Full wwPDB X-ray Structure Validation Report ⓘ

Apr 15, 2026 – 01:00 AM UTC

PDB ID	:	9PI3 / pdb_00009pi3
Title	:	Single stranded DNA-binding protein (ICP8) from Herpes simplex virus-1, apo form. Mutations: C254S, C455S, K769A, E770A
Authors	:	Erlandsen, H.; Wright, D.
Deposited on	:	2025-07-10
Resolution	:	2.75 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 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:

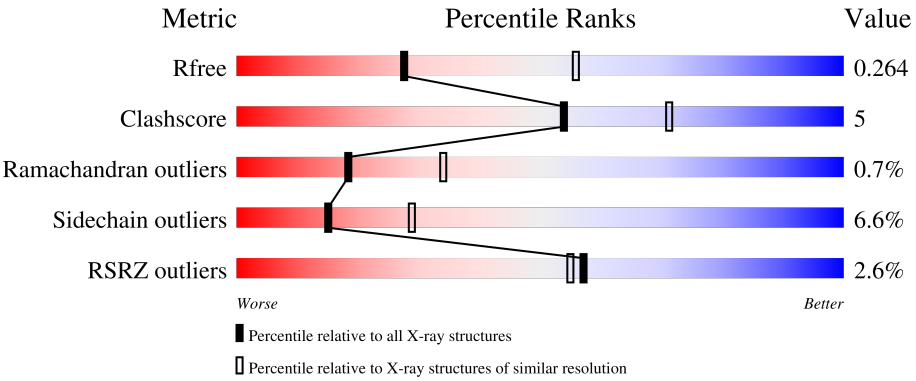
MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.75 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1009 (2.76-2.76)
Clashscore	190562	1044 (2.76-2.76)
Ramachandran outliers	187476	1024 (2.76-2.76)
Sidechain outliers	187428	1024 (2.76-2.76)
RSRZ outliers	180081	1009 (2.76-2.76)

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	1136	2% 75% 15% • 8%
1	B	1136	2% 77% 15% • 7%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 16258 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 Major DNA-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1050	Total	C	N	O	S	0	0	0
			8025	5076	1419	1484	46			
1	B	1060	Total	C	N	O	S	0	0	0
			8067	5097	1428	1495	47			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	254	SER	CYS	engineered mutation	UNP P17470
A	455	SER	CYS	engineered mutation	UNP P17470
A	769	ALA	LYS	engineered mutation	UNP P17470
A	770	ALA	GLU	engineered mutation	UNP P17470
B	254	SER	CYS	engineered mutation	UNP P17470
B	455	SER	CYS	engineered mutation	UNP P17470
B	769	ALA	LYS	engineered mutation	UNP P17470
B	770	ALA	GLU	engineered mutation	UNP P17470

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

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

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	56	Total	O	0	0
			56	56		

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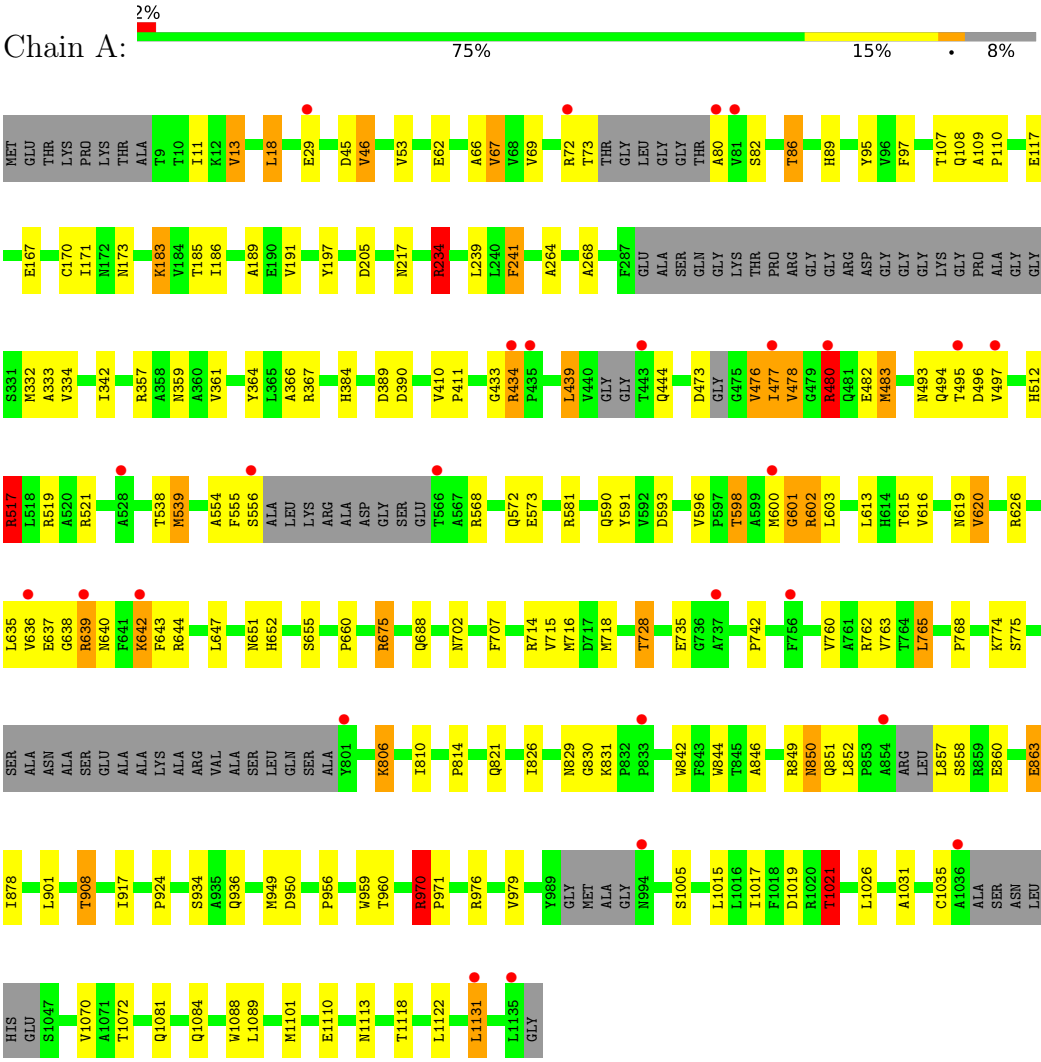
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	108	Total	O	0	0
			108	108		

3 Residue-property plots (i)

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.

