



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 12, 2026 – 12:32 PM UTC

PDB ID : 6HV3 / pdb_00006hv3
Title : Yeast 20S proteasome with human beta2i (1-53)
Authors : Huber, E.M.; Groll, M.
Deposited on : 2018-10-10
Resolution : 2.70 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

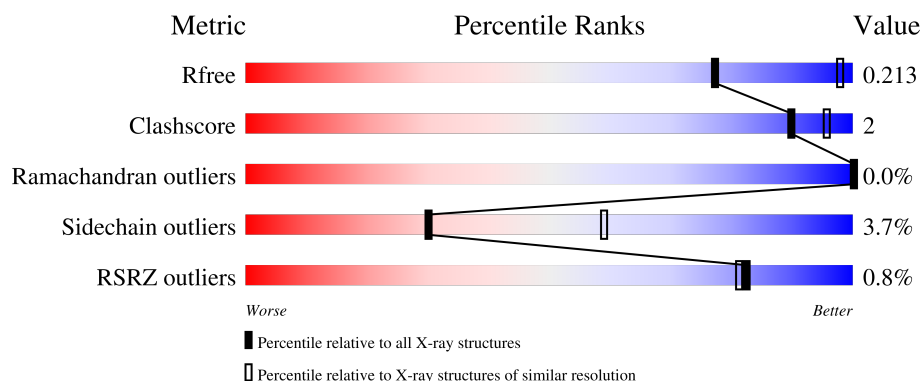
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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}	180053	3538 (2.70-2.70)
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (2.70-2.70)

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 $\leq 5\%$. 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	250	3% 98% .
1	O	250	3% 96% ..
2	B	258	4% 85% 7% • 5%
2	P	258	3% 83% 10% • 5%
3	C	254	% 85% 8% • 6%

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Mol	Chain	Length	Quality of chain
3	Q	254	 2% 84% 9% • 6%
4	D	260	 % 84% 5% • 10%
4	R	260	 85% 5% 10%
5	E	234	 94% 5% •
5	S	234	 94% 5% •
6	F	288	 81% • 16%
6	T	288	 81% • 16%
7	G	252	 92% • •
7	U	252	 92% • •
8	H	226	 % 91% 8% •
8	V	226	 92% 6% ••
9	I	205	 95% •
9	W	205	 95% •
10	J	198	 % 95% • •
10	X	198	 % 95% • •
11	K	212	 96% •
11	Y	212	 97% •
12	L	222	 93% 6%
12	Z	222	 93% 7%
13	M	246	 % 90% • 5%
13	a	246	 89% 5% 5%
14	N	196	 95% 5% •
14	b	196	 % 94% 5% •

2 Entry composition

There are 18 unique types of molecules in this entry. The entry contains 49958 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 Proteasome subunit alpha type-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	250	Total	C	N	O	S	0	0	0
			1915	1219	315	377	4			
1	O	250	Total	C	N	O	S	0	0	0
			1915	1219	315	377	4			

- Molecule 2 is a protein called Proteasome subunit alpha type-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	244	Total	C	N	O	S	0	0	0
			1904	1201	321	379	3			
2	P	244	Total	C	N	O	S	0	0	0
			1904	1201	321	379	3			

- Molecule 3 is a protein called Proteasome subunit alpha type-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	240	Total	C	N	O	S	0	0	0
			1881	1176	329	372	4			
3	Q	240	Total	C	N	O	S	0	0	0
			1881	1176	329	372	4			

- Molecule 4 is a protein called Proteasome subunit alpha type-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	235	Total	C	N	O	S	0	0	0
			1813	1136	304	366	7			
4	R	235	Total	C	N	O	S	0	0	0
			1813	1136	304	366	7			

- Molecule 5 is a protein called Proteasome subunit alpha type-6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	231	Total	C	N	O	S	0	0	0
			1773	1114	307	348	4			
5	S	231	Total	C	N	O	S	0	0	0
			1773	1114	307	348	4			

- Molecule 6 is a protein called Probable proteasome subunit alpha type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	F	243	Total	C	N	O	S	0	0	0
			1892	1203	329	356	4			
6	T	243	Total	C	N	O	S	0	0	0
			1892	1203	329	356	4			

- Molecule 7 is a protein called Proteasome subunit alpha type-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	G	241	Total	C	N	O	S	0	0	0
			1907	1214	320	365	8			
7	U	241	Total	C	N	O	S	0	0	0
			1907	1214	320	365	8			

- Molecule 8 is a protein called Proteasome subunit beta type-10, Proteasome subunit beta type-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	H	226	Total	C	N	O	S	0	0	0
			1716	1081	291	336	8			
8	V	223	Total	C	N	O	S	0	0	0
			1688	1066	287	327	8			

- Molecule 9 is a protein called Proteasome subunit beta type-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
9	I	204	Total	C	N	O	S	0	0	0
			1581	1010	258	305	8			
9	W	204	Total	C	N	O	S	0	0	0
			1581	1010	258	305	8			

- Molecule 10 is a protein called Proteasome subunit beta type-4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	J	195	Total	C	N	O	S	0	0	0
			1561	992	264	299	6			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
10	X	195	Total	C	N	O	S	0	0	0
			1561	992	264	299	6			

- Molecule 11 is a protein called Proteasome subunit beta type-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
11	K	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			
11	Y	212	Total	C	N	O	S	0	0	0
			1644	1045	280	312	7			

- Molecule 12 is a protein called Proteasome subunit beta type-6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
12	L	222	Total	C	N	O	S	0	0	0
			1757	1115	303	335	4			
12	Z	222	Total	C	N	O	S	0	0	0
			1757	1115	303	335	4			

- Molecule 13 is a protein called Proteasome subunit beta type-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
13	M	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	7			
13	a	233	Total	C	N	O	S	0	0	0
			1824	1154	312	351	7			

- Molecule 14 is a protein called Proteasome subunit beta type-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
14	N	196	Total	C	N	O	S	0	0	0
			1512	955	250	300	7			
14	b	196	Total	C	N	O	S	0	0	0
			1512	955	250	300	7			

- Molecule 15 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	G	1	Total	Mg	0	0
			1	1		
15	I	1	Total	Mg	0	0
			1	1		

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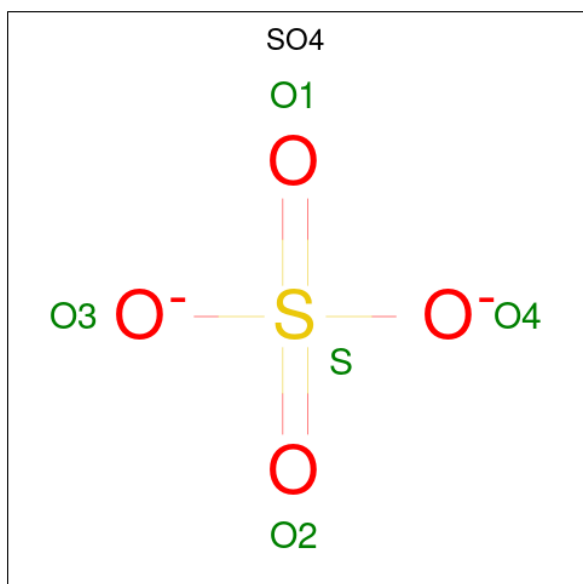
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	K	1	Total	Mg	0	0
			1	1		
15	N	1	Total	Mg	0	0
			1	1		
15	V	1	Total	Mg	0	0
			1	1		
15	W	1	Total	Mg	0	0
			1	1		
15	Y	1	Total	Mg	0	0
			1	1		
15	Z	1	Total	Mg	0	0
			1	1		

- Molecule 16 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	G	1	Total	Cl	0	0
			1	1		
16	U	1	Total	Cl	0	0
			1	1		

- Molecule 17 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
17	H	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
17	V	1	Total	O	S	0	0
			5	4	1		

