



ME290

**Global Engineering Professional
Seminar**

Engineering Standards and Professional
Societies

Engineering Standards and Professional Societies

ABET* requirement: General Criterion 3. Student Outcomes

- 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

*ABET (Accreditation Board for Engineering and Technology, Inc.) is an organization that accredits post-secondary education programs.



Professional Organizations for Mechanical Engineers

- American Society of Mechanical Engineers (ASME)
 - Institution of Mechanical Engineers (IMechE)
 - International Academy for Production Engineering (CIRP)
 - Society of Automotive Engineers (SAE)
 - Society of Manufacturing Engineers (SME)
 - American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
 - Society for Experimental Mechanics (SEM)
 - Acoustical Society of America (ASA)
 - American Society for Nondestructive Testing (ASNT)
 - American Welding Society (AWS)
 - Association of Energy Engineers (AEE)
 - American Society for Testing and Materials (ASTM)
- and many others.



Role of Professional Associations

Most professional associations perform the following functions:

- Advocate on behalf of public policy or broad professional issues affecting members
- Circulate standards for professional preparation and practice
- Provide educational training and professional development programs
- Publish and disseminate research, information and opinion
- Assist members with career development issues
- Create opportunities for professional peers to interact
- Keep members up to date



Common Characteristics

- Legally incorporated non-profit entities.
- Governing board of elected and/or appointed individuals.
- Operations are managed by volunteers.
 - Relatively small office staffs to provide administrative services.
- Funded primarily through member dues, institutional memberships, fees for programs/services, publications, and grants.
- Exercise of power limited to small number of members
- International participation.
- Online presence.

Benefits of Involvement

- Enhance one's development
 - Administrative and professional skills
 - Gain new perspectives and knowledge
 - Develop leadership skills and orientation to the profession
 - Career placement opportunities
- Stronger sense of professional identity
 - Colleagues and professional networks
 - Exchange of ideas
 - Opportunities for continued interactions and get-togethers
- Make a contribution to the association
- Help and/or influence the profession and its direction
 - Shape professional practice and accreditation standards

Benefits of Student Membership

- Professional development
- Networking opportunities
- Seminars and conferences
- Education/training
- Exclusive online resources
- Discounted or free publications
- Resume building
- Job hunting





