WORLDWIDE PDB PROTEIN DATA BANK

Full wwPDB EM Validation Report (i)

Jul 15, 2025 – 10:40 PM JST

PDB ID	:	8K52 / pdb_00008k52
EMDB ID	:	EMD-36893
Title	:	Cryo-EM structure of chitin synthase
Authors	:	Zhang, X.; Niu, S.; Li, P.; Bi, Y.
Deposited on	:	2023-07-20
Resolution	:	2.94 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

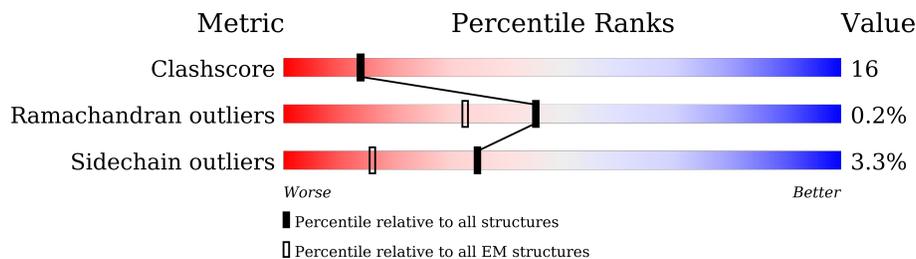|		
EMDB validation analysis	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1   Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 2.94 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
Clashscore		16
Ramachandran outliers		0.2%
Sidechain outliers		3.3%

Worse   *Better*

▌ Percentile relative to all structures
▯ Percentile relative to all EM structures

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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%

Mol	Chain	Length	Quality of chain		
1	A	925	57%	26% •	16%
1	B	925	56%	26% •	16%

2 Entity composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 12506 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 chitin synthase.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	775	Total 6239	C 4053	N 1046	O 1105	S 35	0	0
1	B	773	Total 6215	C 4037	N 1040	O 1103	S 35	0	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	914	LEU	-	expression tag	UNP G4Z2L3
A	915	VAL	-	expression tag	UNP G4Z2L3
A	916	PRO	-	expression tag	UNP G4Z2L3
A	917	ARG	-	expression tag	UNP G4Z2L3
A	918	GLY	-	expression tag	UNP G4Z2L3
A	919	SER	-	expression tag	UNP G4Z2L3
A	920	HIS	-	expression tag	UNP G4Z2L3
A	921	HIS	-	expression tag	UNP G4Z2L3
A	922	HIS	-	expression tag	UNP G4Z2L3
A	923	HIS	-	expression tag	UNP G4Z2L3
A	924	HIS	-	expression tag	UNP G4Z2L3
A	925	HIS	-	expression tag	UNP G4Z2L3
B	914	LEU	-	expression tag	UNP G4Z2L3
B	915	VAL	-	expression tag	UNP G4Z2L3
B	916	PRO	-	expression tag	UNP G4Z2L3
B	917	ARG	-	expression tag	UNP G4Z2L3
B	918	GLY	-	expression tag	UNP G4Z2L3
B	919	SER	-	expression tag	UNP G4Z2L3
B	920	HIS	-	expression tag	UNP G4Z2L3
B	921	HIS	-	expression tag	UNP G4Z2L3
B	922	HIS	-	expression tag	UNP G4Z2L3
B	923	HIS	-	expression tag	UNP G4Z2L3
B	924	HIS	-	expression tag	UNP G4Z2L3
B	925	HIS	-	expression tag	UNP G4Z2L3

- Molecule 2 is URIDINE-5'-DIPHOSPHATE (CCD ID: UDP) (formula: $C_9H_{14}N_2O_{12}P_2$).

UDP

Mol	Chain	Residues	Atoms					AltConf
2	A	1	Total	C	N	O	P	0
			25	9	2	12	2	
2	B	1	Total	C	N	O	P	0
			25	9	2	12	2	

• Molecule 3 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total	Mn	0
			1	1	
3	B	1	Total	Mn	0
			1	1	

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. 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. 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: chitin synthase

Chain A:

• Molecule 1: chitin synthase

Chain B:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	516823	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	60	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	5000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

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

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	0.18	0/6404	0.39	1/8686 (0.0%)
1	B	0.22	0/6375	0.42	1/8644 (0.0%)
All	All	0.20	0/12779	0.41	2/17330 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	726	VAL	N-CA-C	7.23	118.00	110.62
1	A	542	GLY	N-CA-C	-5.01	101.31	113.18

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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	6239	0	6157	202	0
1	B	6215	0	6116	202	0
2	A	25	0	11	2	0
2	B	25	0	11	2	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
All	All	12506	0	12295	388	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 16.

