

Ballot Information

Reference	ISO/DIS 13628-4.2 (Ed 2)	Committee	ISO/TC 67/SC 4
Edition number	2	Vienna agreement	ISO lead
English title	Petroleum and natural gas industries -- Design and operation of subsea production systems -- Part 4: Subsea wellhead and tree equipment		
French title	Industries du pétrole et du gaz naturel -- Conception et exploitation des systèmes de production immergés -- Partie 4: Équipements immergés de tête de puits et tête de production		
Start date	2008-12-04	End date	2009-02-04
Opened by ISO/CS on	2008-12-04 00:07:14	Closed by ISO/CS on	2009-02-06 00:07:16
Status	Closed		
Voting stage	Enquiry	Version number	2
Note			

Result of voting

P-Members voting: 10 in favour out of 10 = 100 % (requirement \geq 66.66%)

(P-Members having abstained are not counted in this vote.)

Member bodies voting: 0 negative votes out of 12 = 0 % (requirement \leq 25%)

Approved

Votes by members					
Country	Member	Status	Approval	Disapproval	Abstention
Argentina	IRAM	P-Member			X
Austria	ON				X
Brazil	ABNT	P-Member	X *		
Canada	SCC	P-Member			X
China	SAC	P-Member	X		
France	AFNOR	P-Member			X
Germany	DIN	P-Member	X		
Indonesia	BSN	P-Member			X
Italy	UNI	P-Member	X		
Korea, Republic of	KATS	P-Member	X		
Netherlands	NEN	P-Member	X		
Norway	SN	P-Member	X *		
Poland	PKN	P-Member	X		
Portugal	IPQ				X
Russian Federation	GOST R	O-Member	X		
Spain	AENOR	O-Member	X		
United Kingdom	BSI	P-Member	X		
USA	ANSI	Secretariat	X *		
P-Member TOTALS Total of P-Members voting: 10			10	0	4
TOTALS			12	0	6
(*) A comment file was submitted with this vote					

Comments from Voters			
Brazil	ABNT	P-Member	Brazil(ABNT).doc
Norway	SN	P-Member	Norway(SN).doc
USA	ANSI	Secretariat	USA(ANSI).doc

Template for comments and secretariat observations

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1	2	(3)	4	5	(6)	(7)
MB ¹	Clause No./ Subclause No./ Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note (e.g. Table 1)	Type of comment ²	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted

BR	5.1.1.1		te	<p>5.1 Design and performance requirements</p> <p>5.1.1 General</p> <p>5.1.1.1 Production capability</p> <p>“- performance verification testing (refer to 5.1.7), which is intended to demonstrate and qualify performance of generic product families, as being representative of defined product variants;”</p> <p>Several validation test processes performed by operator in Brazil have shown that validation by scaling (size) is not reliable for critical applications as subsea. Also, test results from prototype can be used in a straightforward way as reference data for wear-out and performance (force or torque) for future FATs.</p>	Change to: “- performance verification testing (refer to 5.1.7), which is intended to demonstrate and qualify performance of generic product families , as being representative of defined product manufacturing variants;”	
BR	5.1.7.2		ed	<p>Performance verification testing - <u>General</u></p> <p>“Equipment should be qualified with minimal lubricants required for assembly unless the lubricants can be replenished when the equipment is in service or is provided for service in a sealed chamber.”</p>	Change lubricants to “lubricants”	
BR	5.1.7.2		te	<p>Performance verification testing – <u>General</u></p>	Include text:	

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				<p>“Equipment should be qualified with minimal lubricants required for assembly unless the lubricants can be replenished when the equipment is in service or is provided for service in a sealed chamber.”</p> <p>Actuation performance is greatly affected by friction coefficients, especially on valve side.</p> <p>If valve is designed to be operational necessarily using lubrication (grease) to reduce wear-out or friction, manufacturer shall provide objective evidences that such lubrication is not removed during service life (typical 20 years). Operator experience on different design validations (see OTC 13566 - <i>One Company’s Experience in Subsea Valve Testing</i> - E.J. Euthymiou) have shown that preservation of lubrication cannot be assured. In order to obtain a test that is more representative for worst-case service conditions, design validation tests should be done with a degreased valve, although initial prototype lubrication should be maintained, to provide initial functional data between validation (prototype) and forthcoming products (FAT on greased valves).</p>	<p>“If by design, valve actuation assembly needs grease to conform to functional requirements (forces or torques) along service life, manufacturer shall provide objective evidences that such lubrication is not removed during service life (typical 20 years) or all post initial tests (cyclical, functional or sealing) shall be performed on a degreased valve sample (prototype). During design validation tests, assembly can be done with a greased sample, in order to obtain initial tests (FAT-like), to be used as reference data on forthcoming FAT of product valves.”</p>	
BR	5.1.7.6		te	<p>Performance verification testing - Temperature Cycling tests - <u>Allowable Leakage Rate</u> – potential conflicts:</p> <p>“During temperature cycling, rated working pressure shall be applies to the equipment at temperature extremes with no liks beyond the acceptance criteria established in ISO 10423.2003 Annex F.”</p> <p>Even in ISO 10423.2003 acceptance criteria during design validation shall be equal or exceed the required ones for products. In this case, Annex F requirements for</p>	<p>Include a note (for example):</p> <p>“During first 160 cycles (ISO 10423.2003 Annex F – room temperature), valves leakage rate shall be “no visible bubbles” per hold periods.”</p>	

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				<p>a “as new” condition should be at least equal to the product ones.</p> <p>As can be read in ISO 10423.2003 product requirements subclauses 7.4.9.5.7.c, 7.4.9.5.8.b, 7.4.9.5.9.b, 7.4.9.6.6.c, 7.4.9.6.7.b, 7.4.9.6.8.b and ISO 13628-4 (USVs: no visible bubble), design validation requirement should be also “no visible bubbles” at least for a certain number of operations (cycles/strokes), but <u>ISO 10423.2003 Table F.1</u> could induce someone to understand that a higher leakage rate is acceptable for design validation, even for an “as new” component.</p> <p>For information: USVs, it was seen (over 100 design validations, since 1989) that 5Ksi slab-gate valves can be bubble tight (PSL3G) during first 1000 cycles.</p>		
BR	5.1.7.7		te	<p>Performance verification testing - Life cycle/endurance testing – <u>Performance Degradation and reference data:</u></p> <p>Should be explicit that actuator output forces shall meet or exceed the operating requirement specified by the valve or choke manufacturer, even at the end of valve or choke service life.</p>	<p>Suggested requirement:</p> <p>Actuator output forces shall meet or exceed the operating requirement including end of valve or choke service life.</p>	

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Since 2001, Brazilian oil industry has been using design validation tests (PVT) and their cycling tests to estimate wear-out and performance degradation (sealing and actuation) along them. As quality assurance is employed in prototype and also in products, it is considered that PVT results are representative of design and can be used as reference to future product valves. This method is capable to estimate the expected performance degradation due to cycling, which can be used as a FAT acceptance criteria parcel.

To measure and record actuator forces (hydraulic pressure or torque), in order to provide more consistent results, less sensitive to executor mishandling, we suggest to use signature tool as a standard procedure – see figure. For more details/info double click in pdf icon. It also provides objective evidences of acceptable functional behaviour in a standardized way - qualitative (as signature “shape”) and quantitative (A1..A5, R1..R4 key-point tables).



