QUOTE REQUEST

तार : "नेटफिलेब"
TELEGRAMS : NATPHYLAB
फोन : ५८७१६१ (३ल.), ५८७६७३
PHONES : 587161, (3L.), 587673

NATIONAL PHYSICAL LABORATORY

राष्ट्रीय भौतिक अनुसंधान शाला
Hillside Road, NEW DELHI-110012.
हिलसाइड रोड, नई दिल्ली-११००१२

संदर्भ
Ref. No. AM/MW/437/75

तिथि
Date November 7, 1975

Dr. B.K. Agarwala,
Head, Division of Mechanics

M/s. H. Tracy Hall Inc.,
P.O. Box 7533,
University Station,
Provo, Utah 84601,

U.S.A.

Dear Sir,

The National Physical Laboratory wants to purchase from you a belt device with a piston diameter of 1 inch. We would want the facility to operate at about 10 runs per hour. I shall be grateful if you could please quote for the equipment and the time of delivery etc. The quotations should also state separately the cost of spares that you would estimate would be needed for a one-year trouble free operation of the equipment and also the cost of erection and commissioning the equipment which according to rough estimates may involve 3 to 4 weeks of stay at the National Physical Laboratory.

In addition, we would want to have 400 machined and bored pyrophyllite cubes for initial experiments. The prices of the materials may please be indicated separately.

We would also like to investigate the possibility of acquiring a cubic press with the same capability and it would help us if you could give us the quotations for this equipment also.

Thanks very much,

Yours faithfully,

Bhagawals

(B.K. Agarwala)

.625" CUBE ~ .250" HOLE .005" Mo THICK CURRENT RINGS

.030" D by .242" D graphite

.014" D by .242" D Ni

$31,000.

250 lb carbide

12

~~$3000.~~

$6000.

200
24
100

324 in³

~~100.~~

Bind ring for belt

✓ Steel → 30" D X 8" H = 5600 in³

carbide 8" D x 4" H 200 in³

for 600 ton press

Carbide punches 3 2" D 4" H 12 in³ x 2 24 in³

piston tip (punch) 1" D

steel 5" D x 3 60 in³ x 2 120 in³

Backing block

carbide 5" D x 2.5 H 50 in³ x 2 = 100 in³

steel 9" D x 2.5 150 in³ x 2 = 300 in³

Handling unit $1000

steel 12" D x 2" 240 in³ x 2 480 in³

$24,000

8000 in³ / .3 / 2400 lbs steel

6020
480
6500 in³
1300
7850

Belt (Bird Ring) π (15" R)^2 ~~30" D~~ × 8" H × .2833 = 1602 lbs × $12/lb = $19,224.

Carbide ~~8" D~~ 4" R × 4" H × π × ~~.2833~~ = 201 in^3 (die)

✓ Carbide 1.5 D × 1.5 L sell for $250.
$(.75)^2 \times 1.5 \times \pi = 2.65$ in^3 $\frac{201}{2.65} \times \$250. = 18,962$ each

Carbide punches ~~2" D~~ 1" R × 4" H × π = 12.57 in^3; $\frac{12.57}{2.65} \times \$250 = \$1186$ each

Steel B.R. for punches 4" R × 5" L × π = 252 in^3 × .2833 = 72 lb × $15 = $1080 each
(8" D)

Carbide Backing Block $2\frac{1}{2}$" R × 3" H × π = 59 in^3 $\frac{59}{2.65} \times \$250 = \$5556.$ each
(5" D)

Steel Bird Ring for Carbide back block. 5.5" R
11" D × 3 × π = 160 in^3 × .2833 = 45 lb × $12 = $1920. ea

3" D × 4" H × π = 28.27 in^3 $\frac{28.27}{2.65} \times 250 = 2668.$

SCIENCE - ENGINEERING - TECHNOLOGY — CONSULTING - DESIGN - CONSTRUCTION

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February 21, 1976

Dr. B.K. Agarwalla, Head, Division of Mechanics
National Physical Laboratory
Hillside Road, New Delhi-110012, India

Ref. No. AM/MW/537/75
Quotation/High Pressure Equipment

Dear Dr. Agarwalla:

The following tapered-punch & conical-die high pressure equipment will accept a pyrophyllite cylinder 1 inch in diameter by 1 1/2 inch long.

