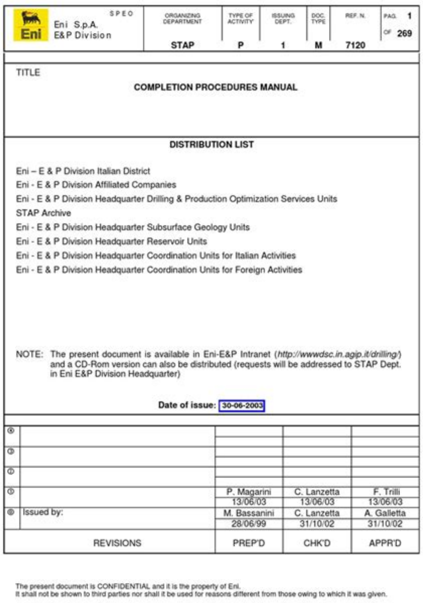
casing design manual eni


Eni S.p.A. E&P Division | SPEO | ORGANIZING DEPARTMENT: STAP | TYPE OF ACTIVITY: P | ISSUING DEPT.: 1 | DOC. TYPE: M | REF. N.: 7120 | PAG. 1 OF 269

TITLE

COMPLETION PROCEDURES MANUAL

DISTRIBUTION LIST

Eni – E & P Division Italian District
Eni - E & P Division Affiliated Companies
Eni - E & P Division Headquarter Drilling & Production Optimization Services Units
STAP Archive
Eni - E & P Division Headquarter Subsurface Geology Units
Eni - E & P Division Headquarter Reservoir Units
Eni - E & P Division Headquarter Coordination Units for Italian Activities
Eni - E & P Division Headquarter Coordination Units for Foreign Activities

NOTE: The present document is available in Eni-E&P Intranet (http://wwwdsc.in.agip.it/drilling/) and a CD-Rom version can also be distributed (requests will be addressed to STAP Dept. in Eni E&P Division Headquarter)

Date of issue: 30-06-2003

		P. Magarini 13/06/03	C. Lanzetta 13/06/03	F. Trilli 13/06/03
	Issued by:	M. Bassanini 28/06/99	C. Lanzetta 31/10/02	A. Galletta 31/10/02
REVISIONS		PREP'D	CHK'D	APPR'D

The present document is CONFIDENTIAL and it is the property of Eni.
It shall not be shown to third parties nor shall it be used for reasons different from those owing to which it was given.

File Name: casing design manual eni.pdf
Size: 3772 KB
Type: PDF, ePub, eBook
Category: Book
Uploaded: 29 May 2019, 14:45 PM
Rating: 4.6/5 from 600 votes.

Status: AVAILABLE

Last checked: 5 Minutes ago!

In order to read or download casing design manual eni ebook, you need to create a FREE account.

Download Now!

eBook includes PDF, ePub and Kindle version

Book Descriptions:

We have made it easy for you to find a PDF Ebooks without any digging. And by having access to our ebooks online or by storing it on your computer, you have convenient answers with casing design manual eni . To get started finding casing design manual eni , you are right to find our website which has a comprehensive collection of manuals listed.
Our library is the biggest of these that have literally hundreds of thousands of different products represented.

Book Descriptions:

casing design manual eni

APPROACH TO CASING DESIGN 417.1. WELLBORE FORCES 427.2. DESIGN FACTOR DF 427.2.1. Company Design Factors 447.2.2. Application of Design Factors 458. TEMPERATURE EFFECTS 11810.1. High Temperature Service 11810.2. Low Temperature Service 11911. LOAD CONDITIONS 12011.1. SAFE ALLOWABLE TENSILE LOAD 12011.2. CEMENTING CONSIDERATIONS 12011.2.1. Casing Support 12011.2.2. Cementing Loads 12111.3. PRESSURE TESTING 12211.4. BUCKLING AND COMPRESSIve loading 12211.4.1. Buckling 12211.4.2. Compressive Loads 12312. PRESSURE RATING OF BOP EQUIPMENT 12612.1. BOP selection criteria 12612.2. Kick tolerance 129ARPOENI S.p.A.Agip DivisionIDENTIFICATION CODEPAGE 5 OF 134REVISIONSTAPP1M6110 01. INTRODUCTIONThe selection of casing grades and weights is an engineering task affected by many factors,including local geology, formation pressures, hole depth, formation temperature, logistics andvarious mechanical factors.The engineer must keep in mind during the design process the major logistics problems incontrolling the handling of the various mixtures of grades and weights by rig personnel withoutrisk of installing the wrong grade and weight of casing in a particular hole section. Buckling in deep and hot wells.Once the factors are considered, casing cost should be considered.If the number of different grades and weights are necessary, it follows that cost is not alwaysa major criterion.Most major operating companies have differing policies for the design of casing for explorationand development wells, e.g For exploration, the current practice is to upgrade the selected casing,irrespective of any cost factor. For development wells, the practice is also to upgrade the selected casing,irrespective of any cost factor. For development wells, the practice is to use the highest measured bottomholeflowing pressures and well head shutin pressures as the limiting factors forinternal pressures expected in the wellbore.http://myplumbingwebsite.com/userfiles/bt-voyager-240-manual.xml