Adobe Acrobat Document

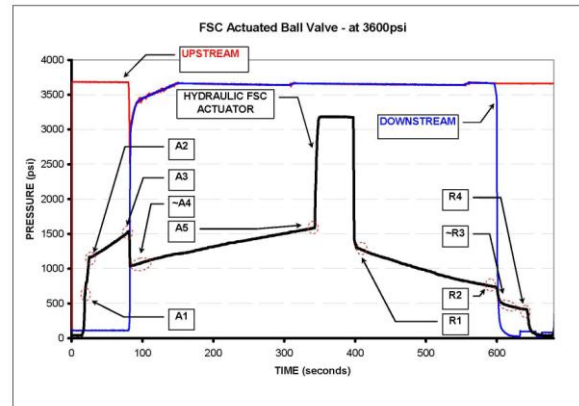


Figure 1 –Signature of FSC hydraulic actuated valve – Test at High Pressure

For hydraulic actuated fail-closed (open) valve the minimum actuator pressure to open (close) and maximum allowable actuator back-pressure to close (open) shall be measured and recorded before and after to perform life cycle/endurance testing.

For rotary actuated valve the minimum torque to open and close shall be measured and recorded before and after to perform life cycle/endurance testing.

The actuator performance degradation (difference of actuator pressure or torque between before and after the life cycle/endurance testing) shall be taken into account to meet clause 7.10.4.3 and to define FAT acceptance criteria.

Forces or torques measurement and recording method shall be based on method presented herein.



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BR	5.1.7.7		te	<p>Performance verification testing - Life cycle/endurance testing – <u>Hyperbaric cycle testing</u></p> <p>Life cycle/endurance testing (<u>open/close the valve under full differential pressure</u>) is intended to evaluate <u>long-term wear characteristics of the valve/actuator assembly</u>, but it not clear that hyperbaric cycle testing shall be performed to evaluate long-term wear characteristics of the valve/actuator assembly under operational condition as clause 7.10.2.3.3 (Water depth rating). Some times It has originated different interpretation between manufacturer and purchaser.</p>	<p>Include text:</p> <p>For valve/actuator assembly hyperbaric cycle testing is intended to evaluate long-term wear characteristics of the valve/actuator assembly under operational condition as clause 7.10.2.3.3.</p>	
BR	5.1.7.7		te	<p>Performance verification testing - Life cycle/endurance testing – <u>Total cumulative cycles</u></p> <p>In the example: “the 200, 3, and 200 pressure/temperature/hyperbaric cycles used to test a valve can cumulatively qualify as 403 cycles toward the 600 total cycles needed for endurance cycling” is not clear what type of testing shall be performed to complete the 600 total cycles (197 secondary function cycles like override actuation cycles? 197 pressure cycles? 197 temperature cycles? 197 hyperbaric cycles? Atmospheric cycles? Combination of them?). See also comment</p>	<p>Clarify the testing type to complete the total cumulative cycles.</p>	

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				related to Table 3.		
BR	5.1.7.7		te	<p>Performance verification testing - Life cycle/endurance testing – Table 3 – Minimum performance verification test requirements – Pressure and Temperature cycling tests</p> <p>Taking into accounting:</p> <ul style="list-style-type: none"> a) Experience has been shown that testing results are strongly dependent of test procedures. In order to establish a standard test procedure should be used recognized test procedure as, for example, ISO 10423 - F.2.3.3.11 Body pressure/temperature cycles; b) According clause 5.1.1.3 – Thermal integrity, product designs shall be capable of functioning throughout the temperature range for which the product is rated. Components shall be rated and qualified for the maximum and minimum operating temperatures that they will experience in service not necessarily the maximum or minimum wellbore fluid temperature due to seawater cooling; c) Valve/actuator assembly shall meet performance requirements at both extreme temperatures. This can be verified by performing dynamic test at maximum/minimum rated temperature as, for example, ISO 10423 - F.2.3.3.3 Dynamic test at maximum rated temperature and F.2.3.3.7 Dynamic test at minimum rated temperature; d) A valve/actuator assembly designed to subsea application can be used to top side application and performance qualification testing expends time and money. e) Clause 10.7.1.2.2.a - Valves shall have their service classification as identified in Clause 5, with respect to pressure rating, temperature, and material class. Additionally, underwater safety valves (USVs) shall be rated for sandy service (Class II), as determined by ISO 10423:2003. <p>At least to valve/actuator assembly the Table 3 should be changed to:</p>	<p>For valve change Table 3 to:</p> <p>200 cycles per ISO 10423 annex F PR-2 (100 atmospheric open/close cycles using main actuation system + 60 atmospheric open/close cycles using secondary actuation system / override + 20 dynamic test at maximum temperature cycles + 20 dynamic test at minimum temperature cycles + body pressure/temperature cycles ~ 3 temperature cycles and 6 pressure cycles – see interpretation of Figure F1 attached)</p> <p>500 cycles per ISO 10423 Annex I</p> <p>200 hyperbaric cycles</p> <p>900 Total cumulative cycles.</p> <p> D:\Documents and Settings\k093\Desкто</p>	

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				<table border="1"> <tr> <td>ISO 10423 Annex F PR2</td> <td>ISO 10423 Annex I CI II PR2</td> <td>Hyperbaric</td> <td>Total</td> </tr> <tr> <td>200 cycles</td> <td>500 cycles</td> <td>200 cycles</td> <td>900</td> </tr> </table>	ISO 10423 Annex F PR2	ISO 10423 Annex I CI II PR2	Hyperbaric	Total	200 cycles	500 cycles	200 cycles	900		
ISO 10423 Annex F PR2	ISO 10423 Annex I CI II PR2	Hyperbaric	Total											
200 cycles	500 cycles	200 cycles	900											
BR	5.1.7.8		te	<p>Product family verification – Validation by Scaling (size)</p> <p>Several validation test processes performed by operator in Brazil have shown that validation by scaling (size) is not reliable for critical applications as subsea. Also, test results from prototype can be used in a straightforward way as reference data for wear-out and performance (force or torque) for future FATs.</p>	<p>Change text to:</p> <p>A product of one size shall not be used to verify other sizes in a product family.</p>									
BR	10.7.1.2.2	c	te	<p>Valve – Table 16 - Design and operating parameters of valves and actuators</p> <p>According clause 5.1.1.6 Cycles - Product designs shall be capable of performing and operating in service as intended for the number of operating cycles as specified by the manufacturer. Products should be designed to operate for a required pressure/temperature cycles, cyclic</p>	<p>Include number of operating cycles.</p>									

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				external loads and multiple make/break (latch/unlatch), as applicable and where applicable verified in performance verification testing.		
BR	7.10.4.2.3	b		<p>Actuator operational test – definition of “Smoothly”</p> <p>“The actuator shall operate smoothly in both directions”</p> <p>Even for a product assembly (valve-actuator) without available validation test data, it is possible to detect if the assembly is able to operate “smoothly” or not, depending how a test is performed.</p> <p>This is an important reason for test standardization, as better described in comments for sub-clauses F.2.2.2.1 and F.2.3.3.1, not only for “smoothly” definition but also to detect lack of repetitive (consistent) operation.</p> <p>It can be reminded that it also provides objective evidences of acceptable functional behaviour in a standardized way - qualitative (as signature “shape”) and quantitative (A1..A5, R1..R4 key-point tables).</p> <p>The next figure was obtained from a “non-smooth” (stick-slip behavior) operation of a USV gate valve, taken during FAT @ 5 ksi.</p>	<p>Change to:</p> <p>"The actuator shall operate smoothly in both directions" to: "The actuator shall operate smoothly and without noticeable stick-slip or chattering behaviour in both directions"</p>	

