



MATERIAL REPORT
INCONEL 625

RD/RM/2007

INTRODUCTION

The goal of this report is a short summary of Inconel 625 atomization status for marketing purposes. There were multiple tests performed on Inconel 625. The atomized material was in the form of a $\varnothing 1,6$ mm wire.

For each test, a microscopic analysis of the distribution, circularity, chemical composition, and oxygen level test was performed.

This report presents an overview of the findings from these tests.

AVERAGE TEST RESULTS

Table 1 Basic average values

	Diameter [μm]	Circularity
Average	52,31	0,97
Standard deviation	11,29	0,06
Max	102,82	1,00
Min	23,96	0,53

Figure 1 Photo of the material x100

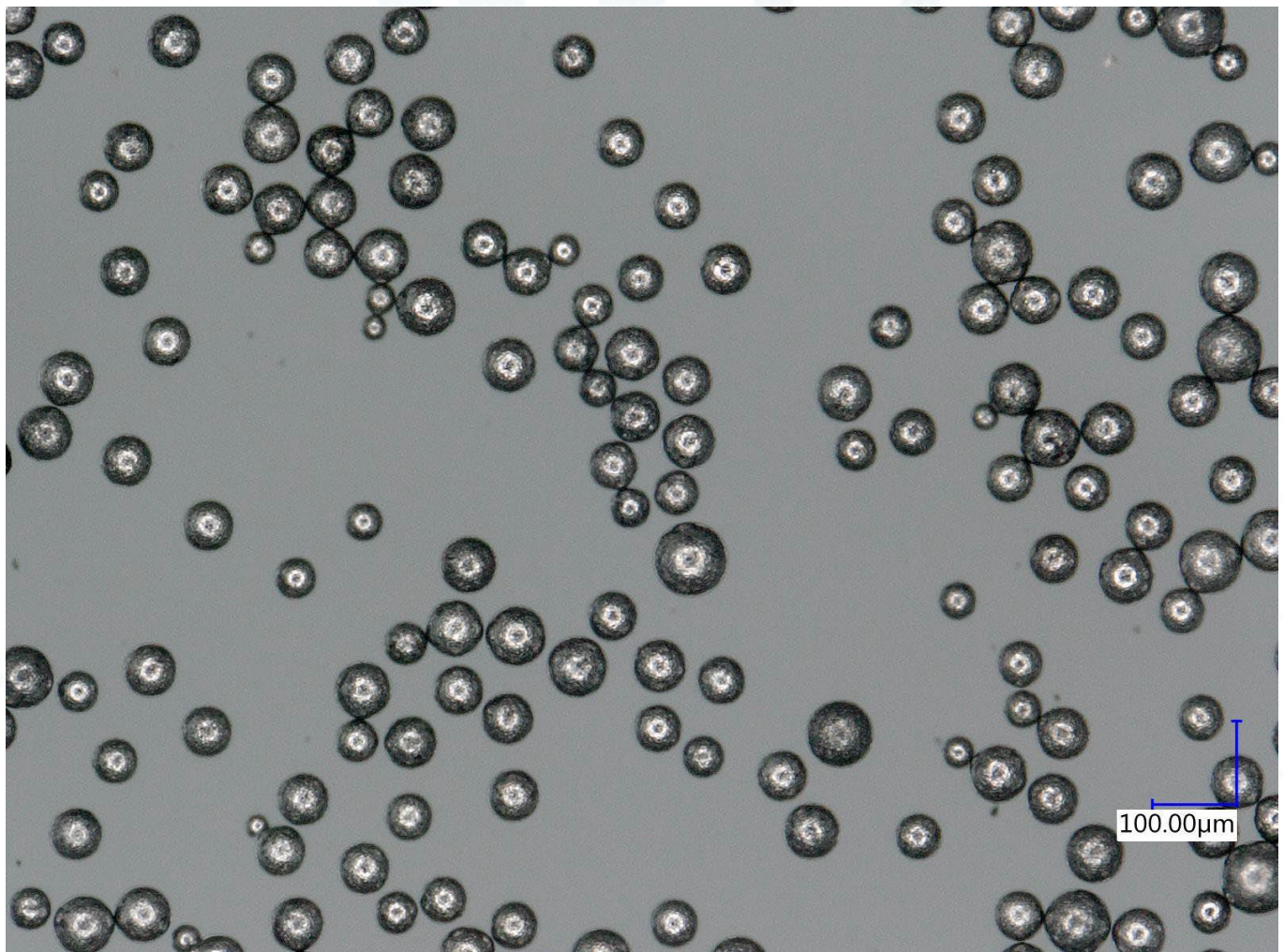


Figure 2 Histogram of the particle size distribution

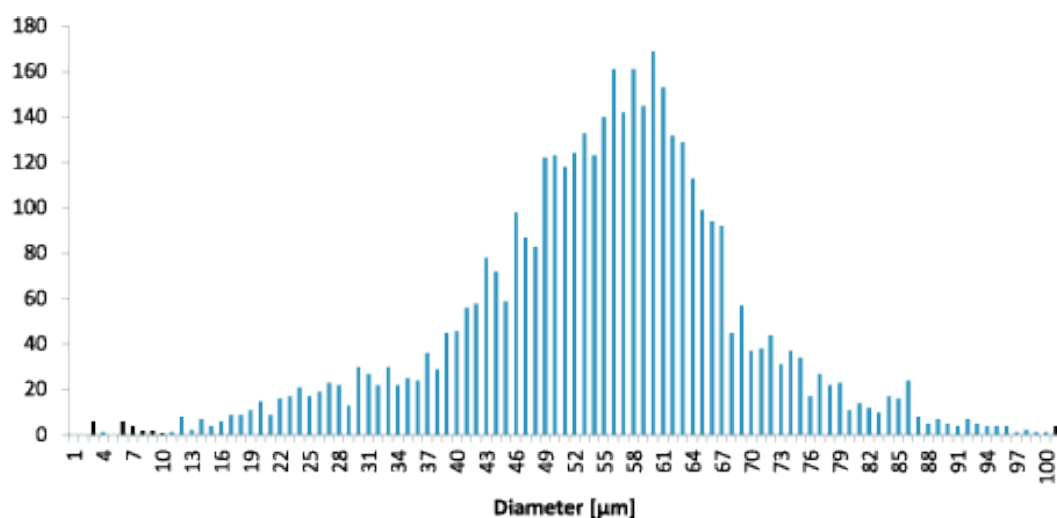


Table 2 Particles size distribution D10, D50, D90

D10	34,23	D50	49,17	D90	62,78
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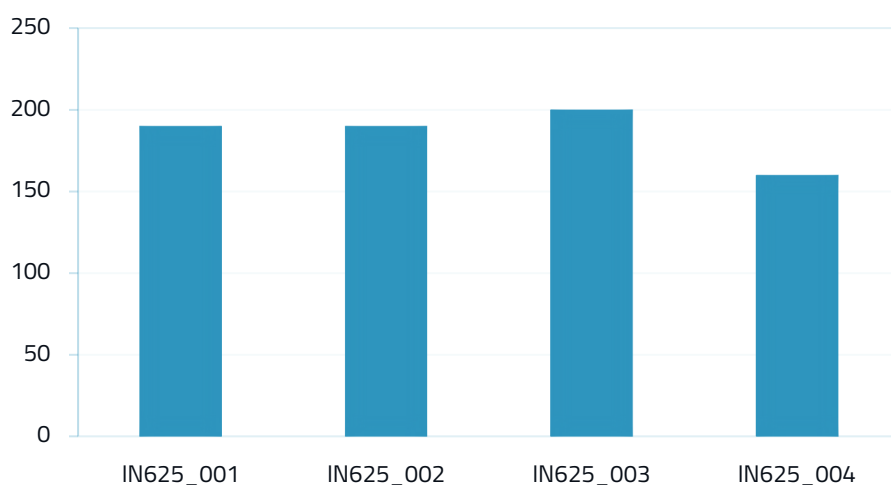
OXYGEN LEVEL

Oxygen levels have been tested in a certified laboratory.
The results are shown below.

