



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 13, 2026 – 01:47 pm BST

PDB ID : 9HX9 / pdb_00009hx9
Title : Structure of the SA2/SCC1/MCM3 complex
Authors : Patel, A.; Panne, D.
Deposited on : 2025-01-07
Resolution : 3.07 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	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

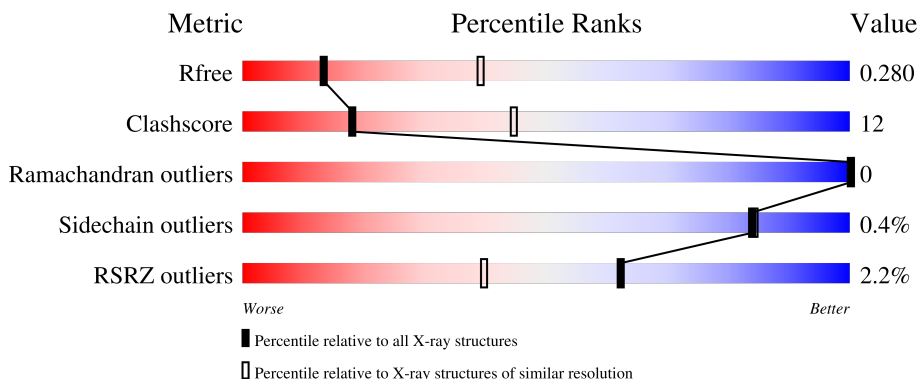
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.07 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	2010 (3.10-3.06)
Clashscore	190562	2102 (3.10-3.06)
Ramachandran outliers	187476	1982 (3.10-3.06)
Sidechain outliers	187428	1981 (3.10-3.06)
RSRZ outliers	180081	2010 (3.10-3.06)

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 $\leq 5\%$. 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	981	2% 68% 27% • 5%
2	B	140	44% 9% 47%
3	C	12	58% 33% 8%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 16614 atoms, of which 8304 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 Cohesin subunit SA-2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	935	Total	C	H	N	O	S	0	1	0
			15209	4848	7596	1268	1441	56			

- Molecule 2 is a protein called 64-kDa C-terminal product.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	74	Total	C	H	N	O	S	0	0	0
			1235	385	639	101	107	3			

- Molecule 3 is a protein called DNA replication licensing factor MCM3.

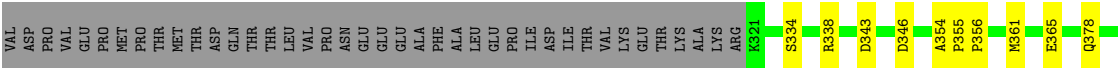
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	11	Total	C	H	N	O	0	0	0
			166	61	69	11	25			

- Molecule 4 is water.

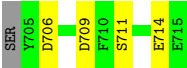
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	3	Total	O	0	0
			3	3		
4	B	1	Total	O	0	0
			1	1		

- Molecule 1: Cohesin subunit SA-2





- Molecule 3: DNA replication licensing factor MCM3



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	79.30Å 108.23Å 177.52Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	92.41 – 3.07 92.41 – 3.08	Depositor EDS
% Data completeness (in resolution range)	76.6 (92.41-3.07) 76.6 (92.41-3.08)	Depositor EDS
R_{merge}	0.22	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.98 (at 3.07Å)	Xtriage
Refinement program	PHENIX 1.21.1_5286	Depositor
R, R_{free}	0.216 , 0.281 0.216 , 0.280	Depositor DCC
R_{free} test set	1142 reflections (3.92%)	wwPDB-VP
Wilson B-factor (Å ²)	70.0	Xtriage
Anisotropy	0.021	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 67.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	16614	wwPDB-VP
Average B, all atoms (Å ²)	88.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.46% 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

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	0.83	2/7750 (0.0%)	1.16	16/10448 (0.2%)
2	B	0.82	0/606	1.17	0/818
3	C	1.11	0/100	0.88	0/136
All	All	0.83	2/8456 (0.0%)	1.16	16/11402 (0.1%)

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	4
2	B	0	2
All	All	0	6

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	225	LYS	C-N	8.34	1.44	1.33
1	A	83	MET	C-N	7.09	1.43	1.33

