May 25, 1965

TETRAHEDRAL X-RAY PRESS, 300 TON

Bill of Materials, etc.

1. Ram base: 4 ea., 4340 steel, aircraft quality, magnafluxed forging, hardness Rc 28-32 throughout, to finish 19 in. diam. x 8 in. thick; Alternate material: Hepenstahl Hardtem B.
2. Retainer ring: 4 ea., low alloy steel, to finish 12 in. O. D. x 10 in. I. D. x 1.75 thick, hardness Rc 28-32.
3. Split ring: 4 ea., low alloy steel, Rc 28-32, to finish 10.38 O. D. x 9.62 I. D. x .743 thick.
4. Cylinder: 4 ea., seamless, hydraulic cylinder tubing, honed and polished I. D., to finish 10 in. O. D. x 8 in. I.D. x 9-1/2 in. long, hardness Rc 45 ± 3.
5. Cylinder top plate: 4 ea., low alloy steel plate or bar stock, to finish 10 in. O. D. x 4 in. I. D. x 2 in. thick. Hardness Rc 28-32.
6. Piston: 4 ea., 4340 steel, hardness Rc 55-59 to finish 8 in. O. D. x 2 in. I. D. x 6 in. long.
7. Piston rod: 4 ea., 4340 steel, upset head forging, hardness Rc 45 ± 3, to finish 9-3/4 O. D. head x 4 in. diam. stem x 13-1/2 in. long.
8. Positioner ring: 4 ea., low alloy steel, hardness Rc 28-32, to finish 5 in. O. D. x 3 in. I. D. x 1 in. thick, bar stock or plate.
9. Binding ring: 12 ea., (includes 8 spares), 4340 steel, aircraft quality, magnafluxed, forging, hardness Rc 51-55, to finish 4 in. O. D. x 1-1/2 in. I. D. x 2-3/4 in. long. Same as McCartney Mfg. dwg. no. C-545 Aug. 7, 1963.
10. Anvil: 12 ea., (includes 8 spares), cobalt cemented (6-8%) virgin tungsten carbide, 1/2 in. size (see H. T. Hall drawing "Tetrahedral Anvils," Sept. 19, 1962. ✱ Standard anvils without holes.
11. Ditto, 3/4 in. size.
12. Ditto, 1 in. size.
13. Piston-rod nut: 4 ea., low alloy steel, 3 in. O. D. x 2 in. I. D. x 1.5 in. long.
14. O-ring (seal B): 4 ea., Series no. 9021-443, Buna N Compound, 90 shore durometer hardness, 8 in. O. D. 1/4 in. wide.

15. Leather back-up washers for item 14 above, 8 ea., Chicago Rawhide Co., part number - 70, 3 in. O.D. x 7-1/2 in. I.D. x 1/8 in. thick.
16. O-ring (seal A): 4 ea., Series no. 9021-445, Buna N compound, 90 shore durometer, 8.5 in. O.D. x 1/4 in. wide.
17. O-ring (seal C): 4 ea., same as item 14.
18. O-ring (seal D): 4 ea., Series no. 9021-345, Buna N compound, 90 shore durometer, 4-3/8 in. O.D. x 3/16 in. wide.
19. Retainer ring hold-down screws: 48 ea., 1/2" -20 thd. x 3" long, socket head cap screws.
20. Cylinder top plate hold down screws: 48 ea., 3/8" - 16 thd. x 1-1/2" long, socket head cap screws.
21. Positioner hold-down screws: 20 eac., size 10-32 x 1-1/2 in. long, socket head cap screws.
22. Binding ring hold-down screws: 12 ea., 1/4-20 x 1-1/2 in. long, socket head cap screws.
23. Guide pins: 4 ea., 1.2500 + 0.0000 - 0.0001" diam. x 7 in. long, Lamina no. TN-125.
24. Pressure tubing: 3 lengths, stainless steel 9/16 in. O.D. x 5/16 in. I.D. x 20 ft.
25. Autoclave "slimline" 15,000 psi fittings and valves for 9/16 in. x 5/16 in. pressure tubing as follows:
    a. nipples, 4 in., 5 ea.
    b. cross, 2 ea.
    c. tee, 3 ea.
    d. elbow, 6 ea.
    e. adapter, tubing to 1/4 in. NPT male, 1 ea.
    f. adapter, tubing to 3/8 in. NPT male, 1 ea.
    g. valve, 2 - way angle, 2 ea.
    h. valve, 2-way straight, 2 ea.
    i. gland, 45 ea.
    j. collar, 45 ea.
    k. adapter, 1 ea., # 155A-9401, tubing to 1/4" NPT male.
26. Sprague pump: 1 ea., no. S-216C-300.
27. Air mufflers: 2 ea., Sprague Engineering Co., Model 0-5.
28. Lubro control unit: 1 ea., Sprague no. P/N 21-009-002 (for use with pump).

Autoclave Engineers 5605 - 2nd W. Salt Lake City

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Alta Engineering 9376 - 9th So. Salt Lake

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29. Relief valve: 1 ea., Sprague no. 005-023A-1.

