PRE-COSTAR
FOS Flat Field Reference Files: A Quick Reference Guide to the Appropriate File for a Particular Date and Instrumental Configuration

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I. Introduction

The Faint Object Spectrograph (FOS) has a plethora of modes that must be calibrated. Some 324 combinations of detector, grating, aperture, and polarizer are potentially supported currently. Naturally, not all combinations are commonly used or likely to be used and unique flat field observations have not been made with all apertures for many configurations.

Multiple USE_AFTER (the date on which a specific calibration reference file becomes valid) entries exist for many of these combinations and, for several combinations, multiple deliveries of files with particular USE_AFTER dates have been made, so that 257 individual reference files have been installed to date in the CDBS at STScI. As a consequence, the process of determining which reference file to use in the reduction or re-processing of data taken with a particular instrumental configuration at a particular time can be daunting.

This report presents in tabular form, ***AS OF 21 JULY 1994***, the currently installed flat field reference file names and their USE_AFTER dates for all supported **PRE-COSTAR** FOS instrumental configurations.

ASCII text and Postscript versions of the tables and explanatory text in this report will be maintained on STEIS and will be available for anonymous ftp from *stsci.edu*. Both the STEIS tables and the explanatory text will be updated periodically.

II. Description of the Tables

The columns of Tables 1 through 7 correspond to each of the allowed spectral elements for a particular detector/polarizer configuration and the rows of these tables list each of the sixteen FOS aperture positions. Each cell defined by this matrix structure contains one or more entries of the form *yyyymmdd abcdefghi.r1h,.r1d* where *yyyymmdd* is the USE_AFTER date and *abcdefghi.r1h* is the name of the flat field reference HEADER file and *abcdefghi.r1d* is the name of the flat field reference DATA file for this USE_AFTER date. Tables 8 and 9 have a similar structure, except, as described in section III, no USE_AFTER entries are provided.

For some combinations of aperture and spectral element, several reference file deliveries have been made since launch for the *same* USE_AFTER date. This has occurred for a variety of reasons including the re-analysis of some observational data and the correction of typographical errors. The listings presented here contain *only the most recent (the best)* reference file delivery for each USE_AFTER date.

Tables 1 and 2 list the non-polarimetric flat field reference files for spectral elements used with the FOS/RED detector and Tables 3 and 4 list non-polarimetric reference files for FOS/BLUE. Tables 5 and 6 provide polarimetric flat field reference files for the BLUE and RED detectors respectively. Tables 7 through 9 contain flat field reference files that have been delivered to CDBS, but are not considered appropriate or necessary for PODPS usage (they are not *verified*).

III. Overview of the Data and Important References

FOS flat field observations have employed several observational methodologies and have been made at a variety of epochs as part of different proposals. A complete history of all files delivered to CDBS is discussed in CAL/FOS-113.

<u>Pre-Launch Flats:</u>

Prior to HST launch the CDBS was populated with "unity-flats" for all instrumental configurations. The flat field vector for each of these files was set to 1 and all files were given the pre-launch default USE_AFTER date of 19900101. The pre-launch files can be identified in the accompanying tables by the presence of a "9" as the first character of the reference file rootname.

note: other files with the 19900101 USE_AFTER date are the first deliveries of true, non-unity flats.

<u>Special "Unity-Flats" for Particular Apertures:</u>

For the C-3 (2.0-BAR), C-4 (0.7x2.0-BAR), and B-4 (BLANK) apertures, "unity-flats" have been delivered for *all* USE_AFTER dates of *all* spectral elements. These reference files were delivered in March, 1993 and replaced previously delivered copies of A-1 aperture flats. They can be identified by the first three characters of the reference file rootname - "d3t".