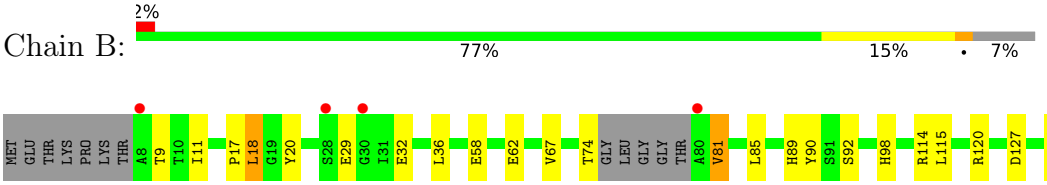
• Molecule 1: Major DNA-binding protein

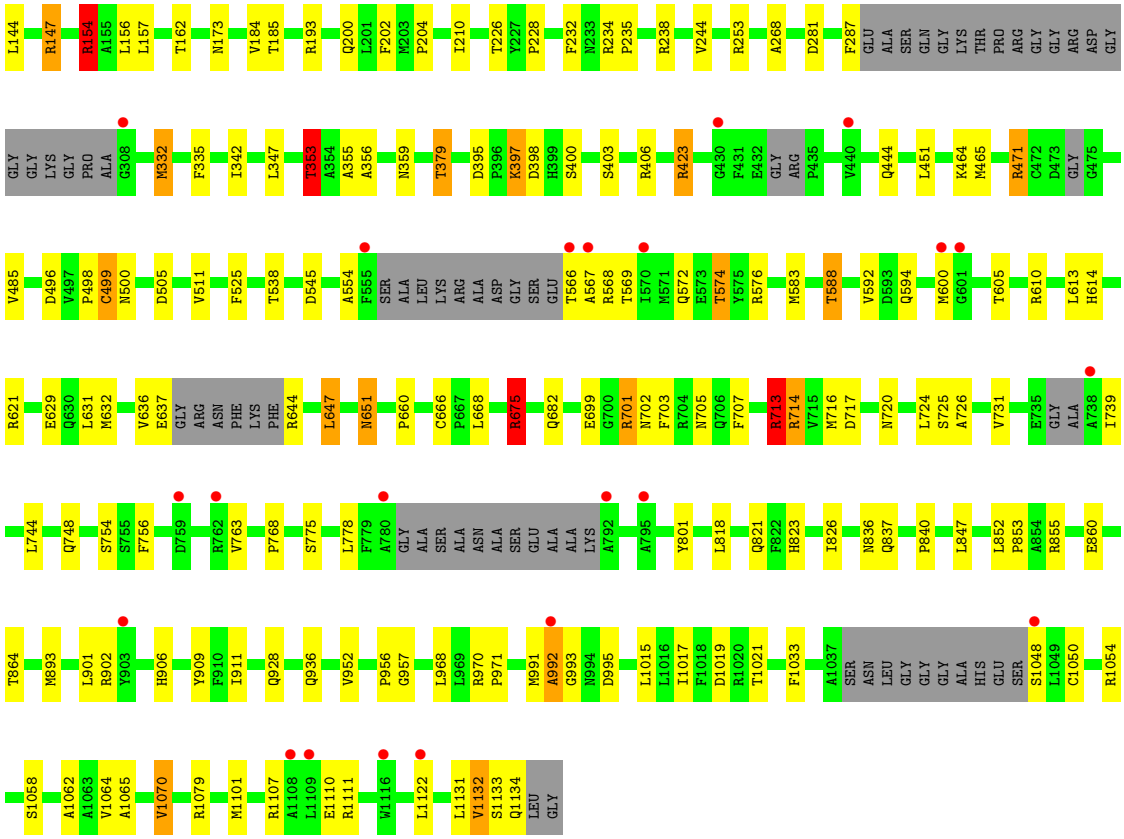
Chain A:



• Molecule 1: Major DNA-binding protein

Chain B:




L144 R147 R154 A155 L156 L157 T162 N173 V184 T185 R193 Q200 L201 F202 M203 P204 I210 T226 Y227 P228 F232 N233 R234 P235 R238 V244 R253 A268 D281 F287 GLU ALA SER GLN GLY LYS THR PRO ARG GLY GLY ARG ASP GLY
GLY GLY LYS GLY PRO ALA G308 M332 F335 I342 L347 T353 A354 A355 A356 N359 T379 D395 P396 K397 D398 H399 S400 S403 R406 R423 G430 F431 E432 GLY ARG P435 V440 Q444 L451 K464 M465 R471 C472 D473 GLY G475
V485 D496 V497 P498 C499 N500 D505 V511 F525 T538 D545 A554 F555 SER ALA LEU LYS ARG ALA ASP GLY SER GLU T566 A567 R568 T569 I570 M571 Q572 E573 T574 Y575 R576 M583 T588 V592 D593 Q594 M600 G601 T605 R610 L613 H614
R621 E629 Q630 L631 M632 V636 E637 GLY ARG ASN PHE LYS PHE R644 L647 N651 P660 C666 P667 L668 R675 Q682 E699 G700 R701 N702 F703 R704 N705 Q706 F707 R713 R714 V715 M716 D717 N720 L724 S725 A726 V731 E735 GLY ALA A738 I739
L744 Q748 S754 S755 F756 D759 R762 V763 P768 S775 L778 F779 A780 GLY ALA SER ALA ASN ALA SER GLU ALA ALA LYS A792 A795 Y801 L818 Q821 F822 H823 I826 N836 Q837 P840 L847 L852 P853 A854 R855 E860
T864 M893 L901 R902 Y903 H906 Y909 F910 I911 Q928 Q936 V952 P956 G957 L968 L969 R970 P971 M991 A992 G993 N994 D995 L1015 L1016 I1017 F1018 D1019 R1020 T1021 F1033 A1037 SER ASN LEU GLY GLY GLY ALA HIS GLU SER S1048 L1049 C1050 R1054
S1058 A1062 A1063 V1064 A1065 V1070 R1079 M1101 R1107 A1108 L1109 E1110 R1111 W1116 L1122 L1131 V1132 S1133 Q1134 LEU GLY

