



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2018 – 06:13 am GMT

PDB ID : 4FEA
Title : Crystal structure of CASPASE-7 in Complex with allosteric inhibitor
Authors : Kabaleeswaran, V.
Deposited on : 2012-05-29
Resolution : 3.79 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7.3 (157068), CSD as539be (2018)
Xtriage (Phenix) : 1.13
EDS : trunk30967
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Refmac : 5.8.0158
CCP4 : 7.0 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk30967

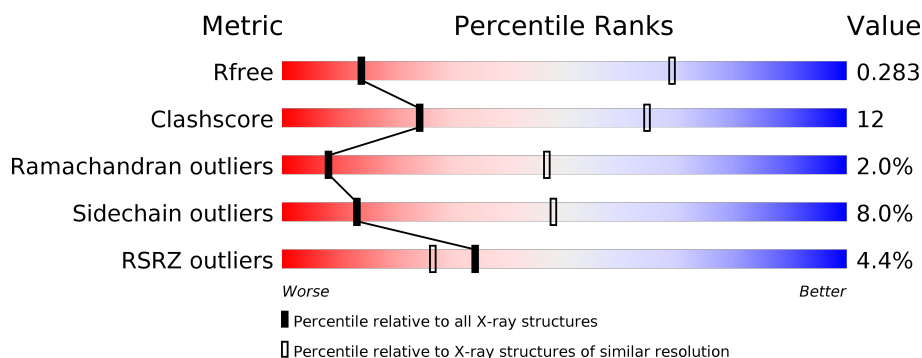
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.79 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	111664	1028 (4.02-3.58)
Clashscore	122126	1061 (4.00-3.60)
Ramachandran outliers	120053	1025 (4.00-3.60)
Sidechain outliers	120020	1019 (4.00-3.60)
RSRZ outliers	108989	1021 (4.06-3.54)

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

Mol	Chain	Length	Quality of chain
1	A	247	<div> <div>5%</div> <div> <div></div> <div>48%</div> <div>17%</div> <div>•</div> <div>31%</div> </div> </div>
1	B	247	<div> <div>2%</div> <div> <div></div> <div>57%</div> <div>21%</div> <div>•</div> <div>21%</div> </div> </div>

2 Entry composition [i](#)

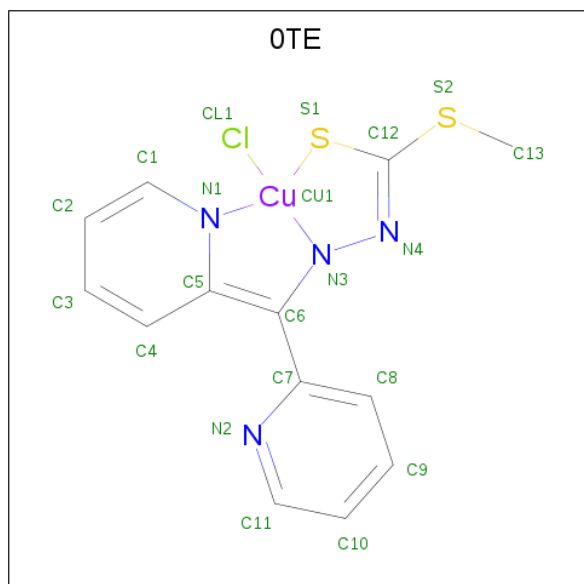
There are 2 unique types of molecules in this entry. The entry contains 2795 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Caspase-7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	170	Total	C	N	O	S	0	0	0
			1287	825	207	241	14			
1	B	196	Total	C	N	O	S	0	0	0
			1466	932	242	277	15			

- Molecule 2 is chloro{methyl hydrogenato(3-)-kappa 2 N,S [pyridin-2-yl(pyridin-2(1H)-ylidene-kappaN)methyl]carbonodithiohydrazonate}copper (three-letter code: 0TE) (formula: C₁₃H₁₁ClCuN₄S₂).

