



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 24, 2026 – 11:06 AM UTC

PDB ID : 6FDJ / pdb_00006fdj
Title : Crystal Structure of Two-Domain Laccase mutant H165A from *Streptomyces griseoflavus* with high copper ions occupancy
Authors : Gabdulkhakov, A.G.; Tishchenko, T.V.
Deposited on : 2017-12-25
Resolution : 2.31 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

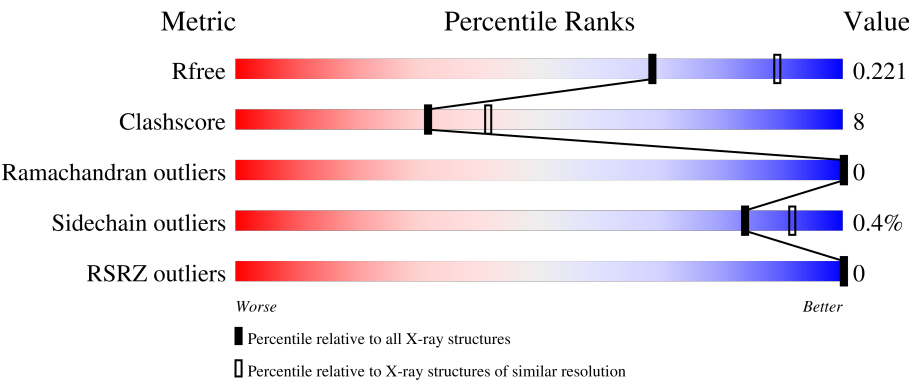
MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.31 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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

Mol	Chain	Length	Quality of chain
1	A	322	72%15%14%
1	B	322	71%15%14%
1	C	322	70%15%15%
1	D	322	71%15%14%
1	E	322	69%17%14%

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Mol	Chain	Length	Quality of chain
1	F	322	 70%16%15%
1	G	322	 73%14%14%
1	H	322	 69%16%14%
1	I	322	 66%20%14%
1	J	322	 70%16%14%
1	K	322	 66%19%14%
1	L	322	 71%14%14%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 25844 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 Two-domain laccase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	278	Total	C	N	O	S	0	0	0
			2125	1325	387	401	12			
1	B	278	Total	C	N	O	S	0	1	0
			2132	1329	388	403	12			
1	C	275	Total	C	N	O	S	0	0	0
			2105	1313	384	396	12			
1	D	278	Total	C	N	O	S	0	0	0
			2125	1325	387	401	12			
1	E	277	Total	C	N	O	S	0	0	0
			2118	1320	386	400	12			
1	F	275	Total	C	N	O	S	0	0	0
			2105	1313	384	396	12			
1	G	278	Total	C	N	O	S	0	0	0
			2125	1325	387	401	12			
1	H	277	Total	C	N	O	S	0	0	0
			2118	1320	386	400	12			
1	I	276	Total	C	N	O	S	0	0	0
			2113	1317	385	399	12			
1	J	277	Total	C	N	O	S	0	0	0
			2120	1322	386	400	12			
1	K	276	Total	C	N	O	S	0	0	0
			2110	1316	385	397	12			
1	L	276	Total	C	N	O	S	0	0	0
			2113	1317	385	399	12			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
B	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
C	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
D	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
E	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81

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Chain	Residue	Modelled	Actual	Comment	Reference
F	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
G	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
H	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
I	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
J	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
K	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81
L	165	ALA	HIS	engineered mutation	UNP A0A0M4FJ81

- Molecule 2 is COPPER (II) ION (CCD ID: CU) (formula: Cu).

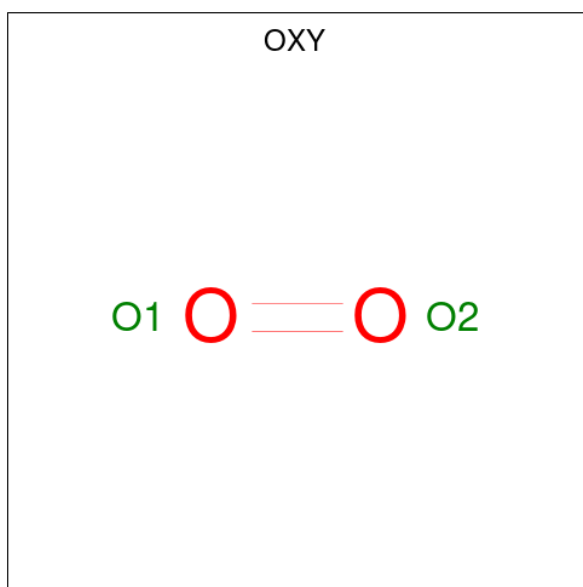
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	7	Total Cu 7 7	0	0
2	B	4	Total Cu 4 4	0	0
2	C	1	Total Cu 1 1	0	0
2	D	7	Total Cu 7 7	0	0
2	E	4	Total Cu 4 4	0	0
2	F	1	Total Cu 1 1	0	0
2	G	7	Total Cu 7 7	0	0
2	H	4	Total Cu 4 4	0	0
2	I	1	Total Cu 1 1	0	0
2	J	7	Total Cu 7 7	0	0
2	K	4	Total Cu 4 4	0	0
2	L	1	Total Cu 1 1	0	0

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		
3	D	1	Total	C	O	0	0
			6	3	3		
3	E	1	Total	C	O	0	0
			6	3	3		
3	E	1	Total	C	O	0	0
			6	3	3		
3	F	1	Total	C	O	0	0
			6	3	3		
3	G	1	Total	C	O	0	0
			6	3	3		
3	H	1	Total	C	O	0	0
			6	3	3		
3	I	1	Total	C	O	0	0
			6	3	3		
3	J	1	Total	C	O	0	0
			6	3	3		
3	J	1	Total	C	O	0	0
			6	3	3		
3	K	1	Total	C	O	0	0
			6	3	3		
3	L	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is OXYGEN MOLECULE (CCD ID: OXY) (formula: O₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O 2 2	0	0
4	B	1	Total O 2 2	0	0
4	D	1	Total O 2 2	0	0
4	G	1	Total O 2 2	0	0
4	J	1	Total O 2 2	0	0
4	K	1	Total O 2 2	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	24	Total O 24 24	0	0
5	B	24	Total O 24 24	0	0
5	C	31	Total O 31 31	0	0
5	D	30	Total O 30 30	0	0
5	E	32	Total O 32 32	0	0
5	F	26	Total O 26 26	0	0

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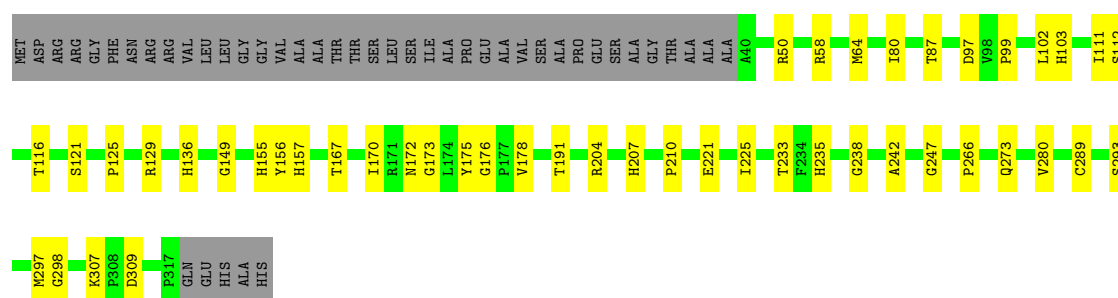
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	G	22	Total 22	O 22	0	0
5	H	28	Total 28	O 28	0	0
5	I	19	Total 19	O 19	0	0
5	J	26	Total 26	O 26	0	0
5	K	18	Total 18	O 18	0	0
5	L	23	Total 23	O 23	0	0

3 Residue-property plots [i](#)

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

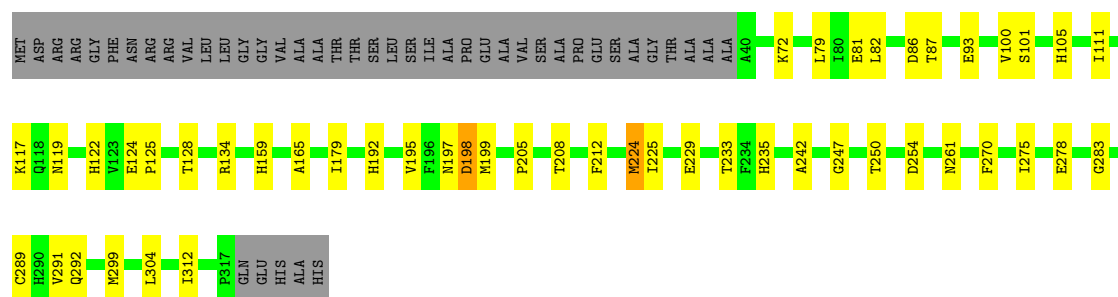
• Molecule 1: Two-domain laccase

Chain A: 



