAL* (DEF. 6)	–	–
SR	SLIP RATIO (DEF. 5)	–	–
	ANGLES		
IA	INCLINATION ANGLE*	deg	deg
SA	SLIP ANGLE*	deg	deg

Table 4-1

LIST DATA SYMBOLS (Cont'd)

SYMBOLS	PARAMETERS	DIMENSIONS ENGLISH	DIMENSIONS S.I.
	TIRE RADII		
RL	RADIUS-LOADED*	in	cm
RE	RADIUS-EFFECTIVE* (DEF. 7)	in	cm
	TIME		
TE	TIME ELAPSED	sec	sec
	TEMPERATURES		
CAT	CONTAINED AIR TEMPERATURE	F	C
TST	TREAD SURFACE TEMPERATURE	F	C
RST	ROAD SURFACE TEMPERATURE	F	C
	TIRE COEFFICIENTS		
NFX	FX/FZ	–	–
NFY	FY/FZ	–	–
NFR	FR/FZ	–	–
F	GM f-FUNCTION	–	–
G	GM g-FUNCTION	–	–
H	GM h-FUNCTION	–	–
ATC	GM ALIGNING TORQUE COEFFICIENT	ft	cm

*DEFINED ACCORDING TO SAE J670e (see Figure 4-1)

Table 4-2

SYMBOL MATHEMATICAL DEFINITIONS

NO.	MATHEMATICAL DEFINITIONS
1	$FR = FX - \frac{BFT}{RL} \times 12$ (FX @ HT = 0)
2	$ER = \frac{12\,(SR + 1)\,T}{RL} - FX$
3	$HT = T - BFT^*$
4	$R = 60\,N/V$
5	$SR = \frac{N \times RL}{k^* \times V \times \cos SA} - 1$
6	$SL = \left(\frac{V}{N}\right)_{\text{free rolling}} \times \left(\frac{N}{V}\right) - 1$
7	$RE = \frac{k^* V}{N} \cos SA$

*VALUES OF BFT ARE ALWAYS NEGATIVE

$$k^* = \begin{cases} 168.07 \text{ FOR ENGLISH SYSTEM} \\ 265.26 \text{ FOR SI SYSTEM} \end{cases}$$

THE DEFINITIONS OF ROLLING RESISTANCE, FR, AND ENERGY LOSS, ER, CAN BE EXTENDED TO INCLUDE THE EFFECTS OF SLIP ANGLE AND INCLINATION ANGLE.

Table 4-3
CONVERSION OF UNITS

1 in	=	2.540 cm
1 lb	=	4.448 N (= 0.4536 kgf)
1 psi	=	0.06895 BAR (= 0.06804 atm = 6.895 kPa)
1 ft-lb	=	1.356 N-m
1 mph	=	1.609 km/h
1 cm	=	0.3937 in
1 N	=	0.2248 lb (= 0.1020 kgf)
1 bar	=	14.50 psi (= 0.9869 atm)
1 N-m	=	0.7376 ft-lb
1 km/h	=	0.6214 mph
1 daN	=	10 N
1 bar	=	10^5 N/m^2 = 100 kPa
1 kgf	=	9.8067 N = 2.2046 lb

4.2 Rolling Resistance Testing

The pneumatic rubber tire develops the longitudinal and lateral forces necessary to accelerate/decelerate and guide the vehicle along a desired track. In developing these forces, some of the input energy to the tire does not produce a useful work output and is instead dissipated as hysteretic and frictional losses. For present purposes, it will suffice to express these losses analytically in terms of forces acting on the tire. Since all of the test data acquired during this phase of the program were with the tire in a free-rolling state, the applied torque condition is of no interest here.

For the case of a straight free-rolling tire operating on a flat surface, the power loss, P_F, may be expressed as:

$$P_F = (FX_F)(V_F) \tag{1}$$

where FX_F is the longitudinal force and V_F is the translational velocity. The subscript F denotes reference to the flat test surface. The power loss from a tire operating on a curved surface is not discussed here.

A free body diagram of a tire rolling on a flat surface is shown in Figure 4-2. The ratio of the power loss, P, to the road velocity, V, is the rolling resistance force, FR, and conforms to the SAE definition (Ref. 4). For a flat test surface,

$$FR_F = P_F/V_F \tag{2}$$

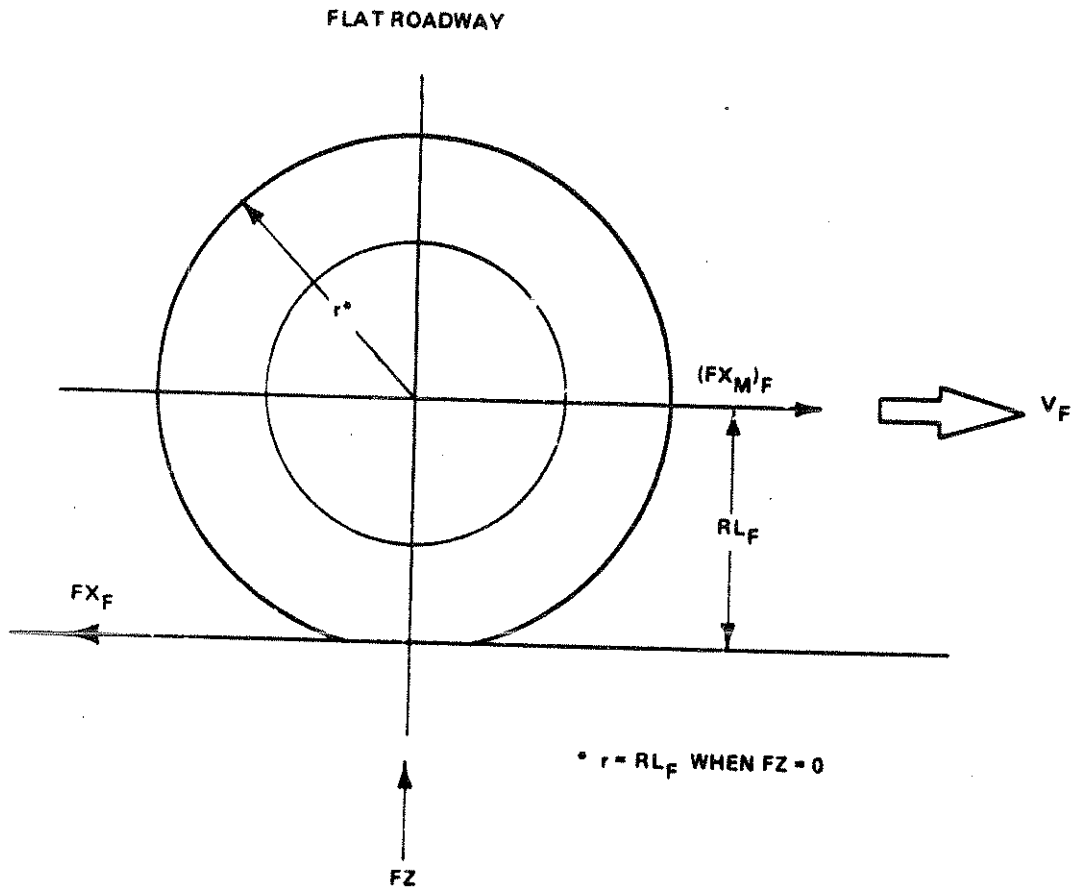
and, in the absence of a bearing friction torque, the longitudinal force measured at the wheel axle $(FX_M)_F$, is exactly equal to the rolling resistance force, FR_F. Equation 2 is applicable only to a straight, free-rolling tire.

For the flat roadway tests, the equation used in calculating the FR data included in this report is:

$$FR_F = -FX + BFT/RL_F \quad (\alpha = 0°) \tag{3}$$

The parameter BFT denotes bearing friction torque that is calculated from appropriate signals generated by the six-component metric balance or force transducers on TIRF. Forces, moments and angles referred to in this report follow the conventional SAE tire axis system previously shown in Figure 4-1.

The Rolling Resistance Force Coefficient (FRC) is defined as the ratio of the rolling resistance to the vertical load.



POWER LOSS $P_F = [FX_F]\ [V_F]$

ROLLING RESISTANCE $FR_F = P_F/V_F = FX_F$

Figure 4-2 ROLLING RESISTANCE OF A FREE-ROLLING TIRE ON A FLAT ROADWAY

5.0 TIRE SELECTION

A representative sample of current tire designs was tested for this study. In a previous report (Tire Parameter Study; Ref. 1) 400 tires were selected for testing. The author stated that "drastic reductions" had to be made from the total population available. The current investigation represents one-eighth that number of tires. The extensive methodology previously employed would have demanded even greater statistical compression of the tire population. The selection process was inherently restrictive with respect to the total population, but extremely successful in identifying a cross-section of today's tires.

The objectives of this program directly influenced the selection process for a small sample of test tires. The testing results were to be analyzed for comparison with the dramatic changes in tire performance characteristics over the past several years due to emphasis on lower rolling resistance, reduced tire weight and increased levels of lateral and braking traction. Furthermore, the selection process required that the initial tire sample be reduced by 50 percent for extended tire testing. Nevertheless, the 50 tires for this test program represent a significant cross-section of passenger car tires available in America. These tires are summarized in Table 5-1.

Selection categories were established in an attempt to identify the wide range of tire performance properties found in current tire design. These categories included:

- High cornering and braking performance
- Low energy loss
- All weather tires
- Temporary space saver tires
- Runflat and retread tires
- Standard Original Equipment (OE)
- Standard aftermarket
- Low cornering and braking performance

Table 5-1 SUMMARY OF SELECTED TIRES

General Selection Category	Tire Type No.	Manufacturer (Distributor)	Description	Tire Size	Tire Sidewall Maximum Rated Load (lbs)	Tire Sidewall Maximum Rated Inflation Pressure (psi)	Rim Size
High Performance and low Rolling Resistance	5	Goodyear	Eagle NCT	P195/70R14	1312	35	5.5 x 14
	8	Michelin	TRX	220/55R390	1435	36	165 x 390
	26	Goodrich	Advantage T/A	P215/70R14			
	49	Continental	TS771	P195/70R14	1340	36	5.5 x 14
	3	General	Dual Steel II	P195/75R14	1400	35	5.5 x 14
	9	Pirelli	P7	P205/55VR14	1130	36	6.5 x 14
	13	Armstrong	Pos-A-Trac	NR50-15	2210	32	8.0 x 15
	4	Stratton	Sport Radial	P195/70R14	1312	35	5.5 x 14
	3	Empco	Power Cat.	GR60-14	1620	32	7.0 x 14
	46	Dunlop	GT Qualifier	GR60-15	1620	32	7.0 x 15
	38	Uniroyal	Steel Belted	P205/75R14	1532	35	5.5 x 14
	10	Pirelli	P8	P185/65SR15	1250	36	5.0 x 15
All Weather	39	Sears	Weatherwise	P195/75R14	1400	35	5.5 x 14
	2	Firestone	Trax 12	P195/75R14	1400	35	5.5 x 14
	12	Bridgestone	RD 401	P195/75R14	1400	35	5.5 x 14
	29	Uniroyal	Tiger Paw	P195/75R14	1400	35	5.5 x 14
	30	Goodyear	Arriva	P195/75R14	1400	35	5.5 x 14
	19	J. C. Penney	Weathertamer	P195/75R14	1400	35	5.5 x 14
Standard OE	47	Firestone	Deluxe Champion	P165/80R13	1069	35	4.5 x 13
	6	Firestone	721	P195/75R14	1400	35	5.5 x 14
	32	Firestone	721	P225/75R15	1874	35	6.0 x 15
	34	Goodyear	Polysteel	P155/80R13	959	35	4.5 x 13
	1	Goodyear	Polysteel	P195/75R14	1400	35	5.5 x 14
	33	Goodyear	Polysteel	P225/75R15	1874	35	6.0 x 15
	48	Uniroyal	Pastrak	P155/80R13	959	35	4.5 x 13
	11	Uniroyal	Steeler	P195/75R14	1400	35	5.5 x 14
	27	Uniroyal	Steeler	P225/75R15	1874	35	6.0 x 15
Standard Aftermarket	31	Firestone	Town & Country	P195/75R14	1400	35	5.5 x 14
	37	Bridgestone	RD108	165SR13	1010	32	4.5 x 13
	45	Sears	Superguard	G78-15	1620	32	5.5 x 15
	7	Semperit	M501	185SR14	1450	36	5.0 x 14
	17	General	Steel Gripper	P225/75R15	1874	35	6.0 x 15
	28	Michelin	XWW	P195/75R14	1400	35	5.5 x 14
	21	Goodyear	Viva	P195/75R14	1400	35	5.5 x 14
	40	Sears	Superguard	FR78-14	1500	32	5.5 x 14
	41	Mansfield	Kevlar	FR78-14	1500	32	5.5 x 14
	23	Montgomery	Gas Miser	P195/75R14	1400	35	5.5 x 14
	24	Uniroyal	Royal Seal	P195/75R14	1400	35	5.5 x 14
	14	General	Jet Radial	P155/80R13	959	35	4.5 x 13
Low Performance	20	Sears	Guardsman	P195/75R14	1400	35	5.5 x 14
	4	Cooper	Trendsetter	A78-13	1060	32	4.5 x 13
	25	K-Mart	KM-78	E78-14	1060	32	4.5 x 14
	36	Cooper	Glas Belt	P155/80R13	959	35	4.5 x 13
	35	Kelly Springfield	Sport Mark	155SR13	950	32	4.5 x 13
	22	Sears	Superguard B.B.	E78-14	1060	32	4.5 x 14
	18	Remington	Pioneer	FR78-14	1500	32	5.5 x 14
Space Saver	16	Uniroyal	Hideaway	T125/70D15	1500	60	3.5 x 15
	50	Firestone	Temp Spare	T125/70D15	1500	60	3.5 x 15
Runflat	15	Goodyear	Self-Support	P195/75R14	1400	35	5.5 x 14
Retread	44	Firestone	Retread-Super	E70-14	1400	32	5.5 x 14

Underlying guidelines included:

- The majority of the tires were radial due to their extensive usage
- Selection of a median popular tire size; P195/75R14
- Various manufacturers
- Size comparisons
- Bias, bias belted, and snow tire types
- Low aspect ratio tires

Several of the selection categories overlap. Low rolling resistance tires were included throughout the selection. Low performance tires include bias, bias belted, snow and some radial constructions.

6.0 TEST PROGRAM

The test program was designed to obtain data measurements from as wide a range of operating conditions as possible. These conditions were in turn applied on as wide a range of tires which exhibited large variations of performance criteria. In essence, extremes in minimums, maximums and representative in-between values of tire performance values were generated at each of the diversified operating conditions. The test program was indeed an effort to obtain an overall cross-section of current tire performance characteristics.

The central focus of the program was to generate performance characteristics in a format readily compatible to NHTSA's mathematical simulation tire model. These characteristics were determined in the form of eighteen performance coefficients and twenty-two modeling constants as detailed in a previous Tire Parameter Determination Study (Ref. 2). In addition, rolling resistance loss was evaluated for a portion of the test tires.

It is important to note that the test load and pressure are expressed as percentages of maximum rated load and pressure in accordance to the Tire and Rim Association (T&RA) Yearbook. Testing has traditionally used the design load and pressure conditions. Although significantly higher in value, the maximum rated specifications are universally accepted.

The total test plan as shown in Table 6-1, was incorporated into two parts. Part I (test group categories I & II) includes testing of all fifty tire types, while Part II (test group categories III through X) was devoted to the "extended" testing on twenty-five of the original tire group. The test categories are summarized as follows:

I	Dry Free Rolling Cornering @ 100% PM
II	Dry Braking ($\alpha = 0°$) @ 100% PM
III	Dry Free Rolling Cornering @ 50% & 150% PM
IV	Dry Braking ($\alpha = 0°$) @ 50% & 150% PM
V	Rolling Resistance
VI	Wet Free Rolling Cornering @ 100% PM

VII Wet Braking (α = 0°) @ 100% PM

VIII Dry Braking (α = 0°) @ 50% & 150% PM

IX Combined Braking and Cornering Traction on new tires @ 50%, 100% & 150% PM & LM

X Combined Braking and Cornering Traction on 50% shaved tires @ 50%, 100% & 150% PM & LM

6.1 Part I: Basic Testing

Part I of the test plan was to obtain cornering and braking characteristics, separately, on the fifty tire types. Testing included variations of Normal Force FZ, Inclination Angle γ, Slip Angle α, and Longitudinal Slip SR. The remainder of the independent variables, Velocity V, Inflation Pressure P and Skid Number SN, were held constant, respectively, V at 30 mph, P at maximum (100 percent PM) rated regulated pressure and dry roadway surface SN at approximately 80. All Part I tests were run on the dry, flat TIRF roadway.

Basically, two test runs were performed on each tire for a total of 100 tests. The first test was free-rolling cornering/camber (test group category I) while the second test was a braking traction test (test group category II).

6.1.1 Free Rolling Cornering

The free rolling test was initially designed to generate the necessary coefficients and constants. In this case, fourteen tire model constants for the five cornering computer model functions of cornering stiffness, camber stiffness, peak lateral force coefficient, overturning moment and aligning torque were derived. In addition, thirteen cornering performance coefficients such as cornering stiffness, camber stiffness, peak lateral force coefficient and pneumatic trail were subsequently calculated. The tire radial spring rate was calculated and is also presented. These values are all located in Appendix B. Three testing variation schemes were performed during each free-rolling test:

Table 6-1

GENERAL TEST MATRIX

TEST GROUP CATEGORY	NUMBER OF TEST RUNS	NUMBER OF TIRES TESTED	TYPE OF TEST	LOAD	SLIP ANGLE	INCLINATION ANGLE	REGULATED INFLATION PRESSURE	SPEED (MPH)	TREAD DEPTH	ROAD SURFACE
I	50	50	FREE ROLLING CORNERING PART A: CAMBER - LOAD PART B: SLIP ANGLE - CAMBER PART C: SLIP ANGLE - LOAD	① 100% ②	0 ③ ③	④ ⑤ 0	P_M	30	100%	DRY
II	50	50	BRAKING TRACTION	①	0	0	P_M	30	100%	DRY
III	10	5	FREE ROLLING CORNERING PART A: CAMBER - LOAD PART B: SLIP ANGLE - CAMBER PART C: SLIP ANGLE - LOAD	① 100% ②	0 ③ ③	④ ⑤ 0	50% P_M AND 150% P_M	30	100%	DRY
IV	10	5	BRAKING TRACTION	①	0	0	50% P_M AND 150% P_M	30	100%	DRY
V	25	25	ROLLING RESISTANCE	①	0	0	⑥	50	100%	DRY
VI	5	5	FREE ROLLING CORNERING PART A: CAMBER - LOAD PART B: SLIP ANGLE - CAMBER PART C: SLIP ANGLE - LOAD	① 100% ②	0 ③ ③	④ ⑤ 0	P_M	30	100%	WET
VII	5	5	BRAKING TRACTION	①	0	0	P_M	30	100%	WET
VIII	40	20	BRAKING TRACTION	①	0	0	50% P_M AND 150% P_M	30	100%	DRY
IX	45	15	COMBINED CORNERING AND BRAKING TRACTION	①	⑦	0	50% P_M, 100% P_M AND 150% P_M	30	100%	DRY
X	45	15	COMBINED CORNERING AND BRAKING TRACTION	①	⑦	0	50% P_M, 100% P_M AND 150% P_M	30	50% SHARED	DRY

Table 6-1 GENERAL TEST MATRIX (Cont.)

VALUES OF TEST VARIABLES

Normal Load	① :	50%, 100% and 150% of L_M
	② :	50%, 100%, 150% and 200% of L_M
Slip Angle	③ :	Sweep from -1 to +20 degrees at a sweep rate of 1 deg./sec.
	⑦ :	0, 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 degrees
Inclination Angle	④ :	Sweep from +20 to -20 degrees at a sweep rate of 1 deg./sec.
	⑤ :	0, 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 degrees
Inflation Pressure	⑥ :	50%, 100% and 150% of P_M the first of six test conditions had a capped inflation pressure condition. All remaining conditions were regulated.

Note 1: The 100% load L_M condition is the maximum T&RA rated load at the maximum rated inflation pressure for each particular tire.

Note 2: The 100% inflation pressure P_M condition is the maximum T&RA rated inflation pressure for each particular tire.

1. The Camber (Inclination) Angle-Load Variation was designed to produce the effect of normal load on camber thrust. The normal load was varied in three increments from 50 percent, 100 percent, to 150 percent of maximum rated load. The inclination angle was swept from 20 degrees to -20 degrees at a rate of one degree per second. The slip angle was held fixed at zero.

2. The Slip Angle - Camber Angle Variation was executed to show the combined effect of camber and slip angle. The inclination (camber) angle was incremented in steps of two degrees starting from zero to +20 degrees. At each step, the inclination angle was held fixed while the slip angle was swept from -1 to +20 degrees at a rate of one degree per second. A total of eleven slip angle sweep cycles were performed in this test phase. The normal load remained constant at 100% (maximum rated) load.

3. The Slip Angle-Load Variation shows the effect of normal load on slip angle. The normal load was varied in four increments: 50, 100, 150 and 200 percent of maximum rated load. At each normal load increment, the slip angle was again swept from -1 to +20 degrees at a sweep rate of 1 degree per second. The inclination angle was held fixed at zero.

A warm-up procedure was performed just prior to the free rolling test described above. The 20-second warm-up run included setting the slip angle to +10 degrees for 10 seconds and then to -10 degrees for an additional 10 seconds. During which time the inclination angle, velocity and load remained constant, respectively, at zero, 45 mph and maximum rated load. No data were taken during the warm-up run.

A total of 50 dry, free-rolling cornering tests were completed under test category I of Part I. These tests were performed at the maximum rated inflation pressure.

6.1.2 Braking Traction

The braking test was performed to generate the eight tire model constants for the three braking computer model functions of peak braking coefficient, longitudinal slip at peak braking force and slide braking coefficient. In addition, five braking performance coefficients such as braking stiffness coefficient, peak braking coefficient and slide braking coefficient were generated.

Three controlled slip ratio braking sweeps up to SR = -1.0 (locked wheel) were conducted during each braking test. The normal load was changed in three increments (50, 100 & 150%) of maximum rated load. The slip angle and inclination angle were held constant at zero degrees.

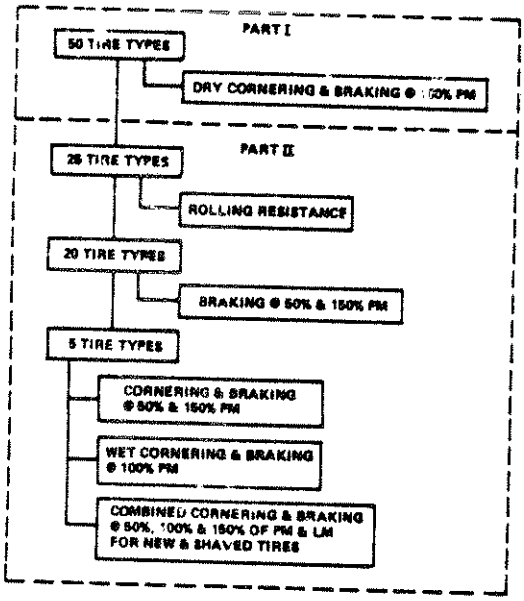
A total of 50 dry, braking (straight-ahead) test runs were completed under test category I of Part I. These tests were performed at the maximum rated inflation pressure.

6.2 Part II: Extended Tire Testing

The extended testing comprised the major portion of the test program. Test tires were selected from the fifty tire sample in various groups of five, twenty and twenty-five tires. The five-tire sample was additionally tested:

- at 50 percent and 150 percent inflation pressure (Pm) for both free-rolling cornering and braking tests, and
- under wet conditions at 100 percent inflation pressure (Pm) for both free-rolling cornering and braking tests, and
- for the combined braking and cornering traction tests under 50 percent, 100 percent and 150 percent of maximum rated load and pressure and for new and shaved tires.

The twenty-tire sample was tested under dry braking at the 50 percent and 150 percent inflation pressure (Pm) conditions. While the twenty-five-tire sample was employed to determine the rolling resistance force characteristics. In summary:



6.2.1 Inflation Pressure Testing

The free rolling cornering and braking tests from Part I were repeated on five new tires for inflation pressures of 50 percent and 150 percent of Pm. All other conditions and testing procedures remained identical. Testing for the 50 percent Pm condition was performed on one set of tires while testing at the 150 percent Pm condition was conducted on a separate set of tires.

In all, twenty variable inflation pressure tests were performed under test categories III (Cornering) and IV (Braking).

6.2.2 Wet Roadway Testing

A total of ten tests were performed on the wet TIRF roadway. A water depth of 0.020 inches was used during the free rolling cornering and the braking testing. Prior to testing, the wet road surface coefficient of friction was determined at SN 30. The ASTM testing procedure employing the ASTM E501 passenger car tire was performed on the flat roadway.

All wet tests were repeats of dry tests conducted in Part I under an inflation pressure of 100 percent Pm. New tires were used for this test phase to include test categories VI (Wet Cornering) and VII (Wet Braking).

6.2.3 Rolling Resistance Testing

The rolling resistance tests were conducted in a manner similar to that specified by the SAE J1269 rolling resistance measurement procedure (Ref. 4). The exception to the SAE procedure was that inflation pressures of 50 percent, 100 percent and 150 percent of Pm and loads of 50 percent, 100 percent and 150 percent of maximum rated load (Lm) were used. The inflation pressure for the first of six conditions was capped (pressure allowed to rise). Inflation pressures were regulated during the remaining five conditions. The test conditions were as follows:

CONDITION	1	2	3	4	5	6
*PRESSURE (%)	100-C	100-R	50-R	100-R	150-R	100-R
LOAD (%)	100	150	100	100	100	50
DURATION (min)	30	10	10	10	10	10

*C - CAPPED; R - REGULATED

Testing was performed on the dry, flat TIRF roadway at a constant velocity of 50 mph. The slip angle and inclination angle were fixed at zero. Twenty-five tires were measured for rolling resistance force under test category V.

6.2.4 Combined Cornering and Braking Traction Testing

The combined lateral and longitudinal force traction tests were a significant portion of the test program. A total of ninety tests were performed on only five tire types (tire types 1 through 5). Testing was performed on both new and 50 percent shaved tires.

6.2.4.1 Combined Testing on New Tires

A separate test was conducted for each of three inflation pressure conditions (50 percent, 100 percent and 150 percent of Pm) and for each of three normal load conditions (50 percent, 100 percent, 150 percent of Lm). The combination of nine conditions on five new tire types resulted in forty-five tests.

The testing procedure required that a braking traction sweep from free rolling to a locked wheel condition (SR = -1) be conducted for each of eleven slip angle conditions. During each braking sweep the slip angle was held fixed at values of 0, 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 degrees. The road speed was held constant at 30 mph on a dry surface.

Testing under these conditions was particularly severe at the combination of high load and low inflation pressure. Asymmetrical tire wear (tested at only positive slip angles) was very noticeable on those test tires.

A total of forty-five combined lateral and braking traction tests were performed under test category IX.

6.2.4.2 Combined Testing on Shaved (50%) Tires

In order to simulate wear, the five test tire types had their tread depths reduced to 50 percent. This tread reduction was accomplished by "shaving" the tires on an Amermac Tire Truer available at Calspan. The tread radius was preserved and the tread depth was reduced uniformily during shaving.

This method of simulating wear was preferred to road-worn wear where the tread radius and tread depth at the outer grooves present significant differences. The uniformily shaved tire was more suitable to the test program in light of the vast differences in defining the "average" road-worn tire wear characteristics. Prior to testing, each shaved tire was "scuffed" on the flat roadway to remove any cutting blade marking and artificially smooth sheen on the tread. The "scuffing" procedure included applying a 50 percent normal load, 100 percent inflation pressure at a constant roadway velocity of 30 mph. The tire was then rapidly swept through a slip angle range of approximately ±6 degrees. This procedure was maintained for 30 seconds. The tire tread was then inspected to determine if the tread surface more closely resembled a road-worn condition. In some cases, this "scuffing" procedure was repeated several times.

In all, forty-five shaved/combined cornering and braking traction tests were performed under test category X.

The two-hundred-and-eighty-six test runs are summarized in Table 6-2.

Table 6-2

TEST PROGRAM SUMMARY TO SHOW OVERALL TESTING PROGRAM TIRE TYPES, TIRF TIRE NUMBERS AND TEST RUN NUMBERS

TIRE TYPE	MANUFACTURER	DESCRIPTION	SIZE	GROUP I DRY CORNERING 50 TIRES/50 TESTS		GROUP II DRY BRAKING 50 TIRES/50 TESTS
				TIRE NO	1.0 PM TEST NO	1.0 PM TEST NO
1	GOODYEAR	POLYSTEEL	P195/75R14	6	2	28
2	FIRESTONE	TRAX 12	P195/75R14	7	8	34
3	GENERAL	DUAL STEEL III	P195/75R14	10	5	31
4	COOPER	TRENDSETTER	A78-13	17	21	52
5	GOODYEAR	RAC S NCT	P185/70R14	62	148	152
6	FIRESTONE	721	P195/75R14	8	7	27
7	SEMPERIT	M501	185SR14	67	139	144
8	MICHELIN	TRX	235/55R390	11	15	44
9	PIRELLI	P7	P205/70VR14	72	139	147
10	PIRELLI	P4	P184/80SR15	78	143	148
11	UNIROYAL	STEELER	P195/75R14	19	3	39
12	BRIDGESTONE	RD401	P195/75R14	21	7	32
13	ARMS-KUNG	POS-A-TRAC	185SR14	65	140	149
14	GENERAL	JET RADIAL	P185/80R13	14	19	49
15	GOODYEAR	SELF SUPPORT TIRE	P195/75R14	54	136	145
16	UNIROYAL	HIDEAWAY	T125/70D15	75/82	142	150
17	GENERAL	STEEL GRIPPER	P225/75R15	20	14	46
18	REMINGTON	PIONEER	FR78-14	25	22	41
19	PENNY	WEATHER TAMER	P185/75R14	28	28	28
20	SEARS	GUARDSMAN	P195/75R14	27	24	37
21	GOODYEAR	VIVA	P185/70R14	94	163	170
22	SEARS	SUPERGUARD P-B	E78-14	30	158	163
23	MONTGOMERY	GASWISER	P185/75R14	105	164	161
24	UNIROYAL	ROYAL SEAL	P175/75T14	95	153	160
25	K MART	SR 70	E78-14	96	167	164
26	GOODRICH	POVANTAGE T/A	P215/70R14	113	168	165
27	UNIROYAL	STEELER	P225/75R15	12	13	44
28	MICHELIN	P4	P185/75R14	24	4	38
29	UNIROYAL	TIGER PAW	P185/70R14	23	6	32
30	GOODYEAR	ARRIVA	P185/75R14	4	9	36
31	FIRESTONE	TOWN & COUNTRY	P185/75R14	9	10	30
32	FIRESTONE	721	P225/75R15	10	11	62
33	GOODYEAR	POLYSTEEL	P225/75R15	8	12	43
34	GOODYEAR	POLYSTEEL	P185/80R13	1	16	47
35	KELLY SPRINGFIELD	SPORT MARK	165SR13	3	17	50
36	COOPER	GLASS BELT	P165/80R13	13	18	46
37	BRIDGESTONE	RD 100	165SR13	16	20	51
38	UNIROYAL	STEEL BELTED	P205/75R14	18	22	48
39	SEARS	WEATHERWISE	P185/75R14	29	25	30
40	SEARS	SUPERGUARD	F78-14	20	53	62
41	MANSFIELD	KEVLAR	H78-14	30	54	63
42	STRATTON	SPORT RADIAL	P195/75R14	30	55	64
43	EMPCO	POWER CAT	G803-14	30	56	65
44	FIRESTONE	RETREAD SUPER SPORTS	E70-14	46	57	66
45	SEARS	SUPER GUARD	G79-15	60	58	68
46	DUNLOP	GT QUALIFIER	G803-15	61	59	67
47	FIRESTONE	DELUXE CHAMPION	P165/80R13	2	60	69
48	UNIROYAL	FASTRACK	P195/60R13	22	61	70
49	CONTINENTAL	TS 77	P185/70R14	61	137	145
50	FIRESTONE	TEMPO SPARE	T125/70D15	63	143	151

TIRE TYPE	GROUP III DRY CORNERING 5 TIRES/10 TESTS			GROUP IV DRY BRAKING 5 TIRES/10 TESTS	
	TIRE NO	0.5 PM TEST NO	1.5 PM TEST NO	0.5 PM TEST NO	1.5 PM TEST NO
34	169	170		186	187
70	171	172		188	189
45	177	178		184	185
74	173	174		190	191
78	175	176		192	193

TIRE TYPE	GROUP V ROLLING RESISTANCE 25 TIRES/25 TESTS #0.5, 1.0 & 1.5 PM		GROUP VI WET CORNERING 5 TIRES/5 TESTS		GROUP VII WET BRAKING 5 TIRES/5 TESTS
	TIRE NO	TEST NO	TIRE NO	1.0 PM TEST NO	1.0 PM TEST NO
1	42	71	33	162	169
2	51	72	40	163	168
3	50	78	46	190	187
4	62	81	73	194	191
5	67	196	11	188	189
6	32	73			
7	68	77			
8	47	76			
9	71	90			
10	79	88			
11	94	74			
12	87	75			
13	86	79			
14	98	80			
15	84	82			
16	86	204			
17	185	202			
18	115	202			
19	114	199			
20	180	197			
21	119	205			
22	39	198			
23	117	210			
24	96	200			
25	67	201			

TIRE TYPE	GROUP VIII DRY TRACTION 20 TIRES/40 TESTS		
	TIRE NO	0.5 PM TEST NO	1.5 PM TEST NO
1	35	126	116
2	65	128	128
3	43	124	134
4	71	131	121
5	76	132	133
6	54	137	113
7	57	138	118
8	69	139	132
9	59	138	128
10	61	139	130
11	88	220	274
12	100	224	213
13	115	221	211
14	134	216	206
15	108	217	207
16	110	222	212
17	99	210	209
18	117	226	223
19	95	218	208
20	97	220	210

GROUP IX - 70% TREAD
COMBINED - DRY CORNERING AND BRAKING
10 TIRES/40 TESTS

TIRE TYPE	50% Fz				100% Fz				100% Fz			
	TIRE NO	0.5 PM TEST NO	1.0 PM TEST NO	1.5 PM TEST NO	TIRE NO	0.5 PM TEST NO	1.0 PM TEST NO	1.5 PM TEST NO	TIRE NO	0.5 PM TEST NO	1.0 PM TEST NO	1.5 PM TEST NO
1	63	91	87	83	44	109	101	97	49	119	112	109
2	23	92	88	84	20	106	102	98	37	200	113	110
3	54	93	89	85	52	107	103	99	53	201	116	111
4	63	94	90	86	64	108	104	100	100	202	275	276
5	—/RUN	95/274	88/273	85/272	—/RUN	99/278	99/279	95/277	—/RUN	99/280-288	99-284	99/283

GROUP X - 50% BRAKED
COMBINED - DRY CORNERING AND BRAKING
5 TIRES/40 TESTS

TIRE TEST	50% PM				100% PM				100% PM			
	TIRE NO	0.5 Fz TEST NO	1.0 Fz TEST NO	1.5 Fz TEST NO	TIRE NO	0.5 Fz TEST NO	1.0 Fz TEST NO	1.5 Fz TEST NO	TIRE NO	0.5 Fz TEST NO	1.0 Fz TEST NO	1.5 Fz TEST NO
1	93	238	243	248	92	234	240	246	41	287	242	257
2	112	239	244	249	111	235	250	254	11	288	243	258
3	108	240	245	270	107	236	251	255	105	229	194	200
4	103	232	246	263	102	232	247	253	101	231	246	241
5	98	241	256	271	96	237	252	257	94	230	245	260

7.0 TEST PROCEDURES

As explained in the previous section, all tires were subjected to the basic program (Part I) consisting of two tests: a free-rolling cornering test and a braking test. A portion of these tires were also subjected to the extended testing (Part II) of the test program. This testing consisted of repeating the Part I testing under wet roadway conditions and under various inflation pressure conditions. The tires were also measured for rolling resistance loss and for combined lateral and braking traction performance. The latter testing technique was repeated for both new and 50% shaved tires.

7.1 Free-Rolling Cornering Runs

The cornering test consisted of three separate phases: camber test phase, cornering/camber test phase and the cornering test phase.

The objective of this program was to generate experimental data to support the ongoing development of computer model functions. It was desired to compute the constants of the model functions from a comprehensive set of experimental data covering all ranges of interest. However, the running time had to be kept short to avoid excessive temperature and pressure changes. An optimal run technique that would deliver a sufficient number of data and will keep temperature and pressure rise small had previously (Ref. 1) been developed at TIRF under a similar testing effort. This run technique was modified to accommodate a significant variation of the current test conditions.

Table 7-1 lists the differences between the previous and current run techniques.

Table 7-1

CORNERING TEST TECHNIQUE

Test Program	Run Duration (sec)	Camber Test Phase		Cornering/Camber Test Phase			Cornering Test Phase	
		Load %	Camber Range (deg)	Load %	Slip Angle Range (deg)	Chamber Angle (deg)	Load %	Slip Angle Range (deg)
Previous	275	75 100 125 150 175	-2 to +2 ($\dot{\gamma}$=1deg/sec)	100	0 to +16 ($\dot{\alpha}$=1deg/sec)	0,2 4,6	50 75 100 125 150 175	+2 to -20 ($\dot{\alpha}$=1deg(sec)
Current	435	50 100 150	+20 to -20 ($\dot{\gamma}$=1deg/sec)	100	-1 to -20 ($\dot{\alpha}$=1deg/sec)	0,2,4 6,8,10 12,14,16, 18,20	50 100 150 200	-1 to +20 ($\dot{\alpha}$=1deg/sec)

Previous: NHTSA Report No. ZM-5563-T-2

* Previous Percent load as a function of T&RA load @ 24 psi
  1. The inflation pressure was capped (allowed to rise) during the test

* Current Percent load as a function of maximum rated load at maximum rated pressure.
  1. The inflation pressure was regulated (maintained at a constant value) during the test.

The time duration for the previous cornering run technique (275 seconds) was consistent with the number of test conditions examined. A significantly larger number of conditions were requested and examined under the current program and therefore the time was increased to 435 seconds. This consisted of a 120-second camber test phase in which camber was changed incrementally between ±20 degrees for 3 loads; a 231-second cornering/camber test phase in which slip angle was changed incrementally between -1 and 20 degrees for eleven inclination angles between 0 and 20 degrees; and a 84-second slip angle test phase in which the slip angle was changed incrementally between -1 and 20 degrees for 4 loads.

The inflation pressure was controlled to a preset value by testing under regulated air conditions. This procedure minimizes the force and moment variations and should enable better correlation of results between test tires.

A warm-up procedure (as described in Section 6) was used to raise the tire temperature to levels similar to those experienced during the actual run. The warm-up was part of the test run.

7.2 Straight-Ahead Braking Traction

A 15-second braking run was employed involving three stops at three different loads. A single stop (free-rolling to lock-up) preceded the actual test run. Testing experience has shown that results from the initial stop of a braking run is significantly different from repeat stops. Other than this break-in stop, no preceding warm-up run was necessary.

The braking and cornering tests of the basic program (Part I) were repeated in Part II under wet roadway and pressure variation conditions.

7.3 Combined lateral and Braking Traction

In this case the normal load remained constant while the slip angle was varied from 0 to +20 degrees at 2 degree increments. The slip angle remained fixed during each of the eleven stops. Similar to the straight-ahead braking, the initial braking condition was used as a break-in.

Three parameters comprised the matrix (see Table 6-2) of fixed test conditions. Load and pressure ranged from 50, to 100, to 150 percent of maximum rated conditions. All tests were repeated under new and shaved tire conditions.

7.4 Rolling Resistance Tests

Rolling resistance runs were performed under free rolling, straight-ahead conditions on the flat TIRF roadway. All values are reported for the flat surface conditions. Six pressure-load conditions were tested for each tire. The initial condition required a 30 minute warm-up while the remaining five conditions were warmed-up for 10 minutes each. The warm-up procedures enabled the tire to reach equilibrium conditions mainly in terms of tire temperature (cavity and tread) and longitudinal force (Fx). Immediately after each test condition had stabilized, thirty seconds of test data were recorded. These test data were averaged and listed in Appendix D.

8.0 TEST RESULTS AND DATA PRESENTATION

The tire information generated for this test program is summarized in the data summaries under Appendix D. The tire performance characteristics are described for free-rolling cornering and rolling resistance testing. Also included are the straight-ahead braking and the combined lateral and longitudinal braking coefficients. These performance characteristics, in terms of forces, moments and non-dimensionalized coefficients, should be assessed with respect to the specific test procedure as well as to the operating conditions.

The operating conditions included testing at the maximum T & RA rated load and pressure values. The majority of the test program was conducted under regulated inflation pressure conditions. The sole exception was the initial test condition (capped inflation pressure) of the rolling resistance tests.

The various test procedures were described earlier in Section 6. Emphasis should be placed on the cornering test technique where a warm-up phase was followed by three testing phases. A considerable amount of data was amassed here, during which the tire was continuously cycled and subsequently increasing tire operating temperature.

A tabulation of some of the test results are included in Table 8-1 for the fifty tire types.

Brief comparisons were made from some of these results. Unless otherwise stated, the test conditions correspond to the maximum rated inflation pressure (1.0 P) and normal load (1.0 L). All values shown are averages calculated for a specific set of operating conditions.

8.1 Test Results

A correlation of cornering and braking coefficients is presented to identify differences between wet and dry testing procedures. The wet average Cornering Stiffness Coefficient (CA/FZ) value is 0.212 while the dry average CA/FZ value is 0.158. The wet CA/FZ shows a significant increase of 33 percent over the dry CA/FZ value.

Table 8-1

SUMMARY OF VARIOUS SELECTED CORNERING, BRAKING AND ROLLING RESISTANCE PERFOMANCE COEFFICIENTS

TIRE TYPE NO	TEST COMMENTS	CORNERING			BRAKING		ROLLING RESISTANCE	
		CALPHA LB/DEG	CA/FZ	MUY PEAK	MUX PEAK	MUX SLIDE	FR (LB)	FRC
1	DRY, 100% L, 100% P	172	0.123	0.93	0.83	0.72	14.6	0.0103
2	DRY 100% L 100% P	177	0.127	0.82	0.71	0.62	14.7	0.0104
3	DRY, 100% L, 100% P	179	0.128	0.80	0.87	0.71	13.5	0.0095
4	DRY, 100% L 100% P	94	0.088	1.03	0.86	0.74	17.9	0.0166
5	DRY 100% L, 100% P	258	0.197	0.86	0.84	0.74	16.0	0.0116
5	DRY 100% L, 100% P	167	0.119	0.89	0.82	0.72	13.3	0.0094
6	DRY 100% L, 50% P				0.83	0.75	21.8	0.0156
6	DRY 100% L 150% P	193	0.138	0.90	0.78	0.68	11.2	0.0086
6	WET 100% L 100% P	213	0.183	0.56	0.88	0.35		
7	DRY 100% L 100% P	215	0.160	0.87	0.83	0.68	15.9	0.0116
7	DRY 100% L 50% P				0.83	0.77	26.1	0.0191
7	DRY 100% L 150% P	230	0.168	0.90	0.93	0.70	12.8	0.0093
7	WET 100% L 100% P	240	0.177	0.87	0.68	0.41		
8	DRY 100% L 100% P	254	0.178	0.86	0.82	0.77	14.9	0.0102
8	DRY 100% L 50% P				0.90	0.77	22.8	0.0157
8	DRY 100% L 150% P	254	0.197	0.83	0.93	0.78	12.6	0.0086
8	WET 100% L 100% P	360	0.276	0.87	0.70	0.41		
9	DRY 100% L 100% P	194	0.176	0.83	0.80	0.82	16.3	0.0136
9	DRY 100% L 50% P				1.13	0.80	32.6	0.0203
9	DRY 100% L 150% P	184	0.164	0.88	0.99	0.80	13.0	0.0117
9	WET 100% L 100% P	270	0.243	0.73	0.88	0.38		
10	DRY 100% L 100% P				0.80	0.76	12.2	0.0089
10	DRY 100% L 50% P				1.08	0.85	20.1	0.0164
10	DRY 100% L 150% P	216	0.176	0.90	1.04	0.82	10.0	0.0081
10	WET 100% L 100% P	252	0.206	0.82	0.81	0.46		
11	DRY 100% L 100% P	194	0.118	0.86	0.80	0.83	14.8	0.010*
11	DRY 100% L 50% P				0.82	0.84		
11	DRY 100% L 150% P				0.95	0.68		
12	DRY 100% L 100% P	201	0.143	0.87	0.81	0.70	13.2	0.0093
12	DRY 100% L 50% P				0.80	0.69		
12	DRY 100% L 150% P				0.79	0.64		
13	DRY 100% L 100% P				1.02	0.76	21.0	0.0000
13	DRY 100% L 50% P				0.82	0.81		
13	DRY 100% L 150% P				1.00	0.79		
14	DRY 100% L 100% P	111	0.110	0.92	0.88	0.73	11.0	0.0113
14	DRY 100% L 50% P				0.87	0.87		
14	DRY 100% L 150% P				0.08	0.67		
15	DRY 100% L 100% P	222	0.190	0.88	0.93	0.71	14.6	0.0103
15	DRY 100% L 50% P				0.88	0.68		
15	DRY 100% L 150% P				0.94	0.64		
16	DRY 100% L 100% P				0.88	0.80	16.3	0.0103
16	DRY 100% L 50% P				0.84	0.70		
16	DRY 100% L 150% P				0.80	0.66		
17	DRY 100% L 100% P	212	0.113	0.87	0.80	0.80	19.0	0.0100
17	DRY 100% L 50% P				0.82	0.81		
17	DRY 100% L 150% P				0.95	0.82		
18	DRY 100% L 100% P	147	0.098	0.87	0.87	0.68	16.3	0.0123
18	DRY 100% L 50% P				0.88	0.72		
18	DRY 100% L 150% P				1.00	0.74		
19	DRY 100% L 100% P	131	0.086	0.80	0.75	0.69	13.8	0.0094
19	DRY 100% L 50% P				0.77	0.66		
19	DRY 100% L 150% P				0.88	0.77		
20	DRY 100% L 100% P	142	0.102	0.89	0.76	0.60	14.2	0.0100
20	DRY 100% L 50% P				0.81	0.64		
20	DRY 100% L 100% P				0.88	0.70		
21	DRY 100% L 100% P	170	0.128	0.87	0.76	0.58	13.4	0.0094
21	DRY 100% L 50% P				0.70	0.60		
21	DRY 100% L 150% P				0.96	0.68		
22	DRY 100% L 100% P	142	0.102	0.81	0.87	0.69	20.3	0.0143
22	DRY 100% L 50% P				0.98	0.77		
22	DRY 100% L 150% P				1.02	0.64		
23	DRY 100% L 100% P	170	0.120	0.86	0.80	0.67	15.3	0.0109
23	DRY 100% L 50% P				0.80	0.70		
23	DRY 100% L 150% P				0.79	0.69		
24	DRY 100% L 100% P	177	0.127	0.66	0.83	0.64	14.3	0.0102
24	DRY 100% L 50% P				0.88	0.68		
24	DRY 100% L 150% P				0.89	0.71		
25	DRY 100% L 100% P	142	0.101	0.52	0.84	0.60	20.6	0.0148
25	DRY 100% L 50% P				0.83	0.70		
25	DRY 100% L 150% P				0.87	0.70		

TABLE 8-1 (CONT.)
SUMMARY OF VARIOUS SELECTED CORNERING AND BRAKING PERFORMANCE COEFFICIENTS

TIRE TYPE NO.	TEST COMMENTS	CORNERING			BRAKING	
		CALPHA LB/DEG	CA/FZ	MUY PEAK	MUX PEAK	MUX SLIDE
26	DRY; 100% L; 100% P	207	0.133	0.84	0.86	0.69
27	DRY; 100% L; 100% P	202	0.108	0.87	0.81	0.61
28	DRY; 100% L; 100% P	202	0.144	0.85	0.87	0.67
29	DRY; 100% L; 100% P	122	0.087	0.87	0.78	0.71
30	DRY; 100% L; 100% P	160	0.115	0.87	0.70	0.81
31	DRY; 100% L; 100% P	169	0.121	0.87	0.76	0.[illegible]6
32	DRY; 100% L; 100% P	231	0.124	0.88	0.86	0.65
33	DRY; 100% L; 100% P	218	0.117	0.86	0.84	0.60
34	DRY; 100% L; 100% P	113	0.118	0.96	0.93	0.74
35	DRY; 100% L; 100% P	89	0.094	0.87	0.99	0.74
36	DRY; 100% L; 100% P	95	0.098	0.89	0.92	0.75
37	DRY; 100% L; 100% P	146	0.144	0.92	0.95	0.73
38	DRY; 100% L; 100% P	164	0.107	0.89	0.86	0.64
39	DRY; 100% L; 100% P	174	0.124	0.90	0.79	0.75
40	DRY; 100% L; 100% P	196	0.131	0.81	0.94	0.64
41	DRY; 100% L; 100% P	169	0.114	0.85	0.92	0.63
42	DRY; 100% L; 100% P	186	0.143	0.89	0.83	0.75
43	DRY; 100% L; 100% P	219	0.136	0.87	0.87	0.70
44	DRY; 100% L; 100% P	133	0.096	0.86	0.84	0.63
45	DRY; 100% L; 100% P	161	0.101	0.85	0.94	0.74
46	DRY; 100% L; 100% P	260	0.155	0.82	0.87	0.71
47	DRY; 100% L; 100% P	140	0.1[illegible]3	0.92	0.85	0.64
48	DRY; 100% L; 100% P	99	0.106	0.84	0.82	0.59
49	DRY; 100% L; 100% P	247	0.189	0.89	0.93	0.66
50	DRY; 100% L; 100% P				0.84	0.57

From previous experience, these results indicate that the percent increase is high. The actual average CA/FZ values are, at first glance, unexpectedly low with respect to the high performance tires tested. However, tire test measurements can be significantly influenced by tire and ambient temperatures.

For this comparison, the corresponding Contained Air Temperature (CAT) values show a dry average CAT value of 57° C while the wet average CAT was 38° C. As the CAT value drops, the CA/FZ value increases. This trend is identical to earlier investigations which involved <u>all</u> dry testing but at various operating temperatures.

Similarly, a correlation exists between the wet and dry CA/FZ results. The rate of change of CA/FZ with respect to CAT is computed:

$$\frac{\Delta\,\overline{CA/FZ}}{\Delta\,\overline{CAT}} = \frac{\overline{CA/FZ}_{wet} - \overline{CA/FZ}_{dry}}{\overline{CAT}_{wet} - \overline{CAT}_{dry}} = \frac{\overline{0.212} - \overline{0.138}}{\overline{38°C} - \overline{57°C}}$$

$$= -0.00284/°C$$

This ratio, -0.00284/° C, closely approximates similar studies.

As previously noted, the $\overline{CA/FZ}$ values reported in this report for the higher performance tires, seemed, "at first glance," to be low. An inspection of the majority of other studies shows that the CA/FZ values were obtained at nearly ambient temperature/tire conditions. Thus, arbitrarily choosing an ambient temperature (and similar CAT value) of 20° C, the present $\overline{CA/FZ}$ values are accordingly adjusted with respect to the above relationship. The equivalent CA/FZ value is computed to be $\overline{0.263}$, a more accepted "absolute" value with respect to the 20° C temperature reference.

In summary, some CA/FZ values for wet and dry testing have been presented and compared. And, the significance of temperature effects resulting from testing procedures and operating conditions have been emphasized.

This should not imply that the results presented in this report need be adjusted, but rather serves to stress the point that readers should be aware of the factors surrounding the reported results.

In any event, the results presented above have been derived from a small sample of measurements. They indicate a general trend rather than a rule or specific values. A systematic analysis should be undertaken to establish the relationship between the Cornering Stiffness Coefficient (CA/FZ) and Contained Air Temperature (CAT).

Additional wet versus dry comparisons show that:

- The wet Lateral Force Peak (MUYPEAK) coefficient decreased by an average of 28%.
- The wet Longitudinal Force Peak (MUXPEAK) coefficient decreased by an average of 23%.
- The wet Longitudinal Force Slide (MUXSLIDE) coefficient decreased by an average of 47%.

Note that the slide braking traction coefficient (MUXSLIDE) significantly decreased under wet conditions. From a vehicle safety aspect, any effort to prevent tire lock-up under wet conditions should be considered.

The average dry test results from the 25 tire types used under extended testing were also examined. Only those results, taken at the 100% load and 100% pressure conditions and under cornering, braking (@ $\alpha = 0°$) and rolling resistance testing are shown.

The upper (average of 5 highest) and lower (average of 4 lowest) bounds for five performance coefficients;

1. Cornering Stiffness Coefficient, CA/FZ
2. Peak Lateral Force (FY) Coefficient, MUYPEAK
3. Peak Braking Force (FX) Coefficient MUXPEAK
4. Slide Braking Force (FX) Coefficient, MUXSLIDE
5. Rolling Resistance Force (FR) Coefficient, FRC

are listed in Table 8-2.

Table 8-2

AVERAGE VALUES OF FIVE PERFORMANCE COEFFICIENTS

	Average Upper Bound	Average Lower Bound	Percent Spread
CA/FZ	0.174	0.097	79%
MUYPEAK	0.95	0.85	12%
MUXPEAK	0.97	0.76	28%
MUXSLIDE	0.80	0.61	31%
FRC	0.0143	0.0094	52%

Where the percent spread is defined;

$$\% \text{ Spread} = \frac{\text{Upper Bound Avg.} - \text{Lower Bound Av.}}{\text{Lower Bound Avg.}} \times 100$$

Table 8-2 shows the wide variations in performance; MUYPEAK has a 12% spread while the CA/FZ has a 79% spread and FRC has a 52% spread. Large modifications can be made to the CA/FZ characteristic without significantly altering the MUYPEAK capabilities.

But in contrast, the possibility of significant trade-offs between the CA/FZ and FRC characteristics is more profound and should be investigated.

From Table 8-2, the overall average values for the five performance characteristics are:

CA/FZ	:	0.136
MUYPEAK	:	0.90
MYXPEAK	:	0.87
MUXSLIDE	:	0.71
FRC	:	0.0119

A general comparison to a previous SAE paper (Ref. 5), shows that four of these averaged value only changed slightly. The fifth value, FRC was not previously measured.

The significant factor, in this case, is to note that the ongoing emphasis on lower tire rolling resistance loss has not compromised the overall tire performance.

A third observation is summarized in Figure 8-1. The plot shows the averaged FRC test data obtained at the three pressures (50% P, 100% P and 150% P) conditions and under the 100% load condition. The FRC values are 0.0174, 0.0119 and 0.0091 respectively for inflation pressures of 50%, 100% and 150% of maximum rated pressure.

An increase in pressure from 100% P to 150% P shows a 17% drop in FRC while a decrease in pressure from 100% P to 50% P shows a 59% increase in FRC. The 3.5:1 ratio emphasizes the consequences of tire underinflation.

