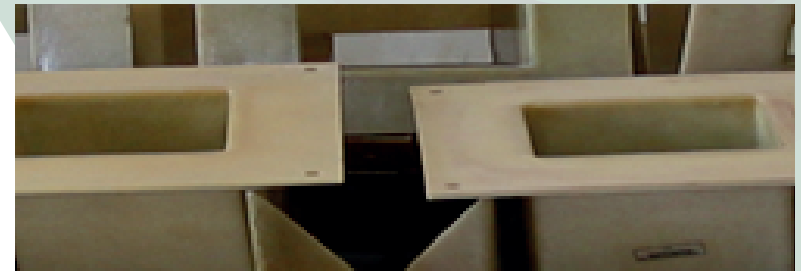


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# Advanced Composites

- Custom Design Engineers.
- Manufacturers.
- FRP Piping Systems.
- Specialized Composites Products.

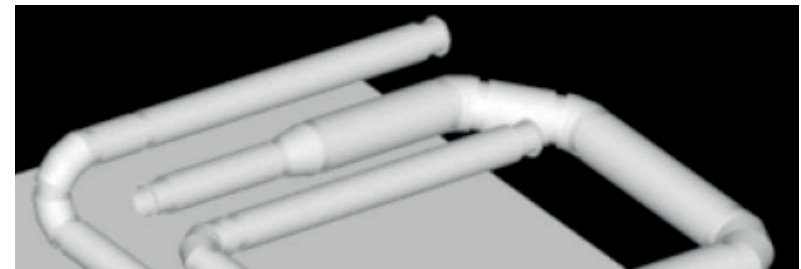
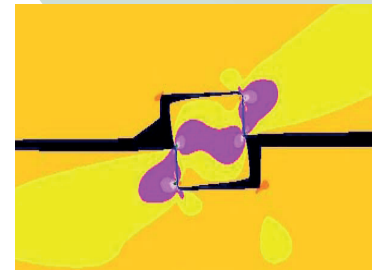
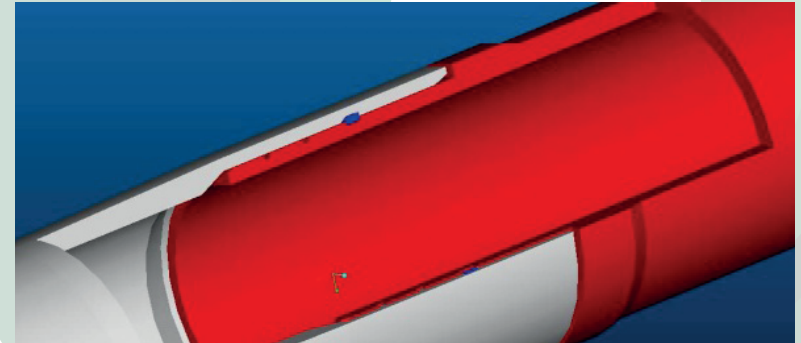






# Competitive Advantage

- International Accreditations, Licenses and Consultants.
- State of the Art Engineering Services.
- Latest Technology Equipment.
- Standard and Custom Products.
- Testing Laboratory.



# Accreditations & Standards

- API 15 LR
- API 15 HR
- WRAS (Water Regulation Advisory Scheme)
- ISO 14692 (Oil & Petrochemical Industry)
- ISO 9001:2008 (Quality Management)
- ISO 14001 & 18001 HSE





# International Key Technical Experts

## • Dr. Brent Strong

- Former President Of Society for the Advancement of Material & Process Engineering.
- Professor Of Manufacturing Engineering Technology, Brigham Young University.
- Recipient of vast Prestigious technical awards.
- Authors of numerous books and Journals on advancement, Technical Design, Engineering and Analysis on.
- Composites and non- metallic structures.

## • Dr. Scott Beckwith

- Beckwith Technology Group, Arizona, USA.
- Key Advisor to US Department of Commerce and State; Materials Technical Advisory Committee for Composites/FRP
- Designed & Developed Carbon/epoxy Composite Drill Pipe Sections with heat pipe system for controlling temperature & contained Pressure of solidified methane hydrate core samples obtained at 1000ft +(Cosmo Oil Co. Japan).
- Expert Consultant on production riser & drilling technology.

# International Key Technical Experts

## • Mr. James Cheek

- Expert Designer for Down Hole tubing and Casing, for Deep waste Injection wells.
- Designed & Installed large DN Casing systems for Brackish Water Wells in Florida for Municipal and Potable Water.
- Vice- President AIM Corporation- Design, Calculations; Metal & FRP Piping, Structural Design & Stress Analysis. Expert
- Former VP of Conley Corporation- Chief Design & Development, Engineering Solutions for FRP.
- Consultant for NASA R & D Program.
- Well Casing Expert.