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				<p>Figure 2 – Actuator signature of FSC valve at high differential pressure. This clicking behavior is present during advance (FSC opening) and return (FSC closure) of actuator, degrading product performance.</p> <p>Although not complete definition, a smooth operation is lack of stick-slip (“clicking”) effects, mainly present on actuations under high differential pressures.</p> <p>Also, comparing data dispersion of key-points (ex.: “std.dev.” or “max-min”) among 4 to 6 signatures provide repetitiveness operational data.</p>		
BR	7.10.2.3.3	e	te	<p>Water depth rating – 0,69 MPa (100 psi)</p> <p>“for hydraulic actuator, 0,69 MPa (100 psi) plus seawater</p>	<p>Suggested requirement:</p> <p>Change 0,69 MPa (100 psi) to a conservative</p>	

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			<p>ambient hydrostatic pressure at the maximum rated depth of the assembly acting on the actuator piston in the opening (closing) direction;”</p> <p>7.10.2.3.3.c considers seawater specific gravity as 1.03. Water based control fluids intentionally present higher density than seawater to avoid control line contamination caused by eventual leakages in it. This higher density is achieved with ethylene glycol or other additives that have higher compressibility than water, causing an increase in fluid density as it is compressed by seawater column. Thermal retraction caused by cooler seawater temperatures, at depths beyond 500 meters, produces additional increase in control fluid density.</p> <p>Brazilian subsea production has used a known control fluid which specific gravity at sea level is 1.039. Information provided by fluid manufacturer was processed and summarized in Table A. Fluid average density at 0 degrees Celsius was calculated as a function of water depth, being presented in Table B and in BRspec. Calculation of Average Density. For other fluid, the average density shall be calculated considering its compressibility and that all fluid column is at 0° C.</p> <p>Analyzing a hypothetical FSC valve that is directly operated at 1,000 meters of water depth, during valve closure, its actuator encounters a fluid back-pressure 23 psi greater than ambient pressure (not including air gap – distance between platform deck and sea water level). For another valve working at 2,500 meters, the additional back-pressure seen by the actuator is now 77 psi (not including air gap), which almost cancels the 100 psi. If we include 30 m of air gap the back-pressure will be greater than 120 psi.</p> <p>Table 1</p>	<p>value or include formula to calculate the back-pressure as a function of:</p> <p>water depth;</p> <p>air gap;</p> <p>Average of the control fluid specific gravity = f (WD).</p>	
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				<table border="1"> <tr> <td>PRESSURE</td> <td colspan="3">Specific Gravity</td> </tr> <tr> <td>(BAR)</td> <td>0°C</td> <td>20°C</td> <td>40°C</td> </tr> <tr> <td>0</td> <td>1.043</td> <td>1.039</td> <td>1.035</td> </tr> <tr> <td>1000</td> <td>1.093</td> <td>1.089</td> <td>1.085</td> </tr> </table> <p>Table 2</p> <table border="1"> <tr> <td>Water Depth (meter)</td> <td>□avrg</td> </tr> <tr> <td>0 to 500</td> <td>1.0443</td> </tr> <tr> <td>501 to 1,000</td> <td>1.0455</td> </tr> <tr> <td>1,001 to 2,000</td> <td>1.0480</td> </tr> <tr> <td>2,001 to 3,000</td> <td>1.0505</td> </tr> </table> <p>Instrumentation Accuracy</p> <p>Minimum PVT instrumentation accuracy requirement for pressure measurements is 0.2% of Full Scale (FS), as stated in ISO 10423.2003. Although 0.2% is adequate for</p>	PRESSURE	Specific Gravity			(BAR)	0°C	20°C	40°C	0	1.043	1.039	1.035	1000	1.093	1.089	1.085	Water Depth (meter)	□avrg	0 to 500	1.0443	501 to 1,000	1.0455	1,001 to 2,000	1.0480	2,001 to 3,000	1.0505		
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			<p>most Performance Verification Testing (PVT) applications, measurement of actuator and hyperbaric chamber pressures for functional tests within BRspec shall be acquired with higher accuracy, with a maximum overall (transmitter plus display or computer) accuracy error of ± 20 psi.</p> <p>Just to illustrate the need for higher accuracy, suppose a valve being qualified for 2000 meters, using transmitters with 0.2% FS accuracy. The actuator transmitter shall work up to 6,000 psi, being chosen a 10,000 psi range. The hyperbaric chamber transmitter will probably be in 5,000 psi range. The maximum transmitter accuracy error (@ 0.2%) at will be respectively ± 20 psi and ± 25 psi, resulting in errors from ± 25 to ± 45 psi. For the customer point of view, the worst value of -45 psi is conservatively chosen as PVT uncertainty. This uncertainty can almost cancel that +100 psi from ISO requirement. Therefore, an increase in overall accuracy is strongly recommended, or alternative criteria shall be used.</p> <p>Combined Effects on Back-Pressure.</p> <p>Alternatively, the 100 psi from ISO can be considered to compensate air gap between platform and sea level, which can be as high as 50 psi, and to provide a minimum functional safety.</p> <p>Summating this air gap pressure to the additional fluid back-pressure, it is possible that certain FSC valves, qualified using standard 0.2% accuracy instruments and presenting a back-pressure just a little higher than 100 psi, might not fully close (back-seat sealed) when working in ultra deep-water. In fact, more than five valve designs have to be revised to increase their actuator back-pressure and fulfill BRspec.</p>		
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				Ref.: OTC 13566 - One Company's Experience in Subsea Valve Testing - E.J. Euthymiou / Petrobras - Petroleo Brasileiro S.A.		
BR	7.10.4.1.3		te	See BR comment regarding clause 7.10.2.3.3	See BR proposed regarding clause 7.10.2.3.3	
BR	TABLE 16		te	Valve – Table 16 - Design and operating parameters of valves and actuators According clause 5.1.1.6 Cycles - Product designs shall be capable of performing and operating in service as intended for the number of operating cycles as specified by the manufacturer. Products should be designed to operate for a required pressure/temperature cycles, cyclic external loads and multiple make/break (latch/unlatch), as applicable and where applicable verified in performance verification testing.	Include number of operating cycles.	
NO	2		ed	ASME VIII Div.2 is referred to in sec. 5.1.3.1 and not found in reference list.	Include ASME VIII Div.2, 2007 in the reference list.	
NO	5.1.1.4 And 5.2.2	1 st parag	te	Reference is made to materials in ISO 10423:2003. Design methods and design factors for bolting in ISO 10434:2003 is based on limit load method. ASME VIII Div.2 2007 gives supplementary requirements to bolting designed to limit load methods, see sec. 3.7 and 3.11.6.2.	Bolting materials shall comply with ASME VIII Div.2 2007 sec. 3.7 and sec. 3.11.6.2.	

