



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 07:52 PM UTC

PDB ID : 5UHA / pdb\_00005uha  
Title : Crystal structure of Mycobacterium tuberculosis transcription initiation complex  
Authors : Lin, W.; Das, K.; Feng, Y.; Ebright, R.H.  
Deposited on : 2017-01-11  
Resolution : 3.91 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	:	4-5-2 with Phenix2.0
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

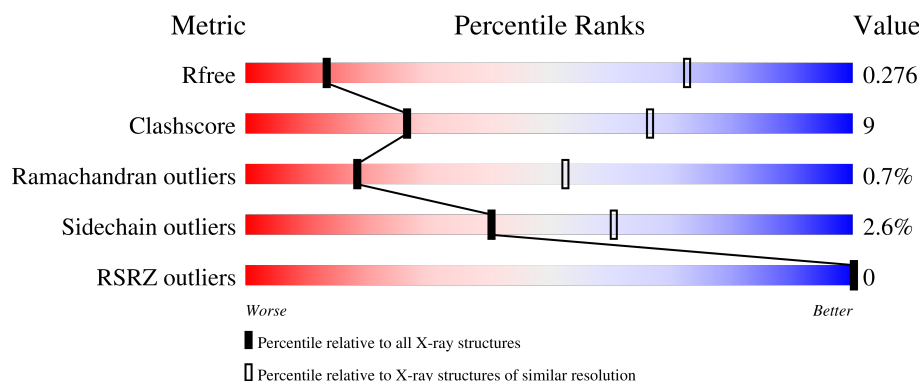
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.91 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.



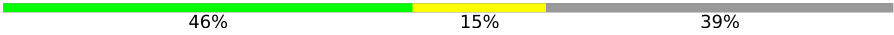


Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	180053	1270 (4.10-3.70)
Clashscore	190562	1034 (4.08-3.72)
Ramachandran outliers	187476	1251 (4.10-3.70)
Sidechain outliers	187428	1243 (4.10-3.70)
RSRZ outliers	180081	1269 (4.10-3.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	347	
1	B	347	
2	C	1178	
3	D	1316	
4	E	110	

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Mol	Chain	Length	Quality of chain
5	F	528	 46% 15% 39%
6	H	23	 39% 61%
7	G	16	 50% 44% 6%

## 2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 25997 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 DNA-directed RNA polymerase subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	224	Total	C	N	O	S	0	0	0
			1704	1072	295	335	2			
1	B	227	Total	C	N	O	S	0	0	0
			1715	1080	291	342	2			

- Molecule 2 is a protein called DNA-directed RNA polymerase subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	1126	Total	C	N	O	S	0	0	0
			8714	5454	1528	1693	39			

- Molecule 3 is a protein called DNA-directed RNA polymerase subunit beta'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	1265	Total	C	N	O	S	0	0	0
			9887	6188	1793	1866	40			

- Molecule 4 is a protein called DNA-directed RNA polymerase subunit omega.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	81	Total	C	N	O	0	0	0
			637	408	106	123			

- Molecule 5 is a protein called RNA polymerase sigma factor SigA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	F	322	Total	C	N	O	S	0	0	0
			2555	1589	461	496	9			

- Molecule 6 is a DNA chain called DNA (5'-D(\*TP\*AP\*TP\*AP\*AP\*TP\*GP\*GP\*GP\*AP\*GP\*CP\*TP\*GP\*TP\*CP\*AP\*CP\*GP\*GP\*AP\*TP\*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	H	23	Total 476	C 227	N 91	O 136	P 22	0	0	0

- Molecule 7 is a DNA chain called DNA (5'-D(\*CP\*AP\*TP\*CP\*CP\*GP\*TP\*GP\*AP\*GP\*TP\*CP\*GP\*AP\*GP\*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
7	G	15	Total 306	C 146	N 58	O 88	P 14	0	0	0

- Molecule 8 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	D	2	Total 2	Zn 2	0	0

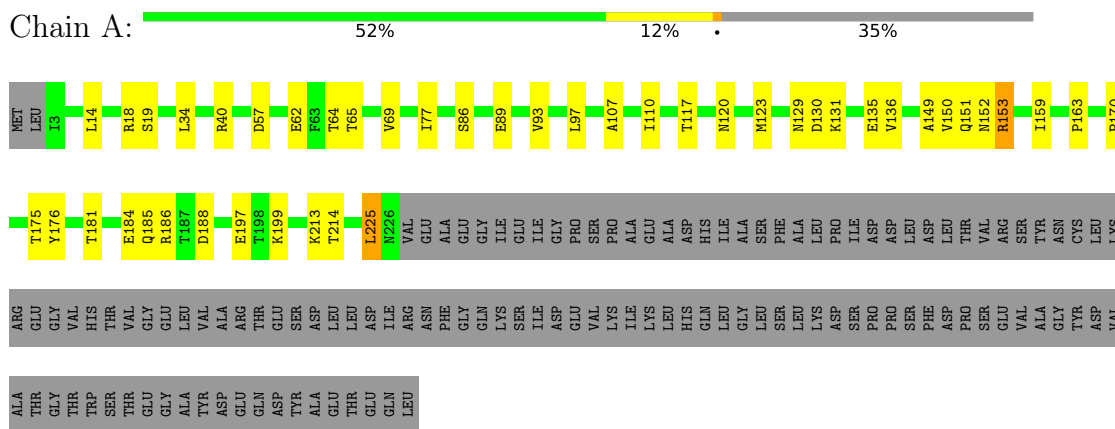
- Molecule 9 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	D	1	Total 1	Mg 1	0	0

### 3 Residue-property plots

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.

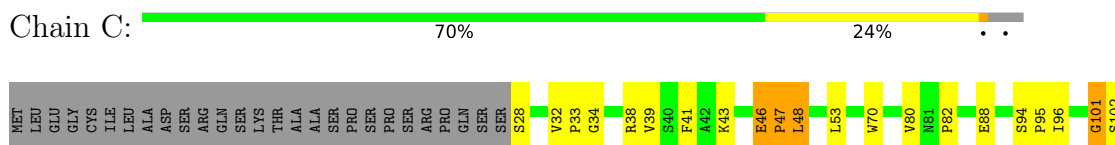
#### • Molecule 1: DNA-directed RNA polymerase subunit alpha

