Connect with our experience in Shale

- Conventional energy resources are decreasing. The pursuit of energy independence and implementation of new technologies have opened up new ways of "unconventional" hydrocarbons - including Shale/Tight oil and gas.
- Vallourec's people, products and integrated services at the heart of each project.
- Challenges: from planning phase to operations since the first wells drilled in the Barnett Shale.
- Partnering with operators from planning phase to operations since the first wells drilled in the Barnett Shale.
- Field running experience, including high stresses on pipe & connections to ensure cost-efficient operations.
- There is an increasing demand in the United States for Shale applications.
- Vallourec has built a small diameter tubes manufacturing plant located in Youngstown, Ohio in the Marcellus and Utica shale plays, from which the first deliveries were made at the end of 2012.
- The State of the art facilities, including State of the art facilities, including
- Enhanced fatigue resistance, with fit-for-purpose solutions.
- Deep oil wells with complex geometry with need for Well Design & Delivery solutions.
- Enhanced fatigue, with fit-for-purpose solutions.
- World Leader in Premium Tubular Solutions
- Get the Vallourec App now!
Connect with our experience in Shale

Conventional energy resources are decreasing. The pursuit of energy independence and implementation of new technologies is increasing their influence. New choices of "unconventional" hydrocarbons - including Shale/Tight oil and gas.

The pursuit of energy independence and implementation of new technologies are driving many countries to operate their reserves and manage their own energy. Conventional energy resources are decreasing, the increasing demand in the United States, and implementation of new technologies are driving many countries to operate their reserves and manage their own energy. To respond to the increasing demand in the United States, hydraulic fracturing. To respond to the increasing demand in the United States, drilling hundreds of gas wells in 2013.

Drilling hundreds of gas wells in 2013.

Vallourec Global Solutions

Vallourec offers a comprehensive range of innovative solutions in addition to premium OCTG products. These solutions are designed to meet your most demanding needs, from technical support to supply chain management and field services.

Vallourec people, products, and services provide solutions for all your Shale applications.

World Leader in Premium Tubular Solutions

Shale Applications

- Challenges
- Optimize reliability, cost efficiency, and minimize running time with the right solutions for your Shale operations.
- Your challenges
  - Increased well integrity
    - Increased well integrity with the right solutions for your Shale operations.
  - Deeper wells
    - High tension on the vertical, high cyclical loads generated by multiple rotation required for installation.
  - Longer laterals
    - High torque resistance for the areas.
  - Multiple well pads
    - Increased fatigue
    - Multiple well pads with need for fast design services and fast delivery.
  - Enhanced fatigue
    - Multiple well pads with need for fast design services and fast delivery.

Your challenges in Shale Applications

- Connect with our experience in Shale
- Vallourec Global Solutions
  - Experience
    - Worldwide manufacturing know-how.
  - Field testing expertise, including running recommendations.
  - Long experience in Shale applications, partnering with operators from planning phase to operations since the first wells drilled in the Barnett Shale.
  - R&D and innovation
    - State of the art facilities, including multiple test frames to ensure Fit-for-Purpose testing.
    - Flexible, integrity, and more.
  - Close to our customers
    - Keep your meet needs.
    - Provide reliable, user-friendly connections and accessories to ensure cost-efficient operations.
  - Close to our customers
    - Keep your meet needs.
    - Provide reliable, user-friendly connections and accessories to ensure cost-efficient operations.

Get the Vallourec App now!

Connect with our experience in Shale

© 2013 - Vallourec Oil & Gas France
Conventional energy resources are decreasing. The pursuit of energy independence and implementation of new technologies are driving many countries to operate their reserves of "unconventional" hydrocarbons – including Shale/Tight oil and gas. Vallourec's premium tubes and connections are designed to operate under the harshest conditions. To respond to the increasing demand in the United States, Vallourec built a small diameter tube manufacturing plant located in Youngstown, Ohio in the industrial and shale plays, from which the first deliveries were made at the end of 2012.

**Experience**
- Worldwide manufacturing since 1919.
- Field running experience, including recommendation warranties.
- Long experience in Shale applications, partnering with operators from planning phase to operations since the first wells drilled in the Barnett Shale.
- R&D and innovation.
- State-of-the-art facilities, including closed-loop stress testing and 2002 and 2011 versions.
- Customized R&D investments to enhance our products performance, especially fatigue resistance, torque and bending resistance.
- Close to our customers.
- Keep our word.
- Provide reliable, user-friendly connections and accessories to ensure cost-efficient operations.
- Vallourec people, products and services provide solutions for all your Shale applications.

