



GENERAL CARBIDE®

THE DESIGNER'S GUIDE TO TUNGSTEN CARBIDE

Shaping Your Success

$$\delta = \frac{bP}{E_s} \left[\frac{b^2 + c^2}{c^2 - b^2} + \mu_s \right] + \frac{bP}{E_c} \left[\frac{a^2 + b^2}{b^2 - a^2} - \mu_c \right]$$

EDM

Brazing Procedures

carbide

Shrink Fit Assembly

Corrosion Resistance

c

wc

Industrial Adhesives

$$E = \frac{\sigma}{\epsilon}$$

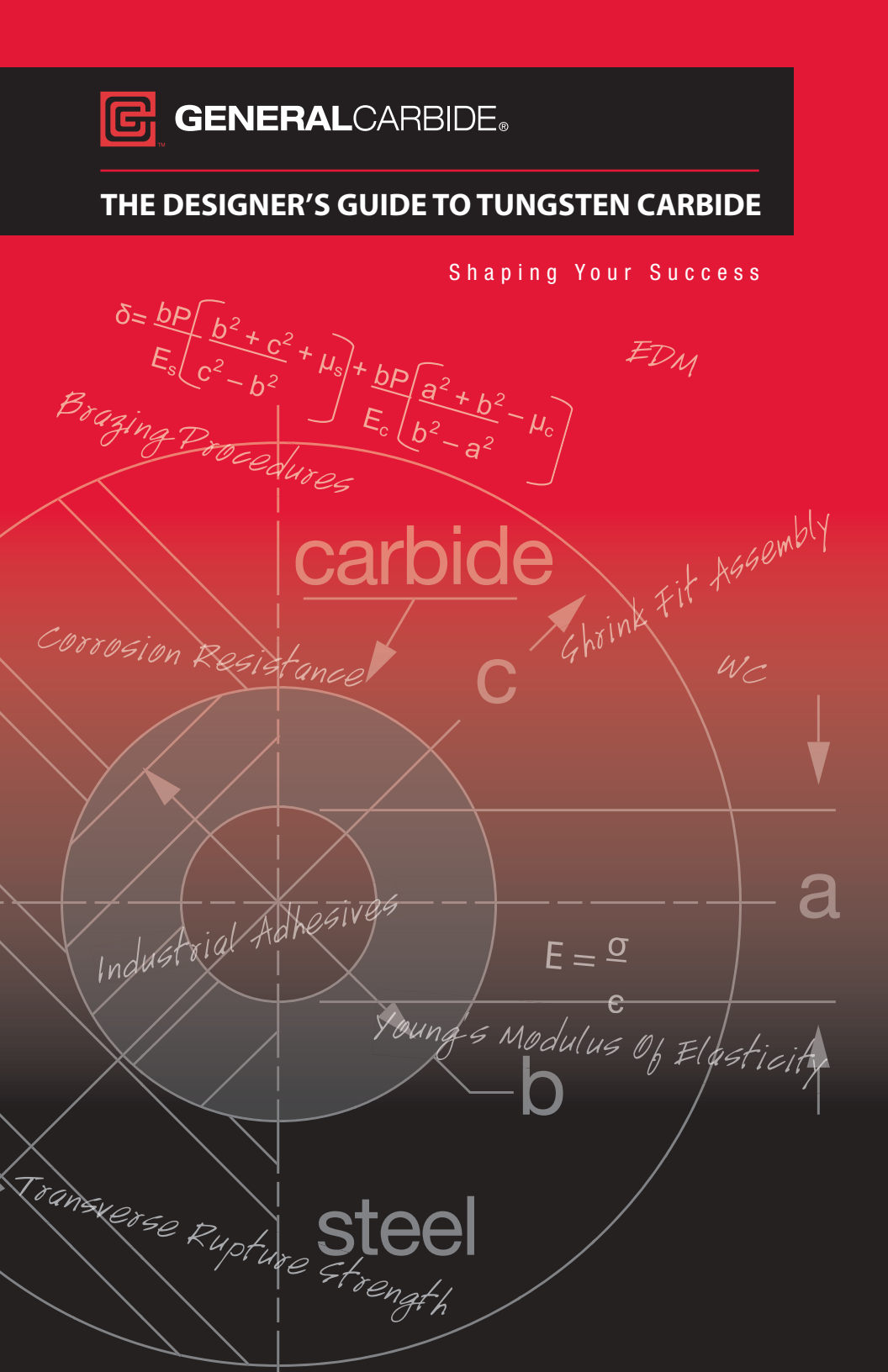
Young's Modulus of Elasticity

a

b

steel

Transverse Rupture Strength



Grade Selection Made Easier

Tungsten Carbide Tooling Selection a Click Away

If you're looking for a better way to determine the tungsten carbide grade that's right for your specific applications, General Carbide can help.

Our new Grade Selector Guide is accessible on our web site at www.generalcarbide.com/gradeselector

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Grade Selector

To identify the correct grade for your application, use our Grade Selector at right.

To identify your industry, use this drop-down menu.

Industry

SUBMIT

If your industry is not listed, call **Thomas R. Shearer**, Director of Marketing and Business Development at **800.245.2465** or **724.836.3000**, or e-mail sales@generalcarbide.com.

The Guide features a step-by-step process that gives you the proper grade selection based on your answers to questions about application parameters and operating environment.

By using the Guide, you'll:

- Simplify the grade selection process
- Accelerate turnaround times for your customers
- Maximize wear life of your tungsten carbide wear parts & tooling

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Introduction

This publication is a reference guide for designers, engineers, fabricators and end users of tungsten carbide material. Specifically, it is a compilation of recommendations derived from practical experience, theoretical stress analysis, proven application engineering practices and modern manufacturing techniques. It will enable the reader to gain insights to best practices for using one of the most unique engineering materials available today.

It has been said that the tool materials of one generation become the engineering materials of the next generation. This observation is certainly true of tungsten carbide. It is a material that has been around since the early 1920s, replacing tool steel in most cutting tool applications and developed into an engineering material used to resist the harshest environments of corrosion, high temperature, impact, high compressive loads, deformation and severe abrasion.

Tungsten carbide competes with advanced ceramics in the wear parts arena, but just as it did not totally displace tool steel, advanced ceramics can not replace tungsten carbide. The reason is that tungsten carbide exhibits superior toughness given its high hardness, which has enabled it to enjoy tremendous growth as a tooling and engineering material.

By using this manual, everyone involved in designing with or using tungsten carbide will have the necessary knowledge for helping to ensure successful and reliable designs for tooling and wear parts.



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