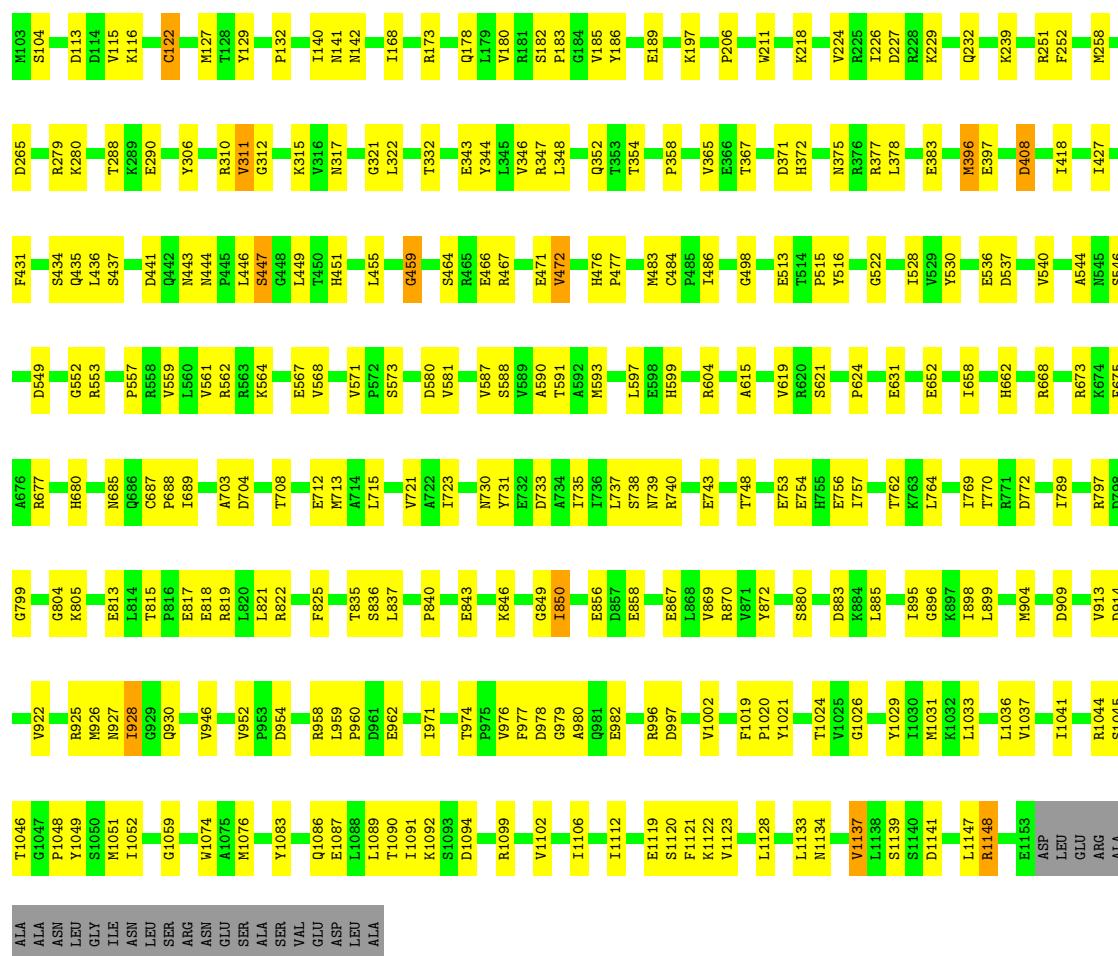


#### • Molecule 1: DNA-directed RNA polymerase subunit alpha



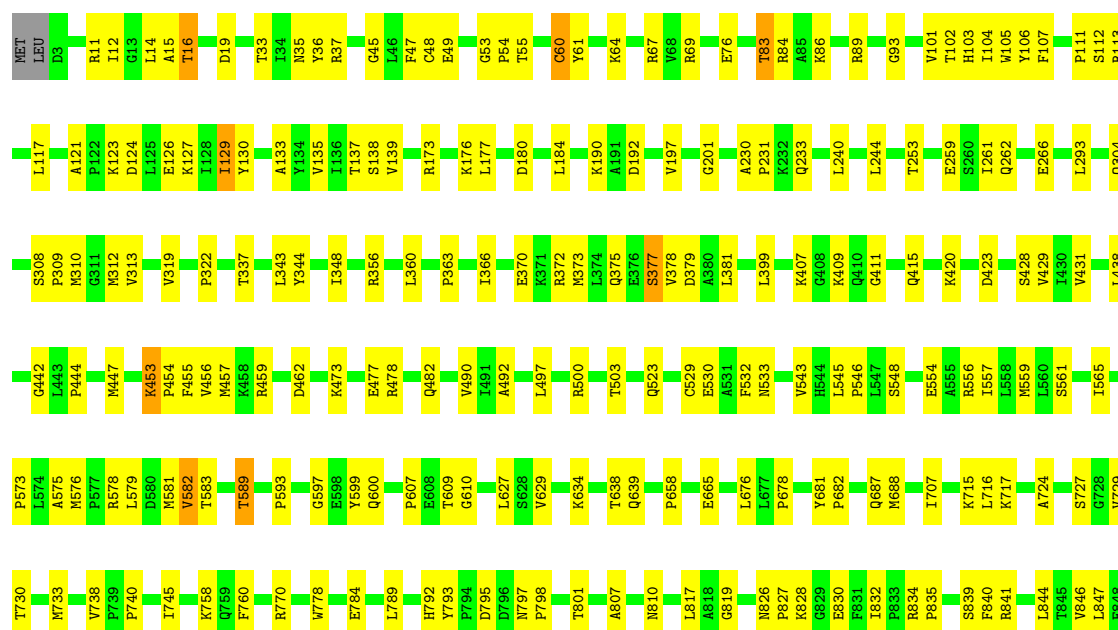
#### • Molecule 2: DNA-directed RNA polymerase subunit beta

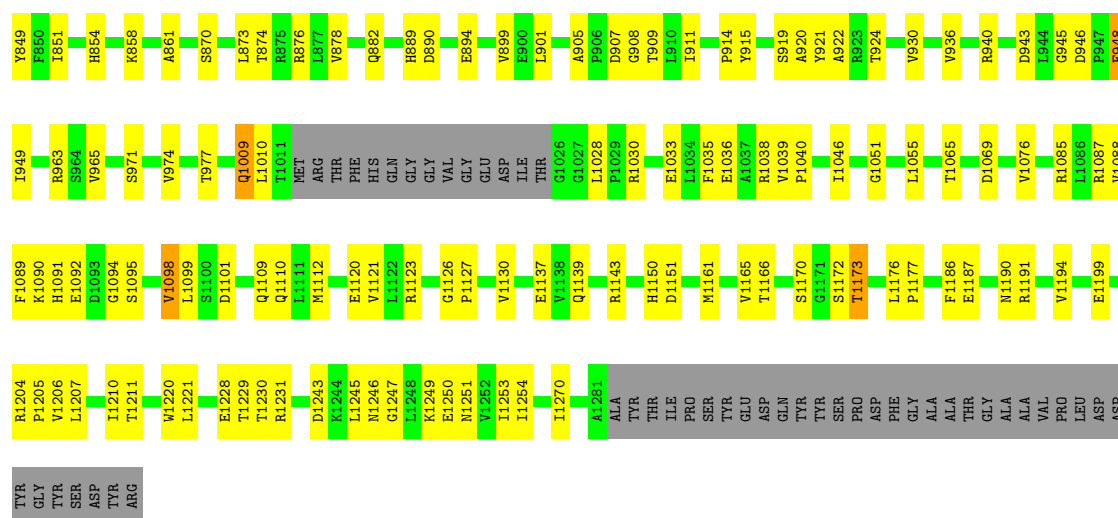




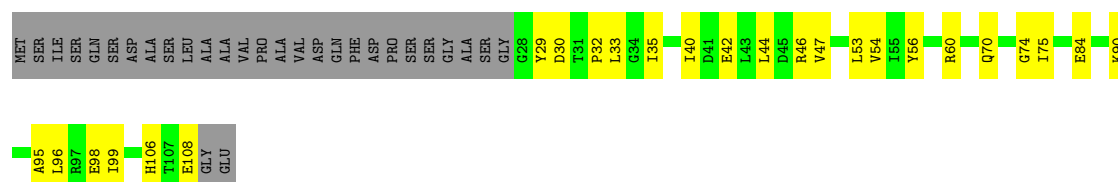
• Molecule 3: DNA-directed RNA polymerase subunit beta'

Chain D: 71% 24%

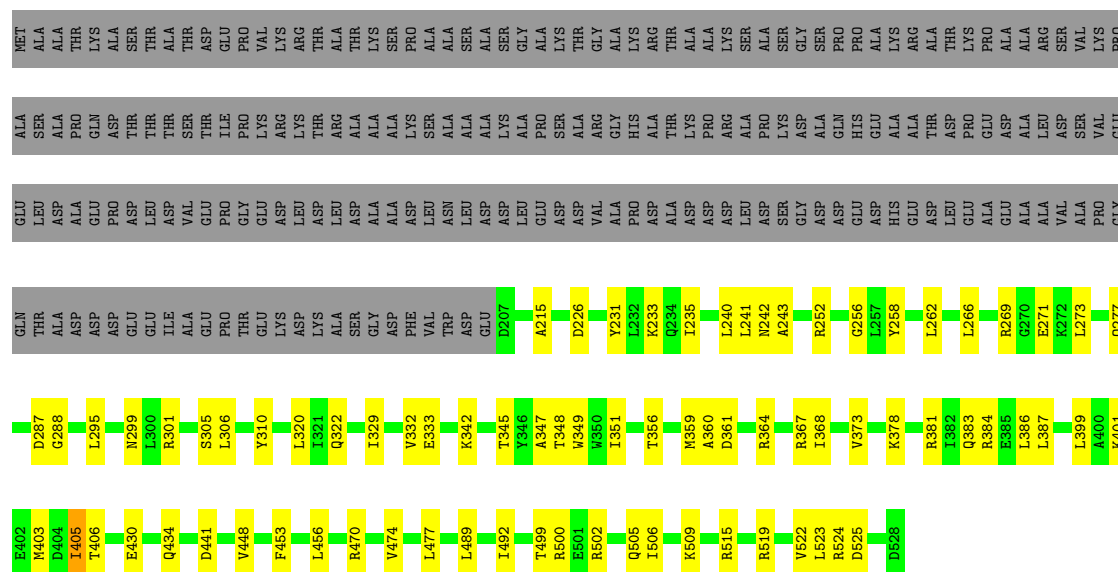




- Molecule 4: DNA-directed RNA polymerase subunit omega

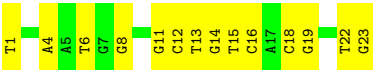
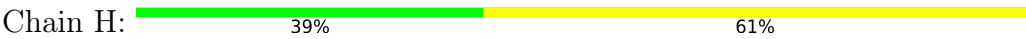


