



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 27, 2023 – 12:05 AM EDT

PDB ID : 6D7K  
Title : Complex structure of Methane monooxygenase hydroxylase in complex with inhibitory subunit  
Authors : Kim, H.; Lee, S.J.; Cho, U.-S.  
Deposited on : 2018-04-24  
Resolution : 2.60 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 2.35.1  
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) : 2.35.1

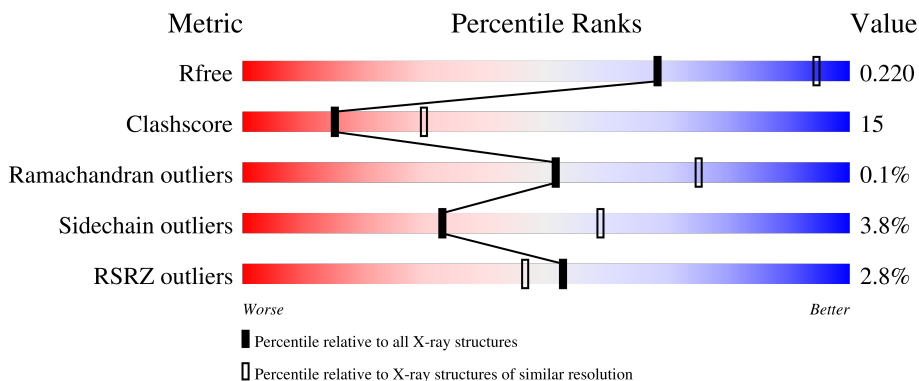
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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.



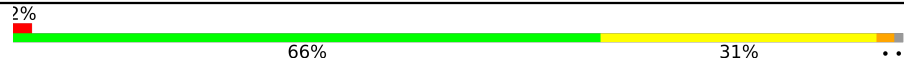
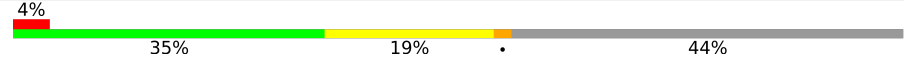
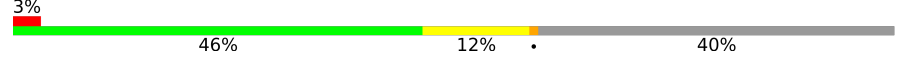
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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  $\geq 3$ , 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	526	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 71%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 24%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">3%      71%      24%      • •</p>
1	E	526	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 65%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 29%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">3%      65%      29%      • •</p>
2	B	395	<div style="display: flex; align-items: center;"> <div style="width: 0%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 63%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 22%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 14%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">%      63%      22%      •      14%</p>
2	F	395	<div style="display: flex; align-items: center;"> <div style="width: 0%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 57%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 26%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 14%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">%      57%      26%      •      14%</p>
3	C	169	<div style="display: flex; align-items: center;"> <div style="width: 4%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 70%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 24%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">4%      70%      24%      • •</p>

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Mol	Chain	Length	Quality of chain
3	G	169	
4	D	114	
4	H	114	

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 17768 atoms, of which 2 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 Methane monooxygenase hydroxylase, MmoX1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	503	4072	2614	701	745	12	0	0	0
1	E	503	4075	2615	703	745	12	0	0	0

- Molecule 2 is a protein called Methane monooxygenase hydroxylase, MmoY.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	339	2745	1755	474	511	5	0	0	0
2	F	339	2743	1754	474	510	5	0	0	0

- Molecule 3 is a protein called Methane monooxygenase hydroxylase, MmoZ.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	165	1331	849	229	251	2	0	0	0
3	G	167	1351	861	235	253	2	0	0	0

- Molecule 4 is a protein called Methane monooxygenase hydroxylase, MmoD.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	64	530	333	98	97	2	0	0	0
4	H	68	554	348	99	105	2	0	0	0

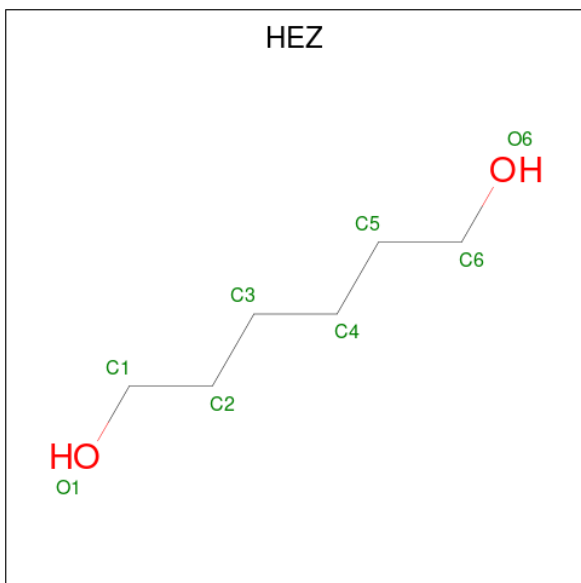
There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-2	SER	-	expression tag	UNP Q27RN3
D	-1	ASN	-	expression tag	UNP Q27RN3
D	0	ALA	-	expression tag	UNP Q27RN3
H	-2	SER	-	expression tag	UNP Q27RN3
H	-1	ASN	-	expression tag	UNP Q27RN3
H	0	ALA	-	expression tag	UNP Q27RN3

- Molecule 5 is FE (III) ION (three-letter code: FE) (formula: Fe).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	2	Total Fe 2 2	0	0
5	E	2	Total Fe 2 2	0	0

- Molecule 6 is HEXANE-1,6-DIOL (three-letter code: HEZ) (formula: C<sub>6</sub>H<sub>14</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 8 6 2	0	0
6	E	1	Total C O 8 6 2	0	0

- Molecule 7 is FORMIC ACID (three-letter code: FMT) (formula: CH<sub>2</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
7	A	1	Total	C	H	O	0	0
			4	1	1	2		
7	E	1	Total	C	H	O	0	0
			4	1	1	2		

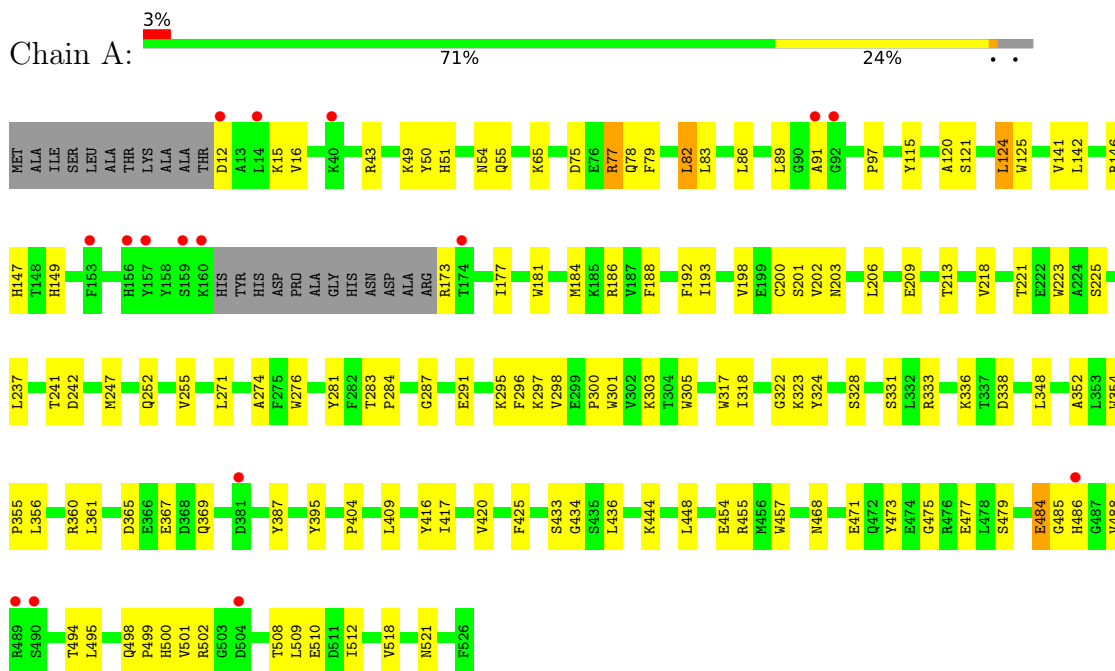
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	81	Total	O	0	0
			81	81		
8	B	48	Total	O	0	0
			48	48		
8	C	21	Total	O	0	0
			21	21		
8	D	7	Total	O	0	0
			7	7		
8	E	84	Total	O	0	0
			84	84		
8	F	54	Total	O	0	0
			54	54		
8	G	30	Total	O	0	0
			30	30		
8	H	14	Total	O	0	0
			14	14		