All (388) 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:A:645:LEU:HD12	1:A:735:CYS:CB	1.64	1.27
1:B:673:VAL:O	1:B:677:ILE:HG13	1.40	1.21
1:A:645:LEU:HB3	1:B:645:LEU:HD11	1.17	1.15
1:A:645:LEU:CD1	1:A:735:CYS:SG	2.35	1.14
1:A:645:LEU:CD1	1:A:735:CYS:CB	2.36	1.03
1:A:645:LEU:HD12	1:A:735:CYS:HB3	1.03	1.01
1:B:722:ILE:O	1:B:726:VAL:HG12	1.61	1.01
1:A:645:LEU:HD13	1:A:735:CYS:SG	2.06	0.94
1:A:645:LEU:CD1	1:A:735:CYS:HB3	1.95	0.94
1:A:645:LEU:HB3	1:B:645:LEU:CD1	1.99	0.91
1:A:547:THR:O	1:A:551:ILE:HD12	1.73	0.88
1:B:730:THR:HG23	1:B:804:TRP:CH2	2.10	0.87
1:B:241:GLU:HG3	1:B:383:VAL:HG21	1.57	0.86
1:A:645:LEU:CB	1:B:645:LEU:HD11	2.05	0.83
1:A:766:LYS:HE2	1:A:766:LYS:H	1.42	0.82
1:B:722:ILE:O	1:B:726:VAL:CG1	2.28	0.82
1:B:492:TYR:HA	1:B:495:GLU:HG2	1.66	0.78
1:B:171:ARG:HD3	1:B:172:PRO:HD2	1.69	0.75
1:B:697:VAL:HG23	1:B:840:LEU:HD22	1.69	0.74
1:A:171:ARG:HD3	1:A:172:PRO:HD2	1.69	0.74
1:A:697:VAL:HG23	1:A:840:LEU:HD22	1.69	0.74
1:A:491:MET:HG2	1:A:498:ILE:HD11	1.71	0.73
1:A:541:ASN:O	1:A:542:GLY:C	2.31	0.72
1:B:645:LEU:O	1:B:645:LEU:HD12	1.89	0.72
1:B:109:ASN:OD1	1:B:171:ARG:NH2	2.24	0.69
1:A:366:PHE:O	1:A:370:ALA:HB3	1.93	0.68
1:B:353:GLU:OE2	1:B:353:GLU:N	2.17	0.68
1:A:432:GLU:OE1	1:A:536:ARG:NH2	2.26	0.68
1:B:721:LEU:O	1:B:725:PHE:HB2	1.94	0.68
1:A:203:TYR:HE1	1:A:327:HIS:HB3	1.59	0.67
1:B:665:LEU:HA	1:B:668:MET:HG2	1.77	0.67
1:B:681:THR:HG22	1:B:683:ALA:H	1.60	0.66
1:B:366:PHE:O	1:B:370:ALA:HB3	1.95	0.66
1:A:109:ASN:OD1	1:A:171:ARG:NH2	2.25	0.66
1:A:707:GLU:OE1	1:A:707:GLU:N	2.24	0.66
1:B:731:ILE:O	1:B:735:CYS:HB2	1.95	0.65
1:B:203:TYR:HE1	1:B:327:HIS:HB3	1.62	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:731:ILE:O	1:A:735:CYS:SG	2.55	0.65
1:A:238:MET:HG3	1:A:246:LEU:HD11	1.78	0.64
1:B:232:LEU:HB3	1:B:284:VAL:HG22	1.79	0.64
1:A:490:ASN:HA	1:A:493:LEU:HD23	1.79	0.64
1:A:492:TYR:HD1	1:A:495:GLU:HG2	1.63	0.64
1:A:26:ARG:HA	1:A:26:ARG:CZ	2.29	0.63
1:A:291:ASP:OD2	2:A:1001:UDP:N3	2.30	0.63
1:A:645:LEU:HD12	1:A:735:CYS:SG	2.17	0.63
1:A:308:GLY:O	1:A:331:HIS:ND1	2.32	0.63
1:A:257:LEU:HB2	1:A:343:LEU:HD21	1.81	0.62
1:B:465:ILE:HG12	1:B:470:LEU:HD13	1.81	0.62
1:A:193:MET:HG2	1:A:198:ALA:HB2	1.81	0.62
1:A:721:LEU:O	1:A:725:PHE:HB2	2.00	0.62
1:B:297:HIS:HB3	1:B:300:THR:OG1	1.99	0.62
1:B:535:GLN:NE2	2:B:1001:UDP:O3B	2.33	0.61
1:B:543:ALA:O	1:B:547:THR:HG23	2.01	0.61
1:B:103:ARG:O	1:B:104:ALA:C	2.44	0.61
1:B:291:ASP:OD2	2:B:1001:UDP:N3	2.34	0.61
1:B:736:ASN:HA	1:B:797:ARG:HH11	1.65	0.60
1:A:784:GLU:HA	1:A:787:GLU:HG3	1.84	0.60
1:B:669:LEU:O	1:B:673:VAL:HG13	2.01	0.60
1:B:730:THR:HG23	1:B:804:TRP:HH2	1.61	0.60
1:B:496:ASP:OD1	1:B:496:ASP:N	2.33	0.60
1:A:707:GLU:HB2	1:A:710:HIS:HD2	1.66	0.60
1:A:115:ASP:N	1:A:115:ASP:OD1	2.34	0.60
1:B:643:ILE:HG23	1:B:652:MET:HE3	1.83	0.60
1:A:371:GLU:OE1	1:A:466:ARG:NH1	2.35	0.59
1:B:117:LEU:O	1:B:121:LEU:HG	2.03	0.59
1:B:473:TYR:CD2	1:B:499:LEU:HD21	2.37	0.59
1:A:220:ARG:HA	1:A:372:GLN:HE22	1.67	0.59
1:B:142:LEU:HG	1:B:317:ILE:HG21	1.84	0.59
1:B:686:HIS:O	1:B:690:VAL:HG12	2.03	0.59
1:A:437:ASN:O	1:A:441:LYS:HB2	2.03	0.58
1:B:492:TYR:CD1	1:B:495:GLU:HG2	2.38	0.58
1:A:304:LEU:HD22	1:A:309:LEU:HD22	1.85	0.58
1:B:619:GLN:O	1:B:619:GLN:NE2	2.36	0.58
1:A:664:GLY:O	1:A:668:MET:HG2	2.03	0.58
1:B:197:GLU:OE1	1:B:228:ARG:NH2	2.35	0.58
1:B:308:GLY:O	1:B:331:HIS:ND1	2.37	0.58
1:B:416:ASN:ND2	1:B:419:GLU:OE1	2.35	0.58