Engineering Standards

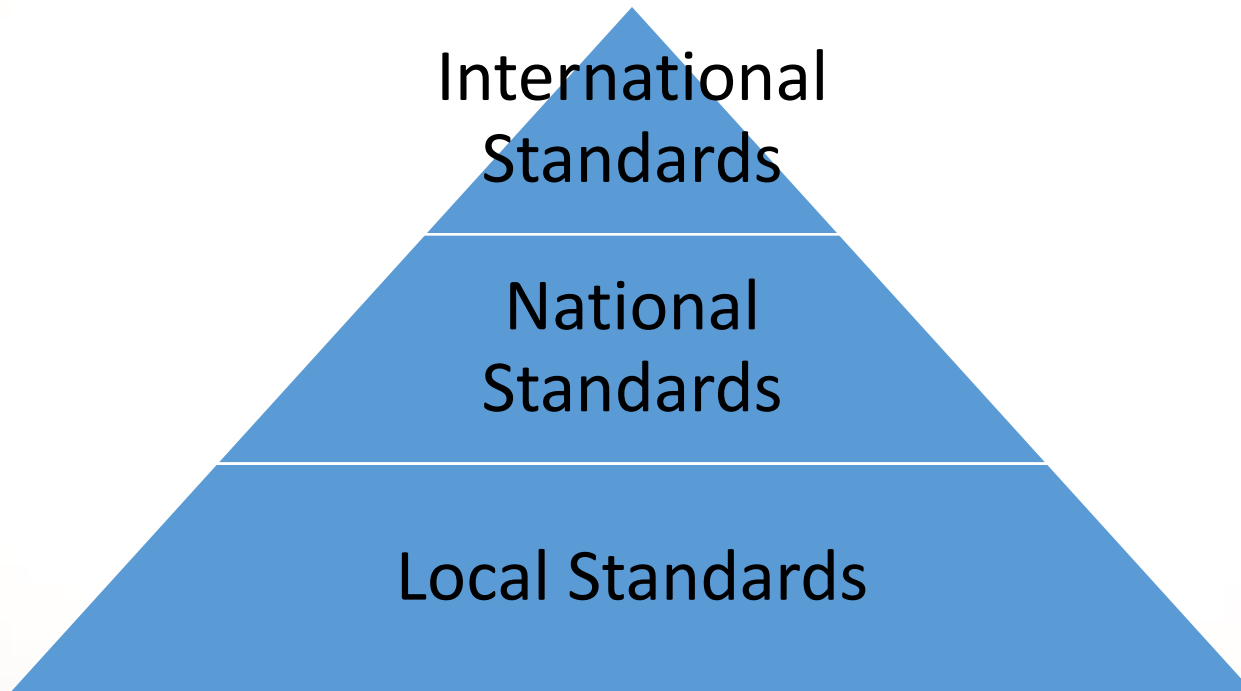
International Bodies

- The world's leading developers of International Standards:
 - International Organization for Standardization (ISO)
 - International Electrotechnical Commission (IEC)
 - International Telecommunication Union (ITU)
- ANSI and (U.S. National Committee (USNC)) are the U.S. clearing house for Standards and a founding member of ISO.

Why Standards are Used?

- They provide a “Legal,” or at least enforceable, means to evaluate acceptability and sale-ability of products and/or services
- They can be applied globally
- Standards are a “COMMUNICATION” tool that allows all users to speak the same language when reacting to products or processes
- They, ultimately, are designed to protect the public from questionable designs, products and practices
- They teach us, as engineers, how we can best meet environmental, technical, health, safety, quality and societal responsibilities





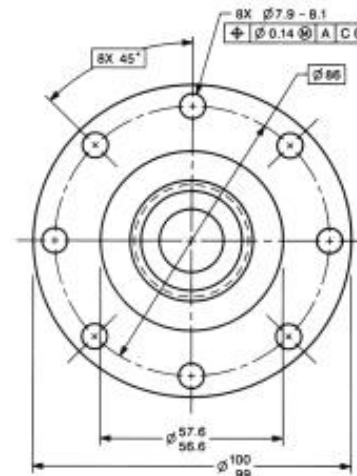
Standards can be classified as local, national or international. Local standards are developed by companies when national or international standards are not available.

Example:

How would you describe your design in manufacturing drawings?