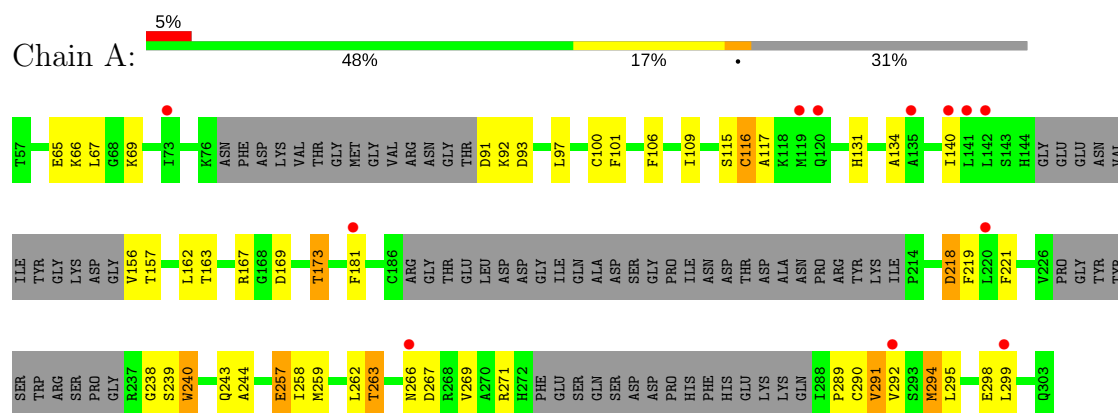


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Cl	Cu	N	S	0
			21	13	1	1	4	2	
2	B	1	Total	C	Cl	Cu	N	S	0
			21	13	1	1	4	2	

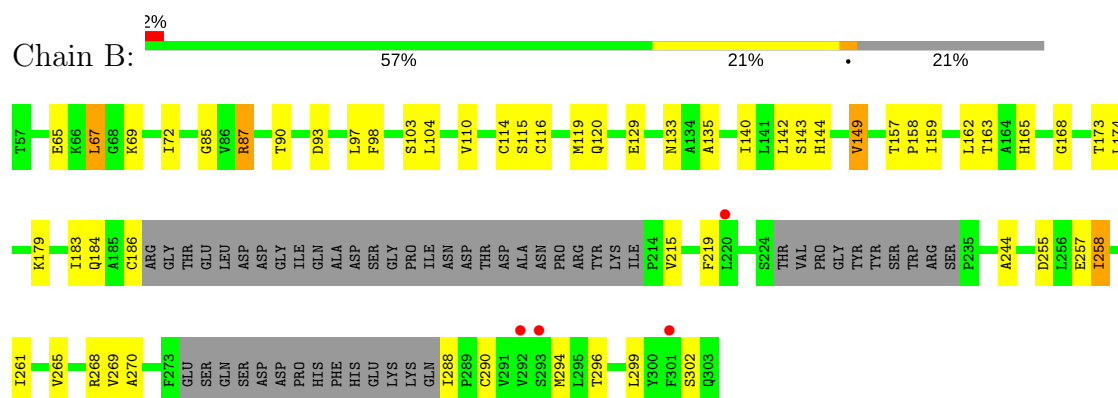
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Caspase-7



• Molecule 1: Caspase-7



4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	88.72Å 88.72Å 185.66Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	76.83 – 3.79 76.83 – 3.79	Depositor EDS
% Data completeness (in resolution range)	92.5 (76.83-3.79) 92.0 (76.83-3.79)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.92 (at 3.78Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.236 , 0.286 0.241 , 0.283	Depositor DCC
R_{free} test set	383 reflections (4.63%)	wwPDB-VP
Wilson B-factor (Å ²)	111.2	Xtriage
Anisotropy	0.639	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 102.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.047 for -h,-k,l	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	2795	wwPDB-VP
Average B, all atoms (Å ²)	120.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.32% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 0TE

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	0.30	0/1306	0.47	0/1763
1	B	0.30	0/1492	0.47	0/2020
All	All	0.30	0/2798	0.47	0/3783

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1287	0	1227	32	0
1	B	1466	0	1363	29	0
2	A	21	0	11	5	0
2	B	21	0	11	3	0
All	All	2795	0	2612	64	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 12.