Further analyses should be made to evaluate the tire temperature increase and consequential damage to the underinflated tire.

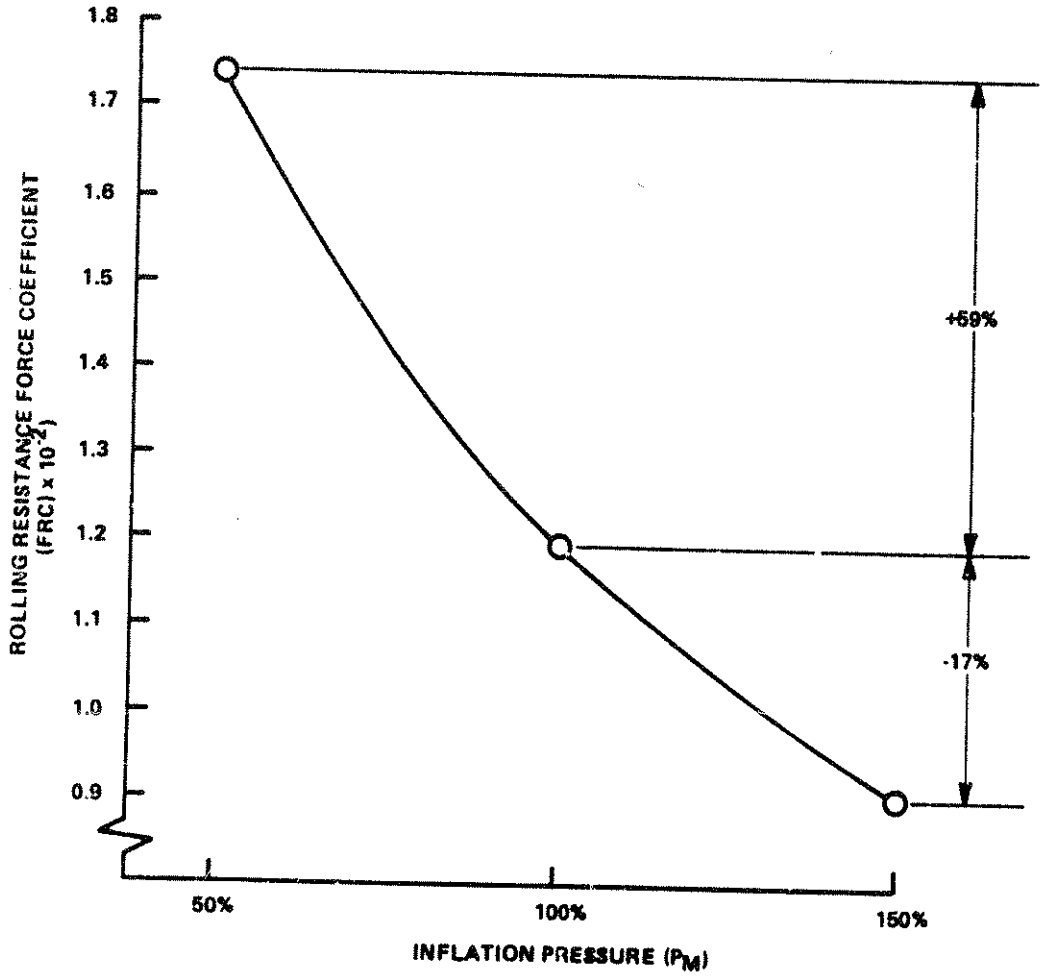


Figure 8-1 GRAPH OF THE ROLLING RESISTANCE FORCE COEFFICIENT VERSUS INFLATION PRESSURE

8.2 Data Presentation

The test data are presented as summaries of the measured force and moment results. The voluminous amount of raw data are available but not included as part of this report. Although a discussion of that data is also provided in this section. These data are presented in two parts.

8.2.1 Part I: Data Summaries

The data summaries are located in Appendix D of this report. The data are ordered according to Tire Type number. All summary results, which include all pertinent test runs for each of the 50 detailed tire types, are subsequently included after each respective Tire Type description. Table 6-2 can be referenced to readily locate a tire and/or test number.

The summaries of the test results include:

1. Tire and Run Identification
2. Footprint
3. Test data results for:
   a) Cornering and braking tests computer modelling constants and performance coefficients are ordered with respect to run number (as listed in 1 above) for each sequential tire type.

   OR

   b) Rolling resistance tests.

Note that the cornering coefficients and constants are not included for a few of the test runs. Although, the raw data were included in their entirety under separate cover. For these runs, the test conditions were too severe for the test tires and the tests were automatically aborted prior to completing the testing sequence. The test data, to the point of termination, are available, but not sufficient for the computer program to properly calculate all of its coefficients and constants.

Some values have already been manually approximated and appeared in the previous section.

The tire and run identification sheet includes the Tire Type Number for the purposes of cross-reference and also Tire Size, Brand Name, Manufacturer, Construction Type, Maximum Rated Load and Inflation Pressure, Number of Plies and Cord Material, Rim Width, Shore Hardness, all tire numbers, DOT Number, Groove Depth, Water Depth and Test Number of each Free Rolling, Braking or Rolling Resistance Test.

A figure showing the tire footprint at maximum rated load and inflation pressure is presented for most tire types. Footprints of a few tires were not obtained due to duplication at a different tire size for the same brand name.

8.2.1.1 Cornering and Braking

The list of coefficients and computer modeling constants are summarized for free-rolling and braking test conditions. The measured coefficients (Ref. 1) are shown in Table 8-3 and 8-4.

The computer modeling constants (Ref. 1) are summarized in Table 8-5. These constants can be used to describe the tire force and moment characteristics in the form of a few mathematical equations (Ref. 1). The load FZ is always taken to be positive.

Table 8-3

TIRE COEFFICIENTS

(for definitions, see Table 8-4)

Symbol	Parameter	Dimension
CALPHA, CA	Cornering Stiffness* (Def. 1)	lb/deg
CA/FZ	Cornering Stiffness Coeff.*	deg^{-1}
CGAMMA, CG	Camber Stiffness* (Def. 2)	lb/deg
CG/FZ	Camber Stiffness Coeff.*	deg^{-1}
CG/CA	Equivalent Slip Angle	
CS	Braking Stiffness (Def.3)	lb
CS/FZ	Braking Stiffness Coeff.*	
MUX PEAK	Peak Braking Coeff.* (Def. 4)	
MUX SLIDE	Slide Braking Coeff.* (Def. 5)	
MUY PEAK	Peak Lateral Force Coeff.* (Def. 6)	
NALPHA, NA	Cornering Aligning Stiffness* (Def. 7)	ft lb/deg
NA/FZ	Cornering Aligning Stiffness Coeff.*	ft/deg
NA/CA	Pneumatic Trail (Cornering)	ft
NGAMMA, NG	Camber Aligning Stiffness (Def. 8)	ft lb/deg
NG/FZ	Camber Aligning Stiffness Coeff.	ft/deg
NG/CG	Pneumatic Trail (Camber)	ft
SA @ MUY PEAK	Slip Angle at MUY Peak	deg
SL PEAK	Longitudinal Slip at MUX PEAK (Def. 9)	
FRC	Rolling Resistance Force Coefficient*	

*SAE Recommended Practice J670e

Table 8-4

COEFFICIENT DEFINITIONS

No.	Definitions
1	CALPHA = CA = ∂(FY)/∂(SA) @ SA = 0
2	CGAMMA = CG = ∂(FY)/∂(IA) @ IA = 0
3	CS = ∂(FX)/∂(SL) @ SL = 0
4	MUX PEAK = FX MAX/FZ
5	MUX SLIDE = FX/FZ @ SL = -1
6	MUY PEAK = FY MAX/FZ
7	NALPHA = NA = ∂(MZ)/∂(SA) @ SA = 0
8	NGAMMA = NG = ∂(MZ)/∂(IA) @ IA = 0
9	SL = (N/V) * ((V/N) @ T = 0)) - 1

where: SA = Slip Angle
IA = Inclination Angle
V = Vehicle Speed
N = Wheel Revolutions per Minute
T = Wheel Torque

Table 8-5

TIRE COMPUTER MODEL FUNCTIONS AND COEFFICIENTS

Constants	Dimensions
CORNERING STIFFNESS (COEFFICIENTS A0, A1, A2) CA = (A0 + A1 * FZ - (A1/A2) * FZ ** 2) * 0.0174533	lb/deg
CAMBER STIFFNESS (COEFFICIENTS A3, A4)+ CG = (A3 * FZ - (A3/A4) * FZ ** 2) * 0.0174533	lb/deg
PEAK LATERAL FORCE COEFFICIENT (COEFFICIENTS B3, B1, B4) MUY PEAK = B3 + B1 * FZ + B4 * FZ ** 2	–
OVERTURNING MOMENT (COEFFICIENTS C1, C2, C3)+ MX = (C1 + C2 * ABS (GAMMA)) * FY * FZ + C3 * GAMMA * FZ	ft lb
ALIGNING TORQUE (COEFFICIENTS K1, K2, K3)+ MZ = (K1 * FZ * + K2 * ABS (FY)) * FY + K3 * FZ * GAMMA/SQRT (ABS (GAMMA))	ft lb
PEAK BRAKING COEFFICIENT (COEFFICIENTS P0, P1, P2)++ MUX PEAK = P0 + P1 * FZ + P2 *FZ ** 2	–
LONGITUDINAL SLIP AT MUX PEAK (COEFFICIENTS R0, R1) SL PEAK = R0 + R1 * FZ	–
SLIDE BRAKING COEFFICIENT (COEFFICIENTS S0, S1, S2)++ MUX SLIDE = S0 + S1 * FZ + S2 * FZ ** 2	–

+GAMMA IN RADIAN: FZ, POSITIVE
++LISTED FOR FIRST AND SECOND ORDER POLYNOMIAL FITS

Lateral Force Equations

The equation used for cornering stiffness as a function of vertical load is:

$$C\alpha = (-\partial Fy/\partial \alpha)_{\alpha=0} = [A_0 + A_1 FZ - (A_1/A_2)FZ^2]\ \pi/180,\ \text{lb/deg}$$

The model equation used for camber stiffness as a function of vertical load is:

$$C\gamma = (\partial Fy/\partial \gamma)_{\gamma=0} = [A_3 FZ - (A_3/A_4)FZ^2]\ \pi/180,\ \text{lb/deg}$$

For peak lateral force coefficient as a function of vertical load, the equation is:

$$\mu_{yp} = Fy_{MAX}/FZ = B_3 + B_1 FZ + B_4 FZ^2,\ \text{lb/lb}$$

Moment Equations

The equation used for overturning moment as a function of vertical load-lateral force and inclination angle (in rad) is:

$$Mx = (C_1 + C_2\ |\gamma|)\ FyFZ + C_3 \gamma FZ,\ \text{ft/lb}$$

The equation for the aligning torque as a function of vertical load, lateral force and inclination (in rad) is:

$$MZ = (K_1 + K_2|Fy|)\ Fy + K_3 FZ\gamma\ /\sqrt{|\gamma|},\ \text{ft/lb}$$

Longitudinal (Braking) Force Equations

The equation used for peak braking coefficient as a function of vertical load is:

$$\mu_{xp} = Fx_{SLIDE}/FZ = S_0 + S_1 FZ + S_2 FZ^2,\ \text{lb/lb}$$

For longitudinal slip at peak braking force as a function of vertical load the equation is:

$$S_{lp} = R_0 + R_1 FZ$$

These eight tire model functions contain 22 coefficients. The data reduction computer program previously used in Reference 1 was modified to account for the different load, slip angle and inclination angle conditions. The program was used to compute the modeling constants and coefficients from the raw data recorded on TIRF. In addition, the dynamic spring rate was calculated from the measured Normal Force (FZ) and Loaded Radius (RL). The Spring Rate (lb/in) appears along with the cornering coefficient information.

8.2.1.2 Rolling Resistance

The rolling resistance test data results are summarized in tables for each of the first twenty five tire types. These data represent the averaged results from data recorded during each of the six stabilized test conditions. Approximately thirty data points, taken at 1 second intervals, were used to calculate the rolling resistance test data. A warm-up period, as detailed in Section 6, preceded each equilibrium test condition.

The symbols are defined in Section 4. In addition, the Rolling Resistance Force Coefficient is presented. It is the ratio of the rolling resistance to the vertical load.

8.2.2 Part II: Raw Data

The "raw" data comprise all data points recorded during the test program. Each data point includes all dependent and independent parameters. These data are available as tabulations for each test run. Also included are X-Y plots which were generated from the numerical values of the tabulated results. The plots and tabulation are preceded by a test/tire description of the test run. The test data have been organized, for each run number, in the following order:

- Tire/Test Description
- Plotted Data
- Tabulation.

Several plots were made for each of three test types: 1) Cornering tests, 2) Straight-ahead braking traction tests and 3) Combined lateral and braking traction testing.

The Cornering tests include three graphs:

1. A plot representing the camber test phase shows the Lateral Force (FY) versus Inclination Angle (IA) for each of three normal loads and at zero slip angle.

2. A plot representing the cornering/camber test phase shows the Lateral Force (FY) versus Slip Angle (SA) for each of eleven inclination angles and at the 100% load condition.

3. A plot representing the cornering test phase shows the Lateral Force (FY) versus Slip Angle (SA) for each of four normal loads and at zero inclination angle.

The Straight-Ahead Braking Traction tests include two graphs for each test:

1. A plot of Normalized Longitudinal (NFX) versus Slip Ratio (SR) for each of three normal loads.

2. A plot of Longitudinal Force (FX) versus Slip Ratio (SR) for each of three normal loads.

The Combined Lateral and Braking Traction tests also include two graphs for each test:

1. A plot of Normalized Longitudinal Force (NFX) versus Slip Ratio (SA) for each of eleven slip angles.

2. A plot of Longitudinal Force (FX) versus Slip Ratio (SR) for each of eleven slip angles.

The tabulated data includes eighteen selected parameters for each test run.

Tabulation for Cornering Tests

The eighteen listed parameters include: TE, SA, IA, FX, FY, FZ, MX, MY, MZ, P, RL, RE, N, SR, T, CAT, NFY, TST.

Tabulation for Braking Tests

The eighteen listed parameters include: TE, SR, V, FX, FY, FZ, NFX, MX, MY, MZ, N, RL, RE, T, FRS, NFR and PL.

Tabulation for Rolling Resistance Tests

The fifteen listed parameters include: TE, V, FZ, P, FR, ER, FX, BFT, RL, FY, MZ, CAT, N and SA.

The raw data plots and lists for the ten testing group categories as described in section 6, have been assembled under separate cover. These categories are under the test headings of free-rolling cornering, straight-ahead braking, combined cornering and braking and rolling resistance.

Cornering Tests

- Group I - Basic, dry at 100% pressure
  - Runs numbered 1-26, 53-61, 136-143 and 162-168.
- Group III - Extended, dry at various pressures
  - Runs numbered 169-178.
- Group VI - Extended, wet at 100% pressure
  - Runs numbered 152-156.

Straight-Ahead Braking Tests

- Group II - Basic, dry at 100% pressure
  - Runs numbered 27-52, 62-70, 144-151 and 179-185.
- Group IV - Extended, dry at various pressures
  - Runs numbered 186-195.
- Group VII - Extended, wet at 100% pressure
  - Runs numbered 157-161.
- Group VIII - Extended, dry at various pressures
  - Runs numbered 116-135, 206-214 and 216-226.

Combined Cornering and Braking Tests

- Group IX - Extended, New tires
  - Runs numbered 83-94, 97-115 and 272-286.
- Group X - Extended, Shaved tires
  - Runs numbered 227-271.

Rolling Resistance Tests

- Group V - Extended, various pressures and loads
  - Runs numbered 71-82, 95, 96, 196-205 and 215.

Table 8-6 shows the overall tire identification to test category correlation.

Table 8-6

OVERALL TIRE IDENTIFICATION AND TEST CATEGORY SCHEDULE

TIRE TYPE	MANUFACTURER	DESCRIPTION	TIRE SIZE	TESTED UNDER TEST GROUP	TREAD DEPTH	ROAD SURFACE	PERCENT OF MAXIMUM RATED PRESSURE (P_M)	PERCENT OF MAXIMUM RATED LOAD (L_M)
1	GOODYEAR	POLYSTEEL	P195/75R14	I	NEW	DRY	100%	50, 100, 150 & 200%
				II				50, 100 & 150%
				V			50, 100 & 150%	
				IX				
				X	SHAVED			
2	FIRESTONE	TRAX 12	P195/75R14	(SAME AS TIRE TYPE 1)				
3	GENERAL	DUAL STEEL III	P195/75R14	(SAME AS TIRE TYPE 1)				
4	COOPER	TRENDSETTER	A78-13	(SAME AS TIRE TYPE 1)				
5	GOODYEAR	EAGLE NCT	P195/70R14	(SAME AS TIRE TYPE 1)				
6	FIRESTONE	721	P195/75R14	I	NEW	DRY	100%	50, 100, 150 & 200%
				II				50, 100 & 150%
				III			50 & 150%	50, 100, 150 & 200%
				IV				50, 100, & 150%
				V			50, 100 & 150%	
				VI		WET	100%	50, 100, 150 & 200%
				VII				50, 100 & 150%
				VIII		DRY	50 & 150%	
7	SEMPIRIT	M501	185SR14	(SAME AS TIRE TYPE 6)				
8	MICHELIN	TRX	220/55A390	(SAME AS TIRE TYPE 6)				
9	PIRELLI	P7	P205/65VR14	(SAME AS TIRE TYPE 6)				
10	PIRELLI	P6	P185/65R15	(SAME AS TIRE TYPE 6)				
11	UNIROYAL	STEEL ER	P195/75R14	I	NEW	DRY	100%	50, 100, 150 & 200%
				II				50, 100 & 150
				V			50, 100 & 150%	
				VIII			50 & 150%	
12	BRIDGESTONE	RD401	P195/75R14	(SAME AS TIRE TYPE 11)				
13	ARMSTRONG	POS-A-TRAC	P185/80-15					
14	GENERAL	JET RADIAL	P155/80R13					
15	GOODYEAR	SELF SUPPORT	P195/75R14					
16	UNIROYAL	HIDEAWAY	T125/70D15					
17	GENERAL	STEEL GRIPPER	P225/75R15					
18	REMINGTON	PIONEER	FR78-14					
19	J. C. PENNEY'S	WEATHERTAMER	P195/75R14					
20	SEARS	GUARDSMAN	P195/75R14					
21	GOODYEAR	VIVA	P195/75R14					
22	SEARS	SUPERGUARD	E78-14					
23	MONTGOMERY	GAS MISER	P195/75R14					
24	UNIROYAL	ROYAL SEAL	P195/75R14					
25	K-MART	KM-78	E78-14					
26	GOODRICH	ADVANTAGE T/A	P215/70R14	I	NEW	DRY	100%	50, 100, 150 & 200%
				II				50, 100 & 150%
27	UNIROYAL	STEELER	P225/75R15	(SAME AS TIRE TYPE 26)				
28	MICHELIN	XWW	P185/75R14					
29	UNIROYAL	TIGER PAW	P195/75R14					
30	GOODYEAR	ARRIVA	P185/75R14					
31	FIRESTONE	TOWN & COUNTRY	P195/75R14					
32	FIRESTONE	721	P225/75R15					
33	GOODYEAR	POLYSTEEL	P225/75R15					
34	GOODYEAR	POLYSTEEL	P155/80R13					
35	KELLY SPRINGFIELD	SPORT MARK	155SR13					
36	COOPER	GLAS BELT	P155/80R13					
37	BRIDGESTONE	RD 108	165SR13					
38	UNIROYAL	STEEL BELTED	P205/75R14					
39	SEARS	WEATHERWISE	P195/75R14					
40	SEARS	SUPER GUARD	FR78-14					
41	MANSFIELD	KEVLAR	FR78-14					
42	STRATTON	SPORT RADIAL	P195/70R14					
43	EMPCO	POWER CAT	QR60-14					
44	FIRESTONE	RETREAD SUPER	E70-14					
45	SEARS	SUPER GUARD	G78-15					
46	DUNLOP	GT QUALIFIER	QR60-15					
47	FIRESTONE	DELUXE CHAMPION	P155/80R13					
48	UNIROYAL	FASTRAK	P155/80R13					
49	CONTINENTAL	TS 771	P195/70R14					
50	FIRESTONE	TEMPA SPARE	T125/70D15					

9.0 REFERENCES

1. Schuring, D. J., "Tire Parameter Determination," Final Report, Report No. DOT-HS-4-00923, November 1975.

2. Martin, J. F., "Experimental Validation of the Calspan Tire Research Facility," Final Report, Report No. ZM-5269-K-1, December 1973.

3. Radt, H. S. and Milliken, W. F., "Non-Dimensionalizing Tire Data for Vehicle Simulation," IME Paper C133/83, May 1983.

4. "Vehicle Dynamics Terminology SAE J670e," SAE Recommended Practice, Society of Automotive Engineers, Inc., 1978.

5. Schuring, D. J., Tapia, G. A., and Gusakov, I., "Influence of Tire Design Parameters on Tire Force and Moment Characteristics," SAE Paper 760732, 1976.

APPENDIX A

TEST SCHEDULE FOR 286 RUNS

Run Number Ordered

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
1	8	Dry	35	30	Free Rolling	1	2	3	I
2	5								
3	15								
4	24								
5	18								
6	22								
7	21								
8	7								
9	4								
10	6								
11	10								
12	9								
13	12								
14	20								
15	11								
16	1								
17	3		32						
18	13		35						
19	14								
20	16		32						
21	17								
22	19		35						
23	25		32						
24	27		35						
25	28								
26	29								
27	8				SR = 0 ▶ -1	0	0	4	II
28	5								

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
29	15	Dry	35	30	SR = 0 ▶ -1	0	0	4	II
30	24								
31	18								
32	22								
33	21								
34	7								
35	4								
36	6								
37	27								
38	28								
39	29								
40	19								
41	25		32						
42	10		35						
43	9								
44	12								
45	20								
46	11								
47	1								
48	13								
49	14								
50	3		32						
51	16								
52	17								
53	26				Free Rolling	1	2	3	I
54	30								
55	39		35						
56	38		32						

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
57	46	Dry	32	30	Free Rolling	1	2	3	I
58	40								
59	41								
60	2		35						
61	3								
62	26		32		SR = 0 ▶ -1	0	0	4	II
63	30								
64	39		35						
65	46		32						
66	38								
67	41								
68	40								
69	2		35						
70	23								
71	42		6	50	Rolling Resistance	0	0	5	V
72	31								
73	32								
74	54								
75	50								
76	57								
77	68								
78	47								
79	66								
80	58								
81	62								
82	60								
83	43		52.5	30	SR = 0 ▶ -1	7	0	700	IX
84	35								

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
85	51	Dry	52.5	30	SR = 0 ▶ -1	7	0	700	IX
86	63		▼					530	
87	43		35					700	
88	35								
89	51							▼	
90	63		▼					530	
91	43		17.5					700	
92	35								
93	51							▼	
94	63		▼	▼	▼	▼	▼	530	▼
95	71		6	50	Rolling Resistance	0	0	5	V
96	75		▼	▼	▼	▼	▼	▼	▼
97	44		52.5	30	SR = 0 ▶ -1	7	0	1400	IX
98	36								
99	52							▼	
100	64		▼					1060	
101	44		35					1400	
102	36								
103	52							▼	
104	64		▼					1060	
105	44		17.5					1400	
106	36								
107	52							▼	
108	64		▼					1060	
109	45		52.5					2100	
110	37								
111	53		▼						
112	45	▼	35	▼	▼	▼	▼	▼	▼

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
113	37	Dry	35	30	SR = 0 ▶ -1	7	0	2100	IX
114	53								
115	45		17.5						
116	32		52.5			0	0	4	VIII
117	54								
118	57								
119	60								
120	68		48						
121	71		52.5						
122	66		48						
123	75		52.5						
124	47								
125	58								
126	32		17.5						
127	54								
128	57								
129	60								
130	68		16						
131	71		17.5						
132	66		16						
133	75		17.5						
134	47								
135	58								
136	59		35		Free Rolling	1	2	3	I
137	61								
138	67		32						
139	72		35						
140	65		32						

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
141	76	Dry	35	30	Free Rolling	1	2	3	I
142	79		60						
143	81								
144	59		35		SR = 0→-1	0	0	4	II
145	61								
146	67		32						
147	72		35						
148	65		32						
149	76		35						
150	82		60						
151	81								
152	33	Wet S/N 30	35		Free Rolling	1	2	3	VI
153	69	(0.020" water)	32						
154	73		35						
155	77								
156	48								
157					SR = 0→-1	0	0	4	VII
158	77								
159	33								
160	69		32						
161	73		35						
162	94	Dry			Free Rolling	1	2	3	I
163	55								
164	105								
165	83								
166	99		32						
167	96								
168	113		35						

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
169	34	Dry	17.5	30	Free Rolling	1	2	3	III
170	33		52.5						
171	70		16						
172	69		48						
173	74		17.5						
174	73		52.5						
175	78		17.5						
176	77		52.5						
177	49		17.5						
178	48		52.5						
179	94		35		SR = 0 ▶ -1	0	0	4	II
180	55								
181	105								
182	83								
183	98		32						
184	96								
185	113		35						
186	34		17.5						IV
187	33		52.5						
188	70		16						
189	69		48						
190	74		17.5						
191	73		52.5						
192	78		17.5						
193	77		52.5						
194	49		17.5						
195	48		52.5						
196	87		6	50	Rolling Resistance	0	0	5	V

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
197	100	Dry	6	50	Rolling Resistance	0	0	5	V
198	99								
199	114								
200	56								
201	97								
202	115								
203	109								
204	80								
205	116								
206	114		52.5	30	SR = 0 ▶ -1	0	0	4	VIII
207	100								
208	56								
209	99		48						
210	97								
211	115								
212	116		52.5						
213	109								
214	80		90						
215	117		6	50	Rolling Resistance	0	0	5	V
216	114		17.5	30	SR = 0 ▶ -1	0	0	4	VIII
217	100								
218	56								
219	99		16						
220	97								
221	115								
222	116		17.5						
223	117		52.5						
224	109		17.5						

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
225	80	Dry	30	30	SR = 0 → -1	0	0	(4)	VIII
226	117		17.5						
227	91		52.5			(7)	0	700	X
228	110								
229	106								
230	94							656	
231	101		48					530	
232	102		32						
233	103		16						
234	92		35					700	
235	111								
236	107								
237	85							656	
238	93		17.5					700	
239	112								
240	108								
241	86							656	
242	91		52.5					1400	
243	110								
244	106								
245	84							1312	
246	101		48					1060	
247	102		32						
248	103		16						
249	92		35					1400	
250	111								
251	107								
252	85							1312	

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
253	93	Dry	17.5	30	SR = 0→-1	7	0	1400	X
254	112								
255	108								
256	86							1312	
257	91		52.5					2100	
258	110								
259	106								
260	84							1968	
261	101		48					1590	
262	102		32						
263	103		16						
264	111		35					2100	
265	92								
266	107								
267	85							1968	
268	93		17.5					2100	
269	112								
270	108								
271	86							1968	
272	88		52.5					656	IX
273	89		35						
274	90		17.5						
275	104		48						
276			32						
277	88		52.5					1312	
278	89		35						
279	90		17.5						
280	37							2100	

TIRE TEST SCHEDULE

RUN (-0-3)	TIRE (300-)	ROAD CONDITION	P psi	V mph	S	SA deg.	IA deg.	LOAD lb	TEST GROUP
281	53	Dry	17.5	30	SR = 0→-1	7	0	2100	IX
282	104		16					1590	
283	88		52.5					1968	
284	89		35						
285	90		17.5						
286									

Tire Test Schedule (Con't)

- Slip Angle Schedule ①: Sweep from -1 to +20 degrees at a sweep rate of 1 deg/sec
- Slip Angle Schedule ⑦: 0, 2, 4, 6, 8 10, 12, 14, 16, 18 and 20 degrees
- Inclination Angle Schedule ②: a) Sweep from -20 to +20 degrees at a sweep rate of 1 deg/sec while at zero slip angle
- Inclination Angle Schedule ②: b) 0, 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 degrees while sweeping Slip Angle
- Normal Load Schedule ③: a) 50%, 100% and 150% of LM during inclination angle sweeps
- Normal Load Schedule ③: b) 50%, 100%, 150% and 200% of LM while at zero inclation angle
- Normal Load Schedule ④: 50%, 100% and 150% of LM
- Normal Load ⑤ - Pressure ⑥ Schedules:

Parameter \ Condition	1	2	3	4	5	6
⑤ Load (%)	100	150	100	100	100	50
⑥ *Pressure (%)	100-C	100-R	50-R	100-R	150-R	100-R
Duration (MIN)	30	10	10	10	10	10

*Pressure: C - capped air, R - regulated air

APPENDIX B

TIRE IDENTIFICATION SCHEDULE FOR 115 TIRES

Tire Number Ordered

TIRE IDENTIFICATION SCHEDULE

TIRE TIRE NO. (300-)	MANUFACTURER (DISTRIBUTOR)	SIZE	TIRE DESCRIPTION	DOT - SERIAL NO.	TIRE TYPE
1	GOODYEAR	P155/80R13	POLYSTEEL RADIAL	MKE4 EHO 299	34
2	FIRESTONE	P155/80R13	DELUXE CHAMPION	VDEA D50 480	47
3	KELLY SPRN.	155SR13	SPORT MARK GP RADIAL	PKE5 KAM 339	35
4	GOODYEAR	P195/75R14	ARRIVA	MDKA VHO 140	30
5	GOODYEAR	P195/75R14	CUSTOM POLY STEEL	MKKA DHZ 041	1
6	FIRESTONE	P195/75R14	SNOW BITER TOWN & COUNTRY	VCKA XH3 380	31
7	FIRESTONE	P195/75R14	TRAX 12	WZKA TRD 031	2
8	FIRESTONE	P195/75R14	721	WZKA XT3 041	6
9	GOODYEAR	P225/75R15	CUSTOM POLY STEEL	MKHH DHO 071	33
10	FIRESTONE	P225/75R15	721	HYHH XR6 101	32
11	MICHELIN	220/55R390	TRX	FHR8 252X 359	8
12	UNIROYAL	P225/75R15	STEELER	APHH UKF 450	27
13	COOPER	P155/80R13	GLAS BELT	UPE4 CBN 450	36
14	GENERAL	P155/80R13	JET RADIAL	ACEW BRD 300	14
15	UNIROYAL	P195/75R14	STEELER	APKA CB 320	11
16	BRIDGESTONE	165SR13	RD 108	EJE9 JBD 410	37
17	COOPER	A78-13	TREND SETTER	UTFS CA6 390	4
18	GENERAL	P195/75R14	DUAL STEEL III	A3KA CB 150	3
19	UNIROYAL	P205/75R14	STEEL BELTED	APKC DH 320	38
20	GENERAL	P225/75R15	DUAL STEEL GRIPPER	ADHH KUU 240	17
21	BRIDGESTONE	P195/75R14	RD 401	EJP9 JBH 051	12

TIRE IDENTIFICATION SCHEDULE

TIRE TIRE NO. (300-)	MANUFACTURER (DISTRIBUTOR)	SIZE	TIRE DESCRIPTION	DOT - SERIAL NO.	TIRE TYPE
22	UNIROYAL	P195/75R14	TIGER PAW	ANKA UKE 081	29
23	UNIROYAL	P155/80R13	FASTRAK	ANE4 EM 011	48
24	MICHELIN	P195/75R14	MICH X	M3A5 311X 439	28
25	REMINGTON	FR78-14	PIONEER	DBL8 L2A 148	18
26	SEARS	FR78-14	SUPERGUARD	CKL8 12C 500	40
27	SEARS	P195/75R14	GUARDSMAN	CHKA 174 520	20
28	J. C. PENNEY	P195/75R14	WEATHERTAMER	HYKA PMY 111	19
29	SEARS	P195/75R14	WEATHERWISE	CEKA 2A1 091	39
30	MANSFIELD	FR78-14	KEVLAR MDG	LVL8 N64 517	41
31	FIRESTONE	P195/75R14	TRAX 12	WZKA TRD 031	2
32	"	"	721	WZKA XT3 141	6
33	"	"	721	WZKA XT3 041	6
34	"	"	721	WZKA XT3 021	6
35	"	"	TRAX 12	WZKA TRD 031	2
36	"	"	TRAX 12	WZKA TRD 031	2
37	"	"	TRAX 12	WZKA TRD 031	2
38	EMPCO	GR60-14	POWER CAT RADIAL 60	A3KX WVE 518	43
39	STRATTON	195/70SR14	SPORT RADIAL 70	BFJ9 RIP 121	42
40	SEARS	G78-15	SUPERGUARD BELTED	CEVV 181 091	45
41	DUNLOP	GR60-15	GT QUALIFIER	DBUF AA9 141	46
42	GOODYEAR	P195/75R14	CUSTOM POLYSTEEL	MKKA DH2 041	1

TIRE IDENTIFICATION SCHEDULE

TIRF TIRE NO. (300-)	MANUFACTURER (DISTRIBUTOR)	SIZE	TIRE DESCRIPTION	DOT - SERIAL NO.	TIRE TYPE
43	GOODYEAR	P195/75R14	CUSTOM POLYSTEEL	MKKA DH2 041	1
44	"	"	"	"	1
45	"	"	"	"	1
46	FIRESTONE	E70-14	RETREAD SUPER SPORTS	VHLB VCY 418	44
47	MICHELIN	220/55R390	TRX	FHR8 252X 369	8
48	"	"	"	FHR8 252X 299	8
49	"	"	"	FHR8 252X 289	8
50	GENERAL	P195/75R14	DUAL STEEL	A3RA CB1 121	3
51	"	"	"	A3RA CB1 500	3
52	"	"	"	A3KA CB1 500	3
53	"	"	"	A3KA CB1 500	3
54	UNIROYAL	P195/75R14	STEELER	APKA CB 270	11
55	"	P195/75R14	ROYAL SEAL	APKA UJ8 190	24
56	"	"	"	"	24
57	BRIDGESTONE	P195/75R14	RD 401	EJP9 JBH 051	12
58	GENERAL	P155/80R13	JET RADIAL	ACE4 EJC 290	14
59	GOODYEAR	P195/75R14	SELF SUPPORT TIRE	MAKA 982 031	15
60	"	"	"	"	15
61	CONTINENTAL	195/70SR14	TS 771	CPJ9 2KD 010	49
62	COOPER	A78-13	TRENDSETTER	UTF5 CA6 390	4
63	"	"	"	"	4

TIRE IDENTIFICATION SCHEDULE

TIRE TIRE NO. (300-)	MANUFACTURER (DISTRIBUTOR)	SIZE	TIRE DESCRIPTION	DOT - SERIAL NO.	TIRE TYPE
64	COOPER	A78-13	TREND SETTER	UTF5 CA6 390	4
65	ARMSTRONG	NR50-15	POS-A-TRACTION TWISTER	CH8V C84 400	13
66	"	"	"	"	13
67	SEMPERIT	185SR14	M501	BTJ5 SYX 121	7
68	"	"	"	"	7
69	"	"	"	"	7
70	"	"	"	"	7
71	PIRELLI	205/55VR14	P7	XAA4 XKAY 290	9
72	"	"	"	"	9
73	"	"	"	"	9
74	"	"	"	"	9
75	PIRELLI	185/65R15	P8	XBMO XJJH 490	10
76	"	"	"	"	10
77	"	"	"	"	10
78	"	"	"	"	10
79	UNIROYAL	T125/70D15	TEMPORARY HIDEAWAY	AKPY H9U1 040	16
80	"	"	"	AKPY H9U5 070	16
81	FIRESTONE	T125/70D15	TEMPA - SPARE	VCPY H9K 089	50
82	UNIROYAL	T125/70D15	TEMPORARY HIDEAWAY	AKPY H9U5 070	16
83	GOODYEAR	P195/70R14	NCT	MKRW RTO 161	5
84	"	"	"	"	5

TIRE IDENTIFICATION SCHEDULE

TIRE TIRE NO. (300-)	MANUFACTURER (DISTRIBUTOR)	SIZE	TIRE DESCRIPTION	DOT - SERIAL NO.	TIRE TYPE
85	GOODYEAR	P195/70R14	NCT	MKRW RTO 151	5
86	"	"	"	"	5
87	"	"	"	MKRW RTO 161	5
88	"	"	"	"	5
89	"	"	"	"	5
90	"	"	"	MKRW RTO 151	5
91	GOODYEAR	P195/75R14	POLYSTEEL	MDKA CBO 201	1
92	"	"	"	MDKA CBO 271	1
93	"	"	"	"	1
94	"	"	VIVA	MBKA EJ5 251	21
95	"	"	"	"	21
96	K-MART	E78-14	K1 78	CC15 K9C 371	25
97	"	"	"	CC15 K9D 341	25
98	SEARS	E78-14	SUPERGUARD	CEL5 181 500	22
99	"	"	"	"	22
100	SEARS	P195/75R14	GUARDSMAN	CKKA 17C 201	20
101	COOPER	A78-13	TREND SETTER	UTF5 CA6 390	4
102	"	"	"	"	4
103	"	"	"	"	4
104	"	"	"	"	4
105	MONTGOMERY	P195/75R14	GAS MISER	W2KA MD3 031	23

TIRE IDENTIFICATION SCHEDULE

TIRE TIRE NO. (300-)	MANUFACTURER (DISTRIBUTOR)	SIZE	TIRE DESCRIPTION	DOT - SERIAL NO.	TIRE TYPE
106	GENERAL	P195/75R14	DUAL STEEL	A3KA CB1 371	3
107	"	"	"	"	3
108	"	"	"	"	3
109	GENERAL	P225/75R15	DUAL STEEL GRIPPER	A3HH WUU 269	17
110	FIRESTONE	P195/75R14	TRAX 12	W2KA TRC 071	2
111	"	"	"	W2KA TRC 301	2
112	"	"	"	"	2
113	B.F. GOODRICH	P215/70R14	ADVANTAGE T/A	BEUX 7F1 171	26
114	J. C. PENNEY	P195/75R14	WEATHERTAMER	HYKA PMY 331	19
115	REMINGTON	FR78-14	PIONEER	DBL8 E18 259	18
116	GOODYEAR	P195/75R14	VIVA	MBKA EJ5 301	21
117	MONTGOMERY	P195/75R14	GAS MISER	W2KA M03 381	23

APPENDIX C

TIRE RESEARCH FACILITY (TIRF) DESCRIPTION

TEST FACILITY

A photograph of the TIRF facility is shown as the frontispiece to this report; a dimensional view of the facility is shown in Figure C-1. The primary features of the machine are:*

Tire Positioning System

The tire, wheel, force sensing balance and hydraulic motor to drive or brake the tire are mounted in the movable upper head. The head provides steer, camber and vertical motions to the tire. These motions (as well as vertical loading) are servocontrolled and programmable for maximizing test efficiency. The ranges of the position variables, the rates at which they may be adjusted and other information are shown in Table C-1.

Table C-1
TIRF CAPABILITIES

CHARACTERISTIC	RANGE
TIRE SLIP ANGLE (α)	$\pm 30^{\circ}$**
TIRE INCLINATION ANGLE (γ)	$\pm 30^{\circ}$***
TIRE SLIP ANGLE RATE ($\dot{\alpha}$)	10°/sec
TIRE INCLINATION ANGLE RATE ($\dot{\gamma}$)	7°/sec
TIRE LOAD RATE (TYPICAL)	2000 lb/sec
TIRE VERTICAL POSITIONING RATE	2"/sec
ROAD SPEED (V)	0-200 mph
TIRE OUTSIDE DIAMETER	Up to 45"
TIRE TREAD WIDTH	24" MAX.
BELT WIDTH	28"

*A more complete description of this facility will be found in Reference 2.
**Can be increased to 90° with special setup.
***Can be increased to 60° with special setup.

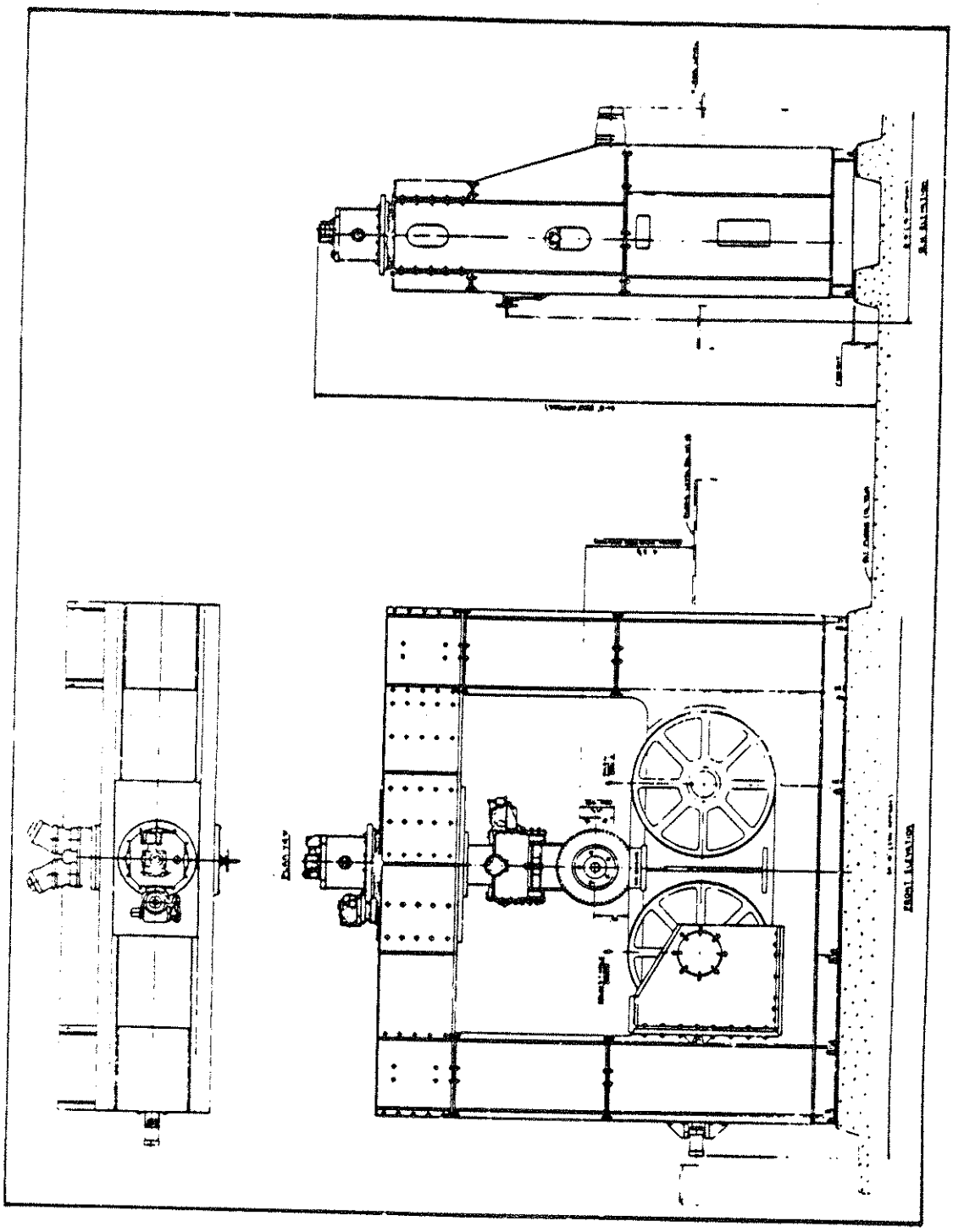


Figure C-1 TIRE RESEARCH MACHINE

Roadway

The 28-inch wide roadway is made up of a stainless steel belt covered with material that simulates the frictional properties of actual road surfaces. The belt is maintained flat to within 1 to 2 mils under the tire patch by the restraint provided by an air bearing pad which is beneath the belt in the tire patch region. The roadway is driven by one of the two 67-inch diameter drums over which it runs. The road speed is servocontrolled; it may be programmed to be constant or varied.

The surfaces usually used are "Safety Walk."* These surfaces have excellent microtexture giving a wet skid number** of about 60 in the untreated condition. The surfaces are honed to reduce the wet skid number to lower values (typically surfaces of skid number 50 and 30 are used).

A unique feature of TIRF is the ability to carry out tests under wet road conditions. A two-dimensional water nozzle spans the roadway. This nozzle has an adjustable throat which can be set to the desired water depth. The flow through the nozzle is then varied by controlling the water pressure. At each test condition the water film is laid on tangential to the belt at belt velocity. The film thickness may be varied from as low as 0.005 inches up to 0.4 inches.

Tire-Wheel Drive

A drive system which is independent of the roadway drive is attached to the tire-wheel shaft. This separate drive allows full variation of tire slip both in the braking and driving modes. The tire slip ratio, referenced to road speed, is under servocontrol.

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*Manufactured by the 3M Company

**At 40 mph and 0.020-inch water depth using the ASTME-501 Standard Pavement Traction Tire

Balance System*

A six-component strain gage balance surrounds the wheel drive shaft. Three orthogonal forces and three corresponding moments are measured through this system. A fourth moment, torque, is sensed by a torque link in the wheel drive shaft. The load ranges of the basic passenger car and truck tire balances are shown in Table C-2. Transfer of forces and moments from the balance axis-system to the conventional SAE location at the tire-roadway interface is in the data reduction computer program.

Table C-2
BALANCE SYSTEM CAPABILITY

COMPONENT	PASSENGER CAR TIRE BALANCE	TRUCK TIRE BALANCE
TIRE LOAD (L)	4000 lb	12,000 lb
TIRE TRACTIVE FORCE	±4000 lb	± 9000 lb
TIRE SIDE FORCE	±4000 lb	± 8000 lb
TIRE SELF ALIGNING TORQUE	±500 lb ft	± 1000 lb ft
TIRE OVERTURNING MOMENT	±1000 lb ft	± 2000 lb ft
TIRE ROLLING RESISTANCE MOMENT	±200 lb ft	± 400 lb ft

System Operation

Data Acquisition Program (DAP) Control

The data acquisition program (DAP) is a software system which controls machine operation and logs data during tests. DAP controls test operations by means of discrete setpoints which are generated in the computer by the program. These setpoints are sent to the machine servos which respond and establish tire

*More detailed information on the balance systems and their calibration may be found in Reference 2.

test conditions. After the setpoints are sent to the servos, a delay time is provided which starts after the machine variables have reached a steady state value within predetermined tolerances. This allows the system to stabilize before data are taken. After data are taken, the next set of test conditions is established and testing continues.

One or two variables can be changed during DAP testing. The other test parameters are kept fixed throughout the test. Up to twenty data points can be used for each variable in a run.

A data reduction program is used to operate on the raw data collected during testing. These new data are reduced to forces and moments in the proper axis system and all variables are scaled to produce quantities with engineering units. Raw and reduced data are temporarily stored in a disc file. Both reduced and raw data can be transferred to magnetic tape and maintained as a permanent record.

Reduced data points can be listed, plotted and curves can be fitted to the points. All of the standard Calspan plots can be generated from DAP test data.

Data lists and plots are displayed on the screen of a CRT console. Hard copies of this information can be made off this display.

Continuous Sampling Program (CSP) Control

The continuous sampling program (CSP) is a software system which controls machine operation and continuously logs data during tests. Test variables can be constant or changed at rapid rates. One or all variables can be changed during a test. Data can be sampled at rates up to 100 samples per second. Pauses are used so that data can be logged during desired intervals of the test.

CSP testing can be conducted quickly which in turn reduces tire wear during severe tests. The high rate of data sampling also permits limited dynamic measurements to be made.

Two-parameter plots of data can be made. Carpet and family plots of test data cannot be made with this program at the present time. CSP data will also reflect time effects if tire characteristics are a function of the rate of change of testing variables.

Data reduction is accomplished in a manner similar to that employed in DAP testing.

Facility Validation

It has generally become accepted by industry and government that data taken on TIRF are valid in the sense that forces, moments, power losses measured on the facility are the same as would be experienced on the road under similar conditions. The facility has been used for over 50 clients representing US and foreign tire and vehicle manufacturers, materials suppliers, marketers, research organizations, government agencies, racing groups, etc. Many of these clients have used the facility for several programs. This extensive and repeated usage has come about because of general satisfaction with the results on the basis of usefulness and correctness.

On a more formal basis, a round robin validation program was sponsored by the Motor Vehicle Manufacturers Association and the Rubber Manufacturers Association in which identical bias-belted and radial ply tires were run at various test conditions on the Calspan TIRF and eight other car and tire industry facilities. Three of these facilities were road testers (trailers or truck bed), two were circular drums (external) and three (in addition to TIRF) were flat bed laboratory machines. Typical results are shown on the following page (Figure C-2)*

*One set of drum data was found to be invalid and is not shown.

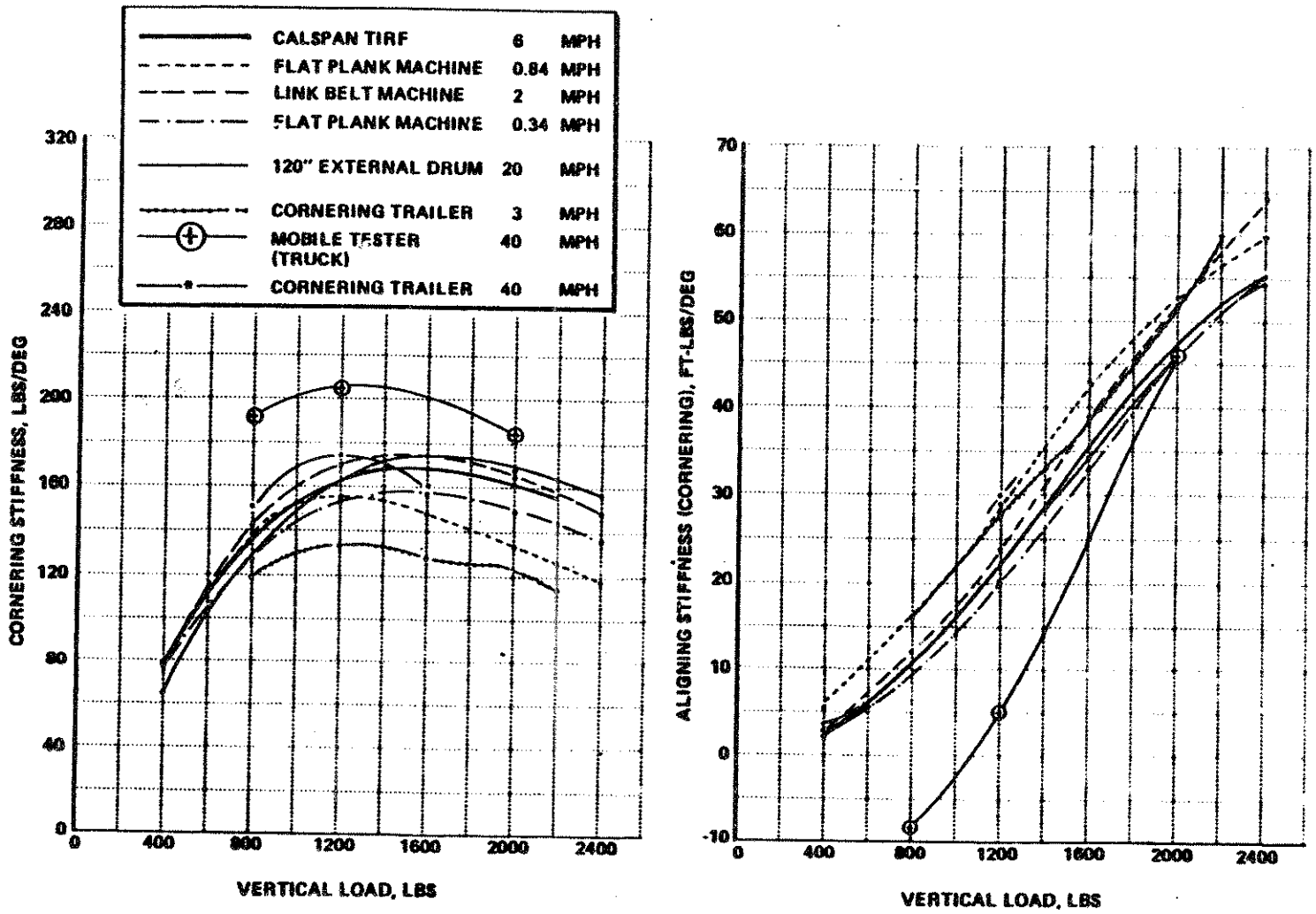


Figure C-2 FACILITY VALIDATION RESULTS: CORNERING STIFFNESS AND ALIGNING TORQUE STIFFNESS VS VERTICAL LOAD FOR A G78-15 TIRE AT 28 PSI

It may be seen that the road test data show significant spread, with the TIRF data falling near the center of this spread. The single drum data (120 in diameter) are in good agreement as are most of the flat bed data. One set of the outlying data from a flat bed plank machine was found to be too low due to insufficient rolling length to obviate tire relaxation effects; when the rolling distance was extended, agreement was improved. The remaining outlier data are also from a plank machine - shorter than the first - so these data are also suspect. Taking these features into account, the TIRF results have come to be accepted as representing the actual forces and moments produced under steady state operating conditions.

Further information on the general validity of TIRF data and the specific validation program may be found in Reference 2.

APPENDIX D

TEST DATA SUMMARIES FOR FIFTY TIRE TYPES

- Title Page
  - Tire Types 1 through 50
  - Testing Categories
  - Test Run Numbers

- Footprint

<u>For Free Rolling Cornering and Braking Traction Testing</u>

- Modelling Constants

- Performance Coefficients

<u>For Rolling Resistance Testing</u>

- Rolling Resistance Data

TABLE D-1

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		1
SIZE		P195 / 75 R 14
MANUFACTURER		GOODYEAR
BRAND NAME		CUSTOM POLY STEEL
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
5	MKKA DH2 041	62	100	-	2	28	
42	↓	↓	↓	-			71
43	↓	↓	↓	-		83, 87, 91	
44	↓	↓	↓	-		97, 101, 105	
45	↓	↓	↓	-		109, 112, 115	
91	CBO 201	↓	50	-		227, 242, 257	
92	271	↓	↓	-		234, 249, 265	
93	↓	↓	↓	-		238, 253, 268	

FOOTPRINT, TIRE NO. 5

FIGURE D-1

Load = 1400 lbs.
Pressure = 35 psi

Reproduced from best available copy.