<u>Science Verification (SV) Flats:</u>

Non-polarimetric observations of G191B2B and KPD0005+5106 were made in SV proposal 1318. USE_AFTER dates between 19900101 and 19910930 correspond to these data. See CAL/FOS-075, S.F. Anderson, February, 1992 for a complete discussion of these observations and their analysis. Polarimetric flat field observations of BD+28D4211 and BD+65D106 were made in proposal 3235 for the three supported FOS/BLUE polarimetric spectral elements. The USE_AFTER date for flats derived from these data is 19900101 - see CAL/FOS-078, R.G. Allen and P.S. Smith, March, 1992.

Cycle 1 Flat Field Program (the "Super Flats"):

Observations of G191B2B and BD+28D4211 were carried out as proposal 2821 in March and June of 1992. See CAL/FOS-088, D. Lindler *et al* for a complete discussion of this program. A special technique was employed that obtained observations at nine separate photocathode positions. An iterative computational procedure, dubbed the "superflat" technique, was devised that could, in principle, simultaneously determine separate vectors containing the photocathode granularity and the spectrum of the star used. Due to problems with both the telescope and the proposal structure, only *verified* FOS/BLUE flats based on these data have been installed in CDBS; these flats can be identified by USE_AFTER dates of 19920101 and the first three characters of the reference rootname - "d2f". The FOS/RED flats produced by this procedure suffer from "ringing" produced by the computational method. These FOS/RED flats are currently considered useful *only* for confirming the presence of blemishes or spectral features. They have been delivered to CDBS with an invalid USE_AFTER and are not verified for PODPS (see Table 8 and 9).

Cycle 1 FOS/RED Flat Field Monitor Flats:

Seven sets of observations of G191B2B and BD+28D4211 were obtained as proposal 3975 between January and June, 1992 with FOS/RED and spectral elements G190H, G270H, and G160L. GO and calibration data taken between launch and mid-1991 had shown that the flat field granularities for these three configurations were highly variable. The data for this program were taken ONLY with the A-1 (4.3) aperture at the default well-centered photocathode position; that is, NO "super flat" procedure was employed in this program. Little change was noted between the first and last epoch of observation, hence only two "verified" flat field deliveries based upon these data were made to CDBS and the PODPS pipeline (see additional note below). These deliveries are based upon the 2 January 1992 and 26 January 1992 epochs of observation and can be recognized by mid-point USE_AFTER dates of 19911114 and 19920114 respectively. The latter delivery closely approximates an average of the flat field behavior over the entire period of this program. See CAL/FOS-089, C. Keyes for details of the analysis of the Cycle 1 FOS/RED Monitor flats.

additional note: Individual flat field reference files have been prepared for each of the seven individual epochs of observation in this program. The five epochs of flats not delivered to the PODPS pipeline have been delivered to CDBS, but have been not been marked as "verified", hence, the STScI utility *getreffile* will not identify them as the appropriate flats for any ST observation. The file names and their USE_AFTER dates are included for completeness in Table 7. Since there are a number of features in these individual flats that vary randomly at the 2-3% level, we do not currently recommend their usage as many of the small variations in these flats may be attributable to small pointing differences for each observation rather than actual photocathode granularity changes. Again, see CAL/FOS-089.

Cycle 2 FOS/RED Flat Field Monitor Program:

This program (proposal 4123) continues the Cycle 1 FOS/RED monitoring program and expands its scope to include C-2 (SLIT) aperture observations for the first time. To date two deliveries of flats based upon these data have been made. These may be identified by USE_AFTER dates of 19920915 or later. Note that substantial flat field structure changes have occurred since the last epoch of the Cycle 1 monitor (June, 1992).

Cycle 2 Flat Field Program:

Observations with all FOS/RED spectral elements not included in the above Cycle 2 monitoring program and with all FOS/BLUE spectral elements will be made of G191B2B in April, 1993 as part of proposal 4699. This program will execute AFTER the onboard GIM correction algorithm is operational. No entries in the accompanying tables pertain to this program.