### 3 Residue-property plots [i](#)

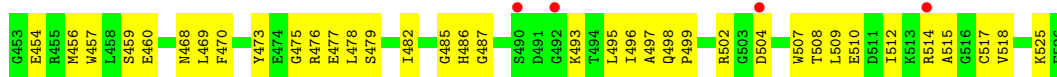
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Methane monooxygenase hydroxylase, MmoX1

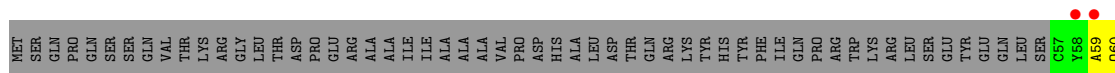


- Molecule 1: Methane monooxygenase hydroxylase, MmoX1

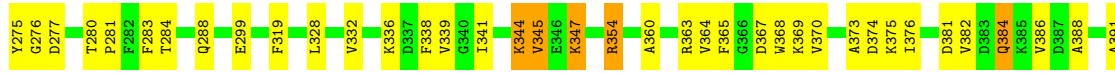
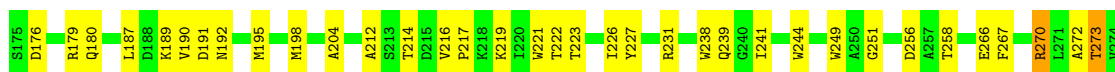
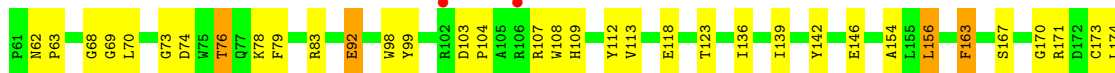
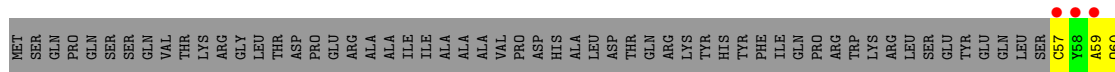




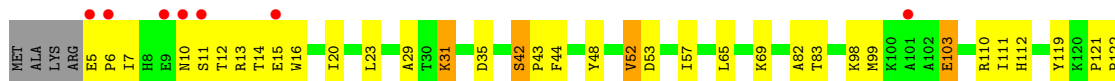
- Molecule 2: Methane monooxygenase hydroxylase, MmoY



- Molecule 2: Methane monooxygenase hydroxylase, MmoY

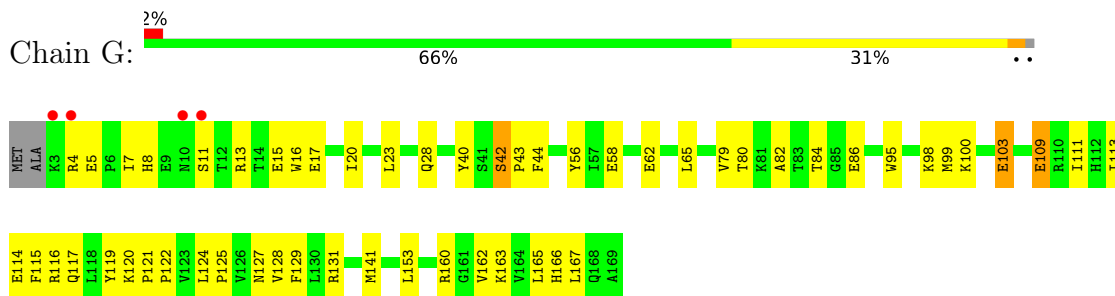


- Molecule 3: Methane monooxygenase hydroxylase, MmoZ

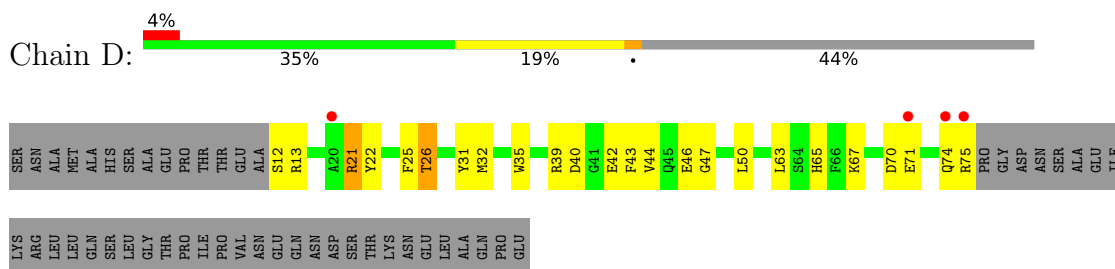




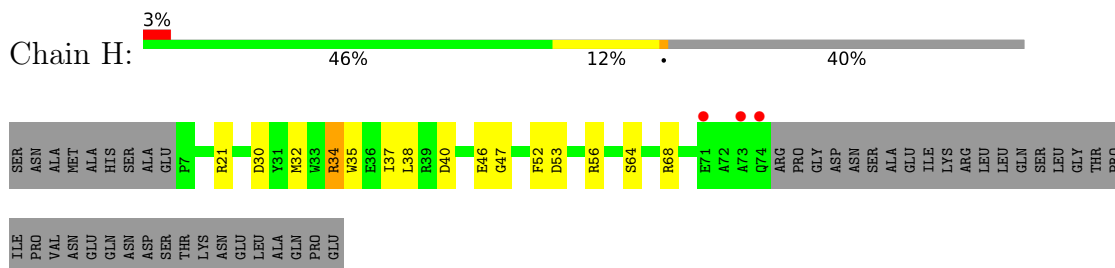
• Molecule 3: Methane monooxygenase hydroxylase, MmoZ



• Molecule 4: Methane monooxygenase hydroxylase, MmoD



• Molecule 4: Methane monooxygenase hydroxylase, MmoD



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	179.78Å 125.78Å 126.38Å 90.00° 102.89° 90.00°	Depositor
Resolution (Å)	22.29 – 2.60 22.29 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.4 (22.29-2.60) 99.4 (22.29-2.60)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.68 (at 2.60Å)	Xtrriage
Refinement program	PHENIX (1.13_2998: ???)	Depositor
R, $R_{free}$	0.178 , 0.221 0.179 , 0.220	Depositor DCC
$R_{free}$ test set	4180 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	43.2	Xtrriage
Anisotropy	0.647	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 46.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	17768	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	49.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.07% 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: FE, FMT, HEZ

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	0.45	0/4195	0.58	1/5699 (0.0%)
1	E	0.50	0/4198	0.56	0/5704
2	B	0.61	2/2825 (0.1%)	0.56	0/3841
2	F	0.61	0/2823	0.62	1/3838 (0.0%)
3	C	0.62	0/1356	0.58	0/1834
3	G	0.76	1/1376 (0.1%)	0.62	0/1859
4	D	0.79	0/542	0.62	0/729
4	H	0.88	0/567	0.64	0/765
All	All	0.58	3/17882 (0.0%)	0.59	2/24269 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	160	TYR	CE1-CZ	-5.52	1.31	1.38
3	G	40	TYR	CE1-CZ	-5.16	1.31	1.38
2	B	159	GLU	CD-OE1	-5.11	1.20	1.25

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	89	LEU	N-CA-C	-5.56	95.99	111.00
2	F	156	LEU	CA-CB-CG	5.47	127.88	115.30

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	4072	0	3891	117	0
1	E	4075	0	3893	161	0
2	B	2745	0	2587	82	0
2	F	2743	0	2582	113	0
3	C	1331	0	1348	41	0
3	G	1351	0	1374	39	0
4	D	530	0	501	16	0
4	H	554	0	521	11	0
5	A	2	0	0	0	0
5	E	2	0	0	0	0
6	A	8	0	13	0	0
6	E	8	0	14	0	0
7	A	3	1	1	0	0
7	E	3	1	1	0	0
8	A	81	0	0	4	0
8	B	48	0	0	4	0
8	C	21	0	0	1	0
8	D	7	0	0	0	0
8	E	84	0	0	4	0
8	F	54	0	0	2	0
8	G	30	0	0	1	0
8	H	14	0	0	1	0
All	All	17766	2	16726	513	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 15.