## • Mr. William Stringfellow

- Renowned Oil & Gas Engineering Consultant (Chevron Texaco, Halliburton, Bechtel).
- Technical Expert for the manufacture of Fiberglass Water Well products.
- Oil Production wells tubing/casing expert.
- Authors of specialized books dealing with "High Performance Composites in the O & G Industry".
- "Field Assembly of Corrosion Resistant Tubulars"
- Industries Memberships: NACE, API C1/SC15.
- Member of API Technical Advisory Committee.
- Writer of Standards for Material & Processes.
- Well Casing Expert.

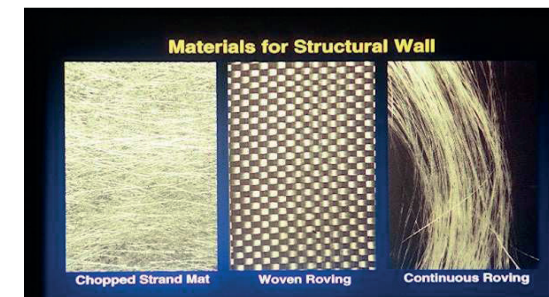
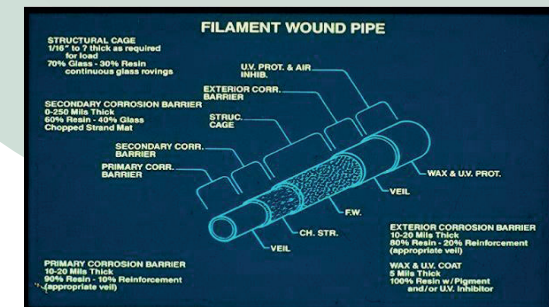


# Manufacturing & Testing Standards

- **BS 5480**  
( British Standard and Specifications for GRP Piping & Fittings )
- **BS 7159**  
( Plant Applications )
- **AWWA M45**  
( American Water Works Association )
- **ASTM**  
( American Society for Testing & Materials - Multiple Standards )

# Manufacturing Process

- Filament Winding.
- Conventional Lamination.
- Resin Transfer Moulding.
- Reinforcing Fibers are for Strength.
- Resins are for Corrosion Resistance and Structural Integrity.







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# Advanced Composites Markets

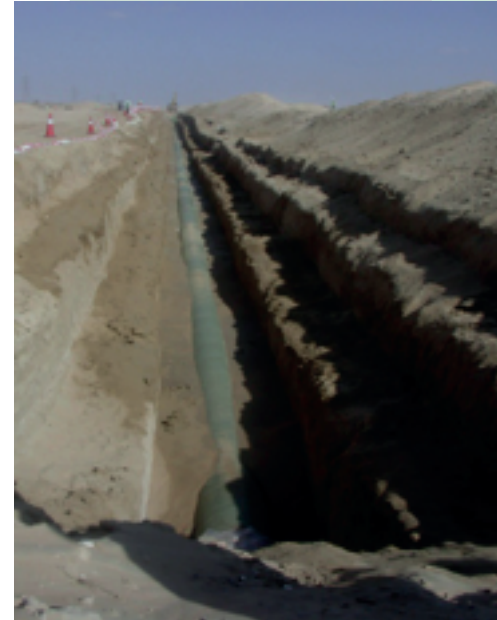
- Municipal & Industrial
- Oilfield
- Petrochemical
- Offshore Oil & Gas
- Marine





# Municipal & Industrial

- Industrial Wastes
- Sanitary Sewers
- Storm Water
- Irrigation
- Well Casing
- Micro Tunneling
- Cooling Water
- Potable Water
- District Cooling