Table 3 Oxygen level in the samples

Sample	Test results [%]	U _B	Test methods
IN625_001	0.019	0.002	LECO methodology
IN625_002	0.019	0.002	
IN625_003	0.020	0.002	
IN625_004	0.016	0.002	

Figure 3 Oxygen level in the samples



CHEMICAL COMPOSITION

The chemical composition was checked in certified laboratory.
Test were performed by ICP-OES method. ,

Table 4 Chemical composition of Inconel powder and Inconel wire #

Requirements for Inconel 625 grade [%]		Inconel powder	U _B ⁽¹⁾	Inconel wire	U _B ⁽¹⁾	Test methods
		Test results [%]				
C	≤ 0.10	< 0.01	-	0.012	0.001	PN-EN ISO 15350:2010
Mn	≤ 0.50	< 0.01	-	< 0.01	-	BOSMAL/I-7-43/06
Si	≤ 0.50	0.18	0.01	0.18	0.01	
P	≤ 0.015	< 0.01	-	< 0.01	-	
S	≤ 0.015	< 0.005	-	< 0.005	-	PN-EN ISO 15350:2010
Cr	20.0 ... 23.0	21.0	0.4	21.3	0.4	BOSMAL/I-7-43/06
Nb	-	3.7	0.2	3.6	0.2	BOSMAL/I-7-43/06
Ta(3)	-	-	-	-	-	
Nb + Ta	3.15 ... 4.15	3.7	0.2	3.6	0.2	
Co	≤ 1.0	< 0.01	-	< 0.01	-	
Mo	8.0 ... 10.0	9.1	0.5	9.0	0.5	
Fe	≤ 5.0	0.23	0.02	0.22	0.02	
Al	≤ 0.40	0.29	0.02	0.29	0.02	
Ti	≤ 0.40	0.22	0.02	0.21	0.02	
Cu	-	0.043	0.002	0.044	0.002	
W	-	< 0.01	0.001	< 0.01	-	
Ni(2)	≥ 58.0	65.1	-	65.1	-	-

⁽¹⁾ U_B – total expanded uncertainty of category B (confidence level 0.95)

