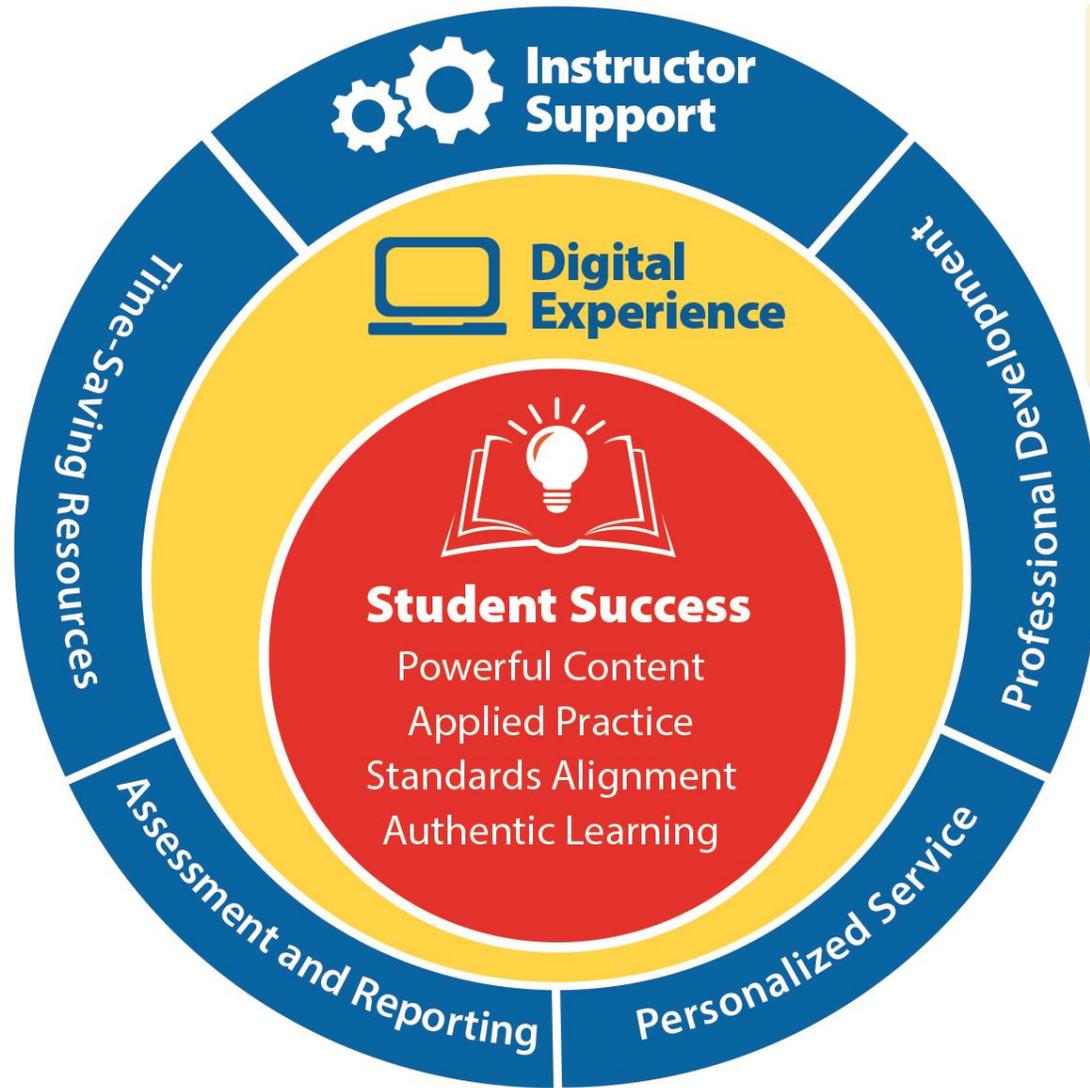


Print Reading for Industry



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Student Success Is At the Heart of What We Do



- ✓ Prepare for class
- ✓ Reinforce new concepts
- ✓ Assess learning

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1 Prints: The Language of Industry

1 Resources

- Textbook Textbook Answer Key
- Lesson Plan

1 Presentations

- Instructor's Presentation
- Instructor's Presentation for

2 Line Conventions and Lettering

2 Resources

- Textbook Textbook Answer Key
- Lesson Plan

2 Presentations

- Instructor's Presentation
- Instructor's Presentation for

Resource Materials

Instructor's Materials

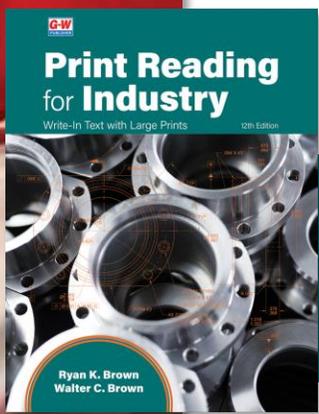
- Release Notes (Updated 8/28/2024)
- Introduction

Textbook Prints PDF Files

- PR 2-1. External Idler Gear
- PR 2-2. Talk-Holder
- PR 3-1. Needle Valve
- PR 3-2. A-42 Swivel Unit Assembly
- PR 4-1. Dual DS Front Cam 2
- PR 4-2. Dead Bolt Locking Pawl

Large AP Bonus Print PDFs

- Body
- MVE2A (Assembly)
- Housing
- Thermal Barrier Support Bracket
- Multifunctional Switch Bracket Assembly
- Lower Chamber-Baker
- Valve Seat Module
- Spline Shaft
- Switch Actuator Assembly
- Shuttle Shaft-Weldment
- Water Pump Fan Pulley



