Shell Global Solutions

International Standards Workshop

19 - 20 Feb 2009, Perth, Australia

Think standards – Think global.
Adoption of International Standards in Shell

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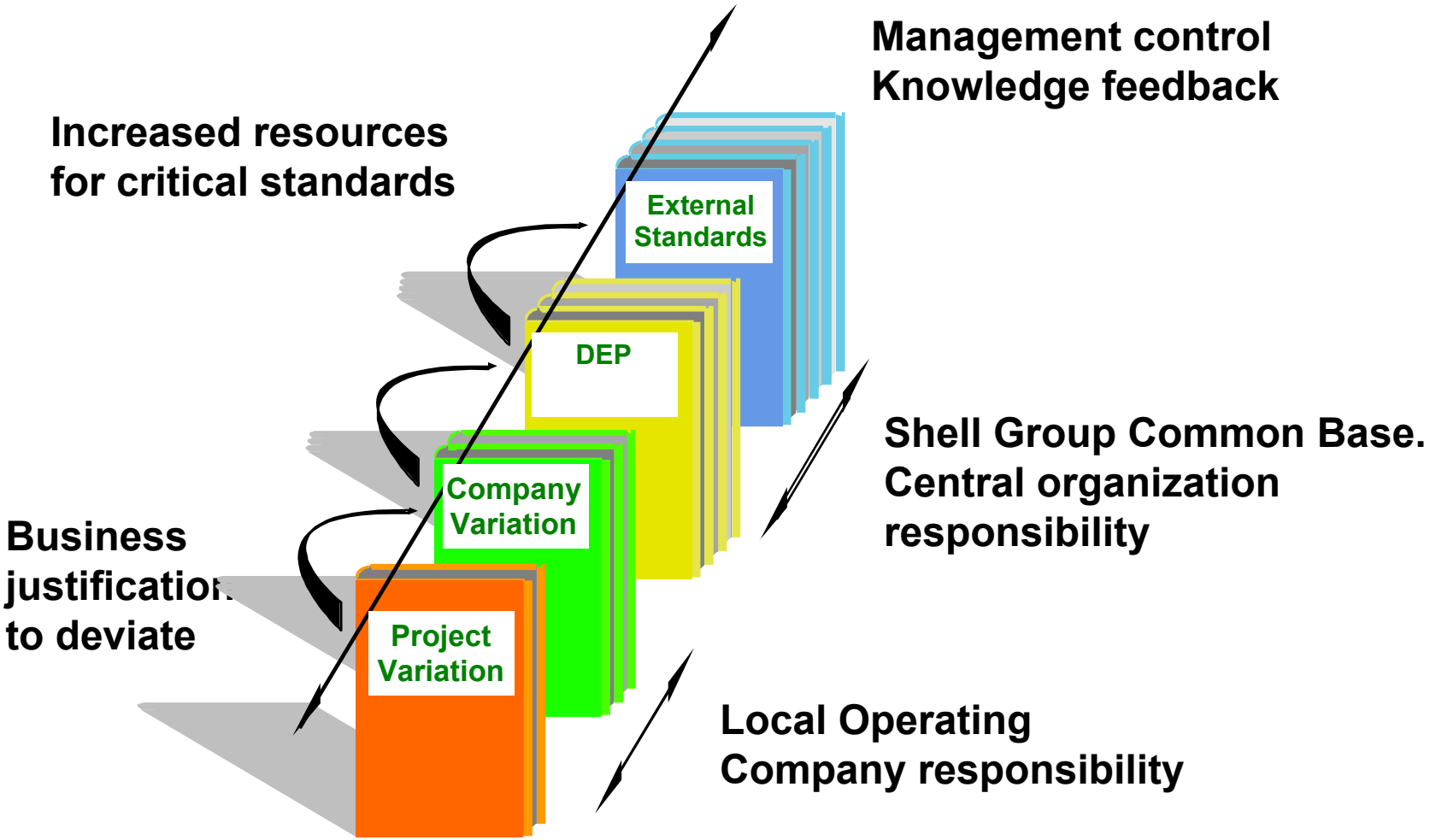
Acting Chair of ISO/TC67
Shell Global Solutions International B.V.

Introduction and purpose

This presentation sets out to explain the following:

- Shell's standards structure and governance
- Purpose and management of Design and Engineering Practices (DEPs)
- Access to standards, and application of DEPs
- Issues relating to application of standards and their management

Shell Transparent Standards Structure



DEP – Design and Engineering Practice
Company Variation – EGGS in USA; ESTGs in Canada; ERDs in Oman etc

ISO/TC67 Vision

In Shell we use both Group Standards and technical standards:

Group Governance

- Group Standards

  - mandatory across Shell, signed by CEO

  - examples: Finance, HSSE (includes AIPSM Standards), IM, Disclosure

- Group Manuals

  - mandatory instructions on implementation of Group Standards

  - examples:AIPSM Application Manual; DEM 1 and DEM 2

- Group Guides

  - Non-mandatory guidance on good practice

Industry/Engineering

- Technical standards

  Internal standards

  - DEPs (Design and Engineering Practices)

  - Local Shell company standards

  - Project specifications

  External standards

  - International Standards (e.g. ISO, IEC standards)

  - national standards (e.g. BS, DIN standards)

  - industry standards (e.g. API, ASTM standards)

- Regulations

  - Legal force; may or may not refer to standards

Shell Standardization Policy

In our DEPs and technical standards:

- Maximize use of common industry standards (ISO/ IEC if possible)
- Minimize additional company requirements
- Ensure variations justified (technical and commercial)
- Ensure continuous improvement (feedback from users)
- Influence external standards bodies. Participate actively in the technical committees and working groups of key external standards

Benefits are maximized when all companies use the same common industry standards

The basics – What are the DEPs ?

The DEPs are made for global Shell application

EP, DS, GP, cross-business:

- Engineering
  - Concept selection guidelines
  - Pre-engineering (selection/variety control; reliability/integrity; purchasing specifations)
  - Life-cycle cost optimised
- Construction (preservation, commissioning, inspection, testing)
- Operation/maintenance

Governance by Shell Standardization Steering Committee (SSSC)

Company Standardization Management

Standards Steering Committee: E&P, refining, distribution, chemicals

Transparent standards structure: policy

Internal standards: provision of standards (DEPs); materials standards catalogue (MESC)

External standards: input to external standards

Variety control: type restriction; vendor selection

Information technology: provision of internal and external standards; CD-ROMs and company website

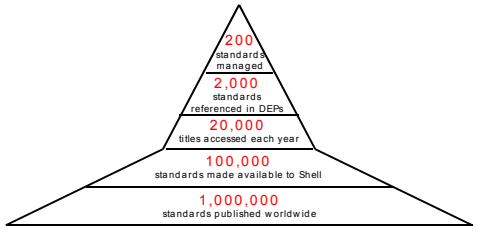
DEP facts

- 360 DEPs
  - Road map for use of the most appropriate external standards
  - 120 are endorsements, amendments/ supplements to external standards
  - 2000+ external standards referenced
- 2000+ website users per day
  (DEPs, external standards, MESC)
- Written in same editing style as external standards
  - Contain a combination of shalls and shoulds
- DEPs updated based on criticality: learnings and pace of change

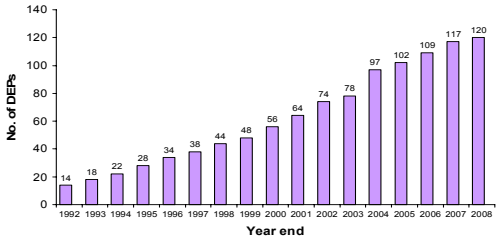
DEPs approved by VP Engineering

Administered by Shell Standards Team

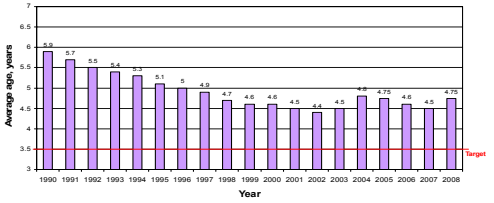
Focus on key external standards



No. of DEPs based on External Standards



DEPs average age



….. still much to do……

TECHNICAL SPECIFICATION

CENTRIFUGAL PUMPS (AMENDMENTS/SUPPLEMENTS TO ISO 13709)

DEP 31.29.02.30-Gen.