⁽²⁾ Ta was not analyzed

SEM

Figure 4 SEM photo of Inconel 625

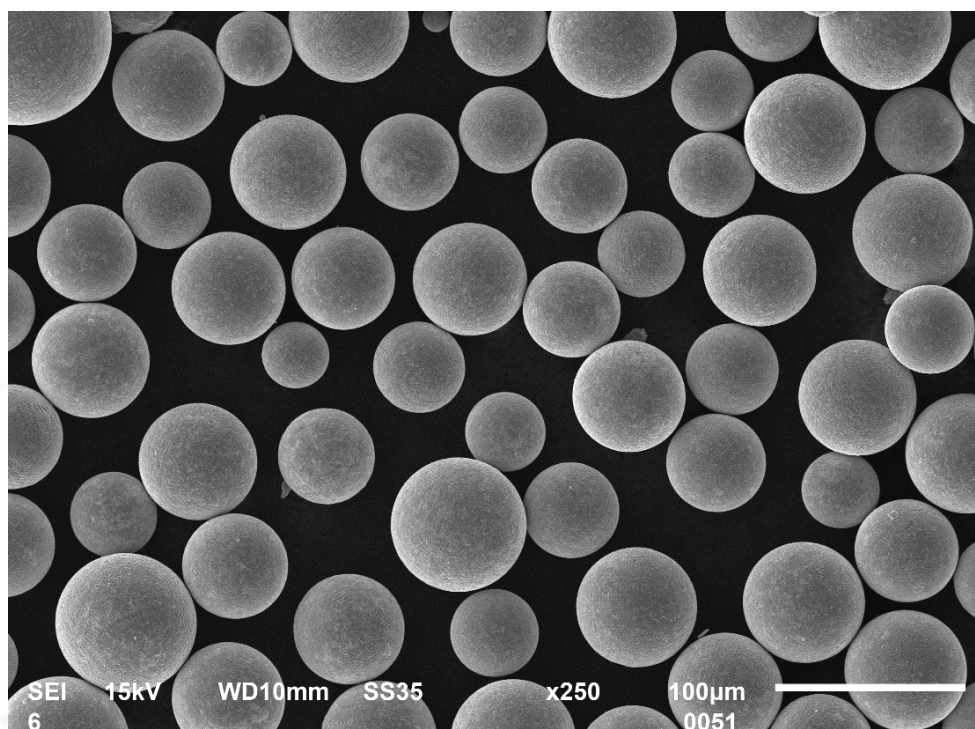
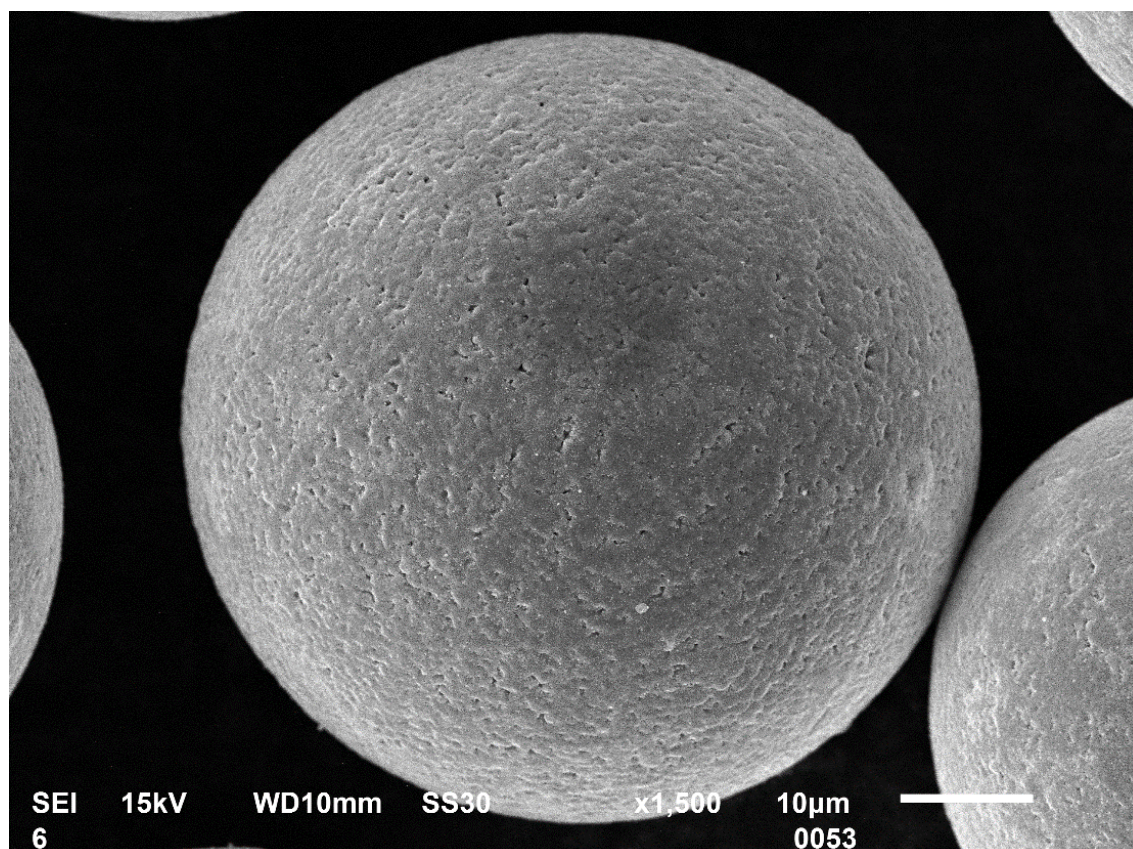


Figure 5 SEM photo of Inconel 625



OVERALL CONCLUSION

For Inconel 625 average measure diameter is 52,31 µm. Particles have good sphericity without any defects. No contaminations were observed among powder particles. No oxidation was observed on some particles. Average oxygen level was measured at 185ppm. ICP-OES examination shows that there is no contamination in chemical composition. Process of atomization of the Steel IN625 was very stable and predictable. Process efficiency oscillated around 95%