



Full wwPDB EM Validation Report ⓘ

Jul 16, 2025 – 10:53 AM JST

PDB ID : 8JHZ / pdb_00008jhz
EMDB ID : EMD-36301
Title : Cryo-EM structure of the TcsH-TMPRSS2 complex
Authors : Zhou, R.; Liang, T.; Zhan, X.
Deposited on : 2023-05-25
Resolution : 3.20 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 ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0rc1
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

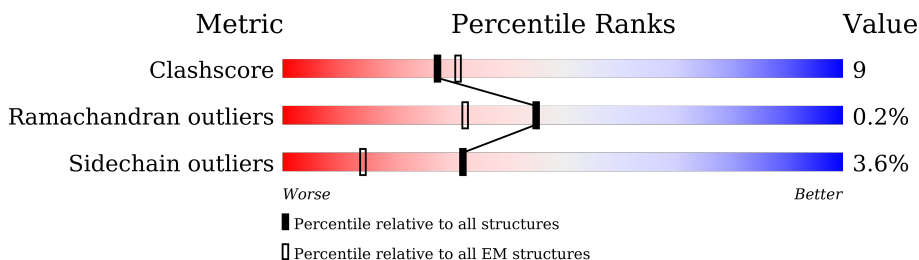
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.20 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)	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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	2626	
2	B	424	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 23814 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 Hemorrhagic toxin.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	N	O	P	S		
1	A	2615	21144	13557	3425	4120	1	41	0	0

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1833	SER	LEU	conflict	UNP M9ZTT7
A	2619	HIS	-	expression tag	UNP M9ZTT7
A	2620	HIS	-	expression tag	UNP M9ZTT7
A	2621	HIS	-	expression tag	UNP M9ZTT7
A	2622	HIS	-	expression tag	UNP M9ZTT7
A	2623	HIS	-	expression tag	UNP M9ZTT7
A	2624	HIS	-	expression tag	UNP M9ZTT7
A	2625	HIS	-	expression tag	UNP M9ZTT7
A	2626	HIS	-	expression tag	UNP M9ZTT7

- Molecule 2 is a protein called Transmembrane protease serine 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	341	2669	1688	462	496	23	0	0

There are 38 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	69	MET	-	initiating methionine	UNP O15393
B	70	GLY	-	expression tag	UNP O15393
B	71	ILE	-	expression tag	UNP O15393
B	72	LEU	-	expression tag	UNP O15393
B	73	PRO	-	expression tag	UNP O15393
B	74	SER	-	expression tag	UNP O15393
B	75	PRO	-	expression tag	UNP O15393
B	76	GLY	-	expression tag	UNP O15393

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Chain	Residue	Modelled	Actual	Comment	Reference
B	77	MET	-	expression tag	UNP O15393
B	78	PRO	-	expression tag	UNP O15393
B	79	ALA	-	expression tag	UNP O15393
B	80	LEU	-	expression tag	UNP O15393
B	81	LEU	-	expression tag	UNP O15393
B	82	SER	-	expression tag	UNP O15393
B	83	LEU	-	expression tag	UNP O15393
B	84	VAL	-	expression tag	UNP O15393
B	85	SER	-	expression tag	UNP O15393
B	86	LEU	-	expression tag	UNP O15393
B	87	LEU	-	expression tag	UNP O15393
B	88	SER	-	expression tag	UNP O15393
B	89	VAL	-	expression tag	UNP O15393
B	90	LEU	-	expression tag	UNP O15393
B	91	LEU	-	expression tag	UNP O15393
B	92	MET	-	expression tag	UNP O15393
B	93	GLY	-	expression tag	UNP O15393
B	94	CYS	-	expression tag	UNP O15393
B	95	VAL	-	expression tag	UNP O15393
B	96	ALA	-	expression tag	UNP O15393
B	97	GLU	-	expression tag	UNP O15393
B	98	THR	-	expression tag	UNP O15393
B	99	GLY	-	expression tag	UNP O15393
B	100	HIS	-	expression tag	UNP O15393
B	101	HIS	-	expression tag	UNP O15393
B	102	HIS	-	expression tag	UNP O15393
B	103	HIS	-	expression tag	UNP O15393
B	104	HIS	-	expression tag	UNP O15393
B	105	HIS	-	expression tag	UNP O15393
B	255	GLN	ARG	conflict	UNP O15393

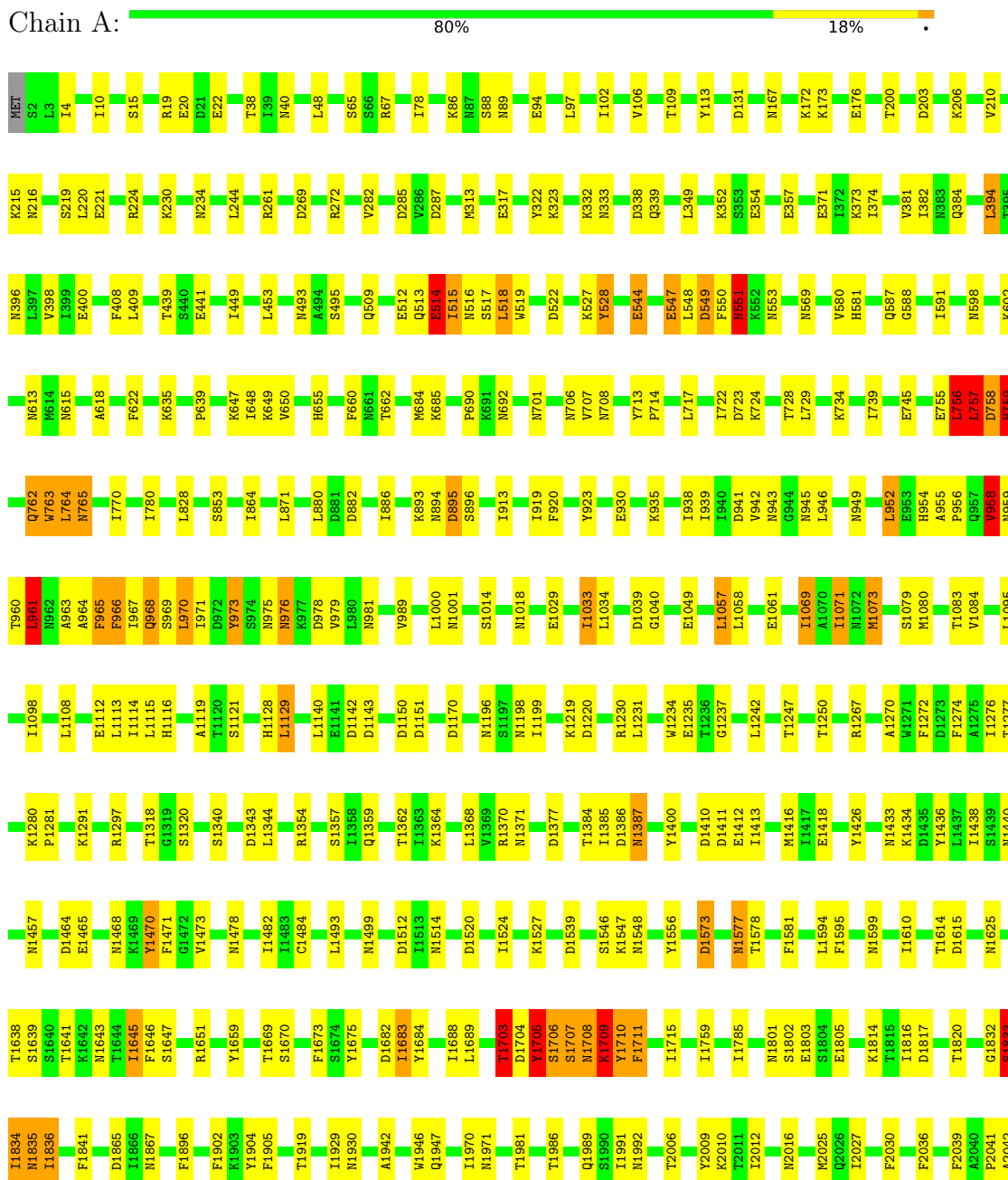
- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total	Zn	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: Hemorrhagic toxin