- Molecule 18 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
18	A	27	Total	O		0	0
			27	27			
18	B	19	Total	O		0	0
			19	19			
18	C	13	Total	O		0	0
			13	13			
18	D	21	Total	O		0	0
			21	21			
18	E	14	Total	O		0	0
			14	14			
18	F	14	Total	O		0	0
			14	14			
18	G	25	Total	O		0	0
			25	25			
18	H	40	Total	O		0	0
			40	40			
18	I	19	Total	O		0	0
			19	19			
18	J	23	Total	O		0	0
			23	23			
18	K	23	Total	O		0	0
			23	23			
18	L	23	Total	O		0	0
			23	23			
18	M	27	Total	O		0	0
			27	27			
18	N	22	Total	O		0	0
			22	22			
18	O	12	Total	O		0	0
			12	12			
18	P	20	Total	O		0	0
			20	20			
18	Q	16	Total	O		0	0
			16	16			
18	R	19	Total	O		0	0
			19	19			

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
18	S	11	Total 11	O 11	0	0
18	T	21	Total 21	O 21	0	0
18	U	29	Total 29	O 29	0	0
18	V	21	Total 21	O 21	0	0
18	W	22	Total 22	O 22	0	0
18	X	21	Total 21	O 21	0	0
18	Y	31	Total 31	O 31	0	0
18	Z	25	Total 25	O 25	0	0
18	a	25	Total 25	O 25	0	0
18	b	23	Total 23	O 23	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.

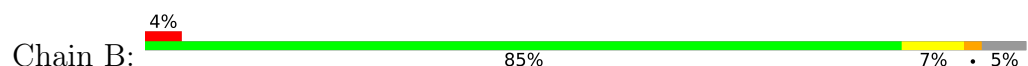
- Molecule 1: Proteasome subunit alpha type-2



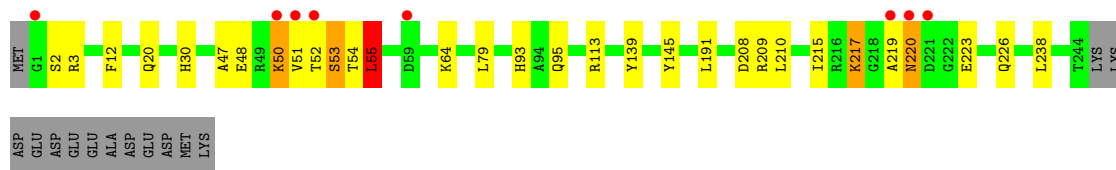
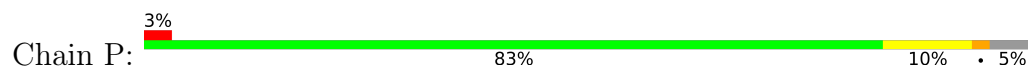
- Molecule 1: Proteasome subunit alpha type-2



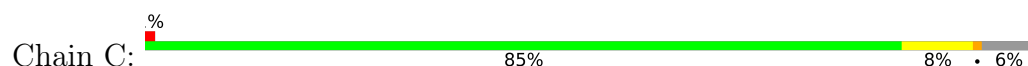
- Molecule 2: Proteasome subunit alpha type-3



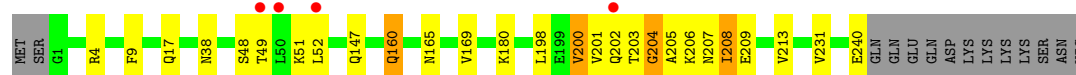
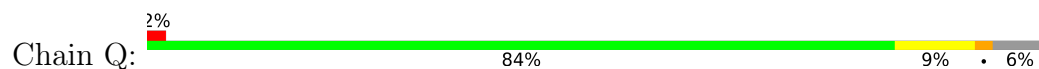
- Molecule 2: Proteasome subunit alpha type-3



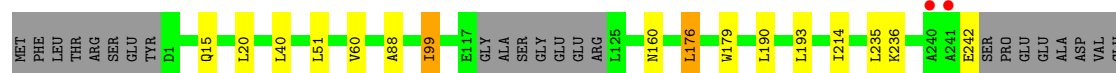
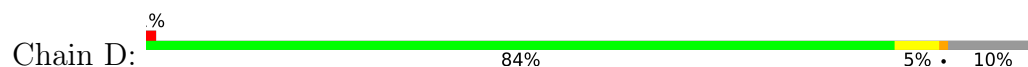
- Molecule 3: Proteasome subunit alpha type-4



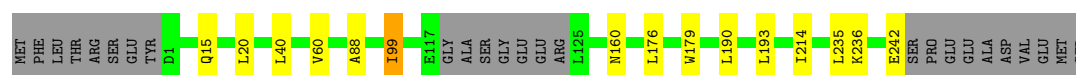
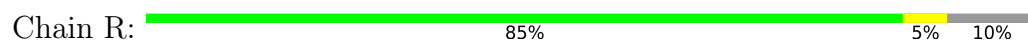
- Molecule 3: Proteasome subunit alpha type-4



- Molecule 4: Proteasome subunit alpha type-5



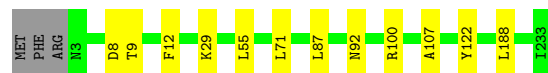
- Molecule 4: Proteasome subunit alpha type-5



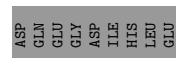
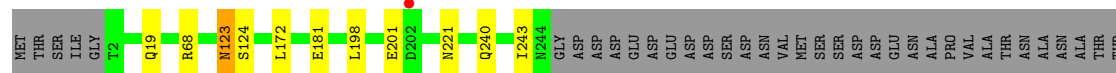
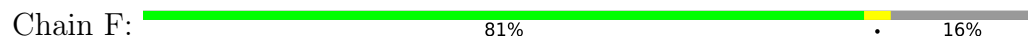
- Molecule 5: Proteasome subunit alpha type-6