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	760	ARG	CG-CD-NE	7.53	128.57	112.00
1	A	227	MET	CG-SD-CE	-7.24	84.97	100.90
1	A	363	LYS	CA-C-N	7.20	131.25	120.31
1	A	363	LYS	C-N-CA	7.20	131.25	120.31
1	A	324	LEU	CD1-CG-CD2	-7.18	95.01	110.80
1	A	545	LYS	CD-CE-NZ	6.08	131.37	111.90
1	A	278	GLN	CB-CG-CD	-5.88	102.61	112.60
1	A	1029	GLN	CB-CA-C	5.72	119.86	110.88
1	A	342	GLU	CA-CB-CG	5.46	125.01	114.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	960	GLY	N-CA-C	-5.39	100.41	113.18
1	A	682	ASP	CB-CA-C	5.38	119.40	110.90
1	A	411	GLU	CB-CG-CD	5.22	121.48	112.60
1	A	394	LEU	CB-CG-CD2	-5.20	95.10	110.70
1	A	779	VAL	CG1-CB-CG2	5.11	122.05	110.80
1	A	282	GLU	CB-CG-CD	5.10	121.26	112.60
1	A	169	LYS	CA-CB-CG	5.06	124.22	114.10

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1033	ARG	Sidechain
1	A	1034	ARG	Sidechain
1	A	240	ASN	Sidechain
1	A	263	ARG	Sidechain
2	B	338	ARG	Sidechain
2	B	391	ARG	Sidechain

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	7613	7596	7595	195	1
2	B	596	639	639	9	1
3	C	97	69	69	4	0
4	A	3	0	0	0	0
4	B	1	0	0	0	0
All	All	8310	8304	8303	203	1

