



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 15, 2017 – 07:43 am GMT

PDB ID : 4Y69
Title : Yeast 20S proteasome in complex with Ac-PAD-ep
Authors : Huber, E.M.; Groll, M.
Deposited on : 2015-02-12
Resolution : 2.90 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

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : trunk28620
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : recalc28949

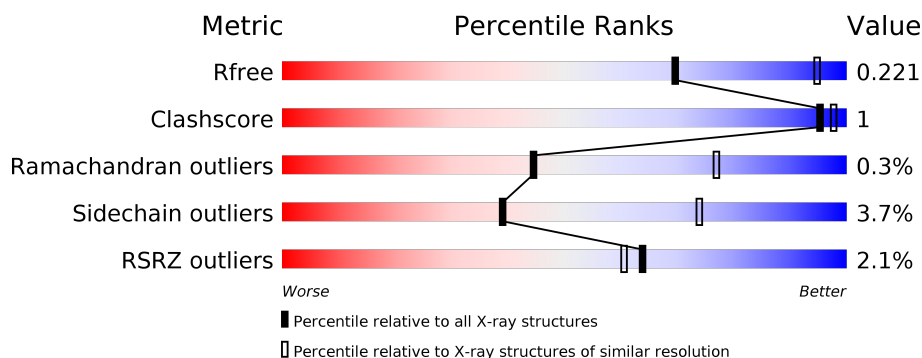
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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}	100719	1586 (2.90-2.90)
Clashscore	112137	1807 (2.90-2.90)
Ramachandran outliers	110173	1768 (2.90-2.90)
Sidechain outliers	110143	1770 (2.90-2.90)
RSRZ outliers	101464	1596 (2.90-2.90)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	<div> <div>4%</div> <div>98%</div> <div>•</div> </div>
1	O	250	<div> <div>2%</div> <div>98%</div> <div>•</div> </div>
2	B	258	<div> <div>4%</div> <div>86%</div> <div>9% 5%</div> </div>
2	P	258	<div> <div>3%</div> <div>87%</div> <div>7% • 5%</div> </div>
3	C	254	<div> <div>5%</div> <div>86%</div> <div>7% • 6%</div> </div>
3	Q	254	<div> <div>6%</div> <div>87%</div> <div>7% • 6%</div> </div>

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Mol	Chain	Length	Quality of chain
4	D	260	
4	R	260	
5	E	234	
5	S	234	
6	F	288	
6	T	288	
7	G	252	
7	U	252	
8	H	232	
8	V	232	
9	I	205	
9	W	205	
10	J	198	
10	X	198	
11	K	212	
11	Y	212	
12	L	222	
12	Z	222	
13	M	246	
13	a	246	
14	N	196	
14	b	196	
15	c	4	
15	d	4	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
16	MG	I	301	-	-	-	X

2 Entry composition

There are 18 unique types of molecules in this entry. The entry contains 49849 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-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	H	226	Total	C	N	O	S	0	1	0
			1726	1087	300	332	7			
8	V	226	Total	C	N	O	S	0	0	0
			1719	1082	298	332	7			

- 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 a protein called Ac-PAD-ep.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
15	c	4	Total	C	N	O	0	0	0
			27	17	3	7			
15	d	4	Total	C	N	O	0	0	0
			27	17	3	7			

- Molecule 16 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
16	G	1	Total 1	Mg 1	0	0
16	K	1	Total 1	Mg 1	0	0
16	I	2	Total 2	Mg 2	0	0
16	Z	1	Total 1	Mg 1	0	0
16	N	1	Total 1	Mg 1	0	0
16	L	1	Total 1	Mg 1	0	0

- Molecule 17 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

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

- Molecule 18 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
18	A	13	Total 13	O 13	0	0
18	B	9	Total 9	O 9	0	0
18	C	20	Total 20	O 20	0	0
18	D	9	Total 9	O 9	0	0
18	E	6	Total 6	O 6	0	0
18	F	15	Total 15	O 15	0	0
18	G	24	Total 24	O 24	0	0
18	H	20	Total 20	O 20	0	0
18	I	16	Total 16	O 16	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
18	J	20	Total 20	O 20	0	0
18	K	9	Total 9	O 9	0	0
18	L	20	Total 20	O 20	0	0
18	M	20	Total 20	O 20	0	0
18	N	18	Total 18	O 18	0	0
18	O	5	Total 5	O 5	0	0
18	P	13	Total 13	O 13	0	0
18	Q	11	Total 11	O 11	0	0
18	R	16	Total 16	O 16	0	0
18	S	6	Total 6	O 6	0	0
18	T	15	Total 15	O 15	0	0
18	U	19	Total 19	O 19	0	0
18	V	14	Total 14	O 14	0	0
18	W	9	Total 9	O 9	0	0
18	X	18	Total 18	O 18	0	0
18	Y	22	Total 22	O 22	0	0
18	Z	14	Total 14	O 14	0	0
18	a	18	Total 18	O 18	0	0
18	b	11	Total 11	O 11	0	0
18	c	2	Total 2	O 2	0	0
18	d	1	Total 1	O 1	0	0

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

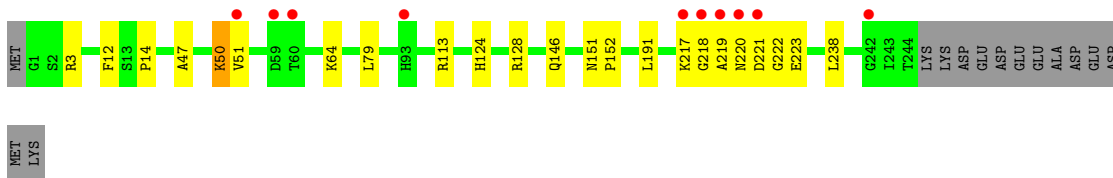
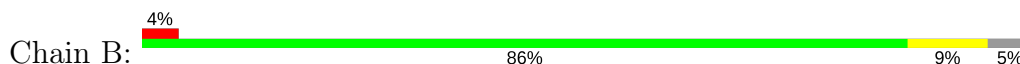
- Molecule 1: Proteasome subunit alpha type-2



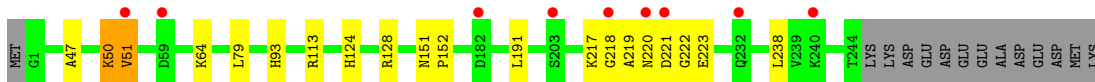
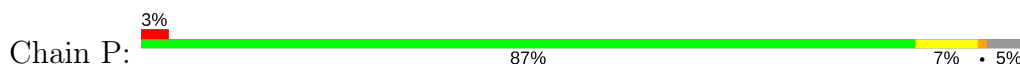
- Molecule 1: Proteasome subunit alpha type-2



