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Coated Abrasives and Related Products Division

October 12, 1972

Dr. Tracy Hall
Megadiamond Corporation
275 West 2380 North
University Station
P. O. Box 189
Provo, Utah 84601

Dear Dr. Hall:

I would like to thank you for the time and cooperation extended me on my recent visit to your hi-pressure laboratory.

As I indicated to you in our conversation, we do have a long term interest in additional hi-pressure apparatus for use in a materials research program, which we are currently pursuing.

I wonder if you would be able to supply me with some additional information relative to the cubic-type press we discussed.

Perhaps you have some published engineering data on some of your previously constructed units which could be made available without compromising any proprietary information. At any rate, I would like information, if available, relating to typical working volumes attainable using normal pyrophyllite gasketing along with the usual current leads, etc. Is there any approximate relationship delineated as a function of cube edge?

Do you have a schematic of a typical cubic charge showing the various components of the assembly?

What would a normal cycle time be in terms of extension and retraction of the rams?

Can a given press be outfitted with multiple sets of interchangeable carbide anvils thus increasing its experimental flexibility by giving a broader range of available working pressures and volumes?

In your experience, does one obtain better carbide component life with the multi-anvil cubic system as opposed to the uni-axial "belt" die system. Or vice versa?

Could you give me an approximate cost relationship between the 300 ton unit you have under construction and a similar unit with about twice the tonnage capacity?

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I would also be interested in lead time estimates on delivery of such systems.

Normally, I would have hoped to have had resolved some of these points during our recent discussion, however, as you recall I was scrambling to catch a plane and I didn't get as much information in my notes as I would have liked.

Thank you again for your courtesy and for any additional information you may be able to supply.

Sincerely,

R N Howard

R. N. Howard, Manager
Diamond & Micro Abrasives
3M Center, Bldg. 53-6W
St. Paul, Minnesota 55101

RNH:bam

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27 October 1972

R. N. Howard
Diamond & Micro Abrasives
3 M Center, Bldg. 53-6W
St. Paul, Minnesota 55101

Dear Dr. Howard:

Thank you for your letter of October 12, 1972. I will attempt to answer your questions in the same order that you asked them concerning cubic type presses.

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1. I do not have any published engineering data and there is considerable proprietary information that has been developed in our fifteen years of designing and building such equipment.

2. The working volume can be directly scaled to the cube edge, said edge being 25% longer than the anvil face edge. Permissible working volume depends on time, temperature, and pressure. As any of these three quantities increases, working volume must decrease. In a 200 ton press operating to 65 kbar for 5 minutes at 1500° C the anvil edge would be ½ inch and the working volume would be a cylinder .30 inch long by .25 inch diameter. You can scale directly from this.

3. A schematic of a typical cubic cell is enclosed.

4. Ram extension and retraction can be almost as fast as you like but higher speeds cost more. The 300 ton press under construction will close and build to maximum pressure in 20 seconds and open in 15 seconds.

5. Multiple sets of interchangeable anvils of different sizes are available and are easily removed and installed.

6. In my experience, carbide life is highest in the Tetrahedral press, followed by the Cubic Press as second best and the Belt as giving the shortest life.

7. The 300 ton Cubic Unit is $35,000. complete and ready to run. A similar 600 ton unit would cost about $90,000.

8. It takes approximately one year to build a press.

Sincerely,

H. Tracy Hall

H. Tracy Hall
President