



# Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 03:39 am BST

PDB ID : 2F1D  
Title : X-Ray Structure of imidazoglycerol-phosphate dehydratase  
Authors : Rice, D.W.; Glynn, S.E.; Baker, P.J.; Sedelnikova, S.E.; Davies, C.L.; Eadsforth, T.C.  
Deposited on : 2005-11-14  
Resolution : 3.00 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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

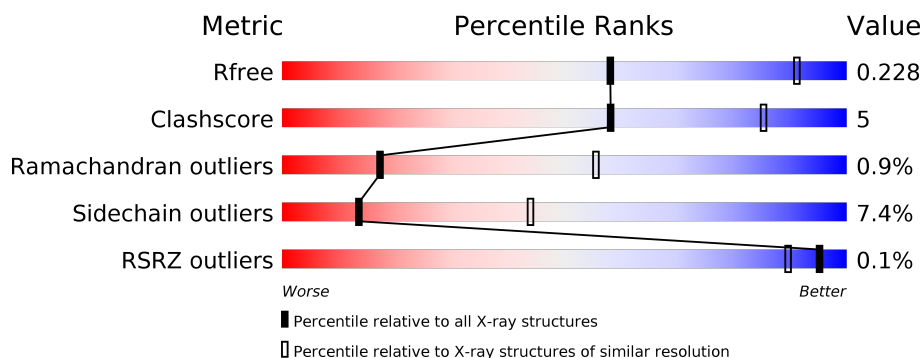
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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))
$R_{free}$	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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  $\geq 3$ , 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	207	
1	B	207	
1	C	207	
1	D	207	
1	E	207	
1	F	207	

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Mol	Chain	Length	Quality of chain
1	G	207	 73%15%12%
1	H	207	 71%15%12%
1	I	207	 71%16%12%
1	J	207	 71%13%12%
1	K	207	 72%14%12%
1	L	207	 72%15%12%
1	M	207	 71%16%12%
1	N	207	 73%15%12%
1	O	207	 67%20%12%
1	P	207	 69%17%12%

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 22288 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 Imidazoleglycerol-phosphate dehydratase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	B	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	C	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	D	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	E	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	F	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	G	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	H	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	I	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	J	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	K	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	L	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	M	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	N	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	O	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			
1	P	183	Total	C	N	O	S	0	0	0
			1386	866	250	268	2			

- Molecule 2 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	P	2	Total	Mn	0	0
			2	2		
2	G	2	Total	Mn	0	0
			2	2		
2	J	2	Total	Mn	0	0
			2	2		
2	D	2	Total	Mn	0	0
			2	2		
2	K	2	Total	Mn	0	0
			2	2		
2	E	2	Total	Mn	0	0
			2	2		
2	H	2	Total	Mn	0	0
			2	2		
2	B	2	Total	Mn	0	0
			2	2		
2	I	2	Total	Mn	0	0
			2	2		
2	C	2	Total	Mn	0	0
			2	2		
2	A	2	Total	Mn	0	0
			2	2		
2	N	2	Total	Mn	0	0
			2	2		
2	O	2	Total	Mn	0	0
			2	2		
2	L	2	Total	Mn	0	0
			2	2		
2	F	2	Total	Mn	0	0
			2	2		
2	M	2	Total	Mn	0	0
			2	2		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	G	1	Total	O	S	0	0
			5	4	1		
3	H	1	Total	O	S	0	0
			5	4	1		
3	I	1	Total	O	S	0	0
			5	4	1		
3	J	1	Total	O	S	0	0
			5	4	1		
3	K	1	Total	O	S	0	0
			5	4	1		
3	L	1	Total	O	S	0	0
			5	4	1		
3	M	1	Total	O	S	0	0
			5	4	1		
3	N	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	O	1	Total	O	S	0	0
			5	4	1		
3	P	1	Total	O	S	0	0
			5	4	1		

### 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.

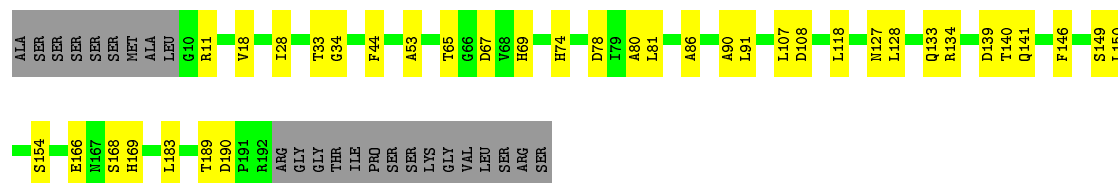
- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain A: 



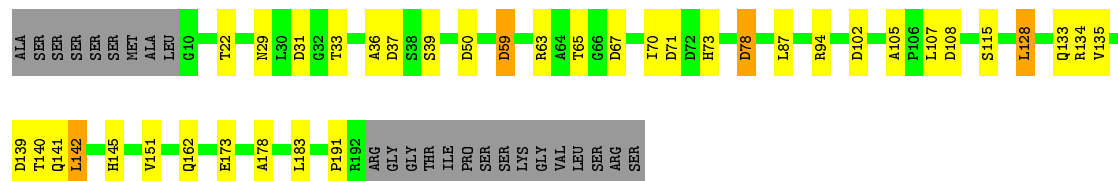
- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain B: 




- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain C: 



- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain D: 





GLY  
THR  
ILE  
SER  
PRO  
SER  
SER  
SER  
LYS  
GLY  
LEU  
VAL  
SER  
SER  
SER

- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain E:  71% 15% 12%

ALA  
SER  
SER  
SER  
SER  
SER  
SER  
MET  
ALA  
LEU  
G10  
T33  
D87  
F44  
H61  
V62  
R63  
A64  
T85  
G66  
D67  
V68  
H69  
D72  
D78  
I79  
A80  
A105  
P106  
L107  
D108  
V114  
D117  
P122  
L128  
Q133  
R134  
V135  
D139  
T140  
Q141  
L142  
F146  
M156  
Q162

H169  
A174  
A178  
F179  
L183  
P191  
R192  
ARG  
GLY  
THR  
ILE  
PRO  
SER  
SER  
LYS  
GLY  
VAL  
LEU  
SER  
ARG  
SER

- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain F:  72% 14% 12%

ALA  
SER  
SER  
SER  
SER  
SER  
SER  
MET  
ALA  
LEU  
G10  
V18  
N23  
D31  
G32  
T33  
F44  
H47  
Q51  
D59  
R63  
A64  
T65  
G65  
D67  
H73  
D78  
R94  
N98  
D108  
V114  
M127  
L128  
Q133  
R134  
D139  
T140  
Q141  
L142  
H145  
L150

S154  
T160  
S168  
H169  
F179  
L183  
D190  
R191  
R192  
ARG  
GLY  
THR  
ILE  
PRO  
SER  
SER  
LYS  
GLY  
VAL  
LEU  
SER  
ARG  
SER

- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain G:  73% 15% 12%

ALA  
SER  
SER  
SER  
SER  
SER  
SER  
MET  
ALA  
LEU  
G10  
L30  
D31  
G32  
T33  
A36  
D37  
H47  
D50  
D59  
R63  
D67  
V68  
H69  
D72  
H73  
D78  
L81  
R99  
D108  
L116  
D117  
L118  
Q133  
R134  
V135  
D139  
T140  
Q141  
L142  
H145  
S149  
S168

L183  
T187  
R192  
ARG  
GLY  
THR  
ILE  
PRO  
SER  
SER  
LYS  
GLY  
VAL  
LEU  
SER  
ARG  
SER

- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain H:  71% 15% 12%

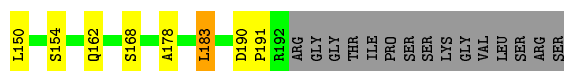
ALA  
SER  
SER  
SER  
SER  
SER  
SER  
MET  
ALA  
LEU  
G10  
E21  
S25  
N29  
T33  
D37  
F44  
D59  
V60  
H61  
R63  
D67  
V68  
H69  
I70  
D78  
D102  
L107  
D108  
V114  
S115  
L116  
L128  
Q133  
R134  
D139  
T140  
Q141  
L142  
L150  
S154  
S168

H169  
A174  
F179  
A180  
R181  
A182  
L183  
D190  
P191  
R192  
ARG  
GLY  
THR  
ILE  
PRO  
SER  
SER  
LYS  
GLY  
VAL  
LEU  
SER  
ARG  
SER

- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

Chain I:  71% 16% 12%

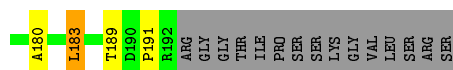
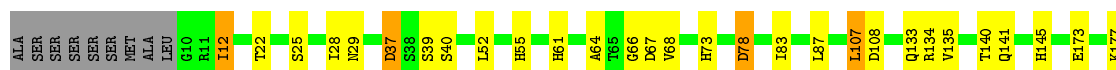
ALA  
SER  
SER  
SER  
SER  
SER  
SER  
MET  
ALA  
LEU  
G10  
N29  
T33  
D37  
S40  
D46  
F58  
D59  
R63  
A64  
T65  
G66  
D67  
H73  
L81  
N98  
R99  
A105  
P106  
L107  
D108  
D117  
Y123  
L128  
Q133  
R134  
V135  
D139  
T140  
Q141  
L142  
H145  
S149



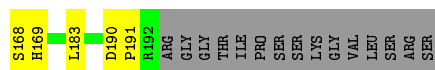
- Molecule 1: Imidazoglycerol-phosphate dehydratase 1



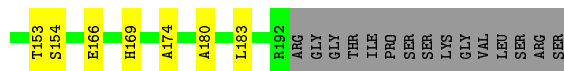
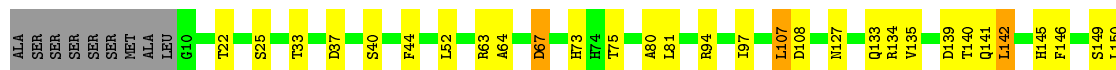
- Molecule 1: Imidazoglycerol-phosphate dehydratase 1



- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

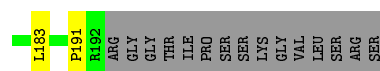


- Molecule 1: Imidazoglycerol-phosphate dehydratase 1



- Molecule 1: Imidazoglycerol-phosphate dehydratase 1

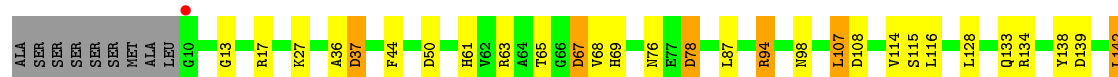




- Molecule 1: Imidazoglycerol-phosphate dehydratase 1



- Molecule 1: Imidazoglycerol-phosphate dehydratase 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	157.95Å 157.95Å 479.96Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	20.00 – 3.00 20.00 – 3.00	Depositor EDS
% Data completeness (in resolution range)	98.3 (20.00-3.00) 98.3 (20.00-3.00)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.07 (at 2.98Å)	Xtriage
Refinement program	REFMAC 5.1.24	Depositor
R, $R_{free}$	0.240 , 0.286 0.228 , 0.228	Depositor DCC
$R_{free}$ test set	4414 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	37.1	Xtriage
Anisotropy	0.010	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , -0.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.034 for -h-k,k,-l	Xtriage
$F_o, F_c$ correlation	0.88	EDS
Total number of atoms	22288	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	17.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 18.80% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: MN, 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	0.50	0/1412	0.85	5/1921 (0.3%)
1	B	0.48	0/1412	0.82	3/1921 (0.2%)
1	C	0.52	0/1412	0.85	6/1921 (0.3%)
1	D	0.50	0/1412	0.83	3/1921 (0.2%)
1	E	0.52	0/1412	0.85	4/1921 (0.2%)
1	F	0.47	0/1412	0.84	5/1921 (0.3%)
1	G	0.50	0/1412	0.84	7/1921 (0.4%)
1	H	0.53	0/1412	0.85	4/1921 (0.2%)
1	I	0.51	0/1412	0.83	3/1921 (0.2%)
1	J	0.48	0/1412	0.84	9/1921 (0.5%)
1	K	0.51	0/1412	0.83	3/1921 (0.2%)
1	L	0.50	0/1412	0.82	5/1921 (0.3%)
1	M	0.50	0/1412	0.82	2/1921 (0.1%)
1	N	0.49	0/1412	0.83	2/1921 (0.1%)
1	O	0.53	0/1412	0.84	5/1921 (0.3%)
1	P	0.49	0/1412	0.82	3/1921 (0.2%)
All	All	0.50	0/22592	0.84	69/30736 (0.2%)

There are no bond length outliers.