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	87378	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50.00	Depositor
Minimum defocus (nm)	1500	Depositor
Maximum defocus (nm)	2000	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: SEP, 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	0.55	41/21600 (0.2%)	0.63	49/29255 (0.2%)
2	B	0.69	13/2740 (0.5%)	0.85	31/3724 (0.8%)
All	All	0.57	54/24340 (0.2%)	0.66	80/32979 (0.2%)

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	A	0	3
2	B	0	2
All	All	0	5

All (54) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1833	SER	C-O	-14.91	1.04	1.23
1	A	1471	PHE	C-O	-14.04	1.06	1.23
1	A	1710	TYR	C-O	-13.38	1.07	1.24
2	B	304	ASN	C-O	-13.14	1.04	1.23
1	A	408	PHE	C-O	-12.22	1.08	1.24
1	A	1832	GLY	C-O	-12.07	1.08	1.23
1	A	514	GLU	C-O	-11.65	1.10	1.24
1	A	1709	LYS	C-O	-11.17	1.09	1.24
1	A	1711	PHE	C-O	-10.84	1.12	1.24
1	A	1834	ILE	C-O	-10.64	1.08	1.23
1	A	1711	PHE	C-N	10.56	1.47	1.33
2	B	301	PRO	C-O	-10.17	1.11	1.24
1	A	513	GLN	C-O	-10.07	1.12	1.24
2	B	306	TRP	C-O	-9.70	1.12	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	305	PRO	C-O	-9.46	1.11	1.24
1	A	287	ASP	C-O	-8.60	1.14	1.24
2	B	303	ASN	C-O	-8.27	1.12	1.24
1	A	1704	ASP	C-O	-8.05	1.13	1.24
2	B	300	LYS	C-O	-7.94	1.14	1.24
1	A	757	LEU	C-O	-7.79	1.14	1.23
1	A	967	ILE	C-O	-7.75	1.14	1.24
1	A	758	ASP	C-O	-7.64	1.13	1.23
1	A	1833	SER	CA-CB	-7.35	1.41	1.53
1	A	763	TRP	C-O	-7.30	1.15	1.24
2	B	342	LYS	C-O	-7.14	1.15	1.24
1	A	964	ALA	C-O	-7.07	1.15	1.24
1	A	287	ASP	CG-OD2	-7.00	1.12	1.25
2	B	413	ARG	C-O	-6.97	1.12	1.23
1	A	528	TYR	C-O	-6.86	1.15	1.24
1	A	519	TRP	C-O	-6.75	1.16	1.24
1	A	762	GLN	C-O	-6.73	1.15	1.23
1	A	1703	THR	C-O	-6.61	1.15	1.24
1	A	1707	SER	CA-CB	-6.44	1.42	1.53
2	B	414	TYR	C-O	-6.38	1.16	1.23
1	A	759	HIS	CE1-NE2	-6.27	1.26	1.32
1	A	1707	SER	C-O	-6.24	1.16	1.24
1	A	1836	ILE	C-O	-6.22	1.17	1.24
1	A	961	LEU	C-O	-6.13	1.17	1.24
1	A	1706	SER	CA-CB	-6.11	1.44	1.52
1	A	1708	ASN	C-O	-6.08	1.15	1.23
1	A	970	LEU	C-O	-5.79	1.17	1.24
2	B	342	LYS	CG-CD	-5.77	1.35	1.52
1	A	1834	ILE	CA-CB	-5.76	1.49	1.55
2	B	414	TYR	CA-C	-5.76	1.46	1.52
2	B	302	LEU	C-O	-5.74	1.12	1.23
1	A	963	ALA	C-O	-5.63	1.17	1.24
1	A	2608	ILE	C-O	5.53	1.32	1.24
1	A	1835	ASN	C-O	-5.51	1.17	1.24
1	A	756	LEU	C-O	-5.48	1.17	1.24
1	A	516	ASN	C-O	-5.46	1.12	1.23
2	B	301	PRO	N-CA	-5.39	1.40	1.47
1	A	969	SER	CA-CB	-5.36	1.45	1.53
1	A	968	GLN	C-O	-5.27	1.18	1.24
1	A	549	ASP	C-O	-5.21	1.17	1.24

All (80) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	408	PHE	CB-CA-C	-14.85	82.17	110.67
1	A	1711	PHE	CA-C-N	14.36	134.57	119.78
1	A	1711	PHE	C-N-CA	14.36	134.57	119.78
2	B	414	TYR	N-CA-C	-14.00	93.44	114.16
1	A	960	THR	CA-CB-OG1	-12.94	90.19	109.60
1	A	959	ASN	CB-CA-C	-12.64	89.80	110.79
1	A	1833	SER	CA-C-O	-11.04	109.53	121.56
2	B	306	TRP	N-CA-CB	-10.40	97.26	110.98
1	A	966	PHE	CB-CA-C	-10.25	94.78	110.88
2	B	305	PRO	CB-CA-C	-9.95	95.15	111.56
1	A	1835	ASN	CB-CA-C	-9.85	92.69	109.72
1	A	287	ASP	CA-CB-CG	-9.84	102.77	112.60
1	A	1703	THR	CA-CB-OG1	-9.78	94.94	109.60
1	A	549	ASP	CA-CB-CG	-9.30	103.30	112.60
1	A	1471	PHE	CB-CA-C	-8.68	92.01	109.79
2	B	306	TRP	CB-CA-C	8.68	123.50	109.27
2	B	342	LYS	CB-CG-CD	-8.53	91.69	111.30
1	A	973	TYR	CA-C-O	-8.45	110.57	120.62
2	B	414	TYR	CA-C-N	-8.40	106.84	121.97
2	B	414	TYR	C-N-CA	-8.40	106.84	121.97
2	B	302	LEU	N-CA-CB	-8.37	100.73	110.35
1	A	965	PHE	CB-CA-C	-8.36	96.92	110.79
1	A	759	HIS	CA-CB-CG	8.06	121.86	113.80
1	A	1704	ASP	CA-CB-CG	-8.01	104.59	112.60
2	B	306	TRP	N-CA-C	-8.00	102.79	114.39
1	A	973	TYR	CA-C-N	-7.74	111.08	123.23
1	A	973	TYR	C-N-CA	-7.74	111.08	123.23
1	A	960	THR	CB-CA-C	-7.70	97.75	110.85
2	B	305	PRO	N-CD-CG	-7.52	91.92	103.20
1	A	968	GLN	CB-CA-C	-7.05	99.08	110.79
1	A	1704	ASP	CB-CA-C	-6.99	96.50	110.42
2	B	300	LYS	CB-CA-C	-6.98	96.41	110.17
1	A	1708	ASN	CA-CB-CG	-6.93	105.67	112.60
2	B	299	GLU	O-C-N	6.88	130.79	122.68
1	A	758	ASP	CA-C-O	-6.76	114.03	121.87
2	B	300	LYS	CA-C-O	-6.73	110.93	120.16
1	A	758	ASP	N-CA-CB	-6.59	100.94	110.36
2	B	342	LYS	CA-C-O	-6.56	111.12	120.51
1	A	1711	PHE	CB-CA-C	-6.43	103.03	110.17
2	B	417	ASP	CA-CB-CG	6.34	118.94	112.60
1	A	513	GLN	CB-CG-CD	-6.29	101.91	112.60
2	B	299	GLU	CA-C-N	6.24	137.03	121.80
2	B	299	GLU	C-N-CA	6.24	137.03	121.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	342	LYS	CB-CA-C	6.23	122.81	110.42
2	B	304	ASN	CA-C-O	-6.19	114.99	120.19
1	A	2099	THR	CB-CA-C	-6.09	99.22	111.17
2	B	305	PRO	N-CA-CB	-6.09	96.85	103.25
2	B	413	ARG	CB-CA-C	6.09	120.46	111.88
1	A	1708	ASN	CB-CA-C	-6.05	97.88	110.40
1	A	528	TYR	CB-CA-C	-5.95	97.88	110.31
2	B	419	LEU	CA-C-O	-5.90	111.99	119.31
1	A	519	TRP	CA-C-O	-5.90	113.73	120.58
2	B	414	TYR	O-C-N	5.89	127.92	121.85
1	A	1705	TYR	CB-CA-C	-5.77	98.93	110.42
2	B	419	LEU	N-CA-C	-5.70	105.83	112.89
1	A	1834	ILE	CA-C-O	-5.69	116.43	121.09
1	A	1709	LYS	CA-C-O	-5.68	112.39	120.51
1	A	1710	TYR	CB-CA-C	-5.67	99.34	109.71
1	A	2064	ASN	CA-CB-CG	-5.64	106.96	112.60
2	B	412	SER	CA-C-N	-5.63	113.63	122.08
2	B	412	SER	C-N-CA	-5.63	113.63	122.08
1	A	2099	THR	CA-C-N	5.61	130.09	121.45
1	A	2099	THR	C-N-CA	5.61	130.09	121.45
1	A	758	ASP	CB-CA-C	-5.56	98.29	109.68
2	B	341	THR	O-C-N	5.55	130.29	122.41
1	A	551	ASN	CA-C-O	-5.50	112.36	118.69
2	B	342	LYS	CA-C-N	5.45	128.59	120.90
2	B	342	LYS	C-N-CA	5.45	128.59	120.90
1	A	958	VAL	CA-C-O	-5.39	115.35	120.95
1	A	512	GLU	CB-CA-C	-5.33	100.03	110.11
2	B	305	PRO	N-CA-C	5.28	123.35	112.47
1	A	2100	GLY	CA-C-O	-5.27	115.90	122.65
1	A	514	GLU	CA-C-O	-5.23	115.01	120.55
1	A	408	PHE	N-CA-CB	5.16	118.27	110.28
1	A	1706	SER	CA-C-N	5.13	131.34	121.54
1	A	1706	SER	C-N-CA	5.13	131.34	121.54
1	A	1834	ILE	N-CA-CB	-5.11	102.53	110.96
1	A	1710	TYR	CA-C-O	-5.10	114.85	120.36
1	A	2099	THR	CA-C-O	-5.10	115.98	121.38
2	B	302	LEU	CA-C-O	-5.02	114.31	122.20