1:B:418:PHE:HZ	1:B:709:HIS:HD2	1.51	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:791:LYS:HG3	1:B:651:HIS:CG	2.39	0.57
1:B:437:ASN:O	1:B:441:LYS:HB2	2.04	0.57
1:B:677:ILE:O	1:B:677:ILE:HG22	2.04	0.57
1:A:212:ILE:H	1:A:212:ILE:HD12	1.69	0.57
1:B:495:GLU:HB3	1:B:498:ILE:HB	1.85	0.57
1:A:142:LEU:HB3	1:A:317:ILE:HG21	1.87	0.57
1:A:313:ASP:HB3	1:B:765:PHE:HE2	1.69	0.57
1:B:645:LEU:HD12	1:B:645:LEU:C	2.30	0.57
1:A:426:ILE:HD11	1:A:527:HIS:HA	1.87	0.57
1:A:641:ILE:HD13	1:A:731:ILE:HD11	1.87	0.57
1:A:241:GLU:O	1:A:300:THR:OG1	2.22	0.56
1:A:686:HIS:O	1:A:690:VAL:HG12	2.05	0.56
1:B:367:ASN:O	1:B:371:GLU:HB2	2.05	0.56
1:A:418:PHE:HZ	1:A:709:HIS:HD2	1.53	0.56
1:B:494:ALA:C	1:B:495:GLU:HG3	2.28	0.56
1:B:257:LEU:HB2	1:B:343:LEU:HD21	1.86	0.56
1:B:473:TYR:CG	1:B:499:LEU:HD21	2.40	0.56
1:B:359:LEU:HD11	1:B:495:GLU:OE1	2.06	0.56
1:B:431:PHE:HE2	1:B:711:ILE:HG23	1.71	0.56
1:B:197:GLU:OE2	1:B:228:ARG:NH1	2.38	0.56
1:A:619:GLN:O	1:A:619:GLN:NE2	2.38	0.56
1:B:488:ILE:HA	1:B:491:MET:HB3	1.88	0.56
1:A:298:PRO:HA	1:A:301:LEU:HD12	1.88	0.55
1:B:304:LEU:HD22	1:B:309:LEU:HD22	1.88	0.55
1:B:386:MET:SD	1:B:386:MET:N	2.79	0.55
1:B:668:MET:HE3	1:B:668:MET:HA	1.88	0.55
1:A:386:MET:SD	1:A:386:MET:N	2.80	0.55
1:A:413:THR:OG1	1:A:414:VAL:N	2.40	0.55
1:A:444:GLU:HB3	1:A:449:PHE:O	2.05	0.55
1:A:647:ASN:HB3	1:B:794:GLU:HB3	1.87	0.55
1:B:811:PHE:O	1:B:815:VAL:HG12	2.07	0.55
1:A:327:HIS:NE2	1:A:353:GLU:OE1	2.39	0.55
1:B:120:TYR:HB3	1:B:154:CYS:SG	2.47	0.55
1:B:261:LYS:HG2	1:B:278:ASP:H	1.72	0.55
1:A:237:THR:O	2:A:1001:UDP:O3'	2.24	0.55
1:B:735:CYS:HA	1:B:801:LEU:HD22	1.88	0.55
1:A:722:ILE:O	1:A:726:VAL:HG12	2.07	0.54
1:A:496:ASP:N	1:A:496:ASP:OD1	2.41	0.54
1:B:667:MET:SD	1:B:723:PRO:HD3	2.48	0.54
1:A:296:VAL:HG23	1:A:301:LEU:HD11	1.89	0.54
1:B:663:PHE:HB3	1:B:723:PRO:HG2	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:451:SER:HB3	1:A:497:ARG:HH21	1.72	0.54
1:B:528:ASP:OD1	1:B:529:LEU:N	2.41	0.54
1:A:120:TYR:HB3	1:A:154:CYS:SG	2.48	0.54
1:A:117:LEU:O	1:A:121:LEU:HD12	2.08	0.54
1:B:667:MET:HG3	1:B:723:PRO:HG3	1.89	0.53
1:A:187:ASP:OD1	1:A:187:ASP:N	2.40	0.53
1:A:197:GLU:OE2	1:A:228:ARG:NH1	2.31	0.53
1:A:220:ARG:HA	1:A:372:GLN:NE2	2.23	0.53
1:A:694:THR:HG23	1:A:695:VAL:HG23	1.91	0.53
1:B:730:THR:CG2	1:B:804:TRP:CH2	2.89	0.53
1:A:536:ARG:O	1:A:540:LEU:HG	2.09	0.53
1:B:177:VAL:HG21	1:B:314:LEU:HD11	1.91	0.53
1:A:386:MET:N	1:A:522:ARG:O	2.39	0.53
1:A:416:ASN:HB3	1:A:419:GLU:HB3	1.91	0.53
1:B:371:GLU:OE1	1:B:462:TYR:OH	2.27	0.53
1:A:238:MET:HE2	1:A:246:LEU:HD21	1.92	0.52
1:B:103:ARG:O	1:B:106:ALA:N	2.42	0.52
1:A:677:ILE:O	1:A:681:THR:OG1	2.26	0.52
1:A:736:ASN:HA	1:A:797:ARG:HH11	1.75	0.52
1:A:431:PHE:HE2	1:A:711:ILE:HG23	1.73	0.52
1:A:551:ILE:HD12	1:A:551:ILE:H	1.74	0.52
1:B:444:GLU:HB3	1:B:449:PHE:O	2.09	0.52
1:B:369:PHE:O	1:B:373:ILE:HG12	2.10	0.52
1:A:366:PHE:HE1	1:A:378:THR:HG21	1.74	0.52
1:B:537:LYS:O	1:B:541:ASN:HB2	2.09	0.52
1:A:811:PHE:O	1:A:815:VAL:HG12	2.10	0.52
1:B:187:ASP:OD1	1:B:187:ASP:N	2.41	0.52
1:A:472:ALA:O	1:A:492:TYR:OH	2.24	0.52
1:A:817:TYR:HE2	1:B:631:PHE:HZ	1.58	0.52
1:A:794:GLU:HB3	1:B:647:ASN:HB3	1.92	0.51
1:A:241:GLU:HG3	1:A:383:VAL:HG11	1.90	0.51
1:B:231:ARG:HD3	1:B:376:GLU:HB2	1.92	0.51
1:A:294:GLU:O	1:B:780:ARG:NH2	2.44	0.51
1:A:631:PHE:HZ	1:B:817:TYR:HE2	1.58	0.51
1:B:730:THR:CG2	1:B:804:TRP:CZ2	2.93	0.51
1:B:286:VAL:HG21	1:B:345:ILE:HD11	1.93	0.51
1:B:431:PHE:CE2	1:B:711:ILE:HG23	2.46	0.51