All (69) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	108	ASP	CB-CG-OD2	7.66	125.19	118.30
1	O	108	ASP	CB-CG-OD2	7.59	125.13	118.30
1	B	108	ASP	CB-CG-OD2	7.57	125.11	118.30
1	I	108	ASP	CB-CG-OD2	7.48	125.03	118.30
1	E	78	ASP	CB-CG-OD2	7.32	124.89	118.30
1	H	37	ASP	CB-CG-OD2	7.22	124.80	118.30
1	I	37	ASP	CB-CG-OD2	7.17	124.76	118.30
1	J	108	ASP	CB-CG-OD2	7.04	124.63	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	67	ASP	CB-CG-OD2	7.02	124.61	118.30
1	D	108	ASP	CB-CG-OD2	7.01	124.61	118.30
1	N	78	ASP	CB-CG-OD2	6.97	124.57	118.30
1	G	139	ASP	CB-CG-OD2	6.83	124.44	118.30
1	D	78	ASP	CB-CG-OD2	6.80	124.42	118.30
1	A	78	ASP	CB-CG-OD2	6.72	124.34	118.30
1	L	102	ASP	CB-CG-OD2	6.61	124.25	118.30
1	O	78	ASP	CB-CG-OD2	6.59	124.23	118.30
1	J	102	ASP	CB-CG-OD2	6.53	124.18	118.30
1	L	37	ASP	CB-CG-OD2	6.41	124.07	118.30
1	B	78	ASP	CB-CG-OD2	6.38	124.04	118.30
1	P	78	ASP	CB-CG-OD2	6.36	124.03	118.30
1	H	102	ASP	CB-CG-OD2	6.34	124.01	118.30
1	E	108	ASP	CB-CG-OD2	6.22	123.89	118.30
1	M	108	ASP	CB-CG-OD2	6.18	123.86	118.30
1	A	108	ASP	CB-CG-OD2	6.18	123.86	118.30
1	A	72	ASP	CB-CG-OD2	6.14	123.83	118.30
1	P	108	ASP	CB-CG-OD2	6.12	123.81	118.30
1	J	31	ASP	CB-CG-OD2	6.08	123.78	118.30
1	F	108	ASP	CB-CG-OD2	6.07	123.77	118.30
1	P	37	ASP	CB-CG-OD2	6.04	123.74	118.30
1	O	102	ASP	CB-CG-OD2	6.02	123.72	118.30
1	C	78	ASP	CB-CG-OD2	6.01	123.71	118.30
1	H	78	ASP	CB-CG-OD2	5.89	123.61	118.30
1	J	139	ASP	CB-CG-OD2	5.87	123.59	118.30
1	C	31	ASP	CB-CG-OD2	5.79	123.51	118.30
1	G	37	ASP	CB-CG-OD2	5.74	123.47	118.30
1	O	190	ASP	CB-CG-OD2	5.73	123.46	118.30
1	D	102	ASP	CB-CG-OD2	5.73	123.45	118.30
1	F	59	ASP	CB-CG-OD2	5.70	123.43	118.30
1	K	37	ASP	CB-CG-OD2	5.63	123.36	118.30
1	G	78	ASP	CB-CG-OD2	5.63	123.36	118.30
1	G	108	ASP	CB-CG-OD2	5.62	123.35	118.30
1	M	37	ASP	CB-CG-OD2	5.60	123.34	118.30
1	A	37	ASP	CB-CG-OD2	5.59	123.33	118.30
1	C	59	ASP	CB-CG-OD2	5.51	123.26	118.30
1	I	117	ASP	CB-CG-OD2	5.51	123.26	118.30
1	K	108	ASP	CB-CG-OD2	5.49	123.24	118.30
1	G	31	ASP	CB-CG-OD2	5.46	123.22	118.30
1	L	108	ASP	CB-CG-OD2	5.46	123.21	118.30
1	C	37	ASP	CB-CG-OD2	5.43	123.19	118.30
1	B	139	ASP	CB-CG-OD2	5.42	123.18	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	72	ASP	CB-CG-OD2	5.42	123.17	118.30
1	J	190	ASP	CB-CG-OD2	5.40	123.16	118.30
1	J	72	ASP	CB-CG-OD2	5.40	123.16	118.30
1	N	108	ASP	CB-CG-OD2	5.38	123.14	118.30
1	J	78	ASP	CB-CG-OD2	5.34	123.10	118.30
1	C	102	ASP	CB-CG-OD2	5.30	123.07	118.30
1	E	117	ASP	CB-CG-OD2	5.30	123.07	118.30
1	J	59	ASP	CB-CG-OD2	5.30	123.07	118.30
1	K	78	ASP	CB-CG-OD2	5.26	123.04	118.30
1	G	72	ASP	CB-CG-OD2	5.26	123.03	118.30
1	F	78	ASP	CB-CG-OD2	5.21	122.99	118.30
1	L	78	ASP	CB-CG-OD2	5.21	122.99	118.30
1	L	190	ASP	CB-CG-OD2	5.20	122.98	118.30
1	J	117	ASP	CB-CG-OD2	5.17	122.96	118.30
1	A	139	ASP	CB-CG-OD2	5.17	122.95	118.30
1	F	31	ASP	CB-CG-OD2	5.14	122.93	118.30
1	G	59	ASP	CB-CG-OD2	5.09	122.88	118.30
1	H	108	ASP	CB-CG-OD2	5.06	122.86	118.30
1	O	31	ASP	CB-CG-OD2	5.01	122.81	118.30

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	1386	0	1330	13	0
1	B	1386	0	1330	15	0
1	C	1386	0	1330	14	0
1	D	1386	0	1330	10	0
1	E	1386	0	1330	14	0
1	F	1386	0	1330	15	0
1	G	1386	0	1330	13	0
1	H	1386	0	1330	14	0
1	I	1386	0	1330	17	0
1	J	1386	0	1330	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	K	1386	0	1330	14	0
1	L	1386	0	1330	13	0
1	M	1386	0	1330	15	0
1	N	1386	0	1330	14	0
1	O	1386	0	1330	19	0
1	P	1386	0	1330	19	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
2	G	2	0	0	0	0
2	H	2	0	0	0	0
2	I	2	0	0	0	0
2	J	2	0	0	0	0
2	K	2	0	0	0	0
2	L	2	0	0	0	0
2	M	2	0	0	0	0
2	N	2	0	0	0	0
2	O	2	0	0	0	0
2	P	2	0	0	0	0
3	A	5	0	0	0	0
3	B	5	0	0	0	0
3	C	5	0	0	0	0
3	D	5	0	0	0	0
3	E	5	0	0	0	0
3	F	5	0	0	0	0
3	G	5	0	0	0	0
3	H	5	0	0	0	0
3	I	5	0	0	0	0
3	J	5	0	0	0	0
3	K	5	0	0	0	0
3	L	5	0	0	0	0
3	M	5	0	0	0	0
3	N	5	0	0	0	0
3	O	5	0	0	0	0
3	P	5	0	0	0	0
All	All	22288	0	21280	208	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 5.



