Full wwPDB X-ray Structure Validation Report ⓘ

Oct 7, 2024 – 04:21 PM JST

PDB ID	:	8JZT
Title	:	The sigF and anti-sigma factor complex
Authors	:	Chen, Y.J.; Su, D.
Deposited on	:	2023-07-06
Resolution	:	1.94 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references ⓘ) were used in the production of this report:

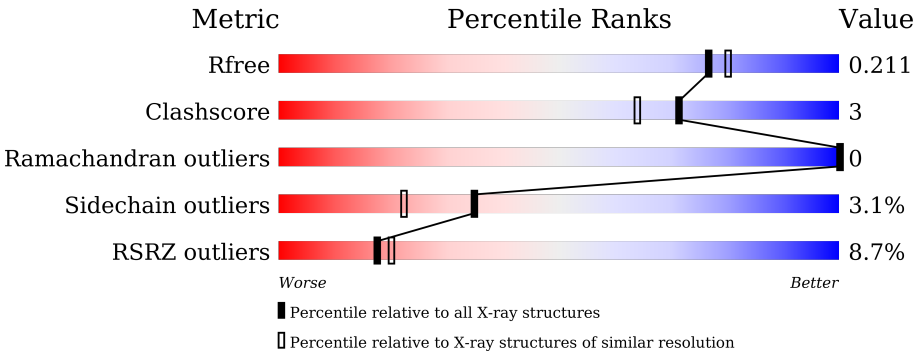
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.94 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1306 (1.94-1.94)
Clashscore	180529	1400 (1.94-1.94)
Ramachandran outliers	177936	1387 (1.94-1.94)
Sidechain outliers	177891	1387 (1.94-1.94)
RSRZ outliers	164620	1306 (1.94-1.94)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	69	6% 81% • 17%
1	C	69	14% 72% 19% • 7%
1	E	69	16% 93% 6% •
2	B	141	9% 80% 10% •• 7%
2	D	141	6% 87% •• 8%
2	F	141	4% 84% 9% •• 6%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 5033 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called RNA polymerase sigma factor SigF.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	57	Total	C	N	O	S	0	0	0
			458	289	85	82	2			
1	C	64	Total	C	N	O	S	0	1	0
			521	327	95	96	3			
1	E	69	Total	C	N	O	S	0	0	0
			552	345	104	101	2			

- Molecule 2 is a protein called Anti-sigma-F factor RsbW.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	131	Total	C	N	O	S	0	1	0
			1011	632	185	191	3			
2	D	130	Total	C	N	O	S	0	1	0
			980	612	176	190	2			
2	F	133	Total	C	N	O	S	0	5	0
			1053	660	189	201	3			

There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	5	MET	-	initiating methionine	UNP P9WGX7
B	6	ALA	-	expression tag	UNP P9WGX7
B	7	ASP	-	expression tag	UNP P9WGX7
B	8	LEU	-	expression tag	UNP P9WGX7
B	9	ASN	-	expression tag	UNP P9WGX7
B	10	TRP	-	expression tag	UNP P9WGX7
B	11	MET	-	expression tag	UNP P9WGX7
D	5	MET	-	initiating methionine	UNP P9WGX7
D	6	ALA	-	expression tag	UNP P9WGX7
D	7	ASP	-	expression tag	UNP P9WGX7
D	8	LEU	-	expression tag	UNP P9WGX7
D	9	ASN	-	expression tag	UNP P9WGX7

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Chain	Residue	Modelled	Actual	Comment	Reference
D	10	TRP	-	expression tag	UNP P9WGX7
D	11	MET	-	expression tag	UNP P9WGX7
F	5	MET	-	initiating methionine	UNP P9WGX7
F	6	ALA	-	expression tag	UNP P9WGX7
F	7	ASP	-	expression tag	UNP P9WGX7
F	8	LEU	-	expression tag	UNP P9WGX7
F	9	ASN	-	expression tag	UNP P9WGX7
F	10	TRP	-	expression tag	UNP P9WGX7
F	11	MET	-	expression tag	UNP P9WGX7