Lesson Plans, PowerPoint Presentations, and Answer Keys

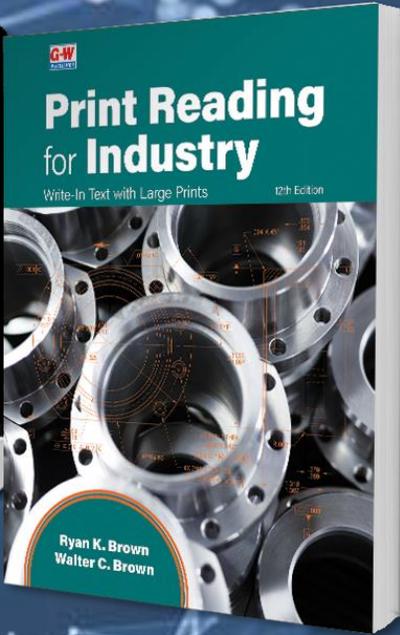
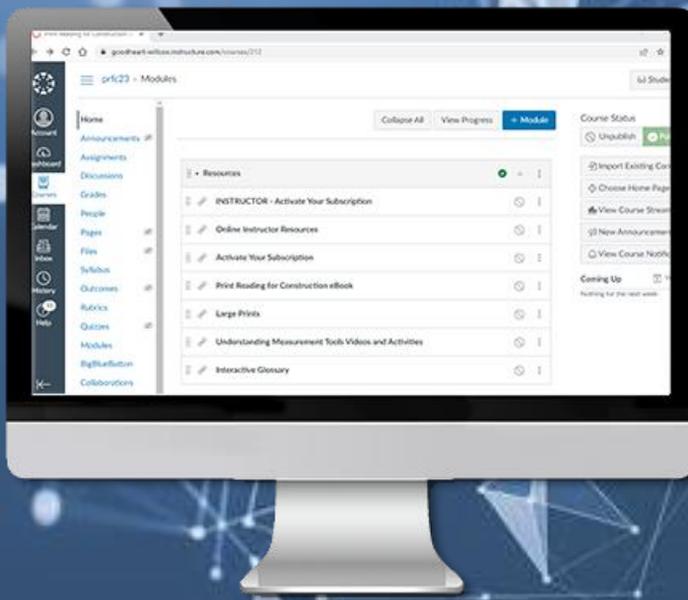


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LMS and CMS Integration Easy Navigation

2: E-Flash Cards

Definition (1 of 31)

Item of value that is owned.

2: E-Flash Cards

Term (1 of 31)

asset

Select to flip

Previous Remove Next

E-Flash Cards & Vocabulary Practice

2: Vocabulary Game

Select a point value. Choose the term that matches the definition.

Score: 800

<input checked="" type="radio"/>	100	100	100	100
<input type="radio"/>	200	200	200	200
<input type="radio"/>	300	<input checked="" type="radio"/>	300	300
<input type="radio"/>	400	400	400	<input checked="" type="radio"/>

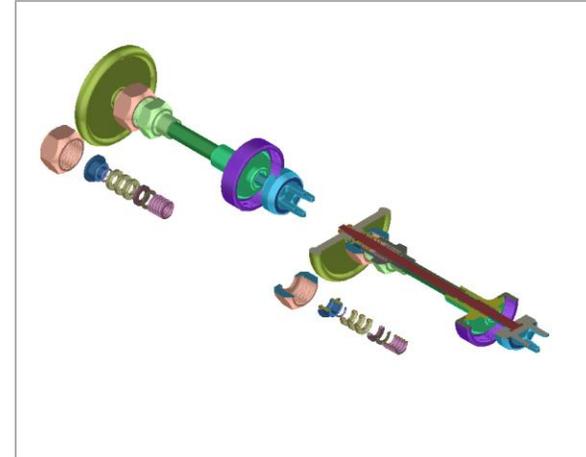
Definition: Act of giving money, goods, or services to meet the needs of others and support causes that are important to an individual.

- pay yourself first
- variable expense
- recordkeeping
- philanthropy

Check Answer

Interactive Activities

Large Prints & 3D Files



A	∅ 4.08 +0/-0.08	3	1	-	0991-9433	STUD-M4 X 0.7 X 10 LONG PRESS	3
B	∅ 3.2	2					

207.5±0.5
-175
-169.1

3X ∅1 PRESS IN "A" HOLES FROM FAR SIDE

AS REQUIRED BOTH SIDES

FORMED VIEW

MATERIAL: CONTROLLED FABRICATION
LESS OTHERWISE SPECIFIED

TOLERANCES:
 BETWEEN DATUM AND PARALLEL CENTERLINES: ±0.4
 BETWEEN DATUM AND PARALLEL EDGES: ±0.4
 BETWEEN PARALLEL CENTERLINES: ±0.25
 BETWEEN PARALLEL EDGES: ±0.25
 HOLE SIZES TOLERANCES:
 <12: ±0.15
 >12: +0.25/-0.15
 SCALLOPED EDGES ARE PERMITTED UNLESS INDICATED.
 BEND DEDUCTION USED IN CALCULATING FLAT PATTERN: 3.79 @90°
 INSIDE BEND RADIUS: 2
 FORMED VIEW DIMENSIONS ARE TO THE OUTSIDE OF BENDS
 BEND VIEW DIMENSION TOLERANCE: ±0.5

