



LABORATORY REPORT

TO: Perfect Point, Inc.
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PROJECT NO.: 6032-106782-2
REVISION NO.: 0
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AUTHORIZATION: P1367-SBIR

PROJECT: Per customer's request, Metcut Research Inc. sectioned, mounted, polished, etched, and analyzed the supplied specimens, see Figure 1.

1. Metallographic evaluation of EDM cut surfaces.

Sample IDs:	See Table 1
Material:	T7075 Aluminum
Number of samples:	3
MRI Mount No.:	See Table 1
Etchant:	Keller's

SUMMARY:

Please find enclosed the data acquired from the material submitted to Metcut Research Inc. The technique employed for analysis was standard metallography. These tasks were carried out via Metcut's latest revision of needed procedures with references to all applicable ASTM specifications and customer's supplied specifications. If you have any further questions or would like to discuss the results, please feel free to contact us at your leisure.

Handwritten signature of Christopher S. Starr in black ink.

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I. INTRODUCTION:

Per customer's request, a review of the supplied material was performed. The specified tests were completed utilizing standard laboratory techniques. These tests include, but are not limited to, polishing and etching (Keller's) specimen to analyze the EDM cut area for recast layer, HAZ and microcracking with special attention to the chamfer area of the EDM cut. Optical microscopy was used for all reported measurements and analysis, and reference images are shown below. Table I gives all test results. Metcut's latest procedure revisions applied to all tasks completed. All data has been inserted into the report for customer review.

II. DATA AND CONCLUSION:

The supplied samples were sectioned, mounted, polished, and etched in effort to reveal the microstructure of the full EDM cut.

Since Metcut was not privy to all background data, design requirements or otherwise, all final interpretations are left to customer. Metcut will, at customer's discretion, discuss in more detail any of the observations that have been made. Please feel free to contact us at your convenience with additional comments or questions.

TABLE I. Customer IDs and mount numbers with test results for the received aluminum samples.

MRI Mount#	Customer Sample ID's	Deepest Crack Observed (inches)	Maximum Recast Thickness (inches)	HAZ Thickness (inches)
83970	XREC 19	None observed	None observed	None observed
83971	ECNR 19	None observed	None observed	None observed
83972	YREC 19	None observed	None observed	None observed

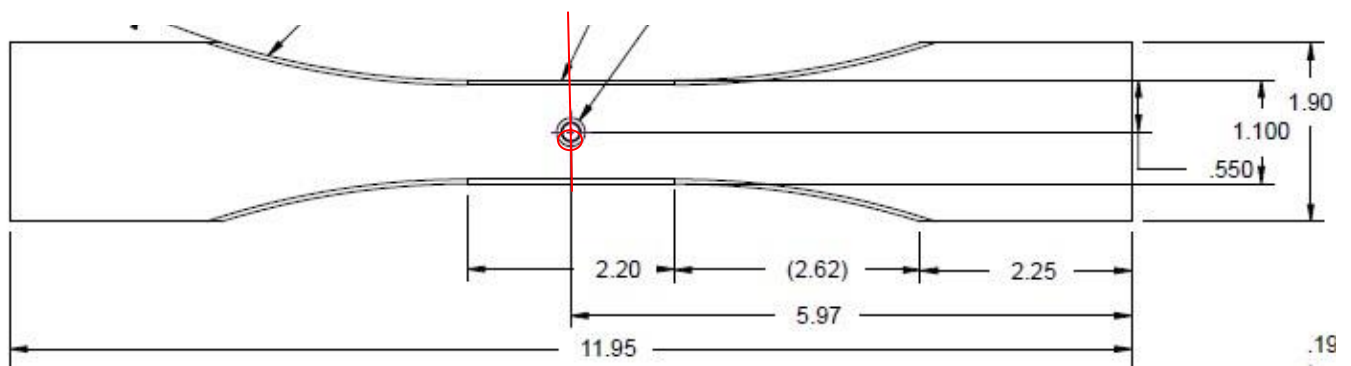


FIGURE 1. Drawing of EDM samples received for analysis. Red line shows sectioning location. Red circle shows area of interest shown in photomicrographs.



FIGURE 2. MRI Mount No.: 83970. Typical microstructure of the supplied sample XREC 19 is presented in the unetched condition showing the full EDM cut area. No cracking observed. 200X magnification.