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1703	THR	Mainchain
1	A	1833	SER	Mainchain
1	A	756	LEU	Mainchain
2	B	300	LYS	Mainchain
2	B	306	TRP	Mainchain

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	21144	0	20628	384	0
2	B	2669	0	2561	63	0
3	A	1	0	0	0	0
All	All	23814	0	23189	446	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 (446) 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:2308:PHE:CZ	1:A:2331:ILE:HD13	1.37	1.56
1:A:2326:THR:CB	1:A:2340:PRO:HA	1.49	1.42
1:A:2308:PHE:HZ	1:A:2331:ILE:CD1	1.32	1.39
1:A:2326:THR:OG1	1:A:2340:PRO:CA	1.75	1.33
1:A:655:HIS:HE1	1:A:759:HIS:CE1	1.51	1.28
1:A:2460:GLN:HB2	1:A:2474:ASP:O	1.12	1.26
1:A:655:HIS:CE1	1:A:759:HIS:CE1	2.18	1.19
1:A:2326:THR:OG1	1:A:2340:PRO:HA	1.37	1.14
1:A:2308:PHE:CE2	1:A:2331:ILE:HD13	1.84	1.11
1:A:2099:THR:O	1:A:2102:HIS:NE2	1.82	1.11
1:A:2070:PHE:CD1	1:A:2075:LYS:O	2.03	1.11
1:A:2460:GLN:CB	1:A:2474:ASP:O	1.99	1.11
1:A:2308:PHE:CZ	1:A:2331:ILE:CD1	2.17	1.10
1:A:2070:PHE:CE1	1:A:2075:LYS:O	2.08	1.06
1:A:1073:MET:HE1	1:A:1484:CYS:SG	1.97	1.04
1:A:2326:THR:CG2	1:A:2340:PRO:HA	1.87	1.03