May 2004

DESIGN AND ENGINEERING PRACTICE

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APPENDICES

The complexity of our technical governance is simplified through a single point of access

Shell Technical Standards intranet site:

- Access for all Shell staff worldwide to the internal company technical standards;
- 100,000 external standards from the main standards organizations used by Shell;
- Communication to build shared vision
- Accessed by 2000+ users per day

http://sww.shell.com/standards

Abbreviations

This presentation makes use of many abbreviations in order to illustrate the various issues.

These include:

ISO CS	ISO Central Secretariat	http://www.iso.org
IEC CS	IEC Central Secretariat	http://www.iec.org
ISO/TC67	ISO Technical Committee 67	http://www.tc67.net
API	American Petroleum Institute	http://www.api.org
ANSI	American National Standards Institute	http://www.ansi.org
CEN	European Standards Organization	http://www.cenorm.be
OGP	International Association of Oil and Gas Producers	http://www.ogp.org.uk
DEP	Shell Group Design and Engineering Practice	http://www.shell.com
MESC	Shell Materials Equipment Standards and Code	http://www.shell.com

Conclusions

- Standards are a corporate asset, and not a corporate liability
- Shell will maintain a standards system
- Shell needs and uses international standards
- Shell participates in developing international standards

- Organizations should develop a standards plan to meet their needs (Identify key standards; manage use of these)

Thank You

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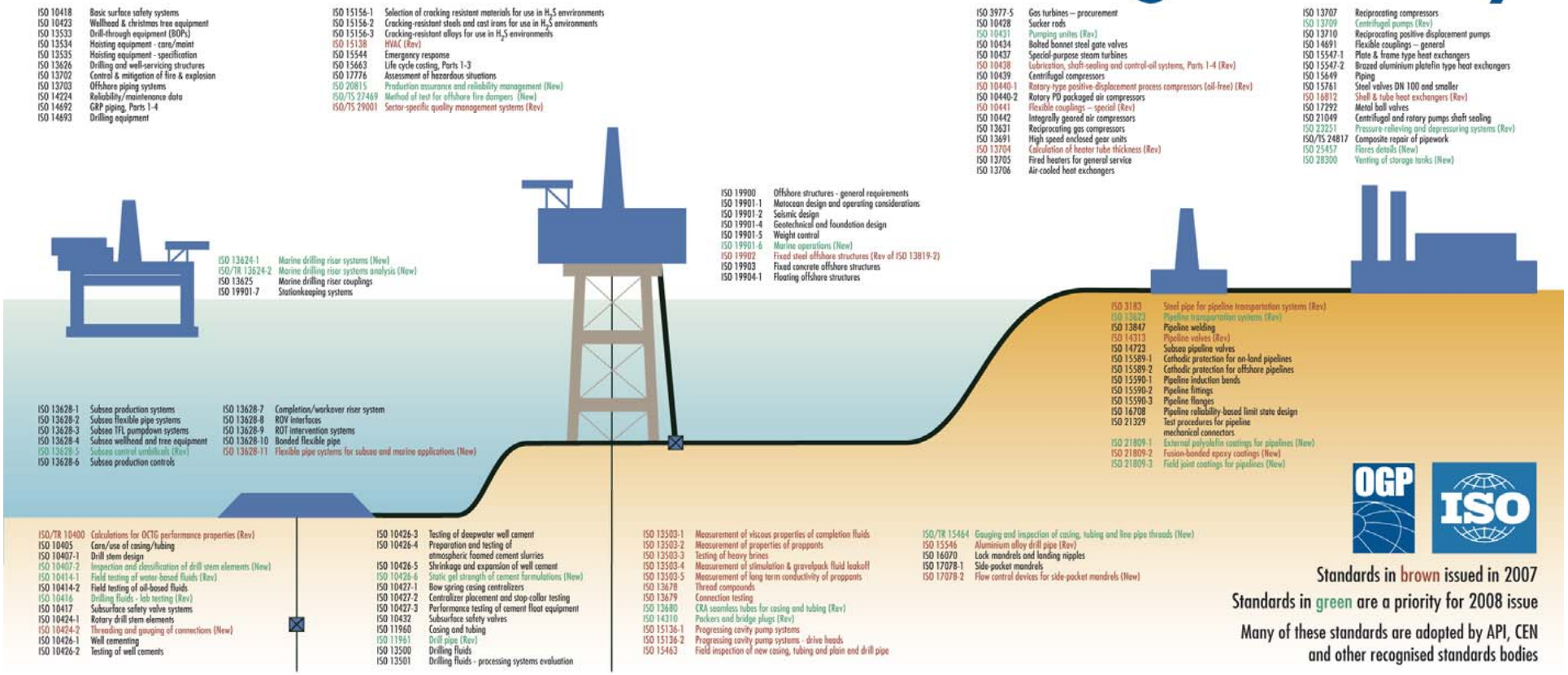
Back-up

Introduction

- **Who needs standards? The world needs standards. Shell uses standards.**
- **By way of example, I will describe Shell's technical standards needs, and what Shell and our industry sector "the petroleum, petrochemical and natural gas industry" are doing about this. I can speak from our experience.**
- **Shell is an international company, trading in an international industry, using international (and national) suppliers under many different regulatory regimes. For our projects and operations, Shell prefers to use International Standards (ISO, IEC, ITU), and is actively supporting this.**

ISO Standards for use in the oil & gas industry



ISO TC67 has published 130+ standards.

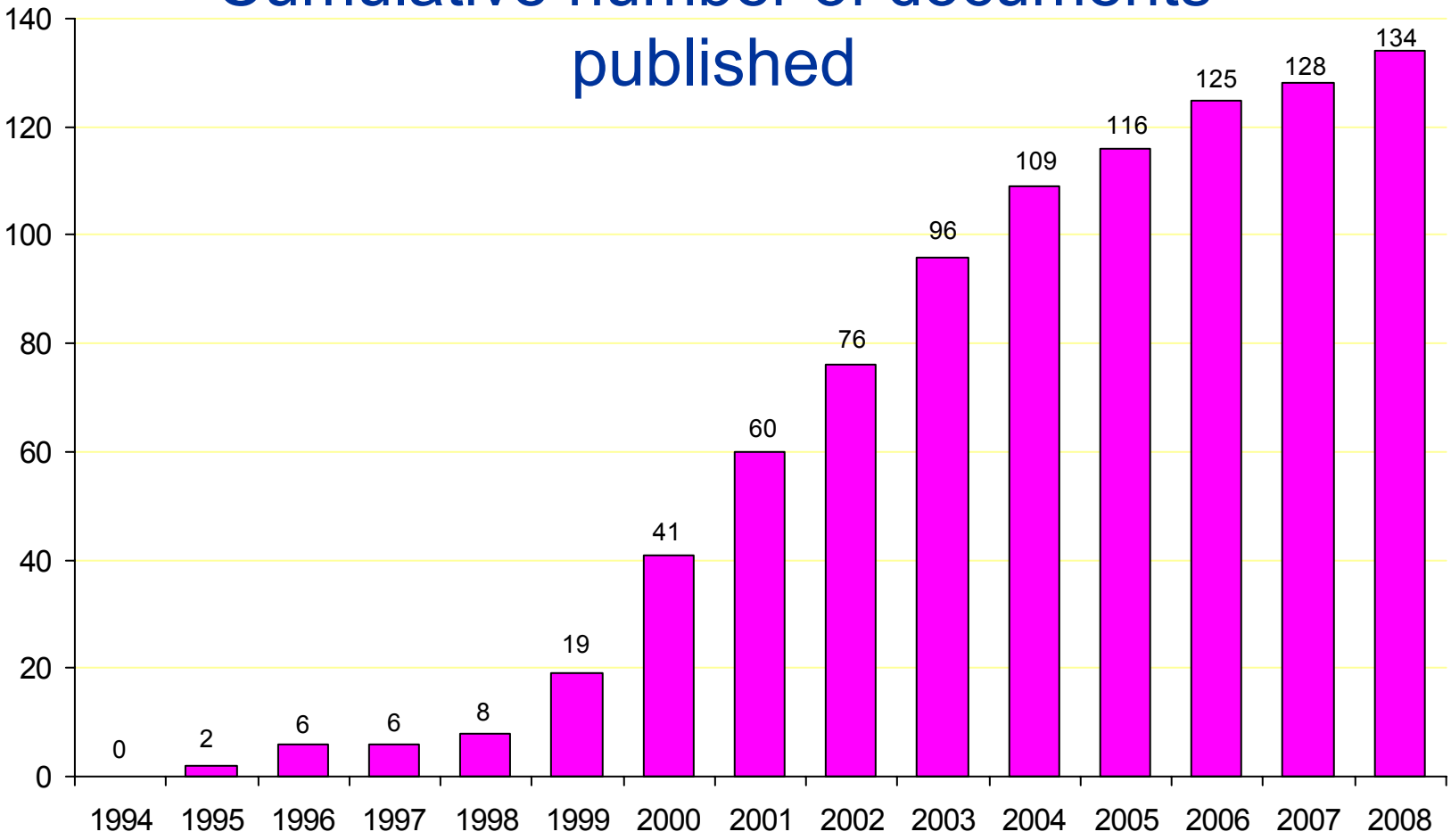
API has adopted 65+ of these as joint API / ISO standards.