- **eni casing design manual, casing design manual eni, casing design manual enid, casing design manual enigma, casing design manual enix, eni casing design manual.**

These pressures will obviously placecontrols only on the design of production casing or the production liner, andintermediate casing.ARPOENI S.p.A.Agip DivisionIDENTIFICATION CODEPAGE 6 OF 134REVISIONSTAPP1M6110 01.1. PURPOSE OF CASINGCasing tubulars are placed in a wellbore for the following reasonsa Supporting the weight of the wellhead and BOP stack.b Providing a return path for mud to surface when drilling.c Controlling well pressure by containing downhole pressure.d Isolating high pressure zones from the wellbore.e Isolating permeable zones from the wellbore which are likely to cause differentialsticking.f Isolating special trouble zones which may cause hole problems e.g. Swelling clay, shales. Sloughing shales. Plastic formations evaporites. Formations causing mud contamination e.g. gypsum, anhydrite, salt. Frozen unconsolidated layers in permafrost areas. Where formations are sufficiently stable, this string may be used toinstall the full mud circulation system.It also serves the following purposes Guide the drilling string and subsequent casing into the hole. The conductor inoffshore drilling may form a part of the piling system for a wellhead jacket or piledplatform.

on page 1 of 134 Search inside document Browse Books Site Directory Site Language English Change Language English Change Language. What is Fluid Catalytic Cracking FCC. What is Thermal Cracking.http://www.immo3d.ma/stock/bt-voyager-2500v-manual.xml

What is Vaccum Distillation.Do You have the ability of writing about petroleum and natural gas. Addendum Italia alla specifica STAPA1SS1719 Rev. C.Some tools and features may not work as expected. We apologize for the inconvenience. Thanks a lot. But most of the files have been removed by 4shared support team.Its very wonderful Thanks you very very much!!! Cheer!!! Could you please upload. Thanks. Could someone post them somewhere else Thanks Thats quite a very informative post. Thanks for your share. I am trying to download the file Horizontal and vertical drilling by Davenport but it seems to be that something is wrong. Could you help me Thanks in advance juferoca68 Best regards We all need these books.But the links are dead. Could someone in possesion of these softcopies upload please. Thanking you If any one have plz help.I would be grateful if you send me the new threads.Thanks, Carlos Im a driller in Canada wanting to go consulting and dont see a lot of this material too often.I am in desert and forgot mybook. Jazaka Allah. Is there a link besides this.Jazakamullah. Thanks in advance. Luis. But great collection! Cheers Can you give me links to download ERD books Thanks a lot! Thank you very much. Please upload the books again. Thanks! PM me. Also I need some applications hope you can kindly help me.Could you please send me a link to get them.Thank you very much for sharing this important information. Only need to buy a subscription for one month or three months. Best regards Andres Salas Unfortunately the links are dead, there is a statement about claim. Really need it for reupload again. Sorry, the link was dead. Sorry, the link was dead. Thanks a million. Appreciate your help, Regards, Can you try to maybe zip all and make it into a file. Might be easier. thanks again Might be easier. thanks again. He has been involved in the first UBD project in Italy as “Project Focal Point”. BV Italy, ENEL Green Power, SNPC Congo, GLENCORE EXPL.