DO NOT SCALE DRAWING

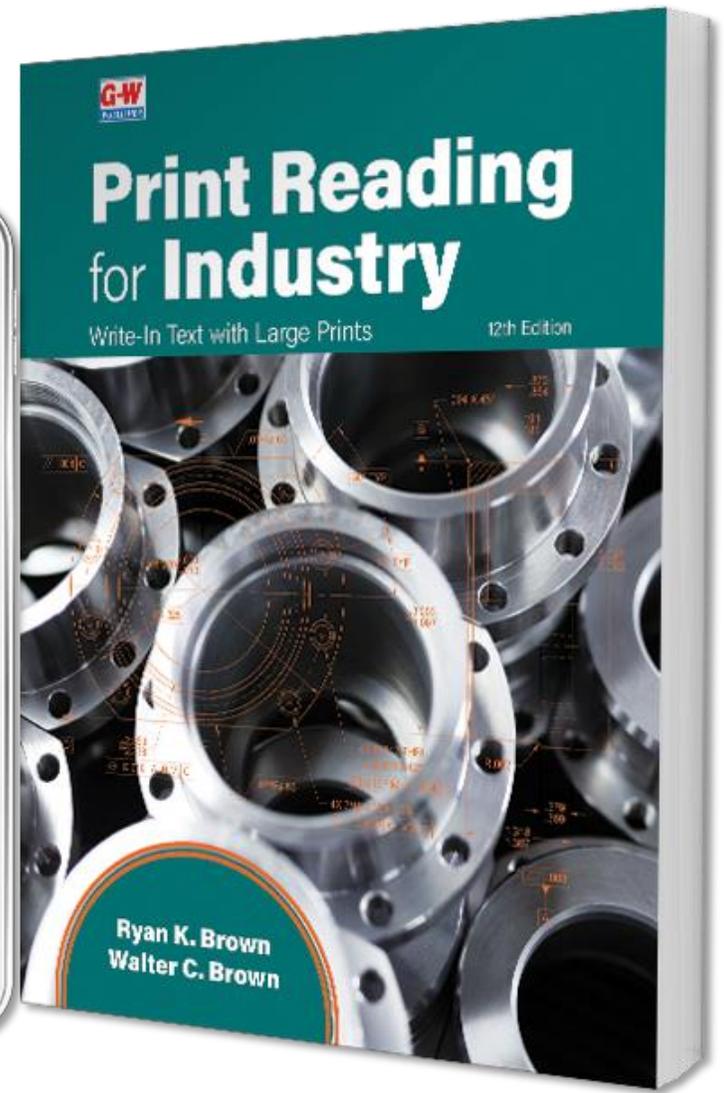
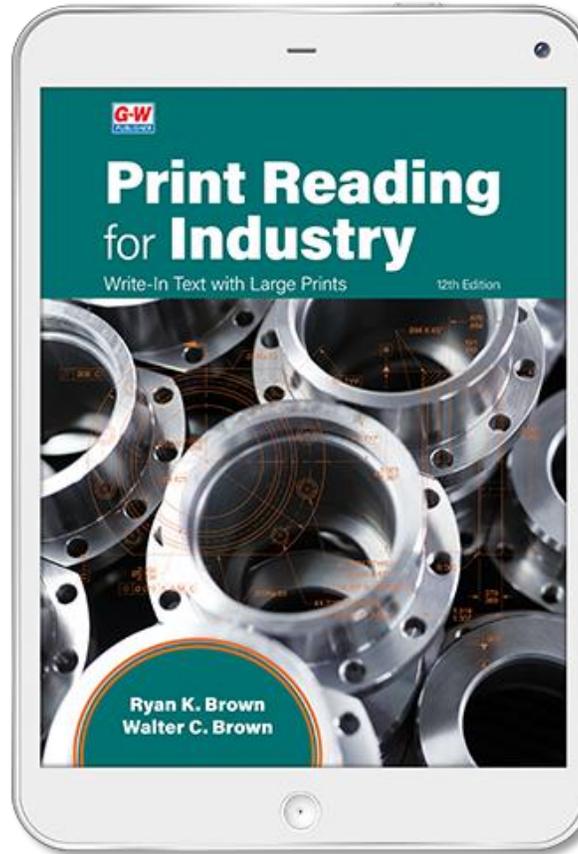
MATERIAL:		DRAWN:		DATE:	
2 THICK #5052-H32 ALUMINUM		JVDH		5/18/XX	
FINISH:		CHECKED:		DATE:	
SEE NEXT ASSEMBLY		KELLOGG		7/15/XX	
SCALE:		PROJ ENGR:		DATE:	
1:1		CLARK		7/15/XX	
SIZE:		APPROVED:		DATE:	
D		CLARK		8/7/XX	

WCB ENGINEERING

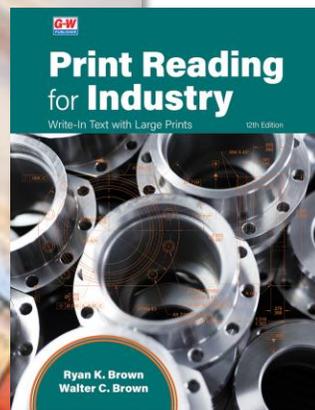
BRACKET-FAIR ELECT SWITCH

N630-1028

Integrate G-W Digital Resources



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Section 1 Introduction to Drafting and Print Reading

- 1 Prints: The Language of Industry
- 2 Line Conventions and Lettering
- 3 Title Blocks and Parts Lists

Section 2 Fundamentals of Shape Description

- 4 Geometric Terms and Construction
- 5 Multiview Drawings
- 6 Section Views
- 7 Auxiliary Views
- 8 Screw Thread Representation

Section 3 Fundamentals of Size Description and Annotations

- 9 Dimensioning
- 10 Tolerancing
- 11 Machining Specifications and Drawing Notes
- 12 Surface Texture Symbols
- 13 Geometric Dimensioning and Tolerancing
- 14 Drawing Revision Systems

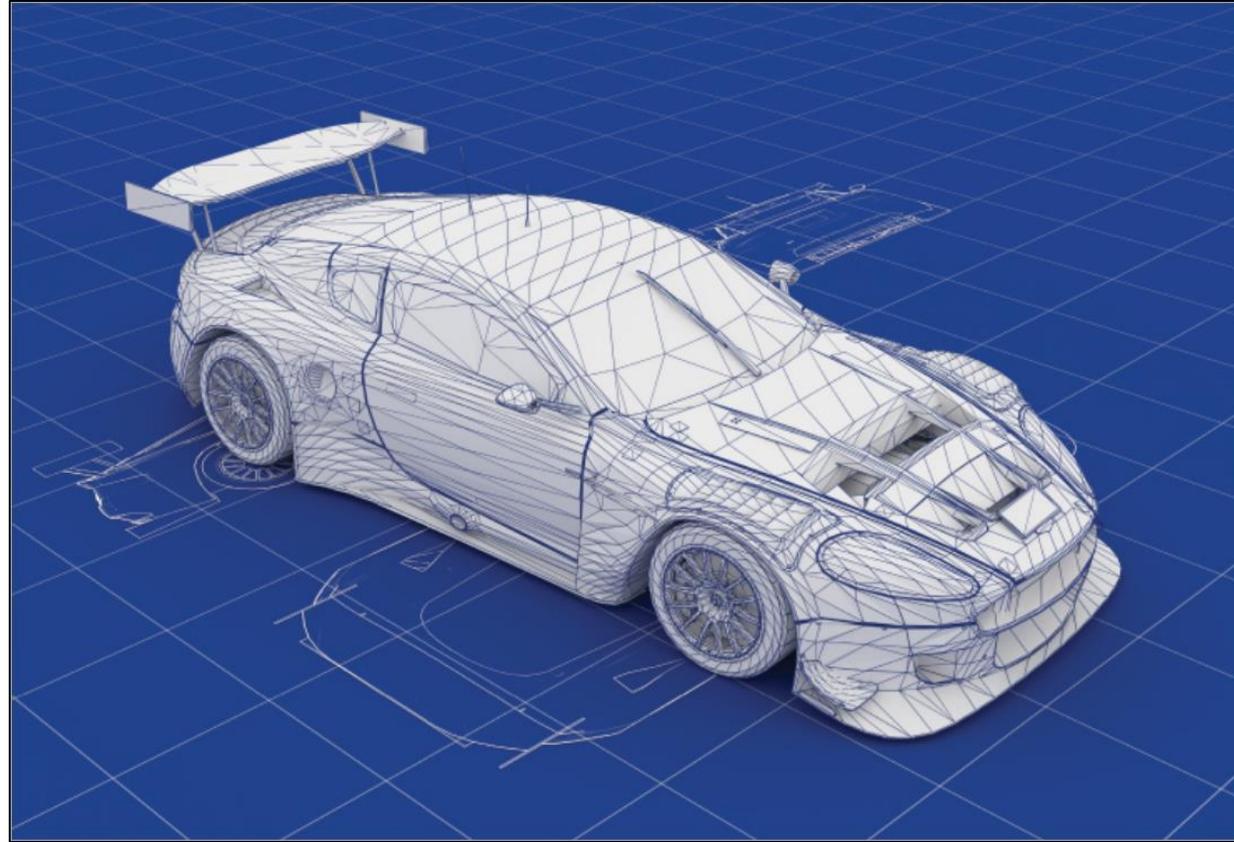
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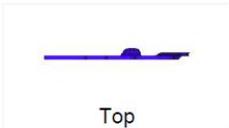
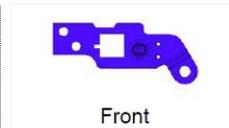
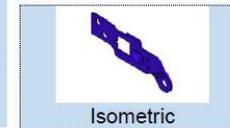
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- 20 Plastic Parts
- 21 Precision Sheet Metal Parts
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Student Textbook