CEN has adopted 110+ of these as joint European EN ISO standards.

China, Gulf Region, India, Kazakhstan etc. have also adopted many of these ISO standards.

Shell follows these industry standards

ISO/TC67 accomplishments: Cumulative number of documents published



Note: excluding "fasttrack"ISOs

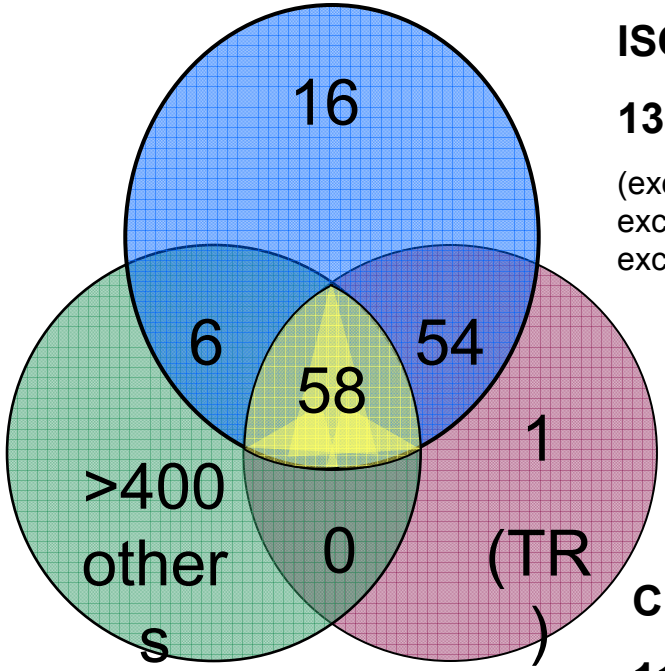
Global standards used locally worldwide ISO-API-CEN

API

Upstream & Refining

64 cobranded published;

(excl. NACE MR0175/ISO 15156;
excl API Spec 9A/ISO 10425 from ISO/TC105
excl ISO 10497 from ISO/TC 153;
Excl 4 MPMS adoptions from ISO/TC28)



ISO/TC67

134 published

(excl. ISO 10425 from ISO/TC105;
excl ISO 10497 from ISO/TC 153;
excl. so-called “fast-track” standards)