- Molecule 5: Proteasome subunit alpha type-6

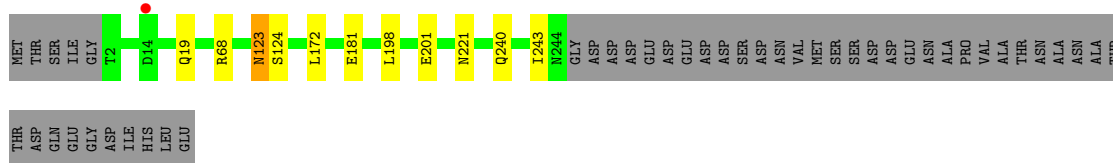


- Molecule 6: Probable proteasome subunit alpha type-7



- Molecule 6: Probable proteasome subunit alpha type-7

Chain T:  81% 16%



- Molecule 7: Proteasome subunit alpha type-1

Chain G:  92%



- Molecule 7: Proteasome subunit alpha type-1

Chain U:  92%



- Molecule 8: Proteasome subunit beta type-10, Proteasome subunit beta type-2

Chain H:  91% 8%

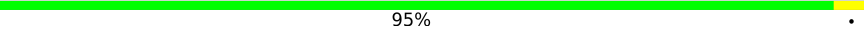


- Molecule 8: Proteasome subunit beta type-10, Proteasome subunit beta type-2

Chain V:  92% 6%

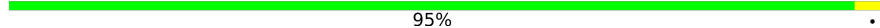


- Molecule 9: Proteasome subunit beta type-3

Chain I:  95%

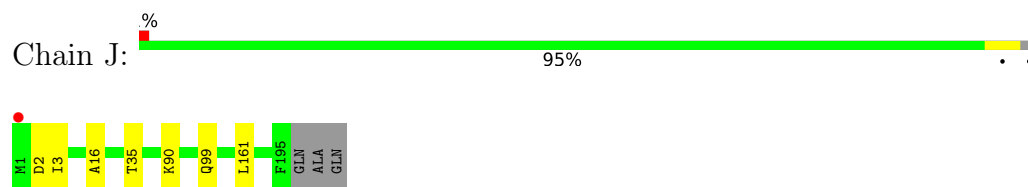


- Molecule 9: Proteasome subunit beta type-3

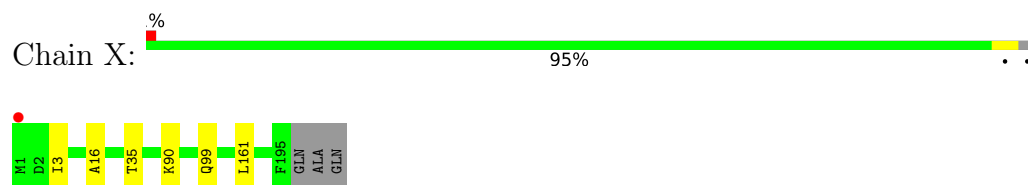
Chain W:  95%



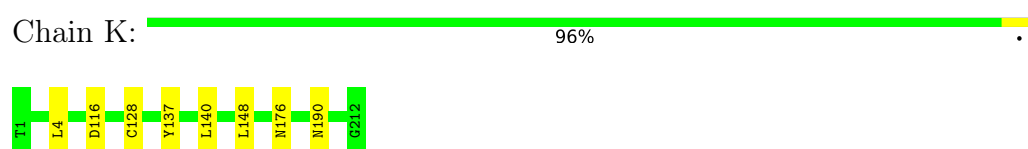
- Molecule 10: Proteasome subunit beta type-4



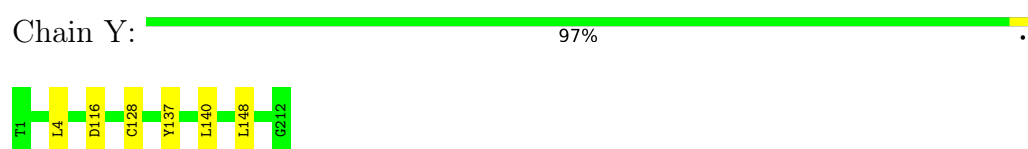
- Molecule 10: Proteasome subunit beta type-4



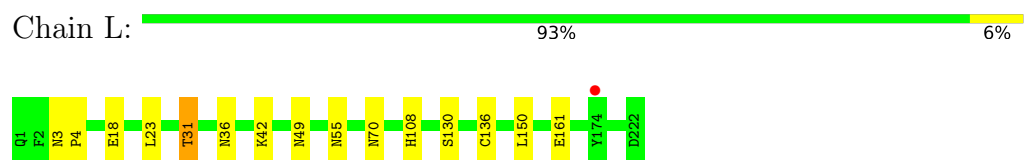
- Molecule 11: Proteasome subunit beta type-5



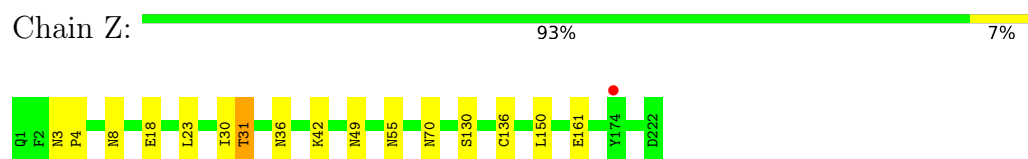
- Molecule 11: Proteasome subunit beta type-5



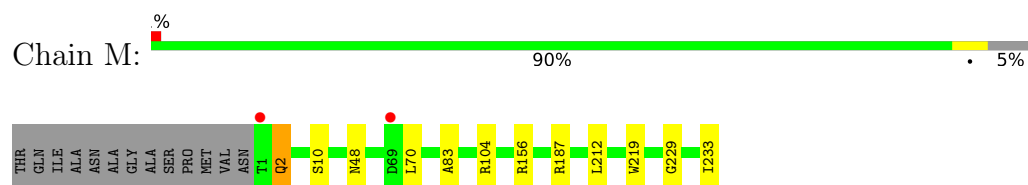
- Molecule 12: Proteasome subunit beta type-6



- Molecule 12: Proteasome subunit beta type-6

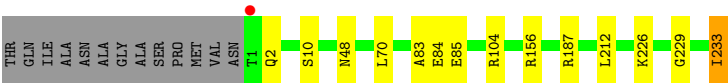


- Molecule 13: Proteasome subunit beta type-7

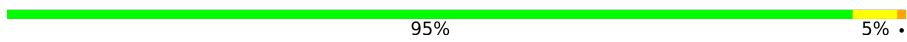


● Molecule 13: Proteasome subunit beta type-7

Chain a:  89% 5% 5%

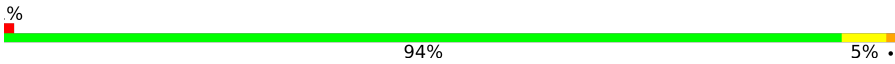


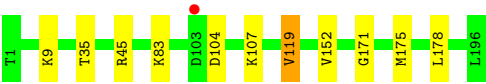
● Molecule 14: Proteasome subunit beta type-1

Chain N:  95% 5%



● Molecule 14: Proteasome subunit beta type-1

Chain b:  % 94% 5% •



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	135.37Å 301.72Å 144.99Å 90.00° 113.12° 90.00°	Depositor
Resolution (Å)	15.00 – 2.70 15.00 – 2.70	Depositor EDS
% Data completeness (in resolution range)	96.5 (15.00-2.70) 96.5 (15.00-2.70)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.53 (at 2.69Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.177 , 0.209 0.182 , 0.213	Depositor DCC
R_{free} test set	14073 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	55.9	Xtriage
Anisotropy	0.385	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 54.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	49958	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.37% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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

Bond lengths and bond angles in the following residue types are not validated in this section: CL, MG, SO4

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	0.58	0/1952	0.82	0/2642
1	O	0.59	0/1952	0.83	1/2642 (0.0%)
2	B	0.63	0/1934	0.91	4/2618 (0.2%)
2	P	0.65	0/1934	0.90	5/2618 (0.2%)
3	C	0.59	0/1910	0.89	3/2586 (0.1%)
3	Q	0.59	0/1910	0.85	3/2586 (0.1%)
4	D	0.54	0/1837	0.80	0/2475
4	R	0.54	0/1837	0.80	0/2475
5	E	0.55	0/1800	0.76	0/2433
5	S	0.58	0/1800	0.78	0/2433
6	F	0.55	0/1932	0.81	0/2609
6	T	0.55	0/1932	0.81	0/2609
7	G	0.53	0/1945	0.78	0/2634
7	U	0.53	0/1945	0.79	0/2634
8	H	0.60	0/1746	0.87	3/2365 (0.1%)
8	V	0.49	0/1718	0.84	3/2329 (0.1%)
9	I	0.58	0/1611	0.81	0/2174
9	W	0.59	0/1611	0.80	0/2174
10	J	0.54	0/1589	0.78	0/2142
10	X	0.54	0/1589	0.78	0/2142
11	K	0.50	0/1681	0.78	0/2274
11	Y	0.50	0/1681	0.78	0/2274
12	L	0.52	0/1795	0.76	0/2420
12	Z	0.52	0/1795	0.76	0/2420
13	M	0.55	0/1855	0.80	1/2514 (0.0%)
13	a	0.65	0/1855	0.82	1/2514 (0.0%)
14	N	0.52	0/1541	0.77	0/2087
14	b	0.51	0/1541	0.77	0/2087
All	All	0.56	0/50228	0.81	24/67910 (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
8	H	0	1
8	V	0	1
All	All	0	2

There are no bond length outliers.

