



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 04:18 PM UTC

PDB ID : 3PSI / pdb_00003psi
Title : Crystal Structure of the Spt6 core domain from *Saccharomyces cerevisiae*,
Form Spt6(239-1451)
Authors : Close, D.; Hill, C.P.; Johnson, S.J.
Deposited on : 2010-12-01
Resolution : 3.30 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

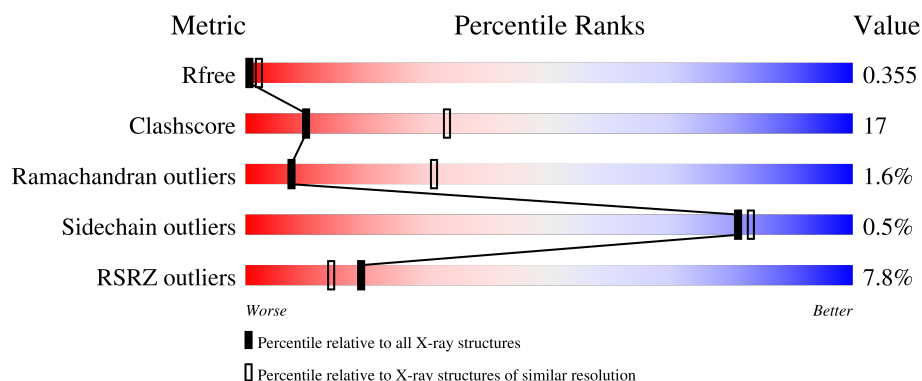
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.30 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	1169 (3.32-3.28)
Clashscore	190562	1209 (3.32-3.28)
Ramachandran outliers	187476	1188 (3.32-3.28)
Sidechain outliers	187428	1187 (3.32-3.28)
RSRZ outliers	180081	1169 (3.32-3.28)

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	1219	5% 46% 21% • 31%

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 13677 atoms, of which 6800 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 Transcription elongation factor SPT6.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	843	Total	C	H	N	O	S	0	0	0
			13677	4370	6800	1164	1326	17			

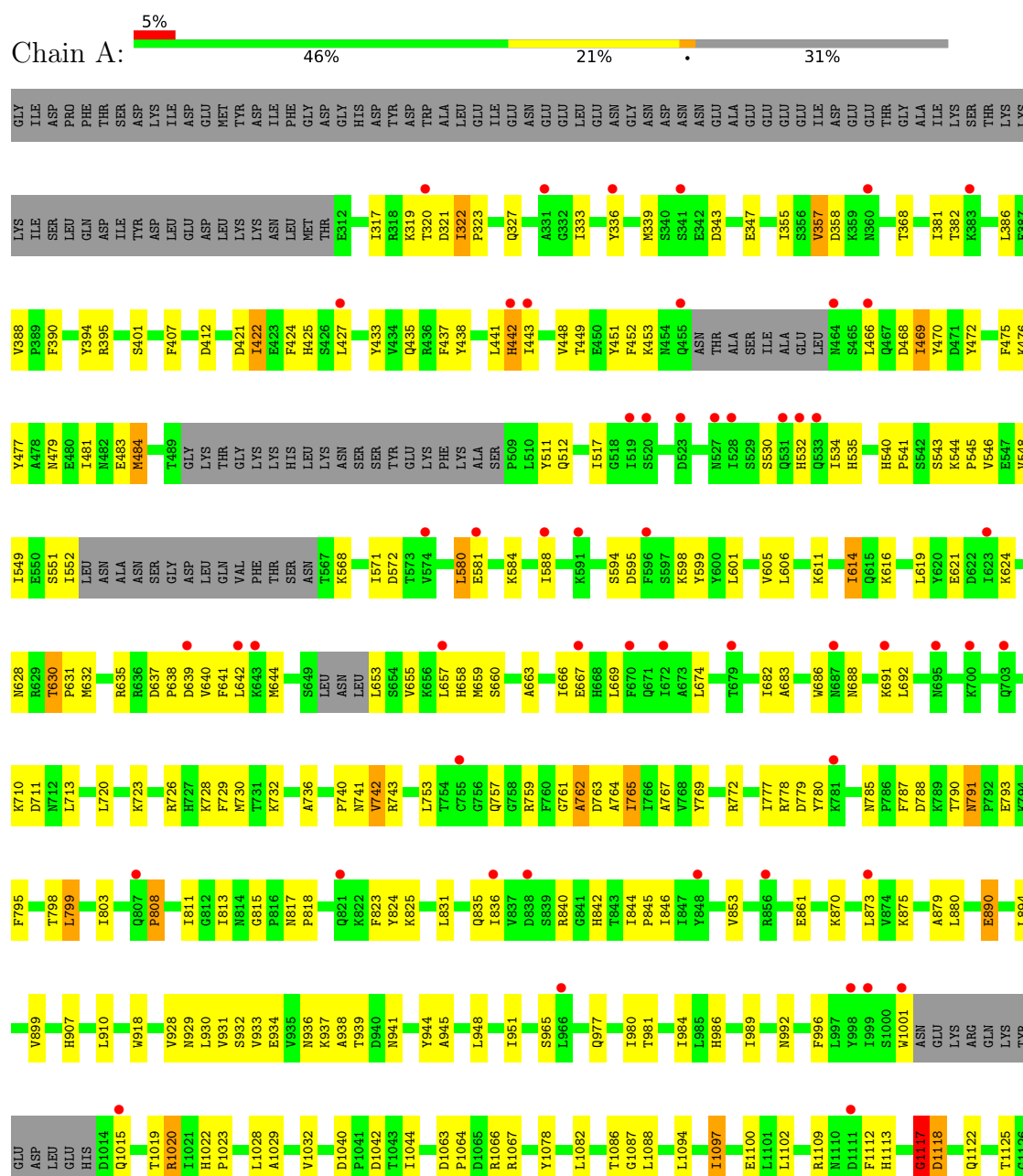
There are 6 discrepancies between the modelled and reference sequences:

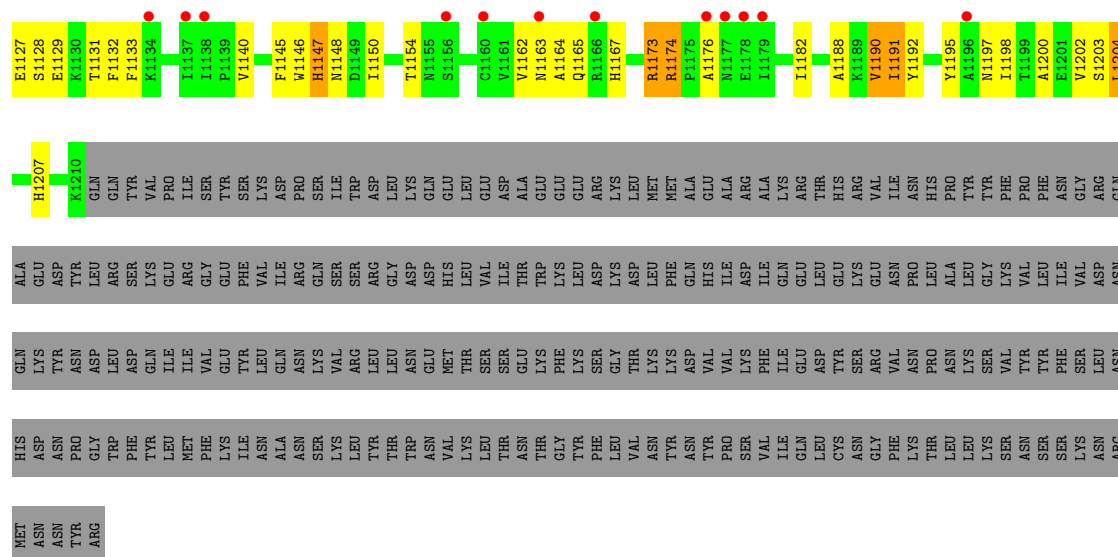
Chain	Residue	Modelled	Actual	Comment	Reference
A	233	GLY	-	expression tag	UNP P23615
A	234	ILE	-	expression tag	UNP P23615
A	235	ASP	-	expression tag	UNP P23615
A	236	PRO	-	expression tag	UNP P23615
A	237	PHE	-	expression tag	UNP P23615
A	238	THR	-	expression tag	UNP P23615

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 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: Transcription elongation factor SPT6





4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	118.75Å 118.75Å 214.41Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	45.67 – 3.30 45.67 – 3.30	Depositor EDS
% Data completeness (in resolution range)	99.4 (45.67-3.30) 99.5 (45.67-3.30)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.44 (at 3.32Å)	Xtriage
Refinement program	PHENIX 1.6.4_486	Depositor
R, R_{free}	0.265 , 0.308 0.259 , 0.355	Depositor DCC
R_{free} test set	2836 reflections (10.50%)	wwPDB-VP
Wilson B-factor (Å ²)	111.6	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 157.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.017 for -h,-k,l	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	13677	wwPDB-VP
Average B, all atoms (Å ²)	170.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.75% 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	0.79	3/7015 (0.0%)	1.14	38/9487 (0.4%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	388	VAL	CA-CB	9.95	1.59	1.54
1	A	368	THR	CA-CB	-5.39	1.45	1.53
1	A	322	ILE	CA-CB	-5.18	1.47	1.54