Cycle 2 and 3 Polarimetry Flat Field Program:

Polarimetry flat fields based on Cycle 2 proposal 4697 and Cycle 3 proposal 5051 were produced by Richard Allen. These files were delivered in early June 1994. Only the FOS/BLUE A-1 (4.3) and B-3 (1.0) and FOS/RED A-1 (4.3) apertures are calibrated. They can be identified by the first 3 characters of the rootname - “e5v”. The remaining FOS/RED flats are the pre-launch unity flats.

Polarization flats for the B-1 (0.5) aperture with FOS/BLUE and Pol B were delivered in November, 1992. These flats were simply duplicates of the then-current B-3 (1.0) aperture polarization flats. The 0.5 aperture is not a standard supported option for polarimetry and since it has not been used since, the 0.5 aperture reference files have not been updated.

IV. Availability of this Information and Updates

Periodically updated ASCII text and Postscript versions of the explanatory text and the Tables herein will be maintained in the /instrument_news/fos/ sub-directory on STEIS and will be available for anonymous ftp from *stsci.edu*. The files will be named “flat_field_tables_*mmmyy*.ps” and “flat_field_tables_*mmmyy*.txt”, where the extension “ps” indicates the Postscript version, the extension “txt” denotes the ASCII text version, and “*mmmyy*” is the posting date in month and year. For example, these files delivered are “flat_field_tables_aug94.ps” and “flat_field_tables_aug94.txt”. Current flat field information is also available from the STScI Research Support Branch Analysis Hot Line (telephone: (410) 338-1082 or e-mail: *analysis@stsci.edu*).

References

Allen,R.G. and Smith,P.S., 1992,Instrument Science Report CAL/FOS-078.

Anderson, S.F, 1992, Instrument Science Report CAL/FOS-075.

Lindler, D., Bohlin, R., Hartig, G., and Keyes, C., 1993, Instrument Science Report CAL/FOS-088.

Keyes, C.D., 1993, Instrument Science Report CAL/FOS-089, in preparation.

Taylor, C.J. and Keyes, C.D., 1994, Instrument Science Report CAL/FOS-113.

Notes for TABLE interpretation:

yyyymmdd: USE_AFTER date (4-digit year A.D., 2-digit month, 2-digit day)

abcdefghi.r1h,.r1d: rootname of flat field reference files and extensions for header and data files.

A pre-launch epoch file can be always identified in the accompanying tables by the presence of a "9" as the first character of the reference file rootname.

The letter "l" in rootnames in the tables is italicized ("*l*") to make it more legible.

FOS FLAT FIELD REFERENCE FILES

Table 1: RED H19,H27,L15,H40 REFERENCE FILES

Aperture	H19	H27	L15	H40
A-1 (4.3)	19900101 d1c1112qy.r1h,.r1d	19900101 d1c1112sy.r1h,.r1d	19900101 d1c1112my.r1h,.r1d	19900101 baf13101y.r1h,.r1d
	19910201 d1c1201hy.r1h,.r1d	19910201 d1c1201jy.r1h,.r1d	19910201 d1c1201gy.r1h,.r1d	
	19911114 d1c1044qy.r1h,.r1d	19911114 d1c1044ky.r1h,.r1d	19911114 d1c1044my.r1h,.r1d	
	19920114 d1c11470y.r1h,.r1d	19920114 d1c11474y.r1h,.r1d	19920114 d1c11476y.r1h,.r1d	
	19920915 d231547hy.r1h,.r1d	19920915 d231547sy.r1h,.r1d	19920915 d2315487y.r1h,.r1d	
A-2 (0.5 pair) UPPER	19900101 d1c11132y.r1h,.r1d	19900101 d1c11134y.r1h,.r1d	19900101 d1c1112ty.r1h,.r1d	19900101 9be1438oy.r1h,.r1d
	19910201 d1c1201oy.r1h,.r1d	19910201 d1c1201ry.r1h,.r1d	19910201 d1c1201*l*y.r1h,.r1d	
	19911114 d1c1044oy.r1h,.r1d	19911114 d1c1044sy.r1h,.r1d	19911114 d1c10452y.r1h,.r1d	
	19920114 d1c11477y.r1h,.r1d	19920114 d1c1147by.r1h,.r1d	19920114 d1c1147gy.r1h,.r1d	
	19920915 d231548hy.r1h,.r1d	19920915 d231548sy.r1h,.r1d	19920915 d2315497y.r1h,.r1d	
A-2 (0.5 pair) LOWER	19900101 d1c11133y.r1h,.r1d	19900101 d1c11135y.r1h,.r1d	19900101 d1c11130y.r1h,.r1d	19900101 9be1439ey.r1h,.r1d
	19910201 d1c1201py.r1h,.r1d	19910201 d1c1201sy.r1h,.r1d	19910201 d1c1201my.r1h,.r1d	
	19911114 d1c1044qy.r1h,.r1d	19911114 d1c10450y.r1h,.r1d	19911114 d1c10457y.r1h,.r1d	
	19920114 d1c11479y.r1h,.r1d	19920114 d1c1147ey.r1h,.r1d	19920114 d1c11509y.r1h,.r1d	
	19920915 d231548ny.r1h,.r1d	19920915 d2315493y.r1h,.r1d	19920915 d231549cy.r1h,.r1d	
A-3 (0.25 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-3(0.25 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
A-4 (0.1 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-4 (0.1 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
B-1 (0.5)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-2 (0.3)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1