Vallourec Global Solutions
- From Conception to Completion
- Vallourec offers a comprehensive range of innovative solutions in addition to premium OCTG products. These solutions are designed to meet your most challenging needs, from technical support to supply chain management and field services.
- Fit-for-Purpose testing.
- Optimize reliability, efficiency, user-friendliness and integrated services at all the stage of each project.
- Vallourec people, products, and services provide solutions for all your unconventional wells.

**Shale/Tight APPLICATIONS**
- Optimize reliability, cost efficiency, and minimize running time with the right solutions for your Shale operations.

**Your challenges in Shale Applications**
- Increased well integrity
  - Additional rotation may be required for installation of the string at the target depth.
  - Increased fatigue
- Deeper wells
  - Additional rotation may be required for installation of the string at the target depth.
- Longer laterals
  - High torque resistance for the area.
- Multiple well pads
- Shall/Tight oil and gas wells have their own unique challenges that require experienced partners to provide guidance on the available solutions.
- Requirements are individually analyzed, driven by lessons learned, while keeping reliability, efficiency, user-friendliness and integrated services at all the stage of each project.

Vallourec, people, products and services provide solutions for all your unconventional wells.
Solutions for your Well Architecture

**CAL IV - 2011**

- **ISO 13679**
- **5” - 9 5/8” OD**
- **T&C**
- **95 - 125 ksi**
- Carbon steel, purpose testing

**Fit for CAL II - 2011**

- **ISO 13679**
- **5” - 5 ½” OD**
- **Premium**

**Torque**

- Simple, reliable, and easy-running bending, and compression
- Excellent resistance to torque, tension, and compression
- Easy to install and remove
- Reduced trip time due to faster makeup; less than ½ turns

**Enhanced torque & tension resistance**

- For extended lateral sections
- A single premium solution for the full string

**High Torque semi-flush connection**

- **(ft. lbs)**
  - 30 000

**Quality Assurance**

- ISO 13679 FDIS 2011 CAL II standard
- Production integrity: following water production stages of the shale installation / fracturation and encountered by the string during the different steps of the lateral section during the installation in the lateral section
- Fracturing induced fatigue plays a key role in the behaviors of the connections

**Testing for purpose**

- A key for successful operations, providing you with quality assurance at each step of your project:

**Installation:** fatigue testing simulating rotation at installation

**Fracturing:** multiple internal pressures/tension cycles treated with water

**Production integrity:** following ISO 13679 FDSI 2011 CAL II standard

**Valve涯s** has a number of tests dedicated in purpose testing protocol based on the state of the art of fatigue life.

- This testing protocol simulates the different loads encountered by the string during the different steps of the entire installation / fracturation and production

**Shale specifics**

- Fatigue plays a key role in the behaviors of the connections
- Shale loads are more focused on cyclical effects
- Economics and risks are on a different scale

**Shale test program**

- VAM® EDGE SF and VAM® SG have been tested following ISO 13679 FDSI 2011 CAL II standard

**Post-Fatigue testing**

- Sample tested to 50% of fatigue life - cycles to failure
- Establish fatigue life - cycles to failure
- Varying stress ranges to replicate common dogleg severities

**Reasonant Fatigue testing**

- Introducing single point fatigue testing simulating a single cycle of fatigue life
- Same sample subjected to multiple single cycles of fatigue life

**Fatigue plays a key role in the behaviors of the connections**

- Shale loads are more focused on cyclical effects
- Economics and risks are on a different scale

**Shale test program**

- VAM® EDGE SF and VAM® SG have been tested following ISO 13679 FDSI 2011 CAL II standard

**High Torque semi-flush connection**

- **(ft. lbs)**
  - 30 000

**Solutions for your Drilling Operations**

**Premium Semi-Flush**

- **2” - 5 1/2” OD**
- **ISO 13679**
- **5” - 9 5/8” OD**

**Premium**

- **OD x 2-1/16” ID**
- **VX 39: 4-7/8”**
- **Dual OD tool joint**
- **0.330” WT**
- **OD tube S-135, for performance**

**Reducing Total Cost of Ownership**

- **High torque, no sag as API connections without a stabbing guide**
- **Patented thread profile allowing deep stab**, 40° thread stabbing flank and pin nose with shallow chamfer for easy stab
- **Longer service life due to less material removal during recut**
- **Higher API GO for lighter weight with the need for a metal internal test**
- **Patented tread profile allowing deep stab**
- **30% to 70% less trips to full close up**

