

THE POCKET ILLUSTRATED
DICTIONARY OF
ENGINEERING
TERMS

R. L. TIMINGS and P. TWIGG



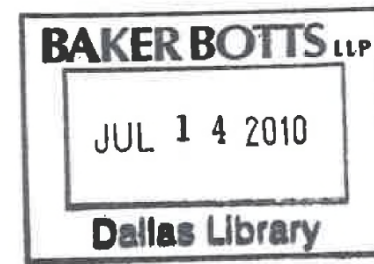
**The Pocket Illustrated Dictionary
of Engineering Terms**

RECEIVED

Property of the
Dallas Library of
Baker Botts, L.L.P.

The Pocket Illustrated Dictionary of Engineering Terms

R.L. Timings
P. Twigg



BUTTERWORTH
HEINEMANN

OXFORD AUCKLAND BOSTON JOHANNESBURG MELBOURNE NEW DELHI

Butterworth-Heinemann
Linacre House, Jordan Hill, Oxford OX2 8DP
225 Wildwood Avenue, Woburn, MA 01801-2041
A division of Reed Educational and Professional Publishing Ltd

 A member of the Reed Elsevier plc group

First published 2001

© R.L. Timings and P. Twigg 2001

All rights reserved. No part of this publication may be reproduced in any material form (including photocopying or storing in any medium by electronic means and whether or not transiently or incidentally to some other use of this publication) without the written permission of the copyright holder except in accordance with the provisions of the Copyright, Designs and Patents Act 1988 or under the terms of a licence issued by the Copyright Licensing Agency Ltd, 90 Tottenham Court Road, London, England W1P 9HE. Applications for the copyright holder's written permission to reproduce any part of this publication should be addressed to the publishers

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

ISBN 0 7506 5071 0

Typeset at Replika Press Pvt Ltd, 100% EOU, Delhi 110 040, India
Printed by Gutenberg Press, Malta



Introduction

It is the intention of the authors that this dictionary should assist students of general engineering design and manufacture in their studies. It is suitable for students at various levels of study up to and including higher technicians, both BTEC and graduate.

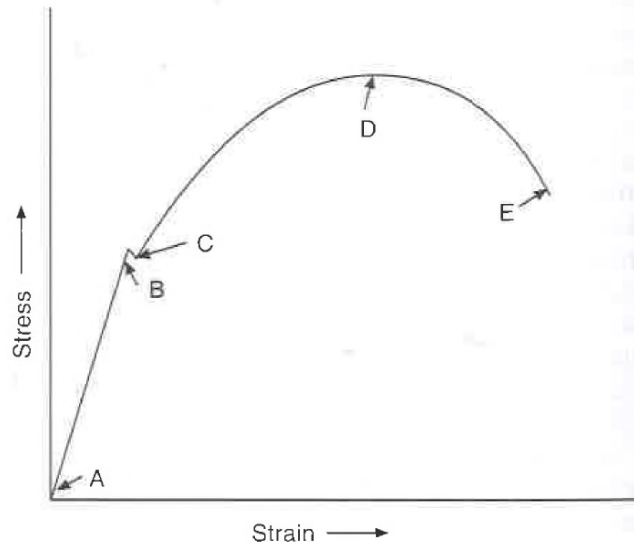
The length of any dictionary is determined by commercial considerations and this one is no exception. Therefore, the authors have endeavoured to give as broad a coverage as possible within reasonable limits of size and cost. To this end, four main topic areas have been considered and the number of definitions has been shared almost equally between these topic areas.

- mathematics and statistics,
- engineering science,
- electrical engineering, electronic engineering and information technology,
- mechanical engineering, manufacture, computer-aided engineering and materials.

In addition, there are a number of appendices covering such topic areas as Laplace transforms and standard forms for derivatives and integrals, together with tables of SI units and conversion factors.

The definition of many engineering terms depends on the context in which the term is used. For example, a *filter* is a device for removing foreign matter from an oil when considering lubrication, but a *filter* can also be an electrical circuit for accepting or rejecting a signal of a particular frequency or band of frequencies. Therefore, to avoid confusion, each headword (in bold type) is followed by

extension of the sample specimen is measured for each increase in load. The results are then plotted on a graph whose axes will be either load and extension or stress and strain. An example of a stress/strain curve for annealed mild steel is shown in Fig. T.2.



- A → B Elastic deformation (Strain is proportional to stress)
- B Elastic limit (Limit of proportionality)
- C Yield point
- C → E Plastic deformation
- D Ultimate tensile stress for the material (UTS)
- E Breaking stress

Fig. T.2 Typical Tensile Test Curve for Annealed low-carbon (mild) steel

tension (*sci*) When two direct forces acting in opposite directions in the same plane are applied to a material so that they tend to stretch it, the material is said to be *in tension*.

terminal potential difference (*elec*) The measured potential across the terminals of a source of electrical energy when a load is applied to that source. All sources of electrical energy have an *internal resistance* that is in series with the external load resistance. The e.m.f. of the source is measured at the terminals under *no-load* conditions. As soon as a load is connected, the terminal potential falls and the e.m.f. becomes the sum of the potential differences across the internal resistance and the external load. The greater the external load the lower will be the terminal potential difference. This is why the lights of a car dim when the starter is operated.

tesla (*elec*) Unit of magnetic flux density, symbol T ; $1\ T = 1\ \text{Wb}/\text{m}^2$.

thermal conduction (*sci*) See: *conduction*.

thermal insulation (*sci*) See: *insulation*.

thermistor (*elec*) Semiconductor sensing element used for temperature measurement. Its decrease in resistance is proportional to the rise in temperature.

thermocouple (*sci*) Device comprised of two dissimilar electrical conductors welded together at the ends to form a circuit. It is used as a sensing element to measure temperature. The junction of the two dissimilar metals is called the *hot junction* and the connection to an indicating instrument is called the *cold junction*. If a temperature difference occurs between the two junctions an electric current will flow around the circuit. This is proportional to the temperature difference and can be measured. Usually the cold junction is kept as a reference and the hot junction is applied as the sensing element. See: *pyrometer*.

thermodynamics—first law (*sci*) This states that: 'when a system undergoes a thermodynamic cycle, the net heat supplied from the surroundings to the system is equal to the net work done on the surroundings by the system'. This is a particular form of the *principle of conservation of energy*. For a system that is not a