Dimensioning and Tolerancing

Engineering Drawing and Related Documentation Practices



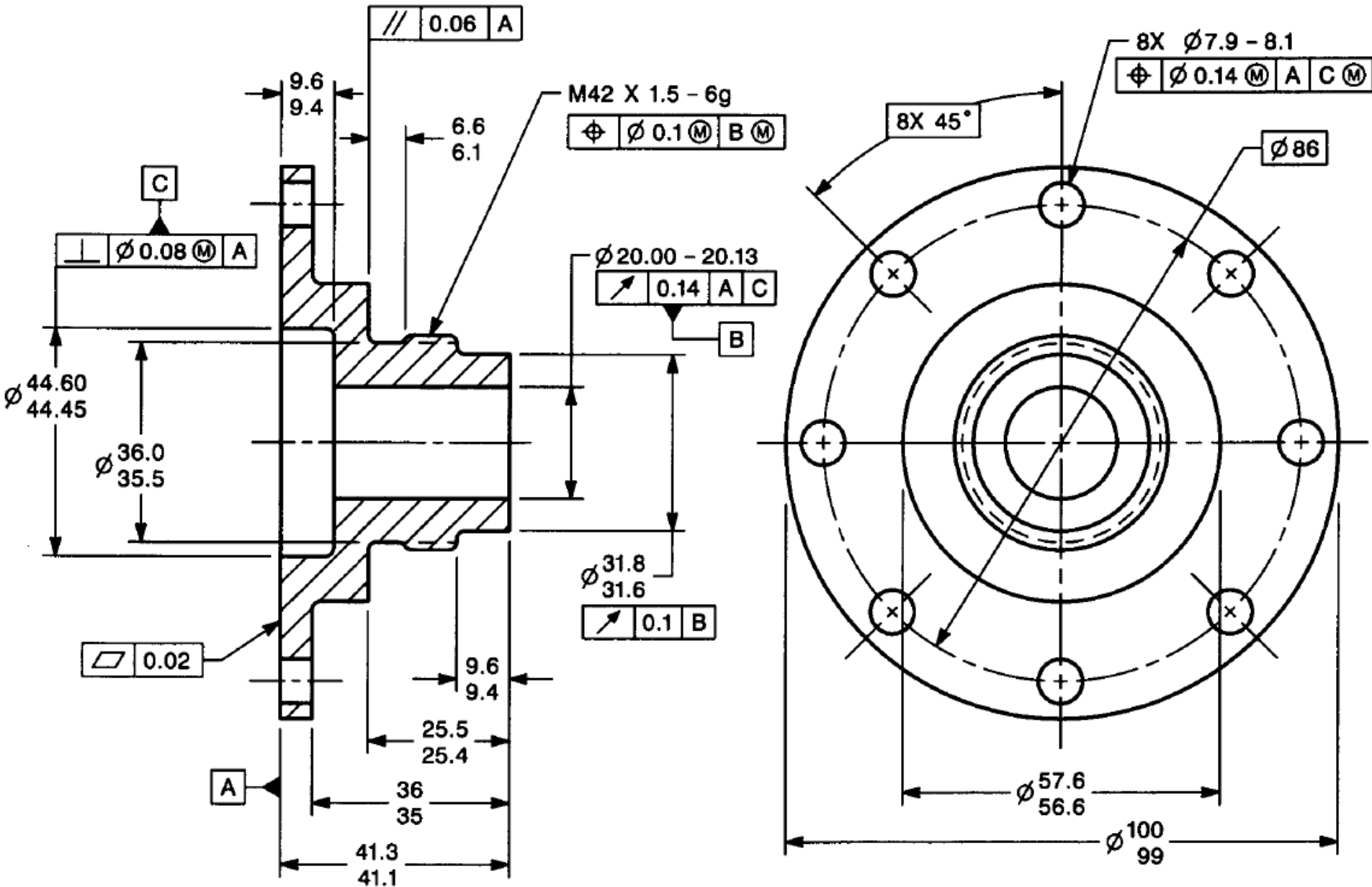
AN INTERNATIONAL STANDARD



The American Society of
Mechanical Engineers



Sample Drawing per ASME Y14.5

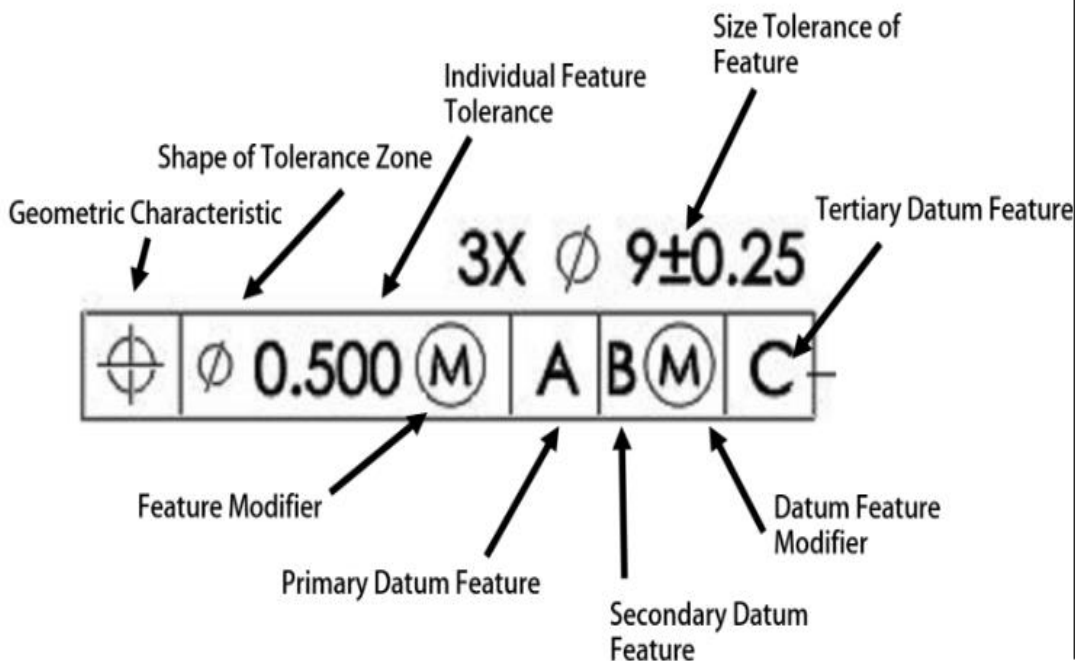




AUM

American University Of The Middle East

Typical Symbols in ASME Y14.5



Characteristics	Symbol
At maximum material condition	$\textcircled{M}$
At least material condition	$\textcircled{L}$
Projected tolerance zone	$\textcircled{P}$
Free state	$\textcircled{F}$
Tangent Plane	$\textcircled{T}$
Diameter	$\textcircled{\varnothing}$
Spherical Diameter	$S\textcircled{\varnothing}$
Radius	R
Spherical Radius	SR
Controlled Radius	CR
Reference	$()$
Arc Length	$\frown$
Statistical Tolerance	$\textcircled{ST}$
Between	$\longleftrightarrow$

Typical Symbols in ASME Y14.5

SYMBOL	GEOMETRIC CHARACTERISTIC	TOLERANCE TYPE	CONTROL SUMMARY
	FLATNESS	FORM (NO RELATION BETWEEN FEATURES)	CONTROLS FORM (SHAPE) OF SURFACES AND CAN ALSO CONTROL FORM OF AN AXIS OR MEDIAN PLANE DATUM REFERENCE IS NOT ALLOWED
	STRAIGHTNESS		
	CYLINDRICITY		
	CIRCULARITY (ROUNDNESS)		
	PERPENDICULARITY	ORIENTATION (NO RELATION BETWEEN FEATURES)	CONTROLS ORIENTATION (TILT) OF SURFACES, AXES, OR MEDIAN PLANES FOR SIZE AND NON-SIZE FEATURES DATUM REFERENCE REQUIRED
	PARALLELISM		
	ANGULARITY		
	POSITION	LOCATION	LOCATES CENTER POINTS, AXES, AND MEDIAN PLANES FOR SIZE FEATURES ALSO CONTROLS ORIENTATION
