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Nota di contenuto	Solar Technologies for Buildings; Contents; Preface; Abbreviations in the text; 1 Solar energy use in buildings; 1.1 Energy consumption of buildings; 1.1.1 Residential buildings; 1.1.2 Office and administrative buildings; 1.1.3 Air conditioning; 1.2 Meeting requirements by active and passive solar energy use; 1.2.1 Active solar energy use for electricity, heating and cooling; 1.2.2 Meeting heating energy requirements by passive solar energy use; 2 Solar irradiance; 2.1 Extraterrestrial solar irradiance; 2.1.1 Power and spectral distribution of solar irradiance; 2.1.2 Sun-Earth geometry 2.1.2.1 Equator coordinates2.1.2.2 Horizon coordinates; 2.1.2.3 Sun-position diagrams; 2.2 The passage of rays through the atmosphere; 2.3 Statistical production of hourly irradiance data records; 2.3.1 Daily

average values from monthly average values; 2.3.2 Hourly average values from daily average values; 2.4 Global irradiance and irradiance on inclined surfaces; 2.4.1 Direct and diffuse irradiance; 2.4.2 Conversion of global irradiance to inclined surfaces; 2.4.2.1 An isotropic diffuse irradiance model; 2.4.2.2 Diffuse irradiance model based on Perez
2.4.3 Measurement techniques for solar irradiance2.5 Shading; 3 Solar thermal energy; 3.1 Solar-thermal water collectors; 3.1.1 Innovations; 3.1.2 System overview; 3.1.3 Thermal collector types; 3.1.3.1 Swimming pool absorbers; 3.1.3.2 Flat plate collectors; 3.1.3.3 Vacuum tube collectors; 3.1.3.4 Parabolic concentrating collectors; 3.1.4 System engineering for heating drinking-water; 3.1.4.1 The solar circuit and hydraulics; 3.1.4.2 Heat storage; 3.1.4.3 Piping and circulation losses; 3.1.5 System technology for heating support
3.1.6 Large solar plants for heating drinking water with short-term stores3.1.6.1 Design of large solar plants; 3.1.7 Solar district heating; 3.1.8 Costs and economy; 3.1.9 Operational experiences and relevant standards; 3.1.10 Efficiency calculation of thermal collectors; 3.1.10.1 Temperature distribution of the absorber; 3.1.10.2 Collector efficiency factor F'; 3.1.10.3 Heat dissipation factor F(R); 3.1.10.4 Heat losses of thermal collectors; 3.1.10.5 Optical characteristics of transparent covers and absorber materials; 3.1.11 Storage modelling; 3.2 Solar air collectors
3.2.1 System engineering3.2.2 Calculation of the available thermal power of solar air collectors; 3.2.2.1 Temperature-dependent material properties of air; 3.2.2.2 Energy balance and collector efficiency factor; 3.2.2.3 Convective heat transfer in air collectors; 3.2.2.4 Thermal efficiency of air collectors; 3.2.3 Design of the air circuit; 3.2.3.1 Collector pressure losses; 3.2.3.2 Air duct systems; 4 Solar cooling; 4.1 Open cycle desiccant cooling; 4.1.1 Introduction to the technology; 4.1.2 Coupling with solar thermal collectors; 4.1.3 Costs
4.1.4 Physical and technological bases of sorption-supported air-conditioning

Sommario/riassunto

A complete overview of solar technologies relevant to the built environment, including solar thermal energy for heating and cooling, passive solar energy for daylighting and heating supply, and photovoltaics for electricity productionProvides practical examples and calculations to enable component and system simulation e.g. Calculation of U-values, I-V curve parameters and radiance distribution modellingDiscusses the new trends in thermal energy use, including the architectural integration of collector systems, integrated ventilation photovoltaics facades and solar powered abso