1:B:244:GLN:N	1:B:244:GLN:OE1	2.43	0.51
1:A:431:PHE:CE2	1:A:711:ILE:HG23	2.46	0.50
1:A:790:LYS:O	1:A:794:GLU:HG2	2.12	0.50
1:A:616:GLU:HG2	1:A:617:TYR:H	1.76	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:645:LEU:HD11	1:A:801:LEU:HD22	1.93	0.50
1:B:138:LYS:HG3	1:B:139:ILE:N	2.25	0.50
1:A:33:GLU:O	1:A:37:ILE:HD12	2.12	0.50
1:A:766:LYS:HE2	1:A:766:LYS:N	2.20	0.50
1:B:214:PHE:HZ	1:B:328:LEU:HD11	1.77	0.50
1:B:264:MET:CE	1:B:264:MET:H	2.23	0.50
1:B:616:GLU:HG2	1:B:617:TYR:H	1.75	0.50
1:B:413:THR:OG1	1:B:414:VAL:N	2.44	0.50
1:B:423:ASN:HB3	1:B:426:ILE:HB	1.94	0.50
1:B:479:ILE:HD11	1:B:484:LEU:HD21	1.93	0.50
1:A:667:MET:SD	1:A:723:PRO:HD3	2.51	0.50
1:A:26:ARG:NH2	1:A:29:MET:SD	2.85	0.49
1:A:256:ASN:HD22	1:A:392:LEU:HG	1.77	0.49
1:B:776:GLU:HB2	1:B:779:ARG:HH12	1.77	0.49
1:B:784:GLU:HA	1:B:787:GLU:HG3	1.93	0.49
1:B:480:GLU:HG2	1:B:482:ASP:H	1.77	0.49
1:B:495:GLU:HB3	1:B:498:ILE:CG1	2.42	0.49
1:A:473:TYR:HB2	1:A:499:LEU:HD13	1.94	0.49
1:A:640:LEU:HD21	1:A:659:VAL:HG11	1.93	0.49
1:B:119:LEU:HD12	1:B:119:LEU:H	1.78	0.49
1:B:536:ARG:HG3	1:B:729:PHE:CD2	2.47	0.49
1:B:597:PHE:HB2	1:B:629:TYR:HE2	1.77	0.49
1:A:528:ASP:OD1	1:A:529:LEU:N	2.46	0.49
1:B:264:MET:H	1:B:264:MET:HE3	1.78	0.49
1:B:666:MET:O	1:B:669:LEU:HG	2.12	0.49
1:A:112:ARG:HB3	1:A:115:ASP:OD1	2.12	0.49
1:A:261:LYS:HA	1:A:277:GLY:HA2	1.94	0.49
1:A:491:MET:CG	1:A:498:ILE:HD11	2.42	0.49
1:B:379:ALA:HA	1:B:459:ALA:HA	1.95	0.49
1:A:707:GLU:HB2	1:A:710:HIS:CD2	2.46	0.49
1:A:264:MET:SD	1:A:264:MET:N	2.76	0.48
1:B:298:PRO:HB2	1:B:299:LYS:NZ	2.28	0.48
1:A:315:LEU:O	1:A:319:SER:HB3	2.12	0.48
1:A:645:LEU:HD11	1:A:735:CYS:SG	2.45	0.48
1:A:95:GLU:HG2	1:B:768:VAL:HG22	1.96	0.48
1:A:537:LYS:HD3	1:A:732:TYR:CE2	2.49	0.48
1:B:239:TYR:O	1:B:241:GLU:CD	2.57	0.48
1:B:386:MET:N	1:B:522:ARG:O	2.46	0.48
1:A:673:VAL:O	1:A:677:ILE:HG12	2.14	0.48
1:A:696:GLY:HA2	1:A:699:PHE:HD2	1.79	0.48
1:B:492:TYR:HA	1:B:495:GLU:CG	2.41	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:256:ASN:HD22	1:B:392:LEU:HG	1.79	0.48
1:B:423:ASN:ND2	1:B:426:ILE:HD13	2.28	0.48
1:B:825:MET:HE2	1:B:825:MET:HA	1.96	0.48
1:A:637:LEU:O	1:A:641:ILE:HG12	2.13	0.48
1:A:537:LYS:HB2	1:A:732:TYR:CD2	2.48	0.47
1:A:645:LEU:HD11	1:A:735:CYS:HA	1.95	0.47
1:A:781:GLU:O	1:A:784:GLU:HG3	2.14	0.47
1:B:104:ALA:HB2	1:B:119:LEU:HB2	1.96	0.47
1:B:220:ARG:HA	1:B:372:GLN:NE2	2.29	0.47
1:B:492:TYR:HD1	1:B:495:GLU:OE1	1.97	0.47
1:B:696:GLY:HA2	1:B:699:PHE:HD2	1.79	0.47
1:B:200:ARG:NH1	1:B:200:ARG:HB2	2.30	0.47
1:B:301:LEU:O	1:B:305:GLU:HG3	2.15	0.47
1:B:533:ILE:HG12	1:B:729:PHE:HE1	1.80	0.47
1:B:648:ASN:OD1	1:B:648:ASN:C	2.57	0.47
1:B:293:ARG:HG3	1:B:353:GLU:HA	1.96	0.47
1:A:597:PHE:HB2	1:A:629:TYR:HE2	1.79	0.47
1:A:645:LEU:HD11	1:A:735:CYS:CB	2.40	0.47
1:A:494:ALA:HB3	1:A:542:GLY:HA3	1.97	0.47
1:B:495:GLU:HB3	1:B:498:ILE:CB	2.44	0.47
1:B:510:ASN:C	1:B:511:TRP:HE3	2.22	0.47
1:A:177:VAL:HG21	1:A:314:LEU:HD11	1.97	0.46
1:B:222:ARG:HD2	1:B:222:ARG:HA	1.78	0.46
1:A:495:GLU:HB3	1:A:498:ILE:HD12	1.98	0.46
1:A:651:HIS:HB3	1:B:791:LYS:HE3	1.96	0.46
1:A:765:PHE:HE2	1:B:313:ASP:HB3	1.80	0.46
1:B:730:THR:HG23	1:B:804:TRP:CZ2	2.50	0.46
1:A:768:VAL:HG22	1:B:95:GLU:HG2	1.98	0.46
1:B:234:ILE:HD11	1:B:381:MET:CG	2.46	0.46
1:A:188:TRP:NE1	1:A:334:GLN:OE1	2.48	0.46
1:A:231:ARG:HD3	1:A:376:GLU:HB2	1.98	0.46
1:A:390:SER:O	1:A:394:HIS:ND1	2.48	0.46
1:A:650:LYS:HD2	1:A:651:HIS:HD1	1.81	0.46
