Table Of Contents

Acknowledgments

Introduction

Chapter 1:

Flaw Detection Sonic Testers Hand-Held Magnetic Particle Testers Wet Mag Bench Testers Dye Penetrant Pressure Testing

Chapter 2:

Engine Blocks
Flaw Checking the Block
Decking the Block
Correcting Cylinder Bores
Oil Restrictors and Screens
Lifter Valley Surface
Rod and Crank Clearance
Oil Hole Alignment
Threaded Holes

Chapter 3:

Block Machining
Main Bore Align Honing
Deck Resurfacing
Cylinder Honing
Cylinder Boring
Plateau Finishing
Cylinder Bore Distortion
Lifter Bores
Hot Honing
Camshaft Bore

Chapter 4:

Oiling Systems Wet Sump Systems Dry Sump Systems External Oil Coolers Oil Restrictors
Oil Drainback
Intermediate Shaft
High-Pressure High-Volume Pumps
Pre-Lube Before Initial Startup

Chapter 5:

Engine Math
Bore and Stroke
Connecting Rod Length
Rod Ratio
Piston Compression Height
Compression Ratio (part 1)
Combustion Chamber Volume
Piston Dome Volume
Head Gasket Volume
Deck Height Volume
Cylinder Swept Volume

Compression Ratio (part 2)

Chapter 6:

Crankshafts
Crankshaft Types
Surface Hardening
Reducing Rotating Mass
Inspection
Stroker Clearance
Shot Peening
Stress Relieving
Counterweight Modifications
Cross Drilling
Chamfering Oil Holes

Chapter 7:

Connecting Rods
Rod Types
Center-to-Center Length
Piston-to-Rod Clearance
Rod-to-Block Clearance
Rod-to-Camshaft Clearance
Rod Bearing Clearance
Rod Side Clearance
Beam Design

Rod Bolt Tightening Connecting Rod Inspection

Chapter 8:

Pistons

Performance Pistons

Piston-to-Wall Clearance

Piston Diameter

Piston Skirt to Crankshaft Clearance

Coatings

Piston Pins

Ring Grooves

Piston-to-Head Clearance

Piston-to-Valve Clearance

Piston Compression Distance

Compression Ratio

Deck Height

Gasket Volume

Piston Dome Volume

Combustion Chamber Volume

Valve Pockets

Ordering Custom Pistons

Chapter 9:

Piston Rings

Ring Types

Tension and Gap

Piston Ring Trends

Determining Ring Depth

Ring Installation Method

Chapter 10:

Camshafts

Cam Types

Protecting the Cam

Cam Runout

Cam Endplay

Degreeing the Cam

Adjusting Cam Timing

Lobe Separation Angles

GM LS Cam Lifters

Special Firing Order Camshafts

Camshaft Needle Bearings Distributor Gears

Chapter 11:

Cylinder Heads

Cast Iron versus Aluminum

Deck Surface Finish

Deck Flatness

Valves

Ports and Runners

Finishing Bare Cylinder Heads

Inspection and Reconditioning

Flow Bench Testing

Cylinder Head Installation

Chapter 12:

Valves, Springs, Retainers and Locks

Valve Inspection

Valve Seats

Performance Valve Technology

Valvesprings

Retainer Fit

Valvespring Seats

Retainers and Locks

Chapter 13:

Rocker Arms

Rocker Arm Ratio

Guideplates

Roller Rockers

Rocker Arm Materials

OHC Followers

Valve Cover Clearance

Upgrading OEM LS Rocker Arm Trunnions

Chapter 14:

Pushrods

Check for Runout

Pushrod Length

Guideplates

Pushrod Diameter

Pushrod Wall Thickness

Pushrod End Types Clean the Pushrods

Chapter 15:

Intake Manifolds
Manifold Types
Port Matching
Intake Plenum
Intake Port Surface
Manifold Bolts
Converting LS to Carb
Manifold Surface Protections
Carb Spacers

Chapter 16:

Balancing
Internal versus External Balance
Weight Matching
Bobweights
Balancing Procedures

Chapter 17:

Timing Systems Chain Drive Belt Drive Gear Drive

Chapter 18:

Engine Performance Coatings and Treatments Coating Types Cryogenic Stress Relief Vibratory Stress Relief Hard Cylinder Coating

Source Guide