, NAM Netherland in connection with drilling operations, and liaising with all matters concerning well planning, well engineering issues and companies KPI. He represented Norsk Agip in development Technical Committees for the Ekofisk redevelopment Project and for the Development of Norne and Haltenbanken. Then he worked as Manager of the Well Area Laboratories, which dealt with topics, such as drilling fluids, cementing operations, production optimization, rock mechanics and environment. He was member of the “Blowout Intervention Team”, which worked on the blowouts of the well Oniku South 1 Nigeria and well Loango 626 Congo. In the period 20022004, he was Programme Manager of two eni strategic projects “Geological Sequestration of Carbon Dioxide” and “Sulphur Management During Exploration and Production Activities”. In 20092010, he held, as Professor, the course on “Drilling Engineering” at the Politecnico di Torino. He is also coauthor of the eni publication “Hydrocarbons Origin, Exploration and Production” 2005 and of the Chapter “Drilling of Directional and Horizontal Wells” 2009 of the Treccani Encyclopaedia of Hydrocarbons. Degree in Chemical Engineering and he is Commissioning Manager at Cv Service group. He has a gained a considerable experience in Well Control procedures and operations, providing his expertise in connection with AGIP projects in UK, Kazakhstan, China, Pakistan, Yemen, Saudi Arabia, Egypt,Algeria,Libya, Tunisia, Congo, Angola, Nigeria, Venezuela, USA, Ecuador, Iran, Iraq. With SERPRO Socotec group he has been a Technical Advisor for Petroleum Engineering in Sonatrach field Hassi Messaoud in Algeria,and then a Reservoir Engineering Manager in Tbilisi Georgia for Frontera Resources. He has been assigned by ENI in UK and Tehran as Head Operational Geologist in charge of geological operations for the appraisal and development of the offshore South Pars Field, and for the appraisal and development phases of the land Darquain oil Field.

Angelo as Senior Project Manager managed the replacement of two FSO for the Vega and Rospo offshore field in Italy with the conversion of two crude oil tankers. Maurizio has spent most of his professional career working for top oil services Companies on international oil and gas projects. He joined Baker Oil Tools and Baker Sand Control where he covered the supervisor position in connection with ali completion activities related to worldwide project in Europe and Africa. Later, he joined Otis Engineering where he was in charge of job preparation, personnel management and coordination. In 1994 he moved further his professional career with Halliburton where he was appointed as Completion Manager, dealing with the design and developrnent of single and dual completions, multiple grave I pack jobs in cased and open holes, safety valves, slickline jobs, standard and HPHT environment. Se vuoi saperne di piu o negare il consenso a tutti o ad alcuni cookie, consulta la cookie policy. Chiudendo questo banner, scorrendo questa pagina o proseguendo la navigazione in altra maniera, acconsenti all'uso dei cookie. Cookie Policy Accetto Questo sito utilizza i cookie per fonire la migliore esperienza di navigazione possibile. Or Gauge Ring measure hole size. To connect the Xmas Tree to the Manifold Its kind of test Other people might have an idea. If you received an answer, delete the abbreviation from this section, and add it to its alphabetical section If it is not there yet.CS1 maint archived copy as title link Network International. By using this site, you agree to the Terms of Use and Privacy Policy. You may have to register before you can post click the register link above to proceed. To start viewing messages, select the forum that you want to visit from the selection below. If you continue using our website, well assume that you are happy to receive all cookies on this website.

At the forefront of the Italian oil and gas giant's longstanding commitment to accessing ever more extreme environments, he tells World Expro about the latest inhouse developments.The companys impact on the environmental is one of the key elements driving its technology selection process. The companys impact on the environmental is one of the key elements driving its technology selection process. In the 1990s we started the production of a field in the Po Valley in northwestern Italy. More recently, it is worth mentioning Kashagan, a highpressure field in the north Caspian Sea with a lot of hydrogen sulphide, as well as some assets in the Gulf of Mexico and offshore Egypt.It is a closedloop system, able to analyse realtime drilling data to detect kicks or losses, and keeps continuous circulation in the well. This system enables us to access deeper targets and new reserves while maintaining the same hole size and reach shallower targets with reduced casing sizes. This technology, like managed pressure drilling, has been developed inhouse with the support of external partners for specific subsystems.We've been working with oil companies, both major and niche technology providers, within and outside the industry.Depending on the application, we have to rely on service providers because those are the guys who will bring us the technology.Industrialisation is always an important consideration.Given the size of the pie, real efforts are being undertaken to identify further areas of improvement, including the potential of dualactivity rigs.The projects mentioned earlier are an example in this regard the managed pressure drilling system certainly increases safety while the smaller diameter casing profile benefits the environment by reducing the amount of drilling cuttings.Also you may unsubscribe from receiving marketing emails by clicking the unsubscribe link in each email. Help with editing SPE disclaims any and all liability for your use of such content.

