

Indiana University – Purdue University Fort Wayne
Opus: Research & Creativity at IPFW

Manufacturing & Construction Engineering
Technology and Interior Design Senior Design
Projects

School of Engineering, Technology and Computer
Science Design Projects

4-15-1981

Cool Handle

Ronald E. Bratton

Indiana University - Purdue University Fort Wayne

Follow this and additional works at: http://opus.ipfw.edu/etcs_seniorproj_mcetid

Opus Citation

Ronald E. Bratton (1981). Cool Handle.

http://opus.ipfw.edu/etcs_seniorproj_mcetid/185

This Senior Design Project is brought to you for free and open access by the School of Engineering, Technology and Computer Science Design Projects at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in Manufacturing & Construction Engineering Technology and Interior Design Senior Design Projects by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact admin@lib.ipfw.edu.

COOL HANDLE

Submitted to Dr. W. W. Worthley
Chairman, Department of Manufacturing Technology
Indiana University-Purdue University at Fort Wayne

Submitted by R. E. Bratton
For partial fulfillment of the requirements
for Senior Project MET 497 and English W421

April 15, 1981

ABSTRACT

The COOL HANDLE is a patented silicone rubber sleeve which can be slipped over the steel handle of a commercial cooking utensil. By reducing the hand contact temperature of the utensil, this product enables the cook to safely and comfortably grasp the utensil handle. The COOL HANDLE lowers the hand contact temperature from as high as 400 F to below 130 F. This product is also designed to be durable, low cost, rigid and stable, and have retro-fit and replacement capabilities. The COOL HANDLE is fabricated from a silicone rubber material which meets the requirements of the Food and Drug Administration for repeated use in food applications. This material when tested, proved to be acceptable for thermal insulation, tensile strength, heat and flame resistance, and percent of elongation. One of the three size variations ranging in manufacturing cost from \$.31 to \$.59 each, will conform to virtually any commercial cooking utensil presently marketed. COOL HANDLES are transferred molded in three sets (one for each size) of multi-cavity tooling, then packaged in windowed display cards which are used for merchandizing. Market research indicates that expected first year sales volume for the COOL HANDLES will be approximately twelve percent of the nations estimated 3.3 million commercial fry and sauce pans. The costs incurred for the development of the COOL HANDLE was \$ [REDACTED] for design and testing, and \$ [REDACTED] for production.

TABLE OF CONTENTS

Title Page	i
Abstract	i
Index to Tables and Figures	iii
Introduction	iv
Objective	iv
I. COOL HANDLE, an Overview	1
A. COOL HANDLE Design	1
B. COOL HANDLE Material	2
II. Design Parameters	2
A. COOL HANDLE Design Criteria	2
B. COOL HANDLE Material Criteria	4
III. Development Process	4
A. Material Search	4
B. Material Selection	6
C. Design	7
D. Prototype Manufacture	11
IV. Testing	11
A. Heat and Flame Resistance	11
B. Insertion and Removal Wear	13
C. Oil and Wash Resistance	14
D. Handle Adaptability	14
V. Production	15
A. Method of Production	15
B. Tooling	15
C. Packaging	15
VI. Anticipated Sales Level	16
A. Market Potential	16
B. Expected Level of Customer Acceptance	16
VII. Costs	18
A. Development	18
B. Production	18
C. End Product	18
Summary	19
Bibliography	20
Appendix A - Physical Properties of Materials Evaluated	21
Appendix B - A Study of the Characteristics of Silicone Rubber	26
Appendix C - COOL HANDLE Design	56
Appendix D - Patent Search	64
Appendix E - COOL HANDLE Patent	98
Appendix F - Test Data	105
Appendix G - Market Research	113
Appendix H - COOL HANDLE Costing	116

INDEX to TABLES and FIGURES

FIGURES

1. COOL HANDLE	iv
2. COOL HANDLES ready for use	1
3. COOL HANDLE features	2
4. COOL HANDLE preliminary rendering	8
5. COOL HANDLE wall thickness vs. hand contact temperature	10
6. Heat and Flame Resistance Test Fixture	12
7. Insertion and Removal Wear Test Fixture	14
8. COOL HANDLE display	16

TABLES

1. Various silicone rubber compounds	6
2. Market segments and geographical regions with sample size	17