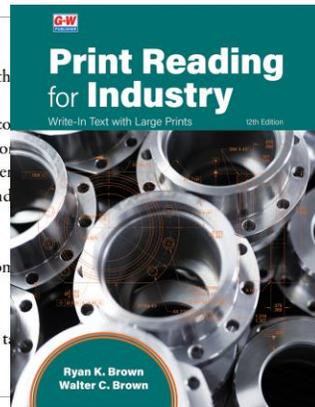
Print Reading for Industry



Pipe Thread Designations

Within reference materials, many common acronyms are found throughout the descriptions of pipe threads found in thread specification notes:

- NPT (National Pipe Taper). Common tapered pipe thread for general use; needs sealant tape or compound
- NPS (National Pipe Straight). Straight pipe thread; good rigidity; sealable with O-ring or gasket, or sealant
- NPTF (National Pipe Taper Fuel). Version of NPT, especially for fuel connections, featuring tighter tolerances
- NPSF (National Pipe Straight Fuel). Straight internal thread to mate with an NPTF external thread
- NPTR (National Pipe Taper Railing). Tapered pipe thread for railing joints
- NPSM (National Pipe Straight Mechanical). Straight pipe thread for general couplings
- NPSL (National Pipe Straight Loose). For loose-fitting mechanical joints with locknuts
- NPSH (National Pipe Straight Hose). For hose coupling applications
- PTF-SAE SHORT (Pipe Thread Fuel-Society of Automotive Engineers-Short). Dryseal SAE short thread
- NPSI (National Pipe Straight-Intermediate). Dryseal intermediate internal straight pipe thread



What's New to the Edition

UNIT 1

Prints: The Language of Industry

LEARNING OUTCOMES

After completing this unit, you will be able to:

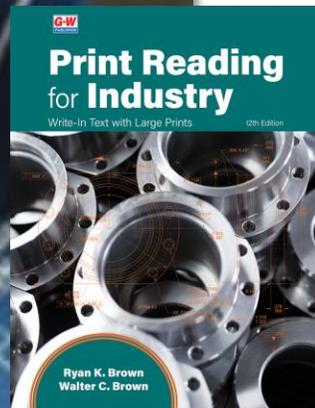
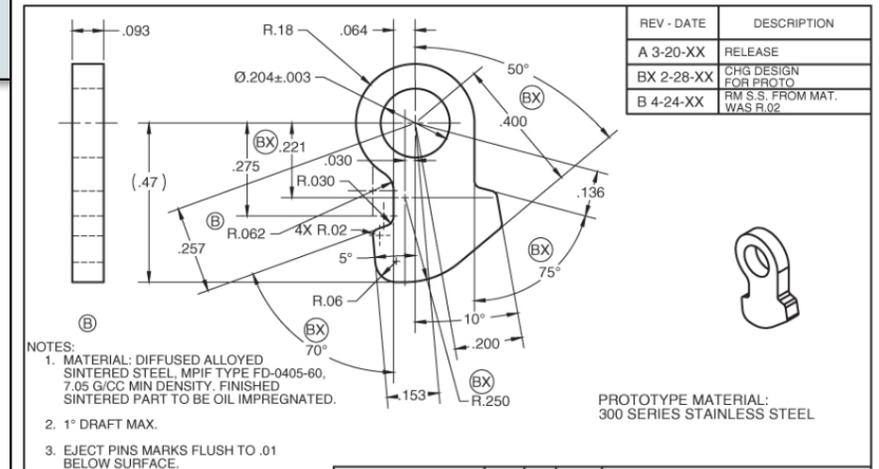
- 1.1 Identify the importance of prints.
- 1.2 Discuss historical processes and technologies related to prints.
- 1.3 Explain how prints are produced.
- 1.4 Identify and define terms related to prints.
- 1.5 Identify two important elements of print reading.
- 1.6 Describe a sequence of steps that are important to print reading.
- 1.7 Identify ways in which to care for paper prints.
- 1.8 Identify and discuss options for using prints in an electronic (digital) format.
- 1.9 Discuss the role of various organizations in the standardization of drawings.
- 1.10 Explain the historical and current role of prints in the design process.
- 1.11 Describe additive manufacturing and its role in the design process and prints.
- 1.12 Discuss trends in engineering documentation that may reduce the need for paper prints.

