

**Take five minutes or less to
answer the questions on
the handout sheet**

This presentation was possible through a grant provided by:



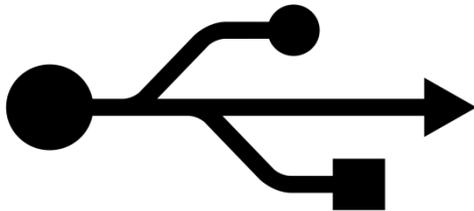
*Establishing Freshman-to-Senior Bookend
Experiences to Provide Academic and Professional
Introductions to Standardization*

Dr. Mike Ogle, Principal Investigator

Does Any of This Look Familiar?



IEEE 802.11



IEC 62680

10W-30

SAE J300

using many ASTM tests

<http://www.viscopedia.com/viscosity-tables/substances/sae-viscosity-grades/>

General Prohibition Sign



“This safety sign cannot be used on its own and requires a supplementary sign to give further information about the action which is prohibited.”

ISO 7010:2011 — Graphical symbols -- Safety colours and safety signs -- Registered safety signs

ISO/TC 145/SC 2

Website reference: <https://www.iso.org/obp/ui/#iso:grs:7010:2:P001>

**General
Mandatory
Action
Sign**



“This safety sign cannot be used on its own and requires a supplementary sign to give further information about the action to be taken.”

ISO 7010:2011 — Graphical symbols -- Safety colours and safety signs -- Registered safety signs

ISO/TC 145/SC 2

Website reference: <https://www.iso.org/obp/ui/#iso:grs:7010:2:M001>

General Warning Sign



“This safety sign cannot be used on its own and requires a supplementary sign to give further information about the hazard.”

ISO 7010:2011 — Graphical symbols -- Safety colours and safety signs -- Registered safety signs

ISO/TC 145/SC 2

Website reference: <https://www.iso.org/obp/ui/#iso:grs:7010:2:W001>



“Do not wear metal-studded footwear”

General Prohibition Sign



“This safety sign cannot be used on its own and requires a supplementary sign to give further information about the action which is prohibited.”

Designation

ISO 7010:2011 — Graphical symbols -- Safety colours and safety signs -- Registered safety signs

Responsible committee

ISO/TC 145/SC 2

Website reference: <https://www.iso.org/obp/ui/#iso:grs:7010:2:P001>

What Is a Standard?

A standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose.

<http://www.iso.org/iso/home/standards.htm>

More Important, Why Standardize?

Interoperability (size, shape, frequency, voltage),
Performance (capacity, strength, lifespan, flexibility)
Safety (impact resistance, fire resistance, labeling)
Consistent terminology for the above functionality
Consistent tests for the above functionality
Consumer confidence to enable a market