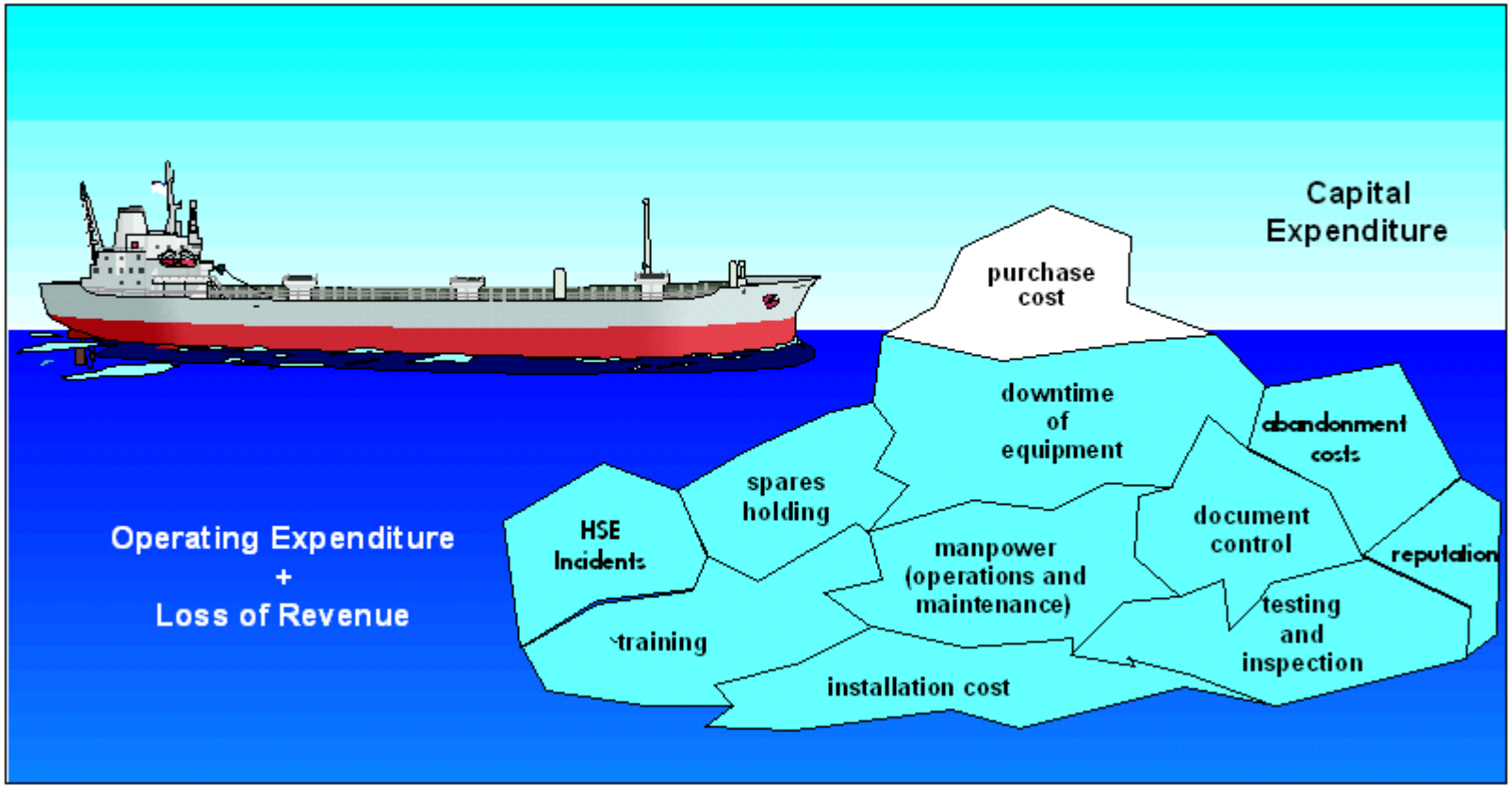
CEN/TC12

113 published

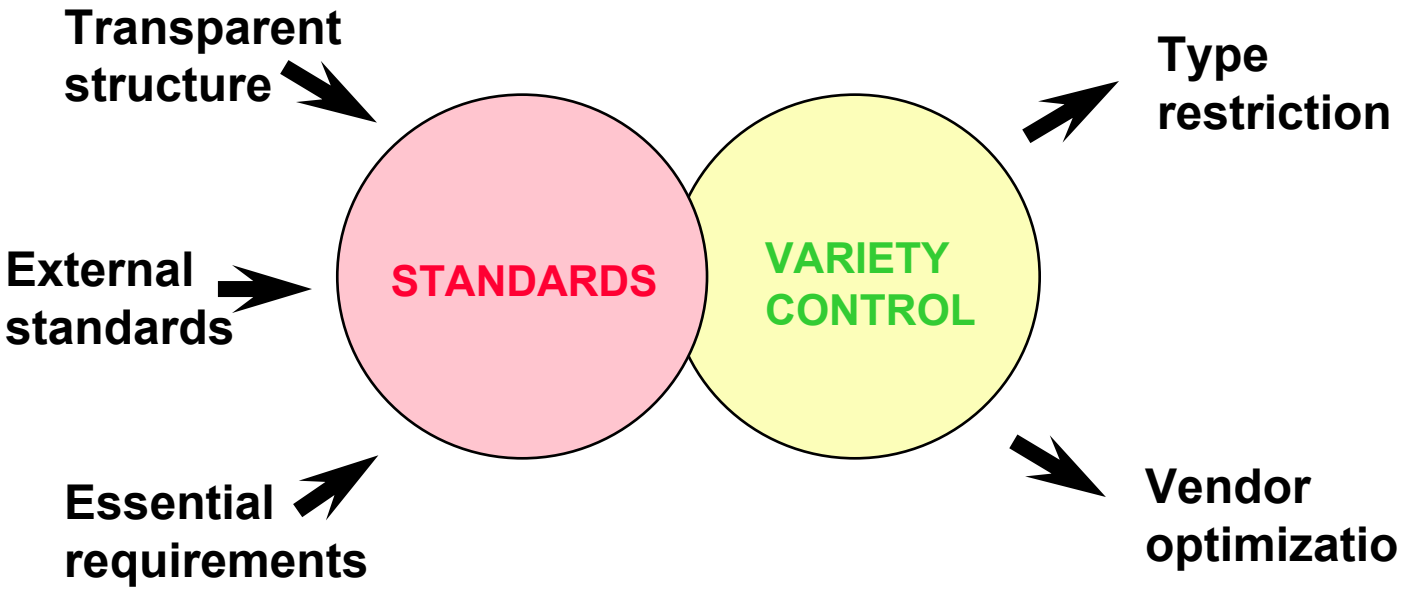
(incl. EN ISO 10434, EN ISO 15761 and EN ISO 17292 from CEN/TC69;
and incl. TR for use of ASME B31.1)

Note: 32 of the other >400 API Standards are linked with 35 of the other 75 ISO/TC67 Standards

Total Cost of Ownership



Standards + Variety Control = Standardization



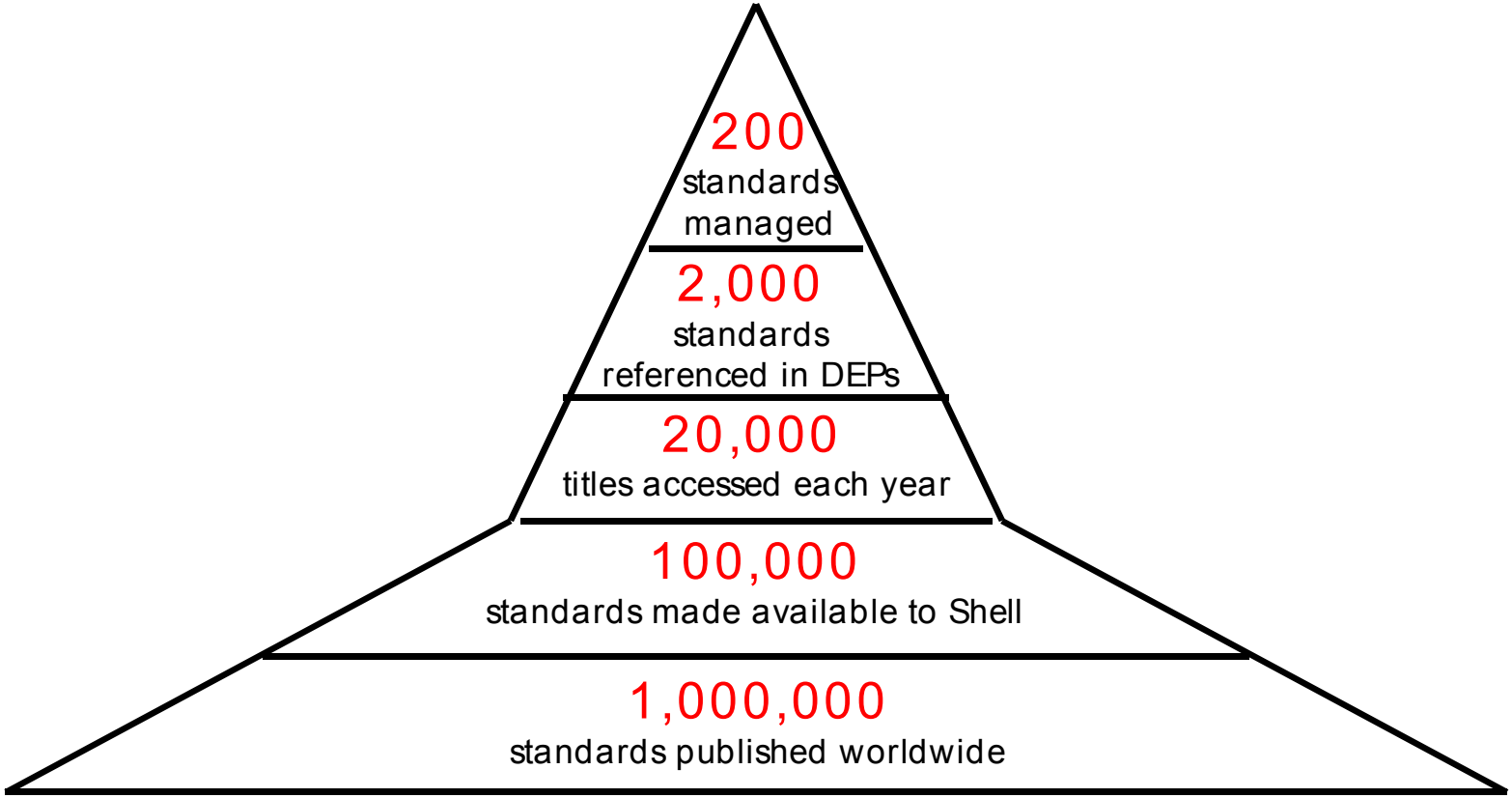
A catalogue such as MESC is a key enabler for standardization

Two standardization examples

30% price savings on electric cable, and 50% stock reduction.

