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**מטאלבס - מטלורגיה שימושית בע"מ**  
 מספר ח.פ. : 515534220  
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**ISRAC**  
 Israel Laboratory  
 Accreditation  
 Authority  
 ISO/IEC 17025  
 No. 373

Date: 15.03.2021

**Metallabs Test Report No: 210122**

Accreditation for ISO/IEC 17025-2017

Company Name	Contact Name	Contact Details
T.S. Metal LTD	Talal Abo Kartome	talalabokartome@gmail.com

Part Description	Welded Pipe Ø6" SCH 120	Other	
		WPS No.	WPS 1003
Material	A/SA-335 P22 Steel	Welder Name	Khaled Abu Shakra
		Welder ID	201166188
		Welding Process	GTAW+SMAW
Dimensions	Diameter: Ø6" Wall Thickness: 14.27 mm	Weld No.	-
		Electrode	-
		PWHT	-
Other Description	According to ASME IX		

Test No.	Tests Performed	Number of Specimens	Standard	Requirements	Comments
1	Tensile Test	2	ASTM E8-16a ASME IX-2019	ASME IX-2019	-
2	Bending test	4	ASME IX-2019	ASME IX-2019	-
3	Hardness test	1	ASTM E92-17	-	-
4	Macroscopic Examination	1	ASTM E3-17 ASTM E340-15	-	-

The test conditions and results are detailed further

Conclusions	<p>1. The tensile test and the bending test results comply with ASME IX-2019 standard requirements.</p> <p>2. No defects or irregularities were found in the macroscopic examination.</p>
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Prepared by: Peter Geltser

Laboratory Manager


All tests performed at Berl  
 Katsanelson 13 St. Ashkelon,  
 Israel at Room Temp.:  
 24±5°C ; Humidity: 40±20%

Approved by: Zohar Natan

Quality Manager

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## 1. Test Results

### 1.1. Tensile Test

The test was performed using Shimadzu tensile test machine, according to ASTM E8-16a standard.

The test was conducted on specimens that were prepared in according to ASME IX-2019 standard.

The tests were carried out under ISRAC's accreditation. The test results are detailed in Table 1:

**Table 1: Tensile Test Results**

Specimen	Width [mm]	Thickness [mm]	Max Force [kN]	U.T.S [MPa]	Location of Break
T1	19.03	12.43	121.745	515	Base Metal
T2	19.16	12.33	123.123	520	Base Metal
<b>ASME IX-2019 Standard Req. for A/SA-335 P22 Steel, Min.</b>	-	-	-	415	-

### 1.2. Bending Test

The bending test was performed on standard specimens in accordance with ASME IX-2019 standard.


The tests were carried out under ISRAC's accreditation.

The test details and results are shown in Table 2:

**Table 2: Bending Test Results**

Specimen	Thickness of Specimens [mm]	Mandrel Diameter [mm]	Distance Between Rollers [mm]	Defect Size [mm]	Results
Side Bend 1	10	40	63	-	Pass
Side Bend 2				-	Pass
Side Bend 3				-	Pass
Side Bend 4				-	Pass

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### 1.3. Hardness Test

The welding hardness distribution test was performed on an INNOVATEST MODEL NOVA 360 hardness tester, using Vickers method with 10Kg. load on polished specimen, according to ASTM E 92-17 standard. The test was carried out under ISRAC's accreditation. The test results and the locations are detailed in Table 3:

**Table 3: Hardness Test - Vickers Method**

Location	Hardness							
	Face			Avg.	Root			Avg.
<b>Base Metal 1</b>	149	153	154	152	145	151	156	151
<b>HAZ 1</b>	211	209	214	211	192	189	211	197
<b>Weld Metal</b>	218	218	217	218	210	211	212	211
<b>HAZ 2</b>	218	213	214	215	179	179	179	179
<b>Base Metal 2</b>	154	148	152	151	144	146	141	144

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#### 1.4. Macroscopic Examination

The macroscopic examination was performed on polished and etched section in accordance with ASTM E3-17 and ASTM E340-15. Figure 1 shows the polished and etched macroscopic section through the welding. No defects or irregularities were found.

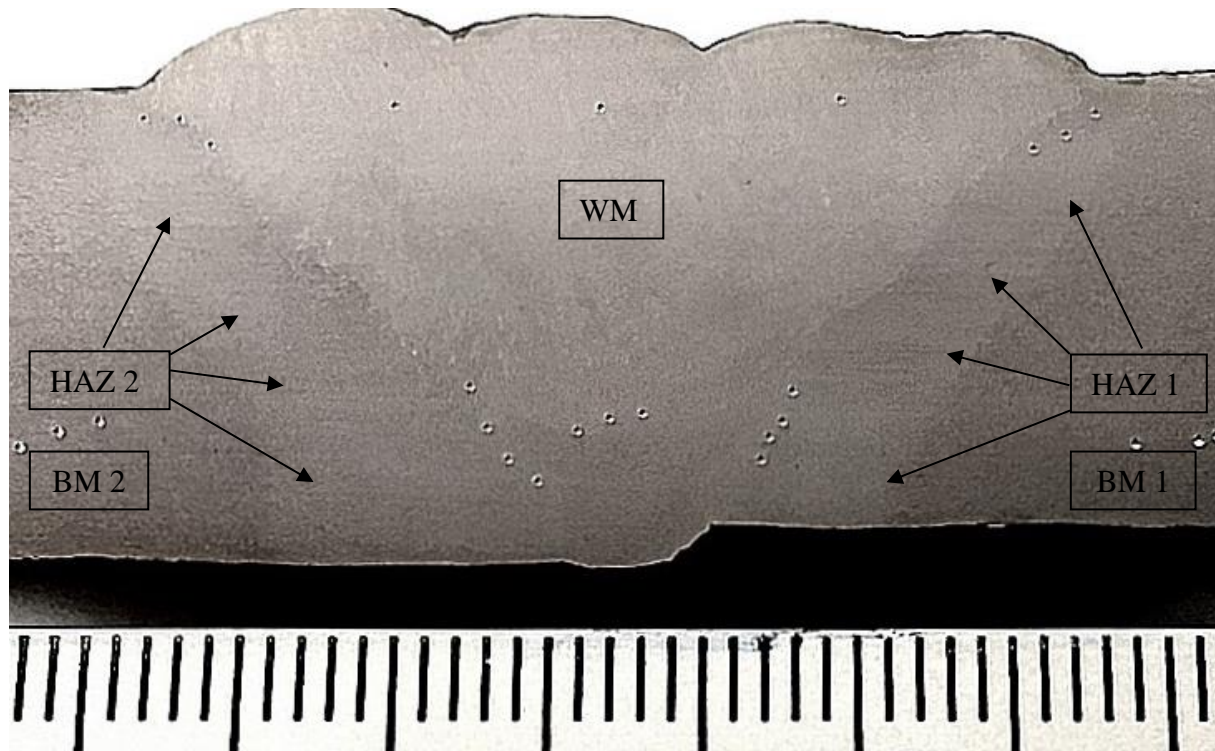


Figure 1

Macroscopic section through the welding, polished and etched with nital reagent

WM – Weld metal

HAZ – Heat affected zone

BM – Base metal

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