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	204	GLY	N-CA-C	13.43	128.74	112.49
2	B	219	ALA	N-CA-C	-11.58	92.47	110.42
2	B	217	LYS	N-CA-C	-11.55	91.39	109.76
8	H	188	ARG	NE-CZ-NH1	-10.72	110.78	121.50
3	C	201	VAL	N-CA-C	10.67	121.50	110.62
8	V	188	ARG	NE-CZ-NH2	-10.52	109.73	119.20
8	H	188	ARG	NE-CZ-NH2	9.82	128.04	119.20
8	V	188	ARG	CD-NE-CZ	9.13	137.18	124.40
8	H	188	ARG	CD-NE-CZ	8.17	135.84	124.40
2	P	50	LYS	N-CA-C	7.11	119.03	111.28
2	P	55	LEU	N-CA-C	7.08	121.18	112.54
8	V	188	ARG	NE-CZ-NH1	6.61	128.11	121.50
2	B	221	ASP	N-CA-C	6.17	120.15	111.52
3	Q	204	GLY	N-CA-C	-6.08	105.64	112.33
3	Q	208	ILE	N-CA-C	5.91	117.70	109.55
2	B	54	THR	N-CA-C	5.80	117.68	111.36
3	C	205	ALA	N-CA-C	5.76	123.07	110.80
1	O	6	SER	N-CA-C	-5.66	104.95	112.94
2	P	217	LYS	N-CA-C	-5.57	106.46	113.20
13	a	10	SER	N-CA-C	5.46	117.99	110.35
3	Q	200	VAL	CB-CA-C	-5.36	105.04	110.88
13	M	10	SER	N-CA-C	5.36	117.85	110.35
2	P	210	LEU	N-CA-C	5.30	117.87	109.50
2	P	53	SER	N-CA-C	-5.17	101.22	109.07

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
8	H	188	ARG	Sidechain

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Mol	Chain	Res	Type	Group
8	V	188	ARG	Sidechain

5.2 Too-close contacts ⓘ

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	1915	0	1929	6	0
1	O	1915	0	1929	10	0
2	B	1904	0	1904	25	0
2	P	1904	0	1904	27	0
3	C	1881	0	1895	12	0
3	Q	1881	0	1895	30	0
4	D	1813	0	1797	4	0
4	R	1813	0	1797	3	0
5	E	1773	0	1775	9	0
5	S	1773	0	1775	12	0
6	F	1892	0	1883	4	0
6	T	1892	0	1883	4	0
7	G	1907	0	1901	1	0
7	U	1907	0	1901	2	0
8	H	1716	0	1703	12	0
8	V	1688	0	1683	6	0
9	I	1581	0	1574	7	0
9	W	1581	0	1574	7	0
10	J	1561	0	1569	1	0
10	X	1561	0	1569	1	0
11	K	1644	0	1595	3	0
11	Y	1644	0	1595	2	0
12	L	1757	0	1711	7	0
12	Z	1757	0	1711	8	0
13	M	1824	0	1832	3	0
13	a	1824	0	1832	7	0
14	N	1512	0	1481	3	0
14	b	1512	0	1481	4	0
15	G	1	0	0	0	0
15	I	1	0	0	0	0
15	K	1	0	0	0	0
15	N	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
15	V	1	0	0	0	0
15	W	1	0	0	0	0
15	Y	1	0	0	0	0
15	Z	1	0	0	0	0
16	G	1	0	0	0	0
16	U	1	0	0	0	0
17	H	5	0	0	0	0
17	V	5	0	0	0	0
18	A	27	0	0	0	0
18	B	19	0	0	1	0
18	C	13	0	0	0	0
18	D	21	0	0	0	0
18	E	14	0	0	0	0
18	F	14	0	0	0	0
18	G	25	0	0	0	0
18	H	40	0	0	0	0
18	I	19	0	0	0	0
18	J	23	0	0	0	0
18	K	23	0	0	0	0
18	L	23	0	0	0	0
18	M	27	0	0	1	0
18	N	22	0	0	0	0
18	O	12	0	0	0	0
18	P	20	0	0	1	0
18	Q	16	0	0	0	0
18	R	19	0	0	0	0
18	S	11	0	0	0	0
18	T	21	0	0	0	0
18	U	29	0	0	0	0
18	V	21	0	0	0	0
18	W	22	0	0	0	0
18	X	21	0	0	0	0
18	Y	31	0	0	0	0
18	Z	25	0	0	0	0
18	a	25	0	0	0	0
18	b	23	0	0	0	0
All	All	49958	0	49078	180	0

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 2.