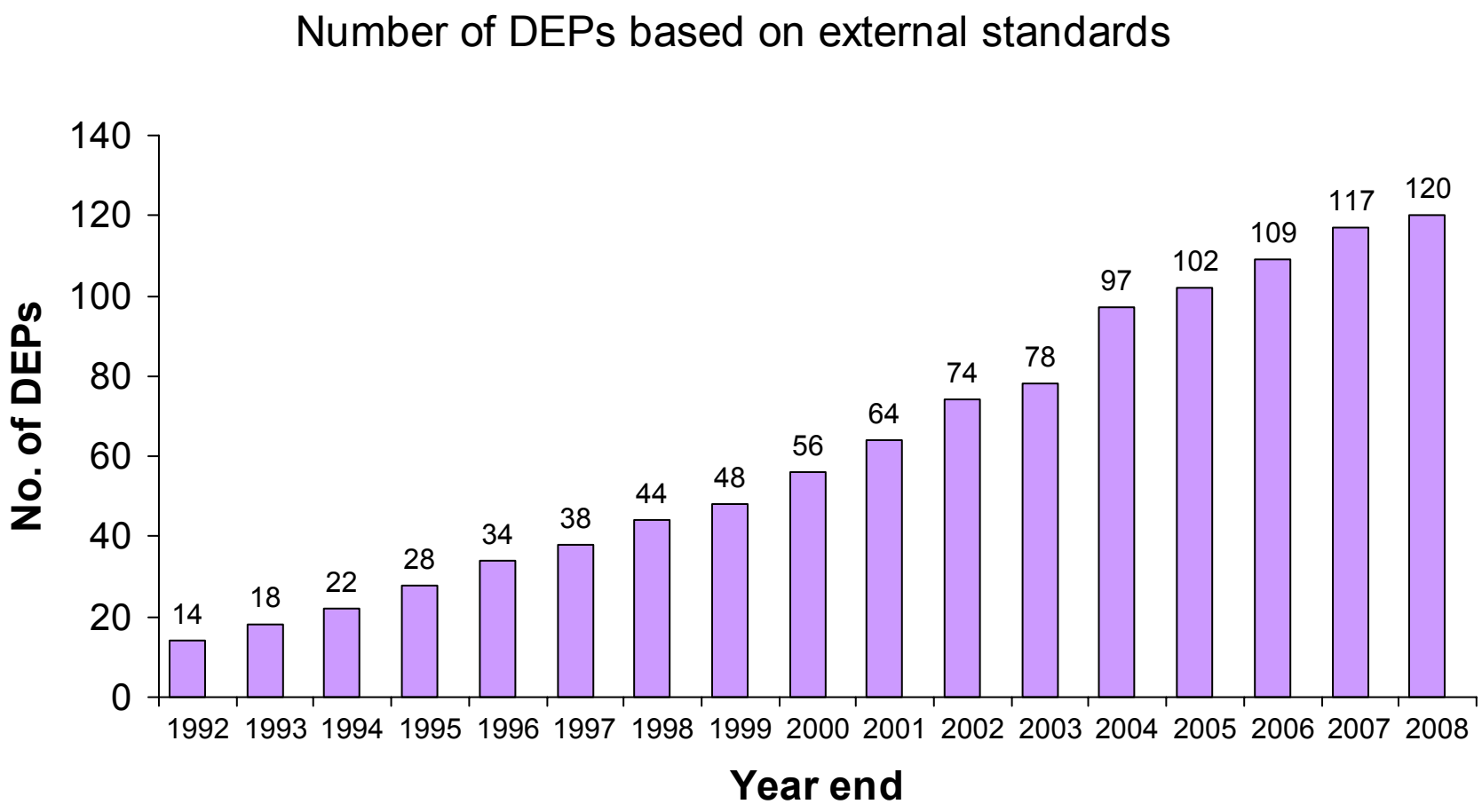
30% price savings on valves, and 80% stock reduction.

Focus on key external standards

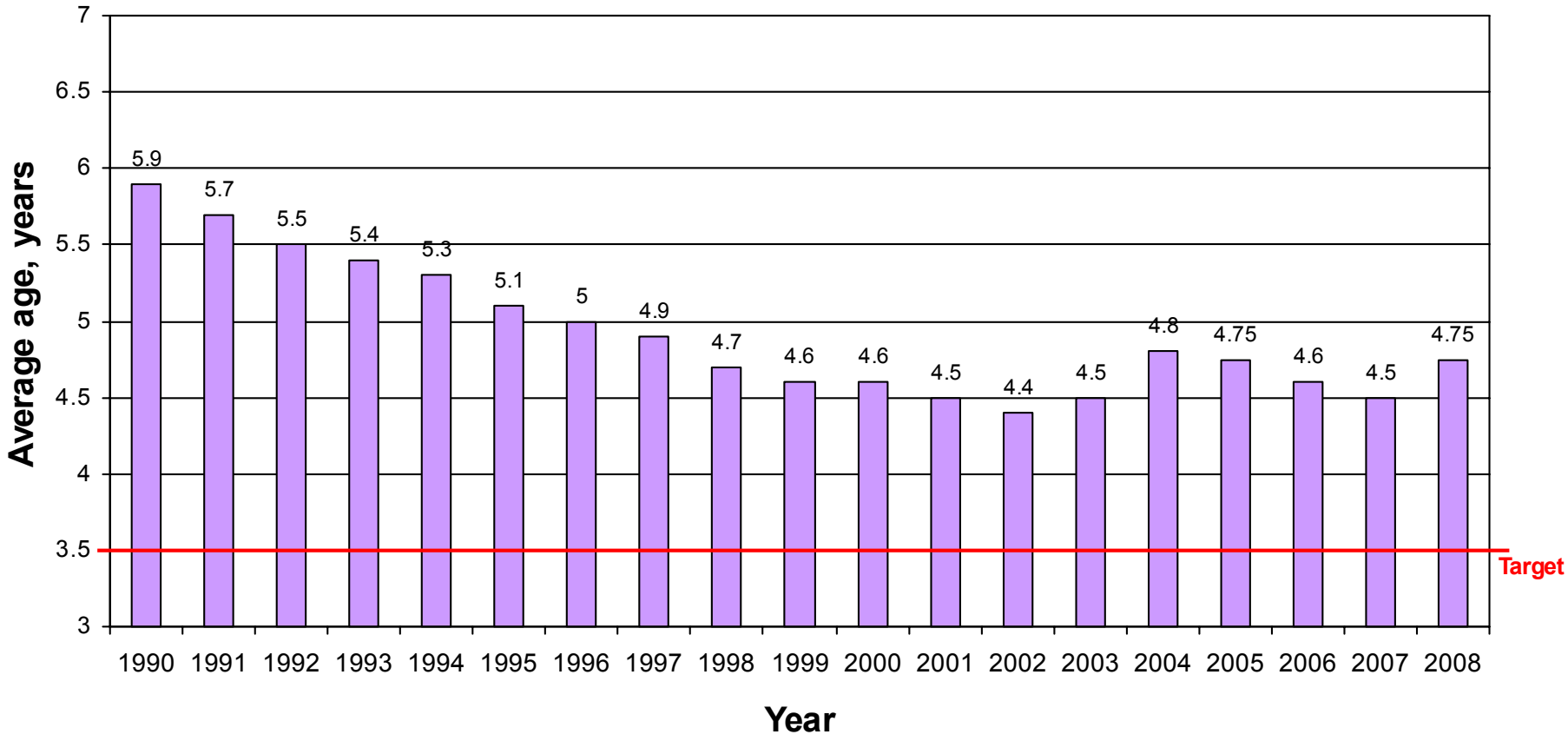


Trend towards transparency - Benefit of external standards efforts

(Total number of DEPs = 350)



DEP average age



Company benefits from standards

Cost Reduction - Increase Business Efficiency

- Simplify design and procurement; Variety Control
- Interchangeability of equipment
- Promote stable and global market

Enhance Technical Integrity

- Safety, Health and protection of the Environment
- Maximise availability, minimise lost revenue

Establish a Common Technology Base

- Technology transfer / Sharing best practice / Remove barriers to trade (WTO)