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	89.99Å 140.20Å 98.80Å 90.00° 111.06° 90.00°	Depositor
Resolution (Å)	92.20 – 2.75 92.20 – 2.75	Depositor EDS
% Data completeness (in resolution range)	100.0 (92.20-2.75) 100.0 (92.20-2.75)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.55 (at 2.73Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.184 , 0.263 0.189 , 0.264	Depositor DCC
R_{free} test set	2968 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	35.2	Xtriage
Anisotropy	0.057	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 31.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	16258	wwPDB-VP
Average B, all atoms (Å^2)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.91% of the height of the origin peak. No significant pseudotranslation is detected.*

[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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.58	0/8197	1.16	27/11135 (0.2%)
1	B	0.60	0/8237	1.17	31/11190 (0.3%)
All	All	0.59	0/16434	1.17	58/22325 (0.3%)

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	13
1	B	0	10
All	All	0	23

There are no bond length outliers.

All (58) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	18	LEU	N-CA-CB	-10.18	95.03	110.20
1	B	1132	VAL	N-CA-CB	-7.66	102.41	112.36
1	B	185	THR	CA-CB-OG1	-7.48	98.38	109.60
1	B	353	THR	CA-CB-OG1	-7.09	98.96	109.60
1	A	390	ASP	CA-CB-CG	6.96	119.56	112.60
1	B	821	GLN	N-CA-CB	6.82	120.25	110.16
1	B	705	ASN	CB-CA-C	-6.81	99.10	110.68
1	A	389	ASP	CA-CB-CG	6.77	119.37	112.60
1	B	423	ARG	N-CA-CB	-6.57	99.76	110.14
1	B	379	THR	CA-CB-OG1	-6.49	99.86	109.60
1	B	500	ASN	CB-CA-C	-6.48	97.28	109.72
1	B	134	ASP	CA-CB-CG	6.44	119.04	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	1084	GLN	CB-CA-C	6.39	122.25	110.24
1	A	908	THR	CA-CB-OG1	-6.29	100.17	109.60
1	A	950	ASP	CA-CB-CG	6.29	118.89	112.60
1	B	335	PHE	N-CA-CB	-6.24	101.69	111.05
1	B	142	GLU	N-CA-CB	6.05	119.12	110.16
1	A	514	THR	CA-CB-OG1	-6.05	100.53	109.60
1	B	62	GLU	CB-CA-C	5.98	119.87	110.19
1	A	95	TYR	CB-CA-C	5.96	120.06	110.16
1	B	127	ASP	CA-CB-CG	5.91	118.51	112.60
1	B	538	THR	CA-CB-OG1	-5.89	100.76	109.60
1	B	281	ASP	CA-CB-CG	5.85	118.45	112.60
1	A	1110	GLU	CB-CA-C	-5.79	101.00	110.85
1	B	154	ARG	NE-CZ-NH2	-5.76	114.01	119.20
1	B	332	MET	CG-SD-CE	-5.72	88.32	100.90
1	A	598	THR	CA-CB-OG1	-5.71	101.04	109.60
1	A	688	GLN	CB-CA-C	-5.65	100.61	110.17
1	B	335	PHE	CB-CA-C	5.64	120.84	110.24
1	A	643	PHE	CA-CB-CG	5.64	119.44	113.80
1	B	756	PHE	CA-CB-CG	5.63	119.43	113.80
1	A	620	VAL	N-CA-CB	5.59	116.71	110.51
1	B	18	LEU	N-CA-CB	-5.58	101.30	110.40
1	B	287	PHE	CA-C-O	-5.51	111.43	120.80
1	A	960	THR	CA-CB-OG1	-5.47	101.39	109.60
1	B	114	ARG	N-CA-CB	5.44	117.90	110.01
1	B	114	ARG	CB-CA-C	-5.42	102.36	110.88
1	A	707	PHE	CA-CB-CG	-5.39	108.41	113.80
1	B	226	THR	CA-CB-OG1	-5.38	101.53	109.60
1	A	217	ASN	CB-CA-C	-5.36	101.15	110.09
1	A	205	ASP	CA-CB-CG	5.32	117.92	112.60
1	A	1081	GLN	N-CA-CB	-5.31	102.09	110.06
1	A	593	ASP	CA-CB-CG	5.30	117.90	112.60
1	B	244	VAL	N-CA-CB	-5.30	107.29	111.64
1	A	1118	THR	CA-CB-OG1	-5.29	101.66	109.60
1	A	1021	THR	CA-CB-OG1	-5.27	101.69	109.60
1	B	451	LEU	N-CA-CB	5.23	117.80	110.12
1	A	539	MET	CB-CA-C	5.20	120.37	111.68
1	A	538	THR	CA-CB-OG1	-5.16	101.86	109.60
1	B	58	GLU	CB-CG-CD	5.15	121.35	112.60
1	B	995	ASP	CA-CB-CG	5.15	117.75	112.60
1	B	1019	ASP	CA-CB-CG	5.14	117.74	112.60
1	B	74	THR	CA-CB-OG1	-5.13	101.90	109.60
1	A	364	TYR	N-CA-C	-5.13	105.58	111.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	837	GLN	CB-CA-C	5.08	115.64	109.85
1	A	765	LEU	N-CA-CB	-5.06	103.15	110.84
1	A	493	ASN	CB-CA-C	5.04	117.76	109.90
1	A	72	ARG	CB-CA-C	-5.01	99.50	110.67

There are no chirality outliers.