**High Premium Strength**

- **Premium**
- **21 HT**
- **VAM® EDGE SF & VAM® SG**
- **Recommended MUT of 21,200 ft-lbs**

**Elevator capacity of 369,000 lbs**

**Recommended Fatigue testing**

- **(ft. lbs)**
  - 15 000

**Reducing Total Cost of Ownership**

- **High torque, no sag as API connections without a stabbing guide**
- **Patented thread profile allowing deep stab**, 40° thread stabbing flank and pin nose with shallow chamfer for easy stab
- **Lower repair and maintenance cost, and less number of turns as compared to equivalent connections**
- **Elevator capacity of 369,000 lbs**

**Maximizing Drilling Efficiency and Tubular Life**

- **VAM® EDGE SF & VAM® SG**
- **Premium Torsional Strength of 37,600 lbs**
- **Recommended MUT of 21,200 ft-lbs**

**Highest single shoulder 2% - 5%**

- **6” - 5%**

**Semi Premium**

- **2” - 5 1/2” OD**
- **ISO 13679**
- **5” - 9 5/8” OD**

**Semi-Premium**

- **OD x 2-1/16” ID**
- **VX 39: 4-7/8”**
- **Dual OD tool joint**
- **0.330” WT**
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**Maximizing Drilling Efficiency and Tubular Life**

- **VAM® EDGE SF & VAM® SG**
- **Recommended MUT of 21,200 ft-lbs**

**Elevator capacity of 369,000 lbs**
Solutions for your Well Architecture

The next generation
High Torque semi-flush connection
- Multi-angle precision solution for the full string length with enhanced torque and tension
- New internal thread design

Brings the complete package to your Shale needs

- Excellent fatigue resistance to torque, bending, and compression
- Lower repair and maintenance costs, and less number of turns as compared to equivalent connections
- Reduced trip time due to faster makeup; less than ½ turn

Shale Drill Pipe

OD x 2-11/16" ID
OD x 5-¼" Dual
VX 39: 4-7/8"
Dual OD tool joint
0.330" WT
OD tube S-135,
4 ¼" 15.40: 4 ¼"

Shade Drill Pipe

Maximizing Drilling Efficiency and Tubular Life

- Premium Tensile Strength of 432,000 lbs
- Recommended MUT of 21,200 ft-lbs
- Standard handling & fishing equipment

Promax Semi-flush
2" x 1-1/4" ID
ISO 13679 CAL II-2011
1/16" OD tool joint
Contact steel, 80-125 ksi

0.330" WT
OD tube S-135, 4 ¼" 15.40: 4 ¼"

Series A (4 quadrant)
Series B at ambient with Bending
Series B at elevated temperature

Loads during fracture treatment
Then tested to ISO 13679 Series B Pressure / Tension frac cycles
Multiple High Pressure / Tension cycles
Same sample subjected to multiple test with bending
Establish fatigue life - cycles to failure
Varying stress ranges to replicate
Test to failure on several samples

Reasonant Fatigue testing
Cyclical fatigue to simulate the rotation of the connections.
Fatigue plays a key role in the behaviors of the connections.
Shale loads are more focused on cyclical effects.
Economics and risks are on a different scale from Deep Water.

VAM® EDGE SF and VAM® SG have been tested according this test protocol.
ISO 13679 FDIS 2011 CAL II standard
Production integrity: following
Fracturing induced fatigue.
Installation: fatigue testing
Prevent Fatigue testing
Fracture treatment simulation
Fatigue testing simulating multiple cycles to failure
Pressure / Tension frac cycles
Establish fatigue life - cycles to failure
Varying stress ranges to replicate
Test to failure on several samples

Vale's has developed a sophisticated fit for purpose testing protocol based on the specificity of the connections and the testing protocol simulates the different loads induced by the environment during the life of the string at installation / field operation.

- Production integrity: following
- Fracturing induced fatigue.
- Installation: fatigue testing
- Prevent Fatigue testing
- Fracture treatment simulation

- Pressure / Tension frac cycles
- Establish fatigue life - cycles to failure
- Varying stress ranges to replicate
- Test to failure on several samples

Vale’s shale test program
- Cyclical fatigue to include the rotation of the string along the section of the internal section
- High pressure internal pressure from Hydraulics
- Fracturing induced Fatigue
- ISO 13679 FDIS 2011 CAL II test to simulate the production phase
- ISO 9813-1, and VAM® SG have been tested to the fit for purpose test program and any connections used in Shale Tight plays could be tested according this test protocol.