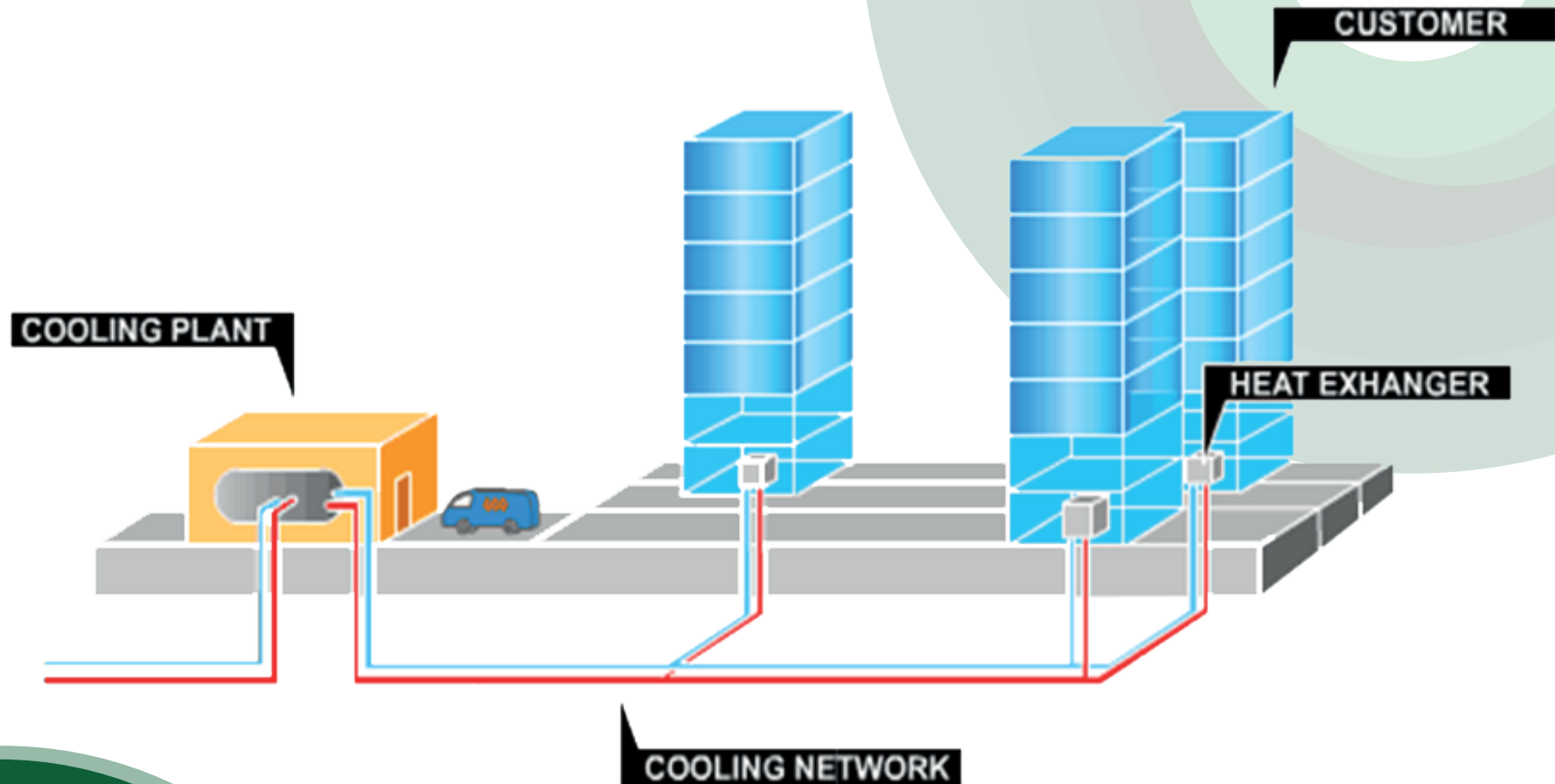
# District Cooling

A Growing Market for Pre-insulated GRP Pressure Pipe.

Launched with Palm District Cooling on the prestigious Jumeirah Lake Towers.

- Supply of sizes : 350, 400, 450, 500, 600, 700, 750, 800, 900, 1000, 1100, 1200, 1400 mm.
- GRP Carrier rated for 16 Bar and 10,000 stiffness (PN16 - SN 10,000).
- Closed cell polyurethane foam insulation GRP jacket with 2,500 stiffness.
- Engineering assistance and stress analysis.
- Supply of jacketed fittings such as bends, tees, puddle flanges, reducers, etc. Significantly longer life cycle cost savings.
- over traditional pipe such as steel and thermoplastics.