TABLE D-2

RUN: 2- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
708.0	126.2	0.178	12.0	0.017	0.095	699.8	4.5	0.006	0.5	0.001	0.109	0.035	703.3	1.00	16.5
1399.2	172.0	0.123	31.8	0.023	0.185	1400.2	13.7	0.010	1.6	0.001	0.113	0.000	1400.3	0.93	18.2
2094.4	163.5	0.078	52.3	0.025	0.320	2097.3	24.8	0.012	2.9	0.001	0.116	0.162	2102.9	0.83	21.8
2784.9	130.8	0.047	74.6	0.027	0.570	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2793.9	0.87	37.1

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2660.11 A1 = 8.24 A2 = 3508.90

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.278 A4 = -1429.56

LATERAL FRICTION COEFFICIENTS:

B3 = 1.168 B1 =-2.641E-04 B4 = 5.581E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.707E-05 C2 =-1.924E-04 C3 =-0.384

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.119E-04 K2 =-2.260E-04 K3 = 0.166

SPRING RATE (LB/IN) : 1160.4

TABLE D-3

RUN: 28- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
707.4	-0.262	0.903	0.804	10494.5	14.96	-0.016	-0.000022
1400.1	-0.318	0.827	0.717	48054.0	36.80	-0.061	-0.000044
2097.3	-0.247	0.767	0.684	32515.9	17.27	-0.104	-0.000050

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9695 P1 =-9.603E-05

P0 =0.9989 P1 =-1.475E-04 P2 = 1.735E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.292 R1 = 1.131E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8559 S1 =-8.619E-05

S0 =0.9517 S1 =-2.483E-04 S2 = 5.801E-08

TABLE D-4

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 71

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.6	35.1	17.6	35	52.6	35.1
Load, -FZ (lb)	1424	2106	1406	1408	1409	713
Rolling Resistance, FR (lb)	14.4	22.6	22.9	14.5	13.2	7.9
FR Coefficient, FR/-FZ	.0101	.0107	.0163	.0103	.0094	.0111

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-5

RUN: 83- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	716.7	-0.198	1.060	0.905	11440.4	15.98	0.001	0.000001
4.	716.3	0.260	1.030	0.947	3874.2	10.78	-0.502	-0.000700
8.	717.0	-0.149	1.006	0.970	2474.5	6.91	-0.505	-0.000704
12.	713.8	-0.997	1.007	0.985	1670.4	4.68	-0.505	-0.000707
16.	712.6	-0.996	0.984	0.973	1258.5	3.58	-0.505	-0.000709
20.	717.7	-0.999	0.966	0.945	1007.4	2.85	-0.506	-0.000705

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-6

RUN: 87- D- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	715.2	-0.205	1.133	0.882	13245.8	19.02	-0.016	-0.000023
4.	716.3	0.584	1.103	0.865	5315.2	15.15	-0.510	-0.000712
8.	713.4	0.297	1.057	0.954	3300.0	9.42	-0.512	-0.000718
12.	717.6	-0.111	1.000	0.844	2039.7	5.78	-0.514	-0.000716
16.	714.0	-0.506	0.945	0.875	1408.0	4.04	-0.514	-0.000719
20.	717.2	-0.569	0.909	0.770	1062.9	3.02	-0.514	-0.000717

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-7

RUN: 91- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	714.7	-0.138	1.112	0.955	14106.7	21.09	-0.063	-0.000088
4.	714.8	-0.200	1.087	0 889	0.0	0.0	-0.075	-0.000105
8.	717.1	-0.278	0.974	0.836	6416.9	9.66	-0.088	-0.000123
12.	714.8	-0.884	0.894	0.870	3883.2	6.08	-0.120	-0.000168
16.	715.4	-0.696	0.847	0.788	1770.9	2.67	-0.091	-0.000128
20.	717.2	-0.727	0.917	0.772	1917.9	2.84	-0.075	-0.000104

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-8

RUN: 97- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1402.0	-0.166	0.962	0.734	19514.5	14.27	-0.027	-0.000019
4.	1404.7	-0.264	0.896	0.725	12986.9	9.52	-0.035	-0.000025
8.	1410.8	-0.486	0.816	0.755	7978.4	5.86	-0.041	-0.000029
12.	1416.0	-0.671	0.733	0.703	4731.7	3.48	-0.046	-0.000032
16.	1411.4	-0.998	0.721	0.714	3109.5	2.30	-0.045	-0.000032
20.	1412.5	-0.999	0.588	0.674	2245.3	1.65	-0.046	-0.000033

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-9

RUN: 101- J- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1408.0	-0.190	1.013	0.741	19322.8	14.54	-0.055	-0.000039
4.	1410.0	0.480	0.968	0.772	7467.9	11.26	-0.531	-0.000377
8.	1417.7	0.300	0.883	0.831	4846.2	7.32	-0.536	-0.000378
12.	1415.8	-0.999	0.841	0.834	2663.2	4.04	-0.539	-0.000381
16.	1417.1	-0.446	0.771	0.760	2003.0	3.04	-0.539	-0.000381
20.	1417.3	-0.996	0.790	0.784	1520.4	2.32	-0.540	-0.000381

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-10

RUN: 105- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1405.3	-0.176	1.155	0.893	23001.3	18.79	-0.132	-0.000094
4.	1408.5	0.620	1.116	0.820	7992.0	13.22	-0.567	-0.000403
8.	1413.6	0.263	0.978	0.827	5054.3	8.58	-0.572	-0.000405
12.	1415.8	-0.122	0.892	0.850	3929.9	6.78	-0.581	-0.000410
16.	1421.4	-0.586	0.839	0.810	2709.9	4.70	-0.589	-0.000414
20.	1425.6	-0.586	0.809	0.784	2246.2	3.99	-0.602	-0.000422

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-11

RUN: 109- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2102.8	-0.168	0.824	0.626	21137.2	10.66	-0.058	-0.000028
4.	2104.1	0.533	0.770	0.636	8049.4	8.17	-0.532	-0.000253
8.	2115.3	0.188	0.719	0.617	5389.8	5.48	-0.537	-0.000254
12.	2111.4	-0.996	0.645	0.640	2788.9	2.85	-0.540	-0.000256
16.	2116.4	-0.999	0.646	0.640	1914.4	1.96	-0.541	-0.000256
20.	2111.8	-0.997	0.645	0.643	1450.3	1.49	-0.542	-0.000255

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-12

RUN: 112- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2098.4	-0.155	0.926	0.686	24686.6	13.06	-0.101	-0.000048
4.	2107.6	-0.192	0.898	0.715	17457.3	9.30	-0.107	-0.000051
8.	2117.8	-0.352	0.843	0.744	13850.1	7.44	-0.119	-0.000056
12.	2115.6	-0.553	0.774	0.721	8518.3	4.61	-0.129	-0.000061
16.	2121.9	-0.993	0.747	0.741	5823.4	3.16	-0.136	-0.000064
20.	2118.9	-0.981	0.723	0.714	4189.6	2.28	-0.136	-0.000064

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-13

RUN: 22[illegible] 0[illegible] 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	694.5	-0.213	1.012	0.844	5087.0	7.55	-0.025	-0.000036
4.	699.2	-1.001	0.862	0.835	3355.2	4.91	-0.023	-0.000033
8.	696.6	-0.999	0.851	0.842	2207.7	3.29	-0.031	-0.000044
12.	690.6	-1.000	0.851	0.828	1666.5	2.47	-0.028	-0.000040
16.	689.7	-0.999	0.840	0.830	1282.2	1.93	-0.033	-0.000047
20.	690.1	-1.000	0.800	0.777	999.9	1.50	-0.033	-0.000047

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-14

RUN: 242- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1394.3	-0.115	0.995	0.700	29458.4	22.34	-0.054	-0.000039
4.	1402.4	-0.154	0.887	0.688	20806.7	15.73	-0.061	-0.000043
8.	1396.9	-0.340	0.786	0.688	9407.9	7.18	-0.066	-0.000047
12.	1400.2	-0.453	0.706	0.687	5662.7	4.32	-0.068	-0.000049
16.	1396.7	-0.611	0.664	0.614	3529.1	2.69	-0.066	-0.000048
20.	1398.7	-0.996	0.641	0.638	2548.7	1.94	-0.065	-0.000047

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-15

RUN: 257- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2096.1	-0.106	0.909	0.612	14907.1	7.80	-0.086	-0.000041
4.	2095.8	0.548	0.813	0.605	6607.6	6.94	-0.546	-0.000260
8.	2106.0	0.278	0.728	0.602	4253.8	4.46	-0.550	-0.000261
12.	2103.8	0.048	0.649	0.555	2877.8	3.02	-0.551	-0.000262
16.	2105.8	-0.999	0.635	0.629	2091.1	2.20	-0.552	-0.000262
20.	2105.6	-0.546	0.590	0.575	1583.2	1.67	-0.552	-0.000262

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-16

RUN: 234- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	694.9	-0.104	0.998	0.749	17026.3	24.82	-0.039	-0.000056
4.	695.0	-0.242	0.920	0.782	8668.8	12.79	-0.040	-0.000057
8.	694.1	-0.345	0.814	0.771	4995.4	7.50	-0.044	-0.000063
12.	694.8	-0.769	0.784	0.775	3323.1	4.98	-0.043	-0.000062
16.	697.0	-0.831	0.774	0.714	1590.3	2.35	-0.043	-0.000062
20.	695.3	-0.848	0.742	0.656	1281.7	1.88	-0.036	-0.000052

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-17

RUN: 249- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1392.6	-0.115	0.985	0.706	17352.1	13.60	-0.082	-0.000059
4.	1392.7	0.683	0.904	0.680	5873.8	9.30	-0.544	-0.000390
8.	1405.2	0.388	0.764	0.656	3263.6	5.12	-0.548	-0.000390
12.	1403.8	0.097	0.676	0.643	2002.2	3.15	-0.548	-0.000390
16.	1404.0	-0.989	0.647	0.641	1444.6	2.26	-0.548	-0.000390
20.	1398.0	-0.994	0.638	0.637	1010.1	1.58	-0.547	-0.000392

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-18

RUN: 265- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2088.4	-0.114	0.966	0.669	15886.4	8.64	-0.120	-0.000057
4.	2091.5	-0.214	0.891	0.653	13186.2	7.23	-0.122	-0.000058
8.	2102.1	-0.254	0.728	0.624	9571.2	5.32	-0.140	-0.000067
12.	2102.6	-0.450	0.672	0.640	6063.9	3.37	-0.148	-0.000070
16.	2105.1	-0.996	0.634	0.627	4536.1	2.49	-0.145	-0.000069
20.	2098.9	-0.992	0.611	0.605	1701.8	1.04	-0.240	-0.000114

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-19

RUN: 238- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	690.9	-0.091	0.923	0.865	5337.2	8.11	-0.063	-0.000091
4.	694.1	0.550	0.875	0.794	5734.6	17.94	-0.535	-0.000770
8.	698.2	0.079	0.805	0.796	2593.8	8.11	-0.537	-0.000769
12.	693.8	-0.996	0.811	0.802	1465.6	4.58	-0.537	-0.000774
16.	697.8	-0.885	0.746	0.720	1076.6	3.35	-0.540	-0.000774
20.	699.6	-0.484	0.701	0.671	771.6	2.39	-0.541	-0.000773

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-20

RUN: 253- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1337.6	-0.140	0.922	0.747	12827.2	10.70	-0.140	-0.000101
4.	1386.5	-0.210	0.946	0.754	10987.5	9.37	-0.142	-0.000103
8.	1395.2	-0.375	0.813	0.739	6407.3	5.61	-0.160	-0.000116
12.	1404.7	-0.754	0.754	0.743	4117.1	3.59	-0.167	-0.000119
16.	1406.9	-0.938	0.737	0.727	2969.4	2.57	-0.175	-0.000125
20.	1407.1	-0.997	0.712	0.707	2366.7	2.04	-0.177	-0.000126

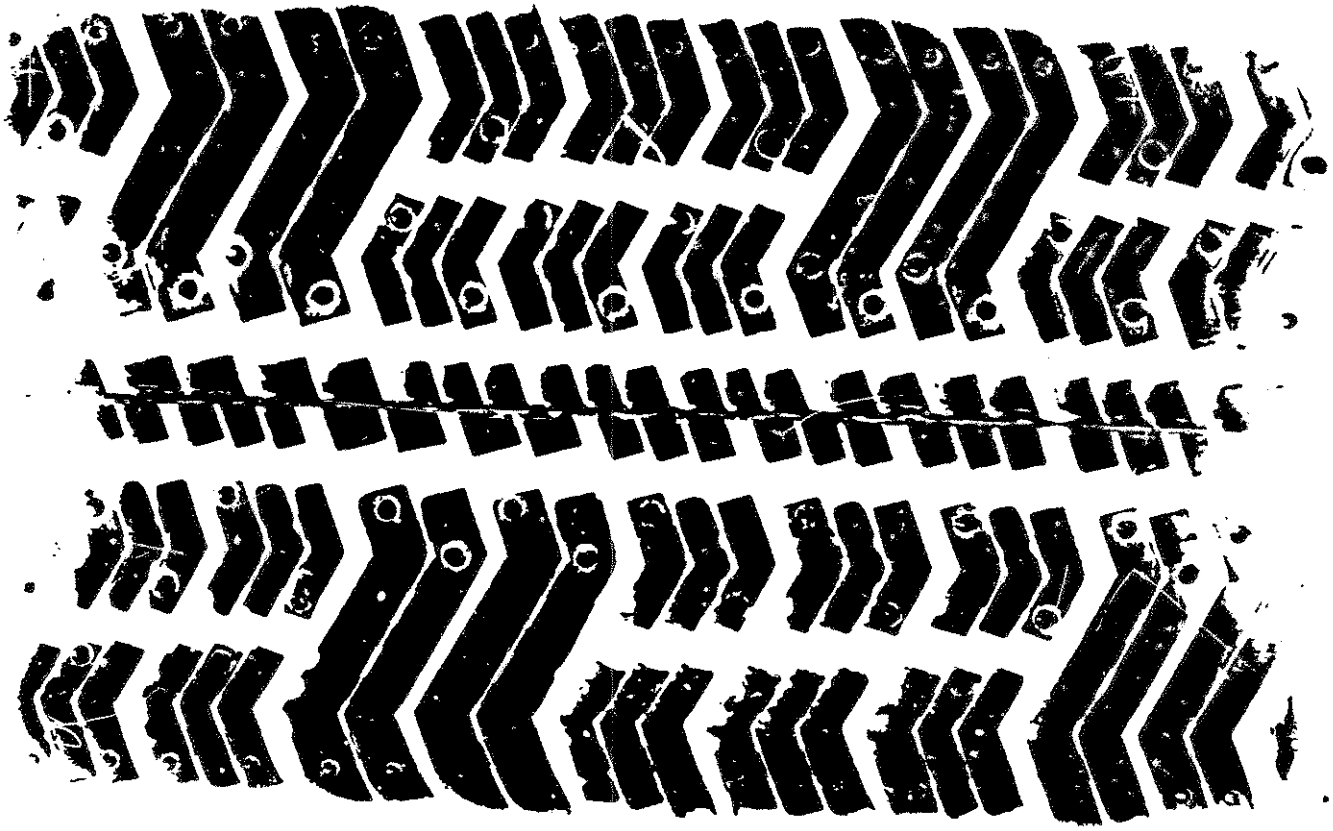
TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-21

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		2
SIZE		P195 /75 R 14
MANUFACTURER		FIRESTONE
BRAND NAME		TRAX 12
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS TIRES #110, 111 & 112		TREAD: 1 POLYESTER + 1 STEEL SIDEWALL: 1 POLYESTER

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
7	W2KA TRD 031	58	100	-	8	34	
31				-			72
35				-		84, 88, 92	
36				-		98, 102, 106	
37				-		110, 113, 280	
110	W2KA TRC 071		50	-		228, 243, 258	
111	301			-		235, 250, 264	
112	301			-		239, 254, 269	



FOOTPRINT, TIRE NO. 7

FIGURE D-2

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-22

RUN: 8- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
700.2	131.1	0.187	11.5	0.016	0.088	698.5	6.0	0.009	0.4	0.001	0.074	0.046	702.9	0.99	19.1
1391.3	176.8	0.127	31.0	0.022	0.176	1397.6	15.3	0.011	1.1	0.001	0.070	0.086	1401.2	0.92	16.2
2094.2	168.5	0.080	49.2	0.023	0.292	2092.5	25.7	0.012	2.4	0.001	0.094	0.152	2100.9	0.85	21.4
2788.0	139.8	0.050	71.4	0.026	0.511	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2793.6	0.97	42.8

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3204.28 A1 = 7.82 A2 = 3555.05

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.434 A4 = -3296.46

LATERAL FRICTION COEFFICIENTS:

B3 = 1.199 B1 =-3.589E-04 B4 = 9.764E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.051E-05 C2 =-1.660E-04 C3 =-0.358

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.101E-04 K2 =-2.257E-04 K3 = 0.182

SPRING RATE (LB/IN) : 1233.1

TABLE D-23

RUN: 34- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
707.5	-0.284	0.825	0.711	10020.8	14.33	-0.013	-0.000019
1401.8	-0.384	0.714	0.620	16830.8	12.81	-0.054	-0.000039
2097.7	-0.445	0.643	0.558	22062.5	11.66	-0.101	-0.000048

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9115 P1 =-1.313E-04

P0 =0.9824 P1 =-2.489E-04 P2 = 4.222E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.208 R1 =-1.152E-04

MUX SLIDE COEFFICIENTS:

S0 =0.7834 S1 =-1.096E-04

S0 =0.8331 S1 =-1.923E-04 S2 = 2.946E-08

TABLE D-24

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 72

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	40.0	35.0	17.6	35.1	52.6	35.1
Load, -FZ (lb)	1439	2108	1406	1419	1410	714
Rolling Resistance, FR (lb)	14.9	22.6	22.1	14.7	12.2	7.4
FR Coefficient, FR/-FZ	.0104	.0107	.0157	.0104	.0087	.0104

Note:
1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.
2. The Load (FZ) was the actual test load.
3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

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TABLE D-25

RUN: 84- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	712.2	-0.996	0.845	0.829	6649.5	9.47	-0.012	-0.000016
4.	712.2	-0.999	0.931	0.916	3342.9	5.69	-0.036	-0.000051
8.	715.2	-0.999	0.949	0.936	4171.6	5.88	-0.015	-0.000021
12.	714.9	-0.999	0.932	0.919	2907.9	4.37	-0.061	-0.000085
16.	716.4	-0.999	0.857	0.835	2019.8	3.01	-0.069	-0.000096
20.	714.7	-1.000	0.834	0.805	1548.2	2.19	-0.023	-0.000032

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-26

RUN: 88- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	711.0	-0.228	1.074	0.868	7783.7	11.23	-0.020	-0.000027
4.	712.7	-0.211	1.066	0.885	8099.3	11.72	-0.025	-0.000035
8.	712.9	-0.350	0.948	0.879	4567.0	6.56	-0.030	-0.000042
12.	711.2	-0.620	0.874	0.778	3163.8	4.59	-0.032	-0.000045
16.	712.0	-0.998	0.888	0.877	2246.5	3.26	-0.035	-0.000049
20.	716.7	-0.999	0.901	0.885	1662.6	2.40	-0.036	-0.000050

TEST PRESSURE: 35 psi
(Regulated)

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TABLE D-27

RUN: 92- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	706.3	-0.238	1.107	0.910	12689.4	18.96	-0.048	-0.000068
4.	709.8	0.568	1.052	0.945	4889.5	14.53	-0.528	-0.000744
8.	712.9	0.322	0.947	0.889	2668.6	8.16	-0.537	-0.000753
12.	716.4	0.101	0.913	0.890	1640.0	5.12	-0.550	-0.000768
16.	718.8	-0.969	0.882	0.865	987.7	3.13	-0.559	-0.000778
20.	717.9	-0.859	0.857	0.845	881.7	2.73	-0.546	-0.000761

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-28

RUN: 08- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1401.1	-0.229	0.687	0.534	14344.0	10.48	-0.022	-0.000015
4.	1407.2	-0.258	0.688	0.634	9859.2	7.16	-0.028	-0.000020
8.	1408.0	-0.333	0.656	0.606	6150.7	4.48	-0.033	-0.000023
12.	1409.6	-0.999	0.637	0.625	3309.7	2.40	-0.037	-0.000026
16.	1412.8	-0.711	0.617	0.600	2586.8	1.89	-0.041	-0.000029
20.	1409.2	-0.999	0.650	0.640	1975.9	1.45	-0.044	-0.000031

TEST PRESSURE: 52.5 psi
(Regulated)

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TABLE D-29

RUN: 102- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1405.4	-0.185	0.861	0.640	12910.5	9.71	-0.054	-0.000038
4.	1411.2	-0.250	0.819	0.698	12134.5	9.16	-0.063	-0.000044
8.	1414.2	-0.401	0.746	0.671	7415.3	5.62	-0.072	-0.000051
12.	1415.1	-0.495	0.713	0.626	4741.0	3.60	-0.077	-0.000054
16.	1415.9	-0.999	0.710	0.704	3302.7	2.52	-0.079	-0.000055
20.	1413.7	-0.691	0.655	0.644	2432.0	1.86	-0.079	-0.000056

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-30

RUN: 106- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1401.8	-0.176	0.936	0.731	15037.1	12.24	-0.119	-0.000085
4.	1409.4	0.724	0.944	0.756	5572.8	9.39	-0.574	-0.000407
8.	1414.5	0.291	0.885	0.761	4290.9	7.29	-0.578	-0.000409
12.	1418.0	0.171	0.852	0.727	3133.7	5.38	-0.586	-0.000413
16.	1419.9	-0 155	0.818	0.767	2062.4	3.65	-0.599	-0.000422
20.	1419.2	-0.476	0.798	0.761	1487.9	2.65	-0.604	-0.000426

TEST PRESSURE: 17.5 psi
(Regulated)

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TABLE D-31

RUN: 110- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2102.3	-0.181	0.618	0.492	505.[illegible]	0.26	-0.057	-0.000027
4.	2107.3	-0.198	0.601	0.497	523.6	0.27	-0.065	-0.000031
8.	2112.9	-0.409	0.578	0.509	820.4	0.42	-0.071	-0.000034
12.	2117.4	-0.644	0.546	0.512	659.9	0.34	-0.078	-0.000037
16.	2114.4	-0.664	0.534	0.509	584.2	0.30	-0.082	-0.000039
20.	2114.1	-0.999	0.573	0.565	1725.1	0.89	-0.082	-0.000039

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-32

RUN: 113- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0	2104.0	-0.183	0.780	0.542	18607.0	9.81	-0.099	-0.000047
4.	2111.8	-0.237	0.741	0.555	13904.2	7.37	-0.108	-0.000051
8.	2113.8	-0.354	0.706	0.576	9837.9	5.25	-0.119	-0.000056
12.	2116.9	-0.509	0.667	0.622	6561.7	3.52	-0.126	-0.000060
16.	2115.3	-0.719	0.643	0.611	4575.9	2.47	-0.129	-0.000061
20.	2120.2	-0.701	0.630	0.620	3391.6	1.83	-0.130	-0.000061

TEST PRESSURE: 35 psi
(Regulated)

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TABLE D-33

RUN: 280- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2086.5	-0.153	0.884	0.678	12619.1	7.66	-0.209	-0.000100
4.	2090.5	-0.200	0.867	0.718	11882.7	7.23	-0.210	-0.000100
8.	2094.5	-0.320	0.827	0.685	8983.2	5.67	-0.222	-0.000106
12.	2002.4	-0.456	0.788	0.691	6937.1	4.91	-0.237	-0.000118
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-34

RUN: 228- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	690.0	-0.169	1.058	0.923	9714.7	14.24	-0.023	-0.000033
4.	697.6	0.408	0.997	0.980	2737.4	3.03	-0.512	-0.000734
8.	691.9	-0.985	1.014	1.009	1797.1	5.36	-0.511	-0.000739
12.	695.8	-0.655	0.909	0.849	1206.8	3.57	-0.510	-0.000733
16.	692.9	-0.701	0.896	0.855	989.1	2.94	-0.515	-0.000744
20.	693.3	-0.817	0.885	0.824	683.2	2.01	-0.509	-0.000734

TEST PRESSURE: 52.5 psi
(Regulated)

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TABLE D-35

RUN: 243- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1397.0	-0.144	0.983	0.787	26071.5	19.79	-0.057	-0.000041
4.	1395.5	-0.216	0.869	0.808	18709.4	14.30	-0.060	-0.000043
8.	1401.0	-0.812	0.777	0.683	8593.6	6.54	-0.067	-0.000048
12.	1399.5	-0.537	0.755	0.658	5176.9	3.96	-0.068	-0.000049
16.	1397.6	-0.791	0.723	0.686	3653.6	2.80	-0.067	-0.000048
20.	1398.2	-0.921	0.696	0.653	2529.4	1.93	-0.068	-0.000049

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-36

RUN: 258- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2094.4	-0.176	0.907	0.649	14653.2	7.65	-0.086	-0.000041
4.	2094.2	-0.223	0.792	0.673	12818.1	6.75	-0.091	-0.000043
8.	2101.2	-0.400	0.720	0.589	7984.4	4.19	-0.097	-0.000046
12.	2103.1	-0.552	0.679	0.613	5314.2	2.79	-0.099	-0.000047
16.	2106.5	-0.850	0.651	0.642	3982.7	2.10	-0.104	-0.000050
20.	2103.9	-1.000	0.675	0.664	3120.3	1.65	-0.107	-0.000051

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-37

RUN: 235- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	689.8	-0.162	0.989	0.753	17687.1	26.11	-0.034	-0.000050
4.	699.8	-0.243	0.970	0.761	9456.4	14.10	-0.038	-0.000054
8.	698.5	-0.334	0.882	0.755	5105.3	7.70	-0.042	-0.000060
12.	692.2	-0.467	0.804	0.737	2884.0	4.38	-0.041	-0.000059
16.	694.8	-0.732	0.740	0.707	917.2	2.75	-0.519	-0.000746
20.	694.3	-0.681	0.711	0.699	552.2	1.94	-0.516	-0.000744

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-38

RUN: 250- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1387.3	-0.146	0.987	0.687	14066.8	10.98	-0.077	-0.000055
4.	1386.4	-0.199	0.915	0.730	9122.5	7.22	-0.085	-0.000061
8.	1392.4	-0.377	0.768	0.649	5298.8	4.21	-0.093	-0.000067
12.	1392.6	-0.465	0.698	0.666	3739.7	2.93	-0.090	-0.000065
16.	1391.1	-0.930	0.688	0.658	2740.7	2.16	-0.093	-0.000067
20.	1396.2	-0.832	0.661	0.626	2118.6	1.67	-0.099	-0.000071

TEST PRESSURE: 35 psi
(Regulated)

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TABLE D-39

RUN: 264- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2096.6	-0.091	0.944	0.628	32997.2	17.97	-0.123	-0.000059
4.	2095.0	-0.175	0.886	0.621	22137.8	12.22	-0.130	-0.000062
8.	2103.7	-0.259	0.763	0.621	14649.5	8.15	-0.141	-0.000067
12.	2107.2	-0.354	0.706	0.636	9344.6	5.22	-0.149	-0.000071
16.	2106.8	-0.422	0.648	0.595	5906.1	3.28	-0.152	-0.000072
20.	2115.2	-0.614	0.611	0.582	4435.6	2.46	-0.153	-0.000072

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-40

RUN: 239- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	689.3	-0.245	0.827	0.818	13399.0	20.37	-0.063	-0.000091
4.	698.7	-0.182	0.818	0.785	10905.6	17.03	-0.071	-0.000102
8.	699.2	-0.868	0.786	0.756	5164.9	8.04	-0.079	-0.000114
12.	701.8	-0.998	0.756	0.754	2945.5	4.60	-0.081	-0.000116
16.	702.6	-0.971	0.745	0.716	2181.3	3.39	-0.086	-0.000123
20.	702.1	-0.986	0.727	0.715	1549.0	2.43	-0.084	-0.000120

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-41

RUN: 254- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1384.8	-0.175	0.844	0.674	12923.6	10.91	-0.143	-0.000104
4.	1385.6	-0.254	0.930	0.740	10842.9	9.23	-0.145	-0.000104
8.	1402.2	-0.314	0.829	0.713	6367.9	5.66	-0.168	-0.000120
12.	1406.4	-0.554	0.770	0.698	4110.3	3.66	-0.179	-0.000127
16.	1407.6	-0.796	0.743	0.703	3124.2	2.77	-0.188	-0.000133
20.	1410.2	-0.898	0.725	0.688	2435.9	2.16	-0.193	-0.000137

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-42

RUN: 269- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2089.6	-0.114	0.990	0.749	11250.1	6.88	-0.216	-0.000103
4.	2094.4	-0.159	0.947	0.738	9680.2	6.02	-0.222	-0.000106
8.	1985.1	-0.229	0.867	0.769	9294.0	6.07	-0.233	-0.000117
12.	1731.2	-0.905	0.804	0.785	6448.7	5.16	-0.236	-0.000133
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

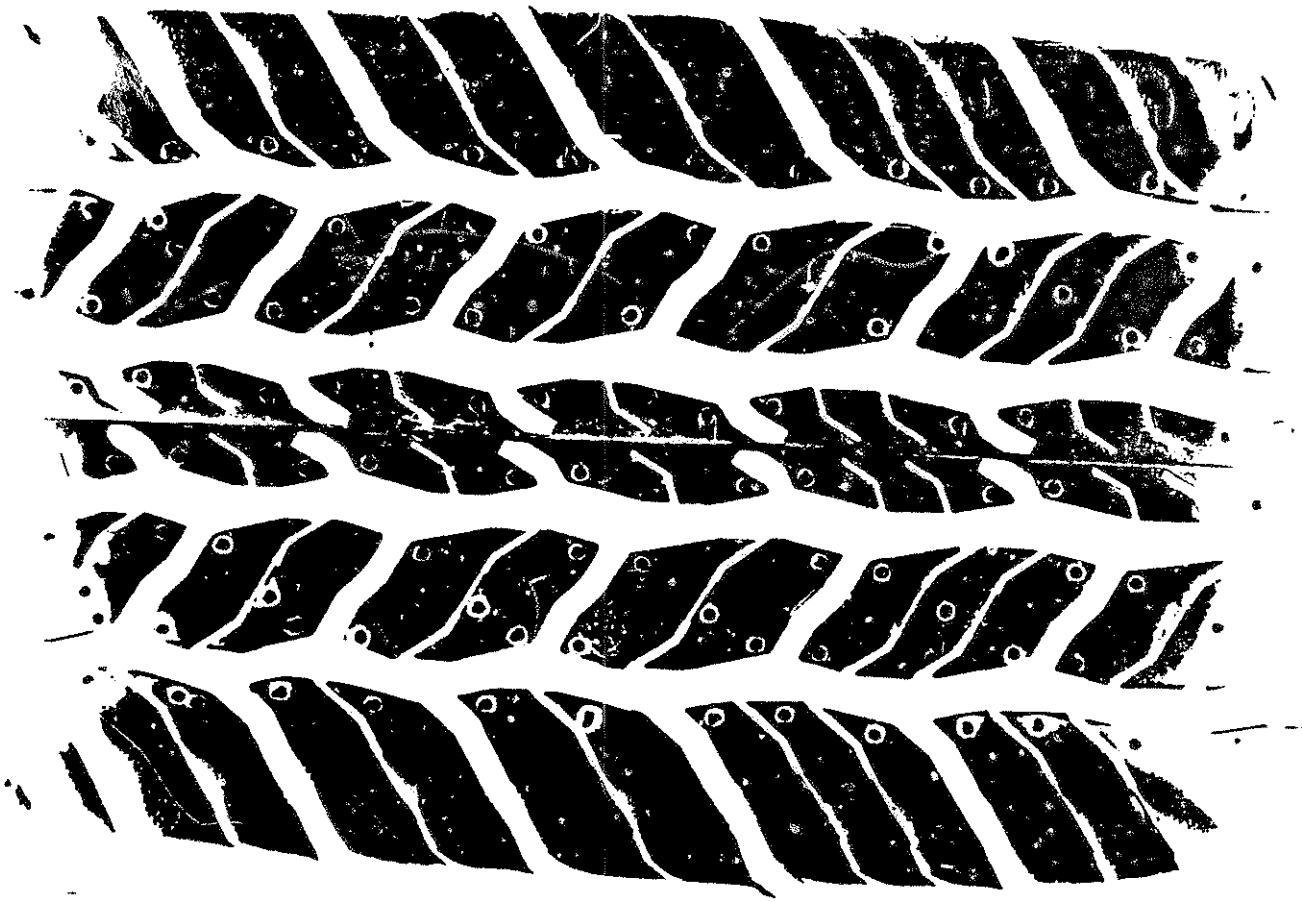
TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-43

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		3
SIZE		P195/75R14
MANUFACTURER		GENERAL
BRAND NAME		DUAL STEEL III
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 STEEL + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
18	A3KACB150	59	100	-	5	31	
50	A3RACB1121			-			75
51	1500			-		85, 89, 93	
52	11500			-		99, 103, 107	
53	1500			-		111, 114, 281	
106	A3KACB1371		50	-		229, 244, 259	
107				-		236, 251, 266	
108				-		240, 255, 270	



FOOTPRINT, TIRE NO. 18

FIGURE D-3

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-44

RUN: 5- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
705.8	124.3	0.176	11.6	0.016	0.093	698.5	6.9	0.010	0.6	0.001	0.084	0.056	700.5	1.00	18.2
1397.7	179.4	0.128	32.2	0.023	0.180	1396.1	15.9	0.011	1.2	0.001	0.075	0.089	1400.7	0.89	16.5
2093.5	176.4	0.084	49.9	0.024	0.283	2091.2	25.0	0.012	1.9	0.001	0.075	0.141	2103.9	0.81	19.2
2792.7	151.6	0.054	71.4	0.026	0.471	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2794.1	0.79	30.8

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2112.75 A1 = 8.91 A2 = 3770.65

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.555 A4 = -8679.68

LATERAL FRICTION COEFFICIENTS:

B3 = 1.151 B1 =-2.498E-04 B4 = 4.309E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-7.795E-05 C2 =-1.781E-04 C3 =-0.362

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.202E-04 K2 = 2.299E-04 K3 = 0.182

SPRING RATE (LB/IN) : 1296.9

TABLE D-45

RUN: 31- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
706.5	-0.287	0.938	0.844	9316.8	13.31	-0.016	-0.000023
1400.7	-0.382	0.866	0.706	20437.1	15.55	-0.057	-0.000041
2098.1	-0.513	0.811	0.661	23107.3	12.23	-0.100	-0.000048

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0000 P1 =-9.139E-05

P0 =1.0276 P1 =-1.796E-04 P2 = 1.721E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.165 R1 =-1.630E-04

MUX SLIDE COEFFICIENTS:

S0 =0.9211 S1 =-1.315E-04

S0 =1.0801 S1 =-4.029E-04 S2 = 9.682E-08

TABLE D-46

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 75

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	40.0	35.1	17.5	35.1	52.7	35.1
Load, -FZ (lb)	1416	2104	1411	1413	1412	717
Rolling Resistance, FR (lb)	13.2	21.6	22.4	13.5	11.1	7.0
FR Coefficient, FR/-FZ	.0093	.0103	.0159	.0096	.0079	.0098

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-47

RUN: 85- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	711.7	-0.271	0.937	0.878	7318.9	10.49	-0.005	-0.000006
4.	707.1	-0.300	0.985	0.922	8137.6	11.50	-0.005	-0.000008
8.	712.7	-0.392	0.976	0.826	5287.2	7.47	-0.011	-0.000016
12.	715.2	-0.463	0.926	0.893	3587.1	5.05	-0.012	-0.000017
16.	716.9	-0.930	0.925	0.914	2671.6	3.76	-0.012	-0.000017
20.	713.8	-1.000	0.888	0.873	0.0	0.0	-0.410	-0.000575

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-48

RUN: 89- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	715.4	-0.210	1.106	0.799	11331.1	16.36	-0.018	-0.000025
4.	716.9	-0.155	1.084	0.911	0.0	0.0	-0.062	-0.000086
8.	718.1	-0.227	0.967	0.950	0.0	0.0	-0.125	-0.000173
12.	719.2	-0.989	0.902	0.890	3406.0	4.94	-0.046	-0.000063
16.	718.1	-0.764	0.851	0.743	2161.1	3.16	-0.054	-0.000075
20	713.1	-0.687	0.805	0.713	1055.8	1.67	-0.115	-0.000161

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-49

RUN: 93- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	710.8	-0.157	1.151	0.909	14644.4	22.23	-0.052	-0.000073
4.	714.9	-0.150	1.084	0.845	13308.9	19.76	-0.055	-0.000077
8.	715.9	-0.286	0.906	0.842	6424.5	9.51	-0.064	-0.000089
12.	715.0	-0.768	0.847	0.744	3657.2	5.40	-0.068	-0.000095
16.	717.2	-0.808	0.817	0.734	2315.4	3.43	-0.068	-0.000095
20.	715.3	-0.987	0.804	0.793	1755.1	2.59	-0.062	-0.000086

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-50

RUN: 99- 0- 3

COMBINED CORNERING AND BRAKING TRIE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1403.4	-0.170	0.954	0.697	16983.0	12.35	-0.020	-0.000014
4.	1409.3	0.428	0.883	0.704	7065.0	10.20	-0.511	-0.000363
8.	1409.9	0.286	0.820	0.721	3975.2	5.78	-0.515	-0.000365
12.	1412.3	-0.144	0.767	0.752	2623.7	3.81	-0.517	-0.000366
16.	1417.7	-0.344	0.734	0.726	1887.4	2.75	-0.518	-0.000366
20.	1414.3	-1.000	0.718	0.712	1293.6	1.89	-0.518	-0.000366

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-51

RUN: 103- 3- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1408.3	-0.160	1.027	0.678	20929.6	15.72	-0.052	-0.000037
4.	1408.9	-0.196	0.956	0.669	15734.5	11.80	-0.056	-0.000040
8.	1410.0	-0.307	0.864	0.687	9174.3	6.90	-0.065	-0.000046
12.	1414.4	-0.462	0.780	0.748	5623.6	4.24	-0.069	-0.000049
16.	1415.6	-0.584	0.740	0.727	3750.9	2.82	-0.072	-0.000051
20.	1416.3	-0.762	0.704	0.696	2833.7	2.14	-0.073	-0.000051

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-52

RUN: 107- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1403.3	-0.138	0.994	0.769	0.0	0.0	-0.126	-0.000090
4.	1405.1	0.746	0.994	0.746	0.0	0.0	-0.573	-0.000408
8.	1408.3	0.322	0.918	0.752	4311.5	7.25	-0.568	-0.000403
12.	1416.7	-0.026	0.858	0.782	3697.6	6.21	-0.575	-0.000406
16.	1419.3	-0.342	0.833	0.796	2440.5	4.14	-0.582	-0.000410
20.	1421.5	-0.460	0.807	0.766	1747.5	2.99	-0.588	-0.000413

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-53

RUN: 111- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2104.2	-0.135	0.811	0.591	19929.0	10.02	-0.055	-0.000026
4.	2107.8	-0.231	0.755	0.602	15034.3	7.54	-0.058	-0.000028
8.	2115.3	-0.397	0.689	0.601	9346.2	4.72	-0.069	-0.000032
12.	2111.8	-0.532	0.632	0.618	5500.6	2.79	-0.071	-0.000034
16.	2116.9	-0.695	0.603	0.599	3883.9	1.98	-0.075	-0.000036
20.	2113.3	-0.999	0.650	0.644	2687.4	1.37	-0.076	-0.000036

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-54

RUN: 114- 2- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2100.1	-0.116	0.914	0.507	24343.2	12.66	-0.087	-0.000042
4.	2107.1	-0.190	0.849	0.536	20282.9	10.63	-0.093	-0.000044
8.	2111.6	-0.305	0.757	0.529	11751.8	6.21	-0.109	-0.000051
12.	2114.8	-0.475	0.695	0.569	7040.5	3.74	-0.118	-0.000056
16.	2114.9	-0.604	0.666	0.578	4541.6	2.42	-0.121	-0.000057
20.	2116.5	-0.650	0.640	0.594	3613.8	1.94	-0.125	-0.000059

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-55

RUN: 281- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2085.5	-0.144	0.852	0.615	10360.7	6.22	-0.197	-0.000094
4.	2085.6	0.526	0.896	0.638	6509.3	7.87	-0.601	-0.000288
8.	2094.1	0.422	0.873	0.710	4951.9	6.25	-0.610	-0.000291
12.	2011.4	-0.138	0.810	0.747	3785.1	5.26	-0.619	-0.000306
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-56

RUN: 229- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	694.2	-0.142	1.196	0.898	17022.1	25.34	-0.026	-0.000037
4.	694.8	-0.266	1.096	0.877	11434.8	16.52	-0.028	-0.000040
8.	692.9	-0.331	1.004	0.823	5756.8	8.46	-0.030	-0.000043
12.	690.7	-0.576	0.939	0.856	3523.7	5.20	-0.028	-0.000041
16.	693.7	-0.812	0.891	0.792	2301.1	3.35	-0.013	-0.000019
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-57

RUN: 244- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1393.9	-0.113	1.095	0.762	30777.8	23.37	-0.052	-0.000038
4.	1394.6	-0.156	0.990	0.671	23747.9	18.13	-0.059	-0.000043
8.	1398.3	-0.387	0.850	0.702	11189.8	8.46	-0.065	-0.000047
12.	1399.7	-0.531	0.779	0.711	6687.6	5.08	-0.068	-0.000049
16.	1400.7	-0.998	0.774	0.765	4280.1	3.24	-0.064	-0.000046
20.	1396.4	-0.869	0.705	0.681	2993.3	2.27	-0.060	-0.000043

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-58

RUN: 259- J- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2098.8	-0.139	0.974	0.640	17183.9	8.90	-0.083	-0.000039
4.	2094.9	-0.212	0.908	0.641	13263.4	6.93	-0.083	-0.000040
8.	2103.5	-0.345	0.761	0.617	9163.9	4.81	-0.097	-0.000046
12.	2103.0	-0.512	0.685	0.652	5913.2	3.10	-0.101	-0.000048
16.	2099.9	-0.999	0.668	0.662	4397.1	2.31	-0.102	-0.000049
20.	2110.2	-0.903	0.614	0.603	3080.6	1.61	-0.102	-0.000048

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-59

RUN: 236- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	695.5	-0.100	1.081	0.871	17442.5	25.60	-0.029	-0.000042
4.	695.6	0.640	0.977	0.830	6323.5	18.51	-0.517	-0.000743
8.	693.1	0.302	0.900	0.828	3348.5	10.01	-0.519	-0.000749
12.	692.5	-0.902	0.856	0.826	1821.0	5.45	-0.519	-0.000750
16.	691.9	-0.505	0.827	0.752	1150.5	3.44	-0.517	-0.000747
20.	695.4	-0.700	0.809	0.775	798.7	2.36	-0.509	-0.000731

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-60

RUN: 251- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1391.0	-0.108	1.042	0.681	14069.4	10.94	-0.072	-0.000052
4.	1393.8	-0.221	0.961	0.699	9788.3	7.66	-0.080	-0.000057
8.	1398.2	-0.297	0.818	0.690	6025.7	4.75	-0.090	-0.000065
12.	1401.1	-0.993	0.745	0.737	4075.0	3.19	-0.095	-0.000067
16.	1405.2	-0.920	0.724	0.681	3166.5	2.46	-0.091	-0.000065
20.	1401.4	-0.887	0.679	0.661	2319.5	1.82	-0.096	-0.000069

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-61

RUN: 266- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2095.3	-0.137	0.928	0.638	16362.4	8.84	-0.115	-0.000055
4.	2090.0	-0.180	0.907	0.650	12615.4	6.90	-0.118	-0.000056
8.	2101.6	-0.309	0.763	0.616	9415.2	5.25	-0.139	-0.000066
12.	2103.5	-0.464	0.717	0.640	6292.6	3.51	-0.149	-0.000071
16.	2108.4	-0.687	0.666	0.627	4581.2	2.55	-0.150	-0.000071
20.	2108.7	-0.637	0.625	0.601	3603.9	2.00	-0.152	-0.000072

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-62

RUN: 240- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	693.0	-0.214	0.951	0.856	19678.3	30.56	-0.060	-0.000086
4.	698.3	-0.206	0.943	0.807	12495.9	19.42	-0.071	-0.000101
8.	694.4	-0.563	0.905	0.868	6140.7	9.57	-0.078	-0.000113
12.	702.2	-0.774	0.849	0.790	3517.6	5.46	-0.083	-0.000119
16.	695.3	-0.947	0.848	0.775	2558.6	3.99	-0.084	-0.000121
20.	696.3	-0.993	0.848	0.825	2004.8	3.14	-0.087	-0.000124

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-63

RUN: 255- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1384.1	-0.141	0.893	0.702	12287.2	10.31	-0.136	-0.000098
4.	1389.9	0.607	0.996	0.740	4788.5	8.27	-0.573	-0.000412
8.	1398.4	0.509	0.896	0.776	3371.0	6.00	-0.584	-0.000418
12.	1403.9	-0.219	0.845	0.807	2228.6	4.03	-0.592	-0.000422
16.	1408.4	-0.545	0.823	0.798	1619.6	2.94	-0.598	-0.000424
20.	1410.0	-0.734	0.806	0.781	1257.0	2.27	-0.602	-0.000427

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-64

RUN: 270- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	2087.9	-0.154	0.912	0.732	12808.0	7.81	-0.211	-0.000101
4.	2089.6	-0.181	0.990	0.745	9330.0	5.75	-0.217	-0.000104
8.	1961.3	-0.252	0.909	0.789	8810.4	5.84	-0.230	-0.000117
12.	1763.3	-0.998	0.945	0.840	7072.1	5.76	-0.238	-0.000135
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-65

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		4
SIZE		A78-13
MANUFACTURER		COOPER
BRAND NAME		TRENDSETTER
CONSTRUCTION TYPE		BIAS
MAX. RATED LOAD (lb.)		1060
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	4 POLYESTER
	SIDEWALL	
RIM WIDTH (in.)		4.5"
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
17	UTF5 CA6390	58	100	–	21	52	
62				–			81
63				–		86, 90, 94	
64				–		100, 104, 108	
101			50	–		231, 246, 261	
102				–		232, 247, 262	
103				–		233, 248, 263	
104			100	–		275, 276, 282	

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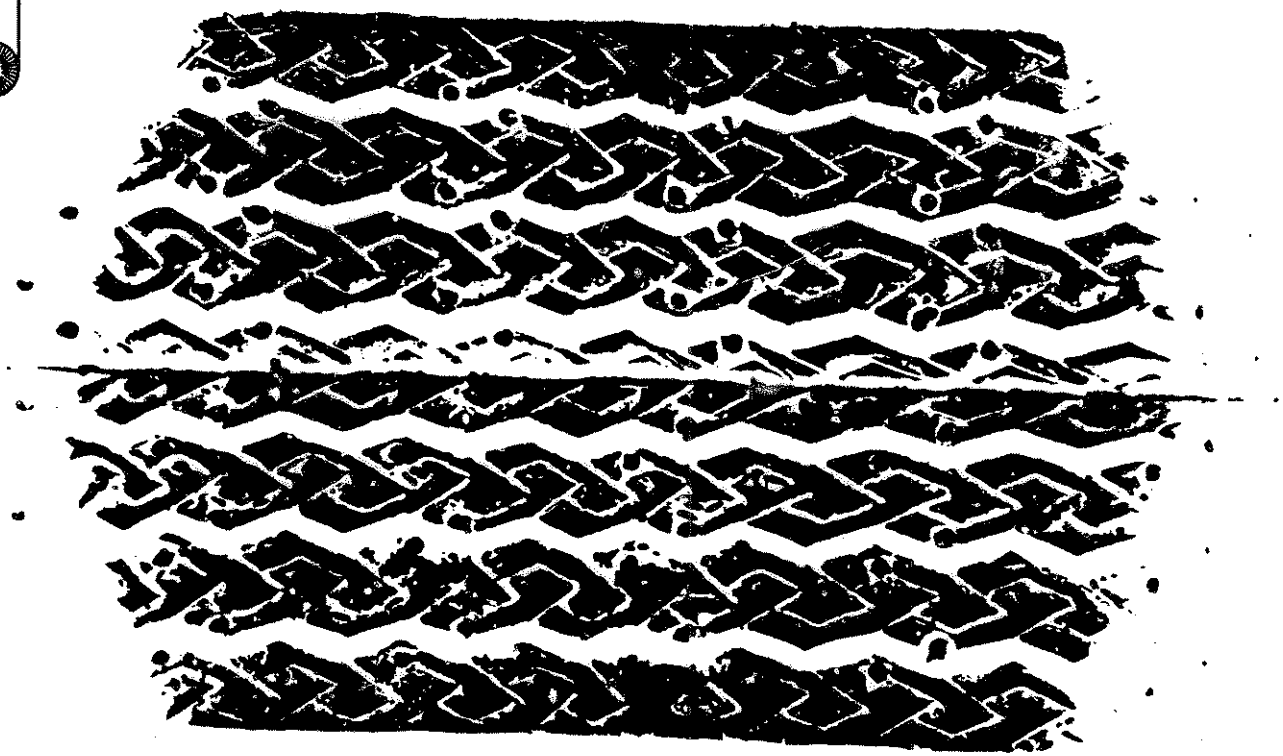

FOOTPRINT, TIRE NO. 17

FIGURE D-4

Load = 1060 lbs.
Pressure = 32 psi

TABLE D-66

RUN: 21- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
526.0	63.6	0.121	6.0	0.011	0.094	525.9	6.7	0.013	0.8	0.001	0.112	0.105	531.3	1.09	17.4
1056.7	94.4	0.089	14.7	0.014	0.156	1055.7	17.0	0.016	2.1	0.002	0.124	0.180	1061.0	1.03	19.8
1582 9	93.4	0.059	25.0	0.016	0.268	1587.8	24.5	0.015	3.1	0.002	0.127	0.262	1587.2	0.84	22.9
2112.6	82.8	0.039	36.7	0.017	0.443	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2117.2	16.07	1078.7

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 1029.98 A1 = 6.20 A2 = 2928.24

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.848 A4 =-23605.43

LATERAL FRICTION COEFFICIENTS:

B3 =12.732 B1 =-2.772E-02 B4 = 1.366E-05

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.368E-04 C2 = 2.487E-05 C3 =-0.190

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.380E-04 K2 = 2.296E-04 K3 = 0.174

SPRING RATE (LB/IN) : 1310.7

TABLE D-67

RUN: 52- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
530.4	-0.271	0.990	0.867	6189.2	11.79	0.001	0.000002
1058.2	-0.194	0.885	0.744	11817.1	11.45	-0.014	-0.000013
1582.5	-0.225	0.831	0.684	12850.6	8.52	-0.037	-0.000023

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0265 P1 =-5.542E-05

P0 =1.0645 P1 =-1.161E-04 P2 = 2.039E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.169 R1 = 2.011E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8114 S1 =-9.854E-05

S0 =0.9598 S1 =-3.385E-04 S2 = 8.050E-08

TABLE D-68

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 81

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	38.8	32.0	16.0	32.1	48.1	32.1
Load,-FZ (lb)	1110	1597	1062	1077	1065	550
Rolling Resistance, FR (lb)	16.8	31.0	30.1	17.9	14.2	8.1
FR Coefficient, FR/-FZ	.0151	.0194	.0283	.0166	.0133	.0147

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-69

RUN: 86- J- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	538.1	-0.291	0.976	0.885	6671.5	12.18	0.007	0.000013
4.	540.0	-0.388	0.993	0.961	5313.9	9.81	0.003	0.000005
8.	540.3	-0.593	0.971	0.935	3576.3	6.67	-0.001	-0.000002
12.	542.8	-0.998	0.960	0.948	2392.9	4.41	-0.000	-0.000000
16.	548.6	-0.999	0.994	0.978	1908.9	3.50	-0.000	-0.000000
20.	542.2	-0.998	1.010	0.994	1490.7	2.79	-0.001	-0.000002

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-70

RUN: 90- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	540.7	-0.274	1.072	0.852	6248.9	11.59	-0.002	-0.000003
4.	541.7	-0.294	1.102	0.893	6288.9	11.62	-0.003	-0.000006
8.	542.2	-0.463	1.047	0.940	4251.8	7.76	-0.010	-0.000019
12.	539.5	-0.602	1.007	0.949	2963.0	5.54	-0.019	-0.000036
16.	540.0	-0.655	0.965	0.920	2123.3	4.04	-0.025	-0.000046
20.	543.0	-0.870	0.927	0.917	1616.3	3.06	-0.037	-0.000068

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-71

RUN: 94- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	532.7	-0.213	1.042	0.910	0.0	0.0	0.005	0.000010
4.	533.8	0.549	1.022	0.893	3313.3	12.55	-0.500	-0.000936
8.	537.7	0.392	0.954	0.901	2361.2	8.91	-0.505	-0.000939
12.	536.3	0.146	0.914	0.876	1673.1	6.31	-0.509	-0.000948
16.	536.7	-0.917	0.927	0.905	1141.2	4.31	-0.511	-0.000951
20.	535.7	-0.994	0.919	0.916	861.9	3.30	-0.513	-0.000958

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-72

RUN: 100- 9- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1063.5	-0.252	0.898	0.778	11618.9	10.94	0.001	0.000001
4.	1064.9	0.329	0.072	0.797	4213.3	7.92	-0.501	-0.000470
8.	1067.3	-0.083	0.815	0.790	2445.9	4.62	-0.505	-0.000474
12.	1069.3	-0 998	0.746	0.736	1578.9	2.97	-0.507	-0.000474
16.	1070.7	-0.998	0.743	0.740	1094.2	2.07	-0.510	-0.000476
20.	1070.0	-0.999	0.729	0.711	762.4	1.45	-0.510	-0.000477

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-73

RUN: 104- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1059.4	-0.176	0.953	0.750	10217.3	9.80	-0.009	-0.000009
4.	1064.8	0 556	0.809	0.756	4872.7	9.35	-0.509	-0.000478
8.	1058.4	0 386	0.790	0.716	2858.8	5.51	-0.513	-0.000480
12.	1069.1	0.055	0.726	0.709	1827.4	3.54	-0.517	-0.000484
16.	1072.4	-0.527	0.705	0.651	1245.4	2.40	-0.520	-0.000485
20.	1070.7	-0.998	0.711	0.704	890.1	1.73	-0.522	-0.000487

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-74

RUN: 108- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1060.3	-0.263	0.880	0.735	9200.2	9.17	-0.035	-0.000033
4.	1063.1	0.612	0.903	0.797	3944.5	7.96	-0.523	-0.000492
8.	1070.5	0.440	0.878	0.768	2644.3	5.57	-0.538	-0.000503
12.	1071.4	-0.988	0.856	0.852	2116.2	4.62	-0.556	-0.000519
16.	1073.8	-0.999	0.809	0.808	1426.9	3.19	-0.570	-0.000531
20.	1052.3	-0.986	0.817	0.813	1224.8	2.94	-0.575	-0.000546

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-75

RUN: 231- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	517.2	-0.151	1.035	0.706	-572.5	-1.12	-0.015	-0.000028
4.	517.1	-0.209	0.981	0.813	6529.2	12.79	-0.020	-0.000038
8.	517.9	-0.386	0.905	0.766	3346.3	6.72	-0.023	-0.000044
12.	516.5	-1.001	0.931	0.886	2322.5	4.61	-0.026	-0.000050
16.	519.8	-1.000	1.003	0.980	1623.3	3.22	-0.028	-0.000053
20.	519.6	-0.769	0.800	0.707	1255.8	2.51	-0.030	-0.000058

