STEREO CONFIGURATION CHANGE REQUEST

For Office Use Only	TITLE: Waiver to approve the use of Shin-Etsu adhesive for the manufacture of the LET/HET SSD's on IMPACT.	CLASS: I / II	NUMBER: DATE: 1/7/2003; rev 3/21/03

CONFIGURED ITEM:		ORIGINATOR:		PRIORITY:	
STS Number:	Payload: STEREO	Name: Lil Reichenthal Organization: NASA/GSFC			Routine
Component :	Experiment: IMPACT	Phone: 301-286-5634		x	Urgent
Component Part #:	Serial #:	Email: Lillian.S.Reichenthal@nasa.gov			Emergency

TYPE OF REQUEST:			RESPONSIBLE ORGANIZATION/INDIVIDUAL:	IMPACTS: (If yes attach additional pages)				
	Configuration		Tycho VonRosenvinge	COST:		Yes	x	No
	Deviation	#		SCHEDULE:		Yes	x	No
X	Waiver	#						
	Other:							

REASONS FOR CHANGE:						RETEST REQUIRED:	
	Improvement		Test/Payload Failure		New Document:	x	No
	Reliability		Specification Requirements		Other:		Yes

PROPOSED CHANGE (Attach additional pages as required):
We request a waiver for use of Shin-Etus adhesive KJR-9022E. This is used by Micron in the manufacture of the solid-state detectors for IMPACT/LET and HET on STEREO. This is not a NASA approved adhesive.

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RATIONALE (Attach additional pages as required):

There are 3 reasons why a waiver should be acceptable:

(1) We use only very tiny amounts of this material to adhere each detector wafer to a narrow lip around the wafer periphery. The total amount of Shin-Etsu adhesive used is estimated to be 95 mg for LET and 140 mg for HET.

(2) Outgassing from this material is small at the maximum temperature that the finished detectors will be allowed to see (40 degrees C) . We submitted two cured samples of Shin-Etsu adhesive to Fred Gross of the materials Branch at Goddard. He put each sample in a thermal vacuum chamber at 40 degrees C for >~120 hours and weighed them as a function of time. Each lost 0.1% total mass in the course of the test (see attached report). No measurement was made of the composition of the outgassed material, but from previous measurements Fred Gross says that it consists of low molecular weight silicones. We expect that each detector will be in vacuum and temperature cycled hot and cold at least 240 hours prior to delivery to the spacecraft; a minimum time at +40 degrees C will be 120 hours.

(3 The outgassing vents for HET and LET are pointed well away from where SECCHI is located. These vent directions are indicated in the accompanying file (purge-directions.pdf).

Finally, we mention that the properties of this material are important to minimize detector leakage current and possible cracking of the detector wafers over the required range of temperature and vibration levels. It would be an expensive research project to find an alternate material.

DOCUMENTS/DRAWINGS AFFECTED (Document No./Title/Section) : n/a

Attached report is contained in 3 files: SE1.tif, SE2.tif, SE3.tif

AFFECTED (Check all that apply):

FLIGHT SYSTEMS:				GROUND SYSTEMS:			
	Avionics		Electrical and Cables				
x	Experiment		Software / Firmware				
	Structures and Mechanical		Other:				Other:

REQUIRED APPROVAL DATE: _____

REQUIRED JUSTIFICATION:

STEREO CONFIGURATION CHANGE REQUEST

For Office Use Only	TITLE:	CLASS:		NUMBER:
			I	
			II	DATE:

CONTRACT / AGREEMENT NUMBER EFFECTIVITY:

√	STEREO NAS5-97271		IMPACT S-13635Y		PLASTIC NAS5-00132		SECCHI S-13631Y

DOCUMENTS / DRAWINGS TO BE REVISED:

Document / Drawing Number:	Document / Drawing Title:	Section(s) No.	EO No.:	Date Completed:

PROCESSING APPROVAL:

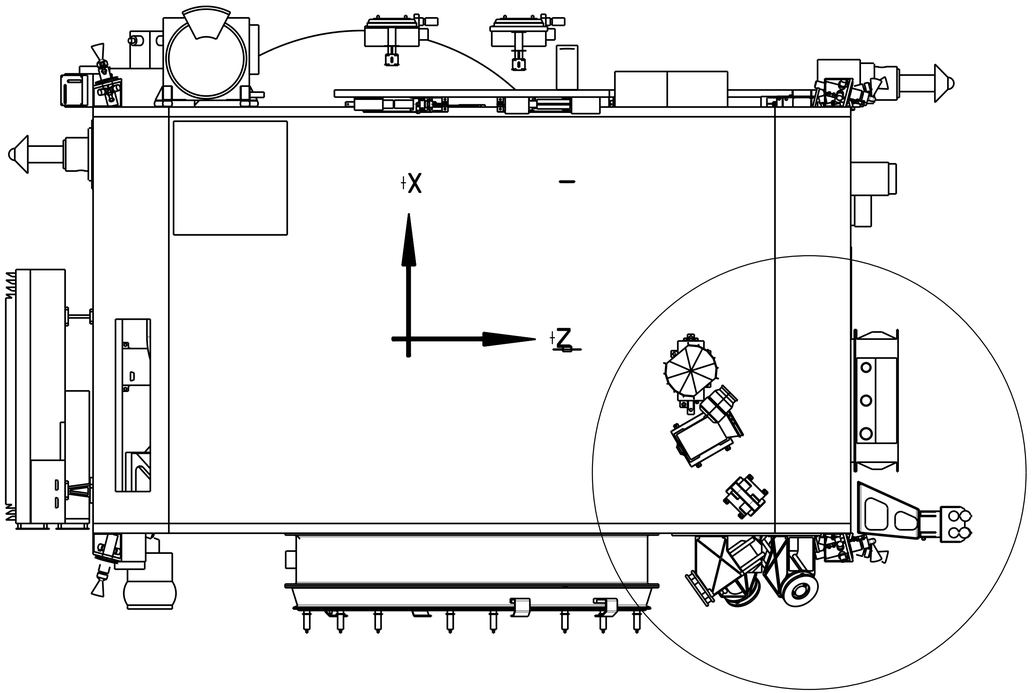
	CCB		
	Out of Board		
	Emergency	Systems Engineer	Date

CCB APPROVAL:

CCB ACTION DATE:		CCB ACTION ITEMS / CONDITIONS:
	Approved	
	Denied	
	Withdrawn	
	Hold	

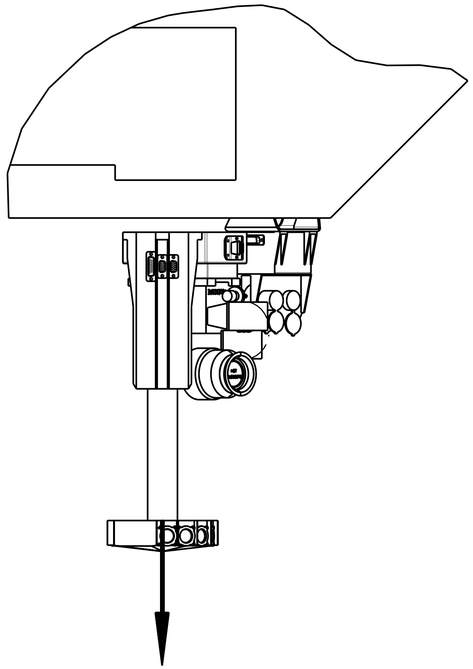
CLOSEOUT COMMENTS:	DATE OF CLOSEOUT:
	CMO

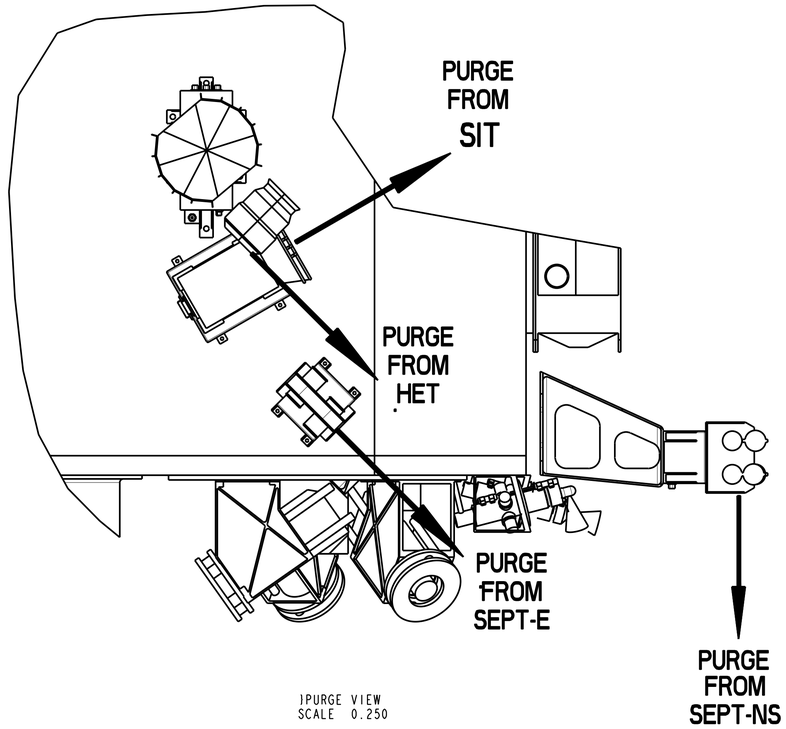
EXHAUST PURGE FLOW	
HET	45° BETWEEN -X AND +Z
LET	+Y DIRECTION
SEPT-E	45° BETWEEN -X AND +Z
SEPT-NS	-X DIRECTION