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2060:PHE:CZ	1:A:2083:ILE:HD13	1.94	1.02
1:A:2060:PHE:HZ	1:A:2083:ILE:HD13	1.23	1.00
1:A:1836:ILE:HD12	1:A:1841:PHE:CD2	1.97	1.00
1:A:1705:TYR:CD2	1:A:1759:ILE:HD13	1.99	0.97
1:A:2326:THR:OG1	1:A:2340:PRO:N	1.95	0.97
1:A:1073:MET:CE	1:A:1484:CYS:SG	2.52	0.96
2:B:300:LYS:HB3	2:B:301:PRO:CD	1.94	0.94
1:A:2460:GLN:HG2	1:A:2477:SER:N	1.82	0.94
1:A:2326:THR:CB	1:A:2340:PRO:CA	2.39	0.91
1:A:1675:TYR:O	1:A:1708:ASN:OD1	1.90	0.90
2:B:300:LYS:HB3	2:B:301:PRO:HD3	1.54	0.90
2:B:300:LYS:O	2:B:300:LYS:NZ	2.03	0.90
1:A:2460:GLN:HB3	1:A:2477:SER:HA	1.53	0.90
2:B:419:LEU:HD23	2:B:461:TRP:CH2	2.06	0.90
1:A:655:HIS:CE1	1:A:759:HIS:HE1	1.87	0.88
1:A:765:ASN:O	1:A:765:ASN:ND2	2.07	0.88
1:A:547:GLU:OE1	1:A:547:GLU:N	2.06	0.88
1:A:2308:PHE:HE2	1:A:2331:ILE:HG21	1.40	0.87
2:B:371:MET:O	2:B:449:LYS:NZ	2.07	0.86
2:B:416:TYR:OH	2:B:471:PRO:O	1.91	0.86
1:A:1836:ILE:HD12	1:A:1841:PHE:HD2	1.40	0.84
1:A:2460:GLN:HG2	1:A:2477:SER:H	1.40	0.83
1:A:2506:THR:OG1	1:A:2511:ASN:OD1	1.96	0.83
1:A:2063:ILE:CG2	1:A:2068:TYR:HE2	1.92	0.82
1:A:2327:GLY:O	1:A:2337:TYR:CD1	2.33	0.82
1:A:2460:GLN:HA	1:A:2473:PHE:HB2	1.60	0.82
1:A:1682:ASP:OD1	1:A:1708:ASN:ND2	2.14	0.81
2:B:328:VAL:HG21	2:B:349:MET:HE3	1.62	0.81
1:A:2326:THR:HG21	1:A:2340:PRO:HA	1.61	0.81
1:A:528:TYR:CE2	1:A:660:PHE:HA	2.15	0.80
1:A:2603:ILE:HD12	1:A:2603:ILE:O	1.81	0.80
2:B:419:LEU:HD23	2:B:461:TRP:CZ2	2.17	0.80
1:A:2550:TYR:OH	1:A:2554:PHE:O	2.00	0.79
2:B:419:LEU:CD2	2:B:461:TRP:CH2	2.66	0.78
1:A:2099:THR:O	1:A:2102:HIS:CD2	2.38	0.77
1:A:930:GLU:HG3	1:A:966:PHE:HD1	1.50	0.77
1:A:591:ILE:HD13	1:A:759:HIS:HA	1.67	0.77
1:A:2006:THR:HG21	1:A:2010:LYS:HD2	1.67	0.77
1:A:764:LEU:HD23	1:A:764:LEU:N	2.00	0.76
1:A:1436:TYR:O	1:A:1440:ASN:ND2	2.19	0.76
1:A:961:LEU:O	1:A:961:LEU:HD22	1.86	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:930:GLU:HG3	1:A:966:PHE:CD1	2.21	0.74
1:A:2326:THR:OG1	1:A:2340:PRO:CB	2.36	0.73
1:A:2291:ASN:H	1:A:2296:ASN:HA	1.54	0.73
1:A:2326:THR:HB	1:A:2340:PRO:HA	1.61	0.72
1:A:1705:TYR:CD2	1:A:1759:ILE:CD1	2.73	0.72
1:A:4:ILE:HD13	1:A:976:ASN:HD21	1.54	0.72
1:A:2295:ASN:HB2	1:A:2302:ILE:HD13	1.72	0.72
2:B:291:ILE:HD12	2:B:351:LEU:HD21	1.71	0.71
2:B:437:CYS:SG	2:B:438:GLN:N	2.63	0.71
1:A:1108:LEU:HD12	1:A:1113:LEU:HB3	1.71	0.71
1:A:2326:THR:OG1	1:A:2340:PRO:CG	2.39	0.71
1:A:2060:PHE:HZ	1:A:2083:ILE:CD1	2.03	0.71
1:A:2243:TYR:OH	1:A:2272:LYS:NZ	2.24	0.71
1:A:2461:ASN:ND2	1:A:2475:SER:HA	2.06	0.71
1:A:2308:PHE:CE2	1:A:2331:ILE:HG21	2.26	0.70
1:A:528:TYR:HE2	1:A:660:PHE:HA	1.57	0.70
1:A:2288:ALA:HB1	1:A:2292:THR:HG21	1.75	0.69
1:A:2295:ASN:HD21	1:A:2300:GLN:HB3	1.57	0.69
1:A:756:LEU:HD12	1:A:756:LEU:O	1.93	0.69
1:A:2460:GLN:CB	1:A:2477:SER:HA	2.22	0.68
1:A:38:THR:HG22	1:A:40:ASN:H	1.57	0.68
1:A:2176:ALA:HB2	1:A:2184:GLU:HG3	1.75	0.68
1:A:2057:GLN:NE2	1:A:2072:ASN:O	2.27	0.67
1:A:2233:THR:O	1:A:2233:THR:OG1	2.11	0.67
1:A:527:LYS:NZ	1:A:701:ASN:OD1	2.27	0.66
2:B:457:GLY:HA2	2:B:477:VAL:HG23	1.77	0.66
1:A:221:GLU:OE2	1:A:224:ARG:NH2	2.29	0.66
1:A:384:GLN:OE1	1:A:509:GLN:NE2	2.28	0.66
1:A:2327:GLY:O	1:A:2337:TYR:HA	1.96	0.65
1:A:354:GLU:HB2	1:A:357:GLU:HG3	1.78	0.65
1:A:2308:PHE:HZ	1:A:2331:ILE:HD11	1.51	0.65
1:A:591:ILE:CD1	1:A:759:HIS:HA	2.27	0.64
1:A:1548:ASN:ND2	1:A:1599:ASN:O	2.30	0.64
1:A:1478:ASN:ND2	1:A:1520:ASP:OD2	2.30	0.64
1:A:15:SER:HB3	1:A:67:ARG:HH21	1.63	0.64
1:A:509:GLN:O	1:A:514:GLU:HG2	1.98	0.64
1:A:2460:GLN:HA	1:A:2473:PHE:CB	2.29	0.63
1:A:551:ASN:O	1:A:553:ASN:ND2	2.31	0.63
2:B:385:GLY:O	2:B:394:SER:N	2.31	0.63
1:A:971:ILE:O	1:A:971:ILE:HG22	1.99	0.62
2:B:291:ILE:CD1	2:B:351:LEU:HD21	2.28	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2489:HIS:ND1	2:B:322:TYR:OH	2.33	0.62
1:A:942:VAL:HG23	1:A:943:ASN:H	1.63	0.62
1:A:2356:LYS:NZ	1:A:2404:ASN:O	2.32	0.62
1:A:2561:ARG:NE	1:A:2609:ASP:O	2.32	0.62
1:A:647:LYS:HG3	1:A:692:ASN:HB2	1.81	0.61
1:A:2060:PHE:CE2	1:A:2083:ILE:HG21	2.34	0.61
1:A:1069:ILE:HD12	1:A:1457:ASN:HB2	1.80	0.61
1:A:2439:PHE:HB2	1:A:2479:ALA:HB3	1.82	0.61
1:A:1247:THR:O	1:A:1250:THR:OG1	2.16	0.61
2:B:295:ALA:N	2:B:345:ASP:OD1	2.33	0.61
1:A:20:GLU:OE2	1:A:67:ARG:NH1	2.33	0.61
1:A:518:LEU:HD23	1:A:518:LEU:O	2.01	0.61
1:A:757:LEU:HG	1:A:757:LEU:O	2.00	0.61
1:A:1638:THR:HG22	1:A:1639:SER:H	1.64	0.61
1:A:2154:ASN:OD1	1:A:2158:ILE:N	2.34	0.61
1:A:2460:GLN:HG2	1:A:2477:SER:CA	2.30	0.61
1:A:762:GLN:O	1:A:762:GLN:HG3	2.00	0.60
1:A:1340:SER:N	1:A:1343:ASP:OD1	2.27	0.60
1:A:2460:GLN:CG	1:A:2477:SER:HA	2.32	0.60
1:A:2326:THR:HG21	1:A:2340:PRO:CA	2.30	0.60
1:A:1546:SER:OG	1:A:1547:LYS:N	2.35	0.60
1:A:2063:ILE:O	1:A:2063:ILE:HG13	2.01	0.60
1:A:2168:ASP:OD1	1:A:2209:LYS:NZ	2.35	0.60
1:A:2294:ASN:HB3	1:A:2302:ILE:HD11	1.83	0.60
1:A:1073:MET:HE3	1:A:1484:CYS:SG	2.38	0.59
1:A:1071:ILE:HG12	1:A:1473:VAL:HG23	1.83	0.59
1:A:94:GLU:OE2	1:A:94:GLU:N	2.34	0.59
1:A:2278:PHE:HB2	1:A:2287:PHE:HE2	1.67	0.59
1:A:598:ASN:ND2	1:A:745:GLU:OE1	2.35	0.59
1:A:1946:TRP:O	1:A:1947:GLN:NE2	2.36	0.59
2:B:203:ASP:OD1	2:B:203:ASP:N	2.33	0.59
1:A:1386:ASP:N	1:A:1386:ASP:OD2	2.34	0.59
1:A:551:ASN:H	1:A:551:ASN:ND2	2.00	0.58
2:B:463:SER:O	2:B:463:SER:OG	2.15	0.58
1:A:2063:ILE:CG2	1:A:2068:TYR:CE2	2.82	0.58
1:A:439:THR:HG23	1:A:441:GLU:H	1.69	0.58
1:A:763:TRP:N	1:A:763:TRP:CD1	2.72	0.57
2:B:482:ASP:OD1	2:B:483:TRP:N	2.37	0.57
1:A:2009:TYR:HE2	1:A:2016:ASN:HB3	1.69	0.57
1:A:722:ILE:HD11	1:A:734:LYS:HD3	1.87	0.57
1:A:2060:PHE:HE2	1:A:2083:ILE:HG21	1.70	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:200:THR:OG1	1:A:203:ASP:OD1	2.20	0.56
1:A:2072:ASN:OD1	1:A:2072:ASN:N	2.36	0.56
1:A:1578:THR:HG22	1:A:1835:ASN:ND2	2.20	0.56
1:A:1493:LEU:HD21	1:A:1524:ILE:HD13	1.86	0.56
1:A:1706:SER:O	1:A:1706:SER:OG	2.21	0.56
1:A:1970:ILE:HG22	1:A:1971:ASN:ND2	2.20	0.56
1:A:2460:GLN:CG	1:A:2477:SER:CA	2.84	0.56
1:A:1242:LEU:O	1:A:1267:ARG:NH1	2.39	0.56
1:A:48:LEU:HD22	1:A:78:ILE:HG23	1.88	0.56
1:A:2326:THR:OG1	1:A:2340:PRO:CD	2.54	0.56
1:A:1836:ILE:CD1	1:A:1841:PHE:CD2	2.82	0.56
1:A:354:GLU:N	1:A:357:GLU:OE2	2.27	0.56
1:A:1196:ASN:OD1	1:A:1198:ASN:ND2	2.40	0.56
1:A:1235:GLU:OE1	1:A:1280:LYS:NZ	2.31	0.55
1:A:528:TYR:CD2	1:A:660:PHE:HA	2.41	0.55
1:A:2063:ILE:HG21	1:A:2068:TYR:HE2	1.71	0.55
2:B:358:ASN:OD1	2:B:360:LEU:N	2.36	0.55
2:B:211:LYS:N	2:B:226:TYR:O	2.38	0.55
1:A:2063:ILE:HG23	1:A:2068:TYR:HE2	1.72	0.55
2:B:177:ASN:OD1	2:B:179:ASN:N	2.35	0.55
2:B:465:CYS:O	2:B:466:ALA:HB3	2.05	0.55