# Advanced Composites Pipes District Cooling System

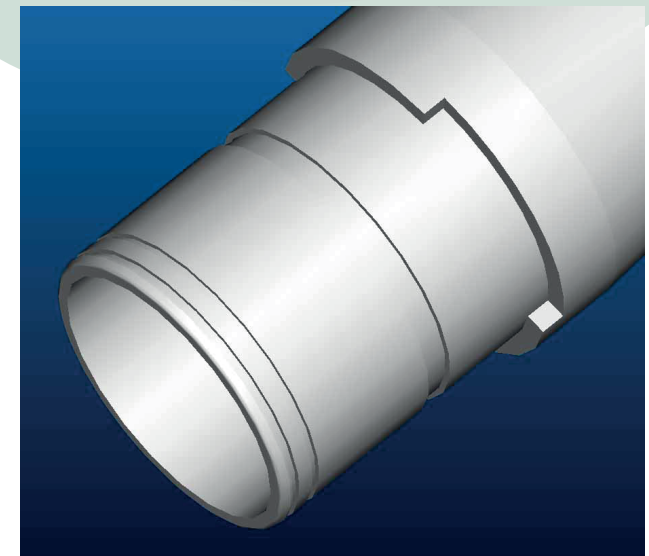
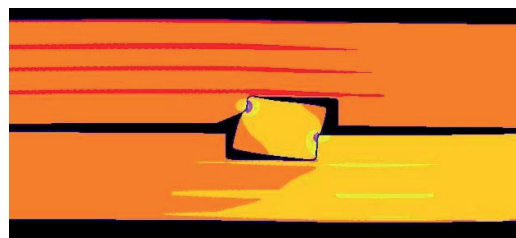
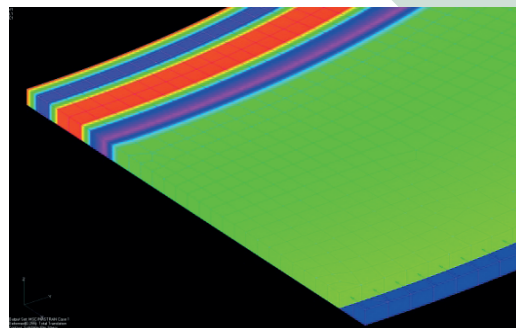
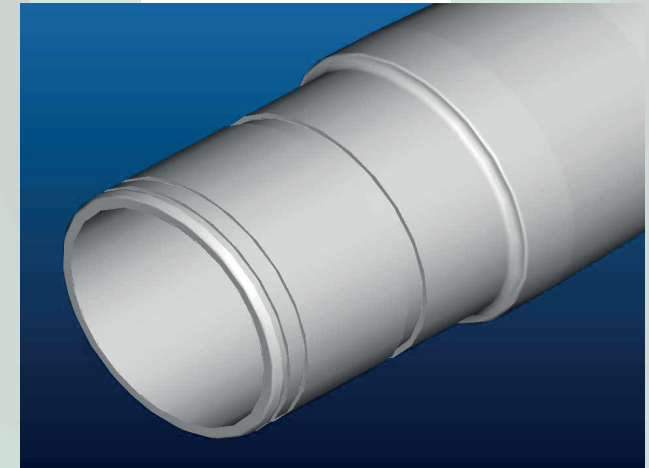




# GRE Well Casings

Design, FEM analysis, qualification testing and manufacture of:

- Well head.
- Flanged pipe.
- 330mm GRE well casing bell and spigot.
- 330mm GRE well casing anti-rotation.
- 150mm GRE well casing bell and spigot.
- 150mm GRE well casing anti-rotation.
- Float shoe.
- Overshot.
- Upper string connector.
- Perforated base pipe.
- Base screen.
- Sediment tube.

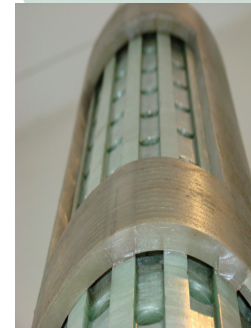
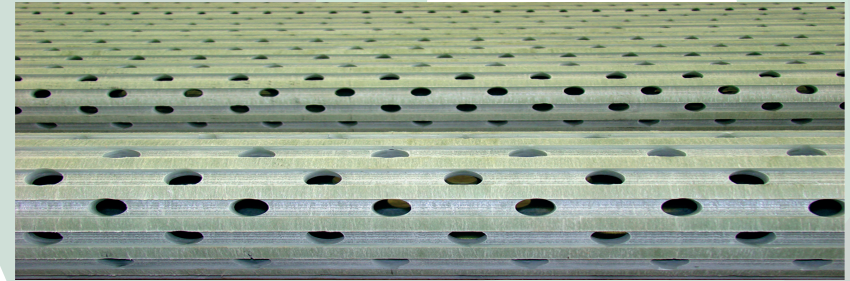




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# Advanced Composites Products

- Custom Designed & Engineered Piping Systems.
- 25mm To 4000mm Piping Systems.
- Shop Fabrication.
- System Analysis.
- Engineering Support.





CRITICAL FACTORS



# Design Flexibility

- **GRP**  
Can be custom made to any size, properties can be changed depending on requirements by changing fibre, resin, winding angle.
- **Steel**  
Comes in standard sizes, standard properties.
- **HDPE**  
Comes in standard sizes, properties flexible to an extent.



# Corrosion Resistance

- **GRP**  
Excellent corrosion resistance even in aggressive environment.
- **Steel**  
Highly susceptible to corrosion, requires expensive anticorrosive treatment.
- **HDPE**  
Good corrosion resistance.



# Flow Properties

- GRP

Excellent flow properties, Hazen William 150 with no change over time.

