

Contents

<i>Preface</i>	<i>ix</i>
<i>Acknowledgements</i>	<i>xii</i>
Introduction	
<i>D. R. Blackmore</i>	
References	13
2 Principles Governing Fuel Economy in a Gasoline Engine	14
<i>D. R. Blackmore</i>	
2.1 Introduction	14
2.2 Definitions	14
2.3 Fuel heating value	15
2.4 Engine efficiency	17
2.5 Vehicle efficiency	35
2.6 What is the potential for fuel economy gain?	41
References	42
3 Motor Gasoline and the Effect of Compression Ratio on Octane Requirement and Fuel Economy	44
<i>A. G. Bell</i>	
3.1 Introduction	44
3.2 Motor gasoline and its effects on performance	44
3.3 Octane number, compression ratio and economy	55
3.4 The car and the refinery as a single economic unit	61
3.5 Summary	66
References	66
4 The Effect of the Physical Properties of Gasoline on Fuel Economy	68
<i>B. D. Caddock</i>	
4.1 Introduction	68
4.2 Specific gravity and net volumetric heating value	68
4.3 Fuel volatility	71
4.4 Fuel viscosity	74
4.5 Discussion	75
References	76

5	The Effect of Gasoline Additives on Fuel Economy	77
	<i>I. C. H. Robinson</i>	
	5.1 Introduction	77
	5.2 Anti-knock additives	79
	5.3 Anti-oxidants	80
	5.4 Anti-icing additives	80
	5.5 Ignition control additives	81
	5.6 Carburettor and inlet system cleanliness additives	83
	5.7 Other additives	87
	References	88
6	The Effect of Mixture Preparation on Fuel Economy	89
	<i>G. A. Harrow</i>	
	6.1 Introduction	89
	6.2 Mixture quality in current carburetted engines	90
	6.3 Mixture maldistribution between cylinders	93
	6.4 Cold starting and the use of the choke	98
	6.5 Engine power and its impact on fuel economy during road service	99
	6.6 Mixture quality and fuel consumption at part load	103
	6.7 Mixture quality and fuel consumption at full throttle	105
	6.8 Engine operation with weak mixtures	108
	6.9 Practical systems for improved mixture preparation	109
	6.10 Fuel injection systems	112
	6.11 Concluding remarks	115
	References	115
	The Effect of Vehicle Maintenance on Fuel Economy	119
	<i>J. Atkinson and O. Postle</i>	
	7.1 Introduction	119
	7.2 Thornton Research Centre tests	120
	7.3 Other similar test work	126
	7.4 Concluding remarks	131
	References	132
8	The Effect of Emission Controls on Fuel Economy	133
	<i>D. R. Blackmore</i>	
	8.1 Introduction	133
	8.2 Historical surveys of vehicle fuel economy	135
	8.3 The effect on fuel economy of individual exhaust emission control measures	143
	8.4 Discussion	152
	8.5 Conclusions	154
	References	

9	The Measurement of Fuel Economy	157
	<i>R. Burt</i>	
9.1	Introduction	157
9.2	Measurement in uncontrolled road tests	158
9.3	Measurement in controlled road tests	160
9.4	Measurement in cycle tests with cars driven on the road	163
9.5	Measurement in cycle tests with cars driven on a chassis dynamometer	170
9.6	Measurement of fuel economy in bench engine tests	190
9.7	Concluding remarks	192
	References	192
10	The Effect of Crankcase Lubricants on Fuel Economy	194
	<i>B. Bull and A. J. Humphrys</i>	
10.1	Introduction	194
10.2	Literature survey	196
10.3	Discussion	200
10.4	Conclusions	201
	References	201
11	The Effect of Transmission Lubricants on Fuel Economy	203
	<i>E. L. Padmore</i>	
11.1	Introduction	203
11.2	Fuel economy related to axle lubrication (vehicle track tests)	203
11.3	Axle efficiency related to lubricant viscosity and performance additive selection (rig tests)	209
11.4	Fuel economy related to automatic transmission lubrication (vehicle track tests)	214
11.5	Work on axle-lubricant-related fuel economy carried out by vehicle manufacturers	219
11.6	Conclusions	219
	References	220
12	Mileage Marathons	221
	<i>W. S. Affleck and G. B. Toft</i>	
12.1	Introduction	221
12.2	History	221
12.3	Some theory	223
12.4	Minimizing power requirement	224
12.5	Providing the power	227
12.6	Theory and practice	233
12.7	The tale of a successful 'special'	233
	References	237

<i>Appendix A</i>	Glossary of Terms	238
<i>Appendix B</i>	Some Statistical Terms Commonly Used in Connection with the Measurement of Fuel Economy	241
<i>Appendix C</i>	A Guide to Mechanical Devices for the Improvement of Fuel Economy	243
<i>Appendix D</i>	A Guide to Fuel-additive Inventions for the Improvement of Fuel Economy	244
<i>Appendix E</i>	Why the Diesel Engine and the Lean-burn Gasoline Engine give Improved Fuel Economy Compared with the Conventional Gasoline Engine <i>D. R. Blackmore and R. Burt</i> References	246 251
<i>Appendix F</i>	Abbreviations, Units and Conversions	252
	F.1 Abbreviations	252
	F.2 Units and conversions	252
	F.3 Conversions between commonly used units of fuel economy and consumption	
<i>Index</i>		259