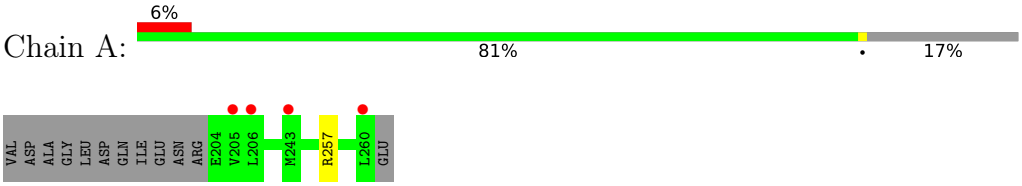
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	40	Total O 40 40	0	0
3	B	112	Total O 112 112	0	0
3	C	23	Total O 23 23	0	0
3	D	105	Total O 105 105	0	0
3	E	65	Total O 65 65	0	0
3	F	113	Total O 113 113	0	0

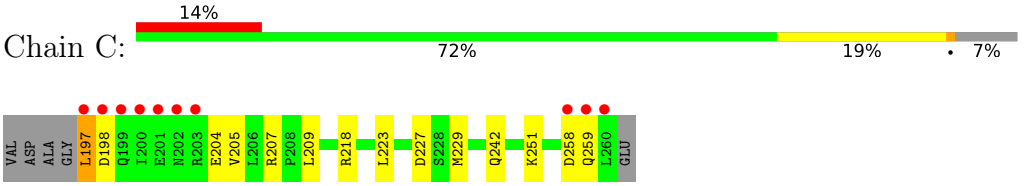
3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

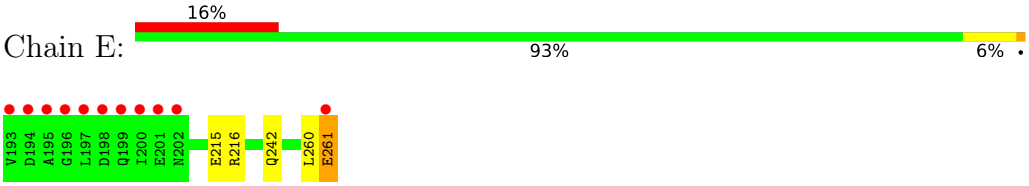
• Molecule 1: RNA polymerase sigma factor SigF



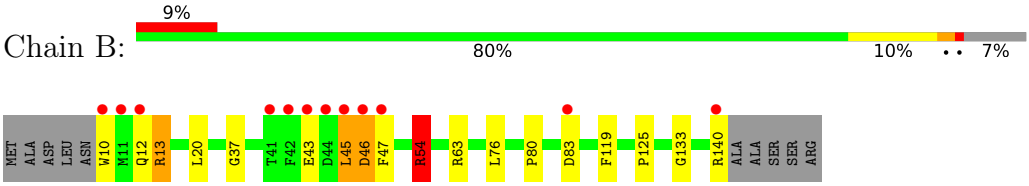
• Molecule 1: RNA polymerase sigma factor SigF



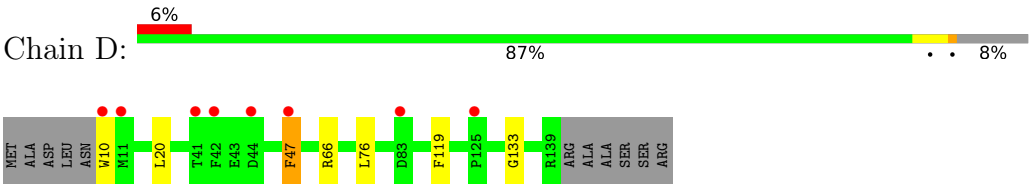
• Molecule 1: RNA polymerase sigma factor SigF



• Molecule 2: Anti-sigma-F factor RsbW



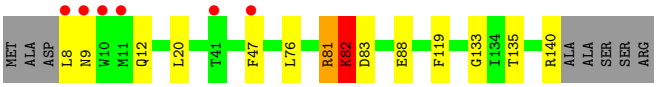
• Molecule 2: Anti-sigma-F factor RsbW



• Molecule 2: Anti-sigma-F factor RsbW

Chain F:


4%
84%
9%
6%


MET
ALA
ASP
L8
N9
W10
M11
Q12
L20
T41
F47
L76
R81
K82
D83
E88
F119
G133
I134
T135
R140
ALA
ALA
SER
SER
ARG

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	134.53Å 79.55Å 77.60Å 90.00° 91.93° 90.00°	Depositor
Resolution (Å)	38.78 – 1.94 38.78 – 1.94	Depositor EDS
% Data completeness (in resolution range)	100.0 (38.78-1.94) 99.9 (38.78-1.94)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.46 (at 1.95Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.169 , 0.209 0.179 , 0.211	Depositor DCC
R_{free} test set	58184 reflections (3.33%)	wwPDB-VP
Wilson B-factor (Å^2)	32.4	Xtriage
Anisotropy	0.018	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 45.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.008 for -1/2*h+3/2*k,1/2*h+1/2*k,-l 0.007 for -1/2*h-3/2*k,-1/2*h+1/2*k,-l 0.035 for 1/2*h+3/2*k,1/2*h-1/2*k,-l 0.048 for 1/2*h-3/2*k,-1/2*h-1/2*k,-l 0.017 for -h,-k,l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	5033	wwPDB-VP
Average B, all atoms (Å^2)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.35% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.38	0/462	0.62	0/622
1	C	0.44	0/525	0.65	0/707
1	E	0.40	0/556	0.66	0/748
2	B	0.44	0/1026	0.70	0/1399
2	D	0.44	0/993	0.69	0/1358
2	F	0.48	0/1069	0.70	1/1460 (0.1%)
All	All	0.44	0/4631	0.68	1/6294 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	2
2	F	0	4
All	All	0	6

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	F	76	LEU	CA-CB-CG	5.27	127.42	115.30

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	13	ARG	Sidechain
2	B	54	ARG	Sidechain
2	F	81	ARG	Sidechain
2	F	82	LYS	Mainchain

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Mol	Chain	Res	Type	Group
2	F	83[A]	ASP	Mainchain

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	458	0	484	1	0
1	C	521	0	540	7	0
1	E	552	0	575	4	0
2	B	1011	0	1011	9	0
2	D	980	0	968	7	0
2	F	1053	0	1043	7	0
3	A	40	0	0	0	0
3	B	112	0	0	0	0
3	C	23	0	0	0	0
3	D	105	0	0	1	0
3	E	65	0	0	0	0
3	F	113	0	0	1	1
All	All	5033	0	4621	29	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (29) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:242:GLN:HB3	2:D:47:PHE:CE1	2.31	0.65
2:D:10:TRP:CB	3:D:255:HOH:O	2.44	0.65
1:E:261:GLU:HG2	3:F:295:HOH:O	1.96	0.64
2:F:81:ARG:O	2:F:140:ARG:NH1	2.32	0.61
1:E:242:GLN:HB3	2:F:47[B]:PHE:CZ	2.39	0.58
1:C:258:ASP:HA	2:D:66:ARG:HH12	1.71	0.55
2:D:20:LEU:HD12	2:D:76:LEU:HD23	1.91	0.51
1:C:204:GLU:CD	1:C:207:ARG:HH12	2.17	0.48
1:C:223:LEU:HD22	1:C:229[A]:MET:SD	2.54	0.48
2:B:43:GLU:HG3	2:B:80:PRO:HB3	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:20:LEU:HD22	2:F:20:LEU:CD2	2.45	0.47
2:F:88:GLU:HG3	2:F:135[B]:THR:HG22	1.96	0.47
1:C:209:LEU:HD22	1:C:259:GLN:OE1	2.15	0.46
1:C:242:GLN:HB3	2:D:47:PHE:CZ	2.49	0.46
2:F:9:ASN:HB3	2:F:12:GLN:HE21	1.81	0.46
2:B:83:ASP:OD1	2:B:83:ASP:N	2.39	0.45
2:B:20:LEU:HD12	2:B:76:LEU:HD23	1.99	0.44
2:F:82:LYS:HB3	2:F:82:LYS:HE2	1.42	0.44
1:E:260:LEU:O	1:E:261:GLU:HB3	2.18	0.44
2:D:119:PHE:CZ	2:D:133:GLY:HA3	2.53	0.43
2:B:119:PHE:CZ	2:B:133:GLY:HA3	2.54	0.43
2:B:46:ASP:OD1	2:B:47:PHE:N	2.52	0.43
2:B:45:LEU:HD13	2:B:140:ARG:C	2.40	0.42
1:E:215:GLU:OE1	1:E:216:ARG:N	2.52	0.42
2:B:37:GLY:HA2	2:B:54:ARG:HD2	2.01	0.42
1:A:257:ARG:HG3	2:B:63:ARG:NH2	2.35	0.41
2:B:10:TRP:HE1	2:B:12:GLN:HB3	1.86	0.41
2:F:119:PHE:CZ	2:F:133:GLY:HA3	2.56	0.41
1:C:197:LEU:HD22	1:C:197:LEU:HA	1.75	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:298:HOH:O	3:F:302:HOH:O[2_656]	2.12	0.08