TECHNICAL TERMS

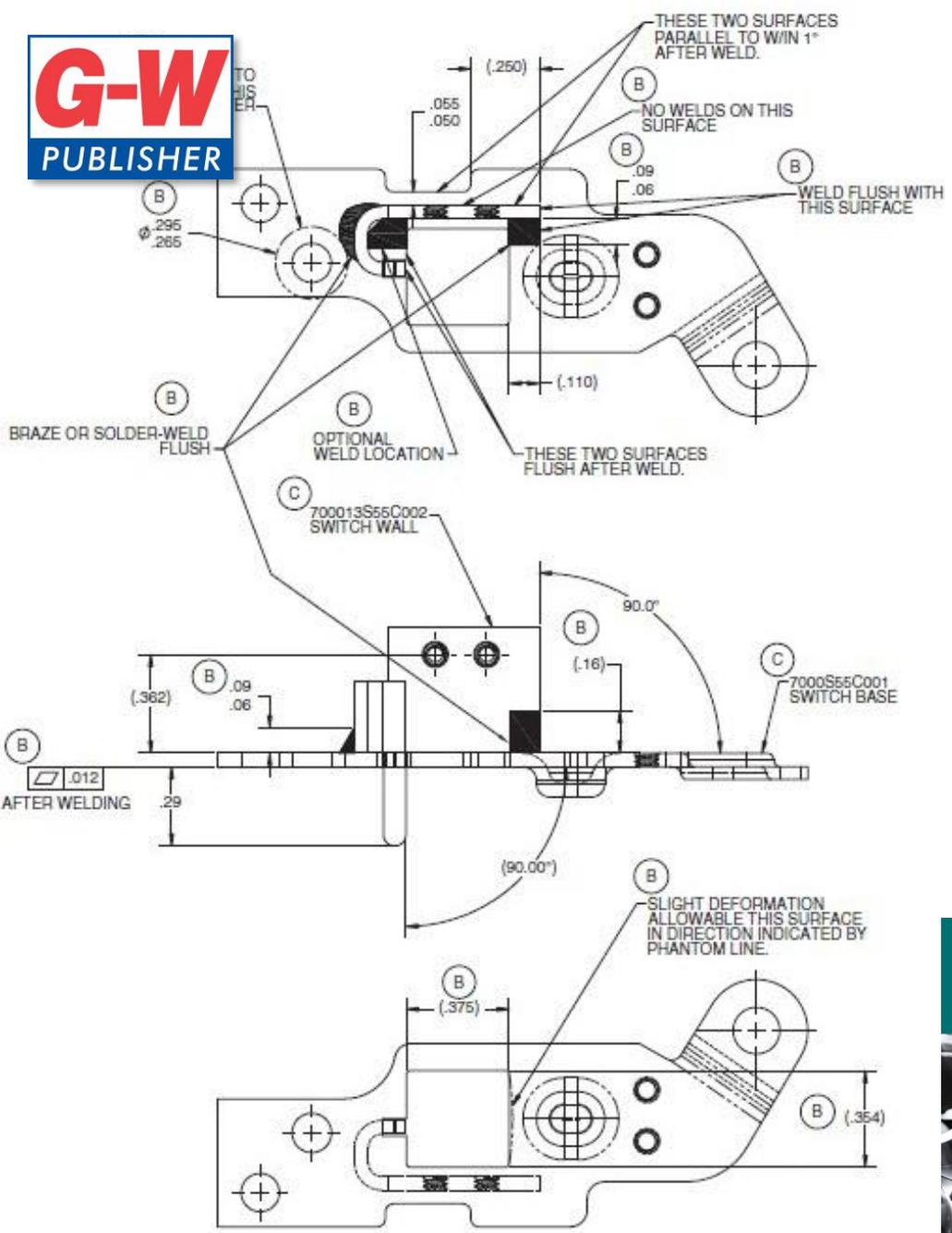
- additive manufacturing
- American Society of Mechanical Engineers (ASME)
- blueprint
- computer-aided engineering (CAE)
- design process
- design web format (DWF)
- diazo
- drafting

Introduction

You have probably heard the saying, "a picture is worth a thousand words." This is certainly true when referring to a drawing of a product. It would be next to impossible for an engineer or designer to describe in words the shape, size, and relationship of the various parts of a machine in sufficient detail for skilled workers to produce the object. Drawings are the universal language used by engineers, designers, technicians, and skilled workers to quickly and accurately communicate the necessary information to fabricate, assemble, or service industrial products, Figure 1-1.



Unit-Opening Material

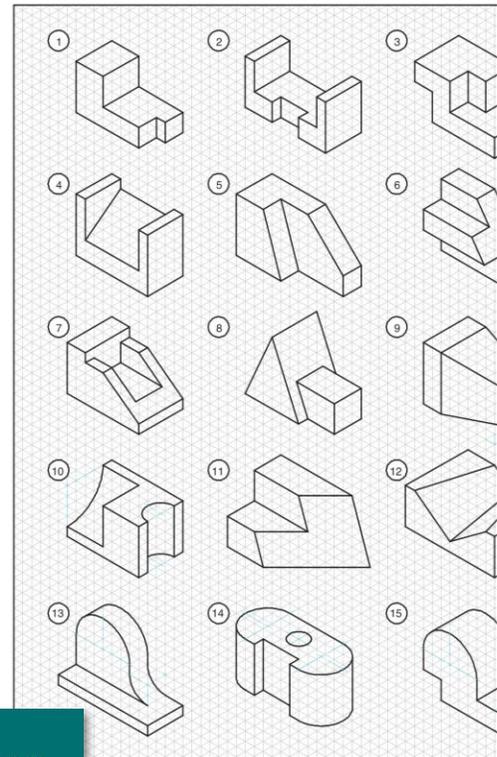


Apply and Analyze

Name _____ Date _____ Class _____

Review Activity 5-5

Sketching Multiview Drawings



throughout the years, chain lines can be used with a local callout note, and the simulated graphic pattern can then be omitted.

Broaching

Broaching is done on a special machine using a machine tool called a broach, Figure 11-22. The broach progressively "punches" a shape with a series of cutting teeth. The teeth are set in such a way that each tooth is a few thousandths of an inch higher than the preceding one. Broaching can produce holes of circular, square, or irregular outline; keyways; internal gear teeth; splines; or flat external contours. Broaching is fast and accurate and produces a good-quality finish. As discussed several times in this unit, the practice of specifying the machine tool to make a particular feature is discouraged, but if a broaching operation is required, a local callout note may specify the process.

