Full wwPDB X-ray Structure Validation Report ⓘ

Nov 20, 2023 – 12:04 PM JST

PDB ID	:	7CJD
Title	:	Crystal structure of the SARS-CoV-2 PLpro C111S mutant
Authors	:	Gao, X.; Cui, S.
Deposited on	:	2020-07-10
Resolution	:	2.50 Å(reported)

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	:	2.36
buster-report	:	1.1.7 (2018)
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)	:	2.36
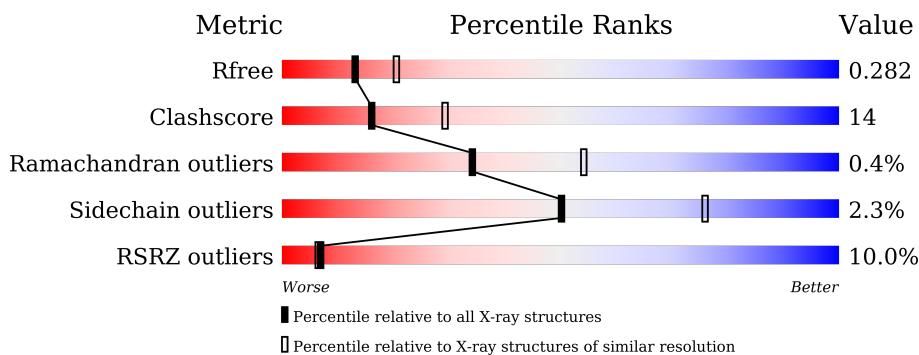
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION
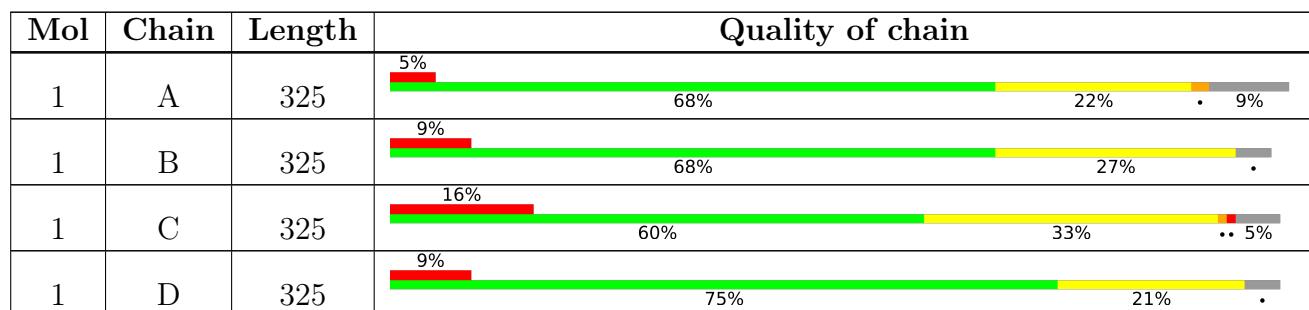
The reported resolution of this entry is 2.50 Å.

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	Percentile Ranks	Value
Rfree		0.282
Clashscore		14
Ramachandran outliers		0.4%
Sidechain outliers		2.3%
RSRZ outliers		10.0%

Worse ← → *Better*

█ Percentile relative to all X-ray structures
▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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 <=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	325	5% / 68% 22% · 9%
1	B	325	9% / 68% 27% ·
1	C	325	16% / 60% 33% ·· 5%
1	D	325	9% / 75% 21% ·

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 19318 atoms, of which 9498 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 Non-structural protein 3.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	D	313	Total	C	H	N	O	S	0	0	0
			4906	1580	2422	410	476	18			
1	A	297	Total	C	H	N	O	S	0	0	0
			4649	1502	2292	389	450	16			
1	B	311	Total	C	H	N	O	S	0	0	0
			4876	1571	2408	408	471	18			
1	C	310	Total	C	H	N	O	S	0	0	0
			4831	1566	2370	407	470	18			

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	0	MET	-	initiating methionine	UNP P0DTD1
D	111	SER	CYS	engineered mutation	UNP P0DTD1
D	319	HIS	-	expression tag	UNP P0DTD1
D	320	HIS	-	expression tag	UNP P0DTD1
D	321	HIS	-	expression tag	UNP P0DTD1
D	322	HIS	-	expression tag	UNP P0DTD1
D	323	HIS	-	expression tag	UNP P0DTD1
D	324	HIS	-	expression tag	UNP P0DTD1
A	0	MET	-	initiating methionine	UNP P0DTD1
A	111	SER	CYS	engineered mutation	UNP P0DTD1
A	319	HIS	-	expression tag	UNP P0DTD1
A	320	HIS	-	expression tag	UNP P0DTD1
A	321	HIS	-	expression tag	UNP P0DTD1
A	322	HIS	-	expression tag	UNP P0DTD1
A	323	HIS	-	expression tag	UNP P0DTD1
A	324	HIS	-	expression tag	UNP P0DTD1
B	0	MET	-	initiating methionine	UNP P0DTD1
B	111	SER	CYS	engineered mutation	UNP P0DTD1
B	319	HIS	-	expression tag	UNP P0DTD1
B	320	HIS	-	expression tag	UNP P0DTD1
B	321	HIS	-	expression tag	UNP P0DTD1