ISO 3873:1977(en) Industrial safety helmets

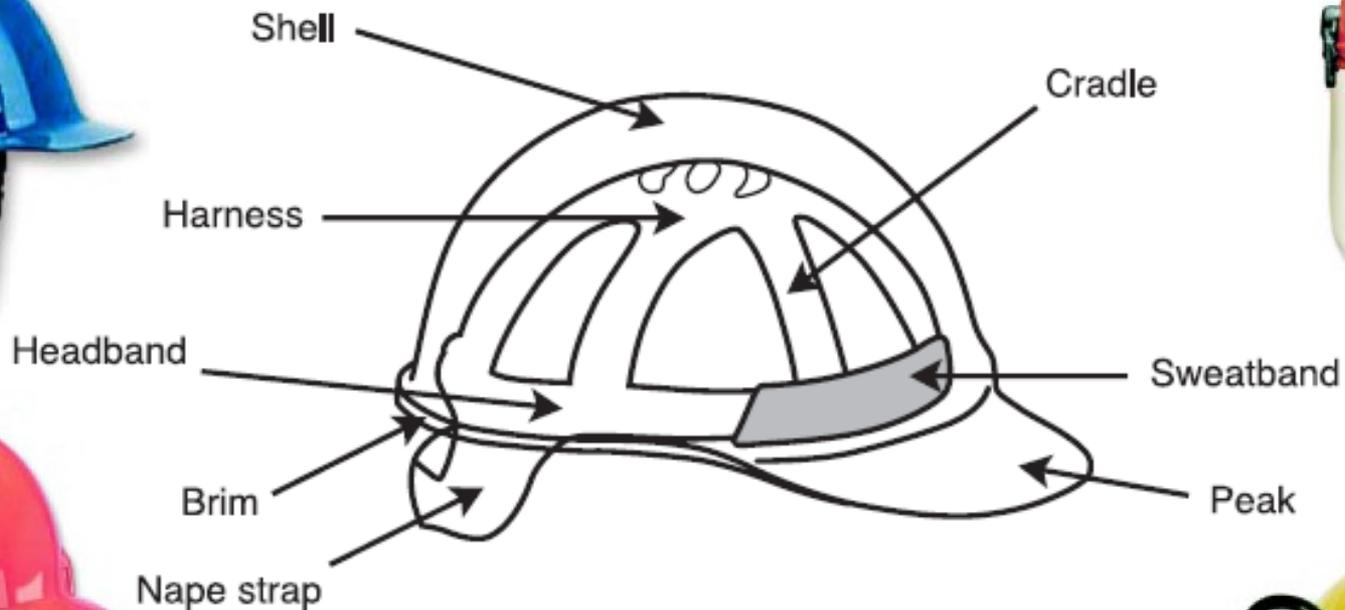


Figure C: General design



http://www.labour.gov.hk/eng/public/os/C/helmet_eng.pdf

Other Standards for Industrial safety helmets

- American National Standard - For industrial head protection (ANSI Z89.1)
- Australian/New Zealand Standard - Occupational protective helmets (AS/NZS 1801)
- Canadian Standard - Safety helmets (CSA Z94.1)
- European Standard - Specification for industrial safety helmets (EN 397)
- International Standard - Industrial safety helmets (ISO 3873)
- Japanese Industrial Standard - Industrial safety helmets (JIS T 8131)
- People's Republic of China National Standard - Safety helmets (GB 2811)

ISO 3873:1977(en) Industrial safety helmets

Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*

It has been approved by the member bodies of the following countries :

Australia	Israel	Spain
Austria	Italy	Sweden
Bulgaria	Mexico	Switzerland
Denmark	Netherlands	Turkey
France	New Zealand	United Kingdom
Germany	Norway	U.S.S.R.
Hungary	Poland	Yugoslavia
Iran	Romania	
Ireland	South Africa, Rep. of	

The member body of the following country expressed disapproval of the document on technical grounds : Belgium

ISO 3873:1977(en) Industrial safety helmets

1 SCOPE

This International Standard specifies physical and performance requirements, methods of test and marking requirements for industrial safety helmets.

3 DEFINITIONS

3.1

safety helmet

A helmet primarily intended to protect the upper part of a wearer's head against a blow.

3.2

shell

The hard, smoothly finished material that provides the general form of the helmet.

3.3

peak

A permanent extension of the shell above the eyes.

3.4

brim

A rim surrounding the shell.

ISO 3873:1977(en) Industrial safety helmets

FOREWORD

1 SCOPE

2 FIELD OF APPLICATION

3 DEFINITIONS

[-] 4 PHYSICAL REQUIREMENTS

4.1 Materials

4.2 General construction

4.3 Shell

4.4 Vertical clearance

4.5 Horizontal clearance

4.6 Wearing height

4.7 Mass

[-] 5 PERFORMANCE REQUIREMENTS

+ 5.1 Mandatory requirements

+ 5.2 Optional requirements

[-] 6 TEST REQUIREMENTS

6.1 Samples

+ 6.2 Conditioning for testing

+ 6.3 Headforms

6.4 Verification of clearances and wearing height

+ 6.5 Shock absorption test

+ 6.6 Penetration test

+ 6.7 Flammability test

6.8 Electrical insulation test

6.9 Lateral rigidity test

[-] 7 MARKING

7.1 Markings on the helmet

7.2 Additional information

What are the words for the ANSI acronym?

American National Standards Institute



ANSI is a private organization, coordinating the U.S. consensus standards system, providing a neutral forum for the development of policies on standards issues and serves as a watchdog for standards development and conformity assessment programs and processes by accrediting and auditing standards developers.

1,073 Total ANSI Members
605 Company Members
343 Organizational Members
64 Government Members
23 Educational/Institutional Members
38 International Members

240 ANSI-Accredited Standards Developers (ASDs)
11,368 Approved American National Standards (ANS)



All Standards, Specifications, Guidelines are not ANSI Standards, but all American National Standards (ANS) are ANSI Standards

So What Do You Get with an ANS Process?

