



# UNITED STATES WELDING CORPORATION

<p align="center"><b>USW ALLOY DESIGNATION AND DESCRIPTION</b></p>	<p align="center"><b>TURBALOY® 521</b> MC-GRADE GTAW SOLID BARE WELDING WIRE IRON BASE</p>	<p align="center">ISO 9001 AS 9100</p>	<p align="center"><b>DATA SHEET</b>  <b>974</b></p>																																										
<p align="center"><b>CROSS-REFERENCE CONFORMANCE SPECIFICATIONS</b></p>	<p>USW 974 521 MC-GRADE AS3423B 2¼ Cr 1 Mo - Copper free.</p> <p align="right">MSRR 9500/230 BS 2901 Pt A33 (commercial grade version only) AWS A5.28 ER 90S-B3 MC-GRADE version</p>																																												
<p align="center"><b>METALLURGICAL BACKGROUND INFORMATION</b></p>	<p>TURBALOY® 521 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.</p> <p>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.</p> <p>TURBALOY® 521 is a creep resisting 2¼ 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 ELI grade of filler wire. (NOTE: This is not a LC grade alloy)</p>																																												
<p align="center"><b>MATERIALS TO BE WELDED AND APPLICATIONS</b></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,</p> <p>1¼Cr ½Mo, 2Cr ½Mo, 2¼Cr 1Mo, 3Cr ½Mo steels.</p> <p>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"><b>WIRE CHEMISTRY WT%</b></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"><b>WELD PROPERTIES</b></p>	<p>Minimum specified yield strength    540 MPa</p> <p align="right">Density 7.83 gm/cc</p> <p>Minimum specified tensile strength    620 MPa, as per AWS A5.28</p>																																												
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<p align="center"><b>PACKAGING</b></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>DFARS Compliant</p>		<p align="right">www.usweldingcorp.com</p>																																											