	PROFILE OF A SURFACE		LOCATES SURFACES ALSO CONTROLS SIZE, FORM, AND ORIENTATION OF SURFACES BASED ON DATUM REFERENCE
	PROFILE OF A LINE		
	TOTAL RUNOUT	RUNOUT	CONTROLS SURFACE COAXIALITY ALSO CONTROLS FORM AND ORIENTATION OF SURFACES
	CIRCULAR RUNOUT		
	CONCENTRICITY	LOCATION (DERIVED MEDIAN POINTS)	LOCATES DERIVED MEDIAN POINTS OF A FEATURE <i>NOT COMMON...CONSIDER USING POSITION, RUNOUT, OR PROFILE</i>
	SYMMETRY		

Examples



ISO ICS 21 Mechanical Systems and Components for General Use

New Standards RSS Feed for ISO department 

ISO ICS 21 Mechanical Systems and Components for General Use

ISO ICS 21 Mechanical Systems and Components for General Use standards qualify for up to 20% discount on standards and documents.

489 records found .071 (seconds)

<< First

< Previous

Next >

Last >>

IEC 61400-4:2012

Revises ISO 81400-4:2005*ISO 81400-4:2005/Cor 1:2005
Wind turbines - Part 4: Design requirements for wind turbine gearboxes



Price: **\$232.00**

Full Member Price : **\$185.60**



Alert Me



Buy PDF from ANSI

ISO 10129:2017

Revises ISO 10129:2006
Plain bearings - Testing of bearing metals - Resistance to corrosion by lubricants under static conditions

Examples

ISO 13253:2017

Revises ISO 13253:2011

Ducted **air-conditioners** and **air-to-air** heat pumps - Testing and rating for performance

... of **air-cooled**, **air-conditioners** and **air-to-air** heat pumps. ISO 13253:2017 is applicable to the following equipment: - ducted **air-cooled air conditioners**...