All (208) 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:141:GLN:HE22	1:F:168:SER:H	1.25	0.84
1:K:141:GLN:HE22	1:N:168:SER:H	1.33	0.73
1:I:168:SER:H	1:J:141:GLN:HE22	1.35	0.72
1:M:141:GLN:HE22	1:P:168:SER:H	1.36	0.72
1:H:150:LEU:O	1:H:154:SER:HB3	1.91	0.70
1:P:150:LEU:O	1:P:154:SER:HB2	1.92	0.69
1:M:139:ASP:HB3	1:M:142:LEU:HD22	1.75	0.69
1:B:168:SER:H	1:G:141:GLN:HE22	1.40	0.68
1:E:37:ASP:OD1	1:E:61:HIS:HD2	1.77	0.68
1:P:36:ALA:HB1	1:P:50:ASP:OD1	1.93	0.68
1:M:94:ARG:HB3	1:M:97:ILE:HD11	1.78	0.66
1:L:44:PHE:HE1	1:L:169:HIS:HD1	1.44	0.65
1:L:141:GLN:HE22	1:O:168:SER:H	1.45	0.64
1:B:133:GLN:H	1:G:133:GLN:HE22	1.46	0.64
1:J:67:ASP:HB3	1:J:70:ILE:HD12	1.79	0.64
1:D:141:GLN:HE22	1:G:168:SER:H	1.46	0.64
1:P:139:ASP:HB3	1:P:142:LEU:HD22	1.79	0.63
1:E:141:GLN:HE22	1:H:168:SER:H	1.47	0.63
1:D:133:GLN:HE22	1:G:133:GLN:H	1.47	0.62
1:O:70:ILE:HG22	1:O:71:ASP:HB2	1.82	0.62
1:P:147:PHE:O	1:P:151:VAL:HG23	2.00	0.61
1:J:168:SER:H	1:O:141:GLN:HE22	1.49	0.60
1:A:44:PHE:HE1	1:A:169:HIS:HD1	1.49	0.60
1:C:133:GLN:HE22	1:F:133:GLN:H	1.50	0.60
1:L:139:ASP:HB3	1:L:142:LEU:HD22	1.84	0.59
1:I:141:GLN:HE22	1:L:168:SER:H	1.48	0.59
1:F:18:VAL:HG22	1:F:23:ASN:ND2	2.18	0.59
1:E:105:ALA:HB3	1:E:178:ALA:HB2	1.84	0.59
1:E:133:GLN:HE22	1:H:133:GLN:H	1.51	0.59
1:I:150:LEU:O	1:I:154:SER:HB2	2.03	0.58
1:L:13:GLY:O	1:L:27:LYS:HA	2.03	0.58
1:M:40:SER:HA	1:M:64:ALA:HB3	1.86	0.58
1:P:114:VAL:HG11	1:P:179:PHE:HA	1.86	0.56
1:I:29:ASN:HB3	1:I:59:ASP:HB2	1.87	0.56
1:F:139:ASP:HB3	1:F:142:LEU:HD22	1.88	0.56
1:B:44:PHE:HE1	1:B:169:HIS:HD1	1.53	0.55
1:K:107:LEU:HD23	1:K:173:GLU:HB3	1.89	0.55
1:E:44:PHE:HE1	1:E:169:HIS:HD1	1.55	0.55
1:A:139:ASP:HB3	1:A:142:LEU:HD22	1.89	0.55
1:I:81:LEU:HG	1:I:149:SER:HB3	1.88	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:73:HIS:CE1	1:O:145:HIS:CD2	2.95	0.55
1:J:133:GLN:H	1:O:133:GLN:HE22	1.54	0.54
1:A:150:LEU:O	1:A:154:SER:HB2	2.06	0.54
1:D:36:ALA:HB1	1:D:50:ASP:OD1	2.06	0.54
1:K:87:LEU:HD21	1:K:183:LEU:HD11	1.89	0.54
1:O:114:VAL:HG11	1:O:179:PHE:HA	1.89	0.54
1:N:67:ASP:O	1:N:69:HIS:N	2.41	0.54
1:I:73:HIS:CE1	1:I:145:HIS:CD2	2.96	0.54
1:K:73:HIS:CE1	1:K:145:HIS:CD2	2.95	0.54
1:B:34:GLY:HA2	1:B:53:ALA:O	2.08	0.53
1:I:128:LEU:HD12	1:I:162:GLN:HB2	1.90	0.53
1:K:133:GLN:HE22	1:N:133:GLN:H	1.54	0.53
1:P:67:ASP:O	1:P:69:HIS:N	2.41	0.53
1:C:141:GLN:HE22	1:F:168:SER:N	1.99	0.53
1:K:12:ILE:HD11	1:K:29:ASN:HD22	1.74	0.53
1:L:67:ASP:CB	1:L:70:ILE:HD12	2.39	0.53
1:E:80:ALA:HB2	1:E:146:PHE:CD1	2.44	0.52
1:M:133:GLN:HE22	1:P:133:GLN:H	1.55	0.52
1:H:21:GLU:HB3	1:H:67:ASP:OD2	2.09	0.52
1:B:28:ILE:HD12	1:B:86:ALA:HB3	1.92	0.52
1:G:30:LEU:HD22	1:G:187:THR:HG21	1.90	0.52
1:K:28:ILE:HD11	1:K:83:ILE:HG23	1.92	0.52
1:C:139:ASP:HB3	1:C:142:LEU:HD22	1.90	0.52
1:A:52:LEU:HD12	1:A:180:ALA:HB2	1.92	0.51
1:N:70:ILE:HG22	1:N:71:ASP:HB2	1.91	0.51
1:P:44:PHE:HE1	1:P:169:HIS:HD1	1.59	0.51
1:G:73:HIS:CE1	1:G:145:HIS:CD2	2.99	0.51
1:M:81:LEU:HD22	1:M:153:THR:HG23	1.92	0.51
1:F:98:ASN:OD1	1:F:190:ASP:HB2	2.10	0.51
1:O:150:LEU:O	1:O:154:SER:HB2	2.10	0.51
1:H:37:ASP:OD1	1:H:61:HIS:HD2	1.94	0.51
1:I:73:HIS:CE1	1:I:145:HIS:HD2	2.28	0.51
1:F:128:LEU:HD13	1:F:160:ILE:HG22	1.93	0.50
1:N:21:GLU:HB3	1:N:67:ASP:OD2	2.12	0.50
1:A:168:SER:H	1:B:141:GLN:HE22	1.58	0.49
1:I:133:GLN:HE22	1:L:133:GLN:H	1.58	0.49
1:B:80:ALA:HB2	1:B:146:PHE:CD1	2.47	0.49
1:N:73:HIS:CE1	1:N:145:HIS:HD2	2.29	0.49
1:P:116:LEU:HA	1:P:157:THR:O	2.13	0.49
1:A:44:PHE:HE1	1:A:169:HIS:ND1	2.11	0.49
1:H:44:PHE:HE1	1:H:169:HIS:HD1	1.61	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:44:PHE:HE1	1:O:169:HIS:HD1	1.61	0.48
1:C:70:ILE:HG22	1:C:71:ASP:HB2	1.94	0.48
1:C:105:ALA:HB3	1:C:178:ALA:HB2	1.95	0.48
1:C:141:GLN:NE2	1:F:168:SER:H	2.02	0.48
1:N:67:ASP:O	1:N:68:VAL:C	2.52	0.48
1:H:29:ASN:HB3	1:H:59:ASP:HB2	1.95	0.48
1:O:128:LEU:HD12	1:O:162:GLN:HB2	1.96	0.48
1:G:73:HIS:CE1	1:G:145:HIS:HD2	2.32	0.47
1:D:70:ILE:HG22	1:D:71:ASP:HB2	1.96	0.47
1:D:139:ASP:HB3	1:D:142:LEU:HD22	1.97	0.47
1:P:17:ARG:NH1	1:P:78:ASP:OD1	2.48	0.47
1:A:133:GLN:HE22	1:D:133:GLN:H	1.61	0.47
1:C:29:ASN:HB3	1:C:59:ASP:HB2	1.97	0.47
1:E:114:VAL:HG11	1:E:179:PHE:HA	1.96	0.47
1:A:70:ILE:HG22	1:A:71:ASP:HB2	1.96	0.47
1:D:44:PHE:HE1	1:D:169:HIS:HD1	1.61	0.47
1:H:67:ASP:HB3	1:H:70:ILE:HD12	1.96	0.47
1:K:55:HIS:CE1	1:K:177:LYS:HG2	2.50	0.47
1:J:102:ASP:OD1	1:J:113:HIS:NE2	2.45	0.47
1:N:150:LEU:O	1:N:154:SER:HB2	2.14	0.47
1:N:73:HIS:CE1	1:N:145:HIS:CD2	3.03	0.47
1:F:150:LEU:O	1:F:154:SER:HB2	2.14	0.47
1:L:70:ILE:HG22	1:L:71:ASP:HB2	1.97	0.47
1:C:107:LEU:HD23	1:C:173:GLU:HB3	1.97	0.46
1:M:150:LEU:O	1:M:154:SER:HB3	2.15	0.46
1:H:190:ASP:O	1:H:192:ARG:N	2.48	0.46
1:F:73:HIS:CE1	1:F:145:HIS:HD2	2.33	0.46
1:H:139:ASP:HB3	1:H:142:LEU:HD22	1.96	0.46
1:D:58:PHE:CZ	1:D:183:LEU:HD13	2.51	0.46
1:F:114:VAL:HG11	1:F:179:PHE:HA	1.98	0.46
1:F:18:VAL:CG2	1:F:23:ASN:ND2	2.78	0.46
1:O:128:LEU:HD13	1:O:160:ILE:HG22	1.98	0.45