All (180) 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)
2:B:219:ALA:HB3	2:B:223:GLU:HG3	1.23	1.09
2:B:225:TYR:CE2	8:H:225:GLU:HB2	1.95	1.02
2:B:219:ALA:CB	2:B:223:GLU:HG3	1.93	0.98
1:O:4:ARG:HH11	1:O:4:ARG:HG2	1.33	0.92
3:Q:203:THR:HG22	3:Q:204:GLY:H	1.37	0.89
3:Q:203:THR:HB	3:Q:207:ASN:ND2	1.89	0.87
8:H:113:ILE:HG13	8:H:119:THR:HG22	1.56	0.85
8:V:113:ILE:HG13	8:V:119:THR:HG22	1.55	0.85
2:B:219:ALA:HB3	2:B:223:GLU:CG	2.08	0.84
2:B:145:TYR:OH	2:B:217:LYS:N	2.11	0.81
8:H:224:GLN:NE2	8:H:224:GLN:HA	1.94	0.80
2:P:219:ALA:HB3	2:P:223:GLU:O	1.82	0.80
2:B:145:TYR:OH	2:B:217:LYS:HB2	1.82	0.79
8:H:224:GLN:HA	8:H:224:GLN:HE21	1.47	0.78
3:Q:198:LEU:HA	3:Q:201:VAL:HG12	1.66	0.77
2:P:145:TYR:OH	2:P:217:LYS:HB2	1.85	0.75
2:P:48:GLU:OE2	2:P:209:ARG:NH1	2.17	0.75
2:P:54:THR:HG23	2:P:55:LEU:HD13	1.67	0.75
3:Q:165:ASN:HB2	3:Q:200:VAL:HG11	1.69	0.75
1:O:4:ARG:HB3	2:P:2:SER:OG	1.87	0.74
3:C:48:SER:HB2	3:C:207:ASN:HD21	1.54	0.72
3:Q:203:THR:HG22	3:Q:204:GLY:N	2.04	0.72
3:Q:202:GLN:O	3:Q:203:THR:OG1	2.06	0.72
2:B:51:VAL:HG13	2:B:52:THR:N	2.06	0.71
3:Q:203:THR:HB	3:Q:207:ASN:HD21	1.55	0.70
8:H:222:ASP:OD1	9:I:74:LYS:NZ	2.26	0.68
1:A:4:ARG:HB3	2:B:2:SER:OG	1.94	0.67
2:B:95:GLN:HE22	9:I:71:ASN:HD22	1.40	0.67
2:P:145:TYR:OH	2:P:217:LYS:N	2.29	0.66
3:Q:201:VAL:HG13	3:Q:202:GLN:N	2.10	0.66
3:C:204:GLY:O	3:C:231:VAL:HG21	1.97	0.64
2:B:12:PHE:H	3:C:17:GLN:HE22	1.45	0.64
3:C:160:GLN:HE21	3:C:160:GLN:HA	1.61	0.64
2:P:3:ARG:NH1	5:S:122:TYR:OH	2.32	0.63
3:Q:160:GLN:HE21	3:Q:160:GLN:HA	1.64	0.63
2:P:95:GLN:HE22	9:W:71:ASN:HD22	1.45	0.63
3:Q:198:LEU:HA	3:Q:201:VAL:CG1	2.28	0.63
2:P:3:ARG:CZ	5:S:122:TYR:OH	2.47	0.63
2:P:93:HIS:HB3	18:P:301:HOH:O	1.99	0.62
2:B:93:HIS:HB3	18:B:301:HOH:O	1.98	0.62
2:B:145:TYR:OH	2:B:217:LYS:CB	2.47	0.62
1:O:4:ARG:HG2	1:O:4:ARG:NH1	2.01	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:Q:205:ALA:HB2	3:Q:231:VAL:HG21	1.82	0.62
12:Z:31:THR:HG23	12:Z:36:ASN:HD21	1.66	0.60
3:Q:204:GLY:O	3:Q:207:ASN:ND2	2.34	0.60
2:P:51:VAL:HG12	2:P:52:THR:N	2.15	0.60
6:F:123:ASN:C	6:F:123:ASN:HD22	2.10	0.59
12:L:31:THR:HG23	12:L:36:ASN:HD21	1.66	0.59
3:C:165:ASN:HB2	3:C:200:VAL:HG11	1.83	0.59
1:A:4:ARG:HD3	5:E:122:TYR:CD2	2.37	0.59
3:Q:203:THR:CG2	3:Q:204:GLY:H	2.10	0.59
3:Q:198:LEU:HD23	3:Q:201:VAL:HG11	1.85	0.58
6:T:123:ASN:C	6:T:123:ASN:HD22	2.12	0.57
1:A:4:ARG:CB	2:B:2:SER:OG	2.53	0.57
3:Q:203:THR:CB	3:Q:207:ASN:HD21	2.18	0.57
5:E:92:ASN:HD21	12:L:70:ASN:HD21	1.51	0.56
7:G:23:PHE:O	7:G:26:THR:HB	2.05	0.56
7:U:23:PHE:O	7:U:26:THR:HB	2.05	0.56
2:B:145:TYR:HH	2:B:217:LYS:N	2.02	0.56
14:b:152:VAL:HA	14:b:175:MET:HE1	1.87	0.56
1:A:4:ARG:CD	5:E:122:TYR:CD2	2.89	0.55
3:C:201:VAL:O	3:C:202:GLN:HB3	2.05	0.55
5:E:12:PHE:H	6:F:19:GLN:HE22	1.52	0.55
14:N:152:VAL:HA	14:N:175:MET:HE1	1.89	0.55
5:S:12:PHE:H	6:T:19:GLN:HE22	1.54	0.55
2:B:51:VAL:HG13	2:B:52:THR:H	1.72	0.54
1:A:4:ARG:CD	5:E:122:TYR:HD2	2.19	0.54
3:Q:48:SER:HB2	3:Q:207:ASN:OD1	2.08	0.54
2:B:51:VAL:HG21	2:B:56:LEU:HD22	1.89	0.54
2:B:145:TYR:HH	2:B:217:LYS:HB2	1.73	0.54
3:Q:206:LYS:HD2	3:Q:206:LYS:H	1.73	0.54
3:C:201:VAL:HG13	3:C:202:GLN:N	2.23	0.53
13:a:83:ALA:HB1	13:a:84:GLU:OE2	2.08	0.53
6:T:123:ASN:HD22	6:T:124:SER:N	2.06	0.53
5:S:92:ASN:HD21	12:Z:70:ASN:HD21	1.57	0.53
13:M:2:GLN:NE2	18:M:301:HOH:O	2.40	0.53
2:B:225:TYR:HE2	8:H:225:GLU:HB2	1.68	0.53
2:P:30:HIS:O	2:P:50:LYS:HE3	2.09	0.53
3:C:202:GLN:O	3:C:202:GLN:HG2	2.09	0.52
3:Q:201:VAL:CG1	3:Q:202:GLN:N	2.73	0.52
2:B:220:ASN:N	2:B:220:ASN:OD1	2.41	0.52
3:C:48:SER:HB2	3:C:207:ASN:ND2	2.22	0.52
6:F:123:ASN:HD22	6:F:124:SER:N	2.08	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:P:139:TYR:CZ	2:P:217:LYS:HE3	2.45	0.52
3:Q:203:THR:CG2	3:Q:204:GLY:N	2.72	0.51
2:B:51:VAL:CG1	2:B:52:THR:N	2.73	0.51
9:I:37:ASN:C	9:I:37:ASN:HD22	2.19	0.51
9:W:37:ASN:C	9:W:37:ASN:HD22	2.18	0.51
10:J:16:ALA:HB2	10:J:161:LEU:HD21	1.92	0.51
1:O:2:THR:HG22	1:O:3:ASP:N	2.25	0.51
1:O:12:PHE:H	2:P:20:GLN:HE22	1.57	0.51
3:Q:208:ILE:HG22	3:Q:209:GLU:N	2.27	0.50
12:Z:31:THR:CG2	12:Z:36:ASN:HD21	2.24	0.50
10:X:16:ALA:HB2	10:X:161:LEU:HD21	1.93	0.50
2:B:95:GLN:NE2	9:I:71:ASN:HD22	2.10	0.50
1:O:4:ARG:HE	5:S:122:TYR:HE2	1.61	0.49
13:a:84:GLU:OE2	13:a:84:GLU:N	2.33	0.49
12:L:31:THR:CG2	12:L:36:ASN:HD21	2.24	0.49
2:P:51:VAL:CG1	2:P:52:THR:N	2.75	0.49
8:V:98:LEU:HD12	8:V:113:ILE:HG21	1.95	0.49
3:Q:203:THR:CG2	3:Q:207:ASN:HD21	2.26	0.49
13:a:226:LYS:HG2	13:a:233:ILE:OXT	2.13	0.49
5:E:92:ASN:ND2	12:L:70:ASN:HD21	2.10	0.48
2:P:12:PHE:H	3:Q:17:GLN:HE22	1.62	0.48
5:E:92:ASN:HD21	12:L:70:ASN:ND2	2.11	0.48
8:H:98:LEU:HD12	8:H:113:ILE:HG21	1.95	0.48
13:M:156:ARG:HH11	8:V:165:ASN:HD22	1.62	0.47
2:P:220:ASN:ND2	2:P:220:ASN:C	2.72	0.47
3:Q:165:ASN:CB	3:Q:200:VAL:HG11	2.42	0.47
2:P:139:TYR:OH	2:P:217:LYS:HE3	2.14	0.47
8:H:219:ASN:ND2	8:H:219:ASN:C	2.73	0.47
2:P:3:ARG:NH2	5:S:122:TYR:OH	2.47	0.47
8:V:35:HIS:NE2	8:V:53:GLU:HG2	2.30	0.47
3:C:201:VAL:HG13	3:C:203:THR:H	1.80	0.46
12:L:3:ASN:HD22	12:L:4:PRO:HD2	1.80	0.46
1:A:12:PHE:H	2:B:20:GLN:HE22	1.63	0.46
8:H:224:GLN:HE21	8:H:224:GLN:CA	2.23	0.46
2:P:95:GLN:NE2	9:W:71:ASN:HD22	2.12	0.46
3:Q:200:VAL:HG12	3:Q:200:VAL:O	2.16	0.46
3:Q:208:ILE:CG2	3:Q:209:GLU:N	2.79	0.46
9:I:106:PRO:HD2	9:I:123:PHE:HB2	1.97	0.46
2:P:208:ASP:OD1	2:P:208:ASP:N	2.49	0.46
12:Z:3:ASN:HD22	12:Z:4:PRO:HD2	1.81	0.45
5:S:87:LEU:HD21	5:S:107:ALA:HB1	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:H:84:LYS:HE2	8:H:119:THR:HG23	1.99	0.45
5:E:87:LEU:HD21	5:E:107:ALA:HB1	1.98	0.44
3:Q:202:GLN:C	3:Q:203:THR:HG1	2.14	0.44
4:R:160:ASN:HB3	4:R:179:TRP:CE2	2.53	0.44
11:K:128:CYS:HB2	11:K:137:TYR:CE2	2.53	0.44
14:N:83:LYS:HG3	14:N:119:VAL:CG2	2.48	0.44
2:P:47:ALA:HB1	2:P:64:LYS:HD2	2.00	0.44
5:S:92:ASN:ND2	12:Z:70:ASN:HD21	2.16	0.44
8:V:222:ASP:OD1	9:W:74:LYS:NZ	2.40	0.44
8:H:165:ASN:HD22	13:a:156:ARG:HH11	1.66	0.44
14:b:83:LYS:HG3	14:b:119:VAL:CG2	2.48	0.44
12:Z:42:LYS:HD2	12:Z:55:ASN:HD22	1.83	0.44
5:S:100:ARG:HH21	13:a:85:GLU:HG3	1.83	0.43
4:D:160:ASN:HB3	4:D:179:TRP:CE2	2.53	0.43
2:P:139:TYR:OH	2:P:217:LYS:CE	2.66	0.43
14:b:35:THR:HG21	14:b:45:ARG:HE	1.83	0.43
9:W:106:PRO:HD2	9:W:123:PHE:HB2	1.99	0.43
11:K:128:CYS:HB2	11:K:137:TYR:CZ	2.54	0.43
2:P:52:THR:HG22	2:P:53:SER:H	1.84	0.43
9:W:10:ILE:HG21	9:W:141:ALA:HB3	2.01	0.43
2:B:219:ALA:HB3	2:B:223:GLU:O	2.19	0.43
4:D:176:LEU:HD22	5:E:55:LEU:CD2	2.49	0.42
2:P:145:TYR:HH	2:P:217:LYS:N	2.16	0.42
5:S:92:ASN:HD21	12:Z:70:ASN:ND2	2.15	0.42
3:C:9:PHE:H	4:D:15:GLN:HE22	1.67	0.42
3:Q:9:PHE:H	4:R:15:GLN:HE22	1.67	0.42
8:V:84:LYS:HE2	8:V:119:THR:HG23	2.02	0.42
9:I:10:ILE:HG21	9:I:141:ALA:HB3	2.02	0.42
3:C:200:VAL:O	3:C:200:VAL:HG12	2.19	0.42
11:Y:128:CYS:HB2	11:Y:137:TYR:CZ	2.55	0.42
12:L:42:LYS:HD2	12:L:55:ASN:HD22	1.83	0.42
11:K:176:ASN:ND2	11:K:190:ASN:HD22	2.18	0.41
14:N:35:THR:HG21	14:N:45:ARG:HE	1.84	0.41
1:O:23:TYR:CD1	7:U:12:PRO:HA	2.55	0.41
4:D:88:ALA:HA	4:D:99:ILE:HG21	2.01	0.41
3:Q:203:THR:CB	3:Q:207:ASN:ND2	2.72	0.41
4:R:88:ALA:HA	4:R:99:ILE:HG21	2.02	0.41
6:T:198:LEU:HD12	6:T:243:ILE:HG22	2.03	0.41
2:B:47:ALA:HB1	2:B:64:LYS:HD2	2.02	0.41
2:B:51:VAL:CG1	2:B:52:THR:H	2.33	0.41
2:P:215:ILE:HG12	2:P:226:GLN:HG2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
9:I:141:ALA:HB2	9:I:177:ASP:HB2	2.02	0.41
1:O:4:ARG:CD	5:S:122:TYR:CD2	3.04	0.41
5:S:100:ARG:NH2	13:a:85:GLU:HG3	2.35	0.41
1:O:4:ARG:HH11	1:O:4:ARG:CG	2.13	0.41
12:Z:8:ASN:HA	12:Z:30:ILE:O	2.21	0.41
3:Q:201:VAL:CG1	3:Q:202:GLN:H	2.34	0.41
6:F:198:LEU:HD12	6:F:243:ILE:HG22	2.03	0.40
9:W:141:ALA:HB2	9:W:177:ASP:HB2	2.03	0.40
2:P:48:GLU:CD	2:P:209:ARG:HH12	2.20	0.40
11:Y:128:CYS:HB2	11:Y:137:TYR:CE2	2.55	0.40
13:M:219:TRP:CH2	14:b:171:GLY:HA2	2.56	0.40
8:H:104:ASP:HB2	8:H:105:PRO:HD2	2.04	0.40
1:O:2:THR:CG2	1:O:3:ASP:N	2.84	0.40
3:Q:201:VAL:HG13	3:Q:202:GLN:H	1.83	0.40
13:a:83:ALA:CB	13:a:84:GLU:OE2	2.70	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	248/250 (99%)	242 (98%)	6 (2%)	0	100	100
1	O	248/250 (99%)	242 (98%)	6 (2%)	0	100	100
2	B	242/258 (94%)	238 (98%)	4 (2%)	0	100	100
2	P	242/258 (94%)	238 (98%)	4 (2%)	0	100	100
3	C	238/254 (94%)	234 (98%)	4 (2%)	0	100	100
3	Q	238/254 (94%)	234 (98%)	4 (2%)	0	100	100
4	D	231/260 (89%)	227 (98%)	4 (2%)	0	100	100
4	R	231/260 (89%)	227 (98%)	4 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	E	229/234 (98%)	220 (96%)	9 (4%)	0	100	100
5	S	229/234 (98%)	221 (96%)	8 (4%)	0	100	100
6	F	241/288 (84%)	239 (99%)	2 (1%)	0	100	100
6	T	241/288 (84%)	237 (98%)	4 (2%)	0	100	100
7	G	239/252 (95%)	238 (100%)	1 (0%)	0	100	100
7	U	239/252 (95%)	238 (100%)	1 (0%)	0	100	100
8	H	224/226 (99%)	218 (97%)	6 (3%)	0	100	100
8	V	221/226 (98%)	215 (97%)	6 (3%)	0	100	100
9	I	202/205 (98%)	195 (96%)	7 (4%)	0	100	100
9	W	202/205 (98%)	195 (96%)	7 (4%)	0	100	100
10	J	193/198 (98%)	189 (98%)	4 (2%)	0	100	100
10	X	193/198 (98%)	189 (98%)	4 (2%)	0	100	100
11	K	210/212 (99%)	205 (98%)	5 (2%)	0	100	100
11	Y	210/212 (99%)	205 (98%)	5 (2%)	0	100	100
12	L	220/222 (99%)	216 (98%)	4 (2%)	0	100	100
12	Z	220/222 (99%)	216 (98%)	4 (2%)	0	100	100
13	M	231/246 (94%)	224 (97%)	5 (2%)	2 (1%)	14	35
13	a	231/246 (94%)	224 (97%)	6 (3%)	1 (0%)	30	54
14	N	194/196 (99%)	190 (98%)	4 (2%)	0	100	100
14	b	194/196 (99%)	189 (97%)	5 (3%)	0	100	100
All	All	6281/6602 (95%)	6145 (98%)	133 (2%)	3 (0%)	100	100