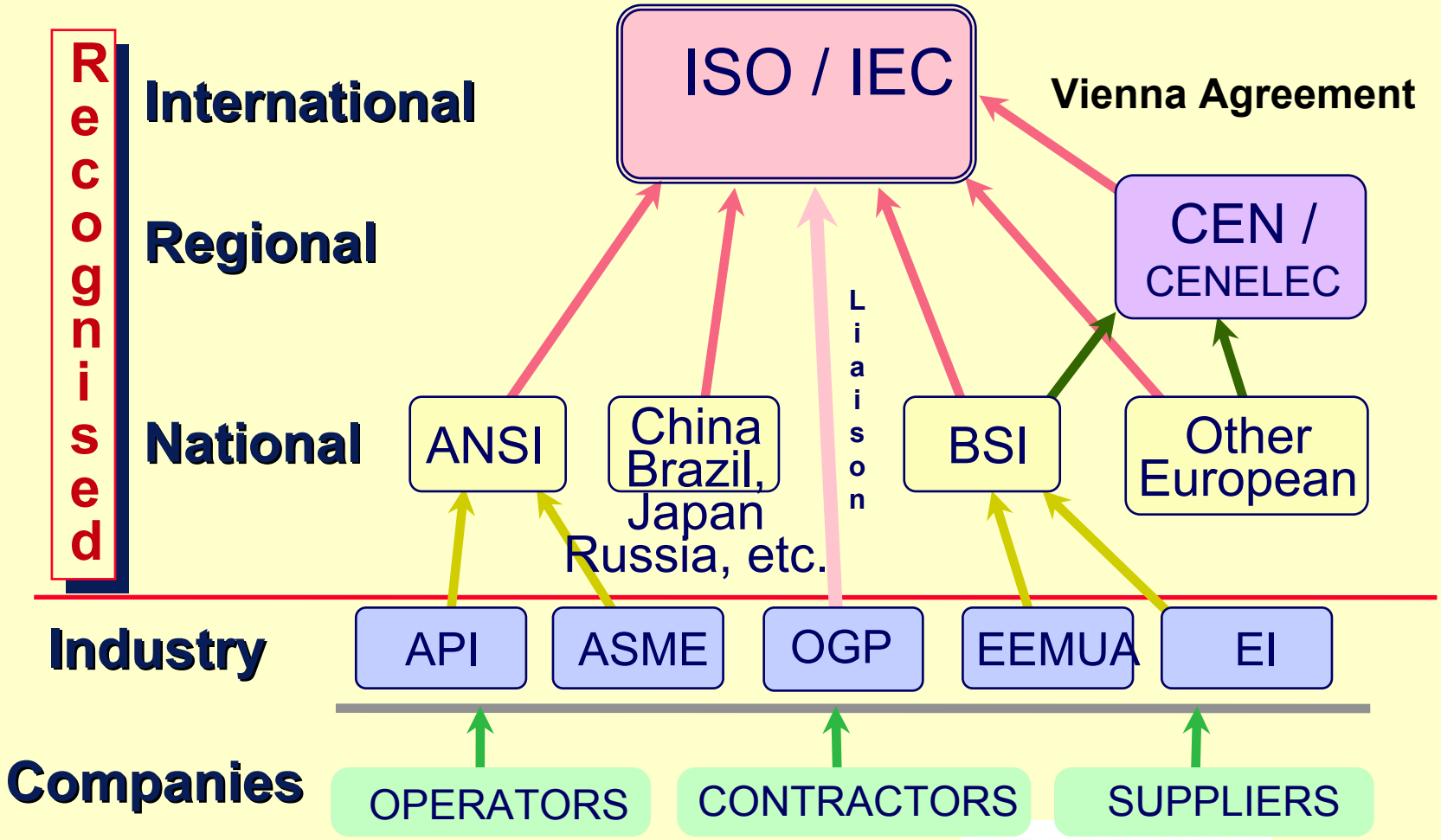
Support Legislation where linked

- Safety and Environmental Regulations (e.g. Process Safety Management, US)
- Procurement Legislation (e.g. European Directives)
- Essential Requirements (e.g. 'New Approach' European Directives)

IPA benchmark statistics report that using a coherent standards system saves projects:

5 % on Capex and 13 % on schedule

Standardization Bodies - Relationships



ISO/TC67 statements

Mission:

To create value-added standards for the oil and natural gas industry

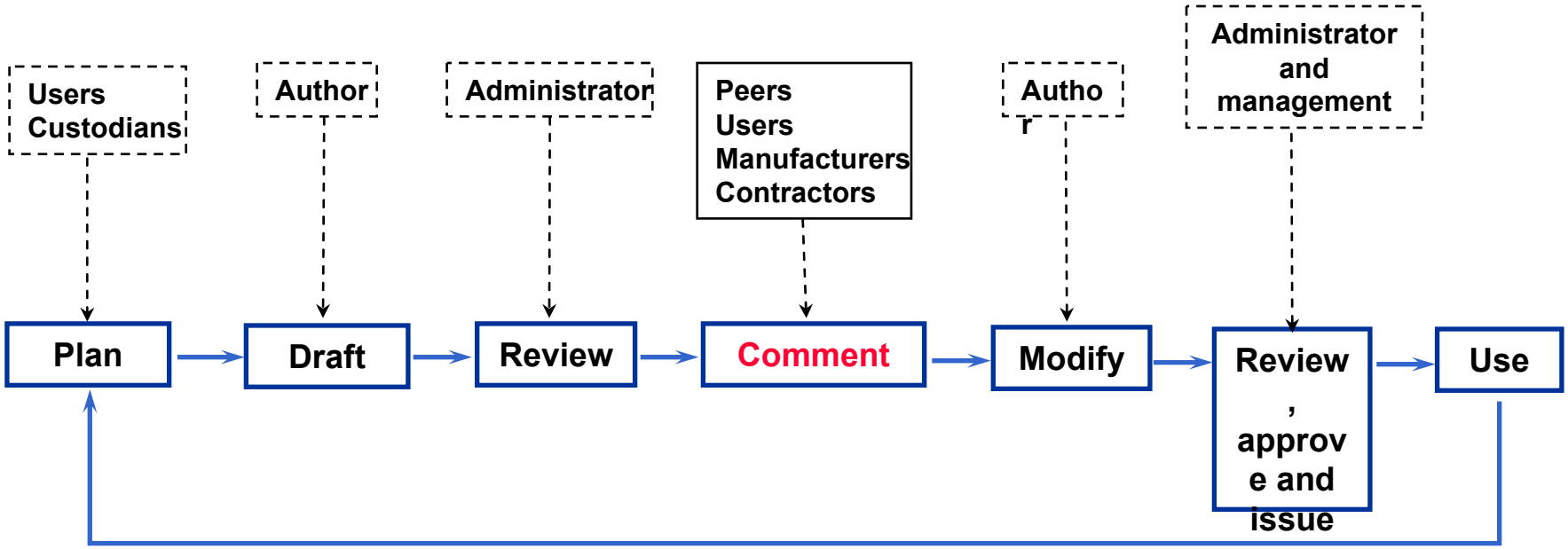
Vision:

Global standards used locally worldwide

Goals:

- Prepare standards required by this industry
- Prepare standards that could be adopted worldwide by bodies such as API and CEN
- Publish standards that enable companies to minimize their specifications
- Deliver standards to the target dates on the agreed work programme

DEP making process



DEP & MESC system contents

Subject Category	No of DEPs
Miscellaneous Engineering Subjects and Indices	26
Mechanical Engineering	
General	13
General equipment/noise/safety relief systems	11
Boilers/furnaces	4
Heat exchangers	7
Vessels/columns/reactors	10
Rotating equipment	28
Piping and pipelines	44
Construction materials	4
Welding	3
Maintenance and inspection	6
Offshore applications	17
Instrument Engineering and Telecommunications	34
Electrical Engineering	20
Civil Engineering	21
Surface Protection	23
Safety and fire fighting	8
Drilling and production	24
Total number of DEPs	**303**

MESC covers most of the piping class items, such as pipes, valves, flanges, fittings, gaskets, level gauges, meterruns, Y-type strainers, thermowells, etc.

INTERNATIONAL STANDARD

ISO 13709

First edition
2003-07-01

Centrifugal pumps for petroleum, petrochemical and natural gas industries

Pompes centrifuges pour les industries du pétrole, de la pétrochimie et du gaz naturel

Reference number
ISO 13709:2003(E)

Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries

ANSI/API Standard 610
Tenth Edition, October 2004

ISO 13709: 2003, (Identical) Centrifugal pumps for petroleum, petrochemical and natural gas industries

American Petroleum Institute

Helping You Get The Job Done Right.℠

TECHNICAL SPECIFICATION

CENTRIFUGAL PUMPS (AMENDMENTS/SUPPLEMENTS TO ISO 13709)

DEP 31.29.02.30-Gen.

May 2004

DESIGN AND ENGINEERING PRACTICE

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8.2.4.1.3 REPLACE THIS CLAUSE BY:

A lateral analysis of the pump shall be performed in accordance with Annex I, and assessed at design clearances and at three times specified wear ring and bushing clearances. Unless otherwise specified a shop verification of the unbalanced response analysis shall be performed.

ADD NEW CLAUSE:

8.2.4.1.4 The analysis report shall include sufficient dimensional and mass elastic data to perform an independent analysis. Any input models used shall also be included.

8.2.6 Lubrication

8.2.6.1 REPLACE THE FIRST SENTENCE OF THIS CLAUSE BY:

A pressure-lubrication system shall be furnished to supply oil at a suitable pressure to the pump bearings, the driver and any other driven equipment, including gears.