Table 1: RED H19,H27,L15,H40 REFERENCE FILES

Aperture	H19	H27	L15	H40
B-3 (1.0)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-4 (BLANK)	19900101 d3t11065y.r1h,.r1d	19900101 d3t11065y.r1h,.r1d	19900101 d3t11065y.r1h,.r1d	19900101 d3t11065y.r1h,.r1d
	19910201 d3t10261y.r1h,.r1d	19910201 d3t10264y.r1h,.r1d	19910201 d3t10267y.r1h,.r1d	
	19911114 d3t1034ry.r1h,.r1d	19911114 d3t10350y.r1h,.r1d	19911114 d3t10353y.r1h,.r1d	
	19920114 d3t10417y.r1h,.r1d	19920114 d3t1041by.r1h,.r1d	19920114 d3t1041ey.r1h,.r1d	
	19920915 d3t1050by.r1h,.r1d	19920915 d3t1050fy.r1h,.r1d	19920915 d3t1050iy.r1h,.r1d	
C-1 (1.0 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
C-1 (1.0 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
C-2 (0.25x2.0 slit)	19900101 d1c1112qy.r1h,.r1d	19900101 d1c1112sy.r1h,.r1d	19900101 d1c1112my.r1h,.r1d	SAME AS A-1
	19910201 d1c1201hy.r1h,.r1d	19910201 d1c1201jy.r1h,.r1d	19910201 d1c1201gy.r1h,.r1d	
	19911114 d1c1044hy.r1h,.r1d	19911114 d1c1044ky.r1h,.r1d	19911114 d1c1044my.r1h,.r1d	
	19920114 d1c11470y.r1h,.r1d	19920114 d1c11474y.r1h,.r1d	19920114 d1c11476y.r1h,.r1d	
	19920915 d241317ky.r1h,.r1d	19920915 d241317my.r1h,.r1d	19920915 d241317ny.r1h,.r1d	
C-3 (2.0-BAR)	19900101 d3t11066y.r1h,.r1d	19900101 d3t11066y.r1h,.r1d	19900101 d3t11066y.r1h,.r1d	19900101 d3t11066y.r1h,.r1d
	19910201 d3t10262y.r1h,.r1d	19910201 d3t10265y.r1h,.r1d	19910201 d3t10268y.r1h,.r1d	
	19911114 d3t1034sy.r1h,.r1d	19911114 d3t10351y.r1h,.r1d	19911114 d3t10354y.r1h,.r1d	
	19920114 d3t10418y.r1h,.r1d	19920114 d3t1041cy.r1h,.r1d	19920114 d3t1041fy.r1h,.r1d	
	19920915 d3t1050cy.r1h,.r1d	19920915 d3t1050gy.r1h,.r1d	19920915 d3t1050jy.r1h,.r1d	
C-4 (0.7x2.0-BAR)	19900101 d3t11067y.r1h,.r1d	19900101 d3t11067y.r1h,.r1d	19900101 d3t11067y.r1h,.r1d	19900101 d3t11067y.r1h,.r1d
	19910201 d3t10263y.r1h,.r1d	19910201 d3t10266y.r1h,.r1d	19910201 d3t10269y.r1h,.r1d	
	19911114 d3t1034ty.r1h,.r1d	19911114 d3t10352y.r1h,.r1d	19911114 d3t10355y.r1h,.r1d	
	19920114 d3t10419y.r1h,.r1d	19920114 d3t1041dy.r1h,.r1d	19920114 d3t1041hy.r1h,.r1d	
	19920915 d3t1050ey.r1h,.r1d	19920915 d3t1050hy.r1h,.r1d	19920915 d3t1050ky.r1h,.r1d	

