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Nota di contenuto	A PRACTICAL GUIDE TO COMPRESSOR TECHNOLOGY; ABOUT THE AUTHOR; CONTENTS; PREFACE; ACKNOWLEDGMENTS; PART I POSITIVE DISPLACEMENT COMPRESSOR TECHNOLOGY; 1 Theory; 1.1 Symbols; 1.2 How a Compressor Works; 1.3 First Law of Thermodynamics; 1.4 Second Law of Thermodynamics; 1.5 Ideal or Perfect Gas Laws; 1.5.1 Boyle's Law; 1.5.2 Charles' Law; 1.5.3 Amonton's Law; 1.5.4 Dalton's Law; 1.5.5 Amagat's Law; 1.5.6 Avogadro's Law; 1.5.7 Perfect Gas Formula; 1.6 Vapor Pressure; 1.7 Gas and Vapor; 1.8 Partial Pressures; 1.9 Critical Conditions; 1.10 Compressibility; 1.11 Generalized Compressibility Charts 1.12 Gas Mixtures 1.13 The Mole; 1.14 Specific Volume and Density; 1.15 Volume Percent of Constituents; 1.16 Molecular Weight of a Mixture; 1.17 Specific Gravity and Partial Pressure; 1.18 Ratio of Specific Heats; 1.19 Pseudo-critical Conditions and Compressibility; 1.20 Weight-Basis Items; 1.21 Compression Cycles; 1.22 Power Requirement; 1.23 Compressibility Correction; 1.24 Multiple Staging; 1.25 Volume References; 1.26 Cylinder Clearance and Volumetric Efficiency; 1.27 Cylinder Clearance and Compression Efficiency; Reference; 2 Reciprocating Process Compressor Design Overview

2.1 Crankshaft Design; 2.2 Bearings and Lubrication Systems; 2.3 Connecting Rods; 2.4 Crossheads; 2.5 Frames and Cylinders; 2.6 Cooling Provisions; 2.7 Pistons; 2.8 Piston and Rider Rings; 2.9 Valves; 2.10 Piston Rods; 2.11 Packings; 2.12 Cylinder Lubrication; 2.13 Distance Pieces; 2.14 Reciprocating Compressor Modernization; 2.14.1 Cylinder Upgrades; 2.14.2 Design for Easy Maintenance; 2.14.3 Crosshead Designs and Attention to Reliable Lubrication; 2.14.4 Materials; 3 Reciprocating Compressor Performance and Monitoring Considerations; 3.1 Capacity Control; 3.1.1 Recycle or Bypass; 3.1.2 Suction Throttling; 3.1.3 Suction Valve Unloading; 3.1.4 Clearance Pockets; 3.2 More About Cylinder Jacket Cooling and Heating Arrangements; 3.2.1 Methods of Cooling; 3.3 Comparing Lubricated and Nonlubricated Conventional Cylinder Construction; 3.3.1 Lubricated Cylinder Designs; 3.3.2 Nonlubricated Cylinder Design; 3.4 Compressor Vent and Buffer Systems; 3.5 Compressor Instrumentation; 3.5.1 Electric vs. Pneumatic Switches; 3.5.2 Switch Set Points; 3.5.3 Control Panels; 3.5.4 Valve-in-Piston Reciprocating Compressors; 3.5.5 Barrel-Frame Reciprocating Compressors; 3.6 Condition Monitoring of Reciprocating Compressors; 3.6.1 Maintenance Strategies; 3.6.2 Justification for Machine Monitoring; 3.6.3 What to Monitor and Why; References; 4 Labyrinth Piston Compressors; 4.1 Main Design Features; 4.2 Energy Consumption; 4.3 Sealing Problems; 5 Hypercompressors; 5.1 Introduction; 5.2 Cylinders and Piston Seals; 5.3 Cylinder Heads and Valves; 5.4 Drive Mechanism; 5.5 Miscellaneous Problems; 5.6 Conclusions; 6 Metal Diaphragm Compressors; 6.1 Introduction; 6.2 Terminology; 6.3 Description; 7 Lobe and Sliding Vane Compressors; 8 Liquid Ring Compressors; 9 Rotary Screw Compressors and Filter Separators

Sommario/riassunto

A Complete overview of theory, selection, design, operation, and maintenance This text offers a thorough overview of the operating characteristics, efficiencies, design features, troubleshooting, and maintenance of dynamic and positive displacement process gas compressors. The author examines a wide spectrum of compressors used in heavy process industries, with an emphasis on improving reliability and avoiding failure. Readers learn both the theory underlying compressors as well as the myriad day-to-day practical issues and challenges that chemical engineers and plant operation person
