**=======================================================================MIXER**

**MIXER**

**PROGRAM MIXER MIXER**

**============= MIXER**

**VERSION 76-1 (NOVEMBER 1976) MIXER**

**VERSION 81-1 (APRIL 1981) \*IBM VERSION MIXER**

**VERSION 82-1 (AUGUST 1982) \*COMPUTER INDEPENDENT VERSION MIXER**

**VERSION 84-1 (JUNE 1984) \*SPECIAL I/O ROUTINES TO GUARANTEE MIXER**

**ACCURACY OF ENERGY. MIXER**

**\*DOUBLE PRECISION TREATMENT OF ENERGY MIXER**

**(REQUIRED FOR NARROW RESONANCES). MIXER**

**VERSION 86-1 (JANUARY 1986)\*FORTRAN-77/H VERSION MIXER**

**VERSION 88-1 (JULY 1988) \*OPTION...INTERNALLY DEFINE ALL I/O MIXER**

**FILE NAMES (SEE, SUBROUTINE FILIO1 MIXER**

**AND FILIO2 FOR DETAILS). MIXER**

**\*IMPROVED BASED ON USER COMMENTS. MIXER**

**VERSION 89-1 (JANUARY 1989)\*PSYCHOANALYZED BY PROGRAM FREUD TO MIXER**

**INSURE PROGRAM WILL NOT DO ANYTHING MIXER**

**CRAZY. MIXER**

**\*UPDATED TO USE NEW PROGRAM CONVERT MIXER**

**KEYWORDS. MIXER**

**\*ADDED LIVERMORE CIVIC COMPILER MIXER**

**CONVENTIONS. MIXER**

**VERSION 92-1 (JANUARY 1992)\*UPDATED BASED ON USER COMMENTS MIXER**

**\*ADDED PHOTON CROSS SECTIONS MIXER**

**\*ADDED FORTRAN SAVE OPTION MIXER**

**\*OUTPUT IN ENDF/B-VI FORMAT MIXER**

**\*COMPLETELY CONSISTENT I/O ROUTINES - MIXER**

**TO MINIMIZE COMPUTER DEPENDENCE. MIXER**

**\*NOTE, CHANGE IN INPUT PARAMETER MIXER**

**FORMAT. MIXER**

**VERSION 94-1 (JANUARY 1994)\*VARIABLE ENDF/B DATA FILENAMES MIXER**

**TO ALLOW ACCESS TO FILE STRUCTURES MIXER**

**(WARNING - INPUT PARAMETER FORMAT MIXER**

**HAS BEEN CHANGED) MIXER**

**\*CLOSE ALL FILES BEFORE TERMINATING MIXER**

**(SEE, SUBROUTINE ENDIT) MIXER**

**\*INCREASED INCORE PAGE SIZE FROM MIXER**

**1002 TO 4008. MIXER**

**VERSION 96-1 (JANUARY 1996) \*COMPLETE RE-WRITE MIXER**

**\*IMPROVED COMPUTER INDEPENDENCE MIXER**

**\*ALL DOUBLE PRECISION MIXER**

**\*ON SCREEN OUTPUT MIXER**

**\*UNIFORM TREATMENT OF ENDF/B I/O MIXER**

**\*IMPROVED OUTPUT PRECISION MIXER**

**\*DEFINED SCRATCH FILE NAMES MIXER**

**\*INCREASED INCORE PAGE SIZE FROM MIXER**

**4008 TO 12000. MIXER**

**VERSION 99-1 (MARCH 1999) \*CORRECTED CHARACTER TO FLOATING MIXER**

**POINT READ FOR MORE DIGITS MIXER**

**\*UPDATED TEST FOR ENDF/B FORMAT MIXER**

**VERSION BASED ON RECENT FORMAT CHANGEMIXER**

**\*GENERAL IMPROVEMENTS BASED ON MIXER**

**USER FEEDBACK MIXER**

**VERSION 99-2 (JUNE 1999) \*ASSUME ENDF/B-VI, NOT V, IF MISSING MIXER**

**MF=1, MT-451. MIXER**

**VERS. 2000-1 (FEBRUARY 2000)\*GENERAL IMPROVEMENTS BASED ON MIXER**

**USER FEEDBACK MIXER**

**VERS. 2002-1 (MAY 2002) \*OPTIONAL INPUT PARAMETERS MIXER**

**VERS. 2004-1 (MARCH 2004) \*ADDED INCLUDE FOR COMMON MIXER**

**\*INCREASED INCORE PAGE SIZE FROM MIXER**

**12000 TO 60000. MIXER**

**VERS. 2005-1 (OCT. 2005) \*CORRECTED MERGE ERROR MIXER**

**VERS. 2007-1 (JAN. 2007) \*CHECKED AGAINST ALL ENDF/B-VII MIXER**

**\*INCREASED INCORE PAGE SIZE FROM MIXER**

**60,000 TO 240,000. MIXER**

**VERS. 2007-2 (DEC. 2007) \*72 CHARACTER FILE NAMES. MIXER**

**VERS. 2008-1 (JUNE 2008) \*ADDED GRAMS OR ATOMS INPUT MIXER**

**VERS. 2010-1 (Apr. 2010) \*General update based on user feedbackMIXER**

**VERS. 2012-1 (Aug. 2012) \*Added CODENAME MIXER**

**\*32 and 64 bit Compatible MIXER**

**\*Added ERROR stop MIXER**

**VERS. 2015-1 (Jan. 2015) \*Extended OUT9. MIXER**

**\*Replaced ALL 