All (513) 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:276:GLY:HA2	2:F:273:THR:HG23	1.27	1.08
1:E:493:LYS:HG3	1:E:508:THR:HB	1.34	1.08
1:E:52:MET:HE2	1:E:128:ALA:HA	1.45	0.97
2:F:219:LYS:HE2	2:F:223:THR:HG21	1.46	0.96
3:G:65:LEU:HD23	3:G:122:PRO:HG2	1.50	0.93

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:99:MET:HE1	3:C:112:HIS:HB2	1.50	0.91
1:E:82:LEU:HD21	1:E:154:ILE:HD11	1.50	0.89
1:E:53:ALA:O	1:E:56:THR:HG23	1.73	0.87
1:A:488:VAL:HG11	1:A:509:LEU:HD11	1.58	0.85
1:E:493:LYS:HE3	1:E:510:GLU:H	1.42	0.85
1:A:146:ARG:HB2	2:B:109:HIS:CE1	2.12	0.85
2:F:108:TRP:HA	2:F:180:GLN:NE2	1.91	0.83
1:E:100:GLY:HA2	1:E:103:MET:HE2	1.61	0.82
1:A:146:ARG:HD3	8:A:701:HOH:O	1.78	0.82
2:F:270:ARG:O	2:F:273:THR:HG22	1.82	0.80
2:B:276:GLY:HA2	2:F:273:THR:CG2	2.11	0.80
1:E:448:LEU:HD22	1:E:454:GLU:HA	1.61	0.80
1:E:190:ASP:OD2	2:F:76:THR:HB	1.82	0.79
1:E:186:ARG:CB	2:F:76:THR:HG21	2.13	0.79
1:E:100:GLY:O	1:E:104:LYS:HE2	1.84	0.78
1:E:146:ARG:HB2	2:F:109:HIS:NE2	1.98	0.78
2:F:92:GLU:HG2	2:F:319:PHE:CZ	2.18	0.78
2:B:108:TRP:HA	2:B:180:GLN:NE2	1.98	0.78
1:E:82:LEU:HD21	1:E:154:ILE:CD1	2.13	0.78
1:E:365:ASP:O	1:E:369:GLN:HG3	1.85	0.77
2:B:276:GLY:CA	2:F:273:THR:HG23	2.10	0.77
1:E:186:ARG:HB2	2:F:76:THR:HG21	1.65	0.77
1:A:510:GLU:OE1	1:A:510:GLU:N	2.18	0.77
1:E:11:THR:HG21	1:E:14:LEU:HD12	1.65	0.77
3:C:153:LEU:O	3:C:157:ARG:HG3	1.85	0.76
2:B:207:VAL:CG2	2:B:210:PHE:HB2	2.14	0.76
1:E:109:PHE:CE2	1:E:184:MET:HG3	2.21	0.76
3:C:11:SER:O	3:C:15:GLU:HG2	1.86	0.76
1:E:146:ARG:HB2	2:F:109:HIS:CD2	2.21	0.75
1:E:186:ARG:CA	2:F:76:THR:HG21	2.17	0.73
1:E:110:LEU:HD12	1:E:236:PHE:HE1	1.53	0.73
1:E:172:ARG:CZ	2:F:70:LEU:HD13	2.18	0.73
1:E:100:GLY:HA2	1:E:103:MET:CE	2.18	0.73
1:E:149:HIS:CE1	2:F:109:HIS:H	2.08	0.71
1:A:78:GLN:OE1	1:A:146:ARG:NH2	2.25	0.70
1:A:209:GLU:HA	1:A:213:THR:OG1	1.91	0.70
1:E:52:MET:HE2	1:E:128:ALA:CA	2.20	0.70
1:E:360:ARG:HG2	1:E:498:GLN:HB2	1.74	0.70
1:E:110:LEU:HD22	1:E:151:CYS:SG	2.32	0.70
1:E:144:GLU:O	1:E:148:THR:HG23	1.92	0.70
1:E:403:ILE:HD13	1:E:515:ALA:CB	2.21	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:149:HIS:CE1	2:B:109:HIS:H	2.09	0.70
1:A:147:HIS:HE1	1:A:242:ASP:OD2	1.74	0.69
4:D:63:LEU:O	4:D:67:LYS:HG3	1.92	0.69
4:D:42:GLU:O	4:D:44:VAL:HG23	1.93	0.69
1:A:97:PRO:HB2	1:A:501:VAL:HG11	1.73	0.69
2:B:393:PHE:CE2	2:B:395:ASN:HB3	2.28	0.69
2:B:382:VAL:O	2:B:386:VAL:HG23	1.93	0.68
2:F:336:LYS:HE3	2:F:388:ALA:O	1.94	0.67
2:F:341:ILE:O	2:F:344:LYS:HG2	1.93	0.67
2:B:101:HIS:O	2:B:102:ARG:NH1	2.24	0.67
1:A:202:VAL:HA	1:A:206:LEU:HB2	1.74	0.67
1:E:186:ARG:HA	2:F:76:THR:HG21	1.75	0.67
3:G:99:MET:HE2	3:G:111:ILE:CG2	2.23	0.67
2:F:92:GLU:HG2	2:F:319:PHE:CE1	2.29	0.67
2:F:272:ALA:HB1	2:F:277:ASP:HB3	1.76	0.67
2:B:207:VAL:HG23	2:B:210:PHE:HB2	1.76	0.67
3:C:14:THR:HG22	8:C:218:HOH:O	1.95	0.67
1:E:146:ARG:HB2	2:F:109:HIS:CE1	2.29	0.67
3:C:99:MET:CE	3:C:112:HIS:HB2	2.22	0.66
3:C:42:SER:HB2	3:C:43:PRO:CD	2.26	0.66
3:C:98:LYS:HG2	3:C:111:ILE:HD13	1.76	0.66
3:C:20:ILE:O	3:C:23:LEU:HD12	1.95	0.65
1:A:247:MET:HG2	4:D:32:MET:CE	2.25	0.65
1:A:317:TRP:CG	4:D:50:LEU:HD22	2.32	0.65
1:A:125:TRP:CE2	2:B:167:SER:HB3	2.31	0.65
2:F:222:THR:HA	2:F:231:ARG:HE	1.61	0.65
2:F:381:ASP:OD2	2:F:384:GLN:HB2	1.96	0.65
1:E:112:VAL:HG21	1:E:181:TRP:CZ3	2.31	0.65
3:G:163:LYS:HD3	3:G:165:LEU:HD21	1.77	0.65
1:A:177:ILE:HD11	1:A:485:GLY:HA3	1.79	0.65
1:E:247:MET:HG2	4:H:32:MET:CE	2.26	0.64
1:E:354:TRP:CG	1:E:355:PRO:HD3	2.32	0.64
1:A:91:ALA:HB2	4:H:21:ARG:CZ	2.26	0.64
2:F:393:PHE:CE2	2:F:395:ASN:HB2	2.32	0.64
1:A:300:PRO:HG2	1:A:303:LYS:HG3	1.80	0.64
1:E:495:LEU:HD21	1:E:509:LEU:HD23	1.79	0.63
2:F:198:MET:HE3	2:F:283:PHE:HE2	1.63	0.63
1:E:109:PHE:CZ	1:E:184:MET:HG3	2.33	0.63
3:G:121:PRO:HD3	3:G:129:PHE:CG	2.34	0.63
1:A:352:ALA:HA	1:A:404:PRO:HB2	1.80	0.63
2:F:363:ARG:NH2	8:F:402:HOH:O	2.32	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:G:58:GLU:O	3:G:62:GLU:HG3	1.98	0.62
1:A:149:HIS:CE1	2:B:108:TRP:HB2	2.35	0.62
1:E:202:VAL:HG11	1:E:271:LEU:HA	1.81	0.62
1:A:146:ARG:HB2	2:B:109:HIS:NE2	2.15	0.62
2:F:136:ILE:O	2:F:139:ILE:HG22	1.99	0.62
1:A:354:TRP:CG	1:A:355:PRO:HD3	2.35	0.62
1:A:448:LEU:HD22	1:A:454:GLU:HA	1.81	0.62
1:E:403:ILE:HD13	1:E:515:ALA:HB2	1.81	0.62
1:A:97:PRO:HB2	1:A:501:VAL:CG1	2.30	0.61
3:G:82:ALA:HB2	3:G:124:LEU:HD23	1.81	0.61
1:A:416:TYR:O	1:A:417:ILE:HD13	2.00	0.61
1:E:71:GLU:OE1	1:E:74:LYS:HE2	2.00	0.61
2:B:267:PHE:O	2:B:271:LEU:HB2	2.00	0.61
2:F:251:GLY:O	2:F:256:ASP:HB2	2.00	0.61
1:E:493:LYS:NZ	1:E:510:GLU:HG2	2.16	0.61
1:A:218:VAL:O	1:A:221:THR:HB	2.01	0.60