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	605	VAL	N-CA-C	8.14	119.60	107.80
1	A	630	THR	CA-C-N	7.64	127.68	119.28
1	A	630	THR	C-N-CA	7.64	127.68	119.28
1	A	381	ILE	N-CA-C	7.50	117.58	110.53
1	A	333	ILE	N-CA-C	7.28	117.18	106.85
1	A	355	ILE	N-CA-C	6.99	117.82	111.81
1	A	728	LYS	N-CA-C	-6.96	103.62	111.07
1	A	918	TRP	N-CA-C	6.32	117.83	111.07
1	A	484	MET	N-CA-C	-6.16	104.57	111.28
1	A	1113	HIS	CA-C-N	6.08	125.84	119.76
1	A	1113	HIS	C-N-CA	6.08	125.84	119.76
1	A	791	ASN	CA-C-N	-5.97	112.38	119.84
1	A	791	ASN	C-N-CA	-5.97	112.38	119.84
1	A	468	ASP	N-CA-C	5.93	117.41	111.07
1	A	1078	TYR	N-CA-C	5.90	117.39	111.07
1	A	1118	ASP	N-CA-C	-5.75	105.01	111.28
1	A	388	VAL	CB-CA-C	-5.74	108.25	113.70
1	A	322	ILE	CA-C-N	-5.57	114.22	119.90
1	A	322	ILE	C-N-CA	-5.57	114.22	119.90
1	A	765	ILE	N-CA-C	5.57	116.60	108.58
1	A	808	PRO	CA-C-O	-5.49	115.31	122.12

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1191	ILE	CB-CA-C	-5.49	102.29	111.29
1	A	815	GLY	CA-C-N	5.41	124.75	118.85
1	A	815	GLY	C-N-CA	5.41	124.75	118.85
1	A	825	LYS	N-CA-C	-5.38	104.65	111.11
1	A	1102	LEU	N-CA-C	-5.36	105.12	110.97
1	A	1190	VAL	CB-CA-C	-5.35	105.46	111.45
1	A	595	ASP	N-CA-C	-5.29	106.09	112.54
1	A	588	ILE	N-CA-C	5.25	115.46	110.42
1	A	1097	ILE	N-CA-C	5.19	115.41	110.42
1	A	1020	ARG	NE-CZ-NH1	-5.16	116.34	121.50
1	A	1097	ILE	CB-CA-C	-5.15	105.38	111.97
1	A	948	LEU	N-CA-C	5.13	116.87	111.28
1	A	1117	GLY	N-CA-C	5.12	125.33	113.18
1	A	655	VAL	N-CA-C	5.11	116.03	107.18
1	A	469	ILE	N-CA-CB	5.08	116.15	110.51
1	A	799	LEU	N-CA-C	-5.03	105.80	111.28
1	A	723	LYS	N-CA-C	5.02	116.44	111.07

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	6877	6800	6777	237	0
All	All	6877	6800	6777	237	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 17.

All (237) 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:980:ILE:HD12	1:A:981:THR:N	1.84	0.92
1:A:601:LEU:HD11	1:A:658:HIS:HB2	1.61	0.83