1:P:128:LEU:HD12	1:P:162:GLN:HB2	1.99	0.45
1:P:13:GLY:O	1:P:27:LYS:HA	2.15	0.45
1:G:81:LEU:HG	1:G:149:SER:HB3	1.98	0.45
1:P:98:ASN:OD1	1:P:190:ASP:HB2	2.15	0.45
1:J:51:GLN:OE1	1:J:177:LYS:HE2	2.17	0.45
1:J:190:ASP:OD1	1:J:190:ASP:C	2.55	0.45
1:L:133:GLN:HE22	1:O:133:GLN:H	1.64	0.45
1:M:44:PHE:HE1	1:M:169:HIS:ND1	2.15	0.45
1:B:150:LEU:O	1:B:154:SER:CB	2.64	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:37:ASP:OD1	1:K:61:HIS:HD2	2.00	0.45
1:N:102:ASP:OD1	1:N:113:HIS:NE2	2.38	0.45
1:N:47:HIS:O	1:N:51:GLN:HG2	2.17	0.45
1:O:128:LEU:HG	1:O:162:GLN:HE21	1.80	0.45
1:M:73:HIS:CE1	1:M:145:HIS:CD2	3.05	0.45
1:O:116:LEU:HA	1:O:157:THR:O	2.17	0.45
1:E:139:ASP:HB3	1:E:142:LEU:HD22	1.99	0.44
1:H:116:LEU:C	1:H:116:LEU:HD12	2.38	0.44
1:J:73:HIS:CE1	1:J:145:HIS:CD2	3.05	0.44
1:B:190:ASP:C	1:B:190:ASP:OD1	2.55	0.44
1:C:36:ALA:HB1	1:C:50:ASP:OD1	2.18	0.44
1:D:128:LEU:HD13	1:D:160:ILE:HG22	1.99	0.44
1:O:105:ALA:HB3	1:O:178:ALA:HB2	1.99	0.44
1:I:139:ASP:HB3	1:I:142:LEU:HD22	2.00	0.44
1:P:37:ASP:OD1	1:P:61:HIS:HD2	2.01	0.44
1:J:18:VAL:HG13	1:J:23:ASN:HD22	1.82	0.44
1:J:98:ASN:O	1:J:99:ARG:HB2	2.17	0.44
1:I:58:PHE:CZ	1:I:183:LEU:HD13	2.53	0.44
1:E:128:LEU:HA	1:E:162:GLN:HE21	1.83	0.44
1:L:73:HIS:CE1	1:L:145:HIS:HD2	2.36	0.44
1:E:122:PRO:HA	1:E:156:MET:O	2.18	0.43
1:J:33:THR:O	1:J:33:THR:OG1	2.36	0.43
1:O:129:GLU:H	1:O:162:GLN:NE2	2.16	0.43
1:H:67:ASP:O	1:H:69:HIS:N	2.51	0.43
1:L:73:HIS:CE1	1:L:145:HIS:CD2	3.06	0.43
1:E:107:LEU:HB3	1:E:174:ALA:HB2	2.00	0.43
1:M:52:LEU:HD12	1:M:180:ALA:HB2	1.99	0.43
1:G:36:ALA:HB1	1:G:50:ASP:OD1	2.19	0.43
1:J:73:HIS:CE1	1:J:145:HIS:HD2	2.36	0.43
1:O:183:LEU:HD23	1:O:183:LEU:HA	1.91	0.43
1:C:22:THR:OG1	1:C:78:ASP:OD2	2.36	0.43
1:L:74:HIS:CE1	1:O:47:HIS:CE1	3.07	0.43
1:C:73:HIS:CE1	1:C:145:HIS:HD2	2.37	0.43
1:H:114:VAL:HG11	1:H:179:PHE:HA	2.00	0.43
1:B:81:LEU:HG	1:B:149:SER:HB3	2.00	0.42
1:K:52:LEU:HD12	1:K:180:ALA:HB2	2.01	0.42
1:J:107:LEU:HD23	1:J:173:GLU:HB3	2.00	0.42
1:O:67:ASP:HB3	1:O:70:ILE:HD12	2.00	0.42
1:C:128:LEU:HA	1:C:162:GLN:HE21	1.85	0.42
1:H:107:LEU:HB3	1:H:174:ALA:HB2	2.01	0.42
1:K:40:SER:HA	1:K:64:ALA:HB3	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:44:PHE:HE1	1:F:169:HIS:HD1	1.66	0.42
1:M:80:ALA:HB2	1:M:146:PHE:CD1	2.54	0.42
1:M:81:LEU:HD23	1:M:149:SER:O	2.20	0.42
1:O:126:TYR:CE2	1:O:144:GLU:HB2	2.55	0.42
1:A:183:LEU:O	1:A:187:THR:HG23	2.19	0.42
1:B:67:ASP:O	1:B:69:HIS:N	2.52	0.42
1:J:139:ASP:HB3	1:J:142:LEU:HD22	2.01	0.42
1:M:22:THR:HG21	1:M:75:THR:HA	2.00	0.42
1:A:80:ALA:HB2	1:A:146:PHE:CD1	2.55	0.42
1:J:68:VAL:HG13	1:J:72:ASP:OD1	2.20	0.42
1:N:150:LEU:O	1:N:154:SER:CB	2.68	0.42
1:B:150:LEU:O	1:B:154:SER:HB3	2.19	0.42
1:E:44:PHE:HE1	1:E:169:HIS:ND1	2.16	0.42
1:I:98:ASN:OD1	1:I:190:ASP:HB2	2.20	0.42
1:K:22:THR:OG1	1:K:78:ASP:OD2	2.31	0.42
1:P:87:LEU:HD12	1:P:87:LEU:HA	1.91	0.42
1:E:107:LEU:CB	1:E:174:ALA:HB2	2.50	0.41
1:L:47:HIS:O	1:L:51:GLN:HG2	2.19	0.41
1:P:107:LEU:HB3	1:P:174:ALA:HB2	2.02	0.41
1:I:123:TYR:CD2	1:I:123:TYR:C	2.94	0.41
1:M:107:LEU:HB3	1:M:174:ALA:HB2	2.02	0.41
1:D:74:HIS:CE1	1:G:47:HIS:CE1	3.09	0.41
1:G:116:LEU:C	1:G:116:LEU:HD12	2.41	0.41
1:I:98:ASN:O	1:I:99:ARG:CB	2.68	0.41
1:N:114:VAL:HG11	1:N:179:PHE:HA	2.02	0.41
1:F:145:HIS:ND1	1:F:145:HIS:O	2.53	0.41
1:N:52:LEU:HA	1:N:180:ALA:HB2	2.02	0.41
1:A:47:HIS:CE1	1:B:74:HIS:HE1	2.38	0.41
1:I:40:SER:OG	1:I:46:ASP:OD1	2.23	0.41
1:K:66:GLY:O	1:K:68:VAL:N	2.47	0.41
1:B:91:LEU:HD11	1:B:118:LEU:HD13	2.02	0.41
1:C:87:LEU:HA	1:C:87:LEU:HD12	1.88	0.41
1:F:47:HIS:O	1:F:51:GLN:HG2	2.20	0.41
1:P:133:GLN:HE21	1:P:133:GLN:HB3	1.74	0.41
1:G:118:LEU:HD23	1:G:118:LEU:HA	1.92	0.41
1:E:67:ASP:O	1:E:69:HIS:N	2.54	0.41
1:A:67:ASP:HB3	1:A:70:ILE:HD12	2.03	0.40
1:B:11:ARG:HB3	1:B:90:ALA:O	2.21	0.40
1:I:105:ALA:HB3	1:I:178:ALA:HB2	2.03	0.40
1:P:76:ASN:ND2	1:P:138:TYR:OH	2.54	0.40
1:K:66:GLY:C	1:K:68:VAL:H	2.23	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:139:ASP:O	1:I:142:LEU:HB2	2.21	0.40
1:A:150:LEU:O	1:A:154:SER:CB	2.70	0.40
1:G:67:ASP:O	1:G:69:HIS:N	2.55	0.40
1:M:73:HIS:CE1	1:M:145:HIS:HD2	2.40	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	181/207 (87%)	170 (94%)	10 (6%)	1 (1%)	25	64
1	B	181/207 (87%)	167 (92%)	14 (8%)	0	100	100
1	C	181/207 (87%)	170 (94%)	10 (6%)	1 (1%)	25	64
1	D	181/207 (87%)	167 (92%)	13 (7%)	1 (1%)	25	64
1	E	181/207 (87%)	168 (93%)	10 (6%)	3 (2%)	9	39
1	F	181/207 (87%)	168 (93%)	12 (7%)	1 (1%)	25	64
1	G	181/207 (87%)	168 (93%)	10 (6%)	3 (2%)	9	39
1	H	181/207 (87%)	164 (91%)	15 (8%)	2 (1%)	14	50
1	I	181/207 (87%)	169 (93%)	10 (6%)	2 (1%)	14	50
1	J	181/207 (87%)	166 (92%)	12 (7%)	3 (2%)	9	39
1	K	181/207 (87%)	168 (93%)	11 (6%)	2 (1%)	14	50
1	L	181/207 (87%)	168 (93%)	12 (7%)	1 (1%)	25	64
1	M	181/207 (87%)	169 (93%)	11 (6%)	1 (1%)	25	64
1	N	181/207 (87%)	167 (92%)	12 (7%)	2 (1%)	14	50
1	O	181/207 (87%)	163 (90%)	17 (9%)	1 (1%)	25	64
1	P	181/207 (87%)	167 (92%)	12 (7%)	2 (1%)	14	50

