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

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."

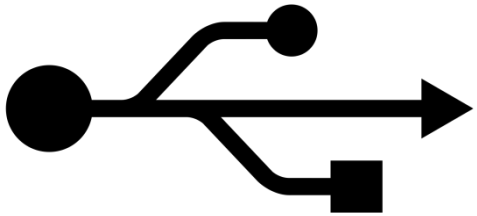
ISO 7010:2011 — Graphical symbols -- Safety colours and safety signs -- Registered safety signs

ISO/TC 145/SC 2

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

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/

Underwriters Laboratories

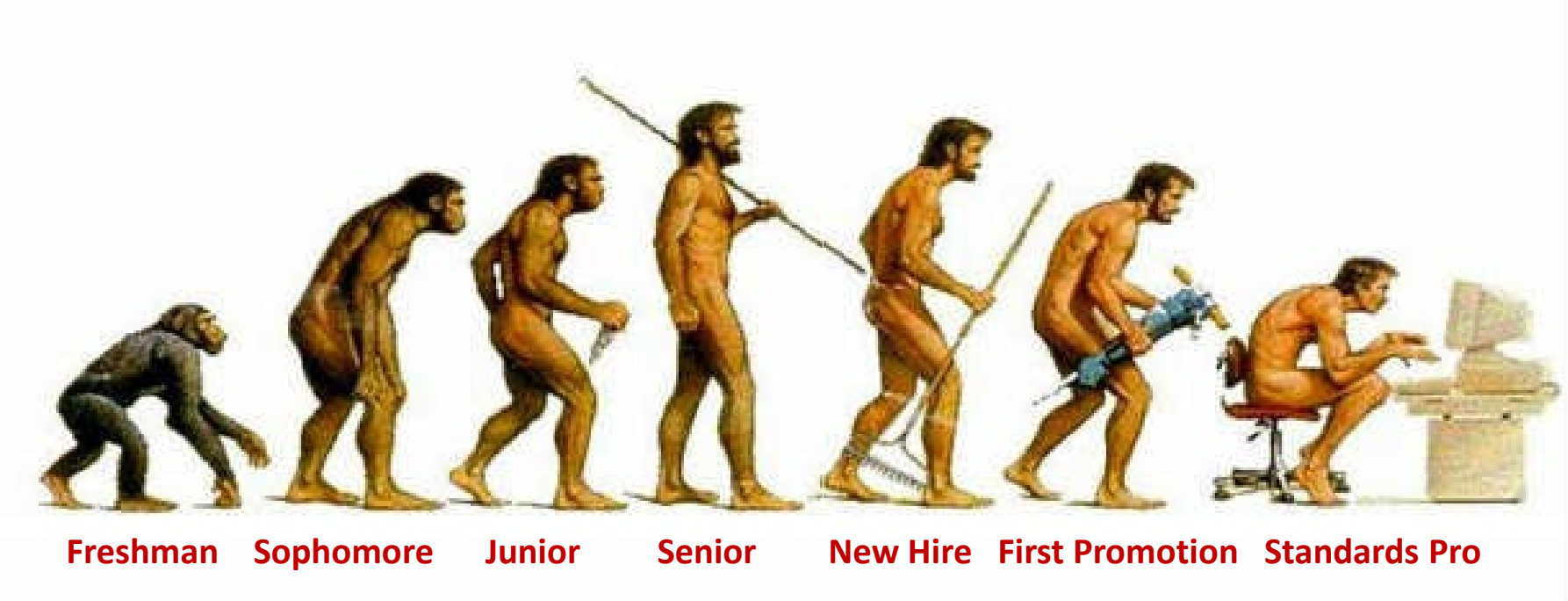
Over 1300 standards

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, you may 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 right…for better or worse…those are the people that will be creating our standards!

Evolution of the Student to Standards Professional



Yes, you can develop to become the professional that is experienced and insightful enough to be one of the people the country and the world depends upon for development of standards that affect daily life

https://alphabytesoup.files.wordpress.com/2012/07/evolution_of_man.jpg

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

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

Technical committees

The list of ISO technical committees provides basic information for each technical committee (TC). The TCs are listed in numerical order, following the order in which they were established. For example, TC 1 focusing on screw threads was created in 1947 and TC 269 on railway applications was created in 2012.