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:980:ILE:HD12	1:A:981:THR:H	1.41	0.81
1:A:653:LEU:HD12	1:A:653:LEU:C	2.07	0.79
1:A:641:PHE:CE1	1:A:713:LEU:HD23	2.21	0.75
1:A:540:HIS:CE1	1:A:543:SER:HB3	2.24	0.73
1:A:475:PHE:CE1	1:A:580:LEU:CD1	2.72	0.72
1:A:598:LYS:HG3	1:A:599:TYR:CD2	2.25	0.71
1:A:435:GLN:HB2	1:A:452:PHE:CE1	2.27	0.70
1:A:890:GLU:OE2	1:A:890:GLU:HA	1.90	0.70
1:A:1029:ALA:O	1:A:1032:VAL:HG22	1.93	0.69
1:A:1125:THR:HG22	1:A:1127:GLU:HB2	1.75	0.69
1:A:394:TYR:CE1	1:A:1022:HIS:HB2	2.28	0.69
1:A:614:ILE:HG21	1:A:624:LYS:HD2	1.75	0.68
1:A:642:LEU:HB3	1:A:910:LEU:HD13	1.74	0.68
1:A:934:GLU:HG3	1:A:937:LYS:H	1.57	0.68
1:A:1125:THR:CG2	1:A:1127:GLU:HB2	2.23	0.68
1:A:517:ILE:O	1:A:517:ILE:HG22	1.95	0.67
1:A:929:ASN:HB3	1:A:996:PHE:CE1	2.30	0.66
1:A:339:MET:HE3	1:A:343:ASP:HB3	1.78	0.65
1:A:475:PHE:HZ	1:A:581:GLU:HG2	1.62	0.65
1:A:534:ILE:HG13	1:A:535:HIS:ND1	2.12	0.64
1:A:929:ASN:HB3	1:A:996:PHE:CD1	2.33	0.64
1:A:401:SER:HB3	1:A:407:PHE:CD2	2.33	0.64
1:A:1191:ILE:HG22	1:A:1191:ILE:O	1.98	0.64
1:A:357:VAL:HG23	1:A:358:ASP:N	2.13	0.63
1:A:632:MET:HG3	1:A:635:ARG:HH21	1.64	0.63
1:A:443:ILE:HD13	1:A:477:TYR:HE2	1.62	0.63
1:A:475:PHE:CZ	1:A:581:GLU:HG2	2.32	0.63
1:A:594:SER:O	1:A:598:LYS:HG2	1.99	0.63
1:A:741:ASN:OD1	1:A:742:VAL:N	2.31	0.63
1:A:441:LEU:O	1:A:442:HIS:C	2.42	0.63
1:A:1001:TRP:CD1	1:A:1015:GLN:OE1	2.52	0.62
1:A:357:VAL:HG23	1:A:358:ASP:H	1.64	0.62
1:A:817:ASN:HB2	1:A:818:PRO:CD	2.29	0.62
1:A:441:LEU:HD11	1:A:481:ILE:HG12	1.82	0.62
1:A:791:ASN:HB3	1:A:793:GLU:OE2	2.01	0.61
1:A:1191:ILE:HD11	1:A:1203:SER:HB3	1.82	0.61
1:A:1001:TRP:NE1	1:A:1015:GLN:OE1	2.33	0.61
1:A:517:ILE:O	1:A:517:ILE:CG2	2.49	0.61
1:A:817:ASN:HB2	1:A:818:PRO:HD2	1.83	0.61
1:A:546:VAL:O	1:A:549:ILE:HB	2.00	0.61
1:A:657:LEU:N	1:A:657:LEU:HD22	2.16	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1146:TRP:O	1:A:1147:HIS:C	2.45	0.60
1:A:437:PHE:CE1	1:A:484:MET:HE1	2.36	0.60
1:A:322:ILE:HG23	1:A:323:PRO:HD2	1.84	0.60
1:A:630:THR:HB	1:A:631:PRO:HD2	1.83	0.60
1:A:1146:TRP:O	1:A:1148:ASN:N	2.35	0.59
1:A:844:ILE:HG23	1:A:845:PRO:HD2	1.84	0.59
1:A:544:LYS:HG3	1:A:546:VAL:HG12	1.85	0.59
1:A:317:ILE:HG12	1:A:327:GLN:OE1	2.03	0.59
1:A:549:ILE:HD13	1:A:571:ILE:HG22	1.85	0.59
1:A:688:ASN:HA	1:A:691:LYS:HG2	1.84	0.59
1:A:476:LYS:HG3	1:A:477:TYR:CE1	2.37	0.58
1:A:1147:HIS:O	1:A:1148:ASN:OD1	2.21	0.58
1:A:637:ASP:HB3	1:A:640:VAL:HG23	1.86	0.58
1:A:545:PRO:O	1:A:548:VAL:HG22	2.04	0.57
1:A:653:LEU:HD12	1:A:653:LEU:O	2.04	0.57
1:A:653:LEU:C	1:A:653:LEU:CD1	2.77	0.57
1:A:1145:PHE:HE1	1:A:1182:ILE:HG12	1.70	0.57
1:A:1127:GLU:HG2	1:A:1132:PHE:HB2	1.87	0.56
