

DUOLINE[®] 20

Corrosion Resistant Oil Field Tubulars for seawater injection and disposal of salt water or other environmentally degrading corrosive fluids. Historically proven performance in corrosive gas and fluid injection for offshore and land-based applications.

A cost effective alternative to high-priced alloyed steel tubular goods utilized in seawater injection and salt water disposal from offshore production operations.

THE CHALLENGE:

- The impact of high costs associated with specially alloyed tubular goods for seawater injection and disposal of corrosive fluids and gases lowers platform operating profits and do not contribute to the economic value of the project.
- Equipment for removal of oxygen and dissolved solids has footprint implications on crowded platforms and lends additional cost to the project.
- Internally coated products are not well suited to aggressively corrosive environments and time between workovers is shortened. The impact of this is increased platform operating expenditure over what **DUOLINE[®]** customers are accustomed to.
- State and Federal regulations and costly permitting are hurting project economics to the extent that downhole disposal increasingly makes more sense.

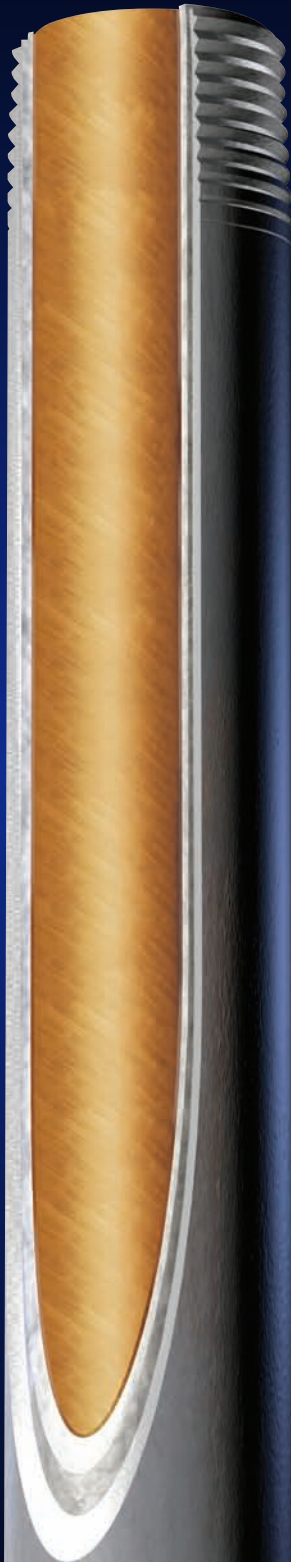
THE CHALLENGE:

Install **DUOLINE[®] 20** into carbon steel tubing for internal protection against corrosion.

DUOLINE[®] 20 is a durable Glass-Reinforced Epoxy (GRE) liner that can be installed in carbon steel for a less-expensive, equally-effective alternative to expensive alloys. **DUOLINE[®] 20** can be installed into tubing or casing terminated with either standard or premium connections.



Duoline[®] lining systems extend the life of your tubulars



HOW DOES DUOLINE[®] 20 WORK?

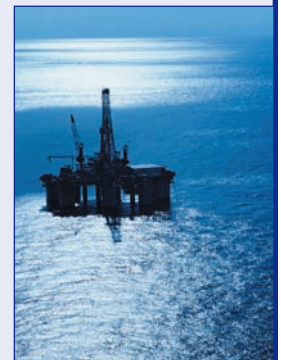
DUOLINE[®] 20 is a filament-wound Glass-Reinforced Epoxy (GRE) liner manufactured by Duoline Technologies which is installed into OCTG employed in corrosive service. It is widely accepted that GRE lining is a more robust alternative to internal plastic coating. **DUOLINE[®] 20** is a very effective corrosion barrier with a long history of tubular protection in a variety of offshore and land-based applications.

NEED OBJECTIVE PROOF OF PERFORMANCE? HERE IT IS:

Duoline Technologies has been in the salt water disposal business for more than fifty years. Originally operators of disposal systems distributed throughout North America, Duoline Technologies had sufficient corrosion problems to justify the creation, manufacturing and installation of the **Duoline[®]** lining systems into their injection tubing. The liners proved so effective that **Duoline[®]** is now a core business activity. The liners have evolved over many years but the concept hasn't changed. **Duoline[®]** liners have been installed in over 75 million feet of tubing world-wide, including multiple seawater injection strings installed for a variety of operators in the North Sea.

CASE HISTORY # 1

CUSTOMER: BP
FIELD: SCHIEHALLION
WELL TYPE: OFFSHORE WATER INJECTOR
COMPLETION TYPE: SUBSEA, 400 METER
WATER DEPTH
NO. OF WELLS: 11 INSTALLED,
2 ADDITIONAL COMPLETIONS SCHEDULED
INSTALLATION DATE: ORIGINAL COMPLETION OCTOBER 1996
INJECTION RATE: 25-55,000 BWPD
INJECTION TEMP: BHT - 140° F
INJECTION PRESSURE: 1,800 PSI
BHP: 2,950 PSI
WELL DEPTH: 10,000-12,000 FEET
LINING TYPE: DUOLINE[®] 20
SIZE: 7"
CONNECTION: VAM[®] TOP FLD*
GRADE: L80 0.5% CR
INJECTED FLUIDS: FILTERED SEAWATER



* VAM[®] TOP + DL-Ring is the new product release replacing VAM[®] TOP FLD since 2002