1:E:510:GLU:O	1:E:514:ARG:HG3	2.01	0.60
1:E:473:TYR:HE1	3:G:7:ILE:HD11	1.66	0.60
2:B:369:LYS:HZ3	2:B:380:ILE:HG23	1.66	0.60
1:E:112:VAL:HG21	1:E:181:TRP:HZ3	1.67	0.60
1:A:360:ARG:HG2	1:A:498:GLN:HB2	1.84	0.60
1:E:147:HIS:HE1	1:E:242:ASP:OD2	1.83	0.60
3:G:16:TRP:O	3:G:20:ILE:HG13	2.02	0.60
1:E:425:PHE:CE2	1:E:427:PRO:HG3	2.37	0.59
1:E:177:ILE:HD11	1:E:485:GLY:HA3	1.84	0.59
3:G:127:ASN:O	3:G:131:ARG:HG2	2.02	0.59
1:E:110:LEU:HD23	1:E:114:GLU:HG2	1.83	0.59
1:A:12:ASP:N	1:A:15:LYS:HZ2	2.01	0.59
2:B:369:LYS:NZ	2:B:380:ILE:HG23	2.17	0.59
1:E:29:HIS:ND1	1:E:61:LYS:HE2	2.17	0.59
1:A:142:LEU:HD11	2:B:187:LEU:HD22	1.85	0.58
1:E:244:LEU:HD22	4:H:34:ARG:HG3	1.85	0.58
3:C:98:LYS:HG2	3:C:111:ILE:CD1	2.32	0.58
1:A:354:TRP:CD1	1:A:355:PRO:HD3	2.38	0.58
1:E:149:HIS:CE1	2:F:108:TRP:HB2	2.38	0.58
1:E:33:GLN:OE1	1:E:132:GLU:HG3	2.02	0.58
2:F:219:LYS:HE2	2:F:223:THR:CG2	2.28	0.58
3:G:98:LYS:HE3	3:G:111:ILE:HG12	1.85	0.58
2:F:139:ILE:CD1	2:F:277:ASP:HA	2.33	0.58
1:A:455:ARG:NH1	8:A:702:HOH:O	2.35	0.58
1:A:488:VAL:HG11	1:A:509:LEU:CD1	2.31	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:354:ARG:HG3	2:F:393:PHE:CD2	2.39	0.58
1:A:296:PHE:HE2	1:A:298:VAL:HG22	1.69	0.58
1:A:484:GLU:OE2	3:C:7:ILE:HG13	2.03	0.58
1:E:186:ARG:HB2	2:F:76:THR:CG2	2.32	0.58
1:A:475:GLY:O	1:A:518:VAL:HG13	2.04	0.58
1:E:172:ARG:HD3	2:F:70:LEU:HD22	1.85	0.57
1:E:482:ILE:HG21	1:E:495:LEU:HD22	1.85	0.57
1:E:56:THR:HG21	1:E:256:SER:HB2	1.85	0.57
1:E:43:ARG:CZ	1:E:51:HIS:HD1	2.17	0.57
3:C:121:PRO:HD3	3:C:129:PHE:CG	2.39	0.57
1:E:448:LEU:CD2	1:E:454:GLU:HA	2.33	0.57
1:E:231:ILE:N	1:E:231:ILE:HD12	2.20	0.56
2:F:139:ILE:HD12	2:F:277:ASP:HA	1.86	0.56
1:E:176:ALA:HA	1:E:181:TRP:CD1	2.40	0.56
1:E:247:MET:HG2	4:H:32:MET:HE1	1.87	0.56
8:F:405:HOH:O	3:G:113:ILE:HG12	2.04	0.56
1:E:120:ALA:HB2	1:E:192:PHE:HB3	1.87	0.56
1:A:202:VAL:HG22	1:A:206:LEU:HD12	1.87	0.56
2:B:93:LEU:HD23	2:B:306:LEU:HD13	1.87	0.56
1:E:493:LYS:HG3	1:E:508:THR:CB	2.22	0.56
2:B:108:TRP:HA	2:B:180:GLN:HE22	1.71	0.56
1:E:469:LEU:HD12	1:E:470:PHE:N	2.21	0.56
1:E:476:ARG:O	1:E:518:VAL:HA	2.05	0.56
3:G:166:HIS:O	3:G:167:LEU:HD23	2.06	0.56
2:F:354:ARG:HG3	2:F:393:PHE:CE2	2.41	0.55
3:G:100:LYS:NZ	8:G:201:HOH:O	2.38	0.55
1:A:149:HIS:ND1	2:B:108:TRP:HB2	2.21	0.55
3:C:103:GLU:CD	3:C:103:GLU:H	2.09	0.55
4:D:43:PHE:HZ	4:D:46:GLU:HB2	1.71	0.55
2:F:142:TYR:CE1	2:F:146:GLU:HG3	2.41	0.55
2:B:272:ALA:HB1	2:B:277:ASP:HB3	1.89	0.55
3:G:42:SER:HB2	3:G:43:PRO:CD	2.37	0.55
4:H:35:TRP:CZ2	4:H:47:GLY:HA3	2.42	0.55
1:E:173:ARG:HD3	1:E:486:HIS:ND1	2.22	0.55
2:F:222:THR:HA	2:F:231:ARG:NE	2.20	0.55
1:A:16:VAL:HG12	2:B:137:ARG:HD3	1.89	0.54
1:E:52:MET:HE1	1:E:128:ALA:HB2	1.89	0.54
1:E:110:LEU:HD12	1:E:236:PHE:CE1	2.41	0.54
1:E:75:ASP:OD1	1:E:146:ARG:NE	2.40	0.54
2:F:369:LYS:HA	2:F:373:ALA:HB3	1.89	0.54
1:E:83:LEU:O	1:E:87:THR:HG23	2.06	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:219:LYS:CE	2:F:223:THR:HG21	2.30	0.54
4:D:71:GLU:O	4:D:74:GLN:HG2	2.06	0.54
2:B:328:LEU:O	2:B:332:VAL:HG23	2.07	0.54
3:G:8:HIS:HA	3:G:13:ARG:NH1	2.22	0.54
1:E:398:PRO:HA	1:E:507:TRP:CE2	2.43	0.53
1:A:120:ALA:HB2	1:A:192:PHE:HB3	1.88	0.53
1:A:495:LEU:HD11	1:A:512:ILE:HG13	1.89	0.53
3:G:5:GLU:OE2	3:G:11:SER:OG	2.27	0.53
1:A:338:ASP:HB2	1:A:433:SER:OG	2.09	0.53
1:E:147:HIS:CE1	1:E:242:ASP:OD2	2.60	0.53
1:E:209:GLU:HA	1:E:213:THR:OG1	2.08	0.53
1:E:354:TRP:CD1	1:E:355:PRO:HD3	2.43	0.53
2:B:118:GLU:HG2	2:F:118:GLU:HG2	1.88	0.53
4:D:21:ARG:HG3	4:D:40:ASP:OD1	2.08	0.53
1:A:65:LYS:HD2	2:B:120:ALA:HB2	1.91	0.53
2:B:110:ALA:HB3	2:B:111:PRO:HD3	1.91	0.53
2:B:394:LYS:O	2:B:395:ASN:HB2	2.08	0.53
1:E:24:GLU:O	1:E:27:GLU:HB2	2.09	0.53
2:F:170:GLY:O	2:F:179:ARG:NH1	2.38	0.53
2:B:121:ARG:NH2	8:B:401:HOH:O	2.26	0.52
1:A:448:LEU:CD2	1:A:454:GLU:HA	2.39	0.52
2:F:239:GLN:HA	2:F:239:GLN:OE1	2.09	0.52
2:F:266:GLU:OE2	2:F:363:ARG:NH1	2.42	0.52
4:H:21:ARG:HG2	4:H:40:ASP:OD1	2.09	0.52
2:F:108:TRP:HA	2:F:180:GLN:HE22	1.72	0.52
2:F:107:ARG:O	2:F:180:GLN:NE2	2.41	0.52
1:E:452:TRP:O	1:E:456:MET:HG3	2.10	0.52
2:F:299:GLU:OE2	2:F:375:LYS:HE3	2.10	0.52
1:E:206:LEU:HD11	1:E:254:VAL:CG2	2.39	0.52
2:F:382:VAL:O	2:F:386:VAL:HG23	2.09	0.52
1:E:115:TYR:CZ	2:F:176:ASP:OD1	2.63	0.52
1:A:333:ARG:NH1	8:A:704:HOH:O	2.41	0.52
3:C:10:ASN:HB2	3:C:13:ARG:HG3	1.91	0.52
3:C:31:LYS:HE2	3:C:35:ASP:OD2	2.10	0.52
1:E:43:ARG:NH2	1:E:51:HIS:HA	2.25	0.52
1:A:75:ASP:OD1	1:A:146:ARG:NE	2.37	0.52
2:B:369:LYS:HE2	2:B:382:VAL:HG23	1.90	0.52
1:E:56:THR:HG21	1:E:256:SER:CB	2.40	0.52
1:E:125:TRP:CE2	2:F:167:SER:HB3	2.44	0.51
1:E:68:ALA:HA	2:F:113:VAL:HG13	1.93	0.51