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				Please include these material requirements to bolting		
NO	5.1.1.5	2 nd parag	te	Reference is made to ISO 13628-7 with respect to design requirements. Design requirements in ISO 13628-7 can not be used if not the material and fabrication requirements in section 7 in ISO 13628-7 are fulfilled. E.g. the materials shall have sufficient ductility, toughness and soundness to have ductile failure modes for the actual environment it is applied. In addition, mechanical testing shall be based on prolongation samples in order to obtain reliable mechanical properties representing the actual materials.	Add this sentence: "When 13628-7 design requirements are applied, materials and fabrication shall comply with ISO 13628-7 Clause 7."	
NO	5.1.3.1	1 st parag	ed	Check if reference to Appendix 5 in ASME VIII Div.2 is correct.	Update reference.	
NO	5.1.3.1	1 st parag	te	See comment to sect. 5.1.1.4.	Add this sentence at the end of the first paragraph: "When 13628-7 design requirements are applied, materials and fabrication shall comply with ISO 13628-7 Clause 7."	
NO	5.1.3.5	2 nd parag	te	Stress limit is given for bolts. Please include stress limits for nuts also. The stud shall be stronger than the nut.	... Between 67% and 73 % of the bolt's/nut's material yield strength.	
NO	5.1.3.5	3 rd parag	ed	The sentence is not unique, i.e. 83% of what.	... beyond 83 % of the bolt's/nuts's material yield strength.	
NO	5.1.3.6	2 nd parag	te	See comment to sect. 5.1.1.4.	Add this sentence at the end of the first paragraph: "When 13628-7 design requirements are applied, materials and fabrication shall comply with ISO 13628-7 Clause 7."	
NO	5.2.2	1 st paragr	te	Reference to ISO 13629-7 material requirements applicable when design methods in ISO 13628-7 is missing. Consider to include reference to ASME VIII Div. 2 2007 also for bolting (NDT/Charpy).	When 13628-7 design requirements are applied, materials and fabrication shall comply with ISO 13628-7 Clause 7. Bolting materials shall comply with ASME VIII Div.2 2007 sec. 3.7 and sec. 3.11.6.2.	
NO	5.4.1	1 st paragr	te	Critical bolting and closure bolting shall be traced to material certificates as critical forgings in order to be consistent. Note, bending of ISO type flanged connections, the bolting is weaker than the flanges, hence, confidence in material strength is important.	Fastener material and fasteners shall be managed in a system that permits lot control to avoid mixtures. This shall be accomplished by identifications which follow the material/fasteners and shall provide vital information about the material and its origin. All fasteners shall be marked with the manufacturer's identification symbols, material grade and material certificate identification symbols to ensure full traceability to the melt and heat treatment lot.	
NO	Annex G	Table G.5	te	No reference to bolt and gasket certificate is given.	Please include one box for bolt certificate reference and one box for gasket certificate	

Template for comments and secretariat observations

Date: 2009-02-04	Document: ISO DIS 13628-4.2
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1	2	(3)	4	5	(6)	(7)
MB¹	Clause No./ Subclause No./ Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note (e.g. Table 1)	Type of comment²	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted

					reference.	
NO	Annex L, Clause L.2	Item b)	te	It is stated that fatigue strength of the connector may be ensured by calculations. For non-preloaded or low preloaded connectors which hub face separation during pressure/normal design conditions, fretting/wear and leak tightness may occur. In these cases testing has to be performed as there are no reliable calculation methods. For preloaded connectors with no hub face separation for normal operating conditions, fatigue strength may be given by stress concentration factors with selection of standard S-N curves.	Fatigue performance may be documented by calculations for connectors which remain preloaded during normal operating conditions. In these cases, stress concentration factors and S-N curves shall be part of the documentation. In cases where hub face separation occurs during normal operations, testing shall be considered to document fatigue performance.	
NO	Annex L, Clause L.2	Item b)	te	Include loss of preload capacity in addition, i.e. at which load level does the connector start to loose preload. See original revision of Annex L for definition.		
NO	Annex L, Clause L.3		te	Criteria is given for Normal/Extreme and Accidental. Please include a note that connectors which separate during normal (working) conditions have to be fatigue tested.	Note to Normal: 1) Fatigue testing shall be performed for cyclic loaded connections which not remain preloaded for normal (working) conditions.	
NO	Annex L, Clause L.4	Item b) last two sentence.	te	ASME VIII Div. 2 2007 provide stress strain curves which should be used. Remove the two last sentences and include reference to ASME VIII Div.2 2007.	If not any actual stress-strain curve are available, the true stress-strain curve provided in ASME VIII Div.2 2007 Appendix 3.D shall be used.	
NO	Annex L, Clause L.5.6	Item g)	te	When comparing FEA with testing, the FEA shall be based on actual material strength values and not minimum specified values in order to compare apples and apples.	FEA to be compared with tests shall be based on actual preload/roll over pressure and actual material strength values.	
US			Techn	1) Annex L - Normative		

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			ical	This section should be made Informative or preferably removed. 2) Multiple small spelling & gramatical errors - full list will be sent to Subcommittee chairman, Ross Fraser, by email.		
US	Intro		Ed	RP90 Title incorrect	Change to "Annular Casing Pressure Management for Offshore Wells	
US	Intro		Ed	Reference to ROV as 13628-8 and ROT as 13628-9 will become obsolete when -13 is complete	Delete the 13628-8 and 13628-9 references	
US	4.2 and throughout document		Ed	Reference to 10423:2003 is too specific. Document currently in revision and to keep 13628-4 aligned with 10423 requirements, remove the date reference	Change all 10432:2003 to just "10423" or "current 10423"	
US	1.2		Te	Clearly the TG does not understand the implications of the scope with respect to the maintenance of the monogram program. Granted, this is an ISO document, but consideration should be made as to how it affects the MP and ultimately the O&G industry. This is a very poorly defined scope. Individual components should not be listed and only identified in a diagram. For example, as things are currently listed, Studs and Nuts can be monogrammed. Studs and nuts are a commodity item. The product listing is all encompassing but ill-conceived.	Remove individual components of assembled equipment that is not expected to be manufactured individually (such as tree cap, studs and nut, corrosion caps or other commodity items). Need to align the products similar to 10423. Reference the Annex drawings	
US	1.2		Te	Also, consider what companies are licensed to manufacture. There are several products listed that are not manufactured at all, so it implies that they are not needed or poorly defined in the standard	Remove "Control Pod Running/Retrieval & Testing Tool" from Tree Equipment Remove "Subsea Completion Adaptors for Mudline Wellheads" from Mudline Suspension Equipment	
US	3.1		Editorial	The term "surface BOP" is used in Sec's 11.1, 11.4.1, and Annex F. There should exist a definition of same for mudline system	Add the following: surface BOP blow-out preventer stack designed for use on subsea mudline wellheads which is located on a surface facility such as a fixed platform or jack-up drilling unit	
	3.1.22		Spelling mistake	to the sug sea tree' tree t i a'	to the subsea tree' tree to a'	

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	5.1.4.2		Spelling mistake	d) 'nomin cal '	d) 'nominal'	
	5.1.4.5.2		Spelling mistake	comply <u>e</u> ith'	comply with'	
	5.1.4.8		Superfluous text	greater than Rockwell (.....)) or greater,'	greater than Rockwell.....'	
	5.1.7.2	Para. 3	Spelling mistake	'lubricants'	'lubricants'	
			Text	Allowance for filed proven equipment (grandfather clause)	Add statement to the effect that components may meet this requirement with sufficient documentation on previous applicable field usage.	
	5.1.7.3	Para. 2	Wordings/punctuation	Manufacturers <u>may at their option</u> substitute'	Manufacturers may, at their discretion, substitute'	

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	Integrity			<p><i>maximum and minimum operating temperatures that they will experience in service not necessarily the maximum or minimum wellbore fluid temperature due to seawater cooling”</i></p> <p>Not necessarily Isn't clear enough on the requirement further info needed.</p>		
	5.1.2.1.1 General	1 st Para	ed	Text refers to section 7.9.12, this section doesn't exist in the document.	Check / Amend	
	5.1.2.2.1 Standard operating temperature rating. & 5.1.2.2.2 Standard operating temperature	1 st Para	ed	Temp classifications, 121° C was 120° C. 66° C was 65° C.	Check / Amend	