More information Therefore, this chapter provides the basic knowledge for practical casing and tubing strength evaluation and design.Casing is needed to maintain borehole stability, prevent contamination of water sands, isolate water from producing formations, and control well pressures during drilling, production, and workover operations. Casing provides locations for the installation of blowout preventers, wellhead equipment, production packers, and production tubing. The cost of casing is a major part of the overall well cost, so selection of casing size, grade, connectors, and setting depth is a primary engineering and economic consideration.There are six basic types of casing strings. Each is discussed next. Conductor Casing. Conductor casing is the first string set below the structural casing i.e., drive pipe or marine conductor run to protect loose nearsurface formations and to enable circulation of drilling fluid. The conductor isolates unconsolidated formations and water sands and protects against shallow gas. This is usually the string onto which the casing head is installed. A diverter or a blowout prevention BOP stack may be installed onto this string. When cemented, this string is typically cemented to the surface or to the mudline in offshore wells. Surface Casing. Surface casing is set to provide blowout protection, isolate water sands, and prevent lost circulation. It also often provides adequate shoe strength to drill into highpressure transition zones. In deviated wells, the surface casing may cover the build section to prevent keyseating of the formation during deeper drilling. This string is typically cemented to the surface or to the mudline in offshore wells Intermediate Casing. Intermediate casing is set to isolate unstable hole sections, lostcirculation zones, lowpressure zones, and production zones. It is often set in the transition zone from normal to abnormal pressure. The casing cement top must isolate any hydrocarbon zones.

Some wells require multiple intermediate strings. Some intermediate strings may also be production strings if a liner is run beneath them. Production Casing. Production casing is used to isolate production zones and contain formation pressures in the event of a tubing leak. It may also be exposed to injection pressures from fracture jobs, downcasing, gas lift, or the injection of inhibitor oil. A good primary cement job is very critical for this string. Liner. Liner is a casing string that does not extend back to the wellhead but instead is hung from another casing string. Liners are used instead of full casing strings to reduce cost, improve hydraulic performance when drilling deeper, allow the use of larger tubing above the liner top, and not represent a tension limitation for a rig. Liners can be either an intermediate or a production string. Liners are typically cemented over their entire length. Tieback String. Tieback string is a casing string that provides additional pressure integrity from the liner top to the wellhead. An intermediate tieback is used to isolate a casing string that cannot withstand possible pressure loads if drilling is continued usually because of excessive wear or higher than anticipated pressures. Similarly, a production tieback isolates an intermediate string from production loads. Tiebacks can be uncemented or partially cemented. An example of a typical casing program that illustrates each of the specified casing string types is shown in Fig. 7.1. Tubing must be adequately strong to resist loads and deformations associated with production and workovers. Further, tubing must be sized to support the expected rates of production of oil and gas. Clearly, tubing that is too small restricts production and subsequent economic performance of the well. Tubing that is too large, however, may have an economic impact beyond the cost of the tubing string itself because the tubing size will influence the overall casing design of the well.

Almost without exception, casing is manufactured of mild 0.3 carbon steel, normalized with small amounts of manganese. Strength can also be increased with quenching and tempering. This designation consists of a grade letter followed by a number, which designates the minimum yield strength of the steel in ksi 10 3 psi. Table 7.1 summarizes the standard API grades. Burst strength, collapse resistance, and tensile strength are the most important mechanical properties of casing and tubing.Each mechanical property of casing and tubing is discussed next. Burst Strength. If casing is subjected to internal pressure higher than external, it is said that casing is exposed to burst pressure. Burst pressure conditions occur during well control operations, integrity tests, and squeeze cementing. This equation, commonly known as the Barlow equation, calculates the internal pressure at which the tangential or hoop stress at the inner wall of the pipe reaches the yield strength YS of the material. The effect of axial loading on the burst strength is discussed later. Collapse Strength. If external pressure exceeds internal pressure, the casing is subjected to collapse. Such conditions may exist during cementing operations or well evacuation. Yield Strength Collapse. Yield strength collapse is based on yield at the inner wall using the Lame thick wall elastic solution.No analytic expression has been derived that accurately models collapse behavior in this regime. Regression analysis results in a 95% confidence level that 99.5% of all pipes manufactured to API specifications will fail at a collapse pressure higher than the plastic collapse pressure.Transition collapse is obtained by a numerical curve fit between the plastic and elastic regimes.The use of high collapse casing has gained wide acceptance in the industry, but its use remains controversial among some operators.