3:G:99:MET:HE2	3:G:111:ILE:HG22	1.90	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:371:ASP:O	2:B:375:LYS:HD2	2.10	0.51
1:E:493:LYS:HE3	1:E:510:GLU:HB2	1.92	0.51
1:A:186:ARG:NH1	1:A:420:VAL:HG12	2.25	0.51
1:E:439:HIS:CG	3:G:162:VAL:HG11	2.45	0.51
1:A:247:MET:HG2	4:D:32:MET:HE2	1.92	0.51
1:A:276:TRP:CE3	1:A:331:SER:HB2	2.45	0.51
1:E:405:TYR:O	1:E:408:LEU:HB2	2.11	0.51
2:F:60:GLN:HB2	2:F:176:ASP:OD1	2.09	0.51
2:B:65:TRP:HH2	2:B:75:TRP:HE1	1.58	0.51
2:B:150:LYS:HB3	2:B:220:ILE:CD1	2.40	0.51
1:E:143:ASP:OD2	1:E:245:ARG:NH1	2.44	0.51
1:E:313:TRP:CZ2	1:E:318:ILE:HD11	2.45	0.51
2:F:336:LYS:HE2	2:F:391:ALA:HB3	1.93	0.51
1:A:395:TYR:HD1	1:A:404:PRO:HG3	1.76	0.51
2:B:259:PHE:HA	2:B:335:LEU:HD21	1.93	0.51
2:B:325:GLU:HG2	2:B:378:PHE:HE2	1.75	0.51
1:E:352:ALA:HA	1:E:404:PRO:HG2	1.93	0.51
1:A:287:GLY:HA3	1:A:301:TRP:CD1	2.46	0.51
1:A:416:TYR:C	1:A:417:ILE:HD13	2.31	0.51
2:B:101:HIS:ND1	2:B:300:ASP:OD2	2.40	0.50
2:F:339:VAL:HG12	2:F:393:PHE:HA	1.93	0.50
3:G:128:VAL:HG22	3:G:131:ARG:HH21	1.76	0.50
2:B:79:PHE:HB2	2:B:83:ARG:HB3	1.94	0.50
1:A:43:ARG:HH12	1:A:51:HIS:HA	1.75	0.50
2:B:121:ARG:NE	8:B:401:HOH:O	2.32	0.50
3:C:124:LEU:HD22	3:C:125:PRO:HD2	1.93	0.50
1:A:77:ARG:NH1	1:E:84:ASP:OD1	2.34	0.50
1:A:198:VAL:O	1:A:202:VAL:HG23	2.12	0.50
1:E:475:GLY:HA2	1:E:518:VAL:HG12	1.94	0.50
1:A:291:GLU:O	1:A:297:LYS:HE3	2.12	0.50
2:B:109:HIS:O	2:B:113:VAL:HG22	2.12	0.50
3:C:65:LEU:HD23	3:C:122:PRO:HG2	1.93	0.50
1:E:95:VAL:HG12	1:E:96:HIS:O	2.12	0.50
1:E:299:GLU:HG3	1:E:300:PRO:HD2	1.93	0.50
2:F:74:ASP:OD2	2:F:78:LYS:NZ	2.44	0.50
1:A:395:TYR:CE1	1:A:404:PRO:HG2	2.47	0.50
2:F:381:ASP:OD2	2:F:384:GLN:CB	2.60	0.50
1:A:237:LEU:O	1:A:241:THR:HG23	2.12	0.50
2:F:226:ILE:HG23	2:F:338:PHE:HA	1.94	0.50
2:F:367:ASP:O	2:F:370:VAL:HG12	2.11	0.50
1:A:82:LEU:O	1:A:86:LEU:HB2	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:53:ASP:O	3:C:57:ILE:HG13	2.12	0.50
3:G:124:LEU:HD22	3:G:125:PRO:HD2	1.93	0.50
1:A:146:ARG:HB2	2:B:109:HIS:CD2	2.47	0.49
2:B:206:LEU:HD22	8:B:435:HOH:O	2.12	0.49
1:E:477:GLU:HA	1:E:517:CYS:O	2.11	0.49
3:G:103:GLU:CD	3:G:103:GLU:H	2.15	0.49
1:A:322:GLY:O	1:A:324:TYR:O	2.31	0.49
1:A:354:TRP:CZ3	1:A:499:PRO:HD3	2.47	0.49
1:A:448:LEU:HD12	1:A:448:LEU:N	2.28	0.49
2:B:348:VAL:HG23	2:B:351:ALA:HB3	1.94	0.49
1:E:395:TYR:CE1	1:E:404:PRO:HG3	2.47	0.49
2:F:231:ARG:HH11	2:F:231:ARG:HG2	1.77	0.49
2:B:60:GLN:HB2	2:B:176:ASP:OD1	2.12	0.49
1:E:108:ASN:HD21	1:E:175:ARG:NH1	2.10	0.49
2:B:368:TRP:CZ3	2:B:373:ALA:HB2	2.48	0.49
1:E:66:GLU:OE2	1:E:69:ARG:NH2	2.44	0.49
1:A:177:ILE:CD1	1:A:485:GLY:HA3	2.41	0.49
1:E:115:TYR:HA	1:E:118:ILE:HD12	1.95	0.49
1:E:206:LEU:HD11	1:E:254:VAL:HG21	1.95	0.49
2:F:108:TRP:HA	2:F:180:GLN:HE21	1.73	0.49
1:A:54:ASN:O	1:A:55:GLN:HB2	2.13	0.49
1:E:11:THR:CG2	1:E:14:LEU:HD12	2.40	0.49
1:E:354:TRP:CH2	1:E:499:PRO:HD3	2.48	0.49
2:F:339:VAL:CG1	2:F:393:PHE:HA	2.43	0.49
4:H:52:PHE:CE2	4:H:56:ARG:HD2	2.47	0.49
1:E:395:TYR:HE1	1:E:404:PRO:HG3	1.78	0.48
2:B:110:ALA:HB3	2:B:111:PRO:CD	2.42	0.48
1:E:29:HIS:CE1	1:E:61:LYS:HE2	2.48	0.48
3:G:23:LEU:CD2	3:G:28:GLN:HG2	2.43	0.48
1:A:318:ILE:HG21	1:A:328:SER:HA	1.95	0.48
3:G:15:GLU:HG3	3:G:16:TRP:N	2.27	0.48
3:C:16:TRP:O	3:C:20:ILE:HG13	2.13	0.48
1:A:202:VAL:HG11	1:A:271:LEU:HA	1.94	0.48
3:G:13:ARG:HD3	3:G:56:TYR:CD2	2.49	0.48
1:A:121:SER:HB2	1:A:141:VAL:HG22	1.95	0.48
2:B:156:LEU:HD12	2:B:156:LEU:C	2.34	0.48
4:H:46:GLU:HG2	8:H:202:HOH:O	2.14	0.48
1:A:146:ARG:HA	2:B:109:HIS:CG	2.48	0.48
2:F:68:GLY:O	2:F:70:LEU:HD12	2.13	0.48
1:A:494:THR:HG22	1:A:508:THR:HG22	1.96	0.48
2:F:341:ILE:O	2:F:344:LYS:CG	2.60	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:444:LYS:HD3	3:C:48:TYR:CE2	2.49	0.47
3:C:31:LYS:HD3	3:C:35:ASP:OD2	2.14	0.47
2:F:258:THR:HA	2:F:364:VAL:CG1	2.44	0.47
1:E:177:ILE:CD1	1:E:485:GLY:HA3	2.42	0.47
1:E:502:ARG:HH11	1:E:504:ASP:HB3	1.79	0.47
4:H:37:ILE:C	4:H:38:LEU:HD12	2.35	0.47
1:A:354:TRP:N	1:A:355:PRO:CD	2.77	0.47
1:E:221:THR:HG23	1:E:233:PRO:HB3	1.95	0.47
1:A:365:ASP:O	1:A:369:GLN:HG3	2.14	0.47
2:F:204:ALA:HB2	2:F:212:ALA:HB2	1.97	0.47
2:B:103:ASP:OD2	2:B:107:ARG:HG2	2.15	0.47
3:C:153:LEU:O	3:C:157:ARG:CG	2.58	0.47
2:F:336:LYS:CE	2:F:391:ALA:HB3	2.44	0.47
1:E:502:ARG:NH1	1:E:504:ASP:HB3	2.30	0.47
1:A:223:TRP:CD1	1:A:298:VAL:HG21	2.50	0.47
2:B:63:PRO:HD3	2:B:75:TRP:CH2	2.49	0.47
4:D:74:GLN:HB3	1:E:92:GLY:HA3	1.95	0.47
1:E:125:TRP:CZ2	2:F:163:PHE:CE1	3.02	0.47
1:A:225:SER:HB2	4:D:65:HIS:ND1	2.30	0.47
2:F:369:LYS:HG2	2:F:374:ASP:OD2	2.15	0.47
3:G:84:THR:OG1	3:G:86:GLU:HG3	2.15	0.47
4:D:70:ASP:HB3	1:E:91:ALA:HB1	1.97	0.47
