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FINAL REPORT

CR 115534

QUALIFICATION TEST UNIT SLIDE STAINER

(BECKMAN P/N 673753)

(NASA-CR-115534) QUALIFICATION TEST UNIT SLIDE STAINER (BECKMAN P/N 673753) Final Report P.S. Bernier (Beckman Instruments, Inc.) Mar. 1972 144 p CSCL 14B G3/14

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Contract NAS 9-12473

March 1972

Prepared for:

National Aeronautics and Space Administration
Manned Spacecraft Center
Operations Equipment Development Branch
Houston, Texas

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TITLE IMSS SLIDE STAINER QUALIFICATION UNIT

CUSTOMER NASA/MSC

CONTRACT NO. NAS 9-12473

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RELEASE DATE 3/16/72

673753

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March 22, 1972
FR-1097-101

Attention: Mr. J. L. Day, Mail Code DE52

Subject: Final Report
Fabrication of a Slide Stainer for
Period January through March 17, 1972

Reference: Contract No. NAS 9-12473

Gentlemen:

During the period covered by this final report, the Advanced Technology Operations of Beckman Instruments, Inc., has designed, fabricated, and tested a Qualification Test Unit Slide Stainer, Beckman P/N 673753. This letter and its attachments summarize the results of the contract. Attachments to this letter are as follows:

A. Top assembly drawing, Qualification Test Unit Slide Stainer.

B. Predelivery Acceptance Test Plan and Procedure.

C. PDA Test Data Sheets.

D. Operating Procedures.

E. Materials and Parts List.

F. Reagents List.

FABRICATION AND TESTING

Objective

The objective of this contract was to fabricate and acceptance test one Beckman P/N 673753 IMSS Slide Stainer developed under contract NAS 9-11929. The Slide

Stainer was to be designated as a Qualification Test Unit, and would be capable of performing both Gram and Wright blood stains of prepared slides.

The Approach

Again, attention was given to liquid containment, waste handling, absence of contamination from previous staining, and stability of reagents. The staining unit was to be self-contained and capable of independent operation. In addition, a reduction in both weight and size, as compared to the prototype, was to be accomplished in conjunction with certain modifications reflected from testing the prototype delivered previously.

The Environment

The design objectives of this module were that it operate under one- or zero-g conditions and be compatible with Skylab A environmental conditions.

Primary Performance Objectives

The Slide Stainer module was to be designed to perform the required Slide Stainer operations in a zero- to one-g environment without contamination of the cabin atmosphere, and was to be compatible with Skylab A environmental conditions, the unit to have a maximum weight of 4.1 pounds including expendables and maximum nominal dimensions of 4.1 x 5.1 x 9.0 inches. The Slide Stainer would have the capability of staining 48 Gram stains and 16 Wright stains, mixed intermittently.

Secondary Performance Characteristics

Slide Holder

The slide holder was to be designed to confine the slide in such a manner as to allow reagents and rinse solutions to pass over the area to be stained without escaping to the cabin atmosphere.

Visual Indication

The slide was to be mounted to allow visual indication that the various stains had covered the area of interest, and that the stains had been adequately flushed before the slide is removed.

Liquid Handling

The various stains and reagents were to be confined and handled in a manner to prevent leakage and dissemination of liquids or vapors into the cabin.

Liquid Waste

The liquid waste from the staining procedure would be collected in a disposable plastic container. The volume of the reservoir will be adequate to contain all fluids and air flushes generated during the staining of six slides. The container was to be designed to prevent the contents from spilling during disposal.

Operability, General Design Goals

Maintainability

The equipment was to be designed to provide accessibility consistent with efficient testing, service, and maintenance during all phases of testing and operational activities.

Useful Life

The equipment was to be designed to have a useful life of at least 2 years except for expendable equipment. Maintenance is an acceptable way of obtaining a useful life. Resupply and replacement or substitute components will be possible.

Shelf Life

The equipment, exclusive of reagents, was to have a minimum shelf life of 3 years under normal warehouse conditions. Any limited-calendar life items were to be identified and replacement assured, when required, by the station operating procedures. The desired shelf life of reagents was to be 9 months.

Operating Life

Limited operating life items were to be identified and on-time replacement, recalibration, or adjustments assured, when required, for the station operating procedures.

Environment

The equipment and its components were to withstand the Skylab A environmental conditions.

Design Concept

A block diagram of the design concept of the Slide Stainer is shown in Figure 1. Reagents are stored and dispensed from modified syringes fitted with a screw drive for the plunger. The tip of each syringe is fitted with a cap holding a rubber septum. In use, the syringe tips are pushed over a needle mounted in a manifold and connected to a reagent selector valve. The needles penetrate the septum of each syringe and permit the liquid contents to be dispensed.

A common air and water flush input to the reagent selector valve connects directly into the common output line of the valve within the valve body. The common output of the selector valve connects directly to the staining chamber.

The staining chamber cover permits the positioning of a 1- x 3-inch microscopic slide over an "O" ring. Closing the chamber cover forces the slide onto the "O" ring, forming a very small volume circular cavity between the surface of the glass slide and the bottom of the chamber. Small entrance and exit ports in the base of the chamber allow the flow of fluids through the formed cavity. Manually operated plunger-type pumps force flushing water and air through the cavity to flush out staining solutions.

Additional Specifications

The following specifications outline the IMSS Qualification Test Slide Stainer as defined by Beckman P/N 673753 and modifications reflected by present testing. The primary, but not total, modifications include:

1. Retention of the slide chamber cover in open position.
2. Detents or positions on reagent selector valve in flushing positions. (The initial position of reagent dispenser screws and each 1/4 turn is marked.)

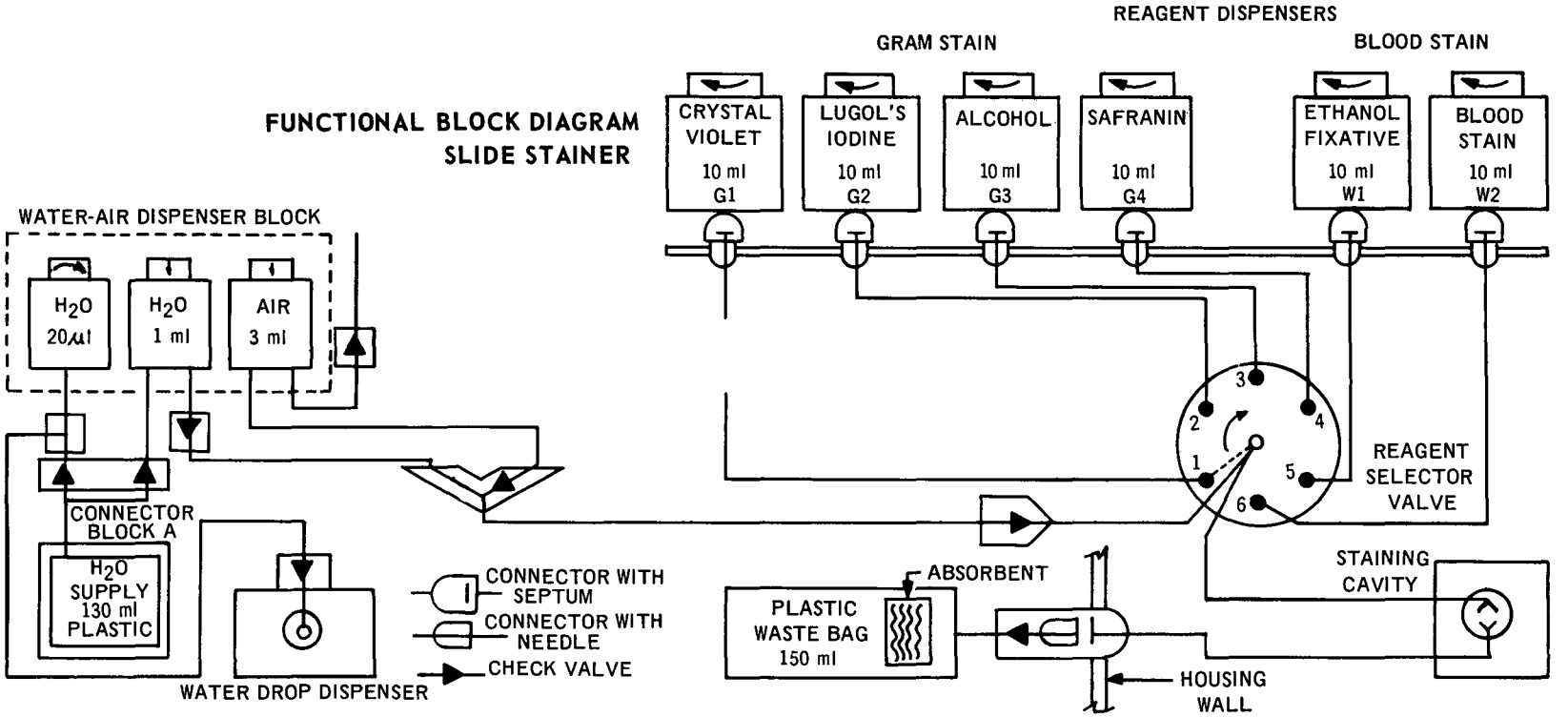


Figure 1. Qualification Test Unit Slide Stainer, Functional Block Diagram.

3. Location and marking of system flush probe valve interior to the Slide Stainer and relocation of door and lengthen probe, or provide other improved flushing system.
4. Serrations totally around reagent dispenser body head.
5. Brazing or other positive attachment of needle manifolds to needles.
6. Delete water reservoir housing.
7. Store water bags evacuated for use with S/C water, including adaptor for water gun.
8. Water drop dispenser corrected to give reliable operation.
9. Spring pressure increased to positively locate the reagent dispenser.
10. All plastic parts of Teflon or polycarbonate.
11. Eliminate potential corrosion problems.
12. Positively retain "O" ring.
13. Operating procedure displayed on each unit.
14. A device provided to retain Slide Stainer in IMSS, as defined by MSC.

THE QUALIFICATION TEST UNIT SLIDE STAINER

The completed Qualification Test Unit Slide Stainer, Beckman P/N 673753, is shown in Figures 2 and 3 with the major components identified. A Top Assembly Drawing, Attachment A, shows the detailed construction of the Slide Stainer and, together with the Parts and Materials List, Attachment E, identifies components.

The Qualification Test Slide Stainer differs considerably from the prototype unit in that it is slightly smaller in size, 4.1 x 5.1 x 9.0 inches instead of 4.3 x 5.3 x 9.2 inches, and weighs slightly less than 4.1 pounds instead of 7 pounds. Also, many of the internal parts of the Qualification Test Unit do not resemble those of the prototype but do, however, reflect those changes necessary for weight reduction and required modifications.

Weight Reduction

It was first thought that the weight reduction could be accomplished by a materials substitution method with a moderate amount of redesign of the dispenser guide tube assembly utilizing lightening holds where permissible.

Actually, the weight and size reduction, coupled with the required modifications, resulted in a major redesign effort. The redesign and modifications are described in this report. The improvements and changes in the Qualification Test Slide Stainer over the prototype are considerable. A physical examination and operation of both units is needed for complete comparison and appreciation of the work involved.

A major weight reduction resulted in replacing the heavy, 613-gram polycarbonate block dispenser guide tube assembly with a lightweight, 192-gram dip-brazed aluminum structure with numerous lightening holes (see Detail A, Top Assembly Drawing shown in Attachment A.) The two large-needle connector blocks were replaced with six small individual needle connector blocks, resulting in a weight reduction of over 150 grams.

Each reagent dispenser assembly was reduced approximately 90 grams by substituting polycarbonate for aluminum in the outer shell. Polycarbonate has a specific gravity of 1.20 while aluminum has a specific gravity of 2.5. Aluminum was also substituted for steel and brass for another weight reduction. Shafts, knobs, etc., were hollowed out and the tubes were reduced in weight by putting numerous lightening holes in the tube walls.

Where structurally possible, thinner aluminum walls were used, especially in the housing, doors, and bottom plate. Unnecessary bulk weight was removed from the staining chamber, chamber cover, drop dispenser, selector valve body, knobs, and connector blocks. In places such as the selector valve knob, substituting polycarbonate for aluminum, plus hollowing out of the structure, resulted in about 3-to-1 weight reduction. The water and air dispenser assembly was made smaller and the plungers were hollowed out.

The flushing valve, probe, tubing, and storage space in the front door were eliminated by utilizing residual alcohol in reagent dispensers G3 and W1 for flushing, thus aiding in weight reduction.

A saving of 125 grams was realized by adding a 5-gram S/C water-gun fitting to the water supply bag, thus permitting the use of S/C water.

