

# CARBIDE TECHNOLOGIES

## TECHNICAL REPORT 2007-XXX

Subject: XXXXXXXX PO XXXXX Samples A-C

### Introduction

Samples as noted above for analysis to Amamco's: "MATERIAL REQUIREMENTS AND SPECIFICATION FOR SOLID CARBIDE"; Document Number: XXXXXX XXXXX . The results of CTI's analysis are presented in this report.

### Results

Table 1 – Metallurgical Properties

Sample ID	A1	A2	A3	B1	B2	C1	C2	C3		
Size	11/16	1/2	3/8	7.3mm	18.3mm	3/4	5/8	1/2	Specifications CT-110H	Amamco Specifications
Hardness, HRA	91.7	91.8	91.7	91.8	91.7	91.9	91.8	91.9	91.4 - 91.9 - 92.4	91.5-92.8
Density - g/cu. cm.	14.52	14.60	14.55	14.64	14.69	14.56	14.52	14.54	14.32 - 14.52 - 14.72	+/- 0.07 g/cm3 of theoretical
%Co from Density	10.1%	9.3%	9.8%	8.9%	8.5%	9.7%	10.1%	9.9%	-	8.5-12.0%
Estimated %Cobalt	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10%	
Porosity	A01 B00 C00	A01 B00 C00	A01 B00 C00	A01 B00 C00	A01 B00 C00	A01 B00 C00	A01 B00 C00	A01 B00 C00	A01 B00 C00 Max	A01 B00 C00 Max
Structure & Grain Size, 1500X	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC range 0.5-1.0 microns, Average 0.8 micron Submicron	WC 95%<1.0 micron, 5% to 2.0 micron
Coercivity, HC Oe	230	242	230	234	236	308	259	280	230-330	239-314
Magsat, emu/g	12.0	13.2	12.0	13.6	13.6	12.6	14.0	14.2	13.6	
%SMS	75%	83%	75%	85%	85%	79%	88%	89%	75% to 95%	
Max Magsat %Co, emu/g	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
GE HC No.	120.0	132.0	120.0	136.0	136.0	126.0	140.0	142.0	136.0	120-145
Remarks	Good quality 0.8 submicron, Meets XXXXX specification	Good quality 0.8 submicron, Meets XXXXXXXX specification	Good quality 0.8 submicron, Meets XXXXX specification	Good quality 0.8 submicron, Meets XXXXX specification	Good quality 0.8 submicron, Meets XXXXX specification	Good quality 0.8 submicron, Meets XXXXX specification	Good quality 0.8 submicron, Meets XXXXX specification	Good quality 0.8 submicron, Meets XXXXX specification	No macro pores allowed	

Table 2 Photomicrographs

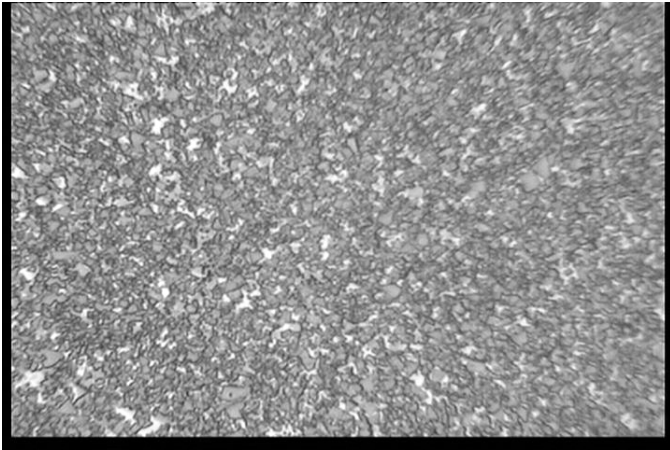


Fig. 1, Sample A1, etched 2.5m Murakami, 1500X Typical grain size.