1:A:2461:ASN:N	1:A:2473:PHE:O	2.29	0.54
1:A:1539:ASP:HB2	1:A:1556:TYR:HB3	1.89	0.54
1:A:515:ILE:HG23	1:A:708:ASN:HD21	1.72	0.54
1:A:966:PHE:C	1:A:966:PHE:CD2	2.84	0.54
2:B:346:ILE:HG21	2:B:480:PHE:CD2	2.42	0.54
1:A:1865:ASP:OD1	1:A:1867:ASN:ND2	2.40	0.54
1:A:1986:THR:O	1:A:1989:GLN:NE2	2.41	0.54
1:A:2327:GLY:N	1:A:2338:PHE:O	2.39	0.54
2:B:342:LYS:O	2:B:345:ASP:HB2	2.08	0.54
1:A:2457:ILE:HD11	1:A:2459:TYR:HD2	1.73	0.53
1:A:167:ASN:OD1	1:A:167:ASN:N	2.41	0.53
1:A:2062:THR:O	1:A:2062:THR:HG23	2.08	0.53
1:A:613:ASN:OD1	1:A:613:ASN:N	2.39	0.53
1:A:65:SER:OG	1:A:67:ARG:HG2	2.09	0.53
1:A:2211:ILE:HD12	1:A:2215:GLN:HG3	1.91	0.53
1:A:2613:GLN:OE1	1:A:2613:GLN:HA	2.08	0.53
1:A:1196:ASN:HD22	1:A:1199:ILE:HG13	1.74	0.53
1:A:2036:PHE:O	1:A:2075:LYS:HA	2.09	0.53
2:B:413:ARG:HB3	2:B:417:ASP:HB2	1.91	0.52
1:A:961:LEU:HD22	1:A:961:LEU:C	2.33	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2326:THR:HG1	1:A:2340:PRO:N	2.02	0.52
1:A:313:MET:O	1:A:317:GLU:HG3	2.09	0.52
1:A:1079:SER:O	1:A:1083:THR:HG23	2.09	0.52
1:A:2461:ASN:HD21	1:A:2475:SER:CA	2.23	0.52
2:B:336:ASN:OD1	2:B:336:ASN:O	2.27	0.52
1:A:618:ALA:HB3	1:A:635:LYS:HD3	1.90	0.52
1:A:2460:GLN:HB3	1:A:2473:PHE:HB3	1.92	0.52
1:A:882:ASP:OD1	1:A:882:ASP:N	2.39	0.52
1:A:893:LYS:HD3	1:A:895:ASP:H	1.76	0.51
1:A:2308:PHE:CZ	1:A:2331:ILE:HD11	2.34	0.51
1:A:2042:ALA:HB2	1:A:2050:GLU:HB2	1.92	0.51
1:A:2231:ALA:O	1:A:2233:THR:HG22	2.10	0.51
2:B:271:VAL:HG12	2:B:312:ALA:HB2	1.93	0.51
1:A:396:ASN:O	1:A:400:GLU:HG2	2.11	0.51
1:A:880:LEU:HD11	1:A:913:ILE:HG13	1.92	0.51
1:A:2308:PHE:CE1	1:A:2317:TYR:HB2	2.46	0.51
1:A:713:TYR:HB3	1:A:714:PRO:HD3	1.93	0.51
1:A:1578:THR:O	1:A:1581:PHE:HB3	2.11	0.51
1:A:2461:ASN:HD21	1:A:2475:SER:HA	1.76	0.51
2:B:328:VAL:HG21	2:B:349:MET:CE	2.38	0.51
1:A:1673:PHE:CZ	1:A:1688:ILE:HD13	2.46	0.50
1:A:2025:MET:HE1	1:A:2050:GLU:HG3	1.94	0.50
1:A:2246:SER:HB3	1:A:2252:GLN:HG3	1.94	0.50
1:A:1359:GLN:O	1:A:1362:THR:OG1	2.28	0.50
1:A:1196:ASN:ND2	1:A:1199:ILE:HG13	2.27	0.50
1:A:216:ASN:OD1	1:A:219:SER:N	2.40	0.50
1:A:1651:ARG:HD3	1:A:1684:TYR:O	2.11	0.50
1:A:374:ILE:HG12	1:A:382:ILE:O	2.11	0.50
1:A:1387:ASN:OD1	1:A:1387:ASN:N	2.45	0.49
1:A:1548:ASN:HD21	1:A:1599:ASN:HD22	1.60	0.49
2:B:146:ASN:N	2:B:146:ASN:OD1	2.44	0.49
2:B:278:VAL:O	2:B:280:VAL:HG23	2.12	0.49
1:A:1833:SER:O	1:A:1833:SER:OG	2.27	0.49
1:A:2274:THR:HG22	1:A:2275:THR:H	1.77	0.49
1:A:2459:TYR:CE1	1:A:2462:LYS:HE3	2.47	0.49
1:A:989:VAL:HG12	1:A:1000:LEU:HD11	1.94	0.49
1:A:2284:PHE:HB2	1:A:2324:ALA:HB3	1.94	0.49
1:A:2175:PRO:O	1:A:2182:ASN:ND2	2.41	0.49
1:A:1115:LEU:HB2	1:A:1281:PRO:HD3	1.95	0.49
1:A:1128:HIS:NE2	1:A:1150:ASP:O	2.39	0.49
1:A:973:TYR:O	1:A:973:TYR:CD1	2.65	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1709:LYS:O	1:A:1709:LYS:HG2	2.12	0.49
1:A:2523:VAL:HG21	1:A:2562:TYR:CD2	2.48	0.49
1:A:2461:ASN:HD21	1:A:2475:SER:CB	2.25	0.49
2:B:468:ALA:O	2:B:469:TYR:HB2	2.13	0.49
1:A:1039:ASP:N	1:A:1039:ASP:OD1	2.45	0.48
1:A:1573:ASP:OD2	1:A:1573:ASP:N	2.31	0.48
2:B:275:VAL:HB	2:B:280:VAL:HG21	1.94	0.48
1:A:1340:SER:OG	1:A:1343:ASP:OD2	2.29	0.48
1:A:322:TYR:HD2	1:A:349:LEU:HD12	1.78	0.48
1:A:954:HIS:O	1:A:958:VAL:HG22	2.13	0.48
1:A:2460:GLN:CG	1:A:2477:SER:H	2.18	0.48
1:A:550:PHE:HD1	1:A:587:GLN:NE2	2.11	0.48
1:A:2461:ASN:ND2	1:A:2475:SER:CA	2.76	0.48
1:A:871:LEU:HB3	1:A:981:ASN:HD22	1.79	0.48
1:A:1029:GLU:H	1:A:1029:GLU:CD	2.22	0.48
1:A:1080:MET:HE2	1:A:1344:LEU:HD22	1.96	0.48
1:A:1377:ASP:HB3	1:A:1384:THR:HB	1.95	0.48
1:A:1270:ALA:C	1:A:1272:PHE:H	2.21	0.48
1:A:588:GLY:HA2	1:A:613:ASN:HD22	1.79	0.47
1:A:756:LEU:HD23	1:A:770:ILE:HG13	1.96	0.47
1:A:765:ASN:ND2	1:A:765:ASN:C	2.71	0.47
1:A:871:LEU:HD13	1:A:920:PHE:HE1	1.79	0.47
1:A:2107:LYS:HD3	1:A:2138:ILE:HD13	1.95	0.47
1:A:88:SER:OG	1:A:89:ASN:OD1	2.32	0.47
1:A:206:LYS:HG3	1:A:220:LEU:HD12	1.96	0.47
1:A:323:LYS:NZ	1:A:352:LYS:O	2.29	0.47
1:A:549:ASP:HB3	1:A:551:ASN:HD21	1.80	0.47
1:A:973:TYR:HE1	1:A:978:ASP:OD2	1.97	0.47
1:A:1410:ASP:OD2	1:A:1412:GLU:HG2	2.14	0.47
2:B:380:TRP:CZ2	2:B:401:LYS:HD2	2.49	0.47
1:A:22:GLU:OE2	1:A:22:GLU:N	2.47	0.47
1:A:550:PHE:CD1	1:A:587:GLN:NE2	2.83	0.47
1:A:2461:ASN:HD21	1:A:2475:SER:HB3	1.79	0.47
2:B:213:ASN:O	2:B:224:LYS:NZ	2.39	0.47
1:A:515:ILE:HG23	1:A:708:ASN:ND2	2.29	0.47
1:A:968:GLN:O	1:A:968:GLN:HG3	2.13	0.47
1:A:685:LYS:HD3	1:A:728:THR:HG23	1.96	0.47
1:A:717:LEU:HD23	1:A:739:ILE:HD13	1.97	0.47
1:A:763:TRP:CD1	1:A:763:TRP:H	2.31	0.47
1:A:935:LYS:O	1:A:935:LYS:HG2	2.14	0.47
1:A:648:ILE:HG13	1:A:690:PRO:HG3	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2261:LEU:HB2	1:A:2263:PHE:HE2	1.79	0.47
1:A:409:LEU:HD13	1:A:449:ILE:HD12	1.98	0.46
1:A:1577:ASN:OD1	1:A:1577:ASN:N	2.48	0.46
1:A:551:ASN:ND2	1:A:551:ASN:N	2.60	0.46
1:A:591:ILE:HD11	1:A:759:HIS:O	2.15	0.46
1:A:1115:LEU:HD13	1:A:1281:PRO:HG3	1.98	0.46
1:A:2326:THR:OG1	1:A:2340:PRO:HG3	2.13	0.46
1:A:394:LEU:O	1:A:398:VAL:HG23	2.16	0.46
1:A:2100:GLY:O	1:A:2102:HIS:HD2	1.98	0.46
1:A:2460:GLN:CG	1:A:2477:SER:N	2.69	0.46
1:A:109:THR:O	1:A:113:TYR:HD2	1.99	0.46
1:A:941:ASP:HB3	1:A:946:LEU:HD13	1.97	0.46
1:A:1272:PHE:HB2	1:A:1274:PHE:CE2	2.51	0.46
1:A:1711:PHE:N	1:A:1711:PHE:CD2	2.84	0.46
1:A:1904:TYR:O	1:A:1919:THR:HA	2.16	0.46
1:A:2284:PHE:O	1:A:2323:LYS:HA	2.15	0.46
1:A:2080:TRP:CH2	1:A:2111:PHE:HZ	2.34	0.46
2:B:149:VAL:HG12	2:B:160:VAL:HG22	1.98	0.46
2:B:400:ALA:HB1	2:B:434:VAL:HG13	1.97	0.46
1:A:493:ASN:OD1	1:A:495:SER:OG	2.30	0.45
1:A:518:LEU:HD22	1:A:707:VAL:CG2	2.47	0.45
1:A:1645:ILE:HD11	1:A:1651:ARG:HB3	1.97	0.45
1:A:2441:TYR:HD2	1:A:2459:TYR:CD2	2.35	0.45
1:A:317:GLU:OE1	1:A:333:ASN:HB2	2.16	0.45
1:A:894:ASN:O	1:A:896:SER:N	2.38	0.45
1:A:1433:ASN:HB3	1:A:1436:TYR:HB3	1.97	0.45
1:A:2460:GLN:CG	1:A:2474:ASP:O	2.64	0.45
1:A:210:VAL:HG23	1:A:215:LYS:O	2.17	0.45
2:B:450:ASN:OD1	2:B:450:ASN:O	2.33	0.45
1:A:86:LYS:NZ	1:A:371:GLU:OE1	2.45	0.45
1:A:230:LYS:O	1:A:234:ASN:ND2	2.50	0.45
1:A:549:ASP:OD1	1:A:549:ASP:N	2.48	0.45
1:A:1033:ILE:HG13	1:A:1034:LEU:H	1.81	0.45
1:A:1594:LEU:HD23	1:A:1595:PHE:CE2	2.52	0.45
1:A:1896:PHE:HB2	1:A:1905:PHE:CE2	2.52	0.45
1:A:1802:SER:O	1:A:1802:SER:OG	2.27	0.45
1:A:2326:THR:HB	1:A:2339:ASN:O	2.17	0.45
2:B:357:PHE:CZ	2:B:363:PRO:HG3	2.52	0.45
1:A:2271:SER:O	1:A:2271:SER:OG	2.35	0.45
1:A:2291:ASN:N	1:A:2296:ASN:HA	2.28	0.45
1:A:684:MET:HE1	1:A:729:LEU:HD11	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1902:PHE:HB2	1:A:1942:ALA:HB3	1.99	0.44
1:A:549:ASP:HB3	1:A:551:ASN:ND2	2.33	0.44
