

Metalcasting: A Sand Casting Manual for the Small Foundry Vol. I

By Stephen D. Chastain

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The Small Foundry Series by Stephen Chastain
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Volume I. Iron Melting Cupola Furnaces for the Small Foundry
Volume II. Build an Oil-Fired Tilting Furnace
Volume III. Metal Casting: A Sand Casting Manual Vol. I
Volume IV. Metal Casting: A Sand Casting Manual Vol. II

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WARNING – DISCLAIMER

This book is to provide information on the methods the author used to operate a small foundry. Foundry work can be dangerous. No attempt has been made to point out all of the dangers or even a majority of them. Although the information has been researched and believed to be accurate, no liability is assumed for the use of the information contained in this book. If you do not wish to be bound by the above, you may return the book for a full refund.

Warning: Molten metal and high intensity combustion can be dangerous. Incomplete combustion produces carbon monoxide, a poisonous gas. Only operate a furnace outdoors. Stay clear of all ports when a furnace is in operation. Observe all rules regarding safe foundry practice. Do not attempt to melt metal if you are not qualified. Do not use gasoline or other low flashpoint fuels to light a furnace. Do not spill molten metal on yourself, others or any wet or damp surface. Always wear protective gear. Observe all regulations regarding the safe handling of gaseous and liquid fuels. Safety is your primary responsibility.

TABLE OF CONTENTS VOLUME I

Purpose & Introduction	5
Health and Safety	7
I. THE SAND CASTING PROCESS	9
The sand casting process	9
Basic Foundry Equipment	10
II. FOUNDRY PROJECTS:	21
Make a Match Plate Vibrator	21
Mold Making	29
Making Wooden Flasks	40
Making Flask Hardware	47
Making an Aluminum Flask	54
Rammer	57
Hardware Patents	59
III. MELTING EQUIPMENT	61
Crucibles and Ladles	61
Furnaces for the Small Foundry	70
Beginner's Charcoal Furnace	75
Stepping up to a Gas Fired Furnace	84
Forming Sheet Metal for Furnaces	98
IV. TEMPERATURE MEASUREMENT	113
Temperature Measurement	113
Thermocouples	114

Making a Thermocouple Thermometer	117
Optical Pyrometers	121
V. FOUNDRY SANDS AND BINDERS	126
Molding Sand	126
Clays	145
Mullers and Mulling	148
Cement Binders	150
Development of Oil Bonded Sand	153
Petro Bond	154
Furan Binders	158
VI. COREMAKING	160
Cores	160
Core Binders	169
Baking Cores	173
Core Finishing	179
Core Jigs	183
Core Buoyancy	185
Strainer Cores	191
Core Coatings	193
BIBLIOGRAPHY	196
APPENDIX	197
SUPPLIERS	202
INDEX	204

Continued In Volume II

PURPOSE:

The purpose of this book, volumes I and II, is to describe and demonstrate the basic sand casting process so it may be successfully applied to the small foundry. The book will cover green sand molding, skin dried and dry sand molds. Sands, core practice, mold washes and basic molding equipment are described, as well as the basic principles of gating and risering. A brief introduction to the metallurgy of cast iron, copper based alloys and aluminum are presented. Construction of small furnaces and various pieces of small foundry equipment are included so that you can build your own equipment as your foundry grows. Temperature measurement, an introduction to pattern making and typical automotive casting of the 1930's complete the sand casting books.

This book is not intended to be an exhaustive study of foundry practice. It is deliberately focused on low-tech readily available binders such as clay, linseed oil and molasses. Man has cast metals for thousands of years before modern polymer binders, petro-bond, cast Styrofoam patterns, and air set sand were available. Your grandfather probably drove a car with an engine cast in a skin dried mold sprayed with molasses water and pasted up cores made of sand and linseed oil. They work as well today as they did then.

Metal casting has been an art long before it was a science. In some areas the science has yet to catch up with the art. Basic theories are presented to help you design or troubleshoot your work as your casting projects become more complicated. As with all the books in the "Small Foundry Series," math is included as a tool or to help explain an idea. The math is not difficult and may be done on \$9.95 scientific calculator (read the instructions for the calculator). Tables and graphs are provided where calculations are long and tedious.