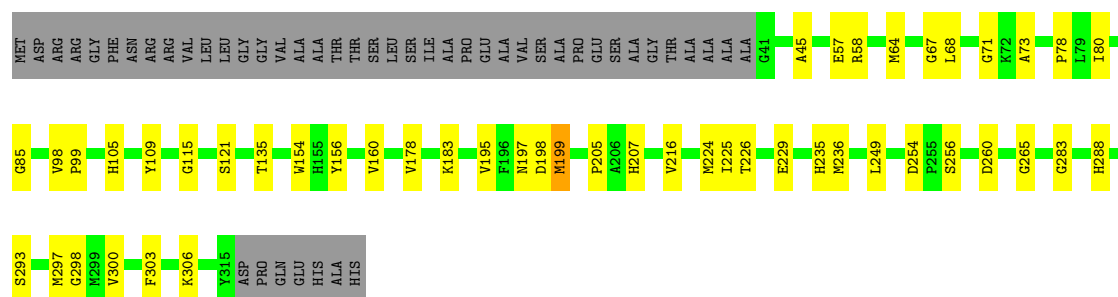
• Molecule 1: Two-domain laccase

Chain B: 

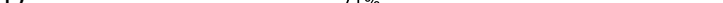


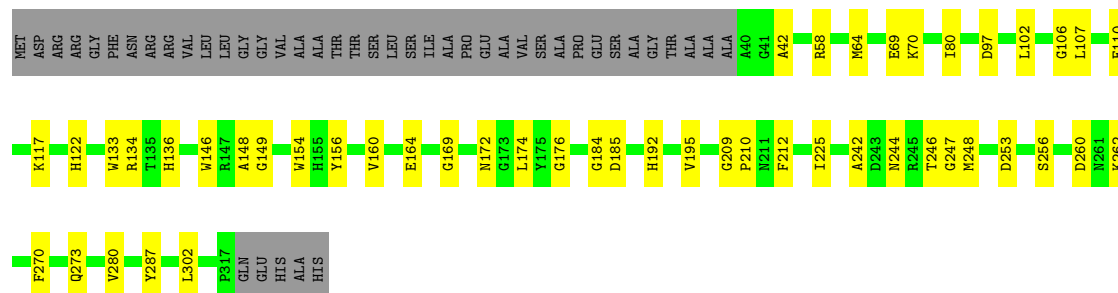
• Molecule 1: Two-domain laccase

Chain C: 