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 (203) 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:961:LEU:HD23	1:A:966:THR:HB	1.60	0.84
1:A:1015:LYS:HD3	1:A:1048:LEU:HD23	1.63	0.79
1:A:561:THR:HG22	1:A:599:ILE:HD11	1.66	0.78
1:A:432:LEU:HD23	1:A:484:MET:HE3	1.68	0.76
1:A:756:GLU:HA	1:A:759:LEU:HD12	1.66	0.76
1:A:139:MET:HE2	1:A:143:GLU:HB3	1.68	0.75
1:A:429:GLY:HA2	1:A:484:MET:HE2	1.67	0.75
1:A:967:ARG:HG2	1:A:1011:LEU:HD21	1.70	0.74
1:A:549:THR:HB	1:A:552:GLU:H	1.52	0.74
1:A:785:GLU:O	1:A:789:THR:HG23	1.87	0.74
1:A:961:LEU:HD22	1:A:967:ARG:HG3	1.70	0.73
1:A:990:GLU:OE2	1:A:1027:THR:HG21	1.89	0.71
1:A:601:THR:HG21	1:A:645:THR:OG1	1.90	0.71
1:A:961:LEU:HD13	1:A:1011:LEU:HD23	1.74	0.69
1:A:620:VAL:HG11	1:A:657:LEU:HD21	1.73	0.69
1:A:571:LEU:HD13	1:A:591:LEU:HD12	1.73	0.69
1:A:961:LEU:CD1	1:A:1011:LEU:HD23	2.25	0.66
1:A:119:ASN:HD21	1:A:131:VAL:H	1.43	0.66
1:A:312:ILE:HG12	1:A:316:MET:HE2	1.78	0.66
1:A:305:ARG:NE	1:A:338:ASP:OD1	2.27	0.66
1:A:762:LYS:HE3	1:A:766:ARG:HD2	1.76	0.66
1:A:241:MET:HE2	1:A:274:LEU:HB3	1.77	0.65
1:A:496:GLU:HG2	1:A:566:LEU:HD11	1.78	0.65
1:A:281:ILE:HD13	1:A:284:MET:CE	2.26	0.65
1:A:462:LYS:O	1:A:466:PHE:CD2	2.50	0.65
1:A:366:LEU:HD12	1:A:366:LEU:O	1.96	0.65
1:A:615:GLN:OE1	1:A:615:GLN:HA	1.98	0.63
1:A:762:LYS:HD2	1:A:813:LEU:HA	1.81	0.63
1:A:889:TYR:OH	1:A:901:LYS:HE3	1.99	0.62
1:A:1015:LYS:NZ	1:A:1047:SER:O	2.30	0.62
1:A:401:SER:HB3	1:A:403:GLU:HG2	1.82	0.62
1:A:549:THR:HG22	1:A:551:LYS:H	1.65	0.61
1:A:986:ASN:HB2	1:A:993:PRO:O	2.01	0.60
1:A:758:LEU:HD21	1:A:812:PRO:HG2	1.83	0.60
1:A:908:ARG:HG3	1:A:912:LYS:HD3	1.84	0.60
1:A:227:MET:HG2	1:A:315:TRP:CZ2	2.36	0.60
1:A:669:LEU:CD2	1:A:715:LEU:HD11	2.32	0.59
1:A:476:HIS:CE1	2:B:361:MET:HE2	2.37	0.59
1:A:993:PRO:HG2	1:A:1037:VAL:HG22	1.84	0.59
1:A:255:MET:HE1	1:A:261:ASN:OD1	2.03	0.59
1:A:224:MET:HB3	1:A:311:GLU:HG3	1.84	0.58
1:A:609:LEU:CD2	1:A:646:ILE:HD12	2.33	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:951:LEU:HD11	1:A:955:PHE:CE1	2.37	0.58
1:A:309:ILE:HG13	1:A:335:THR:HG21	1.85	0.58
1:A:961:LEU:CD2	1:A:967:ARG:HG3	2.34	0.57
1:A:432:LEU:HD23	1:A:484:MET:CE	2.35	0.57
1:A:414:TYR:OH	1:A:435:LYS:HG2	2.04	0.57
1:A:606:GLU:HB3	1:A:649:ARG:CZ	2.34	0.56
1:A:225:LYS:HA	1:A:228:THR:HG22	1.86	0.56
1:A:728:GLN:OE1	1:A:731:ILE:HD11	2.06	0.56
1:A:665:PHE:O	1:A:669:LEU:HG	2.05	0.55
1:A:750:GLU:O	1:A:753:SER:HB2	2.06	0.55
1:A:880:ASN:OD1	1:A:881:THR:N	2.39	0.55
1:A:966:THR:O	1:A:967:ARG:C	2.51	0.54
1:A:91:GLY:C	1:A:93:SER:H	2.16	0.54
1:A:513:LEU:N	1:A:513:LEU:HD12	2.23	0.53
1:A:567:PHE:HA	1:A:570:ALA:HB3	1.90	0.53
1:A:758:LEU:HD21	1:A:812:PRO:CG	2.39	0.53
1:A:926:LEU:HB3	1:A:948:ILE:HD13	1.90	0.53
1:A:539:VAL:HG13	1:A:539:VAL:O	2.09	0.53
1:A:585:VAL:HG23	1:A:586:THR:N	2.23	0.53
1:A:302:ALA:HB2	1:A:340:GLN:HG3	1.92	0.52
1:A:702:ASP:HB2	1:A:743:TRP:CZ3	2.44	0.52
1:A:496:GLU:CG	1:A:566:LEU:HD11	2.40	0.52
1:A:803:MET:SD	1:A:811:GLU:HG2	2.50	0.51
1:A:522:ILE:HD12	1:A:584:LYS:HD3	1.91	0.51
