

# FutureWrap Structural LT

## Technical Summary



**FutureWrap**  
Structural™

Repair system	Structural LT
<b>Overview</b>	<p>Futurewrap Carbon/LT was developed for the repair of structural components (beams, struts, CHS etc.), tanks and vessels and is based on a carbon cloth and a two-part ambient cure epoxy resin. Due to its excellent adhesion strength, Futurewrap Carbon/LT can seal through-wall defects and re-instate the integrity of the damaged/corroded components.</p> <p>The technical specification is based on the qualification requirements of ISO 248171.</p>
<b>Applications</b>	Structural components, tanks and vessels
<b>Defects</b>	Internal, external, through wall
<b>Fibre type</b>	Carbon - quad-axial stitched cloth (0°/45°/-45°/90°)
<b>Resin type</b>	Epoxy resin (two part) – Ambient cure
<b>Maximum design temperature (°C)</b>	110
<b>Maximum design pressure (through wall defect) (bar)</b>	75
<b>Maximum design pressure (non-through wall defect) (bar)</b>	350
<b>Modulus 0° (GPa)</b>	34.4
<b>Modulus 90° (GPa)</b>	34.4
<b>Poisson's ratio 0°</b>	0.35
<b>Poisson's ratio 90°</b>	0.35
<b>Shear modulus (GPa)</b>	2
<b>Thermal expansion coefficient 0° (mm/mm/°C * 10<sup>-6</sup>)</b>	5
<b>Thermal expansion coefficient 90° (mm/mm/°C * 10<sup>-6</sup>)</b>	5
<b>Design allowable strain 0° (mm/mm)</b>	0.004
<b>Design allowable strain 90° (mm/mm)</b>	0.004
<b>Energy release rate (J/m<sup>2</sup>)</b>	360
<b>Cure time (hrs)</b>	24
<b>Chemical resistance</b>	3<pH<10

# FutureWrap Structural HT

## Technical Summary



**FutureWrap**  
Structural™

Repair system	Structural HT
<b>Overview</b>	<p>Futurewrap Carbon/HT was developed for the repair of structural components (beams, struts, CHS etc.), tanks and vessels at elevated temperatures and is based on a carbon cloth and a two-part post cure epoxy resin. Due to its excellent adhesion strength, Futurewrap Carbon/HT can seal through-wall defects and re-instate the integrity of the damaged/corroded components.</p> <p>The technical specification is based on the qualification requirements of ISO 248171.</p>
<b>Applications</b>	Structural components, tanks and vessels
<b>Defects</b>	Internal, external, through wall
<b>Fibre type</b>	Carbon - quad-axial stitched cloth (0°/45°/-45°/90°)
<b>Resin type</b>	Epoxy resin (two part) – Post cure
<b>Maximum design temperature (°C)</b>	260
<b>Maximum design pressure (through wall defect) (bar)</b>	50
<b>Maximum design pressure (non-through wall defect) (bar)</b>	350
<b>Modulus 0° (GPa)</b>	34.4
<b>Modulus 90° (GPa)</b>	34.4
<b>Poisson's ratio 0°</b>	0.35
<b>Poisson's ratio 90°</b>	0.35
<b>Shear modulus (GPa)</b>	2
<b>Thermal expansion coefficient 0° (mm/mm/°C * 10<sup>-6</sup>)</b>	18
<b>Thermal expansion coefficient 90° (mm/mm/°C * 10<sup>-6</sup>)</b>	18
<b>Design allowable strain 0° (mm/mm)</b>	0.004
<b>Design allowable strain 90° (mm/mm)</b>	0.004
<b>Energy release rate (J/m<sup>2</sup>)</b>	223
<b>Cure time (hrs)</b>	24
<b>Chemical resistance</b>	3<pH<10

# FutureWrap Structural Aquasplash

## Technical Summary



**FutureWrap**  
Structural™

Repair system	Structural Aquasplash
Overview	<p>Futurewrap Aquasplash was developed for the repair of all topside and subsea pipework, pipelines (all components), caissons and risers and is based on a carbon cloth and a two-part ambient cure epoxy resin. Due to its excellent adhesion strength even in the presence of water, Futurewrap Aquasplash can seal through-wall defects and re-instate the integrity of the damaged/corroded pipework.</p> <p>The technical specification is based on the qualification requirements of ISO 248171.</p>
Applications	Pipework, pipelines (All components), caissons and risers
Defects	Internal, external, through wall
Fiber type	Carbon - quad-axial stitched cloth (0°/45°/-45°/90°)
Resin type	Epoxy resin (two part) – Ambient Cure
Maximum design temperature (0C)	62
Maximum design pressure (through wall defect) (bar)	50
Maximum design pressure (non-through wall defect) (bar)	350
Modulus 0° (GPa)	34.4
Modulus 90° (GPa)	34.4
Poisson's ratio 0°	0.35
Poisson's ratio 90°	0.35
Shear modulus (GPa)	2
Thermal expansion coefficient 0° (mm/mm/°C * 10 <sup>-6</sup> )	18
Thermal expansion coefficient 90° (mm/mm/°C * 10 <sup>-6</sup> )	18
Design allowable strain 0° (mm/mm)	0.004
Design allowable strain 90° (mm/mm)	0.004
Energy release rate (J/m <sup>2</sup> )	1111
Energy Release rate (J/m <sup>2</sup> ) (submerged)	570
Cure time (hrs)	24
Chemical resistance	3<pH<10

# FutureWrap Structural HT

## Technical Summary



**FutureWrap**  
Structural™

<b>Repair system</b>	UD Carbon/LT
<b>Overview</b>	<p>Futurewrap UD Carbon/LT was developed for the repair of structural components (beams, struts, CHS etc.) and is based on a carbon cloth and a two-part ambient cure epoxy resin. Due to its excellent adhesion strength, Futurewrap UD Carbon/LT can re-instate the integrity of the damaged/corroded components.</p> <p>The technical specification is based on the qualification requirements of ISO 248171.</p>
<b>Applications</b>	Structural components
<b>Defects</b>	External
<b>Fibre type</b>	Carbon – uni-axial stitched cloth (0°)
<b>Resin type</b>	Epoxy resin (two part) – Ambient cure
<b>Maximum design temperature (°C)</b>	110
<b>Maximum design pressure (non-through wall defect) (bar)</b>	350
<b>Modulus 0° (GPa)</b>	103
<b>Modulus 90° (GPa)</b>	8.7
<b>Poisson's ratio 0°</b>	0.24
<b>Poisson's ratio 90°</b>	0.02
<b>Shear modulus (GPa)</b>	2
<b>Thermal expansion coefficient 0° (mm/mm/°C * 10<sup>-6</sup>)</b>	-6.7
<b>Thermal expansion coefficient 90° (mm/mm/°C * 10<sup>-6</sup>)</b>	50
<b>Design allowable strain 0° (mm/mm)</b>	0.004
<b>Design allowable strain 90° (mm/mm)</b>	0.004
<b>Cure time (hrs)</b>	24
<b>Chemical resistance</b>	3<pH<10