3 way IF Statements. MIXER**

**VERS. 2017-1 (May 2017) \*Increse max. points to 1,200,000 MIXER**

**\*updated based on user feedbsck. MIXER**

**\*All floating input parameters changedMIXER**

**to character input + IN9 conversion. MIXER**

**VERS. 2018-1 (Jan. 2018) \*Added on-line output for ALL ENDERRORMIXER**

**VERS. 2019-1 (June 2019) \*Additional Interpolation Law Tests MIXER**

**\*Added WARNING if ANY MT ends below MIXER**

**Maximum Tabulated Energy of ANY otherMIXER**

**MT = the ENDF Data is NOT uniquely MIXER**

**defined above this energy. MIXER**

**\*Corrected ERROR that could set last MIXER**

**(highest energy) cross section = 0.0 MIXER**

**\*No longer automatically extend cross MIXER**

**sections as constant above tabulated MIXER**

**energy range. MIXER**

**VERS. 2020-1 (June 2020) \*Complete Re-write to allow some MIXER**

**reactions to be missing, e.g., MIXER**

**define (n,t) for natural abundant MIXER**

**element by summing over isotopes, MIXER**

**where only some isotopes have (n,t). MIXER**

**\*Additional Interpolation Law Tests MIXER**

**\*Min 1 File allowed,e.g. select MT MIXER**

**Previously assumed 2 or more files MIXER**

**needed for MIX. MIXER**

**VERS. 2021-1 (Jan. 2021) \*Updated for FORTRAN 2018 MIXER**

**MIXER**

**Acknowledgement 2019 MIXER**

**-------------------- MIXER**

**I thank Daniel Lopez Aldama (Agency of Nuclear Energy and AdvancedMIXER**

**Technologies, Havana, Cuba), for finding and fixing an ERROR in MIXER**

**MIXER that could result in the last MIXED energy point (highest MIXER**

**energy output) ERROREOUSLY setting the cross section = 0.0. This MIXER**

**problem has been corrected in 2019-1. MIXER**

**MIXER**

**Defining High Energy Data MIXER**

**------------------------- MIXER**

**Starting with MIXER (2019-1), it will no longer automatically MIXER**

**extend MTs as CONSTANT above the energy range where they are MIXER**

**tabulated to the Maximum Tabulated Energy of any other MT in MIX. MIXER**

**Above this energy the ENDF MIX is not UNIQUELY defined - in this MIXER**

**case it was potentially TOTALLY MISLEADING users of MIXER in that MIXER**

**it was doing "invisiable evaluation" - starting with 2019-1 MIXER**

**MIXER will, MIXER**

**1) Extend the cross section = 0. MIXER**

**2) Print WARNING messages idenifying the Maximum Tabulated Energy MIXER**

**of ANY MT - and which MTs stop below this energy. MIXER**

**3) Print a final WARNING that the MIX is NO UNIQUELY defined MIXER**

**above the LOWEST common tabulated energy fot any MT. MIXER**

**MIXER**

**OWNED, MAINTAINED AND DISTRIBUTED BY MIXER**

**------------------------------------ MIXER**

**THE NUCLEAR DATA SECTION MIXER**

**INTERNATIONAL ATOMIC ENERGY AGENCY MIXER**

**P.O. BOX 100 MIXER**

**A-1400, VIENNA, AUSTRIA MIXER**

**EUROPE MIXER**

**MIXER**

**ORIGINALLY WRITTEN BY MIXER**

**------------------------------------ MIXER**

**Dermott E. Cullen MIXER**

**MIXER**

**PRESENT CONTACT INFORMATION MIXER**

**--------------------------- MIXER**

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**MIXER**