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	2896/3312 (87%)	2679 (92%)	191 (7%)	26 (1%)	17 55

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	K	67	ASP
1	N	68	VAL
1	E	67	ASP
1	G	67	ASP
1	P	68	VAL
1	A	67	ASP
1	D	99	ARG
1	G	99	ARG
1	H	191	PRO
1	I	99	ARG
1	J	67	ASP
1	K	191	PRO
1	M	67	ASP
1	P	94	ARG
1	E	191	PRO
1	F	67	ASP
1	I	191	PRO
1	J	99	ARG
1	J	191	PRO
1	L	191	PRO
1	G	68	VAL
1	C	191	PRO
1	O	191	PRO
1	E	68	VAL
1	H	68	VAL
1	N	191	PRO

### 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	145/171 (85%)	133 (92%)	12 (8%)	11	39
1	B	145/171 (85%)	134 (92%)	11 (8%)	13	43
1	C	145/171 (85%)	131 (90%)	14 (10%)	8	31
1	D	145/171 (85%)	135 (93%)	10 (7%)	15	48
1	E	145/171 (85%)	136 (94%)	9 (6%)	18	52
1	F	145/171 (85%)	133 (92%)	12 (8%)	11	39
1	G	145/171 (85%)	138 (95%)	7 (5%)	25	62
1	H	145/171 (85%)	134 (92%)	11 (8%)	13	43
1	I	145/171 (85%)	137 (94%)	8 (6%)	21	57
1	J	145/171 (85%)	135 (93%)	10 (7%)	15	48
1	K	145/171 (85%)	136 (94%)	9 (6%)	18	52
1	L	145/171 (85%)	132 (91%)	13 (9%)	9	35
1	M	145/171 (85%)	133 (92%)	12 (8%)	11	39
1	N	145/171 (85%)	136 (94%)	9 (6%)	18	52
1	O	145/171 (85%)	130 (90%)	15 (10%)	7	28
1	P	145/171 (85%)	136 (94%)	9 (6%)	18	52
All	All	2320/2736 (85%)	2149 (93%)	171 (7%)	13	44