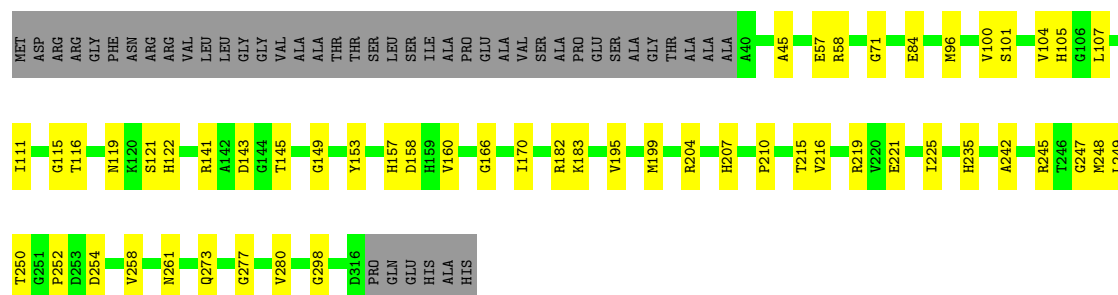
- Molecule 1: Two-domain laccase

Chain D:  71% 15% 14%

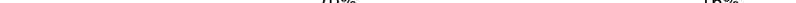


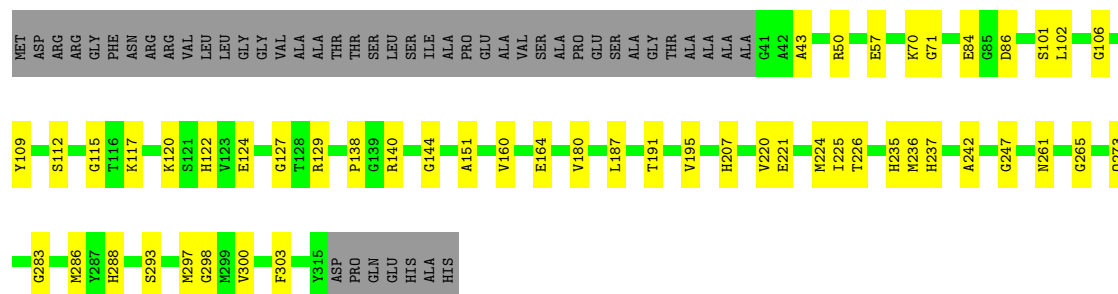
- Molecule 1: Two-domain laccase

Chain E: 69% 17% 14%



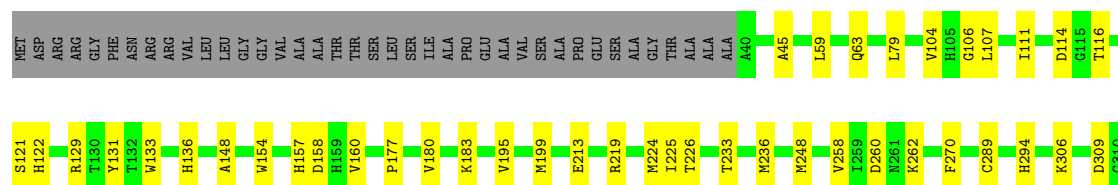
- Molecule 1: Two-domain laccase

Chain F:  70% 16% 15%



- Molecule 1: Two-domain laccase

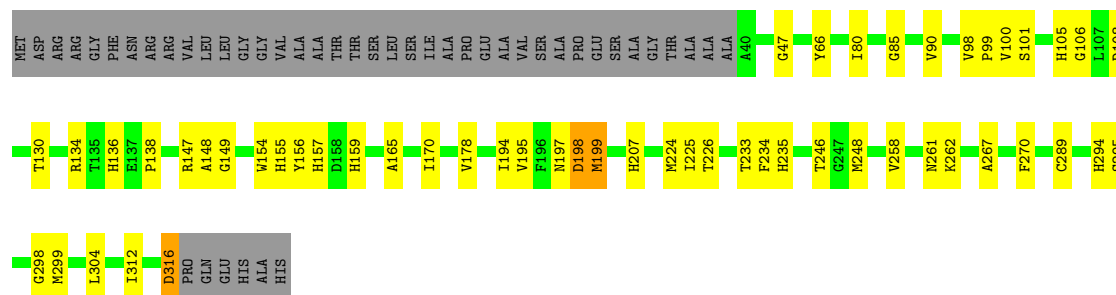
Chain G: 73% 14% 14%





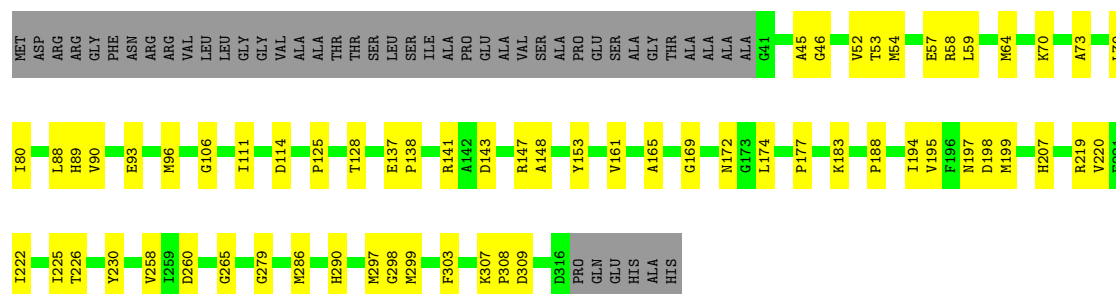
- Molecule 1: Two-domain laccase

Chain H: 69% 16% 14%



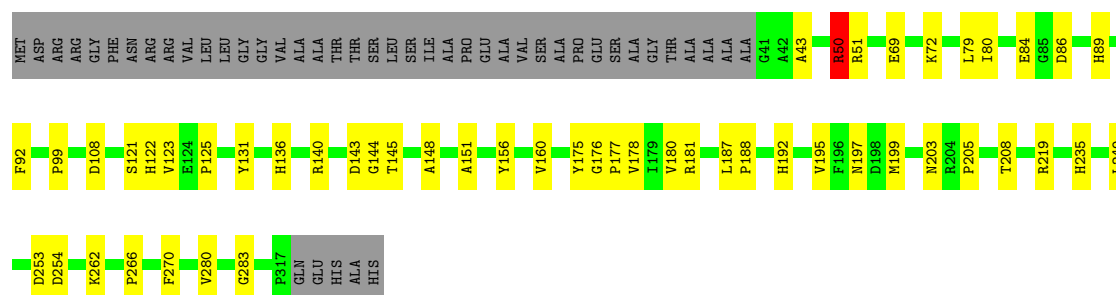
- Molecule 1: Two-domain laccase

Chain I: 66% 20% 14%



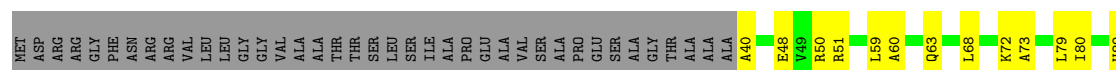
- Molecule 1: Two-domain laccase

Chain J: 70% 16% 14%



- Molecule 1: Two-domain laccase

Chain K: 66% 19% 14%



- Molecule 1: Two-domain laccase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	77.37Å 95.12Å 116.47Å 90.13° 90.11° 91.85°	Depositor
Resolution (Å)	49.71 – 2.31 49.71 – 2.31	Depositor EDS
% Data completeness (in resolution range)	98.0 (49.71-2.31) 97.5 (49.71-2.31)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.75 (at 2.32Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.171 , 0.222 0.171 , 0.221	Depositor DCC
R_{free} test set	7160 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å ²)	34.0	Xtriage
Anisotropy	0.429	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 18.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.43$, $\langle L^2 \rangle = 0.26$	Xtriage
Estimated twinning fraction	0.107 for h,-k,-l 0.158 for -h,k,-l 0.205 for -h,-k,l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	25844	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.67% 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: OXY, GOL, CU

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	0.36	0/2186	0.57	0/2970
1	B	0.39	0/2193	0.63	3/2980 (0.1%)
1	C	0.37	0/2165	0.59	1/2940 (0.0%)
1	D	0.38	0/2186	0.60	0/2970
1	E	0.40	0/2178	0.59	0/2958
1	F	0.37	0/2165	0.59	0/2940
1	G	0.36	0/2186	0.58	0/2970
1	H	0.37	0/2178	0.61	2/2958 (0.1%)
1	I	0.32	0/2173	0.58	1/2951 (0.0%)
1	J	0.40	1/2181 (0.0%)	0.58	0/2963
1	K	0.37	0/2170	0.64	4/2947 (0.1%)
1	L	0.39	0/2173	0.58	1/2951 (0.0%)
All	All	0.37	1/26134 (0.0%)	0.60	12/35498 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	J	50	ARG	C-O	-6.29	1.16	1.23

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	199	MET	N-CA-C	7.02	120.41	112.97
1	K	205	PRO	CB-CA-C	-6.06	103.87	111.56
1	B	198	ASP	N-CA-C	-5.97	98.09	110.80
1	H	199	MET	N-CA-C	5.87	119.41	112.72
1	H	198	ASP	N-CA-C	-5.85	98.19	108.08
1	B	199	MET	N-CA-CB	-5.83	102.37	110.65
1	I	199	MET	N-CA-CB	-5.73	102.88	111.25
1	K	205	PRO	N-CA-C	5.53	119.88	111.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	315	TYR	N-CA-C	5.43	117.55	109.25
1	K	199	MET	N-CA-C	5.35	118.82	112.72
1	C	199	MET	N-CA-CB	-5.20	103.10	110.79
1	K	199	MET	N-CA-CB	-5.05	103.18	110.70

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	2125	0	1999	33	0
1	B	2132	0	2006	35	0
1	C	2105	0	1983	34	0
1	D	2125	0	1999	32	0
1	E	2118	0	1993	39	0
1	F	2105	0	1983	35	0
1	G	2125	0	1999	36	0
1	H	2118	0	1992	39	0
1	I	2113	0	1987	48	0
1	J	2120	0	1994	33	0
1	K	2110	0	1988	42	0
1	L	2113	0	1987	35	0
2	A	7	0	0	0	0
2	B	4	0	0	1	0
2	C	1	0	0	0	0
2	D	7	0	0	0	0
2	E	4	0	0	0	0
2	F	1	0	0	0	0
2	G	7	0	0	0	0
2	H	4	0	0	0	0
2	I	1	0	0	0	0
2	J	7	0	0	0	0
2	K	4	0	0	0	0
2	L	1	0	0	0	0
3	A	6	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	D	6	0	8	0	0
3	E	12	0	16	2	0
3	F	6	0	8	0	0
3	G	6	0	8	0	0
3	H	6	0	8	0	0
3	I	6	0	8	1	0
3	J	12	0	16	0	0
3	K	6	0	8	0	0
3	L	6	0	8	1	0
4	A	2	0	0	1	0
4	B	2	0	0	0	0
4	D	2	0	0	0	0
4	G	2	0	0	0	0
4	J	2	0	0	0	0
4	K	2	0	0	0	0
5	A	24	0	0	0	0
5	B	24	0	0	0	0
5	C	31	0	0	1	0
5	D	30	0	0	1	0
5	E	32	0	0	1	0
5	F	26	0	0	1	0
5	G	22	0	0	1	0
5	H	28	0	0	1	0
5	I	19	0	0	2	0
5	J	26	0	0	3	0
5	K	18	0	0	0	0
5	L	23	0	0	0	0
All	All	25844	0	24006	403	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 8.