CURRENT FLOW
DIRECTION OF
OF EXHAUST PURGE

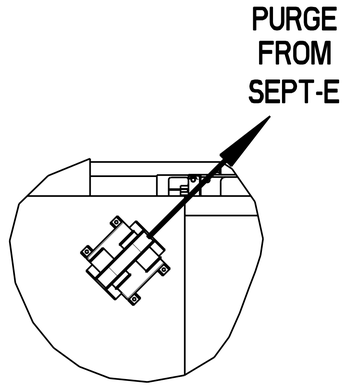
PLOT DATE: 09-Nov-01



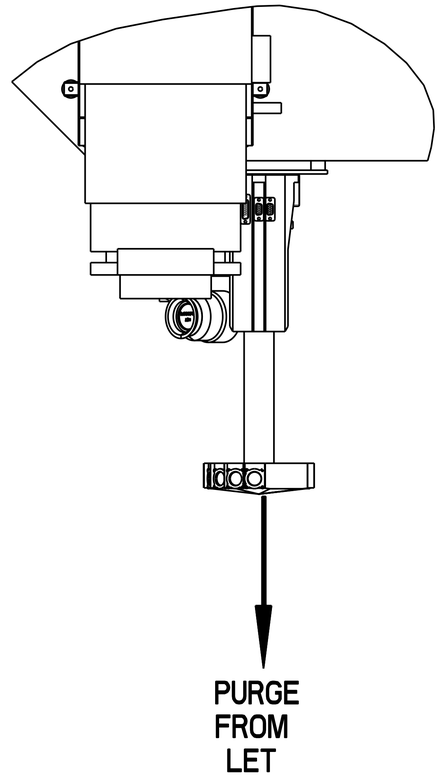


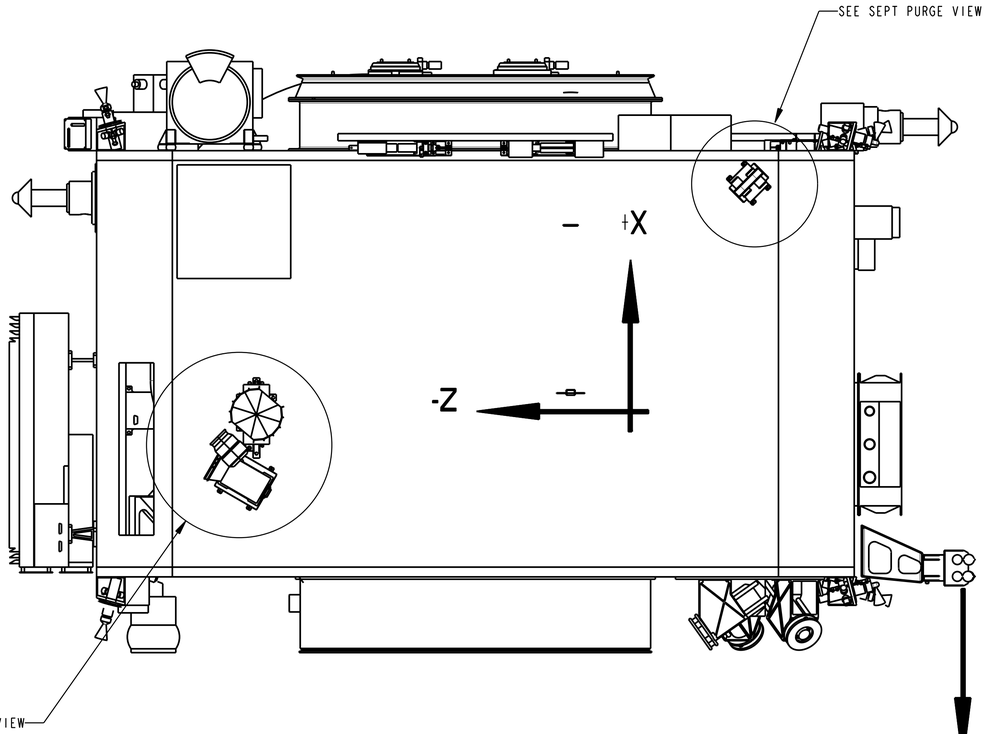
1PURGE VIEW
SCALE 0.250

EXHAUST PURGE FLOW	
HET	45° BETWEEN -X AND -Z
LET	+Y DIRECTION
SEPT-E	45° BETWEEN +X AND +Z
SEPT-NS	-X DIRECTION



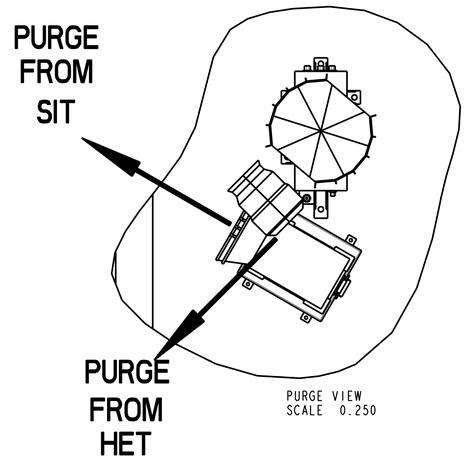
SEPT PURGE VIEW
SCALE 0.250





CURRENT FLOW
DIRECTION OF
OF EXHAUST PURGE
FOR BEHIND SPACECRAFT

PURGE
FROM
SEPT-NS



PURGE VIEW
SCALE 0.250

PLOT DATE: 09-Nov-01

MATERIALS ENGINEERING BRANCH
CODE 541
LABORATORY REPORT

TO: 541/Project Engineering & Support Group/Mr. F. Gross

FROM: 541/Materials Analysis & Technology Group/Mr. A. Montoya

SUBJECT: Total Mass Loss (TML) for Shin-Etsu KJR9022E Adhesives

DATE: March 11, 2003

ANALYSIS #: AM03-002

PROJECT: STEREO

Samples Submitted:

Shin-Etsu KJR9022E Silicone Adhesives:
(1) Cured at Room Temperature
(2) Cures at 125°C for 30 minutes

Analysis Performed:

Cahn Vacuum Microbalance; 40°C for minimum of 120 hours in 10^{-6} torr vacuum

Results/Conclusions:

Using the initial mass of each sample and the total mass loss measured by the microbalance during the test, the %TML was calculated as follows:

$$\%TML = (\Delta m/m_i) \times 100$$

where, Δm is total mass loss during test in grams
m_i is initial mass in grams

The table below lists the results for each sample tested. A plot of each test is also provided with this report.

Table 1
%TML for Shin-Etsu KJR9022E

Sample	Initial Mass, g	Length of Test, hrs.	Total mass loss, g	%TML
Cured at RT	6.40333	136	6.34722×10^{-2}	0.10
Cured at 125°C for 30 minutes	6.31370	120.5	6.19633×10^{-3}	0.10

I wish to acknowledge Mr. Carl Taylor /541 for performing the data collection for these tests. If there are any questions regarding this report, please contact me at x6-5289.

Alex Montoya

cc:
541/Flom, Y.
541/Uber, J.
541/Taylor, C.