1:A:637:HIS:HD2	1:A:700:ALA:O	1.93	0.51
1:A:724:ASP:OD1	1:A:724:ASP:O	2.29	0.51
3:C:711:SER:O	3:C:714:GLU:OE2	2.29	0.51
1:A:125:SER:O	1:A:214:ALA:HB1	2.11	0.51
1:A:496:GLU:HG2	1:A:566:LEU:CD1	2.41	0.50
1:A:133:ALA:O	1:A:137:ARG:HG3	2.11	0.50
1:A:886:PHE:CE1	1:A:904:MET:HG3	2.47	0.50
1:A:622:LYS:O	1:A:622:LYS:HG3	2.09	0.50
1:A:986:ASN:O	1:A:989:GLY:N	2.43	0.50
1:A:312:ILE:HD11	1:A:328:TYR:HB3	1.94	0.50
1:A:324:LEU:HD13	1:A:360:LEU:HB3	1.94	0.50
1:A:838:ASP:O	1:A:839:ASP:C	2.53	0.50
1:A:669:LEU:HD21	1:A:715:LEU:HD11	1.94	0.50
1:A:366:LEU:HD12	1:A:366:LEU:C	2.37	0.49
1:A:494:ASP:O	1:A:497:CYS:HB3	2.12	0.49
1:A:378:MET:O	1:A:387:ALA:HA	2.12	0.49
1:A:698:HIS:CE1	1:A:703:LEU:HB2	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:714:GLU:OE1	3:C:714:GLU:HA	2.12	0.49
1:A:208:SER:HA	1:A:219:SER:OG	2.12	0.49
1:A:422:ARG:N	1:A:423:PRO:CD	2.74	0.49
1:A:748:ILE:HG13	1:A:761:LEU:HD23	1.95	0.49
1:A:220:THR:OG1	1:A:296:ARG:HG3	2.13	0.49
1:A:669:LEU:HD22	1:A:715:LEU:HD11	1.95	0.49
1:A:926:LEU:CD1	1:A:951:LEU:HD23	2.42	0.49
1:A:970:ILE:HG23	1:A:1010:LEU:HD23	1.95	0.49
1:A:99:VAL:HG21	1:A:181:VAL:HG12	1.94	0.48
1:A:228:THR:HB	1:A:315:TRP:HE1	1.77	0.48
1:A:727:GLU:HG3	1:A:728:GLN:N	2.28	0.48
1:A:135:MET:HE2	1:A:144:ILE:HG23	1.95	0.48
1:A:748:ILE:HG13	1:A:761:LEU:CD2	2.44	0.48
1:A:324:LEU:C	1:A:324:LEU:HD23	2.39	0.48
1:A:305:ARG:HH21	1:A:338:ASP:CG	2.21	0.48
1:A:609:LEU:HD21	1:A:646:ILE:HD12	1.95	0.48
1:A:248:TYR:CE2	1:A:268:LEU:HD21	2.48	0.48
1:A:355:TYR:CD1	1:A:393:LEU:HD11	2.49	0.48
1:A:953:ARG:O	1:A:956:ALA:HB3	2.14	0.48
1:A:986:ASN:ND2	1:A:993:PRO:O	2.43	0.48
1:A:167:GLN:HG2	1:A:168:TRP:N	2.28	0.48
1:A:914:GLN:O	1:A:918:THR:HG23	2.14	0.48
2:B:354:ALA:HB1	2:B:355:PRO:HD2	1.96	0.48
1:A:828:PHE:CD1	1:A:832:HIS:HD2	2.32	0.47
1:A:762:LYS:HB2	1:A:813:LEU:HD23	1.96	0.47
1:A:591:LEU:HB2	1:A:592:PRO:HD3	1.97	0.47
1:A:888:GLN:HB3	1:A:892:TYR:HD2	1.79	0.47
1:A:893:TYR:O	1:A:897:GLY:HA3	2.14	0.47
1:A:333:GLY:HA3	1:A:371:PHE:CZ	2.49	0.47
3:C:706:ASP:O	3:C:709:ASP:HB2	2.15	0.47
1:A:637:HIS:NE2	2:B:382:ASN:ND2	2.62	0.47
1:A:464:LEU:HD12	1:A:464:LEU:HA	1.63	0.47
1:A:476:HIS:CE1	2:B:361:MET:CE	2.97	0.47
1:A:466:PHE:HB3	1:A:470:GLU:OE2	2.14	0.46
1:A:975:LYS:HD3	1:A:1021:TYR:CD2	2.51	0.46
1:A:241:MET:HE1	1:A:278:GLN:OE1	2.14	0.46
1:A:617:ARG:NH1	1:A:657:LEU:HA	2.30	0.46
1:A:960:GLY:O	1:A:963:GLN:HG2	2.15	0.46
1:A:975:LYS:HD3	1:A:1021:TYR:CE2	2.50	0.46
1:A:811:GLU:N	1:A:812:PRO:HD2	2.31	0.46
1:A:601:THR:HA	1:A:606:GLU:OE2	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:849:GLU:HA	1:A:853:SER:OG	2.15	0.46
1:A:762:LYS:HB2	1:A:813:LEU:CD2	2.46	0.46
1:A:849:GLU:HG3	1:A:850:ASP:H	1.81	0.45
1:A:993:PRO:HA	1:A:1038:TRP:CZ2	2.52	0.45
1:A:637:HIS:CD2	1:A:700:ALA:O	2.69	0.45
1:A:241:MET:HE1	1:A:278:GLN:CD	2.42	0.45
1:A:692:LYS:HE3	1:A:732:HIS:CE1	2.51	0.45
1:A:1022:LEU:HD21	1:A:1041:LEU:HD11	1.99	0.44
3:C:711:SER:O	3:C:714:GLU:CD	2.60	0.44
1:A:724:ASP:O	1:A:724:ASP:CG	2.60	0.44
1:A:954:ARG:O	1:A:958:THR:HG23	2.18	0.44