Table 2: RED H57,H78,L65,PRI REFERENCE FILES

Aperture	H57	H78	L65	PRISM
A-1 (4.3)	19900101 baf13103y.r1h,.r1d	19900101 9ba09580y.r1h,.r1d	19900101 baf13104y.r1h,.r1d	19900101 baf13105y.r1h,.r1d
A-2 (0.5 pair) UPPER	19900101 9be1438oy.r1h,.r1d	19900101 9be1438oy.r1h,.r1d	19900101 9be1438oy.r1h,.r1d	19900101 9be1438oy.r1h,.r1d
A-2 (0.5 pair) LOWER	19900101 9be1439ey.r1h,.r1d	19900101 9be1439ey.r1h,.r1d	19900101 9be1439ey.r1h,.r1d	19900101 9be1439ey.r1h,.r1d
A-3 (0.25 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-3(0.25 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
A-4 (0.1 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-4 (0.1 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
B-1 (0.5)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-2 (0.3)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-3 (1.0)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-4 (BLANK)	19900101 d3t11065y.r1h,.r1d	19900101 d3t11065y.r1h,.r1d	19900101 d3t11065y.r1h,.r1d	19900101 d3t11065y.r1h,.r1d
C-1 (1.0 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
C-1 (1.0 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
C-2 (0.25x2.0 slit)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-3 (2.0-BAR)	19900101 d3t11066y.r1h,.r1d	19900101 d3t11066y.r1h,.r1d	19900101 d3t11066y.r1h,.r1d	19900101 d3t11066y.r1h,.r1d
C-4 (0.7x2.0-BAR)	19900101 d3t11067y.r1h,.r1d	19900101 d3t11067y.r1h,.r1d	19900101 d3t11067y.r1h,.r1d	19900101 d3t11067y.r1h,.r1d