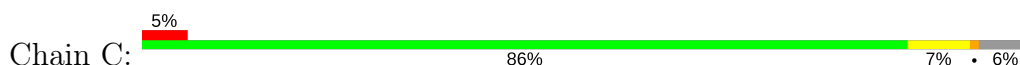
- Molecule 2: Proteasome subunit alpha type-3



- Molecule 2: Proteasome subunit alpha type-3



- Molecule 3: Proteasome subunit alpha type-4



GLU
GLN
ASP
LYS
LYS
LYS
LYS
SER
ASN
HIS

• Molecule 3: Proteasome subunit alpha type-4

Chain Q: 6% 87% 7% 6%

MET SER GI R4 K35 N38 S48 T49 L50 K61 L52 T55 N77 V124 Q147 T148 E149 P150 S158 A159 Q160 V169 K180 E187 V201 Q202 T203 G204 A205 K206 E225 Q229 Q236 E237 K238 Q239 E240 GLN GLN GLN GLN ASP LYS LYS LYS SER ASN HIS

• Molecule 4: Proteasome subunit alpha type-5

Chain D: 2% 85% 10%

MET PHE LEU THR ARG SER GLU TYR D1 T47 L51 H91 I99 E117 GLY ALA SER GLY GLY GLU GLU ARG L125 D143 Y159 N160 L176 W179 L193 I214 D224 E230 L235 K236 A241 E242 SER PRO GLU GLU ALA VAL ASP MET SER

• Molecule 4: Proteasome subunit alpha type-5

Chain R: 2% 85% 5% 10%

MET PHE LEU THR ARG SER GLU TYR D1 L51 H91 I99 E117 GLY ALA SER GLY GLU GLU ARG L125 D143 Y159 N160 L176 W179 L193 I214 Q217 L235 K236 A241 E242 SER PRO GLU GLU ALA VAL MET SER

• Molecule 5: Proteasome subunit alpha type-6

Chain E: 3% 91% 8% 8%

MET PHE ARG N3 T9 F12 K29 L55 L71 A77 P78 L87 N99 A107 Y122 G123 L175 F178 N184 L188 D201 D202 V207 D208 E227 K231 Y232 I233

• Molecule 5: Proteasome subunit alpha type-6

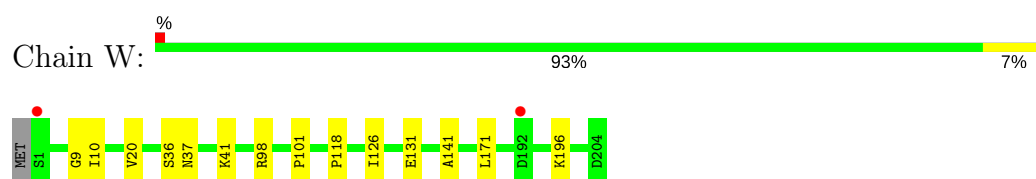
Chain S: 4% 91% 8% 7%

MET PHE ARG N3 T9 F12 K29 N51 L55 S56 Y58 L71 A77 P78 L87 N99 A107 R173 T174 L175 F178 M184 L188 E194 D202 E203 S204 V207 D208 D218 K231 Y232 I233

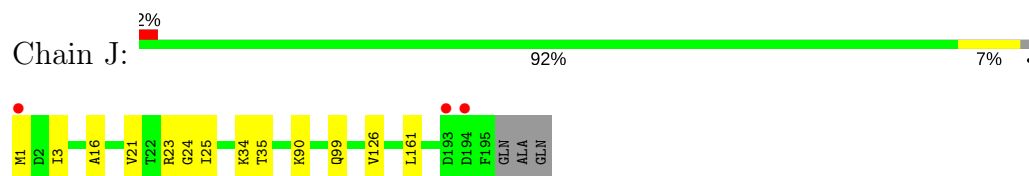
• Molecule 6: Probable proteasome subunit alpha type-7

Chain F: 2% 81% 16% 1%

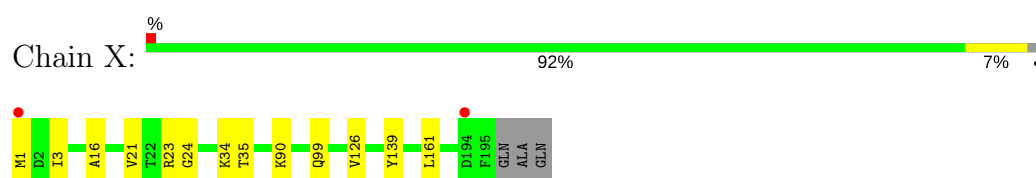
MET THR SER ILE GLY Q19 Q117 M123 K139 L172 D177 E181 E201 D202 E205 K206 D207 N214 Q240 N244 GLY ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP ASP VAL MET SER SER ASP ASP ASP ASP VAL MET SER



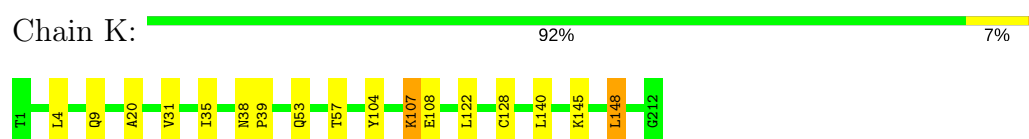
- Molecule 10: Proteasome subunit beta type-4



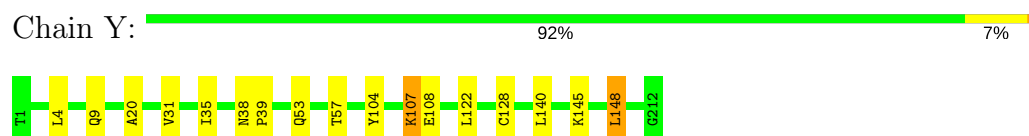
- Molecule 10: Proteasome subunit beta type-4



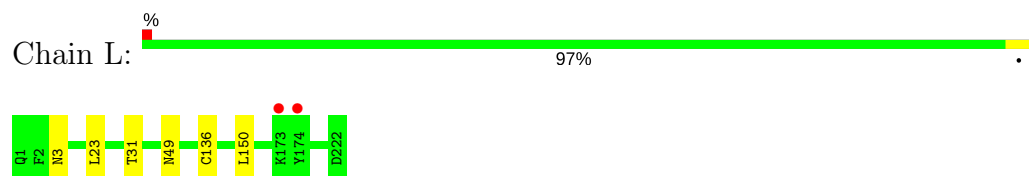
- Molecule 11: Proteasome subunit beta type-5



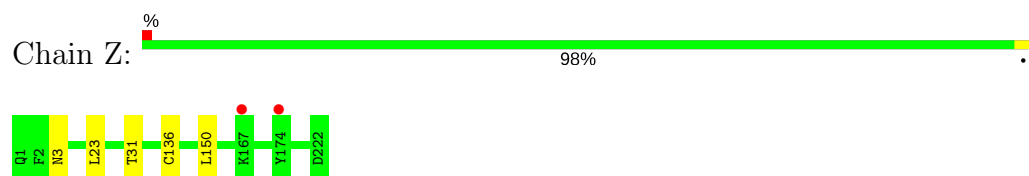
- Molecule 11: Proteasome subunit beta type-5