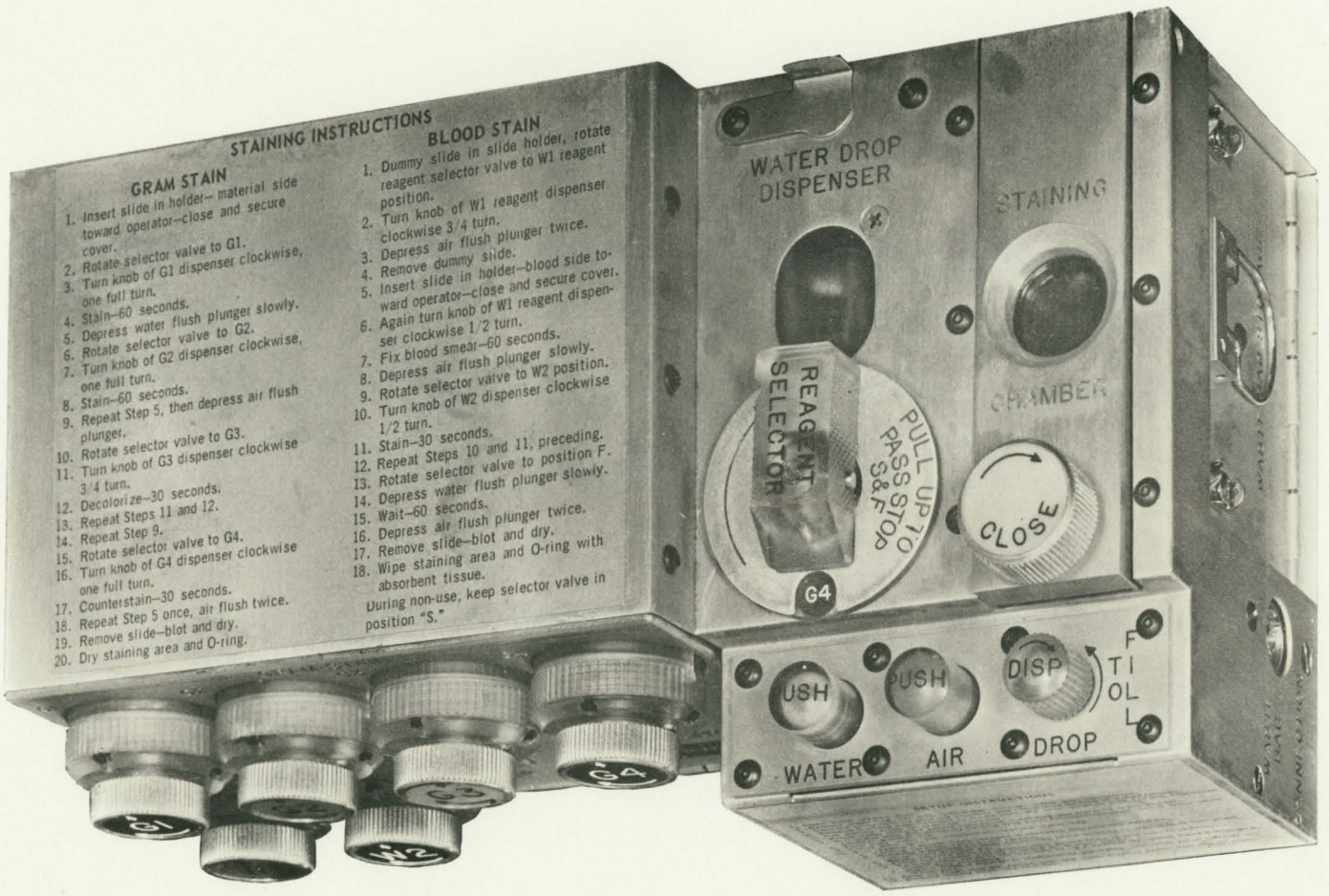


Figure 2. Qualification Test Unit Slide Stainer, Top View.

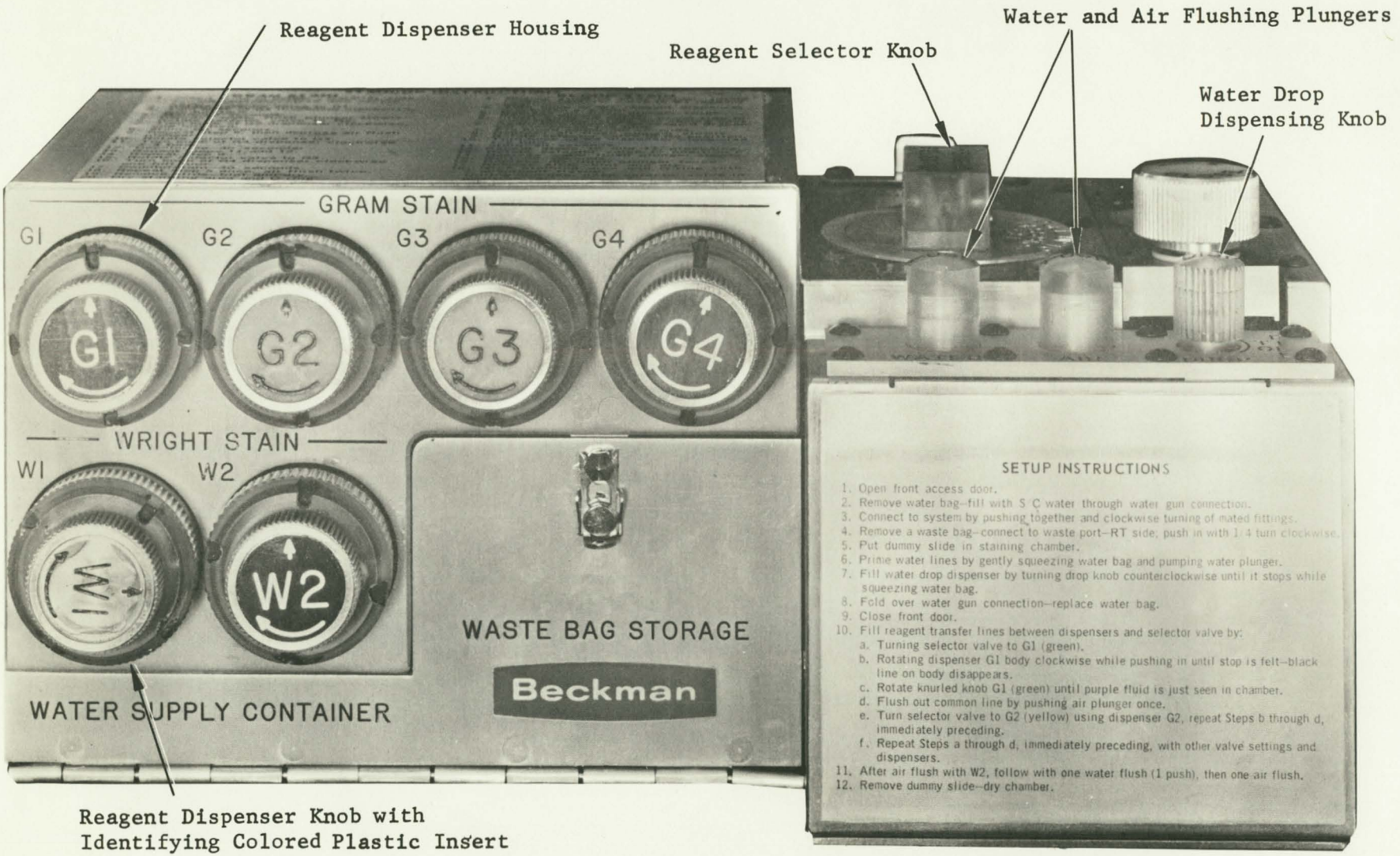


Figure 3. Qualification Test Unit Slide Stainer, Front View.

Reagent Dispenser Seal Redesign and Test

During evaluation of the Prototype Slide Stainer at NASA-MSC, many of the reagent dispensers were found to leak reagents past the double Teflon sealing edges of the dispenser plunger tip. Eventually, this was traced to the wide range of thermal expansion and contraction of Teflon. The problem was solved by installing an oversize "O" ring in the groove immediately behind the dual Teflon sealing edges. During the period in which the sealing problem was being studied, Beckman personnel worked closely with The Hamilton Co., supplier of the glass syringe barrels and plunger tips. Three novel and different Teflon tips were furnished Beckman by The Hamilton Co. for evaluation. All three failed to meet the requirements, especially in low temperature ($40^{o}F$) sealing ability. The final design adopted for the Qualification Test Unit is shown in Figure 4. Basically, the two Teflon sealing edges are backed up by two rubber "O" rings. To test this concept, all 18 reagent dispensers were filled with alcohol, then cycled between $40^{o}F$ and $105^{o}F$ six times, allowing the dispensers to reach room temperature prior to changing temperature environment exposure. Initially, the dispensers were exposed to $40^{o}F$ temperature for 72 hours, then removed and immediately maximum pressure applied by finger tightening the dispenser knob. After the initial test, a minimum of 8 hours exposure at either temperature was immediately followed by applying maximum pressure. Another pressure test was performed by connecting a reagent dispenser to a pressure gauge via a copper tube and adaptor. The knurled knob of the reagent dispenser was turned to maximum finger torque and a maximum pressure of 40 psi was realized. Each syringe was then tested for total as well as needle-septum leakage by placing each over a needle adaptor and applying 60 psi from an external source connected to the needle adaptor and pressure gauge through a "T" fitting. No leaks were observed at the needle septum interface or around the plunger after approximately 3 minutes at 60 psi.

Fluid Transport System Pressure Test

During assembly and after final assembly, each dispenser, septum-needle interface, and selector valve position and associated tubing was pressure-tested to 60 psi without observing any leaks. In addition, the staining chamber, with a

dummy slide in position, and the waste port connection were tested to 60 psi without evidence of leaks.

The air and water flushing systems were tested with a dummy slide in the chamber and the waste port connection blocked. No leakage was observed with maximum finger pressure on the plungers.

"O" Ring Material

The "O" ring used in the reagent dispensers and those used in the water and air plungers have such specific requirements as long term storage under compression (low compression set), good abrasion resistance, compatibility with the various chemical reagents, and good oxidation resistance because of the relatively high oxygen content of the Skylab environment.

An application engineer at a local "O" ring distributor assisted in the selection of the "O" ring material. This material was a fluoro-silicone elastomer, TH1057, and was chosen because of its very low compression set and excellent oxidation resistance. During preliminary assembly and testing, it was observed that the "O" rings made with TH1057 had poor abrasion resistance and mechanical strength. Actual tests of the "O" rings lubricated with Krytox 240AC and placed in the water and air flushing assembly showed that small rubber particles were being rubbed off the surface of the "O" rings during movement in the polycarbonate blocks of the flushing assembly. During assembly of the reagent dispenser plungers, a moderate stretching of the "O" ring is necessary. When stretched, the "O" rings made of TH1057 showed small tears or broke apart. Based on the above experience, a decision was made to use VITON A "O" rings throughout the Slide Stainer.

Material Substitution Problems

As part of the weight reduction and redesign, the reagent dispenser knob and threaded shaft were changed from steel to polycarbonate for the knob and aluminum for the threaded shaft. The knob and shaft are retained in position but allowed to rotate by the use of a retainer ring around the base of the knob.

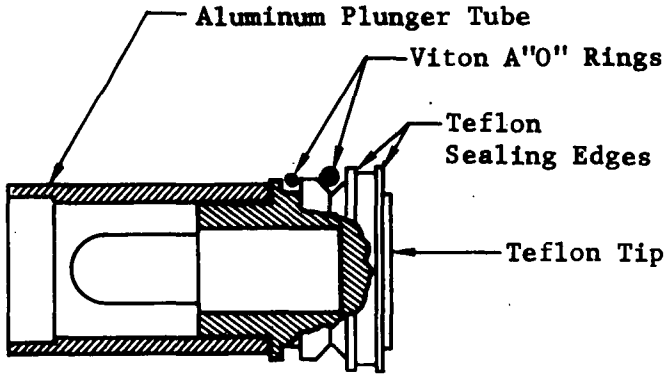


Figure 4. Reagent Dispenser Plunger Tip Showing Sealing "O" Rings.

During preliminary assembly, it was found that the polycarbonate knob was apparently too soft and permitted the retaining ring to slip off when axial loading was applied. A hollowed out aluminum knob was substituted for the polycarbonate knob.

During the refilling of reagent dispensers following a PDA test, the threaded tip of two polycarbonate dispenser end-caps twisted off. The major cause of this failure was determined to be a too-thin wall inside the threaded polycarbonate section coupled with too much stress applied by the compression of the rubber septum and bottoming out of the septum cap. A third dispenser was found to have a cracked threaded area but did not leak during the testing.

The end cap was redesigned with a larger thread, thus permitting a thicker wall and the polycarbonate part annealed after machining.

To allow a larger thread inside the septum cap but keeping the same outer diameter, the material for the septum cap was changed to aluminum. To reduce the possible stress on the end cap caused by bottoming out of the septum cap, the septum cap was made shorter.

The end cap, as well as the whole housing of the reagent dispenser, was originally made of aluminum in the prototype unit. As part of the redesign of the dispenser to reduce weight, polycarbonate was substituted for aluminum and the difference in strength taken into consideration. However, the wall thickness and associated stress of the threaded section of the end cap were apparently not given adequate attention.

A report of this failure is also covered in Attachment C, Predelivery Acceptance Test Data Sheets.

Preparation of Reagents

The Gram stain reagents (see Attachment F) were prepared according to standard procedure as given in Gradwohl, R.B.H., M.D.; "Clinical Laboratory Methods and Diagnosis," 1956 Ed., p. 1401.

After aging for 72 hours, the reagents were filtered through Whatman #1 filter paper. A wetting agent, LECONAL WETTING AGENT, distributed by E. H. Sargent & Co., was added to the crystal violet reagent, Gram's Iodine and safranin counter stain--3-ml wetting agent to 500-ml stain.

The stains, including the Camco Quick Stain, were then aged 40°F for 72 hours and filtered cold. A final aging of 7 days, followed by filtering, was performed prior to use.

Gram stains of known gram positive and gram negative organisms were made, using standard stains and procedures and compared with gram stains of the same organisms stained with the specially prepared and filtered reagents. There was no observable difference between the two sets.

Evaluation of Staining Procedures for Qual Test Unit Slide Stainer

Preliminary gram stain procedures resulted in doubtful gram stains or mixed staining of a single organism because of excess bubble formation in the staining cavity. It was immediately noted that the Gram's Iodine, reagent G2, showed poor flow characteristics in the staining cavity with the formation of bubbles. The crystal violet stain, reagent G1, showed only a slight tendency for bubble formation while the decolorizing alcohol, G3, and the counterstain, G4, appeared to thoroughly wet the slide surface and had little tendency for bubble formation.

Initially, poor wetting of the slide surface appeared to be the major cause of bubble formation with the Gram's Iodine solution, G2. A wetting agent was tested with a small quantity of reagents G1, G2, and G4 using B. Subtilis as a gram positive organism and S. marcescens as a gram negative organism. Both organisms stained typically. Therefore, wetting agent at a concentration of 3-ml per 500-ml stain was added to reagents G1, G2, and G4.