Table 3: BLUE H13,H19,H27,H40 REFERENCE FILES

Aperture	H13	H19	H27	H40
A-1 (4.3)	19900101 baf13107y.r1h,.r1d	19900101 baf1310ay.r1h,.r1d	19900101 baf1310cy.r1h,.r1d	19900101 baf1310dy.r1h,.r1d
	19920101 d2f1332py.r1h,.r1d	19920101 d2f1332sy.r1h,.r1d	19920101 d2f1332ty.r1h,.r1d	19920101 d2f13331y.r1h,.r1d
A-2 (0.5 pair) UPPER	19900101 9be14405y.r1h,.r1d	19900101 9be14405y.r1h,.r1d	19900101 9be14405y.r1h,.r1d	19900101 9be14405y.r1h,.r1d
	19920101 d2f13334y.r1h,.r1d	19920101 d2f13336y.r1h,.r1d	19920101 d2f13338y.r1h,.r1d	19920101 d2f1333ay.r1h,.r1d
A-2 (0.5 pair) LOWER	19900101 9be1440iy.r1h,.r1d	19900101 9be1440iy.r1h,.r1d	19900101 9be1440iy.r1h,.r1d	19900101 9be1440iy.r1h,.r1d
	19920101 d2f1333dy.r1h,.r1d	19920101 d2f1333gy.r1h,.r1d	19920101 d2f1333iy.r1h,.r1d	19920101 d2f1333jy.r1h,.r1d
A-3 (0.25 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-3(0.25 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
A-4 (0.1 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-4 (0.1 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
B-1 (0.5)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-2 (0.3)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-3 (1.0)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-4 (BLANK)	19900101 d3t11068y.r1h,.r1d	19900101 d3t11068y.r1h,.r1d	19900101 d3t11068y.r1h,.r1d	19900101 d3t11068y.r1h,.r1d
	19920101 d3t1117dy.r1h,.r1d	19920101 d3t1117dy.r1h,.r1d	19920101 d3t1117dy.r1h,.r1d	19920101 d3t1117dy.r1h,.r1d
C-1 (1.0 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
C-1 (1.0 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
C-2 (0.25x2.0 slit)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-3 (2.0-BAR)	19900101 d3t11069y.r1h,.r1d	19900101 d3t11069y.r1h,.r1d	19900101 d3t11069y.r1h,.r1d	19900101 d3t11069y.r1h,.r1d
	19920101 d3t1117ey.r1h,.r1d	19920101 d3t1117ey.r1h,.r1d	19920101 d3t1117ey.r1h,.r1d	19920101 d3t1117ey.r1h,.r1d
C-4 (0.7x2.0-BAR)	19900101 d3t1106ay.r1h,.r1d	19900101 d3t1106ay.r1h,.r1d	19900101 d3t1106ay.r1h,.r1d	19900101 d3t1106ay.r1h,.r1d
	19920101 d3t1117gy.r1h,.r1d	19920101 d3t1117gy.r1h,.r1d	19920101 d3t1117gy.r1h,.r1d	19920101 d3t1117gy.r1h,.r1d

Table 4: BLUE H57,L15,L65,PRI REFERENCE FILES

Aperture	H57	L15	L65	PRISM
A-1 (4.3)	19900101 9ba0959jy.r1h,.r1d	19900101 baf13108y.r1h,.r1d	19900101 9ba0959jy.r1h,.r1d	19900101 baf1310fy.r1h,.r1d
		19920101 d2f1332ry.r1h,.r1d		19920101 d2f13332y.r1h,.r1d
A-2 (0.5 pair) UPPER	19900101 9be14405y.r1h,.r1d	19900101 9be14405y.r1h,.r1d	19900101 9be14405y.r1h,.r1d	19900101 9be14405y.r1h,.r1d
		19920101 d2f13335y.r1h,.r1d		19920101 d2f1333cy.r1h,.r1d
A-2 (0.5 pair) LOWER	19900101 9be1440iy.r1h,.r1d	19900101 9be1440iy.r1h,.r1d	19900101 9be1440iy.r1h,.r1d	19900101 9be1440iy.r1h,.r1d
		19920101 d2f1333fy.r1h,.r1d		19920101 d2f1333*l*y.r1h,.r1d
A-3 (0.25 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-3(0.25 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
A-4 (0.1 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-4 (0.1 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
B-1 (0.5)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-2 (0.3)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-3 (1.0)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-4 (BLANK)	19900101 d3t11068y.r1h,.r1d	19900101 d3t11068y.r1h,.r1d	19900101 d3t11068y.r1h,.r1d	19900101 d3t11068y.r1h,.r1d
	19920101 d3t1117dy.r1h,.r1d	19920101 d3t1117dy.r1h,.r1d	19920101 d3t1117dy.r1h,.r1d	19920101 d3t1117dy.r1h,.r1d
C-1 (1.0 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
C-1 (1.0 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
C-2 (0.25x2.0 slit)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-3 (2.0-BAR)	19900101 d3t11069y.r1h,.r1d	19900101 d3t11069y.r1h,.r1d	19900101 d3t11069y.r1h,.r1d	19900101 d3t11069y.r1h,.r1d
	19920101 d3t1117ey.r1h,.r1d	19920101 d3t1117ey.r1h,.r1d	19920101 d3t1117ey.r1h,.r1d	19920101 d3t1117ey.r1h,.r1d
C-4 (0.7x2.0-BAR)	19900101 d3t1106ay.r1h,.r1d	19900101 d3t1106ay.r1h,.r1d	19900101 d3t1106ay.r1h,.r1d	19900101 d3t1106ay.r1h,.r1d
	19920101 d3t1117gy.r1h,.r1d	19920101 d3t1117gy.r1h,.r1d	19920101 d3t1117gy.r1h,.r1d	19920101 d3t1117gy.r1h,.r1d