- Molecule 12: Proteasome subunit beta type-6



- Molecule 12: Proteasome subunit beta type-6



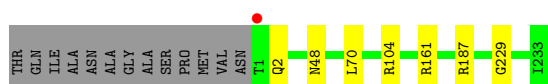
- Molecule 13: Proteasome subunit beta type-7

Chain M:  90% • • 5%



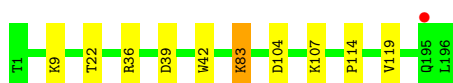
- Molecule 13: Proteasome subunit beta type-7

Chain a:  92% • 5%



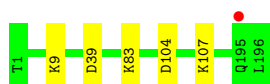
- Molecule 14: Proteasome subunit beta type-1

Chain N:  95% 5% •



- Molecule 14: Proteasome subunit beta type-1

Chain b:  97% •



- Molecule 15: Ac-PAD-ep

Chain c:  100%

There are no outlier residues recorded for this chain.

- Molecule 15: Ac-PAD-ep

Chain d:  100%

There are no outlier residues recorded for this chain.

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	136.68Å 301.26Å 145.94Å 90.00° 113.23° 90.00°	Depositor
Resolution (Å)	15.00 – 2.90 15.00 – 2.90	Depositor EDS
% Data completeness (in resolution range)	94.2 (15.00-2.90) 94.3 (15.00-2.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.42 (at 2.91Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.195 , 0.217 0.201 , 0.221	Depositor DCC
R_{free} test set	11173 reflections (5.26%)	DCC
Wilson B-factor (Å ²)	52.6	Xtriage
Anisotropy	0.097	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 36.6	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	0.93	EDS
Total number of atoms	49849	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.49% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: ASJ, MG, N7P, POL, CL

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	0.28	0/1952	0.46	0/2642
1	O	0.27	0/1952	0.46	0/2642
2	B	0.28	0/1934	0.50	0/2618
2	P	0.28	0/1934	0.50	0/2618
3	C	0.28	0/1910	0.51	0/2586
3	Q	0.27	0/1910	0.50	0/2586
4	D	0.27	0/1837	0.48	0/2475
4	R	0.27	0/1837	0.48	0/2475
5	E	0.27	0/1800	0.47	0/2433
5	S	0.27	0/1800	0.47	0/2433
6	F	0.27	0/1932	0.45	0/2609
6	T	0.27	0/1932	0.45	0/2609
7	G	0.27	0/1945	0.47	0/2634
7	U	0.28	0/1945	0.47	0/2634
8	H	0.50	2/1761 (0.1%)	0.65	6/2388 (0.3%)
8	V	0.29	0/1750	0.48	0/2373
9	I	0.30	0/1611	0.49	0/2174
9	W	0.29	0/1611	0.49	0/2174
10	J	0.27	0/1589	0.48	0/2142
10	X	0.27	0/1589	0.48	0/2142
11	K	0.27	0/1681	0.51	0/2274
11	Y	0.28	0/1681	0.51	0/2274
12	L	0.30	0/1795	0.49	0/2420
12	Z	0.28	0/1795	0.48	0/2420
13	M	0.28	0/1855	0.51	0/2514
13	a	0.29	0/1855	0.51	0/2514
14	N	0.35	0/1541	0.51	0/2087
14	b	0.29	0/1541	0.49	0/2087
15	c	1.18	0/4	1.01	0/4
15	d	1.46	0/4	2.02	0/4
All	All	0.29	2/50283 (0.0%)	0.49	6/67985 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	H	114[A]	HIS	CA-C	9.90	1.78	1.52
8	H	114[B]	HIS	CA-C	9.90	1.78	1.52

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	H	114[A]	HIS	CA-C-O	10.04	141.18	120.10
8	H	114[B]	HIS	CA-C-O	10.04	141.18	120.10
8	H	114[A]	HIS	CA-C-N	-7.85	99.94	117.20
8	H	114[B]	HIS	CA-C-N	-7.85	99.94	117.20
8	H	114[A]	HIS	CB-CA-C	-5.86	98.68	110.40
8	H	114[B]	HIS	CB-CA-C	-5.86	98.68	110.40

There are no chirality outliers.

There are no planarity outliers.

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	1	0
1	O	1915	0	1929	2	0
2	B	1904	0	1904	13	0
2	P	1904	0	1904	9	0
3	C	1881	0	1895	10	0
3	Q	1881	0	1895	6	0
4	D	1813	0	1797	4	0
4	R	1813	0	1797	4	0
5	E	1773	0	1775	6	0
5	S	1773	0	1775	5	0
6	F	1892	0	1883	1	0
6	T	1892	0	1883	2	0
7	G	1907	0	1901	4	0
7	U	1907	0	1901	4	0
8	H	1726	0	1726	19	0
8	V	1719	0	1719	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	I	1581	0	1574	7	0
9	W	1581	0	1574	7	0
10	J	1561	0	1569	6	0
10	X	1561	0	1569	6	0
11	K	1644	0	1595	6	0
11	Y	1644	0	1595	6	0
12	L	1757	0	1711	0	0
12	Z	1757	0	1711	0	0
13	M	1824	0	1832	6	0
13	a	1824	0	1832	0	0
14	N	1512	0	1479	5	0
14	b	1512	0	1478	0	0
15	c	27	0	14	0	0
15	d	27	0	14	0	0
16	G	1	0	0	0	0
16	I	2	0	0	0	0
16	K	1	0	0	0	0
16	L	1	0	0	0	0
16	N	1	0	0	0	0
16	Z	1	0	0	0	0
17	G	1	0	0	0	0
17	U	1	0	0	0	0
18	A	13	0	0	0	0
18	B	9	0	0	0	0
18	C	20	0	0	0	0
18	D	9	0	0	0	0
18	E	6	0	0	0	0
18	F	15	0	0	0	0
18	G	24	0	0	0	0
18	H	20	0	0	1	0
18	I	16	0	0	0	0
18	J	20	0	0	0	0
18	K	9	0	0	0	0
18	L	20	0	0	0	0
18	M	20	0	0	1	0
18	N	18	0	0	0	0
18	O	5	0	0	0	0
18	P	13	0	0	1	0
18	Q	11	0	0	0	0
18	R	16	0	0	0	0
18	S	6	0	0	0	0
18	T	15	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
18	U	19	0	0	0	0
18	V	14	0	0	0	0
18	W	9	0	0	0	0
18	X	18	0	0	0	0
18	Y	22	0	0	0	0
18	Z	14	0	0	0	0
18	a	18	0	0	0	0
18	b	11	0	0	0	0
18	c	2	0	0	0	0
18	d	1	0	0	0	0
All	All	49849	0	49160	124	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 1.