1:B:298:PRO:HB2	1:B:299:LYS:HZ2	1.81	0.46
1:A:791:LYS:HE3	1:B:651:HIS:HB3	1.96	0.46
1:B:498:ILE:HD12	1:B:549:PHE:HD2	1.80	0.46
1:A:28:SER:O	1:A:32:VAL:HG13	2.15	0.46
1:A:326:CYS:HB2	1:A:352:LYS:HA	1.97	0.46
1:A:473:TYR:CE1	1:A:495:GLU:HB2	2.50	0.46
1:A:33:GLU:O	1:A:36:GLY:N	2.50	0.45
1:A:264:MET:SD	1:A:270:SER:OG	2.74	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:379:ALA:HA	1:A:459:ALA:HA	1.97	0.45
1:A:647:ASN:ND2	1:A:652:MET:SD	2.85	0.45
1:B:721:LEU:HD12	1:B:724:SER:HB3	1.98	0.45
1:B:297:HIS:CB	1:B:300:THR:OG1	2.64	0.45
1:B:637:LEU:O	1:B:641:ILE:HG23	2.16	0.45
1:A:333:LEU:HD12	1:A:345:ILE:HG23	1.98	0.45
1:B:269:LYS:HE3	1:B:397:PHE:CZ	2.51	0.45
1:B:333:LEU:HD12	1:B:345:ILE:HG23	1.99	0.45
1:B:768:VAL:O	1:B:772:ARG:HG2	2.15	0.45
1:A:464:ALA:O	1:A:469:PRO:HG2	2.16	0.45
1:A:547:THR:O	1:A:551:ILE:CD1	2.55	0.45
1:B:205:PRO:HB2	1:B:324:ALA:HB2	1.98	0.45
1:B:237:THR:O	1:B:383:VAL:HG13	2.17	0.45
1:A:473:TYR:HE1	1:A:495:GLU:OE1	2.00	0.45
1:A:544:PHE:O	1:A:544:PHE:CG	2.69	0.45
1:A:663:PHE:HB3	1:A:723:PRO:HG2	1.99	0.45
1:B:540:LEU:HA	1:B:543:ALA:HB3	1.99	0.45
1:A:600:VAL:HG13	1:A:673:VAL:HG21	1.99	0.45
1:A:603:GLY:HA2	1:A:608:ARG:HG3	1.97	0.45
1:A:611:PHE:HB3	1:A:680:SER:OG	2.17	0.44
1:B:101:LEU:HD23	1:B:101:LEU:HA	1.72	0.44
1:B:464:ALA:HB2	1:B:511:TRP:CD1	2.52	0.44
1:B:491:MET:SD	1:B:549:PHE:HB2	2.57	0.44
1:A:235:CYS:HB2	1:A:365:TYR:CZ	2.52	0.44
1:A:470:LEU:HD23	1:A:470:LEU:HA	1.83	0.44
1:A:488:ILE:O	1:A:491:MET:HB3	2.17	0.44
1:B:206:VAL:O	1:B:325:GLN:N	2.33	0.44
1:A:365:TYR:OH	1:A:378:THR:HG23	2.17	0.44
1:B:395:LEU:HD12	1:B:516:VAL:HG21	1.98	0.44
1:A:405:ILE:HD13	1:A:514:HIS:HB3	1.99	0.44
1:A:605:GLN:HA	1:A:622:LEU:HG	1.99	0.44
1:A:791:LYS:HG3	1:B:651:HIS:HB3	2.00	0.44
1:A:735:CYS:HA	1:A:801:LEU:HD22	2.00	0.44
1:B:495:GLU:CB	1:B:498:ILE:HB	2.48	0.44
1:B:769:ILE:HD13	1:B:769:ILE:HA	1.88	0.44
1:B:776:GLU:HB2	1:B:779:ARG:NH1	2.32	0.44
1:A:779:ARG:NH1	1:A:779:ARG:HB3	2.33	0.44
1:B:264:MET:SD	1:B:270:SER:OG	2.75	0.44
1:B:702:SER:HB3	1:B:707:GLU:O	2.18	0.44
1:B:497:ARG:HG3	1:B:546:ALA:HB1	2.00	0.44
1:A:645:LEU:CD1	1:A:735:CYS:CA	2.95	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:264:MET:SD	1:B:264:MET:N	2.86	0.43
1:B:426:ILE:HD11	1:B:527:HIS:HA	1.99	0.43
1:B:235:CYS:HB2	1:B:365:TYR:CZ	2.53	0.43
1:B:296:VAL:HG21	1:B:301:LEU:HD21	2.01	0.43
1:B:246:LEU:O	1:B:250:LEU:HG	2.18	0.43
1:A:232:LEU:HD22	1:A:233:MET:H	1.84	0.43
1:A:233:MET:SD	1:A:373:ILE:HD11	2.58	0.43
1:A:337:VAL:HG12	1:A:338:ASN:OD1	2.17	0.43
1:B:409:CYS:SG	1:B:452:VAL:HG23	2.59	0.43
1:B:638:LEU:O	1:B:641:ILE:HG13	2.19	0.43
1:A:93:SER:HB3	1:A:96:GLU:CD	2.43	0.43
1:A:143:LEU:HD13	1:A:143:LEU:HA	1.90	0.43
1:A:495:GLU:O	1:A:498:ILE:HB	2.18	0.43
1:A:645:LEU:HD11	1:A:735:CYS:CA	2.49	0.43
1:A:168:LYS:HE3	1:A:169:HIS:HB2	2.00	0.43
1:A:229:ARG:HG3	1:A:231:ARG:HH21	1.84	0.43
1:A:844:ILE:O	1:A:848:VAL:HG13	2.18	0.43
1:B:168:LYS:HE3	1:B:169:HIS:ND1	2.34	0.43
1:A:369:PHE:O	1:A:373:ILE:HG12	2.18	0.43
1:B:366:PHE:HD2	1:B:474:PHE:HZ	1.66	0.43
1:A:464:ALA:HB2	1:A:511:TRP:CD1	2.54	0.43
1:B:136:ASN:HB3	1:B:139:ILE:HB	2.01	0.43
1:B:426:ILE:CD1	1:B:527:HIS:HA	2.49	0.42
1:B:661:ALA:O	1:B:665:LEU:HD22	2.18	0.42
1:A:641:ILE:CD1	1:A:731:ILE:HD11	2.49	0.42
1:B:184:TRP:CE3	1:B:184:TRP:HA	2.53	0.42
1:B:211:PRO:HB3	1:B:368:ALA:HB2	1.99	0.42
1:A:228:ARG:NH1	1:A:346:GLN:OE1	2.52	0.42
1:A:349:PHE:CE2	1:A:351:LEU:HB2	2.52	0.42
1:A:644:GLY:C	1:A:646:GLY:N	2.77	0.42