WORLDWIDE
wwPDB
PROTEIN DATA BANK
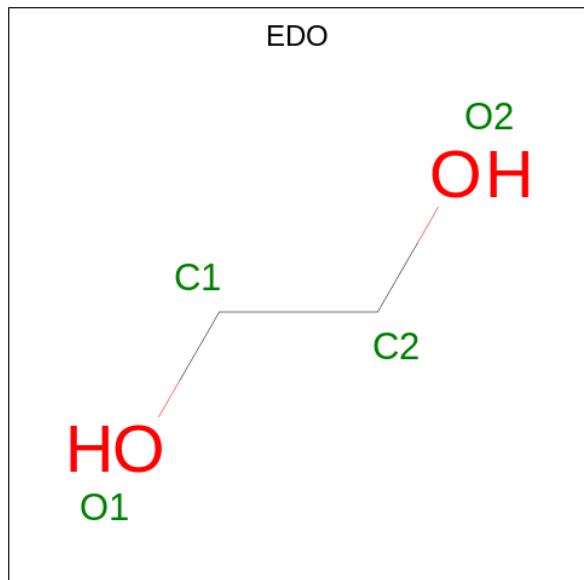
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Chain	Residue	Modelled	Actual	Comment	Reference
B	322	HIS	-	expression tag	UNP P0DTD1
B	323	HIS	-	expression tag	UNP P0DTD1
B	324	HIS	-	expression tag	UNP P0DTD1
C	0	MET	-	initiating methionine	UNP P0DTD1
C	111	SER	CYS	engineered mutation	UNP P0DTD1
C	319	HIS	-	expression tag	UNP P0DTD1
C	320	HIS	-	expression tag	UNP P0DTD1
C	321	HIS	-	expression tag	UNP P0DTD1
C	322	HIS	-	expression tag	UNP P0DTD1
C	323	HIS	-	expression tag	UNP P0DTD1
C	324	HIS	-	expression tag	UNP P0DTD1

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	D	1	Total 1	Zn 1	0	0
2	A	1	Total 1	Zn 1	0	0
2	B	1	Total 1	Zn 1	0	0
2	C	1	Total 1	Zn 1	1	0

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).

EDO

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total C H O 10 2 6 2				0	0
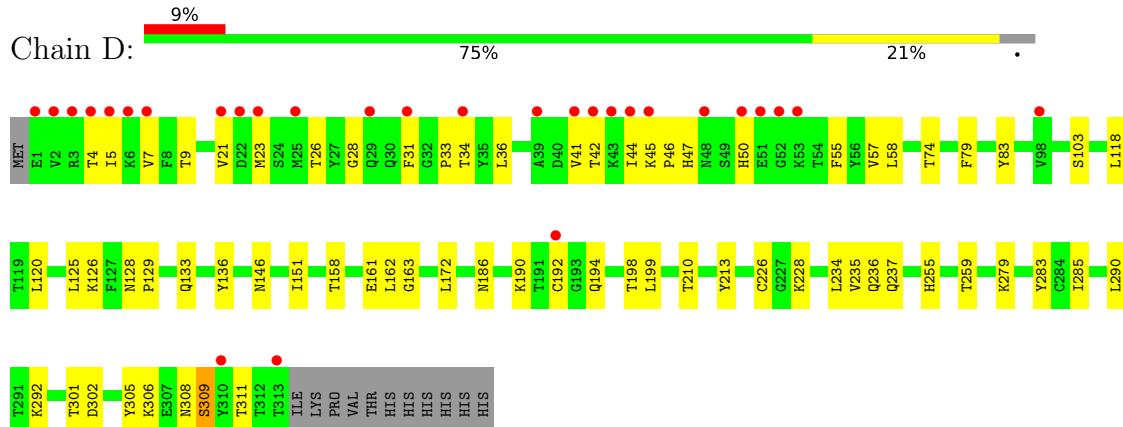
- Molecule 4 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	14	Total O 14 14		0	0
4	A	15	Total O 15 15		0	0
4	B	5	Total O 5 5		0	0
4	C	8	Total O 8 8		0	0
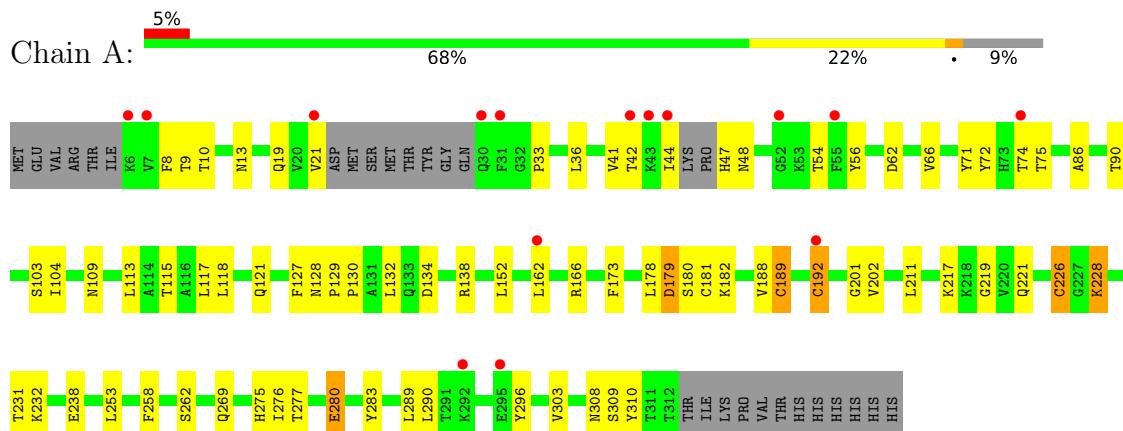
3 Residue-property plots ⓘ

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.
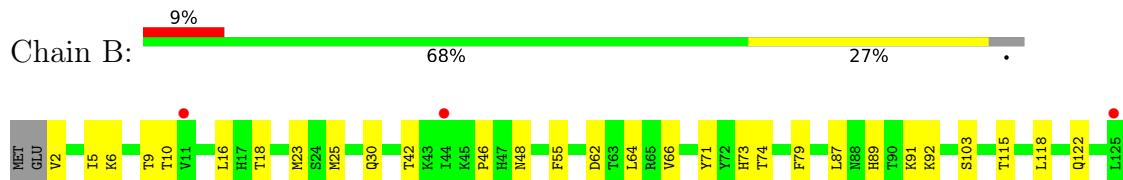
• Molecule 1: Non-structural protein 3


