Requirements for ILBNP - Improved Lower Body Neg. Press.

General: This device is to be a working prototype of a flight version of an ILBNP which will consist of a garment covering each foot and leg separately & and lower torso to the iliac crests. It will have a series of compartments with increasingly negative pressures from torso to feet and ranging from a usual -15 mm Hg to -105. Each compartment will be controlled by a pressure regulator in the suit. Associated gear to be delivered within 7 months from receipt of contract and materials includes a negative pressure pump and longitudinal support for the garment.

Configuration - The device will be based on the prototype developed by Whitmore Enterprises using annular steel support rings for a fabric garment possibly with rigid shoes. The compartment separators will be a custom fitted resilient foam or equivalent which are self adjusting with the exception of the torso. Each There will be six compartments in the leg and a single torso compartment. At least one port in each compartment will allow the pressures to be independently controlled. Either series or parallel or any combination of regulators & negative pressure sources may be used. It is assumed that some form of waist

ILBNP

support, probably over the shoulder straps will be required as will an adjustable waist ~~band~~ seal. A ~~a pair of~~ flexible supply line will allow freedom of motion of each leg and a reasonable range of freedom. The range of motion of the suit will be that allowed by the construction and pressures. A ~~pr~~ gauge and switch will allow each compartment to be monitored.

Specifications: The goal of this development is to produce a workable suit i.e. one which produces a series of increasing negative pressures from low torso to foot and which can be worn for reasonable periods rather than meet specifications. In keeping with this specifications should be used as goals rather than absolute measures. A flow meter must be available for test and will be delivered.

Size/wt - Custom fitted to the project engineer. (W.T.)

Weight of suit proper is less than 50 # and ~~stowed~~ stowed volume is equal to or less than a standard locker. This does not include the vacuum pump.

A ~~single~~ negative pressure gauge will allow monitoring of any compatment relative to ambient pressure with an

It shall be a goal ~~of these~~ to maintain pressures within ± 10 mm. Hg of set ~~to~~ values. The regulators should be capable of ~~to~~ independently set pressure differentials of 10, 15 & 20 mm Hg in the absence of significant leaks.

There shall be safety pressure ~~regula~~ valves or other arrangement to limit torso pressure to - 35 mm Hg ± a tolerance of ~~to~~ upper thigh to -70 and calf to -150; all ± 10 mm Hg.

If commercially available a 24 V. pressure pump should be used however a manual pump may be substituted.

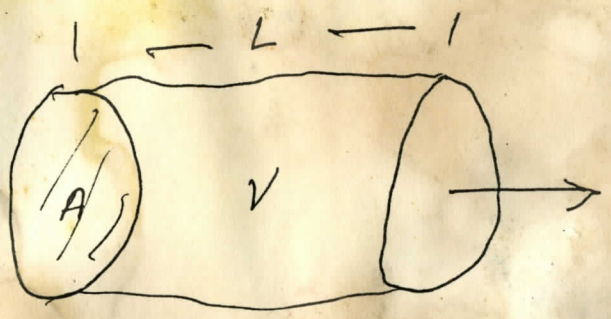
Reports, delivery, etc. -

A brief monthly progress report will be required and a final report that outlines only technical differences from the goals or previous prototype. It is anticipated that several fittings & test values will be made, at the contractors if possible, but otherwise at JSC. The final acceptance will be at JSC at which time test values will be recorded. The pump, gauges & suit will be delivered

G.F.E. Pressure suit material equivalent to that used in the previous contract will be supplied. If possible a cast of the user's leg will be provided, otherwise any and all measurements as needed.

$V = LA$

$A = 2\pi r^2$



$P = 100$ mm Hg

$P = 1.9$ PSI

760 mm Hg = 14.7 psi

or

$$760 \overline{)\,14.70} \quad .0193$$

$$\begin{array}{r} 760 \\ \hline 7100 \\ 6840 \\ \hline 2600 \end{array}$$

1.9×10^{-2} PSI / mm Hg