All (403) 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:K:158:ASP:OD2	1:K:161:VAL:HG12	1.66	0.96
1:C:80:ILE:HB	1:C:178:VAL:HG12	1.51	0.93
1:B:289:CYS:HG	2:B:401:CU:CU	0.68	0.89
1:J:151:ALA:HA	1:J:180:VAL:HG23	1.56	0.86
1:B:124:GLU:HG3	1:B:125:PRO:HD2	1.58	0.84
1:J:199:MET:HB2	5:J:510:HOH:O	1.78	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:80:ILE:HD12	1:A:156:TYR:CE1	2.20	0.77
1:C:199:MET:HB2	5:C:519:HOH:O	1.84	0.76
1:A:80:ILE:CD1	1:A:156:TYR:CE1	2.69	0.75
1:F:57:GLU:OE2	1:F:70:LYS:HD2	1.88	0.74
1:F:288:HIS:HB3	1:F:300:VAL:HG12	1.72	0.71
1:H:262:LYS:HD2	1:H:270:PHE:CE2	2.26	0.71
1:I:64:MET:SD	1:I:96:MET:HE1	2.31	0.69
1:G:136:HIS:NE2	1:G:148:ALA:O	2.22	0.69
1:K:93:GLU:HB2	1:K:128:THR:HG22	1.74	0.69
1:I:46:GLY:H	1:I:183:LYS:NZ	1.93	0.67
1:J:192:HIS:NE2	5:J:502:HOH:O	2.28	0.67
1:L:191:THR:HG23	1:L:221:GLU:HG2	1.75	0.67
1:E:84:GLU:OE2	1:E:182:ARG:NH2	2.25	0.66
1:I:59:LEU:HD21	1:I:73:ALA:HB3	1.78	0.66
1:A:80:ILE:HD12	1:A:156:TYR:HE1	1.57	0.66
1:I:64:MET:HE1	1:I:161:VAL:HG11	1.78	0.66
1:I:64:MET:HG3	1:I:172:ASN:HB3	1.77	0.66
1:K:59:LEU:HD21	1:K:73:ALA:HB3	1.78	0.66
1:H:224:MET:HG2	1:H:270:PHE:CZ	2.30	0.66
1:E:57:GLU:OE2	1:E:71:GLY:N	2.28	0.66
1:G:262:LYS:HD3	1:G:270:PHE:CE1	2.32	0.65
1:J:197:ASN:ND2	1:J:203:ASN:OD1	2.27	0.65
1:L:224:MET:HE1	1:L:226:THR:OG1	1.97	0.65
1:J:188:PRO:HA	1:J:219:ARG:HG2	1.79	0.64
1:E:245:ARG:NH1	3:E:404:GOL:O3	2.31	0.64
1:A:280:VAL:HG12	1:C:109:TYR:H	1.63	0.64
1:C:99:PRO:HD2	1:H:98:VAL:HG12	1.78	0.64
1:C:288:HIS:HB3	1:C:300:VAL:HG12	1.80	0.63
1:B:195:VAL:HG22	1:B:225:ILE:HB	1.81	0.62
1:K:60:ALA:O	1:K:63:GLN:HG3	2.00	0.62
1:E:219:ARG:HH12	1:E:248:MET:CE	2.13	0.61
1:L:52:VAL:HG22	1:L:88:LEU:HD11	1.81	0.61
1:A:156:TYR:CZ	1:A:176:GLY:HA3	2.36	0.61
1:K:141:ARG:HH21	1:L:278:GLU:CD	2.08	0.60
1:K:143:ASP:OD1	1:K:145:THR:HG22	2.01	0.60
1:D:122:HIS:HB3	1:D:160:VAL:HG21	1.84	0.60
1:F:237:HIS:CE1	1:F:286:MET:HE2	2.36	0.60
1:H:304:LEU:HB3	1:H:312:ILE:HD13	1.84	0.60
1:L:221:GLU:HB2	1:L:273:GLN:HG2	1.83	0.60
1:F:117:LYS:HD3	1:F:164:GLU:HG2	1.84	0.60
1:F:57:GLU:OE2	1:F:70:LYS:HA	2.02	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:50:ARG:NH1	1:F:86:ASP:OD2	2.35	0.59
1:C:297:MET:HG2	1:I:230:TYR:OH	2.02	0.59
1:K:79:LEU:HD11	1:K:179:ILE:HG13	1.84	0.59
1:E:115:GLY:H	1:E:121:SER:HB3	1.68	0.58
1:G:224:MET:SD	1:G:224:MET:C	2.86	0.58
1:D:136:HIS:NE2	1:D:148:ALA:O	2.23	0.58
1:H:154:TRP:HB2	1:H:178:VAL:HG23	1.84	0.58
1:D:156:TYR:CZ	1:D:176:GLY:HA3	2.39	0.58
1:J:140:ARG:NH1	1:J:144:GLY:O	2.33	0.58
1:K:141:ARG:HH11	1:K:145:THR:CG2	2.17	0.57
1:A:307:LYS:HB2	1:A:309:ASP:OD1	2.04	0.57
1:A:64:MET:HE3	1:A:172:ASN:HD22	1.69	0.57
1:A:64:MET:HE3	1:A:172:ASN:ND2	2.20	0.57
1:B:233:THR:OG1	1:B:261:ASN:OD1	2.21	0.57
1:K:51:ARG:HG2	1:K:89:HIS:HB2	1.86	0.57
1:A:103:HIS:NE2	4:A:407:OXY:O2	2.37	0.57
1:K:68:LEU:H	1:K:72:LYS:HE2	1.69	0.57
1:E:104:VAL:HG21	1:E:107:LEU:HD22	1.87	0.57
1:G:262:LYS:CD	1:G:270:PHE:CZ	2.87	0.57
1:H:207:HIS:CE1	1:H:298:GLY:HA2	2.39	0.57
1:J:280:VAL:HG12	1:L:109:TYR:H	1.69	0.57
1:E:45:ALA:HB2	1:E:183:LYS:HE2	1.86	0.56
1:B:111:ILE:HG13	1:B:119:ASN:ND2	2.20	0.56
1:G:224:MET:HE1	1:G:226:THR:OG1	2.04	0.56
1:I:197:ASN:O	1:I:198:ASP:HB2	2.05	0.56
1:F:151:ALA:HA	1:F:180:VAL:HB	1.87	0.56
1:E:122:HIS:HB3	1:E:160:VAL:HG21	1.88	0.56
1:K:141:ARG:NH2	1:L:278:GLU:OE1	2.34	0.56
1:B:242:ALA:O	1:B:247:GLY:HA2	2.05	0.56
1:H:289:CYS:O	1:H:295:SER:HB3	2.06	0.56
1:A:207:HIS:CD2	1:A:298:GLY:HA2	2.41	0.56
1:J:156:TYR:HD1	1:J:178:VAL:HG23	1.70	0.56
1:D:58:ARG:NH2	1:D:97:ASP:OD1	2.39	0.56
1:I:45:ALA:HA	1:I:183:LYS:HG3	1.89	0.55
1:J:121:SER:O	1:J:131:TYR:OH	2.23	0.55
1:E:242:ALA:O	1:E:247:GLY:HA2	2.05	0.55
1:G:122:HIS:HB3	1:G:160:VAL:HG21	1.88	0.55
1:G:258:VAL:HG21	1:I:148:ALA:HB1	1.88	0.55
1:A:111:ILE:HG21	1:B:283:GLY:HA3	1.89	0.55
1:D:42:ALA:HA	1:D:185:ASP:O	2.06	0.55
1:D:64:MET:HE3	1:D:172:ASN:OD1	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:207:HIS:CE1	1:F:298:GLY:HA2	2.41	0.55
1:I:52:VAL:HG12	1:I:88:LEU:HD21	1.89	0.55
1:L:86:ASP:O	1:L:135:THR:OG1	2.25	0.55
1:E:207:HIS:CE1	1:E:298:GLY:HA2	2.43	0.54
1:F:236:MET:HE1	1:F:303:PHE:CD2	2.43	0.54
1:A:157:HIS:ND1	1:A:170:ILE:HD11	2.23	0.54
1:B:124:GLU:CG	1:B:125:PRO:HD2	2.35	0.54
1:J:136:HIS:NE2	1:J:148:ALA:O	2.30	0.54
1:L:216:VAL:HG23	1:L:306:LYS:O	2.08	0.54
1:B:197:ASN:O	1:B:198:ASP:HB2	2.08	0.54
1:E:250:THR:HG22	1:E:254:ASP:HB2	1.89	0.54
1:G:116:THR:H	1:G:121:SER:HB3	1.71	0.54
1:A:99:PRO:HG3	1:A:125:PRO:HD3	1.90	0.53
1:L:312:ILE:HB	1:L:315:TYR:HB3	1.91	0.53
1:E:111:ILE:HG21	1:F:283:GLY:HA3	1.91	0.53
1:K:159:HIS:CE1	1:L:286:MET:HE1	2.43	0.53
1:F:224:MET:HE1	1:F:226:THR:OG1	2.08	0.53
1:L:54:MET:HE3	1:L:66:TYR:CD1	2.44	0.53
1:B:93:GLU:HB2	1:B:128[A]:THR:HG22	1.90	0.53
1:G:106:GLY:HA3	1:G:154:TRP:CD2	2.44	0.53
1:G:262:LYS:CD	1:G:270:PHE:CE1	2.91	0.53
1:G:262:LYS:HD2	1:G:270:PHE:CZ	2.43	0.53
1:L:207:HIS:CE1	1:L:298:GLY:HA2	2.44	0.53
1:D:148:ALA:HB1	1:E:258:VAL:HG21	1.90	0.53
1:E:195:VAL:HA	1:E:225:ILE:O	2.09	0.53
1:F:84:GLU:OE1	1:F:138:PRO:HD3	2.08	0.53
1:D:80:ILE:HD12	1:D:156:TYR:CE1	2.44	0.52
1:G:79:LEU:HA	1:G:177:PRO:HG2	1.90	0.52
1:H:197:ASN:O	1:H:198:ASP:HB2	2.09	0.52
1:I:79:LEU:HA	1:I:177:PRO:HG2	1.90	0.52
1:C:236:MET:HE1	1:C:303:PHE:CD2	2.44	0.52
1:D:117:LYS:HD2	1:D:164:GLU:OE2	2.10	0.52
1:D:244:ASN:HB3	1:D:256:SER:OG	2.09	0.52
1:G:195:VAL:HA	1:G:225:ILE:O	2.09	0.52
1:G:260:ASP:OD2	1:I:106:GLY:N	2.42	0.52
1:B:117:LYS:HD3	1:B:122:HIS:CD2	2.45	0.52
1:E:221:GLU:HB2	1:E:273:GLN:HG2	1.92	0.52
1:B:111:ILE:HD12	1:C:283:GLY:HA3	1.90	0.52
1:D:262:LYS:HD3	1:D:270:PHE:CE1	2.45	0.52
1:K:158:ASP:OD2	1:K:161:VAL:CG1	2.51	0.52
1:G:262:LYS:HD3	1:G:270:PHE:CZ	2.45	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:262:LYS:HE2	1:G:270:PHE:CG	2.44	0.51
1:J:205:PRO:HG2	1:J:208:THR:HG21	1.91	0.51
1:J:266:PRO:HG2	1:K:291:VAL:HG22	1.91	0.51
1:I:88:LEU:HD23	1:I:89:HIS:N	2.24	0.51
1:B:79:LEU:HD11	1:B:179:ILE:HG13	1.93	0.51
1:E:157:HIS:ND1	1:E:158:ASP:O	2.42	0.51
1:K:138:PRO:HB2	1:K:146:TRP:CZ2	2.46	0.51
1:D:110:GLU:HG3	1:D:134:ARG:HH21	1.76	0.51