Quality Assurance

Testing for purpose is a key for successful operations, providing you with quality assurance at each step of your project

Installation: fatigue testing simulating rotation at installation
Fracturing: multiple internal pressure/tension cycles tested with water
Production integrity: following ISO 13679 FDIS 2011 CAL II standard

Vale’s has developed a sophisticated fit for purpose testing protocol based on the specificity of the connections and the testing protocol simulates the different loads induced by the environment during the life of the string at installation / field operation.

- Production integrity: following
- Fracturing induced fatigue.
- Installation: fatigue testing
- Prevent Fatigue testing
- Fracture treatment simulation

- Pressure / Tension frac cycles
- Establish fatigue life - cycles to failure
- Varying stress ranges to replicate
- Test to failure on several samples

Vale’s shale test program
- Cyclical fatigue to include the rotation of the string along the section of the internal section
- High pressure internal pressure from Hydraulics
- Fracturing induced Fatigue
- ISO 13679 FDIS 2011 CAL II test to simulate the production phase
- ISO 9813-1, and VAM® SG have been tested to the fit for purpose test program and any connections used in Shale Tight plays could be tested according this test protocol.
Solutions for your Well Architecture

**Premium Semi-flush**

- **80 - 125 ksi**
- Carbon steel,
- CAL IV - 2011
- ISO 13679
- High Performance
- 5” - 9 5/8” OD
- T&C

**Semi-flush Premium**

- **95 - 125 ksi**
- Carbon steel,
- Purpose testing
- CAL II - 2011
- ISO 13679
- 4 ½” - 5 ½” OD
- Semi-flush

**Simple, reliable, and easy-running**

- Bending, and compression
- Connect with confidence

**Enhanced torque & tension resistance**

- To your Shale needs
- Brings the complete package to your Shale needs

**For extended lateral sections**

- Length with enhanced torque and tension
- The next generation

**Shale Drill Pipe**

- OD x 2-11/16” ID
- OD x 5-¼” Dual
- VX 39: 4-7/8”
- 0.330” WT
- 4 ¼” 15.40: 4 ¼”
- Recommended for performance

**High Torque**

- Patented thread profile allowing deep stab
- Only 6 to 7 turns to full make-up
- Short thread pitch for a metal-2-metal seal during recut
- Slender profile for efficient hydraulics
- 0.065” elliptical thread root radius for maximum fatigue resistance
- 40° thread stabbing flank and pin nose with shallow chamfer for easy stab
- Patented Tapered End geometry for maximum fatigue resistance

**Reducing Total Cost of Ownership**

- Higher efficiency due to reduced trip time
- Increased number of turns as compared to equivalent connections
- Long lateral length due to reduced side forces on the tube
- Less risk of stuck pipe due to efficient hydraulics
- Less material removal for a longer service life due to proprietary design
- Higher efficiency for total lateral to produce performance

**Maximizing Drilling Efficiency**

- Premium Torsional Strength of 37,600 lbs
- Premium Tensile Strength of 432,000 lbs
- Recommended MUT of 21,200 ft-lbs
- Standard handling & fishing equipment
-和支持不依赖于混频器

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**Testing for purpose is a key for successful operations, providing you with quality assurance at each step of your project:**

**Installation:** fatigue testing simulating rotation at installation

**Fracturing:** multiple internal pressure/tension cycles tested with water

- Production integrity: following ISO 13679 FDIS 2011 CAL II standard

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**Shale specific installation / fracturation and production.**

Shale loads are more focused on cyclical effects. Economics and risks are on a different scale than API.

**Vallourec's shale test program** simulates the different loads encountered by the Shale application. This testing protocol simulates all the steps of the Shale application. This testing protocol is based on the specificity of the Shale application. This testing protocol simulates all the steps of the Shale application.

**High pressure internal pressure from Hydraulic Fracturing (HF):**

- Series A (4 quadrant)
- Series B at ambient with Bending
- Series B at elevated temperature

**Fatigue plays a key role in the behavior during fracture treatment**

**Post-Fatigue testing**

- Same sample subjected to multiple High Pressure / Tension cycles
- Multiple High Pressure / Tension cycles
- Sample tested to 50% of Fatigue life - cycles to failure

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**Precise semi-flush**

- **75% 90%**
- VAM® EDGE SF and VAM® SG have been tested according this test protocol.