1:A:264:MET:H	1:A:264:MET:CE	2.33	0.42
1:A:222:ARG:N	1:A:330:GLU:OE2	2.43	0.42
1:A:512:THR:HG21	1:A:567:ARG:HH21	1.84	0.42
1:B:462:TYR:HA	1:B:465:ILE:HG22	2.00	0.42
1:B:773:ARG:O	1:B:777:GLU:HB2	2.20	0.42
1:B:220:ARG:HA	1:B:372:GLN:HE22	1.85	0.42
1:B:647:ASN:OD1	1:B:647:ASN:N	2.53	0.42
1:A:499:LEU:O	1:A:503:VAL:HG23	2.19	0.42
1:A:794:GLU:O	1:A:797:ARG:HG3	2.20	0.42
1:B:470:LEU:HG	1:B:474:PHE:CE2	2.55	0.42
1:B:667:MET:HE2	1:B:667:MET:HB3	1.70	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:773:ARG:HA	1:B:773:ARG:HD2	1.84	0.42
1:B:826:PRO:O	1:B:830:ILE:HD13	2.19	0.42
1:A:37:ILE:HD12	1:A:37:ILE:H	1.84	0.42
1:A:366:PHE:HD2	1:A:474:PHE:HZ	1.67	0.42
1:A:414:VAL:HG22	1:A:525:VAL:HG11	2.01	0.42
1:A:438:ILE:HG23	1:A:705:HIS:ND1	2.35	0.42
1:B:233:MET:SD	1:B:373:ILE:HD11	2.59	0.42
1:A:647:ASN:HD21	1:A:652:MET:CE	2.32	0.42
1:B:93:SER:HB3	1:B:96:GLU:OE1	2.20	0.42
1:B:117:LEU:HD23	1:B:117:LEU:H	1.85	0.42
1:B:301:LEU:HD22	1:B:310:TYR:CZ	2.54	0.42
1:B:292:GLY:O	1:B:296:VAL:HG13	2.19	0.41
1:B:438:ILE:HG23	1:B:705:HIS:ND1	2.35	0.41
1:A:704:LEU:HD11	1:A:847:TRP:CD2	2.55	0.41
1:B:232:LEU:HD22	1:B:233:MET:H	1.84	0.41
1:B:390:SER:O	1:B:394:HIS:ND1	2.53	0.41
1:A:309:LEU:HD21	1:A:349:PHE:CG	2.55	0.41
1:A:621:VAL:HA	1:A:624:CYS:HB3	2.02	0.41
1:B:158:CYS:O	1:B:162:GLU:HG2	2.20	0.41
1:A:359:LEU:HD22	1:A:495:GLU:OE2	2.20	0.41
1:A:537:LYS:HB2	1:A:732:TYR:CE2	2.55	0.41
1:B:664:GLY:O	1:B:668:MET:HG2	2.20	0.41
1:A:93:SER:O	1:A:96:GLU:HG2	2.20	0.41
1:A:702:SER:HB3	1:A:707:GLU:O	2.21	0.41
1:A:434:LYS:HD3	1:A:434:LYS:HA	1.83	0.41
1:A:492:TYR:CD1	1:A:495:GLU:HG2	2.49	0.41
1:B:91:ILE:HD12	1:B:91:ILE:O	2.21	0.41
1:B:605:GLN:HA	1:B:622:LEU:HG	2.01	0.41
1:B:464:ALA:O	1:B:469:PRO:HG2	2.20	0.41
1:A:37:ILE:N	1:A:38:PRO:HD2	2.36	0.41
1:A:269:LYS:HD3	1:A:269:LYS:HA	1.85	0.41
1:A:360:ASP:HA	1:A:477:LEU:HD11	2.03	0.41
1:B:417:PRO:HB3	1:B:430:HIS:CD2	2.56	0.41
1:B:678:PHE:O	1:B:678:PHE:CD1	2.73	0.41
1:A:97:ALA:HB1	1:A:127:MET:HG2	2.03	0.41
1:A:200:ARG:HD3	1:A:200:ARG:HA	1.86	0.41
1:A:515:TYR:HD2	1:A:846:HIS:HE1	1.69	0.41
1:A:541:ASN:O	1:A:542:GLY:O	2.38	0.41
1:A:644:GLY:O	1:A:646:GLY:N	2.53	0.41
1:A:728:ILE:O	1:A:731:ILE:HG22	2.21	0.41
1:B:299:LYS:HA	1:B:299:LYS:HD3	1.78	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:844:ILE:O	1:B:848:VAL:HG13	2.21	0.41
1:A:208:CYS:HB2	1:A:217:LEU:HD12	2.03	0.41
1:A:254:ALA:HB1	1:A:342:LEU:HB3	2.03	0.41
1:A:293:ARG:HA	1:A:351:LEU:HD11	2.03	0.41
1:B:492:TYR:HD1	1:B:495:GLU:HG2	1.82	0.41
1:B:548:LEU:HD23	1:B:548:LEU:HA	1.88	0.41
1:A:29:MET:O	1:A:32:VAL:HG22	2.21	0.40
1:A:508:ASN:HA	1:A:562:LYS:HG2	2.03	0.40
1:B:177:VAL:HG11	1:B:318:ASN:HD21	1.85	0.40
1:A:441:LYS:HB3	1:A:515:TYR:CG	2.56	0.40
1:A:647:ASN:HB2	1:A:651:HIS:NE2	2.36	0.40
1:B:114:ARG:HA	1:B:114:ARG:HD3	1.80	0.40
1:B:164:ARG:H	1:B:164:ARG:HG2	1.74	0.40
1:B:360:ASP:HA	1:B:477:LEU:HD11	2.02	0.40
1:B:434:LYS:HD3	1:B:434:LYS:HA	1.78	0.40
1:B:640:LEU:HD21	1:B:659:VAL:HG11	2.02	0.40
1:B:678:PHE:HE2	1:B:691:SER:CB	2.33	0.40
1:A:647:ASN:OD1	1:A:647:ASN:N	2.45	0.40
1:A:589:PRO:HG2	1:A:804:TRP:HZ2	1.87	0.40
1:A:721:LEU:HD12	1:A:725:PHE:HD2	1.86	0.40
1:B:330:GLU:HG2	1:B:348:VAL:HG22	2.02	0.40
1:B:441:LYS:HB3	1:B:515:TYR:CG	2.57	0.40
1:B:721:LEU:HD12	1:B:721:LEU:HA	1.93	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	765/925 (83%)	721 (94%)	42 (6%)	2 (0%)	37	60
1	B	760/925 (82%)	718 (94%)	41 (5%)	1 (0%)	48	72

