Nucleosynthesis in Massive Stars
Nucleosynthesis Data Files
Presupernova Structure

Below we provide **preliminary** data sets. Note that *part of* this data is not yet published in refereed journals and thus may be updated without notice.
We would appreciate if you contact us before using the data on this site for your publications.

The Data

internal name	presupernova structure data
s15....	222 kByte
s19....	162 kByte
s20....	206 kByte
s21....	173 kByte
s25....	200 kByte
s30....	194 kByte
s35....	187 kByte
s40....	134 kByte

Hydro / EOS data explanation

column	data	unit
grid	cell number	---
cell outer total mass	mass coordinate at the cell top interface	g
cell outer radius	radius coordinate at the cell top interface	cm
cell outer velocity	velocity of the cell top interface	$cm\ s^{-1}$
cell density	average density of the cell	$g\ cm^{-3}$
cell temperature	average temperature of the cell	K
cell pressure	average pressure of the cell	$dyn\ cm^{-2}$
cell specific energy	average specific energy of the cell	$erg\ g^{-1}$
cell specific entropy	average specific entropy of cell	$k_B\ baryon^{-1}$
cell angular velocity	average angular velocity of the cell	$rad\ s^{-1}$
cell A_bar	average mean mass number of nuclei in the cell	1
cell Y_e	average electrons per baryon in the cell	1
stability	hydrodynamic stability of outer cell boundary	---

Network data explanation

APPROX: approximative 19 isotope network

QSE: Quasi Statitstical Equilibrium
        isotopes treated in three NSE subgroups which are connected by "bottleneck" reactions
        137 isotope network for weak rates

NSE: Nuclear Statistical Equilibrium
        137 isotope network for weak rates

column	network		unit
	APPROX	**QSE / NSE**	**unit**
neutrons	neutrons	neutrons	(mass fraction)
H1	^{1}H	protons	(mass fraction)
He3	^{3}He	---	(mass fraction)
He4	^{4}He	$1 < A < 6$	(mass fraction)
C12	^{12}C	---	(mass fraction)
N14	^{14}N	---	(mass fraction)
O16	^{16}O	^{16}O (unburned yet)	(mass fraction)
Ne20	^{20}Ne	---	(mass fraction)
Mg24	^{24}Mg	$22 < A < 29$, excluding ^{28}Si	(mass fraction)
Si28	^{28}Si	^{28}Si	(mass fraction)
S32	^{32}S	$28 < A < 36$	(mass fraction)
Ar36	^{36}Ar	$35 < A < 40$	(mass fraction)
Ca40	^{40}Ca	$39 < A < 44$	(mass fraction)
Ti44	^{44}Ti	$43 < A < 48$	(mass fraction)
Cr48	^{48}Cr	$47 < A < 52$	(mass fraction)
Fe52	^{52}Fe	---	(mass fraction)
Fe54	^{54}Fe ($+^{56}$Fe)	A approximately 2*Z+2, Iron Peak	(mass fraction)
Ni56	^{56}Ni	$A < 2*Z+2$, Iron Peak	(mass fraction)
Fe56	---	^{56}Fe only	(mass fraction)
'Fe'	---	$A > 2*Z + 3$, Iron Peak, excluding ^{56}Fe	(mass fraction)

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