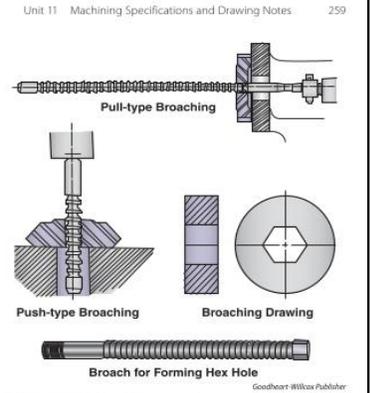
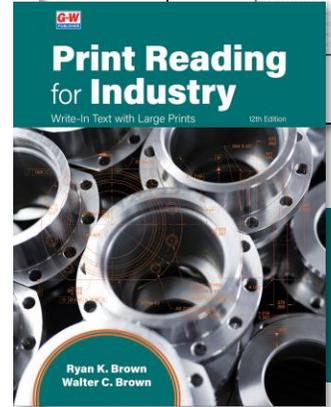


Figure 11-22. Broaching is another common machining process.

Summary

- Additional annotations to the views and dimensions are referred to as notes, specifications, or callouts.
- Notes fall into the two broad categories of local notes and general notes.
- ASME standard symbols, such as those for counterbore, countersink, and depth, help clarify local notes without using words.
- Drilled and reamed holes can be dimensioned with leader lines, but linear dimensions can also help clarify sizes in certain situations.
- A cylindrical enlargement at one end of a hole is called a counterbore or spotface and serves a variety of purposes.
- A conical enlargement at one end of a hole is called a countersink, while a counterdrill is when a cylindrical hole is also drilled larger than, and coaxial with, a smaller hole, creating a conical transition.
- Chamfered edges are characterized as slightly beveled edges that may eliminate burrs and sharpness or allow for easier assembly.
- Necks and undercuts provide for retaining rings or better transition between adjacent cylinders, and they should be dimensioned in a fashion that complements inspection.
- Keyways that accommodate a variety of standard keys can be specified with local callout notes, but particular linear dimensions can also be given that complement the inspection process.
- ASME standard knurls can be dimensioned with callouts that specify pitch, type, and finish diameter, using chain lines to indicate the area to which the knurl is applied.
- Broaching is a machining process using a tooth-based tool that progressively punches a hole of a particular shape—perhaps a square, hexagon, or keyway profile.

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Illustrations and Bonus Print Reading Exercises

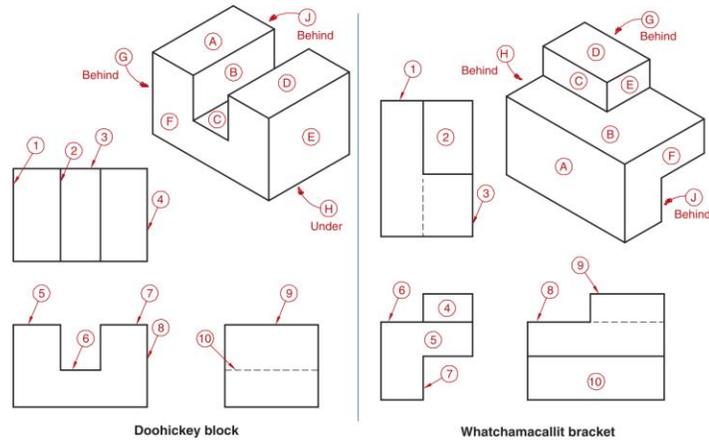
Apply and Analyze

Name _____ Date _____ Class _____

Review Activity 5-1

Normal Surfaces

Study each pictorial (3D) drawing and the identification letters placed on or pointing to the normal surfaces. Match the ID letter to the corresponding number for each of the multiview (orthographic) callouts. Answers may be used more than once. Note: The letter I is not used.



Note: In the pictorial view, arrows pointing directly to a line are referencing a surface that is not visible but is around the corner of that edge from the viewer's point of view.

Doohickey Block

- | | | | |
|----------|-----------|----------|-----------|
| 1. _____ | 6. _____ | 1. _____ | 6. _____ |
| 2. _____ | 7. _____ | 2. _____ | 7. _____ |
| 3. _____ | 8. _____ | 3. _____ | 8. _____ |
| 4. _____ | 9. _____ | 4. _____ | 9. _____ |
| 5. _____ | 10. _____ | 5. _____ | 10. _____ |

Whatchamacallit Bracket

- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

Apply and Analyze

Name _____ Date _____ Class _____

Industry Print Exercise 5-1

Study the print PR 5-1 and answer the questions below.

- This drawing has the three principal views. What are they?

- What dimension term is applied to the value of 2.125?

- Is the feature that appears as a circle in the right-side view hidden or visible in the front view?

- What is the height of this part?

- What type of surface is the surface that encompasses four holes in the top view: normal, inclined, or oblique?

- What is the total width of this part?

- Which letter of the alphabet, M, H, or I, is used to identify the frontal plane?

- In the top view, how many lines represent the hidden edges?

- The bottom, flat normal surface of the part is inclined. How wide is it?

- In the top view, the right-most vertical edge represents two surfaces only, or maximum contour. How wide is it?

- What is the name of this part?

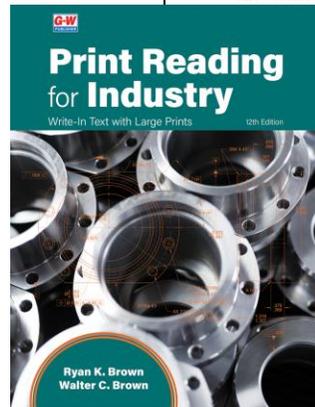
- What is the drawing number or part number?

Review questions based on previous units

- What is the name of this company located in the state of _____?
- What is the five-digit material code for this part?
- What is the last name of the person who designed this part?

Summary

- A convention is a generally accepted way of doing things.
- The list of ASME standard lines is referred to as the alphabet of lines.
- Standard practices recommend two thicknesses for linework in industrial prints: thick (0.6 mm) and thin (0.3 mm).
- The visible line can be described as a thick and continuous line used to show the outline and shape of the part.
- The hidden line can be described as thin, black, short, closely spaced dashes used to describe hidden features of the object in a particular view.
- The center line can be described as a series of thin, black dashes, alternating between medium and long, used to show symmetry, identify center axes, or describe paths of motion.
- Lines used in dimensioning are drawn black, thin, and continuous, including extension lines that extend the shape from the view, and dimension lines that include arrows on each end to show the extent and direction of the dimension.
- Leader lines, drawn thin and black, feature an arrow on one end and a shoulder on the other end, most often in association with a lettered note.
- Lines used in sectional views include section lines, which are thin and black and usually appear in a pattern of angled lines sometimes called hatching, with the possibility of dashes to identify particular materials.
- Cutting-plane lines and viewing-plane lines may be drawn in one of three options, all of which include elbows and arrows to express the direction for viewing.
- Break lines can be used when shortened views of long objects are just as informative, when section views need to be broken-out, or when partial views can be clearly expressed with less space on the print.
- The alphabet of lines includes several miscellaneous types of lines, such as the phantom line, stitch line, and chain line, each with a recommended dash pattern and line weight.
- The style of lettering recommended for standard industrial drawings is uppercase single-stroke Gothic lettering, indicating a clear, sans-serif form of lettering that is easy to read.