- Molecule 5: RNA polymerase sigma factor SigA

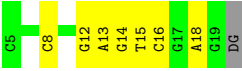


- Molecule 6: DNA (5'-D(\*TP\*AP\*TP\*AP\*AP\*TP\*GP\*GP\*GP\*AP\*GP\*CP\*TP\*GP\*TP\*CP\*AP\*CP\*GP\*GP\*AP\*TP\*G)-3')





● Molecule 7: DNA (5'-D(\*CP\*AP\*TP\*CP\*CP\*GP\*TP\*GP\*AP\*GP\*TP\*CP\*GP\*AP\*GP\*G)-3')



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	150.20Å 163.48Å 195.65Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.91 – 3.91 48.91 – 3.91	Depositor EDS
% Data completeness (in resolution range)	77.9 (48.91-3.91) 61.4 (48.91-3.91)	Depositor EDS
$R_{merge}$	0.22	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.60 (at 3.88Å)	Xtriage
Refinement program	PHENIX	Depositor
R, $R_{free}$	0.211 , 0.279 0.216 , 0.276	Depositor DCC
$R_{free}$ test set	1988 reflections (5.75%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	26.4	Xtriage
Anisotropy	0.591	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.25 , 26.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.37$ , $\langle L^2 \rangle = 0.20$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	25997	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.97% 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

### 5.1 Standard geometry

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

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	0.35	0/1730	0.81	0/2354
1	B	0.33	0/1741	0.82	1/2371 (0.0%)
2	C	0.37	0/8873	0.79	7/12031 (0.1%)
3	D	0.40	0/10052	0.79	8/13591 (0.1%)
4	E	0.37	0/650	0.79	0/886
5	F	0.37	0/2585	0.76	2/3485 (0.1%)
6	H	0.23	0/535	0.38	0/826
7	G	0.25	0/343	0.38	0/528
All	All	0.37	0/26509	0.78	18/36072 (0.0%)

There are no bond length outliers.

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	453	LYS	CA-C-N	-6.31	113.22	120.04
3	D	453	LYS	C-N-CA	-6.31	113.22	120.04
3	D	909	THR	CB-CA-C	-6.22	109.42	116.63
2	C	101	GLY	N-CA-C	-5.86	107.00	115.27
2	C	952	VAL	CA-C-N	5.44	125.44	119.89
2	C	952	VAL	C-N-CA	5.44	125.44	119.89
3	D	304	GLN	N-CA-C	5.39	116.83	111.07
2	C	459	GLY	CA-C-N	5.35	125.65	119.93
2	C	459	GLY	C-N-CA	5.35	125.65	119.93
2	C	546	SER	CA-C-N	5.25	125.26	119.90
2	C	546	SER	C-N-CA	5.25	125.26	119.90
3	D	53	GLY	CA-C-N	5.08	125.48	119.99
3	D	53	GLY	C-N-CA	5.08	125.48	119.99
5	F	406	THR	CA-C-N	5.08	124.57	119.19
5	F	406	THR	C-N-CA	5.08	124.57	119.19
1	B	184	GLU	CB-CA-C	-5.07	110.33	117.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	1126	GLY	CA-C-N	5.05	126.15	119.84
3	D	1126	GLY	C-N-CA	5.05	126.15	119.84

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	1704	0	1741	27	0
1	B	1715	0	1739	27	0
2	C	8714	0	8636	191	0
3	D	9887	0	9943	204	0
4	E	637	0	635	19	0
5	F	2555	0	2579	51	0
6	H	476	0	261	13	0
7	G	306	0	170	7	0
8	D	2	0	0	0	0
9	D	1	0	0	0	0
All	All	25997	0	25704	479	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 9.