When the reagents with the wetting agent were used in the stainer, a 50-percent reduction of bubble formation was noted, especially with the Gram's Iodine, G2.

Further experimentation identified the air flush used prior to the Gram's Iodine as a contributing factor in the bubble formation. The staining procedure was modified to use only a water flush between the crystal violet reagent, G1, and the Gram's Iodine, G2. The addition of the wetting agent and the omission of two air flushes following the crystal violet reagent has resulted in a staining procedure in which the formation of bubbles is held to a minimum and which produces a reliable Gram Stain--equivalent to standard laboratory gram stains.

Flushing Procedure Evaluation

Part of the weight reduction was accomplished by eliminating the flushing probe, valve, and associated tubing and clamps --The flushing of the Qual Test Unit to be performed by using the residual alcohol in dispensers G3 and W1. Since the alcohol is a better solvent for the reagents (stains) than water, a smaller quantity of alcohol should be adequate.

To evaluate this flushing concept, the following test was performed:

The Slide Stainer was set up as per instructions (see Attachment D). Sixteen gram stains and 8 blood stains were performed as per staining instructions

(Attachment D). Following the staining procedures, reagent dispensers G1, G2, G4, and W2 were removed. Dispensers G1 and/or G3, containing alcohol, were put in place of G1, G2, G4 and W2 and alcohol flushed through the lines as given in Attachment D flushing instructions. Following the flushing, the stainer was placed in a vacuum chamber and the chamber pumped down to 25 microns or less and maintained at or below 25 microns for a minimum of 8 hours. After removal from the vacuum chamber, the needles and fluid transfer lines were tested for blockage by residual reagents. The cycle was repeated six more times without any evidence of blockage of lines or needles due to residual reagents. A total of 116 gram stains and 56 blood stains were performed satisfactorily prior to the PDA tests.

FULFILLMENT OF SPECIFICATIONS

The specifications listed were fulfilled as follows:

1. A ball-plunger and detent were installed in the staining chamber and cover to retain the cover in an open position when required.

2. Two additional positions of the selector valve were marked S, for stop, and F, for flush, and two stops installed in the knob assembly such that the knob must be pulled up about 1/8 inch in order to pass these two stops.

3. As explained elsewhere in this report, an improved flushing procedure has eliminated the need for flushing probe, valve, and attachments.

4. A coarse knurl has been placed totally around the reagent dispenser body head and each 1/4 turn marked with a groove and painted black.

5. Needles have been soft-soldered to a stainless steel plate which is made part of the individual needle connectors. Brazing would anneal or soften the needle and permit easy bending.

6. The water reservoir housing has been deleted.

7. Water bags are being designed to include an S/C adaptor for the water gun and will be stored evacuated.

8. The water drop dispenser has been redesigned and in principle now functions similar to the reagent dispenser. Turning the knob counter-clockwise fully fills the dispenser--turning 1/4 turn clockwise a 20 μl drop at the drop dispenser port.

9. The spring rate of the spring used for retention of reagent dispensers in the prototype Slide Stainer was given by the vendor as 7 pounds. The springs used in the same position in the Qualification Test Unit have a 9- to 12-pound rate.

   Since the dispenser outer shell or housing was changed from aluminum to polycarbonate and the spring rate almost doubled, the possibility of the guide pin distorting or cutting into the walls of the milled groove was considered. Two guide pins and associated grooves were designed into the reagent dispenser shell and a stress analysis made of the pin-groove and spring combination.

STRESS ANALYSIS

Stress analysis for a spring has a spring rate k = 15 lbs/inch. The force applied to two pins should be $F = k$ = 15 x 0.28 = 4.2 lbs. Each pin will then be loaded by P = 2.1 lbs. For a 0.050-inch-long pin, p = 42 lbs/inch. The contact area between the pin and the Lexan seat has a width:

$$b = 1.6\sqrt{\frac{pD_1D_2}{D_1 - D_2}\left(\frac{1 - \nu_1^2}{E_1} + \frac{1 - \nu_2^2}{E_2}\right)} = 17.88 \times 10^3 \text{ inches.}$$

The contact area is $A = b \times l_{eff} = 0.000894 \text{ inch}^2$.

The maximum stress is then $\sigma_{max} = \frac{P}{A} = 2{,}350$ psi.

Since the yield strength of Lexan is $\sigma_{ty} = 9{,}500$ psi, the margin of safety is:

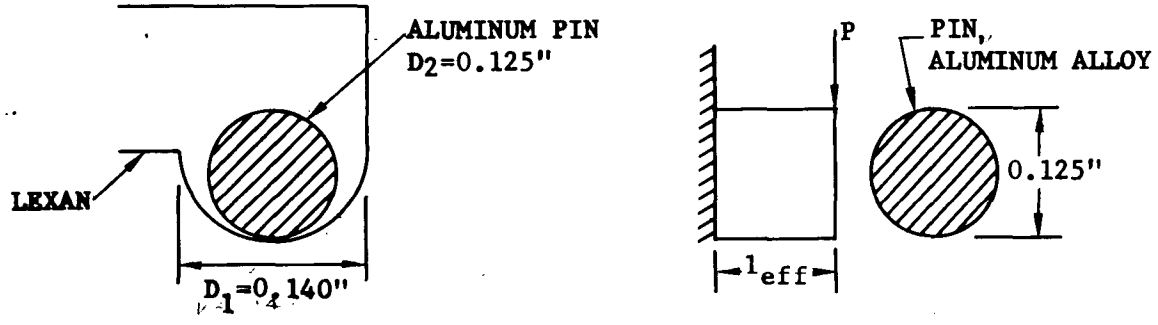
$$MS = \frac{9{,}500}{2{,}350} - 1 = 3.04 > 0$$

Assume that the pins are press-fit in the pin holes, maximum stress will occur at the fixed end.

$$\sigma_{max} = \frac{M_{max} \times \frac{D_2}{2}}{\frac{\pi}{64} D_2^4} = \frac{p \times l_{eff} \times D_2}{22 \times 10^{-6}}$$

Let $\sigma_{max} = \sigma_{ty} = 36{,}000$ psi, it implies that the maximum force that the aluminum pins can take is $P_{max} = 120$ lbs.

Since there will be only 2.1 lbs. force applied to each pin, the existing design has a margin of safety M.S. = 56>>0. No failure will be anticipated.



10. The requirement for all plastic parts to be either Teflon or polycarbonate could not be met. The Chromatronix reagent selector valve is obtainable only in Kel-F or Delrin. Kel-F is close to Teflon in many of its properties, so a Kel-F valve was used.

    The colored identification discs in the knob of each reagent dispenser and as part of the selector valve position indicator are still made of plexiglas since polycarbonate is not available in colors. A special order for colored polycarbonate could provide such colors, but the

cost for the small quantity required would be all out of proportion to the total cost of the slide stainer. In addition, the time required to obtain the colored polycarbonate would practically eliminate its use in any Skylab Slide Stainer.

The Teflon tubing connector assembly utilizes a plastic fitting, Beckman P/N 183956, available only in Delrin and weighing 0.2 gram. Teflon would be mechanically unsuitable and time did not permit obtaining a special order using Kel-F as the material.

The water and waste bags being designed and fabricated by Whirlpool Corp. are required to have a short one-inch flexible tube suitable for attaching the water and waste bag connectors. The actual material has not been detailed yet but is not likely to be Teflon.

11. Elimination of potential corrosion problem has been fulfilled by using stainless steel screws in areas of concern and all springs, except the small one in the reagent selector valve knob, are Teflon-coated for maximum corrosion resistance (0.5 mil FEP and 2 coats of 1.0 mil TFE).

12. The "O" ring forming the staining chamber cavity is now cemented in place with epoxy cement.

13. The Qualification Test Unit Slide Stainer has the setup instructions on the front panel, the staining instructions on the top, the flushing instructions on the left side-panel and a block diagram of the fluid system on the back. The instructions were photographically imprinted on a 7-mil litho plate which was then cemented on the Stainer housing.

14. A spring made according to NASA-MSC drawing SDC 42100354 was riveted to the back of the instrument.

Additional Changes or Modifications

A few additional changes or modifications were incorporated in the Qualification Test Unit:

1. Connector blocks secured to main housing to assure maximum protection of fluid system during vibration and other environmental tests.
2. Air and water flush connection made directly into selector valve stator to provide greater flushing efficiency and increased component reliability.
3. The efficiency and reliability of the water and air flushing plungers has been increased by the use of two sealing "O" rings in place of a single "O" ring.

PROBABLE MODIFICATIONS FOR FLIGHT QUALIFIED SLIDE STAINER

During the PDA tests, Mr. J. Day commented on a few improvements which he suggested be incorporated in any future slide stainer for NASA.

1. Color anodizing of housing either blue or black.
2. More positive detent action on reagent dispensers.
3. Use of magnetic septum retainer tool and septum retainer.
4. All screws to be standard slotted heads for ease of maintenance.
5. Annealing all polycarbonate parts following machining.

ATTACHMENT A

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ATP-1097-501

Revised March 1972

ATTACHMENT B

PREDELIVERY ACCEPTANCE TEST PLAN AND PROCEDURE

FOR

QUALIFICATION TEST UNIT SLIDE STAINER

(Beckman P/N 673753)

Contract NAS 9-12473

February 1972

Prepared for:

National Aeronautics and Space Administration
Manned Spacecraft Center
Operations Equipment Development Branch
Houston, Texas

1.0 PREDELIVERY ACCEPTANCE TEST PLAN

1.1 Scope

The Qualification Test Slide Stainer shall be a self-contained system capable of performing both an eight-step Gram Stain of micro-organisms and a Wright's stain of blood smears.

The Predelivery Acceptance Test shall demonstrate the performance characteristics described below.

2.0 PERFORMANCE CHARACTERISTICS

2.1 Primary

2.1.1 The unit shall have the capability of staining both heat-fixed micro-organism slide preparations with an eight-step Gram stain and blood smears with a Wright's stain mixed intermittently.

2.1.2 The Gram stained micro-organism preparations and Wright-stained blood smears will be equivalent to similar preparations stained by standard laboratory methods.

2.1.3 The stainer shall be capable of operating in a zero to 1 g environment without contamination of the spacecraft atmosphere.

2.1.4 Maximum nominal dimensions to be 4.1 x 5.1 x 9.0 inches.

2.1.5 Maximum weight to be 4.1 pounds.

2.2 Secondary

2.2.1 The slide holder shall confine the slide in such a manner as to allow reagents and rinse solutions to pass over the area to be stained without escaping to the spacecraft atmosphere.

2.2.2 The slide holder shall allow visual indication that the various stains have covered the area of interest, and that stains have been adequately flushed before slide removal.

2.2.3 The various stains and reagents shall be confined and handled in a manner that prevents leakage and dissemination of liquids and vapors into the spacecraft atmosphere.

2.2.4 The liquid waste from the staining procedure will be collected in a disposable plastic container. The volume of the waste container will be adequate to contain all fluid and air flushes during the staining of six slides. The waste container shall be designed to prevent the contents from spilling during disposal.

2.2.4.1 Each waste container shall contain a liquid absorbent capable of absorbing the liquid waste from staining six slides.

2.2.4.2 Number of waste containers shall be stored within the staining units and be easily accessible.

2.2.5 A means of dispensing a drop of water for slide preparation shall be provided.

2.2.6 The reagent and stain storage and dispensing containers to be of a material(s) which will not affect the normal stability of stains or reagents.

2.2.7 Reagent and stain transport system to have minimum contamination from previous staining.

2.2.8 Easy resupply of reagents and wash water.

2.2.9 A means of flushing entire system when required.

2.2.10 A hold-down connection shall be provided in the bottom of the unit.

2.2.11 Reagent and stain dispensers and valve positions shall be positively identified.

2.2.12 Accessibility for maintenance to provide required useful life and shelf life.

3.0 PREDELIVERY ACCEPTANCE TEST PROCEDURE

3.1 Physical Inspection

3.1.1 A physical inspection shall be conducted to demonstrate the requirements listed in Table 1.

TABLE 1

Requirement	Inspection Method	Predelivery Acceptance Data Sheet
Dimensions	Measurement	2.1.4
Visibility of Slide	Visual	2.2.2
Storage	Visual	2.2.4.2

Requirement	Inspection Method	Reference Paragraph
Self-containment	Visual & Analysis	1.1
Resupply	Demonstration	2.2.8
Hold-down	Visual	2.2.10
Labeling	Visual	2.2.11
Accessibility	Demonstration	2.2.12
Fluid Connection Integrity	Demonstration	2.2.3

3.1.2 A physical inspection or demonstration shall also be conducted to show compliance with the following specifications as outlined in Paragraph 3.0 in Statement of Work.

(1) Retention of the slide chamber cover in open position.

(2) Detents or positions on reagent selector valve in flushing positions. Mark initial position of reagent dispenser screws and each 1/4 turn. Dispenser screws will be easily rotated.

(3) Location and marking of system flush probe valve interior to the slide stainer and relocation of door and lengthen probe, or provide other improved flushing system.

(4) Serrations totally around reagent dispenser body head.

(5) Brazing or other positive attachment of needle manifolds to needles.

(6) Delete water reservoir housing.

(7) Store water bags evacuated for use with S/C water, including adaptor for water gun.

(8) Water drop dispenser shall be corrected to give reliable operation.

(9) Spring pressure shall be increased to positively locate the reagent dispenser.

(10) All plastic parts shall be Teflon or polycarbonate.

(11) Eliminate potential corrosion problems.

(12) Positively retain O-ring.

(13) Operating procedure shall be displayed on each unit.

(14) A device shall be provided to retain slide stainer in IMSS, as defined by MSC Dwg. SDC42100354.

3.2 Staining Demonstration

3.2.1 The staining of micro-organism slide preparations and blood smears shall demonstrate the ability of the slide stainer to meet the remainder of the requirements not covered in section 3.1.

3.2.1.1 The staining demonstration shall consist of staining of Gram-positive and Gram-negative organisms supplied by NASA. Each unit shall be tested to perform 50 gram interspersed with 25 Wright's stains without failure or leakage.