**PURPOSE MIXER**

**------- MIXER**

**THIS PROGRAM IS DESIGNED TO CALCULATE THE ENERGY DEPENDENT CROSS MIXER**

**SECTION FOR A COMPOSITE MIXTURE OF UP TO 10 DIFFERENT MATERIALS. MIXER**

**MIXER**

**THE PRESENT VERSION WILL ONLY CALCULATE THE CROSS SECTION FOR ONE MIXER**

**FINAL REACTION (ENDF/B SECTION), E.G. TOTAL CROSS SECTION, BUT NOTMIXER**

**ANY OTHER REACTION. MIXER**

**MIXER**

**NOTE, THIS PROGRAM WILL NOT COMBINE ALL REACTIONS FOR A MIXTURE MIXER**

**OF MATERIALS DURING A SINGLE RUN - ONLY ONE REACTION WILL BE MIXER**

**CREATED PER RUN. MIXER**

**MIXER**

**EVALUATED DATA FORMAT MIXER**

**--------------------- MIXER**

**THE CROSS SECTIONS ARE READ FROM THE ENDF/B FORMAT AND THE MIXER**

**COMPOSITE CROSS SECTION IS CONVERTED TO AN EQUIVALENT BARNS/ATOM MIXER**

**FORM AND OUTPUT IN THE ENDF/B FORMAT WITH AN EQUIVALENT ATOMIC MIXER**

**WEIGHT. THE USER MUST SPECIFY THE COMPOSITION BY GIVING THE ZA, MIXER**

**MT AND GRAMS OR ATOMS OF EACH CONSTITUENT. IN ADDITION THE USER MIXER**

**IDENTIFY THE COMPOSITE CROSS SECTION BY SPECIFYING THE ZA, MAT MIXER**

**AND MT TO BE USED IN THE ENDF/B FORMATTED OUTPUT. MIXER**

**MIXER**

**SINCE ONLY THE CROSS SECTIONS IN FILE 3 AND 23 ARE USED, AND THE MIXER**

**FORMAT FOR FILE 3/23 IS THE SAME IN ALL VERSIONS ON ENDF/B, THIS MIXER**

**PROGRAM MAY BE USED WITH ANY VERSION OF ENDF/B DATA (I.E., MIXER**

**ENDF/B-I, II, III, IV, V OR VI). DURING A SINGLE RUN IT MAY EVEN MIXER**

**BE USED TO READ AND COMBINE EVALUATIONS WHICH ARE IN DIFFERENT MIXER**

**VERSIONS OF THE ENDF/B FORMAT. MIXER**

**MIXER**

**ENDF/B FORMATTED OUTPUT WILL BE IN THE ENDF/B-VI FORMAT REGARDLESSMIXER**

**OF THE FORMAT OF THE INPUT ENDF/B DATA. THIS WILL ONLY EFFECT THE MIXER**

**HOLLERITH SECTION (MF=1, MT=451). THE FORMAT OF CROSS SECTIONS MIXER**

**(MF=3) IS THE SAME IN ALL VERSION OF THE ENDF/B FORMAT. MIXER**

**MIXER**

**IN ORDER TO GUARANTEE PROPER OPERATION OF THIS PROGRAM THE DATA MIXER**

**MUST BE PROPERLY CODED IN THE ENDF/B FORMAT. NO ERROR CHECKING IS MIXER**

**PERFORMED. IT IS PARTICULARLY IMPORTANT THAT THE FOLLOWING DATA MIXER**

**BE CORRECT MIXER**

**MIXER**

**(1) ZA, MF, MT - MUST BE CORRECT IN ORDER TO ALLOW PROGRAM TO MIXER**

**SELECT THE APPROPRIATE SECTIONS TO BE COMBINED. MIXER**

**(2) AWRE - ATOMIC WEIGHT RATIO MUST BE CORRECT TO ALLOW PROGRAM MIXER**

**TO CONVERT THE USER SPECIFIED GRAMS INTO ATOMS FOR MIXER**

**PROPER ATOM RATIO MIXING. MIXER**

**(3) (ENERGIES, CROSS SECTIONS) - MUST BE CORRECT, LINEARLY MIXER**

**======== MIXER**

**INTERPOLABLE, IN ASCENDING ENERGY ORDER OF (E, BARNS). MIXER**

**============ MIXER**

**MIXER**

**TO CONVERT ENDF/B FORMATTED DATA TO THE REQUIRED INPUT FORM MIXER**

**THE FOLLOWING PROGRAMS MAY BE USED, MIXER**

**LINEAR - CONVERT TABULATED CROSS SECTIONS TO LINEARLY MIXER**

**INTERPOLABLE FORM. MIXER**

**RECENT - RECONSTRUCT RESONANCE CONTRIBUTION, ADD TO BACKGROUNDMIXER**

**CROSS SECTION AND OUTPUT THE COMBINATION IN LINEARLY MIXER**

**INTERPOLABLE FORM. MIXER**

**SIGMA1 - DOPPLER BROADEN CROSS SECTIONS TO ANY TEMPERATURE ANDMIXER**

**OUTPUT THE RESULT IN LINEARLY INTERPOLABLE FORM. MIXER**

**MIXER**

**DOCUMENTATION MIXER**

**------------- MIXER**

**THE FACT THAT THIS PROGRAM HAS COMBINED THE DATA IS DOCUMENTED MIXER**

**IN THE OUTPUT ENDF/B FORMAT IN THE HOLLERITH SECTION BY FIRST MIXER**

**IDENTIFYING THE VERSION OF THIS PROGRAM THAT WAS USED, IN THE FORMMIXER**

**MIXER**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*( PROGRAM MIXER 2021-1) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*MIXER**