Unfortunately, all manufacturers’ claims have not been substantiated with the appropriate level of qualification testing. If high collapse casing is deemed necessary in a design, appropriate expert advice should be obtained to evaluate the manufacturer’s qualification test data such as lengths to diameter ratio, testing conditions end constraints, and the number of tests performed. Equivalent Internal Pressure. Axial strength is the product of the crosssectional area based on nominal dimensions and the yield strength. Combined Stress Effects. All the pipestrength equations previously given are based on a uniaxial stress state i.e., a state in which only one of the three principal stresses is nonzero. This idealized situation never occurs in oilfield applications because pipe in a wellbore is always subjected to combined loading conditions. The fundamental basis of casing design is that if stresses in the pipe wall exceed the yield strength of the material, a failure condition exists. Hence, the yield strength is a measure of the maximum allowable stress. To evaluate the pipe strength under combined loading conditions, the uniaxial yield strength is compared to the yielding condition. It is a theoretical value that allows a generalized threedimensional 3D stress state to be compared with a uniaxial failure criterion the yield strength. In other words, if the triaxial stress exceeds the yield strength, a yield failure is indicated. The triaxial safety factor is the ratio of the material’s yield strength to the triaxial stress. The calculated axial stress,.To illustrate these concepts, let us consider a few particular cases. Combined Collapse and Tension. It is clearly seen that as the axial stress S a increases, the pipe collapse resistance decreases. Plotting this ellipse, Fig. 7.2 allows a direct comparison of the triaxial criterion with the API ratings. Loads that fall within the design envelope meet the design criteria.

The curved lower right corner is caused by the combined stress effects, as described in Eq. 7.14. Combined burst and compression loading corresponds to the upper lefthand quadrant of the design envelope. This is the region where triaxial analysis is most critical because reliance on the uniaxial criterion alone would not predict several possible failures. For high burst loads i.e., high tangential stress and moderate compression, a burst failure can occur at a differential pressure less than the API burst pressure. For high compression and moderate burst loads, the failure mode is permanent corkscrewing i.e., plastic deformation because of helical buckling. This combined loading typically occurs when a high internal pressure is experienced because of a tubing leak or a buildup of annular pressure after the casing temperature has been increased because of production. The temperature increase, in the uncemented portion of the casing, causes thermal growth, which can result in significant increases in compression and buckling. The increase in internal pressure also results in increased buckling. Combined Burst and Tension Loading. Combined burst and tension loading corresponds to the upper righthand quadrant of the design envelope. This is the region where reliance on the uniaxial criterion alone can result in a design that is more conservative than necessary. For high burst loads and moderate tension, a burst yield failure will not occur until after the API burst pressure has been exceeded. As the tension approaches the axial limit, a burst failure can occur at a differential pressure less than the API value. For high tension and moderate burst loads, pipe body yield will not occur until a tension greater than the uniaxial rating is reached. Taking advantage of the increase in burst resistance in the presence of tension represents a good opportunity for the design engineer to save money while maintaining wellbore integrity.

Similarly, the designer might wish to allow loads between the uniaxial and triaxial tension ratings. However, great care should be taken in the latter case because of the uncertainty of what burst pressure might be seen in conjunction with a high tensile load an exception to this is the green cement pressure test load case. Also, connection ratings may limit your ability to design in this region. Use of Triaxal Criterion for Collapse Loading. For many pipes used in the oil field, collapse is an inelastic stability failure or an elastic stability failure independent of yield strength. The triaxial criterion is based on elastic behavior and the yield strength of the material and, hence, should not be used with collapse loads. This collapse criterion along with the effects of tension and internal pressure which are triaxial effects result in the API criterion being essentially identical to the triaxial method in the lower righthand quadrant of the triaxial ellipse for thickwall pipes. For high compression and moderate collapse loads experienced in the lower lefthand quadrant of the design envelope, the failure mode may be permanent corkscrewing because of helical buckling. It is appropriate to use the triaxial criterion in this case. This load combination typically can occur only in wells that experience a large increase in temperature because of production. The combination of a collapse load that causes reverse ballooning and a temperature increase acts to increase compression in the uncemented portion of the string. Most design engineers use a minimum wall for burst calculations and nominal dimensions for collapse and axial calculations. Arguments can be made for using either assumption in the case of triaxial design. Most importantly, more so than the choice of dimensional assumptions, is that the results of the triaxial analysis should be consistent with the uniaxial ratings with which they may be compared.