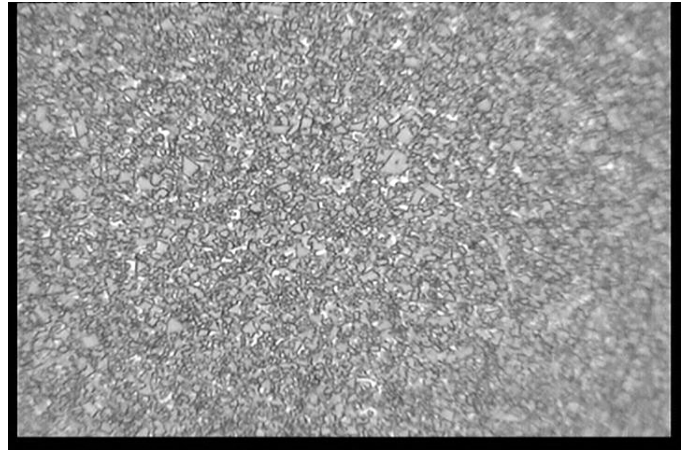


Fig. 2, Sample A2, etched 2.5m Murakami, 1500X Typical grain size.

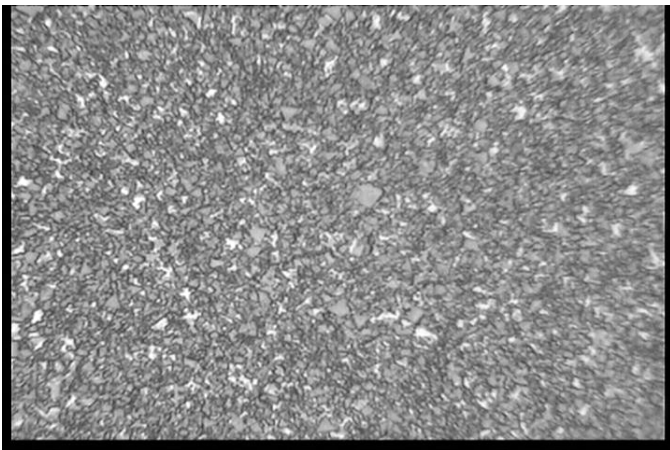


Fig. 3, Sample A3, etched 2.5m Murakami, 1500X Typical grain size.

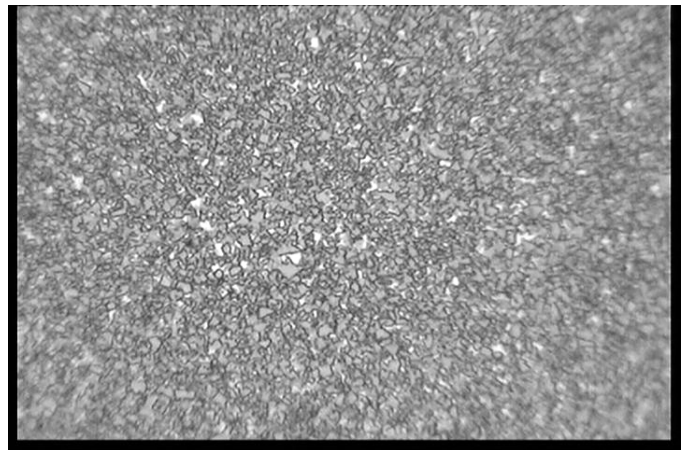


Fig. 4, Sample B1, etched 2.5m Murakami, 1500X Typical grain size.

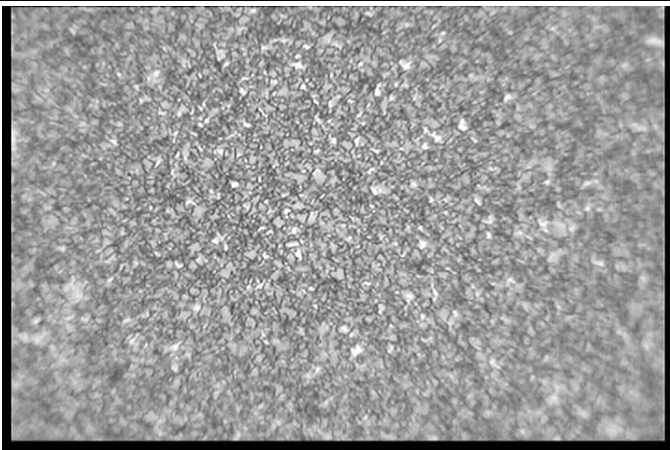


Fig. 5, Sample B2, etched 2.5m Murakami, 1500X Typical grain size.