**MIXER**

**THIS IS FOLLOWED BY THE TWO LINE IDENTIFICATION INPUT BY THE USER.MIXER**

**THIS IS FOLLOWED BY COMPOSITION INPUT BY THE USER. MIXER**

**MIXER**

**NEUTRON OR PHOTON DATA MIXER**

**---------------------- MIXER**

**THIS PROGRAM WILL ALLOW YOU TO PROCESS EITHER NEUTRON OR PHOTON MIXER**

**CROSS SECTIONS - BUT YOU CANNOT MIX THE TWO TYPES TOGETHER. BY MIXER**

**INPUT YOU CAN SPECIFY THE OUTPUT MF = 3 (NEUTRONS) OR 23 (PHOTONS)MIXER**

**WHATEVER TYPE YOU SPECIFIED FOR OUTPUT IS THE ONLY TYPE OF DATA MIXER**

**WHICH WILL BE PROCESSED BY THIS PROGRAM. MIXER**

**MIXER**

**DEFINING THE COMPOSITION MIXER**

**------------------------ MIXER**

**THE USER MAY SPECIFY UP TO 10 DIFFERENT SECTIONS OF DATA TO BE MIXER**

**COMBINED, EACH SECTION IDENTIFIED BY ZA AND MT NUMBER. THE MIXER**

**AMOUNT OF EACH MATERIAL IS SPECIFIED BY DEFINING THE NUMBER OF MIXER**

**GRAMS OF EACH MATERIAL IN THE COMPOSITE MIXTURE. THIS CAN BE MIXER**

**DERIVED FROM THE VOLUME FRACTION SIMPLY BY MULTIPLYING THE STP MIXER**

**DENSITY OF EACH MATERIAL BY ITS VOLUME FRACTION. NOTE, DO NOT MIXER**

**INPUT ATOM FRACTIONS. MIXER**

**MIXER**

**THE LIST OF SECTIONS TO BE COMBINED MAY BE SPECIFIED IN ANY MIXER**

**ORDER, I.E. THEY NEED NOT BE IN ZA ORDER OR THE ORDER THAT THE MIXER**

**EVALUATED DATA APPEARS ON THE ENDF/B FORMATTED TAPE. MIXER**

**MIXER**

**IF ANY REQUESTED SECTION OF DATA IS NOT FOUND ON THE ORIGINAL MIXER**

**ENDF/B FORMATTED FILE, THE PROGRAM WILL PRINT A LIST OF THE MIXER**

**MISSING SECTIONS AND TERMINATE. IF ALL REQUESTED SECTIONS ARE MIXER**

**FOUND THE PROGRAM WILL PRODUCE A COMPOSITE SECTION USING THE MIXER**

**UNION OF ALL ENERGIES FOUND IN ANY SECTION. THE COMPOSITE SECTION MIXER**

**WILL NOT BE THINNED. MIXER**

**MIXER**

**PRIOR TO LATER USE IN ANY APPLICATION THE NUMBER OF ENERGY POINTS MIXER**

**IN THE COMPOSITE CROSS SECTION MAY BE MINIMIZED BY USING PROGRAM MIXER**

**LINEAR, UCRL-50400, VOL. 17, PART B TO THIN THE DATA. MIXER**

**MIXER**

**ONLY LINEARLY INTERPOLABLE DATA MIXER**

**------------------------------- MIXER**

**THE CROSS SECTIONS TO BE COMBINED MUST BE IN LINEARLY INTERPOLABLEMIXER**

**TABULATED FORM (I. E., FILE 3 OR 23, INTERPOLATION LAW 2). MIXER**

**MIXER**

**TO CONVERT TABULATED CROSS SECTIONS TO LINEARLY INTERPOLABLE FORM MIXER**

**SEE, PROGRAM LINEAR, UCRL-50400, VOL. 17, PART A. MIXER**

**MIXER**

**TO CONVERT RESONANCE PARAMETERS TO LINEARLY INTERPOLABLE FORM SEE,MIXER**

**PROGRAM RECENT, UCRL-50400, VOL. 17, PART C. MIXER**

**MIXER**

**TO DOPPLER BROADEN LINEARLY INTERPOLABLE DATA TO ANY TEMPERATURE MIXER**

**SEE PROGRAM SIGMA1, UCRL-50400, VOL. 17, PART B. MIXER**

**MIXER**

**PAGING SYSTEM MIXER**