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	rating adjusted for seawater cooling.					
US	5.1.2.1.1 General		Technical	<p>Treatment of differential pressure in the document was referred to the task group by the joint API 17/ISO 13628 leadership. The task group retained On-Line Resources to review the use of the term in the specification & suggest changes to the wording if needed.</p> <p>That work has been completed & it is suggested the wording below be used in the clause for the first four paragraphs of 5.1.2.1.1.</p> <p>A pdf file will be forwarded which more adequately describes the changes.</p>	<p>5.1.2.1.1 General</p> <p>Pressure ratings shall comply with the following paragraphs. Where small diameter lines, such as SCSSV control lines or chemical injection lines, pass through a cavity, such as the tree/tubing hanger cavity, equipment bounding that cavity shall be designed for the maximum pressure in any of the lines, unless a means is provided to monitor and relieve the cavity pressure in the event of a leak in any of those lines. In addition, the effects of external loads (i.e. bending moments, tension), ambient hydrostatic loads and fatigue shall be considered.</p> <p>For the purpose of this part of ISO 13628, pressure ratings shall be interpreted as follows: Pressure-containing equipment ratings are based on differential pressure, whereas pressure-controlling tree components are rated based on the absolute pressure minus 1 atmosphere. For clarity, the following examples are offered.</p> <p>EXAMPLE 1 Pressure-containing components rated for 69 MPa (10 000 psi) are tested, marked for 69 MPa (10 000 psi) differential pressure service. If the application is in a water depth that results in 17,2 MPa (2 500 psi) external ambient pressure, these components could be used up to a pressure of 86,25 MPa (12 500 psi), even though their rated working pressure is marked as 69 MPa (10 000 psi). The equipment's capacity for</p>	

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					<p>externally applied tension and bending will be reduced in these circumstances. The effect on non-metallic seal material properties of the higher operating and ambient pressures shall also be considered in the design.</p> <p>EXAMPLE 2 Pressure-controlling tree components may be isolated from the external ambient pressure under certain operating conditions. For example, valves on a subsea gas well may have little or no pressure on the "downstream" side of their gates when the valves are closed and the flowline pressure is vented to atmosphere. In such cases, external ambient seawater pressure would not reduce the "differential pressure" acting across the valve bore sealing mechanism. Thus, in most cases, valves in this type of service cannot be used in applications where the absolute pressures would exceed the rated working pressure stamped on the equipment plus one atmosphere.</p>	
US	5.1.2.1.1		Technical	RWP of subsea hardware (wellheads, trees, connectors, etc) is currently based on absolute pressure. There currently does not exist a peer reviewed body of work	Delete the statement: "For the purpose of this part of ISO 13628, pressure ratings shall be interpreted as differential	

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				which supports the assertion that subsea equipment designed to absolute pressure may take credit for external hydrostatic pressure.	pressure." Delete Examples 1, 2, & 3 Wording should be included such that: For RWP to include the affects of external hydrostatic pressure, it must be designed specifically for that purpose.	
US	5.1.2.1.1		Editorial	There are numerous references to Sec 7.9.12. This section does not exist. It appears this may be referencing Sec 7.9	Modify document to reference correct section.	
US	5.1.2.2.1		Ge	Reference to 10423 Table 2 & Annex G.2 may change if reference documents change	Pull the information from those two tables into the document and remove the reference.	
	5.1.3.5 Closure bolting & critical bolting.	4 th para	te	Hardness increased from Rockwell "C" 32 to Rockwell "C" 35. Is this correct...???	Check / Amend if required.	
US	5.1.3.5		Ge	Reference to 10423:2003 4.3.4, section is small	Just add the information from 10423:2003 4.3.4 directly to the document to avoid any changes in the reference in the future	
	5.1.3.6 Primary structured components	All	ge	Used to state Unpressurised primary structured components. Why has this been removed from the section heading & statement...???	Check / Amend if required.	
US	5.1.4.2		Te	Tolerance references incorrect. Currently only allowable tolerance implied "-0/+Value listed"	Tolerance should be identified as "±" the value	
US	5.1.4.2.a		Te	Tolerance exceeds measurement. For a value to whole number, the tolerance cannot be to hundredths	Change tolerance to ±0,5 for measurements X	
US	5.1.4.2.c		Te	Tolerance does not match root value for 3 places past decimal point	Change tolerance to ±0,120	
US	5.1.6		Te	What makes an individual "qualified"	Define qualification requirements or delete	

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					"qualified" and just leave "competent"	
US	5.1.6		Te	Current design requirements expect independent "review", not "review and verification"	Delete "and verify" to keep in line with QMS requirements defined by 9001	
US	5.1.7 (Table 3)		Technical	In a HXT system, whether one or two plugs are used, the first plug is a primary sealing device. As such, it should undergo the same qualification as any other primary sealing device.	Change: "Metal seal (exposed to well bore in production)" To: "Metal seal, including HXT crown plug, (exposed to well bore in production)"	
	Table 3 – Min. performance verification test requirements	All	te	No minimum specified for manufactures endurance cycling test...??? Could be anything...	Check / Amend if required.	
US	5.1.7.2		Te	One does not qualify design, one validates a design with first article procedures	Change "qualify" to "validate"	
US	5.1.7.2		Ge	"Substantive Change" is a definition	Move to Definition section	
US	5.1.7.3		Ed	Title is singular, but text reference to gas and hydro	Change title to "Test Media"	
US	5.1.7.8		Te	Verification is a "review" by definition in ISO	Change to "Validation" in Title and "validate" in the subsequent paragraph	
US	5.1.7.9		Te	Is "time" of test really a value-added record?	Delete "time of test"	

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US	5.2.2		Te	QTC is not addressed in definitions or abbreviations	Add QTC to abbreviations and define in definitions	
	5.2.2	Para. 3	Spelling	'High load vreaing'	'High load bearing'	
	5.2.2 Material properties	4 th para	ed	High load "vreaing", spelling error.	Edit	
	5.3.3.2	b)	Spelling	'groo <u>g</u> es', 'val <u>a</u> ve' and 'v <u>o</u> re' 'resist <u>a</u> nces'	'grooves', 'valve' and 'bore' 'resistance'	
	5.3.3.3	b)	Spelling/punctuation	b) 'groo <u>g</u> es', 'val <u>a</u> ve' and 'v <u>o</u> re' 'mechanisms <u>,</u> and'	'grooves', 'valve' and 'bore' 'mechanisms and'	
US	5.3.3.3.a		Te	There is no "Other Weld Overlay" in 10423, Clause 6	Reference "Other corrosion-resistant overlay"	
	5.3.3.4	Para. 1	Spelling	'sur <u>a</u> ves'	'surfaces'	
	5.3.3.4 CRA Overlay off wetted surfaces of pressure containing parts.	1 st para	ed	Spelling error, suraves should be surfaces.	Edit	
US	5.3.3.4.a		Ed	Typo, should not be "connection-resistant"	Change to "corrosion-resistant"	
	5.3.3.5	b) NOTE	Spelling	'trim".' 'surf <u>a</u> ves'	'trim)".' 'surfaces'	