All (124) 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)
8:H:118:SER:OG	18:H:301:HOH:O	1.87	0.91
8:H:114[A]:HIS:CA	8:H:115:ALA:N	2.38	0.86
8:H:53:GLU:OE1	8:H:57:GLN:NE2	2.24	0.69
8:H:53:GLU:O	8:H:57:GLN:HG3	1.94	0.68
8:V:53:GLU:O	8:V:57:GLN:HG3	1.94	0.68
8:V:53:GLU:OE2	8:V:57:GLN:NE2	2.31	0.64
2:P:93:HIS:HB3	18:P:301:HOH:O	1.98	0.62
7:G:68:ARG:HH12	14:N:36:ARG:HH22	1.51	0.58
8:H:120:ASP:OD1	8:H:120:ASP:N	2.37	0.58
8:H:97:TYR:HE2	8:H:114[B]:HIS:CE1	2.27	0.52
3:C:201:VAL:O	3:C:202:GLN:CB	2.57	0.51
10:J:21:VAL:HG11	11:K:122:LEU:HD11	1.92	0.51
7:G:23:PHE:O	7:G:26:THR:HB	2.11	0.51
8:V:35:HIS:CE1	8:V:53:GLU:HG2	2.46	0.51
3:Q:201:VAL:O	3:Q:202:GLN:CB	2.58	0.51
11:Y:20:ALA:HB2	11:Y:31:VAL:HG21	1.93	0.51
3:C:160:GLN:HA	3:C:160:GLN:HE21	1.76	0.51
2:B:221:ASP:O	2:B:223:GLU:N	2.45	0.50
10:X:21:VAL:HG11	11:Y:122:LEU:HD11	1.94	0.50
2:P:221:ASP:O	2:P:223:GLU:N	2.45	0.50
3:Q:51:LYS:O	3:Q:52:LEU:HB2	2.11	0.50
11:K:20:ALA:HB2	11:K:31:VAL:HG21	1.94	0.49
3:C:51:LYS:O	3:C:52:LEU:HB2	2.11	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:S:12:PHE:H	6:T:19:GLN:HE22	1.60	0.49
10:J:16:ALA:HB2	10:J:161:LEU:HD21	1.94	0.49
5:E:12:PHE:H	6:F:19:GLN:HE22	1.60	0.48
1:O:23:TYR:CD1	7:U:12:PRO:HA	2.49	0.48
3:Q:160:GLN:HE21	3:Q:160:GLN:HA	1.77	0.48
10:X:16:ALA:HB2	10:X:161:LEU:HD21	1.95	0.48
11:K:53:GLN:O	11:K:57:THR:HG23	2.13	0.47
7:U:23:PHE:O	7:U:26:THR:HB	2.14	0.47
14:N:36:ARG:HG3	14:N:42:TRP:CE2	2.49	0.47
2:P:217:LYS:C	2:P:219:ALA:H	2.18	0.47
11:Y:53:GLN:O	11:Y:57:THR:HG23	2.15	0.47
8:V:113:ILE:HG13	8:V:119:THR:HG22	1.96	0.47
9:I:10:ILE:HG21	9:I:141:ALA:HB3	1.97	0.47
9:I:9:GLY:HA3	9:I:41:LYS:HE2	1.97	0.47
9:W:10:ILE:HG21	9:W:141:ALA:HB3	1.97	0.47
2:B:217:LYS:C	2:B:219:ALA:H	2.18	0.46
13:M:27:LEU:HD21	13:M:34:LEU:HD22	1.98	0.46
8:H:97:TYR:HE2	8:H:114[B]:HIS:NE2	2.13	0.46
9:I:36:SER:HB2	10:J:126:VAL:HG11	1.97	0.46
4:R:159:TYR:CE2	5:S:56:SER:HB3	2.51	0.46
2:B:146:GLN:HG2	3:C:57:ILE:HG21	1.96	0.46
2:B:3:ARG:HB3	5:E:122:TYR:OH	2.15	0.46
8:H:35:HIS:CE1	8:H:53:GLU:HG2	2.51	0.46
13:M:2:GLN:NE2	18:M:301:HOH:O	2.49	0.46
8:V:35:HIS:HB3	8:V:56:THR:HG21	1.98	0.45
1:O:122:THR:HG22	2:P:128:ARG:HH21	1.80	0.45
2:P:124:HIS:HB3	3:Q:124:VAL:HG12	1.99	0.45
10:X:1:MET:HG2	10:X:34:LYS:HE3	1.98	0.45
8:V:113:ILE:CG1	8:V:119:THR:HG22	2.46	0.45
8:V:112:SER:OG	8:V:120:ASP:OD1	2.18	0.45
2:B:47:ALA:HB1	2:B:64:LYS:HD2	1.99	0.45
13:M:35:ARG:HD3	13:M:36:PHE:CZ	2.52	0.45
2:P:47:ALA:HB1	2:P:64:LYS:HD2	1.99	0.45
2:B:12:PHE:H	3:C:17:GLN:HE22	1.65	0.44
8:H:50:ALA:CB	9:I:126:ILE:HG23	2.47	0.44
8:H:35:HIS:HB3	8:H:56:THR:HG21	1.98	0.44
2:P:151:ASN:HB2	2:P:152:PRO:CD	2.48	0.44
9:W:9:GLY:HA3	9:W:41:LYS:HE2	1.98	0.44
11:Y:107:LYS:HG3	11:Y:108:GLU:HG3	2.00	0.44
8:V:104:ASP:HB2	8:V:105:PRO:HD2	1.99	0.43
2:B:151:ASN:HB2	2:B:152:PRO:CD	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:J:1:MET:HG2	10:J:34:LYS:HE3	1.99	0.43
11:K:107:LYS:HG3	11:K:108:GLU:HG3	2.00	0.43
3:C:35:LYS:HG2	3:C:158:SER:O	2.18	0.43
13:M:35:ARG:NH1	14:N:114:PRO:HB3	2.34	0.43
3:Q:35:LYS:HG2	3:Q:158:SER:O	2.18	0.43
8:H:104:ASP:HB2	8:H:105:PRO:HD2	1.99	0.43
14:N:83:LYS:HG3	14:N:119:VAL:CG2	2.49	0.43
4:R:91:HIS:CD2	4:R:99:ILE:HG22	2.54	0.43
1:A:122:THR:HG22	2:B:128:ARG:HH21	1.84	0.42
2:B:124:HIS:HB3	3:C:124:VAL:HG12	2.02	0.42
2:B:50:LYS:HD3	2:B:50:LYS:HA	1.91	0.42
3:C:149:GLU:HB2	3:C:150:PRO:HD2	2.02	0.42
5:S:87:LEU:HD21	5:S:107:ALA:HB1	2.00	0.42
9:W:98:ARG:O	9:W:126:ILE:HD11	2.20	0.42
5:E:87:LEU:HD21	5:E:107:ALA:HB1	2.00	0.42
4:D:176:LEU:HD22	5:E:55:LEU:CD2	2.50	0.42
11:K:38:ASN:HB2	11:K:39:PRO:CD	2.50	0.42
8:V:218:VAL:CG2	9:W:196:LYS:HB2	2.50	0.42
8:H:196:ARG:NH2	9:I:150:GLU:HG3	2.35	0.42
3:Q:149:GLU:HB2	3:Q:150:PRO:HD2	2.02	0.42
9:I:20:VAL:HG13	9:I:118:PRO:HB3	2.02	0.42
4:R:160:ASN:HB3	4:R:179:TRP:CE2	2.55	0.42
11:K:145:LYS:HB2	11:K:148:LEU:HD13	2.02	0.41
4:D:91:HIS:CD2	4:D:99:ILE:HG22	2.55	0.41
11:Y:38:ASN:HB2	11:Y:39:PRO:CD	2.50	0.41
11:Y:145:LYS:HB2	11:Y:148:LEU:HD13	2.01	0.41
2:B:14:PRO:HA	3:C:20:TYR:CD1	2.55	0.41
4:D:160:ASN:HB3	4:D:179:TRP:CE2	2.55	0.41
5:E:175:LEU:HA	5:E:178:PHE:CE2	2.56	0.41
4:R:91:HIS:HB3	4:R:99:ILE:CG2	2.50	0.41
4:D:91:HIS:HB3	4:D:99:ILE:CG2	2.51	0.41
8:V:35:HIS:CB	8:V:56:THR:HG21	2.51	0.41
2:B:14:PRO:HA	3:C:20:TYR:CE1	2.56	0.41
5:E:77:ALA:N	5:E:78:PRO:CD	2.84	0.41
9:I:98:ARG:O	9:I:126:ILE:HD11	2.20	0.41
5:S:175:LEU:HA	5:S:178:PHE:CE2	2.55	0.41
7:U:78:ILE:N	7:U:79:PRO:CD	2.84	0.41
9:W:20:VAL:HG13	9:W:118:PRO:HB3	2.02	0.41
6:T:117:GLN:NE2	18:T:301:HOH:O	2.54	0.41
8:H:97:TYR:CE2	8:H:114[B]:HIS:CE1	3.07	0.41
13:M:35:ARG:HH12	14:N:114:PRO:HB3	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:P:151:ASN:HB2	2:P:152:PRO:HD2	2.03	0.41
2:P:50:LYS:O	2:P:51:VAL:C	2.59	0.41
5:S:77:ALA:N	5:S:78:PRO:CD	2.84	0.41
7:G:78:ILE:N	7:G:79:PRO:CD	2.84	0.41
13:M:187:ARG:NH1	8:V:139:GLU:OE1	2.53	0.41
7:U:149:ASP:HB2	7:U:150:PRO:CD	2.52	0.40
7:G:149:ASP:HB2	7:G:150:PRO:CD	2.51	0.40
10:X:1:MET:HB3	10:X:34:LYS:HE3	2.04	0.40
2:B:151:ASN:HB2	2:B:152:PRO:HD2	2.03	0.40
9:W:101:PRO:HB3	9:W:126:ILE:HD12	2.04	0.40
10:J:25:ILE:O	10:X:139:TYR:OH	2.39	0.40
10:J:1:MET:HB3	10:J:34:LYS:HE3	2.03	0.40
9:W:36:SER:HB2	10:X:126:VAL:HG11	2.03	0.40