1:A:871:LEU:HD13	1:A:920:PHE:CE1	2.52	0.44
1:A:2025:MET:HE2	1:A:2025:MET:HB3	1.91	0.44
1:A:2221:LYS:HD3	1:A:2251:LEU:HD23	1.99	0.44
1:A:10:ILE:HD13	1:A:19:ARG:HH22	1.83	0.44
1:A:173:LYS:HD2	1:A:173:LYS:HA	1.82	0.44
1:A:1129:LEU:HA	1:A:1129:LEU:HD23	1.64	0.44
1:A:2326:THR:CG2	1:A:2340:PRO:CA	2.77	0.44
2:B:386:ALA:HB2	2:B:392:LYS:O	2.17	0.44
2:B:378:LEU:C	2:B:378:LEU:HD13	2.43	0.44
1:A:706:ASN:OD1	1:A:706:ASN:N	2.51	0.44
1:A:2190:TYR:O	1:A:2208:SER:HA	2.17	0.44
1:A:1220:ASP:OD2	1:A:1220:ASP:N	2.41	0.44
1:A:1669:THR:O	1:A:1670:SER:OG	2.34	0.44
1:A:2016:ASN:HB2	1:A:2053:ALA:HB3	1.99	0.44
2:B:392:LYS:N	2:B:392:LYS:HD2	2.33	0.44
1:A:15:SER:HB3	1:A:67:ARG:NH2	2.29	0.44
1:A:622:PHE:CE1	1:A:639:PRO:HD3	2.53	0.44
1:A:1140:LEU:HD11	1:A:1219:LYS:HE3	1.99	0.44
1:A:1411:ASP:N	1:A:1411:ASP:OD2	2.40	0.44
1:A:2459:TYR:CD1	1:A:2462:LYS:HE3	2.53	0.44
2:B:222:TYR:HA	2:B:225:LEU:CD2	2.48	0.44
1:A:723:ASP:OD2	1:A:724:LYS:N	2.51	0.43
1:A:1014:SER:O	1:A:1018:ASN:ND2	2.50	0.43
1:A:1049:GLU:OE2	1:A:1058:LEU:HD11	2.17	0.43
2:B:465:CYS:O	2:B:466:ALA:CB	2.66	0.43
1:A:102:ILE:HG23	1:A:131:ASP:HB2	2.00	0.43
1:A:338:ASP:OD2	1:A:339:GLN:N	2.49	0.43
1:A:518:LEU:HD22	1:A:707:VAL:HG21	1.99	0.43
1:A:2191:GLN:HB3	1:A:2206:ASN:HA	2.00	0.43
1:A:2277:VAL:HA	1:A:2285:GLU:O	2.18	0.43
1:A:1991:ILE:HG22	1:A:1992:ASN:ND2	2.33	0.43
1:A:923:TYR:OH	1:A:970:LEU:HD11	2.18	0.43
1:A:1614:THR:OG1	1:A:1615:ASP:N	2.52	0.43
1:A:2080:TRP:CH2	1:A:2111:PHE:CZ	3.06	0.43
1:A:2156:LYS:HE3	1:A:2156:LYS:HB3	1.77	0.43
1:A:2212:THR:OG1	1:A:2226:SER:HA	2.18	0.43
1:A:2241:GLU:OE1	1:A:2272:LYS:HE3	2.19	0.43
1:A:2295:ASN:HD21	1:A:2300:GLN:CB	2.29	0.43
1:A:1237:GLY:N	1:A:1277:THR:OG1	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:941:ASP:HB2	1:A:945:ASN:O	2.18	0.43
1:A:942:VAL:HG23	1:A:943:ASN:N	2.32	0.43
1:A:949:ASN:ND2	1:A:1040:GLY:O	2.52	0.43
1:A:1119:ALA:HB1	1:A:1242:LEU:HD11	2.00	0.43
1:A:2123:HIS:HB2	1:A:2132:PHE:HE2	1.83	0.43
1:A:2457:ILE:CD1	1:A:2459:TYR:HD2	2.32	0.43
2:B:433:ASN:O	2:B:434:VAL:HG23	2.19	0.43
1:A:2311:ILE:O	1:A:2311:ILE:HG13	2.19	0.43
1:A:975:ASN:ND2	1:A:976:ASN:O	2.52	0.43
1:A:2499:ILE:HG22	1:A:2500:GLY:N	2.34	0.43
2:B:287:THR:HG21	2:B:488:MET:HE3	2.01	0.43
2:B:376:GLU:OE1	2:B:403:LEU:HD23	2.19	0.42
1:A:1114:ILE:HD13	1:A:2260:ARG:HH22	1.84	0.42
1:A:2609:ASP:OD1	1:A:2609:ASP:N	2.48	0.42
2:B:336:ASN:OD1	2:B:336:ASN:C	2.62	0.42
1:A:1095:LEU:H	1:A:1095:LEU:HD23	1.84	0.42
1:A:1385:ILE:HG22	1:A:1386:ASP:H	1.83	0.42
1:A:1464:ASP:OD2	1:A:1468:ASN:HB2	2.19	0.42
2:B:221:ILE:O	2:B:225:LEU:HD22	2.19	0.42
1:A:1080:MET:O	1:A:1084:VAL:HG23	2.19	0.42
1:A:1219:LYS:O	1:A:1297:ARG:NH1	2.53	0.42
1:A:1834:ILE:HD13	1:A:1834:ILE:HG21	1.70	0.42
2:B:336:ASN:O	2:B:337:TYR:C	2.61	0.42
1:A:756:LEU:H	1:A:756:LEU:HG	1.77	0.42
1:A:1242:LEU:HD23	1:A:1242:LEU:HA	1.72	0.42
1:A:1929:ILE:HG22	1:A:1930:ASN:OD1	2.20	0.42
1:A:2027:ILE:HD11	1:A:2041:PRO:HG3	2.00	0.42
1:A:2531:GLU:OE2	1:A:2547:SER:OG	2.26	0.42
2:B:221:ILE:HG23	2:B:222:TYR:CE1	2.54	0.42
2:B:409:ARG:HA	2:B:409:ARG:NE	2.34	0.42
1:A:261:ARG:NH2	1:A:453:LEU:O	2.53	0.42
1:A:1465:GLU:H	1:A:1465:GLU:CD	2.27	0.42
1:A:2063:ILE:C	1:A:2063:ILE:HD12	2.44	0.42
1:A:2526:GLY:N	1:A:2529:GLY:O	2.46	0.42
2:B:316:ARG:NE	2:B:396:VAL:HG12	2.35	0.42
1:A:2133:ASN:HB3	1:A:2136:THR:HG22	2.02	0.42
1:A:2523:VAL:HB	1:A:2562:TYR:CE2	2.55	0.42
2:B:267:TRP:CZ2	2:B:380:TRP:CE3	3.07	0.42
1:A:97:LEU:HD12	1:A:282:VAL:HB	2.02	0.42
1:A:1234:TRP:CZ3	1:A:1276:ILE:HG12	2.55	0.42
1:A:1683:ILE:HG23	1:A:1710:TYR:CE1	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1470:TYR:N	1:A:1470:TYR:CD2	2.88	0.42
1:A:2010:LYS:HD3	1:A:2012:ILE:HD11	2.02	0.42
1:A:2184:GLU:CD	1:A:2184:GLU:H	2.28	0.42
2:B:213:ASN:OD1	2:B:214:THR:N	2.53	0.42
2:B:222:TYR:HA	2:B:225:LEU:HD23	2.02	0.42
1:A:269:ASP:O	1:A:272:ARG:HG2	2.19	0.41
1:A:971:ILE:O	1:A:971:ILE:CG2	2.66	0.41
1:A:1170:ASP:O	1:A:1231:LEU:HD12	2.20	0.41
2:B:417:ASP:CG	2:B:417:ASP:O	2.63	0.41
1:A:955:ALA:HB3	1:A:956:PRO:HD3	2.02	0.41
1:A:518:LEU:CD2	1:A:707:VAL:HG21	2.50	0.41
1:A:581:HIS:HA	1:A:649:LYS:O	2.20	0.41
1:A:1357:SER:OG	1:A:1364:LYS:HD2	2.20	0.41
1:A:882:ASP:HB3	1:A:979:VAL:O	2.20	0.41
1:A:1151:ASP:OD2	1:A:1230:ARG:NH2	2.53	0.41
1:A:1434:LYS:O	1:A:1438:ILE:HG12	2.21	0.41
1:A:1140:LEU:HG	1:A:1143:ASP:HA	2.01	0.41
1:A:1354:ARG:HG2	1:A:1368:LEU:HD23	2.02	0.41
1:A:1370:ARG:HG2	1:A:1371:ASN:CG	2.46	0.41
1:A:1410:ASP:OD1	1:A:1413:ILE:HB	2.20	0.41
1:A:1416:MET:HE2	1:A:1416:MET:HB3	1.70	0.41
1:A:1512:ASP:O	1:A:1514:ASN:ND2	2.54	0.41
1:A:1527:LYS:HE3	1:A:1527:LYS:HB2	1.67	0.41
1:A:2030:PHE:HB2	1:A:2039:PHE:HE2	1.84	0.41
2:B:296:HIS:ND1	2:B:342:LYS:HE2	2.36	0.41
2:B:374:GLN:HB2	2:B:375:PRO:HD2	2.01	0.41
1:A:591:ILE:HD11	1:A:759:HIS:C	2.46	0.41
1:A:1418:GLU:O	1:A:1426:TYR:HA	2.21	0.41
2:B:210:MET:HB3	2:B:225:LEU:HB3	2.03	0.41
2:B:427:ALA:HB3	2:B:474:TYR:CE1	2.56	0.41
1:A:1320:SER:O	1:A:1320:SER:OG	2.39	0.41
1:A:952:LEU:HD13	1:A:1625:ASN:OD1	2.20	0.41
1:A:1001:ASN:OD1	1:A:1001:ASN:N	2.53	0.41
1:A:1805:GLU:HB2	1:A:1816:ILE:HD13	2.02	0.41
1:A:2060:PHE:CE1	1:A:2069:TYR:HB2	2.56	0.41
1:A:2214:TRP:CE3	1:A:2221:LYS:HE2	2.56	0.41
1:A:2306:ASN:O	1:A:2307:LYS:HD3	2.21	0.41
1:A:2491:PHE:CE2	1:A:2518:LEU:HD13	2.55	0.41
1:A:172:LYS:O	1:A:176:GLU:HG3	2.21	0.41
1:A:864:ILE:HG22	1:A:973:TYR:CE2	2.56	0.41
1:A:1057:LEU:O	1:A:1061:GLU:HG3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1112:GLU:O	1:A:1113:LEU:C	2.63	0.41
1:A:2182:ASN:HB2	1:A:2186:GLN:HB3	2.03	0.41
1:A:2255:TYR:HH	1:A:2262:ASN:CG	2.21	0.41
1:A:569:ASN:ND2	1:A:602:LYS:HA	2.35	0.40
1:A:1029:GLU:OE1	1:A:1029:GLU:N	2.40	0.40
1:A:1801:ASN:OD1	1:A:1803:GLU:HG2	2.21	0.40
1:A:2260:ARG:HD2	1:A:2260:ARG:N	2.37	0.40
1:A:332:LYS:HE2	1:A:332:LYS:HB2	1.90	0.40
1:A:758:ASP:OD2	1:A:759:HIS:N	2.54	0.40
1:A:1689:LEU:HD12	1:A:1715:ILE:HB	2.03	0.40
2:B:212:LEU:HG	2:B:213:ASN:N	2.36	0.40
2:B:275:VAL:HG23	2:B:308:TRP:CE3	2.56	0.40
1:A:4:ILE:HD13	1:A:976:ASN:ND2	2.30	0.40
1:A:1291:LYS:HA	1:A:1318:THR:OG1	2.22	0.40
1:A:371:GLU:OE2	1:A:373:LYS:HE3	2.21	0.40
1:A:544:GLU:H	1:A:544:GLU:HG2	1.42	0.40
1:A:2292:THR:N	1:A:2295:ASN:O	2.54	0.40
1:A:2491:PHE:CZ	1:A:2518:LEU:HD13	2.56	0.40
1:A:1116:HIS:HB3	1:A:1121:SER:HB3	2.04	0.40
1:A:1814:LYS:O	1:A:1820:THR:HA	2.22	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	2612/2626 (100%)	2499 (96%)	109 (4%)	4 (0%)	44	75
2	B	337/424 (80%)	300 (89%)	34 (10%)	3 (1%)	14	49
All	All	2949/3050 (97%)	2799 (95%)	143 (5%)	7 (0%)	45	75