All (171) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	54	SER
1	A	63	ARG
1	A	65	THR
1	A	99	ARG
1	A	127	ASN
1	A	128	LEU
1	A	134	ARG
1	A	135	VAL
1	A	140	THR
1	A	142	LEU
1	A	183	LEU
1	A	185	GLN
1	B	18	VAL
1	B	33	THR
1	B	65	THR
1	B	107	LEU

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Mol	Chain	Res	Type
1	B	127	ASN
1	B	128	LEU
1	B	134	ARG
1	B	140	THR
1	B	166	GLU
1	B	183	LEU
1	B	189	THR
1	C	33	THR
1	C	39	SER
1	C	63	ARG
1	C	65	THR
1	C	67	ASP
1	C	94	ARG
1	C	115	SER
1	C	128	LEU
1	C	134	ARG
1	C	135	VAL
1	C	140	THR
1	C	142	LEU
1	C	151	VAL
1	C	183	LEU
1	D	25	SER
1	D	33	THR
1	D	67	ASP
1	D	99	ARG
1	D	115	SER
1	D	134	ARG
1	D	135	VAL
1	D	140	THR
1	D	142	LEU
1	D	183	LEU
1	E	33	THR
1	E	63	ARG
1	E	65	THR
1	E	107	LEU
1	E	134	ARG
1	E	135	VAL
1	E	140	THR
1	E	142	LEU
1	E	183	LEU
1	F	33	THR
1	F	63	ARG

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Mol	Chain	Res	Type
1	F	65	THR
1	F	67	ASP
1	F	94	ARG
1	F	127	ASN
1	F	128	LEU
1	F	134	ARG
1	F	140	THR
1	F	142	LEU
1	F	183	LEU
1	F	190	ASP
1	G	33	THR
1	G	63	ARG
1	G	134	ARG
1	G	135	VAL
1	G	140	THR
1	G	142	LEU
1	G	183	LEU
1	H	25	SER
1	H	33	THR
1	H	63	ARG
1	H	107	LEU
1	H	128	LEU
1	H	134	ARG
1	H	140	THR
1	H	142	LEU
1	H	154	SER
1	H	181	ARG
1	H	183	LEU
1	I	33	THR
1	I	63	ARG
1	I	65	THR
1	I	67	ASP
1	I	107	LEU
1	I	135	VAL
1	I	140	THR
1	I	183	LEU
1	J	25	SER
1	J	33	THR
1	J	65	THR
1	J	67	ASP
1	J	107	LEU
1	J	128	LEU

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Mol	Chain	Res	Type
1	J	134	ARG
1	J	140	THR
1	J	142	LEU
1	J	183	LEU
1	K	12	ILE
1	K	25	SER
1	K	39	SER
1	K	107	LEU
1	K	134	ARG
1	K	135	VAL
1	K	140	THR
1	K	183	LEU
1	K	189	THR
1	L	12	ILE
1	L	17	ARG
1	L	33	THR
1	L	67	ASP
1	L	107	LEU
1	L	115	SER
1	L	134	ARG
1	L	135	VAL
1	L	140	THR
1	L	142	LEU
1	L	161	ARG
1	L	166	GLU
1	L	183	LEU
1	M	25	SER
1	M	33	THR
1	M	63	ARG
1	M	67	ASP
1	M	107	LEU
1	M	127	ASN
1	M	134	ARG
1	M	135	VAL
1	M	140	THR
1	M	142	LEU
1	M	166	GLU
1	M	183	LEU
1	N	33	THR
1	N	63	ARG
1	N	65	THR
1	N	99	ARG

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Mol	Chain	Res	Type
1	N	107	LEU
1	N	128	LEU
1	N	134	ARG
1	N	135	VAL
1	N	183	LEU
1	O	18	VAL
1	O	33	THR
1	O	38	SER
1	O	54	SER
1	O	65	THR
1	O	67	ASP
1	O	87	LEU
1	O	99	ARG
1	O	107	LEU
1	O	127	ASN
1	O	128	LEU
1	O	134	ARG
1	O	135	VAL
1	O	140	THR
1	O	183	LEU
1	P	63	ARG
1	P	65	THR
1	P	67	ASP
1	P	94	ARG
1	P	107	LEU
1	P	115	SER
1	P	134	ARG
1	P	142	LEU
1	P	183	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (101) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	76	ASN
1	A	133	GLN
1	A	141	GLN
1	A	162	GLN
1	B	23	ASN
1	B	73	HIS
1	B	76	ASN
1	B	133	GLN
1	B	141	GLN

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Mol	Chain	Res	Type
1	B	162	GLN
1	C	76	ASN
1	C	133	GLN
1	C	141	GLN
1	C	159	HIS
1	C	162	GLN
1	D	23	ASN
1	D	61	HIS
1	D	76	ASN
1	D	133	GLN
1	D	141	GLN
1	D	162	GLN
1	E	61	HIS
1	E	76	ASN
1	E	133	GLN
1	E	141	GLN
1	E	159	HIS
1	E	162	GLN
1	F	23	ASN
1	F	61	HIS
1	F	73	HIS
1	F	76	ASN
1	F	127	ASN
1	F	133	GLN
1	F	159	HIS
1	F	162	GLN
1	G	73	HIS
1	G	76	ASN
1	G	133	GLN
1	G	141	GLN
1	G	162	GLN
1	G	185	GLN
1	H	47	HIS
1	H	61	HIS
1	H	73	HIS
1	H	76	ASN
1	H	133	GLN
1	H	141	GLN
1	H	162	GLN
1	H	185	GLN
1	I	23	ASN
1	I	76	ASN

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Mol	Chain	Res	Type
1	I	133	GLN
1	I	141	GLN
1	I	159	HIS
1	I	162	GLN
1	J	23	ASN
1	J	61	HIS
1	J	76	ASN
1	J	127	ASN
1	J	133	GLN
1	J	141	GLN
1	J	162	GLN
1	K	61	HIS
1	K	73	HIS
1	K	76	ASN
1	K	133	GLN
1	K	141	GLN
1	K	162	GLN
1	K	185	GLN
1	L	47	HIS
1	L	61	HIS
1	L	76	ASN
1	L	133	GLN
1	L	141	GLN
1	L	185	GLN
1	M	76	ASN
1	M	133	GLN
1	M	141	GLN
1	M	162	GLN
1	N	61	HIS
1	N	73	HIS
1	N	76	ASN
1	N	133	GLN
1	N	141	GLN
1	N	162	GLN
1	O	23	ASN
1	O	76	ASN
1	O	133	GLN
1	O	141	GLN
1	O	159	HIS
1	O	162	GLN
1	P	23	ASN
1	P	47	HIS

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Mol	Chain	Res	Type
1	P	61	HIS
1	P	73	HIS
1	P	76	ASN
1	P	127	ASN
1	P	133	GLN
1	P	141	GLN
1	P	159	HIS
1	P	162	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 carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