There are no symmetry-related clashes.

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	248/250 (99%)	238 (96%)	9 (4%)	1 (0%)	38	72
1	O	248/250 (99%)	238 (96%)	9 (4%)	1 (0%)	38	72
2	B	242/258 (94%)	233 (96%)	5 (2%)	4 (2%)	11	36
2	P	242/258 (94%)	233 (96%)	5 (2%)	4 (2%)	11	36
3	C	238/254 (94%)	233 (98%)	3 (1%)	2 (1%)	22	57
3	Q	238/254 (94%)	233 (98%)	3 (1%)	2 (1%)	22	57
4	D	231/260 (89%)	227 (98%)	4 (2%)	0	100	100
4	R	231/260 (89%)	228 (99%)	3 (1%)	0	100	100
5	E	229/234 (98%)	223 (97%)	6 (3%)	0	100	100
5	S	229/234 (98%)	223 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
6	F	241/288 (84%)	236 (98%)	5 (2%)	0	100	100
6	T	241/288 (84%)	237 (98%)	4 (2%)	0	100	100
7	G	239/252 (95%)	239 (100%)	0	0	100	100
7	U	239/252 (95%)	239 (100%)	0	0	100	100
8	H	225/232 (97%)	218 (97%)	6 (3%)	1 (0%)	38	72
8	V	224/232 (97%)	218 (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%)	3 (2%)	1 (0%)	32	68
10	X	193/198 (98%)	189 (98%)	3 (2%)	1 (0%)	32	68
11	K	210/212 (99%)	206 (98%)	4 (2%)	0	100	100
11	Y	210/212 (99%)	206 (98%)	4 (2%)	0	100	100
12	L	220/222 (99%)	215 (98%)	5 (2%)	0	100	100
12	Z	220/222 (99%)	215 (98%)	5 (2%)	0	100	100
13	M	231/246 (94%)	224 (97%)	6 (3%)	1 (0%)	38	72
13	a	231/246 (94%)	224 (97%)	6 (3%)	1 (0%)	38	72
14	N	194/196 (99%)	188 (97%)	6 (3%)	0	100	100
14	b	194/196 (99%)	189 (97%)	5 (3%)	0	100	100
15	c	1/4 (25%)	1 (100%)	0	0	100	100
15	d	1/4 (25%)	1 (100%)	0	0	100	100
All	All	6287/6622 (95%)	6133 (98%)	135 (2%)	19 (0%)	44	77

All (19) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	51	VAL
2	B	222	GLY
3	C	202	GLN
2	P	51	VAL
2	P	222	GLY
3	Q	202	GLN
1	A	2	THR
2	B	218	GLY
8	H	115	ALA
1	O	2	THR