All (479) 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:C:483:MET:HE3	2:C:498:GLY:HA3	1.57	0.86
2:C:279:ARG:HD3	5:F:215:ALA:HB1	1.68	0.76
3:D:1165:VAL:HG12	3:D:1205:PRO:HA	1.67	0.75
6:H:16:DC:O2	7:G:12:DG:N2	2.15	0.75
3:D:137:THR:OG1	3:D:253:THR:O	2.01	0.74
3:D:1090:LYS:HB3	3:D:1092:GLU:HG2	1.69	0.74
3:D:107:PHE:HZ	3:D:126:GLU:HG2	1.53	0.73
3:D:1030:ARG:HH21	3:D:1137:GLU:HG2	1.53	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:173:ARG:NH1	2:C:437:SER:O	2.21	0.73
2:C:48:LEU:HD12	2:C:528:ILE:HD13	1.71	0.73
2:C:1122:LYS:HE2	2:C:1148:ARG:HG2	1.68	0.73
3:D:738:VAL:HG13	3:D:841:ARG:HD3	1.70	0.72
2:C:239:LYS:NZ	2:C:265:ASP:OD2	2.24	0.71
5:F:522:VAL:HG23	5:F:523:LEU:HD12	1.73	0.71
2:C:113:ASP:HB2	2:C:132:PRO:HG2	1.73	0.71
3:D:93:GLY:O	3:D:319:VAL:N	2.22	0.70
2:C:38:ARG:NH1	2:C:712:GLU:OE1	2.15	0.69
2:C:568:VAL:HG21	3:D:847:LEU:HD21	1.75	0.69
1:A:213:LYS:HD3	1:B:227:VAL:HG23	1.75	0.69
2:C:371:ASP:OD1	6:H:14:DG:N1	2.23	0.68
1:A:107:ALA:HB2	1:A:123:MET:HE2	1.75	0.68
3:D:373:MET:O	3:D:377:SER:OG	2.10	0.68
2:C:101:GLY:O	2:C:142:ASN:ND2	2.27	0.67
5:F:401:LYS:HA	5:F:405:ILE:HA	1.76	0.67
3:D:409:LYS:NZ	7:G:14:DG:OP1	2.26	0.67
5:F:470:ARG:HB3	5:F:506:ILE:HD13	1.75	0.67
2:C:1045:SER:OG	2:C:1046:THR:N	2.23	0.67
3:D:589:THR:HG21	3:D:688:MET:HG2	1.77	0.67
2:C:658:ILE:HD11	2:C:688:PRO:HB3	1.75	0.67
3:D:438:LEU:O	3:D:561:SER:OG	2.14	0.66
1:B:75:GLU:O	1:B:79:ASN:ND2	2.29	0.66
5:F:506:ILE:HA	5:F:509:LYS:HD2	1.76	0.66
4:E:47:VAL:HG11	4:E:53:LEU:HB2	1.77	0.65
2:C:189:GLU:HB2	2:C:367:THR:HG21	1.77	0.65
3:D:130:TYR:OH	3:D:379:ASP:OD2	2.13	0.65
2:C:96:ILE:HD13	2:C:397:GLU:HG3	1.78	0.65
3:D:1250:GLU:OE2	3:D:1250:GLU:N	2.28	0.65
5:F:477:LEU:HD13	5:F:492:ILE:HG23	1.78	0.65
2:C:441:ASP:O	2:C:447:SER:OG	2.15	0.65
3:D:459:ARG:HA	3:D:462:ASP:HB2	1.78	0.64
5:F:242:ASN:OD1	5:F:243:ALA:N	2.31	0.64
2:C:815:THR:HG22	2:C:817:GLU:H	1.61	0.64
3:D:1245:LEU:HD13	3:D:1254:ILE:HD13	1.79	0.64
3:D:565:ILE:HG23	3:D:575:ALA:HB3	1.79	0.64
3:D:890:ASP:OD2	3:D:963:ARG:NH2	2.31	0.64
5:F:499:THR:OG1	5:F:500:ARG:N	2.31	0.64
5:F:269:ARG:NH1	5:F:271:GLU:OE1	2.30	0.63
2:C:762:THR:HG23	2:C:764:LEU:H	1.63	0.63
3:D:599:TYR:HA	3:D:610:GLY:HA3	1.80	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:F:345:THR:HB	6:H:4:DA:H8	1.64	0.62
3:D:905:ALA:HB2	3:D:911:ILE:HG13	1.82	0.62
3:D:1221:LEU:HG	3:D:1253:ILE:HD12	1.80	0.62
3:D:545:LEU:HD12	3:D:546:PRO:HD2	1.81	0.61
2:C:1076:MET:HE1	3:D:559:MET:HE1	1.80	0.61
2:C:1041:ILE:HD11	3:D:447:MET:HG3	1.82	0.61
2:C:182:SER:HB2	2:C:377:ARG:HB2	1.81	0.61
3:D:638:THR:HG23	3:D:639:GLN:HG2	1.82	0.61
4:E:42:GLU:O	4:E:46:ARG:NH1	2.33	0.61
2:C:43:LYS:NZ	2:C:544:ALA:O	2.34	0.60
3:D:828:LYS:HE3	3:D:830:GLU:HB2	1.82	0.60
2:C:959:LEU:HD12	2:C:960:PRO:HD2	1.83	0.60
2:C:536:GLU:OE2	2:C:562:ARG:NH1	2.31	0.60
2:C:799:GLY:C	3:D:478:ARG:HH12	2.10	0.60
6:H:15:DT:H2''	6:H:16:DC:H5'	1.84	0.60
3:D:1085:ARG:HA	3:D:1112:MET:HA	1.84	0.60
2:C:756:GLU:HG3	2:C:870:ARG:HG2	1.83	0.59
3:D:1055:LEU:HB2	3:D:1101:ASP:HB3	1.84	0.59
3:D:1170:SER:O	3:D:1173:THR:OG1	2.19	0.59
3:D:428:SER:OG	3:D:429:VAL:N	2.36	0.59
5:F:240:LEU:HD21	5:F:301:ARG:HD2	1.84	0.59
5:F:256:GLY:HA3	5:F:288:GLY:HA3	1.84	0.59
2:C:978:ASP:OD2	2:C:979:GLY:N	2.36	0.59
3:D:60:CYS:SG	3:D:61:TYR:N	2.74	0.59
5:F:470:ARG:HH11	5:F:506:ILE:HD11	1.68	0.59
6:H:22:DT:H1'	6:H:23:DG:H5'	1.85	0.59
1:A:197:GLU:OE1	2:C:996:ARG:NH1	2.32	0.58
2:C:974:THR:HG23	2:C:980:ALA:H	1.68	0.58
2:C:597:LEU:HB3	2:C:976:VAL:HG13	1.85	0.58
1:A:152:ASN:HB3	1:A:163:PRO:HB3	1.86	0.58
2:C:317:ASN:O	2:C:321:GLY:N	2.35	0.58
2:C:378:LEU:HD21	2:C:455:LEU:HD22	1.85	0.58
2:C:396:MET:HE1	2:C:418:ILE:HG23	1.86	0.58
2:C:486:ILE:HD11	3:D:849:TYR:HE2	1.69	0.58
3:D:266:GLU:HA	3:D:310:MET:HE1	1.85	0.58
3:D:64:LYS:NZ	3:D:76:GLU:OE2	2.31	0.57
3:D:530:GLU:HB2	3:D:578:ARG:HD2	1.85	0.57
2:C:441:ASP:OD2	2:C:443:ASN:ND2	2.37	0.57
2:C:516:TYR:OH	2:C:562:ARG:NH1	2.37	0.57
2:C:1024:THR:H	3:D:730:THR:HG21	1.68	0.57
6:H:19:DG:O6	7:G:8:DC:N4	2.37	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:1220:TRP:CD1	3:D:1243:ASP:HB2	2.40	0.57
2:C:513:GLU:HB3	2:C:530:TYR:HB3	1.87	0.57
3:D:442:GLY:HA3	3:D:523:GLN:HB2	1.86	0.57
3:D:343:LEU:HD13	3:D:381:LEU:HA	1.86	0.57
2:C:757:ILE:HB	2:C:837:LEU:HD22	1.87	0.56
3:D:230:ALA:N	3:D:233:GLN:OE1	2.37	0.56
3:D:1035:PHE:HB3	3:D:1210:ILE:HD13	1.87	0.56
1:B:90:ASP:HA	1:B:142:ARG:HD3	1.87	0.56
2:C:675:PHE:N	2:C:685:ASN:OD1	2.37	0.56
1:A:62:GLU:HG3	1:A:77:ILE:HD12	1.87	0.56
2:C:104:SER:HB3	2:C:140:ILE:HB	1.87	0.56
4:E:33:LEU:HD23	4:E:33:LEU:H	1.70	0.56
3:D:1090:LYS:HG2	3:D:1091:HIS:H	1.71	0.55
2:C:178:GLN:HG2	2:C:180:VAL:HG13	1.87	0.55
1:A:64:THR:OG1	1:A:65:THR:N	2.39	0.55
3:D:363:PRO:HD2	3:D:366:ILE:HD12	1.88	0.55
6:H:12:DC:H1'	6:H:13:DT:C2	2.40	0.55
1:B:72:ASP:OD1	1:B:73:VAL:N	2.38	0.55
2:C:1094:ASP:OD1	2:C:1119:GLU:N	2.39	0.55
3:D:1120:GLU:HA	3:D:1123:ARG:HG2	1.88	0.55
2:C:1119:GLU:OE2	3:D:89:ARG:NH2	2.40	0.55
3:D:1030:ARG:NH1	3:D:1033:GLU:OE1	2.37	0.55
2:C:631:GLU:H	2:C:631:GLU:CD	2.16	0.54
2:C:1044:ARG:NH1	2:C:1048:PRO:HD2	2.22	0.54
3:D:16:THR:HB	3:D:19:ASP:H	1.73	0.54
2:C:88:GLU:CD	2:C:310:ARG:HH12	2.15	0.54
3:D:826:ASN:HD22	3:D:832:ILE:HD11	1.73	0.54
2:C:757:ILE:HD12	2:C:837:LEU:HB2	1.89	0.54
1:B:27:GLU:HG3	1:B:28:PRO:HD2	1.90	0.54
3:D:190:LYS:HE3	3:D:192:ASP:HB3	1.90	0.54
4:E:60:ARG:NE	4:E:98:GLU:OE2	2.38	0.54
1:A:153:ARG:HH21	2:C:846:LYS:HE3	1.73	0.54
1:B:148:PRO:O	1:B:152:ASN:ND2	2.40	0.54
2:C:183:PRO:HB2	2:C:312:GLY:HA2	1.89	0.54
3:D:123:LYS:HE3	3:D:127:LYS:HE2	1.90	0.54
1:B:84:VAL:HG12	1:B:199:LYS:HD3	1.90	0.54
2:C:28:SER:N	2:C:962:GLU:OE1	2.40	0.54
3:D:454:PRO:HA	3:D:457:MET:HE2	1.90	0.54
1:B:27:GLU:HB3	1:B:30:PHE:HD2	1.72	0.53
2:C:1052:ILE:O	3:D:89:ARG:NH1	2.41	0.53
2:C:587:VAL:HB	2:C:591:THR:HB	1.90	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:175:THR:OG1	1:A:176:TYR:N	2.40	0.53
2:C:1089:LEU:HB3	3:D:420:LYS:NZ	2.23	0.53
3:D:444:PRO:HB2	3:D:447:MET:HB2	1.89	0.53
2:C:704:ASP:HB2	2:C:708:THR:HB	1.91	0.53
3:D:1110:GLN:NE2	3:D:1112:MET:O	2.34	0.53
1:A:89:GLU:HG3	1:A:93:VAL:HG11	1.90	0.53
3:D:1092:GLU:HG3	3:D:1094:GLY:H	1.74	0.53
2:C:455:LEU:N	2:C:498:GLY:O	2.35	0.53
2:C:484:CYS:HB2	2:C:588:SER:HB3	1.89	0.53
2:C:677:ARG:HE	2:C:753:GLU:HA	1.74	0.53
3:D:1161:MET:HE2	3:D:1207:LEU:HD11	1.91	0.53
2:C:115:VAL:HG11	2:C:129:TYR:CE1	2.44	0.52
2:C:818:GLU:OE2	2:C:822:ARG:NH1	2.42	0.52
3:D:921:TYR:HE1	3:D:946:ASP:HA	1.74	0.52
2:C:982:GLU:OE1	2:C:982:GLU:N	2.31	0.52
3:D:407:LYS:HE2	3:D:1230:THR:HG21	1.91	0.52
2:C:472:VAL:HG22	6:H:14:DG:C2	2.44	0.52
2:C:1148:ARG:NH1	3:D:86:LYS:HG3	2.25	0.52
2:C:899:LEU:HB2	2:C:904:MET:HE1	1.92	0.52
3:D:67:ARG:HD2	3:D:69:ARG:NE	2.25	0.52
3:D:372:ARG:HH22	5:F:231:TYR:HB2	1.75	0.52
3:D:914:PRO:HG2	3:D:915:TYR:HD1	1.74	0.52
3:D:1247:GLY:O	3:D:1251:ASN:ND2	2.40	0.52
1:B:170:PRO:HA	1:B:199:LYS:HD2	1.90	0.51
2:C:348:LEU:HD13	2:C:365:VAL:HG12	1.91	0.51
1:B:27:GLU:HB3	1:B:30:PHE:CD2	2.46	0.51
2:C:311:VAL:HG21	2:C:377:ARG:HD2	1.92	0.51
5:F:273:LEU:HD13	5:F:277:GLN:HB3	1.92	0.51
5:F:505:GLN:HG3	5:F:509:LYS:HE3	1.91	0.51