All (23) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	121	ARG	Sidechain
1	A	234	ARG	Sidechain
1	A	367	ARG	Sidechain
1	A	480	ARG	Sidechain
1	A	517	ARG	Sidechain
1	A	568	ARG	Sidechain
1	A	626	ARG	Sidechain
1	A	639	ARG	Sidechain
1	A	644	ARG	Sidechain
1	A	675	ARG	Sidechain
1	A	714	ARG	Sidechain
1	A	970	ARG	Sidechain
1	A	976	ARG	Sidechain
1	B	120	ARG	Sidechain
1	B	147	ARG	Sidechain
1	B	154	ARG	Sidechain
1	B	238	ARG	Sidechain
1	B	423	ARG	Sidechain
1	B	471	ARG	Sidechain
1	B	675	ARG	Sidechain
1	B	713	ARG	Sidechain
1	B	714	ARG	Sidechain
1	B	855	ARG	Sidechain

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	8025	0	7917	85	0
1	B	8067	0	7964	75	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	56	0	0	0	0
3	B	108	0	0	0	0
All	All	16258	0	15881	155	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 5.

All (155) 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:1017:ILE:HD11	1:B:1054:ARG:HH12	1.35	0.87
1:A:970:ARG:HG3	1:A:970:ARG:HH11	1.43	0.83
1:B:11:ILE:HD11	1:B:731:VAL:HG22	1.62	0.79
1:B:545:ASP:OD1	1:B:576:ARG:NH2	2.18	0.77
1:A:11:ILE:HD12	1:A:334:VAL:HG11	1.71	0.71
1:B:353:THR:HG22	1:B:356:ALA:H	1.59	0.68
1:B:36:LEU:O	1:B:464:LYS:NZ	2.28	0.66
1:A:572:GLN:O	1:A:581:ARG:NH2	2.31	0.63
1:B:847:LEU:C	1:B:847:LEU:HD23	2.24	0.63
1:B:90:TYR:HA	1:B:162:THR:HA	1.82	0.62
1:A:829:ASN:O	1:A:831:LYS:N	2.32	0.62
1:A:517:ARG:HG2	1:A:517:ARG:HH11	1.65	0.61
1:B:234:ARG:HB3	1:B:235:PRO:HD3	1.83	0.60
1:A:476:VAL:HG21	1:B:1079:ARG:HE	1.67	0.60
1:A:1017:ILE:HD11	1:B:1054:ARG:NH1	2.14	0.59
1:B:675:ARG:HG2	1:B:675:ARG:HH11	1.68	0.59
1:A:268:ALA:HA	1:A:332:MET:HE3	1.85	0.59
1:B:485:VAL:HG22	1:B:928:GLN:HE21	1.68	0.58
1:B:471:ARG:NH1	1:B:957:GLY:O	2.37	0.58
1:A:519:ARG:HD3	1:B:588:THR:O	2.03	0.58
1:A:11:ILE:CD1	1:A:334:VAL:HG11	2.33	0.57
1:B:713:ARG:HH11	1:B:716:MET:HB2	1.69	0.57
1:A:647:LEU:HD21	1:A:901:LEU:HD23	1.86	0.57
1:B:1111:ARG:HH11	1:B:1111:ARG:HG3	1.70	0.57
1:A:53:VAL:O	1:A:342:ILE:HG22	2.05	0.56
1:B:1015:LEU:O	1:B:1017:ILE:HD12	2.06	0.56
1:A:89:HIS:CE1	1:A:660:PRO:HG3	2.41	0.55
1:B:610:ARG:NH2	1:B:860:GLU:HB3	2.21	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:253:ARG:NH2	1:B:682:GLN:OE1	2.37	0.55
1:B:554:ALA:HA	1:B:574:THR:HG22	1.87	0.55
1:A:728:THR:HA	1:A:765:LEU:O	2.06	0.55
1:A:62:GLU:HA	1:A:62:GLU:OE1	2.05	0.55
1:A:310:PHE:C	1:A:310:PHE:CD1	2.85	0.54
1:B:991:MET:O	1:B:992:ALA:C	2.50	0.54
1:A:590:GLN:HB3	1:A:602:ARG:HG3	1.88	0.54
1:A:591:TYR:O	1:A:603:LEU:HD11	2.06	0.53
1:B:614:HIS:HE1	1:B:864:THR:OG1	1.91	0.53
1:A:167:GLU:HG3	1:A:264:ALA:HB3	1.90	0.52
1:A:1031:ALA:HA	1:A:1035:CYS:O	2.10	0.52
1:B:1133:SER:O	1:B:1134:GLN:C	2.53	0.52
1:A:652:HIS:O	1:A:774:LYS:HA	2.10	0.51
1:A:45:ASP:CG	1:A:45:ASP:O	2.53	0.51
1:A:860:GLU:O	1:A:863:GLU:HB2	2.10	0.51
1:A:1070:VAL:HG22	1:A:1122:LEU:HD23	1.91	0.51
1:A:600:MET:O	1:A:601:GLY:C	2.52	0.51
1:B:359:ASN:OD1	1:B:956:PRO:HA	2.10	0.51
1:A:633:ARG:C	1:A:635:LEU:H	2.19	0.51
1:B:567:ALA:HB1	1:B:1070:VAL:HG21	1.93	0.50
1:A:934:SER:OG	1:A:936:GLN:O	2.28	0.50
1:A:613:LEU:HD13	1:A:826:ILE:HD11	1.92	0.50
1:A:357:ARG:O	1:A:361:VAL:HG23	2.12	0.50
1:A:478:VAL:HB	1:A:480:ARG:HD2	1.92	0.50
1:A:1088:TRP:CE3	1:A:1101:MET:HG3	2.46	0.50
1:B:144:LEU:HA	1:B:147:ARG:HG2	1.94	0.50
1:A:13:VAL:HG12	1:A:66:ALA:HB2	1.93	0.50
1:A:516:MET:HG2	1:A:519:ARG:NH2	2.27	0.49
1:A:970:ARG:HB3	1:A:971:PRO:HD3	1.93	0.49
1:B:89:HIS:CE1	1:B:660:PRO:HG2	2.47	0.49
1:B:173:ASN:HD21	1:B:210:ILE:H	1.61	0.49
1:B:498:PRO:O	1:B:499:CYS:HB2	2.11	0.49
1:B:778:LEU:HD22	1:B:911:ILE:HG22	1.94	0.49
1:B:610:ARG:NH1	1:B:864:THR:OG1	2.45	0.49
1:B:67:VAL:O	1:B:85:LEU:HA	2.13	0.49
1:A:138:GLU:OE1	1:A:234:ARG:NH1	2.46	0.48
1:B:651:ASN:N	1:B:651:ASN:OD1	2.45	0.48
1:A:616:VAL:O	1:A:620:VAL:HG23	2.14	0.48
1:B:347:LEU:HG	1:B:1033:PHE:O	2.12	0.48
1:A:410:VAL:HG21	1:A:439:LEU:HD21	1.96	0.48
1:B:724:LEU:HD11	1:B:768:PRO:HB3	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:228:PRO:HB3	1:B:748:GLN:HB3	1.96	0.47