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
13	a	229	GLY
13	M	83	ALA
13	M	229	GLY

5.3.2 Protein sidechains ⓘ

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	209/209 (100%)	205 (98%)	4 (2%)	50	77
1	O	209/209 (100%)	204 (98%)	5 (2%)	43	72
2	B	203/216 (94%)	194 (96%)	9 (4%)	25	53
2	P	203/216 (94%)	197 (97%)	6 (3%)	36	66
3	C	212/226 (94%)	201 (95%)	11 (5%)	21	47
3	Q	212/226 (94%)	201 (95%)	11 (5%)	21	47
4	D	194/215 (90%)	182 (94%)	12 (6%)	16	39
4	R	194/215 (90%)	183 (94%)	11 (6%)	18	43
5	E	190/193 (98%)	183 (96%)	7 (4%)	30	59
5	S	190/193 (98%)	184 (97%)	6 (3%)	34	64
6	F	201/239 (84%)	194 (96%)	7 (4%)	32	61
6	T	201/239 (84%)	194 (96%)	7 (4%)	32	61
7	G	206/210 (98%)	198 (96%)	8 (4%)	28	57
7	U	206/210 (98%)	198 (96%)	8 (4%)	28	57
8	H	184/184 (100%)	172 (94%)	12 (6%)	15	37
8	V	181/184 (98%)	172 (95%)	9 (5%)	22	48
9	I	172/173 (99%)	170 (99%)	2 (1%)	63	84
9	W	172/173 (99%)	170 (99%)	2 (1%)	63	84
10	J	173/175 (99%)	168 (97%)	5 (3%)	37	67
10	X	173/175 (99%)	169 (98%)	4 (2%)	44	73
11	K	169/169 (100%)	165 (98%)	4 (2%)	43	72
11	Y	169/169 (100%)	165 (98%)	4 (2%)	43	72
12	L	185/185 (100%)	176 (95%)	9 (5%)	22	49
12	Z	185/185 (100%)	177 (96%)	8 (4%)	26	54
13	M	199/208 (96%)	192 (96%)	7 (4%)	32	61
13	a	199/208 (96%)	192 (96%)	7 (4%)	32	61
14	N	162/162 (100%)	157 (97%)	5 (3%)	35	65
14	b	162/162 (100%)	157 (97%)	5 (3%)	35	65
All	All	5315/5528 (96%)	5120 (96%)	195 (4%)	30	59