5:F:231:TYR:CE2	5:F:235:ILE:HD11	2.44	0.51
3:D:1166:THR:HB	3:D:1206:VAL:HG21	1.93	0.51
5:F:430:GLU:HG3	7:G:18:DA:N1	2.26	0.51
2:C:1089:LEU:HB3	3:D:420:LYS:HZ2	1.76	0.51
5:F:364:ARG:HG3	5:F:368:ILE:HG12	1.93	0.51
2:C:168:ILE:HG12	2:C:431:PHE:HB3	1.93	0.51
2:C:733:ASP:OD2	2:C:925:ARG:NH2	2.44	0.51
2:C:1087:GLU:HG3	2:C:1091:ILE:HD11	1.92	0.51
3:D:834:ARG:NH1	3:D:851:ILE:HG13	2.26	0.51
4:E:95:ALA:O	4:E:99:ILE:HG13	2.10	0.51
3:D:930:VAL:HG22	3:D:936:VAL:HG12	1.92	0.50
2:C:730:ASN:OD1	2:C:730:ASN:N	2.44	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:815:THR:O	2:C:819:ARG:N	2.41	0.50
2:C:1148:ARG:NH1	3:D:86:LYS:O	2.45	0.50
5:F:295:LEU:HD23	5:F:332:VAL:HG23	1.94	0.50
2:C:1112:ILE:HG13	3:D:548:SER:HA	1.94	0.50
3:D:1176:LEU:H	3:D:1176:LEU:HD12	1.77	0.50
5:F:349:TRP:HB3	6:H:1:DT:H4'	1.94	0.50
1:B:11:GLU:HB2	1:B:22:VAL:HB	1.94	0.49
2:C:624:PRO:HB3	2:C:1029:TYR:CD2	2.47	0.49
3:D:14:LEU:HD12	3:D:15:ALA:H	1.77	0.49
3:D:121:ALA:HB3	3:D:124:ASP:HB2	1.93	0.49
4:E:47:VAL:HG23	4:E:106:HIS:NE2	2.27	0.49
1:A:120:ASN:OD1	1:A:120:ASN:N	2.43	0.49
2:C:754:GLU:OE2	2:C:872:TYR:OH	2.27	0.49
3:D:184:LEU:HD12	3:D:197:VAL:HG21	1.94	0.49
3:D:453:LYS:O	3:D:457:MET:HG3	2.12	0.49
5:F:386:LEU:HD12	5:F:399:LEU:HD23	1.93	0.49
3:D:482:GLN:N	3:D:482:GLN:OE1	2.46	0.49
2:C:446:LEU:HB2	2:C:713:MET:HE2	1.94	0.49
2:C:561:VAL:HG21	2:C:571:VAL:HB	1.94	0.49
2:C:597:LEU:HD23	2:C:976:VAL:HG11	1.94	0.49
3:D:676:LEU:HD23	3:D:716:LEU:HD23	1.94	0.49
3:D:1089:PHE:HA	3:D:1095:SER:HA	1.93	0.49
1:A:129:ASN:ND2	2:C:652:GLU:HG3	2.27	0.49
3:D:240:LEU:O	3:D:244:LEU:N	2.45	0.49
3:D:344:TYR:O	3:D:348:ILE:HG13	2.13	0.49
3:D:36:TYR:CZ	3:D:37:ARG:HG3	2.47	0.49
3:D:492:ALA:HB3	4:E:90:LYS:HE2	1.95	0.49
3:D:965:VAL:HG13	3:D:974:VAL:HG11	1.95	0.49
2:C:377:ARG:HH22	2:C:383:GLU:CD	2.21	0.49
2:C:825:PHE:CE1	5:F:524:ARG:HD2	2.48	0.49
3:D:1220:TRP:NE1	3:D:1243:ASP:HB2	2.28	0.49
4:E:56:TYR:HE2	4:E:99:ILE:HG12	1.78	0.49
2:C:466:GLU:OE1	7:G:13:DA:N6	2.46	0.49
2:C:738:SER:HA	2:C:904:MET:HE3	1.95	0.49
3:D:894:GLU:HA	3:D:940:ARG:HH12	1.77	0.49
6:H:11:DG:H5''	6:H:12:DC:C4	2.48	0.49
2:C:815:THR:HG21	5:F:453:PHE:HE1	1.78	0.49
3:D:106:TYR:CD2	3:D:312:MET:HG2	2.48	0.49
3:D:1065:THR:HG23	3:D:1076:VAL:HB	1.95	0.49
3:D:138:SER:O	3:D:253:THR:N	2.41	0.48
3:D:1249:LYS:O	3:D:1253:ILE:HG13	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:F:226:ASP:OD1	6:H:8:DG:N1	2.44	0.48
3:D:589:THR:HB	3:D:687:GLN:HA	1.95	0.48
3:D:832:ILE:HG22	3:D:834:ARG:H	1.77	0.48
5:F:384:ARG:HA	5:F:387:LEU:HB2	1.96	0.48
5:F:474:VAL:HA	5:F:477:LEU:HD12	1.96	0.48
2:C:476:HIS:CG	2:C:477:PRO:HD2	2.48	0.48
2:C:1102:VAL:HG13	2:C:1112:ILE:HD12	1.95	0.48
3:D:104:ILE:HB	3:D:379:ASP:OD1	2.14	0.48
3:D:556:ARG:HG3	4:E:35:ILE:HG12	1.96	0.48
2:C:599:HIS:HB3	2:C:928:ILE:HD12	1.95	0.48
5:F:383:GLN:HA	5:F:399:LEU:HD21	1.95	0.48
5:F:360:ALA:HB1	5:F:373:VAL:HG21	1.96	0.48
5:F:499:THR:HG23	5:F:500:ARG:HD2	1.95	0.48
2:C:197:LYS:HD2	2:C:218:LYS:HA	1.95	0.47
3:D:573:PRO:HB2	3:D:576:MET:HE2	1.95	0.47
1:A:14:LEU:HD23	1:A:19:SER:HB2	1.96	0.47
2:C:522:GLY:O	2:C:553:ARG:HA	2.14	0.47
3:D:447:MET:HE2	3:D:447:MET:HB3	1.79	0.47
3:D:724:ALA:O	3:D:727:SER:OG	2.29	0.47
3:D:370:GLU:OE2	5:F:322:GLN:NE2	2.22	0.47
3:D:634:LYS:HE2	3:D:665:GLU:HG2	1.96	0.47
5:F:515:ARG:O	5:F:519:ARG:N	2.47	0.47
2:C:444:ASN:HD22	2:C:615:ALA:HB3	1.78	0.47
3:D:101:VAL:HG23	3:D:375:GLN:CD	2.40	0.47
3:D:907:ASP:OD1	3:D:908:GLY:N	2.47	0.47
5:F:262:LEU:O	5:F:266:LEU:HG	2.15	0.47
2:C:347:ARG:HH11	2:C:352:GLN:HE22	1.63	0.47
3:D:356:ARG:HH21	3:D:360:LEU:HD11	1.80	0.47
3:D:373:MET:HE1	5:F:322:GLN:HG3	1.97	0.47
3:D:915:TYR:HA	3:D:1143:ARG:HH12	1.79	0.47
4:E:70:GLN:O	4:E:74:GLY:N	2.33	0.47
2:C:116:LYS:HG3	2:C:132:PRO:HD3	1.97	0.47
1:A:97:LEU:HD12	1:A:110:ILE:HG12	1.97	0.47
3:D:819:GLY:O	3:D:839:SER:HB3	2.15	0.46
4:E:96:LEU:HA	4:E:99:ILE:HD12	1.97	0.46
3:D:530:GLU:HB2	3:D:578:ARG:CD	2.45	0.46
3:D:600:GLN:HB2	3:D:609:THR:HB	1.97	0.46
2:C:46:GLU:N	2:C:47:PRO:HD3	2.31	0.46
3:D:873:LEU:HA	3:D:876:ARG:HE	1.79	0.46
5:F:378:LYS:HD3	5:F:381:ARG:HH11	1.80	0.46
7:G:15:DT:H2'	7:G:16:DC:C6	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:149:ALA:O	1:A:151:GLN:N	2.49	0.46
1:B:99:LYS:HD3	1:B:105:VAL:HG22	1.95	0.46
2:C:1031:MET:HE3	2:C:1033:LEU:HD21	1.97	0.46
5:F:329:ILE:O	5:F:333:GLU:HG2	2.15	0.46
3:D:557:ILE:HD12	4:E:54:VAL:HG22	1.96	0.46
4:E:84:GLU:CD	4:E:84:GLU:H	2.24	0.46
1:A:185:GLN:HG2	1:A:186:ARG:H	1.81	0.46
2:C:377:ARG:NH2	2:C:383:GLU:OE1	2.49	0.46
2:C:739:ASN:ND2	2:C:743:GLU:OE2	2.48	0.46
3:D:54:PRO:HG2	3:D:83:THR:O	2.16	0.46
3:D:778:TRP:CE2	3:D:835:PRO:HG3	2.51	0.46
2:C:1139:SER:OG	2:C:1141:ASP:OD1	2.31	0.46
3:D:83:THR:HG22	3:D:84:ARG:H	1.80	0.46
1:B:92:PRO:HB3	1:B:141:GLU:HG2	1.97	0.46
2:C:544:ALA:HB2	2:C:580:ASP:HB2	1.97	0.46
2:C:805:LYS:HE2	2:C:835:THR:O	2.16	0.46
2:C:1020:PRO:HB2	2:C:1021:TYR:CD2	2.52	0.45
2:C:740:ARG:HH21	2:C:914:ASP:CG	2.24	0.45
3:D:497:LEU:O	3:D:543:VAL:HA	2.17	0.45
2:C:251:ARG:NH2	2:C:343:GLU:OE1	2.40	0.45
2:C:515:PRO:HB2	2:C:581:VAL:HG21	1.97	0.45
3:D:310:MET:HE2	3:D:310:MET:HB2	1.86	0.45
2:C:604:ARG:NH1	2:C:925:ARG:HD2	2.32	0.45
2:C:731:TYR:HE1	3:D:579:LEU:HB2	1.80	0.45
3:D:924:THR:HG22	3:D:943:ASP:HA	1.98	0.45
3:D:1051:GLY:HA2	3:D:1069:ASP:HB2	1.98	0.45
2:C:689:ILE:HG13	2:C:703:ALA:HA	1.98	0.45
2:C:958:ARG:N	2:C:958:ARG:HD2	2.31	0.45
3:D:529:CYS:O	3:D:533:ASN:N	2.50	0.45
3:D:870:SER:O	3:D:874:THR:OG1	2.30	0.45
3:D:11:ARG:HG2	3:D:12:ILE:N	2.31	0.45
3:D:889:HIS:O	3:D:977:THR:OG1	2.29	0.45
2:C:464:SER:HB3	2:C:467:ARG:HG3	1.99	0.45
2:C:735:ILE:O	2:C:896:GLY:N	2.49	0.45
3:D:797:ASN:HA	3:D:798:PRO:HD3	1.78	0.45
2:C:396:MET:HE3	2:C:396:MET:HB2	1.81	0.45
2:C:721:VAL:HG12	2:C:1026:GLY:C	2.41	0.45
2:C:909:ASP:OD1	2:C:909:ASP:N	2.45	0.45
3:D:740:PRO:HD3	3:D:792:HIS:ND1	2.31	0.45
5:F:403:MET:HE3	5:F:403:MET:HB2	1.84	0.45
2:C:590:ALA:HA	2:C:593:MET:HE3	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:737:LEU:HB2	2:C:898:ILE:HG12	1.99	0.45
2:C:928:ILE:H	2:C:928:ILE:HG13	1.50	0.45
3:D:681:TYR:HA	3:D:682:PRO:HD2	1.81	0.45
2:C:662:HIS:HE1	2:C:668:ARG:HB2	1.83	0.44
3:D:1036:GLU:OE2	3:D:1211:THR:OG1	2.35	0.44
4:E:29:TYR:OH	4:E:42:GLU:OE2	2.25	0.44
4:E:56:TYR:CE2	4:E:99:ILE:HG12	2.53	0.44
2:C:549:ASP:HB3	2:C:553:ARG:H	1.81	0.44
2:C:70:TRP:CH2	2:C:82:PRO:HB2	2.53	0.44
3:D:103:HIS:CE1	3:D:105:TRP:HB2	2.52	0.44
3:D:139:VAL:HG12	3:D:231:PRO:HD3	2.00	0.44
1:B:44:SER:O	1:B:144:ARG:HB3	2.17	0.44
1:B:110:ILE:O	1:B:112:PRO:HD3	2.17	0.44
2:C:813:GLU:OE1	3:D:67:ARG:HG3	2.17	0.44
2:C:840:PRO:HB2	2:C:843:GLU:HG3	2.00	0.44
3:D:49:GLU:OE2	3:D:55:THR:N	2.38	0.44
5:F:299:ASN:OD1	6:H:6:DT:N3	2.44	0.44
1:A:40:ARG:HB2	1:B:33:THR:HG23	1.98	0.44
1:A:130:ASP:O	1:A:131:LYS:HG2	2.18	0.44
3:D:293:LEU:HD21	3:D:1177:PRO:HG2	1.99	0.44
3:D:707:ILE:HD11	4:E:32:PRO:HB3	1.99	0.44
5:F:231:TYR:O	5:F:235:ILE:HG13	2.18	0.44
5:F:320:LEU:HD21	5:F:359:MET:HE3	1.99	0.44
1:A:170:PRO:HA	1:A:199:LYS:HD2	1.98	0.44
3:D:882:GLN:OE1	3:D:1249:LYS:HB2	2.17	0.44
3:D:1087:ARG:HG2	3:D:1098:VAL:HG22	2.00	0.44
1:B:183:VAL:HB	1:B:189:PHE:CD1	2.53	0.44
2:C:804:GLY:HA2	2:C:836:SER:OG	2.18	0.44