• Molecule 1: Non-structural protein 3
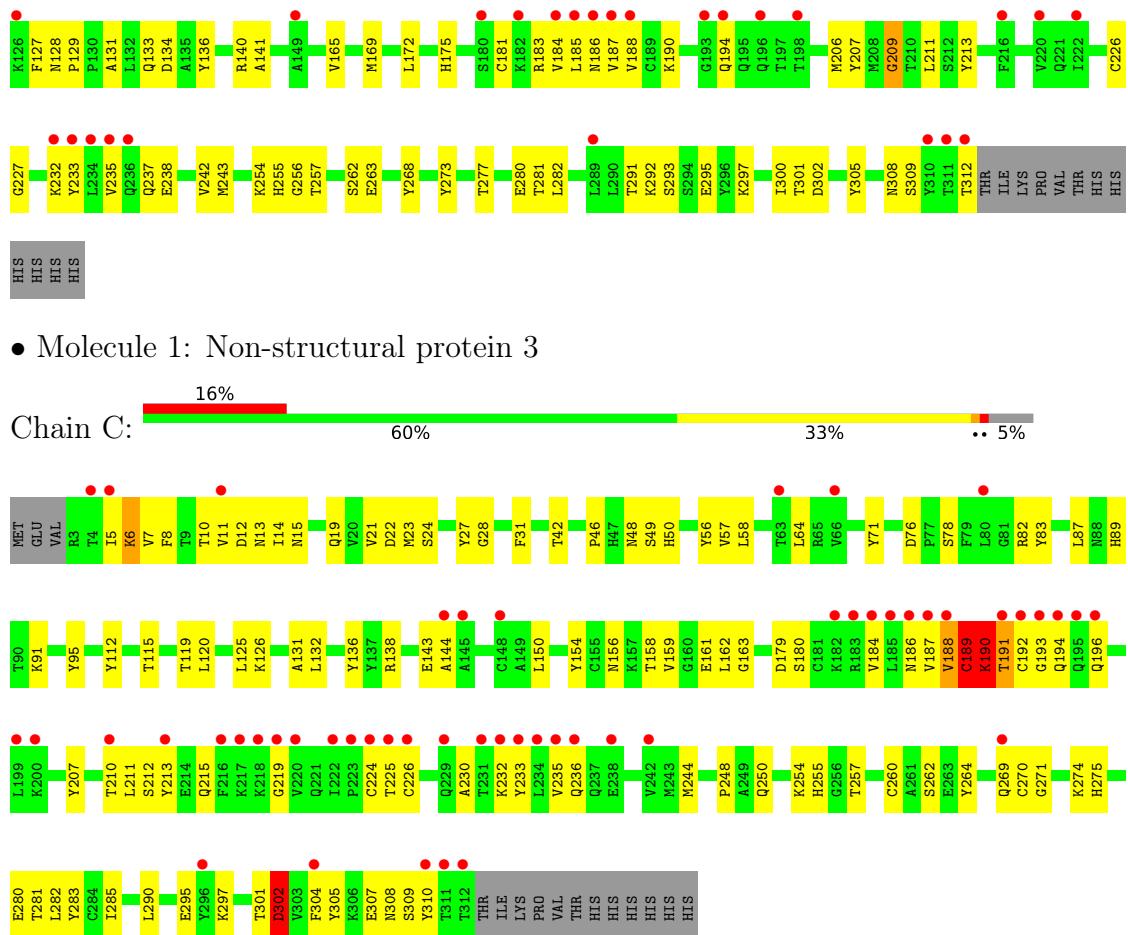
• Molecule 1: Non-structural protein 3

• Molecule 1: Non-structural protein 3

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	169.02Å 108.63Å 100.27Å 90.00° 118.87° 90.00°	Depositor
Resolution (Å)	43.90 – 2.50 46.58 – 2.50	Depositor EDS
% Data completeness (in resolution range)	98.8 (43.90-2.50) 99.5 (46.58-2.50)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.31 (at 2.51Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.233 , 0.282 0.234 , 0.282	Depositor DCC
R_{free} test set	2727 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	62.0	Xtriage
Anisotropy	0.176	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 45.6	EDS
L-test for twinning[2]	$< |L| > = 0.52, < L^2 > = 0.35$	Xtriage
Estimated twinning fraction	0.000 for -1/2*h+1/2*k+l,1/2*h-1/2*k+l,1/2*h+1/2*k 0.000 for -1/2*h-1/2*k+l,-1/2*h-1/2*k-l,1/2*h-1/2*k	Xtriage
F_o,F_c correlation	0.84	EDS
Total number of atoms	19318	wwPDB-VP
Average B, all atoms (Å^2)	75.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.58% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: EDO, ZN

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	0.53	2/2412 (0.1%)	0.64	0/3271
1	B	0.44	0/2527	0.61	0/3429
1	C	0.44	0/2520	0.62	0/3419
1	D	0.46	1/2543 (0.0%)	0.63	0/3451
All	All	0.47	3/10002 (0.0%)	0.62	0/13570

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	2

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	226	CYS	CB-SG	-7.66	1.69	1.82
1	A	189	CYS	CB-SG	-6.95	1.70	1.82
1	D	226	CYS	CB-SG	-5.13	1.73	1.81

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	188	VAL	Peptide
1	C	189	CYS	Peptide

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	2357	2292	2292	57	0
1	B	2468	2408	2407	64	2
1	C	2461	2370	2400	121	1
1	D	2484	2422	2423	46	1
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	4	6	6	1	0
4	A	15	0	0	2	0
4	B	5	0	0	0	0
4	C	8	0	0	2	0
4	D	14	0	0	0	0
All	All	9820	9498	9528	280	2

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 14.