Item 1.	Compound alloy steel binding ring assembly for tungsten carbide conical die (1 required)	$19,224.00 each
Item 2.	Carbide die for item 1 above (1 required)	$18,962.00 each
Item 3.	Compound alloy steel binding ring assembly for tapered matching carbide punches (2 required)	$ 3,024.00 each
Item 4.	Carbide punch with 1 inch diameter tip for item 3 above (2 required)	$ 2,780.00 each
Item 5.	Compound alloy steel binding ring for carbide backing block behind each punch (2 required)	$ 2,290.00 each
Item 6.	Carbide backing block for item 5 (2 required)	$ 5,556.00 each

The suggested spares for one year's operation follows: Item 1, 7 each; Item 2, 40 each; Item 3, 8 each; Item 4, 80 each; Item 5, 8 each, Item 6, 8 each.

Note that tungsten carbide is the very expensive item. General Electric, deBeers, and others make their own carbide at a probable cost of 25% of what I must charge. Their "in-house" production of carbide gives them a competitive edge that is absolutely necessary for commercial high pressure use. If you order the high pressure apparatus from us, we will provide you with drawings for the tungsten carbide components.

The six items of equipment above could be used in a conventional 600 ton hydraulic press of adequate inside clearance (Birdsborough or ASEA presses for example). The die assembly could be moved in and out of the press with a forklift. A forklift of at least 4000 pound capacity and overhead trolley lifting equipment systems of about the same capacity are going to be a necessity for you in any high-pressure installation.

You will need assembly/disassembly fixtures for pushing compound binding rings together and for pressing in carbide components. We could supply these assembly/disassembly fixtures at a cost of $12,000.00.

you will need a second press of 1000 ton capacity for assembly/disassembly operations. Much more thrust is required for disassembling the binding ring assembly (Item 1) than for pushing anvils into the relatively small binding rings of cubic presses.

You will also need fixtures to fasten items 1 through 6 to the plattens of a standard 600 ton hydraulic press. These could not be designed until the inside dimensions of the press were known. I would estimate $10,000.00 for these.

It would be better to use special presses designed particularly for use with the six items. We would be willing to build these as quoted below.

Item 1P. Two-way 600 ton press accomodating two pressure chambers. One assembly is under pressure while another unit's pressed sample is being removed and replaced with an unpressed sample. The chambers (consisting of items 1 and 2) need not be handled by external means (such as a forklift). The equipment for rotating chambers through the press is an inegral part of the apparatus. $396,000.00 each

Item 2P. 1000 ton Assembly/Disassembly press (requires external handling equipment such as a forklift). $135,000.00 each

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CUBIC PRESS

A 1000 ton Cubic Press would be comparable in capabilities to the 600 ton tapered piston/conical die type device above. The anvils would be 1.25 inches on edge and the corresponding pyrophyllite cube would be 1.56 inch on edge. With 6 anvils and 6 binding rings and all hydraulics and electricals the cost of this press would be: $375,000.00 each

Extra carbide anvils would cost $ 2,668.00 each
Extra binding rings would cost $ 1,920.00 each

The recommended ANVIL supply for one year's operation would be 300. The number of binding rings for one year's operation would be 30.

Note that tungsten carbide costs for a Cubic Press are considerably below that for a tapered-piston/conical cylinder (die) device. Also the peripheral equipment requirements are less. The press you are currently using to replace anvils in your 200 ton cubic press is large enough to do the same for a 1000 ton cubic press.

Pyrophyllite cubic cells for this press would be $8.00 each complete with all internal components in lots of 500 or more.

All prices quoted are f.o.b. Provo, Utah.

Delivery time on any of the presses would be two years from the time of receipt of an order. Other major components (items 1 through 6) would require one year for manufacturing.

Prices will remain firm from the time of the receipt of an order until completion of the job. However, quoted prices will increase at the rate of 2.1% per month beginning April 1, 1976. This escalator is valid until August 1, 1976. A new quotation would be necessary after that date.

Terms: 50% of purchase price with order. Balance will be due after certification of completion of the equipment and its satisfactory working condition in Provo prior to shipment.

I would require $22,000.00 plus travel and living expenses for the trip from Provo to your laboratory and return with a total time of one month to be spent in your laboratory commissioning the equipment.

Very truly yours,

H. Tracy Hall

H. Tracy Hall