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Mol	Chain	Res	Type
2	P	218	GLY
3	C	205	ALA
3	Q	205	ALA
2	B	220	ASN
2	P	220	ASN
10	J	24	GLY
10	X	24	GLY
13	M	229	GLY
13	a	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%)	206 (99%)	3 (1%)	71	91
1	O	209/209 (100%)	206 (99%)	3 (1%)	71	91
2	B	203/216 (94%)	198 (98%)	5 (2%)	53	83
2	P	203/216 (94%)	198 (98%)	5 (2%)	53	83
3	C	212/226 (94%)	202 (95%)	10 (5%)	30	65
3	Q	212/226 (94%)	201 (95%)	11 (5%)	27	61
4	D	194/215 (90%)	184 (95%)	10 (5%)	27	61
4	R	194/215 (90%)	184 (95%)	10 (5%)	27	61
5	E	190/193 (98%)	179 (94%)	11 (6%)	23	56
5	S	190/193 (98%)	179 (94%)	11 (6%)	23	56
6	F	201/239 (84%)	191 (95%)	10 (5%)	28	62
6	T	201/239 (84%)	191 (95%)	10 (5%)	28	62
7	G	206/210 (98%)	196 (95%)	10 (5%)	29	63
7	U	206/210 (98%)	196 (95%)	10 (5%)	29	63
8	H	186/190 (98%)	179 (96%)	7 (4%)	38	73
8	V	185/190 (97%)	179 (97%)	6 (3%)	44	78
9	I	172/173 (99%)	169 (98%)	3 (2%)	66	89

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	W	172/173 (99%)	169 (98%)	3 (2%)	66	89
10	J	173/175 (99%)	168 (97%)	5 (3%)	48	81
10	X	173/175 (99%)	168 (97%)	5 (3%)	48	81
11	K	169/169 (100%)	161 (95%)	8 (5%)	30	65
11	Y	169/169 (100%)	161 (95%)	8 (5%)	30	65
12	L	185/185 (100%)	179 (97%)	6 (3%)	44	78
12	Z	185/185 (100%)	180 (97%)	5 (3%)	50	82
13	M	199/208 (96%)	193 (97%)	6 (3%)	46	80
13	a	199/208 (96%)	193 (97%)	6 (3%)	46	80
14	N	162/162 (100%)	156 (96%)	6 (4%)	39	74
14	b	162/162 (100%)	157 (97%)	5 (3%)	45	79
All	All	5321/5540 (96%)	5123 (96%)	198 (4%)	39	74

All (198) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	122	THR
1	A	157	PHE
1	A	250	LEU
2	B	50	LYS
2	B	79	LEU
2	B	113	ARG
2	B	191	LEU
2	B	238	LEU
3	C	4	ARG
3	C	38	ASN
3	C	51	LYS
3	C	77	ASN
3	C	147	GLN
3	C	160	GLN
3	C	169	VAL
3	C	180	LYS
3	C	206	LYS
3	C	240	GLU
4	D	51	LEU
4	D	99	ILE
4	D	125	LEU
4	D	143	ASP

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Mol	Chain	Res	Type
4	D	176	LEU
4	D	193	LEU
4	D	214	ILE
4	D	235	LEU
4	D	236	LYS
4	D	242	GLU
5	E	9	THR
5	E	29	LYS
5	E	55	LEU
5	E	71	LEU
5	E	99	ASN
5	E	184	ASN
5	E	188	LEU
5	E	202	ASP
5	E	207	VAL
5	E	208	ASP
5	E	231	LYS
6	F	117	GLN
6	F	123	ASN
6	F	139	LYS
6	F	172	LEU
6	F	181	GLU
6	F	201	GLU
6	F	202	ASP
6	F	207	ASP
6	F	214	TRP
6	F	240	GLN
7	G	26	THR
7	G	75	ASN
7	G	83	ASN
7	G	115	LEU
7	G	117	GLN
7	G	122	ARG
7	G	125	MET
7	G	208	GLU
7	G	235	ARG
7	G	236	LEU
8	H	30	ASN
8	H	53	GLU
8	H	55	VAL
8	H	68	LEU
8	H	118	SER

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Mol	Chain	Res	Type
8	H	120	ASP
8	H	196	ARG
9	I	37	ASN
9	I	131	GLU
9	I	171	LEU
10	J	3	ILE
10	J	23	ARG
10	J	35	THR
10	J	90	LYS
10	J	99	GLN
11	K	4	LEU
11	K	9	GLN
11	K	35	ILE
11	K	104	TYR
11	K	107	LYS
11	K	128	CYS
11	K	140	LEU
11	K	148	LEU
12	L	3	ASN
12	L	23	LEU
12	L	31	THR
12	L	49	ASN
12	L	136	CYS
12	L	150	LEU
13	M	2	GLN
13	M	48	ASN
13	M	70	LEU
13	M	104	ARG
13	M	161	ARG
13	M	187	ARG
14	N	9	LYS
14	N	22	THR
14	N	39	ASP
14	N	83	LYS
14	N	104	ASP
14	N	107	LYS
1	O	122	THR
1	O	157	PHE
1	O	250	LEU
2	P	50	LYS
2	P	79	LEU
2	P	113	ARG

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Mol	Chain	Res	Type
2	P	191	LEU
2	P	238	LEU
3	Q	4	ARG
3	Q	38	ASN
3	Q	50	LEU
3	Q	51	LYS
3	Q	77	ASN
3	Q	147	GLN
3	Q	160	GLN
3	Q	169	VAL
3	Q	180	LYS
3	Q	206	LYS
3	Q	240	GLU
4	R	51	LEU
4	R	99	ILE
4	R	125	LEU
4	R	143	ASP
4	R	176	LEU
4	R	193	LEU
4	R	214	ILE
4	R	235	LEU
4	R	236	LYS
4	R	242	GLU
5	S	9	THR
5	S	29	LYS
5	S	55	LEU
5	S	71	LEU
5	S	99	ASN
5	S	184	ASN
5	S	188	LEU
5	S	202	ASP
5	S	207	VAL
5	S	208	ASP
5	S	231	LYS
6	T	117	GLN
6	T	123	ASN
6	T	139	LYS
6	T	172	LEU
6	T	181	GLU
6	T	201	GLU
6	T	202	ASP
6	T	207	ASP

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Mol	Chain	Res	Type
6	T	214	TRP
6	T	240	GLN
7	U	26	THR
7	U	75	ASN
7	U	83	ASN
7	U	115	LEU
7	U	117	GLN
7	U	122	ARG
7	U	125	MET
7	U	208	GLU
7	U	235	ARG
7	U	236	LEU
8	V	30	ASN
8	V	55	VAL
8	V	68	LEU
8	V	84	LYS
8	V	113	ILE
8	V	196	ARG
9	W	37	ASN
9	W	131	GLU
9	W	171	LEU
10	X	3	ILE
10	X	23	ARG
10	X	35	THR
10	X	90	LYS
10	X	99	GLN
11	Y	4	LEU
11	Y	9	GLN
11	Y	35	ILE
11	Y	104	TYR
11	Y	107	LYS
11	Y	128	CYS
11	Y	140	LEU
11	Y	148	LEU
12	Z	3	ASN
12	Z	23	LEU
12	Z	31	THR
12	Z	136	CYS
12	Z	150	LEU
13	a	2	GLN
13	a	48	ASN
13	a	70	LEU