- Steel

Hazen William value which is a degree of smoothness is 120 for new and 80 for corroded steel.

- HDPE

Good flow properties when new (Hazen William 140).





# Handling & Installation

- **GRP**  
One sixth the weight of steel, reduced installation costs.
- **Steel**  
Very Heavy, high installation and handling costs.
- **HDPE**  
Heavy for large sizes, deflects if stored improperly.



# Maintenance

- **GRP**  
Virtually no maintenance as immune to bacterial / algae attack, no slime.
- **Steel**  
Needs protection from elements, susceptible to bacteria, algae attack.
- **HDPE**  
Less maintenance than steel.



# Structural Integrity

- GRP

Reinforced with fibres, can maintain critical tolerances for the most demanding applications.

- Steel

Good structural integrity.

- HDPE

Un-reinforced, hence less structural integrity.



# Strength to Weight Ratio

- GRP

Excellent. stronger than steel on an equal weight basis. strength per unit weight surpasses even stainless steel.

- Steel

Very poor.

- HDPE

Better than steel.



# Fire Retardance

- **GRP**  
Can be made extremely fire retardant by using special resins like Phenolics or by additives like Antimony Trioxide. Retains 50% strength even at 700F.
- **Steel**  
Catastrophic failure at high temperatures.
- **HDPE**  
Thermoplastic, no significant fire resistance.



# Thermal Conductivity

- GRP

Standard fiberglass pipes are non conductive. Hence insulation, if at all required, is less than steel.

- Steel

Conductor of heat.

- HDPE

Non conductive.



# Ultra Violet Resistance

- **GRP**  
Can be made resistant to UV rays by adding additives like Tinuvin.
- **Steel**  
Comes in standard sizes, standard properties.
- **HDPE**  
Comes in standard sizes, properties flexible to an extent.



## Life Span

- GRP  
50 to 60 years.
- Steel  
5 to 13 Years depending on corrosion and maintenance.
- HDPE  
30 to 50 years.



## Critical Factors

## Steel

## HDPE

## GRP

• Design Flexibility	HIGH	LOW	HIGH
• Corrosion Resistance	WEAK	GOOD	STRONG
• Flow Properties	WEAK (130-80)	MEDIUM (140-100)	EXCELLENT (150-130)
• Handling and installation	HARD	HARD	EASY
• Maintenance	HIGH	LOW	LOW
• Structural integrity	STRONG	WEAK	STRONG
• Strength-to- Weight	LOW	LOW	HIGH
• Fire Retardance	STRONG	WEAK	STRONG
• Thermal insulation	WEAK	AVERAGE	STRONG
• Thermal Conductivity	HIGH	LOW	LOW
• Ultra-violet Resistant	HIGH	HIGH	HIGH
• Life Span	5 – 13	30 – 50	30 - 50



# Resin Selection

- Corrosion Resistance
- Operating Temperature
- FDA Compliance
- Fire Retardance
- Weatherability





# Pipes, Fittings, Components

- Ability to tailor properties to meet wide-ranging performance specifications.
- Flexibility in meeting key service conditions through advanced technology.





# Advanced Composites Technology

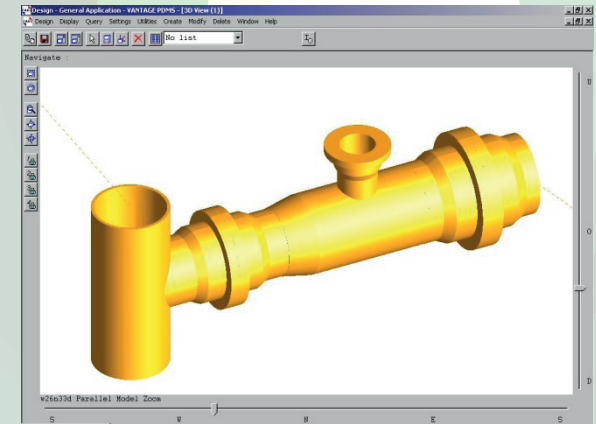
- American Technology
- European Technology
- Latest 4-AXIS Filament Winding Equipment\*
- Exclusive Licensee Agreement with EDO Specialty Plastics Inc. (EDO Corporation)

\*Note – License granted by US Department of Trade based on Inspections & Monitoring.



# Advanced Composites Technology

- Computer Program For Pipe Composite PRO – USA.
- Process Design.
- Mechanical Design.
- Computer Program For Complex Parts From Cadwind – Belgium.







# Advanced Composites Quality Control

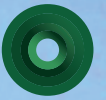
- In House Materials & Quality Laboratory.
- Mechanical, Rheologic And Thermal Analyses & Testing.
- Pressure Testing Equipment > 300 Bar.