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-76

RUN: 246- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1051.2	-0.146	1.032	0.761	15786.7	15.58	-0.030	-0.000029
4.	1048.9	-0.225	0.938	0.836	11539.5	11.46	-0.035	-0.000034
8.	1053.3	-0.362	0.843	0.729	7173.7	7.14	-0.042	-0.000040
12.	1054.9	-0.440	0.782	0.731	4502.3	4.47	-0.046	-0.000044
16.	1053.8	-0.716	0.744	0.707	2989.6	2.97	-0.048	-0.000045
20.	1049.9	-0.929	0.744	0.716	2146.1	2.15	-0.051	-0.000048

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-77

RUN: 261- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1578.7	-0.215	0.913	0.639	7847.6	5.23	-0.042	-0.000026
4.	1579.6	-0.235	0.857	0.602	6547.8	4.39	-0.046	-0.000029
8.	1594.9	-0.401	0.774	0.616	5279.5	3.55	-0.063	-0.000040
12.	1533.6	-0.998	0.765	0.758	4025.4	2.71	-0.073	-0.000046
16.	1594.0	-0.912	0.728	0.657	3099.0	2.09	-0.070	-0.000044
20.	1583.8	-0.940	0.699	0.669	2386.3	1.61	-0.077	-0.000048

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-78

RUN: 232- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	514.5	-0.141	0.968	0.800	9250.6	18.70	-0.015	-0.000029
4.	515.8	-0.178	0.976	0.747	6176.5	12.38	-0.022	-0.000042
8.	512.7	-0.381	0.874	0.785	3537.0	7.07	-0.024	-0.000046
12.	514.0	-0.812	0.818	0.761	2322.5	4.63	-0.028	-0.000055
16.	512.9	-0.827	0.805	0.745	1633.0	3.25	-0.029	-0.000057
20.	515.2	-0.939	0.786	0.738	1242.0	2.50	-0.031	-0.000061

TEST PRESSURE: 32 psi
(Regulated)

TABLE D-79

RUN: 247- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1044.9	-0.161	0.939	0.686	14965.3	15.07	-0.031	-0.000029
4.	1051.5	-0.185	0.911	0.693	12009.0	12.16	-0.044	-0.000042
8.	1050.2	-0.282	0.789	0.685	7195.7	7.25	-0.058	-0.000055
12.	1054.7	-0.398	0.720	0.705	4240.7	4.26	-0.064	-0.000060
16.	1055.8	-0.767	0.689	0.665	2698.6	2.70	-0.067	-0.000064
20.	1056.7	-0.846	0.672	0.658	2042.8	2.04	-0.070	-0.000066

TEST PRESSURE: 32 psi
(Regulated)

TABLE D-80

RUN: 262- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1573.4	-0.151	0.838	0.653	17387.4	11.82	-0.053	-0.000034
4.	1579.2	-0.172	0.870	0.656	13344.1	9.27	-0.069	-0.000043
8.	1588.9	-0.219	0.793	0.656	9228.9	6.60	-0.098	-0.000061
12.	1588.7	-0.341	0.733	0.641	6700.0	4.93	-0.120	-0.000076
16.	1591.5	-0.998	0.754	0.744	4493.0	3.27	-0.137	-0.000086
20.	1592.6	-0.913	0.683	0.650	3488.8	2.56	-0.145	-0.000091

TEST PRESSURE: 32 psi
(Regulated)

TABLE D-81

RUN: 233- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	511.3	-0.341	0.939	0.898	6609.0	13.42	-0.013	-0.000025
4.	508.7	-0.376	0.913	0.871	5660.8	11.46	-0.024	-0.000047
8.	510.2	-0.909	0.879	0.842	3339.8	6.69	-0.032	-0.000063
12.	520.9	-0.962	0.851	0.835	2532.1	5.00	-0.039	-0.000074
16.	524.3	-0.995	0.830	0.817	1828.0	3.63	-0.042	-0.000080
20.	520.8	-0.941	0.792	0.759	1437.9	2.89	-0.044	-0.000085

TEST PRESSURE: 16 psi
(Regulated)

TABLE D-82

RUN: 248- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1040.1	-0.187	0.823	0.676	14416.2	14.92	-0.052	-0.000050
4.	1047.9	-0.170	0.905	0.727	10209.9	10.87	-0.070	-0.000067
8.	1052.3	-0.224	0.833	0.782	6011.8	6.99	-0.109	-0.000104
12.	1058.4	-0.910	0.825	0.819	4564.3	5.47	-0.145	-0.000137
16.	1060.8	-0.991	0.838	0.836	3772.9	4.58	-0.178	-0.000168
20.	1056.6	-0.858	0.854	0.830	3083.6	4.02	-0.201	-0.000191

TEST PRESSURE: 16 psi
(Regulated)

TABLE D-83

RUN: 263- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1567.4	-0.185	0.765	0.646	12359.7	9.06	-0.109	-0.000069
4.	1565.9	-0.193	0.916	0.768	9022.1	6.96	-0.130	-0.000083
8.	1402.2	-0.292	0.939	0.843	6773.1	5.72	-0.161	-0.000115
12.	1242.2	-0.372	0.916	0.875	9263.8	9.15	-0.195	-0.000157
16.	1123.5	-0.917	0.892	0.869	5727.4	7.08	-0.200	-0.000179
20.	1012.2	-0.879	0.878	0.859	3646.5	5.19	-0.197	-0.000194

TEST PRESSURE: 16 psi
(Regulated)

TABLE D-84

RUN: 276- 9- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1581.3	-0.254	0.822	0.608	7780.6	5.14	-0.033	-0.000021
4.	1577.3	-0.275	0.752	0.627	6080.2	4.02	-0.036	-0.000023
8.	1582.8	-0.474	0.666	0.638	4319.0	2.88	-0.049	-0.000031
12.	1581.5	-1.000	0.689	0.666	3070.4	2.07	-0.060	-0.000038
16.	1584.4	-0.999	0.689	0.676	2370.6	1.59	-0.064	-0.000040
20.	1583.3	-1.000	0.686	0.668	1891.0	1.27	-0.061	-0.000038

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-85

RUN: 276- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1576.7	-0.241	0.816	0.624	7235.0	4.87	-0.045	-0.000028
4.	1577.9	-0.254	0.838	0.647	6492.7	4.41	-0.052	-0.000033
8.	1593.0	-0.339	0.774	0.671	4733.4	3.30	-0.075	-0.000047
12.	1585.2	-0.456	0.725	0.679	3721.4	2.64	-0.099	-0.000062
16.	1591.0	-0.870	0.686	0.639	2840.1	2.03	-0.114	-0.000072
20.	1590.8	-0.802	0.661	0.651	2316.6	1.65	-0.122	-0.000077

TEST PRESSURE: 32 psi
(Regulated)

TABLE D-86

RUN: 282- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1571.1	-0.278	0.774	0.601	6640.3	4.79	-0.121	-0.000077
4.	1571.8	-0.301	0.927	0.671	5229.5	4.03	-0.133	-0.000085
8.	1461.6	-0.373	0.934	0.799	4057.2	3.41	-0.162	-0.000111
12.	1272.2	-0.806	0.906	0.881	0.0	0.0	-0.249	-0.000196
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 16 psi
(Regulated)

TABLE D-87

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		5
SIZE		P195/70R14
MANUFACTURER		GOODYEAR
BRAND NAME		EAGLE NST
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1312
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 4 ARAMID
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
83	MKRWRT0161	73	100	–	165	182	
84	161		50	–		230,245,260	
85	151			–		237,252,267	
86	151			–		241,256,271	
87	161		100	–			19½
88	161			–		272,277,283	
89	161			–		273,278,284	
90	151			–		274,279,285	

TABLE D-88

RUN: 165- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
659.4	163.8	0.248	12.5	0.019	0.076	660.0	4.4	0.007	0.6	0.001	0.144	0.027	655.6	0.97	11.1
1311.9	258.4	0.197	35.1	0.027	0.136	1323.2	9.5	0.007	1.3	0.001	0.133	0.037	1314.2	0.86	12.1
1982.7	262.1	0.132	56.4	0.028	0.215	1983.9	15.0	0.008	1.7	0.001	0.116	0.057	1972.9	0.80	13.1
2637.3	216.5	0.082	77.8	0.029	0.359	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2630.7	0.68	18.8

CORNERING STIFFNESS COEFFICIENTS:

A0 = 515.85 A1 = 16.69 A2 = 3599.00

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.368 A4 =-11337.69

LATERAL FRICTION COEFFICIENTS:

B3 = 1.053 B1 =-1.296E-04 B4 =-3.786E-09

OVERTURNING MOMENT COEFFICIENTS:

C1 =-6.546E-05 C2 =-2.642E-04 C3 =-0.391

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.901E-04 K2 = 2.148E-04 K3 = 0.107

SPRING RATE (LB/IN) : 1272.3

TABLE D-89

RUN: 182- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
649.1	-0.272	1.008	0.840	3669.9	5.68	-0.012	-0.000019
1302.0	-0.201	0.942	0.740	7440.6	5.93	-0.043	-0.000033
1960.5	-0.178	0.852	0.654	7079.0	3.97	-0.089	-0.000045

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0887 P1 =-1.187E-04

P0 =1.0499 P1 =-4.384E-05 P2 =-2.841E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.310 R1 = 7.108E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9297 S1 =-1.419E-04

S0 =0.9525 S1 =-1.356E-04 S2 = 1.675E-08

TABLE D-90

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 196

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	40.3	35.1	17.5	35.0	52.6	35.0
Load, -FZ (lb)	1329	1970	1321	1340	1327	669
Rolling Resistance, FR (lb)	15.2	24.3	24.2	16.0	13.8	8.5
FR Coefficient, FR/-FZ	.0114	.0123	.0183	.0119	.0104	.0127

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-91

RUN: 230- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	651.5	-0.206	1.063	0.933	13774.7	21.35	-0.018	-0.000027
4.	650.4	-1.001	0.994	0.962	8528.2	13.61	-0.021	-0.000033
8.	655.3	-0.418	0.944	0.876	5175.0	8.07	-0.026	-0.000039
12.	653.5	-1.000	0.960	0.913	3145.7	4.91	-0.026	-0.000040
16.	654.1	-1.000	0.919	0.902	2057.8	3.27	-0.028	-0.000043
20.	648.6	-1.000	0.972	0.930	1627.1	2.58	-0.030	-0.000047

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-92

RUN: 245- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1301.4	-0.135	1.021	0.761	37938.7	30.56	-0.044	-0.000034
4.	1308.5	0.583	0.900	0.731	8250.2	13.38	-0.526	-0.000402
8.	1309.3	0.267	0.789	0.770	4057.9	6.57	-0.528	-0.000403
12.	1305.7	-1.000	0.803	0.794	2612.5	4.25	-0.529	-0.000405
16.	1311.0	-1.000	0.830	0.823	1814.1	2.92	-0.531	-0.000405
20.	1311.5	-0.997	0.770	0.762	1336.8	2.16	-0.532	-0.000405

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-93

RUN: 260- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1949.7	-0.184	0.972	0.725	13952.7	7.69	-0.068	-0.000035
4.	1951.9	-0.226	0.799	0.701	10559.0	5.84	-0.076	-0.000039
8.	1957.9	-0.438	0.736	0.683	6339.9	3.53	-0.087	-0.000044
12.	1959.3	-0.530	0.724	0.709	4680.2	2.61	-0.091	-0.000046
16.	1959.6	-0.999	0.713	0.698	3636.8	2.04	-0.093	-0.000047
20.	1956.7	-0.999	0.714	0.704	3002.8	1.68	-0.091	-0.000046

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-94

RUN: 237- 3- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	643.9	-0.148	1.089	1.008	12996.6	20.63	-0.021	-0.000032
4.	645.4	-0.263	1.052	0.818	9239.2	14.68	-0.024	-0.000036
8.	655.2	-0.635	0.966	0.800	5853.6	9.26	-0.031	-0.000047
12.	650.7	-0.964	0.946	0.858	3034.4	4.86	-0.032	-0.000049
16.	648.9	-1.000	0.908	0.873	1953.2	3.12	-0.026	-0.000040
20.	644.3	-0.881	0.812	0.735	1205.3	1.91	-0.021	-0.000033

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-95

RUN: 252- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1302.6	-0.137	1.031	0.770	11734.7	9.60	-0.059	-0.000045
4.	1307.5	-0.277	0.953	0.776	7980.5	6.56	-0.065	-0.000050
8.	1311.3	-0.357	0.829	0.792	4579.1	3.78	-0.077	-0.000058
12.	1308.8	-0.814	0.757	0.727	3347.6	2.77	-0.074	-0.000057
16.	1315.0	-0.931	0.725	0.676	2621.4	2.16	-0.084	-0.000064
20.	1308.5	-0.823	0.713	0.691	2090.7	1.75	-0.085	-0.000065

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-96

RUN: 267- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1579.0	-0.147	1.035	0.755	12509.3	8.61	-0.076	-0.000048
4.	1583.9	-0.199	0.923	0.735	10351.2	7.17	-0.083	-0.000052
8.	1586.9	-0.390	0.813	0.753	5786.7	4.01	-0.094	-0.000059
12.	1591.7	-0.527	0.761	0.697	4251.3	2.96	-0.100	-0.000063
15.	1589.7	-0.655	0.710	0.695	3264.8	2.27	-0.103	-0.000064
20.	1590.9	-0.838	0.690	0.681	2568.1	1.80	-0.106	-0.000067

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-97

RUN: 241- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	643.7	-0.169	0.998	0.943	14493.9	23.62	-0.042	-0.000065
4.	645.7	-0.993	0.978	0.972	4524.2	14.80	-0.525	-0.000813
8.	656.2	-0.877	0.953	0.927	2380.0	7.72	-0.528	-0.000804
12.	649.2	-0 502	0.909	0.835	1531.0	5.05	-0.529	-0.000815
16.	651.3	-0.917	0.915	0.901	1044.6	3.44	-0.531	-0.000815
20.	660.5	-0.756	0.843	0.820	761.3	2.48	-0.530	-0.000803

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-98

RUN: 256- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1304.4	-0.171	0.924	0.724	10134.5	8.77	-0.112	-0.000086
4.	1307.4	-0.206	0.953	0.751	9175.5	8.12	-0.119	-0.000091
8.	1315.5	-0.448	0.829	0.795	4987.0	4.48	-0.136	-0.000103
12.	1317.6	-0.999	0.807	0.804	3330.3	2.99	-0.145	-0.000110
16.	1318.8	-1.000	0.819	0.810	2669.4	2.42	-0.155	-0.000117
20.	1317.2	-0.998	0.795	0.789	2192.2	1.99	-0.160	-0.000122

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-99

RUN: 271- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1948.0	-0.129	0.929	0.634	15314.6	9.69	-0.187	-0.000096
4.	1944.9	-0.177	1.032	0.821	12264.9	7.89	-0.191	-0.000098
8.	1914.7	-0.316	0.926	0.829	12235.1	8.25	-0.208	-0.000109
12.	1760.2	-0.689	0.884	0.839	6141.9	4.94	-0.196	-0.000112
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-100

RUN: 272- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	653.0	-0.239	0.867	0.702	3692.6	5.58	-0.010	-0.000016
4.	648.6	-0.346	0.848	0.773	2501.1	3.94	-0.013	-0.000020
8.	654.3	-1.000	0.878	0.836	1973.8	3.05	-0.020	-0.000031
12.	648.8	-1.000	0.899	0.848	1533.6	2.40	-0.025	-0.000038
16.	650.4	-1.001	0.856	0.803	1242.9	1.95	-0.024	-0.000037
20.	646.1	-1.000	0.806	0.773	1038.9	1.65	-0.030	-0.000046

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-101

RUN: 277- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1304.1	-0.257	0.928	0.710	8675.7	6.89	-0.036	-0.000028
4.	1304.2	-0.255	0.846	0.749	6302.3	5.01	-0.038	-0.000029
8.	1302.9	-1.000	0.788	0.772	4116.6	3.31	-0.046	-0.000035
12.	1303.8	-1.001	0.796	0.761	3098.4	2.49	-0.052	-0.000040
16.	1305.9	-1.000	0.767	0.739	2479.6	2.00	-0.055	-0.000042
20.	1305.0	-0.999	0.756	0.734	1997.0	1.62	-0.058	-0.000045

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-102

RUN: 283- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1961.8	-0.169	0.904	0.624	12551.2	6.86	-0.066	-0.000034
4.	1960.1	-0.271	0.814	0.650	9763.9	5.35	-0.069	-0.000035
8.	1960.8	-0.434	0.740	0.655	6089.6	3.35	-0.080	-0.000041
12.	1965.2	-0.620	0.679	0.624	4297.8	2.39	-0.088	-0.000045
16.	1965.4	-0.999	0.654	0.635	3337.5	1.86	-0.091	-0.000046
20.	1966.9	-0.999	0.674	0.657	2744.2	1.53	-0.089	-0.000045

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-103

RUN: 273- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	650.5	-0.227	0.951	0.778	4526.9	6.97	-0.017	-0.000027
4.	649.2	0.359	0.936	0.835	1592.6	4.96	-0.511	-0.000787
8.	649.2	0.015	0.892	0.847	1111.3	3.53	-0.514	-0.000793
12.	662.2	-0.271	0.852	0.821	860.7	2.70	-0.517	-0.000781
16.	654.8	-1.000	0.850	0.828	644.3	2.04	-0.518	-0.000791
20.	651.1	-1.000	0.827	0.804	524.9	1.67	-0.521	-0.000800

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-104

RUN: 278- 0- 3 . COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1300.5	-0.197	1.010	0.777	10451.3	8.52	-0.053	-0.000041
4.	1304.8	-0.281	0.919	0.791	7474.3	6.07	-0.057	-0.000044
8.	1312.2	-0.383	0.835	0.802	4515.7	3.72	-0.072	-0.000055
12.	1316.1	-0.528	0.792	0.752	3284.9	2.72	-0.079	-0.000060
16.	1310.9	-1.000	0.809	0.778	2583.2	2.15	-0.081	-0.000062
20.	1310.8	-1.000	0.751	0.736	2041.0	1.69	-0.081	-0.000062

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-105

RUN: 284- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1962.1	-0.148	1.005	0.682	15447.8	9.29	-0.097	-0.000049
4.	1954.8	-0.182	0.903	0.694	10938.7	6.27	-0.107	-0.000054
8.	1971.4	-0.444	0.818	0.722	7109.1	4.14	-0.124	-0.000063
12.	1973.5	-0.623	0.752	0.733	4836.3	2.82	-0.130	-0.000066
16.	1975.4	-0.999	0.724	0.710	3690.5	2.15	-0.130	-0.000066
20.	1971.9	-0.997	0.735	0.728	3157.5	1.84	-0.137	-0.000069

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-106

RUN: 274- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	645.4	-0.232	0.965	0.836	6087.9	9.71	-0.034	-0.000052
4.	645.3	-0.284	0.943	0.828	3374.5	5.47	-0.044	-0.000068
8.	665.3	-0.420	0.843	0.804	1855.5	3.01	-0.053	-0.000080
12.	662.6	-0.995	0.812	0.809	1697.5	2.74	-0.055	-0.000083
16.	659.4	-0.943	0.779	0.725	1324.7	2.14	-0.059	-0.000089
20.	659.7	-0.869	0.741	0.703	1056.7	1.70	-0.059	-0.000090

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-107

RUN: 279- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1296.3	-0.199	0.926	0.739	11499.4	9.98	-0.105	-0.000081
4.	1304.4	-0.230	0.945	0.754	7875.9	6.97	-0.116	-0.000089
8.	1315.5	-0.333	0.842	0.697	5024.4	4.51	-0.134	-0.000102
12.	1319.3	-0.555	0.773	0.725	3271.4	2.95	-0.146	-0.000111
16.	1321.9	-0.806	0.743	0.725	2499.2	2.27	-0.154	-0.000117
20.	1321.4	-0.808	0.711	0.697	2008.7	1.82	-0.160	-0.000121

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-108

RUN: 285- 0- 3 COMBINED CORNERING AND BRAKING TIRE COEFFICEINTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1956.1	-0.093	0.879	0.656	0.0	0.0	-0.222	-0.000114
4.	1960.2	0.030	0.964	0.727	0.0	0.0	-0.607	-0.000310
8.	1938.2	0.319	0.879	0.773	0.0	0.0	-0.639	-0.000330
12.	1828.3	-0.997	0.878	0.862	3226.7	4.93	-0.602	-0.000329
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-109

RUN: 286- 0- 3

COMBINED CORNERING AND BRAKING TIRE COEFFICIENTS

SLIP ANGLE	LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
0.	1957.0	-0.177	0.946	0.713	16347.9	10.37	-0.192	-0.000098
4.	1962.1	-0.227	1.003	0.737	12156.7	7.88	-0.203	-0.000104
8.	1946.3	-0.364	0.917	0.798	9859.0	6.57	-0.210	-0.000108
12.	1825.6	-0.689	0.855	0.805	6161.4	4.73	-0.205	-0.000112
16.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-110

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		6
SIZE		P195/75 R14
MANUFACTURER		FIRESTONE
BRAND NAME		721
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
8	W2KAXT3041	55	100	-	1	27	
32	3041			-		116,126	73
33	3041			0.020, -	152,170	159,187	
34	3021			-	169	186	

FOOTPRINT, TIRE NO. 8

FIGURE D-5

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-111

RUN: 1- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
702.1	120.4	0.171	10.9	0.016	0.091	696.8	6.9	0.010	0.6	0.001	0.079	0.058	703.8	0.94	18.3
1398.0	167.0	0.119	30.2	0.022	0.181	1398.1	15.5	0.011	1.1	0.001	0.074	0.093	1401.8	0.89	16.5
2090.7	167.3	0.080	51.4	0.025	0.307	2096.7	25.0	0.012	2.2	0.001	0.087	0.149	2097.7	0.82	20.4
2782.9	141.6	0.051	73.1	0.026	0.516	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2791.8	0.83	32.9

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2380.39 A1 = 8.03 A2 = 3733.28

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.525 A4 = -6922.91

LATERAL FRICTION COEFFICIENTS:

B3 = 1.041 B1 =-1.579E-04 B4 = 2.854E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.337E-05 C2 =-1.877E-04 C3 =-0.369

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.192E-04 K2 = 2.378E-04 K3 = 0.185

SPRING RATE (LB/IN) : 1266.8

TABLE D-112

RUN: 27- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
708.3	-0.259	0.903	0.884	11878.0	17.05	-0.014	-0.000020
1401.3	-0.234	0.815	0.722	19646.2	14.79	-0.053	-0.000038
2097.2	-0.220	0.772	0.626	20110.1	10.61	-0.096	-0.000046

MUX PEAK COEFFICIENTS:

P0 =0.9618 P1 =-9.394E-05

P0 =1.0399 P1 =-2.269E-04 P2 = 4.733E-08

LONGITUDINAL SLIP AT MUX PEA COEFFICIENTS:

R0 =-0.277 R1 = 2.821E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0046 S1 =-1.858E-04

S0 =1.1215 S1 =-3.838E-04 S2 = 7.018E-08

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-113

RUN: 170- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
696.9	119.7	0.172	9.0	0.013	0.075	707.4	6.1	0.009	0.4	0.001	0.062	0.051	701.3	0.98	15.7
1398.5	193.0	0.138	24.9	0.018	0.129	1409.2	14.2	0.010	1.0	0.001	0.068	0.073	1401.8	0.90	17.3
2104.5	220.1	0.105	44.4	0.021	0.202	2118.3	22.8	0.011	1.8	0.001	0.079	0.104	2106.2	0.84	19.1
2810.4	216.9	0.077	63.1	0.022	0.291	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2808.2	0.79	19.4

TEST PRESSURE: 52.5 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 759.85 A1 = 10.35 A2 = 4670.91

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.465 A4 = -6298.80

LATERAL FRICTION COEFFICILNTS:

B3 = 1.073 B1 =-1.524E-04 B4 = 1.876E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-4.716E-05 C2 =-1.521E-04 C3 =-0.430

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.539E-04 K2 = 1.574E-04 K3 = 0.122

SPRING RATE (LB/IN) : 1797.6

TABLE D-114

RUN: 186- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
690.3	-0.245	0.956	0.864	3959.6	5.91	-0.049	-0.000072
1390.8	-0.220	0.930	0.752	6144.8	5.01	-0.122	-0.000088
2091.3	-0.203	0.874	0.725	-8546.0	-5.10	-0.195	-0.000093

TEST PRESSURE: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0013 P1 =-5.842E-05

P0 =0.9523 P1 = 2.541E-05 P2 =-3.050E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.264 R1 = 2.990E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9190 S1 =-9.977E-05

S0 =1.0602 S1 =-3.417E-04 S2 = 8.684E-08

TABLE D-115

RUN: 187- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
693.1	-1.001	0.865	0.803	2429.9	3.50	-0.012	-0.000018
1393.9	-0.242	0.781	0.683	6273.9	4.63	-0.034	-0.000025
2098.0	-0.291	0.693	0.614	7520.5	3.83	-0.068	-0.000032

MUX PEAK COEFFICIENTS:

P0 =0.9497 P1 =-1.219E-04

P0 =0.9451 P1 =-1.151E-04 P2 =-2.032E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-1.215 R1 = 5.043E-04

MUX SLIDE COEFFICIENTS:

S0 =0.8875 S1 =-1.344E-04

S0 =0.9702 S1 =-2.760E-04 S2 = 5.081E-08

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-116

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 73

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	40.1	35.1	17.5	35.1	52.6	35.1
Load, -FZ (lb)	1413	2103	1411	1411	1406	714
Rolling Resistance, FR (lb)	13.0	21.4	21.8	13.3	11.2	6.7
FR Coefficient, FR/-FZ	.0092	.0102	.0155	.0094	.0080	.0094

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

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TABLE D-117

RUN: 152- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
698.2	154.1	0.221	13.6	0.020	0.088	695.7	6.8	0.010	0.6	0.001	0.089	0.044	702.9	0.62	6.8
1391.9	212.6	0.153	38.2	0.027	0.179	1396.2	15.1	0.011	1.2	0.001	0.080	0.0	1395.6	0.56	7.7
2093.8	197.8	0.094	59.1	0.028	0.299	2098.4	23.7	0.011	2.0	0.001	0.086	0.120	2097.1	0.50	9.4
2785.9	171.8	0.062	76.7	0.028	0.446	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2792.9	0.43	10.8

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3923.87 A1 = 9.03 A2 = 3607.65

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.543 A4 =-10711.12

LATERAL FRICTION COEFFICIENTS:

B3 = 0.672 B1 =-7.718E-05 B4 =-3.239E-09

OVERTURNING MOMENT COEFFICIENTS:

C1 =-6.714E-05 C2 =-2.172E-04 C3 =-0.424

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.746E-04 K2 = 3.094E-04 K3 = 0.109

SPRING RATE (LB/IN) : 1300.2

TABLE D-118

RUN: 159- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
705.1	-0.185	0.664	0.415	4676.7	6.75	-0.017	-0.000025
1402.6	-0.120	0.662	0.377	15009.6	11.32	-0.054	-0.000039
3972.2	-0.125	0.632	0.096	373.0	0.03	-0.053	-0.000023

MUX PEAK COEFFICIENTS:

P0 =0.6734 P1 =-1.037E-05

P0 =0.6628 P1 = 3.004E-06 P2 =-2.748E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.170 R1 = 1.259E-05

MUX SLIDE COEFFICIENTS:

S0 =0.5004 S1 =-1.009E-04

S0 =0.4358 S1 =-1.802E-05 S2 =-1.702E-08

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-119

RUN: 126- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
707.9	-0.163	0.993	0.785	18509.8	26.95	-0.033	-0.000047
1399.9	-0.153	0.900	0.662	24302.3	19.42	-0.103	-0.000073
2101.0	-0.153	0.843	0.668	24904.1	14.40	-0.175	-0.000083

MUX PEAK COEFFICIENTS:

P0 =1.0639 P1 =-1.082E-04

P0 =1.1255 P1 =-2.136E-04 P2 = 3.740E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.167 R1 = 7.561E-06

MUX SLIDE COEFFICIENTS:

S0 =0.8224 S1 =-8.375E-05

S0 =1.0448 S1 =-4.597E-04 S2 = 1.336E-07

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-120

RUN: 116- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
707.3	-0.278	0.933	0.811	6687.2	9.52	-0.000	-0.000001
1405.0	-0.250	0.873	0.687	16901.1	12.31	-0.027	-0.000019
2100.2	-0.190	0.806	0.624	21314.0	10.78	-0.056	-0.000027

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9982 P1 =-9.078E-05

P0 =0.9877 P1 =-7.216E-05 P2 =-6.418E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.328 R1 = 6.361E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8956 S1 =-1.342E-04

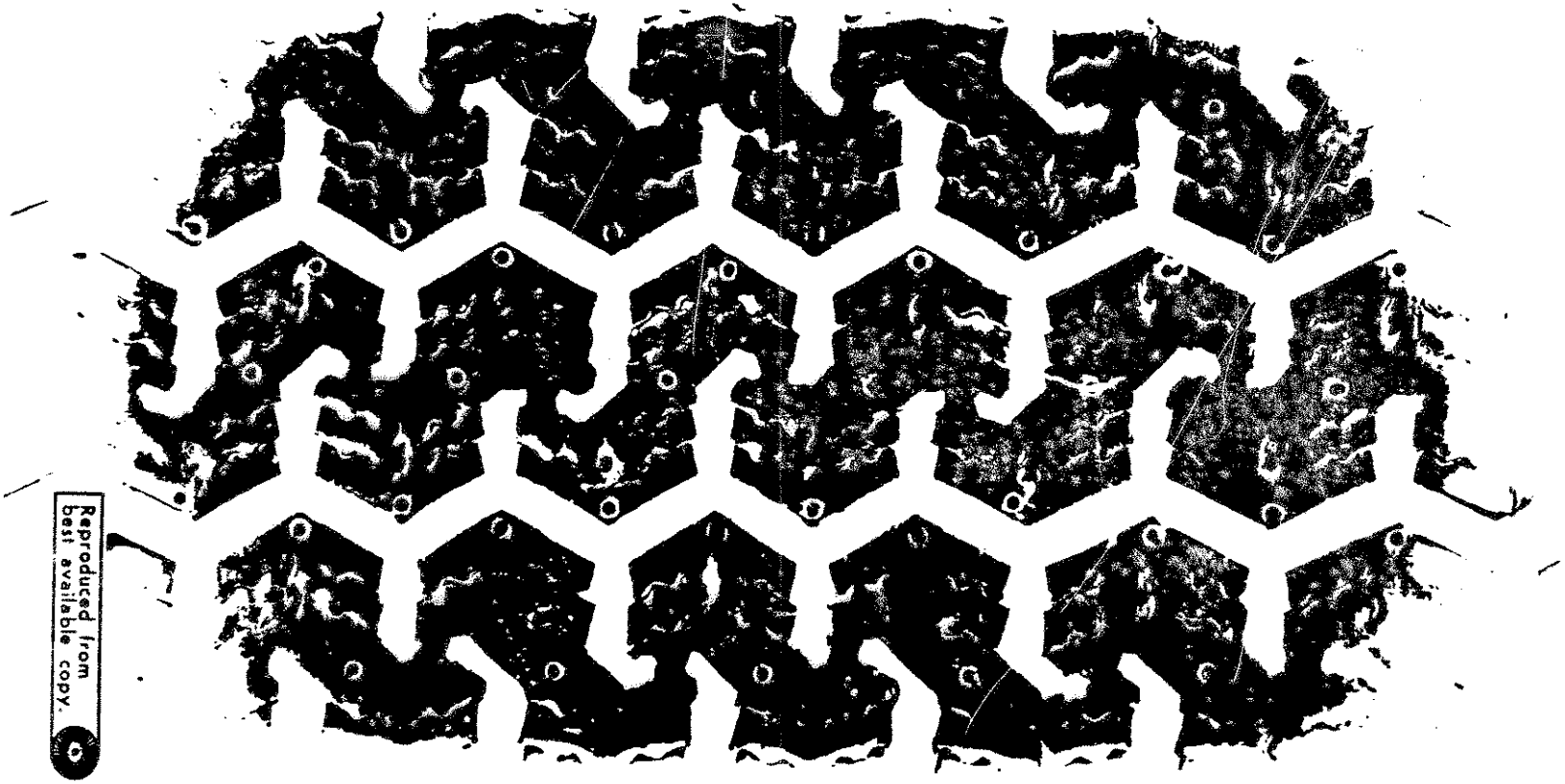
S0 =0.9989 S1 =-3.088E-04 S2 = 6.204E-08

TABLE D-121

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		7
SIZE		185 SR14
MANUFACTURER		SEMPERIT
BRAND NAME		M501
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1450
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 RAYON + 2 STEEL
	SIDEWALL	2 RAYON
RIM WIDTH (in.)		5.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
67	BTJ5 SYX 121	69	100	-	138	146	
68	↓		↓	-		120,130	77
69				0.020, -	153,172	160,189	
70				-	171	188	



FOOTPRINT, TIRE NO. 67

FIGURE D-6

Load = 1360 lbs.
Pressure = 32 psi

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TABLE D-122

RUN: 138- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
582.5	161.1	0.236	14.4	0.021	0.089	676.3	5.7	0.008	0.5	0.001	0.095	0.035	681.9	0.92	10.3
1349.5	214.7	0.159	38.1	0.028	0.178	1348.3	11.9	0.009	0.9	0.001	0.073	0.056	1359.7	0.87	13.0
2033.7	187.5	0.092	57.3	0.028	0.305	2039.2	18.1	0.009	1.2	0.001	0.067	0.097	2042.7	0.79	19.7
2712.5	141.2	0.052	75.2	0.028	0.532	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2713.4	0.57	24.4

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4142.05 A1 = 9.86 A2 = 3157.05

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.487 A4 =-39446.26

LATERAL FRICTION COEFFICIENTS:

B3 = 0.859 B1 = 1.503E-04 B4 =-9.385E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.638E-05 C2 =-1.945E-04 C3 =-0.278

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.339E-04 K2 =-2.648E-04 K3 = 0.144

SPRING RATE (LB/IN) : 1090.5

TABLE D-123

RUN: 146- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
685.0	-0.391	0.962	0.782	5668.2	8.30	-0.021	-0.000031
1361.2	-0.171	0.930	0.663	28726.7	22.66	-0.068	-0.[illegible]0050
2041.1	-0.117	0.898	0.580	35372.5	19.60	-0.116	-0.000057

MUX PEAK COEFFICIENTS:

P0 =0.9938 P1 =-4.664E-05

P0 =0.9941 P1 =-4.535E-05 P2 =-6.282E-10

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.501 R1 = 2.016E-04

MUX SLIDE COEFFICIENTS:

S0 =0.8780 S1 =-1.488E-04

S0 =0.9394 S1 =-2.556E-04 S2 = 3.911E-08

TEST PRESSURE: 32 psi
(Regulated)

RUN: 172- 0- 3

TABLE D-124

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
692.7	146.5	0.211	11.1	0.016	0.076	682.0	5.3	0.008	0.4	0.001	0.084	0.036	674.7	1.00	14.7
1367.5	230.2	0.168	29.8	0.022	0.130	1367.2	11.3	0.008	0.9	0.001	0.076	0.049	1361.2	0.89	11.[illegible]
2050.2	247.5	0.121	51.2	0.025	0.207	2056.5	17.4	0.008	1.2	0.001	0.068	0.070	2047.1	0.81	13.0
2732.4	228.0	0.083	68.5	0.025	0.300	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2725.5	0.76	18.4

CORNERING STIFFNESS COEFFICIENTS:

A0 = 884.70 A1 = 13.20 A2 = 4112.99

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.443 A4 =-21519.71

LATERAL FRICTION COEFFICIENTS:

B3 = 1.132 B1 =-2.135E-04 B4 = 2.798E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-5.686E-05 C2 =-1.632E-04 C3 =-0.342

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.719E-04 K2 = 1.820E-04 K3 = 0.104

SPRING RATE (LB/IN) : 1542.9

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-125

RUN: 188- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
673.6	-0.252	0.986	0.835	3669.2	5.69	-0.055	-0.000082
1348.1	-0.269	0.927	0.771	7559.9	6.47	-0.14[illegible]	-0.000104
2031.1	-0.251	0.888	0.726	9545.1	2.26	-0.220	-0.000108

MUX PEAK COEFFICIENTS:

P0 =1.0316 P1 =-7.236E-05

P0 =1.0668 P1 =-1.361E-04 P2 = 2.311E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.258 R1 = 3.993E-07

MUX SLIDE COEFFICIENTS:

S0 =0.8857 S1 =-7.997E-05

S0 =0.9181 S1 =-1.364E-04 S2 = 2.061E-08

TEST PRESSURE: 16 psi
(Regulated)

TABLE D-126

RUN: 189- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
678.6	-0.291	0.970	0.773	3242.0	4.83	-0.008	-0.000012
1351.7	-0.213	0.927	0.695	5467.6	4.25	-0.045	-0.000034
2037.0	-0.181	0.876	0.630	7609.6	4.08	-0.086	-0.000042

MUX PEAK COEFFICIENTS:

P0 =1.0188 P1 =-6.947E-05

P0 =1.0065 P1 =-4.698E-05 P2 =-8.087E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.340 R1 = 8.097E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8417 S1 =-1.048E-04

S0 =0.8643 S1 =-1.451E-04 S2 = 1.474E-08

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-127

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 77

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	38.2	32.1	16.0	32.1	48.1	32.1
Load, -FZ (lb)	1366	2048	1370	1371	1377	692
Rolling Resistance, FR (lb)	15.1	24.1	26.1	15.9	12.8	9.0
FR Coefficient, FR/-FZ	.0111	.0118	.0191	.0116	.0093	.0130

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-128

RUN: 153- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
680.7	198.9	0.292	18.0	0.026	0.091	676.4	5.4	0.008	0.6	0.001	0.121	0.027	676.2	0.74	9.4
1353.1	239.5	0.177	45.3	0.033	0.189	1353.6	11.4	0.008	1.0	0.001	0.090	0.048	1357.7	0.67	8.6
2040.4	189.1	0.093	65.2	0.032	0.345	2040.4	18.3	0.009	1.4	0.001	0.076	0.097	2041.3	0.57	10.3
2711.1	143.3	0.053	78.3	0.029	0.546	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2712.5	0.46	14.1

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

AC = 7911.33 A1 = 7.37 A2 = 2715.41

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.425 A4 = -9830.25

LATERAL FRICTION COEFFICIENTS:

B3 = 0.783 B1 =-4.560E-05 B4 =-2.733E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.551E-05 C2 =-2.547E-04 C3 =-0.327

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.126E-04 K2 =-3.420E-04 K3 = 0.108

SPRING RATE (LB/IN) : 1113.3

TABLE D-129

RUN: 160- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
684.8	-0.176	0.679	0.463	3636.2	5.37	-0.018	-0.000026
1358.8	-0.11[illegible]	0.681	0.414	34662.9	27.21	-0.062	-0.000046
2038.4	-0.099	0.684	0.390	35250.1	19.44	-0.109	-0.000053

MUX PEAK COEFFICIENTS:

P0 =0.6765 P1 = 3.783E-06

P0 =0.6778 P1 = 1.300E-06 P2 = 9.524E-10

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.208 R1 = 5.668E-05

MUX SLIDE COEFFICIENTS:

S0 =0.4955 S1 =-5.364E-05

S0 =0.5373 S1 =-1.265E-04 S2 = 2.687E-08

TEST PRESSURE: 32 psi
(Regulated)

TABLE D-130

RUN: 130- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
687.9	-0.219	1.008	0.869	13057.0	19.80	-0.043	-0.000063
1360.7	-0.130	0.911	0.651	25366.4	21.27	-0.123	-0.000091
2042.5	-0.148	0.785	0.628	20549.1	12.74	-0.205	-0.000100

MUX PEAK COEFFICIENTS:

P0 =1.1062 P1 =-1.648E-04

P0 =1.0815 P1 =-8.575E-05 P2 =-2.907E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.236 R1 = 5.188E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9584 S1 =-1.777E-04

S0 =1.2903 S1 =-7.604E-04 S2 = 2.133E-07

TEST PRESSURE: 16 psi
(Regulated)

TABLE D-131

RUN: 120- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
691.2	-0.219	0.916	0.755	15099.6	23.07	-0.000	-0.000001
1363.4	-0.186	0.874	0.665	20546.8	15.63	-0.032	-0.000023
2044.2	-0.160	0.809	0.607	27671.5	14.47	-0.063	-0.000031

MUX PEAK COEFFICIENTS:

P0 =0.9749 P1 =-7.974E-05

P0 =0.9340 P1 =-1.059E-05 P2 =-2.545E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.247 R1 = 4.306E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8256 S1 =-1.097E-04

S0 =0.3813 S1 =-2.083E-04 S2 = 3.603E-08

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-132

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		B
SIZE		220/55 R 390
MANUFACTURER		MICHELIN
BRAND NAME		TRX
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1435
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 1 POLYAMIDE + 1 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (~~in.~~)		165 mm
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
11	FHR 8 252 X 359	64	100	–	15	46	
47	X 369			–		124, 134	78
48	X 299			0.020, –	156, 178	157, 195	
49	X 289			–	177	194	

FOOTPRINT, TIRE NO. 11

FIGURE D-7

Load = 1435 lbs.
Pressure = 35 psi

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RUN: 15- 0- 3

TABLE D-133

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
715.6	163.6	0.229	11.5	0.016	0.070	710.7	5.7	0.008	0.7	0.001	0.123	0.035	720.1	1.02	16.5
1425.1	254.3	0.178	35.2	0.025	0.138	1430.1	11.9	0.008	1.3	0.001	0.113	0.047	1438.1	0.95	15.6
2147.0	287.3	0.134	61.7	0.029	0.215	2143.3	18.1	0.008	2.3	0.001	0.129	0.063	2154.8	0.88	19.2
2859.0	262.6	0.092	91.1	0.032	0.347	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2816.9	0.82	21.8

CORNERING STIFFNESS COEFFICIENTS:

A0 = 842.60 A1 = 14.26 A2 = 4386.67

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.452 A4 = -28473.00

LATERAL FRICTION COEFFICIENTS:

B3 = 1.098 B1 = -1.067E-04 B4 = 2.958E-09

OVERTURNING MOMENT COEFFICIENTS:

C1 = -4.210E-05 C2 = -2.921E-04 C3 = -0.544

ALIGNING TORQUE COEFFICIENTS:

K1 = -1.678E-04 K2 = 1.591E-04 K3 = 0.171

SPRING RATE (LB/IN) : 1378.6

TABLE D-134

RUN: 46- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
725.9	-0.233	0.913	0.859	10214.3	14.12	-0.005	-0.000008
1434.6	-0.220	0.917	0.768	18802.5	13.62	-0.042	-0.000029
2151.8	-0.173	0.918	0.719	20367.7	10.34	-0.084	-0.000039

MUX PEAK COEFFICIENTS:

P0 =0.9103 P1 = 4.010E-06

P0 =0.9036 P1 = 1.486E-05 P2 =-3.716E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.270 R1 = 4.235E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9228 S1 =-9.822E-05

S0 =0.9942 S1 =-2.185E-04 S2 = 4.181E-08

TEST PRESSURE: 35 psi
(Regulated)

RUN: 178- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUVPEAK	SA@MUVPK DEG
724.5	167.6	0.231	10.7	0.015	0.064	714.4	6.1	0.008	0.5	0.001	0.100	0.036	717.9	1.04	12.9
1443.2	284.4	0.197	30.0	0.021	0.105	1441.0	13.3	0.009	1.4	0.001	0.103	0.047	1435.9	0.93	13.8
2164.8	351.4	0.162	51.7	0.024	0.147	2171.7	19.8	0.009	2.3	0.001	0.115	0.056	2170.3	0.8.	13.8
2884.8	382.0	0.132	76.3	0.026	0.200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2888.0	0.79	13.3

CORNERING STIFFNESS COEFFICIENTS:

A0 = 553.96 A1 = 14.26 A2 = 5976.41

TEST PRESSURE: 52.5 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.510 A4 =-67810.56

LATERAL FRICTION COEFFICIENTS:

B3 = 1.143 B1 =-1.616E-04 B4 = 1.444E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.503E-05 C2 =-2.493E-04 C3 =-0.595

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.086E-04 K2 = 1.050E-04 K3 = 0.099

SPRING RATE (LB/IN) : 1971.6

TABLE D-136

RUN: 194- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
712.3	-0.181	0.946	0.883	21374.1	31.35	-0.035	-0.000049
1426.6	-0.128	0.904	0.770	31102.5	24.49	-0.103	-0.000072
2152.2	-0.158	0.661	0.695	29735.5	16.68	-0.173	-0.000080

MUX PEAK COEFFICIENTS:

P0 =0.9879 P1 =-5.393E-05

P0 =0.9866 P1 =-5.701E-05 P2 = 0.0

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.178 R1 = 1.572E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9699 S1 =-1.308E-04

S0 =1.0345 S1 =-2.401E-04 S2 = 3.822E-08

TEST PRESSURE: 17.5 psi
(Regulated)

RUN: 195- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
715.8	-0.196	0.983	0.913	9945.5	13.88	-0.009	-0.000013
1429.9	-0.210	0.925	0.781	21731.3	15.21	-0.030	-0.000021
2152.1	-0.197	0.848	0.[illegible]	23415.4	11.57	-0.060	-0.000028

MUX PEAK COEFFICIENTS:

P0 =1.0527 P1 =-9.368E-05

P0 =1.0224 P1 =-4.247E-05 P2 =-1.735E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.200 R1 =-9.148E-07

MUX SLIDE COEFFICIENTS:

S0 =1.0180 S1 =-1.560E-04

S0 =1.0858 S1 =-2.699E-04 S2 = 3.959E-08

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-138

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 78

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	38.5	35.1	17.6	35.1	52.6	35.1
Load,-FZ (lb)	1447	2161	1441	1453	1465	729
Rolling Resistance, FR (lb)	14.6	23.5	22.6	14.9	12.6	7.6
FR Coefficient, FR/-FZ	.0101	.0109	.0157	.0103	.0086	.0104

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-139

RUN: 156 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MU DE
714.9	255.8	0.358	16.9	0.024	0.066	708.5	4.7	0.007	0.7	0.001	0.152	0.018	715.7	0.69	9
1431.0	395.1	0.276	49.3	0.034	0.125	1428.3	9.5	0.007	1.3	0.001	0.133	0.024	1429.4	0.67	6
2148.[illegible]	399.8	0.186	80.2	0.037	0.201	2150.6	14.6	0.007	2.0	0.001	0.139	0.037	2154.6	0.63	8
2858.1	352.8	0.123	103.2	0.036	0.293	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2867.1	0.56	10

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2502.15 A1 = 21.05 A2 = 4026.38

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.371 A4 =-43914.03

LATERAL FRICTION COEFFICIENTS:

B3 = 0.683 B1 = 2.369E-05 B4 =-2.309E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.653E-05 C2 =-3.598E-04 C3 =-0.610

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.027E-04 K2 = 1.396E-04 K3 = 0.109

SPRING RATE (LB/IN) : 1421.2

TABLE D-140

RUN: 157- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
719.9	-0.162	0.721	0.456	4569.3	6.36	0.002	0.000003
1433.9	-0.118	0.701	0.412	11245.2	8.10	-0.029	-0.000020
2152.0	-0.121	0.671	0.373	8020.6	4.00	-0.069	-0.000032

MUX PEAK COEFFICIENTS:

P0 =0.7476 P1 =-3.472E-05

P0 =0.7303 P1 =-5.796E-06 P2 =-9.962E-09

TEST PRESSURE: 35 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.175 R1 = 2.893E-05

MUX SLIDE COEFFICIENTS:

S0 =0.4963 S1 =-5.760E-05

S0 =0.5033 S1 =-7.002E-05 S2 = 4.359E-09

RUN: 134- 0- 3

TABLE D-141

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
726.8	-0.184	0.946	0.815	10822.9	15.06	-0.022	-0.000031
1435.3	-0.152	0.907	0.717	20219.2	15.55	-0.087	-0.000060
2153.0	-0.155	0.865	0.619	23079.6	12.78	-0.157	-0.000073

MUX PEAK COEFFICIENTS:

P0 =0.9883 P1 =-5.719E-05

P0 =0.9835 P1 =-4.907E-05 P2 =-2.784E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.193 R1 = 2.058E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9147 S1 =-1.373E-04

S0 =0.9163 S1 =-1.395E-04 S2 = 4.641E-10

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-142

RUN: 124- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
726.4	-0.284	0.954	0.874	9366.1	12.86	0.006	0.000008
1441.6	-0.268	0.907	0.757	14109.3	10.00	-0.017	-0.000012
2154.7	-0.252	0.862	0.693	20020.7	9.76	-0.045	-0.000021

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0004 P1 =-6.429E-05

P0 =1.0034 P1 =-7.055E-05 P2 = 2.300E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.301 R1 = 2.251E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9574 S1 =-1.267E-04

S0 =1.0463 S1 =-2.739E-04 S2 = 5.107E-08

TABLE D-143

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		9
SIZE		P205/55VR14
MANUFACTURER		PIRELLI
BRAND NAME		P7
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1130
MAX. RATED INFLATION PRESS. (psi)		36
NO. OF PLIES AND CORD MATERIAL	TREAD	2 RAYON + 2 STEEL + 2 NYLON
	SIDEWALL	2 RAYON
RIM WIDTH (in.)		6.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
71	XAA4XKAY290		100	-		121, 131	95
72	↓	66	↓	-	139	147	
73				0.020, -	134, 174	161, 191	
74				-	173	190	

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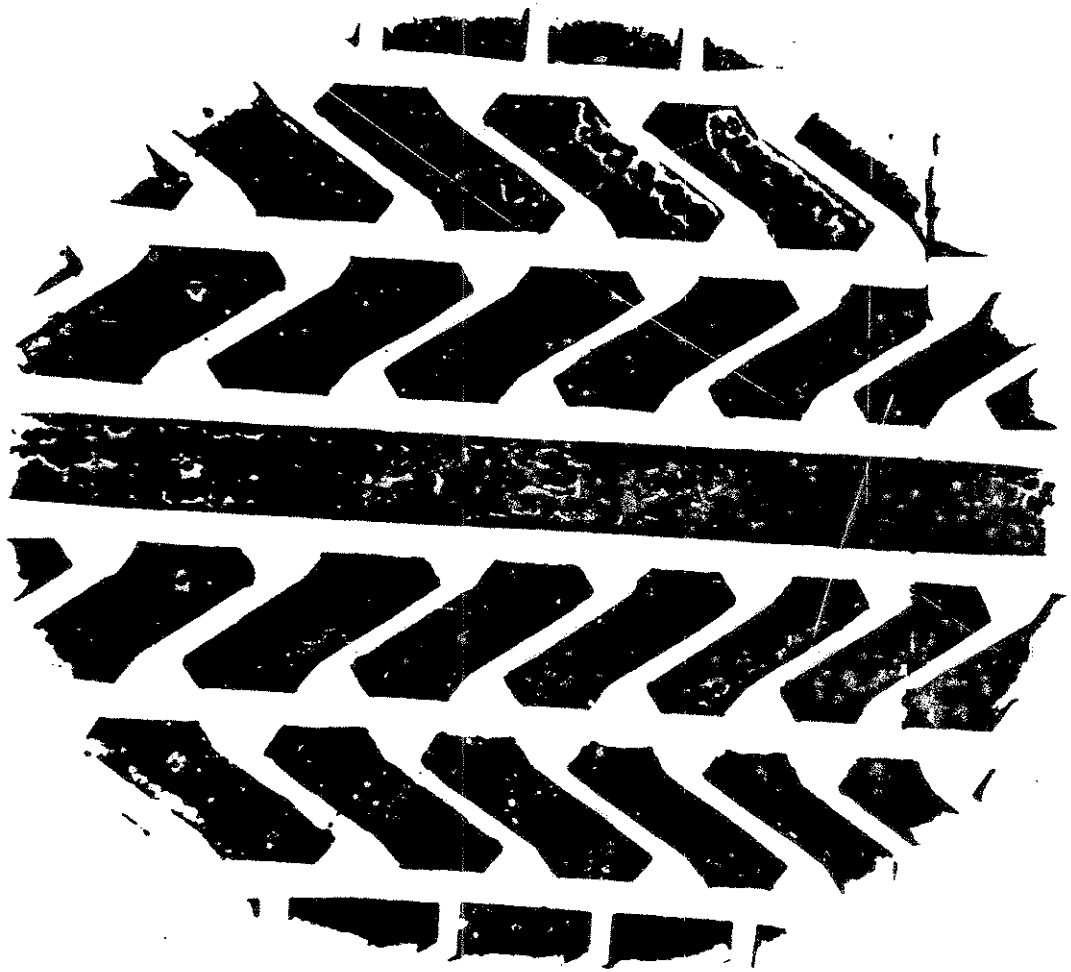

FOOTPRINT, TIRE NO. 72

FIGURE D-8

Load = 1110 lbs.
Pressure = 35 psi

TABLE D-144

RUN: 139- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
552.9	115.4	0.209	7.7	0.014	0.067	549.5	6.8	0.012	0.9	0.002	0.135	0.059	549.9	1.00	11.2
1102.8	193.9	0.176	25.1	0.023	0.129	1102.3	16.3	0.015	2.5	0.002	0.152	0.084	1109.0	0.93	13.0
1661.1	225.0	0.135	47.3	0.028	0.210	1663.6	24.8	0.015	3.9	0.002	0.157	0.110	1668.1	0.89	13.0
2210.7	223.9	0.101	78.4	0.035	0.350	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2222.8	0.85	12.4

CORNERING STIFFNESS COEFFICIENTS:

A0 = 29.55 A1 = 14.04 A2 = 3748.81

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.749 A4 =-10521.77

LATERAL FRICTION COEFFICIENTS:

B3 = 1.066 B1 =-1.411E-04 B4 = 1.981E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-3.297E-05 C2 =-2.218E-04 C3 =-0.549

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.038E-04 K2 = 1.973E-04 K3 = 0.201

SPRING RATE (LB/IN) : 1182.1

TABLE D-145

RUN: 147- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
557.9	-0.292	0.950	0.905	1261.5	2.31	-0.017	-0.000030
1112.1	-0.241	0.988	0.824	8646.3	8.22	-0.053	-0.000047
1663.4	-0.168	1.026	0.787	38643.7	25.54	-0.090	-0.000054

MUX PEAK COEFFICIENTS:

P0 =0.9117 P1 = 6.858E-05

P0 =0.9103 P1 = 7.335E-05 P2 =-2.272E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.358 R1 = 1.116E-04

MUX SLIDE COEFFICIENTS:

S0 =0.9565 S1 =-1.061E-04

S0 =1.0279 S1 =-2.633E-04 S2 = 7.016E-08

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-146

RUN: 174- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SAGMUYPK DEG
565.5	109.7	0.194	5.9	0.011	0.054	553.5	5.9	0.011	0.7	0.001	0.118	0.054	547.3	1.06	17.3
1119.3	183.8	0.164	18.1	0.016	0.098	1115.1	14.3	0.013	2.0	0.002	0.140	0.078	1106.0	0.95	16.5
1668.7	245.1	0.147	35.5	0.021	0.145	1678.9	22.8	0.014	3.6	0.002	0.157	0.093	1672.5	0.93	13.8
2226.0	294.7	0.132	59.6	0.027	0.202	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2230.0	0.89	13.4

