

[Table Of Contents](#)

Acknowledgments

Introduction

Chapter 1: Race Engine Planning

Consider the Limitations

Performance Objectives

Unlocking Hidden Power

How Cylinders Influence Each Other

Chapter 2: Torque and Horsepower

Volumetric Efficiency

Understanding BSFC

Where Power Comes From

What Influences Power?

Chapter 3: Cylinder Blocks

Grooming the Short Block

Block Type

Block Inspection

Machine Shop Processes

Chapter 4: Crankshafts

Crankshaft Types

Strength Treatments

Counterweights

Operating Conditions

Crankshaft Oiling

Engine Balancing

Crankshaft Dampening

Chapter 5: Piston Technology

Piston Speed

Acceleration

Piston Speed Issues

Selection Factors

Race Piston Terminology

Rings

Piston Ring Terminology

Ring Installation

Micro-Welding

Chapter 6: Connecting Rods

Rod Length as a Tuning Component

Connecting Rod Materials

Characteristics of Rod Activity

Rod-to-Piston Clearance

Chapter 7: Engine Bearings

Characteristics of Engine Bearings

Roller Cam Bearings

Clearances

Bearing Failures

Chapter 8: Cylinder Heads

Choosing a Cylinder Head

Valves and Valve Sizes

Chapter 9: Induction Systems

Dual-Plane Intakes

Single-Plane Intakes

Tunnel Ram Intakes

Plenum Characteristics

Mixture Conditioning

Surface Texturing

Reversion

Secondary Intake Considerations

Flow Testing

Electronic Fuel Injection

Chapter 10: Carburetors

Carburetor Selection

Exit Air Speed

Tuning Elements

Basic Tuning and Maintenance

Final Thoughts

Chapter 11: Camshafts

Understanding Cam Specs

Calculating Valve Lift

Finding TDC

Degreeing the Cam

Calculating Valve Overlap

Camshaft Terminology

Rocker Ratio Tuning

Duration

Camshaft Selection Criteria

Firing Order Swaps

Chapter 12: Sumps and Oiling

Wet Sump Systems

Dry Sump Systems

Oil Accumulators for Racing Engines

Common Modifications

Chapter 13: Ignition Systems

Ignition Choices

Race Engine Ignition Tips

Chapter 14: Exhaust Systems

PipeMax Header Software

Step Headers

Header Design Kit

Chapter 15: Engine Build Tips

Assembly Procedure

Chapter 16: Engine Startup and Maintenance

Startup and Break-In

Maintenance Program

Recommended Maintenance

Engine Dyno Testing

Source Guide