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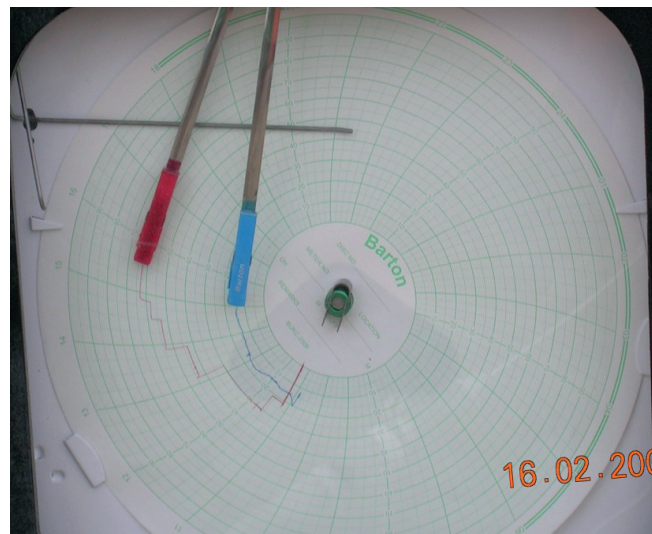












ويدي ادمس للمقاولات (ش.م.م.)  
Wade Adams Contracting (L.L.C.)

### HYDROSTATIC PRESSURE TEST REPORT

Project	: Jumeirah Lake Tower	Doc. No.	: N/A-JLT-HTR-007A
Client	: Nakheel	Date	: 25 <sup>th</sup> Jan 06
DC Provider	: Palm District cooling	Dwg. No.	: EM 534/SK-370
DC Contractor	: Wade Adams	Pipe Ref	: Ø 700
Jointing Contractor/Supervision	: Advance composite	Location	: Road No:1

[Supply & Return]

Dia of the Pipe : Ø 700

Section : IVC-1.27 to 1.29

Total No. of Joints : Refer As-Built

Test Pressure : 13 bar

Test Duration : 24 Hours

Description : Re-test As per instruction from PDC (Mr. J. H. Thorne)

Attachments : Pressure-temperature graph

Press Gauge Details : 01-2854-02, 05-2854-01

Hydrotest conducted for a period of 24 hrs @ 13 bar.

for Wade Adams Contracting 	for Advance composite 	for BV 
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Refer BV Remarks Page 2 of 2



# LIST OF MAJOR JOBS

JOB NO	Client	Project Name	Location	Application	Date Completed
1	Al Ryum General Contracting (ARCO)	FEWA 1W 2012	Ajman, UAE	GRP Fittings	Ongoing
2	Masafi Water Company	District Colling Network Expansion	Masafi, UAE	District Cooling	Ongoing
3	Ahmad Ramadan Juma (ARJ) Engineering	Aspen Tower	Dubai, UAE	GRP Spools	Ongoing
4	Drake & Scull International	Presidential Palace	Abu Dhabi, UAE	Drainage & Sewerage	Ongoing
5	National Contract & Transport Co.	Mudiafi Int'l. Road Contract	Khor Fakkan, UAE	Drainage & Sewerage	Ongoing
6	Darwish Engineering	Auto Zone in Al Ruqaah	Sharjah, UAE	Drainage & Sewerage	Ongoing
7	Al Ryum General Contracting (ARCO)	FEWA 6 W 2012	Ras Al Khaimah	GRP Fittings	Ongoing
8	Great Man Made River Authority	Kufra Well Fields	Kufra, Libya	GRE Well Casing	Ongoing
9	Wade Adams General Contracting	5th Industrial Intersection	Sharjah, UAE	GRE Fittings	Ongoing
10	Sharjah Electricity & Water Authority (SEWA)	Supply of GRP Fittings	Sharjah, UAE	Drainage & Sewerage	Ongoing
11	Darwish Engineering	Dibba Al Hissen Ring Road	Sharjah , UAE	Drainage & Sewerage	2013
12	Al Ryum General Contracting (ARCO)	FEWA 4 EW Um Al Quawain Water Wells	Um Al Quwain , UAE	Potable Water GRE Transmission Lines	2012
13	Belhassa Projects LLC	FEWA 14 W	Ras Al Khaimah	Drainage & Sewerage	2012