Projection Planes

Projection Planes

The role of projection planes in orthographic projection



But that said, we think you'll find this lesson beneficial to developing your ability

[Hide transcript](#)

Transcript

Projection Planes

Every multiview drawing on an industrial print can scientifically be explained as an orthographic projection of a 3D

A GD&T Case Study in Position

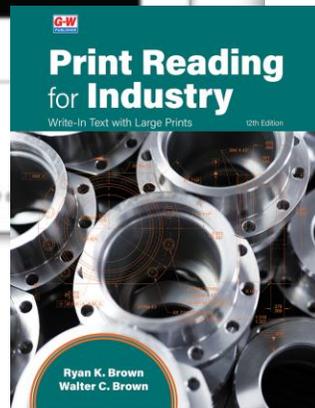
for either of these sets of features yet.

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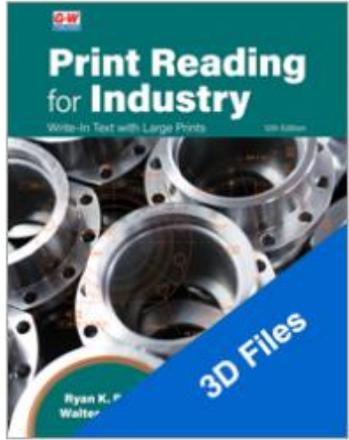
Transcript

A GD&T Case Study in Position

In the *Print Reading for Industry* text, Unit 13 covers an introduction to Geometric Dimensioning and Tolerancing, GD&T. In Unit 13, the focus is on reading the symbols and associated values within the feature control frame, more than on how to determine



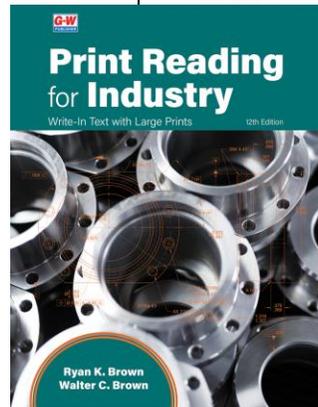
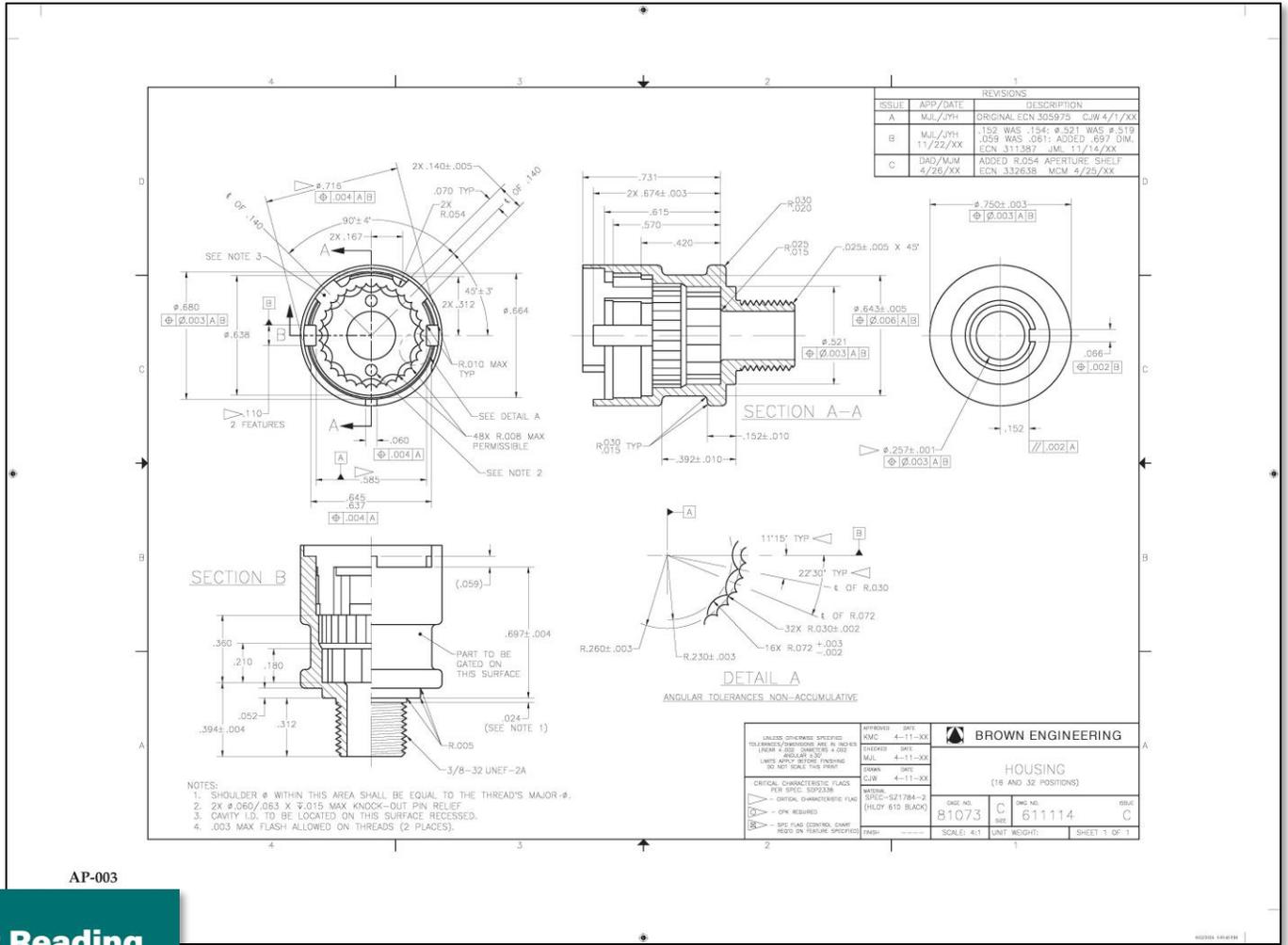
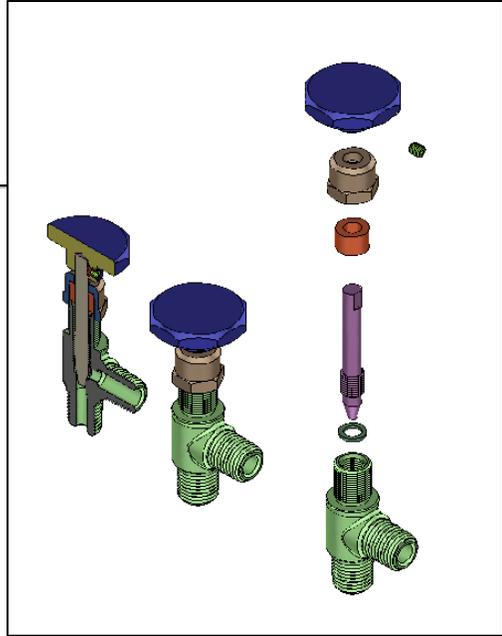
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**Print Reading for Industry 12e,
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-  STL Files for Textbook Prints



