

# HANDBOOK OF POLYOLIFERMS

Second Edition, Revised and Expanded

edited by

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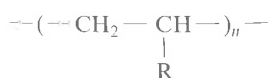
## Mechanical Properties and Parameters of Polyolefins

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## I. INTRODUCTION

This chapter is an extended and updated review of the systematized data on the mechanical properties of polyolefins (PO). The mode of presentation from the first edition of *Handbook of Polyolefins* as used by Bogdanov [1] has been adopted. This kind of presentation was considered very useful for readers involved in PO manufacture, processing, application, and research.

The data presented refer to the most important POs with the general formulae:



(a) with R = H, polyethylene (PE):

High density polyethylene (HDPE) and ultrahigh molecular weight polymer (UHMWHDPE);  
Low density polyethylene with branched carbon backbone (LDPE) or linear carbon backbone (LLDPE);  
Random copolymer ethylene/ $\alpha$ -olefins.

(b) with R = CH<sub>3</sub>, polypropylene (PP):

Isotactic polypropylene (IPP);  
Syndiotactic polypropylene (SPP);  
Atactic polypropylene (APP);  
Ethylene-propylene block copolymers with isotactic polypropylene segments (I-PEP).

New commercial grades of polyethylenes synthesized with both Ziegler-Natta and metallocene catalysts were included.

The selected mechanical properties refer to one-component polyolefin systems.

These properties as well as their dependences on various factors ( $F_i$ )—Pr( $F_i$ )—are presented in Table 1 where the literature (articles, monographs, encyclopaedias, handbooks, etc.) containing information about them is classified. Only a limited number of data are presented here in tabular and graphical form. All properties and dependences presented in tabular and graphical form are accompanied by corresponding references which are underlined in Table 1.

The text, abbreviation, and symbols to the data from the English references in graphic and tabular form are not changed (original) or insignificantly changed; those from the references in other languages are translated using our own terms and abbreviations; data in tabular form are not given fully because of the limited number of pages.

## II. MECHANICAL PROPERTIES

Only mechanical properties (behavior) (Mch. Pr.) of PO are chosen mainly at uniaxial strain.

Selected mechanical properties and parameters as well as their dependences on definite factors are presented in Tables 2–14 and Figs. 1–96.

(Text continues on p 271)



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