**------------- MIXER**

**THERE IS NO LIMIT TO THE THE NUMBER OF DATA POINTS IN EACH OF THE MIXER**

**SECTIONS TO BE COMBINED, NOR IS THERE A LIMIT TO THE NUMBER OF MIXER**

**DATA POINTS IN THE COMPOSITE MIXTURE CROSS SECTION. MIXER**

**MIXER**

**ALL REQUIRED SECTIONS OF DATA ARE READ FROM THE ORIGINAL ENDF/B MIXER**

**FORMATTED FILE. ANY SECTION OF 60000 OR FEWER POINTS WILL BE MIXER**

**TOTALLY CORE RESIDENT. LARGER SECTIONS ARE LOADED INTO A PAGING MIXER**

**SYSTEM USING A SCRATCH FILE WITH ONLY 60000 POINTS PER SECTION MIXER**

**CORE RESIDENT AT ANY ONE TIME. SIMILARLY THE COMPOSITE SECTION MIXER**

**WILL BE TOTALLY CORE RESIDENT IF IT CONTAINS 60000 OR FEWER POINTSMIXER**

**AND LARGER COMPOSITE SECTIONS WILL BE LOADED INTO A PAGING MIXER**

**SYSTEM WHERE ONLY 60000 POINTS ARE CORE RESIDENT AT ANY TIME. SINCMIXER**

**A PAGING SYSTEM MAY BE USED BY ANY SECTION OF DATA THERE IS NO MIXER**

**LIMIT TO THE SIZE OF EITHER THE ORIGINAL SECTIONS, NOR TO THE MIXER**

**COMPOSITE SECTION, E.G. A SECTION MAY CONTAIN 100,000 ENERGIES MIXER**

**AND CROSS SECTIONS TO DESCRIBE A GIVEN REACTION. MIXER**

**MIXER**

**PAGE SIZE MIXER**

**--------- MIXER**

**THE PAGE SIZE USED IN THIS PROGRAM IS DEFINED BY THE PARAMETER MIXER**

**NPAGE AND THE DIMENSIONS OF THE ARRAYS XTAB AND YTAB. IN ORDER MIXER**

**TO ADAPT THIS PROGRAM FOR USE ON ANY COMPUTER THE PAGE SIZE MAY MIXER**

**BE INCREASED OR DECREASED BUT THE FOLLOWING RULES MUST BE FOLLOWEDMIXER**

**==== MIXER**

**MIXER**

**(1) NPAGE - MUST BE A MULTIPLE OF 3 IN ORDER TO ALLOW THE PROGRAM MIXER**

**TO READ FULL CARDS OF ENDF/B DATA (3 POINTS PER LINE). FAILUREMIXER**

**TO FOLLOW THIS RULE CAN LEAD TO LOSS OF DATA AND/OR PROGRAM MIXER**

**ERRORS DURING EXECUTION. MIXER**

**(3) YTAB - THE DIMENSION OF YTAB MUST BE (NPAGE,11). MIXER**

**(4) XTAB - THE DIMENSION OF XTAB MUST BE (NPAGE,11). MIXER**

**MIXER**

**DOPPLER BROADENING MIXER**

**------------------ MIXER**

**THE COMPOSITE CROSS SECTION OUTPUT FROM THIS PROGRAM SHOULD NOT MIXER**

**BE DOPPLER BROADENED USING PROGRAM SIGMA1, OR THE EQUIVALENT. THE MIXER**

**ATOMIC WEIGHT USED TO IDENTIFY THE COMPOSITE MIXTURE IS BASED ON MIXER**

**THE ATOM FRACTION OF EACH CONSTITUENT AND CANNOT BE USED TO MIXER**

**CHARACTERIZE THE BROADENING OF ANY GIVEN RESONANCE IN THE MIXTURE MIXER**

**DUE TO THE CONTRIBUTION OF ONE CONSTITUENT. IN ORDER TO CONSIDER MIXER**

**DOPPLER BROADENING FIRST USE PROGRAM SIGMA1 TO BROADEN THE CROSS MIXER**

**SECTION FOR EACH OF THE CONSTITUENTS AND THEN COMBINE THE MIXER**

**BROADENED DATA USING PROGRAM MIXER. MIXER**

**MIXER**

**EXAMPLE USE MIXER**

**----------- MIXER**

**THE OUTPUT FROM THIS PROGRAM HAS BEEN FOUND TO BE