3.2.1.2 Zero gravity capability shall be demonstrated by analysis.

3.2.1.3 Two blood smears shall be stained with Wright's stain intermittently between the micro-organism slides.

3.2.1.4 To demonstrate the adequate staining of micro-organisms and blood smears by the slide stainer, duplicate micro-organism slides and blood smears shall be stained concurrently by a standard laboratory method and a comparison made.

3.2.1.5 The integrity of fluid connections shall be established by examination after the staining demonstration.

3.2.1.6 The safety features of the slide stainer, reagent containers and waste containers will be demonstrated during and following the staining procedure.

3.3 Quality Assurance

3.3.1 NASA and DCAS Quality Assurance Inspectors will witness and record the results of the test. The Quality Assurance report will be made a part of the Acceptance Test Report.

ATTACHMENT C

PREDELIVERY ACCEPTANCE TEST DATA SHEETS

AND

FAILURE/CORRECTIVE ACTION REPORT

Contract NAS 9-12473

March 1972

Prepared for:

National Aeronautics and Space Administration
Manned Spacecraft Center
Operations Equipment Development Branch
Houston, Texas

PREDELIVERY ACCEPTANCE DATA SHEET - REF: ATP-1097-501

- SLIDE STAINER -

Slide Stainer Part Number 673753 Date 3/13/72

Slide Stainer Serial Number 001 Tested by _____

Reference Paragraph 3.1 Physical Inspection

Reference Paragraph 3.1.1 Table-1

	Design Goal	Actual	Discrepancy	Remarks	Accept / Reject
1. Dimensions -				CABLE TIE FOR TUBING ON INSIDE OF UNIT MADE OF NYLON - NEED WAIVER	BTS
Height	4.1 in.	4.107"	+.007		
Width	5.1 in.	5.062"			
Depth	9.0 in.	9.033"	+.033	9.033 = HIGH POINT ON DEPTH, 8.997 = LOW POINT	
2. Weight	4.1 lbs. max. (1861.4 g)	1833.2 gm.		EST. WEIGHT OF (6) WASTE BAGS AND (1) WATER BAG = 180gm.	
3. Visibility of Slide	Window in Chamber Housing				
4. Storage	Six containers stored internally, calculated volume req. _____				
5. Self-Containment	Unit shall contain dispensers for crystal violet, gram's iodine, alcohol decolorizer, safranin, alcohol dehydrator, Wright's stain, water flush and air flush, and provision for water drop dispensing.	OPERATION OF ALL PHASES CHECKED	N/A	PERFORMANCE SATISFACTORY	BTS
6. Resupply	Reagent dispensers shall be readily replaceable. Water reservoir shall be replaceable and/or refillable from S/C water dispenser.	SAMPLE BAG FILLED	N/A	OK	BTS

C-1

PREDELIVERY ACCEPTANCE DATA SHEET

- SLIDE STAINER -

	Design Goal	Actual	Discrepancy	Remarks	Accept/~~Reject~~
7. Hold-down	A nut shall be provided to permit attachment of stainer to IMSS work station surface.	INSTALLED	N/A	OK	(BT9)
8. Labeling	All controls, dispensers, and storage areas shall be clearly labeled.	EACH CONTROL & DISPENSER LABELED	N/A	OK	(BT9)
9. Accessibility	Parts shall be accessible. Bottom plate will be removed to illustrate accessibility.	CHECKED	N/A	OK	(BT9)
10. Fluid Connection Integrity	All fluid connections will be checked for leakage after test performance.	CHECKED	NO LEAKS IN SYSTEM	OK	(BT9)

Reference Paragraph 3.1.2	Remarks	Accept/~~Reject~~
(1) OK		(BT9)
(2) OK		
(3) OK		
(4) OK		
(5) OK		
(6) OK		
(7) OK		
(8) OK		
(9) OK		
(10) OK		
(11) OK		
(12) OK		
(13) OK		(BT9)
(14) OK		

PREDELIVERY ACCEPTANCE DATA SHEET

-SLIDE STAINER -

Reference Paragraph 3.2

STAINING DEMONSTRATION

		Design Goal	Remarks	Accept/Reject
3.2.1.1.	Staining Demonstration	50 gram stain, 25 Wright's stain. Demonstration will include start-up and shut down procedure.	ALL 75 SLIDES STAINED SATISFACTORY	B/9
3.2.1.2.	Zero Gravity Capability	Two stains will be performed with unit placed on back surface. Quality of preparation will be examined.	NO DEGRADATION OF SLIDES STAINED ON BACK SURFACE	B/9
3.2.1.3.	Blood Smears	At least two blood smears will be stained in series with gram stains.	STAINS PERFORMED	B/9
3.2.1.4.	Stain Quality	Stain quality will be evaluated by comparison with standard preparations. Comparisons will be performed by NASA Tech Monitor.	STAIN QUALITY ACCEPTABLE	B/9
3.2.1.5.	Safety Features	Freedom from leakage after operation will be demonstrated.	NO SYSTEM LEAKAGE	B/9

Test Witnessed by:

NASA Q.A. Representative Richard E. McGrath NASA

Q.A. Representative R.A. Bernier

Other J. L. Day 3-16-72

J. L. DAY, CODE DES2

3/10/72
R.G. Mathews

FAILURE / CORRECTIVE ACTION REPORT FORM

NO: 1097-1

CUSTOMER/INTERNAL	PROJECT NO:	DRAWING NO:	REV.	PART/ASSM.
NASA	NAS 9-12473	673753		673908

MFG. PART ☒ / PURCH. PART ☐	ELECT ☐	MECH ☐	FAB ☒	HDWR ☐	COMP ☐	CHEMICAL ☐	OPTICS ☐	GLASS ☐	PAINT ☐	TOOLING ☐	WIRE ☐	OTHER ☐

LOT SIZE	AMT ACCEPT / AMT REJECT	QUALIFICATION ☐	TEST ☐	PROCESS ☐	DESIGN ☐	OTHER ☐

DESCRIPTION OF FAILURE

AT SEQUENCE # 3.2.1.1 of ATP-1097-501 (STAINING DEMONSTRATION) THE END CAP BROKE OFF WHILE DISASSEMBLING THE SYRINGE FOR REFILL OF REAGENT. SUBSEQUENT EXAMINATION AT SEQUENCE # 3.2.1.5 REVEALED TWO (2) MORE SYRINGES BROKEN AT THE SAME LOCATION. EVALUATION OF THE PART DETERMINED: [1] A THIN (.020") WALL IN THE END CAP AT THAT POINT, [2] STRESS OF THE MATERIAL FROM THE MACHINING OPERATION AND [3] PRESSURE CAUSED BY THE SEPTUM CAP BOTTOMING OUT ON THE END CAP, ALL CONTRIBUTED TO THE BREAKAGE.

IMMEDIATE REPLY ☐	24 HR. ☐ / 48 HR. ☐	PHONE ☐	TWX ☐	MEMO ☐	LETTER ☐	OTHER ☐	NOTE: THIS FORM MUST BE COMPLETED AND RETURNED REGARDLESS OF OTHER COMMITMENTS.

TIME: _____ DATE: _____

PROJECT ENG.	QA/RELIABILITY	LIAISON ENG.	PROJECT MANAGER	GOVERNMENT REP.
	P.A. Bernier			P.E. McGrath NE4 5-16-72

CORRECTIVE / PREVENTIVE ACTION

STOP	REDESIGN	REWORK	RE-TEST	QUALIFY	SCRAP	MRB	ACCEPT	OTHER
☐	☒	☐	☐	☐	☐	☐	☐	☐

INSTRUCTIONS

CORRECTION FOR THE ABOVE POINTS: [1] LARGER THREAD ON THE END CAP TO STRENGTHEN IT
[2] ANNEAL THE PARTS AFTER THE MACHINING OPERATION
[3] REDESIGN THE SEPTUM CAP, MAKING IT SHORTER TO PREVENT BOTTOMING OUT. CHANGED MATERIAL TO MAINTAIN STRENGTH, PART NOW MADE OF ALUMINUM

CONFIRM BY:	PHONE ☐	TWX ☐	MEMO ☐	LETTER ☐	REPORT ☐	CERTIFICATION ☐	IMMEDIATE REPLY ☐	24 HR. ☐ / 48 HR. ☐

TIME: _____ DATE: _____

AUTHORIZATION:	NAME	TITLE	REPRESENTING

2-21-64 – BA 1.16 ×22-20 64

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FAILURE / CORRECTIVE ACTION REPORT FORM NO: 1097-2

CUSTOMER/INTERNAL	PROJECT NO:	DRAWING NO:	REV.	PART/ASSM.
NASA	NAS 9-12473	673753		

MFG PART ☐ / PURCH. PART ☒	ELECT ☐	MECH ☐	FAB ☐	HDWR ☐	COMP ☐	CHEMICAL ☐	OPTICS ☐	GLASS ☐	PAINT ☐	TOOLING ☐	WIRE ☐	OTHER ☐

LOT SIZE	AMT ACCEPT / AMT REJECT 1	QUALIFICATION ☒	TEST ☒	PROCESS ☐	DESIGN ☐	OTHER ☐

DESCRIPTION OF FAILURE

WHILE PERFORMING SEQUENCE # 3.2.1.1 OF ATP-1097-501 (STAINING DEMONSTRATION) ONE OF THE GLASS SLIDES WAS BROKEN WHEN ATTEMPTING TO REMOVE IT AFTER STAINING. SEVERAL SLIDES WERE SUBSEQUENTLY INSTALLED IN THE STAINING CHAMBER AND THE CHAMBER FASTENED DOWN MUCH TIGHTER THAN REQUIRED TO SEAL THE UNIT. SLIDES WERE ALSO INSERTED IMPROPERLY, (AT AN ANGLE) IN AN ATTEMPT TO CAUSE FURTHER BREAKAGE. THE SLIDE BREAKAGE COULD NOT BE DUPLICATED.

IMMEDIATE REPLY ☐	24 HR. ☐ / 48 HR. ☐	PHONE ☐	TWX ☐	MEMO ☐	LETTER ☐	OTHER ☐	NOTE: THIS FORM MUST BE COMPLETED AND RETURNED REGARDLESS OF OTHER COMMITMENTS.

TIME: _____ DATE: _____

PROJECT ENG.	QA/RELIABILITY LIAISON ENG.	PROJECT MANAGER	GOVERNMENT REP.
	R.A. Bennion		R.E. McGrath NE4 3-16-72

CORRECTIVE / PREVENTIVE ACTION

STOP	REDESIGN	REWORK	RE-TEST	QUALIFY	SCRAP	MRB	ACCEPT	OTHER
☐	☐	☐	☐	☐	☐	☐	☒	☐

INSTRUCTIONS

SINCE FAILURE COULD NOT BE DUPLICATED, EVALUATION DETERMINED BREAKAGE DUE TO OPERATOR ERROR, NOT FAILURE OF THE SYSTEM.

CONFIRM BY:	PHONE ☐	TWX ☐	MEMO ☐	LETTER ☐	REPORT ☐	CERTIFICATION ☐	IMMEDIATE REPLY ☐	24 HR. ☐ / 48 HR. ☐

TIME: _____ DATE: _____ AUTHORIZATION: NAME _____ TITLE _____ REPRESENTING _____

2-21-64 – BA 1.16 X22-20 64

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ATTACHMENT D

OPERATING PROCEDURES

FOR

QUALIFICATION TEST UNIT SLIDE STAINER

(BECKMAN P/N 673753)

Contract NAS 9-12473

March 1972

Prepared for:

National Aeronautics and Space Administration
Manned Spacecraft Center
Operations Equipment Development Branch
Houston, Texas

FR-1097-101

STAINING INSTRUCTIONS

QUALIFICATION TEST UNIT SLIDE STAINER

STAINING INSTRUCTIONS

GRAM STAIN

1. Insert slide in holder– material side toward operator–close and secure cover.
2. Rotate selector valve to G1.
3. Turn knob of G1 dispenser clockwise, one full turn.
4. Stain–60 seconds.
5. Depress water flush plunger slowly.
6. Rotate selector valve to G2.
7. Turn knob of G2 dispenser clockwise, one full turn.
8. Stain–60 seconds.
9. Repeat Step 5, then depress air flush plunger.
10. Rotate selector valve to G3.
11. Turn knob of G3 dispenser clockwise 3/4 turn.
12. Decolorize–30 seconds.
13. Repeat Steps 11 and 12.
14. Repeat Step 9.
15. Rotate selector valve to G4.
16. Turn knob of G4 dispenser clockwise one full turn.
17. Counterstain–30 seconds.
18. Repeat Step 5 once, air flush twice.
19. Remove slide–blot and dry.
20. Dry staining area and O-ring.

BLOOD STAIN

1. Dummy slide in slide holder, rotate reagent selector valve to W1 reagent position.
2. Turn knob of W1 reagent dispenser clockwise 3/4 turn.
3. Depress air flush plunger twice.
4. Remove dummy slide.
5. Insert slide in holder–blood side toward operator–close and secure cover.
6. Again turn knob of W1 reagent dispenser clockwise 1/2 turn.
7. Fix blood smear–60 seconds.
8. Depress air flush plunger slowly.
9. Rotate selector valve to W2 position.
10. Turn knob of W2 dispenser clockwise 1/2 turn.
11. Stain–30 seconds.
12. Repeat Steps 10 and 11, preceding.
13. Rotate selector valve to position F.
14. Depress water flush plunger slowly.
15. Wait–60 seconds.
16. Depress air flush plunger twice.
17. Remove slide–blot and dry.
18. Wipe staining area and O-ring with absorbent tissue.

During non-use, keep selector valve in position "S."

NOTE: These instructions are the actual size used on the Slide Stainer.

