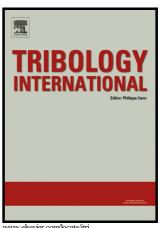
Author's Accepted Manuscript

Prediction of the Erosive Footprint in the Abrasive Jet Micro-machining of Flat and Curved Glass

K. Kowsari, A. Nouhi, V. Hadavi, J.K. Spelt, M. Papini



www.elsevier.com/locate/itri

PII: S0301-679X(16)30404-2

DOI: http://dx.doi.org/10.1016/j.triboint.2016.10.038

JTRI4428 Reference:

To appear in: Tribiology International

Received date: 13 July 2016

Revised date: 28 September 2016 Accepted date: 26 October 2016

Cite this article as: K. Kowsari, A. Nouhi, V. Hadavi, J.K. Spelt and M. Papini Prediction of the Erosive Footprint in the Abrasive Jet Micro-machining of Fla Glass, Tribiology Curved International http://dx.doi.org/10.1016/j.triboint.2016.10.038

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

CCEPTED MANUSCR

Prediction of the Erosive Footprint in the Abrasive Jet Micro-machining of Flat and **Curved Glass**

K. Kowsari^a, A. Nouhi^b, V. Hadavi^b, J.K. Spelt^{a,b*} M. Papini^{b,a*},

^aDepartment of Mechanical and Industrial Engineering, University of Toronto, 5 King's College

Road, Toronto, ON, Canada M5S 3G8, Canada

^bDepartment of Mechanical and Industrial Engineering, Ryerson University, 350 Victoria Street,

Toronto, Ontario, M5B 2K3, Canada

spelt@mie.utoronto.ca, mpapini@ryerson.ca,

*corresponding authors: Tel.: +1 (416) 978-5435, Fax: +1 (416) 978-7753

*corresponding authors: Tel.: +1 (416) 979-5000 X7655, Fax: +1 (416) 979-5265

Abstract

A computational fluid dynamics (CFD) procedure is presented for the prediction of the

erosive footprint size in abrasive jet micro-machining (AJM). The CFD-obtained footprints were

in good agreement with those measured experimentally. The footprint was found to be due to

both primary particle impacts in the conical plume emanating from the nozzle, and secondary

particle impacts driven by the flow. The footprint depended on target curvature because the

spread in lateral particle rebounds differed, depending on the target radius. It thus follows that

footprints obtained from shallow channels machined on flat targets cannot be used to predict

channel shape on curved surfaces. Since the footprint must consider secondary impacts, this has

important implications for surface profile modeling of curved surfaces.

Keywords: abrasive particle; air jet; footprint; computational fluid dynamics.

1

Download English Version:

https://daneshyari.com/en/article/4986290

Download Persian Version:

https://daneshyari.com/article/4986290

<u>Daneshyari.com</u>