1:F:124:GLU:OE1	1:F:127:GLY:HA3	2.10	0.51
1:L:214:ALA:O	1:L:306:LYS:N	2.37	0.51
1:B:235:HIS:HB2	1:B:261:ASN:ND2	2.26	0.50
1:D:246:THR:HB	1:D:248:MET:HE3	1.93	0.50
1:B:275:ILE:HB	1:B:278:GLU:HB2	1.94	0.50
1:E:115:GLY:H	1:E:121:SER:CB	2.24	0.50
1:H:226:THR:O	1:H:267:ALA:N	2.38	0.50
1:K:105:HIS:CE1	1:L:235:HIS:CE1	2.99	0.50
1:A:116:THR:H	1:A:121:SER:HB3	1.76	0.50
1:A:242:ALA:O	1:A:247:GLY:HA2	2.12	0.50
1:G:111:ILE:O	1:G:114:ASP:HB2	2.11	0.50
1:K:275:ILE:HB	1:K:278:GLU:HB2	1.93	0.50
1:B:82:LEU:HB3	1:B:86:ASP:HB2	1.92	0.50
1:L:140:ARG:HG3	1:L:140:ARG:HH11	1.75	0.50
1:C:80:ILE:HD12	1:C:156:TYR:CE1	2.47	0.50
1:I:57:GLU:HG2	1:I:70:LYS:HE3	1.94	0.50
1:J:79:LEU:HA	1:J:177:PRO:HG2	1.93	0.50
1:C:115:GLY:H	1:C:121:SER:HB2	1.77	0.50
1:L:59:LEU:N	1:L:63:GLN:O	2.33	0.50
1:E:111:ILE:HB	1:E:119:ASN:ND2	2.26	0.50
1:G:224:MET:SD	5:G:517:HOH:O	2.60	0.50
1:I:153:TYR:O	3:I:402:GOL:H12	2.11	0.50
1:G:157:HIS:ND1	1:G:158:ASP:O	2.37	0.49
1:D:195:VAL:HA	1:D:225:ILE:O	2.12	0.49
1:B:229:GLU:OE2	1:C:293:SER:OG	2.23	0.49
1:B:233:THR:HG22	1:B:291:VAL:HG23	1.94	0.49
1:G:262:LYS:HE2	1:G:270:PHE:CD1	2.47	0.49
1:E:219:ARG:HH22	1:E:248:MET:HE1	1.75	0.49
1:E:166:GLY:O	1:E:170:ILE:HG13	2.12	0.49
1:D:242:ALA:O	1:D:247:GLY:HA2	2.11	0.49
1:J:50:ARG:NH1	1:J:86:ASP:OD2	2.44	0.49
1:J:143:ASP:OD1	1:J:145:THR:OG1	2.30	0.49
1:A:293:SER:HB3	1:C:229:GLU:OE2	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:199:MET:HE1	1:H:294:HIS:HA	1.94	0.49
1:K:140:ARG:CD	1:K:146:TRP:HE3	2.26	0.49
1:D:280:VAL:HG12	1:F:109:TYR:H	1.78	0.48
1:F:288:HIS:CB	1:F:300:VAL:HG12	2.40	0.48
1:K:199:MET:HE1	1:K:294:HIS:CD2	2.48	0.48
1:A:221:GLU:HB2	1:A:273:GLN:HG2	1.94	0.48
1:E:235:HIS:HB2	1:E:261:ASN:OD1	2.12	0.48
1:G:219:ARG:HH22	1:G:248:MET:HE1	1.79	0.48
1:L:153:TYR:H	3:L:402:GOL:HO2	1.55	0.48
1:I:111:ILE:O	1:I:114:ASP:HB2	2.14	0.48
1:E:149:GLY:HA3	1:E:182:ARG:HH21	1.78	0.48
1:F:101:SER:OG	1:F:115:GLY:O	2.32	0.48
1:A:293:SER:O	1:A:297:MET:HG3	2.14	0.48
1:E:58:ARG:HG3	1:E:96:MET:HG2	1.96	0.48
1:D:192:HIS:HB3	1:D:212:PHE:CE1	2.49	0.48
1:F:57:GLU:OE2	1:F:71:GLY:N	2.43	0.48
1:F:226:THR:HB	1:F:265:GLY:O	2.13	0.48
1:H:233:THR:O	1:H:289:CYS:HA	2.14	0.48
1:I:58:ARG:HG2	1:I:96:MET:HE3	1.96	0.48
1:D:210:PRO:HD2	1:D:287:TYR:OH	2.13	0.48
1:H:235:HIS:HB2	1:H:261:ASN:OD1	2.14	0.48
1:I:58:ARG:CG	1:I:96:MET:HE3	2.43	0.48
1:B:205:PRO:O	1:B:208:THR:OG1	2.30	0.47
1:H:195:VAL:HA	1:H:225:ILE:O	2.14	0.47
1:H:194:ILE:O	1:H:224:MET:HA	2.14	0.47
1:G:262:LYS:HD2	1:G:270:PHE:CE2	2.48	0.47
1:J:51:ARG:HA	1:J:89:HIS:O	2.14	0.47
1:G:116:THR:N	1:G:121:SER:HB3	2.29	0.47
1:H:157:HIS:ND1	1:H:170:ILE:HD11	2.30	0.47
1:B:198:ASP:OD1	1:B:229:GLU:N	2.44	0.47
1:E:277:GLY:HA2	1:E:280:VAL:HG23	1.96	0.47
1:K:141:ARG:HH11	1:K:145:THR:HG23	1.78	0.47
1:D:106:GLY:HA3	1:D:154:TRP:CD2	2.49	0.47
1:D:260:ASP:OD2	1:F:106:GLY:N	2.47	0.47
1:G:233:THR:O	1:G:289:CYS:HA	2.15	0.47
1:J:80:ILE:HB	1:J:178:VAL:HG22	1.97	0.47
1:K:120:LYS:HD2	1:K:120:LYS:HA	1.73	0.47
1:G:315:TYR:O	1:K:309:ASP:HB3	2.14	0.47
1:F:224:MET:SD	1:F:224:MET:C	2.99	0.46
1:C:85:GLY:N	1:C:135:THR:OG1	2.47	0.46
1:E:116:THR:H	1:E:121:SER:HB3	1.80	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:194:ILE:HD12	1:I:222:ILE:HG23	1.97	0.46
1:J:69:GLU:HB2	1:J:72:LYS:HD3	1.97	0.46
1:L:104:VAL:HB	1:L:133:TRP:CZ2	2.51	0.46
1:H:148:ALA:HB1	1:I:258:VAL:HG21	1.98	0.46
1:L:115:GLY:N	1:L:121:SER:OG	2.48	0.46
1:A:266:PRO:O	1:B:233:THR:HG21	2.15	0.46
1:B:100:VAL:HG22	1:B:101:SER:H	1.79	0.46
1:C:207:HIS:CE1	1:C:298:GLY:HA2	2.51	0.46
1:I:46:GLY:H	1:I:183:LYS:HZ2	1.61	0.46
1:B:195:VAL:HA	1:B:225:ILE:O	2.16	0.46
1:H:156:TYR:HD2	1:H:178:VAL:HG13	1.80	0.46
1:L:195:VAL:HA	1:L:225:ILE:O	2.16	0.46
1:C:67:GLY:HA3	1:C:73:ALA:HA	1.97	0.46
1:H:134:ARG:NH1	1:I:279:GLY:O	2.29	0.46
1:C:235:HIS:HE1	1:C:260:ASP:OD2	1.98	0.46
1:E:249:LEU:HD22	1:E:254:ASP:HB3	1.98	0.46
1:H:105:HIS:CD2	1:H:155:HIS:CE1	3.04	0.46
1:J:92:PHE:CD1	1:J:123:VAL:HG21	2.51	0.46
1:B:192:HIS:HB3	1:B:212:PHE:CE1	2.51	0.45
1:E:105:HIS:CE1	1:F:235:HIS:CE1	3.04	0.45
1:E:141:ARG:HB2	1:E:145:THR:O	2.15	0.45
1:E:149:GLY:HA3	1:E:182:ARG:NH2	2.31	0.45
1:I:54:MET:HE1	1:I:80:ILE:HD11	1.98	0.45
1:L:306:LYS:HG2	1:L:312:ILE:HD11	1.97	0.45
1:K:116:THR:H	1:K:121:SER:HB3	1.81	0.45
1:K:141:ARG:HH11	1:K:145:THR:HG21	1.81	0.45
1:K:175:TYR:OH	1:K:203:ASN:OD1	2.22	0.45
1:L:67:GLY:HA3	1:L:73:ALA:HA	1.99	0.45
1:B:159:HIS:CE1	1:B:165:ALA:HA	2.51	0.45
1:H:289:CYS:HB2	1:H:299:MET:HE2	1.99	0.45
1:C:154:TRP:HB2	1:C:178:VAL:HG23	1.98	0.45
1:D:136:HIS:CD2	1:D:149:GLY:HA2	2.51	0.45
1:K:100:VAL:HG22	1:K:101:SER:H	1.80	0.45
1:I:165:ALA:HB1	5:I:511:HOH:O	2.17	0.45
1:K:40:ALA:HB3	1:K:186:VAL:HG13	1.99	0.45
1:I:64:MET:HE3	1:I:174:LEU:CD1	2.47	0.45
1:L:224:MET:HE1	1:L:226:THR:HG1	1.82	0.45
1:E:84:GLU:OE2	1:E:149:GLY:HA3	2.16	0.45
1:F:293:SER:O	1:F:297:MET:HG2	2.17	0.45
1:G:199:MET:HE1	1:G:294:HIS:CD2	2.52	0.45
1:I:96:MET:O	1:I:125:PRO:HB3	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:237:HIS:CE1	1:L:286:MET:HE2	2.52	0.45
1:D:195:VAL:HG22	1:D:225:ILE:HB	1.99	0.44
1:F:112:SER:O	1:F:129:ARG:NH1	2.51	0.44
1:H:178:VAL:HG23	1:H:178:VAL:O	2.17	0.44
1:K:141:ARG:HB2	1:K:145:THR:HG22	1.98	0.44
1:J:143:ASP:OD1	1:J:143:ASP:C	2.60	0.44
1:L:153:TYR:OH	1:L:221:GLU:OE1	2.30	0.44
1:A:235:HIS:CE1	1:C:105:HIS:CE1	3.06	0.44
1:E:104:VAL:HG12	5:E:522:HOH:O	2.16	0.44
1:F:242:ALA:O	1:F:247:GLY:HA2	2.18	0.44
1:B:87:THR:HG23	1:B:134:ARG:HG2	1.98	0.44
1:B:304:LEU:HB3	1:B:312:ILE:HD13	2.00	0.44
1:G:236:MET:HE2	1:G:236:MET:HB3	1.90	0.44
1:I:183:LYS:H	1:I:183:LYS:CD	2.30	0.44
1:K:48:GLU:HG2	1:K:50:ARG:HG3	1.99	0.44
1:B:105:HIS:CE1	1:C:235:HIS:CE1	3.06	0.44
1:B:229:GLU:OE1	1:C:293:SER:N	2.42	0.44
1:F:195:VAL:HA	1:F:225:ILE:O	2.17	0.44
1:H:80:ILE:HB	1:H:178:VAL:HG12	2.00	0.44
1:K:195:VAL:HA	1:K:225:ILE:O	2.18	0.44
1:D:253:ASP:HB2	5:D:521:HOH:O	2.17	0.44
1:E:115:GLY:N	1:E:121:SER:HB3	2.33	0.44
1:I:188:PRO:HA	1:I:219:ARG:HG2	1.99	0.44
1:J:108:ASP:OD2	1:J:136:HIS:ND1	2.50	0.44
1:H:316:ASP:OD1	1:H:316:ASP:N	2.46	0.44
1:I:207:HIS:CE1	1:I:298:GLY:HA2	2.53	0.44
