

Guido PERUCCHINI

PERSONAL DATA

PLACE AND DATE OF BIRTH: Milan, Italy | 22nd March 1994
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EDUCATION

Current **Politecnico di Milano**, Milan, IT
SEP 2013 BSC in ENERGY ENGINEERING
Structure and Solid Mechanics, Theoretical and Applied Mechanics, Vibrations, Thermodynamics and Heat Transfer, Fluid Mechanics, Similitude, Boundary Layer, Dimensional Analysis and Models, Electrical Power System, Industrial Distribution Networks, Fluid Machinery, Power Production Plant, Machine Design and Manufacturing, Energy Systems and Environmental Impact, Analytical and Numerical Methods, Industrial Measurements and Instruments
▷ REPORT: *Design of a test bench for analysis, modelling and optimization of refrigeration cycles based on carbon dioxide compression*

JUN 2013 **Liceo Scientifico G.B. Grassi**, Saronno, IT
SEP 2008 SCIENTIFIC HIGH SCHOOL DIPLOMA | Score 75/100
▷ STUDENT EXCHANGE PROGRAM - MUNICH

WORK EXPERIENCE

FEB 2016 | Intern Student at POLITECNICO DI MILANO, WIND TUNNEL, Milan
SEP 2015 | Supporting research group working on wind energy topics during aerodynamics and load tests in wind tunnel.
Tasks: drawing secondary AutoCAD parts of test models used in wind tunnel, inspect and guarantee dimensional tolerance and quality finish of parts. Assembling secondary parts, building test structure, instrumentation set up (pressure transducer).

Current **Web Designer and Developer, Freelance, Milan**
SEP 2010 | Developing and designing website in HTML code with php responsive forms, updating sites, FTP, understanding technical requirements, backing up information. Dealing with clients from several countries to ensure customer satisfaction.
Often in synergy: logos, brand identity, printables, newsletter

AUG 2012 | Volunteer at AGESCI SCOUT, Saronno
SEP 2011 | *Leader of Scout Group Team*
Responsibility role, experience in team working, organization of educational and recreational activities, managing of emergency situations, first-aid training

LANGUAGES

ITALIAN: Mothertongue
ENGLISH: Proficiency
GERMAN: Intermediate level

CERTIFICATES

GEN 2017 IELTS Academic Certificate; OVERALL SCORE: 7.5/9.0; LEVEL: C1
NOV 2016 TOEIC; OVERALL SCORE: 935/990; LEVEL: C1

SKILLS

Programming Languages: C, Matlab, HTML, \LaTeX
CAD Systems: Autodesk Inventor, AutoCAD, SolidEdge, SolidWorks
Statistical Computing: R-Project, Minitab
Adobe: Photoshop, Illustrator, Dreamweaver, Lightroom
Other Skills: team-working, problem-solving, critical thinking

EXTRA-CURRICULAR ACTIVITIES

Tennis competitions at pre-agonistic level
Swimming competitions at pre-agonistic level
Ski competitions at pre-agonistic level
Co-Founder of SARONNO GIOVANI student youth association
Member of AGESCI® Scout Association
Member of IEEE®

BACHELOR'S THESIS: DESIGN OF A TEST BENCH FOR ANALYSIS, MODELLING AND OPTIMIZATION OF REFRIGERATION CYCLES BASED ON CARBON DIOXIDE COMPRESSION

Abstract

The present work deals with the thermodynamic analysis of an experimental cycle based on carbon dioxide compression, with a main focus on the performance-oriented aspects. For this reason a test bench is initially characterized and at a second stage the research aims to optimize the cycle, at least at a qualitative level.

After a short review on the reversed simple thermodynamic cycle and the physics laws that determine it, the discussion moves to the choice of carbon dioxide as refrigerating liquid. These motivations gain effectiveness after the comparison of other refrigerating liquids, which are however more common and established in industrial applications. A broad description of the layout and the structure of the plant is then given together with the analysis of the operational parts and their dimensioning for the structure of the test circuit.

At this point, the dissertation covers the core of the experimental analysis on the test bench. This includes a first research on the parameters that define the performance of the cycle, an investigation on the uncertainty of these quantities and finally the characteristics of the measuring tools able to minimize this error. Once these considerations have been made, the choice of the most suitable instrument becomes of primary importance.

Given these guidelines for an operating regime, it is firstly presented the numerical simulation of the cycle, which later is completed with the optimization conditions and critical considerations. These are based on the analysis of the experimental data and describe the variation of the coefficient of performance (COP) as function of the thermodynamic cycle parameters.

Once the discussion on the test bench is concluded, the data obtained are compared to the state-of-the-art attributes and the techniques currently exploited to enhance the efficiency of common refrigerating cycles. At last, the implementation of these methods in the test bench subject of the study is elaborated.

Key words: CO₂, refrigeration cycle, compression, COP, test bench.

Refer to: polimi.academia.edu