1:A:441:LEU:O	1:A:443:ILE:HG23	2.05	0.56
1:A:443:ILE:HD13	1:A:477:TYR:CE2	2.39	0.56
1:A:965:SER:HB3	1:A:984:ILE:HD12	1.87	0.56
1:A:469:ILE:O	1:A:472:TYR:HB3	2.06	0.55
1:A:427:LEU:C	1:A:427:LEU:HD13	2.30	0.55
1:A:437:PHE:HZ	1:A:481:ILE:HD13	1.72	0.55
1:A:931:VAL:O	1:A:932:SER:HB2	2.06	0.55
1:A:1082:LEU:O	1:A:1086:THR:HG22	2.07	0.55
1:A:873:LEU:HD12	1:A:873:LEU:H	1.72	0.55
1:A:321:ASP:OD1	1:A:986:HIS:HB2	2.07	0.54
1:A:937:LYS:HE2	1:A:944:TYR:CD1	2.41	0.54
1:A:769:TYR:HD2	1:A:777:ILE:HB	1.72	0.54
1:A:1146:TRP:C	1:A:1148:ASN:N	2.66	0.54
1:A:1066:ARG:HG3	1:A:1067:ARG:N	2.22	0.54
1:A:977:GLN:O	1:A:980:ILE:HG13	2.07	0.54
1:A:811:ILE:HB	1:A:846:ILE:HG12	1.90	0.53
1:A:933:VAL:HG23	1:A:951:ILE:HD11	1.90	0.53
1:A:1145:PHE:CE1	1:A:1182:ILE:HG12	2.44	0.53
1:A:475:PHE:HE1	1:A:580:LEU:HD12	1.74	0.53
1:A:321:ASP:CG	1:A:986:HIS:HB2	2.34	0.53
1:A:475:PHE:CE1	1:A:580:LEU:HD12	2.44	0.53
1:A:614:ILE:HG22	1:A:616:LYS:H	1.74	0.52
1:A:640:VAL:HG12	1:A:644:MET:HE3	1.92	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1146:TRP:CD1	1:A:1147:HIS:N	2.78	0.52
1:A:1128:SER:HB2	1:A:1131:THR:OG1	2.08	0.52
1:A:606:LEU:HD13	1:A:611:LYS:HG2	1.90	0.52
1:A:1028:LEU:HD21	1:A:1094:LEU:HD21	1.91	0.52
1:A:347:GLU:OE2	1:A:421:ASP:OD1	2.28	0.52
1:A:1173:ARG:O	1:A:1174:ARG:HB2	2.10	0.51
1:A:544:LYS:HB2	1:A:545:PRO:HD2	1.92	0.51
1:A:726:ARG:NH1	1:A:730:MET:HE1	2.26	0.51
1:A:1173:ARG:HG2	1:A:1174:ARG:H	1.75	0.51
1:A:320:THR:HB	1:A:327:GLN:HE22	1.76	0.51
1:A:347:GLU:HB2	1:A:424:PHE:CE2	2.46	0.51
1:A:873:LEU:HD12	1:A:873:LEU:N	2.25	0.51
1:A:928:VAL:HG12	1:A:951:ILE:HD13	1.93	0.51
1:A:568:LYS:HA	1:A:571:ILE:HG12	1.93	0.51
1:A:930:LEU:O	1:A:1020:ARG:NH1	2.35	0.51
1:A:394:TYR:C	1:A:395:ARG:HG2	2.35	0.50
1:A:1140:VAL:HG12	1:A:1154:THR:HG22	1.93	0.50
1:A:1191:ILE:O	1:A:1191:ILE:CG2	2.57	0.50
1:A:639:ASP:HB2	1:A:907:HIS:CE1	2.46	0.50
1:A:740:PRO:O	1:A:741:ASN:CG	2.54	0.50
1:A:980:ILE:HD12	1:A:981:THR:HG23	1.94	0.50
1:A:803:ILE:HG23	1:A:808:PRO:HD2	1.94	0.50
1:A:803:ILE:HG21	1:A:836:ILE:HD13	1.93	0.50
1:A:777:ILE:N	1:A:777:ILE:HD12	2.27	0.49
1:A:336:TYR:OH	1:A:382:THR:HG22	2.12	0.49
1:A:1197:ASN:O	1:A:1198:ILE:C	2.55	0.49
1:A:873:LEU:H	1:A:873:LEU:CD1	2.26	0.49
1:A:729:PHE:O	1:A:732:LYS:HB2	2.12	0.49
1:A:741:ASN:O	1:A:742:VAL:HB	2.13	0.49
1:A:743:ARG:HB2	1:A:840:ARG:HH22	1.78	0.49
1:A:401:SER:HB3	1:A:407:PHE:CE2	2.48	0.48
1:A:1022:HIS:CG	1:A:1023:PRO:HD2	2.49	0.48
1:A:1163:ASN:C	1:A:1165:GLN:H	2.21	0.48
1:A:598:LYS:HD3	1:A:599:TYR:HE2	1.79	0.48
1:A:640:VAL:O	1:A:644:MET:HG3	2.14	0.48
1:A:757:GLN:HB3	1:A:763:ASP:OD2	2.13	0.48