EXTREMELY MIXER**

**USEFUL IN THE FOLLOWING APPLICATIONS... MIXER**

**MIXER**

**(1) CALCULATE A COMPOSITE TOTAL CROSS SECTON FOR LATER USE AS MIXER**

**A WEIGHTING FUNCTION IN SELF-SHIELDING THE CROSS SECTIONS MIXER**

**OF EACH CONSTITUENT OF THE MIXTURE SEPARATELY. MIXER**

**MIXER**

**PROGRAM GROUPIE CAN USE THE CALCULATED COMPOSITE TOTAL CROSS MIXER**

**SECTION AS THE TOTAL CROSS SECTION FOR EACH CONSTITUENT OF MIXER**

**THE MIXTURE IN ORDER TO CALCULATE SELF-SHIELDED CROSS SECTIONMIXER**

**FOR EACH CONSTITUENT OF THE MIXTURE. MIXER**

**MIXER**

**(2) CALCULATE COMPOSITE TOTAL AND FISSION CROSS SECTIONS IN MIXER**

**ORDER TO CALCULATE THE TRANSMISSION AND SELF-INDICATION MIXER**

**THROUGH COMPOSITE MATERIALS. GENERALLY IN THIS CASE THE MIXER**

**TOTAL CROSS SECTION WILL BE CALCULATED FOR THE COMPOSITION MIXER**

**OF THE SAMPLE AND THE FISSION CROSS SECTION WILL BE MIXER**

**CALCULATED FOR THE COMPOSITION OF THE FISSION CHAMBER MIXER**

**(WHICH GENERALLY WILL HAVE A DIFFERENT COMPOSITION THAN THE MIXER**

**SAMPLE). MIXER**

**MIXER**

**PROGRAM VIRGIN CAN USE THE OUTPUT FROM THIS PROGRAM TO MIXER**

**PERFORM TRANSMISSION AND SELF-INDICATION CALCULATIONS. MIXER**

**PROGRAM VIRGIN WILL ANALYTICALLY CALCULATE THE UNCOLLIDED MIXER**

**(I.E. VIRGIN) FLUX TRANSMITTED AND REACTION RATE DUE TO ANY MIXER**

**TABULATED LINEARLY INTERPOLABLE INCIDENT SPECTRUM. RESULTS MIXER**

**WILL BE PRESENTLY FOR UP TO 10 DIFFERENT SAMPLE THICKNESSES MIXER**

**AND BINNED INTO ENERGY GROUPS IN ORDER TO SIMULATE AN MIXER**

**EXPERIMENTAL MEASUREMENT. MIXER**

**MIXER**

**(3) THE OUTPUT FROM THIS PROGRAM IS VERY USEFUL TO PLOT IN ORDER MIXER**

**TO SEE THE IMPORTANCE OF SPECIFIC CROSS SECTION FEATURES IN MIXER**

**THE COMPOSITE CROSS SECTION. MIXER**

**MIXER**

**PROGRAM COMPLOT CAN BE USED TO PLOT THE OUTPUT FROM THIS MIXER**

**PROGRAM AND IF REQUIRED EXAMINE ANY PARTICULAR ENERGY RANGE MIXER**

**IN DETAIL. IN ORDER TO DO THIS THE (ZA, MT) EQUIVALENCE OPTIONMIXER**

**OF PROGRAM COMPLOT SHOULD BE USED. TO COMPARE ANY CONSTITUENT MIXER**

**CROSS SECTION TO THE COMPOSITE CROSS SECTION THE INPUT TO MIXER**

**COMPLOT SHOULD EQUATE THE (ZA,MT) OF THE COMPOSITE TO THE MIXER**

**(ZA,MT) OF ONE CONSTITUENT AND THE MULTIPLIER INPUT TO MIXER**

**COMPLOT SHOULD BE THE ATOM FRACTION FOR THE CONSTITUENT (THE MIXER**

**ATOM FRACTIONS ARE DEFINED IN THE OUTPUT LISTING FROM PROGRAM MIXER**

**MIXER). MIXER**

**MIXER**

**INPUT FILES MIXER**

**----------- MIXER**

**UNIT DESCRIPTION MIXER**

**---- ----------- MIXER**

**2 INPUT CARDS (BCD - 80 CHARACTERS/RECORD) MIXER**

**10 ORIGINAL EVALUATED DATA IN ENDF/B FORMAT MIXER**

**(BCD - 80 CHARACTERS/RECORD) MIXER**