Table 5: BLUE H13,H19,H27 POLARIZER REFERENCE FILES

Aperture	H13-POL B	H19-POL B	H27-POL B
A-1 (4.3) PASS 1	19900101 bbj13255y.r1h,.r1d	19900101 bbj1325cy.r1h,.r1d	19900101 bbj1325iy.r1h,.r1d
	19930608 e5v11159y.r1h,.r1d	19930608 e5v1115dy.r1h,.r1d	19930608 e5v1115iy.r1h,.r1d
A-1 (4.3) PASS 2	19900101 bbj13257y.r1h,.r1d	19900101 bbj1325dy.r1h,.r1d	19900101 bbj1325jy.r1h,.r1d
	19930608 e5v1115ay.r1h,.r1d	19930608 e5v1115ey.r1h,.r1d	19930608 e5v1115jy.r1h,.r1d
B-1 (0.5) PASS 1	19900101 cbj11439y.r1h,.r1d	19900101 cbj1143dy.r1h,.r1d	19900101 cbj1143hy.r1h,.r1d
B-1 (0.5) PASS 2	19900101 cbj1143cy.r1h,.r1d	19900101 cbj1143fy.r1h,.r1d	19900101 cbj1143iy.r1h,.r1d
B-3 (1.0) PASS 1	19900101 bbj13259y.r1h,.r1d	19900101 bbj1325fy.r1h,.r1d	19900101 bbj1325ly.r1h,.r1d
	19930608 e5v1115by.r1h,.r1d	19930608 e5v1115gy.r1h,.r1d	19930608 e5v1115ky.r1h,.r1d
B-3 (1.0) PASS 2	19900101 bbj1325ay.r1h,.r1d	19900101 bbj1325gy.r1h,.r1d	19900101 bbj1325my.r1h,.r1d
	19930608 e5v1115cy.r1h,.r1d	19930608 e5v1115hy.r1h,.r1d	19930608 e5v1115my.r1h,.r1d

Table 6: RED H19,H27,H40 POLARIZER REFERENCE FILES

Aperture	H19-POL B	H27-POL B	H40-POL A
A-1 (4.3) PASS 1	19900101 9ba09578y.r1h,.r1d	19900101 9ba09578y.r1h,.r1d	19900101 9461658by.r1h,.r1d
	19930608 e5v11151y.r1h,.r1d	19930608 e5v11154y.r1h,.r1d	19930608 e5v11156y.r1h,.r1d
A-1 (4.3) PASS 2	19900101 9ba0957jy.r1h,.r1d	19900101 9ba0957jy.r1h,.r1d	19900101 9ba09588y.r1h,.r1d
	19930608 e5v11153y.r1h,.r1d	19930608 e5v11155y.r1h,.r1d	19930608 e5v11157y.r1h,.r1d
B-1 (0.5) PASS 1	19900101 9ba09578y.r1h,.r1d	19900101 9ba09578y.r1h,.r1d	19900101 9461658by.r1h,.r1d
B-1 (0.5) PASS 2	19900101 9ba0957jy.r1h,.r1d	19900101 9ba0957jy.r1h,.r1d	19900101 9ba09588y.r1h,.r1d
B-3 (1.0) PASS 1	19900101 9ba09578y.r1h,.r1d	19900101 9ba09578y.r1h,.r1d	19900101 9461658by.r1h,.r1d
B-3 (1.0) PASS 2	19900101 9ba0957jy.r1h,.r1d	19900101 9ba0957jy.r1h,.r1d	19900101 9ba09588y.r1h,.r1d