All (280) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:190:LYS:C	1:C:190:LYS:HE3	1.61	1.17
1:C:190:LYS:HD3	1:C:225:THR:OG1	1.45	1.16
1:C:186:ASN:ND2	1:C:194:GLN:OE1	1.90	1.03
1:C:213:TYR:OH	1:C:307:GLU:OE2	1.78	1.00
1:C:48:ASN:O	1:C:50:HIS:N	1.99	0.96
1:B:122:GLN:OE1	1:B:277:THR:OG1	1.82	0.96
1:D:120:LEU:O	1:D:136:TYR:OH	1.86	0.92
1:A:113:LEU:HD11	1:A:152:LEU:HD21	1.50	0.92
1:C:76:ASP:O	4:C:601:HOH:O	1.92	0.87
1:A:189:CYS:SG	1:A:192:CYS:HB3	2.16	0.85
1:B:254:LYS:O	1:B:257:THR:HG22	1.76	0.85
1:C:190:LYS:HD2	1:C:225:THR:N	1.92	0.84
1:C:190:LYS:HB2	1:C:224:CYS:SG	2.18	0.83
1:D:255:HIS:NE2	1:D:279:LYS:O	2.12	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:283:TYR:HD2	1:A:290:LEU:HD11	1.43	0.79
1:B:127:PHE:O	1:B:133:GLN:NE2	2.16	0.79
1:C:27:TYR:HH	1:C:50:HIS:HD1	1.31	0.79
1:B:5:ILE:HG23	1:B:23:MET:CE	2.13	0.78
3:A:502:EDO:O2	4:A:601:HOH:O	2.01	0.78
1:A:179:ASP:OD1	1:A:179:ASP:N	2.17	0.77
1:C:190:LYS:CE	1:C:226:CYS:H	1.97	0.77
1:D:83:TYR:OH	1:D:146:ASN:ND2	2.19	0.76
1:D:234:LEU:HD21	1:D:237:GLN:HB2	1.68	0.75
1:C:190:LYS:HG3	1:C:191:THR:H	1.50	0.74
1:D:151:ILE:HG12	1:D:172:LEU:HD11	1.70	0.74
1:B:5:ILE:HG23	1:B:23:MET:HE2	1.70	0.73
1:C:190:LYS:HE3	1:C:190:LYS:O	1.89	0.73
1:C:190:LYS:HE3	1:C:190:LYS:CA	2.17	0.72
1:C:190:LYS:HD2	1:C:224:CYS:HB3	1.71	0.72
1:C:82:ARG:NH1	1:C:156:ASN:OD1	2.23	0.72
1:B:281:THR:HG21	1:B:292:LYS:HG3	1.73	0.71
1:C:184:VAL:HG23	1:C:236:GLN:H	1.56	0.70
1:C:282:LEU:HD12	1:C:295:GLU:HA	1.76	0.68
1:C:308:ASN:OD1	1:C:309:SER:N	2.24	0.68
1:C:190:LYS:HZ1	1:C:226:CYS:HB2	1.58	0.68
1:D:74:THR:HG21	1:D:79:PHE:CD2	2.28	0.68
1:C:190:LYS:HD2	1:C:225:THR:H	1.60	0.67
1:A:221:GLN:OE1	1:A:231:THR:HG22	1.95	0.66
1:C:12:ASP:OD2	1:C:15:ASN:ND2	2.29	0.66
1:A:103:SER:HB2	1:A:118:LEU:HD21	1.78	0.66
1:A:75:THR:HG1	1:B:268:TYR:HH	1.44	0.65
1:C:22:ASP:OD1	1:C:24:SER:OG	2.05	0.65
1:D:301:THR:HG23	1:D:302:ASP:OD1	1.97	0.65
1:B:308:ASN:OD1	1:B:309:SER:N	2.26	0.64
1:B:187:VAL:HG22	1:B:232:LYS:HB2	1.79	0.64
1:A:162:LEU:HD11	1:C:270:CYS:HB2	1.78	0.64
1:C:283:TYR:HD1	1:C:290:LEU:HD11	1.62	0.63
1:D:45:LYS:HD3	1:D:46:PRO:HD2	1.80	0.63
1:A:283:TYR:CD2	1:A:290:LEU:HD11	2.29	0.62
1:C:71:TYR:CE2	1:C:131:ALA:HB2	2.33	0.62
1:D:5:ILE:HD13	1:D:47:HIS:O	2.00	0.62
1:C:190:LYS:HE3	1:C:191:THR:N	2.12	0.62
1:C:207:TYR:HE2	1:C:210:THR:HG22	1.66	0.61
1:C:76:ASP:OD1	1:C:78:SER:N	2.33	0.61
1:C:190:LYS:HG3	1:C:191:THR:N	2.16	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:33:PRO:HB2	1:D:58:LEU:HD23	1.84	0.60
1:B:185:LEU:HD13	1:B:232:LYS:HD2	1.83	0.60
1:D:283:TYR:CE1	1:D:292:LYS:HG2	2.37	0.59
1:A:308:ASN:OD1	1:A:309:SER:N	2.36	0.59
1:D:23:MET:O	1:D:45:LYS:HD2	2.03	0.59
1:B:183:ARG:NE	1:B:237:GLN:OE1	2.22	0.58
1:C:19:GLN:HG2	1:C:31:PHE:HE1	1.67	0.58
1:D:45:LYS:HD3	1:D:46:PRO:CD	2.34	0.58
1:C:186:ASN:OD1	1:C:196:GLN:HA	2.04	0.58
1:C:248:PRO:HB3	1:C:301:THR:HG22	1.86	0.57
1:C:190:LYS:CE	1:C:190:LYS:CA	2.82	0.57
1:A:219:GLY:HA2	1:A:232:LYS:O	2.05	0.57
1:B:301:THR:HG23	1:B:302:ASP:OD2	2.04	0.57
1:D:259:THR:OG1	1:D:306:LYS:HG3	2.04	0.57