Price: **\$232.00**



Buy PDF from ANSI

Full Member Price : **\$185.60**



Alert Me

ISO 5151:2017

Revises ISO 5151:2010

Non-ducted **air conditioners** and heat pumps - Testing and rating for performance

... of **air-cooled air conditioners** and **air-to-air** heat pumps. ISO 5151:2017 is applicable to the following equipment: - non-ducted **air-cooled air**...



Price: **\$209.00**



Buy PDF from ANSI

Full Member Price : **\$167.20**

Examples

Available at:

https://www.astm.org/GLOBAL/images/Handbook_Eng.pdf



What Is a Standard?

A standard is a common language that promotes the flow of goods between buyer and seller and protects the general welfare. One example comes from building design. When architects design a building, they stipulate exactly what steel is required by referencing a standard specification on the drawing. They may, for example, refer to “ASTM A 36,” which is a specification for structural steel. This one document is the simplest and best possible way to communicate to a contractor the type of steel desired in terms of composition, strength, and quality. ASTM Specification A 36 is a four-page publication describing the requirements that the steel must meet. Using standards, architects do not have to consult volumes of reference books and expend reams of paper and costly hours describing steel thickness, tensile strength, and other characteristics.

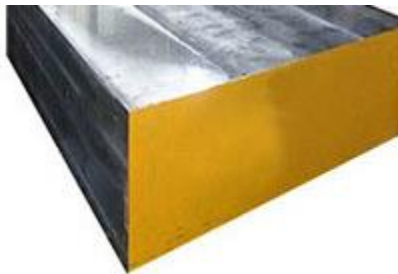




AUM

American University Of The Middle East

ASTM A36 Steel Specification



mechanical properties			
	yield strength	Tensile Strength	Elongation
ASTM A36	≥250Mpa	400—550Mpa	≥20%
JIS SS400	≥215Mpa	400~510Mpa	≥20%
GB Q235A	235Mpa	400—550Mpa	≥39%

chemical composition					
Grade	C	Si	Mn	P	S
ASTM A36	≤0.25	≤0.40	≤0.80-1.20	≤0.040	≤0.050
JIS SS400	—	—	—	≤0.050	≤0.050
S275JR	≤0.22	≤1.50	≤1.50	≤0.045	≤0.045
GB Q235A	0.14~0.22	≤0.30	0.30~0.65	≤0.045	≤0.050

Some Popular ISO standards

 Secure | <https://www.iso.org/popular-standards.html>

Most
companies
have
certification



ISO 9001 Quality management

Make sure your products and services meet customers' needs with this family of standards.



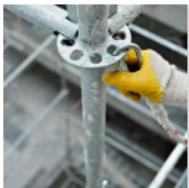
ISO/IEC 27001 Information security management

Ensure your organization's information is secure with this family of standards.



ISO 14001 Environmental management

Improve your environmental performance with this family of standards.



ISO 31000 Risk management

Manage risks that could be negative for your company's performance with this standard.



ISO 45001 Occupational health and safety

Reduce workplace risks and create safer working environments.



ISO 50001 Energy management

ISO's standard for helping organizations manage their energy performance.



ISO 8601 Date and time format

Use an internationally accepted way to represent dates and times.

[Home](#) > [About us](#) > [Who we are](#) > [Quality & Environment](#)

Our Commitment

Quality & Environmental Policies

Airbus Defence and Space operates a fully integrated Business Management System compliant and certified to the ISO9001 and ISO14001 international management standards.

We are a worldwide company focused on achieving high quality, customer satisfaction, environmental and social responsibility and strive to always work towards improving efficiency.

These values are formalized in our Quality and Environmental policies.



Documents

-  Certificate ISO 9001
-  Certificate ISO 14001
-  AQAP 2110 Certificate EN version – CIS & Intelligence FR
-  AQAP 2110/2210 certificate EN version – CIS & Intelligence GE

Summary

- Professional Societies have a vital role in engineering life and provide a range of benefits
- Engineering Standards set the rules for international acceptability and sale-ability of products/services