SETUP INSTRUCTIONS

QUAL TEST UNIT SLIDE STAINER

SETUP INSTRUCTIONS

1. Open front access door.
2. Remove water bag–fill with S/C water through water gun connection.
3. Connect to system by pushing together and clockwise turning of mated fittings.
4. Remove a waste bag–connect to waste port–RT side; push in with 1/4 turn clockwise.
5. Put dummy slide in staining chamber.
6. Prime water lines by gently squeezing water bag and pumping water plunger.
7. Fill water drop dispenser by turning drop knob counterclockwise until it stops while squeezing water bag.
8. Fold over water gun connection–replace water bag.
9. Close front door.
10. Fill reagent transfer lines between dispensers and selector valve by:
    a. Turning selector valve to G1 (green).
    b. Rotating dispenser G1 body clockwise while pushing in until stop is felt–black line on body disappears.
    c. Rotate knurled knob G1 (green) until purple fluid is just seen in chamber.
    d. Flush out common line by pushing air plunger once.
    e. Turn selector valve to G2 (yellow) using dispenser G2, repeat Steps b through d, immediately preceding.
    f. Repeat Steps a through d, immediately preceding, with other valve settings and dispensers.
11. After air flush with W2, follow with one water flush (1 push), then one air flush.
12. Remove dummy slide–dry chamber.

NOTE: These instructions are the actual size used on the Slide Stainer.

FLUSHING INSTRUCTIONS

QUAL TEST UNIT SLIDE STAINER

FLUSHING INSTRUCTIONS

1. Attach waste bag to waste port.
2. Just prior to removing a dispenser, turn selector valve to corresponding position.
3. Turn each dispense knob one-half turn counterclockwise.
4. Remove all dispensers by rotating counterclockwise and pulling out, aided by spring.
5. Place dummy slide in chamber.
6. Flush out lines G1, G2, G4 and W2 as follows, using alcohol dispensers G3 and W1.
7. Turn selector valve to W2.
8. Insert W1 dispenser in W2 guide tube—turn clockwise and push completely in—black line on body disappears.
9. Turn knob of W1 clockwise two turns—wait 2 minutes.
10. Turn knob of W1 clockwise one turn—wait 2 minutes.
11. Turn knob of W1 clockwise one turn.
12. Flush out common line with two air flushes.
13. Turn selector valve to G1.
14. Place dispenser W1 in G1 guide tube.
15. Repeat Steps 9 through 12, preceding.
16. Turn selector valve to G2.
17. Repeat Steps 9 through 12, preceding.
18. Turn selector valve to G4.
19. Place dispenser G3 in G4 guide tube.
20. Repeat Steps 9 through 12, preceding.
21. With alcohol remaining in G3 and W1, repeat Steps 6 through 19, preceding using half volume.
22. Turn selector valve to F position; remove dispenser G3 and W1.
23. Remove dummy slide from chamber.
24. Disconnect waste bag.
25. Disconnect water bag from system.
26. Turn syringes G1, G2, G4 and W2 one-half turn counterclockwise—remove cap by turning counterclockwise.
27. Remove septum caps of dispensers—add teflon disc to caps and replace.
28. Turn drop dispenser knob fully clockwise. Absorb water at drop outlet.

NOTE: These instructions are the actual size used on the Slide Stainer.

ATTACHMENT E

PARTS AND MATERIALS LIST

FOR

QUALIFICATION TEST UNIT SLIDE STAINER

(BECKMAN P/N 673753)

Contract NAS 9-12473

March 1972

Prepared for:

National Aeronautics and Space Administration
Manned Spacecraft Center
Operations Equipment Development Branch
Houston, Texas

Beckman® INSTRUMENTS, INC.			DESIGN ACTIVITY	05721	PL 673753	
	SPECIFICATION	TYPE MODEL SERIES		CODE IDENT	SHEET 1 OF 13 SHEETS	REV
CONTRACT	NAS 9-12473		APPROVED DATE	ITEM NOMENCLATURE	SLIDE STAINER	

QTY REQD PER NEXT ASSY					SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT gram	ITEM NO.
1						GUIDE TUBE ASSY, BRAZED		673920		AL	192	1
	1					FRONT PLATE		673919		AL	14.0	2
	1					REAR PLATE		673921		AL	16.1	3
	1					SUPPORT LEFT SIDE		673922		AL	7.5	4
	1					SUPPORT RIGHT SIDE		673923		AL	17.0	5
	6					TUBE SYRINGE GUIDE		673918		AL	20.6	6
	12					PIN, SYRINGE GUIDE		673810		AL	0.15	7
	3					NUT PLATE		673809		AL	3.6	8
		9				NUT, CLINCH FLOATING 4-40		AC-440-1		ST	1.0	9
6						SYRINGE ASSY		673824				10
	6					SYRINGE TUBE		673906		PC	16.5	11
	6					TUBE CAP		673907		PC	4.35	12
	6					END CAP		673822		PC	3.8	13
	6					SEPTUM CAP		673823		AL	2.0	14
	6					SHAFT, SYRINGE DRIVE		673911		AL	2.2	15
	6					PLUNGER, DRIVE RING		673912		PC	1.6	16
	6					SYRINGE, MODIFIED GLASS		673913		GLASS	19.9	17
		6				SYRINGE BARREL, 30 ML	22582	10216		GLASS	NA	18
	6					BUSHING		673914		KEL-F	1.2	19
	6					PLUNGER TIP, MODIFIED		673915		TEF	12.3	20

SYM	DESCRIPTION	DATE	APPD	SYMBOLS
AL	ALUMINUM			V - VENDOR PART
PC	POLYCARBONATE			* - SPEC CONTROL DWG
TEF	TEFLON			B - BULK MATERIAL

27-71.06 NOTE: WEIGHTS BELOW 0.1 GRAM NOT SHOWN

Beckman® INSTRUMENTS, INC.			DESIGN ACTIVITY	05721	PL 673753	
	SPECIFICATION	TYPE MODEL SERIES		CODE IDENT	SHEET 2 OF 13 SHEETS	REV
CONTRACT	NAS 9-12473			ITEM NOMENCLATURE		
			APPROVED DATE	SLIDE STAINER		

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
6		PLUNGER TIP, 30 ML SYRINGE	22582	13716		--	NA	21
6		BUSHING, THREADED		673806		CRES	4.4	22
6		TUBE, SYRINGE PLUNGER		673808		AL	3.65	23
6		KNOB, SYRINGE DRIVE SCREW		673905		AL	5.5	24
6		PIN, SPRING, 1/16 X 3/8 LG				ST	---	25
1		IDENTIFICATION DISC G1		673985-1		PL	0.5	26
1		IDENTIFICATION DISC G2		673985-2		PL	0.5	27
1		IDENTIFICATION DISC G3		673985-3		PL	0.5	28
1		IDENTIFICATION DISC G4		673985-4		PL	0.5	29
1		IDENTIFICATION DISC W1		673985-5		PL	0.5	30
1		IDENTIFICATION DISC W2		673985-6		PL	0.5	31
6		PIN, SPRING, 1/16 X 1/4 LG						32
6		BALL PLUNGER, 8-32 X .344 LG		B-50	VLIER ENG CORP BURBANK, CA	ST	0.55	33
6		"O" RING, VITON A	83259	A-113		VA	0.5	34
6		"O" RING, VITON A	83259	A-115		VA	0.6	35
6		SEPTUM	22582	75803		SR	0.2	36
6		RETAINING RING	79136	5100-031-S		ST	0.1	37
AR		LUBRICANT	89497	KRYTOX 240AC		FH	---	38
AR		CEMENT, EPOXY	11147	8751		EP	---	39
6		RETAINING RING	79136	5100-037-S		ST	0.1	40

SYM	DESCRIPTION	DATE	APPD	SYMBOLS
PL	PLEXIGLAS			V - VENDOR PART
AL	ALUMINUM			* - SPEC CONTROL DWG
ST	STEEL			B - BULK MATERIAL

27-71.06 SR - SILICONE RUBBER EP - EPOXY
VA - VITON A FH - FLUORINATED HYDROCARBON

Beckman® INSTRUMENTS, INC.

DESIGN ACTIVITY

05721	PL 673753	
CODE IDENT	SHEET 3 OF 13 SHEETS	REV

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

APPROVED DATE

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
12		SCREW, BUTTON, HEX HEAD 4-40 X 3/8 LG				ST	0.4	41
6		SPRING RETAINER		673926		AL	0.55	42
6		NEEDLE SUBASSY		673917		ST	1.1	43
6		NEEDLE	06531	1277		ST	---	44
6		PLATE, NEEDLE MOUNTING		673924		ST	1.15	45
6		NEEDLE CONNECTOR BLOCK		673925		PC	2.4	46
6		SPRING		673927		ST	2.5	47
1		THUMB RECESS		673986		PC	6.0	48
2		SCREWS, 2-56, 1/4 LG FLAT HEAD SLOTTED STAINLESS				ST	0.3	49
1		COVER, DROP DISPENSER		673991		ST	0.9	50
1		WATER DROP DISPENSER		673990		PC	5.9	51
2		SCREW, BUTTON HEX HEAD 4-40 X 3/8 LG				ST	0.4	52
1		CHECK VALVE	29208	VA-3143			0.15	53
1		STAINING CHAMBER		673975		PC	43.0	54
1		STAINING CHAMBER COVER		673976		AL	39.1	55
1		SLIDE RETAINING SPRING		673977		ST	1.2	56
1		WINDOW, STAINING CHAMBER		673979		PC	0.9	57

SYM	DESCRIPTION	DATE	APPD	SYMBOLS
ST	STEEL			V - VENDOR PART
TEF	TEFLON			* - SPEC CONTROL DWG
PC	POLYCARBONATE			B - BULK MATERIAL
AL	ALUMINUM			

Beckman® INSTRUMENTS, INC.

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

DESIGN ACTIVITY

APPROVED DATE

05721	PL 673753	
CODE IDENT	SHEET 4 OF 13 SHEETS	REV

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
1		SPACER		673980		TEF	0.3	58
1		KNOB, STAINING CHAMBER		673978		AL	8.1	59
1		I.D. DISC STAINING CHAMBER KNOB		673821		PL	0.5	60
1		SHAFT, STAINER LID		673928		AL	1.0	61
1		RETAINING RING TRUARC	79136	5100-0370S		ST	0.5	62
1		"O" RING, VITON A	83259	A-019		VA	0.3	63
AR		CEMENT, EPOXY	11147	8751		EP	---	64
1		BALL PLUNGER, 8/32 X 0.344 LG		B-50	VLIER ENG CORP BURBANK, CA	ST	0.55	65
6		KEENSERT, 4-40 INTERNAL THREAD	29372	KNCC-440		ST	0.2	66
6		SCREWS, BUTTON HEX HEAD, 4-40 X 3/8 LG				ST	0.4	67
2		SCREWS, BUTTON HEX HEAD, 4-40 X 3/16 LG				ST	0.3	68
1		SCREW,ALLEN HEAD CAP,1/4-28 X 1/2 STAINLESS				ST	5.8	69
1		KNOB, SELECTOR VALVE		673816		PC	4.7	70
1		PIN, SPRING, 1/16 X 3/8 LG				ST	---	71
1		SKIRT		673942		AL	3.3	72
1		PIN, KNOB RETAINER		673817		CRES	0.9	73
1		SPRING	70472	C120-016-0250S		ST	0.15	74
1		SCREW, SET, 10-32 X 1/8 LG				ST	0.1	75
1		DISC, VALVE INDEXING		673982		PC	3.0	76

SYM	DESCRIPTION	DATE	APPD
TEF	TEFLON		
PL	PLEXIGLAS		
AL	ALUMINUM		

SYMBOLS

V - VENDOR PART
* - SPEC CONTROL DWG
B - BULK MATERIAL

27-71.06 ST - STEEL EP - EPOXY
VA - VITON A PC - POLYCARBONATE

Beckman® INSTRUMENTS, INC.

SPECIFICATION	TYPE MODEL SERIES
CONTRACT NAS 9-12473	

DESIGN ACTIVITY

APPROVED DATE

05721	PL 673753	
CODE IDENT	SHEET 5 OF 13 SHEETS	REV

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
1		DISC, INDICATING, G1		673985-7		PL	0.1	77
1		DISC, INDICATING, G2		673985-8		PL	0.1	78
1		DISC, INDICATING, G3		673985-9		PL	0.1	79
1		DISC, INDICATING, G4		673985-10		PL	0.1	80
1		DISC, INDICATING, W1		673985-11		PL	0.1	81
1		DISC, INDICATING, W2		673985-12		PL	0.1	82
1		DISC, INDICATING, F		673985-13		PL	0.1	83
1		DISC, INDICATING, S		673985-14		PL	0.1	84
3		SCREWS, SELECTOR VALVE RETAINING, 8-32 X 1/2, FLATHEAD SLOTTED, STAINLESS				ST	3.6	85
1		SHAFT, VALVE		673820		CRES	2.0	86
1		VALVE, CHROMATRONIX MODIFIED, TOP		673815		KF	51.0	87
1		VALVE, CHROMATRONIX MODIFIED, BOTTOM		673819		KF	59.3	88
1		VALVE, CHEMINERT		R6031V6K	CHROMATRONIX BERKELEY, CA	KF	NA	89
3		PIN, SPRING, 1/16 X 3/8 LG				ST	---	90
1		VALVE FITTING		673818		CRES	5.9	91
1		"O" RING, 0.19 O.D.		853984		VA	<0.1	92
1		CHECK VALVE	29208	VA-3143	Mat'l VL-1502H8		0.1	93

SYM	DESCRIPTION	DATE	APPD
PL	PLEXIGLAS		
KF	KEL-F		
VA	VITON A		

SYMBOLS

V - VENDOR PART
* - SPEC CONTROL DWG
B - BULK MATERIAL

Beckman® INSTRUMENTS, INC.