1:B:103:SER:HB2	1:B:118:LEU:HD21	1.85	0.57
1:C:190:LYS:HD3	1:C:225:THR:CB	2.35	0.57
1:D:236:GLN:HG3	1:D:311:THR:HG22	1.86	0.57
1:C:189:CYS:HB2	1:C:193:GLY:HA2	1.87	0.56
1:C:244:MET:O	1:C:302:ASP:HA	2.04	0.56
1:B:206:MET:HE2	1:B:243:MET:SD	2.46	0.56
1:D:7:VAL:HG12	1:D:50:HIS:O	2.05	0.56
1:B:186:ASN:HB3	1:B:233:TYR:CE1	2.41	0.55
1:C:119:THR:HG21	1:C:304:PHE:CE2	2.41	0.55
1:A:47:HIS:CG	1:A:48:ASN:H	2.25	0.55
1:B:255:HIS:ND1	1:B:256:GLY:N	2.55	0.55
1:A:62:ASP:O	1:A:66:VAL:HG23	2.07	0.54
1:A:173:PHE:HB3	1:A:202:VAL:HG22	1.89	0.54
1:A:72:TYR:HB2	1:A:74:THR:HG22	1.90	0.54
1:A:211:LEU:HD22	1:A:303:VAL:HG23	1.90	0.54
1:C:190:LYS:HD3	1:C:225:THR:HG1	1.66	0.54
1:C:188:VAL:O	1:C:230:ALA:HB1	2.07	0.54
1:C:13:ASN:HB2	1:C:56:TYR:OH	2.08	0.54
1:D:26:THR:HG22	1:D:44:ILE:C	2.29	0.53
1:B:254:LYS:HD3	1:B:255:HIS:O	2.08	0.53
1:C:186:ASN:OD1	1:C:196:GLN:CA	2.56	0.53
1:C:190:LYS:HE2	1:C:226:CYS:H	1.73	0.53
1:C:57:VAL:HG12	1:C:58:LEU:O	2.08	0.53
1:B:115:THR:HG21	1:B:262:SER:CB	2.38	0.53
1:B:281:THR:CG2	1:B:292:LYS:HG3	2.38	0.53
1:A:178:LEU:O	1:A:201:GLY:HA2	2.08	0.52
1:C:19:GLN:HG2	1:C:31:PHE:CE1	2.45	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:21:VAL:HG12	1:D:31:PHE:CZ	2.44	0.52
1:B:136:TYR:CE2	1:B:140:ARG:HD2	2.45	0.52
1:D:4:THR:HA	1:D:23:MET:HG3	1.92	0.52
1:B:184:VAL:HG23	1:B:235:VAL:HB	1.91	0.52
1:B:87:LEU:HG	1:B:91:LYS:HD2	1.91	0.52
1:D:285:ILE:HG12	1:D:290:LEU:HD13	1.92	0.52
1:B:183:ARG:HH21	1:B:242:VAL:HG12	1.75	0.52
1:C:283:TYR:CD1	1:C:290:LEU:HD11	2.42	0.52
1:B:211:LEU:HD23	1:B:300:ILE:HG22	1.91	0.52
1:C:190:LYS:NZ	1:C:226:CYS:H	2.07	0.52
1:D:33:PRO:HB2	1:D:58:LEU:CD2	2.40	0.51
1:C:190:LYS:HE2	1:C:226:CYS:CB	2.40	0.51
1:C:190:LYS:NZ	1:C:226:CYS:HB2	2.25	0.51
1:C:254:LYS:NZ	1:C:295:GLU:OE1	2.44	0.51
1:C:71:TYR:CD2	1:C:131:ALA:HB2	2.46	0.51
1:C:119:THR:HG23	1:C:260:CYS:SG	2.50	0.51
1:C:257:THR:O	1:C:257:THR:HG22	2.09	0.51
1:C:11:VAL:HG13	1:C:64:LEU:HD22	1.92	0.51
1:B:281:THR:HG21	1:B:292:LYS:CG	2.40	0.51
1:C:190:LYS:HE2	1:C:226:CYS:SG	2.51	0.51
1:D:28:GLY:N	1:D:42:THR:O	2.44	0.51
1:A:280:GLU:OE2	1:A:283:TYR:OH	2.20	0.51
1:B:190:LYS:HA	1:B:190:LYS:HE2	1.91	0.51
1:C:190:LYS:CG	1:C:191:THR:N	2.74	0.51
1:A:129:PRO:HG2	1:A:132:LEU:HB2	1.93	0.51
1:B:127:PHE:N	1:B:133:GLN:HE22	2.08	0.50
1:A:289:LEU:HD12	1:A:290:LEU:H	1.77	0.50
1:C:22:ASP:O	1:C:23:MET:HB2	2.11	0.50
1:D:128:ASN:HB2	1:D:129:PRO:HD3	1.94	0.50
1:C:190:LYS:HE2	1:C:226:CYS:HB2	1.93	0.50
1:A:71:TYR:CD1	1:A:130:PRO:HB2	2.47	0.50
1:B:71:TYR:CE2	1:B:131:ALA:HB2	2.47	0.50
1:C:188:VAL:O	1:C:230:ALA:CB	2.60	0.50
1:C:7:VAL:HG12	1:C:8:PHE:N	2.27	0.50
1:C:188:VAL:HG12	1:C:189:CYS:H	1.76	0.50
1:D:133:GLN:OE1	1:D:133:GLN:HA	2.12	0.49
1:C:184:VAL:CG2	1:C:236:GLN:H	2.24	0.49
1:C:213:TYR:HB2	1:C:305:TYR:CE2	2.48	0.49
1:A:117:LEU:O	1:A:121:GLN:HG3	2.12	0.49
1:B:115:THR:HG21	1:B:262:SER:HB3	1.93	0.49
1:C:7:VAL:CG1	1:C:8:PHE:N	2.75	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:219:GLY:HA2	1:C:232:LYS:O	2.12	0.49
1:C:236:GLN:HA	1:C:310:TYR:O	2.12	0.49
1:D:213:TYR:HB2	1:D:305:TYR:CE2	2.48	0.49