1:A:778:ARG:CG	1:A:779:ASP:N	2.76	0.48
1:A:798:THR:O	1:A:799:LEU:C	2.55	0.48
1:A:894:LEU:HB2	1:A:899:VAL:CG2	2.44	0.48
1:A:765:ILE:HD13	1:A:823:PHE:CE1	2.49	0.47
1:A:1001:TRP:CD1	1:A:1001:TRP:O	2.67	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:785:ASN:O	1:A:788:ASP:HB2	2.14	0.47
1:A:598:LYS:HD3	1:A:599:TYR:CE2	2.50	0.47
1:A:1148:ASN:HB3	1:A:1164:ALA:HB1	1.95	0.47
1:A:691:LYS:HG3	1:A:692:LEU:N	2.29	0.47
1:A:740:PRO:O	1:A:741:ASN:OD1	2.32	0.47
1:A:386:LEU:HD13	1:A:390:PHE:CE2	2.49	0.47
1:A:1190:VAL:HA	1:A:1202:VAL:HG22	1.97	0.47
1:A:1118:ASP:O	1:A:1122:GLN:HG3	2.14	0.47
1:A:1020:ARG:HB2	1:A:1100:GLU:CD	2.40	0.47
1:A:449:THR:HG22	1:A:453:LYS:HE3	1.97	0.47
1:A:1167:HIS:NE2	1:A:1176:ALA:HB2	2.29	0.47
1:A:437:PHE:CZ	1:A:481:ILE:HD13	2.49	0.47
1:A:540:HIS:HB2	1:A:686:TRP:CE2	2.50	0.47
1:A:619:LEU:N	1:A:619:LEU:HD12	2.30	0.46
1:A:769:TYR:CD2	1:A:777:ILE:HB	2.49	0.46
1:A:339:MET:CE	1:A:424:PHE:HE2	2.29	0.46
1:A:1150:ILE:HB	1:A:1162:VAL:HB	1.98	0.46
1:A:466:LEU:HD12	1:A:466:LEU:N	2.31	0.46
1:A:339:MET:HE1	1:A:424:PHE:CE2	2.51	0.46
1:A:421:ASP:O	1:A:422:ILE:C	2.56	0.46
1:A:1122:GLN:NE2	1:A:1129:GLU:HB2	2.31	0.46
1:A:1207:HIS:O	1:A:1207:HIS:CG	2.69	0.46
1:A:1088:LEU:N	1:A:1088:LEU:HD12	2.31	0.46
1:A:1022:HIS:ND1	1:A:1023:PRO:HD2	2.31	0.46
1:A:1198:ILE:O	1:A:1198:ILE:HG22	2.15	0.45
1:A:1087:GLY:C	1:A:1088:LEU:HD12	2.40	0.45
1:A:657:LEU:N	1:A:657:LEU:CD2	2.80	0.45
1:A:861:GLU:OE1	1:A:861:GLU:HA	2.16	0.45
1:A:767:ALA:HB3	1:A:780:TYR:HB2	1.99	0.45
1:A:320:THR:HB	1:A:327:GLN:NE2	2.32	0.45
1:A:778:ARG:HG3	1:A:779:ASP:H	1.82	0.45
1:A:659:MET:HG2	1:A:660:SER:N	2.32	0.44
1:A:641:PHE:O	1:A:644:MET:HB2	2.17	0.44
1:A:322:ILE:HG22	1:A:323:PRO:N	2.32	0.44
1:A:545:PRO:O	1:A:549:ILE:HG13	2.18	0.44
1:A:511:TYR:O	1:A:512:GLN:C	2.61	0.44
1:A:741:ASN:OD1	1:A:741:ASN:C	2.61	0.44
1:A:929:ASN:O	1:A:996:PHE:HD1	2.01	0.44
1:A:1125:THR:HG21	1:A:1127:GLU:HB2	1.96	0.44
1:A:469:ILE:HG13	1:A:470:TYR:N	2.33	0.44
1:A:710:LYS:O	1:A:711:ASP:C	2.59	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1094:LEU:HA	1:A:1097:ILE:HD12	2.00	0.44
1:A:319:LYS:O	1:A:320:THR:C	2.61	0.43
1:A:475:PHE:HZ	1:A:581:GLU:CG	2.28	0.43
1:A:1131:THR:O	1:A:1131:THR:HG22	2.17	0.43
1:A:630:THR:CB	1:A:631:PRO:HD2	2.46	0.43
1:A:931:VAL:HG21	1:A:1109:ARG:CZ	2.48	0.43
1:A:879:ALA:O	1:A:880:LEU:C	2.61	0.43
1:A:831:LEU:HD23	1:A:831:LEU:HA	1.72	0.43
1:A:853:VAL:HG13	1:A:894:LEU:HD21	2.01	0.43
1:A:1191:ILE:HD11	1:A:1203:SER:CB	2.47	0.43
1:A:322:ILE:C	1:A:989:ILE:HD11	2.44	0.43
1:A:323:PRO:HG3	1:A:992:ASN:ND2	2.34	0.43
1:A:552:ILE:HD12	1:A:552:ILE:C	2.43	0.43
1:A:322:ILE:O	1:A:323:PRO:C	2.59	0.43