1:J:235:HIS:CE1	1:L:105:HIS:CE1	3.05	0.44
1:F:57:GLU:CD	1:F:70:LYS:HD2	2.42	0.44
1:H:246:THR:HG23	1:H:248:MET:H	1.82	0.44
1:I:138:PRO:HA	1:I:147:ARG:O	2.18	0.44
1:J:249:LEU:HD22	1:J:254:ASP:HB3	2.00	0.44
1:A:116:THR:N	1:A:121:SER:HB3	2.33	0.43
1:F:191:THR:OG1	1:F:221:GLU:OE1	2.31	0.43
1:H:159:HIS:CE1	1:I:286:MET:HE1	2.53	0.43
1:L:253:ASP:OD1	1:L:253:ASP:N	2.30	0.43
1:C:197:ASN:O	1:C:198:ASP:HB2	2.18	0.43
1:C:216:VAL:HG23	1:C:306:LYS:O	2.19	0.43
1:I:141:ARG:HB2	1:I:143:ASP:OD1	2.16	0.43
1:A:156:TYR:HD1	1:A:178:VAL:CG2	2.31	0.43
1:A:58:ARG:NH1	1:A:97:ASP:OD1	2.51	0.43
1:B:224:MET:HB3	1:B:270:PHE:CE1	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:248:MET:HE2	1:D:273:GLN:HB2	1.99	0.43
1:H:138:PRO:HD3	1:H:149:GLY:HA3	2.00	0.43
1:I:195:VAL:HA	1:I:225:ILE:O	2.18	0.43
1:I:307:LYS:O	1:I:308:PRO:C	2.61	0.43
1:J:84:GLU:HG3	1:J:181:ARG:O	2.19	0.43
1:A:112:SER:O	1:A:129:ARG:NH2	2.52	0.43
1:J:122:HIS:HB3	1:J:160:VAL:HG21	2.01	0.43
1:G:195:VAL:HG22	1:G:225:ILE:HB	2.00	0.43
1:J:43:ALA:HB2	1:J:187:LEU:HD21	2.00	0.43
1:K:80:ILE:HD12	1:K:156:TYR:CE2	2.54	0.43
1:K:129:ARG:HG2	1:K:130:THR:N	2.33	0.43
1:C:195:VAL:HA	1:C:225:ILE:O	2.19	0.43
1:G:129:ARG:HD3	1:G:131:TYR:CZ	2.54	0.42
1:I:299:MET:HE2	1:I:299:MET:HB3	1.90	0.42
1:B:250:THR:HB	1:B:254:ASP:HB2	2.00	0.42
1:C:226:THR:HB	1:C:265:GLY:O	2.19	0.42
1:F:43:ALA:HB2	1:F:187:LEU:HD21	2.00	0.42
1:H:246:THR:HG22	5:H:528:HOH:O	2.19	0.42
1:L:198:ASP:O	1:L:232:HIS:CE1	2.72	0.42
1:A:155:HIS:HB3	1:A:225:ILE:HD13	2.02	0.42
1:A:167:THR:OG1	1:B:292:GLN:HB3	2.19	0.42
1:B:81:GLU:HA	1:B:179:ILE:O	2.19	0.42
1:D:209:GLY:HA3	1:D:210:PRO:HA	1.84	0.42
1:J:175:TYR:CE1	1:J:195:VAL:HG11	2.54	0.42
1:A:173:GLY:HA2	1:A:175:TYR:CE2	2.54	0.42
1:A:191:THR:HA	1:A:221:GLU:O	2.20	0.42
1:D:107:LEU:HD12	1:D:133:TRP:HB3	2.02	0.42
1:C:58:ARG:NH1	1:C:64:MET:HE2	2.35	0.42
1:I:88:LEU:HD23	1:I:88:LEU:C	2.44	0.42
1:A:136:HIS:CD2	1:A:149:GLY:HA2	2.54	0.42
1:F:235:HIS:HB2	1:F:261:ASN:OD1	2.20	0.42
1:J:262:LYS:HD3	1:J:270:PHE:CE2	2.54	0.42
1:F:120:LYS:HD3	1:F:120:LYS:HA	1.75	0.42
1:F:140:ARG:NH2	1:F:144:GLY:O	2.51	0.42
1:G:107:LEU:HD21	1:G:180:VAL:HG21	2.00	0.42
1:K:262:LYS:HD3	1:K:263:ILE:O	2.20	0.42
1:B:72:LYS:HB3	1:B:72:LYS:HE3	1.88	0.42
1:D:146:TRP:CH2	1:E:252:PRO:HG3	2.55	0.42
1:D:302:LEU:HD23	1:D:302:LEU:HA	1.88	0.42
1:E:153:TYR:CZ	3:E:404:GOL:H2	2.54	0.42
1:H:234:PHE:O	1:H:261:ASN:HA	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:88:LEU:HD22	1:I:90:VAL:HG23	2.02	0.42
1:A:50:ARG:HG2	1:A:87:THR:O	2.20	0.42
1:D:106:GLY:HA3	1:D:154:TRP:CE3	2.55	0.42
1:H:267:ALA:HB2	1:I:290:HIS:CE1	2.55	0.42
1:B:289:CYS:HB2	1:B:299:MET:HE2	2.01	0.41
1:C:45:ALA:HB2	1:C:183:LYS:HD2	2.01	0.41
1:C:68:LEU:HG	1:C:78:PRO:HG3	2.02	0.41
1:H:90:VAL:O	1:H:130:THR:HA	2.19	0.41
1:I:52:VAL:HG22	1:I:53:THR:N	2.35	0.41
1:I:93:GLU:HB2	1:I:128:THR:HG22	2.01	0.41
1:K:109:TYR:H	1:L:280:VAL:HG12	1.85	0.41
1:D:169:GLY:O	1:D:174:LEU:HB2	2.20	0.41
1:G:45:ALA:HA	1:G:183:LYS:HB2	2.02	0.41
1:H:100:VAL:HG22	1:H:101:SER:H	1.85	0.41
1:K:204:ARG:HD3	1:K:210:PRO:HD3	2.01	0.41
1:I:226:THR:HB	1:I:265:GLY:O	2.20	0.41
1:L:197:ASN:O	1:L:198:ASP:HB2	2.20	0.41
1:F:224:MET:SD	5:F:516:HOH:O	2.62	0.41
1:E:204:ARG:HD3	1:E:210:PRO:HD3	2.02	0.41
1:F:140:ARG:HG3	1:F:140:ARG:HH21	1.86	0.41
1:F:220:VAL:O	1:F:273:GLN:HA	2.20	0.41
1:G:309:ASP:CG	1:G:311:THR:HG1	2.28	0.41
1:C:236:MET:HE1	1:C:303:PHE:HD2	1.86	0.41
1:I:169:GLY:O	1:I:174:LEU:HB2	2.21	0.41
1:J:253:ASP:OD1	1:J:253:ASP:N	2.52	0.41
1:K:136:HIS:CD2	1:K:149:GLY:HA2	2.56	0.41
1:C:57:GLU:CD	1:C:71:GLY:H	2.29	0.41
1:C:205:PRO:HA	1:I:297:MET:HE1	2.01	0.41
1:H:108:ASP:OD2	1:H:136:HIS:ND1	2.47	0.41
1:I:137:GLU:HG2	1:I:183:LYS:HE2	2.01	0.41
1:L:306:LYS:HG2	1:L:312:ILE:CD1	2.50	0.41
1:C:249:LEU:HD22	1:C:254:ASP:HB3	2.03	0.41
1:E:199:MET:HE3	1:E:199:MET:HB3	1.86	0.41
1:G:104:VAL:HB	1:G:133:TRP:CZ2	2.56	0.41
1:G:213:GLU:HB3	1:G:306:LYS:HE2	2.02	0.41
1:I:260:ASP:OD2	5:I:501:HOH:O	2.22	0.41
1:J:99:PRO:HG3	1:J:125:PRO:HD3	2.03	0.41
1:J:283:GLY:HA3	1:L:111:ILE:HD13	2.01	0.41
1:K:226:THR:O	1:K:267:ALA:N	2.41	0.41
1:G:148:ALA:HB1	1:H:258:VAL:HG21	2.02	0.41
1:K:198:ASP:OD1	1:K:228:GLY:HA3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:204:ARG:HD3	1:A:210:PRO:HD3	2.03	0.40
1:H:66:TYR:CD2	1:H:156:TYR:HE1	2.39	0.40
1:H:106:GLY:HA3	1:H:154:TRP:CD2	2.57	0.40
1:J:262:LYS:HD2	5:J:508:HOH:O	2.20	0.40
1:D:42:ALA:HB1	1:D:184:GLY:HA2	2.02	0.40
1:E:215:THR:O	1:E:216:VAL:C	2.64	0.40
1:G:59:LEU:HB2	1:G:63:GLN:HB2	2.03	0.40
1:I:64:MET:HE1	1:I:161:VAL:HG21	2.04	0.40
1:I:220:VAL:HG21	1:I:303:PHE:HZ	1.86	0.40
1:L:242:ALA:O	1:L:247:GLY:HA2	2.21	0.40
1:C:98:VAL:HG12	1:H:99:PRO:HD2	2.03	0.40
1:C:156:TYR:HD1	1:C:178:VAL:HG13	1.87	0.40
1:C:249:LEU:HD23	1:C:256:SER:HB2	2.02	0.40
1:F:122:HIS:HB3	1:F:160:VAL:HG11	2.03	0.40
1:H:138:PRO:HA	1:H:147:ARG:O	2.20	0.40
1:H:159:HIS:CE1	1:H:165:ALA:HA	2.56	0.40
1:J:156:TYR:CZ	1:J:176:GLY:HA3	2.56	0.40
1:K:229:GLU:OE2	1:L:293:SER:OG	2.29	0.40
1:A:233:THR:O	1:A:289:CYS:HA	2.20	0.40
1:E:100:VAL:HG22	1:E:101:SER:H	1.86	0.40
1:E:143:ASP:OD1	1:E:145:THR:OG1	2.36	0.40
1:K:140:ARG:HD2	1:K:146:TRP:HE3	1.86	0.40
1:A:238:GLY:O	1:A:280:VAL:HG21	2.22	0.40
1:D:69:GLU:HG2	1:D:70:LYS:N	2.35	0.40
1:H:47:GLY:HA2	1:H:85:GLY:O	2.21	0.40
1:I:307:LYS:O	1:I:309:ASP:N	2.54	0.40
1:K:247:GLY:HA3	1:K:272:PHE:CB	2.52	0.40
1:K:288:HIS:HB3	1:K:300:VAL:HG13	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	276/322 (86%)	269 (98%)	7 (2%)	0	100	100
1	B	277/322 (86%)	261 (94%)	16 (6%)	0	100	100
1	C	273/322 (85%)	255 (93%)	18 (7%)	0	100	100
1	D	276/322 (86%)	261 (95%)	15 (5%)	0	100	100
1	E	275/322 (85%)	257 (94%)	18 (6%)	0	100	100
1	F	273/322 (85%)	256 (94%)	17 (6%)	0	100	100
1	G	276/322 (86%)	259 (94%)	17 (6%)	0	100	100
1	H	275/322 (85%)	264 (96%)	11 (4%)	0	100	100
1	I	274/322 (85%)	255 (93%)	19 (7%)	0	100	100
1	J	275/322 (85%)	266 (97%)	9 (3%)	0	100	100
1	K	274/322 (85%)	258 (94%)	16 (6%)	0	100	100
1	L	274/322 (85%)	262 (96%)	12 (4%)	0	100	100
All	All	3298/3864 (85%)	3123 (95%)	175 (5%)	0	100	100