1:E:110:LEU:HD23	1:E:110:LEU:C	2.36	0.47
1:E:360:ARG:CG	1:E:498:GLN:HB2	2.42	0.47
1:E:493:LYS:HD2	1:E:509:LEU:HB2	1.97	0.47
1:A:283:THR:HB	1:A:284:PRO:HD3	1.97	0.47
1:A:354:TRP:CH2	1:A:499:PRO:HD3	2.50	0.47
2:B:164:ASN:HB3	2:B:238:TRP:CE2	2.50	0.47
3:C:160:ARG:HG3	3:C:162:VAL:HG13	1.97	0.47
4:D:35:TRP:CZ2	4:D:47:GLY:HA3	2.50	0.47
1:E:184:MET:HE3	1:E:184:MET:C	2.35	0.46
2:F:344:LYS:HB3	2:F:344:LYS:HE3	1.67	0.46
3:G:95:TRP:CE3	3:G:115:PHE:HB2	2.50	0.46
2:B:62:ASN:HB2	2:B:99:TYR:OH	2.15	0.46
1:E:354:TRP:CZ3	1:E:499:PRO:HD3	2.50	0.46
1:A:181:TRP:CZ3	1:A:184:MET:HE1	2.49	0.46
1:A:193:ILE:HB	2:B:171:ARG:CZ	2.45	0.46
1:A:295:LYS:NZ	1:A:365:ASP:OD2	2.39	0.46
1:A:395:TYR:HE1	1:A:404:PRO:HG2	1.80	0.46
2:F:189:LYS:HE2	2:F:192:ASN:ND2	2.31	0.46
3:C:10:ASN:O	3:C:14:THR:HG23	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:369:LYS:HA	2:B:373:ALA:HB3	1.98	0.46
1:A:501:VAL:HG12	1:A:501:VAL:O	2.15	0.46
2:B:369:LYS:NZ	2:B:380:ILE:O	2.39	0.46
2:F:238:TRP:CD1	2:F:238:TRP:C	2.90	0.46
1:E:493:LYS:HZ1	1:E:510:GLU:HG2	1.79	0.46
3:C:69:LYS:HD2	3:C:83:THR:HG21	1.98	0.46
1:E:186:ARG:CB	2:F:76:THR:CG2	2.91	0.46
2:F:59:ALA:N	2:F:176:ASP:OD2	2.38	0.46
1:A:500:HIS:CE1	1:A:502:ARG:O	2.69	0.46
4:H:38:LEU:HD12	4:H:38:LEU:N	2.31	0.46
1:E:71:GLU:OE1	1:E:74:LYS:CE	2.64	0.45
1:E:173:ARG:HD3	1:E:486:HIS:CE1	2.51	0.45
2:F:393:PHE:O	2:F:394:LYS:HG2	2.16	0.45
3:G:114:GLU:HA	3:G:117:GLN:HE21	1.81	0.45
3:G:120:LYS:HA	3:G:129:PHE:CE1	2.51	0.45
1:E:93:ASN:OD1	1:E:94:LYS:N	2.49	0.45
2:B:326:HIS:O	2:B:329:ALA:HB3	2.15	0.45
2:F:112:TYR:CE2	2:F:187:LEU:HD23	2.52	0.45
1:A:125:TRP:CD2	2:B:167:SER:HB3	2.52	0.45
2:B:207:VAL:CG2	2:B:207:VAL:O	2.64	0.45
3:C:65:LEU:O	3:C:69:LYS:HG3	2.17	0.45
2:F:79:PHE:HB2	2:F:83:ARG:HB3	1.98	0.45
3:G:160:ARG:HG3	3:G:162:VAL:HG23	1.98	0.45
1:A:473:TYR:HE1	3:C:7:ILE:HD11	1.81	0.45
1:E:193:ILE:O	2:F:171:ARG:NH2	2.46	0.45
2:F:123:THR:HG21	2:F:198:MET:HE1	1.97	0.45
1:A:323:LYS:N	8:A:703:HOH:O	2.39	0.45
1:E:275:PHE:CZ	1:E:332:LEU:HD13	2.52	0.45
2:F:154:ALA:HB3	2:F:227:TYR:CE2	2.52	0.45
2:F:275:TYR:OH	2:F:345:VAL:HG13	2.17	0.45
1:A:193:ILE:HD11	2:B:85:SER:HB3	1.98	0.45
2:B:273:THR:OG1	2:F:276:GLY:HA2	2.17	0.45
1:E:75:ASP:OD1	1:E:146:ARG:CZ	2.65	0.45
1:E:354:TRP:N	1:E:355:PRO:CD	2.80	0.45
3:C:42:SER:HB2	3:C:43:PRO:HD2	1.96	0.45
1:E:86:LEU:HD13	1:E:157:TYR:CD2	2.52	0.45
1:E:211:CYS:HB2	1:E:313:TRP:CD1	2.52	0.45
1:E:86:LEU:HD23	1:E:86:LEU:HA	1.84	0.45
3:C:163:LYS:HG3	3:C:165:LEU:HD23	1.99	0.45
1:A:115:TYR:CE2	2:B:59:ALA:HB3	2.52	0.44
1:E:223:TRP:CD1	1:E:298:VAL:HG21	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:221:TRP:CZ2	2:F:231:ARG:HA	2.52	0.44
1:A:281:TYR:O	1:A:284:PRO:HD2	2.18	0.44
2:B:243:ASP:HB3	2:B:246:GLU:HB3	1.99	0.44
2:F:195:MET:SD	2:F:198:MET:HE2	2.57	0.44
2:B:320:LEU:HD23	2:B:320:LEU:HA	1.65	0.44
1:E:94:LYS:HB3	1:E:95:VAL:H	1.52	0.44
1:E:123:MET:HB2	2:F:171:ARG:HD3	1.98	0.44
1:E:497:ALA:O	1:E:498:GLN:HG2	2.18	0.44
2:F:365:PHE:HB2	2:F:382:VAL:HG13	2.00	0.44
1:E:110:LEU:CD1	1:E:236:PHE:HE1	2.26	0.44
1:A:501:VAL:CG1	1:A:501:VAL:O	2.66	0.44
1:E:110:LEU:HD23	1:E:110:LEU:O	2.17	0.44
3:C:121:PRO:HD3	3:C:129:PHE:CD2	2.52	0.44
1:A:468:ASN:OD1	1:A:471:GLU:HG3	2.17	0.44
1:E:33:GLN:HA	1:E:131:ALA:HB3	2.00	0.44
1:A:361:LEU:N	1:A:361:LEU:HD23	2.32	0.44
2:B:354:ARG:HB2	2:B:393:PHE:HE2	1.82	0.44
2:F:63:PRO:O	2:F:69:GLY:HA3	2.17	0.44
2:F:173:CYS:HA	2:F:244:TRP:CE2	2.53	0.44
1:A:124:LEU:HD11	1:A:201:SER:HB2	1.99	0.43
4:D:13:ARG:HG2	4:D:25:PHE:HB3	2.00	0.43
1:E:448:LEU:HD21	1:E:457:TRP:HB3	2.00	0.43
3:G:79:VAL:HG12	3:G:80:THR:HG23	2.00	0.43
1:A:454:GLU:OE2	3:C:157:ARG:HD3	2.18	0.43
2:B:162:LEU:HD23	2:B:162:LEU:HA	1.86	0.43
1:A:202:VAL:CG1	1:A:274:ALA:HB3	2.48	0.43
3:C:119:TYR:O	3:C:124:LEU:HB2	2.18	0.43
4:D:26:THR:HG23	4:D:35:TRP:HB3	2.01	0.43
3:G:119:TYR:O	3:G:124:LEU:HB2	2.18	0.43
1:A:115:TYR:CD2	2:B:59:ALA:CB	3.01	0.43
2:B:330:ARG:H	2:B:330:ARG:HG2	1.65	0.43
2:F:328:LEU:O	2:F:332:VAL:HG23	2.18	0.43
1:A:115:TYR:CE2	2:B:59:ALA:CB	3.01	0.43
1:A:147:HIS:CE1	1:A:242:ASP:OD2	2.63	0.43
1:A:455:ARG:NH2	3:C:151:THR:O	2.51	0.43
2:B:60:GLN:HG2	2:B:62:ASN:OD1	2.19	0.43
2:B:390:LEU:HD23	2:B:390:LEU:HA	1.86	0.43
2:F:249:TRP:CZ2	2:F:376:ILE:HD13	2.54	0.43
2:F:368:TRP:CZ3	2:F:373:ALA:HB2	2.53	0.43
2:B:207:VAL:HG23	2:B:207:VAL:O	2.18	0.43
1:E:202:VAL:HA	1:E:206:LEU:HB2	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:184:MET:HE2	1:E:184:MET:HB3	1.38	0.43
1:E:289:LEU:C	1:E:289:LEU:HD23	2.39	0.43
1:A:115:TYR:CD2	2:B:59:ALA:HB3	2.53	0.43
1:A:425:PHE:CZ	1:A:434:GLY:O	2.72	0.43