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

DESIGN ACTIVITY

APPROVED DATE

05721	PL 673753	
CODE IDENT	SHEET 6 OF 13 SHEETS	REV

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY					SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
1						ASSY, DISPENSING CHAMBER		673950			114	95
	1					DISPENSING CHAMBER		673951		PC	64.2	96
	1					PLUNGER, WATER		673952		PC	4.7	97
	1					PLUNGER, DROP		673953		PC	3.2	98
	1					PLUNGER, AIR		673954		PC	7.4	99
	AR					LUBRICANT	89497		KRYTOX 240AC		---	100
	1					SPRING, TEFLON COATED	70472	C0850-068-0875S		ST+TEF	4.4	101
	1					SPRING, TEFLON COATED	70472	C600-045-0880S		ST+TEF	1.4	102
	1					RETAINING PLATE		673958		AL	13.5	103
	1					NUT, PLUNGER DRIVE		673959		CRES	5.4	104
	1					ASSY, PLUNGER DRIVE		673960		AL+PC	6.1	105
		1				SCREW, PLUNGER DRIVE		673961		AL	4.1	106
		1				KNOB, PLUNGER DRIVE		673962		PC	1.9	107
		1				PIN, SPRING, 1/16 X 1/4 LG				ST	----	108
	1					PIN, SPRING, 1/16 X 1/4 LG				ST	----	109
	2					"O" RING, VITON A	83259			VA	0.2	110
	2					"O" RING, VITON A	83259	2-112		VA	0.5	111
	2					"O" RING, VITON A	83259	2-012		VA	0.15	112
	1					RETAINING RING	79136	5100-025-ST		ST	0.1	113
	1					BALL PLUNGER.		SSB-46N	VLIER ENG CORP BURBANK, CALIF	ST	0.55	114

SYM	DESCRIPTION	DATE	APPD
PC	POLYCARBONATE		
ST	STEEL		
TEF	TEFLON		

SYMBOLS

V - VENDOR PART
* - SPEC CONTROL DWG
B - BULK MATERIAL

27-71.06 AL - ALUMINUM
VA - VITON A

Beckman® INSTRUMENTS, INC.

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

DESIGN ACTIVITY

APPROVED DATE

05721	PL 673753	
CODE IDENT	SHEET 7 OF 13 SHEETS	REV

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
8		SCREWS, BUTTON HEX HEAD, 4-40 X 3/8 LG				ST	0.4	115
1		DOOR, FRONT		673933		AL	32.0	116
1		DOOR		673933-1		AL		117
1		DOUBLER		673933-2		AL		118
1		HINGE			MS20257-1	AL		119
1		PIN			MS20253-1-538	ST		120
4		RIVET, 0.094 DIA X 0.25 LG			MS20426A3-4	ST	0.5	121
1		LATCH	80813	1-L		ST	0.4	122
1		GUIDE	80813	1-G-1		ST	0.25	123
1		WASHER	80813	1-W		ST	----	124
1		RIVET	80813	1-R-057		ST	0.25	125
1		DOOR, SIDE		673934		AL	23.0	126
1		DOOR		673934-1		AL		127
1		HANDLE MOUNT		673939		AL	2.6	128
1		HINGE			MS20257-1	AL		129
1		PIN			MS20253-1-318	ST		130
4		RIVET, 0.094 X 0.19 LG			MS20426A3-3	AL	0.5	131
1		HANDLE		673938		AL	1.6	132

SYM	DESCRIPTION	DATE	APPD	SYMBOLS
AL	ALUMINUM			V - VENDOR PART
ST	STEEL			* - SPEC CONTROL DWG
				B - BULK MATERIAL

Beckman® INSTRUMENTS, INC.

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

DESIGN ACTIVITY

APPROVED DATE

05721 | PL 673753

CODE IDENT | SHEET 8 OF 13 SHEETS | REV

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY					SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT. GRAM	ITEM NO.
	2					SCREWS, BUTTON HEX HEAD, 4-40 X 1/4 LG				ST	0.4	133
	2					GUIDE	80813	1-G-1		ST	0.25	134
	2					LATCH	80813	1-L		ST	0.4	135
	2					RIVET	80813	1-R-057		ST	0.25	136
	2					WASHER	80813	1-W		ST	----	137
1						HOUSING ASSY, BRAZED		673930		AL	186	138
	1					FRAME, HOUSING		673930-1		AL	65	139
	1					TOP, HOUSING		673930-2		AL	82	140
	1					END PLATE		673930-3		AL	20	141
	9					NUT, CLINCH 4-40	46384	AC 440-1		ST	1.0	142
	3					STUD	80813	1-H-6-051-312		ST	1.1	143
	3					NUT, 6-32				ST	0.4	144
1						COVER, BOTTOM, COMPLETE		673940		AL	170.6	145
	1					PLATE, BOTTOM		673940-1		AL	86.7	146
	1					DOOR, FRONT		673933		AL	32.0	147
	1					DOOR, SIDE		673938		AL	23.0	148
	8					RIVET, 0.094 DIA X 0.25 LG			MS20426A3-4	AL	1.0	149
	1					NUT, CLINCH, 1/4-20	46384	CLS-0420-1		ST	3.0	150

SYM	DESCRIPTION	DATE	APPD	SYMBOLS
ST AL	STEEL ALUMINUM			V - VENDOR PART • - SPEC CONTROL DWG B - BULK MATERIAL

Beckman® INSTRUMENTS, INC.			DESIGN ACTIVITY	05721	PL 673753	
	SPECIFICATION	TYPE MODEL SERIES		CODE IDENT	SHEET 9 OF 13 SHEETS	REV
CONTRACT	NAS 9-12473		APPROVED DATE	ITEM NOMENCLATURE: SLIDE STAINER		

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
1		DOUBLER		673940-2		AL	3.0	151
1		DIVIDER		673971		AL	11.3	152
9		SCREWS, FLAT HEAD SLOTTED, 4-40 X 1/4 LG				ST	0.4	153
1		ANGLE, MTG TOP		673811		AL	2.2	154
1		TAB, STUD MOUNT		673931		AL	2.1	155
1		STAINING INSTRUCTIONS		673946		AL	6.0	156
1		SETUP INSTRUCTIONS		673947		AL	2.5	157
1		FLUSHING INSTRUCTIONS		673948		AL	2.5	158
1		FUNCTIONAL BLOCK DIAGRAM		673949		AL	8.5	159
1		SPRING, CONTAINER, ASSY, IMSS	21356	SDC42100354			8.0	160
1		TUBE ASSY		673902		*	<3.0	161
1		TUBE ASSY		673902-1		*	<3.0	162
1		TUBE ASSY		673902-2		*	<3.0	163
1		TUBE ASSY		673902-3		*	<3.0	164
1		TUBE ASSY		673902-4		*	<3.0	165
1		TUBE ASSY		673902-5		*	<3.0	166
1		TUBE ASSY		673902-6		*	<3.0	167
1		TUBE ASSY		673902-7		*	<3.0	168

SYM	DESCRIPTION	DATE	APPD	SYMBOLS
AL	ALUMINUM			V - VENDOR PART
ST	STEEL			* - SPEC CONTROL DWG
				B - BULK MATERIAL

27-71.06 *TEFLON-STEEL-BRASS-VITON A-DELRIN

Beckman® INSTRUMENTS, INC.			DESIGN ACTIVITY	05721	PL 673753	
	SPECIFICATION	TYPE MODEL SERIES		CODE IDENT	SHEET 10 OF 13 SHEETS	REV
CONTRACT	NAS 9-12473		APPROVED DATE	ITEM NOMENCLATURE SLIDE STAINER		

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
1		TUBE ASSY		673902-8		*	<3.0	169
1		TUBE ASSY		673902-9		*	<3.0	170
1		TUBE ASSY		673902-10		*	<3.0	171
20		WASHER, FLAT		165-101489		ST	0.1	172
20		FITTING TUBE, 1/4-28		183956		DEL	0.2	173
20		"O" RING, 0.19 OD		853984		VA	---	174
4FT		TUBING, TEFLON, 1/32 ID X 0.016 WALL		45-049-83		TEF	6.0	175
20		FERRULE		187723		BR	0.15	176
1		MANIFOLD BLOCK		673802		PC	8.0	177
1		MANIFOLD BLOCK, BOTTOM		673802-1		PC	5.0	178
1		MANIFOLD BLOCK, TOP		673803		PC	2.6	179
2		CHECK VALVE	29208	VA-3143	MAT'L VL-1502H8		0.4	180
AR		SOLVENT, CEMENT-DICHLOROETHYLENE					---	181
2		CHECK VALVE, HOUSING		673801		PC	1.05	182
2		CHECK VALVES	29208	VA-3143	MAT'L VL-1502H8		0.2	183
1		"Y" CONNECTOR		673805		PC	6.0	184
1		CHECK VALVE	29208	VA-3143	MAT'L VL-1502H8		0.2	185
1		"T" CONNECTOR		673804		PC	5.0	186

SYM	DESCRIPTION	DATE	APPD
DEL	DELRIN		
ST	STEEL		
VA	VITON A		

SYMBOLS
V - VENDOR PART
* - SPEC CONTROL DWG
B - BULK MATERIAL

27-71.06 BR - BRASS PC - POLYCARBONATE *COMPOSED OF STEEL, BRASS, TEFLON,
TEF - TEFLON VITON A AND DELRIN

Beckman® INSTRUMENTS, INC.

DESIGN ACTIVITY

05721 | PL 673753

CODE IDENT | SHEET 11 OF 13 SHEETS | REV

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

APPROVED DATE

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY					SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
1						WASTE PORT CONN ASSY		673963		--	21.5	187
	1					CONN. MOUNT WASTE BAG		673987		PC	9.2	188
	1					BNC UG 260/U ADPTR		673813		BR	10.2	189
		1				BNC UG 260/U	13511	BNC UG 260/U		BR	NA	190
	1					WATER BAG CONN		673998		PC	1.1	191
	5"					TUBING, TEFLON, 1/32 X 0.016 WALL		45-049-83		TEF	0.5	192
	1					SEPTUM	22582	760-22		SR	0.1	193
	1					SEPTUM RETAINER		673814		BR	0.3	194
	1					PIN, SPRING, 1/16 X 3/8 LG				ST	----	195
	2					SCREWS, SET, 4-40 X 1/4 LG				ST	0.4	196
	AR					CEMENT, EPOXY	11147	8751		EP	----	197
1						CABLE TIE	06383	SST-25-C		NY	2.5	198
1						SEPTUM RETAINER TOOL		673989		AL	4.5	199
5"						CHAIN, BALL				ST	10.0	200
1						WATER BAG CONN ASSY		673965		--	11.8	201
	1					WATER BAG CONNECTOR		673998		PC	1.1	202
	1					TUBING CONN, BNC UG-260/U MOD		673966		BR	10.2	203
	1					SEPTUM	22582	760-22		SR	0.1	204

SYM	DESCRIPTION	DATE	APPD
PC	POLYCARBONATE		
BR	BRASS		
TEF	TEFLON		

SYMBOLS
V - VENDOR PART
* - SPEC CONTROL DWG
B - BULK MATERIAL

27-71.06

SR - SILICONE RUBBER
EP - EPOXY CEMENT
NY - NYLON
AL - ALUMINUM

Beckman® INSTRUMENTS, INC.

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

DESIGN ACTIVITY

APPROVED DATE

05721	PL 673753	
CODE IDENT	SHEET 12 OF 13 SHEETS	REV

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY					SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
	1					SEPTUM RETAINER		673814		BR	0.3	205
	1					BNC UG260/U ADPTR		673813		BR	0.4	206
		1				BNC UG 260/U	13511	BNC260/U		BR	10.2	207
6						WASTE BAG CONNECTOR ASSY		673964		--	6.9	208
	6					TUBING CONN, WASTE BAG		673996		PC	2.4	209
	6					NEEDLE HOLDER ADPTR		673812		PC	0.6	210
	6					NEEDLE, MODIFIED		673964-1		ST	---	211
		6				NEEDLE, YALE HUBER BEVEL	06531	1277		ST	NA	212
	6					TUBING CONN, BNC VG-1094/U MOD		673999		BR	3.9	213
		6				BNC CONN VG-1094/U	13511	BNC VG-1094/U		BR	NA	214
	AR					CEMENT, EPOXY	11147	8751		EP	---	215
1						REAGENTS LIST		673967		--	----	216
	10ML					REAGENT G1--CRYSTAL VIOLET		673967-1		--	10.0	217
	10ML					REAGENT G2--GRAM'S IODINE		673967-2		--	10.0	218
	10ML					REAGENT G3--ALCOHOL, REAGENT		673967-3		--	10.0	219
	10ML					REAGENT G4--COUNTER STAIN		673967-4		--	10.0	220
	10ML					REAGENT W1--METHANOL, ABSOLUTE		673967-5		--	10.0	221
	10ML					REAGENT W2--CAMCO QUICK STAIN (BLOOD STAIN)		673967-6		--	10.0	222

SYM	DESCRIPTION	DATE	APPD
BR	BRASS		
PC	POLYCARBONATE		
ST	STEEL		
EP	EPOXY		

SYMBOLS

V - VENDOR PART
* - SPEC CONTROL DWG
B - BULK MATERIAL

Beckman® INSTRUMENTS, INC.