1:A:225:LEU:HD13	1:A:225:LEU:H	1.82	0.44
2:C:731:TYR:CE1	3:D:579:LEU:HB2	2.53	0.44
2:C:926:MET:HE1	3:D:817:LEU:HA	1.99	0.44
2:C:38:ARG:HA	2:C:971:ILE:HG13	1.99	0.43
2:C:904:MET:HG2	2:C:913:VAL:O	2.18	0.43
2:C:1086:GLN:O	2:C:1090:THR:OG1	2.31	0.43
2:C:1121:PHE:CE1	3:D:1254:ILE:HG22	2.53	0.43
5:F:342:LYS:HB3	5:F:342:LYS:HE2	1.71	0.43
5:F:474:VAL:HA	5:F:477:LEU:HB2	2.00	0.43
2:C:226:ILE:O	2:C:229:LYS:HG2	2.19	0.43
3:D:101:VAL:HG11	3:D:378:VAL:HG21	2.00	0.43
3:D:795:ASP:O	3:D:801:THR:OG1	2.36	0.43
1:B:95:MET:HE3	1:B:140:VAL:HG21	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:211:TRP:HB2	2:C:227:ASP:HA	1.99	0.43
2:C:978:ASP:CG	2:C:979:GLY:H	2.23	0.43
2:C:1049:TYR:OH	3:D:423:ASP:OD2	2.32	0.43
3:D:117:LEU:HD22	3:D:312:MET:HE1	2.00	0.43
1:A:186:ARG:H	1:A:186:ARG:HG2	1.66	0.43
2:C:789:ILE:HD12	2:C:869:VAL:HG11	1.99	0.43
3:D:899:VAL:HG11	3:D:920:ALA:HB2	2.00	0.43
3:D:1035:PHE:O	3:D:1210:ILE:HG12	2.18	0.43
3:D:1139:GLN:O	3:D:1143:ARG:HG2	2.17	0.43
2:C:43:LYS:O	2:C:43:LYS:HG3	2.19	0.43
3:D:447:MET:HE1	3:D:543:VAL:HG21	1.98	0.43
3:D:35:ASN:OD1	3:D:36:TYR:N	2.51	0.43
2:C:1059:GLY:HA2	7:G:18:DA:OP2	2.18	0.43
1:B:39:ARG:HH21	1:B:173:LYS:NZ	2.17	0.43
2:C:372:HIS:NE2	2:C:537:ASP:OD2	2.52	0.43
2:C:885:LEU:CD1	2:C:895:ILE:HD11	2.49	0.43
2:C:1051:MET:HA	5:F:441:ASP:HB2	2.01	0.43
1:B:157:ALA:C	1:B:159:ILE:H	2.27	0.43
1:B:212:GLY:O	1:B:216:VAL:HG23	2.18	0.43
2:C:288:THR:HG22	2:C:290:GLU:H	1.83	0.43
2:C:687:CYS:HA	2:C:688:PRO:HD3	1.77	0.43
2:C:821:LEU:HD22	5:F:456:LEU:HD11	2.00	0.43
3:D:676:LEU:HG	3:D:715:LYS:HB3	2.00	0.43
3:D:789:LEU:HD22	3:D:793:TYR:CE2	2.54	0.43
2:C:347:ARG:HB3	2:C:352:GLN:HB2	2.00	0.43
3:D:745:ILE:HD13	3:D:784:GLU:HG2	2.01	0.43
3:D:1270:ILE:HG12	4:E:108:GLU:HA	2.01	0.43
5:F:489:LEU:H	5:F:489:LEU:HD23	1.83	0.43
2:C:53:LEU:HD13	2:C:449:LEU:HD21	2.01	0.42
3:D:760:PHE:CG	3:D:770:ARG:HD2	2.53	0.42
5:F:347:ALA:O	5:F:351:ILE:HG13	2.19	0.42
3:D:45:GLY:H	3:D:48:CYS:HB2	1.83	0.42
1:A:34:LEU:HD21	1:B:218:LEU:HD13	2.00	0.42
2:C:47:PRO:HG2	2:C:581:VAL:O	2.19	0.42
2:C:484:CYS:CB	2:C:588:SER:HB3	2.48	0.42
2:C:770:THR:HG23	2:C:772:ASP:H	1.84	0.42
3:D:840:PHE:CD2	3:D:844:LEU:HD11	2.54	0.42
2:C:41:PHE:O	2:C:979:GLY:HA2	2.19	0.42
3:D:578:ARG:H	3:D:581:MET:HE3	1.84	0.42
3:D:1127:PRO:O	3:D:1130:VAL:HG12	2.19	0.42
1:A:86:SER:OG	1:A:117:THR:OG1	2.37	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:102:SER:O	2:C:141:ASN:ND2	2.53	0.42
2:C:896:GLY:HA2	3:D:431:VAL:HG13	2.02	0.42
3:D:945:GLY:H	3:D:948:GLU:HG3	1.85	0.42
5:F:271:GLU:H	5:F:271:GLU:HG2	1.65	0.42
3:D:858:LYS:O	3:D:861:ALA:HB3	2.20	0.42
3:D:1038:ARG:NH1	6:H:18:DC:O3'	2.52	0.42
3:D:1172:SER:N	3:D:1199:GLU:O	2.35	0.42
1:B:178:VAL:HG22	1:B:192:LEU:HD13	2.01	0.42
3:D:130:TYR:O	3:D:372:ARG:HD3	2.19	0.42
3:D:176:LYS:NZ	3:D:180:ASP:OD2	2.52	0.42
3:D:874:THR:O	3:D:878:VAL:HG23	2.19	0.42
5:F:252:ARG:NH1	5:F:287:ASP:OD1	2.47	0.42
5:F:502:ARG:O	5:F:506:ILE:HG13	2.20	0.42
1:A:214:THR:HA	1:B:230:GLU:HG2	2.00	0.42
2:C:444:ASN:ND2	2:C:615:ALA:HB3	2.34	0.42
2:C:977:PHE:CG	3:D:846:VAL:HG22	2.55	0.42
2:C:1106:ILE:HD13	3:D:455:PHE:CE2	2.55	0.42
3:D:1088:VAL:HG11	3:D:1109:GLN:CD	2.45	0.42
1:A:18:ARG:NH1	2:C:997:ASP:OD1	2.52	0.42
2:C:315:LYS:HD2	2:C:315:LYS:HA	1.85	0.42
2:C:849:GLY:O	2:C:850:ILE:HD12	2.20	0.42
2:C:1019:PHE:HA	2:C:1020:PRO:HD3	1.87	0.42
3:D:500:ARG:HD2	3:D:532:PHE:O	2.19	0.42
3:D:832:ILE:HG22	3:D:834:ARG:N	2.34	0.42
3:D:919:SER:OG	3:D:1151:ASP:OD2	2.33	0.42
4:E:40:ILE:O	4:E:44:LEU:HG	2.20	0.42
5:F:310:TYR:HB3	5:F:359:MET:HE1	2.02	0.42
1:A:197:GLU:CD	2:C:996:ARG:HH12	2.27	0.41
2:C:122:CYS:SG	2:C:127:MET:HG3	2.60	0.41
3:D:102:THR:HG21	3:D:129:ILE:HD13	2.01	0.41
3:D:717:LYS:HE2	3:D:717:LYS:HB3	1.75	0.41
3:D:1221:LEU:HD12	3:D:1221:LEU:HA	1.87	0.41
2:C:721:VAL:HG12	2:C:1026:GLY:O	2.20	0.41
2:C:1128:LEU:HD22	2:C:1133:LEU:HD12	2.01	0.41
2:C:1137:VAL:HG21	2:C:1147:LEU:HD11	2.02	0.41
5:F:306:LEU:HD22	5:F:348:THR:HG23	2.02	0.41
1:A:57:ASP:HB2	1:A:135:GLU:HB3	2.02	0.41
2:C:619:VAL:HG23	2:C:748:THR:O	2.19	0.41
2:C:723:ILE:O	3:D:730:THR:HG23	2.20	0.41
2:C:954:ASP:O	2:C:958:ARG:NH1	2.53	0.41
3:D:101:VAL:HG23	3:D:375:GLN:OE1	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:102:THR:HG22	3:D:313:VAL:HG22	2.01	0.41
3:D:127:LYS:O	3:D:133:ALA:N	2.53	0.41
3:D:729:VAL:HG13	3:D:798:PRO:HB3	2.02	0.41
2:C:252:PHE:HB3	2:C:258:MET:HG3	2.02	0.41
2:C:435:GLN:OE1	2:C:459:GLY:HA2	2.20	0.41
2:C:927:ASN:O	2:C:930:GLN:HG2	2.20	0.41
3:D:922:ALA:HB3	3:D:1150:HIS:CE1	2.56	0.41
2:C:769:ILE:HD12	2:C:867:GLU:HB3	2.03	0.41
3:D:343:LEU:HD21	3:D:399:LEU:HD12	2.02	0.41
3:D:409:LYS:C	3:D:411:GLY:H	2.28	0.41
2:C:615:ALA:HB3	2:C:715:LEU:HD22	2.03	0.41
2:C:899:LEU:HB2	2:C:904:MET:CE	2.51	0.41
3:D:14:LEU:HD12	3:D:15:ALA:N	2.35	0.41
3:D:1046:ILE:HD13	3:D:1121:VAL:HG22	2.02	0.41
3:D:173:ARG:HA	3:D:173:ARG:HD2	1.86	0.41
1:B:53:SER:HA	1:B:164:VAL:HG23	2.03	0.41
1:B:174:VAL:HG22	1:B:196:VAL:HA	2.02	0.41
2:C:94:SER:HA	2:C:95:PRO:HA	1.68	0.41
2:C:344:TYR:OH	2:C:365:VAL:HA	2.20	0.41
2:C:434:SER:C	2:C:436:LEU:H	2.28	0.41
3:D:456:VAL:HG22	3:D:490:VAL:HG21	2.02	0.41
2:C:186:TYR:HE1	2:C:375:ASN:HB3	1.85	0.41
2:C:206:PRO:HB3	2:C:306:TYR:CZ	2.56	0.41
2:C:347:ARG:NH1	2:C:352:GLN:HE22	2.18	0.41
2:C:567:GLU:HG2	2:C:568:VAL:N	2.36	0.41
2:C:856:GLU:C	2:C:858:GLU:H	2.29	0.41
2:C:1074:TRP:CE2	3:D:878:VAL:HG11	2.56	0.41
2:C:1120:SER:O	2:C:1123:VAL:HB	2.21	0.41
3:D:177:LEU:HD13	3:D:201:GLY:HA3	2.03	0.41
3:D:1039:VAL:HA	3:D:1040:PRO:HD3	1.87	0.41
1:B:221:LEU:HD13	1:B:221:LEU:HA	1.94	0.41
2:C:41:PHE:HB2	2:C:979:GLY:HA2	2.03	0.41
2:C:1044:ARG:HH12	2:C:1048:PRO:HD2	1.84	0.41
3:D:47:PHE:CD2	3:D:322:PRO:HB3	2.56	0.41
3:D:733:MET:HE2	3:D:733:MET:HB3	1.79	0.41
2:C:232:GLN:OE1	2:C:280:LYS:HG3	2.20	0.40
2:C:441:ASP:H	2:C:451:HIS:CD2	2.39	0.40
2:C:880:SER:N	2:C:883:ASP:OD2	2.41	0.40
3:D:259:GLU:O	3:D:262:GLN:HB3	2.21	0.40
2:C:408:ASP:OD1	2:C:408:ASP:N	2.37	0.40
2:C:1087:GLU:OE1	2:C:1092:LYS:HE3	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:111:PRO:O	3:D:113:ARG:HD2	2.21	0.40
2:C:557:PRO:O	2:C:573:SER:N	2.53	0.40
3:D:409:LYS:O	3:D:415:GLN:HB2	2.21	0.40
3:D:582:VAL:HG11	3:D:807:ALA:HA	2.03	0.40
2:C:471:GLU:H	2:C:471:GLU:CD	2.30	0.40
3:D:597:GLY:HA3	3:D:627:LEU:HA	2.03	0.40
3:D:945:GLY:O	3:D:949:ILE:HG12	2.21	0.40
3:D:1009:GLN:H	3:D:1009:GLN:HG3	1.70	0.40
3:D:1010:LEU:HD12	3:D:1028:LEU:HB2	2.03	0.40
3:D:1166:THR:HG22	3:D:1204:ARG:O	2.22	0.40
4:E:29:TYR:HD1	4:E:30:ASP:O	2.04	0.40
1:A:181:THR:O	1:A:188:ASP:HA	2.21	0.40
2:C:441:ASP:HA	2:C:680:HIS:CE1	2.57	0.40
2:C:1083:TYR:HB2	3:D:554:GLU:OE1	2.22	0.40
3:D:308:SER:HA	3:D:309:PRO:HD3	1.81	0.40
3:D:473:LYS:HE3	3:D:477:GLU:OE2	2.21	0.40
3:D:827:PRO:HG3	3:D:854:HIS:NE2	2.37	0.40
3:D:1186:PHE:O	3:D:1190:ASN:HB2	2.21	0.40
3:D:1187:GLU:O	3:D:1191:ARG:HB2	2.22	0.40
3:D:1228:GLU:OE2	3:D:1231:ARG:NH1	2.55	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	222/347 (64%)	208 (94%)	12 (5%)	2 (1%)	14 47
1	B	225/347 (65%)	206 (92%)	15 (7%)	4 (2%)	6 34
2	C	1124/1178 (95%)	1039 (92%)	74 (7%)	11 (1%)	12 45
3	D	1261/1316 (96%)	1184 (94%)	72 (6%)	5 (0%)	30 64