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	5.4.3 Structural components	1 st para	te	NDE on tubulars now no longer specified...???	Check/ amend	
US	5.4.6.2.1 and throughout document		Ed	Reference to a specific clause in 10423 is not recommended. Even though the date is identified in doc reference, if it changes in the future, you can induce confusion. If the clause is short, you should just put it in 13628-4 directly.	Add requirements of specific referenced clause to this section	
US	5.4.6.2.3.i and throughout document		Te	Why list a percentage tolerance? If it is fixed value, such as 2 MPa then the percentage is fixed too Also tolerance does not match root value	Change to 2,0 ± 0,2 MPa	
US	5.1.2.2		Technical	Subclause 5.1.2.2, Temperature ratings, has no provision for rating valve and choke actuators differently than tree components exposed to well fluid. ISO 10423 requires that the upper limit of temperature rating applied to actuators (other than retained-fluid powered actuators) be at least 65 °C (150 °F). A similar requirement is appropriate for 13628-4, since only hydraulic or mechanical actuators are permitted. Using a minimum rating of 121 °C (250 °F) for actuators could dictate use of seal designs and materials that are not optimum for the application.	Add the following to the first paragraph of 5.1.2.2.1: "The minimum temperature rating for valve and choke actuators shall be 2 °C (35 °F) to 65 °C (150 °F)."	
US	5.2.2		Technical	1. In second paragraph of 5.2.2, compliance with API Recommended Practice 6HT is recommended, by use of the word "should" in the first sentence, but an additional	1. In second paragraph of 5.2.2, replace "shall with "should": "For pressure containing and high load bearing forged material, forging practices, heat	

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				<p>requirement is added in the second sentence, using "shall." A requirement cannot be added to a recommendation; the verbs in the two sentences should match. API RP 6HT applies to "Large cross-section and critical cross-section components." Not all pressure-containing and high load bearing parts have large enough cross-sections to benefit from following RP 6HT or from having a QTC heat treated with every part.</p> <p>2. The third paragraph of 5.2.2 contains typographical error.</p>	<p>treatment, and test coupon (QTC or prolongation) requirements should be in accordance with API RP 6HT. In addition, the test coupon should accompany the material it qualifies through all thermal processing, excluding stress relief."</p> <p>2. Change "vreaing" to "bearing".</p>	
	6.3.2	Table 4c, Pos L1	Te	<p>This test calls for 1.5xMWP below tubing hanger. Differs from previous table and against current practice. Safety Critical.</p>	Check, Amend	
	7.1.1	Penultimate para.	Wordi ng	'connections which are made'	'connections that are made'	
	7.1.2.1	Para. 2 Para. 3 Para. 4	Wordi ng/pu nctua tion	<p>'connections which will be made'</p> <p>'underwater in'</p> <p>'specification shall'</p> <p>'developed which eliminate'</p> <p>'studs or bolts installed'</p>	<p>'connections that will be made'</p> <p>'underwater, in'</p> <p>'specification, shall'</p> <p>'developed that eliminate'</p> <p>'studs or screws installed'</p>	
	7.1.2.2.1	Table 6	Wordi ng	<p>'height of chamfer'</p> <p>Inconsistency in the number of decimal places used for the (in) tolerances.</p> <p>The decimal division indicator for the (in) values is represented by a ','</p>	<p>'Dia of pressure passage holes'</p> <p>The decimal division indicator for the (in) values</p>	

			ology	column		
	7.1.2.4	Table 10	Deci mal point	The decimal division indicator for the (in) values is represented by a ‘,’	The decimal division indicator for the (in) values should be represented by a ‘.’	
	7.1.2.5.6	Table 11	Deci mal point	The decimal division indicator for the (in) values is represented by a ‘,’ ‘Nominal size and bore’ ‘Retainer groove radius’ ‘RG’	The decimal division indicator for the (in) values should be represented by a ‘.’ ‘Nominal size and bore’ ‘B’ ‘Retainer groove radius’ ‘GR’ Or the callout on the sketch should be amended. The decimal division indicator for the (in) values should be represented by a ‘.’	
		Tables 12, 13 & 14	Colu mn Head ers			
			Deci mal point	The decimal division indicator for the (in) values is represented by a ‘,’		
US	7.5.4		Editori al	7.5.4 contains multiple typographical errors.	1. change "...avoidedlocal..." to "...avoided. Local..." 2. change "...coatins demmed..." to "...coatings deemed..."	
US	7.10.4.2.4		Te	Retention time of the data sheet should take into consideration the sale of the product. Currently the data sheet can he discarded after 5 years, even if product not	Change to ...and shall be maintained...for 5 years after the sale of the product.	

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				sold		
	7.13.5.2		Spelling	'into the <u>dsign</u> '	'into the design'	
	7.15.2.1	Para. 1	Decimal point	'0,5 in wall'	'0.5 in wall'	
		Para 5	Decimal point	'101,6 mm (4,0 in)'	'101,6 mm (4.0 in)'	
	7.15.2.3	Bullet point	Spelling	'installation load and'	'installation loads and'	
	7.15.3	Para. 1		'1,829 m (6,0 ft)'	'1,829 m (6 ft)'	
US	7.20.4.1		Editorial	Last sentence: "Refer to Annex J" is in imperative form, implying a requirement, but Annex J is informative, not normative.	Replace last sentence with: "Recommended test procedures may be found in Annex J."	
US	7.20.2.5		Technical	Second paragraph, first sentence of 7.20.5, Routing, requires that "electrical cables shall be routed such that any water entering the compensated hoses will move away from the end terminations by gravity." This is not always possible on an insert retrievable choke.	Change "shall" to "should."	

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US	7.21.2.1.4 and Clause 2		Editorial	References "ISA SP75.01" and "ISA SP75.02" are incorrect. Prefixes "SP" refer to the committees that have responsibility for the corresponding standards. The correct references for the standards are "ISA S75.01.01" and "ISA S75.02".	Change "ISA SP75.01" and "ISA SP75.02" to "ISA S75.01.01" and "ISA S75.02".	
US	7.21.2.2.1		Technical	This paragraph requires that chokes be "designed in accordance with the general design requirements" of "ISO 10423, Annex F as required for PR2." ISO 10423 Annex F provides test procedures and not design requirements. The design performance requirements for PR2 are given in subclause 10.9.2 of ISO 10423.	Replace 7.21.2.2.1 with: "Subsea chokes shall be designed in accordance with the general design requirements of 5.1 and ISO 10423 subclause 10.9, PR2."	
US	7.21.3.2.3 b)		Editorial	"...90% of the hydraulic operating pressure" is not sufficiently clear. "RWP" (as discussed in subclause 5.1.2.1.6 of this standard) should be inserted in front of the word "hydraulic".	Change "hydraulic operating pressure" to "RWP."	
US	7.21.3.2.4, 7.21.3.2.5, and Table 28		Technical	Marking of PSL is required, but PSL is not applicable to most choke actuators since they do not include well bore pressure containing components. In ISO 10423, valve and choke actuators do not have a PSL unless they are retained-fluid powered actuators, which type is not permitted in 13628-4. Moreover, PSL is not a design parameter, it is a QA/QC parameter. Marking of PSL is not required for valve actuators. Also, PSL stands for "Product Specification Level," so the addition of the word "level" after PSL is redundant and incorrect.-	1. Delete "PSL level" from 7.21.3.2.4 and 7.21.3.2.5. 2. In Table 28, change "PSL level" to "PSL (if applicable)."	
US	Clause No. 8.14.2, 1st para		Technical	Comment: Submudline casing hangers and load rings used in deep water applications should be treated the same as the other subsea casing hangers in the system and comply with the requirements of subclause 8.6 rather than 10.1.2. These submudline components have more complex geometry and often use high strength (less ductile) materials to meet higher pressure ratings. The less conservative 0.8Sy stress allowable used for the standard mudline equipment should not be applied to these more critical components.	Proposed Change: Remove "design requirements and" from 2nd sentence. Replace 3rd sentence with: "These submudline components shall comply with the requirements of 8.6." Delete last sentence.	
US	9232		Ed	API Spec 7-1 is the same as ISO 10424-1, should this be the reference.	Change Spec 5B to Spec 7-1	
US	5.1.3.5		Techn	First Sentence, 17SS, is not correct.	Should be, 17 SV.	

