**======================================================================= 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 CHANGE Mixer**

**\*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 feedback Mixer**

**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 changed Mixer**

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

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

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

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

**Maximum Tabulated Energy of ANY other Mixer**

**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**

**Mixer**

**Acknowledgement 2019 Mixer**

**-------------------- Mixer**

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

**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**

**Dermott E. Cullen Mixer**

**1466 Hudson Way Mixer**

**Livermore, CA 94550 Mixer**

**U.S.A. Mixer**

**Telephone 925-443-1911 Mixer**

**E. Mail RedCullen1@Comcast.net Mixer**

**Website RedCullen1.net/HOMEPAGE.NEW Mixer**

**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 NOT Mixer**

**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 REGARDLESS Mixer**

**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 BACKGROUND Mixer**

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

**INTERPOLABLE FORM. Mixer**

**SIGMA1 - DOPPLER BROADEN CROSS SECTIONS TO ANY TEMPERATURE AND Mixer**

**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 FORM Mixer**

**Mixer**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*( PROGRAM MIXER 2019-1) \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* 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 INTERPOLABLE Mixer**

**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 POINTS Mixer**

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

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

**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 FOLLOWED Mixer**

**==== 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). FAILURE Mixer**

**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 SECTION Mixer**

**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 OPTION Mixer**

**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**