1:C:190:LYS:CE	1:C:226:CYS:HB2	2.43	0.49
1:C:115:THR:HG21	1:C:262:SER:OG	2.13	0.49
1:C:10:THR:HG21	1:C:13:ASN:HA	1.94	0.48
1:D:308:ASN:OD1	1:D:309:SER:N	2.38	0.48
1:D:34:THR:HG23	1:D:57:VAL:HG12	1.96	0.48
1:C:186:ASN:HB2	1:C:235:VAL:HG21	1.96	0.48
1:A:9:THR:HG23	1:A:19:GLN:HG3	1.95	0.48
1:C:186:ASN:HB3	1:C:233:TYR:CZ	2.49	0.48
1:D:192:CYS:O	1:C:28:GLY:HA3	2.14	0.48
1:D:162:LEU:HD13	1:D:163:GLY:N	2.29	0.48
1:A:103:SER:OG	1:A:104:ILE:N	2.46	0.48
1:C:190:LYS:CD	1:C:226:CYS:H	2.26	0.48
1:C:188:VAL:HG12	1:C:189:CYS:N	2.29	0.48
1:B:71:TYR:CD2	1:B:131:ALA:HB2	2.49	0.47
1:C:120:LEU:O	1:C:136:TYR:OH	2.27	0.47
1:C:190:LYS:CD	1:C:224:CYS:HB3	2.42	0.47
1:B:74:THR:HG21	1:B:79:PHE:CG	2.49	0.47
1:A:188:VAL:HG23	1:A:188:VAL:O	2.14	0.47
1:B:172:LEU:O	1:B:175:HIS:N	2.36	0.47
1:C:162:LEU:HD22	1:C:269:GLN:O	2.15	0.47
1:C:186:ASN:OD1	1:C:196:GLN:CB	2.63	0.47
1:A:115:THR:HG21	1:A:262:SER:OG	2.15	0.47
1:C:264:TYR:CE1	1:C:271:GLY:HA3	2.49	0.47
1:A:8:PHE:HB2	1:A:54:THR:HA	1.96	0.47
1:B:128:ASN:HB2	1:B:129:PRO:HD3	1.97	0.47
1:C:190:LYS:HE2	1:C:191:THR:OG1	2.15	0.47
1:C:211:LEU:O	1:C:305:TYR:OH	2.23	0.47
1:B:165:VAL:O	1:B:169:MET:HG2	2.16	0.46
1:B:207:TYR:CE2	1:B:209:GLY:HA3	2.51	0.46
1:C:184:VAL:HG23	1:C:236:GLN:N	2.27	0.46
1:A:109:ASN:HB3	1:A:162:LEU:HD23	1.97	0.46
1:A:269:GLN:CG	1:C:269:GLN:CD	2.84	0.46
1:B:115:THR:HG21	1:B:262:SER:OG	2.15	0.46
1:C:132:LEU:HG	1:C:154:TYR:CE2	2.51	0.46
1:C:191:THR:OG1	1:C:226:CYS:SG	2.71	0.46
1:A:162:LEU:CD1	1:A:269:GLN:O	2.63	0.46
1:A:181:CYS:HA	1:A:238:GLU:O	2.16	0.46
1:B:282:LEU:HB2	1:B:293:SER:O	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:255:HIS:HA	1:C:282:LEU:HD21	1.97	0.46
1:B:257:THR:O	1:B:257:THR:OG1	2.34	0.45
1:C:27:TYR:OH	1:C:50:HIS:ND1	2.22	0.45
1:D:103:SER:HB2	1:D:118:LEU:HD21	1.97	0.45
1:A:269:GLN:HG3	1:C:269:GLN:CG	2.46	0.45
1:A:10:THR:HG21	1:A:13:ASN:HA	1.98	0.45
1:D:34:THR:HG23	1:D:57:VAL:CG1	2.47	0.45
1:B:10:THR:HB	1:B:16:LEU:HD23	1.99	0.45
1:A:86:ALA:O	1:A:90:THR:HG23	2.16	0.45
1:C:112:TYR:CZ	1:C:163:GLY:HA3	2.52	0.45
1:C:285:ILE:HG12	1:C:290:LEU:HD13	1.99	0.45
1:C:158:THR:OG1	1:C:161:GLU:HG3	2.16	0.45
1:C:212:SER:HB3	1:C:215:GLN:HB2	1.98	0.45
1:B:263:GLU:O	1:B:273:TYR:HA	2.17	0.44
1:B:5:ILE:HD11	1:B:46:PRO:HB3	1.99	0.44
1:C:207:TYR:CE2	1:C:210:THR:HG22	2.50	0.44
1:D:192:CYS:SG	1:C:42:THR:HG22	2.58	0.44
1:A:226:CYS:SG	1:A:228:LYS:HE2	2.58	0.44
1:B:213:TYR:HB2	1:B:305:TYR:CE2	2.53	0.44
1:A:33:PRO:HA	1:A:42:THR:OG1	2.17	0.44
1:B:211:LEU:HD21	1:B:300:ILE:O	2.17	0.44
1:B:262:SER:O	1:B:301:THR:HG22	2.17	0.44
1:C:125:LEU:C	1:C:126:LYS:HD3	2.38	0.44
1:C:89:HIS:HB2	1:C:159:VAL:HG21	1.98	0.44
1:C:188:VAL:CG1	1:C:189:CYS:H	2.31	0.44
1:D:186:ASN:HB2	1:D:235:VAL:CG2	2.48	0.44
1:A:113:LEU:HD11	1:A:152:LEU:CD2	2.36	0.44
1:B:183:ARG:NH2	1:B:242:VAL:HG12	2.32	0.44
1:B:226:CYS:SG	1:B:227:GLY:N	2.91	0.44
1:B:291:THR:HG22	1:B:292:LYS:N	2.33	0.44
1:A:162:LEU:HD12	1:A:269:GLN:O	2.19	0.43
1:C:190:LYS:CD	1:C:225:THR:N	2.74	0.43
1:C:138:ARG:HD2	1:C:138:ARG:HA	1.86	0.43
1:C:21:VAL:HG11	1:C:46:PRO:HG3	2.01	0.43