CORNERING STIFFNESS COEFFICIENTS:

A0 = 1222.39 A1 = 9.62 A2 = 8303.99

TEST PRESSURE: 52.5 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.599 A4 = -5357.85

LATERAL FRICTION COEFFICIENTS:

B3 = 1.186 B1 =-2.654E-04 B4 = 6.115E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.312E-05 C2 =-2.134E-04 C3 =-0.609

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.490E-04 K2 = 1.410E-04 K3 = 0.133

SPRING RATE (LB/IN) : 1633.3

TABLE D-147

RUN: 190- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
546.5	-1.000	1.074	1.045	3443.9	6.36	-0.042	-0.000077
1098.9	-0.157	1.134	0.985	24533.5	24.79	-0.103	-0.000094
1627.8	-0.140	1.135	0.942	67014.1	48.56	-0.166	-0.000102

MUX PEAK COEFFICIENTS:

P0 =1.0530 P1 = 5.610E-05

P0 =0.9564 P1 = 2.679E-04 P2 =-9.766E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-1.306 R1 = 8.008E-04

MUX SLIDE COEFFICIENTS:

S0 =1.0942 S1 =-9.500E-05

S0 =1.1192 S1 =-1.315E-04 S2 = 2.613E-08

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-148

RUN: 191- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
548.6	-0.232	1.007	0.982	10381.3	18.77	-0.014	-0.000026
1102.3	-0.237	0.986	0.862	17360.1	16.85	-0.036	-0.000033
1657.5	-0.182	0.901	0.773	32956.4	21.13	-0.059	-0.000036

MUX PEAK COEFFICIENTS:

P0 =1.0173 P1 =-2.343E-05

P0 =1.0463 P1 =-8.558E-05 P2 = 2.875E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.267 R1 = 4.484E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0801 S1 =-1.884E-04

S0 =1.1293 S1 =-2.985E-04 S2 = 5.002E-08

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-149

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 95

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	40.0	35.2	17.6	35.1	52.6	35.1
Load, -FZ (lb)	1122	1670	1112	1127	1114	562
Rolling Resistance, FR (lb)	14.7	22.4	22.6	15.3	13.0	8.0
FR Coefficient, FR/-FZ	.0131	.0134	.0203	.0136	.0117	.0142

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

RUN: 154- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
552.9	163.7	0.296	9.6	0.017	0.059	548.8	6.2	0.011	1.2	0.002	0.191	0.038	555.1	0.73	11.2
1110.0	269.5	0.243	36.3	0.033	0.135	1103.2	17.3	0.016	3.3	0.003	0.189	0.064	1108.2	0.73	8.6
1659.9	297.4	0.179	61.2	0.037	0.206	1662.4	27.5	0.017	4.9	0.003	0.178	0.092	1665.1	0.67	5.9
2211.9	289.2	0.131	80.4	0.036	0.278	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2221.2	0.65	7.4

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 673.44 A1 = 18.91 A2 = 3552.69

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.676 A4 = -3849.36

LATERAL FRICTION COEFFICIENTS:

B3 = 0.738 B1 = 8.952E-05 B4 =-2.352E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-2.129E-05 C2 =-2.363E-04 C3 =-0.587

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.383E-04 K2 = 1.859E-04 K3 = 0.140

SPRING RATE (LB/IN) 1188.4

TABLE D-151

RUN: 161- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
557.6	-0.177	0.793	0.403	2494.1	4.63	-0.010	-0.000019
1112.7	-0.133	0.798	0.375	7154.7	6.70	-0.044	-0.000040
1663.2	-0.114	0.830	0.378	-40955.4	-26.70	-0.079	-0.000047

MUX PEAK COEFFICIENTS:

P0 =0.7697 P1 = 3.364E-05

P0 =0.8164 P1 =-6.952E-05 P2 = 4.651E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.205 R1 = 5.727E-05

MUX SLIDE COEFFICIENTS:

S0 =0.4102 S1 =-2.254E-05

S0 =0.2610 S1 =-1.336E-04 S2 = 5.012E-08

TEST PRESSURE: 35 psi
(Regulated)

RUN: 131- 0- 3

TABLE D-152

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
56[illegible].6	-0.253	1.180	1.065	20218.5	36.30	-0.022	-0.000039
1115.9	-0.171	1.196	0.949	29701.3	29.10	-0.084	-0.000075
1666.4	-0.144	1.134	0.894	32061.6	22.50	-0.147	-0.000088

TEST PRESSURE: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.2164 P1 =-4.138E-05

P0 =1.0833 P1 = 2.452E-04 P2 =-1.283E-07

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.299 R1 = 9.816E-05

MUX SLIDE COEFFICIENTS:

S0 =1.1426 S1 =-1.553E-04

S0 =1.2455 S1 =-3.767E-04 S2 = 9.934E-08

TABLE D-153

RUN: 121- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
562.4	-0.185	1.037	0.875	0.0	0.0	-0.018	-0.000033
1114.9	-0.195	0.990	0.728	0.0	0.0	-0.031	-0.000028
1667.5	-0.172	0.959	0.697	0.0	0.0	-0.061	-0.000037

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0731 P1 =-6.980E-05

P0 =1.1011 P1 =-1.306E-04 P2 = 2.719E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.198 R1 = 1.208E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9462 S1 =-1.609E-04

S0 =1.1438 S1 =-5.859E-04 S2 = 1.905E-07

TABLE D-154

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		10
SIZE		P185/65SR15
MANUFACTURER		PIRELLI
BRAND NAME		P8
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1250
MAX. RATED INFLATION PRESS. (psi)		36
NO. OF PLIES AND CORD MATERIAL	TREAD	2 NYLON + 2 STEEL
	SIDEWALL	1 NYLON
RIM WIDTH (in.)		5.0
COMMENTS		

Tire (s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
75	YPMCXJJH490		100	-		123,133	96
76		65		-	141	149	
77				0.020, -	155,176	158,193	
78				-	175	192	

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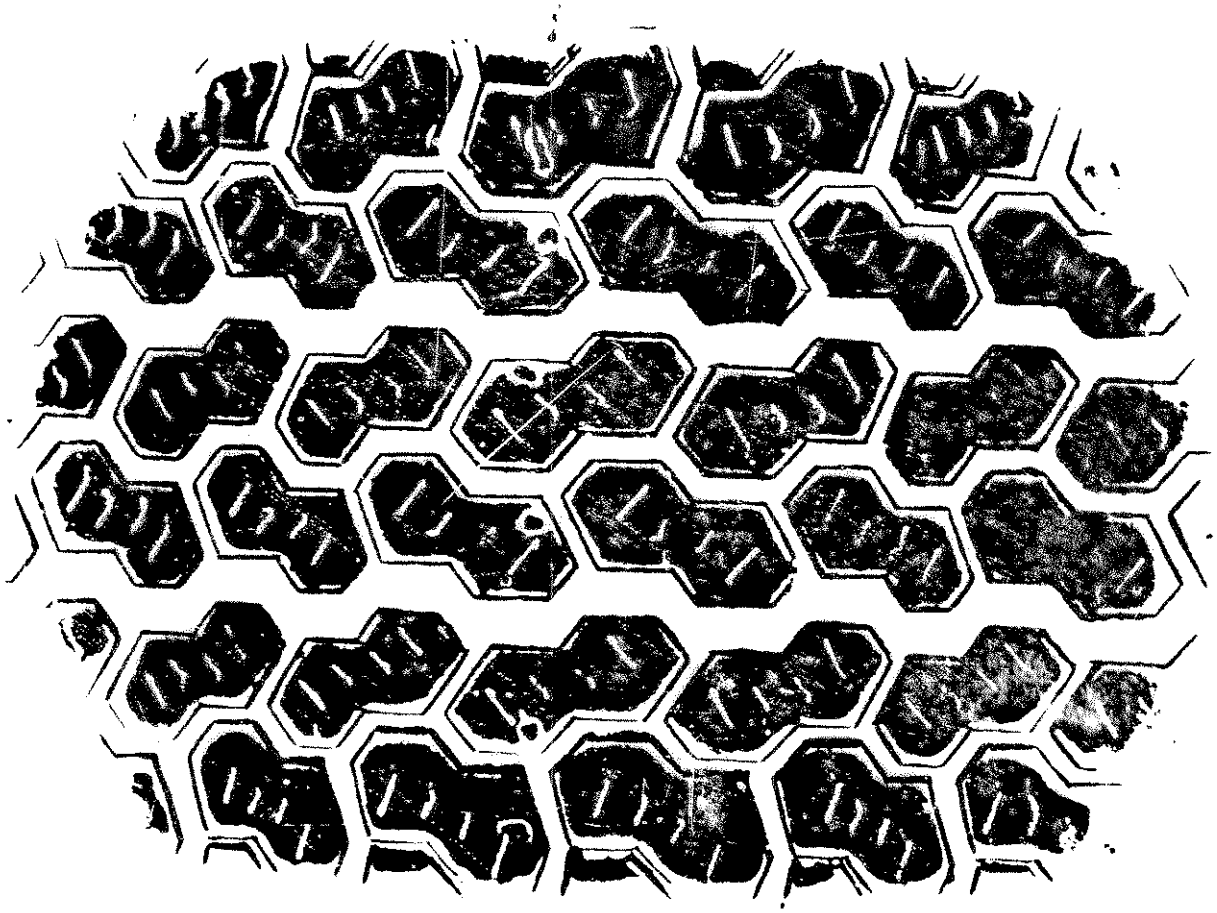


FOOTPRINT, TIRE NO. 76

FIGURE D-9

Load = 1230 lbs.
Pressure = 35 psi

TABLE D-155

RUN: 149- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
616.1	-0.244	0.981	0.866	13168.9	21.98	-0.025	-0.000040
1229.7	-0.168	0.989	0.756	23183.6	20.25	-0.068	-0.000056
1842.3	-0.146	0.994	0.675	41551.4	25.41	-0.113	-0.000062

MUX PEAK COEFFICIENTS:

P0 =0.9750 P1 = 1.068E-05

P0 =0.9710 P1 = 2.179E-05 P2 =-4.530E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.285 R1 = 8.058E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9573 S1 =-1.558E-04

S0 =1.0084 S1 =-2.547E-04 S2 = 4.019E-08

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-156

RUN: 176- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
607.3	123.0	0.203	8.6	0.014	0.070	613.2	4.7	0.008	0.4	0.001	0.089	0.038	609.6	1.03	12.0
1230.1	216.3	0.176	23.6	0.019	0.109	1235.7	11.7	0.009	1.0	0.001	0.099	0.054	1228.5	0.90	12.1
1845.7	247.4	0.134	41.4	0.022	0.167	1856.8	17.9	0.010	1.6	0.001	0.092	0.072	1846.4	0.82	10.3
2473.9	231.0	0.093	59.5	0.024	0.257	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2462.5	0.78	13.3

CORNERING STIFFNESS COEFFICIENTS:

A0 = -995.15 A1 = 15.78 A2 = 3889.68

TEST PRESSURE: 52.5 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.463 A4 = -8644.51

LATERAL FRICTION COEFFICIENTS:

B3 = 1.207 B1 =-3.213E-04 B4 = 6.070E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-4.881E-05 C2 =-2.529E-04 C3 =-0.435

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.547E-04 K2 = 1.541E-04 K3 = 0.104

SPRING RATE (LB/IN) : 1476.8

TABLE D-157

RUN: 192- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
604.0	-0.200	1.088	0.917	12056.5	20.93	-0.055	-0.000091
1219.1	-0.143	1.084	0.852	25329.5	23.85	-0.130	-0.000107
1534.2	-0.146	1.089	0.803	54920.0	42.24	-0.176	-0.000115

MUX PEAK COEFFICIENTS:

P0 =1.0872 P1 =-1.110E-07

P0 =1.1119 P1 =-5.391E-05 P2 = 2.538E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.233 R1 = 6.293E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9918 S1 =-1.200E-04

S0 =0.9423 S1 =-1.155E-05 S2 =-5.217E-08

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-158

RUN: 193- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
606.7	-0.223	1.043	0.919	9764.9	16.24	-0.018	-0.000029
1219.6	0.209	1.040	0.819	28353.3	24.31	-0.042	-0.000035
1837.9	-0.164	1.004	0.727	25929.8	15.25	-0.075	-0.000041

MUX PEAK COEFFICIENTS:

P0 =1.0675 P1 =-3.138E-05

P0 =1.0141 P1 = 7.554E-05 P2 =-4.411E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.256 R1 = 4.739E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0120 S1 =-1.558E-04

S0 =1.0259 S1 =-1.507E-04 S2 = 9.957E-09

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-159

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 96

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	38.2	35.1	17.5	35.1	52.6	35.1
Load, -FZ (lb)	1231	1843	1227	1235	1228	623
Rolling Resistance, FR (lb)	11.8	19.3	20.1	12.2	10.0	6.1
FR Coefficient, FR/-FZ	.0096	.0105	.0164	.0099	.0081	.0098

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-160

RUN: 155- D- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
604.6	174.1	0.288	12.5	0.021	0.072	606.1	5.2	0.009	0.6	0.001	0.121	0.030	605.8	0.63	6.8
1224.2	251.6	0.206	37.8	0.031	0.150	1221.8	14.0	0.011	1.3	0.001	0.095	0.055	1228.7	0.62	8.6
1832.9	224.7	0.123	58.6	0.032	0.261	1841.5	21.5	0.012	2.0	0.001	0.094	0.096	1839.5	0.58	11.2
2448.5	177.2	0.072	76.7	0.031	0.433	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2452.8	0.51	12.6

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3312.48 A1 = 14.28 A2 = 3019.92

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.530 A4 = -6392.15

LATERAL FRICTION COEFFICIENTS:

B3 = 0.618 B1 = 4.764E-05 B4 =-3.662E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-5.223E-05 C2 =-2.797E-04 C3 =-0.403

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.819E-04 K2 =-2.696E-04 K3 = 0.110

SPRING RATE (LB/IN) : 1116.6

TABLE D-161

RUN: 158- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
615.2	-0.189	0.638	0.457	8110.2	13.54	-0.018	-0.000030
1227.8	-0.167	0.611	0.400	25179.4	21.70	-0.053	-0.000043
1842.0	-0.126	0.602	0.389	25561.9	15.42	-0.102	-0.000055

MUX PEAK COEFFICIENTS:

P0 =0.6524 P1 =-2.915E-05

P0 =0.6827 P1 =-8.891E-05 P2 = 2.436E-08

TEST PRESSURE: 35 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.224 R1 = 5.166E-05

MUX SLIDE COEFFICIENTS:

S0 =0.4831 S1 =-5.531E-05

S0 =0.5596 S1 =-2.039E-04 S2 = 6.046E-08

TABLE D-162

RUN: 133- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
518.3	-0.177	0.981	0.898	20418.7	33.92	-0.041	-0.000067
1229.8	-0.121	0.935	0.705	32097.9	29.59	-0.118	-0.000096
1845.0	-0.154	0.921	0.679	27905.6	18.74	-0.194	-0.000105

MUX PEAK COEFFICIENTS:

P0 =1.0058 P1 =-4.860E-05

P0 =1.0589 P1 =-1.523E-04 P2 = 4.198E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.174 R1 = 1.874E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9805 S1 =-1.784E-04

S0 =1.2632 S1 =-7.295E-04 S2 = 2.234E-07

TEST PRESSURE: 17.5 psi
(Regulated)

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
620.5	-0.216	0.930	0.816	10576.3	17.28	-0.001	-0.000001
1230.4	-0.221	0.880	0.711	20100.1	16.85	-0.029	-0.000023
1845.1	-0.162	0.859	0.664	22643.3	13.03	-0.060	-0.000033

MUX PEAK COEFFICIENTS:

P0 =0.9614 P1 =-5.804E-05

P0 =1.0109 P1 =-1.553E-04 P2 = 3.957E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.254 R1 = 4.378E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8828 S1 =-1.238E-04

S0 =0.9818 S1 =-3.173E-04 S2 = 7.863E-08

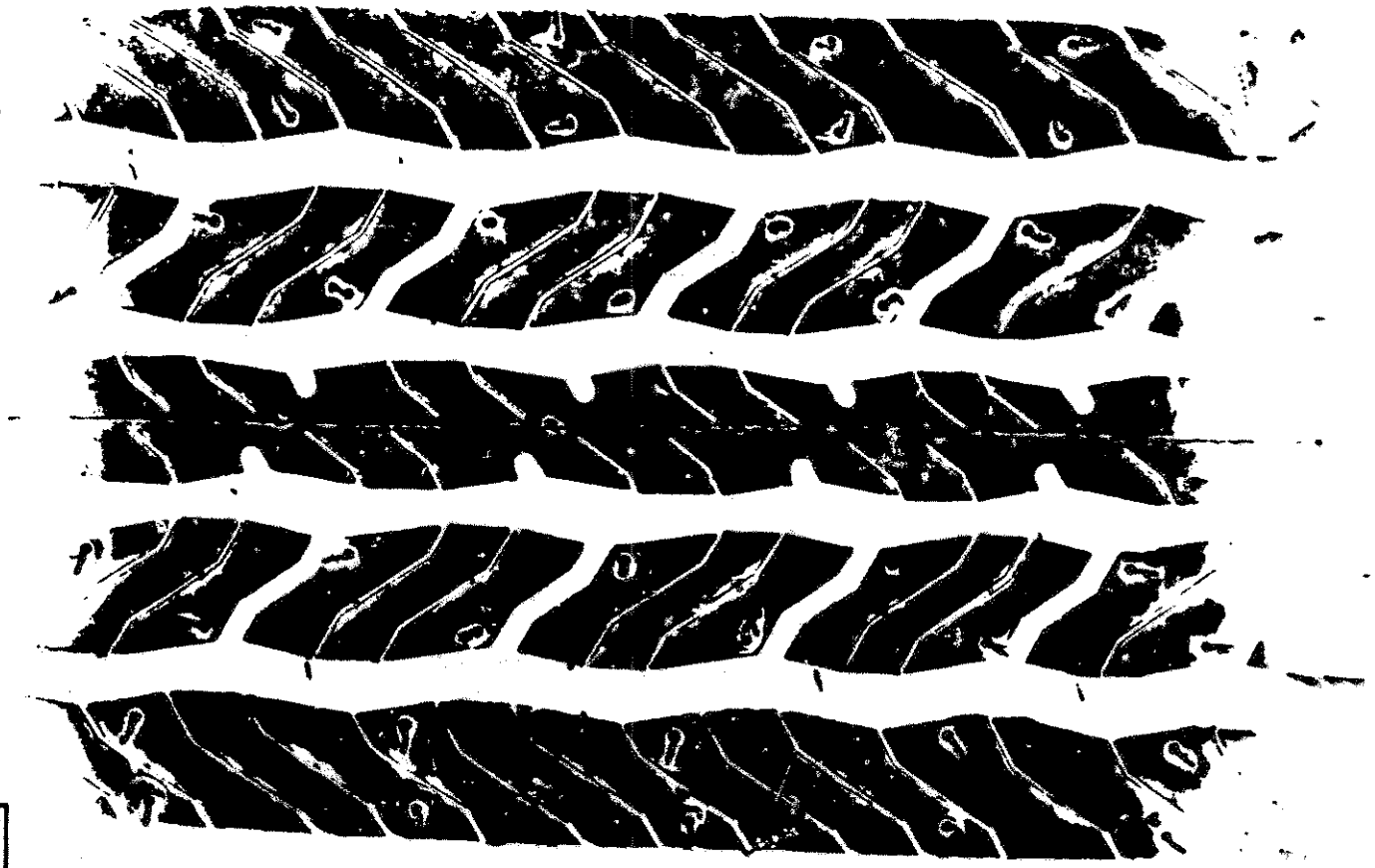
TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-164

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		11
SIZE		P195/75R14
MANUFACTURER		UNIROYAL
BRAND NAME		STEELER
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	1 POLYESTER + 2 STEEL
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
15	APKACB320	66	100	–	3	29	
54	↓ 270		↓	–		117, 127	74



FOOTPRINT, TIRE NO. 15

FIGURE D-10

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-165

RUN: 3- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
703.6	138.1	0.196	14.4	0.020	0.104	699.3	6.4	0.009	0.5	0.001	0.072	0.046	700.6	0.93	14.7
1390.9	164.1	0.118	35.0	0.025	0.213	1397.9	14.6	0.010	0.9	0.001	0.060	0.089	1399.0	0.85	13.8
2089.2	137.1	0.066	52.7	0.025	0.384	2091.8	23.9	0.011	1.8	0.001	0.075	0.174	2098.6	0.86	23.4
2787.0	112.0	0.040	70.4	0.025	0.628	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2779.5	6.72	370.6

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 5726.54 A1 = 4.39 A2 = 2911.43

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.473 A4 = -5399.64

LATERAL FRICTION COEFFICIENTS:

B3 = 5.535 B1 =-8.331E-03 B4 = 3.111E-06

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.146E-05 C2 =-1.750E-04 C3 =-0.309

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.415E-04 K2 = 2.674E-04 K3 = 0.192

SPRING RATE (LB/IN) : 1217.6

TABLE D-166

RUN: 29- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
706.3	-0.196	0.915	0.740	3927.3	5.64	-0.013	-0.000018
1402.9	-0.267	0.800	0.632	7606.4	5.81	-0.065	-0.000046
2095.7	-0.467	0.750	0.586	11230.2	6.10	-0.117	-0.000056

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9888 P1 =-1.192E-04

P0 =1.0993 P1 =-3.086E-04 P2 = 6.746E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.036 R1 =-1.950E-04

MUX SLIDE COEFFICIENTS:

S0 =0.8084 S1 =-1.111E-04

S0 =0.9150 S1 =-2.944E-04 S2 = 6.528E-08

TABLE D-167

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 74

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.6	35.0	17.5	35.1	52.6	35.1
Load, -FZ (lb)	1412	2104	1401	1430	1427	713
Rolling Resistance, FR (lb)	14.1	22.8	23.0	14.8	12.2	7.4
FR Coefficient, FR/-FZ	.0100	.0108	.0164	.0103	.0085	.0104

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-168

RUN: 127- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
708.4	-0.128	1.040	0.854	18063.6	26.47	-0.042	-0.000059
1401.4	-0.114	0.915	0.636	21176.4	17.23	-0.121	-0.000086
2101.3	-0.136	0.841	0.620	26269.7	15.69	-0.200	-0.000095

TEST PRESSURE: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.1320 P1 =-1.428E-04

P0 =1.2192 P1 =-2.922E-04 P2 = 5.346E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.118 R1 =-5.891E-06

MUX SLIDE COEFFICIENTS:

S0 =0.9384 S1 =-1.675E-04

S0 =1.2819 S1 =-7.519E-04 S2 = 2.079E-07

TABLE D-169

RUN: 117- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
708.8	-0.249	1.000	0.809	9984.7	13.89	-0.001	-0.000001
1404.4	-0.170	0.953	0.684	18836.8	13.81	-0.029	-0.000020
2102.1	-0.152	0.868	0.597	20983.5	10.62	-0.060	-0.000028

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0734 P1 =-9.464E-05

P0 =1.0095 P1 = 1.435E-05 P2 =-3.896E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.288 R1 = 6.963E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9100 S1 =-1.521E-04

S0 =0.9743 S1 =-2.622E-04 S2 = 3.896E-08

TABLE D-170

TIRE AND RUN IDENTIFICATION

TIRE TIRE TYPE		12
SIZE		P195/75R14
MANUFACTURER		BRIDGESTONE
BRAND NAME		RD401
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 STEEL + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
21	EJP9JBH051	58	100	–	7	33	
57	↓		↓	–		118, 128	76

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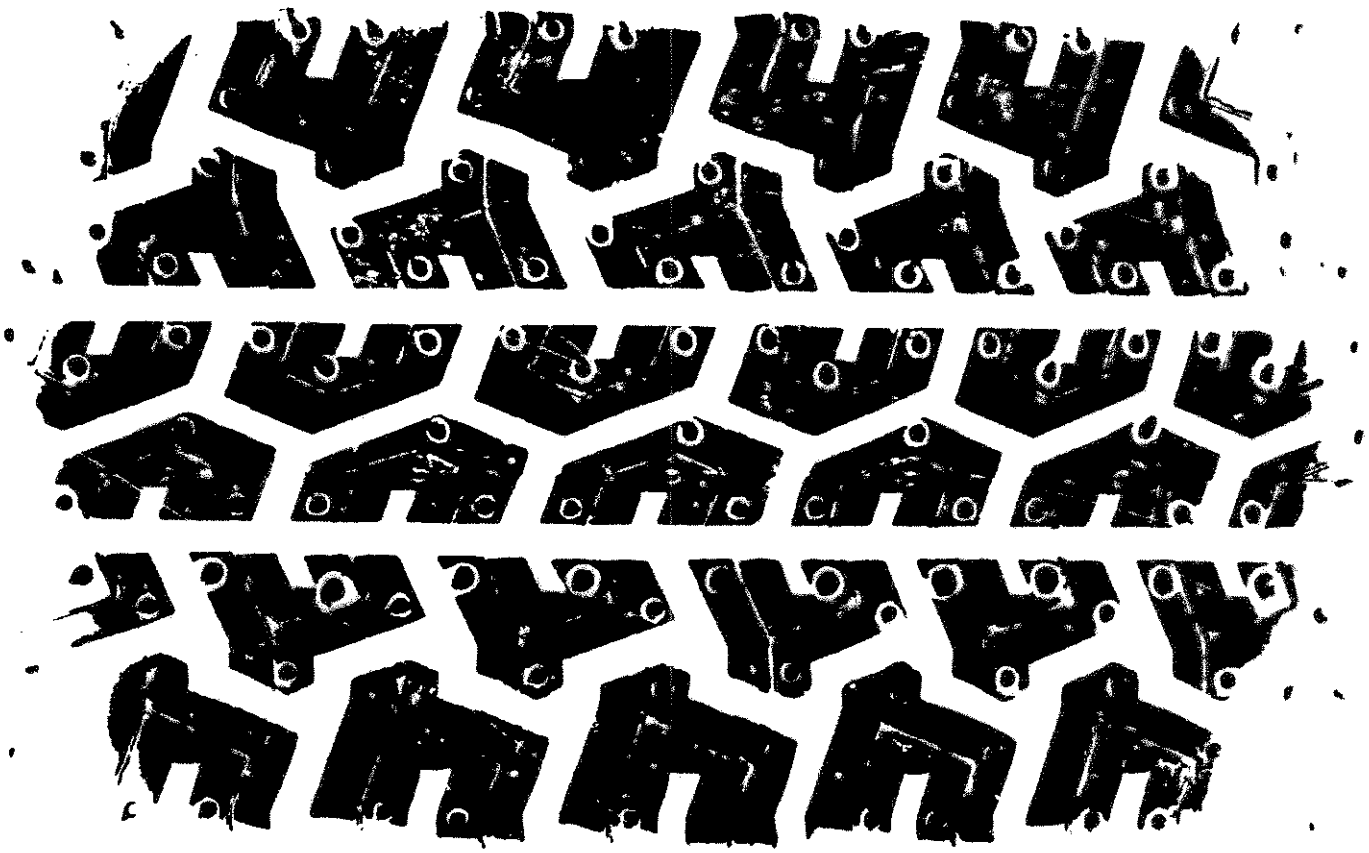


FOOTPRINT, TIRE NO. 21

FIGURE D-11

Load = 1400 lbs.
Pressure = 35 psi

TABLE D-171

RUN: 7- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SAOMUYPK DEG
706.2	132.2	0.187	13.6	0.019	0.103	698.4	6.5	0.009	0.5	0.001	0.083	0.049	703.2	1.00	13.0
1400.2	200.8	0.143	35.0	0.025	0.174	1397.8	14.9	0.011	1.2	0.001	0.080	0.074	1401.8	0.87	13.0
2093.2	206.1	0.098	57.7	0.028	0.280	2093.5	24.0	0.011	2.6	0.001	0.108	0.117	2102.4	0.78	17.4
2790.2	178.4	0.064	83.5	0.030	0.468	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2790.4	0.69	24.0

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 1193.73 A1 = 11.18 A2 = 3910.89

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.497 A4 = -6339.48

LATERAL FRICTION COEFFICIENTS:

B3 = 1.134 B1 =-2.159E-04 B4 = 2.061E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.095E-05 C2 =-2.384E-04 C3 =-0.362

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.164E-04 K2 = 2.476E-04 K3 = 0.178

SPRING RATE (LB/IN) : 1216.6

TABLE D-172

RUN: 33- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
706.6	-0.294	0.890	0.834	11517.1	16.53	-0.014	-0.000020
1400.1	-0.291	0.807	0.696	22775.0	17.25	-0.058	-0.000041
2097.8	-0.332	0.729	0.612	26616.8	14.14	-0.105	-0.000050

MUX PEAK COEFFICIENTS:

P0 =0.9710 P1 =-1.157E-04

P0 =0.9808 P1 =-1.310E-04 P2 = 5.388E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.267 R1 =-2.770E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9379 S1 =-1.599E-04

S0 =1.0311 S1 =-3.189E-04 S2 = 5.657E-08

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-173

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 76

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.1	35.1	17.6	35.0	52.5	35.2
Load, -FZ (lb)	1414	2110	1409	1421	1410	723
Rolling Resistance, FR (lb)	12.5	19.8	20.4	13.2	11.6	7.4
FR Coefficient, FR/-FZ	.0088	.0094	.0145	.0093	.0082	.0102

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-174

RUN: 128- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
706.6	-0.246	0.999	0.744	18374.1	27.00	-0.046	-0.000066
1400.6	-0.125	0.903	0.685	23273.7	19.06	-0.125	-0.000089
2100.9	-0.132	0.879	0.657	27695.7	16.46	-0.198	-0.000094

TEST PRESSURE: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0481 P1 =-8.634E-05

P0 =1.1705 P1 =-2.947E-04 P2 = 7.438E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.282 R1 = 8.145E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7834 S1 =-6.286E-05

S0 =0.8384 S1 =-1.563E-04 S2 = 3.347E-08

TABLE D-175

RUN: 118- [illegible] 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
710.5	-0.243	0.845	0.742	8699.5	12.30	-0.003	-0.000004
1404.0	-0.195	0.790	0.644	17751.7	13.09	-0.031	-0.000022
2101.8	-0.178	0.732	0.585	20564.6	10.41	-0.062	-0.000029

MUX PEAK COEFFICIENTS:

P0 =0.9035 P1 =-8.126E-05

P0 =0.9012 P1 =-7.444E-05 P2 =-2.692E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.272 R1 = 4.682E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8150 S1 =-1.124E-04

S0 =0.8803 S1 =-2.239E-04 S2 = 3.931E-08

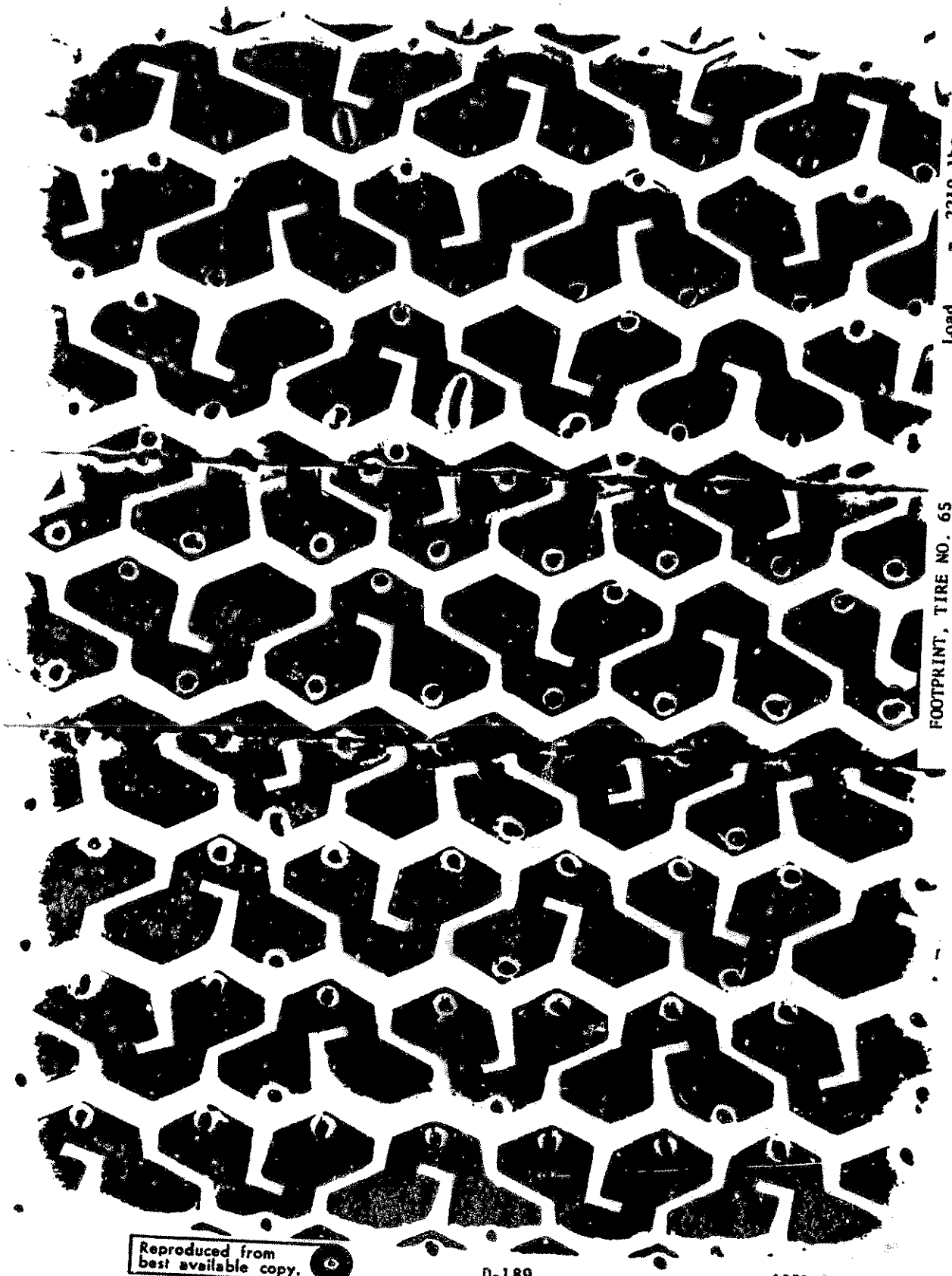
TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-176

TIRE AND RUN IDENTIFICATION

TIRE TIRE TYPE		13
SIZE		NR 50-15
MANUFACTURER		ARMSTRONG
BRAND NAME		POS-A-TRACTION TWISTED
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		2210
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 FIBERGLASS BELTS + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		8.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
65	CHBV684400	65	100	-	140	148	
66	↓		↓	-		122, 132	79



Load = 2210 lbs.
Pressure = 32 psi

FOOTPRINT, TIRE NO. 65

FIGURE D-12

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TABLE D-177

RUN: 148- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
1108.9	-0.207	1.032	0.848	22804.9	21.31	-0.028	-0.000025
2208.8	-0.109	1.023	0.757	44969.8	22.09	-0.078	-0.000035
3310.7	-0.091	0.941	0.691	55704.9	19.34	-0.131	-0.000039

MUX PEAK COEFFICIENTS:

P0 =1.0892 P1 =-4.103E-05

P0 =0.9678 P1 = 9.069E-05 P2 =-2.976E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.253 R1 = 5.290E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9232 S1 =-7.139E-05

S0 =0.9649 S1 =-1.171E-04 S2 = 1.039E-08

TEST PRESSURE: 32 psi
(Regulated)

TABLE D-178

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 79

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	37.8	32.1	16.0	32.1	48.2	32.1
Load, -FZ (lb)	2233	3321	2214	2219	2230	1117
Rolling Resistance, FR (lb)	19.9	35.4	36.2	21.0	17.3	10.5
FR Coefficient, FR/-FZ	.0089	.0107	.0164	.0095	.0078	.0094

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-179

RUN: 132- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
1109.6	-0.300	0.977	0.921	21628.3	20.58	-0.056	-0.000050
2210.0	-0.320	0.916	0.812	35289.4	18.61	-0.144	-0.000065
3310.6	-0.310	0.864	0.745	33262.4	13.07	-0.233	-0.000070

TEST PRESSURE: 16 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0317 P1 =-5.098E-05

P0 =1.0461 P1 =-6.532E-05 P2 = 3.506E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.300 R1 =-4.482E-06

MUX SLIDE COEFFICIENTS:

S0 =1.0033 S1 =-8.055E-05

S0 =1.0698 S1 =-1.525E-04 S2 = 1.622E-08

R' : 122- 0- 3

TABLE D-180

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
1112.3	-0.211	1.073	0.885	15164.8	13.78	-0.008	-0.000008
2216.6	-0.251	1.000	0.787	26887.6	12.68	-0.043	-0.000019
3316.2	-0.303	0.903	0.721	19757.9	6.48	-0.080	-0.000024

MUX PEAK COEFFICIENTS:

P0 =1.1625 P1 =-7.694E-05

P0 =1.1201 P1 =-3.115E-05 P2 =-1.040E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.162 R1 =-4.187E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9633 S1 =-7.471E-05

S0 =1.0149 S1 =-1.311E-04 S2 = 1.272E-08

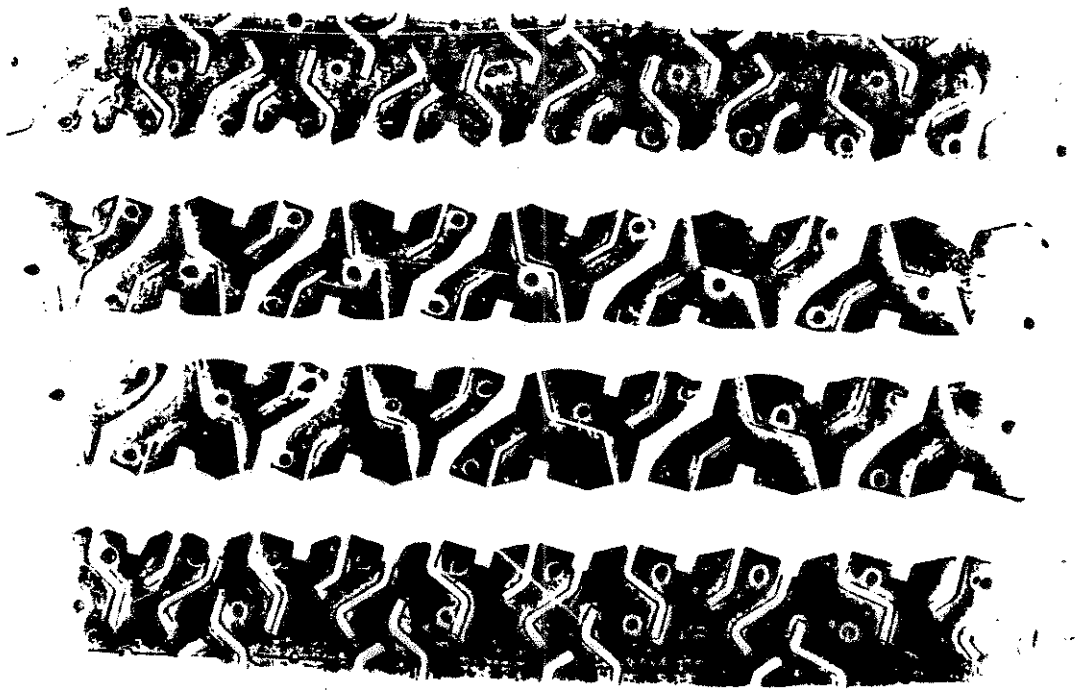
TEST PRESSURE: 48 psi
(Regulated)

TABLE D-181

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		14
SIZE		P155/80 R 13
MANUFACTURER		GENERAL
BRAND NAME		JET RADIAL
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		959
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 FIBERGLASS + 1 POLYESTER
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
14	ACFW BRD120	62	100	–	19	49	
58	ACE4EJC290		↓	–		125, 135	80



FOOTPRINT, TIRE NO. 14

FIGURE D-13

Load = 959 lbs.
Pressure = 35 psi

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TABLE D-182

RUN: 19- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
474.8	83.5	0.176	6.4	0.014	0.077	476.8	4.0	0.008	0.3	0.001	0.084	0.048	483.1	1.00	17.4
958.9	111.4	0.116	17.1	0.018	0.154	956.2	10.0	0.010	0.7	0.001	0.056	0.090	965.1	0.92	16.5
1432.5	108.6	0.076	28.3	0.020	0.261	1441.1	16.8	0.012	1.2	0.001	0.072	0.155	1441.5	0.83	21.0
1916.4	96.1	0.050	42.1	0.022	0.438	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1918.7	0.73	27.8

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2375.55 A1 = 6.39 A2 = 2558.76

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.431 A4 = -2062.81

LATERAL FRICTION COEFFICIENTS:

B3 = 1.061 B1 =-1.135E-04 B4 =-3.146E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.002E-04 C2 =-1.529E-04 C3 =-0.295

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.614E-04 K2 = 2.836E-04 K3 = 0.156

SPRING RATE (LB/IN) : 1075.3

TABLE D.183

RUN: 49- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
480.8	-0.241	0.934	0.847	4150.2	8.88	-0.012	-0.000025
959.5	-0.191	0.887	0.730	0.0	0.0	-0.050	-0.000053
1438.0	-0.160	0.865	0.685	18240.9	13.92	-0.085	-0.000059

MUX PEAK COEFFICIENTS:

P0 =0.9651 P1 =-7.253E-05

P0 =1.0063 P1 =-1.768E-04 P2 = 5.365E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.279 R1 = 8.464E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9157 S1 =-1.688E-04

S0 =1.0366 S1 =-4.707E-04 S2 = 1.568E-07

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-184

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 80

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.4	35.1	17.6	35.1	52.7	35.1
Load, -FZ (lb)	971	1450	977	976	965	500
Rolling Resistance, FR (lb)	10.5	17.0	17.6	11.0	8.9	5.5
FR Coefficient, FR/-FZ	.0108	.0117	.0180	.0113	.0092	.0110

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-185

RUN: 135- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
485.4	-0.146	1.001	0.865	8020.4	17.02	-0.027	-0.000055
965.3	-0.122	0.871	0.665	14656.7	16.86	-0.093	-0.000096
1440.4	-0.203	0.813	0.644	14666.9	12.25	-0.161	-0.000112

MUX PEAK COEFFICIENTS:

P0 =1.0848 P1 =-1.968E-04

P0 =1.2082 P1 =-5.029E-04 P2 = 1.597E-07

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.100 R1 =-5.975E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9342 S1 =-2.208E-04

S0 =1.2228 S1 =-9.381E-04 S2 = 3.722E-07

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-186

RUN: 125- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
485.8	-0.296	0.915	0.790	6534.8	13.24	0.009	0.000019
964.4	-0.259	0.878	0.671	9221.7	9.71	-0.015	-0.000016
1442.5	-0.215	0.820	0.602	11354.8	8.22	-0.043	-0.000030

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9670 P1 =-9.311E-05

P0 =0.9309 P1 =-1.043E-05 P2 =-4.552E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.338 R1 = 8.443E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8775 S1 =-1.969E-04

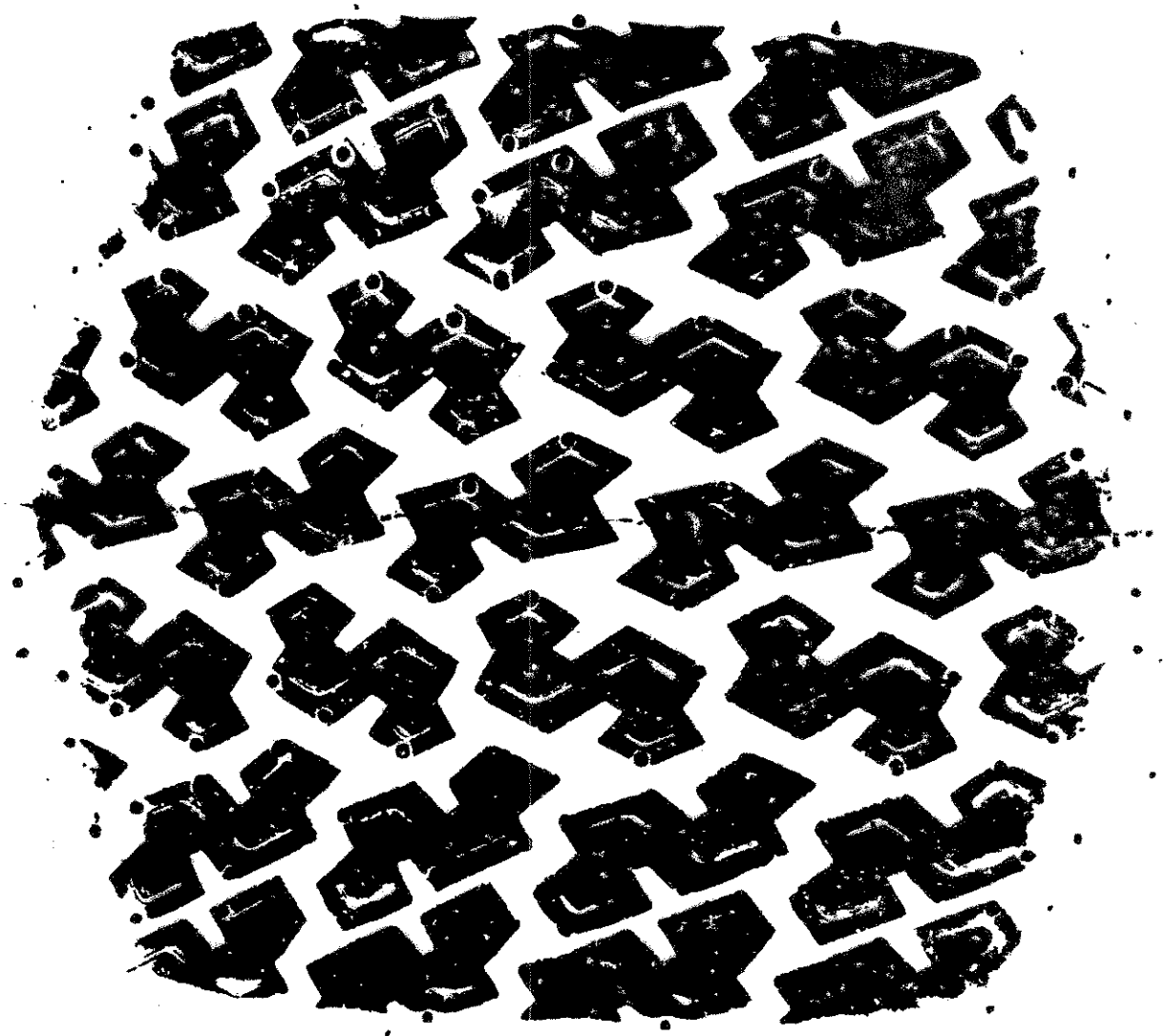
S0 =0.9626 S1 =-4.094E-04 S2 = 1.098E-07

TABLE D-137

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		15
SIZE		P195/75R14
MANUFACTURER		GOODYEAR
BRAND NAME		SELF-SUPPORT TIRE
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 NYLON + 2 STEEL
	SIDEWALL	2 NYLON
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
59	MAKA982031	68	100		136	144	
60	↓		↓			119, 129	82



FOOTPRINT, TIRE NO. 59
FIGURE D-14

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-188

RUN: 136- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SAOMUYPK DEG
699.3	153.1	0.219	13.6	0.019	0.089	695.5	7.6	0.011	1.0	0.001	0.131	0.050	695.6	0.95	13.8
1389.5	221.7	0.160	37.8	0.027	0.171	1393.4	16.2	0.012	2.2	0.002	0.137	0.073	1397.0	0.88	16.5
2087.3	212.7	0.102	60.3	0.029	0.284	2096.7	23.7	0.011	3.4	0.002	0.142	0.111	2100.0	0.84	18.4
2787.0	184.7	0.066	79.0	0.028	0.428	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2797.2	0.74	21.6

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2885.86 A1 = 10.67 A2 = 3732.52

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.668 A4 = 94250.56

LATERAL FRICTION COEFFICIENTS:

B3 = 0.970 B1 =-2.522E-05 B4 =-1.958E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-5.938E-05 C2 =-3.182E-04 C3 =-0.530

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.833E-04 K2 =-2.018E-04 K3 = 0.135

SPRING RATE (LB/IN) : 1643.0

TABLE D-189

RUN: 144- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
707.5	-0.281	0.959	0.897	8181.2	11.73	-0.016	-0.000023
1400.6	-0.157	0.933	0.711	20454.8	15.34	-0.048	-0.000034
2097.7	-0.127	0.875	0.628	33976.1	17.59	-0.080	-0.000038

MUX PEAK COEFFICIENTS:

P0 =1.0065 P1 =-6.010E-05

P0 =0.9523 P1 = 3.367E-05 P2 =-3.302E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.343 R1 = 1.105E-04

MUX SLIDE COEFFICIENTS:

S0 =1.0176 S1 =-1.941E-04

S0 =1.1935 S1 =-4.934E-04 S2 = 1.066E-07

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-190

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 82

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.7	35.1	17.6	35.1	52.6	35.1
Load, -FZ (lb)	1416	2103	1414	1412	1408	717
Rolling Resistance, FR (lb)	13.9	24.8	23.2	14.6	11.7	6.7
FR Coefficient, FR/-FZ	.0098	.0118	.0164	.0103	.0083	.0093

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

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TABLE D-191

RUN: 129- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
708.5	-0.161	0.928	0.738	19896.8	28.89	-0.020	-0.000028
1404.0	-0.138	0.849	0.663	22984.7	17.53	-0.066	-0.000047
2102.4	-0.127	0.769	0.584	23144.3	12.48	-0.113	-0.000054

TEST PRESSURE: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0098 P1 =-1.146E-04

P0 =1.0089 P1 =-1.127E-04 P2 =-5.331E-10

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.176 R1 = 2.412E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8166 S1 =-1.103E-04

S0 =0.8122 S1 =-1.014E-04 S2 =-3.732E-09

TABLE D-192

RUN: 119- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
712.0	-0.235	0.864	0.751	11589.9	16.19	0.001	0.000001
1408.5	-0.174	0.836	0.683	22850.1	16.66	-0.022	-0.000016
2105.9	-0.195	0.782	0.634	23990.3	12.00	-0.046	-0.000022

MUX PEAK COEFFICIENTS:

P0 =0.9096 P1 =-5.828E-05

P0 =0.8654 P1 = 1.937E-05 P2 =-2.770E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.242 R1 = 2.870E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8076 S1 =-8.400E-05

S0 =0.8402 S1 =-1.369E-04 S2 = 1.865E-08

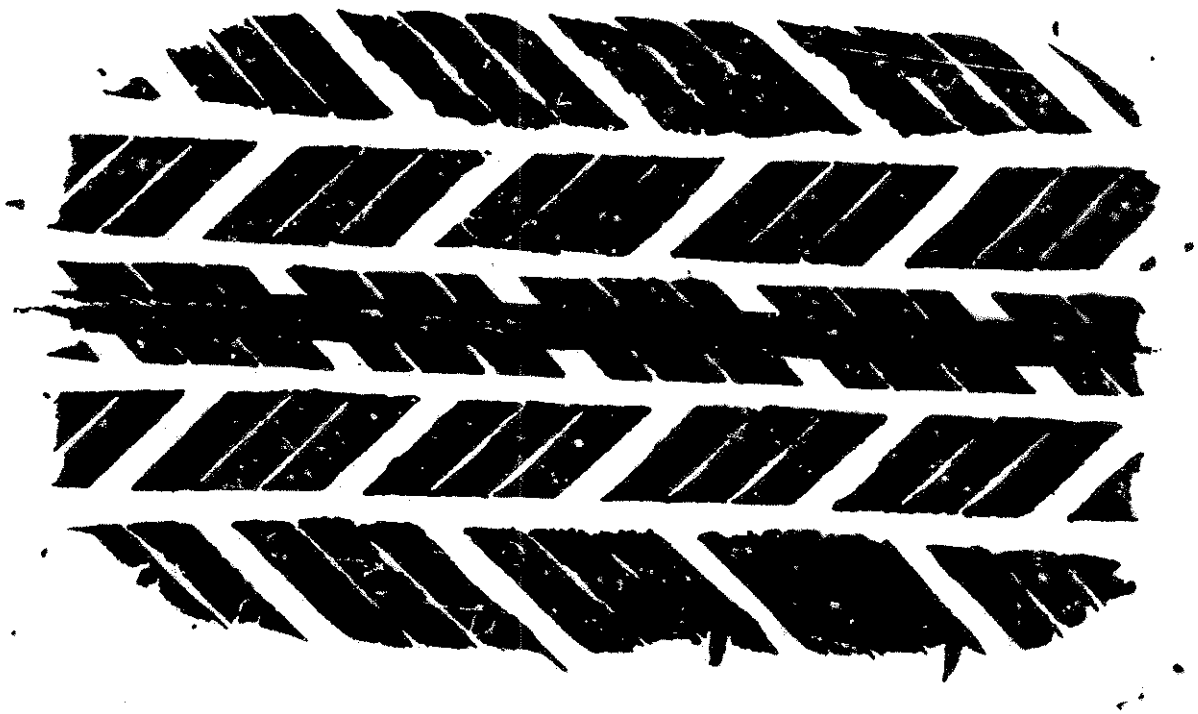
TEST PRESSURE: 52.5 psi (Regulated)

TABLE D-193

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		16
SIZE		T12.5/70 D15
MANUFACTURER		UNIROYAL
BRAND NAME		HIDEAWAY TEMPORARY
CONSTRUCTION TYPE		DIAGONAL (BIAS)
MAX. RATED LOAD (lb.)		1500
MAX. RATED INFLATION PRESS. (psi)		60
NO. OF PLIES AND CORD MATERIAL	TREAD	4 NYLON
	SIDEWALL	
RIM WIDTH (in.)		3.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
79	AKPYH9U1040	62	100	–	142		
80	U5070			–		214,225	204
82	U5070			–		150	



FOOTPRINT, TIRE NO. 79

FIGURE D-15

Load = 1500 lbs.
Pressure = 60 psi

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TABLE D-194

RUN: 150- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
768.0	-0.174	0.911	0.692	6674.2	9.15	-0.016	-0.000021
1498.0	-0.235	0.849	0.604	36702.3	25.50	-0.037	-0.000025
2249.2	-0.200	0.795	0.543	30359.9	14.33	-0.057	-0.000025

MUX PEAK COEFFICIENTS:

P0 =0.9686 P1 =-7.780E-05

P0 =0.9840 P1 =-1.018E-04 P2 = 7.817E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.177 R1 =-1.693E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7626 S1 =-9.979E-05

S0 =0.8092 S1 =-1.742E-04 S2 = 2.487E-08

TEST PRESSURE: 60 psi
(Regulated)