All (195) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	SER
1	A	122	THR
1	A	157	PHE
1	A	250	LEU
2	B	52	THR
2	B	55	LEU
2	B	79	LEU
2	B	102	ASN
2	B	113	ARG
2	B	191	LEU
2	B	220	ASN
2	B	221	ASP
2	B	238	LEU
3	C	4	ARG
3	C	38	ASN
3	C	49	THR
3	C	51	LYS
3	C	52	LEU
3	C	147	GLN
3	C	160	GLN
3	C	169	VAL
3	C	180	LYS
3	C	213	VAL
3	C	240	GLU
4	D	20	LEU
4	D	40	LEU
4	D	51	LEU
4	D	60	VAL
4	D	99	ILE
4	D	176	LEU
4	D	190	LEU
4	D	193	LEU
4	D	214	ILE
4	D	235	LEU
4	D	236	LYS
4	D	242	GLU
5	E	8	ASP
5	E	9	THR
5	E	29	LYS
5	E	55	LEU
5	E	71	LEU
5	E	188	LEU
5	E	231	LYS

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Mol	Chain	Res	Type
6	F	68	ARG
6	F	123	ASN
6	F	172	LEU
6	F	181	GLU
6	F	201	GLU
6	F	221	ASN
6	F	240	GLN
7	G	13	GLU
7	G	26	THR
7	G	83	ASN
7	G	115	LEU
7	G	122	ARG
7	G	125	MET
7	G	235	ARG
7	G	236	LEU
8	H	9	GLN
8	H	25	VAL
8	H	53	GLU
8	H	68	LEU
8	H	113	ILE
8	H	127	LEU
8	H	144	GLN
8	H	153	LYS
8	H	196	ARG
8	H	219	ASN
8	H	224	GLN
8	H	226	GLU
9	I	37	ASN
9	I	171	LEU
10	J	2	ASP
10	J	3	ILE
10	J	35	THR
10	J	90	LYS
10	J	99	GLN
11	K	4	LEU
11	K	116	ASP
11	K	140	LEU
11	K	148	LEU
12	L	18	GLU
12	L	23	LEU
12	L	31	THR
12	L	49	ASN

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Mol	Chain	Res	Type
12	L	108	HIS
12	L	130	SER
12	L	136	CYS
12	L	150	LEU
12	L	161	GLU
13	M	2	GLN
13	M	48	ASN
13	M	70	LEU
13	M	104	ARG
13	M	187	ARG
13	M	212	LEU
13	M	233	ILE
14	N	9	LYS
14	N	104	ASP
14	N	107	LYS
14	N	119	VAL
14	N	178	LEU
1	O	4	ARG
1	O	6	SER
1	O	122	THR
1	O	157	PHE
1	O	250	LEU
2	P	55	LEU
2	P	79	LEU
2	P	113	ARG
2	P	191	LEU
2	P	220	ASN
2	P	238	LEU
3	Q	4	ARG
3	Q	38	ASN
3	Q	49	THR
3	Q	51	LYS
3	Q	52	LEU
3	Q	147	GLN
3	Q	160	GLN
3	Q	169	VAL
3	Q	180	LYS
3	Q	213	VAL
3	Q	240	GLU
4	R	20	LEU
4	R	40	LEU
4	R	60	VAL

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Mol	Chain	Res	Type
4	R	99	ILE
4	R	176	LEU
4	R	190	LEU
4	R	193	LEU
4	R	214	ILE
4	R	235	LEU
4	R	236	LYS
4	R	242	GLU
5	S	8	ASP
5	S	9	THR
5	S	29	LYS
5	S	55	LEU
5	S	71	LEU
5	S	188	LEU
6	T	68	ARG
6	T	123	ASN
6	T	172	LEU
6	T	181	GLU
6	T	201	GLU
6	T	221	ASN
6	T	240	GLN
7	U	13	GLU
7	U	26	THR
7	U	83	ASN
7	U	115	LEU
7	U	122	ARG
7	U	125	MET
7	U	235	ARG
7	U	236	LEU
8	V	9	GLN
8	V	25	VAL
8	V	53	GLU
8	V	68	LEU
8	V	113	ILE
8	V	127	LEU
8	V	144	GLN
8	V	153	LYS
8	V	196	ARG
9	W	37	ASN
9	W	171	LEU
10	X	3	ILE
10	X	35	THR

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Mol	Chain	Res	Type
10	X	90	LYS
10	X	99	GLN
11	Y	4	LEU
11	Y	116	ASP
11	Y	140	LEU
11	Y	148	LEU
12	Z	18	GLU
12	Z	23	LEU
12	Z	31	THR
12	Z	49	ASN
12	Z	130	SER
12	Z	136	CYS
12	Z	150	LEU
12	Z	161	GLU
13	a	2	GLN
13	a	48	ASN
13	a	70	LEU
13	a	104	ARG
13	a	187	ARG
13	a	212	LEU
13	a	233	ILE
14	b	9	LYS
14	b	104	ASP
14	b	107	LYS
14	b	119	VAL
14	b	178	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (149) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	30	GLN
2	B	20	GLN
2	B	95	GLN
2	B	119	GLN
2	B	123	GLN
2	B	124	HIS
2	B	155	ASN
2	B	176	GLN
3	C	17	GLN
3	C	38	ASN
3	C	77	ASN
3	C	115	GLN

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Mol	Chain	Res	Type
3	C	116	GLN
3	C	120	GLN
3	C	147	GLN
3	C	160	GLN
3	C	207	ASN
3	C	233	GLN
4	D	15	GLN
4	D	91	HIS
4	D	106	GLN
4	D	146	GLN
4	D	160	ASN
4	D	225	ASN
5	E	68	HIS
5	E	99	ASN
5	E	116	GLN
5	E	118	ASN
5	E	120	GLN
5	E	151	ASN
5	E	184	ASN
6	F	19	GLN
6	F	86	ASN
6	F	117	GLN
6	F	123	ASN
6	F	143	HIS
6	F	191	GLN
6	F	240	GLN
7	G	30	ASN
7	G	83	ASN
7	G	114	ASN
7	G	117	GLN
7	G	121	GLN
7	G	166	GLN
7	G	167	GLN
7	G	175	ASN
8	H	22	ASN
8	H	35	HIS
8	H	165	ASN
8	H	194	ASN
8	H	224	GLN
9	I	37	ASN
9	I	88	GLN
9	I	168	GLN

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Mol	Chain	Res	Type
10	J	10	GLN
10	J	55	GLN
10	J	63	ASN
11	K	9	GLN
11	K	85	ASN
11	K	176	ASN
11	K	208	ASN
12	L	3	ASN
12	L	36	ASN
12	L	49	ASN
12	L	55	ASN
12	L	70	ASN
12	L	79	HIS
12	L	80	ASN
12	L	135	GLN
12	L	158	ASN
13	M	48	ASN
13	M	102	GLN
13	M	108	ASN
13	M	179	ASN
13	M	194	ASN
13	M	213	GLN
14	N	141	ASN
14	N	161	GLN
1	O	30	GLN
2	P	20	GLN
2	P	95	GLN
2	P	119	GLN
2	P	123	GLN
2	P	124	HIS
2	P	176	GLN
2	P	220	ASN
3	Q	17	GLN
3	Q	38	ASN
3	Q	77	ASN
3	Q	115	GLN
3	Q	116	GLN
3	Q	120	GLN
3	Q	147	GLN
3	Q	160	GLN
3	Q	207	ASN
3	Q	233	GLN

