

Contents

| | | |
|-----------|---|----|
| 1. | Introduction | 9 |
| 2. | The Story of Performance Testing – a Historical Sketch | 11 |
| 3. | Technical Overview | 19 |
| 3.1. | Brakes | 20 |
| 3.1.1. | Hydrokinetic systems | 20 |
| 3.1.2. | Inertia systems | 22 |
| 3.1.3. | Eddy current brakes and electric motors | 24 |
| 3.2. | Roller dynamometers | 27 |
| 3.2.1. | Important influencing variables | 27 |
| 3.2.2. | Key features of construction | 29 |
| 3.2.2.1. | Roller sets | 29 |
| 3.2.2.2. | Axle couplings | 31 |
| 3.3. | Principles of road driving simulation | 33 |
| 4. | Basic Conditions | 39 |
| 4.1. | Ventilation | 43 |
| 4.2. | Exhaust extraction | 48 |
| 4.3. | Noise insulation | 50 |
| 4.4. | Vehicle safety | 51 |
| 5. | Testing | 55 |
| 5.1. | Theory | 57 |
| 5.1.1. | Wheel power/driving power | 57 |
| 5.1.2. | Drag power/power dissipation | 58 |
| 5.1.3. | Effective power | 60 |
| 5.1.4. | Engine torque | 60 |
| 5.1.5. | Simplified testing for passenger cars | 62 |
| 5.2. | Code of practice | 62 |

Contents

| | | |
|-----------|---|------------|
| 6. | Application examples | 75 |
| 6.1. | Performance optimization | 75 |
| 6.2. | Emission behaviour optimization | 84 |
| 6.2.1. | Otto engines | 85 |
| 6.2.2. | Diesel engines | 87 |
| 6.2.3. | Alternative fuels | 89 |
| 6.3. | Fuel efficiency optimization | 91 |
| 6.4. | Preventative and periodic maintenance | 95 |
| 6.5. | Special applications | 99 |
| | | |
| 7. | The Outlook | 107 |
| | | |
| 8. | Annex | 113 |
| 8.1. | Short profile of MAHA | 113 |
| 8.2. | Short profile of ABT-Sportslin | 115 |
| 8.3. | The Author | 117 |