



UNITED STATES WELDING CORPORATION

<p align="center">USW ALLOY DESIGNATION AND DESCRIPTION</p>	<p align="center">TURBALOY® 521 (ELI) MC-GRADE GTAW SOLID BARE WELDING WIRE IRON BASE</p>	<p align="center">ISSUED JANUARY 2007</p>	<p align="center">DATA SHEET 974 (1)</p>																																										
<p align="center">CROSS-REFERENCE CONFORMANCE SPECIFICATIONS</p>	<p>USW - 0974(V) MSRR 9500/230 521 MC-GRADE BS 2901 Pt A33 (commercial grade version only) Thickol AS3423B AWS A5.28 ER 90S-B3 MC-GRADE version 2 1/4 Cr Mo - copper free.</p>																																												
<p align="center">METALLURGICAL BACKGROUND INFORMATION</p>	<p>TURBALOY® 521 EL1 is produced by vacuum induction melting and remelting techniques. The final wire is manufactured by special lubricant-free, roller-die forming followed by surface abrasion and cleaning processes. These manufacturing processes ensure consistent metallurgical integrity of the alloy with regard to control of trace elements and physical purity of the welding wire surface. TURBALOY® 521 EL1 is a creep resisting 2 1/4 Cr Mo steel, widely used for welding missile casings, steam piping and other high performance applications on steels of similar composition. For critical defense equipment, nuclear applications, steam piping and steam turbine work, ultra clean welding conditions should be used together with the EL1 grade of filler wire. (NOTE: This is not a LC grade alloy)</p>																																												
<p align="center">MATERIALS TO BE WELDED AND APPLICATIONS</p>	<p>ASTM grade A182 - F22, A199 - T22, A335 - P22, A217 - WC9, A387 - 22 A336 - F22, A200 - T22, A369 - FP22, A356 - 10, A542 A541 - C16 A213 - T22, A426 - CP22, A643 - C, 1 1/4Cr 1/2Mo, 2Cr 1/2Mo, 2 1/4Cr 1Mo, 3Cr 1/2Mo steels. Low carbon grades used without PWHT on thin gauge welds. However, critical joints involve PWHT. High purity wire gives more scope for non-LC version applications. Once the filler wire has been opened from its special packaging, any unused material must be carefully protected from contamination.</p>																																												
<p align="center">WIRE CHEMISTRY WT%</p>	<table border="0"> <tr> <td>Carbon</td> <td>0.08</td> <td>0.14</td> <td>Copper</td> <td>-</td> <td>0.35</td> </tr> <tr> <td>Manganese</td> <td>0.40</td> <td>0.70</td> <td>Oxygen</td> <td>-</td> <td>0.0025 (25ppm)</td> </tr> <tr> <td>Silicon</td> <td>0.30</td> <td>0.55</td> <td>Nitrogen</td> <td>-</td> <td>0.0050 (50ppm)</td> </tr> <tr> <td>Sulfur</td> <td>-</td> <td>0.010</td> <td>Hydrogen</td> <td>-</td> <td>3ppm</td> </tr> <tr> <td>Phosphorus</td> <td>-</td> <td>0.010</td> <td>Nickel</td> <td></td> <td></td> </tr> <tr> <td>Chromium</td> <td>2.25</td> <td>2.75</td> <td>Aluminum</td> <td></td> <td></td> </tr> <tr> <td>Molybdenum</td> <td>1.10</td> <td>1.10</td> <td>Iron</td> <td></td> <td>Balance</td> </tr> </table>			Carbon	0.08	0.14	Copper	-	0.35	Manganese	0.40	0.70	Oxygen	-	0.0025 (25ppm)	Silicon	0.30	0.55	Nitrogen	-	0.0050 (50ppm)	Sulfur	-	0.010	Hydrogen	-	3ppm	Phosphorus	-	0.010	Nickel			Chromium	2.25	2.75	Aluminum			Molybdenum	1.10	1.10	Iron		Balance
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<p align="center">PACKAGING</p>	<p>Sealed, air-evacuated, argon purged Vapor Barrier enve lopes with desiccants ensure full protection from atmospheric contamination and prolonged shelf-life.</p>																																												
<p>DISTRIBUTED BY:</p>																																													