1:E:439:HIS:HB3	3:G:162:VAL:HG13	2.01	0.43
1:A:305:TRP:CZ3	1:A:336:LYS:HA	2.54	0.42
1:E:172:ARG:NH1	2:F:70:LEU:HD13	2.33	0.42
2:F:360:ALA:HA	2:F:363:ARG:NH1	2.34	0.42
2:F:62:ASN:HB2	2:F:99:TYR:OH	2.19	0.42
3:C:23:LEU:HD22	3:C:29:ALA:HA	2.00	0.42
1:E:100:GLY:HA2	1:E:103:MET:HE3	2.00	0.42
2:F:216:VAL:HB	2:F:217:PRO:HD3	2.00	0.42
1:A:477:GLU:OE1	1:A:479:SER:OG	2.34	0.42
2:B:274:VAL:HG11	2:B:348:VAL:HG21	2.00	0.42
4:D:31:TYR:CD1	4:D:32:MET:HB2	2.55	0.42
1:E:110:LEU:HD22	1:E:151:CYS:HG	1.84	0.42
1:E:493:LYS:CG	1:E:508:THR:HB	2.25	0.42
2:F:112:TYR:HE2	2:F:187:LEU:HD23	1.84	0.42
2:F:214:THR:C	2:F:217:PRO:HD2	2.40	0.42
1:A:356:LEU:HD23	1:A:356:LEU:HA	1.86	0.42
1:E:192:PHE:O	1:E:200:CYS:HB3	2.18	0.42
1:E:459:SER:C	1:E:460:GLU:HG3	2.40	0.42
2:F:284:THR:O	2:F:288:GLN:HG2	2.19	0.42
1:A:295:LYS:HZ2	1:A:367:GLU:HG3	1.85	0.42
1:E:49:LYS:HD3	3:G:141:MET:HB3	2.01	0.42
2:B:121:ARG:CZ	8:B:401:HOH:O	2.65	0.42
1:E:478:LEU:HB2	1:E:517:CYS:HB3	2.01	0.42
2:F:189:LYS:HE2	2:F:192:ASN:HD22	1.85	0.42
1:A:318:ILE:HA	1:A:318:ILE:HD13	1.68	0.42
2:B:118:GLU:HB3	2:F:118:GLU:HB3	2.01	0.42
3:C:44:PHE:CZ	3:C:110:ARG:HD3	2.55	0.42
2:F:98:TRP:CE2	2:F:174:LEU:HD12	2.54	0.42
2:F:267:PHE:CZ	2:F:341:ILE:HD13	2.55	0.42
3:C:103:GLU:OE2	3:C:103:GLU:N	2.51	0.42
2:F:78:LYS:HB3	2:F:83:ARG:O	2.19	0.42
4:H:35:TRP:CH2	4:H:47:GLY:HA3	2.55	0.42
1:A:202:VAL:HG11	1:A:274:ALA:HB3	2.02	0.41
2:B:354:ARG:HB2	2:B:393:PHE:CE2	2.55	0.41
1:E:299:GLU:HA	8:E:765:HOH:O	2.20	0.41
1:A:348:LEU:HD23	1:A:387:TYR:CE1	2.55	0.41
3:C:52:VAL:O	3:C:52:VAL:HG13	2.18	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:33:GLN:CD	1:E:132:GLU:HG3	2.41	0.41
1:E:82:LEU:HD23	1:E:82:LEU:O	2.20	0.41
1:A:296:PHE:HE2	1:A:298:VAL:CG2	2.31	0.41
3:C:154:GLU:OE1	3:C:154:GLU:N	2.39	0.41
1:A:436:LEU:N	3:C:168:GLN:OE1	2.40	0.41
3:C:110:ARG:HD2	3:C:110:ARG:HA	1.88	0.41
1:E:52:MET:HB3	1:E:52:MET:HE3	1.72	0.41
1:A:177:ILE:HD11	1:A:485:GLY:CA	2.49	0.41
1:A:448:LEU:HD21	1:A:457:TRP:CB	2.51	0.41
1:E:495:LEU:CD2	1:E:509:LEU:HD23	2.47	0.41
3:G:116:ARG:O	3:G:120:LYS:HB2	2.20	0.41
2:B:60:GLN:N	2:B:176:ASP:OD2	2.49	0.41
2:B:153:GLY:O	2:B:156:LEU:HG	2.21	0.41
1:A:192:PHE:O	1:A:200:CYS:HB3	2.21	0.41
1:E:118:ILE:HG23	1:E:141:VAL:HG13	2.03	0.41
1:E:192:PHE:CE1	1:E:204:LEU:HA	2.55	0.41
1:E:402:PHE:C	1:E:403:ILE:HD12	2.41	0.41
1:E:469:LEU:HD12	1:E:469:LEU:C	2.41	0.41
2:F:191:ASP:O	2:F:195:MET:HG2	2.21	0.41
2:F:347:LYS:HE3	2:F:347:LYS:HB2	1.45	0.41
3:G:13:ARG:O	3:G:17:GLU:HG3	2.21	0.41
3:G:109:GLU:O	3:G:113:ILE:HG13	2.20	0.41
3:G:120:LYS:HB2	3:G:120:LYS:HE3	1.87	0.41
2:B:229:GLY:HA3	2:B:334:ALA:HA	2.02	0.41
4:D:22:TYR:CE1	4:D:39:ARG:HG3	2.55	0.41
2:F:266:GLU:OE1	2:F:363:ARG:NH1	2.53	0.41
2:F:280:THR:N	2:F:281:PRO:CD	2.84	0.41
2:F:393:PHE:CD2	2:F:395:ASN:HB2	2.56	0.41
3:G:44:PHE:HE2	3:G:113:ILE:HD12	1.85	0.41
1:A:500:HIS:ND1	1:A:502:ARG:HG2	2.36	0.41
2:B:148:LEU:O	2:B:152:TYR:HB3	2.21	0.41
1:E:343:HIS:ND1	8:E:704:HOH:O	2.37	0.41
1:E:493:LYS:CE	1:E:510:GLU:H	2.22	0.41
2:F:266:GLU:CD	2:F:363:ARG:NH1	2.75	0.41
1:A:409:LEU:HD23	1:A:409:LEU:HA	1.87	0.40
2:B:304:TYR:HD1	2:B:305:CYS:SG	2.43	0.40
3:C:5:GLU:HB2	3:C:6:PRO:HD2	2.04	0.40
1:E:221:THR:O	1:E:225:SER:HB2	2.20	0.40
1:E:294:SER:O	1:E:297:LYS:NZ	2.54	0.40
1:A:252:GLN:OE1	1:A:252:GLN:HA	2.20	0.40
3:C:82:ALA:HB2	3:C:124:LEU:HD23	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:E:729:HOH:O	2:F:73:GLY:HA3	2.21	0.40
2:F:103:ASP:OD1	2:F:104:PRO:HD2	2.21	0.40
2:F:187:LEU:O	2:F:190:VAL:HG12	2.21	0.40
2:F:241:ILE:HG22	3:G:127:ASN:ND2	2.36	0.40
1:A:348:LEU:HD23	1:A:387:TYR:CZ	2.56	0.40
1:A:521:ASN:OD1	1:A:521:ASN:C	2.59	0.40
2:B:161:GLY:HA3	2:B:234:VAL:HG11	2.03	0.40
1:E:437:ARG:NH2	1:E:451:ASP:OD1	2.50	0.40
1:E:495:LEU:HD11	1:E:512:ILE:CG1	2.51	0.40
1:A:49:LYS:HE2	1:A:50:TYR:CE1	2.57	0.40
1:A:255:VAL:HG22	1:A:324:TYR:CZ	2.56	0.40
2:B:320:LEU:HD23	2:B:323:TRP:CE3	2.56	0.40
1:E:181:TRP:CE2	1:E:185:LYS:HD3	2.56	0.40
1:E:468:ASN:HA	8:E:724:HOH:O	2.21	0.40
1:E:487:GLY:HA2	1:E:496:ILE:HD12	2.03	0.40
2:F:266:GLU:OE1	2:F:266:GLU:HA	2.21	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	499/526 (95%)	475 (95%)	24 (5%)	0	100	100
1	E	499/526 (95%)	473 (95%)	26 (5%)	0	100	100
2	B	337/395 (85%)	316 (94%)	21 (6%)	0	100	100
2	F	337/395 (85%)	321 (95%)	16 (5%)	0	100	100
3	C	163/169 (96%)	162 (99%)	0	1 (1%)	25	47
3	G	165/169 (98%)	162 (98%)	2 (1%)	1 (1%)	25	47
4	D	62/114 (54%)	57 (92%)	5 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	H	66/114 (58%)	64 (97%)	2 (3%)	0	100	100
All	All	2128/2408 (88%)	2030 (95%)	96 (4%)	2 (0%)	51	75