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	55/69 (80%)	55 (100%)	0	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	63/69 (91%)	62 (98%)	1 (2%)	0	100	100
1	E	67/69 (97%)	65 (97%)	2 (3%)	0	100	100
2	B	130/141 (92%)	126 (97%)	4 (3%)	0	100	100
2	D	129/141 (92%)	125 (97%)	4 (3%)	0	100	100
2	F	136/141 (96%)	129 (95%)	7 (5%)	0	100	100
All	All	580/630 (92%)	562 (97%)	18 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	51/62 (82%)	51 (100%)	0	100	100
1	C	58/62 (94%)	52 (90%)	6 (10%)	6	1
1	E	60/62 (97%)	59 (98%)	1 (2%)	56	45
2	B	107/113 (95%)	102 (95%)	5 (5%)	22	9
2	D	103/113 (91%)	102 (99%)	1 (1%)	73	68
2	F	112/113 (99%)	110 (98%)	2 (2%)	54	43
All	All	491/525 (94%)	476 (97%)	15 (3%)	35	22

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	13	ARG
2	B	45	LEU
2	B	46	ASP
2	B	54	ARG
2	B	125	PRO
1	C	197	LEU
1	C	198	ASP
1	C	205	VAL

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Mol	Chain	Res	Type
1	C	218	ARG
1	C	227	ASP
1	C	251	LYS
2	D	47	PHE
1	E	261	GLU
2	F	8	LEU
2	F	82	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
2	D	124	GLN
2	F	12	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

There are no ligands in this entry.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	57/69 (82%)	0.59	4 (7%) 24 27	31, 48, 94, 134	0
1	C	64/69 (92%)	0.92	10 (15%) 6 7	19, 48, 90, 115	1 (1%)
1	E	69/69 (100%)	0.45	11 (15%) 6 6	25, 38, 96, 149	0
2	B	131/141 (92%)	0.29	12 (9%) 16 19	18, 34, 73, 128	1 (0%)
2	D	130/141 (92%)	0.10	8 (6%) 28 30	15, 34, 65, 94	1 (0%)
2	F	133/141 (94%)	-0.00	6 (4%) 39 43	12, 30, 56, 97	5 (3%)
All	All	584/630 (92%)	0.30	51 (8%) 17 20	12, 36, 82, 149	8 (1%)

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	F	8	LEU	8.0
2	B	10	TRP	7.8
1	C	198	ASP	5.6
1	E	195	ALA	5.5
1	C	197	LEU	5.5
1	C	199	GLN	5.4
2	B	11	MET	5.4
1	E	193	VAL	5.1
2	B	45	LEU	4.8
2	D	10	TRP	4.7
1	C	201	GLU	4.6
2	B	42	PHE	4.4
2	F	10	TRP	4.4
1	A	205	VAL	4.3
2	B	44	ASP	4.2
1	C	200	ILE	4.0
2	B	43	GLU	3.9
2	B	12	GLN	3.9
1	C	260	LEU	3.9

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Mol	Chain	Res	Type	RSRZ
2	B	46	ASP	3.7
2	F	41[A]	THR	3.6
1	E	200	ILE	3.6
2	F	47[A]	PHE	3.6
1	E	197	LEU	3.5
1	E	261	GLU	3.4
1	E	196	GLY	3.4
1	A	260	LEU	3.3
2	F	9	ASN	3.3
2	D	41	THR	3.2
2	F	11	MET	2.9
1	C	259	GLN	2.8
2	B	41	THR	2.8
1	C	202	ASN	2.7
2	D	47	PHE	2.7
2	B	83	ASP	2.7
1	E	198	ASP	2.6
2	B	140	ARG	2.6
2	D	42	PHE	2.6
2	D	83	ASP	2.6
1	A	206	LEU	2.6
1	E	202	ASN	2.6
2	B	47	PHE	2.6
1	E	201	GLU	2.6
1	C	203	ARG	2.6
1	E	194	ASP	2.4
1	E	199	GLN	2.4
2	D	11	MET	2.3
2	D	125	PRO	2.2
2	D	44	ASP	2.1
1	A	243	MET	2.1
1	C	258	ASP	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.