	SPECIFICATION	TYPE MODEL SERIES
CONTRACT	NAS 9-12473	

DESIGN ACTIVITY

APPROVED DATE

05721	PL 673753	
CODE IDENT	SHEET 13 OF 13 SHEETS	REV

ITEM NOMENCLATURE

SLIDE STAINER

QTY REQD PER NEXT ASSY	SYM	NOMENCLATURE OR DESCRIPTION	CODE IDENT	PART OR IDENTIFYING NO.	SPECIFICATION	REF DES	UNIT WT GRAM	ITEM NO.
6		WASTE BAG ASSY		673988		EST.	25.0	223
6		WASTE BAG	81306	(TO BE ADDED)		SLP-4		224
24		ABSORBENT, SPONGE, COMPRESSED	70541	673988-1	28" x 13-3/8" x 1" COMP. FINE PORE SPONGE	CELL	3.6	225
2"		TEFLON HEAT SHRINK TUBING, 1/4" LG				TEF	0.2	226
1		WATER BAG ASSY		673933		EST.	30.0	227
1		WATER BAG	81306	(TO BE ADDED)		SLP-4		228
3/8"		TEFLON HEAT SHRINK TUBING, 1/4" LG				TEF	0.2	229

SYM	DESCRIPTION	DATE	APPD
CELL	CELLULOSE		
TEF	TEFLON		

SYMBOLS

V - VENDOR PART
* - SPEC CONTROL DWG
B - BULK MATERIAL

27-71.06

ATTACHMENT F

REAGENTS LIST

FOR

QUALIFICATION TEST UNIT SLIDE STAINER

(BECKMAN P/N 673753)

Contract NAS 9-12473

March 1972

Prepared for:

National Aeronautics and Space Administration
Manned Spacecraft Center
Operations Equipment Development Branch
Houston, Texas

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED

Gram Stain

Reagent G1(1)	Crystal Violet	
	Crystal Violet	2 gm.
	Alcohol, Reag.	20 ml.
	Ammonium Oxalate	0.8 gm.
	Water, Dist.	80 ml.
Reagent G2(1)	Gram's Iodine	
	Iodine	1 gm.
	Pot. Iodide	2 gm.
	Water, Dist.	300 ml.
Reagent G3	Decolorize Alcohol	
	Ethanol SDA-3A	95%
	Isopropyl	5%
Reagent G4(1)	Counter Stain	
	Safranin (2.5% in Alc)	10 ml.
	Water, Dist.	100 ml.

Wright's Stain (Blood)

Reagent W1	Absolute Methanol
Reagent W2	Commercial Product(2) Wright's Stain

NOTE: a) All stains aged 72 hours after mixing, then filtered through Whatman #1 filter paper.

b) Aged at 40°F 72 hours then filtered cold.

c) Aged 7 days at room temperature, refiltered.

d) After initial filtering, 3 ml LECONAL wetting agent added per 500 ml stain to G1, G2 and G4.

(1) Gradwohl, R. B. H., MD; "Clinical Laboratory Methods and Diagnosis," 1956 Ed., p. 1401.

(2) Camco Quik Stain manufactured by Cambridge Chemical Products, Inc.

QTY REQD	BECKMAN NO.	ITEM NO.	DESCRIPTION	PART NO.	CODE IDENT	MATERIAL

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES.

TOLERANCES

.X ± .05 | ANGULAR ± 0° 30′

.XX ± .02

.XXX ± .005

THREADS CLASS 2A OR 2B

REMOVE BURRS AND SHARP EDGES .02 MAX.

DO NOT SCALE DWG.

	BY	DATE
DR		
CK	John F Brady	3-13-72
ENGR	John F Brady	3-13-72
APPD		

Beckman® INSTRUMENTS, INC.

SPACE ENGINEERING
2500 HARBOR BLVD.
FULLERTON, CLAIF.

TITLE

REAGENTS LIST

SIZE	CODE IDENT NO.	
A	05721	673967

SCALE

SHEET 1 OF 1

27-70.56.2

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673967-3	673967

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: AI

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
MALLINCKRODT	ALCOHOL REAGENT 7006

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
.022			

16 NASA CLASSIFICATION	15 EVAL CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
E	D	[illegible]	C	[illegible]	[illegible]	Y	[illegible]	-	-	.	

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

REAGENT G3 - ALCOHOL, REAGENT

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6739 67-5	6739 67

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	AIEPXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
J. T. BAKER	METHANOL ABSOLUTE

6 QTY OF DETAIL/END ITEM				
1/1				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0.22			

16 NASA CLASS (CTGY)	15 PROCO REQUIREMENTS CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	Y	C	Y	Y	Y	Y	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE
MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

REAGENT W1, METHANOL, ABSOLUTE

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP

PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6739673-6	673967

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	AIEPXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
CAMBRIDGE CHEMICAL PROD, INC.	CAMCO QUIK STAIN

6 QTY OF DETAIL/END ITEM				
	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
022			

16 NASA CLASS (CTGY)	15 PROC REQ (PRMCO OR MSC)	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	Y	C	Y	Y	Y	Y	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE	
MSC	

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

REAGENT W2 - BLOOD STAIN

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 8 8 - 1	6 7 3 9 8 8

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: A A A U X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
AMER SPONGE AND CHAMOIS	

6 QTY OF DETAIL/END ITEM	24/6			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 7 9			

16 NASA CLASS (CTGY)	15 PROPELLANT COMPATIBILITY CLASS	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	C	C	C	C	C	C	-	-		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE 27 (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

ABSORBENT SPONGE, COMPRESSED

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673967-1	673967

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: AIXXXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
BECKMAN INSTRUMENTS	CRYSTAL VIOLET SOL G1

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
.022			

16 NASA CLASS (CTGY)	15 FLAMMABILITY EVALUATION METHOD	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	A	C	C	C	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
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26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

REAGENT G1 - CRYSTAL VIOLET

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	6 7 3 8 0 2
3 DETAIL DWG SOURCE BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE D X B W X X
9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
MATHESON, COLEMAN & BELL	D I C H L O R O E T H Y L E N E

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 2			

16 NASA CLASS (CTGY)	15 PREPARED PROCUREMENT SPEC	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	C	C	C	C	C	C	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

SOLVENT, CEMENT

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
0683-SST-25-C	673753

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: ECBSXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	NYLON

6 QTY OF DETAIL/END ITEM				
	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
.005			

16 NASA CLASS (CTGY)	15 PMRO (PROC REQUIREMENT)	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	C	C	C	C	C	C	-	C		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CABLE TIE

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673967-2	673967

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: AIXXXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
BECKMAN INSTRUMENTS, INC.	GRAM'S IODINE G2

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
022			

16 NASA CLASS (CAT V)	15 PROCESS CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	A	C	C	C	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

REAGENT G2 - GRAM's IODINE

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673967-4	673967

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	AIXXXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
BECKMAN INSTRUMENTS, INC.	COUNTER STAIN G4

6 QTY OF DETAIL/END ITEM				
1/1				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0.22			

16 NASA CLASS (CTGY)	15 MSC-MSFC CLASS	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	A	C	C	C	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE
MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

REAGENT G4 - COUNTER STAIN

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	67398
3 DETAIL DWG SOURCE BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE DEXXXX
9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
WHIRLPOOL CORP.	SLP-4
6 QTY OF DETAIL/END ITEM	
13 WEIGHT (LBS) 033	14 SURFACE AREA (SQ. IN.)
10 MATERIAL SPECIFICATION	11 SPEC SOURCE

16 NASA CLASS (CTGY)	15 PREPROD EVAL REQ'D	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	C	C	C	C	C	C	-	C		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
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26 SUPPORT DOCUMENT SOURCE MSC	

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

WASTE BAG

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	6 7 3 9 6 3

3 DETAIL DWG SOURCE	BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE	B A B J G S

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
EPOXYLITE CORP.	E P O X Y 8 7 5 1

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 4 4			

16 NASA CLASS (CTGY)	15 EVAL PROG CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	C	C	C	C	C	-	C		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CEMENT, EPOXY

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	673964
3 DETAIL DWG SOURCE BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE BABJGS
9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
EPOXYLITE CORP.	EPOXY 8751

6 QTY OF DETAIL/END ITEM	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0044			

16 NASA CLASS (CTGY)	15 PROCESS REQUIREMENT CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	C	C	C	C	C	-	C		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CEMENT, EPOXY

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	673753

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: BABJGS

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
EPOXYLITE CORP.	EPOXY 8751

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
002			

16 NASA CLASS (CTGY)	15 COMPATIBILITY EVALUATION PROC. NO. - TEST	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	C	C	C	C	C	-	C		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CEMENT, EPOXY

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	673824

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	BABJGS

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
EPOXYLITE CORP.	EPOXY 8751

6 QTY OF DETAIL/END ITEM				
	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0044			

16 NASA CLASS (CTGY)	15 MSOO 80-1 EVAL	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	C	C	C	C	C	-	C		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE
MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CEMENT, EPOXY

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	673924
3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE: DBBPXX
9 MATERIAL MANUFACTURER: E. I. DUPONT	7 MATERIAL MANUFACTURERS DESIGNATION: KRYTOX240AC
6 QTY OF DETAIL/END ITEM: 6/1	
13 WEIGHT (LBS): NEGLIGIBLE	14 SURFACE AREA (SQ. IN.):
10 MATERIAL SPECIFICATION:	11 SPEC SOURCE:

16 NASA CLASS (CTGY)	15 CONTAMINATION CONTROL REQUIREMENTS	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	A	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE (YYMMDD)
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26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

LUBRICANT

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	673950

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DBBPXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	KRYTOX240AC

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 EVAPORATION RATE (TQCM)	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	A	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER: MSC02681

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26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

LUBRICANT

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
183956	673902-1THRU10

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DLAJXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	DELRIN

6 QTY OF DETAIL/END ITEM				
20/1				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 EVAL TEST REQD FOR ENGR APPROVAL	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F		-	D	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
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26 SUPPORT DOCUMENT SOURCE	
MSC	

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

FITTING, TUBE, 1/4 X 28

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	6 7 3 9 3 3

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: E H C N X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	T E F L O N T F E

6 QTY OF DETAIL/END ITEM				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
N E G L I G I B L E		M I L - I - 2 3 0 5 3 B - 1 2	

16 NASA CLASS (CTGY)	15 CONTRACTOR EVAL CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE (YYMMDD) 27: 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

TEFLON HEAT SHRINKABLE TUBING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	67398
3 DETAIL DWG SOURCE BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE EHCNXX
9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	TEFLON TFE

6 QTY OF DETAIL/END ITEM	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE		MIL-I-23053B-12	

16 NASA CLASS (CTGY)	15 OUTGASSING EVALUATION 6000	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

TEFLON HEAT SHRINKABLE TUBING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 5 1	6 7 3 9 5 0

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
1 4			

16 NASA CLASS (CTGY)	15 OUTGASSING EVALUATION MSOO RQMT	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	*	A		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

DISPENSING CHAMBER

CONFIG. ACCPT. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673906	673910

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM				
	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
036			

16 NASA CLASS (CTGY)	15 FLAMMABILITY (MSC-RQ-HCP-A)	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	A	B	A	A	A	A	A	-	A	

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
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26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

SYRINGE TUBE

CONFIGURATION ACCPT. REF. TC215

MATERIAL STATUS ____ ____

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP [ ]

PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 0 7	6 7 3 9 1 0

3 DETAIL DWG SOURCE	BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE	D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 1			

16 NASA CLASS (CTGY)	15 PROPOSED EVA MOCR REQ'T	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	A	B	A	A	A	A	A	-	A	

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

TUBE CAP

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

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MANNED SPACECRAFT CENTER
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APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673822	673910

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM				
6/1				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
008			

16 NASA CLASS (CTGY)	15 FLAMMABILITY EVALUATION (FLAMM RQMT)	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	A	B	A	A	A	A	A	-	A	

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS – DESCRIPTIVE APPLICATION AND RATIONALE

END CAP

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673912	673910

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM				
	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
004			

16 NASA CLASS (CTCV)	15 PROPOSED NASA CLASS (CTCV)	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

PLUNGER DRIVE RING

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 2 5	6 7 3 7 5 3

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 6			

16 NASA CLASS CTGY	15 EVAL CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	*	A		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE 27 (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS – DESCRIPTIVE APPLICATION AND RATIONALE

NEEDLE CONNECTOR BLOCK

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP

PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 8 6	6 7 3 7 5 3

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 1			

16 NASA CLASS (CTGY)	15 SPEC EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

THUMB RECESS

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 9 0	6 7 3 7 5 3

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM				
1/1				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 1			

16 NASA CLASS (CTGY)	15 FLAMMABILITY CODE MSC-SE-R-64-1	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

WATER DROP DISPENSER

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673975	673753

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
09			

16 NASA CLASS (CTGY)	15 MSC-RQ-15C/PARA	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	A	B	A	A	A	A	A	*	A	

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

STAINING CHAMBER

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 7 9	6 7 3 7 5 3

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 2			

16 NASA CLASS (CTGY)	15 FLAMMABILITY MSPO REQUIREMENT	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE 27 (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

WINDOW, STAINING CHAMBER

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673953	673950

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKC-A XX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 FLAMMABILITY EXPLOSIVE HAZARD	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

PLUNGER, DROP

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ____ ____

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673915	673910

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCNXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
DUPONT, EI	TEFLON, TFE

6 QTY OF DETAIL/END ITEM				
	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
03			

16 NASA CLASS (CTGY)	15 PROPOSED MSOC EQUIVALENT	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE N/A	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
F	A	-	A	A	A	A	A	-	-	

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

PLUNGER TIP MODIFIED

MATERIAL STATUS ____ ____

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673914	673910

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: BPBFXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
3-M	KEL-F

6 QTY OF DETAIL/END ITEM	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
003			

16 NASA CLASS (CTGY)	15 PREPARED FOR PROCESS REQUIREMENT	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

BUSHING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673819	673753
3 DETAIL DWG SOURCE	8 MATERIAL CODE: BPBFXX
9 MATERIAL MANUFACTURER: 3-M	7 MATERIAL MANUFACTURERS DESIGNATION: KEL-F
6 QTY OF DETAIL/END ITEM	
13 WEIGHT (LBS): 13	14 SURFACE AREA (SQ. IN.)
10 MATERIAL SPECIFICATION	11 SPEC SOURCE

16 NASA CLASS (CTGY)	15 PROCUREMENT SPEC	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

VALVE, CHROMATRONIX, MODIFIED, BOTTOM

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 8 1 5	6 7 3 7 5 3

3 DETAIL DWG SOURCE	8 MATERIAL CODE
	B P B F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
3-M	K E L - F

6 QTY OF DETAIL/END ITEM				
	1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
1 1 3			

16 NASA CLASS (CTGY)	15 FLAMMABILITY GOOD ROOM-AIR/OXYGEN	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	1	A	A	A	A	A	1	1		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	
	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