**MIXER**

**OUTPUT FILES MIXER**

**------------ MIXER**

**UNIT DESCRIPTION MIXER**

**---- ----------- MIXER**

**3 OUTPUT LISTING (BCD - 120 CHARACTERS/RECORD) MIXER**

**11 COMPOSITE EVALUATED DATA IN ENDF/B FORMAT MIXER**

**(BCD - 80 CHARACTERS/RECORD) MIXER**

**MIXER**

**SCRATCH FILES MIXER**

**------------- MIXER**

**UNIT DESCRIPTION MIXER**

**---- ----------- MIXER**

**12 SCRATCH FILE FOR EACH OF THE 10 SECTIONS WHICH MIXER**

**13 WILL BE ADDED TOGETHER TO DEFINE THE FINAL MIXER**

**. SECTION (BINARY - 60000 AND 480000 WORDS/RECORD) MIXER**

**. . MIXER**

**. . MIXER**

**20 . MIXER**

**21 . MIXER**

**22 SCRATCH FILE FOR COMBINED SECTION. MIXER**

**(BINARY - 2004 WORDS/RECORD) MIXER**

**MIXER**

**STANDARD FILE NAMES (SEE SUBROUTINES FILIO1 AND FILIO2) MIXER**

**---------------------------------------------------------------- MIXER**

**UNIT FILE NAME MIXER**

**---- ---------- MIXER**

**2 MIXER.INP MIXER**

**3 MIXER.LST MIXER**

**10 ENDFB.IN MIXER**

**11 ENDFB.OUT MIXER**

**12-22 (SCRATCH) MIXER**

**MIXER**

**INPUT CARDS MIXER**

**----------- MIXER**

**LINE COLS. FORMAT NAME DESCRIPTION MIXER**

**---- ----- ------ ------- ---------- MIXER**

**1-2 1-66 16A4,A2 TITLE TWO LINE TITLE DESCRIBING PROBLEM MIXER**

**(THIS TITLE IS USED TO IDENTIFY THE MIXER**

**OUTPUT LISTING AND IS ALSO WRITTEN MIXER**

**IN MF=1, MT=451 (HOLLERITH SECTION) MIXER**

**OF THE ENDF/B FORMATTED OUTPUT TO MIXER**

**IDENTIFY THE COMPOSITE MIXTURE). MIXER**

**3 1-72 ENDF/B INPUT DATA FILENAME MIXER**

**(STANDARD OPTION = ENDFB.IN) MIXER**

**4 1-72 ENDF/B OUTPUT DATA FILENAME MIXER**

**(STANDARD OPTION = ENDFB.OUT) MIXER**

**5 1-11 I11 IZAOUT ZA IDENTIFICATION FOR COMBINATION MIXER**

**5 12-17 I6 MATOUT MAT IDENTIFICATION FOR COMBINATION MIXER**

**5 18-19 I2 MFOUT MF IDENTIFICATION FOR COMBINATION MIXER**

**5 20-22 I3 MTOUT MT IDENTIFICATION FOR COMBINATION MIXER**

**5 23-33 I11 DEFINE INPUT DENSITY MIXER**

**= 0 = GRAMS = BACKWARDS COMPATIBLE MIXER**

**> 0 = ATOMS = NEW IN 2008 MIXER**

**6-N 1-11 I11 IZAGET ZA (1000\*Z+A) OF MATERIAL MIXER**

**6-N 12-22 I11 MTGET MT OF REACTION MIXER**

**6-N 23-33 E11.4 DENSE MATERIAL DENSITY (ATOMS OR GRAMS) MIXER**

**MIXER**

**THE SIXTH LINE IS REPEATED FOR EACH SECTION (FROM 2 TO 10). MIXER**

**SINCE THE ENDF/B FORMATTED OUTPUT IS IN BARNS/ATOM FORM A MINIMUM MIXER**

**OF TWO SECTIONS MUST BE COMBINED (I.E., IF ONLY ONE SECTION IS MIXER**

**SPECIFIED THE OUTPUT WOULD BE IDENTICAL TO THE INPUT AND AS SUCH MIXER**

**THE PROGRAM WILL CONSIDER THIS TO BE AN ERROR AND NOT PERFORM THE MIXER**

**CALCULATION). THE LIST OF SECTIONS IS TERMINATED BY A BLANK LINE. MIXER**

**MIXER**

**THE LIST OF SECTIONS TO BE