1:A:46:VAL:HG22	1:A:97:PHE:HA	1.94	0.47
1:B:232:PHE:CD1	1:B:232:PHE:C	2.92	0.47
1:B:1062:ALA:HB1	1:B:1132:VAL:CG1	2.45	0.47
1:B:1062:ALA:HB1	1:B:1132:VAL:HG12	1.97	0.47
1:A:186:ILE:HD12	1:A:191:VAL:HG21	1.95	0.47
1:A:554:ALA:O	1:A:556:SER:N	2.47	0.47
1:B:703:PHE:CE1	1:B:707:PHE:CD2	3.02	0.47
1:A:46:VAL:CG1	1:A:239:LEU:HD13	2.45	0.47
1:A:636:VAL:HG23	1:A:637:GLU:HG3	1.96	0.47
1:B:464:LYS:HE2	1:B:666:CYS:SG	2.55	0.47
1:B:465:MET:HE3	1:B:668:LEU:HD11	1.96	0.46
1:A:86:THR:OG1	1:A:762:ARG:NH1	2.48	0.46
1:A:615:THR:HG22	1:A:619:ASN:ND2	2.30	0.46
1:B:403:SER:HB3	1:B:406:ARG:HB2	1.97	0.46
1:B:81:VAL:HG11	1:B:744:LEU:CD1	2.46	0.46
1:A:108:GLN:O	1:A:109:ALA:C	2.57	0.46
1:A:185:THR:HA	1:A:189:ALA:O	2.16	0.46
1:A:73:THR:HA	1:A:80:ALA:O	2.15	0.46
1:B:970:ARG:HB3	1:B:971:PRO:HD3	1.97	0.46
1:B:17:PRO:HG3	1:B:20:TYR:CZ	2.51	0.46
1:B:1111:ARG:HH11	1:B:1111:ARG:CG	2.29	0.46
1:A:89:HIS:HD2	1:A:333:ALA:O	1.99	0.45
1:A:329:ILE:CD1	1:A:716:MET:HE1	2.47	0.45
1:A:494:GLN:C	1:A:496:ASP:H	2.24	0.45
1:A:874:ASP:O	1:A:878:ILE:HG12	2.16	0.45
1:A:842:TRP:HB2	1:B:1132:VAL:HG13	1.98	0.45
1:A:494:GLN:O	1:A:496:ASP:N	2.48	0.45
1:A:806:LYS:HA	1:A:806:LYS:HE2	1.98	0.45
1:A:979:VAL:HA	1:A:1026:LEU:O	2.16	0.45
1:A:715:VAL:HA	1:A:718:MET:HE2	1.99	0.45
1:B:583:MET:SD	1:B:893:MET:HE3	2.56	0.45
1:A:13:VAL:CG1	1:A:66:ALA:HB2	2.47	0.45
1:B:701:ARG:HG2	1:B:701:ARG:HH11	1.82	0.45
1:A:330:VAL:HG22	1:A:768:PRO:HG2	1.97	0.45
1:A:170:CYS:SG	1:A:241:PHE:CD1	3.10	0.45
1:A:183:LYS:HE3	1:A:183:LYS:HB2	1.46	0.45
1:A:483:MET:HE3	1:A:483:MET:HB2	1.79	0.44
1:B:647:LEU:HD21	1:B:901:LEU:HD23	1.99	0.44
1:A:849:ARG:O	1:A:850:ASN:C	2.60	0.44
1:A:1072:THR:HG21	1:A:1088:TRP:CH2	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:115:LEU:HD22	1:B:511:VAL:HG11	1.99	0.44
1:A:46:VAL:HG13	1:A:239:LEU:HD13	2.00	0.44
1:A:639:ARG:O	1:A:640:ASN:C	2.61	0.44
1:B:823:HIS:HB2	1:B:840:PRO:HB3	1.99	0.43
1:B:398:ASP:C	1:B:400:SER:H	2.27	0.43
1:A:1019:ASP:OD1	1:A:1021:THR:HG22	2.19	0.43
1:B:583:MET:HB3	1:B:594:GLN:HG2	1.99	0.43
1:B:1107:ARG:O	1:B:1110:GLU:N	2.52	0.43
1:B:720:ASN:ND2	1:B:726:ALA:H	2.16	0.43
1:A:197:TYR:CZ	1:A:742:PRO:HD3	2.54	0.43
1:B:631:LEU:HG	1:B:632:MET:HE2	2.01	0.42
1:A:917:ILE:HD12	1:A:1015:LEU:HB3	2.01	0.42
1:B:613:LEU:HD22	1:B:826:ILE:HD13	2.01	0.42
1:A:476:VAL:HG12	1:A:477:ILE:HD12	2.01	0.42
1:B:906:HIS:NE2	1:B:909:TYR:O	2.37	0.42
1:A:67:VAL:HG22	1:A:69:VAL:HG23	2.01	0.42
1:A:810:ILE:HG21	1:A:844:TRP:CE3	2.54	0.42
1:A:1088:TRP:CE2	1:A:1101:MET:HB3	2.55	0.42
1:B:610:ARG:HH21	1:B:860:GLU:HB3	1.83	0.42
1:A:366:ALA:HB2	1:A:959:TRP:HB2	2.02	0.42
1:A:924:PRO:O	1:A:949:MET:HE1	2.19	0.42
1:A:970:ARG:HG3	1:A:970:ARG:NH1	2.19	0.42
1:B:818:LEU:HD23	1:B:818:LEU:HA	1.95	0.42
1:B:713:ARG:HA	1:B:713:ARG:HD2	1.31	0.41
1:A:433:GLY:O	1:A:434:ARG:O	2.39	0.41
1:B:200:GLN:OE1	1:B:200:GLN:N	2.51	0.41
1:B:268:ALA:HA	1:B:332:MET:HE3	2.02	0.41
1:B:98:HIS:HB3	1:B:157:LEU:HB2	2.02	0.41
1:A:632:MET:HA	1:A:632:MET:HE2	2.03	0.41
1:A:1131:LEU:H	1:A:1131:LEU:HG	1.48	0.41
1:B:353:THR:HG22	1:B:355:ALA:N	2.36	0.41
1:B:852:LEU:HG	1:B:853:PRO:HD2	2.03	0.41
1:A:735:GLU:OE2	1:A:735:GLU:HA	2.20	0.41
1:B:395:ASP:C	1:B:397:LYS:H	2.29	0.41
1:A:642:LYS:HD2	1:A:642:LYS:HA	1.87	0.41
1:B:464:LYS:CE	1:B:666:CYS:SG	3.09	0.41
1:A:359:ASN:OD1	1:A:956:PRO:HA	2.21	0.41
1:A:814:PRO:HG3	1:A:875:TYR:CD1	2.56	0.41
1:A:846:ALA:HB3	1:A:852:LEU:HD13	2.03	0.41
1:B:801:TYR:CE1	1:B:1021:THR:HG22	2.56	0.41
1:B:968:LEU:HA	1:B:968:LEU:HD12	1.88	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1065:ALA:O	1:B:1101:MET:HE1	2.21	0.40
1:A:384:HIS:O	1:A:411:PRO:HA	2.21	0.40
1:B:202:PHE:CE2	1:B:744:LEU:HA	2.57	0.40
1:B:444:GLN:HE22	1:B:525:PHE:H	1.69	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	1030/1136 (91%)	983 (95%)	37 (4%)	10 (1%)	12	24
1	B	1040/1136 (92%)	984 (95%)	52 (5%)	4 (0%)	30	50
All	All	2070/2272 (91%)	1967 (95%)	89 (4%)	14 (1%)	18	34

