PRECISION OPTICAL GLASSWORKING

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PRECISION OPTICAL GLASSWORKING

A manual for the manufacture,
testing and design of precision
optical components and the
training of optical craftsmen

W. Zschommler

English translation by G. K. Sachdev and J. Maxwell of *Feinoptik-
Glasbearbeitung (Werkkunde für den Feinoptiker)*

Additional chapters by G. K. Sachdev and J. Maxwell

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Preface to German Edition

The original inspiration for this book is to be found in a series of slide lectures describing the manufacture of optical components in America, which were held before audiences of production engineers in Wetzlar in the post-war years of reconstruction.

Compiled for vocational training purposes, this book on the manufacture of optical components, from simple handwork to modern machine finishing, aims to provide the optical worker and the recently qualified engineer engaged in optics with a much needed companion volume to the many books that exist in the fields of theoretical optics and mechanical engineering.

The description of the fundamentals of optical manufacture is intended to perform the same function as technical lectures for beginners and also for qualified engineers who want to set up modern economic optical production and who cannot do so without an understanding of the work processes. It is a peculiarity of optics, in contrast to mechanical manufacture, that very little is published on the actual work processes. Only comparatively few engineers have a knowledge of optical manufacture, for which the necessary training is customarily obtained only by an apprenticeship in the optical trade. It is therefore a further purpose of this book to present this training in a form suitable for the self-tuition of engineers.

For a further understanding of the work processes in optics it is advisable to consult the German national standard of optics manufacture DIN 3140. This contains many practical hints for the testing of optical parts and also guidelines for maintaining optical manufacturing tolerances, with many manufacturing hints and guidelines for the preparation of the optical drawings that are used in modern industry.

Wetzlar, June 1963

Willy Zschommler

Translators' Foreword

When students of optics, engineers, apprentices, craftsmen and specialist technicians look for books on optical manufacturing in the English language, they find that very few have ever been published and these are mostly out of print. Even when they do manage to find a copy of one of these books in a technical library or preserved lovingly by one of the older craftsmen, they may find the information they require but they do not find a compact textbook that leads them systematically through the various stages of optical component manufacture.

While young workers in the metal-based industries have a number of good textbooks and a range of well organised courses linked to qualifications and a career structure, the trainee in optical manufacturing usually has no such support, and it is our intention in translating, updating and extending this book to help them in this direction by providing a suitable guide book.

W. Zschommler's book *Feinoptik-Glasbearbeitung* stands out in the literature as a very complete, compact, logical and graphic account of the principles and details of both traditional and modern methods of glassworking, as followed for both small quantity and large volume manufacturing.

The late Willy Zschommler had an extensive knowledge of the optical industry and much experience as a teacher of young craftsmen. His book is the result of a number of illustrated lectures for craftsmen and engineers in the optical industry, which have been turned into a profusely illustrated manual of optical glassworking. The subject matter is treated in a systematic and logical fashion and it deals with every aspect of optical component manufacture from basic workshop principles to modern high-speed processing methods such as diamond smoothing and polyurethane polishing. The emphasis at all stages of the book is on the development of economic processing methods matched to the required component tolerances, so that the material is also particularly well suited to the needs of production engineers and workshop foremen.

In translating this book we have not only brought the original text up to date but we have also added a second part, which is an introduction to the detailed

specification of optical systems, optical calculations, lens design and the interferometric testing of optical components and subassemblies. We believe that the modern optical technician requires a greater breadth of knowledge than was formerly the case, to meet the sophisticated demands of modern optical manufacturing. It is hoped that this part of the book will encourage the reader to take advantage of the microelectronic revolution, have a go at simple optical calculations and also make more use of the powerful methods of interferometric testing which are so appropriate to the needs of optical manufacturing.

It now gives us particular pleasure to be able to record our thanks to our respective wives, Raj and Janet, for their patient support during our labours of translation, and also to Mrs Shobha Kumar for her help in preparing the manuscript. We would also like to thank the many senior craftsmen, engineers and technicians, unfortunately too numerous to mention individually, with whom it has been our honour to work over the years and for whose successors this book is intended.

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