There are no Ramachandran outliers to report.

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	218/248 (88%)	217 (100%)	1 (0%)	81	90
1	B	219/248 (88%)	218 (100%)	1 (0%)	81	90
1	C	216/248 (87%)	214 (99%)	2 (1%)	70	84
1	D	218/248 (88%)	217 (100%)	1 (0%)	81	90
1	E	217/248 (88%)	217 (100%)	0	100	100
1	F	216/248 (87%)	215 (100%)	1 (0%)	81	90
1	G	218/248 (88%)	218 (100%)	0	100	100
1	H	217/248 (88%)	216 (100%)	1 (0%)	81	90
1	I	217/248 (88%)	217 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	J	218/248 (88%)	217 (100%)	1 (0%)	81	90
1	K	216/248 (87%)	216 (100%)	0	100	100
1	L	217/248 (88%)	215 (99%)	2 (1%)	70	84
All	All	2607/2976 (88%)	2597 (100%)	10 (0%)	84	92

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	102	LEU
1	B	224	MET
1	C	160	VAL
1	C	224	MET
1	D	102	LEU
1	F	102	LEU
1	H	316	ASP
1	J	50	ARG
1	L	50	ARG
1	L	316	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	257	GLN
1	C	192	HIS
1	C	288	HIS
1	E	83	ASN
1	F	83	ASN
1	F	207	HIS
1	G	63	GLN
1	G	83	ASN
1	H	207	HIS
1	I	63	GLN
1	I	119	ASN
1	I	122	HIS
1	I	172	ASN
1	I	207	HIS
1	J	155	HIS
1	J	207	HIS
1	J	292	GLN
1	K	119	ASN

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Mol	Chain	Res	Type
1	L	273	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 66 ligands modelled in this entry, 48 are monoatomic - leaving 18 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	$\# Z > 2$
4	OXY	J	409	2	1,1,1	0.10	0	-		
3	GOL	F	402	-	5,5,5	0.45	0	5,5,5	0.45	0
3	GOL	G	405	-	5,5,5	0.46	0	5,5,5	0.42	0
3	GOL	L	402	-	5,5,5	0.60	0	5,5,5	0.62	0
3	GOL	E	404	-	5,5,5	0.26	0	5,5,5	0.32	0
3	GOL	H	403	-	5,5,5	0.45	0	5,5,5	0.64	0
4	OXY	B	403	2	1,1,1	0.20	0	-		
3	GOL	E	403	-	5,5,5	0.28	0	5,5,5	0.54	0
3	GOL	I	402	-	5,5,5	0.49	0	5,5,5	0.33	0
4	OXY	D	407	2	1,1,1	0.08	0	-		
4	OXY	K	404	2	1,1,1	0.13	0	-		
3	GOL	J	407	-	5,5,5	0.50	0	5,5,5	0.34	0
4	OXY	G	406	2	1,1,1	0.13	0	-		