Of 48 ligands modelled in this entry, 32 are monoatomic - leaving 16 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	$\# Z  > 2$
3	SO4	J	398	-	4,4,4	0.48	0	6,6,6	0.31	0
3	SO4	I	398	-	4,4,4	0.47	0	6,6,6	0.37	0
3	SO4	L	398	-	4,4,4	0.62	0	6,6,6	0.40	0
3	SO4	N	398	-	4,4,4	0.50	0	6,6,6	0.21	0
3	SO4	M	398	-	4,4,4	0.44	0	6,6,6	0.20	0
3	SO4	G	398	-	4,4,4	0.58	0	6,6,6	0.41	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
3	SO4	B	398	-	4,4,4	0.65	0	6,6,6	0.30	0
3	SO4	A	398	-	4,4,4	0.42	0	6,6,6	0.57	0
3	SO4	D	398	-	4,4,4	0.60	0	6,6,6	0.36	0
3	SO4	K	398	-	4,4,4	0.57	0	6,6,6	0.36	0
3	SO4	F	398	-	4,4,4	0.64	0	6,6,6	0.18	0
3	SO4	E	398	-	4,4,4	0.48	0	6,6,6	0.33	0
3	SO4	C	398	-	4,4,4	0.47	0	6,6,6	0.36	0
3	SO4	P	398	-	4,4,4	0.51	0	6,6,6	0.11	0
3	SO4	H	398	-	4,4,4	0.58	0	6,6,6	0.48	0
3	SO4	O	398	-	4,4,4	0.47	0	6,6,6	0.31	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 [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	183/207 (88%)	-0.67	0	100	100	17, 17, 17, 17	0
1	B	183/207 (88%)	-0.67	0	100	100	17, 17, 17, 17	0
1	C	183/207 (88%)	-0.59	0	100	100	17, 17, 17, 17	0
1	D	183/207 (88%)	-0.64	0	100	100	17, 17, 17, 17	0
1	E	183/207 (88%)	-0.60	0	100	100	17, 17, 17, 17	0
1	F	183/207 (88%)	-0.70	0	100	100	17, 17, 17, 17	0
1	G	183/207 (88%)	-0.59	0	100	100	17, 17, 17, 17	0
1	H	183/207 (88%)	-0.60	0	100	100	17, 17, 17, 17	0
1	I	183/207 (88%)	-0.64	0	100	100	17, 17, 17, 17	0
1	J	183/207 (88%)	-0.68	0	100	100	17, 17, 17, 17	0
1	K	183/207 (88%)	-0.60	0	100	100	17, 17, 17, 17	0
1	L	183/207 (88%)	-0.63	0	100	100	17, 17, 17, 17	0
1	M	183/207 (88%)	-0.63	0	100	100	17, 17, 17, 17	0
1	N	183/207 (88%)	-0.66	0	100	100	17, 17, 17, 17	0
1	O	183/207 (88%)	-0.56	1 (0%)	91	75	17, 17, 17, 17	0
1	P	183/207 (88%)	-0.62	1 (0%)	91	75	17, 17, 17, 17	0
All	All	2928/3312 (88%)	-0.63	2 (0%)	95	89	17, 17, 17, 17	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	O	10	GLY	2.3
1	P	10	GLY	2.3

## 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 carbohydrates 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, 95<sup>th</sup> 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
3	SO4	H	398	5/5	0.90	0.44	17,17,17,17	0
3	SO4	B	398	5/5	0.91	0.35	17,17,17,17	0
3	SO4	E	398	5/5	0.91	0.38	17,17,17,17	0
2	MN	C	301	1/1	0.92	0.06	17,17,17,17	0
3	SO4	N	398	5/5	0.92	0.33	17,17,17,17	0
3	SO4	K	398	5/5	0.93	0.30	17,17,17,17	0
3	SO4	G	398	5/5	0.93	0.27	17,17,17,17	0
2	MN	C	300	1/1	0.94	0.14	17,17,17,17	0
2	MN	D	300	1/1	0.94	0.10	17,17,17,17	0
3	SO4	I	398	5/5	0.95	0.39	17,17,17,17	0
2	MN	E	300	1/1	0.95	0.11	17,17,17,17	0
3	SO4	P	398	5/5	0.95	0.39	17,17,17,17	0
2	MN	P	300	1/1	0.95	0.10	17,17,17,17	0
3	SO4	L	398	5/5	0.95	0.36	17,17,17,17	0
3	SO4	O	398	5/5	0.95	0.34	17,17,17,17	0
3	SO4	C	398	5/5	0.95	0.33	17,17,17,17	0
3	SO4	F	398	5/5	0.95	0.38	17,17,17,17	0
3	SO4	D	398	5/5	0.96	0.41	17,17,17,17	0
2	MN	E	301	1/1	0.96	0.06	17,17,17,17	0
2	MN	I	301	1/1	0.96	0.08	17,17,17,17	0
3	SO4	A	398	5/5	0.96	0.37	17,17,17,17	0
2	MN	O	301	1/1	0.96	0.06	17,17,17,17	0
2	MN	D	301	1/1	0.97	0.04	17,17,17,17	0
2	MN	F	300	1/1	0.97	0.10	17,17,17,17	0
2	MN	G	300	1/1	0.97	0.06	17,17,17,17	0
2	MN	B	300	1/1	0.97	0.09	17,17,17,17	0
2	MN	O	300	1/1	0.97	0.12	17,17,17,17	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	MN	H	300	1/1	0.97	0.09	17,17,17,17	0
2	MN	L	300	1/1	0.97	0.07	17,17,17,17	0
2	MN	F	301	1/1	0.97	0.03	17,17,17,17	0
2	MN	P	301	1/1	0.97	0.06	17,17,17,17	0
2	MN	M	300	1/1	0.97	0.09	17,17,17,17	0
3	SO4	J	398	5/5	0.97	0.36	17,17,17,17	0
2	MN	I	300	1/1	0.98	0.10	17,17,17,17	0
2	MN	L	301	1/1	0.98	0.10	17,17,17,17	0
2	MN	K	301	1/1	0.98	0.04	17,17,17,17	0
2	MN	M	301	1/1	0.98	0.04	17,17,17,17	0
2	MN	B	301	1/1	0.98	0.04	17,17,17,17	0
3	SO4	M	398	5/5	0.98	0.28	17,17,17,17	0
2	MN	J	300	1/1	0.98	0.09	17,17,17,17	0
2	MN	K	300	1/1	0.98	0.12	17,17,17,17	0
2	MN	A	300	1/1	0.98	0.11	17,17,17,17	0
2	MN	H	301	1/1	0.98	0.07	17,17,17,17	0
2	MN	A	301	1/1	0.99	0.12	17,17,17,17	0
2	MN	N	300	1/1	0.99	0.13	17,17,17,17	0
2	MN	G	301	1/1	0.99	0.03	17,17,17,17	0
2	MN	N	301	1/1	0.99	0.10	17,17,17,17	0
2	MN	J	301	1/1	0.99	0.03	17,17,17,17	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.