1:D:190:LYS:HD3	1:D:228:LYS:NZ	2.33	0.43
1:A:280:GLU:H	1:A:280:GLU:HG3	1.64	0.43
1:B:235:VAL:HA	1:B:312:THR:HG22	2.01	0.43
1:D:120:LEU:HD22	1:D:125:LEU:CD2	2.49	0.43
1:A:36:LEU:CD1	1:A:54:THR:O	2.67	0.43
1:A:134:ASP:O	1:A:138:ARG:HG2	2.19	0.43
1:B:2:VAL:HG23	1:B:2:VAL:O	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:87:LEU:O	1:C:91:LYS:HG2	2.19	0.43
1:D:120:LEU:CD2	1:D:125:LEU:HD22	2.49	0.42
1:D:198:THR:O	1:D:199:LEU:HD23	2.18	0.42
1:D:308:ASN:CG	1:D:309:SER:H	2.20	0.42
1:B:188:VAL:HG23	1:B:194:GLN:HG2	2.01	0.42
1:A:269:GLN:OE1	1:C:269:GLN:OE1	2.37	0.42
1:D:44:ILE:O	1:D:44:ILE:HG13	2.20	0.42
1:A:128:ASN:N	1:A:129:PRO:HD2	2.34	0.42
1:A:192:CYS:O	1:A:192:CYS:SG	2.77	0.42
1:B:255:HIS:HE2	1:B:280:GLU:C	2.21	0.42
1:A:277:THR:HG23	1:A:283:TYR:HB2	2.02	0.42
1:A:269:GLN:CG	1:C:269:GLN:CG	2.98	0.42
1:B:25:MET:O	1:B:30:GLN:NE2	2.53	0.42
1:A:127:PHE:CD1	1:A:132:LEU:HD13	2.54	0.42
1:B:74:THR:O	1:B:74:THR:HG23	2.19	0.42
1:B:64:LEU:HD23	1:B:64:LEU:HA	1.82	0.42
1:B:206:MET:CE	1:B:243:MET:SD	3.08	0.42
1:C:115:THR:HG23	1:C:275:HIS:ND1	2.35	0.42
1:C:213:TYR:HB2	1:C:305:TYR:CD2	2.55	0.42
1:B:188:VAL:O	1:B:188:VAL:HG13	2.18	0.42
1:C:5:ILE:HD12	1:C:48:ASN:HA	2.01	0.42
1:C:264:TYR:CZ	1:C:271:GLY:HA3	2.54	0.42
1:A:217:LYS:HD3	1:A:310:TYR:CE2	2.56	0.41
1:B:211:LEU:CD2	1:B:300:ILE:HG22	2.50	0.41
1:C:301:THR:O	1:C:301:THR:OG1	2.32	0.41
1:D:9:THR:HA	1:D:55:PHE:O	2.20	0.41
1:A:192:CYS:SG	1:B:42:THR:CG2	3.08	0.41
1:D:41:VAL:HB	1:D:44:ILE:HG12	2.03	0.41
1:A:9:THR:HG23	1:A:19:GLN:CG	2.51	0.41
1:D:158:THR:HG22	1:D:161:GLU:OE2	2.20	0.41
1:D:5:ILE:CD1	1:D:50:HIS:HB2	2.50	0.41
1:A:41:VAL:HB	1:A:44:ILE:HD11	2.03	0.41
1:C:190:LYS:NZ	1:C:226:CYS:N	2.68	0.41
1:C:274:LYS:NZ	4:C:603:HOH:O	2.53	0.41
1:B:128:ASN:O	1:B:129:PRO:C	2.59	0.41
1:D:36:LEU:HD13	1:D:36:LEU:C	2.41	0.41
1:D:172:LEU:HD23	1:D:172:LEU:HA	1.93	0.41
1:A:253:LEU:HB3	1:A:258:PHE:CE1	2.56	0.41
1:B:181:CYS:HA	1:B:238:GLU:O	2.21	0.41
1:C:250:GLN:HB3	1:C:297:LYS:NZ	2.36	0.41
1:A:115:THR:HG23	1:A:275:HIS:HD1	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:83:TYR:HE1	1:C:150:LEU:HG	1.84	0.41
1:A:276:ILE:HD11	1:A:296:TYR:CZ	2.55	0.40
1:B:62:ASP:O	1:B:66:VAL:HG23	2.21	0.40
1:C:57:VAL:HG12	1:C:58:LEU:N	2.36	0.40
1:A:10:THR:O	1:A:56:TYR:HA	2.21	0.40
1:A:21:VAL:O	1:A:21:VAL:HG23	2.21	0.40
1:B:89:HIS:HA	1:B:92:LYS:HE3	2.02	0.40
1:C:83:TYR:CE1	1:C:150:LEU:HG	2.56	0.40
1:B:242:VAL:CG2	1:B:305:TYR:HB2	2.51	0.40
1:C:112:TYR:CE2	1:C:163:GLY:HA3	2.57	0.40
1:C:184:VAL:CG2	1:C:236:GLN:HB3	2.51	0.40
1:A:166:ARG:NE	4:A:603:HOH:O	2.46	0.40
1:C:190:LYS:CE	1:C:191:THR:OG1	2.69	0.40
1:C:248:PRO:HB3	1:C:301:THR:CG2	2.50	0.40
1:C:280:GLU:HG3	1:C:281:THR:N	2.36	0.40
1:D:234:LEU:HD21	1:D:237:GLN:CB	2.46	0.40
1:B:9:THR:HA	1:B:55:PHE:O	2.21	0.40
1:C:95:TYR:CD2	1:C:144:ALA:HB3	2.57	0.40
1:C:112:TYR:CE1	1:C:163:GLY:HA3	2.57	0.40
1:C:184:VAL:CG2	1:C:236:GLN:N	2.85	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:295:GLU:OE2	1:C:6:LYS:NZ[3_545]	2.10	0.10
1:D:126:LYS:NZ	1:B:141:ALA:O[4_555]	2.15	0.05