30. Oil reservoirs: 2 ea., welded steel cans, 8 in. O.D. x 20 in. long x 3/16 in. wall with one 1/2 in. NPT female side oil outlet 1 in. from bottom and one 1/2 in. NPT female top outlet near rim for air inlet, and also 1-1/2 in. NPT female top outlet near rim with pipe plug for filling.

31. Air filter, regulator unit: 1 ea., Sprague model 0-7 without lubricator (for oil reservoirs).

32. Air valve, 1/2 in. NPT (to control Sprague pump), panel mount, Lukenheimer Fig. 907BS.

33. Air valve, 1 ea., (to admit and exhaust air to reservoirs), plug, Republic no. 721-4Tx four way reversing, flanged, 1/2 in. tube connections for air service, lubricant # 3.

34. Pipe fittings (galvanized) as follow:
    a. street elbows, 3/8 in., 6 ea.,
    b. elbows, 3/8 in. 4 ea.
    c. short nipples, 3/8 in., 4 ea.
    d. Tees, 3/8 in., 2 ea.
    e. cross, 3/8 in., 1 ea.
    f. elbows, 1/2 in., 4 ea.
    g. street elbows, 1/2 in., 2 ea.
    h. tees, 1/2 in., 2 ea.
    i. short nipples, 1/2 in., 4 ea.
    j. 3/8 in. pipe, galvanized, 1 length.
    k. 1/2 in. pipe galvanized, 1 length.

35. Parker, Push-lok-82 fittings and hose as follows:
    a. Push-lok 3/8 - 3/8 - 30182-4, 8 ea.
    b. Push-lok 3/8 - 6 - 30682 - 4, 8 ea.
    c. Push-lok hose # 3/8 - 831, 20 ft.
    d. Push-lok 1/2 - 1/2 - 30182-4, 6 ea.
    e. Push-lok 1/2 - 8 - 30682-4, 6 ea.
    f. Push-lok hose # 1/2-831, 20 ft.

36. Tubing to pipe adapter, 3/8 NPT to 3/8 - 37°, straight through, Parker no. 6-6-0103-1, 8 ea.

37. Tubing to pipe adapter, 1/2 NPT to 1/2 - 37°, straight through, Parker no. 8-8-0103-1, 8 ea.

38. Gauge; Heise, 12 in., 12,000 psi max., with automa tic thermal compensator and slotted link, port opening in back of case ~~to connect to Autoclave Engineers 5/16 - 9/16 in. "Slimline" tubing for 15,000 psi use~~. 1/4" N.P.T. female. Gage divisions 0-12,000 in steps of 10 psi.

39. Press stand: 1 ea., consists of steel cylinder 20 in. O. D. x 19 in. I. D. x 30 in. long. A ring 18 in. I. D. x 19 in. O. D. x 1/2 in. wide is welded into one end of the steel cylinder 3 in. from one end. The upright ram base is inserted into the 19 in. I. D. cylinder to a depth of 3 in. and rests on this 1/2 in. wide ring. The other end of the cylinder is welded to a 1" thick circular steel plate ~~24~~ 30 in. in diameter. This forms the base that rests on the floor. Two equispaced oval holes about 12 in. wide x 24 in. long are flame cut into the sides of the 20 in. diameter cylinder to provide access to the bottom side of the ram base.

40. Control console: Standard Electronics rack.

41. Insulating disks: plastic, fiber reinforced, hard, electrical, 5 in. O. D. x .025 in. thick, 4 ea. (for use beneath positioning ring and back-up block).

42. Fiber washers: # 10 screw size, flat, electrical insulating (for use with positioning ring). 1 box.

43. Washers: nickel or cadmium plated, # 10 screw size (for use in mounting positioning ring). 1 box.

44. Tie bars: 6 ea., stress proof (LaSalle Steel Co.), 100,000 psi minimum yield, to finish 4 in. diameter x 37 in. long.

45. Tie bar set screws: 12 ea., 1/2" - 20 x 1/2" long, oval point.

46. Hydraulic oil: 10 gals, Enerpac premium (Wichita Hydraulic Equipment Co., 314 No. Water St.)

47. Electrical insulating sleeves, 20 ea., .248" ± .002 O. D. x .025" ± .002 thick wall x 1" ± .015 long, for placement within 1/4" holes in positioner.

48. Cooling water inlet and outlet pipes, 8 ea., stainless steel, .250" ± .001 O. D. x about .156 I. D. x 3-1/2" long. Threaded one end 1/4 - 28 thd. for 1/2" length.

49. Keys, hard plastic laminate, 4 ea., .1865 ± .0010 wide x .219 ± .005 high x 2.375 ± .020" long. Must be electrically insulating.
50. Anvil back-up block - Same as H. T. Hall drawing # 1, Jan. 30, 1962, 4 ea.
51. Electrical connector: 4 ea., of brass, 6-1/2" O.D. x 4" I.D. x 2" wide x 3/4" thick.
52. Welding Cable: 4 ea., No. 2, 6 ft. long.

Total Press Weight (estimate): 5060 pounds.