1:A:394:LEU:HA	1:A:394:LEU:HD23	1.71	0.44
1:A:460:LEU:HD13	1:A:491:LEU:HD22	2.00	0.44
1:A:1015:LYS:HD3	1:A:1048:LEU:CD2	2.39	0.44
2:B:365:GLU:OE2	2:B:365:GLU:O	2.36	0.44
1:A:793:ASP:OD2	2:B:378:GLN:N	2.43	0.44
1:A:119:ASN:OD1	1:A:131:VAL:HB	2.17	0.44
1:A:191:ILE:HD13	1:A:191:ILE:HG21	1.83	0.44
1:A:492:LEU:O	1:A:498:MET:HE1	2.18	0.44
1:A:599:ILE:O	1:A:605:LEU:HD12	2.18	0.44
1:A:1026:MET:SD	1:A:1041:LEU:HD21	2.58	0.43
1:A:758:LEU:HD11	1:A:812:PRO:HG2	2.01	0.43
1:A:395:THR:O	1:A:398:LEU:HB2	2.18	0.43
1:A:709:PHE:CZ	1:A:764:GLN:HG2	2.54	0.43
1:A:217:HIS:HB2	1:A:304:ILE:HD11	2.01	0.43
1:A:384[B]:TYR:CD1	1:A:421:HIS:NE2	2.87	0.43
1:A:709:PHE:CE1	1:A:764:GLN:HG2	2.53	0.43
1:A:292:VAL:O	1:A:293:PHE:C	2.61	0.43
1:A:788:PHE:CD1	1:A:828:PHE:CD2	3.06	0.43
1:A:1026:MET:HA	1:A:1030:MET:CE	2.49	0.43
1:A:84:LEU:HD23	1:A:120:PHE:HB2	2.00	0.43
1:A:354:LEU:HB3	1:A:364:LEU:HD22	2.01	0.43
1:A:402:GLU:O	1:A:402:GLU:CD	2.62	0.43
1:A:616:ILE:HG21	1:A:636:TYR:CE2	2.54	0.43
1:A:920:ILE:HD12	1:A:920:ILE:HA	1.92	0.43
1:A:418:TYR:HE2	1:A:471:SER:HB3	1.83	0.43
1:A:560:ARG:NH2	1:A:596:ASP:HB2	2.34	0.43
1:A:207:LEU:HB3	1:A:219:SER:HB3	2.01	0.42
1:A:225:LYS:HA	1:A:228:THR:CG2	2.49	0.42
1:A:963:GLN:HG3	1:A:966:THR:OG1	2.19	0.42
1:A:201:ILE:HG12	1:A:288:ILE:HD11	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:346:ASP:OD1	2:B:346:ASP:N	2.50	0.42
1:A:1011:LEU:HD12	1:A:1014:ASP:H	1.85	0.42
1:A:372:LYS:CE	1:A:373:ASP:OD1	2.67	0.42
1:A:531:GLN:O	1:A:534:GLU:O	2.36	0.42
1:A:888:GLN:O	1:A:889:TYR:C	2.61	0.42
1:A:967:ARG:HG2	1:A:1011:LEU:CD2	2.45	0.42
1:A:99:VAL:O	1:A:103:ILE:HG13	2.19	0.42
1:A:177:GLU:O	1:A:178:PHE:C	2.61	0.42
1:A:499:ASN:HD21	1:A:503:LEU:HD12	1.84	0.42
1:A:803:MET:HA	1:A:807:ARG:HB2	2.02	0.42
1:A:893:TYR:O	1:A:897:GLY:N	2.50	0.42
1:A:418:TYR:CE2	1:A:473:LEU:HD13	2.55	0.42
1:A:999:PHE:CD2	1:A:999:PHE:O	2.73	0.42
1:A:571:LEU:HB3	1:A:572:PRO:HD3	2.01	0.42
1:A:920:ILE:HD13	1:A:973:LEU:HG	2.02	0.42
1:A:1015:LYS:CD	1:A:1048:LEU:HD23	2.44	0.42
1:A:796:MET:HE1	1:A:874:TYR:CD2	2.55	0.42
1:A:688:LEU:O	1:A:692:LYS:HG3	2.20	0.42
1:A:952:ALA:HB1	1:A:1006:PHE:CE1	2.55	0.42
1:A:978:ILE:HD11	1:A:1044:TYR:OH	2.20	0.42
1:A:585:VAL:CG2	1:A:586:THR:N	2.83	0.41
1:A:961:LEU:HD11	1:A:1011:LEU:HD23	2.01	0.41
1:A:351:LEU:HA	1:A:351:LEU:HD23	1.86	0.41
1:A:221:LEU:O	1:A:222:ALA:C	2.64	0.41
1:A:418:TYR:CE2	1:A:471:SER:HB3	2.55	0.41
1:A:493:LYS:NZ	1:A:559:ASP:OD2	2.48	0.41
1:A:762:LYS:NZ	1:A:766:ARG:HH11	2.18	0.41
1:A:557:LEU:HD12	1:A:560:ARG:NH1	2.35	0.41
1:A:979:GLU:O	1:A:983:LYS:HE2	2.19	0.41
1:A:281:ILE:HD13	1:A:284:MET:HE1	2.01	0.41
2:B:355:PRO:HA	2:B:356:PRO:HD3	1.98	0.41
1:A:476:HIS:HB2	1:A:523:GLU:OE2	2.21	0.41
1:A:91:GLY:C	1:A:93:SER:N	2.79	0.41
1:A:523:GLU:OE2	1:A:527:CYS:SG	2.79	0.40
1:A:591:LEU:N	1:A:592:PRO:CD	2.85	0.40
1:A:630:GLU:HG2	2:B:381:TRP:CH2	2.56	0.40
1:A:976:ASP:HA	1:A:979:GLU:HG2	2.03	0.40
1:A:952:ALA:HB2	1:A:1002:ILE:HG23	2.03	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:189:SER:OG	2:B:343:ASP:OD2[4_445]	2.10	0.10

