ADVANCED SUPPORT FOR WELL OPTIMIZATION

vallourec
SMART TUBULAR SOLUTIONS
Across all applications, from conventional and unconventional fields, offshore and onshore, to special applications such as geothermal, we support you with competitive and innovative solutions and grades, and help you select the products and services you need.

WHATEVER YOUR CHALLENGE, WE HAVE THE SOLUTION

**OUR EXPERTISE**

- **MATERIAL SELECTION**
  - Extensive testing data base
  - Normative material support
  - Benchmark testing facilities
  - Failure analysis
  - Application modeling

- **WELL DESIGN**
  - Mechanical and thermal analysis
  - Connection selection
  - Torque & drag support
  - Software-friendly Vallourec product data base

- **PRODUCT DEVELOPMENT**
  - Fit-for-purpose product development including design, testing, industrial trial
  - Special products such as Risers, Expendables, Vacuum Insulated Tubing, upset pipes

- **INNOVATION DRIVER**
  - Participation in key Joint Industry Projects and R&D with main IOCs
  - Cooperative-development mindset with extensive expertise

**ADVANCED PRODUCT ANALYSIS**

- Casing wear performance analysis
- Individual pipe data
- On demand FEA and testing
- Heat transfer & fracture mechanics
- Fatigue assessment (CWD, Riser…)

**TESTING AND VALIDATION**

- Applicative and testing normative expertise AIPICT5, ISO 13680, ISO 13679, NACE MR, NORSOK, RP96, I3E, TWCCEP

**YOUR CHALLENGES**

- **COST OPTIMIZATION**
  - Reduce overall project cost by product optimization

- **OPERATIONAL SAVINGS**
  - Running time reduction
  - Stock optimization
  - Standardization

- **CRITICAL WELLS**
  - Fit-for-purpose product development to make your project possible

- **RELIABILITY**
  - Normative and regulatory compliance
  - Integrity risk reduction
  - Field-proven solutions

**ENERGY TRANSITION APPLICATIONS**

- **GEOTHERMAL**
  - Connection selection and testing
  - Special products such as coating, liners, Vacuum Insulated Tubing

- **CCUS**
  - Material selection
  - Connection validation for injection wells

- **HYDROGEN STORAGE**
  - Material selection
  - High-pressure components
  - Storage solutions
Vallourec’s integrated services offering accompanies you along the entire value chain, combining both traditional services and digital solutions, boosting efficiency and reducing costs.

**ENGINEERING SUPPORT**
- From engineering-assistance to training, we support you throughout your project, partnering with you to evaluate load cases, safety factors and design scenarios. We accompany you in the selection of the best materials, grades and connections to reduce costs and enhance well integrity.

**SUPPLY CHAIN**
- **Tubular Sourcing & Resale**: reduce your working capital and your environmental footprint. New procurement solutions increase flexibility, shorten lead times and manage surplus, leveraging Smartengo digital solutions.
- **Material Management & QA/QC**: benefit from inspection services and obtain full visibility of your supply chain. Thanks to the digital solution Smartengo Inventory, reduce your stock and improve stock rotation by 30% using unique traceability ID barcodes and real-time data.

**WELL CONSTRUCTION**
- **Tubular Running QA/QC**: ensure well integrity and running performance. Digital solution Smartengo Running Expert optimizes the sequencing of pipes on drilling rigs and eliminates the risk of errors and costly delays. Running supervision services are guaranteed by VAM® Field Service on-site or remotely, depending on the nature of your operations.
- **Rental Equipment**: lower your capital expenditures, reduce maintenance cost of tooling and avoid idle assets with rental services for tubular equipment and accessories.
- **Pipe Data Service**: optimize pipe sequence, fine-tune running and cementing operations and build advanced well construction tools leveraging actual pipe data provided by Vallourec.

**LIFE OF FIELD**
- Leverage Vallourec’s advanced digital solutions, actual pipe data and new innovative equipment to go one step closer to the modeling and digital monitoring of your well during its lifetime.

VISIT OUR E-COMMERCE WEBSITE
SMARTENGO.Vallourec.COM
A COMPLEX ENVIRONMENT

The Oil and Gas market is vast with multiple applications. While we have chosen to present three of them, Vallourec provides advanced solutions for all applications, and has the capabilities to meet any challenge you may face.

We leverage innovation and digital technology to develop ever more sophisticated, higher performing, and when required, customized solutions for enhanced operations.

CLEANWELL®

CLEANWELL® is a non-polluting dope-free technology developed by VAM®, applied in the mill to threaded connections replacing both storage and running compounds. The “rig-ready” joints reduce handling and pipe preparation operations as well as associated safety risks, both in the yard and on the rig. While providing outstanding sealability and anti-galling & corrosion resistance, it also reduces back-out, rejects and overall running time, thus improving rig operations.