1:A:936:ASN:O	1:A:939:THR:HG22	2.19	0.43
1:A:1040:ASP:O	1:A:1044:ILE:HG13	2.18	0.43
1:A:1086:THR:HG23	1:A:1088:LEU:H	1.82	0.43
1:A:759:ARG:C	1:A:761:GLY:H	2.27	0.43
1:A:1019:THR:HB	1:A:1100:GLU:HB3	2.00	0.43
1:A:438:TYR:CD1	1:A:448:VAL:HG11	2.54	0.42
1:A:571:ILE:HG13	1:A:572:ASP:N	2.34	0.42
1:A:759:ARG:HB3	1:A:762:ALA:HB3	2.00	0.42
1:A:941:ASN:ND2	1:A:944:TYR:HB2	2.33	0.42
1:A:412:ASP:OD1	1:A:726:ARG:NH1	2.53	0.42
1:A:1040:ASP:HB3	1:A:1042:ASP:OD1	2.20	0.42
1:A:1188:ALA:HB2	1:A:1204:LEU:HG	2.02	0.42
1:A:475:PHE:CG	1:A:584:LYS:HD2	2.54	0.42
1:A:530:SER:C	1:A:532:HIS:H	2.28	0.42
1:A:1188:ALA:HB1	1:A:1203:SER:O	2.20	0.42
1:A:336:TYR:CD1	1:A:425:HIS:CD2	3.08	0.42
1:A:545:PRO:HG3	1:A:686:TRP:CD2	2.55	0.42
1:A:601:LEU:C	1:A:601:LEU:HD12	2.45	0.42
1:A:790:THR:HA	1:A:791:ASN:HA	1.61	0.42
1:A:638:PRO:HG3	1:A:720:LEU:CD1	2.50	0.42
1:A:666:ILE:O	1:A:669:LEU:HB2	2.20	0.42
1:A:691:LYS:HG3	1:A:692:LEU:H	1.85	0.42
1:A:448:VAL:O	1:A:451:TYR:HB3	2.20	0.41
1:A:840:ARG:HD2	1:A:842:HIS:CD2	2.55	0.41
1:A:870:LYS:O	1:A:875:LYS:HE3	2.20	0.41
1:A:1118:ASP:HA	1:A:1195:TYR:CD1	2.55	0.41
1:A:772:ARG:CZ	1:A:772:ARG:HB2	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:322:ILE:CG2	1:A:323:PRO:HD2	2.50	0.41
1:A:736:ALA:O	1:A:1112:PHE:HB2	2.21	0.41
1:A:795:PHE:O	1:A:795:PHE:CG	2.73	0.41
1:A:616:LYS:O	1:A:621:GLU:OE1	2.38	0.41
1:A:1063:ASP:OD2	1:A:1064:PRO:HD2	2.20	0.41
1:A:479:ASN:O	1:A:483:GLU:HG3	2.21	0.41
1:A:663:ALA:O	1:A:667:GLU:HG3	2.21	0.41
1:A:791:ASN:HB3	1:A:793:GLU:CD	2.45	0.41
1:A:540:HIS:CE1	1:A:543:SER:H	2.38	0.41
1:A:451:TYR:CE1	1:A:469:ILE:HD13	2.55	0.41
1:A:540:HIS:ND1	1:A:541:PRO:HD2	2.35	0.41
1:A:598:LYS:HG3	1:A:599:TYR:CE2	2.55	0.41
1:A:777:ILE:N	1:A:777:ILE:CD1	2.84	0.41
1:A:938:ALA:O	1:A:945:ALA:HB2	2.20	0.41
1:A:1117:GLY:C	1:A:1195:TYR:HB3	2.46	0.41
1:A:357:VAL:CG2	1:A:358:ASP:N	2.83	0.41
1:A:598:LYS:CD	1:A:599:TYR:CE2	3.04	0.41
1:A:835:GLN:HG2	1:A:835:GLN:O	2.21	0.41
1:A:1202:VAL:HG12	1:A:1203:SER:N	2.36	0.41
1:A:813:ILE:HD11	1:A:824:TYR:HB2	2.03	0.40
1:A:1192:TYR:O	1:A:1200:ALA:HB1	2.21	0.40
1:A:339:MET:HE3	1:A:424:PHE:HE2	1.86	0.40
1:A:682:ILE:HG23	1:A:683:ALA:N	2.36	0.40
1:A:787:PHE:CD2	1:A:787:PHE:N	2.89	0.40
1:A:1133:PHE:O	1:A:1190:VAL:HG21	2.22	0.40
1:A:1163:ASN:OD1	1:A:1164:ALA:N	2.53	0.40
1:A:433:TYR:CD1	1:A:433:TYR:C	2.99	0.40
1:A:1127:GLU:HG2	1:A:1132:PHE:CB	2.50	0.40
1:A:477:TYR:N	1:A:477:TYR:CD1	2.86	0.40
1:A:753:LEU:HB2	1:A:813:ILE:HG22	2.03	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 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	831/1219 (68%)	760 (92%)	58 (7%)	13 (2%)	7	31