TABLE D-195

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 204

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	70.0	60.1	30.1	60.1	90.1	60.1
Load,-FZ (lb)	1540	2260	1432	1537	1578	760
Rolling Resistance, FR (lb)	15.0	25.0	22.6	16.3	13.0	6.4
FR Coefficient, FR/-FZ	.0097	.0111	.0158	.0106	.0086	.0084

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-196

RUN: 225- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
745.3	-0.258	0.938	0.721	4485.0	6.27	-0.040	-0.000054
1296.6	-0.217	0.843	0.704	5812.9	4.30	-0.072	-0.000056
1273.6	-0.231	0.822	0.736	9736.2	7.26	-0.072	-0.000056

MUX PEAK COEFFICIENTS:

P0 =1.0829 P1 =-1.946E-04

P0 =8.0000 P1 =-1.172E-02 P2 = 2.861E-06

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.306 R1 = 6.435E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7247 S1 =-3.926E-06

S0 =****** S1 = 1.563E-02 S2 =-8.583E-06

TEST PRESSURE: 30 psi
(Regulated)

TABLE D-197

RUN: 214- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
745.4	-0.300	0.847	0.723	8747.7	12.33	-0.027	-0.000036
1499.7	-0.220	0.801	0.662	17342.0	12.13	-0.040	-0.000027
2253.6	-0.200	0.729	0.602	19436.0	9.21	-0.058	-0.000026

MUX PEAK COEFFICIENTS:

P0 =0.9101 P1 =-7.850E-05

P0 =0.8687 P1 =-1.122E-05 P2 =-2.292E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.339 R1 = 6.610E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7829 S1 =-8.022E-05

S0 =0.7868 S1 =-8.538E-05 S2 = 1.661E-09

TEST PRESSURE: 90 psi
(Regulated)

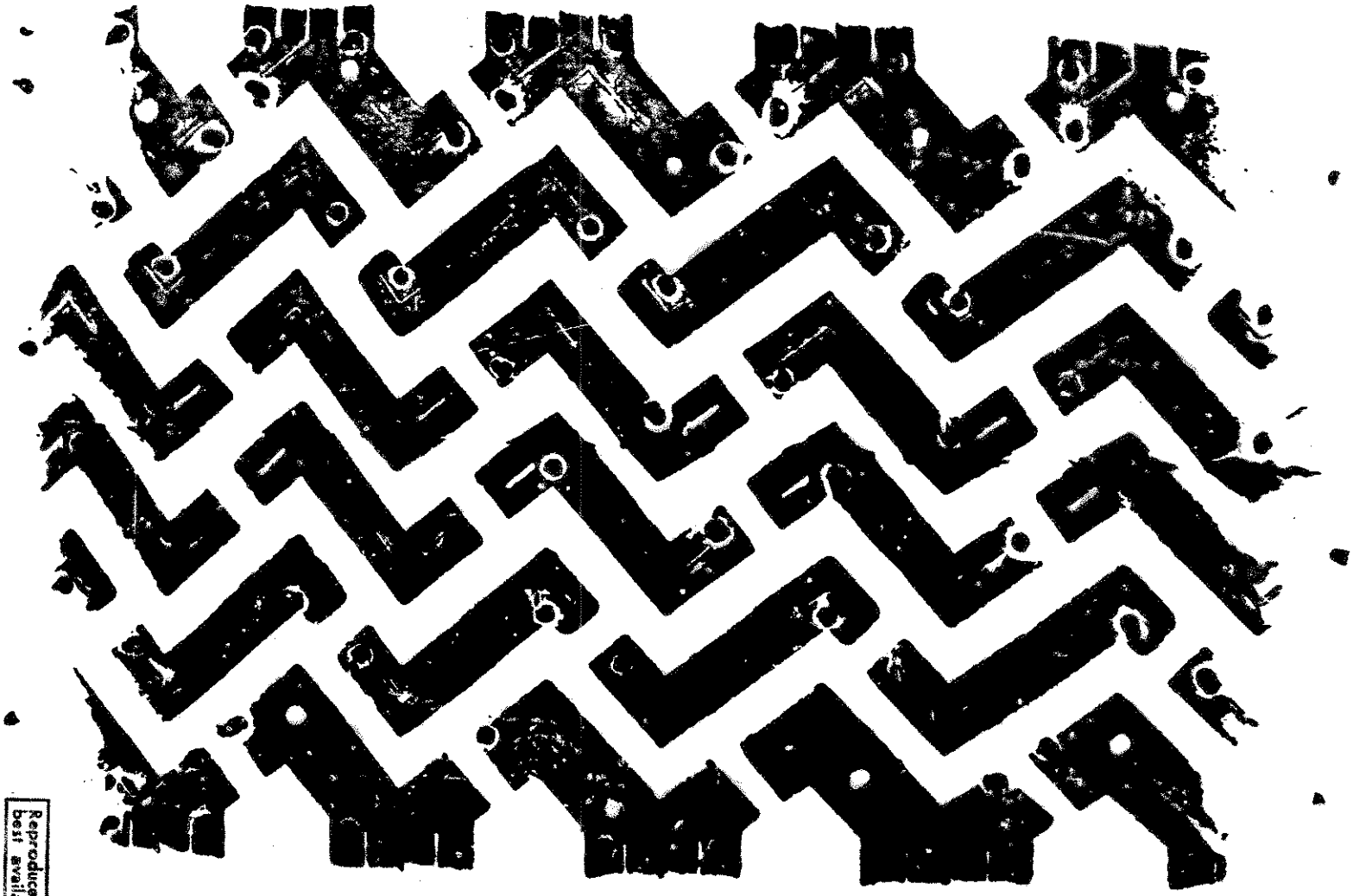
3

TABLE D-198

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		17
SIZE		P225/75R15
MANUFACTURER		GENERAL
BRAND NAME		DUAL STEEL GRIPPER
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1874
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 STEEL + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		6.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
20	ADHHWOU240	61	100	–	14	45	
109	A3HHWOU269		↓	–		213,224	203



Load = 1874 lbs.
Pressure = 35 psi

FOOTPRINT, TIRE NO. 20

FIGURE D-16

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TABLE D-199

RUN: 14- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SAOMUYPK DEG
927.9	159.1	0.171	16.8	0.018	0.106	932.6	6.4	0.007	0.7	0.001	0.104	0.040	940.0	0.98	17.4
1865.1	211.7	0.113	42.6	0.023	0.201	1867.7	15.3	0.008	1.2	0.001	0.079	0.072	1877.3	0.91	19.1
2795.9	194.5	0.070	66.5	0.024	0.342	2803.3	27.0	0.010	2.2	0.001	0.083	0.179	2809.7	0.81	24.5
3731.5	150.0	0.040	91.1	0.024	0.607	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3732.1	0.66	31.4

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3979.04 A1 = 7.14 A2 = 4488.08

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.308 A4 = -3553.93

LATERAL FRICTION COEFFICIENTS:

B3 = 1.010 B1 =-1.170E-05 B4 =-2.172E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.651E-05 C2 =-1.944E-04 C3 =-0.355

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.869E-04 K2 =-2.066E-04 K3 = 0.176

SPRING RATE (LB/IN) : 1405.9

TABLE D-200

RUN: 45- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
943.8	-0.241	0.877	0.767	13961.3	14.90	-0.016	-0.000016
1870.8	-0.167	0.801	0.649	17499.0	9.94	-0.062	-0.000033
2801.7	-0.159	0.764	0.595	15347.0	6.15	-0.109	-0.000039

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9275 P1 =-6.057E-05

P0 =0.9936 P1 =-1.441E-04 P2 = 2.234E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.271 R1 = 4.387E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8433 S1 =-9.231E-05

S0 =0.9537 S1 =-2.340E-04 S2 = 3.765E-08

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TABLE D-201

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 203

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	40.0	35.1	17.5	35.0	52.6	35.0
Load, -FZ (lb)	1898	2822	1876	1896	1901	952
Rolling Resistance, FR (lb)	18.6	30.0	30.4	19.0	16.0	9.7
FR Coefficient, FR/-FZ	.0098	.0106	.0162	.0100	.0084	.0102

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-202

RUN: 224- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
929.3	-0.273	0.961	0.783	5222.7	5.99	-0.063	-0.000067
1864.3	-0.175	0.820	0.608	12029.7	7.45	-0.136	-0.000073
2799.4	-0.163	0.714	0.659	8351.1	3.81	-0.213	-0.000076

TEST PRESSURE: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0783 P1 =-1.322E-04

P0 =1.1380 P1 =-2.071E-04 P2 = 2.020E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.313 R1 = 5.884E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8061 S1 =-6.593E-05

S0 =1.1840 S1 =-5.501E-04 S2 = 1.298E-07

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TABLE D-203

RUN: 213- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
927.8	-0.331	0.984	0.948	13774.0	15.18	-0.019	-0.000020
1864.2	-0.218	0.948	0.822	20974.6	11.86	-0.048	-0.000026
2805.9	-0.260	0.910	0.735	20436.1	7.93	-0.080	-0.000029

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0205 P1 =-3.937E-05

P0 =1.0149 P1 =-3.457E-05 P2 =-1.244E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.340 R1 = 3.790E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0468 S1 =-1.134E-04

S0 =1.1088 S1 =-1.950E-04 S2 = 2.194E-08

TABLE D-204

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		1B
SIZE		FR 78-14
MANUFACTURER (DISTRIBUTOR)		REMINGTON
BRAND NAME		PIONEER
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1500
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 FIBERGLASS
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS TIRE # 115 TREAD:		2 POLYESTER + 2 STEEL

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
25	DBL8L2A148	64	100	–	23	41	
115	DBL8E18259		↓	–		211, 221	202

FOOTPRINT, TIRE NO. 25

FIGURE D-17

Load = 1500 lbs.
Pressure = 32 psi

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TABLE D-205

RUN: 23- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
749.8	132.1	0.176	16.4	0.022	0.124	749.4	7.5	0.010	0.8	0.001	0.101	0.056	757.0	0.93	17.4
1493.5	146.7	0.098	38.2	0.026	0.260	1499.0	17.6	0.012	1.4	0.001	0.082	0.120	1501.1	0.87	18.8
2247.4	117.2	0.052	57.1	0.025	0.487	2248.8	27.9	0.012	2.2	0.001	0.077	0.238	2249.0	1.09	43.5
2987.7	93.5	0.031	71.5	0.024	0.765	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2987.4	0.36	36.1

CORNERING STIFFNESS COEFFICIENTS:

A0 = 6324.63 A1 = 2.59 A2 = 2610.12

TEST PRESSURE: 32 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.553 A4 = -7524.64

LATERAL FRICTION COEFFICIENTS:

B3 = 0.343 B1 = 9.217E-04 B4 =-2.995E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.113E-04 C2 =-1.495E-04 C3 =-0.282

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.684E-04 K2 = 3.409E-04 K3 = 0.209

SPRING RATE (LB/IN) : 1196.4

TABLE D-206

RUN: 41- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
760.5	-0.194	0.867	0.764	14004.8	18.57	-0.019	-0.000025
1500.3	-0.180	0.826	0.677	19978.5	14.32	-0.065	-0.000043
2246.5	-0.138	0.810	0.666	18309.8	9.22	-0.115	-0.000051

MUX PEAK COEFFICIENTS:

P0 =0.8914 P1 =-3.789E-05

P0 =0.9338 P1 =-1.061E-04 P2 = 2.284E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.228 R1 = 3.789E-05

MUX SLIDE COEFFICIENTS:

S0 =0.3017 S1 =-6.624E-05

S0 =0.9331 S1 =-2.755E-04 S2 = 6.962E-08

TEST PRESSURE: 32 psi
(Regulated)

TABLE D-207

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 202

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	37.3	32.1	16.0	32.0	48.1	32.0
Load,-FZ (lb)	1511	2253	1498	1518	1519	771
Rolling Resistance, FR (lb)	17.3	29.6	31.2	18.6	14.8	9.6
FR Coefficient, FR/-FZ	.0114	.0131	.0208	.0123	.0097	.0125

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-208

RUN: 221- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
741.8	-0.212	1.004	0.867	5797.8	8.19	-0.069	-0.000093
1487.9	-0.205	0.884	0.723	4113.6	3.22	-0.144	-0.000097
2239.1	-0.167	0.783	0.648	7659.2	4.41	-0.222	-0.000099

TEST PRESSURE: 16 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.1099 P1 =-1.472E-04

P0 =1.1422 P1 =-1.984E-04 P2 = 1.700E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.239 R1 = 2.983E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9639 S1 =-1.463E-04

S0 =1.0800 S1 =-3.324E-04 S2 = 6.244E-08

TABLE D-209

RUN: 211- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
745.0	-0.255	0.990	0.912	13420.1	18.34	-0.023	-0.000030
1492.1	-0.168	1.000	0.740	26189.9	17.88	-0.053	-0.000035
2248.7	-0.167	0.961	0.731	19546.7	9.52	-0.085	-0.000038

MUX PEAK COEFFICIENTS:

P0 =1.0121 P1 =-1.916E-05

P0 =0.9323 P1 = 1.088E-04 P2 =-4.261E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.284 R1 = 5.849E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9737 S1 =-1.200E-04

S0 =1.2447 S1 =-5.543E-04 S2 = 1.451E-07

TEST PRESSURE: 48 psi
(Regulated)

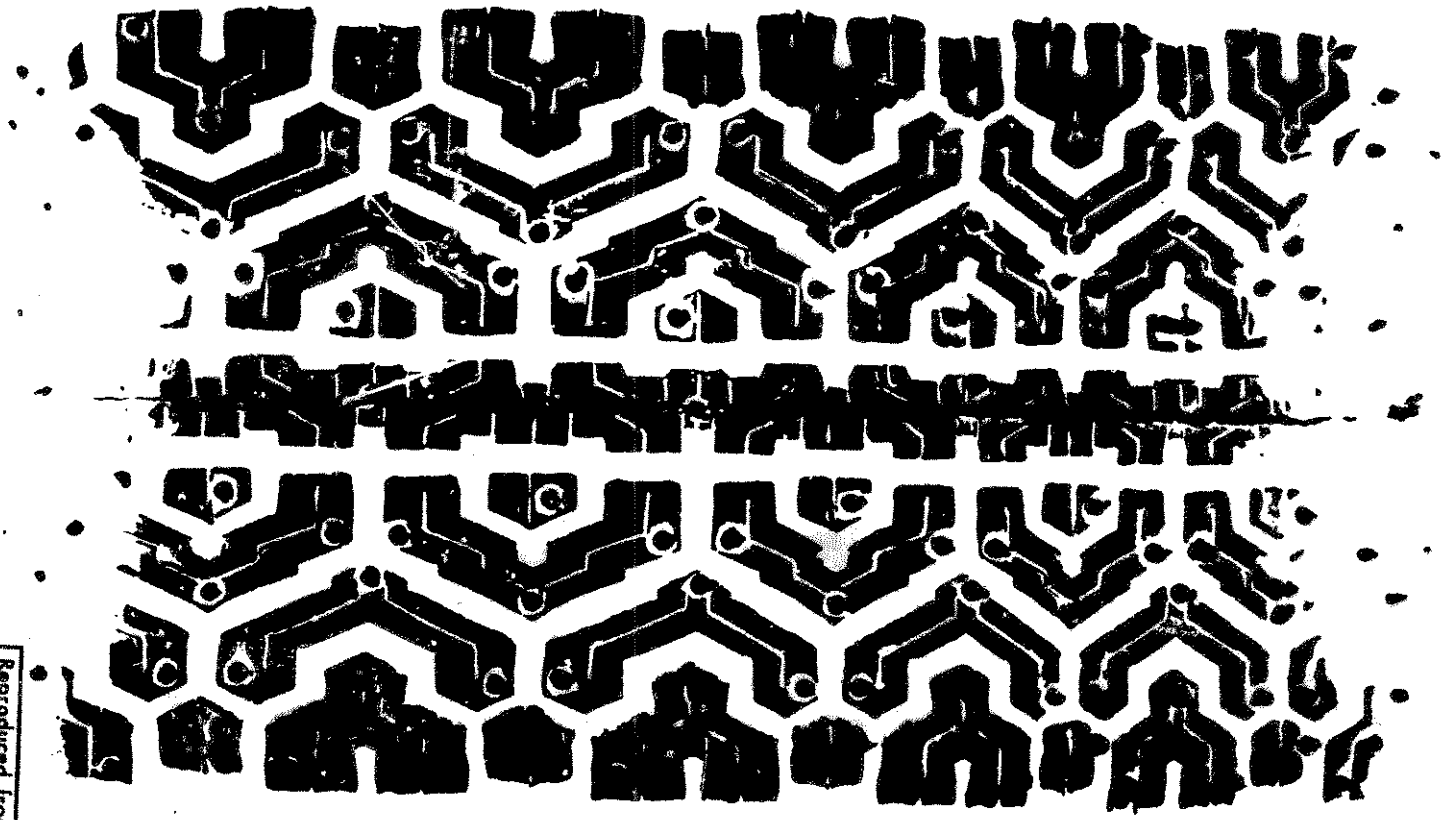
3

TABLE D-210

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		19
SIZE		P195/75R14
MANUFACTURER (DISTRIBUTOR)		PENNEY
BRAND NAME		WEATHER TAMER
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 FIBERGLASS
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
28	HYKA PMY111	51	100	—	25	38	
114	↓ Y033		↓	—		206,216	199



FOOTPRINT, TIRE NO. 28

FIGURE D-18

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-211

RUN: 25- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
697.4	103.5	0.148	10.7	0.015	0.103	695.6	6.2	0.009	0.5	0.001	0.075	0.060	704.2	0.97	18.3
1390.3	131.0	0.094	26.8	0.019	0.205	1397.8	16.0	0.011	1.1	0.001	0.067	0.122	1399.9	0.86	17.5
2096.7	125.2	0.060	43.2	0.021	0.345	2095.7	25.7	0.012	2.0	0.001	0.077	0.205	2099.3	0.89	28.2
2789.1	109.0	0.039	61.9	0.022	0.568	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2789.6	2.63	155.8

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3414.25 A1 = 4.60 A2 = 3556.32

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.497 A4 = -4831.29

LATERAL FRICTION COEFFICIENTS:

B3 = 2.427 B1 =-2.632E-03 B4 = 9.593E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.031E-04 C2 =-1.072E-04 C3 =-0.314

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.251E-04 K2 = 2.551E-04 K3 = 0.180

SPRING RATE (LB/IN) : 1179.2

TABLE D-212

RUN: 38- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
705.1	-0.999	0.839	0.815	6731.2	9.74	-0.013	-0.000018
1401.5	-0.432	0.747	0.688	15022.1	11.31	-0.055	-0.000039
2096.3	-0.439	0.668	0.612	16653.1	8.84	-0.100	-0.000048

MUX PEAK COEFFICIENTS:

P0 =0.9231 P1 =-1.227E-04

P0 =0.9469 P1 =-1.626E-04 P2 = 1.402E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-1.187 R1 = 4.022E-04

MUX SLIDE COEFFICIENTS:

S0 =0.9098 S1 =-1.460E-04

S0 =0.9989 S1 =-2.948E-04 S2 = 5.283E-08

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-213

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 199

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.2	35.0	17.5	35.0	52.6	35.0
Load, -FZ (lb)	1424	2105	1397	1430	1396	704
Rolling Resistance, FR (lb)	13.1	20.7	20.2	13.5	11.3	7.2
FR Coefficient, FR/-FZ	.0092	.0098	.0145	.0094	.0081	.0102

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-214

RUN: 216- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
696.0	-0.912	0.873	0.770	3781.0	5.78	-0.067	-0.000096
1390.1	-0.223	0.770	0.653	7503.3	6.27	-0.140	-0.000101
2089.7	-0.181	0.709	0.600	-22815.0	-13.81	-0.212	-0.000101

MUX PEAK COEFFICIENTS:

P0 =0.9475 P1 =-1.177E-04

P0 =1.0184 P1 =-2.407E-04 P2 = 4.422E-08

TEST PRESSURE: 17.5 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-1.168 R1 = 5.237E-04

MUX SLIDE COEFFICIENTS:

S0 =0.8436 S1 =-1.216E-04

S0 =0.9486 S1 =-3.036E-04 S2 = 6.500E-08

TABLE D-215

RUN: 206- 0- 3

BRAKING TIRE COEFFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
692.2	-1.000	0.932	0.917	8016.9	11.66	-0.019	-0.000028
1392.9	-0.361	0.878	0.772	13522.2	10.37	-0.049	-0.000035
2094.7	-0.289	0.801	0.668	16049.1	8.35	-0.082	-0.000039

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9998 P1 =-9.300E-05

P0 =0.9618 P1 =-2.561E-05 P2 =-2.411E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-1.256 R1 = 5.067E-04

MUX SLIDE COEFFICIENTS:

S0 =1.0336 S1 =-1.779E-04

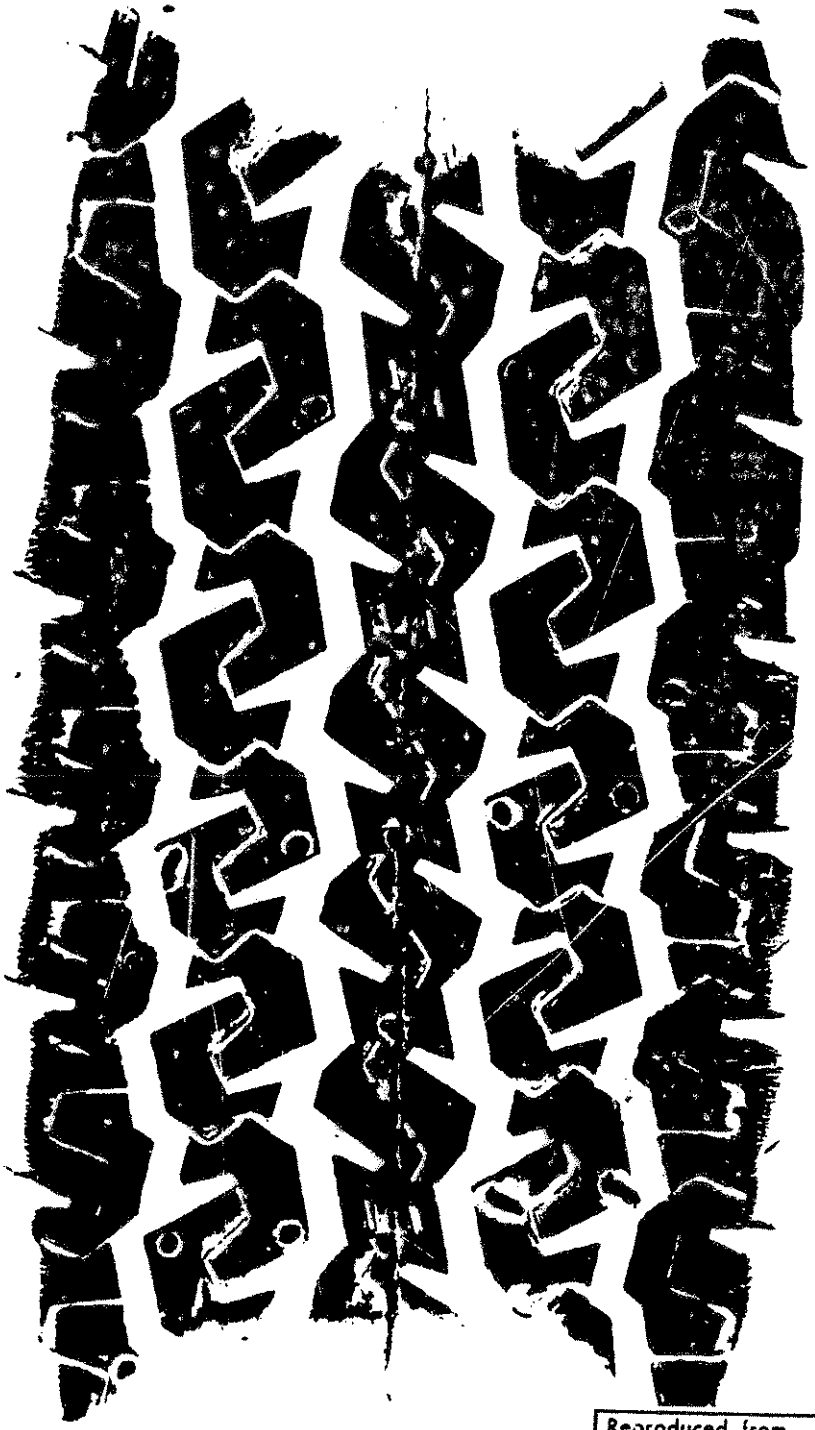
S0 =1.1006 S1 =-2.929E-04 S2 = 4.155E-08

TABLE D-216

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		20
SIZE		P195/75 R14
MANUFACTURER (DISTRIBUTOR)		SEARS
BRAND NAME		GUARDSMAN
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 FIBERGLASS BELTS + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
27	CHKA174520	56	100	–	24	37	
100	CKKA172201		↓	–		207, 217	197



Load = 1400 lbs.
Pressure = 35 psi

FOOTPRINT, TIRE NO. 27
FIGURE D-19

Reproduced from best available copy.

TABLE D-217

RUN: 24- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
699.1	120.3	0.172	14.4	0.021	0.119	698.4	4.7	0.007	0.4	0.001	0.093	0.039	701.1	0.95	15.6
1396.8	142.0	0.102	33.8	0.024	0.238	1398.6	15.2	0.011	1.5	0.001	0.099	0.107	1401.8	0.89	19.4
2091.1	127.3	0.061	51.2	0.024	0.402	2096.7	27.0	0.013	3.0	0.001	0.111	0.212	2098.6	0.95	32.7
2785.5	105.4	0.038	69.4	0.025	0.658	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2789.6	1.40	103.0

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4805.21 A1 = 4.01 A2 = 3107.42

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.316 A4 = -1526.70

LATERAL FRICTION COEFFICIENTS:

B3 = 1.350 B1 =-7.344E-04 B4 = 2.684E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.085E-04 C2 =-9.670E-05 C3 =-0.317

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.406E-04 K2 =-2.733E-04 K3 = 0.169

SPRING RATE (LB/IN) : 1146.4

TABLE D-218

RUN: 37- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
708.3	-0.322	0.863	0.781	10537.1	15.23	-0.017	-0.000024
1403.4	-0.408	0.756	0.680	17744.9	13.48	-0.062	-0.000044
2096.7	-0.462	0.694	0.649	23740.3	12.70	-0.108	-0.000051

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9412 P1 =-1.216E-04

P0 =1.0193 P1 =-2.517E-04 P2 = 4.637E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.257 R1 =-1.004E-04

MUX SLIDE COEFFICIENTS:

S0 =0.8369 S1 =-9.520E-05

S0 =0.9548 S1 =-2.954E-04 S2 = 7.147E-08

TABLE D-219

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 197

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.2	35.0	17.5	35.0	52.6	35.0
Load,-FZ (lb)	1417	2105	1400	1414	1419	716
Rolling Resistance, FR (lb)	13.6	21.9	22.3	14.2	12.0	7.4
FR Coefficient, FR/-FZ	.0096	.0104	.0159	.0100	.0085	.0103

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-220

RUN: 217- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
690.7	-0.249	0.936	0.787	4004.5	6.06	-0.069	-0.000100
1384.6	-0.188	0.811	0.645	4071.2	3.43	-0.143	-0.000103
2087.9	-0.138	0.818	0.623	6379.2	3.90	-0.214	-0.000102

MUX PEAK COEFFICIENTS:

P0 =0.9723 P1 =-8.432E-05

P0 =1.1915 P1 =-4.634E-04 P2 = 1.359E-07

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.302 R1 = 7.942E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8475 S1 =-1.173E-04

S0 =1.0468 S1 =-4.618E-04 S2 = 1.239E-07

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-221

RUN: 207- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
697.2	-0.243	1.058	0.926	11874.1	16.91	-0.021	-0.000030
1398.0	-0.202	0.982	0.760	23770.2	17.80	-0.049	-0.000035
2097.4	-0.188	0.915	0.688	25270.4	13.12	-0.081	-0.000038

MUX PEAK COEFFICIENTS:

P0 =1.1281 P1 =-1.023E-04

P0 =1.1429 P1 =-1.268E-04 P2 = 9.329E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.266 R1 = 3.911E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0288 S1 =-1.699E-04

S0 =1.1875 S1 =-4.408E-04 S2 = 9.692E-08

TEST PRESSURE: 52.5 psi
(Regulated)

TABLE D-222

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		21
SIZE		P195/75R14
MANUFACTURER		GOODYEAR
BRAND NAME		VIVA
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 FIBERGLASS
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
94	MBKAEJ5251	65	100	–	162	179	
116	↓ J5301		↓	–		212, 222	205

TABLE D-223

RUN: 162- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
707.2	141.1	0.200	12.4	0.018	0.088	705.3	6.2	0.009	0.3	0.000	0.050	0.044	696.8	0.93	12.9
1402.3	176.4	0.126	31.1	0.022	0.177	1409.1	14.7	0.010	0.8	0.001	0.052	0.084	1397.7	0.82	14.7
2114.1	163.8	0.077	51.8	0.025	0.317	2118.0	23.5	0.011	1.7	0.001	0.074	0.143	2099.9	0.76	18.4
2820.8	129.2	0.046	74.6	0.026	0.578	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2799.1	0.85	37.1

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4415.70 A1 = 6.72 A2 = 3331.33

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.491 A4 = -6942.71

LATERAL FRICTION COEFFICIENTS:

B3 = 1.167 B1 =-4.057E-04 B4 = 1.047E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.742E-05 C2 =-1.808E-04 C3 =-0.326

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.279E-04 K2 =-2.619E-04 K3 = 0.160

SPRING RATE (LB/IN) : 1155.3

TABLE D-224

RUN: 179- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
692.6	-0.235	0.859	0.705	4211.6	6.04	-0.024	-0.000035
1391.6	-0.185	0.776	0.582	8229.3	6.31	-0.062	-0.000044
2092.9	-0.172	0.717	0.529	7909.0	4.26	-0.112	-0.000054

MUX PEAK COEFFICIENTS:

P0 =0.9261 P1 =-1.013E-04

P0 =0.9669 P1 =-1.743E-04 P2 = 2.589E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.260 R1 = 4.509E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7807 S1 =-1.258E-04

S0 =0.8979 S1 =-3.294E-04 S2 = 7.310E-08

TEST PRESSURE: 35 psi
(Regulated)

TABLE D-225

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 205

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.2	35.0	17.5	35.0	52.6	35.1
Load, -FZ (lb)	1429	2102	1394	1422	1434	706
Rolling Resistance, FR (lb)	12.7	20.8	20.5	13.4	11.1	6.7
FR Coefficient, FR/-FZ	.0089	.0099	.0147	.0094	.0077	.0095

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-226

RUN: 222- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
694.2	-0.209	0.932	0.767	5060.7	7.66	-0.067	-0.000097
1387.4	-0.162	0.785	0.599	7205.1	6.02	-0.140	-0.000101
2089.7	-0.165	0.725	0.562	6100.2	3.72	-0.218	-0.000104

TEST PRESSURE: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0198 P1 =-1.481E-04

P0 =1.1647 P1 =-3.974E-04 P2 = 8.939E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.223 R1 = 3.185E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8472 S1 =-1.472E-04

S0 =1.0688 S1 =-5.285E-04 S2 = 1.369E-07

TABLE D-227

RUN: 212- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
696.6	-0.227	1.051	0.932	12323.6	17.43	-0.021	-0.000030
1391.9	-0.200	0.956	0.677	20670.7	15.62	-0.049	-0.000035
2093.8	-0.173	0.885	0.640	25619.2	13.33	0.081	-0.000039

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.1294 P1 =-1.188E-04

P0 =1.1690 P1 =-1.874E-04 P2 = 2.467E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.264 R1 = 3.877E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0410 S1 =-2.088E-04

S0 =1.4056 S1 =-8.356E-04 S2 = 2.246E-07

TABLE D-228

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		22
SIZE		E78-14
MANUFACTURER (DISTRIBUTOR)		SEARS
BRAND NAME		SUPERGUARD
CONSTRUCTION TYPE		BELTED
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 FIBERGLASS + 2 [illegible]
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
98	CEL5181500	62	100	–	166	183	
99	↓		↓	–		209, 219	198

TABLE D-229

RUN: 166- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
700.0	98.8	0.141	10.9	0.016	0.110	702.8	9.0	0.013	1.2	0.002	0.133	0.091	698.5	1.04	16.1
1399.0	142.1	0.102	29.0	0.021	0.204	1411.6	22.8	0.016	3.3	0.002	0.144	0.161	1398.0	0.91	17.3
2114.7	131.8	0.062	48.6	0.023	0.369	2112.9	31.7	0.015	4.6	0.002	0.145	0.241	2098.6	0.79	24.6
2811.5	109.7	0.039	62.9	0.022	0.573	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2801.7	3.78	227.0

CORNERING STIFFNESS COEFFICIENTS:

A0 = 1924.06 A1 = 6.84 A2 = 3606.10

TEST PRESSURE: 32 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.889 A4 =741047.50

LATERAL FRICTION COEFFICIENTS:

B3 = 3.500 B1 =-4.408E-03 B4 = 1.590E-06

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.188E-04 C2 = 8.300E-06 C3 =-0.272

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.308E-04 K2 =-2.555E-04 K3 = 0.172

SPRING RATE (LB/IN) : 1494.5

TABLE D-230

RUN: 183- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
692.2	-0.274	0.940	0.812	3853.5	5.51	-0.003	-0.000005
1393.6	-0.211	0.866	0.686	6306.9	4.66	-0.028	-0.000020
2091.9	-0.188	0.804	0.604	7699.4	3.93	-0.059	-0.000028

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0052 P1 =-9.715E-05

P0 =1.0223 P1 =-1.273E-04 P2 = 1.091E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.310 R1 = 6.137E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9082 S1 =-1.489E-04

S0 =0 9798 S1 =-2.726E-04 S2 = 4.467E-08

TABLE D-231

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 198

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	37.8	32.1	16.0	32.0	48.1	32.1
Load, -FZ (lb)	1426	2101	1395	1423	1398	719
Rolling Resistance, FR (lb)	19.0	36.4	36.0	20.3	15.9	9.2
FR Coefficient, FR/-FZ	.0133	.0173	.0258	.0143	.0114	.0128

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-232

RUN: 219- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
684.8	-0.195	1.096	0.941	4509.3	6.59	-0.028	-0.000041
1377.9	-0.178	0.978	0.767	7652.3	6.01	-0.072	-0.000053
2075.3	-0.229	0.852	0.644	7419.8	4.19	-0.142	-0.000068

TEST PRESSURE: 16 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.2176 P1 =-1.757E-04

P0 =1.2063 P1 =-1.564E-04 P2 =-7.028E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.167 R1 =-2.472E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0785 S1 =-2.133E-04

S0 =1.1633 S1 =-3.603E-04 S2 = 5.298E-08

TABLE D-233

RUN: 209- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
696.1	-0.243	1.100	0.952	12136.2	17.32	-0.012	-0.000018
1393.5	-0.183	1.015	0.838	21113.2	15.58	-0.027	-0.000019
2094.5	0.185	0.933	0.761	19330.7	9.72	-0.044	-0.000021

MUX PEAK COEFFICIENTS:

P0 =1.1827 P1 =-1.195E-04

P0 =1.1877 P1 =-1.295E-04 P2 = 3.654E-09

TEST PRESSURE: 48 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.261 R1 = 4.119E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0411 S1 =-1.368E-04

S0 =1.1034 S1 =-2.441E-04 S2 = 3.863E-08

TABLE D-234

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		23
SIZE		P195/75 R14
MANUFACTURER (DISTRIBUTOR)		MONTGOMERY WARD
BRAND NAME		GAS MISER
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
105	W2KAMD3031	63	100	–	164	181	
117	↓ MD3381		↓	–		223, 226	215

TABLE D-235

RUN: 164- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
712.6	132.5	0.186	12.7	0.018	0.096	705.2	7.0	0.010	0.5	0.001	0.072	0.053	697.5	0.95	12.1
1413.3	178.6	0.126	34.0	0.024	0.190	1410.7	16.5	0.012	1.1	0.001	0.069	0.092	1398.5	0.86	14.7
2112.4	170.1	0.081	54.2	0.026	0.319	2118.7	25.8	0.012	1.9	0.001	0.075	0.151	2105.1	0.81	19.1
2813.8	142.8	0.051	73.4	0.026	0.514	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2801.9	0.96	38.6

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3264.72 A1 = 7.75 A2 = 3612.11

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.564 A4 = -8543.35

LATERAL FRICTION COEFFICIENTS:

B3 = 1.190 B1 =-4.164E-04 B4 = 1.182E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-7.858E-05 C2 =-1.960E-04 C3 =-0.376

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.247E-04 K2 =-2.481E-04 K3 = 0.153

SPRING RATE (LB/IN) : 1269.1

TABLE D-236

RUN: 181- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
691.1	-0.292	0.924	0.785	3452.8	5.03	-0.020	-0.000029
1390.6	-0.193	0.848	0.668	-22305.3	-16.96	-0.060	-0.000043
2095.3	-0.216	0.777	0.502	4760.3	2.59	-0.110	-0.000053

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9959 P1 =-1.049E-04

P0 =1.0053 P1 =-1.206E-04 P2 = 5.607E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.308 R1 = 5.289E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8796 S1 =-1.445E-04

S0 =0.9337 S1 =-2.366E-04 S2 = 3.313E-08

TABLE D-237

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 215

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	40.0	35.0	17.5	35.0	52.6	35.0
Load, -FZ (lb)	1415	2115	1402	1409	1400	699
Rolling Resistance, FR (lb)	14.8	24.0	24.1	15.3	13.1	7.8
FR Coefficient, FR/-FZ	.0105	.0113	.0172	.0109	.0094	.0112

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-238

RUN: 226- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
690.2	-0.298	0.936	0.771	4280.1	6.46	-0.052	-0.000075
1383.9	-0.156	0.881	0.702	10265.3	8.38	-0.116	-0.000084
2088.5	-0.182	0.796	0.742	11717.7	6.92	-0.189	-0.000091

TEST PRESSURI: 17.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0090 P1 =-9.964E-05

P0 =0.9622 P1 =-1.936E-05 P2 =-2.871E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.326 R1 = 8.219E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7666 S1 =-2.033E-05

S0 =0.9480 S1 =-3.347E-04 S2 = 1.127E-07

TABLE D-239

RUN: 223- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
691.9	-1.000	0.841	0.777	3323.5	4.80	-0.019	-0.000028
1391.9	-0.264	0.787	0.688	8676.7	6.50	-0.039	-0.000028
2097.4	-0.206	0.702	0.585	7906.2	4.07	-0.071	-0.000034

TEST PRESSURE: 52.5 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9150 P1 =-9.928E-05

P0 =0.8672 P1 =-1.583E-05 P2 =-2.990E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-1.277 R1 = 5.645E-04

MUX SLIDE COEFFICIENTS:

S0 =0.8740 S1 =-1.367E-04

S0 =0.8533 S1 =-1.022E-04 S2 =-1.267E-08

TABLE D-240

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		24
SIZE		P195/75R14
MANUFACTURER		UNIROYAL
BRAND NAME		ROYAL SEAL
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1460
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	3
	SIDEWALL	1
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
55	APKAUJB190	69	100	–	163	180	
56	↓		↓	–		208,218	200

TABLE D-241

RUN: 163- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
706.9	141.6	0.200	15.0	0.021	0.106	703.5	7.2	0.010	0.5	0.001	0.073	0.051	695.3	0.94	12.9
1401.8	177.3	0.127	37.2	0.027	0.210	1409.7	16.6	0.012	1.2	0.001	0.070	0.094	1399.9	0.96	13.8
2115.8	151.5	0.072	58.2	0.028	0.384	2116.3	26.7	0.013	2.1	0.001	0.080	0.176	2105.8	0.80	20.1
2819.9	120.3	0.043	75.1	0.027	0.624	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2804.4	0.91	40.6

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4942.79 A1 = 6.09 A2 = 3149.13

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.555 A4 = -6807.54

LATERAL FRICTION COEFFICIENTS:

B3 = 1.143 B1 =-3.573E-04 B4 = 9.728E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.211E-05 C2 =-1.853E-04 C3 =-0.324

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.561E-04 K2 = 2.972E-04 K3 = 0.208

SPRING RATE (LB/IN) : 1203.6

RUN: 180- 0- 3

TABLE D-242

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	S. PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
696.9	-0.233	0.860	0.738	4600.6	6.73	-0.020	-0.000028
1393.0	-0.184	0.829	0.635	7220.3	5.50	-0.062	-0.000044
2096.0	-0.161	0.806	0.609	7951.4	4.26	-0.110	-0.000053

MUX PEAK COEFFICIENTS:

P0 =0.8862 P1 =-3.914E-05

P0 =0.9017 P1 =-6.557E-05 P2 = 9.891E-09

TEST PRESSURE: 35 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.264 R1 = 5.114E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7885 S1 =-9.167E-05

S0 =0.9176 S1 =-3.122E-04 S2 = 7.913E-08

TABLE D-243

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 200

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	39.6	35.0	17.5	35.0	52.6	35.1
Load, -FZ (lb)	1413	2102	1397	1408	1419	719
Rolling Resistance, FR (lb)	13.9	22.8	23.1	14.3	11.7	7.2
FR Coefficient, FR/-FZ	.0098	.0108	.0165	.0102	.0082	.0100

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-244

RUN: 218- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
689.7	-0.145	1.021	0.909	5013.7	7.54	-0.063	-0.000091
1385.9	-0.185	0.846	0.577	9857.3	8.21	-0.132	-0.000095
2089.6	-0.141	0.795	0.592	11230.0	6.78	-0.209	-0.000100

MUX PEAK COEFFICIENTS:

P0 =1.1117 P1 =-1.616E-04

P0 =1.3161 P1 =-5.155E-04 P2 = 1.271E-07

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.161 R1 = 2.893E-06

MUX SLIDE COEFFICIENTS:

S0 =1.0397 S1 =-2.258E-04

S0 =1.2840 S1 =-6.478E-04 S2 = 1.515E-07

TEST PRESSURE: 17.5 psi
(Regulated)

TABLE D-245

RUN: 208- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
696.5	-0.185	1.018	0.848	13277.7	19.20	-0.020	-0.000028
1391.9	-0.178	0.988	0.707	25512.7	19.04	-0.048	-0.000034
2097.8	-0.167	0.941	0.611	25829.7	13.38	-0.077	-0.000037

MUX PEAK COEFFICIENTS:

P0 =1.0585 P1 =-5.460E-05

P0 =1.0319 P1 =-7.667E-06 P2 =-1.652E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.194 R1 = 1.246E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9580 S1 =-1.691E-04

S0 =1.0374 S1 =-3.034E-04 S2 = 4.802E-08

TEST PRESSURE: 52.5 psi
(Regulated)

3

TABLE D-246

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		25
SIZE		E 78-14
MANUFACTURER (DISTRIBUTOR)		K-MART
BRAND NAME		KM 78
CONSTRUCTION TYPE		BIAS PLY
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	4 POLYESTER
	SIDEWALL	
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
96	CC15K9C371	61	100	–	167	184	
97	↓ D341		↓	–		210, 220	201

TABLE D-247

RUN: 167- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
709.8	120.1	0.169	14.1	0.020	0.117	703.2	10.3	0.015	1.2	0.002	0.118	0.085	698.8	1.05	16.5
1411.3	142.4	0.101	31.3	0.022	0.220	1407.6	22.8	0.016	3.0	0.002	0.131	0.160	1399.4	0.92	19.1
2109.3	126.4	0.060	47.8	0.023	0.378	2116.3	30.4	0.014	3.9	0.002	0.129	0.241	2096.5	0.76	25.3
2818.0	102.8	0.036	61.0	0.022	0.593	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2802.2	0.45	42.8

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4718.39 A1 = 4.12 A2 = 3109.17

CAMBER STIFFNESS COEFFICIENTS:

A3 = 1.008 A4 = 12918.55

LATERAL FRICTION COEFFICIENTS:

B3 = 1.071 B1 = 2.836E-05 B4 =-8.787E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.328E-04 C2 = 2.326E-05 C3 =-0.230

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.366E-04 K2 = 2.663E-04 K3 = 0.168

SPRING RATE (LB/IN) : 1340.1

TABLE D-248

RUN: 184- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
692.3	-0.296	0.918	0.805	3582.2	5.17	-0.004	-0.000005
1388.5	-0.241	0.838	0.694	5408.3	4.02	-0.024	-0.000017
2094.0	0.258	0.770	0.620	6820.5	3.46	-0.053	-0.000025

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9889 P1 =-1.056E-04

P0 =1.0097 P1 =-1.432E-04 P2 = 1.338E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.303 R1 = 2.693E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8890 S1 =-1.313E-04

S0 =0.9509 S1 =-2.094E-04 S2 = 3.911E-08

TABLE D-249

ROLLING RESISTANCE TEST DATA RESULTS

Run No. 201

PARAMETER	CONDITION					
	1	2	3	4	5	6
	PRESSURE					
	100%	100%	50%	100%	150%	100%
	LOAD					
	100%	150%	100%	100%	100%	50%
Pressure, P (psi)	37.7	32.0	16.0	32.0	48.0	32.0
Load, -FZ (lb)	1415	2103	1400	1410	1418	708
Rolling Resistance, FR (lb)	19.4	38.2	37.4	20.6	17.0	9.6
FR Coefficient, FR/-FZ	.0137	.0182	.0267	.0146	.0120	.0136

Note: 1. The pressure in Condition 1 was capped while the remaining 5 pressure conditions were regulated.

2. The Load (FZ) was the actual test load.

3. The 100% Load and Pressure conditions are the maximum rated Load and Pressure tire criteria.

TABLE D-250

RUN: 220- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
685.1	-0.298	0.979	0.834	3185.3	4.80	-0.026	-0.000038
1381.7	-0.272	0.829	0.696	5713.0	4.43	-0.067	-0.000048
2079.7	-0.220	0.692	0.606	5440.7	3.06	-0.135	-0.000065

MUX PEAK COEFFICIENTS:

P0 =1.1172 P1 =-2.055E-04

P0 =1.1386 P1 =-2.435E-04 P2 = 1.380E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.341 R1 = 5.619E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9384 S1 =-1.637E-04

S0 =1.0178 S1 =-?.022E-04 S2 = 4.989E-08

TEST PRESSURE: 16 psi
(Regulated)

TABLE D-251

RUN: 210- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
692.5	-0.329	0.995	0.940	11682.7	17.16	-0.014	-0.000020
1394.5	-0.287	0.970	0.781	15570.6	11.67	-0.028	-0.000020
2094.6	-0.236	0.908	0.693	16207.2	8.19	-0.045	-0.000021

MUX PEAK COEFFICIENTS:

P0 =1.0440 P1 =-6.192E-05

P0 =0.9801 P1 = 4.759E-05 P2 =-3.903E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.376 R1 = 6.625E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0500 S1 =-1.757E-04

S0 =1.1676 S1 =-3.799E-04 S2 = 7.344E-08

TEST PRESSURE: 48 psi
(Regulated)

TABLE D-252

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		26
SIZE		P215/70R14
MANUFACTURER		GOODRICH
BRAND NAME		ADVANTAGE
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1554
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	6 RAYON
	SIDEWALL	2 RAYON
RIM WIDTH (in.)		6.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
113	BEUX7F1171	64	100	-	168	185	

TABLE D-253

RUN: 168- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SAGMUYPK DEG
778.7	144.7	0.186	13.6	0.017	0.094	779.4	6.3	0.008	0.6	0.001	0.102	0.043	773.7	0.91	12.9
1556.2	207.1	0.133	34.7	0.022	0.167	1564.7	14.1	0.009	1.4	0.001	0.098	0.068	1549.3	0.84	15.6
2345.6	199.5	0.085	55.3	0.024	0.277	2344.0	22.0	0.009	2.0	0.001	0.091	0.110	2332.7	0.78	20.4
3115.1	162.6	0.052	72.6	0.023	0.447	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3105.1	0.68	25.1

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2427.05 A1 = 9.51 A2 = 4041.20

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.449 A4 =-11464.34

LATERAL FRICTION COEFFICIENTS:

B3 = 0.965 B1 =-6.771E-05 B4 =-7.154E-09

OVERTURNING MOMENT COEFFICIENTS:

C1 =-7.324E-05 C2 =-2.739E-04 C3 =-0.470

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.610E-04 K2 =-1.893E-04 K3 = 0.120

SPRING RATE (LB/IN) : 1344.8

TABLE D-254

RUN: 185- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
770.4	-0.280	0.926	0.808	3435.7	4.50	-0.014	-0.000019
1545.1	-0.220	0.861	0.690	5375.5	3.71	-0.052	-0.000033
2322.9	-0.185	0.778	0.602	6616.7	3.16	-0.095	-0.000041

MUX PEAK COEFFICIENTS:

P0 =1.0020 P1 =-9.532E-05

P0 =0.9710 P1 =-4.979E-05 P2 =-1.479E-08

TEST PRESSURE: 35 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.323 R1 = 6.148E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9054 S1 =-1.329E-04

S0 =0.9558 S1 =-2.109E-04 S2 = 2.539E-08

TABLE D-255

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		27
SIZE		P225/75R15
MANUFACTURER		UNIROYAL
BRAND NAME		STEELER
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1874
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		6.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
12	APHHUKF452	61	100	–	13	44	

Load = 18/4 lbs.
Pressure = 35 psi

FOOTPRINT, TIRE NO. 12

FIGURE D-20

Reproduced from best available copy.