3D Files and Large Bonus Prints



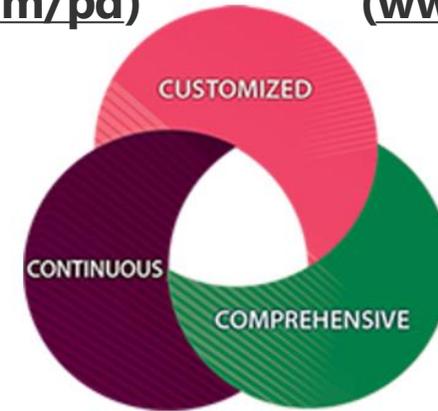
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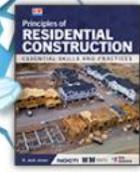
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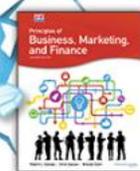
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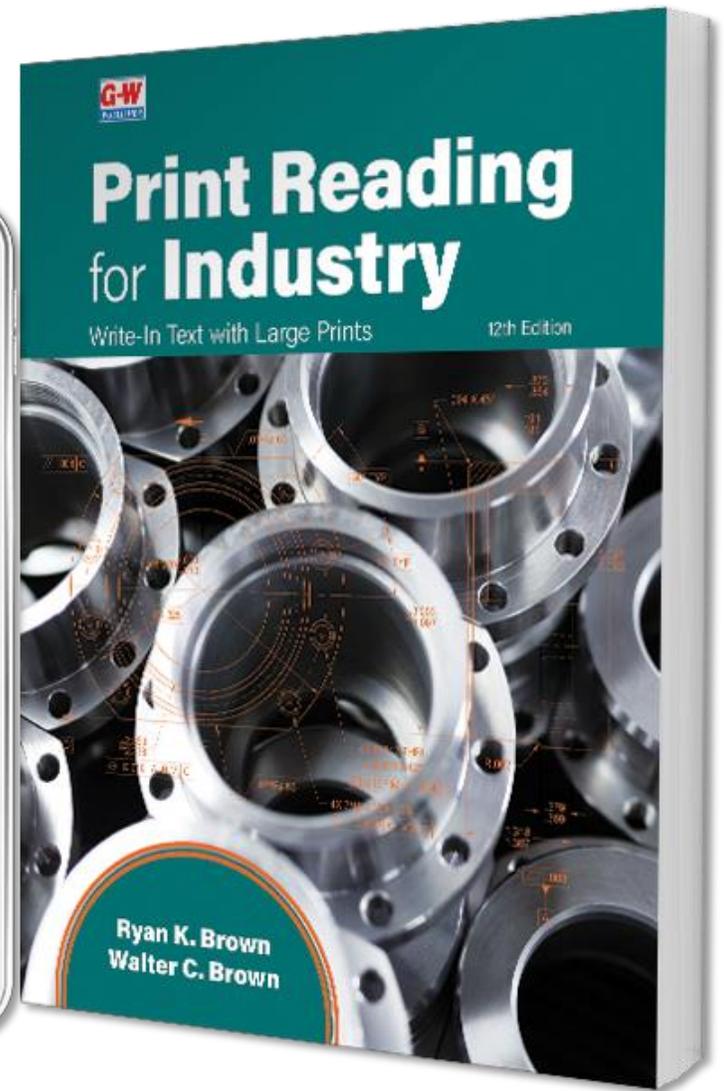
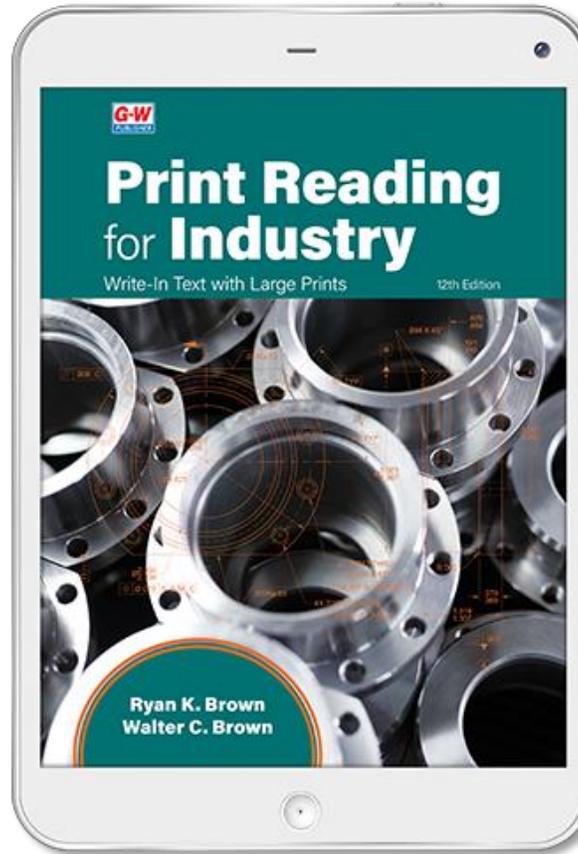


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