8.2.8 Preparation for shipment

8.2.8.3 REPLACE THIS CLAUSE BY:

If a spare rotor is purchased it shall be crated in a metal container in the vertical position for transportation and storage. The crating method shall be suitable for at least 4 years' storage.

Engineering Guides and General Specifications

11 GS-610
Centrifugal Pumps
(amendments/supplements to DEP 31.29.02.30-Gen. (May 2004))

This General Specification is written as amendments and supplements to DEP 31.29.02.30-Gen. Sections of DEP 31.29.02.30-Gen. which are not amended shall remain valid as written.

Amendments/supplements to DEP 31.29.02.30-Gen.

PART I INTRODUCTION

1.1 SCOPE

Replace the sixth paragraph by:

This GS shall be used in conjunction with data sheets 11E610S1 to 11E610S3.

PART II PUMPS FOR NON-ESSENTIAL SERVICE AND SPARED PUMPS FOR ESSENTIAL SERVICE

5. BASIC DESIGN

5.1 General

5.1.16 Noise Control

5.1.16.1 Limits

Replace the first sentence by:

The Contractor shall comply with 24 GS-8 and thereby communicate to the Vendor the specified equipment noise limitations by using data sheet 24G8S1, which forms part of this requisition.

5.1.16.2 Information to be submitted with the tender

Replace this clause by:

The Vendor shall submit guaranteed sound power levels and sound pressure levels (including octave band spectrum) of the equipment, together with any other relevant information as requested in the data sheet 24G8S1.

5.8 Mechanical shaft seals

5.8.1 *Replace the first sentence by:*

All mechnical seals shall be in accordance with 11 GS-682.

5.12 Materials

5.12.1 General

5.12.1.1 *Replace this clause by:*

The materials of construction for pumps purchased on projects managed by the Projects Task Force shall be in accordance with the Materials Selection Report (MSR); if an MSR is not available the materials of construction shall be in accordance with Appendix 1 of DEP 31.29.02.30-Gen. and/or as specified by the materials and corrosion specialist assigned to the project.

6. ACCESSORIES

6.1 Drivers

6.1.1 *Replace this clause by:*

Electric motor drivers shall be in accordance with 15 GS-21, 15 GS-23 or 15 GS-26, as applicable.

6.1.9 *Replace this clause by:*

…, except that gears in services operating at absorbed power above 750 kW (1000 hp) shall be in accordance with 11 GS-613.

6.1.11 *Replace this clause by:*

Internal combustion engines shall comply with NFPA 37 if located in in an area classified as Class 1 Division 1 or Class 1 Division 2.

6.4 Instrumentation

6.4.1 *Replace the last sentence by:*

If supplied, the gauges shall comply with 16 GS-459V or 11 GS-682.

7. INSPECTION, TESTING, AND PREPARATION FOR SHIPMENT

7.2 Inspection

7.2.2 Material Inspection

7.2.2.1.3 Casting Defects

Add new sentence:

API Adopt-back of ISO 13706, as ANSI/API 661

Air-Cooled Heat Exchangers for General Refinery Service

API Standard 661, Fifth Edition
March 2002

ISO 13706: 2000, Petroleum and Natural Gas Industries—Air-cooled Heat Exchangers

American Petroleum Institute

Helping You Get The Job Done Right.℠

European Standard (adoption of ISO 13706 via Vienna Agreement)

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 13706

April 2000

ICS 75.180.20

English version

Petroleum and natural gas industries - Air-cooled heat exchangers (ISO 13706:1998)

Industries du pétrole et du gaz naturel - Echangeurs de chaleur refroidis à l'air (ISO 13706:1998)

Erdöl- und Erdgasindustrien - Luftgekühlte Wärmetauscher (ISO 13706:1998)

This European Standard was approved by CEN on 15 April 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN ISO 13706:2000 E

30 KEY ITEMS FOR ISO/TC67

SUBSURFACE

- ISO 10432 SSSV
- ISO 11960 Casing & tubing
- ISO 11961 Drillpipe
- ISO 10426 Well cements
- ISO 13500 Drilling fluids

SUBSEA SYSTEMS

- ISO 13628-1 Subsea systems
- ISO 13628-2 Flexible pipe
- ISO 13628-4 Subsea wellhead & christmas tree
- ISO 13628-6 Subsea production controls
- ISO 13628-8 ROV
- ISO 13628-9 ROT

OFFSHORE STUCTURES

- ISO 19900 Offshore structures

PRODUCTION EQUIPMENT

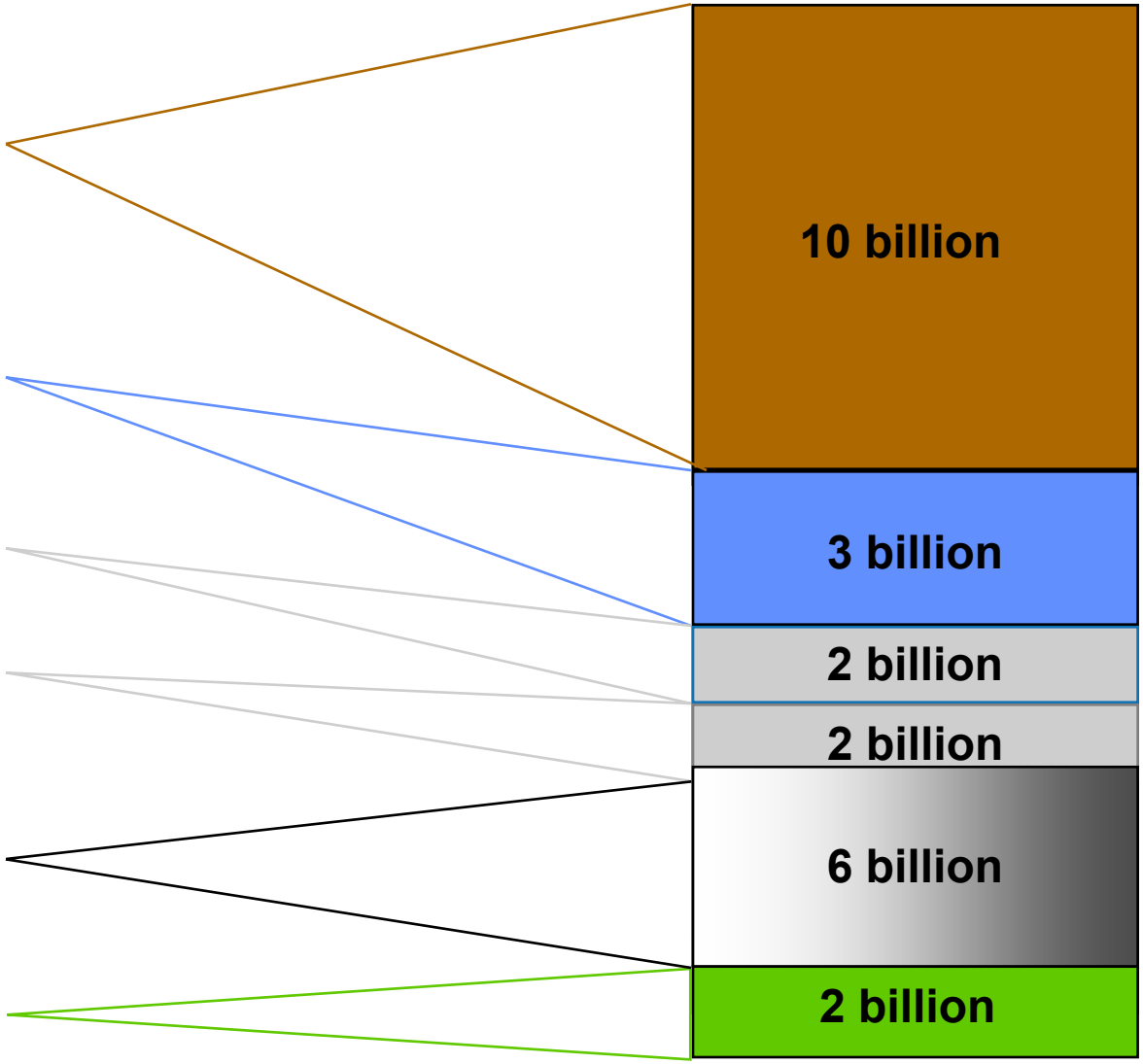
- ISO 10423 Wellhead & christmas trees
- ISO 13533 Drill-through equipment
- ISO 13535 Hoisting equipment
- ISO 15649 Piping systems

PIPELINES

- ISO 13623 Pipeline systems
- ISO 3183 Linepipe
- ISO 13847 Pipeline welding
- ISO 14313 Pipeline valves
- ISO 15589 Cathodic protection
- ISO 15589 Bends, flanges & fittings

PROCESS FACILITIES

- ISO 10437 Steam turbines
- ISO 10439 Centrifugal compressors
- ISO 10441 Flexible couplings
- ISO 13706 Air-cooled heat exchangers
- ISO 13707 Reciprocating compressors
- ISO 13709 Centrifugal pumps
- ISO 21049 Shaft-sealing systems



TOTAL USD 25 billion p.a.