# LIST OF MAJOR JOBS

JOB NO	Client	Project Name	Location	Application	Date Completed
14	Belhassa Projects LLC	FEWA 15 W	Ras Al Khaimah	Drainage & Sewerage	2012
15	Darwish Engineering	Sharjah University	Sharjah, UAE	Drainage & Sewerage	2012
16	Darwish Engineering	Improvement of Sharjah Corniche	Sharjah, UAE	Drainage & Sewerage	2012
17	Power Fusion Pipeline Network	Presidential Palace	Abu Dhabi, UAE	GRP Pipes & Fittings	2012
18	Darwish Engineering	External Works for H.H. Executive Office - Gulayya Area	Sharjah, UAE	Drainage & Sewerage	2012
19	Al Shalila Beach and Transport	Storm Water Network for Ambulance and Rescue Center	Abu Dhabi, UAE	Drainage & Sewerage	2012
20	VENUS ELECTROMECH	Palm Jumeirah Gateway Tower	Dubai, UAE	GRP Fittings	2012
21	TransGulf Electro Mechanical	Fujairah City Center	Fujairah, UAE	Condenser Piping District Cooling Plant	2012
22	Drake & Scull International	Fairmont Hotel	Dubai, UAE	Infrastructure Piping	2012
23	National Contract & Transport Co.	5th Industrial Intersection	Sharjah, UAE	Potable Water + Drainage & Sewerage	2011
24	Drake & Scull International	Khalifa City	Abu Dhabi, UAE	District Cooling	2011
25	Darwish Engineering	Hamriya Free Zone Clover Leaf	Sharjah, UAE	Drainage & Sewerage	2011
26	Al Futtaim Engineering	Dubai Festival City Expansion Zone 14 A	Dubai, UAE	Dubai Festival City - Zone 14A District Cooling Expansion	2011
27	Darwish Engineering	Sharjah Temporary Ponds-Package	Sharjah, UAE	Storm Water Drainage	2010

# LIST OF MAJOR JOBS

JOB NO	Client	Project Name	Location	Application	Date Completed
28	E.T.A.	ADNOC - Al Ruwais Housing & Hospital Complex	Abu Dhabi, UAE	Storm Water Drainage	2010
29	Six Construct	Ajman Sewerage System	Ajman, UAE	Drainage & Sewerage	2010
30	Black & Veatch	Ajman Sewerage System	Ajman, UAE	Drainage & Sewerage	2010
31	National Contract & Transport Co.	Khezammia & Talaa Rd	Sharjah, UAE	Drainage & Sewerage	2010
32	Al Jaber Energy Services	Great Man Made River, Libya	Ghadamas, Libya	GRE Well Casing	2010
33	Darwish Engineering	Al Hail Free Zone	Fujairah, UAE	Drainage & Sewerage	2009
34	National Contract & Transport Co.	Wasit Road Improvement	Sharjah, UAE	Drainage & Sewerage	2009
35	National Contract & Transport Co.	Maliha Rd	Sharjah, UAE	Drainage & Sewerage	2009
36	Nakheel	Palm Jebel Ali Crescent A	Dubai, UAE	District Cooling	2008
37	Palm District Cooling	Jumeirah Village South Phase I - Triangle	Dubai, UAE	District Cooling	2008
38	Palm District Cooling	Jumeirah Village South Phase II - Circle	Dubai, UAE	District Cooling	2008
39	TransGulf Electro Mechanical	Burj Khalifa Development	Dubai, UAE	District Cooling	2007
40	National Contract & Transport Co.	Roads in Al Qarien Nouf Area	Sharjah, UAE	Drainage & Sewerage	2007
41	Darwish Engineering	Layya Wharfage Road - Phase II	Sharjah, UAE	Drainage & Sewerage	2007
42	National Contract & Transport Co.	Al Qadissiya Drainage	Sharjah, UAE	Drainage & Sewerage	2007



# LIST OF MAJOR JOBS

JOB NO	Client	Project Name	Location	Application	Date Completed
43	Drake & Scull International	Dubai Festival City	Dubai, UAE	District Cooling	2007
44	National Contract & Transport Co.	Al Mamzar Pumping Station	Dubai, UAE	Drainage & Sewerage	2007
45	Sharjah General Contractors	Al Majaz New Pumping Station Main Form	Sharjah, UAE	Drainage & Sewerage	2006
46	Sharjah Electricity & Water Authority (SEWA)	Supply of GRP Fittings	Sharjah, UAE	Water Transmission	2006
47	Darwish Engineering	Pumping Station #4 New Rising Main	Sharjah, UAE	Drainage & Sewerage	2006
48	Sharjah Electricity & Water Authority (SEWA)	Kalba Water Distribution (GRE Fittings)	Kalba, UAE	Water Transmission	2006
49	Sharjah Electricity & Water Authority (SEWA)	Supply of GRE Fittings	Sharjah, UAE	Water Transmission	2006
50	Sharjah General Contractors	Sewer Pipeline under Heritage Building - Sheik Area	Sharjah, UAE	Drainage & Sewerage	2006
51	Palm District Cooling	Jumeirah Lake Towers	Dubai, UAE	District Cooling	2006
52	Darwish Engineering	Al Azra Area Drainage	Sharjah, UAE	Drainage & Sewerage	2006
53	Admak General Contracting Co.	Sanitary Drainage - Al Yahar Area - Al Ain	Abu Dhabi, UAE	Drainage & Sewerage	2006
54	Equate Petrochemical Co., Kuwait	Repair of Corroded Carbon Steel Pipes with GRE	Kuwait City, Kuwait	Repair of Corroded CS	2005
55	Al Muftah	Sewerage Treatment Plant	Doha, Qatar	Drainage & Sewerage	2005
56	Al Waha Contracting & Trading	Doha and Rayyan Sewerage - Muraikh Area	Doha, Qatar	Drainage & Sewerage	2005
57	Metito	Umm Al Quwain Reverse Osmosis Plant Expansion	Umm Al Quwain, UAE	R/O Plant Piping	2005