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	G	42	SER
3	C	42	SER

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	415/431 (96%)	405 (98%)	10 (2%)	49	74
1	E	415/431 (96%)	399 (96%)	16 (4%)	32	58
2	B	275/324 (85%)	265 (96%)	10 (4%)	35	61
2	F	274/324 (85%)	262 (96%)	12 (4%)	28	53
3	C	141/144 (98%)	135 (96%)	6 (4%)	29	54
3	G	143/144 (99%)	139 (97%)	4 (3%)	43	69
4	D	55/98 (56%)	51 (93%)	4 (7%)	14	28
4	H	58/98 (59%)	53 (91%)	5 (9%)	10	20
All	All	1776/1994 (89%)	1709 (96%)	67 (4%)	33	59

All (67) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	77	ARG
1	A	79	PHE
1	A	82	LEU
1	A	83	LEU
1	A	124	LEU
1	A	173	ARG

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	188	PHE
1	A	203	ASN
1	A	484	GLU
1	A	486	HIS
2	B	106	ARG
2	B	136	ILE
2	B	148	LEU
2	B	156	LEU
2	B	163	PHE
2	B	270	ARG
2	B	271	LEU
2	B	344	LYS
2	B	348	VAL
2	B	384	GLN
3	C	12	THR
3	C	31	LYS
3	C	52	VAL
3	C	103	GLU
3	C	153	LEU
3	C	157	ARG
4	D	12	SER
4	D	21	ARG
4	D	26	THR
4	D	75	ARG
1	E	30	LYS
1	E	61	LYS
1	E	89	LEU
1	E	125	TRP
1	E	146	ARG
1	E	184	MET
1	E	185	LYS
1	E	188	PHE
1	E	225	SER
1	E	251	TYR
1	E	289	LEU
1	E	299	GLU
1	E	333	ARG
1	E	437	ARG
1	E	479	SER
1	E	525	LYS
2	F	57	CYS
2	F	76	THR

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Mol	Chain	Res	Type
2	F	92	GLU
2	F	156	LEU
2	F	163	PHE
2	F	270	ARG
2	F	273	THR
2	F	344	LYS
2	F	345	VAL
2	F	347	LYS
2	F	354	ARG
2	F	384	GLN
3	G	4	ARG
3	G	103	GLU
3	G	109	GLU
3	G	153	LEU
4	H	30	ASP
4	H	34	ARG
4	H	53	ASP
4	H	64	SER
4	H	68	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	147	HIS
1	E	147	HIS
3	G	117	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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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
6	HEZ	A	603	5	7,7,7	0.55	0	6,6,6	0.77	0
7	FMT	E	604	5	2,2,2	0.68	0	1,1,1	0.93	0
6	HEZ	E	603	5	7,7,7	0.42	0	6,6,6	0.55	0
7	FMT	A	604	5	2,2,2	0.58	0	1,1,1	0.77	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
6	HEZ	A	603	5	-	0/5/5/5	-
6	HEZ	E	603	5	-	0/5/5/5	-

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, 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	503/526 (95%)	-0.35	16 (3%) 47 40	31, 46, 79, 118	0
1	E	503/526 (95%)	-0.34	17 (3%) 45 38	29, 46, 82, 114	0
2	B	339/395 (85%)	-0.41	5 (1%) 73 70	31, 44, 72, 92	0
2	F	339/395 (85%)	-0.46	5 (1%) 73 70	30, 46, 66, 87	0
3	C	165/169 (97%)	-0.23	7 (4%) 36 29	34, 48, 84, 117	0
3	G	167/169 (98%)	-0.35	4 (2%) 59 53	34, 47, 70, 101	0
4	D	64/114 (56%)	-0.18	4 (6%) 20 15	35, 46, 91, 108	0
4	H	68/114 (59%)	-0.30	3 (4%) 34 27	30, 40, 65, 105	0
All	All	2148/2408 (89%)	-0.36	61 (2%) 53 46	29, 46, 78, 118	0

All (61) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	5	GLU	6.0
3	G	3	LYS	5.0
3	C	10	ASN	4.8
2	F	57	CYS	4.7
1	A	92	GLY	4.6
4	D	74	GLN	4.5
1	A	160	LYS	4.4
1	E	91	ALA	4.4
4	H	74	GLN	4.2
4	D	75	ARG	4.1
1	A	486	HIS	3.8
1	E	490	SER	3.7
1	E	11	THR	3.6
2	F	106	ARG	3.5
3	C	9	GLU	3.4
4	H	73	ALA	3.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
4	D	20	ALA	3.2
1	E	156	HIS	3.2
1	A	91	ALA	3.2
1	E	12	ASP	3.1
1	A	40	LYS	3.1
1	A	14	LEU	3.1
2	F	58	TYR	3.0
1	E	176	ALA	3.0
1	E	157	TYR	3.0
1	A	156	HIS	2.9
1	A	12	ASP	2.8
2	B	104	PRO	2.8
2	B	68	GLY	2.8
3	C	6	PRO	2.8
2	B	58	TYR	2.7
1	A	153	PHE	2.7
1	E	15	LYS	2.6
1	A	159	SER	2.6
3	C	101	ALA	2.6
3	C	15	GLU	2.6
1	E	492	GLY	2.5
2	F	59	ALA	2.5
3	C	11	SER	2.5
1	A	174	THR	2.4
2	B	59	ALA	2.4
4	D	71	GLU	2.4
1	A	157	TYR	2.4
1	E	399	LYS	2.3
4	H	71	GLU	2.3
1	E	93	ASN	2.3
1	E	514	ARG	2.2
1	A	490	SER	2.2
1	E	153	PHE	2.2
1	E	155	ASN	2.2
3	G	11	SER	2.2
1	A	381	ASP	2.1
1	E	434	GLY	2.1
1	E	504	ASP	2.1
2	B	208	PRO	2.1
1	A	489	ARG	2.1
1	E	366	GLU	2.1
3	G	10	ASN	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	504	ASP	2.1
3	G	4	ARG	2.1
2	F	102	ARG	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [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(Å <sup>2</sup> )	Q<0.9
6	HEZ	A	603	8/8	0.92	0.23	37,41,44,45	0
6	HEZ	E	603	8/8	0.95	0.24	28,42,47,48	0
7	FMT	A	604	3/3	0.96	0.18	33,37,40,44	0
5	FE	E	602	1/1	0.98	0.13	37,37,37,37	0
5	FE	A	602	1/1	0.99	0.12	42,42,42,42	0
5	FE	E	601	1/1	0.99	0.10	32,32,32,32	0
5	FE	A	601	1/1	0.99	0.11	37,37,37,37	0
7	FMT	E	604	3/3	0.99	0.18	31,33,35,37	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.