

Subject:

Contract [redacted]  
Additional Funding

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Reference:

[redacted]

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Gentlemen:

In accordance

[redacted]

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[redacted] hereby requests that the subject Task Order be amended to provide additional funding. We feel that the increase in funding and extension of delivery are justified for the following reasons, and are in compliance with Section E, Article 12 of the subject contract, entitled "Changes".

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The initial concept of the vacuum table called for two plexiglass plates bolted to a casting, with a valve design utilizing the government patent. A stamping with a collar retainer was suggested. Early design efforts were made along these lines and the first mock-up of the Vacuum Table used these ideas.

The immediate problem with the mock-up was found to be improper sealing between the plates. If the individual valves are not isolated from each other they will not function as intended. Several methods for sealing were tried unsuccessfully before applying the relatively expensive method of using individual O-rings around each hole. The number of holes involved is 4231. This number was estimated at 1600 in the initial concept as the hole spacing was estimated to be one inch. The one inch spacing was reduced to 5/8 inch after tests with photographic paper indicated that resolution losses would occur due to too high a curled edge. The actual required value of resolution was not spelled out in the specifications but was obtained verbally from the customer representative.

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Declass Review by NIMA / DoD

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The use of plexiglass was ruled out after the customer's representative pointed out that the surface of the table must be opaque rather than translucent as is white plexiglass. This change involved some redesign, primarily in the method of bolting the plates to the casting.

Having solved the sealing problems on the mock-up with O-rings, the design of the valves was investigated. The collar type valve was found to be unsuccessful as the material required for proper valve seating was much thinner than anticipated. The thinner material could not be bent into the required shape with any degree of accuracy. Much time was spent developing the valve design for proper seating, ease of manufacturing and reasonable degree of accuracy.

The large increase in the number of valves (from 1600 to 4231) resulted in much greater CFM requirements on the vacuum pump. In an effort to reduce these losses the valve port diameter and the valve seat were investigated. This led to the optimizing of the valve components. The shape of the valve chamber entrance on the table surface was found to be critical. Investigation showed that a flared approach to the hole provided the best pulling (or holding) power with the minimum paper sag over the hole.

The vacuum requirements, which influenced the design from the start were found to be much more severe than was estimated. The vacuum source (to be furnished by the Government) was originally intended to be a vacuum cleaner with high CFM and low vacuum. This proved to be inadequate as a relatively high vacuum is required to hold double weight paper flat to the table. Final results indicate that relatively high vacuum and high CFM are required.

Much design emphasis was placed on keeping machining costs and special tooling to a minimum. Even with this, problems in machining occurred. A 42 inch square plate with over 4200 multi-diameter holes requires special machinery. Much schedule delay occurred as a result of not being able to find vendors for the plates. The plates ended up costing much more to manufacture than estimated, as did the table casting.

In summary, it can be said that the large amount of development work required plus the specialized machining have resulted in a sizable increase over the original budget, particularly in the areas of material and subcontracting.

Because of the lack of funding we are now in a "stop work" condition. Upon receipt of design parameters from the customer's technical representative we will submit a proposal to complete the project.

The following is a breakdown of the funding requested.

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