The result is a lower operating cost and increased efficiency throughout the entire supply chain.

SOLUTIONS

CHALLENGES
- Normative qualifications
- Well integrity
- Temperature, pressure & clearance

CLEANWELL®

Surface Casing
22" 1.25# - X80
Intermediate Casing
18" 117# - VM 125 HC

EXTREME COLLAPSE GRADES
- CP 36°

SOUR SERVICE GRADES
- 16.08" 111# - VM 140 CYHC
- 14.15" 127.5# - VM 140 CYXC
- 11 7/8" 71.8# - VM 125 XCSS

MAX SEALABILITY STANDARDIZATION
- 10.05" 72# - VM 130 HCMS
- 7 5/8" 47.10# - VM 125 13ECRSS
- Production Tubing 5 ½" 23# - VM 110 13ECRSS

OTHER SOLUTIONS

GRADES
- Corrosion Resistant Alloy
- Enhanced Sour VM 125 ESS
- Chromium Grades VM XX 13CR

CONNECTIONS
- VM® EPIC
- CLEANWELL
- VM® HP™

ENVIRONMENTALLY FRIENDLY

MAXIMUM SEALABILITY

CLEARANCE OPTIMIZATION

EXTERNAL PRESSURE RESISTANCE

From 10 1/8" to 16"

From 7 5/8" to 16 1/4"
UNCONVENTIONAL

CHALLENGES
- Standardization
- Operational efficiency
- Product ruggedness

SOLUTIONS

Surface Casing
13 3/8" 68# - K55

Intermediate Casing
8 5/8" 32# - P110 EC

Production Casing
5 1/2" 20# - P110 RY

ENHANCED COLLAPSE GRADES

OTHER SOLUTIONS

<table>
<thead>
<tr>
<th>GRADES</th>
<th>CONNECTIONS</th>
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<tr>
<td>API Grade L80, K55</td>
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<tr>
<td>Enhanced Collapse API HCE</td>
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<td>Mild Service P 110 MS</td>
<td>Mild Service P 110 MS</td>
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COST OPTIMIZATION
HIGH CLEARANCE
HIGH TENSION RATING
STANDARDIZATION
STANDARDIZATION

Standardization
Operational efficiency
Product ruggedness

From 5" to 8 3/4"
Pipe grade selection depends on well environment. See material selection table on the right.

**CONVENTIONAL**

**CHALLENGES**
- Optimize total cost of ownership
- Product supply ease
- Large developments

**SOLUTIONS**

**API GRADES**
- **Surface Casing**
  - 20" 169# - X65
- **Intermediate Casing**
  - 13 3/8" 72# - P110
- **Production Tubing**
  - 4 1/2" 12.60# - L80 13CR
- **Production Casing**
  - 9 5/8" 40.00# - L80
- **Production Liner**
  - 7" 26.00# - Q125

**OTHER SOLUTIONS**
- High Strength VM XX CY
- High Collapse VM XX HC
- eXtreme Sour VM XX XS

**CONNECTIONS**

**CONVENTIONAL PROPERTIES**
- From 3 1/2" to 16"
- **MAX SEALABILITY**
- **STANDARDIZATION**
- **PRESSURE RESISTANCE**
- **EASY TO RUN**
- **COST OPTIMIZATION**

**VM**
- Vallourec Material

**XX**
- SMYS

**YY**
- Product application domain and performance

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<tr>
<th>YY</th>
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<td>CR</td>
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*Pipe grade selection depends on well environment. See material selection table on the right.*
Thanks to our material expertise and manufacturing know-how, we provide a complete portfolio of steel grades, used and approved by all major Oil and Gas companies, including proprietary high-yield grades—up to 160ksi—for all well environments.

Our experts can help you select the most appropriate material for your application, simplifying your supply process and optimizing the associated costs.

For more information on our grades visit: www.expertise.valourec.com

In 1965, Vallourec invented VAM®, a key breakthrough innovation for tubing and casing.

Every year VAM® designs new connections, extends product lines and qualifies new sizes to the most stringent specifications to meet the increasing complexity of accessing reservoirs and to adapt to new user requirements.

For more information on our connections visit: www.vamservices.com
YOUR PARTNER, SETTING THE PACE FOR INNOVATION AND PERFORMANCE EVOLUTION

INTERNATIONAL NETWORK OF VAM® LICENSEES

R&D CENTERS
ROLLING MILLS
FINISHING UNITS
VAM® FIELD SERVICES AND SALES

NEED MORE INFORMATION?
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