COMBINED MAY BE SPECIFIED IN ANY MIXER**

**ORDER, I.E. THEY NEED NOT BE IN ZA ORDER OR THE ORDER THAT THE MIXER**

**EVALUATED DATA APPEARS ON THE ENDF/B FORMATTED TAPE. MIXER**

**MIXER**

**EXAMPLE INPUT NO. 1 MIXER**

**------------------- MIXER**

**CREATE THE TOTAL CROSS SECTION (MT=1) FOR STAINLESS STEEL AND MIXER**

**IDENTIFY THE COMBINED MATERIAL WITH ZA=26800 AND MAT=4000, MIXER**

**THE COMPOSITION BY VOLUME OF THE STEEL WILL BE... MIXER**

**MIXER**

**THE DATA FROM \ENDFB6\K300\LIBRARY.DAT AND WRITE DATA TO MIXER**

**\MIXER\STEEL.DAT MIXER**

**MIXER**

**IRON - 74.8 PER-CENT MIXER**

**CHROMIUM - 16.0 MIXER**

**NICKEL - 6.0 MIXER**

**MANGANESE - 2.0 MIXER**

**SILICON - 1.0 MIXER**

**CARBON - 0.2 MIXER**

**MIXER**

**THE INPUT MUST SPECIFY THE COMPOSITION BY GRAMS OR ATOMS. THIS IS MIXER**

**DEFINED AS THE PRODUCT OF THE STANDARD DENSITY (GRAMS) MIXER**

**TIMES THE VOLUME FRACTION. FOR THIS EXAMPLE THE FOLLOWING 12 MIXER**

**INPUT CARDS ARE REQUIRED.... MIXER**

**MIXER**

**STAINLESS STEEL. COMPOSITION BY PER-CENT VOLUME IS 74.8-IRON, MIXER**

**16-CHROME, 6-NICKEL, 2-MANGANESE, 1-SILICON, 0.2-CARBON MIXER**

**\ENDFB6\K300\LIBRARY.DAT MIXER**

**\MIXER\STEEL.DAT MIXER**

**26800 4000 3 1 0 MIXER**

**26000 1 5.88676 (NOTE, GRAMS INPUT FOR EACH MIXER**

**24000 1 1.150448 CONSTITUENT, E.G. FOR IRON THE MIXER**

**28000 1 0.533928 STP DENSITY IS 7.87 GRAMS. MIXER**

**25055 1 0.1486 THE INPUT VALUE OF 5.88676 IS MIXER**

**14000 1 0.0233 0.748 X 7.87,I.E. VOLUME MIXER**

**6012 1 0.0044958 FRACTION TIMES STP DENSITY). MIXER**

**(BLANK LINE TERMINATES INPUT LIST)MIXER**

**MIXER**

**EXAMPLE INPUT NO. 2 MIXER**

**------------------- MIXER**

**THE SAME EXAMPLE AS THE ABOVE PROBLEM, ONLY USE THE STANDARD MIXER**

**ENDF/B DATA FILENAMES - ENDFB.IN AND ENDFB.OUT (THIS CAN BE MIXER**

**DONE BY LEAVING THE THIRD AND FOURTH INPUT LINES BLANK). MIXER**

**FOR THIS EXAMPLE THE FOLLOWING 12 INPUT CARDS ARE REQUIRED.... MIXER**

**MIXER**

**STAINLESS STEEL. COMPOSITION BY PER-CENT VOLUME IS 74.8-IRON, MIXER**

**16-CHROME, 6-NICKEL, 2-MANGANESE, 1-SILICON, 0.2-CARBON MIXER**

**(NOTE - THIS LINE IS REALLY BLANK) MIXER**

**(NOTE - THIS LINE IS REALLY BLANK) MIXER**

**26800 4000 3 1 MIXER**

**26000 1 5.88676 (NOTE, GRAMS INPUT FOR EACH MIXER**

**24000 1 1.150448 CONSTITUENT, E.G. FOR IRON THE MIXER**

**28000 1 0.533928 STP DENSITY IS 7.87 GRAMS. MIXER**

**25055 1 0.1486 THE INPUT VALUE OF 5.88676 IS MIXER**

**14000 1 0.0233 0.748 X 7.87,I.E. VOLUME MIXER**

**6012 1 0.0044958 FRACTION TIMES STP DENSITY). MIXER**

**(BLANK LINE TERMINATES INPUT LIST)MIXER**

**MIXER**

**=======================================================================MIXER**