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	D	406	-	5,5,5	0.52	0	5,5,5	0.19	0
3	GOL	A	406	-	5,5,5	0.49	0	5,5,5	0.51	0
4	OXY	A	407	2	1,1,1	0.11	0	-		
3	GOL	K	403	-	5,5,5	0.32	0	5,5,5	0.56	0
3	GOL	J	406	-	5,5,5	0.43	0	5,5,5	0.31	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
3	GOL	F	402	-	-	2/4/4/4	-
3	GOL	G	405	-	-	0/4/4/4	-
3	GOL	L	402	-	-	3/4/4/4	-
3	GOL	E	404	-	-	2/4/4/4	-
3	GOL	H	403	-	-	2/4/4/4	-
3	GOL	E	403	-	-	2/4/4/4	-
3	GOL	I	402	-	-	0/4/4/4	-
3	GOL	J	407	-	-	2/4/4/4	-
3	GOL	D	406	-	-	1/4/4/4	-
3	GOL	A	406	-	-	2/4/4/4	-
3	GOL	K	403	-	-	0/4/4/4	-
3	GOL	J	406	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	406	GOL	O1-C1-C2-O2
3	E	403	GOL	O1-C1-C2-C3
3	F	402	GOL	O1-C1-C2-C3
3	H	403	GOL	O1-C1-C2-C3
3	L	402	GOL	O1-C1-C2-C3
3	H	403	GOL	O1-C1-C2-O2
3	A	406	GOL	O1-C1-C2-C3
3	E	404	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
3	J	407	GOL	C1-C2-C3-O3
3	L	402	GOL	C1-C2-C3-O3
3	E	404	GOL	O1-C1-C2-O2
3	F	402	GOL	O1-C1-C2-O2
3	E	403	GOL	O1-C1-C2-O2
3	L	402	GOL	O1-C1-C2-O2
3	J	407	GOL	O2-C2-C3-O3
3	D	406	GOL	O2-C2-C3-O3

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	L	402	GOL	1	0
3	E	404	GOL	2	0
3	I	402	GOL	1	0
4	A	407	OXY	1	0

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, 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	278/322 (86%)	-1.33	0 100 100	17, 33, 48, 69	3 (1%)
1	B	278/322 (86%)	-1.33	0 100 100	18, 31, 47, 89	3 (1%)
1	C	275/322 (85%)	-1.32	0 100 100	21, 33, 52, 65	2 (0%)
1	D	278/322 (86%)	-1.37	0 100 100	18, 30, 45, 61	0
1	E	277/322 (86%)	-1.33	0 100 100	19, 30, 48, 79	2 (0%)
1	F	275/322 (85%)	-1.32	0 100 100	21, 34, 49, 54	2 (0%)
1	G	278/322 (86%)	-1.34	0 100 100	21, 33, 47, 78	0
1	H	277/322 (86%)	-1.33	0 100 100	21, 34, 52, 70	2 (0%)
1	I	276/322 (85%)	-1.18	0 100 100	25, 42, 57, 76	2 (0%)
1	J	277/322 (86%)	-1.33	0 100 100	20, 33, 50, 62	0
1	K	276/322 (85%)	-1.28	0 100 100	21, 35, 52, 69	2 (0%)
1	L	276/322 (85%)	-1.28	0 100 100	23, 37, 54, 62	2 (0%)
All	All	3321/3864 (85%)	-1.31	0 100 100	17, 34, 51, 89	20 (0%)

There are no RSRZ outliers to report.

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	CU	B	405	1/1	0.96	0.08	34,34,34,34	1
2	CU	G	409	1/1	0.98	0.04	47,47,47,47	1
2	CU	H	405	1/1	0.98	0.03	42,42,42,42	1
2	CU	K	406	1/1	0.98	0.09	56,56,56,56	1
3	GOL	E	403	6/6	0.98	0.05	23,28,28,30	0
3	GOL	E	404	6/6	0.98	0.07	34,37,46,52	0
3	GOL	I	402	6/6	0.98	0.04	27,33,34,34	0
4	OXY	D	407	2/2	0.98	0.06	23,23,23,29	2
4	OXY	G	406	2/2	0.98	0.06	28,28,28,31	2
2	CU	J	403	1/1	0.99	0.04	42,42,42,42	1
2	CU	D	403	1/1	0.99	0.02	37,37,37,37	1
3	GOL	A	406	6/6	0.99	0.03	24,29,30,32	0
3	GOL	D	406	6/6	0.99	0.03	21,24,27,27	0
2	CU	D	405	1/1	0.99	0.04	39,39,39,39	1
2	CU	E	406	1/1	0.99	0.03	36,36,36,36	1
3	GOL	F	402	6/6	0.99	0.03	26,30,32,33	0
3	GOL	G	405	6/6	0.99	0.02	28,30,32,32	0
3	GOL	H	403	6/6	0.99	0.04	31,32,35,36	0
2	CU	A	405	1/1	0.99	0.02	42,42,42,42	1
3	GOL	J	406	6/6	0.99	0.06	34,38,41,45	0
3	GOL	J	407	6/6	0.99	0.03	26,28,29,34	0
3	GOL	K	403	6/6	0.99	0.04	30,31,34,41	0
3	GOL	L	402	6/6	0.99	0.03	24,29,35,39	0
4	OXY	A	407	2/2	0.99	0.03	24,24,24,26	2
4	OXY	B	403	2/2	0.99	0.05	22,22,22,28	0
2	CU	A	403	1/1	0.99	0.02	41,41,41,41	1
2	CU	J	402	1/1	0.99	0.03	41,41,41,41	0
4	OXY	K	404	2/2	0.99	0.03	34,34,34,39	0
2	CU	G	407	1/1	1.00	0.02	37,37,37,37	0
2	CU	G	408	1/1	1.00	0.01	39,39,39,39	0
2	CU	A	409	1/1	1.00	0.02	37,37,37,37	0
2	CU	H	401	1/1	1.00	0.01	27,27,27,27	0
2	CU	H	402	1/1	1.00	0.01	40,40,40,40	0
2	CU	H	404	1/1	1.00	0.01	47,47,47,47	0
2	CU	B	401	1/1	1.00	0.01	27,27,27,27	0
2	CU	I	401	1/1	1.00	0.01	35,35,35,35	0
2	CU	J	401	1/1	1.00	0.01	26,26,26,26	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	CU	B	402	1/1	1.00	0.01	34,34,34,34	0
2	CU	B	404	1/1	1.00	0.01	44,44,44,44	1
2	CU	J	404	1/1	1.00	0.01	30,30,30,30	0
2	CU	J	405	1/1	1.00	0.01	37,37,37,37	1
2	CU	J	408	1/1	1.00	0.01	39,39,39,39	0
2	CU	J	410	1/1	1.00	0.02	39,39,39,39	0
2	CU	K	401	1/1	1.00	0.01	25,25,25,25	0
2	CU	K	402	1/1	1.00	0.01	40,40,40,40	0
2	CU	K	405	1/1	1.00	0.01	43,43,43,43	1
2	CU	A	401	1/1	1.00	0.00	26,26,26,26	0
2	CU	L	401	1/1	1.00	0.01	36,36,36,36	0
2	CU	C	401	1/1	1.00	0.01	34,34,34,34	0
2	CU	D	401	1/1	1.00	0.01	28,28,28,28	0
2	CU	D	402	1/1	1.00	0.02	35,35,35,35	0
2	CU	A	404	1/1	1.00	0.01	32,32,32,32	0
2	CU	D	404	1/1	1.00	0.01	32,32,32,32	0
2	CU	A	402	1/1	1.00	0.01	37,37,37,37	0
2	CU	D	408	1/1	1.00	0.01	40,40,40,40	0
2	CU	D	409	1/1	1.00	0.02	37,37,37,37	0
2	CU	E	401	1/1	1.00	0.01	22,22,22,22	0
2	CU	E	402	1/1	1.00	0.01	32,32,32,32	0
2	CU	E	405	1/1	1.00	0.02	42,42,42,42	0
2	CU	A	408	1/1	1.00	0.01	35,35,35,35	0
2	CU	F	401	1/1	1.00	0.01	31,31,31,31	0
2	CU	G	401	1/1	1.00	0.01	26,26,26,26	0
2	CU	G	402	1/1	1.00	0.01	45,45,45,45	0
2	CU	G	403	1/1	1.00	0.01	29,29,29,29	0
4	OXY	J	409	2/2	1.00	0.02	27,27,27,28	0
2	CU	G	404	1/1	1.00	0.03	36,36,36,36	1

6.5 Other polymers

There are no such residues in this entry.