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Mol	Chain	Res	Type
13	a	104	ARG
13	a	161	ARG
13	a	187	ARG
14	b	9	LYS
14	b	39	ASP
14	b	83	LYS
14	b	104	ASP
14	b	107	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (103) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	94	HIS
2	B	20	GLN
2	B	58	GLN
2	B	95	GLN
2	B	119	GLN
2	B	123	GLN
2	B	155	ASN
3	C	17	GLN
3	C	38	ASN
3	C	77	ASN
3	C	116	GLN
3	C	120	GLN
3	C	147	GLN
3	C	160	GLN
4	D	15	GLN
4	D	91	HIS
4	D	100	ASN
4	D	146	GLN
4	D	225	ASN
5	E	68	HIS
5	E	92	ASN
5	E	99	ASN
5	E	116	GLN
5	E	118	ASN
5	E	120	GLN
5	E	184	ASN
6	F	19	GLN
6	F	86	ASN
6	F	117	GLN
6	F	123	ASN

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Mol	Chain	Res	Type
6	F	191	GLN
6	F	240	GLN
7	G	83	ASN
7	G	114	ASN
7	G	117	GLN
7	G	121	GLN
7	G	166	GLN
7	G	167	GLN
8	H	35	HIS
8	H	66	HIS
8	H	165	ASN
9	I	37	ASN
10	J	55	GLN
10	J	146	HIS
11	K	85	ASN
11	K	176	ASN
11	K	208	ASN
12	L	3	ASN
12	L	49	ASN
12	L	70	ASN
13	M	48	ASN
13	M	102	GLN
13	M	179	ASN
13	M	194	ASN
13	M	213	GLN
1	O	94	HIS
2	P	20	GLN
2	P	58	GLN
2	P	95	GLN
2	P	119	GLN
2	P	123	GLN
3	Q	38	ASN
3	Q	77	ASN
3	Q	147	GLN
3	Q	160	GLN
4	R	15	GLN
4	R	91	HIS
4	R	100	ASN
4	R	146	GLN
4	R	210	GLN
4	R	225	ASN
5	S	68	HIS

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Mol	Chain	Res	Type
5	S	92	ASN
5	S	99	ASN
5	S	116	GLN
5	S	120	GLN
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	83	ASN
7	U	114	ASN
7	U	117	GLN
7	U	121	GLN
7	U	166	GLN
7	U	167	GLN
8	V	66	HIS
9	W	37	ASN
10	X	55	GLN
10	X	146	HIS
11	Y	85	ASN
11	Y	176	ASN
11	Y	208	ASN
12	Z	3	ASN
12	Z	49	ASN
12	Z	70	ASN
12	Z	158	ASN
13	a	48	ASN
13	a	102	GLN
13	a	179	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues are modelled in this entry.

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	$\# Z > 2$
15	N7P	c	1	15	9,10,11	3.07	2 (22%)	10,13,15	2.02	3 (30%)
15	ASJ	c	3	15,14	4,7,7	2.25	1 (25%)	3,8,8	0.97	0
15	N7P	d	1	15	9,10,11	3.58	4 (44%)	10,13,15	1.89	3 (30%)
15	ASJ	d	3	15,14	4,7,7	1.92	1 (25%)	3,8,8	1.19	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
15	N7P	c	1	15	-	0/4/16/18	0/1/1/1
15	ASJ	c	3	15,14	-	0/4/6/6	0/0/0/0
15	N7P	d	1	15	-	0/4/16/18	0/1/1/1
15	ASJ	d	3	15,14	-	0/4/6/6	0/0/0/0

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	d	1	N7P	CA-C	-9.44	1.37	1.50
15	c	1	N7P	CA-C	-8.47	1.39	1.50
15	d	1	N7P	CB-CA	-2.66	1.46	1.52
15	d	1	N7P	CD-N	-2.36	1.43	1.47
15	d	1	N7P	CG-CD	-2.34	1.43	1.51
15	c	1	N7P	CG-CD	-2.05	1.44	1.51
15	d	3	ASJ	C-CA	3.33	1.57	1.52
15	c	3	ASJ	C-CA	4.12	1.58	1.52

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	d	1	N7P	CB-CA-C	-3.78	107.50	112.70
15	c	1	N7P	C2-C1-N	-2.26	115.44	117.88
15	c	1	N7P	CB-CG-CD	-2.26	98.86	105.12
15	d	1	N7P	CB-CG-CD	-2.07	99.37	105.12

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
15	d	1	N7P	O1-C1-N	3.26	124.27	120.64
15	c	1	N7P	O1-C1-N	4.61	125.76	120.64

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 9 ligands modelled in this entry, 9 are monoatomic - leaving 0 for Mogul analysis.

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%)	-0.34	9 (3%) 43 37	31, 45, 81, 118	0
1	O	250/250 (100%)	-0.25	4 (1%) 72 70	36, 55, 98, 126	0
2	B	244/258 (94%)	-0.21	10 (4%) 38 32	32, 53, 99, 143	0
2	P	244/258 (94%)	-0.14	9 (3%) 42 37	41, 59, 104, 146	0
3	C	240/254 (94%)	-0.10	12 (5%) 30 25	33, 58, 121, 145	0
3	Q	240/254 (94%)	0.13	15 (6%) 21 16	41, 69, 146, 168	0
4	D	235/260 (90%)	-0.23	6 (2%) 56 51	41, 63, 98, 142	0
4	R	235/260 (90%)	-0.11	4 (1%) 70 68	46, 67, 106, 141	0
5	E	231/234 (98%)	-0.13	6 (2%) 56 51	42, 64, 101, 144	0
5	S	231/234 (98%)	-0.04	9 (3%) 40 35	42, 68, 115, 158	0
6	F	243/288 (84%)	-0.28	6 (2%) 58 53	36, 53, 104, 132	0
6	T	243/288 (84%)	-0.15	7 (2%) 52 46	37, 64, 117, 149	0
7	G	241/252 (95%)	-0.38	2 (0%) 86 85	28, 48, 82, 129	0
7	U	241/252 (95%)	-0.33	2 (0%) 86 85	35, 52, 86, 130	0
8	H	226/232 (97%)	-0.31	7 (3%) 49 43	26, 44, 79, 138	0
8	V	226/232 (97%)	-0.27	7 (3%) 49 43	33, 48, 82, 161	0
9	I	204/205 (99%)	-0.59	1 (0%) 90 90	30, 42, 71, 97	0
9	W	204/205 (99%)	-0.55	2 (0%) 82 81	32, 46, 77, 103	0
10	J	195/198 (98%)	-0.46	3 (1%) 74 72	31, 48, 72, 123	0
10	X	195/198 (98%)	-0.39	2 (1%) 82 81	33, 49, 73, 135	0
11	K	212/212 (100%)	-0.44	0 100 100	29, 48, 71, 93	0
11	Y	212/212 (100%)	-0.51	0 100 100	32, 47, 72, 94	0
12	L	222/222 (100%)	-0.45	2 (0%) 84 83	32, 49, 83, 116	0
12	Z	222/222 (100%)	-0.44	2 (0%) 84 83	30, 47, 76, 110	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
13	M	233/246 (94%)	-0.54	1 (0%) 92 92	28, 45, 68, 88	0
13	a	233/246 (94%)	-0.45	1 (0%) 92 92	28, 44, 66, 84	0
14	N	196/196 (100%)	-0.55	1 (0%) 90 90	27, 39, 68, 95	0
14	b	196/196 (100%)	-0.55	1 (0%) 90 90	28, 41, 69, 104	0
15	c	1/4 (25%)	-0.13	0 100 100	53, 53, 53, 53	0
15	d	1/4 (25%)	-0.47	0 100 100	50, 50, 50, 50	0
All	All	6346/6622 (95%)	-0.32	131 (2%) 64 60	26, 52, 98, 168	0