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	555	PHE
1	A	830	GLY
1	A	434	ARG
1	A	601	GLY
1	A	444	GLN
1	B	499	CYS
1	A	634	ASN
1	A	850	ASN
1	A	908	THR
1	B	992	ALA
1	B	993	GLY
1	B	1131	LEU
1	A	29	GLU
1	A	638	GLY

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	839/885 (95%)	784 (93%)	55 (7%)	15 29
1	B	840/885 (95%)	784 (93%)	56 (7%)	15 28
All	All	1679/1770 (95%)	1568 (93%)	111 (7%)	15 29

All (111) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	VAL
1	A	18	LEU
1	A	46	VAL
1	A	67	VAL
1	A	82	SER
1	A	86	THR
1	A	107	THR
1	A	110	PRO
1	A	117	GLU
1	A	171	ILE
1	A	173	ASN
1	A	183	LYS
1	A	234	ARG
1	A	241	PHE
1	A	439	LEU
1	A	473	ASP
1	A	476	VAL
1	A	477	ILE
1	A	478	VAL
1	A	480	ARG
1	A	482	GLU
1	A	483	MET
1	A	495	THR
1	A	497	VAL
1	A	512	HIS
1	A	517	ARG
1	A	521	ARG

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Mol	Chain	Res	Type
1	A	539	MET
1	A	573	GLU
1	A	596	VAL
1	A	598	THR
1	A	602	ARG
1	A	631	LEU
1	A	633	ARG
1	A	642	LYS
1	A	651	ASN
1	A	655	SER
1	A	675	ARG
1	A	702	ASN
1	A	728	THR
1	A	760	VAL
1	A	763	VAL
1	A	775	SER
1	A	806	LYS
1	A	821	GLN
1	A	851	GLN
1	A	857	LEU
1	A	858	SER
1	A	863	GLU
1	A	970	ARG
1	A	1005	SER
1	A	1021	THR
1	A	1089	LEU
1	A	1113	ASN
1	A	1131	LEU
1	B	9	THR
1	B	18	LEU
1	B	29	GLU
1	B	32	GLU
1	B	81	VAL
1	B	92	SER
1	B	142	GLU
1	B	154	ARG
1	B	156	LEU
1	B	184	VAL
1	B	193	ARG
1	B	204	PRO
1	B	342	ILE
1	B	353	THR