TABLE D-256

RUN: 13- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SAMUYPK DEG
930.6	151.7	0.163	16.6	0.018	0.110	934.5	6.6	0.007	0.7	0.001	0.102	0.044	938.8	0.97	15.6
1869.1	201.5	0.108	43.3	0.023	0.215	1868.9	15.8	0.008	1.2	0.001	0.077	0.079	1875.1	0.87	19.1
2800.3	170.8	0.063	66.8	0.024	0.378	2804.5	28.1	0.010	2.4	0.001	0.084	0.159	2807.5	0.83	25.7
3729.2	140.0	0.038	91.8	0.025	0.656	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3731.7	0.69	34.8

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4248.97 A1 = 6.29 A2 = 4403.11

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.314 A4 = -3406.37

LATERAL FRICTION COEFFICIENTS:

B3 = 1.016 B1 =-4.518E-05 B4 =-1.043E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.840E-05 C2 =-1.709E-04 C3 =-0.320

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.028E-04 K2 = 2.348E-04 K3 = 0.198

SPRING RATE (LB/IN) : 1337.0

TABLE D-257

RUN: 44- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
942.7	-0.181	0.875	0.744	0.0	0.0	-0.019	-0.000021
1874.0	-0.144	0.811	0.608	20924.9	11.94	-0.064	-0.000034
2802.5	-0.119	0.779	0.580	18342.1	7.40	-0.114	-0.000041

MUX PEAK COEFFICIENTS:

P0 =0.9192 P1 =-5.203E-05

P0 =0.9746 P1 =-1.207E-04 P2 = 1.833E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.210 R1 = 3.308E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8094 S1 =-8.825E-05

S0 =0.9922 S1 =-3.211E-04 S2 = 6.206E-08

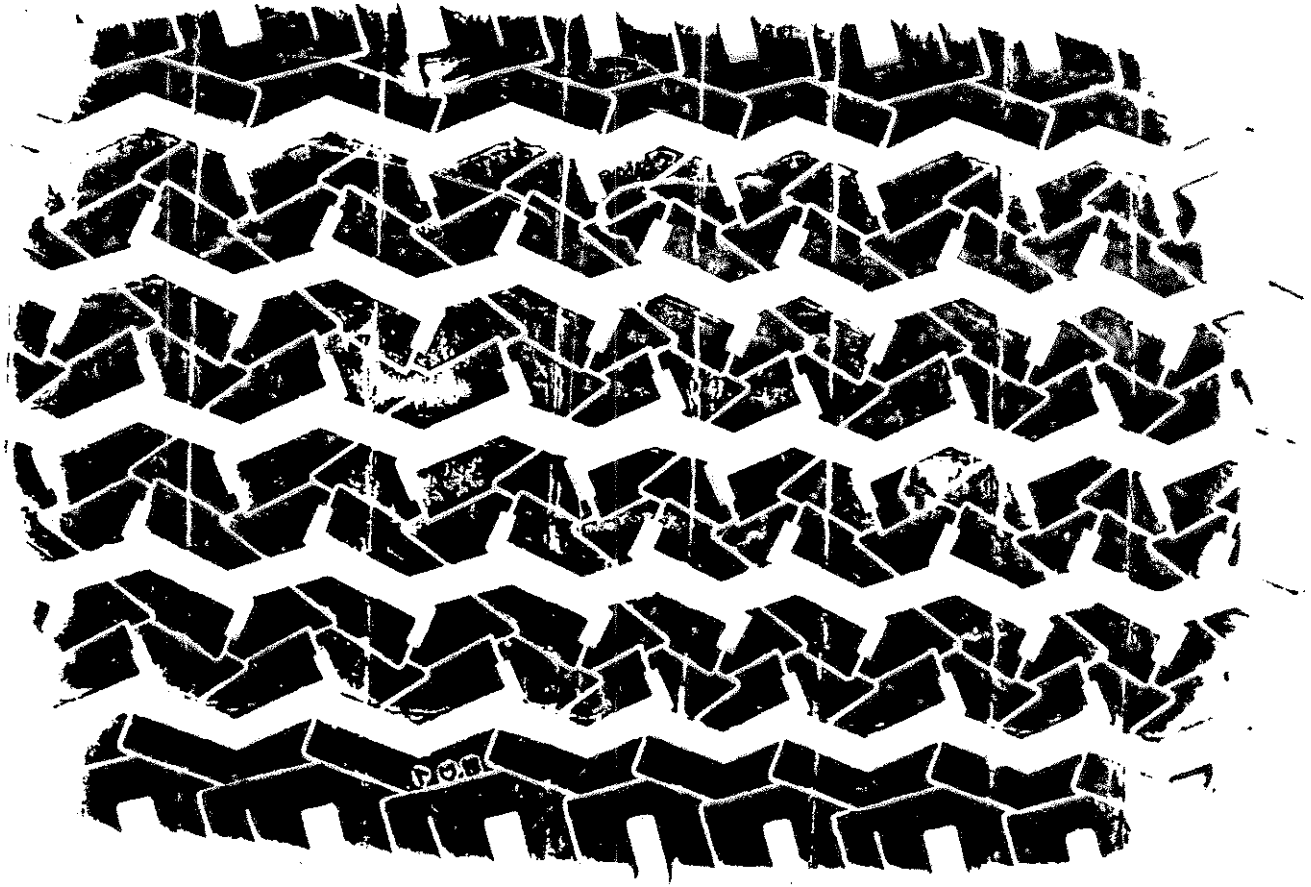
TEST PRESSURE: 35 psi
(Regulated)

TABLE D-258

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		28
SIZE		P195/75R14
MANUFACTURER		MICHELIN
BRAND NAME		MICH. X
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
24	M3A5311X439	65	100	-	4	30	



FOOTPRINT, TIRE NO. 24

FIGURE D-21

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-259

RUN: 6- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
699.9	160.1	0.229	15.2	0.022	0.095	697.9	8.1	0.012	0.5	0.001	0.067	0.050	704.1	0.99	11.2
1401.7	201.9	0.144	39.0	0.028	0.193	1398.6	16.2	0.012	0.9	0.001	0.056	0.080	1402.0	0.85	9.4
2101.2	185.2	0.088	59.0	0.028	0.318	2092.6	24.1	0.011	1.3	0.001	0.056	0.130	2104.5	0.83	17.4
2784.2	145.3	0.052	78.7	0.028	0.542	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2785.4	0.82	30.6

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4869.61 A1 = 7.99 A2 = 3277.85

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.671 A4 =122935.81

LATERAL FRICTION COEFFICIENTS:

B3 = 1.183 B1 =-3.276E-04 B4 = 7.158E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.048E-05 C2 =-2.056E-04 C3 =-0.307

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.453E-04 K2 =-2.564E-04 K3 = 0.192

SPRING RATE (LB/IN) : 1287.1

TABLE D-260

RUN: 30- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
706.8	-0.267	0.959	0.823	12039.4	17.51	-0.014	-0.000020
1400.2	-0.328	0.873	0.673	23194.1	17.66	-0.058	-0.000041
2097.3	-0.394	0.801	0.636	29385.3	15.73	-0.105	-0.000050

MUX PEAK COEFFICIENTS:

P0 =1.0376 P1 =-1.139F-04

P0 =1.0618 P1 =-1.555E-04 P2 = 1.513E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.202 R1 =-9.097E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8995 S1 =-1.347E-04

S0 =1.0946 S1 =-4.663E-04 S2 = 1.189E-07

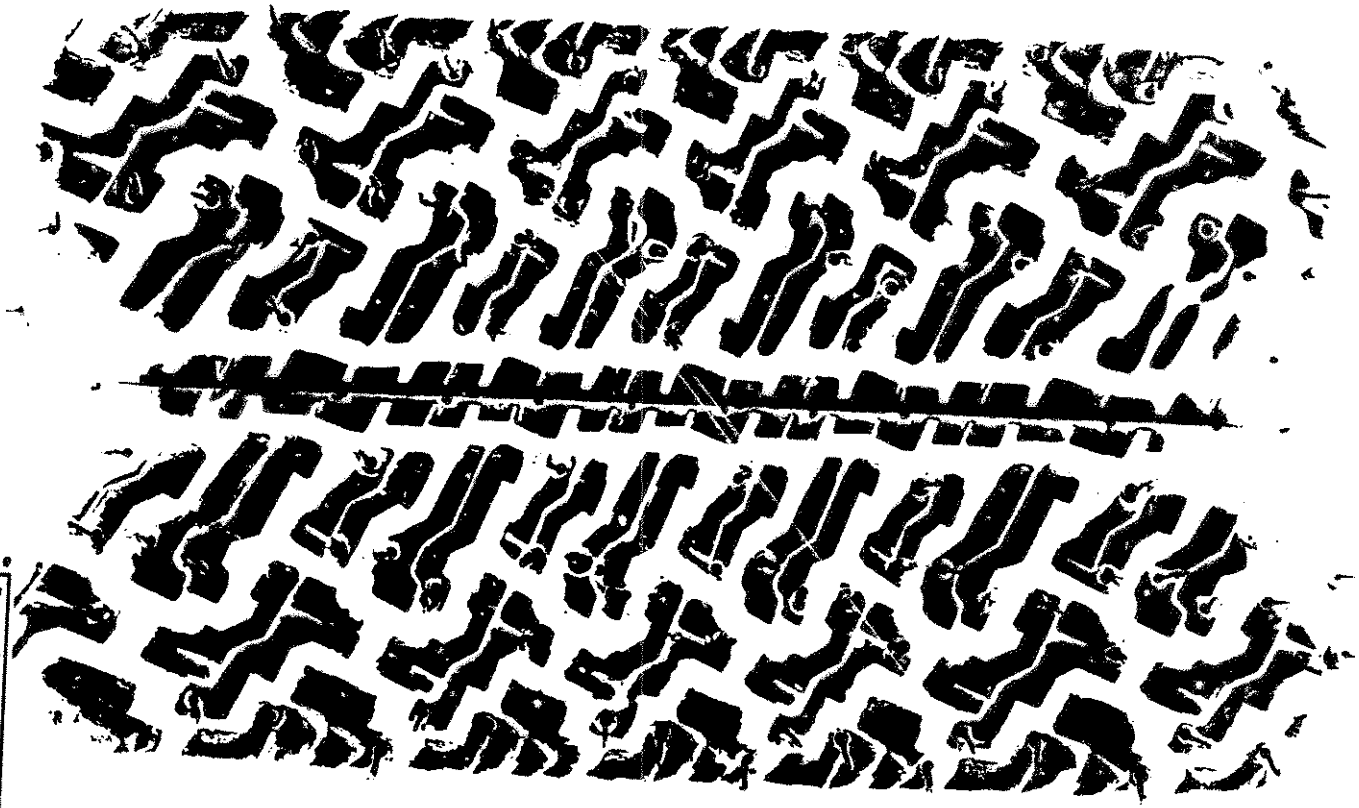
TEST PRESSURE: 35 psi
(Regulated)

TABLE D-261

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		29
SIZE		P195/75 R14
MANUFACTURER		UNIROYAL
BRAND NAME		TIGER PAW
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
22	ANKAUKE081	59	100	-	6	32	



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FOOTPRINT, TIRE NO. 22

FIGURE D-22

Load = 1400 lbs.
Pressure = 35 psi

TABLE D-262

RUN: 6- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
702.5	90.4	0.129	9.6	0.014	0.106	700.2	4.5	0.006	0.4	0.001	0.089	0.050	704.5	1.00	17.2
1395.5	122.1	0.087	23.9	0.017	0.196	1397.7	13.0	0.009	1.0	0.001	0.080	0.106	1397.9	0.87	17.9
2099.9	122.1	0.058	42.4	0.020	0.348	2094.1	23.9	0.011	2.5	0.001	0.106	0.195	2099.7	0.84	28.1
2791.6	110.3	0.040	62.0	0.022	0.563	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2790.5	1.04	60.3

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2366.41 A1 = 5.00 A2 = 3874.39

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.264 A4 = -1405.83

LATERAL FRICTION COEFFICIENTS:

B3 = 1.332 B1 =-5.856E-04 B4 = 1.714E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.008E-04 C2 =-1.255E-04 C3 =-0.287

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.372E-04 K2 =-2.698E-04 K3 = 0.179

SPRING RATE (LB/IN) : 1188.3

TABLE D-263

RUN: 32- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
707.7	-0.353	0.868	0.824	7538.7	10.86	-0.017	-0.000024
1402.2	-0.447	0.784	0.710	14885.2	11.35	-0.060	-0.000043
2096.4	-0.519	0.733	0.679	17480.6	9.38	-0.109	-0.000052

MUX PEAK COEFFICIENTS:

P0 =0.9307 P1 =-9.676E-05

P0 =0.9874 P1 =-1.927E-04 P2 = 3.431E-08

TEST PRESSURE: 35 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.272 R1 =-1.195E-04

MUX SLIDE COEFFICIENTS:

S0 =0.8841 S1 =-1.045E-04

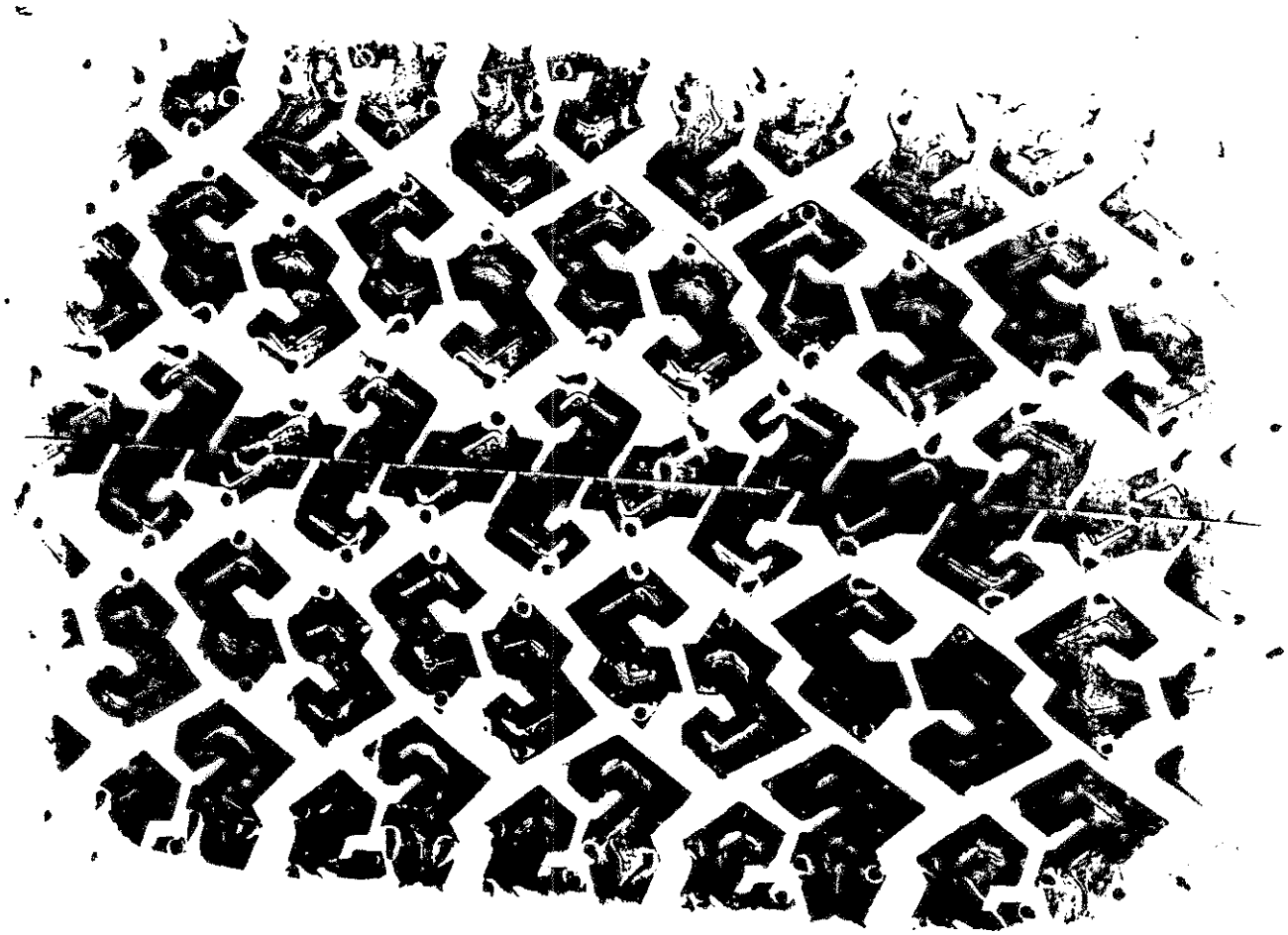
S0 =1.0263 S1 =-3.456E-04 S2 = 8.605E-08

TABLE D-264

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		30
SIZE		P195/75R14
MANUFACTURER		GOODYEAR
BRAND NAME		ARRIVA
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
4	MDKAVH0140	62	100	–	9	35	



FOOTPRINT, TIRE NO. 4

FIGURE D-23

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-265

RUN: 9- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SAPMUYPK DEG
705.1	114.4	0.162	10.9	0.015	0.095	698.6	6.3	0.009	0.5	0.001	0.078	0.055	704.3	0.99	15.6
1396.6	160.0	0.115	28.2	0.020	0.176	1398.0	14.7	0.011	1.0	0.001	0.071	0.092	1399.0	0.87	12.1
2097.1	157.6	0.075	48.9	0.023	0.309	2091.7	24.3	0.012	1.9	0.001	0.079	0.154	2102.1	0.82	19.1
2789.0	136.1	0.049	66.2	0.024	0.486	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2789.1	0.91	35.7

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS

A0 = 2344.58 A1 = 7.50 A2 = 3750.17

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.460 A4 = -4510.79

LATERAL FRICTION COEFFICIENTS:

B3 = 1.236 B1 =-4.171E-04 B4 = 1.073E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.344E-05 C2 =-2.275E-04 C3 =-0.340

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.316E-04 K2 = 2.519E-04 K3 = 0.214

SPRING RATE (LB/IN) : 1266.1

TABLE D-266

RUN: 35- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
707.4	-0.263	0.793	0.715	9825.1	14.01	-0.016	-0.000022
1401.9	-0.340	0.699	0.609	16834.2	12.76	-0.059	-0.000042
2096.5	-0.490	0.678	0.574	22200.1	11.85	-0.104	-0.000050

MUX PEAK COEFFICIENTS:

P0 =0.8399 P1 =-8.304E-05

P0 =0.9618 P1 =-2.932E-04 P2 = 7.495E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.135 R1 =-1.639E-04

MUX SLIDE COEFFICIENTS:

S0 =0.7753 S1 =-1.017E-04

S0 =0.8964 S1 =-3.088E-04 S2 = 7.386E-08

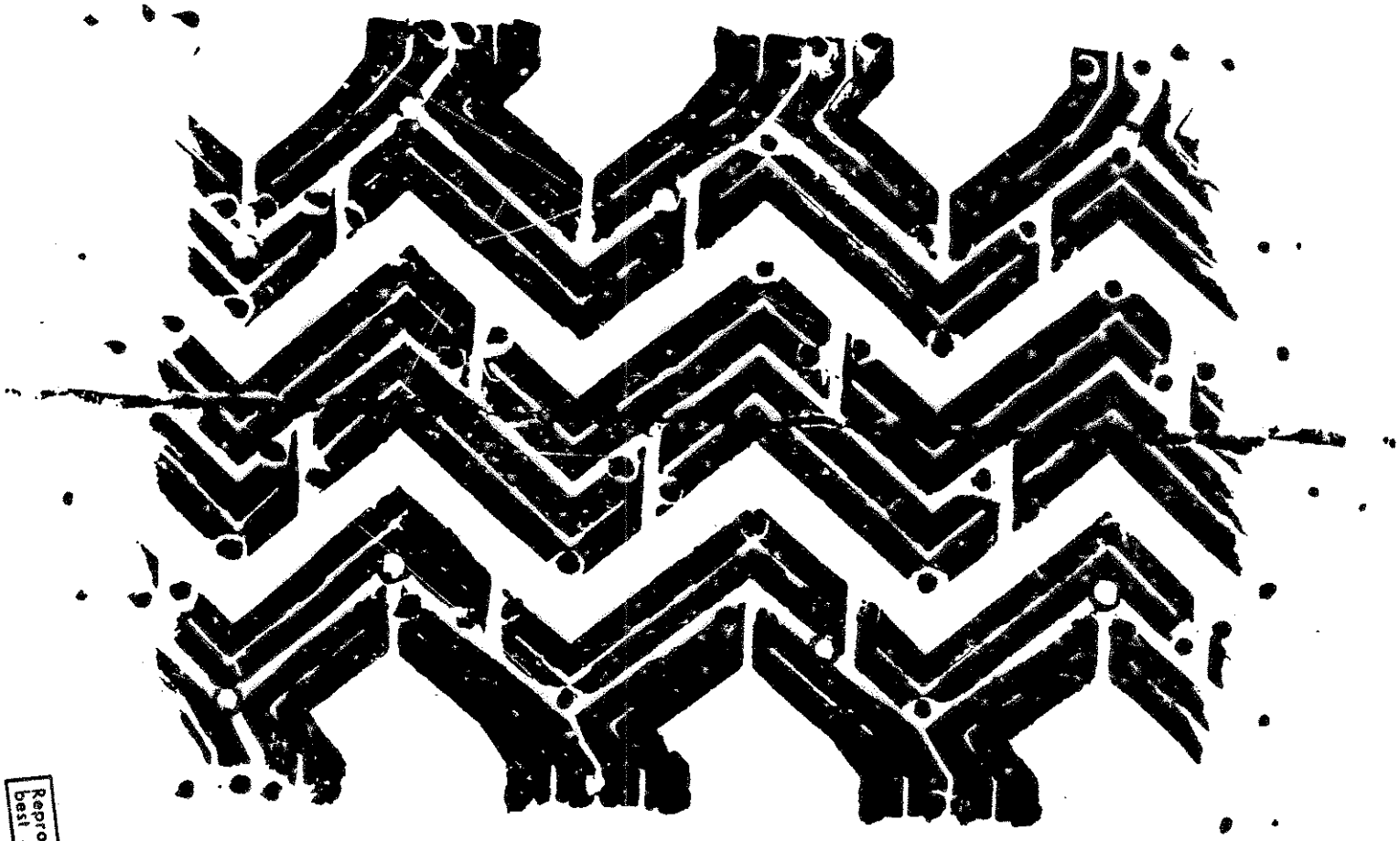
TEST PRESSURE: 35 psi
(Regulated)

TABLE D-267

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		31
SIZE		P195/75 R14
MANUFACTURER		FIRESTONE
BRAND NAME		SNOWBITER TOWN & COUNTRY
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1460
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 FIBERGLASS
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
6	VCKAXH3380	53	100	–	10	36	



FOOTPRINT, TIRE NO. 6

FIGURE D-24

Load = 1400 lbs.
Pressure = 35 psi

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TABLE D-268

RUN: 10- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
700.9	116.3	0.166	9.5	0.014	0.082	699.9	4.9	0.007	0.5	0.001	0.101	0.042	703.5	0.97	15.6
1396.9	168.5	0.121	25.7	0.018	0.153	1398.5	11.7	0.008	1.1	0.001	0.090	0.070	1399.9	0.87	17.4
2094.7	172.0	0.082	42.1	0.020	0.245	2094.9	19.3	0.009	1.6	0.001	0.081	0.112	2102.8	0.83	22.8
2787.8	155.4	0.056	56.7	0.020	0.365	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2792.1	0.86	36.3

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2060.96 A1 = 8.10 A2 = 3976.21

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.363 A4 = -4505.12

LATERAL FRICTION COEFFICIENTS:

B3 = 1.144 B1 =-2.897E-04 B4 = 6.697E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-7.960E-05 C2 =-1.553E-04 C3 =-0.324

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.739E-04 K2 =-1.866E-04 K3 = 0.135

SPRING RATE (LB/IN) : 1356.9

TABLE D-269

RUN: 36- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
705.4	-0.353	0.905	0.804	8348.7	11.81	-0.003	-0.000005
1401.1	-0.374	0.761	0.645	10741.6	9.11	-0.039	-0.000028
2098.0	-0.440	0.677	0.584	18743.7	9.73	-0.080	-0.000038

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0099 P1 =-1.632E-04

P0 =1.1117 P1 =-3.372E-04 P2 = 6.261E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.302 R1 =-6.227E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8994 S1 =-1.583E-04

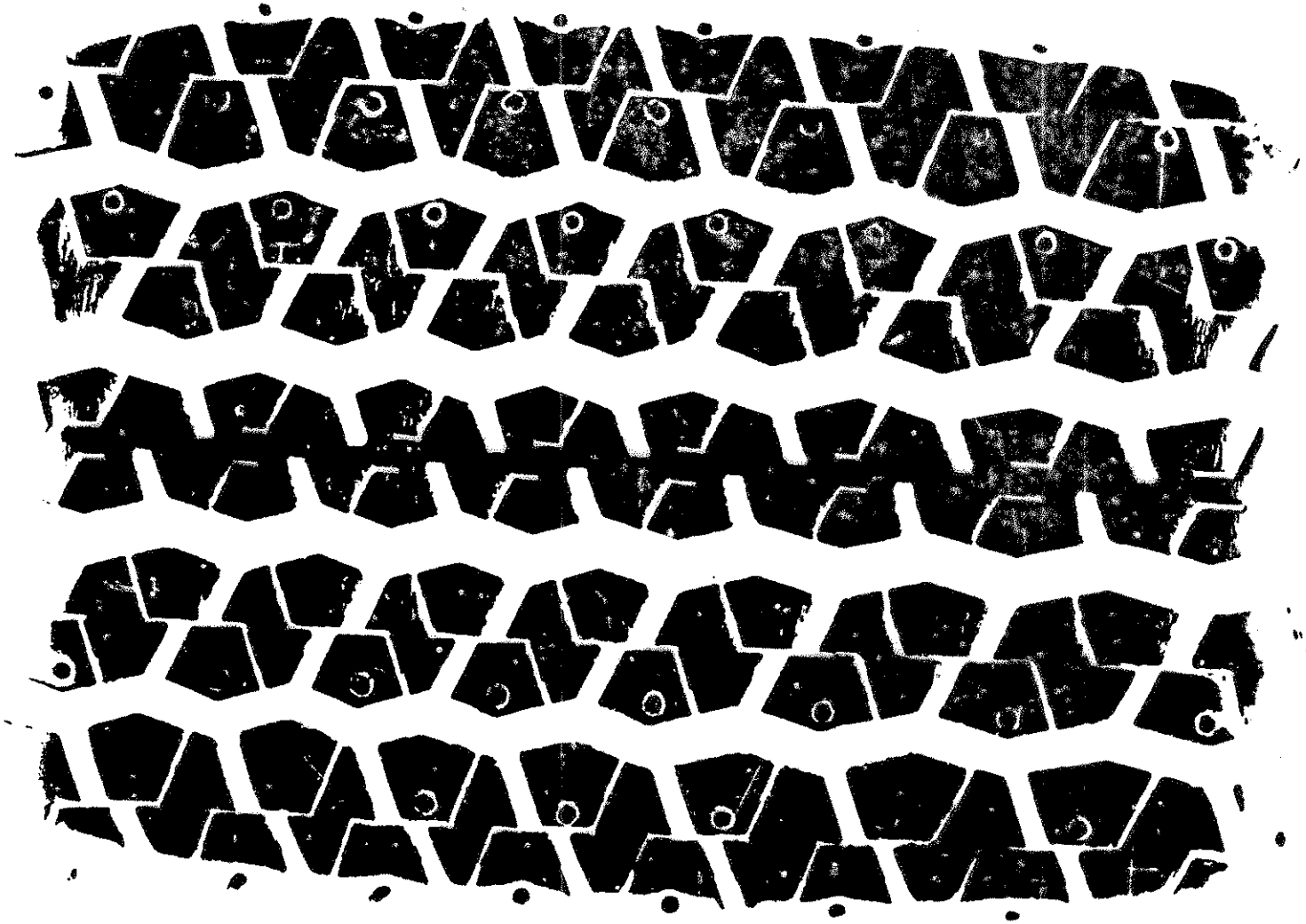
S0 =1.0662 S1 =-4.447E-04 S2 = 1.017E-07

TABLE D-270

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		32
SIZE		P225/75 R15
MANUFACTURER		FIRESTONE
BRAND NAME		721
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1474
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		6.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
10	HKHHXR6101	54	100	–	11	42	



FOOTPRINT, TIRE NO. 10

FIGURE D-25

Load = 1874 lbs.
Pressure = 35 psi

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TABLE D-271

RUN: 11- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
936.9	176.0	0.188	19.2	0.020	0.109	932.3	8.3	0.009	0.7	0.001	0.088	0.047	942.2	0.92	15.6
1861.5	230.5	0.124	49.3	0.026	0.214	1868.3	18.4	0.010	1.5	0.001	0.081	0.080	1878.5	0.88	15.6
2798.4	203.8	0.073	75.5	0.027	0.370	2803.4	30.9	0.011	3.1	0.001	0.099	0.152	2808.5	0.80	21.6
3730.0	157.4	0.042	107.6	0.029	0.683	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3734.3	0.72	31.2

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 4907.84 A1 = 7.28 A2 = 4362.57

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.439 A4 = -6397.61

LATERAL FRICTION COEFFICIENTS:

B3 = 0.953 B1 =-1.907E-05 B4 =-1.172E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.481E-05 C2 =-2.018E-04 C3 =-0.399

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.926E-04 K2 = 2.218E-04 K3 = 0.188

SPRING RATE (LB/IN) : 1370.7

TABLE D-272

RUN: 42- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
944.4	-0.203	0.896	0.779	15778.2	16.98	-0.019	-0.000021
1872.7	-0.128	0.864	0.652	21323.5	12.18	-0.066	-0.000035
2800.6	-0.174	0.780	0.627	14744.9	5.97	-0.115	-0.000041

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9637 P1 =-6.264E-05

P0 =0.8736 P1 = 5.234E-05 P2 =-3.061E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.197 R1 = 1.532E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8388 S1 =-8.183E-05

S0 =1.0112 S1 =-3.031E-04 S2 = 5.903E-08

TABLE D-273

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		33
SIZE		P225/75R15
MANUFACTURER		GOODYEAR
BRAND NAME		CUSTOM POLYSTEEL
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1874
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		6.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
9	MKHHDH0071	57	100	-	12	43	

FOOTPRINT, TIRE NO. 9

FIGURE D-26

Load = 1874 lbs.
Pressure = 35 psi

Reproduced from best available copy.

TABLE D-274

RUN: 12- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
940.3	188.7	0.201	21.6	0.023	0.114	934 1	8.4	0.009	0.7	0.001	0.086	0.045	940.4	0.95	13.9
1865.2	217.6	0.117	51.2	0.027	0.235	1869.7	20.3	0.011	1.6	0.001	0.077	0.093	1875.3	0.86	14.7
2801.2	180.4	0.064	77.7	0.028	0.431	2805.8	33.1	0.012	3.0	0.001	0.091	0.183	2807.4	0.80	21.7
3723.2	135.0	0.036	105.6	0.028	0.783	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3732.9	0.68	30.8

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 7782.79 A1 = 4.56 A2 = 3675.28

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.480 A4 = -6723.78

LATERAL FRICTION COEFFICIENTS:

B3 = 0.996 B1 =-4.644E-05 B4 =-1.006E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.262E-05 C2 =-1.697E-04 C3 =-0.368

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.175E-04 K2 =-2.542E-04 K3 = 0.224

SPRING RATE (LB/IN) : 1325.8

TABLE D-275

RUN: 43- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
944.9	-0.124	0.919	0.744	14372.0	15.45	-0.020	-0.000021
1872.8	-0.102	0.843	0.600	15540.2	9.04	-0.073	-0.000039
2803.5	-0.112	0.800	0.538	17293.2	7.00	-0.120	-0.000043

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9739 P1 =-6.409E-05

P0 =1.0302 P1 =-1.359E-04 P2 = 1.914E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.125 R1 = 6.531E-06

MUX SLIDE COEFFICIENTS:

S0 =0.8347 S1 =-1.106E-04

S0 =0.9748 S1 =-2.896E-04 S2 = 4.766E-08

TABLE D-276

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		34
SIZE		P155/80R13
MANUFACTURER		GOODYEAR
BRAND NAME		POLYSTEEL RADIAL
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		959
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	1 POLYESTER + 2 STEEL
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
1	MKE4EH0299	65	100	–	16	47	

FOOTPRINT, TIRE NO. 1

FIGURE D-27

Load = 959 lbs.
Pressure = 35 psi

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TABLE D-277

RUN: 16- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
477.5	81.5	0.171	6.4	0.013	0.079	472.1	4.4	0.009	0.3	0.001	0.075	0.054	481.4	1.02	16.5
959.0	113.3	0.118	17.5	0.018	0.154	950.4	10.5	0.011	0.7	0.001	0.070	0.093	962.8	0.96	16.5
1432.7	113.3	0.079	31.3	0.022	0.277	1441.7	17.4	0.012	1.2	0.001	0.071	0.154	1440.4	0.86	19.1
1915.3	97.8	0.051	43.9	0.023	0.449	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1918.2	0.78	26.7

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 1744.49 A1 = 7.63 A2 = 2591.46

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.493 A4 = -3692.61

LATERAL FRICTION COEFFICIENTS:

B3 = 1.076 B1 =-1.056E-04 B4 =-2.603E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.393E-05 C2 =-1.973E-04 C3 =-0.311

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.797E-04 K2 =-3.012E-04 K3 = 0.168

SPRING RATE (LB/IN) : 1099.0

TABLE D-278

RUN: 47- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
481.2	-0.223	0.971	0.878	8781.9	18.18	-0.012	-0.000024
958.6	-0.172	0.930	0.743	20167.1	21.94	-0.045	-0.000047
1436.2	-0.151	0.916	0.704	19636.9	14.92	-0.083	-0.000058

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9933 P1 =-5.685E-05

P0 =1.0405 P1 =-1.741E-04 P2 = 6.119E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.254 R1 = 7.524E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9494 S1 =-1.819E-04

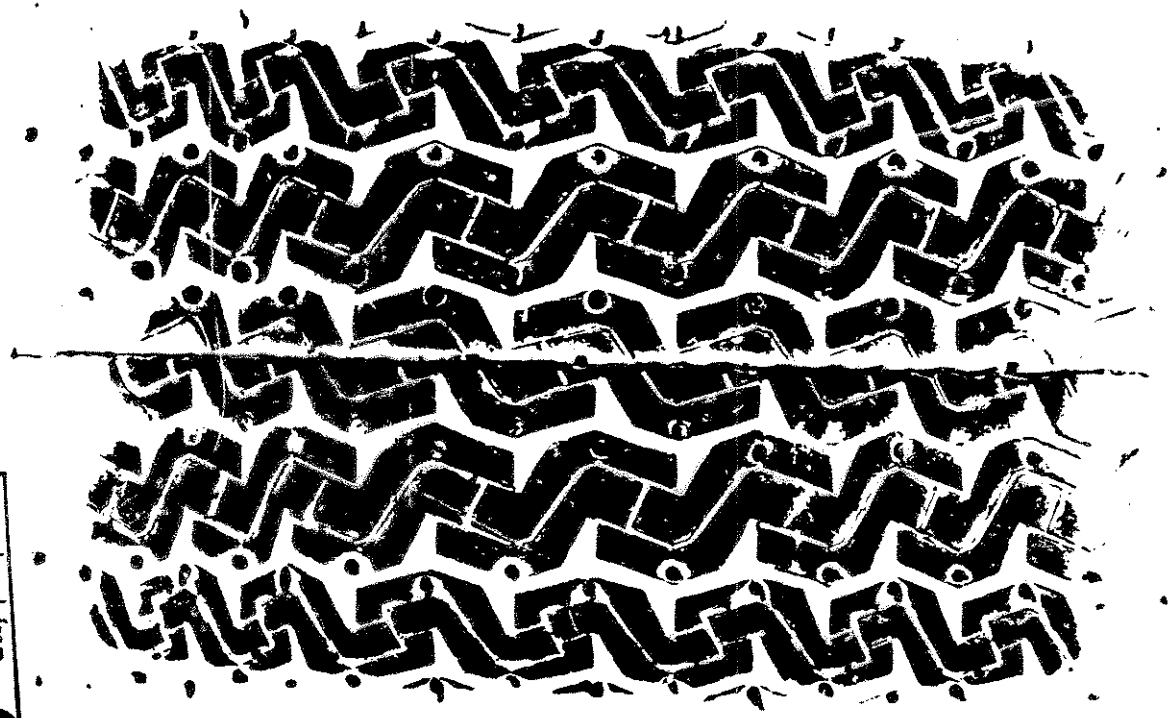
S0 =1.1118 S1 =-5.884E-04 S2 = 2.116E-07

TABLE D-279

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		3.5"
SIZE		155SR13
MANUFACTURER		KELLY SPRINGFIELD
BRAND NAME		SPORT MARK GP RADIAL
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		950
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	1 POLYESTER + 2 FIBERGLASS
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
3	PKE5KAN339	61	100	-	17	50	



FOOTPRINT, TIRE NO. 3

FIGURE D-28

Load = 950 lbs.
Pressure = 32 psi

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TABLE D-280

RUN: 17- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
472.7	71.6	0.152	6.8	0.014	0.095	471.5	4.5	0.010	0.3	0.001	0.074	0.063	477.4	1.01	13.9
942.0	88.5	0.094	17.9	0.019	0.202	947.4	11.2	0.012	0.7	0.001	0.067	0.126	949.5	0.87	13.8
1421.8	86.2	0.061	30.8	0.022	0.357	1428.2	17.5	0.012	1.2	0.001	0.068	0.203	1427.5	0.84	22.7
1896.2	70.9	0.037	40.2	0.021	0.567	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1884.1	0.04	10.6

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2305.15 A1 = 4.82 A2 = 2341.45

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.560 A4 = -5257.60

LATERAL FRICTION COEFFICIENTS:

B3 = 0.579 B1 = 1.166E-03 B4 = -7.561E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 = -1.183E-04 C2 = -1.499E-04 C3 = -0.247

ALIGNING TORQUE COEFFICIENTS:

K1 = -3.482E-04 K2 = 4.057E-04 K3 = 0.195

SPRING RATE (LB/IN) : 943.7

TABLE D-281

RUN: 50- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
478.2	-0.249	1.061	0.904	7344.6	15.60	-0.013	-0.000027
951.4	-0.197	0.993	0.743	15901.0	17.62	-0.053	-0.000056
1423.0	-0.176	0.953	0.729	20844.9	16.21	-0.095	-0.000067

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.1114 P1 =-1.146E-04

P0 =1.1561 P1 =-2.276E-04 P2 = 5.969E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.281 R1 = 7.778E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9679 S1 =-1.850E-04

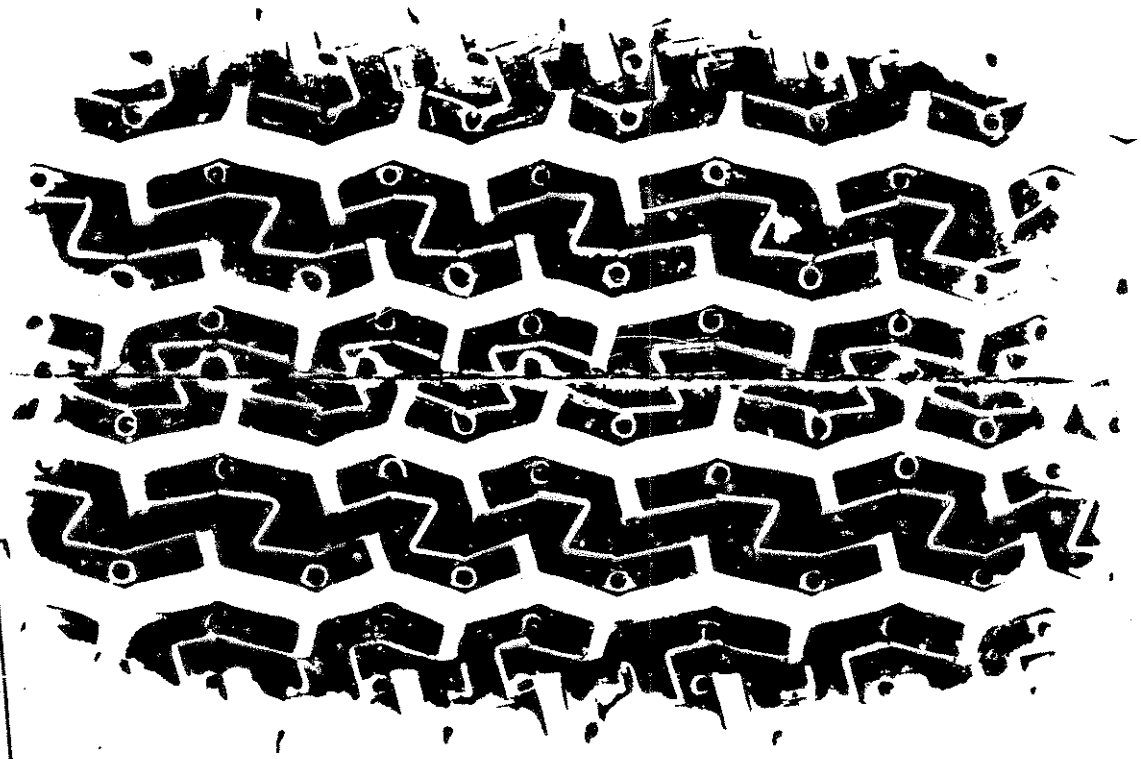
S0 =1.2144 S1 =-8.079E-04 S2 = 3.269E-07

TABLE D-282

TIRE AND RUN IDENTIFICATION

TIRE TIRE TYPE		36
SIZE		P155/80 R13
MANUFACTURER		COOPER
BRAND NAME		GLAS BELT
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		959
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 FIBERGLASS + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
13	UPE4CBN450	57	100	–	18	48	



FOOTPRINT, TIRE NO. 13

FIGURE D-29

Load = 959 lbs.
Pressure = 35 psi

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TABLE D-283

RUN: 18- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
481.5	68.6	0.142	5.6	0.012	0.082	476.5	4.2	0.009	0.4	0.001	0.095	0.061	479.0	0.97	17.4
961.7	94.5	0.098	15.5	0.016	0.164	955.3	10.3	0.011	0.9	0.001	0.087	0.109	957.9	0.89	18.3
1433.6	91.5	0.064	24.4	0.017	0.267	1440.1	16.9	0.012	1.4	0.001	0.083	0.185	1438.8	0.83	23.6
1911.9	85.6	0.045	34.0	0.018	0.396	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1916.5	1.13	54.0

CORNERING STIFFNESS COEFFICIENTS:

A0 = 1886.18 A1 = 5.37 A2 = 2685.01

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.467 A4 = -3192.47

LATERAL FRICTION COEFFICIENTS:

B3 = 1.319 B1 =-8.939E-04 B4 = 4.101E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.998E-05 C2 =-1.456E-04 C3 =-0.264

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.506E-04 K2 =-2.759E-04 K3 = 0.137

SPRING RATE (LB/IN) : 1081.2

TABLE D-284

RUN: 48- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
478.4	-0.265	0.972	0.855	8197.3	16.86	-0.007	-0.000015
958.4	-0.220	0.915	0.754	9937.1	10.91	-0.039	-0.000041
1435.5	-0.201	0.873	0.713	16367.2	12.40	-0.076	-0.000053

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0192 P1 =-1.032E-04

P0 =1.0429 P1 =-1.625E-04 P2 = 3.142E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.292 R1 = 6.653E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9159 S1 =-1.483E-04

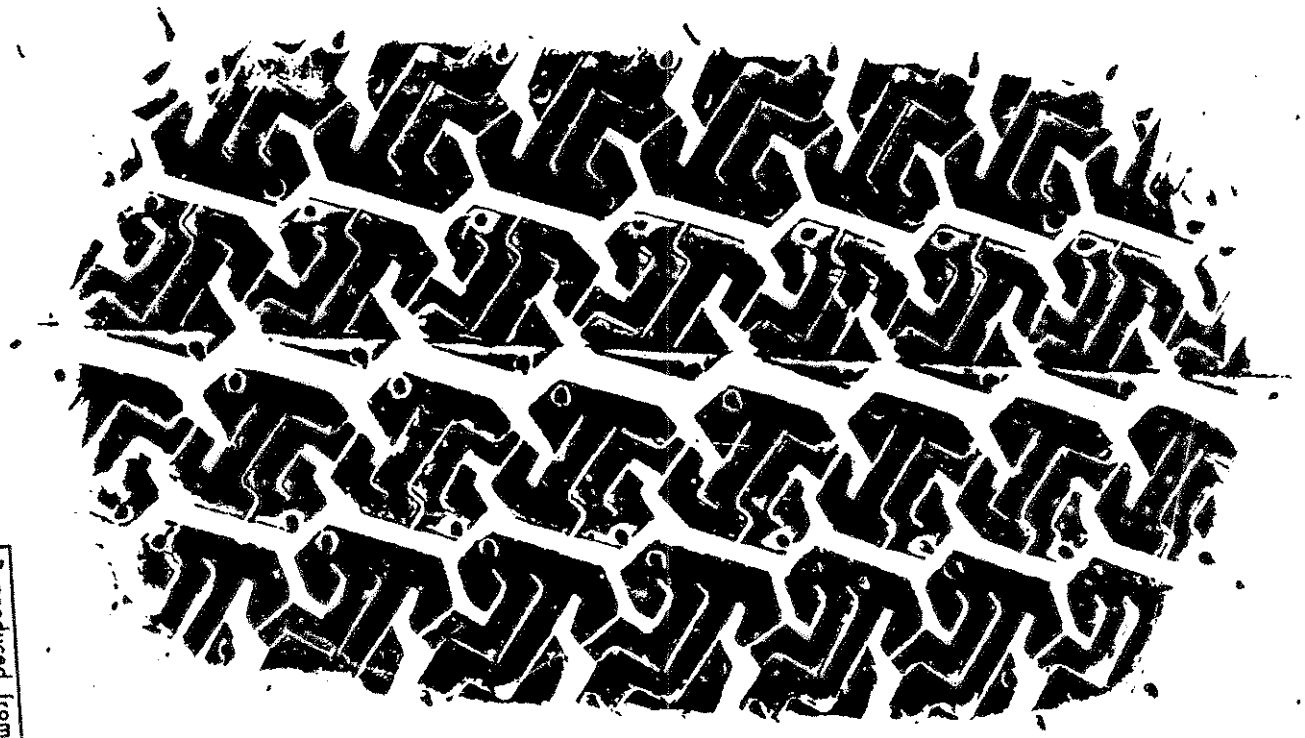
S0 =1.0133 S1 =-3.926E-04 S2 = 1.279E-07

TABLE D-285

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		37
SIZE		165 SR 13
MANUFACTURER		BRIDGESTONE
BRAND NAME		RD 108
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1010
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 STEEL + 1 POLYESTER
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
16	EJE9JBD410	65	100	-	20	51	



FOOTPRINT, TIRE NO. 16

FIGURE D-30

Load = 1010 lbs.
Pressure = 32 psi

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TABLE D-286

RUN: 20- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
505.3	109.4	0.217	8.9	0.018	0.081	501.1	4.5	0.009	0.4	0.001	0.085	0.041	504.1	1.02	10.3
1007.5	145.5	0.144	23.8	0.024	0.164	1005.4	10.7	0.011	0.7	0.001	0.065	0.073	1013.8	0.92	11.2
1511.6	138.9	0.092	39.7	0.026	0.286	1517.9	16.6	0.011	1.1	0.001	0.066	0.115	1515.5	0.92	21.7
2016.8	109.9	0.054	54.5	0.027	0.496	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2014.6	0.97	41.4

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2613.39 A1 = 9.21 A2 = 2506.33

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.523 A4 = -7225.87

LATERAL FRICTION COEFFICIENTS:

B3 = 1.187 B1 =-4.093E-04 B4 = 1.506E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.002E-04 C2 =-2.093E-04 C3 =-0.256

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.918E-04 K2 =-3.005E-04 K3 = 0.186

SPRING RATE (LB/IN) : 1000.6

TABLE D-287

RUN: 51- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
503.2	-0.241	0.941	0.806	12063.6	24.00	-0.014	-0.000029
1006.8	-0.192	0.945	0.733	20757.7	21.94	-0.056	-0.000056
1509.8	-0.172	0.956	0.737	35144.3	25.81	-0.099	-0.000066

MUX PEAK COEFFICIENTS:

P0 =0.9320 P1 = 1.502E-05

P0 =0.9446 P1 =-1.348E-05 P2 = 1.387E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.271 R1 = 6.918E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8276 S1 =-6.854E-05

S0 =0.9547 S1 =-3.696E-04 S2 = 1.492E-07

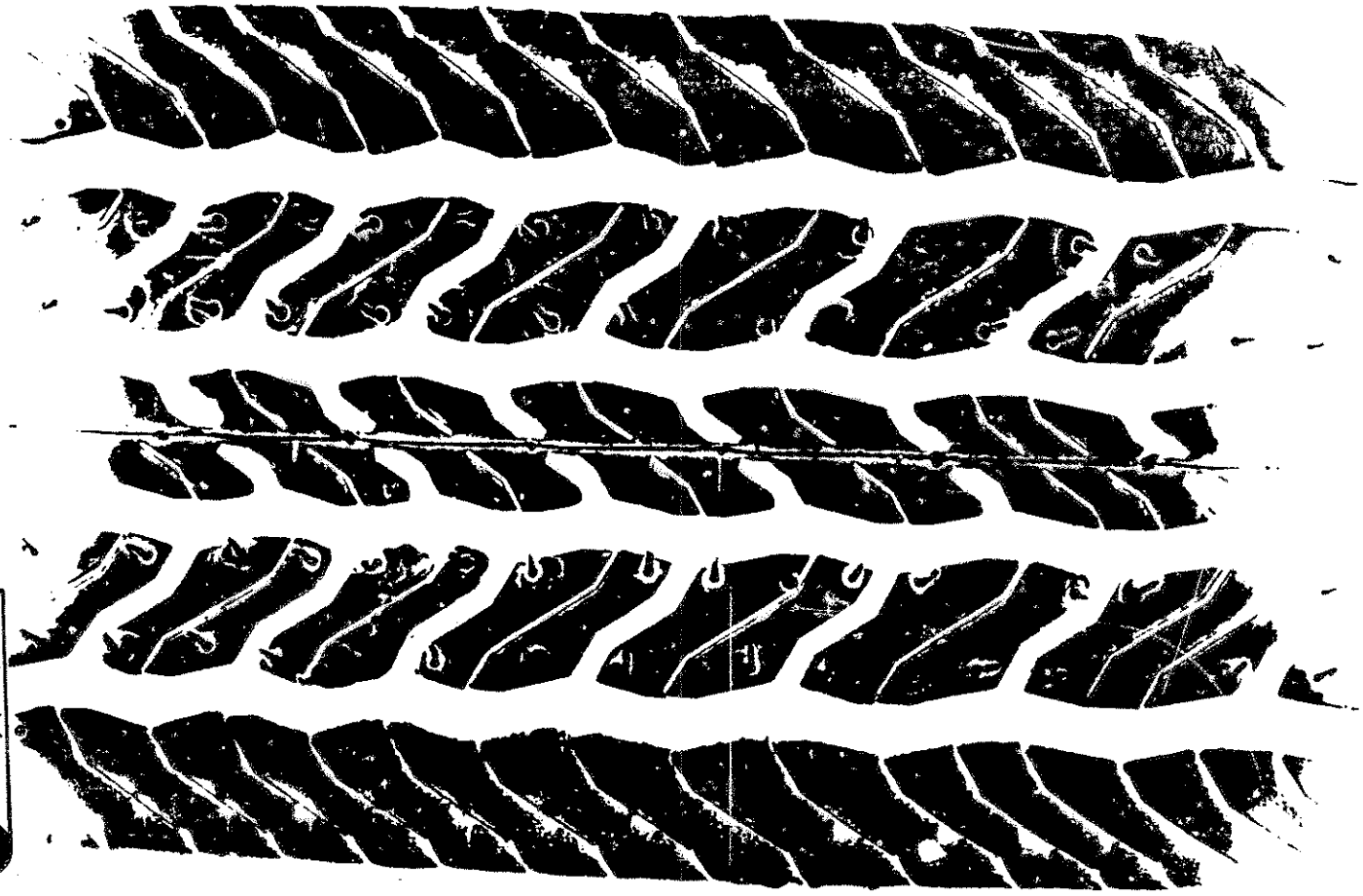
TEST PRESSURE: 32 psi
(Regulated)

TABLE D-288

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		3A
SIZE		P205/75R14
MANUFACTURER		UNIROYAL
BRAND NAME		STEEL BELTED
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1532
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	1 POLYESTER + 2 STEEL
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
19	APKCDH320	58	100	—	22	40	



FOOTPRINT, TIRE NO. 19

FIGURE D-31

Load = 1532 lbs.
Pressure = 35 psi

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TABLE D-289

RUN: 22- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
762.6	125.2	0.164	14.0	0.018	0.112	764.3	4.2	0.006	0.5	0.001	0.108	0.034	766.7	0.92	15.6
1532.7	163.9	0.107	34.2	0.022	0.209	1531.1	11.3	0.007	1.0	0.001	0.092	0.069	1532.6	0.89	17.4
2297.7	144.3	0.063	53.6	0.023	0.371	2294.4	21.5	0.009	2.3	0.001	0.107	0.149	2295.6	0.89	26.8
3052.2	115.8	0.038	76.5	0.025	0.661	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3051.7	0.73	35.5

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3711.47 A1 = 5.98 A2 = 3601.48

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.198 A4 = -1342.75

LATERAL FRICTION COEFFICIENTS:

B3 = 0.852 B1 = 1.218E-04 B4 =-5.186E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.240E-05 C2 =-2.122E-04 C3 =-0.336

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.176E-04 K2 =-2.457E-04 K3 = 0.178

SPRING RATE (LB/IN) : 1197.8

TABLE D-290

RUN: 40- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
774.6	-0.166	0.922	0.735	13543.4	17.80	-0 017	-0.000022
1532.5	-0.153	0.858	0.642	16082.4	11.16	-0.065	-0.000043
2294.0	-0.130	0.848	0.616	25795.5	12.66	-0.115	-0.000050

MUX PEAK COEFFICIENTS:

P0 =0.9515 P1 =-4.918E-05

P0 =1.0426 P1 =-1.913E-04 P2 = 4.637E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.186 R1 = 2.393E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7841 S1 =-7.830E-05

S0 =0.8998 S1 =-2.578E-04 S2 = 5.843E-08

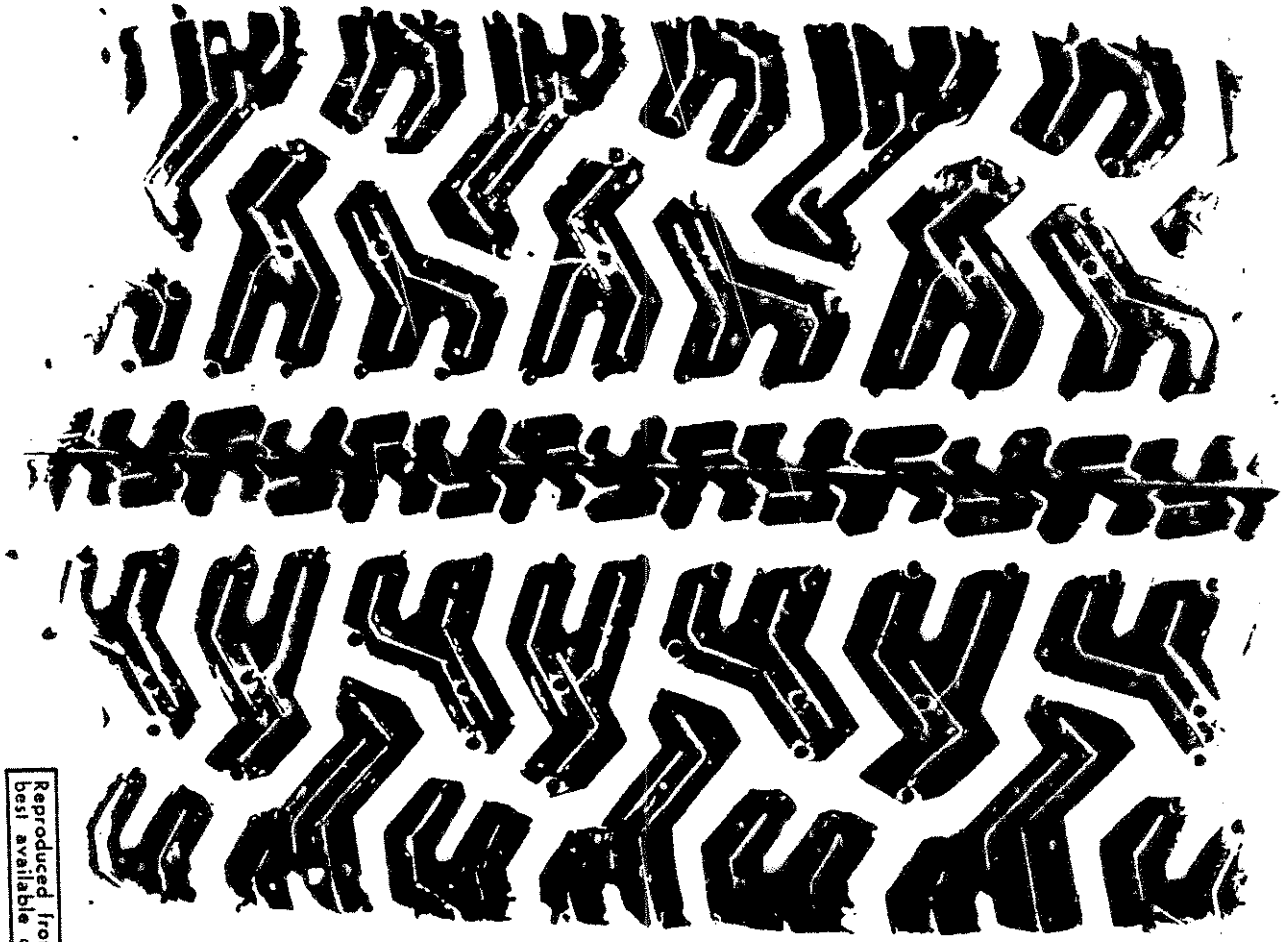
TEST PRESSURE: 35 psi
(Regulated)

TABLE D-291

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		39
SIZE		P195/75 R14
MANUFACTURER (DISTRIBUTOR)		SEARS
BRAND NAME		WEATHER WISE
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	2 STEEL BELTS + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
29	CEKAZA1091	55	100	—	26	39	



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FOOTPRINT, TIRE NO. 29

FIGURE D-32

Load = 1400 lbs.
Pressure = 35 psi

TABLE D-292

RUN: 26- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
706.4	125.3	0.177	11.2	0.016	0.090	698.4	6.7	0.010	0.7	0.001	0.098	0.054	706.6	0.98	16.5
1401.0	173.8	0.124	29.1	0.021	0.167	1398.8	15.4	0.011	1.3	0.001	0.084	0.089	1403.1	0.90	16.4
2100.1	167.0	0.080	48.8	0.023	0.292	2097.6	25.0	0.012	2.0	0.001	0.080	0.150	2101.0	0.83	21.1
2787.3	141.7	0.051	67.3	0.024	0.475	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2794.9	0.92	39.6

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2692.30 A1 = 8.04 A2 = 3651.97

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.510 A4 = -6099.77

LATERAL FRICTION COEFFICIENTS:

B3 = 1.180 B1 =-3.306E-04 B4 = 8.388E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-7.805E-05 C2 =-2.163E-04 C3 =-0.367

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.017E-04 K2 =-2.201E-04 K3 = 0.154

SPRING RATE (LB/IN) : 1305.1

TABLE D-293

RUN: 39- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
708.0	-0.455	0.872	0.815	6691.1	9.55	-0.014	-0.000020
1401.2	-0.446	0.790	0.748	0.0	0.0	-0.055	-0.000039
2098.0	-0.503	0.729	0.669	18498.1	9.77	-0.096	-0.000046

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9411 P1 =-1.028E-04

P0 =0.9767 P1 =-1.629E-04 P2 = 2.111E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.420 R1 =-3.475E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8909 S1 =-1.048E-04

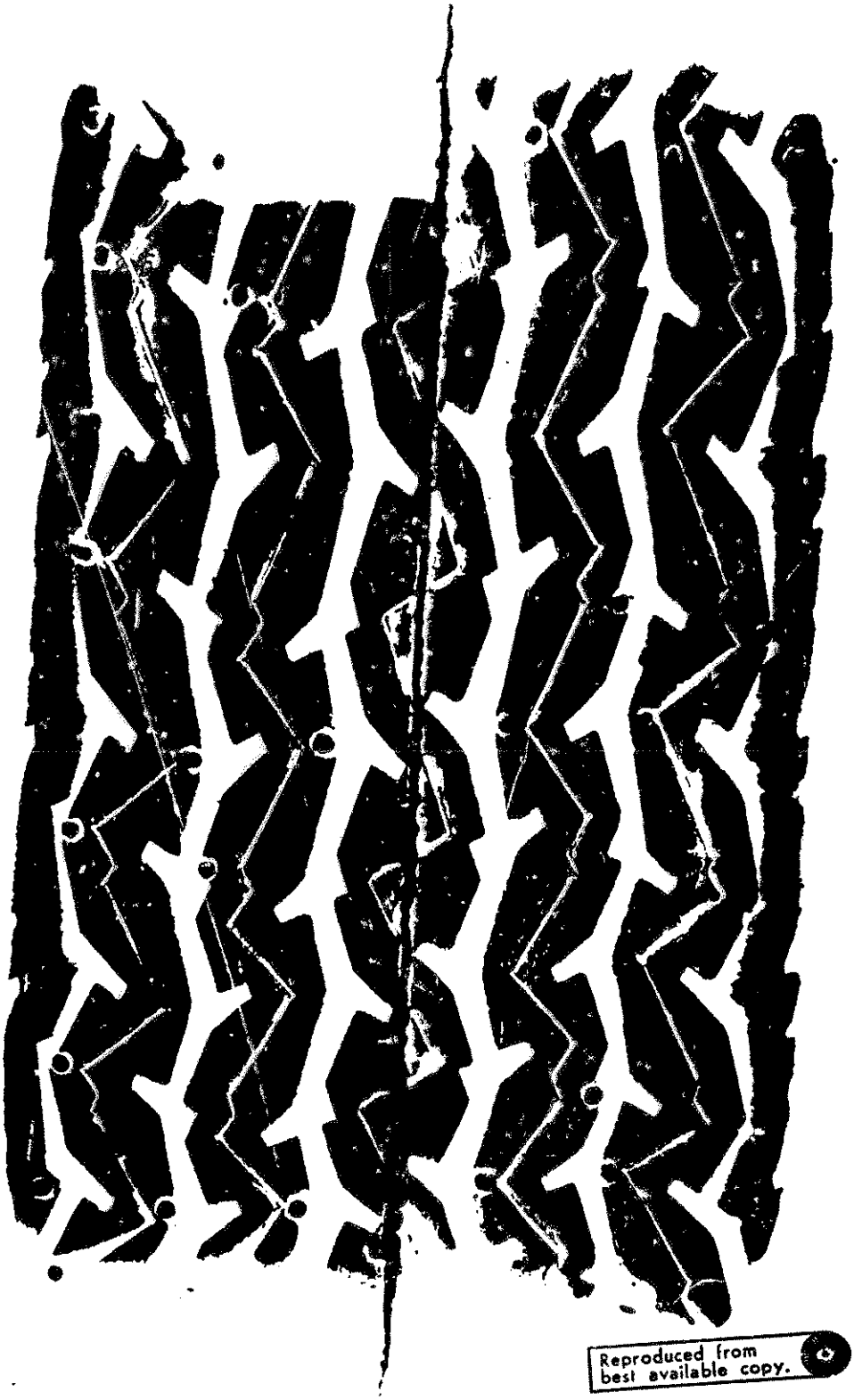
S0 =0.8683 S1 =-6.692E-05 S2 =-1.353E-08

TABLE D-294

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		40
SIZE		FR 78-14
MANUFACTURER (DISTRIBUTOR)		SEARS
BRAND NAME		SUPER GUARD
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1500
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL BT.
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
26	CKLB12C500	59	100	–	53	62	



Load = 1500 lbs.
Pressure = 32 psi

FOOTPRINT, TIRE NO. 26
FIGURE D-33

Reproduced from best available copy.