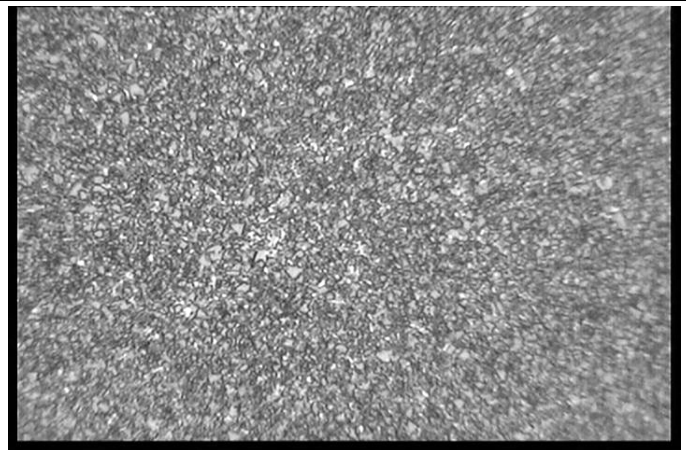


Fig. 6, Sample C1, etched 2.5m Murakami, 1500X Typical grain size.

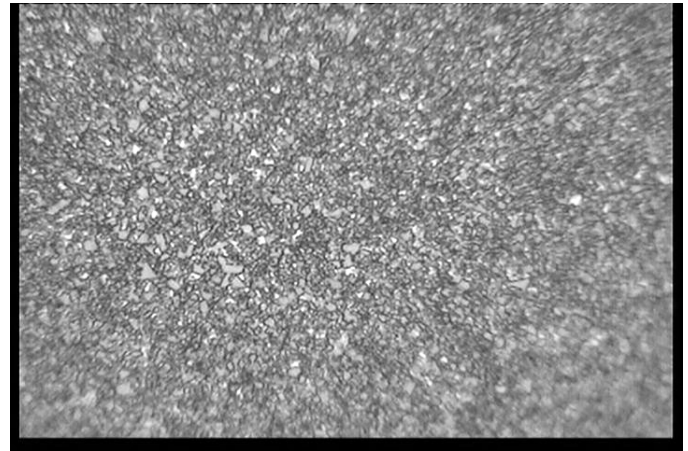
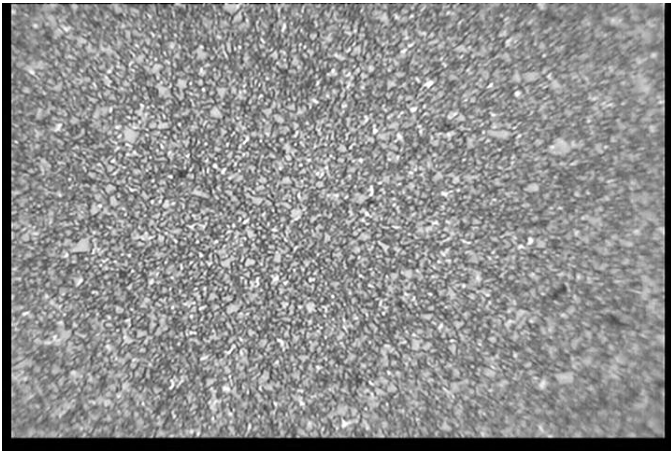


Fig. 7, Sample C2, etched 2.5m Murakami, 1500X Typical grain size.

Fig. 8, Sample C3, etched 2.5m Murakami, 1500X Typical grain size.

### Conclusions

Sample ID	A1	A2	A3	B1	B2	C1	C2	C3
Size	11/16	1/2	3/8	7.3mm	18.3mm	3/4	5/8	1/2
Acceptable to XXXXXX specifications <sup>1</sup>	X	X	X	X	X	X	X	X
Acceptable 10% Co, 0.8μ WC grade	X	X	X	X	X	X	X	X
Minor Fault								
Major Fault								

<sup>1</sup> XXXXX "MATERIAL REQUIREMENTS AND SPECIFICATION FOR SOLID CARBIDE"; Document Number: XXXXX .