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			ical			
US	5.3.3.4 & 5.3.3.5		Technical	All reference to "CRA" (5 places)	Change to "CRM" (5 places)	
US	7.10.2.3.3 e)		Technical	(100 psia) should be changed	(100 psi) is correct.	
US	G.1.3 c)		Technical	Formula As =is incorrect.	Should be: As = (3.14/4)(D-(0.9743/N))sqd	
US	G.1.3 c)		Technical	formula F =, expressed in pounds per foot	should read: formula F =, expressed in pounds.	
US	G.1.3. d)		Technical	formula As = (3.14/4)(D-0.974(3/N))sqd	should be: As = (3.14/4(D-(0.9743)/N))sqd.	
	K.1		ge	K.1 includes the caveat that DNV 2.7-1 "apply to baskets and containers only and not directly to all equipment".	Incorporate the requirements of 2.7-2 & 3 which will broaden the scope of the Annex.	
	K.1	Line 4	ed	Use of "apply"	Replace with "applies"	
	K.2.2.1	Line 3	ed	Use of "in"	Replace with "at"	
	K.2.3.5	Line 2	ed	The word "enough" is not required in context of	Delete.	

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				sentence.		
	K.2.3.5	Figure B-2	te	The radius at the base of the padeye in figure B.2 is denoted by R, which is not consistent with description in nomenclature.	Replace with "r" per Figure B.4.	
	K.2.4	Last paragraph	ed	Delete "needs to be"	Replace with "is"	
	K.3.1		ed	Reference to 2.7-1 section 3.2.1.1 incorrect	Insert correct reference	
	K.3.4.3.2	Note 4	ed	".....are used, these should padeye length (l) and....." does not make sense.	Rewrite	
	Throughout App K		ed	Various equations are not clearly legible.	Use alternative font for parentheses	
US	L.5.4		Technical	<p>Structural failure testing is unnecessary, dangerous, and very expensive.</p> <p>The size and capacity of these tree and BOP connectors will demand special fixturing and housing. The stored energy in the test article and fixture(s) at the point of failure presents a serious safety issue that is unnecessary. If a component does fail, the results can be catastrophic.</p> <p>The "structural failure numerical value" generated by this test is virtually meaningless. It is useless in any engineering equation. It will not show on any sales literature and will not be given out as an operational value to be used during rig operations. It is an unrepeatable "feel-good" value that has no impact on the component design or field service. The design requirements set forth with the 1) accidental, 1) extreme, and 3) normal working limits are values that can be validated and verified repeatedly in the lab and with analytical methods and clearly define the operating parameters of the connector</p> <p>such that the user knows the extremes that he can work with.</p>	Remove L.5.4 Structural Failure Testing	
	Annex L	All	Te	Normative nature of section.	Section should be changed to Informative, or preferably removed completely..	

Template for comments and secretariat observations

Date: 2009-02-04

Document: ISO DIS 13628-4.2

1	2	(3)	4	5	(6)	(7)
MB ¹	Clause No./ Subclause No./ Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note (e.g. Table 1)	Type of comment ²	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted

US	Annex L		Technical	<p>1. This Annex is for testing of "Wellhead Connectors," but no such product is listed in the Scope (Clause 1) or in Definitions (Clause 3). There are no design requirements for Wellhead Connectors in 13628-4. The design and testing of hydraulic connectors used on subsea wellheads is covered in ISO 13533. It is unacceptable practice to have design requirements in one standard and design verification testing in another standard, with maintenance by two separate task groups/subcommittees. It is unacceptable to have a normative annex on any subject for a product that is not within the scope of the standard.</p> <p>2. Annex L is too detailed and too prescriptive for a product as complex as a wellhead connector. It reflects one manufacturer's philosophies and procedures, and has not had sufficient review and discussion by all interested parties.</p> <p>3. Subclause L.5.4, Structural failure testing, is not safe, not practical, and does not provide useful data, being a single-unit prototype test. It is not accepted industry practice. Only the manufacturer and purchaser of a given type of connector can decide if structural failure is a valid test objective and what data could be obtained from such a test.</p>	Delete Annex L	
US	Annex L		Technical	Annex L contradicts the API 16 A document when referencing hydraulic wellhead connectors. API 16 A has been in circulation since 1998 and is presently set for revision. This is an issue that should be addressed with the SC 16 committee to determine which specification, 16 or 17, is to cover hydraulic wellhead, and possibly tree	Remove Annex L from 17D until an agreement is made with the SC 16 committee.	

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2 Type of comment: ge = general te = technical ed = editorial

NOTE Columns 1, 2, 4, 5 are compulsory.

				connectors, in the future. There can be only one set of specifications for a given product.		
US			Editorial	We have noticed numerous editorial typographical errors, missing information on 13-5/8" 5k and 10k swivel flanges, errors in the weldneck dimensions of weldneck flanges. These are relatively minor and suggestions will be sent under separate document to the task group. We are also aware of the effort to resolve the differential pressure issue in the wording in clause 5.1 that John Fowler and the task group are working on and support that effort.		
US	K.2.2.3		Editorial	"specifications" should not be plural	"Although corrosion is not specifically covered in this specification,..."	
US	K.2.3.1		Editorial	The manufacturing tolerances listed are in table form and as such should be in a table with gridlines and a table number for reference.	Convert this data to a table, call it "Table K.1", renumber remaining tables and check for cross references.	
US	K.2.3.1		Editorial	"H" is listed twice in the Dimension column. The first "H" should be "h"	Change the first "H" to "h"	
US	K.3.2		Editorial	"5.3.1.6" has transposed digits	Change to "5.1.3.6"	
US	K Annex K		Editorial	The brackets in the formulas are not displaying correctly and obscure the formula. This appears to be some kind of font problem and occurs frequently throughout Annex K.	Fix the brackets	
US	K.3.3.3		Editorial	The use of the word "tool" is too specific.	Change "tool" to "equipment"	
US	5.1.4.5.2		Editorial	typo, "eith".	Change to "with"	
US	5.4.7		Editorial	first occurrence of the word "or" is a typo.	Should be changed to "of"	
US	7.21.3.1		Editorial	Wording should be added to clarify what scope is being referred to.	In accordance with other sections, the wording should be, "...are beyond the scope of this part of ISO 13628.	
US	7.21.3.3 b)		Editorial	"Testing" is the wrong tense.	Change to "tested"	
US	5.3.3.2 and 5.3.3.3		Editorial	three typos... Grooces, valave, and vore same typos in both sections	Should be grooves, valve and bore	