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	926/981 (94%)	878 (95%)	48 (5%)	0	100	100
2	B	72/140 (51%)	72 (100%)	0	0	100	100
3	C	9/12 (75%)	8 (89%)	1 (11%)	0	100	100
All	All	1007/1133 (89%)	958 (95%)	49 (5%)	0	100	100

There are no Ramachandran outliers to report.

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	846/882 (96%)	843 (100%)	3 (0%)	84	84
2	B	69/129 (54%)	68 (99%)	1 (1%)	59	73
3	C	11/12 (92%)	11 (100%)	0	100	100
All	All	926/1023 (90%)	922 (100%)	4 (0%)	84	84

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	88	VAL
1	A	263	ARG
1	A	361	ASN
2	B	334	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	140	GLN
1	A	275	GLN
1	A	499	ASN
1	A	773	GLN

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](#)

There are no ligands in this entry.

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, 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	935/981 (95%)	0.04	22 (2%) 59 37	14, 93, 158, 216	1 (0%)
2	B	74/140 (52%)	-0.23	0 100 100	22, 60, 117, 129	0
3	C	11/12 (91%)	0.14	0 100 100	40, 70, 107, 111	0
All	All	1020/1133 (90%)	0.02	22 (2%) 62 40	14, 91, 156, 216	1 (0%)

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	357	ASN	4.6
1	A	360	LEU	3.6
1	A	715	LEU	3.4
1	A	875	THR	2.6
1	A	498	MET	2.5
1	A	945	PHE	2.5
1	A	982	PHE	2.3
1	A	80	GLU	2.3
1	A	798	PHE	2.3
1	A	93	SER	2.3
1	A	935	GLY	2.3
1	A	1028	PHE	2.3
1	A	81	ASN	2.3
1	A	800	HIS	2.2
1	A	775	TYR	2.2
1	A	1048	LEU	2.2
1	A	359	GLU	2.2
1	A	984	GLU	2.2
1	A	749	THR	2.1
1	A	597	LEU	2.1
1	A	929	GLU	2.0
1	A	931	ILE	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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.