ISO/TC 1	Screw threads	23
ISO/TC 2	Fasteners	192
ISO/TC 4	Rolling bearings	77
ISO/TC 5	Ferrous metal pipes and metallic fittings	68
ISO/TC 6	Paper, board and pulps	183
ISO/TC 8	Ships and marine technology	294
ISO/TC 10	Technical product documentation	149
ISO/TC 11	Boilers and pressure vessels - STANDBY	2
ISO/TC 12	Quantities and units	16
ISO/TC 14	Shafts for machinery and accessories	8
ISO/TC 17	Steel	312

Number of standards published per Technical Committee

http://www.iso.org/iso/home/standards_development/list_of_iso_technical_committees.htm

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)

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

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 (concensus 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:

We are a private, non-governmental, organization.

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

ANSI is the official U.S. member

165 members

20 500 International Standards

More than 100 000 experts

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/isoinbrief_2015.pdf

Many American National Standards (ANS) become ISO standards

One example is the intermodal freight container

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

ISO 3873:1977(en) Industrial safety helmets

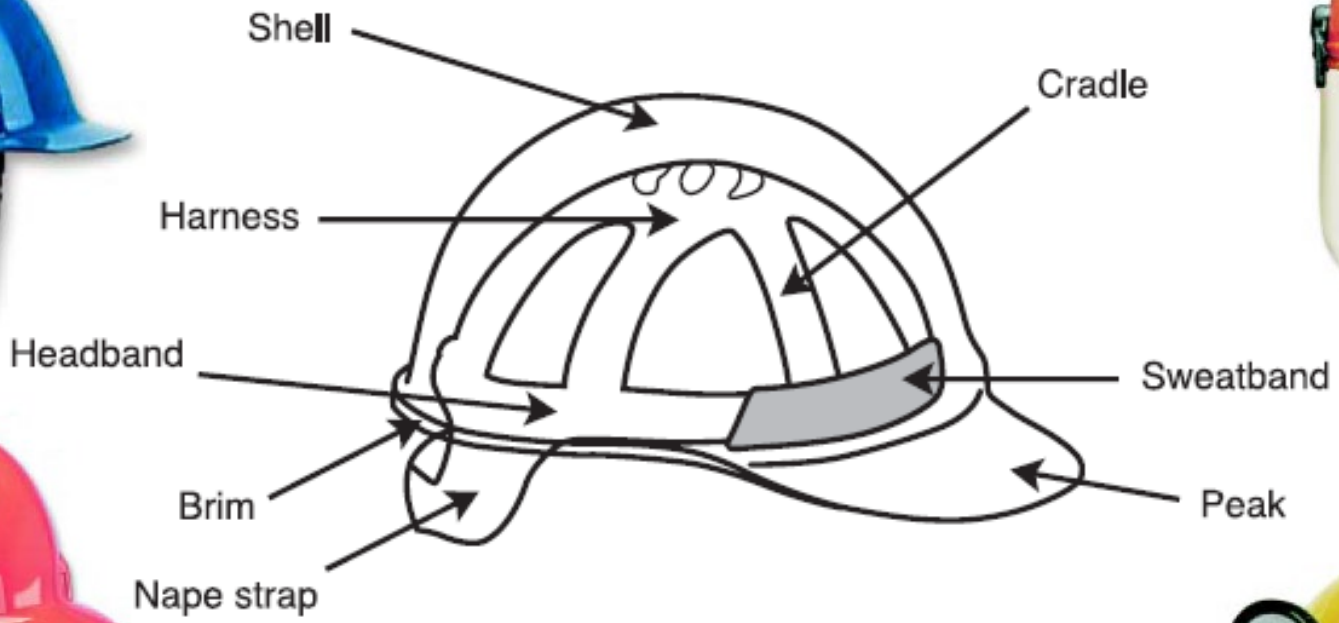


Figure C: General design

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

What is the engineering professional organization in your discipline that you can join as a student?	**ASCE**

ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS

CODES & STANDARDS

http://www.asce.org/codes-and-standards/codes-and-standards/

ASCE Standards provide technical guidelines for promoting safety, reliability, productivity, and efficiency in civil engineering. Many of our standards are referenced by model building codes and adopted by state and local jurisdiction. They also provide guidance for design projects around the world.