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1707	SER
2	B	300	LYS
1	A	1703	THR
2	B	145	GLU
1	A	1705	TYR
2	B	305	PRO
1	A	895	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 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	2352/2362 (100%)	2278 (97%)	74 (3%)	35	66
2	B	290/360 (81%)	268 (92%)	22 (8%)	11	39
All	All	2642/2722 (97%)	2546 (96%)	96 (4%)	32	62

All (96) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	106	VAL
1	A	244	LEU
1	A	285	ASP
1	A	381	VAL
1	A	394	LEU
1	A	514	GLU
1	A	515	ILE
1	A	518	LEU
1	A	522	ASP
1	A	544	GLU
1	A	547	GLU
1	A	548	LEU
1	A	551	ASN
1	A	580	VAL
1	A	615	ASN
1	A	650	VAL
1	A	662	THR

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Mol	Chain	Res	Type
1	A	755	GLU
1	A	756	LEU
1	A	757	LEU
1	A	759	HIS
1	A	764	LEU
1	A	765	ASN
1	A	780	ILE
1	A	828	LEU
1	A	853	SER
1	A	886	ILE
1	A	919	ILE
1	A	938	ILE
1	A	939	ILE
1	A	952	LEU
1	A	958	VAL
1	A	961	LEU
1	A	965	PHE
1	A	976	ASN
1	A	1033	ILE
1	A	1057	LEU
1	A	1069	ILE
1	A	1071	ILE
1	A	1073	MET
1	A	1098	ILE
1	A	1129	LEU
1	A	1142	ASP
1	A	1387	ASN
1	A	1400	TYR
1	A	1470	TYR
1	A	1482	ILE
1	A	1499	ASN
1	A	1573	ASP
1	A	1577	ASN
1	A	1610	ILE
1	A	1641	THR
1	A	1643	ASN
1	A	1645	ILE
1	A	1646	PHE
1	A	1647	SER
1	A	1659	TYR
1	A	1683	ILE
1	A	1705	TYR