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US	5.3.3.2		Editorial	in the note at the bottom of the section, resistances should not be plural	Change to "resistance".	
US	5.4.3		Editorial	two typos. excluding and volumetric	change to excluding and volumetric	
US	5.2.2		Editorial	typo "vreaing"	Change to "bearing"	
US	K.3.1 and K.3.2		Editorial	These two sections should be combined to one section to match the way Section K.3.3 was done.	Add section K.3.1.1 General, which would include the same type of information listed for non-reusable equipment as per K.3.3.1. Rename K.3.1 to K.3.1.2 (as per the format of K.3.3.2) Rename K.3.2 to K.3.1.3 (as per the format of K.3.3.3) Renummer the remaining sections of Annex K and check cross references.	
US	5.3.3.4		Editorial	"connection-resistant overlay" not the proper term	change to "corrosion-resistant overlay".	
US	5.4.5 to 5.4.6		Editorial	Some confusing headings.	5.4.5 Change heading to "Testing for PSL 2 and PSL 3 equipment" 5.4.5.1 Change heading to "Hydrostatic pressure testing" 5.4.6.2.1 Change heading to "Hydrostatic body and seat test for valves and chokes"	

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US	5.1.7		Technical	<p>This section and associated table refer to 5 separate tests; pressure, load, temperature, endurance and hyperbaric. There are paragraphs explaining the parameters of each test except for the hyperbaric test. There is no verbage around what the requirements of the test are. The parameters of hyperbaric testing have been left completely open and unexplained, which may lead to many different interpretations. There is no acceptance criteria listed for hyperbaric testing.</p>	<p>A paragraph should be inserted as 5.1.7.8 (and the remaining renumbered). Clarification needs to be supplied as to the test temperature and also what is meant by hyperbaric cycles in the table. For example, 200 hyperbaric cycles can be taken that the chamber needs to be pressurized 200 times, or that the equipment needs to be cycled through it's travel 200 times under hyperbaric pressure. Also, there should be some statement about testing worse case hyperbaric conditions i.e. worst case loading could occur at either 0 or max internal working pressure in the equipment. Perhaps both conditions should be tested. A qualifying statement for actuators is also required indicating that qualification of an actuator hyperbarically will qualify it to be used on any valve or choke with equal or lesser operating loads. Also, a statement that qualifying to a particular pressure (depth) qualifies all shallower depths. It may seem self evident, but it needs to be stated. Perhaps this statement should be in the product families paragraph. Acceptance criteria for passing the test needs to be stated.</p>	
US	5.1.7.7		Technical	<p>The last two sentences of the paragraph state: "The total number of pressure, temperature, and hyperbaric testing cycles may cumulatively be applied to the total number of cycles specified for endurance cycle testing. For example, the 200, 3 and 200 pressure/temperature/hyperbaric cycles used to test a valve can cumulatively qualify as 403 cycles toward the 600 total cycles needed for endurance cycling."</p> <p>The logic of this is unclear. Pressure cycling is alternately applying and dropping pressure 200 times. Temperature cycling is heating and cooling to max and min temperatures while verifying pressure integrity at the extremes. How are any endurance cycles being performed in these two tests? How can they be applied to the total number of endurance cycles when there is no requirement during pressure and temperature cycling to actually operate the valve? Hyperbaric cycles may qualify, but there is no definition as to what a hyperbaric cycle is.</p>	<p>Once some definition has been given to what a hyperbaric cycle is, this statement should be revised to say that only hyperbaric cycles can be combined with endurance cycles.</p>	
US	Table 3		Technical	<p>For metal and non metallic seals exposed to the wellbore fluid, how do you apply 200 hyperbaric cycles? For static seals, does that mean pressuring and depressuring the hyperbaric chamber 200 times? For a dynamic seal does</p>	<p>There needs to be some further explanation as to the intent and method of testing on seals by themselves.</p>	

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				this mean cycling the equipment 200 times while under hyperbaric pressure? Additionally, if the metal seals are part of a valve or choke being tested as a whole, why would you need to test the seals separately? The seal by itself is not going to see more cycles than it would in the equipment?		
US	5.1.7		Technical	The new qualification rules of this section are going to lead to a massive requalification program for companies with established product unless some clause is included. Established products may already have more "real life" qualification time by actually being in service longer and seeing more cycles than what is recommended by these new qualification rules.	Somewhere there needs to be a statment that products in service prior to release of the standard can be considered qualified if agreed upon between the manufacturer and purchaser.	
US	K.3.1 and K.3.3.2		Technical	In section K.2.1 General, it states that reuseable lifting equipment is designed and tested more strenuously than non-reusable equipment. However, section K.3.1 utilizes the additional LAF for non-reusable equipment, whereas section K.3.3.2 does not use the additional LAF for reusable equipment. This would seem to be in conflict with the statement in K.2.1. All other aspects of design and testing seem to be	Review to ensure this was the actual intent and not vice versa.	

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				<p>inline with Section K.2.1 and I'm just wondering why it is different for the lift point design.</p> <p>A quick example...</p> <p>Two identical structures being used subsea, one reusable, one non-reusable. Both have four padeyes, max lift angle 45°</p> <p>$P = \text{max gross weight of rigging, equipment and cargo} = 5,000 \text{ lbs}$</p> <p>$n = 4$</p> <p>For the non-reusable equipment (permanently installed) according to section K.3.1,</p> $F_p = (3 \times P \times LAF) / ((n-1) \times \cos 45^\circ)$ <p>$LAF = 2.0$</p> <p>Therefore $F_p = 14,142 \text{ lbs}$</p> <p>For the reusable equipment according to section K.3.3.2,</p> $F_p = (3 \times P) / ((n-1) \times \cos 45^\circ)$ <p>Therefore $F_p = 7,071 \text{ lbs}$</p> <p>The design load for the non-reusable equipment is double that of the reusable equipment, which will result in a more robust design. Even with the 85% limitation on stress for the reusable equipment, the design for the non-reusable equipment will be more robust due to the doubling of the design load. This seems contrary to the statement in K.2.1 where it states "Design and testing requirements for reusable lifting equipment are more strenuous as this equipment sees lifting cycles throughout its lifetime."</p>		
US	K.3.4.3.2		Editori	The statement, "If fillet welded cheek plates are used, these should pad eye length (L) and weld height (h)	Review intent and revise wording or remove.	

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			al	stresses." makes no sense.		
US	5.1.3.8.2, 5.5.2, Annex K		Editorial	There is a mixture of "padeye" and "pad eye", including, but not necessarily limited to the sections listed.	Decide on one or the other and make consistent throughout the document.	
US	11		Ed	Scope not needed in title	Remove "Scope" from title to align with other similar titles	
US	E.2		Te	This is a technical section that should be part of the main body of the document an not in an informative annex	Move to appropriate section of main body of document and out of annex.	
US	Equation G-1		Ed	Equation not readable	Fix equations	
US	H.2.5		Ed	Beginning paragraph not readable	Fix equations	
US	K.3.1		Ed	Equations not readable	Fix equations	
US	K.3.3.2		Ed	Equations not readable	Fix equations	
US	K.3.4.3.3		Ed	Equations not readable	Fix equations	
US	Equation L-2		Ed	Equation not readable	Fix equations	
US	M.5 Data Sheets		Ed	Minimize the use of abbreviations when used	Replace "Min." with "Minimal", etc.	
	Figure 1/2/3		Ge	Diagrams to be made clearer.	Amend	
	Figure 1/2/3		te	Single bore tree on mudline tie back figure removed....???	Amend	

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	Figure 4a		Ge	Text needs to be tidied up on examples "CIT Options"	Amend	
	6.4 Marking	1 st & 2 nd para	te	Drift test date removed...???	Check / Amend if required.	