Accredited by ANSI, ASCE has a rigorous and formal process overseen by the Codes and Standards Committee (CSC). Standards are created or updated by a balanced, volunteer standards committee, followed by a public review period.

http://ascelibrary.org/standards lists 89 published standards documents

What is the engineering professional organization in your discipline that 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/

What is the engineering professional organization in your discipline that you can join as a student?	**ASME**

Approximately 4700 volunteers

https://www.asme.org/about-asme/standards

ASME is the leading international developer of codes and standards associated with the art, science, and practice of mechanical engineering. Starting with the first issuance of its legendary Boiler & Pressure Vessel Code in 1914, ASME's codes and standards have grown to nearly 600 offerings currently in print. These offerings cover a breadth of topics, including pressure technology, nuclear plants, elevators / escalators, construction, engineering design, standardization, and performance testing.

What is the engineering professional organization in your discipline that you can join as a student?	SAE

Approximately 9000 volunteers

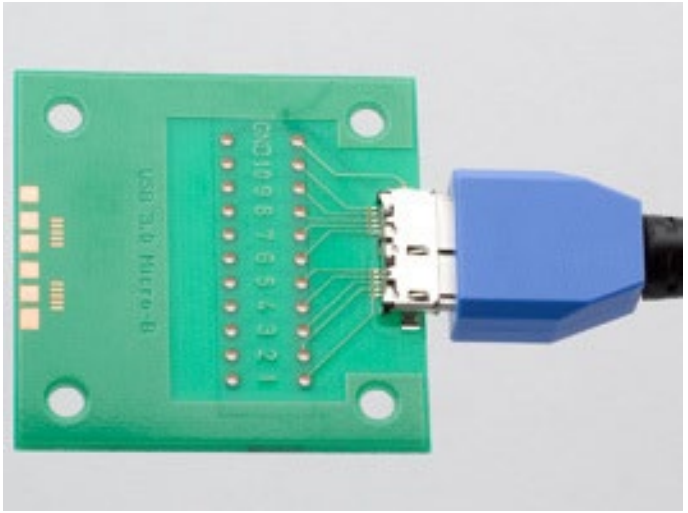
http://standards.sae.org/

SAE standards are internationally recognized for their role in helping ensure the safety, quality, and effectiveness of products and services across the mobility engineering industry.

Almost 10,000 SAE documents created through consensus standards development by more than 240 SAE Technical Committees with 450+ subcommittees and task groups, plus 60 US Technical Advisory Group (USTAG's) to ISO Committees.

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."

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

"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

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

Strengthen your understanding and your career by being aware of the standards that impact your company and your interests

How long (number of months from inspiration to publication) does it take to develop an ANSI standard? An ISO standard?			
ANSI	**It depends…** **min 1+30+45+1 days*A**	***ISO***	**It depends…** **on a lot of factors**