All (64) 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:219:PHE:HB2	1:A:294:MET:HE2	1.56	0.88
1:B:258:ILE:HD11	1:B:299:LEU:HB3	1.58	0.86
1:A:131:HIS:H	1:A:173:THR:HG21	1.54	0.70
1:A:290:CYS:O	1:A:291:VAL:HG23	1.92	0.69
1:B:270:ALA:HB2	1:B:288:ILE:HD11	1.75	0.68
1:A:257:GLU:HG2	1:A:299:LEU:H	1.64	0.61
1:A:219:PHE:CB	1:A:294:MET:HE2	2.31	0.60
1:A:292:VAL:HG11	2:B:701:0TE:C8	2.32	0.59
1:B:97:LEU:HD13	1:B:140:ILE:HG21	1.85	0.58
1:B:244:ALA:HB1	1:B:268:ARG:HD3	1.85	0.58
1:A:92:LYS:HD3	1:A:238:GLY:H	1.69	0.58
1:A:116:CYS:HG	1:A:156:VAL:N	2.04	0.56
1:A:290:CYS:SG	2:A:701:0TE:CL1	3.00	0.55
2:A:701:0TE:H5	2:A:701:0TE:H10	1.89	0.55
1:B:69:LYS:NZ	1:B:129:GLU:OE2	2.32	0.54
1:B:65:GLU:HB3	1:B:133:ASN:HB2	1.90	0.54
2:A:701:0TE:H5	2:A:701:0TE:N4	2.21	0.54
1:B:67:LEU:O	1:B:135:ALA:N	2.39	0.54
1:A:292:VAL:HG11	2:B:701:0TE:C9	2.39	0.52
1:A:69:LYS:HE3	1:A:109:ILE:HD12	1.92	0.52
1:B:219:PHE:CB	1:B:294:MET:HE2	2.40	0.52
1:B:116:CYS:HA	1:B:119:MET:HE2	1.93	0.51
1:A:239:SER:O	1:A:243:GLN:HB2	2.11	0.51
1:B:87:ARG:HH22	1:B:142:LEU:HB3	1.75	0.51
1:B:72:ILE:HB	1:B:110:VAL:HG22	1.92	0.50
1:A:259:MET:O	1:A:263:THR:OG1	2.28	0.49
1:A:101:PHE:O	1:A:106:PHE:HB2	2.13	0.49
1:A:66:LYS:HE2	1:A:134:ALA:HB2	1.94	0.48
1:B:149:VAL:HG23	1:B:158:PRO:HA	1.96	0.48
1:A:257:GLU:HG3	1:A:298:GLU:HB3	1.95	0.48
1:A:115:SER:O	1:A:117:ALA:N	2.46	0.48
1:A:290:CYS:O	1:A:291:VAL:CG2	2.60	0.47
1:B:174:LEU:O	1:B:179:LYS:NZ	2.47	0.47
1:A:218:ASP:HA	1:A:295:LEU:HD23	1.95	0.47
1:B:219:PHE:HB3	1:B:294:MET:HE2	1.96	0.46
1:A:116:CYS:SG	1:A:156:VAL:N	2.89	0.45
1:B:265:VAL:O	1:B:269:VAL:HG12	2.17	0.45
1:A:157:THR:HG21	1:A:162:LEU:HD21	1.98	0.45
1:A:92:LYS:HD3	1:A:238:GLY:N	2.31	0.44
1:A:169:ASP:N	1:A:169:ASP:OD1	2.38	0.44
1:A:266:ASN:HA	1:A:269:VAL:HG12	1.98	0.44
1:B:143:SER:OG	1:B:144:HIS:N	2.50	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:120:GLN:NE2	1:B:162:LEU:HD23	2.34	0.43
1:A:262:LEU:O	1:A:266:ASN:ND2	2.49	0.43
1:A:258:ILE:HG22	1:A:299:LEU:HB3	2.00	0.43
2:A:701:0TE:C8	2:A:701:0TE:N4	2.82	0.43
1:B:90:THR:HA	1:B:93:ASP:HB2	2.01	0.43
1:B:116:CYS:HB3	1:B:157:THR:HG23	2.01	0.43
1:B:103:SER:O	1:B:104:LEU:HD23	2.19	0.42
1:A:181:PHE:HD2	1:A:221:PHE:CE2	2.37	0.42
1:A:267:ASP:HB2	1:B:296:THR:O	2.18	0.42
1:B:142:LEU:HD23	1:B:184:GLN:HB3	2.02	0.42
1:B:261:ILE:O	1:B:265:VAL:HG23	2.19	0.42
1:B:115:SER:O	1:B:119:MET:HG3	2.20	0.42
1:A:267:ASP:O	1:A:271:ARG:HG3	2.20	0.41
1:A:218:ASP:N	1:A:218:ASP:OD2	2.53	0.41
1:B:159:ILE:HD13	1:B:183:ILE:HD13	2.02	0.41
1:B:257:GLU:O	1:B:261:ILE:HG12	2.20	0.41
1:B:85:GLY:O	1:B:144:HIS:HE1	2.03	0.41
1:A:97:LEU:HD13	1:A:140:ILE:HG21	2.01	0.41
2:A:701:0TE:H3	2:B:701:0TE:H4	2.03	0.41
1:A:240:TRP:O	1:A:244:ALA:N	2.44	0.40
1:B:219:PHE:HB2	1:B:294:MET:HE2	2.02	0.40
1:B:120:GLN:OE1	1:B:165:HIS:NE2	2.50	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	158/247 (64%)	139 (88%)	14 (9%)	5 (3%)	4	38
1	B	188/247 (76%)	171 (91%)	15 (8%)	2 (1%)	16	57
All	All	346/494 (70%)	310 (90%)	29 (8%)	7 (2%)	8	47