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Mol	Chain	Res	Type
4	R	15	GLN
4	R	91	HIS
4	R	106	GLN
4	R	160	ASN
4	R	225	ASN
5	S	68	HIS
5	S	99	ASN
5	S	116	GLN
5	S	118	ASN
5	S	120	GLN
5	S	151	ASN
5	S	184	ASN
6	T	19	GLN
6	T	86	ASN
6	T	117	GLN
6	T	123	ASN
6	T	191	GLN
6	T	240	GLN
7	U	30	ASN
7	U	83	ASN
7	U	114	ASN
7	U	117	GLN
7	U	121	GLN
7	U	166	GLN
7	U	167	GLN
7	U	175	ASN
8	V	165	ASN
9	W	37	ASN
9	W	88	GLN
9	W	203	GLN
10	X	55	GLN
10	X	63	ASN
10	X	86	GLN
11	Y	9	GLN
11	Y	85	ASN
11	Y	176	ASN
11	Y	208	ASN
12	Z	3	ASN
12	Z	36	ASN
12	Z	49	ASN
12	Z	55	ASN
12	Z	70	ASN

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Mol	Chain	Res	Type
12	Z	80	ASN
12	Z	135	GLN
12	Z	152	ASN
12	Z	153	GLN
13	a	48	ASN
13	a	102	GLN
13	a	108	ASN
13	a	179	ASN
13	a	194	ASN
13	a	213	GLN
14	b	141	ASN

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](#)

Of 12 ligands modelled in this entry, 10 are monoatomic - leaving 2 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
17	SO4	V	302	-	4,4,4	0.50	0	6,6,6	0.10	0
17	SO4	H	301	-	4,4,4	0.50	0	6,6,6	0.12	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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, 95th 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	250/250 (100%)	-0.35	7 (2%) 55 51	46, 58, 85, 102	0
1	O	250/250 (100%)	-0.29	7 (2%) 55 51	51, 66, 96, 115	0
2	B	244/258 (94%)	-0.24	10 (4%) 41 37	47, 62, 90, 101	0
2	P	244/258 (94%)	-0.27	8 (3%) 49 45	51, 66, 94, 105	0
3	C	240/254 (94%)	-0.35	2 (0%) 82 81	46, 65, 104, 140	0
3	Q	240/254 (94%)	-0.22	4 (1%) 69 67	52, 74, 122, 162	0
4	D	235/260 (90%)	-0.42	2 (0%) 81 80	51, 64, 86, 117	0
4	R	235/260 (90%)	-0.40	0 100 100	53, 67, 89, 119	0
5	E	231/234 (98%)	-0.36	0 100 100	54, 68, 93, 104	0
5	S	231/234 (98%)	-0.31	0 100 100	56, 73, 102, 113	0
6	F	243/288 (84%)	-0.43	1 (0%) 88 87	44, 63, 95, 115	0
6	T	243/288 (84%)	-0.40	1 (0%) 88 87	47, 68, 104, 130	0
7	G	241/252 (95%)	-0.51	0 100 100	45, 57, 80, 105	0
7	U	241/252 (95%)	-0.37	0 100 100	50, 62, 83, 107	0
8	H	226/226 (100%)	-0.49	2 (0%) 81 80	47, 56, 81, 120	0
8	V	223/226 (98%)	-0.43	1 (0%) 88 87	49, 60, 82, 107	0
9	I	204/205 (99%)	-0.67	0 100 100	43, 52, 69, 78	0
9	W	204/205 (99%)	-0.63	0 100 100	45, 56, 73, 85	0
10	J	195/198 (98%)	-0.52	1 (0%) 87 86	45, 56, 71, 83	0
10	X	195/198 (98%)	-0.49	1 (0%) 87 86	49, 58, 71, 87	0
11	K	212/212 (100%)	-0.59	0 100 100	45, 55, 70, 81	0
11	Y	212/212 (100%)	-0.57	0 100 100	47, 56, 71, 81	0
12	L	222/222 (100%)	-0.56	1 (0%) 87 86	47, 57, 78, 89	0
12	Z	222/222 (100%)	-0.51	1 (0%) 87 86	45, 57, 79, 88	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	M	233/246 (94%)	-0.58	2 (0%) 81 80	43, 55, 74, 85	0
13	a	233/246 (94%)	-0.58	1 (0%) 88 87	43, 54, 70, 81	0
14	N	196/196 (100%)	-0.67	0 100 100	42, 51, 68, 80	0
14	b	196/196 (100%)	-0.57	1 (0%) 87 86	43, 53, 71, 82	0
All	All	6341/6602 (96%)	-0.45	53 (0%) 82 81	42, 60, 91, 162	0

All (53) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	219	ALA	7.7
10	J	1	MET	5.6
1	A	228	PRO	5.3
10	X	1	MET	5.1
8	V	223	ILE	4.8
1	A	229	THR	4.6
1	O	1	MET	4.6
3	Q	50	LEU	4.6
1	A	1	MET	4.4
2	B	217	LYS	4.2
2	B	218	GLY	3.7
2	P	51	VAL	3.5
2	P	1	GLY	3.3
2	B	1	GLY	3.3
2	P	219	ALA	3.3
1	O	249	ALA	3.3
2	B	51	VAL	3.2
2	B	220	ASN	3.2
1	A	227	ILE	3.1
13	a	1	THR	3.0
1	O	228	PRO	2.8
2	B	52	THR	2.8
1	O	229	THR	2.8
2	B	221	ASP	2.7
2	P	221	ASP	2.7
3	Q	49	THR	2.6
1	O	222	LEU	2.6
1	A	231	LYS	2.6
2	B	223	GLU	2.5
2	B	93	HIS	2.5
3	Q	52	LEU	2.4
13	M	69	ASP	2.4

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Mol	Chain	Res	Type	RSRZ
12	Z	174	TYR	2.4
1	A	62	SER	2.4
1	O	227	ILE	2.4
3	C	50	LEU	2.4
6	F	202	ASP	2.3
3	C	204	GLY	2.3
12	L	174	TYR	2.3
1	A	55	LEU	2.3
2	P	59	ASP	2.2
1	O	231	LYS	2.2
8	H	226	GLU	2.2
2	P	50	LYS	2.2
2	P	220	ASN	2.1
4	D	241	ALA	2.1
3	Q	202	GLN	2.1
8	H	223	ILE	2.1
14	b	103	ASP	2.1
2	P	52	THR	2.1
6	T	14	ASP	2.0
4	D	240	ALA	2.0
13	M	1	THR	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 oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
15	MG	Z	301	1/1	0.96	0.06	57,57,57,57	0
15	MG	W	301	1/1	0.97	0.12	71,71,71,71	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
15	MG	I	301	1/1	0.97	0.07	62,62,62,62	0
15	MG	G	301	1/1	0.98	0.04	43,43,43,43	0
15	MG	Y	301	1/1	0.98	0.06	64,64,64,64	0
15	MG	V	301	1/1	0.98	0.08	81,81,81,81	0
17	SO4	V	302	5/5	0.98	0.10	54,57,58,62	0
16	CL	G	302	1/1	0.99	0.03	48,48,48,48	0
17	SO4	H	301	5/5	0.99	0.08	55,58,59,65	0
15	MG	K	301	1/1	0.99	0.06	63,63,63,63	0
15	MG	N	201	1/1	1.00	0.05	39,39,39,39	0
16	CL	U	301	1/1	1.00	0.05	55,55,55,55	0

6.5 Other polymers [i](#)

There are no such residues in this entry.