Table 7: RED H19,H27,L15 UN-VERIFIED REFERENCE FILES (CDBS ONLY)

Aperture	H19	H27	L15
A-1 (4.3)	19920210 d2m1349iy.r1h,.r1d	19920210 d2m1349jy.r1h,.r1d	19920210 d2n10335y.r1h,.r1d
	19920305 d2m1349oy.r1h,.r1d	19920305 d2m1349py.r1h,.r1d	19920305 d2n1034iy.r1h,.r1d
	19920401 d2m1349ay.r1h,.r1d	19920401 d2m1349by.r1h,.r1d	19920401 d2n10349y.r1h,.r1d
	19920508 d2m1349ty.r1h,.r1d	19920508 d2m13501y.r1h,.r1d	19920508 d2n1033sy.r1h,.r1d
	19920613 d2m13506y.r1h,.r1d	19920613 d2m13507y.r1h,.r1d	19920613 d2n1033hy.r1h,.r1d
B-1 (0.5)	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-2 (0.3)	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-3 (1.0)	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-4 (BLANK)	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-2 (0.25x2.0 slit)	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-3 (2.0-BAR)	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-4 (0.7x2.0-BAR)	SAME AS A-1	SAME AS A-1	SAME AS A-1

Table 8: RED H19,H27,L15 UN-VERIFIED "SUPERFLAT" REFERENCE FILES (CDBS ONLY)

Aperture	H19	H27	L15
A-1 (4.3)	d3n1113ny.r1h,.r1d	d3n1113ry.r1h,.r1d	d3n1114ay.r1h,.r1
A-2 (0.5 pair) UPPER	d3n1113oy.r1h,.r1d	d3n1113sy.r1h,.r1d	d3n1114by.r1h,.r1
A-2 (0.5 pair) LOWER	d3n1113my.r1h,.r1d	d3n1113py.r1h,.r1d	d3n11147y.r1h,.r1d
A-3(0.25 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-3(0.25 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
A-4 (0.1 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-4 (0.1 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
B-1 (0.5)	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-2 (0.3)	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-3 (1.0)	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-1 (1.0 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
C-1 (1.0 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
C-2 (0.25x2.0 slit)	SAME AS A-1	SAME AS A-1	SAME AS A-1

Table 9: RED H40,H57,L65,PRI UN-VERIFIED "SUPERFLAT" REFERENCE FILES (CDBS ONLY)

Aperture	H40	H57	L65	PRISM
A-1 (4.3)	d3n11141y.r1h,.r1d	d3n11145y.r1h,.r1d	d3n1114dy.r1h,.r1d	d3n1114hy.r1h,.r1d
A-2 (0.5 pair) UPPER	d3n11142y.r1h,.r1d	d3n11146y.r1h,.r1d	d3n1114fy.r1h,.r1d	d3n1114iy.r1h,.r1d
A-2 (0.5 pair) LOWER	d3n1113ty.r1h,.r1d	d3n11143y.r1h,.r1d	d3n1114cy.r1h,.r1d	d3n1114gy.r1h,.r1d
A-3 (0.25 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-3(0.25 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
A-4 (0.1 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
A-4 (0.1 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
B-1 (0.5)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-2 (0.3)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
B-3 (1.0)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1
C-1 (1.0 pair) UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER	SAME AS A-2 UPPER
C-1 (1.0 pair) LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER	SAME AS A-2 LOWER
C-2 (0.25x2.0 slit)	SAME AS A-1	SAME AS A-1	SAME AS A-1	SAME AS A-1