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Mol	Chain	Res	Type
1	B	379	THR
1	B	397	LYS
1	B	496	ASP
1	B	505	ASP
1	B	566	THR
1	B	568	ARG
1	B	569	THR
1	B	572	GLN
1	B	574	THR
1	B	588	THR
1	B	592	VAL
1	B	600	MET
1	B	605	THR
1	B	621	ARG
1	B	629	GLU
1	B	636	VAL
1	B	637	GLU
1	B	644	ARG
1	B	647	LEU
1	B	651	ASN
1	B	675	ARG
1	B	699	GLU
1	B	701	ARG
1	B	702	ASN
1	B	713	ARG
1	B	714	ARG
1	B	717	ASP
1	B	725	SER
1	B	739	ILE
1	B	754	SER
1	B	763	VAL
1	B	775	SER
1	B	836	ASN
1	B	902	ARG
1	B	936	GLN
1	B	952	VAL
1	B	1048	SER
1	B	1050	CYS
1	B	1058	SER
1	B	1064	VAL
1	B	1070	VAL
1	B	1122	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	89	HIS
1	A	177	HIS
1	A	266	HIS
1	A	272	ASN
1	A	614	HIS
1	A	619	ASN
1	A	702	ASN
1	A	708	GLN
1	A	851	GLN
1	A	955	HIS
1	A	1002	ASN
1	A	1052	GLN
1	A	1081	GLN
1	A	1134	GLN
1	B	89	HIS
1	B	98	HIS
1	B	173	ASN
1	B	218	HIS
1	B	399	HIS
1	B	420	GLN
1	B	444	GLN
1	B	572	GLN
1	B	614	HIS
1	B	708	GLN
1	B	720	ASN
1	B	836	ASN
1	B	928	GLN
1	B	936	GLN
1	B	967	ASN
1	B	1002	ASN
1	B	1126	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

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, 95^{th} 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	1050/1136 (92%)	-0.06	28 (2%)	56	54	16, 36, 68, 103	0
1	B	1060/1136 (93%)	-0.19	26 (2%)	58	56	11, 30, 66, 107	0
All	All	2110/2272 (92%)	-0.12	54 (2%)	57	55	11, 33, 68, 107	0

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	555	PHE	5.2
1	B	992	ALA	5.0
1	B	792	ALA	4.1
1	A	779	PHE	3.6
1	B	566	THR	3.4
1	A	566	THR	3.3
1	A	528	ALA	3.3
1	A	801	TYR	3.3
1	A	80	ALA	3.3
1	B	308	GLY	3.2
1	A	639	ARG	3.1
1	A	833	PRO	3.0
1	A	854	ALA	3.0
1	B	795	ALA	3.0
1	A	497	VAL	2.9
1	B	601	GLY	2.9
1	B	80	ALA	2.8
1	A	737	ALA	2.8
1	B	440	VAL	2.8
1	B	567	ALA	2.8
1	A	29	GLU	2.8
1	A	1131	LEU	2.7
1	B	1108	ALA	2.6
1	B	8	ALA	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	1048	SER	2.6
1	A	495	THR	2.6
1	A	556	SER	2.6
1	A	642	LYS	2.6
1	B	30	GLY	2.5
1	A	756	PHE	2.5
1	A	81	VAL	2.5
1	B	600	MET	2.5
1	B	28	SER	2.3
1	B	570	ILE	2.3
1	A	1036	ALA	2.3
1	A	1135	LEU	2.3
1	B	903	TYR	2.3
1	A	480	ARG	2.3
1	B	1116	TRP	2.3
1	A	600	MET	2.2
1	A	72	ARG	2.2
1	B	738	ALA	2.2
1	A	443	THR	2.2
1	B	430	GLY	2.2
1	B	759	ASP	2.2
1	B	1122	LEU	2.2
1	A	477	ILE	2.2
1	B	780	ALA	2.2
1	B	762	ARG	2.1
1	B	1109	LEU	2.1
1	A	435	PRO	2.0
1	A	994	ASN	2.0
1	A	434	ARG	2.0
1	A	636	VAL	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 oligosaccharides in this entry.

6.4 Ligands (i)

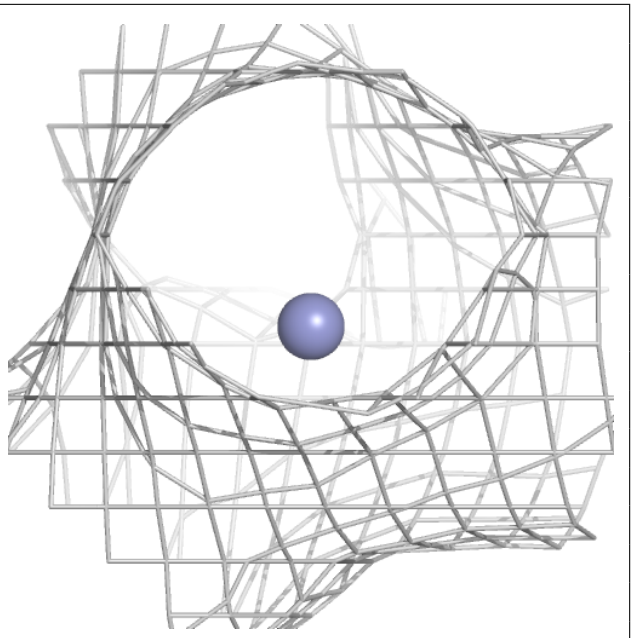
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

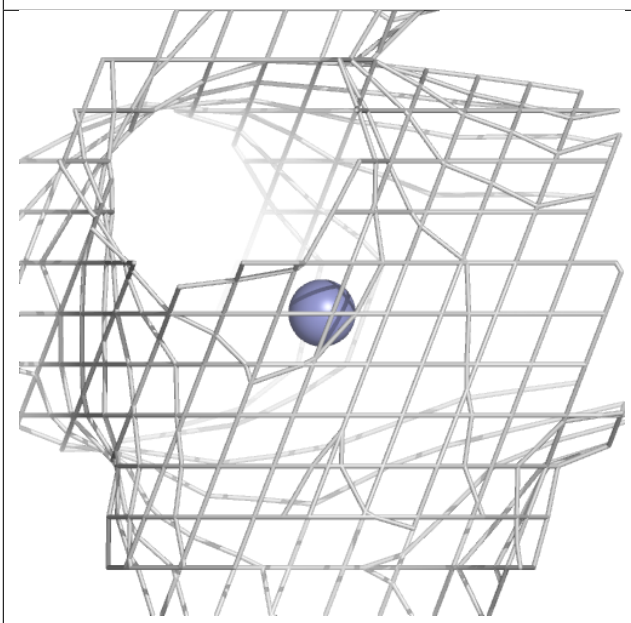
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	ZN	A	1201	1/1	0.99	0.03	40,40,40,40	0
2	ZN	B	1201	1/1	0.99	0.02	27,27,27,27	0