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	E	79/110 (72%)	74 (94%)	5 (6%)	0	100	100
5	F	320/528 (61%)	303 (95%)	16 (5%)	1 (0%)	36	69
All	All	3231/3826 (84%)	3014 (93%)	194 (6%)	23 (1%)	18	53

All (23) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	D	678	PRO
2	C	1148	ARG
5	F	405	ILE
1	A	184	GLU
2	C	33	PRO
2	C	47	PRO
1	A	150	VAL
2	C	1134	ASN
3	D	971	SER
1	B	35	GLY
1	B	226	ASN
2	C	34	GLY
2	C	564	LYS
2	C	922	VAL
1	B	227	VAL
2	C	32	VAL
2	C	358	PRO
3	D	593	PRO
1	B	148	PRO
3	D	658	PRO
2	C	46	GLU
2	C	552	GLY
3	D	607	PRO

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	192/297 (65%)	187 (97%)	5 (3%)	40	60
1	B	192/297 (65%)	191 (100%)	1 (0%)	81	82
2	C	948/998 (95%)	919 (97%)	29 (3%)	35	57
3	D	1048/1095 (96%)	1022 (98%)	26 (2%)	42	62
4	E	68/90 (76%)	67 (98%)	1 (2%)	57	70
5	F	271/427 (64%)	261 (96%)	10 (4%)	30	53
All	All	2719/3204 (85%)	2647 (97%)	72 (3%)	40	60

