



Industrial Consultancy & Sponsored Research (IC&SR)

ABRASIVE SLURRY PREPARATION UNIT FOR MICRO ABRASIVE WATER JET MACHINING APPLICATIONS IITM Technology Available for Licensing

Problem Statement

• The problem statement discussed in the present invention is *how to generate micro abrasive suspension jet in effective manner.*

• Hence, subject invention addresses the issue in efficient manner.

Technology Category/ Market

Technology: Abrasive slurry preparation unit;

Industry/Application: Micro machining applications; Heavy Machinery, Metal Fabrication, Automotive & Transportation; Market: The global abrasive market is projected to reach at a CAGR of 5.0% during

the forecast period (2024-30).

Technology

- □ The claimed patent describes an apparatus for preparing a **uniform mixture of abrasive particle** for the generation of micro abrasive suspension jet.
- □ The apparatus comprises of:
- → a slurry preparation unit for preparing a high-pressure slurry of carrier fluid and abrasive particle,
- \rightarrow a source for pressurized carrier fluid,
- \rightarrow a **conduit** to connect source of carrier fluid to an inlet of slurry preparation unit,
- → a conduit to connect an outlet of the slurry preparation unit to cutting head;
- \rightarrow a **diamond orifice** to form micro abrasive suspension jet.

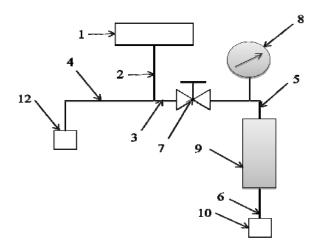


Fig.1 depicts a **flow circuit diagram** of an **apparatus** for generating micro abrasive suspension jet for micromachining application;

Brief Functionality:

The slurry preparation unit is for preparing high pressure slurry of carrier fluid and abrasive particles into abrasive slurry and has a hydraulic cylinder with piston, a slurry cylinder with piston, and hopper for continuous refilling of slurry preparation unit which in turn connected with a diamond orifice to generate micro abrasive suspension jet.

TRL (Technology Readiness Level)

TRL-3, Experimental proof of concept;

Intellectual Property

IITM IDF Ref. 1099; IN Patent No. 376985 (Granted)

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Images

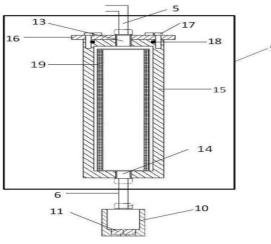


Fig.2 depicts a cross section of the slurry preparation unit and the cutting head;

Reference No. Details	
Components	Reference No.
slurry preparation unit	9
conduit	5,6
hydraulic cylinder	30
slurry cylinder	31
piston	32, 33
hopper	35
diamond orifice	11
porous mesh abrasive holder	19
cutting head	10
non-return valves	36, 41
high pressure vessel	15
hexagonal bolts	17
rubber seal	18
Inlet port Outlet Port	13 14

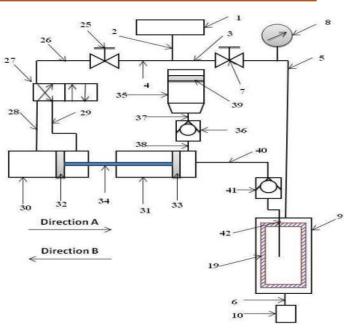


Fig.3 shows a flow circuit diagram of an alternative version of apparatus for generating micro abrasive suspension jet for micro machining application ;

Key Features / Value Proposition

- An apparatus to provide a supply of abrasive particles in a carrier fluid to form a uniformly suspension of abrasive and carrier fluid.
- Slurry preparation unit prevents agglomeration and settlement of abrasives in the flow circuit and also avoids clogging of orifice to enable continuous generation of micro abrasive suspension jet.
- The apparatus facilitates a refill arrangement for continuous supply of abrasives into the slurry preparation unit.

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