

ASNT QUESTIONS & ANSWERS BOOK

TIME OF FLIGHT DIFFRACTION

Levels II and III Review Questions



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QUESTIONS & ANSWERS
BOOK

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The American Society for Nondestructive Testing Inc.



Documents

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ASNT Mission Statement:
ASNT exists to create a safer world by advancing scientific, engineering, and technical knowledge in the field of nondestructive testing.

ASNT Code of Ethics:
The ASNT Code of Ethics was developed to provide members of the Society with broad ethical statements to guide their professional lives. In spirit and in word, each ASNT member is responsible for knowing and adhering to the values and standards set forth in the Society's Code. More information, as well as the complete version of the Code of Ethics, can be found on ASNT's website, asnt.org.

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INTRODUCTION

This book is a new entry into the *ASNT Questions & Answers Book* series. While most books in this series cover a testing method as recognized by Recommended Practice No. SNT-TC-1A, this book specifically focuses on the ultrasonic testing technique time of flight diffraction (TOFD). The questions have been prepared to align with the knowledge of technical principles needed for the qualification of nondestructive testing personnel in this technique as outlined in ANSI/ASNT CP-105-2020. Since CP-105 recommends that an Ultrasonic Testing Level II unrestricted certification be a prerequisite to study of the Time of Flight Diffraction topical outlines as detailed within, the questions in this book also begin at Level II.

As with other books in the *ASNT Questions & Answers* series, this book is intended to provide candidates studying for qualifying examinations with sample Level II and III questions. It will help readers evaluate their knowledge of the principles of TOFD and determine if they possess the thorough understanding of the technique as recommended for qualification by CP-105. This book is also intended to provide sample questions for instructors and employers developing training programs utilizing TOFD.

Employers or other persons utilizing nondestructive testing services are cautioned that they retain full responsibility for ultimate determination of the qualifications of NDT personnel and for the certification process. The questions provided within this book should not serve as a qualifying examination.

Additional Information

Because ASNT is an International System of Units (SI) publisher, throughout the text both SI and imperial units are used.

In ASNT publications, the words *discontinuity* and *defect* have specific meanings. These words are used as follows:

- A *discontinuity* is an intentional (such as drilled holes) or unintentional interruption in the physical structure or configuration of a material or component. NDT techniques reveal *indications* of discontinuities. Discontinuities may exist without being detected.
- A *defect* is a discontinuity whose size, shape, orientation, or location make it detrimental to the useful service of the object, or exceed accept/reject criteria of an applicable specification. Some discontinuities do not exceed an accept/reject criterion and are therefore not defects.
- The process for determining rejectability is *interpretation* or *evaluation*. All defects are discontinuities, but not all discontinuities are defects.

REFERENCES

Recommended References

The following references were used in formulating the questions in this book.

Reference A

ASNT, 2018, *Ultrasonic Testing Classroom Training Book*, second edition, The American Society for Nondestructive Testing, Columbus, OH.*

Reference B

ASME, 2019, *ASME Boiler and Pressure Vessel Code (BPVC)*, Section V – Nondestructive Examination, The American Society of Mechanical Engineers, New York, NY.

Reference C

ASME, 2019, *ASME Boiler and Pressure Vessel Code (BPVC)*, Section VIII – Rules for Construction of Pressure Vessels Division 2 – Alternative Rules, The American Society of Mechanical Engineers, New York, NY.

Reference D

ASTM International, 2019, ASTM E2373/E2373M – 19, *Standard Practice for Use of the Ultrasonic Time of Flight Diffraction (TOFD) Technique*, ASTM International, West Conshohocken, PA.†

Reference E

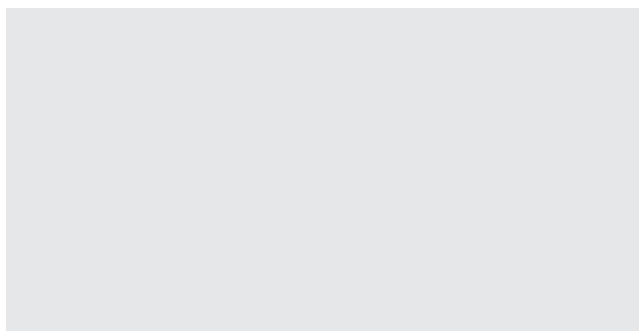
Eclipse Scientific, 2013, *Ultrasonic Time of Flight Diffraction*, first edition, Eclipse Scientific, Owen Sound, Ontario, Canada.

* Available from The American Society for Nondestructive Testing Inc.

† Note: This standard also appears as part of ASTM Volume 03.03 Nondestructive Testing (I): B594 – E2373. The page numbers referenced in this book refer to the standard as published separately from the volume.

Reference Codes

Each question found in this book is followed by letter(s) and page number(s) indicating the specific recommended reference where the answer may be found. For example:



In this example, the letter “A” refers to Reference A in the list above and “199” is the specific page in Reference A where the answer to the question is located.

Reference Usage

Reference A Total = 8

Level II (8)
Level III (0)

Reference B Total = 46

Level II (17)
Level III (29)

Reference C Total = 3

Level II (3)
Level III (0)

Reference D Total = 21

Level II (14)
Level III (7)

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Level II (35)
Level III (28)