All (72) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	69	VAL
1	A	136	VAL
1	A	153	ARG
1	A	159	ILE
1	A	225	LEU
1	B	117	THR
2	C	39	VAL
2	C	48	LEU
2	C	80	VAL
2	C	122	CYS
2	C	185	VAL
2	C	224	VAL
2	C	311	VAL
2	C	322	LEU
2	C	332	THR
2	C	346	VAL
2	C	354	THR
2	C	396	MET
2	C	408	ASP
2	C	427	ILE
2	C	447	SER
2	C	472	VAL
2	C	540	VAL
2	C	559	VAL
2	C	621	SER
2	C	673	ARG
2	C	797	ARG
2	C	850	ILE
2	C	928	ILE
2	C	946	VAL

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Mol	Chain	Res	Type
2	C	1002	VAL
2	C	1036	LEU
2	C	1037	VAL
2	C	1099	ARG
2	C	1137	VAL
3	D	16	THR
3	D	33	THR
3	D	60	CYS
3	D	83	THR
3	D	112	SER
3	D	129	ILE
3	D	135	VAL
3	D	261	ILE
3	D	337	THR
3	D	377	SER
3	D	503	THR
3	D	582	VAL
3	D	583	THR
3	D	589	THR
3	D	629	VAL
3	D	758	LYS
3	D	810	ASN
3	D	901	LEU
3	D	948	GLU
3	D	1009	GLN
3	D	1098	VAL
3	D	1099	LEU
3	D	1173	THR
3	D	1194	VAL
3	D	1229	THR
3	D	1246	ASN
4	E	75	ILE
5	F	233	LYS
5	F	241	LEU
5	F	258	TYR
5	F	305	SER
5	F	356	THR
5	F	361	ASP
5	F	367	ARG
5	F	434	GLN
5	F	448	VAL
5	F	525	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	5	GLN
1	A	36	ASN
1	B	200	ASN
2	C	37	ASN
2	C	232	GLN
2	C	451	HIS
2	C	612	GLN
2	C	662	HIS
2	C	680	HIS
2	C	729	HIS
2	C	755	HIS
3	D	303	GLN
3	D	510	GLN
3	D	1239	ASN
4	E	37	ASN
5	F	362	GLN
5	F	388	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 3 ligands modelled in this entry, 3 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	224/347 (64%)	-1.34	0 100 100	3, 28, 99, 153	0
1	B	227/347 (65%)	-1.24	0 100 100	22, 70, 133, 162	0
2	C	1126/1178 (95%)	-1.38	0 100 100	1, 17, 107, 132	0
3	D	1265/1316 (96%)	-1.41	0 100 100	1, 16, 88, 125	0
4	E	81/110 (73%)	-1.45	0 100 100	6, 16, 53, 91	0
5	F	322/528 (60%)	-1.30	0 100 100	2, 39, 140, 174	0
6	H	23/23 (100%)	-1.05	0 100 100	7, 86, 132, 162	0
7	G	15/16 (93%)	-0.77	0 100 100	80, 103, 134, 134	0
All	All	3283/3865 (84%)	-1.37	0 100 100	1, 22, 110, 174	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 [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
8	ZN	D	1401	1/1	1.00	0.01	55,55,55,55	0
8	ZN	D	1402	1/1	1.00	0.01	25,25,25,25	0
9	MG	D	1403	1/1	1.00	0.03	2,2,2,2	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.