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	65	GLU
1	A	116	CYS
1	B	215	VAL
1	A	291	VAL
1	B	168	GLY
1	A	289	PRO
1	A	167	ARG

5.3.2 Protein sidechains [i](#)

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	137/216 (63%)	126 (92%)	11 (8%)	13	48
1	B	151/216 (70%)	139 (92%)	12 (8%)	13	48
All	All	288/432 (67%)	265 (92%)	23 (8%)	13	48

All (23) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	67	LEU
1	A	91	ASP
1	A	93	ASP
1	A	100	CYS
1	A	163	THR
1	A	173	THR
1	A	218	ASP
1	A	240	TRP
1	A	257	GLU
1	A	263	THR
1	A	294	MET
1	B	67	LEU
1	B	87	ARG
1	B	98	PHE
1	B	114	CYS
1	B	149	VAL

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Mol	Chain	Res	Type
1	B	163	THR
1	B	173	THR
1	B	186	CYS
1	B	255	ASP
1	B	258	ILE
1	B	290	CYS
1	B	302	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	144	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

2 ligands are 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	$\# Z > 2$
2	0TE	A	701	-	23,24,24	3.95	16 (69%)	17,36,36	2.82	9 (52%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	0TE	B	701	-	23,24,24	3.78	16 (69%)	17,36,36	2.83	9 (52%)

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	0TE	A	701	-	-	0/6/35/35	0/4/4/4
2	0TE	B	701	-	-	0/6/35/35	0/4/4/4