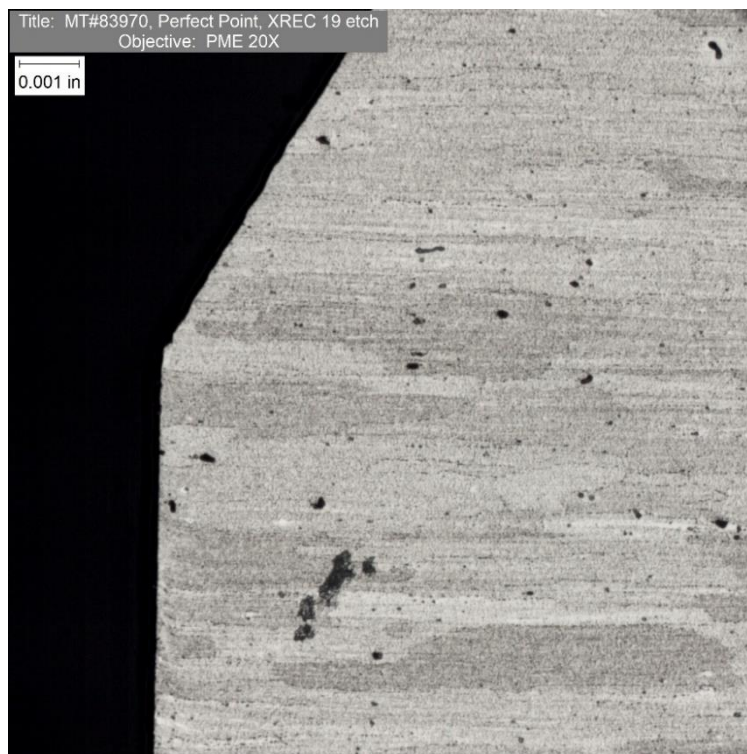


FIGURE 3. MRI Mount No.: 83970. Microstructure of the supplied sample XREC 19 is presented in the etched condition showing EDM cut. No recast layer was observed. 200X magnification, Keller's etch.

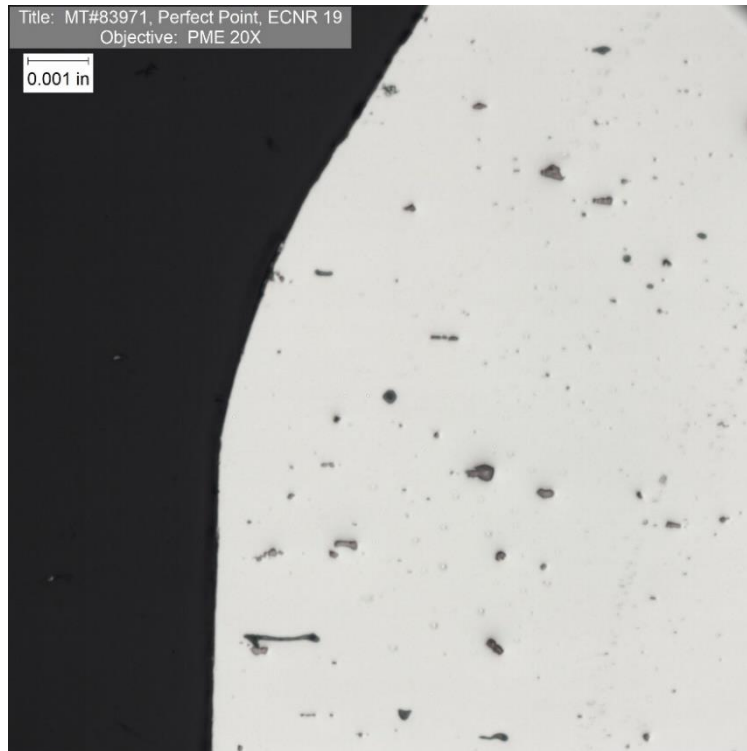


FIGURE 4. MRI Mount No.: 83971. Typical microstructure of the supplied sample ECNR 19 is presented in the unetched condition showing the full EDM cut area. No cracking observed. 200X magnification.

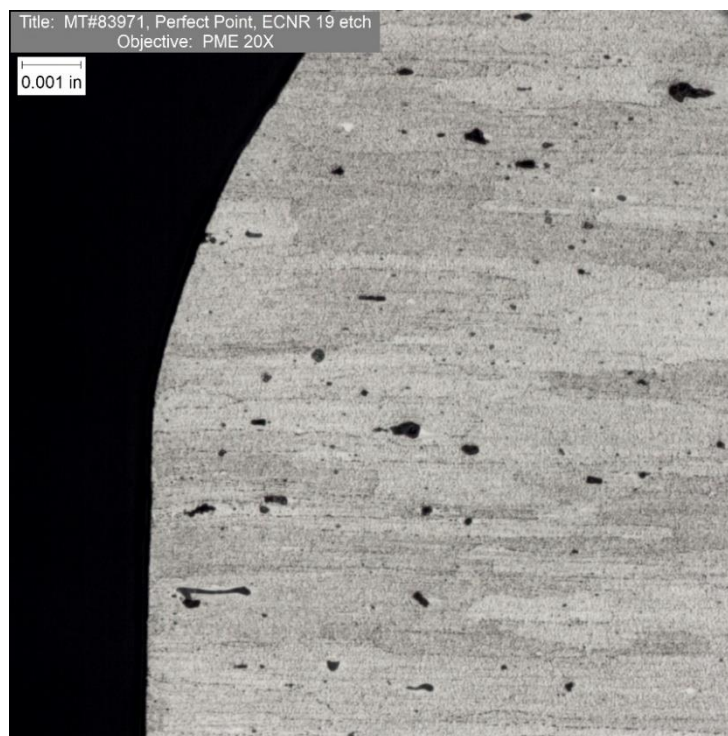


FIGURE 5. MRI Mount No.: 83971. Microstructure of the supplied sample ECNR 19 is presented in the etched condition showing EDM cut. No recast layer was observed. 200X magnification, Keller's etch.



FIGURE 6. MRI Mount No.: 83972. Typical microstructure of the supplied sample YREC 19 is presented in the unetched condition showing the full EDM cut area. No cracking observed. 200X magnification.



FIGURE 7. MRI Mount No.: 83972. Microstructure of the supplied sample YREC 19 is presented in the etched condition showing EDM cut. No recast layer was observed. 200X magnification, Keller's etch.