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	1525/1850 (82%)	1439 (94%)	83 (5%)	3 (0%)	45	66

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	644	GLY
1	A	645	LEU
1	B	725	PHE

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 PDB entries followed by that with respect to all EM entries.

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	665/790 (84%)	647 (97%)	18 (3%)	40	64
1	B	661/790 (84%)	635 (96%)	26 (4%)	27	52
All	All	1326/1580 (84%)	1282 (97%)	44 (3%)	35	57

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	MET
1	A	184	TRP
1	A	215	SER
1	A	289	VAL
1	A	313	ASP
1	A	333	LEU
1	A	345	ILE
1	A	403	HIS
1	A	435	ILE
1	A	495	GLU
1	A	547	THR
1	A	564	THR
1	A	651	HIS
1	A	669	LEU
1	A	712	PHE

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Mol	Chain	Res	Type
1	A	721	LEU
1	A	726	VAL
1	A	778	LEU
1	B	37	ILE
1	B	114	ARG
1	B	153	TRP
1	B	193	MET
1	B	204	THR
1	B	234	ILE
1	B	241	GLU
1	B	288	ILE
1	B	289	VAL
1	B	297	HIS
1	B	300	THR
1	B	333	LEU
1	B	345	ILE
1	B	359	LEU
1	B	426	ILE
1	B	491	MET
1	B	495	GLU
1	B	496	ASP
1	B	512	THR
1	B	540	LEU
1	B	564	THR
1	B	569	MET
1	B	651	HIS
1	B	713	MET
1	B	725	PHE
1	B	726	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	429	GLN
1	A	490	ASN
1	A	508	ASN
1	A	736	ASN
1	A	836	ASN
1	A	851	HIS
1	B	256	ASN
1	B	423	ASN
1	B	508	ASN

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Mol	Chain	Res	Type
1	B	736	ASN
1	B	836	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	$\#|Z| > 2$
2	UDP	A	1001	3	24,26,26	1.26	1 (4%)	37,40,40	1.24	3 (8%)
2	UDP	B	1001	3	24,26,26	1.27	1 (4%)	37,40,40	1.23	3 (8%)

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
2	UDP	A	1001	3	-	9/16/32/32	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	UDP	B	1001	3	-	8/16/32/32	0/2/2/2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1001	UDP	PB-O1B	4.88	1.66	1.50
2	A	1001	UDP	PB-O1B	4.85	1.66	1.50

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	1001	UDP	O3B-PB-O2B	3.43	120.76	107.64
2	B	1001	UDP	O3B-PB-O2B	3.35	120.45	107.64
2	A	1001	UDP	O3A-PB-O1B	-3.30	92.91	111.19
2	B	1001	UDP	O3A-PB-O1B	-3.28	93.00	111.19
2	A	1001	UDP	PA-O3A-PB	-3.04	122.40	132.83
2	B	1001	UDP	PA-O3A-PB	-2.96	122.67	132.83

There are no chirality outliers.