TABLE D-295

RUN: 53- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
741.6	159.5	0.215	18.5	0.025	0.116	736.2	7.3	0.010	0.7	0.001	0.092	0.046	747.3	0.94	12.1
1488.4	195.7	0.131	43.7	0.029	0.223	1485.7	16.3	0.011	1.4	0.001	0.084	0.083	1493.7	0.81	13.9
2236.9	161.4	0.072	64.8	0.029	0.401	2234.8	25.6	0.011	2.1	0.001	0.083	0.159	2241.1	0.74	19.2
2974.1	129.5	0.044	77.7	0.026	0.600	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2976.3	1.08	53.9

CORNERING STIFFNESS COEFFICIENTS:

A0 = 6145.23 A1 = 5.62 A2 = 3174.26

TEST PRESSURE: 32 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.553 A4 =-11569.05

LATERAL FRICTION COEFFICIENTS:

B3 = 1.392 B1 =-7.364E-04 B4 = 2.098E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-9.449E-05 C2 =-2.400E-04 C3 =-0.385

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.279E-04 K2 = 2.851E-04 K3 = 0.151

SPRING RATE (LB/IN) : 1238.3

TABLE D-296

RUN: 62- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
741.6	-0.161	0.989	0.753	20353.5	28.22	-0.017	-0.000022
1486.8	-0.125	0.937	0.635	16382.7	11.71	-0.061	-0.000041
2235.5	-0.131	0.906	0.606	28373.4	14.23	-0.107	-0.000048

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0589 P1 =-9.547E-05

P0 =1.0295 P1 =-4.843E-05 P2 =-1.582E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.162 R1 = 2.272E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8082 S1 =-1.063E-04

S0 =0.9344 S1 =-3.096E-04 S2 = 6.857E-08

TABLE D-297

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		41
SIZE		FR 78-14
MANUFACTURER		MANSFIELD
BRAND NAME		KEVLAR MDG
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1500
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 ARAMID + 2 NYLON
	SIDEWALL	2 NYLON
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
30	LVL8IN64517	65	100	–	54	63	

Load = 1500 lbs.
Pressure = 32 psi

FOOTPRINT, TIRE NO. 30
FIGURE D-34

Reproduced from best available copy.

TABLE D-298

RUN: 54- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
737.3	139.5	0.189	15.5	0.021	0.111	737.8	5.8	0.008	0.8	0.001	0.132	0.042	745.8	0.90	18.2
1483.6	168.7	0.114	39.4	0.027	0.233	1490.4	16.6	0.011	1.8	0.001	0.109	0.099	1492.9	0.85	18.2
2232.7	143.3	0.064	57.6	0.026	0.402	2243.9	28.1	0.013	3.2	0.001	0.114	0.196	2244.2	0.80	24.2
2978.2	112.5	0.038	78.7	0.026	0.700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2984.9	0.83	42.6

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 5346.07 A1 = 4.92 A2 = 3185.48

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.418 A4 = -3019.39

LATERAL FRICTION COEFFICIENTS:

B3 = 1.022 B1 =-1.793E-04 B4 = 3.824E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.072E-04 C2 =-2.264E-04 C3 =-0.350

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.408E-04 K2 =-2.937E-04 K3 = 0.195

SPRING RATE (LB/IN) : 1141.9

TABLE D-299

RUN: 63- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SI PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
742.8	-0.155	0.985	0.742	0.0	0.0	-0.020	-0.000027
1488.9	-0.107	0.923	0.625	25753.9	18.51	-0.065	-0.000044
2236.5	-0.121	0.842	0.583	28339.2	14.33	-0.115	-0.000052

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.8792 P1 =-3.429E-05

P0 =0.8919 P1 =-5.824E-05 P2 = 8.720E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.207 R1 = 3.593E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8071 S1 =-7.249E-05

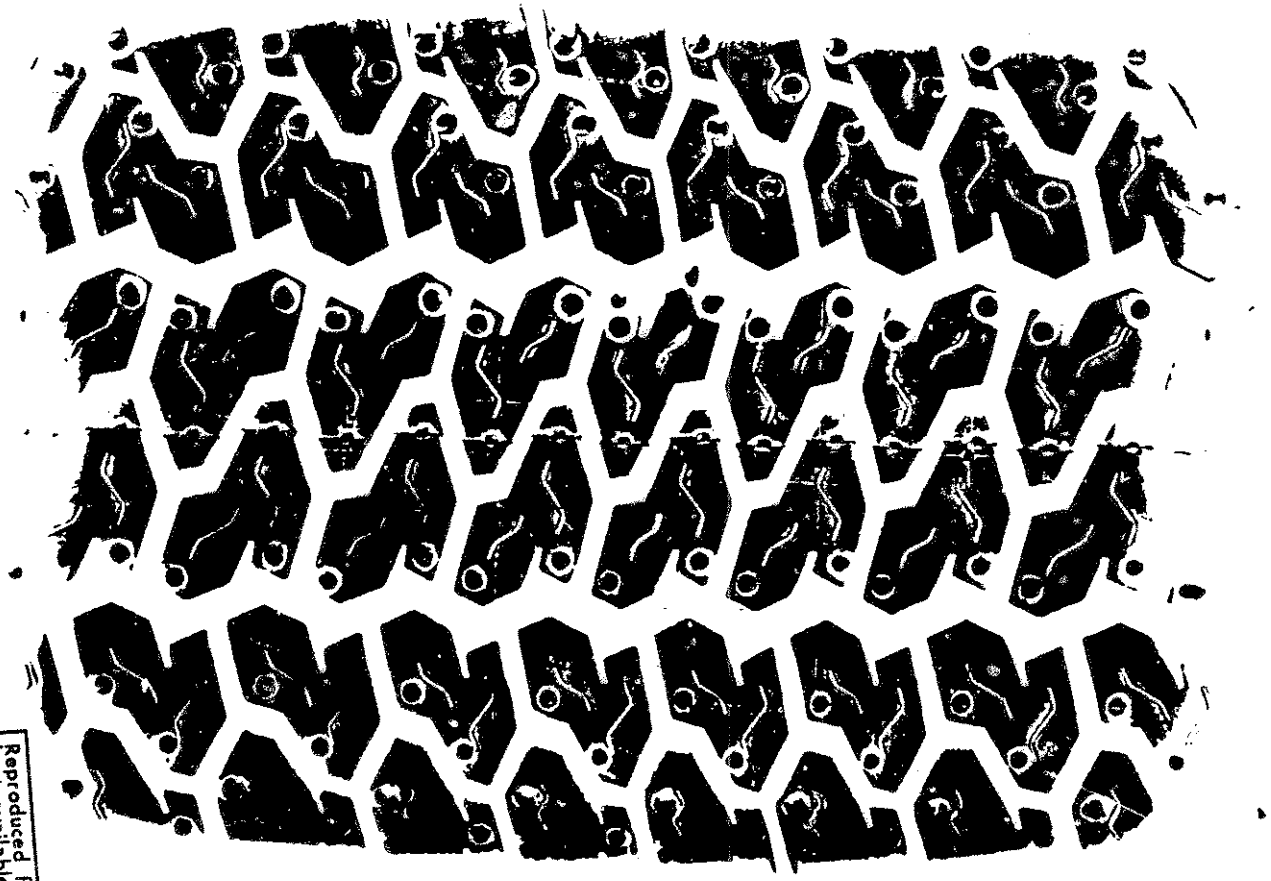
S0 =0.6176 S1 = 2.776E-04 S2 =-1.344E-07

TABLE D-300

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		42
SIZE		P195/70 SR 14
MANUFACTURER (DISTRIBUTOR)		STRATTON
BRAND NAME		SPORT RADIAL 70
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1280
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
39	BFJ9R1P121	58	100	—	55	64	



FOOTPRINT, TIRE NO. 39

FIGURE D-35

Load = 1312 lbs.
Pressure = 35 psi

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TABLE D-301

RUN: 55- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	MA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
643.0	133.3	0.207	12.0	0.019	0.090	642.2	6.1	0.010	0.5	0.001	0.081	0.046	649.9	0.98	12.1
1301.9	185.9	0.143	34.2	0.026	0.184	1296.5	13.9	0.011	1.0	0.001	0.071	0.075	1308.2	0.89	14.8
1953.9	170.0	0.087	52.4	0.027	0.308	1956.3	21.4	0.011	1.4	0.001	0.067	0.126	1960.6	0.80	18.2
2605.4	137.6	0.053	65.8	0.025	0.478	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2611.4	1.11	46.4

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3031.90 A1 = 3.22 A2 = 3237.93

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.558 A4 =-14616.71

LATERAL FRICTION COEFFICIENTS:

B3 = 1.363 B1 =-7.195E-04 B4 = 2.356E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.788E-05 C2 =-2.354E-04 C3 =-0.393

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.134E-04 K2 = 2.382E-04 K3 = 0.128

SPRING RATE (LB/IN) : 1143.6

TABLE D-302

RUN: 64- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
650.4	-0.192	0.858	0.741	11518.6	18.06	-0.017	-0.000025
1300.6	-0.145	0.832	0.751	18328.2	14.96	-0.056	-0.000043
1955.0	-0.145	0.813	0.646	17763.5	10.14	-0.100	-0.000051

TEST PRESSURE: 35 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.0757 P1 =-1.609E-04

P0 =1.1443 P1 =-2.791E-04 P2 = 4.214E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.268 R1 = 5.562E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9394 S1 =-1.972E-04

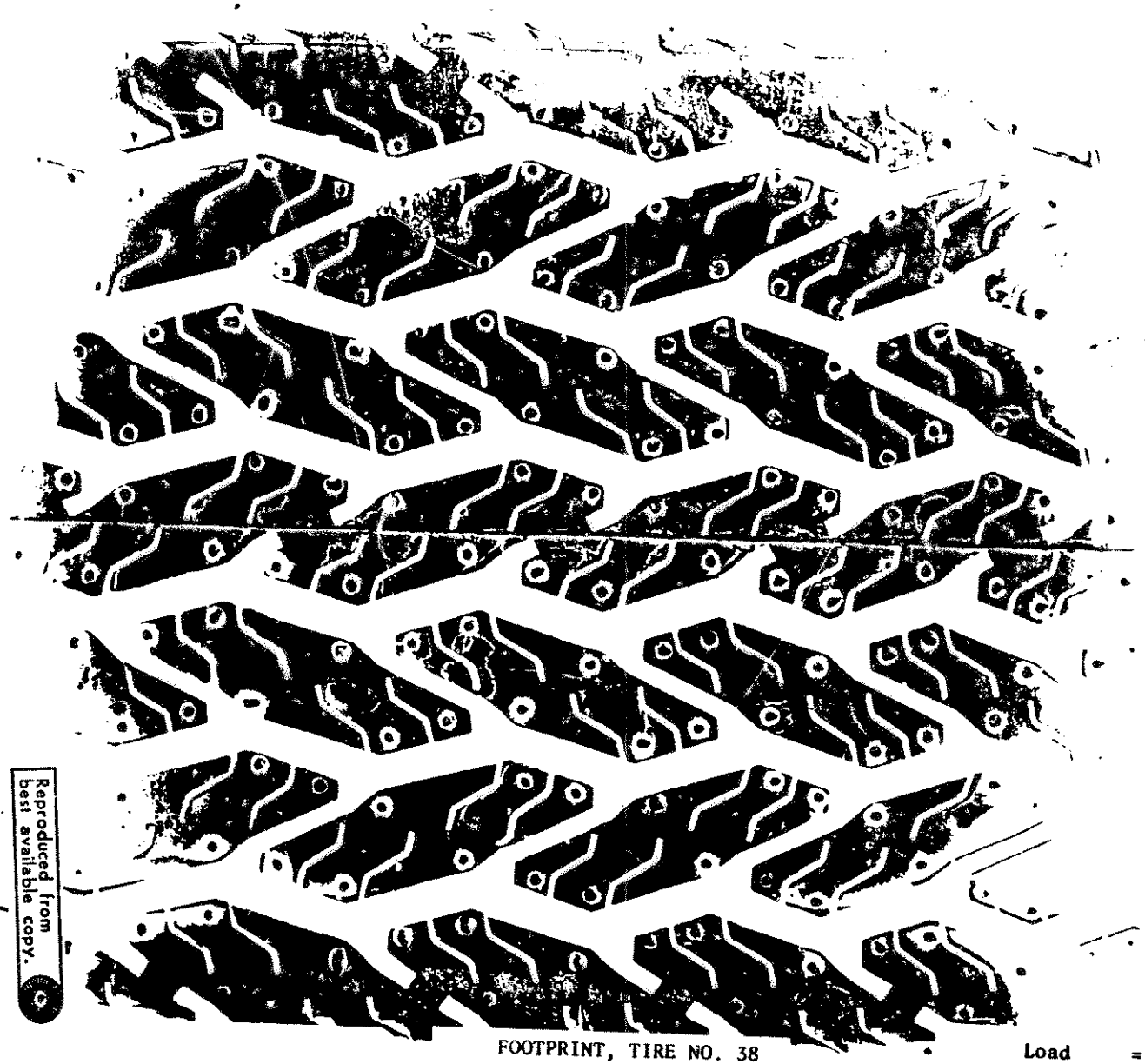
S0 =1.1113 S1 =-4.959E-04 S2 = 1.077E-07

TABLE D-303

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		43
SIZE		GR60-14
MANUFACTURER (DISTRIBUTOR)		EMPCO
BRAND NAME		POWER CAT RADIAL 60
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1620
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 STEEL + 2 POLYESTER
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		7.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
38	A3KXWVE518	61	100	—	56	66	



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FOOTPRINT, TIRE NO. 38

FIGURE D-36

Load = 1620 lbs.
Pressure = 32 psi

TABLE D-304

RUN: 56- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
797.3	147.5	0.185	14.6	0.018	0.099	791.9	9.2	0.012	1.0	0.001	0.113	0.062	800.6	0.98	13.8
1606.8	219.0	0.136	37.9	0.024	0.173	1603.2	21.0	0.013	2.3	0.001	0.111	0.096	1613.3	0.97	12.1
7.2	1.0	0.138	-0.4	-0.055	-0.396	2410.2	32.5	0.013	3.8	0.002	0.117	32.623	7.3	0.52	11.2
3216.0	251.7	0.078	92.8	0.029	0.369	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3227.9	0.72	17.5

CORNERING STIFFNESS COEFFICIENTS:

A0 = 174.52 A1 = 11.47 A2 = 5223.71

TEST PRESSURE: 32 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.663 A4 =-13828.48

LATERAL FRICTION COEFFICIENTS:

B3 = 0.569 B1 = 4.578E-04 B4 =-1.286E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 = 2.288E-04 C2 =-2.921E-04 C3 =-0.568

ALIGNING TORQUE COEFFICIENTS:

K1 =-5.478E-04 K2 =-4.324E-03 K3 = 0.232

SPRING RATE (LB/IN) : 1268.9

TABLE D-305

RUN: 66- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
801.2	-0.203	0.932	0.783	13465.1	17.14	-0.014	-0.000018
1605.9	-0.134	0.866	0.698	24286.8	16.04	-0.059	-0.000037
2412.1	-0.131	0.825	0.613	27491.0	12.81	-0.109	-0.000045

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9744 P1 =-6.698E-05

P0 =0.9728 P1 =-6.416E-05 P2 =-6.713E-10

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.234 R1 = 3.265E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9272 S1 =-1.208E-04

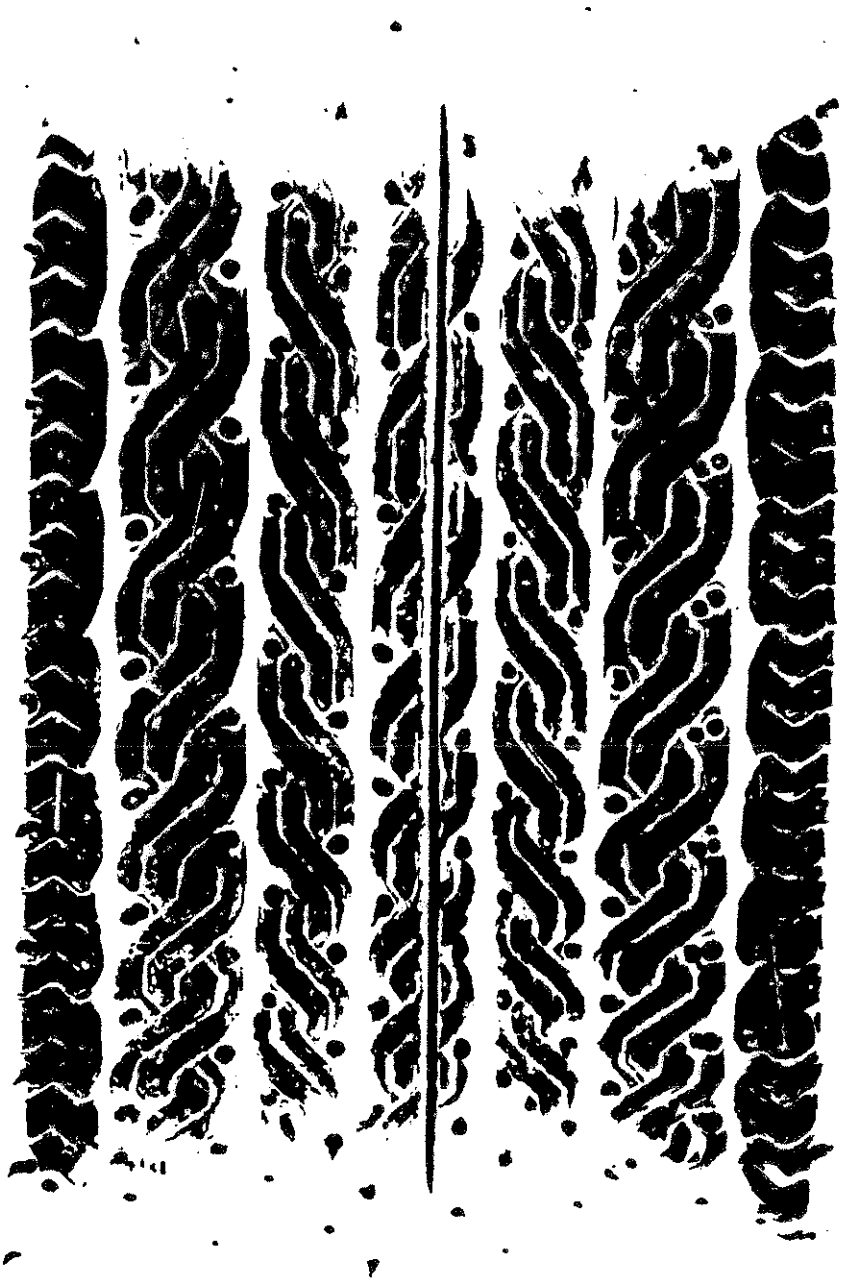
S0 =1.0343 S1 =-2.814E-04 S2 = 4.990E-08

TABLE D-306

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		44
SIZE		E 70-14
MANUFACTURER		FIRESTONE
BRAND NAME		SUPER SPORTS RETREAD
CONSTRUCTION TYPE		BIAS
MAX. RATED LOAD (lb.)		1400
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	4 POLYESTER
	SIDEWALL	
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
46	VHLBVCY418	57	100	—	57	65	



FOOTPRINT, TIRE NO. 46

Load = 1400 lbs.
Pressure = 32 psi

FIGURE D-37

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TABLE D-307

RUN: 57- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	MALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	MGAMMA FTLB/DEG	MG/FZ	MG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
691.7	93.2	0.135	7.7	0.011	0.082	687.3	9.2	0.013	0.9	0.001	0.095	0.098	696.5	0.99	17.4
1384.7	132.8	0.096	21.7	0.016	0.163	1387.4	21.2	0.015	2.9	0.002	0.137	0.160	1394.8	0.86	17.4
2086.6	142.3	0.068	36.5	0.017	0.256	2084.2	30.8	0.015	4.3	0.002	0.141	0.216	2091.9	0.73	21.3
2775.2	121.9	0.044	48.3	0.017	0.397	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2781.4	2.37	174.8

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 1368.46 A1 = 6.98 A2 = 3907.91

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.844 A4 =*********

LATERAL FRICTION COEFFICIENTS:

B3 = 2.447 B1 =-2.603E-03 B4 = 9.140E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.334E-04 C2 = 3.228E-07 C3 =-0.300

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.725E-04 K2 = 2.017E-04 K3 = 0.146

SPRING RATE (LB/IN) : 1528.8

TABLE D-308

RUN: 65- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
689.1	-0.225	0.972	0.821	0.0	0.0	-0.003	-0.000004
1385.5	-0.200	0.839	0.631	15061.0	11.01	-0.009	-0.000007
2082.5	-0.148	0.748	0.546	13843.8	7.02	-0.045	-0.000022

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9806 P1 =-6.614E-05

P0 =1.0248 P1 =-1.328E-04 P2 = 2.057E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.229 R1 = 4.512E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8677 S1 =-1.056E-04

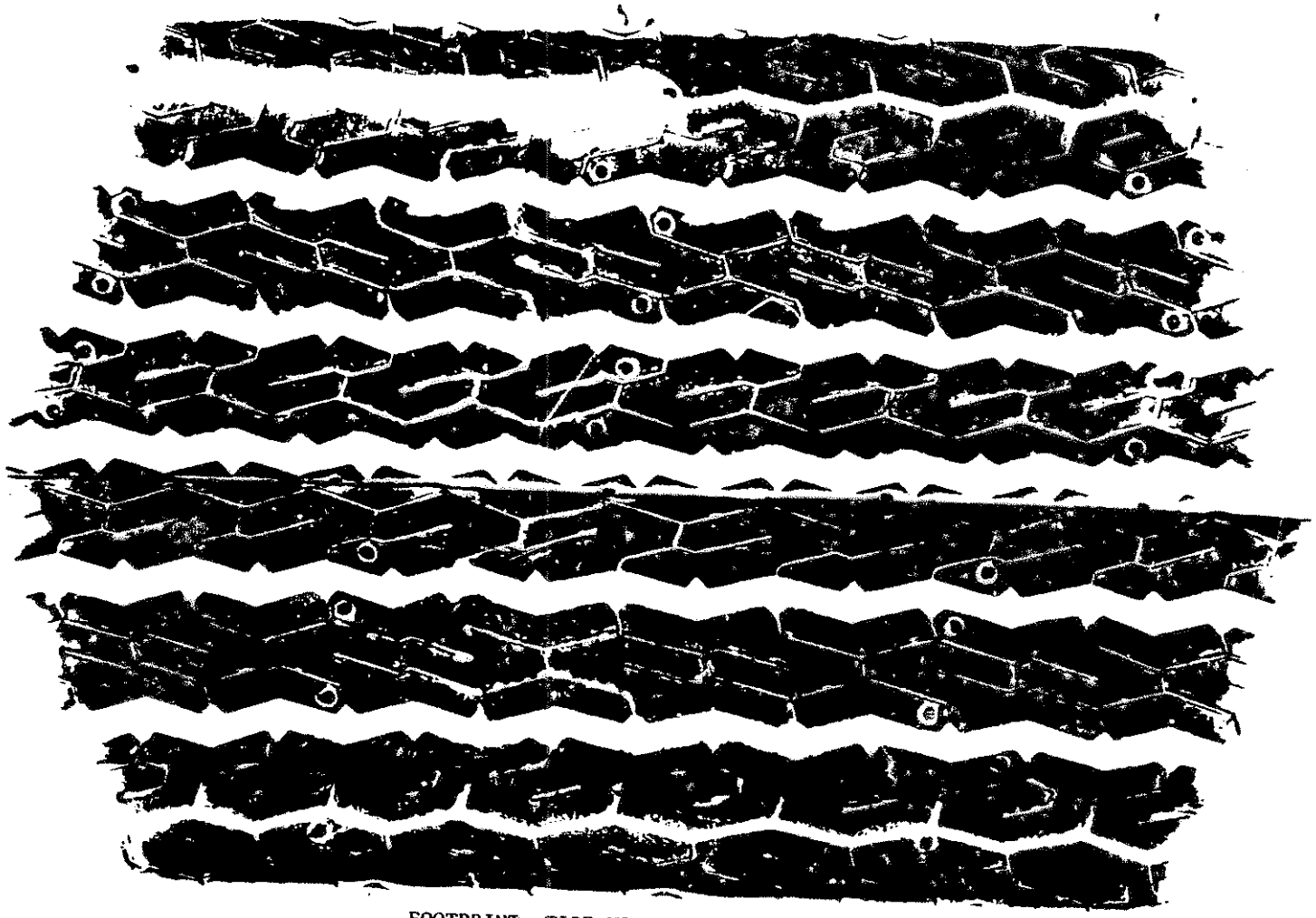
S0 =0.8701 S1 =-1.093E-04 S2 = 1.118E-09

TABLE D-309

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		45
SIZE		G78-15
MANUFACTURER (DISTRIBUTOR)		SEARS
BRAND NAME		SUPERGUARD BELTED
CONSTRUCTION TYPE		BELTED
MAX. RATED LOAD (lb.)		1620
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 FIBERGLASS BELTS
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
40	CEVV181091	55	100	—	58	68	



FOOTPRINT, TIRE NO. 40

FIGURE D-38

Load = 1620 lbs.
Pressure = 32 psi

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TABLE D-310

RUN: 58- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
803.5	123.1	0.153	15.2	0.019	0.123	798.0	11.6	0.015	1.6	0.002	0.140	0.094	804.9	0.99	16.5
1606.0	161.4	0.101	39.4	0.025	0.244	1607.3	27.2	0.017	4.1	0.003	0.149	0.163	1616.7	0.85	17.4
2408.1	145.0	0.060	61.0	0.025	0.421	2415.9	35.6	0.015	5.4	0.002	0.151	0.246	2419.5	0.71	22.7
3216.2	114.7	0.036	73.6	0.023	0.642	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3219.9	1.71	115.2

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3497.36 A1 = 5.79 A2 = 3820.54

TEST PRESSURE: 32 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 1.054 A4 = 13960.09

LATERAL FRICTION COEFFICIENTS:

B3 = 1.987 B1 =-1.524E-03 B4 = 4.412E-07

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.231E-04 C2 =-2.304E-05 C3 =-0.280

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.185E-04 K2 =-2.655E-04 K3 = 0.176

SPRING RATE (LB/IN) : 1551.3

TABLE D-311

RUN: 68- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
801.4	-0.217	1.039	0.909	0.0	0.0	-0.004	-0.000006
1605.2	-0.157	0.942	0.737	11720.8	7.60	-0.026	-0.000016
2410.8	-0.157	0.836	0.618	16638.5	7.40	-0.056	-0.000023

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =0.9512 P1 =-1.009E-04

P0 =0.9207 P1 =-3.159E-05 P2 =-3.319E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.214 R1 = 3.276E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8013 S1 =-1.500E-04

S0 =0.8052 S1 =-1.593E-04 S2 = 4.191E-09

TABLE D-312

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		46
SIZE		GR 60-15
MANUFACTURER		DUNLOP
BRAND NAME		GT QUALIFIER
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1620
MAX. RATED INFLATION PRESS. (psi)		32
NO. OF PLIES AND CORD MATERIAL	TREAD	2 POLYESTER + 2 STEEL + 2 NYLON
	SIDEWALL	2 POLYESTER
RIM WIDTH (in.)		7.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
41	DBUFAA9141	55	100	-	59	67	

Load = 1620 lbs.
Pressure = 32 psi

FOOTPRINT, TIRE NO. 41

FIGURE D-39

Reproduced from best available copy.

TABLE D-313

RUN: 59- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
797.5	151.5	0.190	14.9	0.019	0.099	799.3	4.1	0.005	0.9	0.001	0.222	0.027	804.5	0.88	13.0
1605.8	249.5	0.155	36.3	0.023	0.145	1609.1	11.3	0.007	2.5	0.002	0.220	0.045	1614.4	0.82	13.9
2415.9	281.5	0.117	62.9	0.026	0.223	2411.7	21.4	0.009	4.6	0.002	0.216	0.076	2426.8	0.78	13.0
3218.5	241.4	0.075	100.9	0.031	0.418	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3227.4	0.70	16.3

TEST PRESSURE: 32 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = -839.11 A1 = 14.33 A2 = 4721.94

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.187 A4 = -1394.62

LATERAL FRICTION COEFFICIENTS:

B3 = 0.924 B1 =-5.161E-05 B4 =-4.681E-09

OVERTURNING MOMENT COEFFICIENTS:

C1 =-5.464E-05 C2 =-3.411E-04 C3 =-0.600

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.508E-04 K2 = 1.697E-04 K3 = 0.142

SPRING RATE (LB/IN) : 1256.0

TABLE D-314

RUN: 67- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
800.2	-0.195	0.921	0.841	12199.5	15.41	-0.011	-0.000014
1605.2	-0.207	0.867	0.712	18577.2	12.25	-0.054	-0.000034
2410.7	-0.142	0.813	0.647	23040.5	10.77	-0.106	-0.000044

TEST PRESSURE: 32 psi
(Regulated)

MUX PEAK COEFFICIENTS:

P0 =1.1420 P1 =-1.263E-04

P0 =1.1273 P1 =-1.040E-04 P2 =-6.968E-09

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.238 R1 = 3.776E-05

MUX SLIDE COEFFICIENTS:

S0 =1.0450 S1 =-1.807E-04

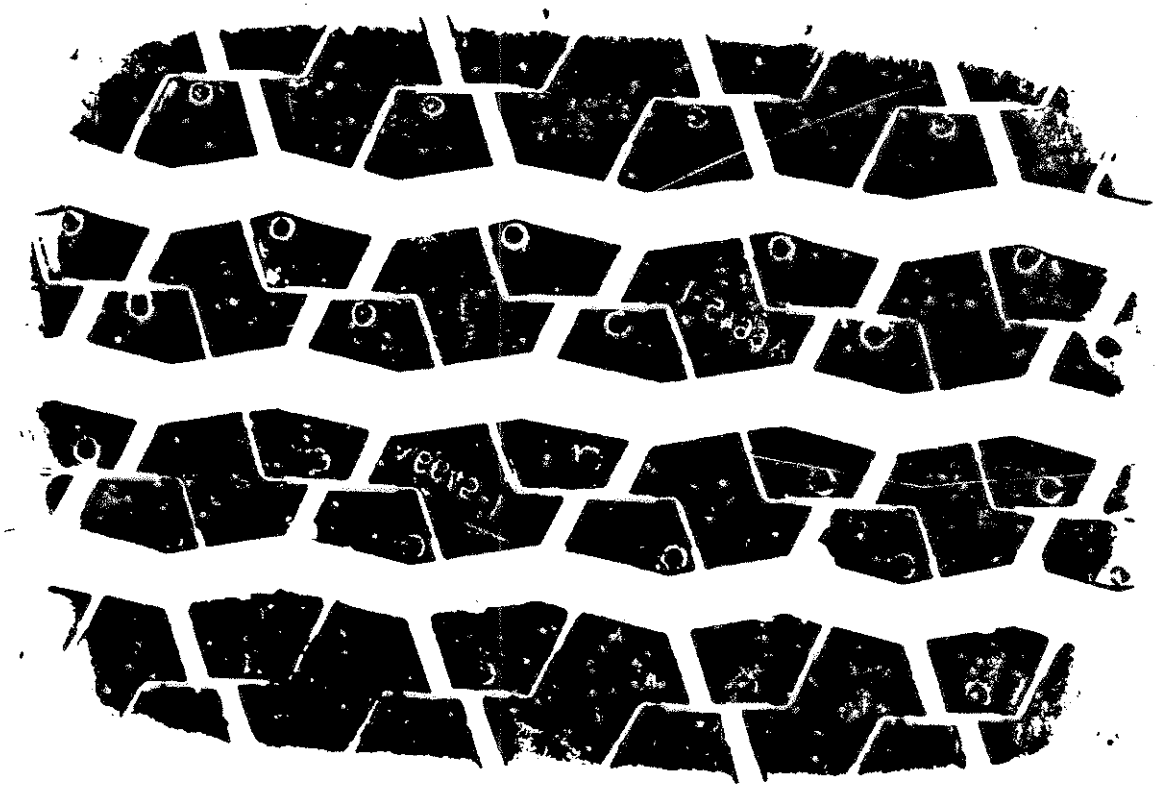
S0 =1.1353 S1 =-3.158E-04 S2 = 4.226E-08

TABLE D-315

TIRE AND RUN IDENTIFICATION

TIRE TIRE TYPE		47
SIZE		P165/80 R13
MANUFACTURER		FIRESTONE
BRAND NAME		DELUXE CHAMPION
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1069
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	1 POLYESTER + 2 STEEL
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		4.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
2	VDEAD504BO	58	100	-	60	69	



FOOTPRINT, TIRE NO. 2

FIGURE D-40

Load = 1069 lbs.
Pressure = 35 psi

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TABLE D-316

RUN: 60- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	MA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
528.0	91.3	0.173	6.5	0.012	0.071	521.0	4.8	0.009	0.4	0.001	0.084	0.053	524.0	0.97	17.4
1057.6	140.2	0.133	18.4	0.017	0.131	1055.7	10.2	0.010	0.8	0.001	0.077	0.072	1062.0	0.92	17.4
1590.5	147.5	0.093	32.5	0.020	0.220	1593.9	15.6	0.010	1.2	0.001	0.077	0.106	1596.2	0.81	19.0
2126.7	130.7	0.061	44.9	0.021	0.343	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2129.3	0.72	24.5

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 847.47 A1 = 10.15 A2 = 3060.88

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.527 A4 =-24451.52

LATERAL FRICTION COEFFICIENTS:

B3 = 1.014 B1 =-5.801E-05 B4 =-3.859E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-8.255E-05 C2 =-2.429E-04 C3 =-0.331

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.058E-04 K2 =-2.193E-04 K3 = 0.117

SPRING RATE (LB/IN) : 1093.1

TABLE D-317

RUN: E9- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
523.3	-0.198	0.895	0.723	8700.9	16.71	-0.011	-0.000021
1056.3	-0.177	0.851	0.642	16945.4	16.83	-0.047	-0.000045
1588.0	-0.164	0.788	0.564	20467.2	14.16	-0.087	-0.000055

MUX PEAK COEFFICIENTS:

P0 =0.9989 P1 =-1.673E-04

P0 =1.1124 P1 =-4.560E-04 P2 = 1.508E-07

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.227 R1 = 6.709E-05

MUX SLIDE COEFFICIENTS:

S0 =0.7924 S1 =-1.884E-04

S0 =0.9193 S1 =-5.097E-04 S2 = 1.695E-07

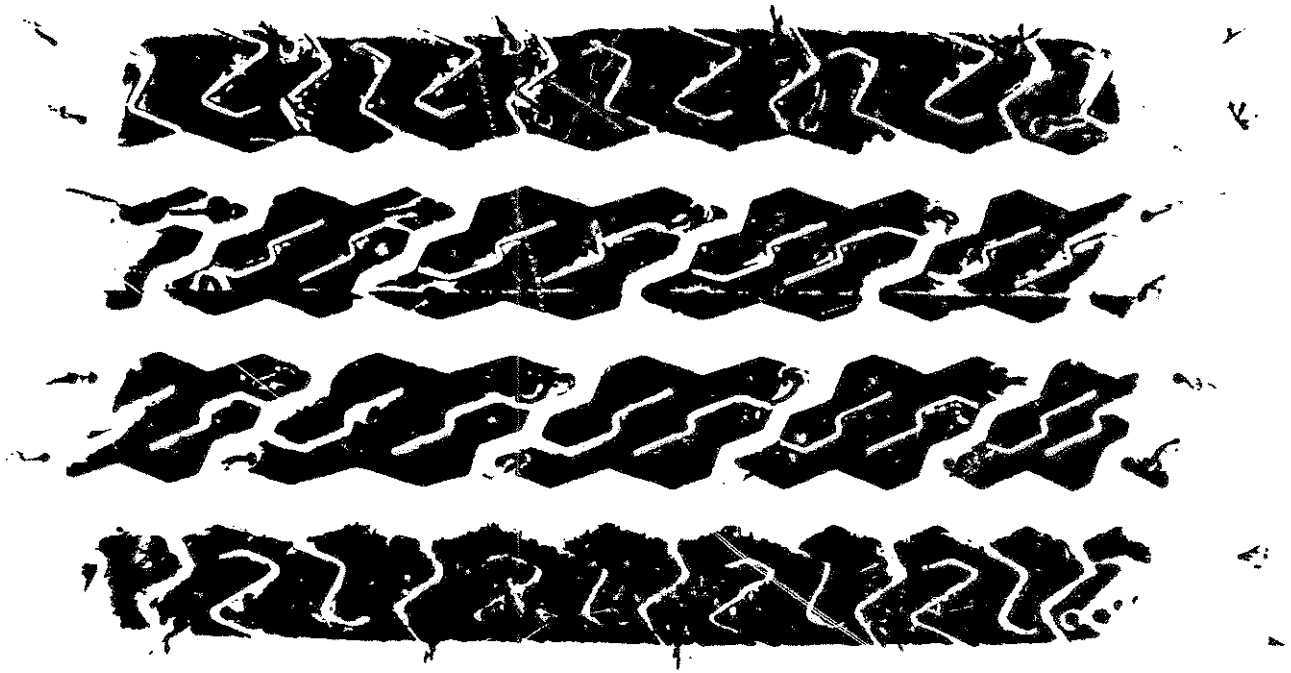
TEST PRESSURE: 35 psi
(Regulated)

TABLE D-318

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		48
SIZE		P155/80R13
MANUFACTURER		UNIROYAL
BRAND NAME		FASTRAK
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		959
MAX. RATED INFLATION PRESS. (psi)		35
NO. OF PLIES AND CORD MATERIAL	TREAD	1 POLYESTER + 2 FIBERGLASS
	SIDEWALL	1 POLYESTER
RIM WIDTH (in.)		5.0
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
23	APJKE1010	62	100	-	61	70	



FOOTPRINT, TIRE NO. 23

FIGURE D-41

Load = 959 lbs.
Pressure = 35 psi

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TABLE D-319

RUN: 61- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
469.1	80.6	0.172	6.8	0.014	0.084	467.8	3.1	0.007	0.3	0.001	0.089	0.039	470.4	0.90	15.6
946.9	99.3	0.105	18.1	0.019	0.182	947.4	8.6	0.009	0.5	0.001	0.062	0.087	952.7	0.84	17.4
1423.6	89.5	0.063	27.0	0.019	0.302	1434.3	15.4	0.011	0.9	0.001	0.058	0.172	1429.1	0.81	25.5
1903.8	79.1	0.042	37.7	0.020	0.477	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1906.6	12.39	776.9

TEST PRESSURE: 35 psi
(Regulated)

CORNERING STIFFNESS COEFFICIENTS:

A0 = 3152.71 A1 = 4.14 A2 = 2278.30

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.311 A4 = -1463.33

LATERAL FRICTION COEFFICIENTS:

B3 = 9.473 B1 =-2.298E-02 B4 = 1.269E-05

OVERTURNING MOMENT COEFFICIENTS:

C1 =-1.201E-04 C2 =-1.112E-04 C3 =-0.241

ALIGNING TORQUE COEFFICIENTS:

K1 =-2.845E-04 K2 = 3.437E-04 K3 = 0.149

SPRING RATE (LB/IN) : 1054.4

TABLE D-320

RUN: 70- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
470.5	-0.203	0.932	0.717	8058.9	17.29	-0.014	-0.000029
949.2	-0.147	0.817	0.588	16142.9	17.95	-0.049	-0.000052
1427.4	-0.139	0.772	0.536	18200.2	14.03	-0.089	-0.000062

MUX PEAK COEFFICIENTS:

P0 =1.0613 P1 =-1.508E-04

P0 =1.1460 P1 =-3.457E-04 P2 = 9.231E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.277 R1 = 4.398E-05

MUX SLIDE COEFFICIENTS:

S0 =0.9490 S1 =-1.741E-04

S0 =1.0523 S1 =-4.083E-04 S2 = 1.114E-07

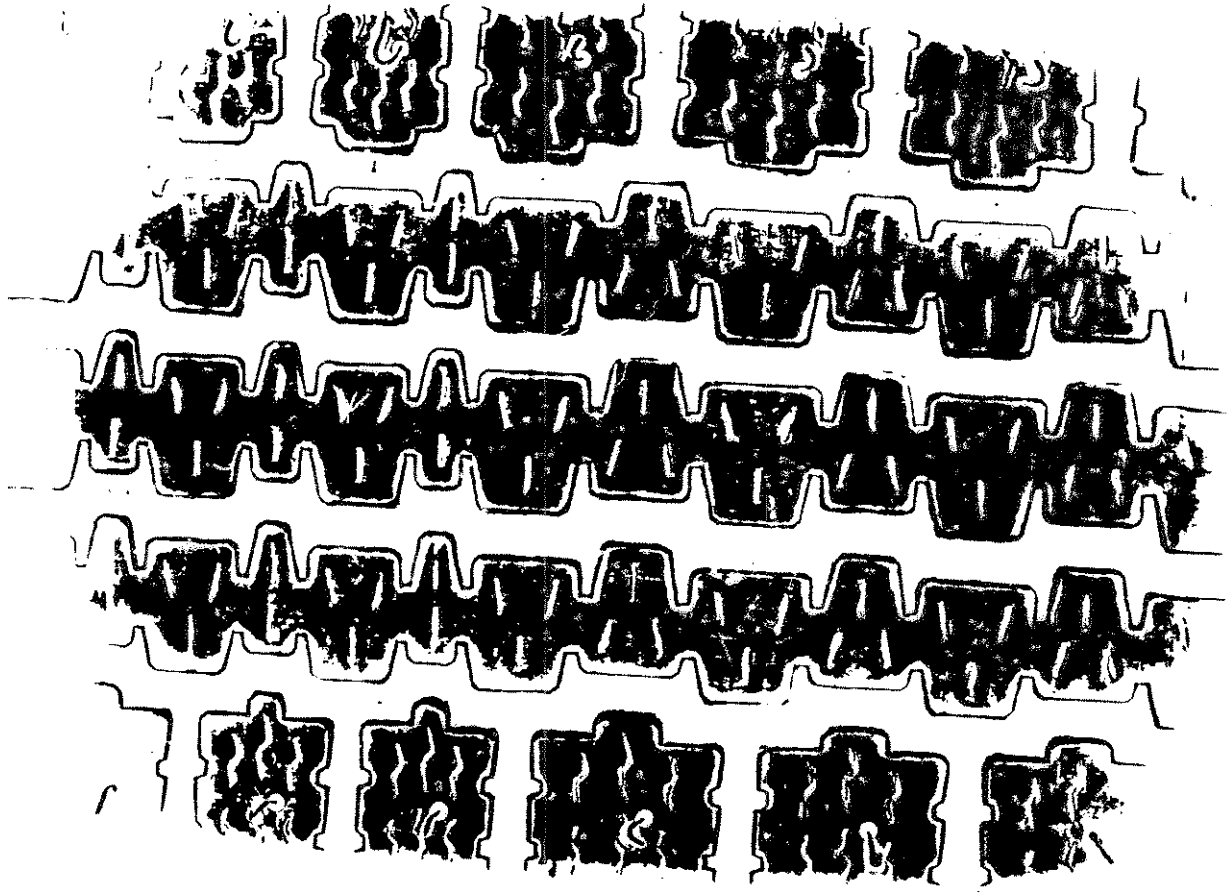
TEST PRESSURE: 35 psi
(Regulated)

TABLE D-321

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		49
SIZE		P195/70R14
MANUFACTURER		CONTINENTAL
BRAND NAME		TS771
CONSTRUCTION TYPE		RADIAL
MAX. RATED LOAD (lb.)		1240
MAX. RATED INFLATION PRESS. (psi)		36
NO. OF PLIES AND CORD MATERIAL	TREAD	2 RAYON + 2 STEEL + 1 NYLON
	SIDEWALL	2 RAYON
RIM WIDTH (in.)		5.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
61	CPJ92XD010	68	100	-	137	145	



FOOTPRINT, TIRE NO. 61

FIGURE D-42

Load = 1312 lbs.
Pressure = 35 psi

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TABLE D-322

RUN: 137- 0- 3

CORNERING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD LB	CALPHA LB/DEG	CA/FZ	NALPHA FTLB/DEG	NA/FZ	NA/CA FT	LOAD LB	CGAMMA LB/DEG	CG/FZ	NGAMMA FTLB/DEG	NG/FZ	NG/CG FT	CG/CA	LOAD LB	MUYPEAK	SA@MUYPK DEG
652.3	174.0	0.267	13.7	0.021	0.078	648.0	5.6	0.009	0.6	0.001	0.104	0.032	658.5	0.97	9.4
1305.1	246.6	0.189	36.2	0.028	0.147	1305.5	13.4	0.010	1.2	0.001	0.088	0.054	1307.0	0.89	9.4
1961.5	230.6	0.118	57.2	0.029	0.248	1965.7	20.5	0.010	1.6	0.001	0.078	0.089	1972.3	0.83	13.9
2615.0	174.7	0.067	80.3	0.031	0.460	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2621.3	0.77	18.8

CORNERING STIFFNESS COEFFICIENTS:

A0 = 2853.00 A1 = 13.95 A2 = 3239.73

TEST PRESSURE: 35 psi
(Regulated)

CAMBER STIFFNESS COEFFICIENTS:

A3 = 0.520 A4 =-12049.54

LATERAL FRICTION COEFFICIENTS:

B3 = 1.011 B1 =-6.120E-05 B4 =-1.603E-08

OVERTURNING MOMENT COEFFICIENTS:

C1 =-6.339E-05 C2 =-2.600E-04 C3 =-0.396

ALIGNING TORQUE COEFFICIENTS:

K1 =-1.874E-04 K2 = 1.886E-04 K3 = 0.184

SPRING RATE (LB/IN) : 1238.1

TABLE D-323

RUN: 145- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUX PEAK	MUX SLIDE	CS	CS/FZ	SRF	SRF/FZ
661.6	-0.214	0.928	0.743	2164.6	3.43	-0.020	-0.000030
1313.9	-0.089	0.928	0.663	16706.8	13.54	-0.061	-0.000047
1967.7	-0.106	0.931	0.609	53274.0	30.24	-0.103	-0.000053

MUX PEAK COEFFICIENTS:

P0 =0.9252 P1 = 2.740E-06

P0 =0.9323 P1 =-7.258E-06 P2 = 3.938E-09

TEST PRESSURE: 35 psi
(Regulated)

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.245 R1 = 8.240E-05

MUX SLIDE COEFFICIENTS:

S0 =0.8063 S1 =-1.023E-04

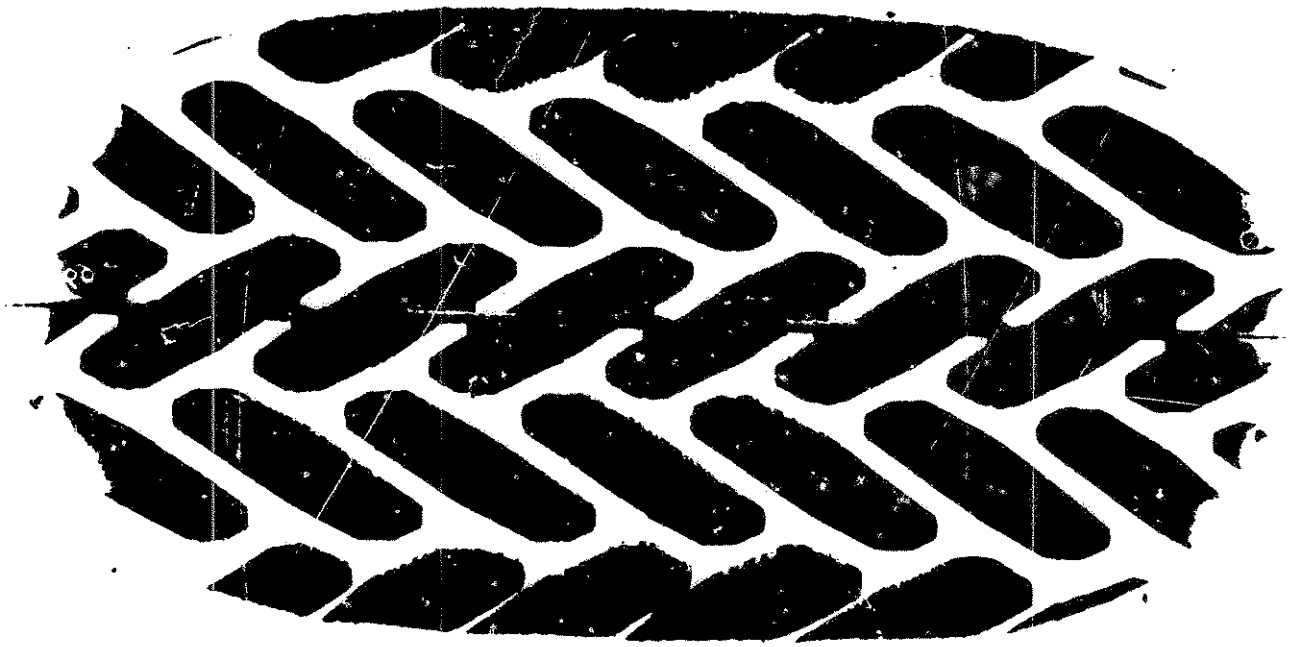
S0 =0.8522 S1 =-1.847E-04 S2 = 3.116E-08

TABLE D-324

TIRE AND RUN IDENTIFICATION

TIRF TIRE TYPE		50
SIZE		T125/70D15
MANUFACTURER		FIRESTONE
BRAND NAME		TEMPA SPARE
CONSTRUCTION TYPE		DIAGONAL (BIAS)
MAX. RATED LOAD (lb.)		1500
MAX. RATED INFLATION PRESS. (psi)		60
NO. OF PLIES AND CORD MATERIAL	TREAD	4 NYLON
	SIDEWALL	
RIM WIDTH (in.)		3.5
COMMENTS		

Tire No.(s)	DOT No.	Shore Hardness	Groove Depth (%)	Water Depth (in.)	Test Run Number(s)		
					Free Rolling	Braking	Rolling Resistance
81	VCPY149K089	69	100	—	143	151	



FOOTPRINT, TIRE NO. 81

FIGURE D-43

Load = 1500 lbs.
Pressure = 60 psi

TABLE D-325

RUN: 151- 0- 3

BRAKING TIRE COEFFICIENTS AND COMPUTER MODEL CONSTANTS

LOAD	SL PEAK	MUY PEAK	MUX SLIDE	CS	CS/FZ	SRI	SRF/FZ
754.2	-0.145	0.857	0.619	1927.1	2.58	-0.022	-0.000029
1496.0	-0.156	0.843	0.572	15157.1	10.66	-0.039	-0.000026
2246.0	-0.165	0.787	0.524	30772.7	14.69	-0.058	-0.000026

MUY PEAK COEFFICIENTS:

P0 =0.8990 P1 =-4.702E-05

P0 =0.8362 P1 = 5.248E-05 P2 =-3.323E-08

LONGITUDINAL SLIP AT MUX PEAK COEFFICIENTS:

R0 =-0.136 R1 =-1.326E-05

MUX SLIDE COEFFICIENTS:

S0 =0.6675 S1 =-6.402E-05

S0 =0.6686 S1 =-6.551E-05 S2 = 3.536E-10

TEST PRESSURE: 60 psi
(Regulated)