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**Alternate connection:**

- **VAM® EDGE SF**
- **VAM® SG**

**Proprietary design**

- Less risk of stuck pipe due to efficient hydraulics
- Higher efficiency for total lateral to produce performance

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**Quality Assurance**

- Production integrity: following ISO 13679 FDIS 2011 CAL II standard

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**High Torque Rubber Connection (HTR)**

- Available in all sizes from 2-3/8” to 5-5/8” API connection size
- No waiting guide
- No fluid lock for faster make-up times than API
- Reduced trip time due to efficient hydraulics
- Only 6 to 7 turns to full make-up without a stabbing guide
- Patented Tapered End geometry for maximum fatigue resistance

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**Solutions for your Drilling Operations**

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**Shade Drill Pipe**

- Maximizing Drilling Efficiency and Tubular Life
- Premium Torsional Strength of 37,600 lbs
- Larger service life due to less material removal during recal
- No LUB 25% gas lightness without the need for a metal-2-metal seal
- Patented thread profile allowing deep stab
- Only 6 to 7 turns to full make-up
- Short thread pitch for a metal-2-metal seal during recut
- Slender profile for efficient hydraulics

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**High Torque Double Bent Connection**

- Available in all sizes from 2-3/8” to 5-5/8” API connection size
- No waiting guide
- No fluid lock for faster make-up times than API
- Reduced trip time due to efficient hydraulics
- Only 6 to 7 turns to full make-up without a stabbing guide
- Patented Tapered End geometry for maximum fatigue resistance
- Slender profile for efficient hydraulics
**Testing for purpose** is a key for successful operations, providing you with quality assurance at each step of your project.

**Installation: fatigue testing simulating rotation at installation**
- Fracturing: multiple internal pressure/tension cycles tested with water
- Production integrity: following ISO 13679 FDIS 2011 CAL II standard

**Shale Drill Pipe**
- Available in all sizes from 2-3/8” to 6-5/8”, all sizes from 4-1/16” to 4-3/4”
- High Torsional Strength of 37,600 lbs
- Premium Tensile Strength of 432,000 lbs
- Recommended MUT of 21,200 ft-lbs

**Quality Assurance**
- High Performance Anti-Shake Chamfer for easy stab
- Up to 5,000 psi gas tightness without the need for a stabbing guide
- Only 6 to 7 turns to full make-up
- Patent pending thread profile allowing deep stab
- 40° thread stabbing flank and pin nose with shallow chamfer for easy stab
- 0.065” elliptical thread root radius for maximum fatigue resistance
- Slim profile for efficient hydraulics

**Maximizing Drilling Efficiency and Tubular Life**
- Premium Torsional Strength of 37,600 lbs
- Premium Tensile Strength of 432,000 lbs
- Premium anti-shake chamfer for easy stab
- Only 6 to 7 turns to full make-up
- 40° thread stabbing flank and pin nose with shallow chamfer for easy stab
- 0.065” elliptical thread root radius for maximum fatigue resistance
- Slim profile for efficient hydraulics
Connect with our experience in Shale

- Conventional energy resource use decreasing, the pursuit of energy independence and implementation of new technologies are among many countries to operate from reserves of "unconventional" hydrocarbons - including Shale/Tight oil and gas.
- Vallourec's premium tubes and connections are uniquely engineered to operate under the Fourier conditions of extraction in deviated wells combined with high internal pressure coming from Vallourec’s premium tubes and connections are optimally designed to operate under the harsh conditions of "unconventional" hydrocarbons - including Shale/Tight oil and gas.
- The development and implementation of new technologies are driving many countries to operate their reserves and implement new technologies.
- Challenges, from planning phase to implementation, require experienced partners to provide guidance on the available solutions.
- Requirements are individually analyzed, and services provide solutions for all your Shale/Tight oil and gas wells.
- Vallourec provides products, people, and integrated services at the heart of each project.
- Vallourec people, products, and services provide solutions for all your unconventional wells.

Vallourec Global Solutions

Vallourec offers a comprehensive range of innovative solutions in addition to premium OCTG products. These solutions are designed to meet your most challenging needs, from technical support to supply chain management and field services.

- Experience
  - Worldwide manufacturing know-how.
  - Field-familiarization, including R&D and innovation.
  - Long experience in Shale applications, partnering with operators from planning phase to operations for the first wells drilled in the Barnett Shale.
  - Final delivery, including High Torque and bending resistance.
  - Close to our customers
  - Provide reliable, user-friendly, connections and accessories to ensure cost-efficient operations.
  - Vallourec people, products, and services provide solutions for all your unconventional wells.

Requirements are individually analyzed, and services provide solutions for all your Shale/Tight oil and gas wells.