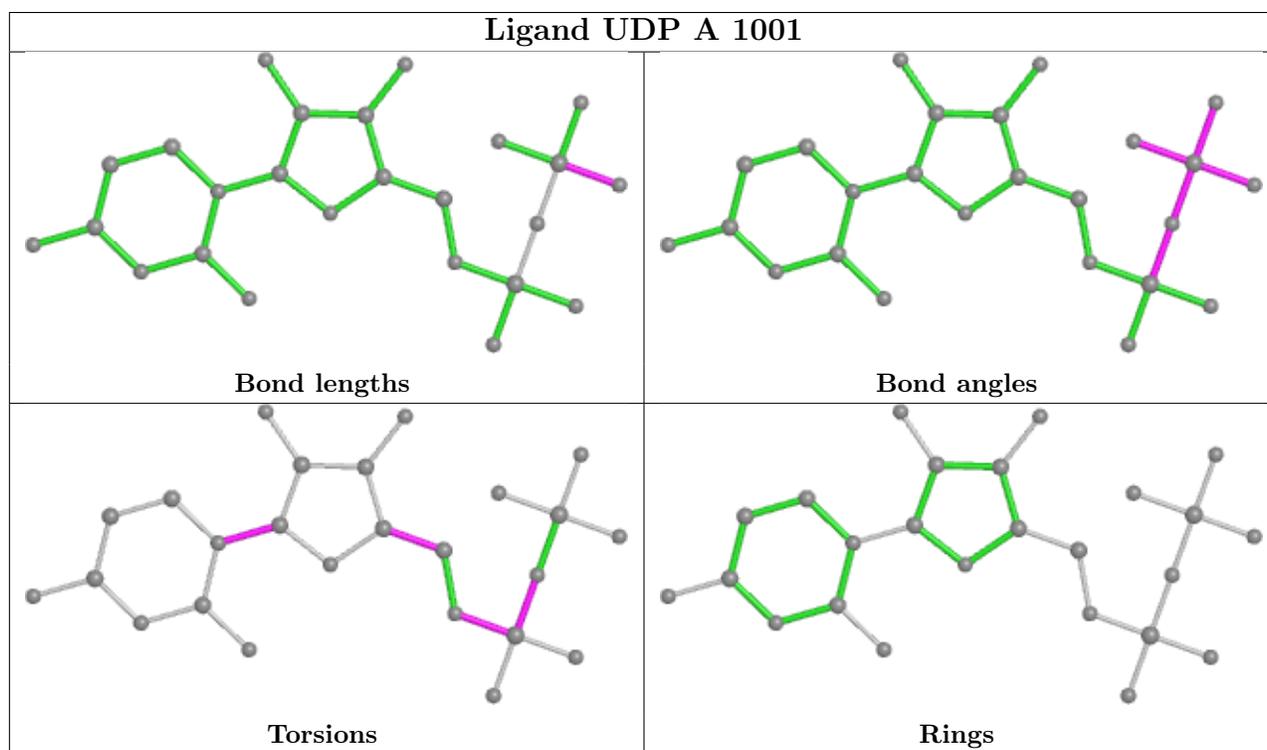All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1001	UDP	C2'-C1'-N1-C6
2	A	1001	UDP	C5'-O5'-PA-O1A
2	A	1001	UDP	C5'-O5'-PA-O2A
2	A	1001	UDP	O4'-C4'-C5'-O5'
2	B	1001	UDP	C2'-C1'-N1-C6
2	A	1001	UDP	C2'-C1'-N1-C2
2	B	1001	UDP	C2'-C1'-N1-C2
2	B	1001	UDP	O4'-C1'-N1-C2
2	B	1001	UDP	C5'-O5'-PA-O2A
2	B	1001	UDP	O4'-C1'-N1-C6
2	A	1001	UDP	O4'-C1'-N1-C6
2	A	1001	UDP	O4'-C1'-N1-C2
2	A	1001	UDP	PB-O3A-PA-O2A
2	A	1001	UDP	C5'-O5'-PA-O3A
2	B	1001	UDP	C5'-O5'-PA-O3A
2	B	1001	UDP	PB-O3A-PA-O2A
2	B	1001	UDP	O4'-C4'-C5'-O5'

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1001	UDP	2	0
2	B	1001	UDP	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand UDP A 1001

Bond lengths   Bond angles

Torsions   Rings

Ligand UDP B 1001

Bond lengths

Bond angles

Torsions

Rings
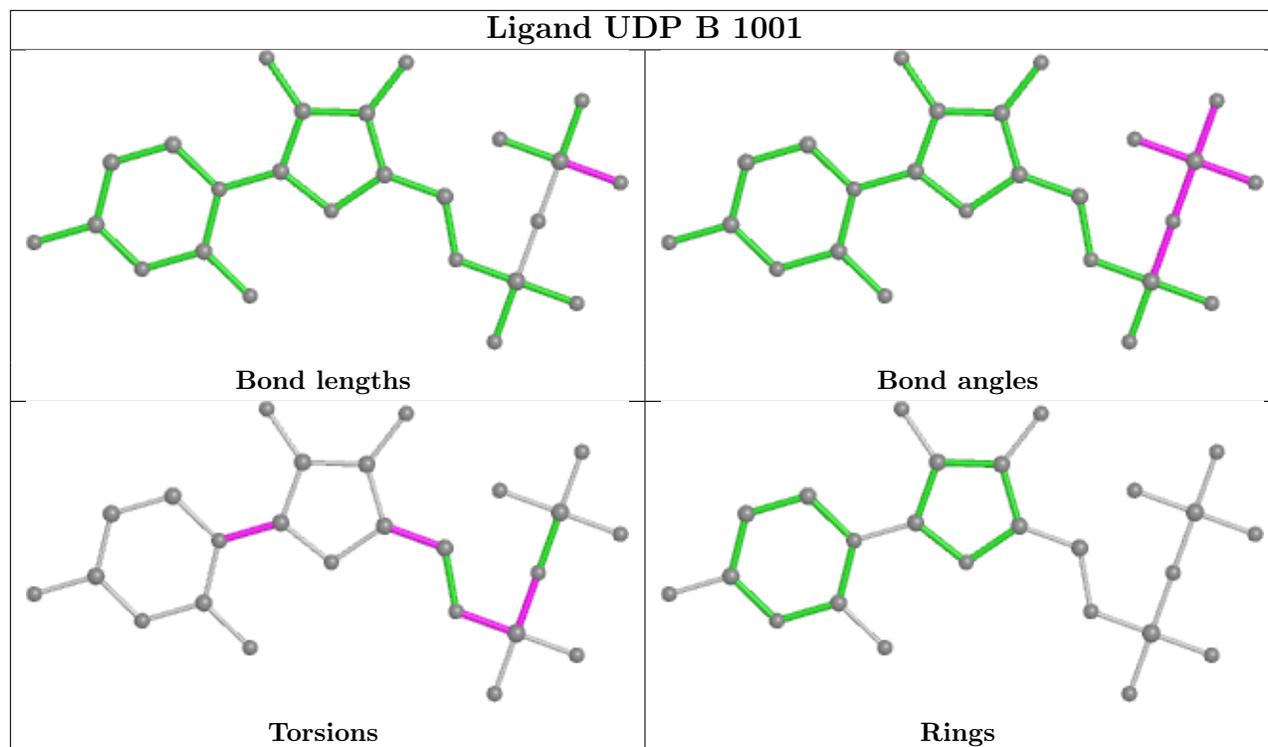
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.