

1. Record Nr.	UNISA996418164603316
Titolo	Cryocoolers [[electronic resource]] : Theory and Applications // edited by Milind D. Atrey
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer , 2020
ISBN	3-030-11307-8
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (X, 236 p. 178 illus., 149 illus. in color.)
Collana	International Cryogenics Monograph Series, , 0538-7051
Disciplina	536.56
Soggetti	Low temperature physics Low temperatures Thermodynamics Heat engineering Heat transfer Mass transfer Medical physics Radiation Aerospace engineering Astronautics Low Temperature Physics Engineering Thermodynamics, Heat and Mass Transfer Medical and Radiation Physics Aerospace Technology and Astronautics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Preface -- Atrey -- Pfothenauer -- Jeong -- Kirichek -- Shirron -- Stautner -- Bain -- Caughley -- Stautner -- Spagna.
Sommario/riassunto	This book serves as an introduction to cryocooler technology and describes the principle applications of cryocoolers across a broad range of fields. It covers the specific requirements of these applications, and describes how the advantages and disadvantages of different cryocooler systems are taken into consideration. For example, Stirling coolers tend to be used only in space applications because of their high

coefficient of performance, low weight and proven reliability, whilst Gifford-McMahon coolers are used for ground applications, such as in cryopumps and MRI shield cooling applications. Joule-Thomson cryocoolers are used in missile technology because of the fast cool down requirements. The cryocooler field is fast developing and the number of applications are growing because of the increasing costs of the cryogens such as Helium and Neon. The first chapter of the book introduces the different types of cryocoolers, their classification, working principles, and their design aspects, and briefly mentions some of the applications of these systems. This introductory chapter is followed by a number of contributions from prominent international researchers, each describing a specific field of application, the cooling requirements and the cryocooler systems employed. These areas of application include gas liquefaction, space technology, medical science, dilution refrigerators, missile systems, and physics research including particle accelerators. Each chapter describes the cooling requirements based on the end use, the approximate cooling load calculations, the criteria for cryocooler selection, the arrangement for cryocooler placement, the connection of the cooler to the object to be cooled, and includes genuine case studies. Intended primarily for researchers working on cryocoolers, the book will also serve as an introduction to cryocooler technology for students, and a useful reference for those using cryocooler systems in any area of application.