CASE HISTORY #2

CUSTOMER: CHEVRON UK LIMITED
FIELD: ALBA, NORTH SEA
WELL TYPE: OFFSHORE WATER INJECTOR
COMPLETION TYPE: PLATFORM, 450 FEET
WATER DEPTH
NO. OF WELLS: 2
YEARS IN SERVICE: SINCE FEBRUARY 1998
INJECTION RATE: 60,000 BWPD
INJECTION TEMP: 170° F BHT
INJECTION PRESSURE: 2,200 PSI SURFACE
WELL DEPTH: 8,100 FEET
LINING TYPE: DUOLINE® 20
SIZE: 7"
CONNECTION: SEAL LOCK FGL CONNECTIONS
GRADE: L80
INJECTED FLUIDS: FILTERED SEAWATER



CASE HISTORY #3

CUSTOMER: SHELL UK EXPRO
FIELD: NORTH CORMORANT
WELL: CN12
TYPE OF WELL : OFFSHORE OIL PRODUCTION
INSTALLATIONS: 1ST COMPLETION OCTOBER 1998
PRODUCTION RATE: 6000 BBL OIL/DAY
INITIAL PRODUCTION: 600 BBL OIL/DAY
CURRENT PRODUCTION: 0 BBL H₂O/DAY
PRODUCTION TEMP: 210° F BHT
SURFACE PRESSURE: 14 BAR, FLOWING
WELL DEPTH: 12,700 FEET
LINING TYPE: DUOLINE® 20
SIZE: 7" 29 PPF RANGE-3
CONNECTION: NSCC-FGL
GRADE: L80 + 1% CHROME
COMPLETION: PLATFORM
WELLBORE DEVIATION: 65°



COMMENTS: There were 32 wireline runs through the Duoline portions of the string during completion operations. Included in these 32 runs were numerous trips to fish lost tool strings and 14,000 feet of parted wireline, as well as 7 perforating runs of broken 3/16" wire.

DUOLINE[®]
TECHNOLOGIES

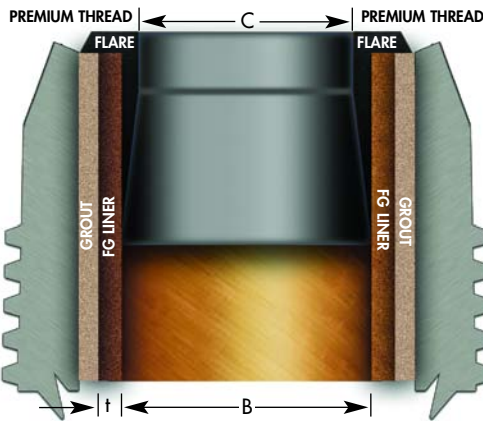
Duoline[®] lining systems extend the life of your tubulars



DUOLINE® 20

DUOLINE® DIMENSIONS AND WEIGHTS

For Premium Connections



DUOLINE® 20 in VAM® Connections

			B	C	t	
Connection Type	Pipe Size (inches)	Pipe Wt. (lbs/ft)	Fiberglass Liner ID (inches)	Minimum DL-System Restricted ID (inches)	D-20 Nominal Thickness (inches)	Nominal Lining Wt. (lb/ft)
NEW VAM®	4-1/2"	12.60	3.691	3.594	0.060	1.50
NEW VAM®	5"	18.00	4.010	3.893	0.065	1.65
NEW VAM®	7"	26.00	5.900	5.779	0.096	2.50
NEW VAM®	7"	29.00	5.800	5.678	0.094	2.50
<hr/>						
VAM® TOP	4-1/2"	12.60	3.600	3.506	0.058	1.50
VAM® TOP	5"	18.00	4.010	3.893	0.065	1.65
VAM® TOP	5-1/2"	17.00	4.520	4.394	0.073	1.80
VAM® TOP	5-1/2"	20.00	4.520	4.394	0.073	1.80
VAM® TOP	6"	18.60	5.036	4.915	0.082	2.00
VAM® TOP	7"	23.00	5.900	5.778	0.096	2.50
VAM® TOP	7"	26.00	5.900	5.778	0.096	2.50
VAM® TOP	7"	29.00	5.800	5.678	0.094	2.50
VAM® TOP	7"	32.00	5.800	5.678	0.094	2.50
VAM® TOP	9-5/8"	47.00	8.260	8.078	0.134	
VAM® TOP	10-3/4"	60.70	9.160	9.003	0.149	
<hr/>						
VAM® TOP HT/HC	4-1/2"	12.60	3.600	3.506	0.058	1.50
VAM® TOP HT/HC	5-1/2"	17.00	4.520	4.394	0.073	1.80
VAM® TOP HT/HC	5-1/2"	20.00	4.395	4.268	0.071	1.80
VAM® TOP HT/HC	7"	29.00	5.800	5.685	0.094	2.50
VAM® TOP HT/HC	7-5/8"	33.70	6.400	6.273	0.104	2.60

Please contact **Duoline® Technologies** Technical Support for Premium Connections, Drift diameters and Premium Connections not listed.



FOR COMPLETE DETAILS ABOUT OUR EXPANDED FACILITIES AND NEW CAPABILITIES LOGON TO www.duoline.com



Bluebird Lane & Highway 271
Gilmer, TX 75644

Phone: 903.734.1371
Fax: 903.734.1571

9019 North County Road West
Odessa, TX 79764

Phone: 432.552.9700
Fax: 432.552.9701

Web-site: www.duoline.com



Duoline® lining systems extend the life of your tubulars