All (131) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	Q	49	THR	6.8
3	Q	206	LYS	6.3
10	X	1	MET	6.2
10	X	194	ASP	5.8
3	Q	50	LEU	5.6
5	E	202	ASP	5.2
5	S	202	ASP	5.1
3	C	49	THR	5.0
6	T	178	HIS	5.0
8	V	224	GLN	4.8
10	J	1	MET	4.8
8	V	226	GLU	4.8
3	Q	236	GLN	4.6
2	B	218	GLY	4.5
3	Q	239	GLN	4.5
6	F	244	ASN	4.3
3	Q	240	GLU	4.3
9	W	1	SER	4.2
8	V	223	ILE	4.0
12	Z	174	TYR	3.9
8	V	222	ASP	3.9
1	A	1	MET	3.9
2	B	221	ASP	3.9
3	C	206	LYS	3.8
2	P	182	ASP	3.8
2	B	219	ALA	3.8
8	V	221	CYS	3.7
1	A	2	THR	3.7
3	Q	225	GLU	3.7

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Mol	Chain	Res	Type	RSRZ
3	Q	48	SER	3.6
3	C	240	GLU	3.6
2	P	218	GLY	3.5
1	A	248	GLU	3.4
1	O	249	ALA	3.3
2	B	51	VAL	3.3
1	A	249	ALA	3.3
3	Q	55	THR	3.3
2	P	59	ASP	3.3
8	V	225	GLU	3.3
8	V	145	ASP	3.2
2	B	59	ASP	3.2
8	H	221	CYS	3.2
3	C	50	LEU	3.2
6	T	230	ASP	3.1
2	B	220	ASN	3.1
4	R	242	GLU	3.1
12	L	174	TYR	3.1
8	H	224	GLN	3.1
3	C	236	GLN	3.1
3	C	205	ALA	3.0
2	P	51	VAL	3.0
7	G	3	TYR	3.0
2	P	221	ASP	3.0
9	I	1	SER	3.0
8	H	226	GLU	2.9
13	a	1	THR	2.9
3	Q	204	GLY	2.9
4	R	217	GLN	2.8
1	O	1	MET	2.8
6	T	243	ILE	2.8
6	T	241	LYS	2.8
8	H	222	ASP	2.7
3	Q	229	GLN	2.7
6	T	2	THR	2.7
10	J	193	ASP	2.7
7	G	179	LYS	2.6
2	P	220	ASN	2.6
3	Q	202	GLN	2.6
2	B	60	THR	2.6
4	R	241	ALA	2.6
3	C	216	ASP	2.6

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Mol	Chain	Res	Type	RSRZ
5	S	204	SER	2.6
6	F	177	ASP	2.5
1	O	201	GLU	2.5
2	B	217	LYS	2.5
2	P	203	SER	2.5
5	E	123	GLY	2.5
12	Z	167	LYS	2.5
6	T	244	ASN	2.5
1	O	2	THR	2.5
7	U	242	GLN	2.5
4	R	125	LEU	2.5
3	C	225	GLU	2.4
5	E	122	TYR	2.4
3	Q	238	LYS	2.4
8	H	225	GLU	2.4
5	E	233	ILE	2.4
6	F	202	ASP	2.4
3	C	60	SER	2.4
10	J	194	ASP	2.4
9	W	192	ASP	2.4
2	B	242	GLY	2.3
5	S	194	GLU	2.3
3	Q	205	ALA	2.3
14	b	195	GLN	2.3
2	P	240	LYS	2.3
5	S	58	TYR	2.3
3	Q	187	GLU	2.3
5	S	218	ASP	2.3
6	F	205	GLU	2.3
5	S	203	GLU	2.3
7	U	181	LYS	2.2
6	F	181	GLU	2.2
1	A	54	PRO	2.2
6	T	215	CYS	2.2
3	C	181	GLU	2.2
8	H	198	GLU	2.2
8	H	223	ILE	2.2
4	D	224	ASP	2.2
3	C	238	LYS	2.1
4	D	1	ASP	2.1
1	A	229	THR	2.1
14	N	195	GLN	2.1

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Mol	Chain	Res	Type	RSRZ
2	P	232	GLN	2.1
4	D	241	ALA	2.1
1	A	62	SER	2.1
2	B	93	HIS	2.1
6	F	2	THR	2.1
1	A	245	ASP	2.1
5	S	173	ARG	2.1
5	S	207	VAL	2.1
13	M	47	ASP	2.1
4	D	47	THR	2.1
3	C	229	GLN	2.0
5	E	227	GLU	2.0
4	D	242	GLU	2.0
5	S	51	ASN	2.0
12	L	173	LYS	2.0
4	D	230	GLU	2.0
5	E	201	ARG	2.0
1	A	201	GLU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
15	N7P	c	1	10/11	0.95	0.14	-	48,51,55,60	0
15	N7P	d	1	10/11	0.95	0.19	-	40,44,50,55	0
15	ASJ	d	3	8/8	0.96	0.11	-	51,54,55,55	0
15	ASJ	c	3	8/8	0.97	0.11	-	54,57,62,63	0

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
16	MG	I	301	1/1	0.96	0.24	5.28	59,59,59,59	0
16	MG	N	201	1/1	0.95	0.15	1.39	36,36,36,36	0
16	MG	K	301	1/1	0.94	0.15	0.84	43,43,43,43	0
16	MG	Z	301	1/1	0.97	0.12	-1.49	45,45,45,45	0
16	MG	I	302	1/1	0.96	0.07	-1.67	48,48,48,48	0
16	MG	L	301	1/1	0.95	0.07	-1.77	64,64,64,64	0
16	MG	G	301	1/1	0.96	0.08	-1.82	40,40,40,40	0
17	CL	G	302	1/1	0.96	0.21	-	30,30,30,30	0
17	CL	U	301	1/1	0.94	0.27	-	30,30,30,30	0

6.5 Other polymers

There are no such residues in this entry.