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	291/325 (90%)	272 (94%)	19 (6%)	0	100	100
1	B	309/325 (95%)	290 (94%)	18 (6%)	1 (0%)	41	61
1	C	308/325 (95%)	287 (93%)	17 (6%)	4 (1%)	12	21
1	D	311/325 (96%)	297 (96%)	14 (4%)	0	100	100
All	All	1219/1300 (94%)	1146 (94%)	68 (6%)	5 (0%)	34	54

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	49	SER
1	C	190	LYS
1	C	189	CYS
1	B	209	GLY
1	C	302	ASP

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	258/285 (90%)	252 (98%)	6 (2%)	50	76
1	B	271/285 (95%)	265 (98%)	6 (2%)	52	77
1	C	270/285 (95%)	260 (96%)	10 (4%)	34	60
1	D	273/285 (96%)	270 (99%)	3 (1%)	73	89
All	All	1072/1140 (94%)	1047 (98%)	25 (2%)	50	76

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	194	GLN
1	D	210	THR
1	D	309	SER
1	A	179	ASP
1	A	180	SER
1	A	182	LYS

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Mol	Chain	Res	Type
1	A	192	CYS
1	A	228	LYS
1	A	280	GLU
1	B	6	LYS
1	B	18	THR
1	B	48	ASN
1	B	73	HIS
1	B	134	ASP
1	B	297	LYS
1	C	6	LYS
1	C	14	ILE
1	C	143	GLU
1	C	179	ASP
1	C	180	SER
1	C	187	VAL
1	C	190	LYS
1	C	191	THR
1	C	192	CYS
1	C	302	ASP

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

Mol	Chain	Res	Type
1	D	146	ASN
1	D	174	GLN
1	B	133	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 5 ligands modelled in this entry, 4 are monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
3	EDO	A	502	-	3,3,3	0.55	0	2,2,2	0.40	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	EDO	A	502	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	502	EDO	O1-C1-C2-O2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	502	EDO	1	0

5.7 Other polymers (i)

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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	297/325 (91%)	0.63	15 (5%)	28	29	44, 59, 88, 114	0
1	B	311/325 (95%)	0.76	28 (9%)	9	9	50, 67, 93, 102	0
1	C	310/325 (95%)	1.07	51 (16%)	1	1	47, 71, 113, 129	0
1	D	313/325 (96%)	0.70	29 (9%)	8	8	45, 61, 97, 114	0
All	All	1231/1300 (94%)	0.79	123 (9%)	7	6	44, 65, 100, 129	0

All (123) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	192	CYS	7.9
1	C	224	CYS	7.0
1	D	2	VAL	6.9
1	C	312	THR	6.2
1	B	311	THR	5.9
1	C	235	VAL	5.6
1	A	7	VAL	5.6
1	D	4	THR	5.6
1	A	31	PHE	5.2
1	C	311	THR	5.2
1	C	226	CYS	5.2
1	C	233	TYR	5.1
1	C	234	LEU	5.1
1	D	45	LYS	5.0
1	B	312	THR	5.0
1	B	196	GLN	5.0
1	C	184	VAL	4.9
1	C	310	TYR	4.9
1	C	195	GLN	4.7
1	A	6	LYS	4.7
1	D	41	VAL	4.6

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Mol	Chain	Res	Type	RSRZ
1	B	187	VAL	4.6
1	D	44	ILE	4.6
1	B	235	VAL	4.5
1	B	233	TYR	4.4
1	D	3	ARG	4.2
1	C	194	GLN	4.1
1	D	5	ILE	4.0
1	C	232	LYS	3.9
1	C	185	LEU	3.9
1	D	51	GLU	3.8
1	B	194	GLN	3.7
1	C	219	GLY	3.7
1	A	44	ILE	3.6
1	C	216	PHE	3.6
1	D	50	HIS	3.6
1	A	21	VAL	3.6
1	C	66	VAL	3.6
1	D	43	LYS	3.5
1	A	52	GLY	3.4
1	C	191	THR	3.4
1	D	42	THR	3.3
1	B	198	THR	3.2
1	D	1	GLU	3.2
1	D	34	THR	3.2
1	A	192	CYS	3.2
1	C	188	VAL	3.1
1	D	31	PHE	3.1
1	B	126	LYS	3.1
1	C	296	TYR	3.1
1	C	196	GLN	3.0
1	D	25	MET	3.0
1	C	238	GLU	3.0
1	C	183	ARG	3.0
1	B	216	PHE	3.0
1	D	48	ASN	3.0
1	D	21	VAL	2.9
1	B	289	LEU	2.9
1	C	225	THR	2.9
1	A	43	LYS	2.9
1	C	80	LEU	2.9
1	C	11	VAL	2.9
1	C	229	GLN	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	52	GLY	2.9
1	B	185	LEU	2.9
1	B	188	VAL	2.9
1	C	222	ILE	2.9
1	A	30	GLN	2.9
1	C	210	THR	2.8
1	A	162	LEU	2.8
1	C	4	THR	2.8
1	B	222	ILE	2.8
1	B	236	GLN	2.7
1	D	98	VAL	2.7
1	C	187	VAL	2.7
1	D	6	LYS	2.7
1	B	234	LEU	2.7
1	C	236	GLN	2.7
1	C	231	THR	2.6
1	C	145	ALA	2.6
1	D	310	TYR	2.6
1	C	213	TYR	2.6
1	A	292	LYS	2.6
1	C	5	ILE	2.5
1	B	186	ASN	2.5
1	C	304	PHE	2.5
1	B	220	VAL	2.5
1	B	310	TYR	2.5
1	C	193	GLY	2.5
1	C	220	VAL	2.4
1	B	44	ILE	2.4
1	A	295	GLU	2.4
1	C	269	GLN	2.4
1	D	7	VAL	2.3
1	B	184	VAL	2.3
1	A	42	THR	2.3
1	D	29	GLN	2.3
1	D	313	THR	2.3
1	D	39	ALA	2.3
1	C	199	LEU	2.3
1	C	217	LYS	2.2
1	B	193	GLY	2.2
1	D	53	LYS	2.2
1	A	74	THR	2.2
1	C	223	PRO	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	11	VAL	2.2
1	D	23	MET	2.2
1	B	180	SER	2.2
1	C	242	VAL	2.1
1	C	63	THR	2.1
1	A	55	PHE	2.1
1	C	148	CYS	2.1
1	B	182	LYS	2.1
1	C	182	LYS	2.1
1	B	232	LYS	2.1
1	C	186	ASN	2.0
1	C	200	LYS	2.0
1	C	218	LYS	2.0
1	C	144	ALA	2.0
1	D	22	ASP	2.0
1	D	192	CYS	2.0
1	B	149	ALA	2.0
1	B	125	LEU	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

LIGAND-RSR INFOmissingINFO

6.5 Other polymers ⓘ

There are no such residues in this entry.