- open, balanced group of interested/affected people (consensus body)
- broad-based, open public review/comment on draft standards
- anyone can comment and be considered during public review
- incorporation of approved changes into a draft standard
- right to appeal if due process was not respected

openness, balance, consensus and due process

What does ISO mean?

equal

ISO formed in 1946 when 25 countries met at the Institute of Civil Engineers in London



International
Organization for
Standardization

Commonly
thought of as:



**International
Standards
Organization**



We are a private,
non-governmental, organization.

165 members



We are a global network of
national standards bodies with
one member per country.

20 500
International Standards

More than
100 000 experts

ANSI is the official U.S. member

http://www.iso.org/iso/isoinbrief_2015.pdf

What is the value of “x” in terms of 10^x for the number of ANSI standards (3 => 1000 4 => 10,000 5 => 100,000 6 => 1,000,000) and what is “x” for the number of ISO standards?

ANSI

<4.1

ISO

>4.3

11,368 Approved American National Standards (ANS)

http://publicaa.ansi.org/sites/apdl/Documents/News%20and%20Publications/Brochures/Annual%20Report%20Archive/ANSI_2014_15_Annual_Report.pdf

20 500
International Standards

http://www.iso.org/iso/isoabbrev_2015.pdf

Many American National Standards (ANS) become ISO standards

One example is the intermodal freight container



https://en.wikipedia.org/wiki/Intermodal_container

Who develops the standards that affect your everyday lives (for example: bicycle helmets, concrete strength, safety signage, USB drive size, gasoline octane levels, Wi-Fi, etc.)?

... ~~well~~ **we** ~~are~~ **to** be the future you

Most people think there is a group of people (hopefully, smart, caring, people) in Washington or some other big city, that know everything about everything and they develop all the standards.

Look to your left and look to your right...for better or worse...those are the people that will be creating your standards!



International
Organization for
Standardization

More than
100 000 experts

What is the electrical engineering professional organization you can join as a student.

IEEE



*Over 1100
active
standards*

A leading consensus building organization that nurtures, develops & advances global technologies. Our work drives the functionality, capabilities and interoperability of a wide range of products and services that transform the way people live, work and communicate.

<http://standards.ieee.org/>



Over 12,000 standards



Approximately 90 standards



Approximately 600 standards



Over 1300 standards



Approximately 150 standards



The American Society of Safety Engineers

Over 130 standards



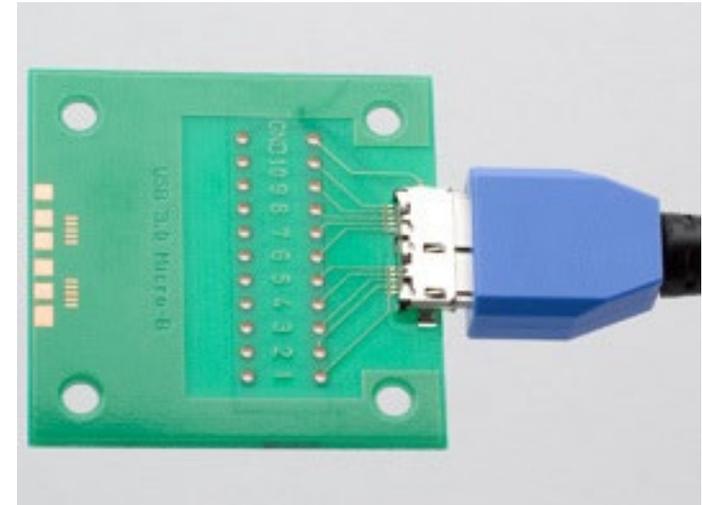
IEC 62280 Family of USB Standards: *Universal Serial Bus interfaces for data and power*

“First introduced in the mid-1990s, USB is now in almost all professional and consumer computer and multimedia devices, such as TV sets, set-top boxes, mobile phones and portable entertainment systems. It has evolved with higher transfer rates, new connectors, and the ability to attach to a wide range of devices.”

“With a total installed base now in excess of 10 billion units, the USB (Universal Serial Bus) is the most successful interface.”

“IEC TC (Technical Committee) 100 prepares International Standards in the field of audio, video and multimedia systems and equipment. Its TA (Technical Area) 14 prepares International Standards for the interfaces and measurement methods that relate to personal computing systems, equipment and other multimedia products.”