*A Let's use IEEE's Standards Association as the target example

- 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

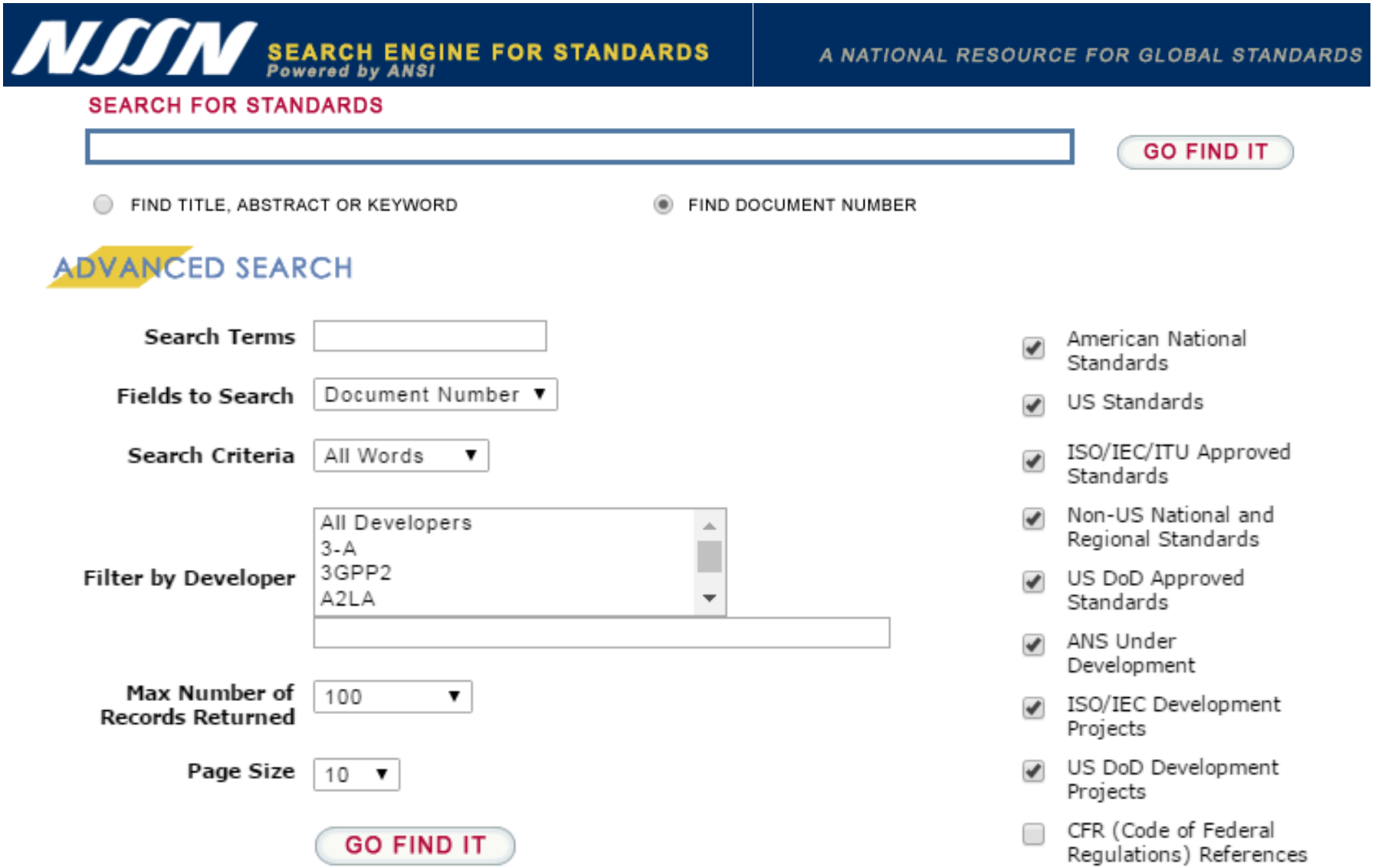
Specify clearly how something should/shall perform by providing clear guidance regarding what is desired and how to measure that performance (innovation encouraged)

vs.

Prescriptive Standards

Specify exactly how something should/shall be done by providing clear requirements regarding specific materials, dimensions, processes, procedures, etc. (no variation)

Where can you find the most comprehensive list of ANSI and ISO standards?	www.NSSN.org



Standards: Enhancing Your Career and Your Life

Standards Awareness and Participation Provides:

Opportunity to learn about new technologies/practices

Early awareness regarding new tests/requirements

Opportunity to build your professional/personal network

Opportunity to be more valuable to your company

National and international travel to meetings

Standards: Enhancing Your Career and Your Life

Crawling, Walking, Running…Evolving

Keep up your reading in your professional organization's work on standards, plus ANSI and ISO publications.

Find out whether others at your company or other professional contacts are involved in standards work and ask them to mentor you (apprentice-like).

As you build experience, find a standard being developed in *Standards Action* or through your professional organization and request to participate.

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.