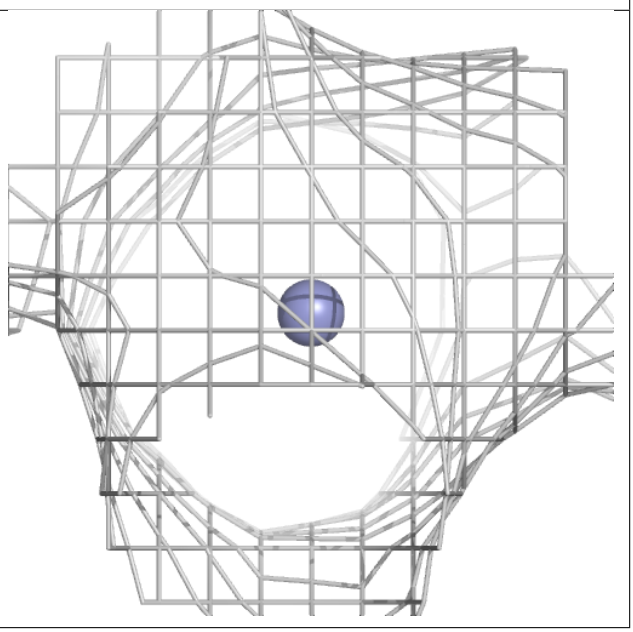
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around ZN A 1201:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

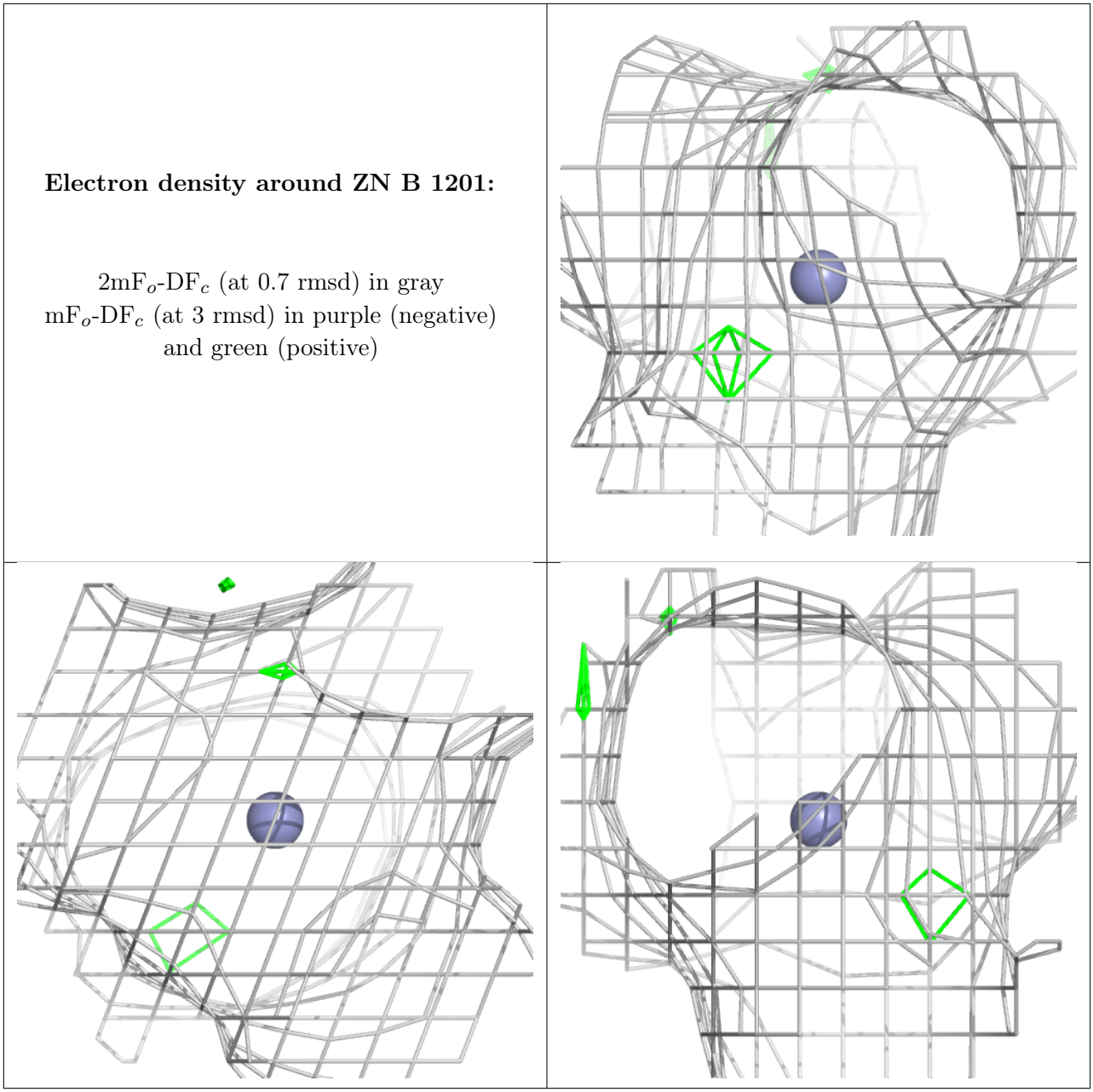






Electron density around ZN B 1201:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.