All (32) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	0TE	C12-N4	-2.91	1.24	1.29
2	B	701	0TE	C12-N4	-2.05	1.25	1.29
2	B	701	0TE	C11-N2	2.05	1.39	1.34
2	B	701	0TE	C1-C2	2.07	1.43	1.38
2	A	701	0TE	C10-C11	2.19	1.44	1.37
2	B	701	0TE	C10-C11	2.25	1.44	1.37
2	A	701	0TE	C11-N2	2.31	1.39	1.34
2	A	701	0TE	CU1-N1	2.37	2.10	2.02
2	A	701	0TE	C6-N3	2.37	1.39	1.35
2	A	701	0TE	C1-N1	2.70	1.40	1.34
2	B	701	0TE	C1-N1	2.76	1.40	1.34
2	B	701	0TE	CU1-N1	2.83	2.11	2.02
2	A	701	0TE	C4-C5	2.87	1.43	1.39
2	B	701	0TE	C4-C5	3.20	1.44	1.39
2	B	701	0TE	C5-N1	3.22	1.41	1.36
2	A	701	0TE	C3-C4	3.32	1.45	1.38
2	A	701	0TE	C8-C7	3.43	1.45	1.39
2	B	701	0TE	C8-C7	3.49	1.45	1.39
2	B	701	0TE	C3-C4	3.56	1.45	1.38
2	A	701	0TE	C12-S2	4.11	1.83	1.75
2	B	701	0TE	C12-S2	4.21	1.83	1.75
2	B	701	0TE	CU1-CL1	4.26	2.31	2.23
2	A	701	0TE	C5-N1	4.32	1.42	1.36
2	B	701	0TE	C7-N2	4.56	1.42	1.34
2	A	701	0TE	C7-N2	4.78	1.42	1.34
2	A	701	0TE	CU1-CL1	4.91	2.32	2.23
2	B	701	0TE	C7-C6	5.96	1.53	1.48
2	B	701	0TE	N3-N4	6.76	1.46	1.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	0TE	N3-N4	7.06	1.47	1.36
2	A	701	0TE	C7-C6	7.88	1.54	1.48
2	A	701	0TE	C5-C6	9.10	1.51	1.39
2	B	701	0TE	C5-C6	9.87	1.52	1.39

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	701	0TE	C4-C5-N1	-4.68	115.29	121.18
2	B	701	0TE	C9-C8-C7	-3.95	113.78	118.64
2	B	701	0TE	C4-C5-N1	-3.69	116.53	121.18
2	B	701	0TE	C2-C1-N1	-3.61	117.25	122.88
2	A	701	0TE	C9-C8-C7	-3.51	114.32	118.64
2	A	701	0TE	C2-C1-N1	-2.67	118.71	122.88
2	A	701	0TE	C10-C11-N2	-2.39	119.49	123.43
2	B	701	0TE	C10-C11-N2	-2.26	119.71	123.43
2	A	701	0TE	C2-C3-C4	2.28	123.32	120.20
2	B	701	0TE	C2-C3-C4	2.49	123.61	120.20
2	A	701	0TE	S1-C12-S2	2.62	118.63	114.12
2	B	701	0TE	C11-N2-C7	3.13	120.99	116.92
2	B	701	0TE	S1-C12-S2	3.22	119.66	114.12
2	A	701	0TE	C11-N2-C7	3.60	121.59	116.92
2	B	701	0TE	C10-C9-C8	4.05	125.75	120.20
2	A	701	0TE	C10-C9-C8	4.17	125.92	120.20
2	A	701	0TE	C1-N1-C5	6.05	126.38	118.42
2	B	701	0TE	C1-N1-C5	6.45	126.91	118.42

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	701	0TE	5	0
2	B	701	0TE	3	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 [i](#)

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	170/247 (68%)	0.54	12 (7%) 16 12	92, 125, 161, 190	0
1	B	196/247 (79%)	0.43	4 (2%) 65 55	82, 111, 143, 168	0
All	All	366/494 (74%)	0.48	16 (4%) 34 27	82, 116, 153, 190	0

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	181	PHE	3.4
1	A	266	ASN	2.8
1	B	293	SER	2.6
1	B	220	LEU	2.5
1	A	73	ILE	2.4
1	A	119	MET	2.4
1	B	301	PHE	2.4
1	A	140	ILE	2.3
1	A	141	LEU	2.3
1	A	135	ALA	2.3
1	A	142	LEU	2.3
1	B	292	VAL	2.2
1	A	220	LEU	2.1
1	A	292	VAL	2.0
1	A	120	GLN	2.0
1	A	299	LEU	2.0

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	0TE	B	701	21/21	0.70	0.30	182,184,185,185	0
2	0TE	A	701	21/21	0.81	0.40	190,192,194,196	0

6.5 Other polymers [i](#)

There are no such residues in this entry.