



UNITED STATES WELDING CORPORATION

USW ALLOY DESIGNATION AND DESCRIPTION	TURBALOY[®] 22-13-5 (209) MC-GRADE GTAW SOLID BARE WELDING WIRE IRON BASE	ISSUED JANUARY 2007	DATA SHEET 5764 (13)																																																
		REVISION NO. A																																																	
CROSS-REFERENCE CONFORMANCE SPECIFICATIONS	AMS 5764 Nitronic 50 AWS A5.9 ER209 USWC 5764 (A)	UNS S20910 XM-19 W N° 1.3964	(REF AMS 5656)																																																
METALLURGICAL BACKGROUND INFORMATION	<p>TURBALOY[®] 22-13-5 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[®] 22-13-5 is a nitrogen strengthened fully austenitic stainless steel and will work harden significantly.</p> <p>TURBALOY[®] 22-13-5 is used for welding base metal of similar composition.</p>																																																		
MATERIALS TO BE WELDED AND APPLICATIONS	<p>AMS 5764, 5861.</p> <p>AMS 276, 580, 240, 479, 412 (All XM-19).</p> <p><i>Note:</i> For lower strength welds, ER316 can be used for welding. Avoid copper contamination to minimize cracking susceptibility.</p>																																																		
WIRE CHEMISTRY WT%	<table> <tr> <td>Carbon</td> <td>-</td> <td>0.06</td> <td>Columbium</td> <td>0.10</td> <td>0.30</td> </tr> <tr> <td>Manganese</td> <td>4.00</td> <td>6.00</td> <td>Nitrogen</td> <td>0.20</td> <td>0.40</td> </tr> <tr> <td>Silicon</td> <td>-</td> <td>1.00</td> <td>Vanadium</td> <td>0.10</td> <td>0.30</td> </tr> <tr> <td>Phosphorus</td> <td>-</td> <td>0.04</td> <td>Titanium</td> <td>-</td> <td>0.02</td> </tr> <tr> <td>Sulfur</td> <td>-</td> <td>0.03</td> <td>Aluminum</td> <td>-</td> <td>0.02</td> </tr> <tr> <td>Chromium</td> <td>20.50</td> <td>23.50</td> <td>Zirconium</td> <td>-</td> <td>0.02</td> </tr> <tr> <td>Nickel</td> <td>11.5</td> <td>13.50</td> <td>Iron</td> <td></td> <td>Balance</td> </tr> <tr> <td>Molybdenum</td> <td>1.50</td> <td>3.00</td> <td></td> <td></td> <td></td> </tr> </table>			Carbon	-	0.06	Columbium	0.10	0.30	Manganese	4.00	6.00	Nitrogen	0.20	0.40	Silicon	-	1.00	Vanadium	0.10	0.30	Phosphorus	-	0.04	Titanium	-	0.02	Sulfur	-	0.03	Aluminum	-	0.02	Chromium	20.50	23.50	Zirconium	-	0.02	Nickel	11.5	13.50	Iron		Balance	Molybdenum	1.50	3.00			
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WELD PROPERTIES	<p>Hardness: 241 HV (annealed sheet). Readily weldable. <i>Note:</i> TURBALOY[®]22-13-5 can also be welded using 309, 312, Ni-base filler metal.</p>																																																		
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PACKAGING	Sealed, Air-evacuated, argon purged Vapor Barrier envelopes with desiccants ensure full protection from atmospheric contamination and prolonged self-life.																																																		

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