<http://iecetech.org/issue/2012-08/IEC-endorses-four-USB-specifications>



- 1) Hi-Speed USB (USB 2.0)
- 2) Cables and Connectors
- 3) Battery Charging
- 4) Micro-USB Cables and Connectors



Webstore

International Electrotechnical Commission

USB 3.0 *IEC 62680 Series*

INTERNATIONAL STANDARD

NORME INTERNATIONALE



SCOPE of IEC 62680-3 on Battery Charging Specification

“The Battery Charging Working Group is chartered with creating specifications that define limits as well as detection, control and reporting mechanisms to permit devices to **draw current in excess of the USB 2.0 specification** for charging and/or powering up from dedicated chargers, hosts, hubs and charging downstream ports. These mechanisms are **backward compatible with USB 2.0** compliant hosts and peripherals.”

<https://webstore.iec.ch/publication/7360>

<http://www.usb.org/developers/docs/>



SAE J1772

Surface Vehicle Recommended Practice - Electric Vehicle Conductive Charge Coupler



Battery packs are still generally non-standard and vary greatly from vehicle to vehicle

General physical, electrical, communication protocol, and performance requirements for the electric vehicle conductive charge system and coupler.

Added to IEC 62196-2 standard (Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories).

Companies participating in the revised 2009 standard include Smart, Chrysler, GM, Ford, Toyota, Honda, Nissan, and Tesla.

<http://www.edn.com/electronics-blogs/automotive-currents/4421241/How-the-J1772-charging-standard-for-plug-in-vehicles-works>

https://en.wikipedia.org/wiki/SAE_J1772

Standards are enforceable as laws	Circle one of the choices below		
	YES	NO	It depends

ANSI and ISO standards are voluntary

Adopt them or don't, it is up to you!

However, if the Code of Federal Regulations or a Building Code references the standard for work you, your company, or your employees are doing, then you follow the standard.

If your client references that you must follow a standard, again you can voluntarily choose not to follow the standard...

...and therefore voluntarily choose not to have their business

How long (number of months from inspiration to publication) does it take to develop an ANSI standard? An ISO standard?

<i>ANSI</i>	It depends... min 1+30+45+1 days*^A	<i>ISO</i>	It depends... on a lot of factors
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*A

- assuming the IEEE SA agrees to give idea consideration on day one
- then IEEE/ANSI posts public announcement in *ANSI Standards Action* (30 days)
- then complete draft document is created/completed during the 30-day period
- draft is posted instantly for public comment after the 30-day mark by ANSI
- then after 45 days there is complete agreement with no comments
- then the next morning, the ANSI standards review board gave its blessing
- then that afternoon, the standard could be published by IEEE

The above is a fantasy world. More likely is 2-4 years of multiple committee meetings, ballots, comment review periods, revisions, administrative/committee/member communication delays, formatting, etc.

Should

Recommendation of good practice, but not mandated
(shoulds allow judgement calls)

VS.

Shall

Mandatory requirement to follow the standard.
(shalls give a standard its teeth)

Performance Standards

Specify clearly how something should/shall perform by providing clear guidance regarding what is desired and how to measure that performance

VS.

Prescriptive Standards

Specify exactly how something should/shall be done by providing clear guidance regarding materials, dimensions, processes, procedures, etc.

Where can you find the most comprehensive list of ANSI and ISO standards?

www.NSSN.org



SEARCH ENGINE FOR STANDARDS
Powered by ANSI

A NATIONAL RESOURCE FOR GLOBAL STANDARDS

SEARCH FOR STANDARDS

GO FIND IT

FIND TITLE, ABSTRACT OR KEYWORD

FIND DOCUMENT NUMBER

ADVANCED SEARCH

Search Terms

Fields to Search

Search Criteria

Filter by Developer

All Developers
3-A
3GPP2
A2LA

Max Number of Records Returned

Page Size

GO FIND IT

- American National Standards
- US Standards
- ISO/IEC/ITU Approved Standards
- Non-US National and Regional Standards
- US DoD Approved Standards
- ANS Under Development
- ISO/IEC Development Projects
- US DoD Development Projects
- CFR (Code of Federal Regulations) References

*Given what you know now
about standards...*

**Take a few minutes to
answer the questions on
the handout sheet.**

Then turn them in as you leave.