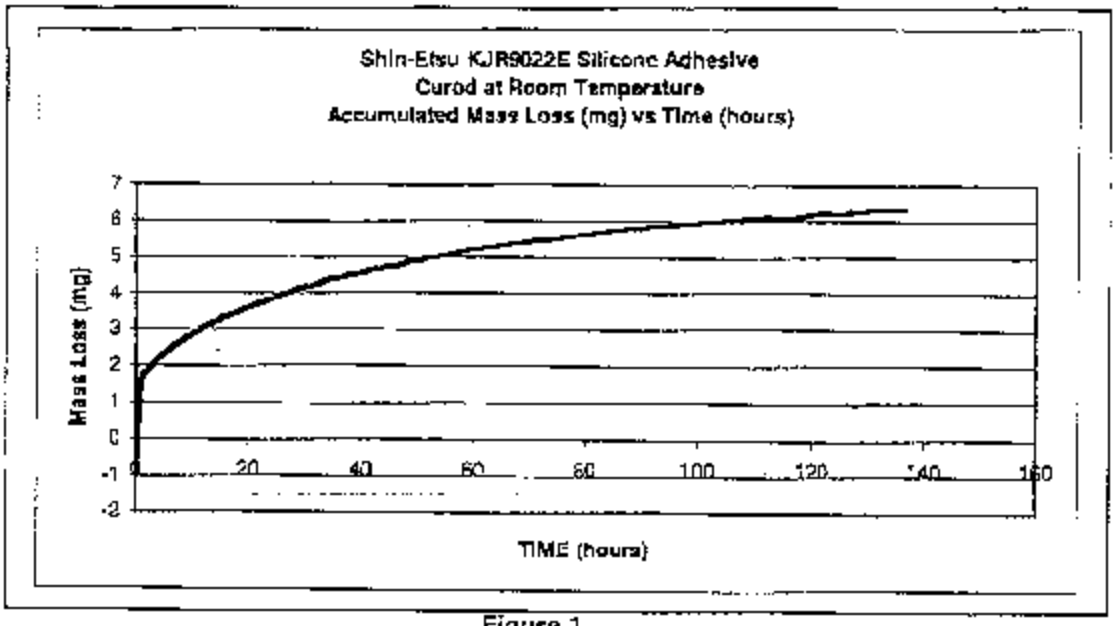


Figure 1
%TML for Shin-Etsu KJR9022E cured at RT after 40°C for 136 hours in 10^{-6} torr

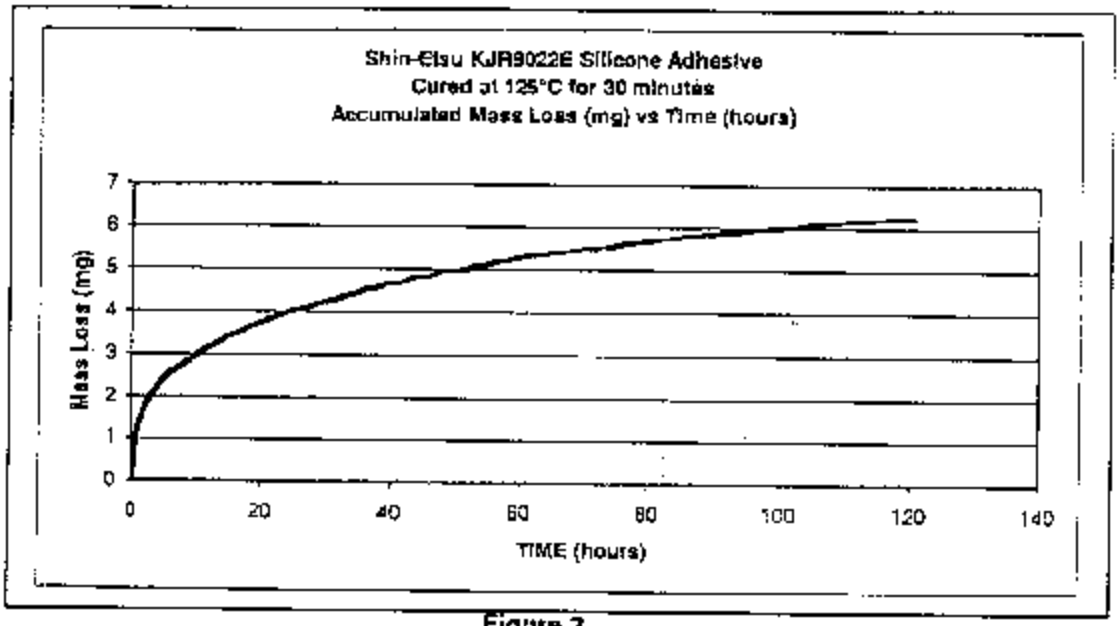


Figure 2
%TML for Shin-Etsu KJR9022E cured at 125°C after 40°C for 120.5 hours in 10^{-6} torr