Triaxial analysis is perhaps most valuable when evaluating burst loads. Hence, it makes sense to calibrate the triaxial analysis to be compatible with the uniaxial burst analysis. This can be done by the appropriate selection of a design factor. Because the triaxial result nominally reduces to the uniaxial burst result when no axial load is applied, the results of both of these analyses should be equivalent. Hence, for a burst design factor of 1.1, a triaxial design factor of 1.25 should be used. Final Triaxal Stress Considerations. Fig. 7.3 graphically summarizes the triaxial, uniaxial, and biaxial limits that should be used in casing design along with a set of consistent design factors. First, for most pipe used in oilfield applications, collapse is frequently an instability failure that occurs before the computed maximum triaxial stress reaches the yield strength. Hence, triaxial stress should not be used as a collapse criterion. Only in thickwall pipe does yielding occur before collapse. Second, the accuracy of triaxial analysis is dependent upon the accurate representation of the conditions that exist both for the pipe as installed in the well and for the subsequent loads of interest. Often, it is the change in load conditions that is most important in stress analysis. Hence, an accurate knowledge of all temperatures and pressures that occur over the life of the well can be critical to accurate triaxial analysis.Threads are used as mechanical means to hold the neighboring joints together during axial tension or compression.The coupling internal yield pressure is typically greater than the pipe body internal yield pressure. In round threads, two small leak paths exist at the crest and root of each thread. In buttress threads, a much larger leak path exists along the stabbing flank and at the root of the coupling thread. API connections rely on thread compound to fill these gaps and provide leak resistance.

The leak resistance provided by the thread compound is typically less than the API internal leak resistance value, particularly for buttress connections. The leak resistance can be improved by using API connections with smaller thread tolerances and, hence, smaller gaps, but it typically will not exceed 5,000 psi with any longterm reliability. Applying tin or zinc plating to the coupling also results in smaller gaps and improves leak resistance.These equations are based on tension tests to failure on 162 roundthread test specimens. Both are theoretically derived and adjusted using statistical methods to match the test data. For standard coupling dimensions, round threads are pin weak i.e., the coupling is noncritical in determining joint strength.They are theoretically derived and adjusted using statistical methods to match test data.This is a different criterion from that used to define the axial strength of the pipe body, which is based on the yield strength. If care is not taken, this approach can lead to a design that inherently does not have the same level of safety for the connections as for the pipe body. This is not the most prudent practice, particularly in light of the fact that most casing failures occur at connections. This discrepancy can be countered by using a higher design factor when performing connection axial design with API connections. If API casing connection joint strengths calculated with the previous formulae are the basis of a design, the designer should use higher axial design factors for the connection analysis.Increased performance should always be weighed against the increased cost for a particular application. Those conditions are tighter dimensional tolerance; plating applied to coupling; use of appropriate thread compound; and performance verified with qualification testing.

If possible, it is recommended to use the joint elastic limit values in the design so that consistent design factors for both pipebody and connection analysis are maintained. If only parting load capacities are available, a higher design factor should be used for connection axial design.These failures can be attributed to improper design or exposure to loads exceeding the rated capacity; failure to comply with makeup requirements; failure to meet manufacturing tolerances; damage during storage and handling; and damage during production operations corrosion, wear, etc.. Connection failure can be classified broadly as leakage; structural failure; galling during makeup; yielding because of internal pressure; jumpout under tensile load; fracture under tensile load; and failure because of excessive torque during makeup or subsequent operations. Avoiding connection failure is not only dependent upon selection of the correct connection but is strongly influenced by other factors, which include manufacturing tolerances; storage storage thread compound and thread protector; transportation thread protector and handling procedures; and running procedures selection of thread compound, application of thread compound, and adherence to correct makeup specifications and procedures. The overall mechanical integrity of a correctly designed casing string is dependent upon a quality assurance program that ensures damaged connections are not used and that operations personnel adhere to the appropriate running procedures.Thermal or pressure loads might produce compressive loads, and if these loads are sufficiently high, the initial configuration will become unstable. However, because the tubing is confined within open hole or casing, the tubing can deform into another stable configuration, usually a helical or coil shape in a vertical wellbore or a lateral Sshaped configuration in a deviated hole.