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Mol	Chain	Res	Type
1	A	1709	LYS
1	A	1785	ILE
1	A	1817	ASP
1	A	1981	THR
1	A	2063	ILE
1	A	2072	ASN
1	A	2077	VAL
1	A	2155	ASP
1	A	2168	ASP
1	A	2233	THR
1	A	2270	ASP
1	A	2326	THR
1	A	2548	ILE
1	A	2581	THR
1	A	2608	ILE
2	B	146	ASN
2	B	148	CYS
2	B	198	GLN
2	B	203	ASP
2	B	204	SER
2	B	227	HIS
2	B	284	SER
2	B	287	THR
2	B	300	LYS
2	B	306	TRP
2	B	332	ILE
2	B	333	SER
2	B	342	LYS
2	B	381	ILE
2	B	413	ARG
2	B	417	ASP
2	B	418	ASN
2	B	419	LEU
2	B	434	VAL
2	B	441	SER
2	B	459	THR
2	B	460	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (51) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	125	ASN

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Mol	Chain	Res	Type
1	A	242	ASN
1	A	404	ASN
1	A	529	GLN
1	A	551	ASN
1	A	553	ASN
1	A	603	ASN
1	A	606	ASN
1	A	615	ASN
1	A	692	ASN
1	A	765	ASN
1	A	814	ASN
1	A	852	ASN
1	A	859	ASN
1	A	879	ASN
1	A	937	ASN
1	A	949	ASN
1	A	976	ASN
1	A	1111	ASN
1	A	1188	HIS
1	A	1196	ASN
1	A	1198	ASN
1	A	1214	ASN
1	A	1420	ASN
1	A	1446	ASN
1	A	1457	ASN
1	A	1491	ASN
1	A	1514	ASN
1	A	1522	ASN
1	A	1548	ASN
1	A	1558	ASN
1	A	1576	HIS
1	A	1792	HIS
1	A	1835	ASN
1	A	1867	ASN
1	A	1868	ASN
1	A	1959	ASN
1	A	1971	ASN
1	A	1992	ASN
1	A	1993	ASN
1	A	2022	ASN
1	A	2026	GLN
1	A	2047	ASN

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Mol	Chain	Res	Type
1	A	2057	GLN
1	A	2160	GLN
1	A	2291	ASN
1	A	2294	ASN
1	A	2419	ASN
1	A	2461	ASN
1	A	2552	ASN
2	B	327	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is modelled in this entry.

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	$\# Z > 2$
1	SEP	A	517	1	8,9,10	1.54	2 (25%)	8,12,14	2.01	2 (25%)

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
1	SEP	A	517	1	-	4/5/8/10	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	517	SEP	P-OG	2.40	1.67	1.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	517	SEP	P-O3P	-2.22	1.46	1.54

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	517	SEP	OG-P-O1P	3.87	117.34	106.47
1	A	517	SEP	OG-CB-CA	2.95	111.02	108.14

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	517	SEP	N-CA-CB-OG
1	A	517	SEP	CB-OG-P-O2P
1	A	517	SEP	CB-OG-P-O3P
1	A	517	SEP	CB-OG-P-O1P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is 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.