VALVE, CHROMATRONIX, MODIFIED, TOP

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 8 5 -1 -2 -3 -4 -5 -6	6 2 3 9 1 0
3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE: D U A M X X
9 MATERIAL MANUFACTURER: ROHM & HAAS	7 MATERIAL MANUFACTURERS DESIGNATION: P L E X I G L A S S
6 QTY OF DETAIL/END ITEM: 6/1	
13 WEIGHT (LBS): N E G L I G I B L E	14 SURFACE AREA (SQ. IN.)
10 MATERIAL SPECIFICATION	11 SPEC SOURCE

16 NASA CLASS (CTGY)	15 EVALUATION CODE (OVERALL)	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	A	A	A	A	A	A	-	D		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

27 SUPT. DOC. DATE (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

INDICATING DISCS

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673821	673978

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DUAMXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
ROHM & HAAS	PLEXIGLASS

6 QTY OF DETAIL/END ITEM	13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
1	001			

16 NASA CLASS (CTGY)	15 EVOL PRODUCTS OF COMBUSTION	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	D	A	A	A	A	A	A	-	D	

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

ID DISC, STAINING CHAMBER KNOB

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673985-7-8-9-10-11-12-13-14	673982

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DUAMXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
ROHM & HAAS	PLEXIGLASS

6 QTY OF DETAIL/END ITEM				
	8/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 OVERALL EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	D	A	A	A	A	A	A	-	D	

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE	
	MSC

28 REMARKS – DESCRIPTIVE APPLICATION AND RATIONALE

DISCS, INDICATING

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
8 3 2 5 9 - A 1 1 3	6 7 3 8 2 4

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D V D F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E I DUPONT	V I T O N A

6 QTY OF DETAIL/END ITEM				
	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 1			

16 NASA CLASS (CTGY)	15 FLAMMABILITY CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	
	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
8 5 3 9 8 4	6 7 3 7 5 3

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D V D F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E.I. DUPONT	V I T O N - A

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
N E G L I G I B L E			

16 NASA CLASS (CTGY)	15 MOD RQMT EVAL	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
83259-2-1-12	67395-0

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DVDFXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E.I. DUPONT	VITON-A

6 QTY OF DETAIL/END ITEM	13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
2/1	001			

16 NASA CLASS (CTGY)	15 OUTGASSING EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
83259-A115	673824

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DVDFXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E.I. DUPONT	VITON-A

6 QTY OF DETAIL/END ITEM				
	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0.01			

16 NASA CLASS (CTGY)	15 CONTRACT EVALUATION REQUIREMENTS	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE	
MSC	

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 8 1 6	6 7 3 7 5 3

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 1 0			

16 NASA CLASS (CTGY)	15 CONTROLLED FLAMMABILITY EVALUATION MSC-SD-T-0004	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	A	B	A	A	A	A	A	1	A	

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE 27 (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

KNOB, SELECTOR VALVE

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673952	673950

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
010			

16 NASA CLASS (CTGY)	15 COMPARTMENT EVAL REQUIRED	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS – DESCRIPTIVE APPLICATION AND RATIONALE

PLUNGER, WATER

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ____ ____ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673954	673950

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
1/1	016			

16 NASA CLASS (CTGY)	15 FLAMMABILITY EVAL PROC NO-TC-FA	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

PLUNGER, AIR

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
83259-A019	673753

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DVDFXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	VITON-A

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 FLAMMABILITY EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B											

25 SUPPORT DOCUMENT NUMBER: MSC02681

27 SUPT. DOC. DATE (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS – DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
8 3 2 5 9 - 2 - 0 1 2	6 7 3 9 5 0

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D V D F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	V I T O N - A

6 QTY OF DETAIL/END ITEM				
	2/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
N E G L I G I B L E			

16 NASA CLASS (CTGY)	15 CONTRACTOR EVALUATION REQUIREMENTS	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP [ ]

PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
8 3 2 5 9 - 2 0 1 4	6 7 3 9 5 0

3 DETAIL DWG SOURCE BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D V D F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	V I T O N - A

6 QTY OF DETAIL/END ITEM	2/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
N E G L I G I B L E			

16 NASA CLASS (CTGY)	15 MSC EVAL REQUIRED	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
F	A	-	A	A	A	A	A	-	-	

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
29208-VA-3143	673991

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DVDFXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	VITON-A

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 OUTGASSING EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CHECK VALVE

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
2258 2-7580 3	673824

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: C H D P X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
ROYAL JET	SILICON RUBBER

6 QTY OF DETAIL/END ITEM	6/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 EVA/VOL FLAMMABILITY TEST	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	A	A	A	A	A	A	*	D		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

SEPTUM

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
2258 2-760-22	67396 5

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: C H D P X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
ROYAL JET	SILICONE RUBBER

6 QTY OF DETAIL/END ITEM				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 OVERALL EVALUATION PROCEDURE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	D	A	A	A	A	A	A	U	D		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC 02681	71015

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS – DESCRIPTIVE APPLICATION AND RATIONALE

SEPTUM

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP [ ]

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
8 5 3 9 8 4	6 7 3 9 0 2 - 1 THRU 10

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D V D F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	V I T O N - A

6 QTY OF DETAIL/END ITEM				
	20/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTCY)	15 FLAMMABILITY EVALUATION PROCEDURE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"O" RING

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP

PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
2258 2-7600-22	673963

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	CHDPXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
ROYAL JET	SILICONE RUBBER

6 QTY OF DETAIL/END ITEM				
	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 COMPATIBILITY WITH OXYGEN-NITROGEN ENVIRONMENT	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	D	A	A	A	A	A	A	-	D	

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

SEPTUM

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP [ ]

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673962	673950

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
004			

16 NASA CLASS (CTGY)	15 OVERALL EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

PLUNGER, DRIVE

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ _____ _____

NASA STAMP

PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 8 0 4	6 7 3 7 5 3
3 DETAIL DWG SOURCE BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE D K C A X X
9 MATERIAL MANUFACTURER: GENERAL ELECTRIC	7 MATERIAL MANUFACTURERS DESIGNATION: L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 1 1			

16 NASA CLASS (CTGY)	15 PROCO EVAL (PROCO-TECH)	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

"T" CONNECTOR

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
29208-VA-3143	673805

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DVDFXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	VITON-A

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTCV)	15 OMSF PARAGRAPH 6000.2C-TCCP EVAL	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
F	A	-	A	A	A	A	A	-	-	

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CHECK VALVE

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
2 9 2 0 8 - V A - 3 1 4 3	6 7 3 8 0 2

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D V D F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS' DESIGNATION
E. I. DUPONT	V I T O N - A

6 QTY OF DETAIL/END ITEM				
	2/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
N E G L I G I B L E			

16 NASA CLASS (CTCY)	15 OVERALL EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
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26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CHECK VALVE

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
29208-VA-3143	673801

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	DVDFXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	VITON-A

6 QTY OF DETAIL/END ITEM				
	2/2			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE
MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CHECK VALVE

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

AS 4240

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673801	673753

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	2/2			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
002			

16 NASA CLASSIFICATION	15 FLAMMABILITY FOOD ACCEPTANCE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	1	A		

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CHECK VALVE HOUSING

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ____ ____

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240

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NONMETALLIC MATERIALS WORKSHEET

APPROVAL _____ DATE _____ NASA STAMP [ ] PAGE _____

1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673998	673963

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
1/1	002			

16 NASA CLASS (CTCY)	15 OVERALL EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

WATER BAG CONN.

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ____ ____ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
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NASA STAMP [ ]

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 8 7	6 7 3 9 6 3

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM				
	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 2 0			

16 NASA CLASS (CTGY)	15 OUTGASSING EVALUATION MSC-SD-T	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	
	MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

CONN. MOUNT, WASTE BAG

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673998	673965
3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE: DKCAXX
9 MATERIAL MANUFACTURER: GENERAL ELECTRIC	7 MATERIAL MANUFACTURERS DESIGNATION: LEXAN
6 QTY OF DETAIL/END ITEM: 1/1	
13 WEIGHT (LBS): 002	14 SURFACE AREA (SQ. IN.):
10 MATERIAL SPECIFICATION:	11 SPEC SOURCE:

16 NASA CLASS (CTGY)	15 FLAMMABILITY EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115
26 SUPPORT DOCUMENT SOURCE: MSC	

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

WATER BAG CONN.

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 9 6	6 7 3 9 6 4

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	6/6			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 5			

16 NASA CLASS (CTGY)	15 FLAMMABILITY MSC 02-1E/AE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

TUBING CONN. WASTE BAG

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 8 1 2	6 7 3 9 6 4

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
6/6	0 0 1			

16 NASA CLASS (CTGY)	15 EVAL PROPERTY REQUIRED	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
B	A	B	A	A	A	A	A	-	A	

25 SUPPORT DOCUMENT NUMBER	27 SUPT. DOC. DATE (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

NEEDLE HOLDER ADAPTOR

CONFIGURATION ACCEPTANCE REF. TC215

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
2 9 2 0 8 - V A - 3 1 4 3	6 7 3 7 5 3

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D V D F X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	V I T O N - A

6 QTY OF DETAIL/END ITEM				
	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
N E G L I G I B L E			

16 NASA CLASS (CTGY)	15 COMPARTMENT EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	
	MSC

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CHECK VALVE

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 8 0 2 - 1	6 7 3 8 0 2

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 1 1			

16 NASA CLASS (CTGY)	15 CONTAM EVAL CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

MANIFOLD BLOCK, BOTTOM

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673803	673802

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCAXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	LEXAN

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0057			

16 NASA CLASS (CTGY)	15 OVERALL EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER: MSC02681

27 SUPT. DOC. DATE (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

MANIFOLD BLOCK, TOP

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

SKYLAB

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 8 0 5	6 7 3 7 5 3

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 1 3			

16 NASA CLASSIFICATION	15 FLAMMABILITY EVALUATION	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE 27 (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

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CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ___ ___

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673980	673753

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DKCNXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	TEFLON TFE

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
NEGLIGIBLE			

16 NASA CLASS (CTGY)	15 OVERALL EVALUATION MSC RQMT	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
F	A	A	A	A	A	A	A	1	1	

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

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MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
NONMETALLIC MATERIALS WORKSHEET

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 6 3	6 7 3 7 5 3

3 DETAIL DWG SOURCE	8 MATERIAL CODE
BECKMAN INSTRUMENTS, INC.	D K C N X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
E. I. DUPONT	T E F L O N T F E

6 QTY OF DETAIL/END ITEM				
1/1				

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 1			

16 NASA CLASS (CTCV)	15 FLAMMABILITY EVALUATION MSC-SD-T-0124	17 CHARACTERISTIC EVALUATION CODES								
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST	
F	A	-	A	A	A	A	A	0	0	

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
M S C 0 2 6 8 1	7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE	
MSC	

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

TEFLON TUBING, 1/32 ID X .016 WALL

MATERIAL STATUS ___ ___ **SKYLAB** PROJECT _____ SUBSYSTEM _____

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
6 7 3 9 8 2 -	6 7 3 7 5 3

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: D K C A X X

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
GENERAL ELECTRIC	L E X A N

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
0 0 6			

16 NASA CLASS (CTGY)	15 PROCESS EVALUATION CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	B	A	A	A	A	A	-	A		

25 SUPPORT DOCUMENT NUMBER: M S C 0 2 6 8 1

SUPT. DOC. DATE 27 (YYMMDD): 7 1 0 1 1 5

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS – DESCRIPTIVE APPLICATION AND RATIONALE

DISC, VALVE INDEXING

CONFIGURATION ACCEPTANCE REF. TC215

MATERIAL STATUS ____ ____

SKYLAB

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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
673902	673902-1THRU10
3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.	8 MATERIAL CODE: DKCNXX
9 MATERIAL MANUFACTURER: E. I. DUPONT	7 MATERIAL MANUFACTURERS DESIGNATION: TEFLON TFE
6 QTY OF DETAIL/END ITEM: 10/1	
13 WEIGHT (LBS): 004	14 SURFACE AREA (SQ. IN.):
10 MATERIAL SPECIFICATION:	11 SPEC SOURCE:

16 NASA CLASSIFICATION	15 PROC REQUIREMENTS CODE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
F	A	-	A	A	A	A	A	-	-		

25 SUPPORT DOCUMENT NUMBER: MSC02681

SUPT. DOC. DATE 27 (YYMMDD): 710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

TUBING, TEFLON, 1/32 ID X .016 WALL

MATERIAL STATUS ___ ___

SKYLAB

PROJECT _____ SUBSYSTEM _____

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MANNED SPACECRAFT CENTER
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1 DETAIL DWG + DASH NO.	2 MAJOR ASSY DWG + DASH NO.
	673933

3 DETAIL DWG SOURCE: BECKMAN INSTRUMENTS, INC.

8 MATERIAL CODE: DEXXXX

9 MATERIAL MANUFACTURER	7 MATERIAL MANUFACTURERS DESIGNATION
WHIRLPOOL CORP.	SLP-4

6 QTY OF DETAIL/END ITEM	1/1			

13 WEIGHT (LBS)	14 SURFACE AREA (SQ. IN.)	10 MATERIAL SPECIFICATION	11 SPEC SOURCE
033			

16 NASA CLASS (CTGY)	15 FLAMMABILITY ROOM ATMOSPHERE	17 CHARACTERISTIC EVALUATION CODES									
		COMBUSTION RATE	ODOR	CARBON MONOXIDE	TOTAL ORGANICS	FLASH POINT	FIRE POINT	WIRE BUNDLE + ACC. TEST	CONFIGURATION TEST		
B	A	C	C	C	C	C	C	-	C		

25 SUPPORT DOCUMENT NUMBER	SUPT. DOC. DATE 27 (YYMMDD)
MSC02681	710115

26 SUPPORT DOCUMENT SOURCE: MSC

28 REMARKS — DESCRIPTIVE APPLICATION AND RATIONALE

WATER BAG

MATERIAL STATUS ____ ____

SKYLAB

PROJECT _____ SUBSYSTEM _____

AS 4240