# LIST OF MAJOR JOBS

JOB NO	Client	Project Name	Location	Application	Date Completed
59	DUTCO Tennant LLC	Supply of GRP Fittings	Dubai, UAE	Drainage & Sewerage	2005
60	National Contract & Transport Co.	Effluent Pumping Station & Underground Reservoir - Al Shahba	Sharjah, UAE	Drainage & Sewerage	2004
61	SGCC-Effluent Disposal Pipeline	Effluent Disposal Pipeline from Gulf to Sea	Sharjah, UAE	Drainage & Sewerage	2004
62	Six Construct	Ajman Sewerage System	Ajman, UAE	Drainage & Sewerage	2004
63	National Contract & Transport Co.	Dibba Channel Road	Sharjah , UAE	Drainage & Sewerage	2004
64	National Contract & Transport Co.	Al Rafaa Land Drainage System	Sharjah , UAE	Drainage & Sewerage	2004
65	Darwish Engineering	Khaldiya Area Sewerage System	Sharjah , UAE	Drainage & Sewerage	2004
66	A & P-DCA Eng Facilities	Engineering Facilities Complex	Dubai, UAE	Drainage & Sewerage	2004
67	Darwish Engineering	Emergency Disposal Pumping Main. Ajman Sewerage Sys.	Ajman, UAE	Drainage & Sewerage	2004
68	Adyard Abu Dhabi	Modification of Gas Detection in Compressor after Cooler	Abu Dhabi, UAE	Drainage & Sewerage	2004
69	National Contract & Transport Co.	Effluent Rising Main - Samnan	Sharjah, UAE	Drainage & Sewerage	2003
70	DUTCO Tennant LLC	New Irrigation System	Dubai, UAE	Drainage & Sewerage	2003
71	BLACK & VEATCH	Ajman Sewerage System	Ajman, UAE	Drainage & Sewerage	2003





# LIST OF MAJOR JOBS

JOB NO	Client	Project Name	Location	Application	Date Completed
72	Qatar Building Company	Cultural Village Phase I	Doha, Qatar	Drainage & Sewerage	2003
73	Darwish Engineering	Al Mamzar Sewer & Surface Water Draining - Al Taawon	Sharjah, UAE	Drainage & Sewerage	2003
74	Black & Veatch	72-UASB Distribution Tanks-Ajman Sewerage System	Ajman, UAE	Drainage & Sewerage	2003
75	Six Construct	Ajman Sewerage System	Ajman, UAE	Drainage & Sewerage	2003
76	Emirates Road Contracting	Upgrading Roads, Bridges & Culverts for Existing Pipeline	Umm Al Quwain, UAE	Drainage & Sewerage	2003
77	Qatar Building Company	Cultural Village Phase I	Doha, Qatar	Drainage & Sewerage	2003
78	Darwish Engineering	Al Taawon Sewer Pumping Main	Sharjah, UAE	Drainage & Sewerage	2003
79	Six Construct	GRP Manhole Liners	Ajman, UAE	Drainage & Sewerage	2003
80	Darwish Engineering	Al Taawon Sewer System	Sharjah, UAE	Drainage & Sewerage	2002
81	Sharjah General Contractors	Saif Zone Drainage & Irrigation	Sharjah, UAE	Drainage & Sewerage	2002
82	Darwish Engineering	Sharjah Sewer System	Sharjah, UAE	Drainage & Sewerage	2002
72	Qatar Building Company	Cultural Village Phase I	Doha, Qatar	Drainage & Sewerage	2003
73	Darwish Engineering	Al Mamzar Sewer & Surface Water Draining - Al Taawon	Sharjah, UAE	Drainage & Sewerage	2003



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THANK YOU !