Piping Classes (one of the 303 DEPs)

- Pre-designed piping systems for a wide variety of services
- Direct link to materials catalogue
- Large reduction in engineering and procurement effort
- Integrity control (continuously updated for code compliance)
- Company-wide standardization
- Variety control (greatly reduced spares holding)
- Increased leverage (larger volume of fewer components)

Caps
Elbows
Tees
Reducers
Branch fittings

Check valves
Gate valves
Globe valves
Ball valves
Butterfly valves

Shell Piping Classes

Direct reference from DEP to the MESC catalogue

PIPING COMPONENTS — DEP 31.38.01.12-GEN. CLASS — ISSUE DATE : JANUARY 1999

ITEM DESCRIPTION	MESC	NOMINAL PIPE SIZE 15	20	25	40	50	80	100	150	200	250	300	350	400	450	500	600
* PIPE																	
PIPE (API 5L-B, SML)	74.13.12	018.1	028.1	038.1	058.1	069.1	103.1	149.1									
PIPE (API 5L-B, EW)	74.13.14								211.1	239.1	279.1	319.1	373.1	421.1	469.1	521.1	
PIPE (API 5L-B, SAW)	74.13.17																569.1
PIPE	74.30.05	018.1	028.1	038.1	058.1	069.1	103.1	149.1	211.1	239.1	279.1	319.1	373.1	421.1	469.1	521.1	569.1
PIPE NIPPLE 50MM	76.30.57	431.1	441.1	451.1	471.1												
* FLANGES																	
BLIND FLANGE	76.62.11	058.1	062.1	066.1	068.1	070.1	072.1	074.1	076.1	078.1	080.1	082.1	084.1	086.1	088.1	090.1	092.1
SPECTACLE BLIND FLANGE	76.88.03	002.1	004.1	006.1	008.1	010.1	012.1	014.1	016.1	018.1	020.1	022.1	024.1	026.1	028.1	030.1	032.1
SPACER RING TYPE (ASME FLANGE)	76.88.16	002.1	004.1	006.1	008.1	010.1	012.1	014.1	016.1	018.1	020.1	022.1	024.1	026.1	028.1	030.1	032.1
WELDING NECK FLANGE	76.62.78	352.1	354.1	356.1	358.1	310.1	312.1	314.1	316.1	208.1	210.1	212.1	214.1	216.1	218.1	220.1	224.1
* FITTINGS																	
CAP BUTT-WELD END	76.30.19	018.1	024.1	030.1	038.1	055.1	075.1	095.1	115.1	132.1	152.1	172.1	192.1	212.1	232.1	255.1	275.1
ELBOW 45 DEG BUTT-WELD ENDS	76.30.38	568.1	574.1	580.1	588.1	605.1	625.1	645.1	665.1	682.1	702.1	722.1	742.1	762.1	782.1	805.1	825.1
ELBOW 90 DEG BUTT-WELD ENDS	76.30.40	568.1	574.1	580.1	588.1	605.1	625.1	645.1	665.1	682.1	702.1	722.1	742.1	762.1	782.1	805.1	825.1
EQUAL TEE BUTT-WELD ENDS	76.30.84	568.1	574.1	580.1	588.1	605.1	625.1	645.1	665.1	682.1	702.1	722.1	742.1	762.1	782.1	805.1	825.1
* VALVES																	
CHECK VALVE FLANGED	77.10.05	003.1	004.1	005.1	007.1												
	77.10.20					008.1	010.1	012.1	014.1	015.1	016.1	017.1	018.1	019.1	020.1	021.1	023.1
CHECK VALVE SOCKET WELD	77.11.04	003.1	004.1	005.1	007.1												
GATE VALVE FLANGED	77.20.04	003.1	004.1	005.1	007.1												
	77.20.20					008.1	010.1	012.1	014.1	015.1	016.1	017.1	018.1	019.1	020.1	021.1	023.1
GATE VALVE SOCKET WELD	77.21.04	003.1	004.1	005.1	007.1												
GLOBE VALVE FLANGED	77.30.05	003.1	004.1	005.1	007.1												
	77.30.20					008.1	010.1	012.1	014.1	015.1							
GLOBE VALVE SOCKET WELD	77.31.04	003.1	004.1	005.1	007.1												
* MISCELLANEOUS																	
GASKET, RF TANGED INSERT	85.30.01	004.1	006.1	008.1	012.1	014.1	018.1	020.1	024.1	026.1	028.1	030.1	032.1	034.1	036.1	038.1	042.1
METER RUN	76.65.96	252.1	254.1	256.1	258.1												
ORIFICE FLANGE SET	76.62.95					710.1	712.1	564.1	566.1	468.1	470.1	472.1	474.1	476.1	478.1	480.1	484.1
STRAINER Y-TYPE	76.83.19					402.1	404.1	406.1	408.1	420.1	421.1	422.1	423.1	424.1			

Noun: Flanges
Modifiers: Pipe
Welding Neck

HEADER CHARACTERISTICS :

Design spec:	ASME B16.5	
Dimensional spec, pipe:	ASME B36.10M/19M	
Mat:	Carbon Steel	
Mat, spec:	ASTM A105M	
Facing, flange:	raised face	
Finish, flange facing:	smooth	
Pressure designation:	150	
ASME CL		
Service:		
Service requirement:		
Temperature limit:		
deg C		
Add reqrmts:	SIOP SPE 76/001 DOC	
	SIOP SPE 76/002 DOC	
Inspection, certif:	ISO 10474 -3.1B	
Caps code:	WNFL CS01	

MESC: 766278.214.1 Flg Pipe Wn A105M CL150 20 DN350
Groove number:

Mass:	50.00	kg
Schedule number, hub:	20	
Size:	350	DN

Piping class
DEP

Buying description
CMT/MESC

Deliverable

A **Piping class** consist of a collection of ***standardized*** piping components, that are compatible and suitable for a defined service at stated pressure and temperature limits

Members of ISO/TC 67

30 Participating (P) Members:

Argentina, Bahrain, Brazil, Canada, China, Denmark, Finland, France, Germany, Indonesia, Iran, Italy, Japan, Korea, Libya, Mexico, Netherlands, Nigeria, Norway, Portugal, Qatar, Romania, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, USA, Venezuela

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Australia, Austria, Azerbaijan, Belgium, Bulgaria, Colombia, Croatia, Cuba, Czech Republic, Ecuador, Egypt, Hong Kong, Hungary, India, Ireland, Kazakhstan, Malaysia, Moldova, Mongolia, Oman, Poland, Saudi Arabia, Serbia, Singapore, Slovakia, Switzerland, Thailand, Trinidad and Tobago, Turkey, Viet Nam

Promote reference to international standards in regulations – or avoid need for regulations

1. To facilitate export of products manufactured nationally, and to facilitate inward investment from overseas.
2. Adopt as many as possible ISO/IEC standards with as few changes as possible.
3. Use same standard as used in Europe, America, China, and elsewhere with all the sustainable benefits of that.
4. Use ISO/IEC Guide 21 as a guide for the procedure for the national adoption of ISO/IEC standards.
5. Energy and organization needed to create committees from all the stakeholders to do this work.

STANDARDS ARE A CORPORATE **ASSET** NOT A CORPORATE **LIABILITY**