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1117	GLY
1	A	742	VAL
1	A	551	SER
1	A	628	ASN
1	A	762	ALA
1	A	764	ALA
1	A	1147	HIS
1	A	1173	ARG
1	A	674	LEU
1	A	442	HIS
1	A	614	ILE
1	A	357	VAL
1	A	1174	ARG

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 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	762/1108 (69%)	758 (100%)	4 (0%)	81	83

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

Mol	Chain	Res	Type
1	A	422	ILE
1	A	580	LEU
1	A	890	GLU
1	A	1204	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10)

such sidechains are listed below:

Mol	Chain	Res	Type
1	A	349	ASN
1	A	425	HIS
1	A	429	ASN
1	A	615	GLN
1	A	828	GLN
1	A	885	HIS
1	A	909	ASN
1	A	982	HIS
1	A	1074	ASN
1	A	1147	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](#)

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	843/1219 (69%)	0.60	66 (7%)	19 14	72, 150, 304, 455	0

All (66) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	691	LYS	6.3
1	A	527	ASN	4.8
1	A	1179	ILE	4.6
1	A	464	ASN	4.0
1	A	1138	ILE	3.9
1	A	1163	ASN	3.7
1	A	331	ALA	3.5
1	A	687	ASN	3.4
1	A	781	LYS	3.3
1	A	581	GLU	3.3
1	A	1196	ALA	3.3
1	A	532	HIS	3.2
1	A	1156	SER	3.1
1	A	523	ASP	3.1
1	A	966	LEU	3.1
1	A	679	THR	3.1
1	A	520	SER	3.1
1	A	873	LEU	3.0
1	A	341	SER	3.0
1	A	1178	GLU	2.9
1	A	695	ASN	2.9
1	A	443	ILE	2.9
1	A	667	GLU	2.8
1	A	672	ILE	2.7
1	A	999	ILE	2.7
1	A	639	ASP	2.7
1	A	642	LEU	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	1166	ARG	2.7
1	A	442	HIS	2.7
1	A	466	LEU	2.7
1	A	670	PHE	2.6
1	A	383	LYS	2.5
1	A	838	ASP	2.5
1	A	531	GLN	2.5
1	A	1001	TRP	2.5
1	A	700	LYS	2.5
1	A	1177	ASN	2.5
1	A	643	LYS	2.5
1	A	588	ILE	2.4
1	A	1160	CYS	2.4
1	A	856	ARG	2.4
1	A	703	GLN	2.4
1	A	755	CYS	2.4
1	A	596	PHE	2.3
1	A	360	ASN	2.3
1	A	528	ILE	2.3
1	A	519	ILE	2.2
1	A	1176	ALA	2.2
1	A	574	VAL	2.2
1	A	1015	GLN	2.2
1	A	623	ILE	2.2
1	A	591	LYS	2.2
1	A	821	GLN	2.2
1	A	1111	ASP	2.2
1	A	320	THR	2.1
1	A	455	GLN	2.1
1	A	836	ILE	2.1
1	A	807	GLN	2.1
1	A	427	LEU	2.1
1	A	998	TYR	2.1
1	A	1134	LYS	2.1
1	A	336	TYR	2.1
1	A	848	TYR	2.1
1	A	657	LEU	2.0
1	A	533	GLN	2.0
1	A	1137	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.