



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 06:22 AM UTC

PDB ID : 1WW1 / pdb_00001ww1
Title : Crystal structure of tRNase Z from *Thermotoga maritima*
Authors : Ishii, R.; Yokoyama, S.; RIKEN Structural Genomics/Proteomics Initiative (RSGI)
Deposited on : 2004-12-30
Resolution : 2.60 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

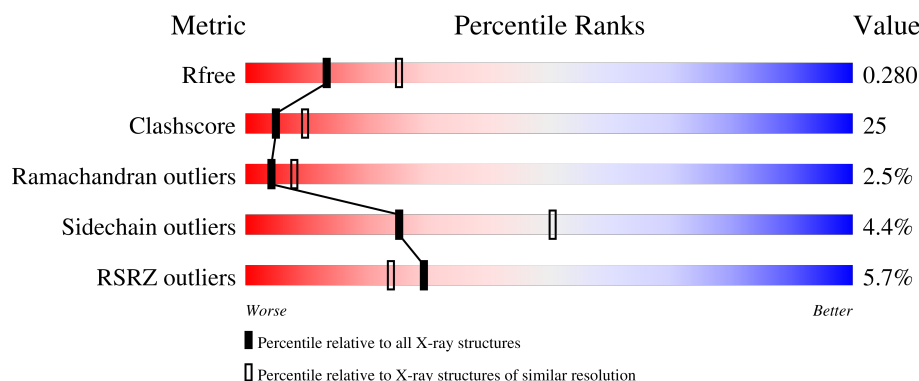
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	280	
1	B	280	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4055 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 tRNase Z.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	250	Total	C	N	O	S	0	0	0
			2054	1325	353	369	7			
1	B	238	Total	C	N	O	S	0	0	0
			1950	1260	334	349	7			

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

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	35	Total	O	0	0
			35	35		
3	B	14	Total	O	0	0
			14	14		

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	111.90Å 73.64Å 91.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.80 – 2.60 47.80 – 2.60	Depositor EDS
% Data completeness (in resolution range)	98.9 (47.80-2.60) 98.9 (47.80-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.05 (at 2.39Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.225 , 0.279 0.224 , 0.280	Depositor DCC
R_{free} test set	1442 reflections (4.82%)	wwPDB-VP
Wilson B-factor (Å ²)	54.7	Xtriage
Anisotropy	0.108	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 55.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	4055	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 30.93 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.2041e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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 [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	0.54	0/2102	1.02	10/2827 (0.4%)
1	B	0.47	0/1995	0.94	3/2684 (0.1%)
All	All	0.51	0/4097	0.99	13/5511 (0.2%)

There are no bond length outliers.

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	176	VAL	N-CA-C	-8.80	101.83	110.72
1	A	142	GLY	N-CA-C	-7.97	97.59	112.10
1	A	42	LYS	N-CA-C	-7.30	104.99	114.04
1	B	142	GLY	N-CA-C	-6.04	101.07	111.57
1	B	189	GLY	N-CA-C	-6.01	105.05	112.33
1	B	42	LYS	N-CA-C	-5.46	107.28	114.04
1	A	264	MET	CA-C-N	5.44	126.64	119.84
1	A	264	MET	C-N-CA	5.44	126.64	119.84
1	A	273	ASP	CA-C-N	5.35	126.53	119.84
1	A	273	ASP	C-N-CA	5.35	126.53	119.84
1	A	188	SER	N-CA-C	5.30	118.21	111.69
1	A	18	SER	N-CA-C	5.25	121.41	109.81
1	A	51	VAL	CB-CA-C	-5.13	105.14	111.70

There are no chirality outliers.

There are no planarity outliers.

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	2054	0	2039	101	1
1	B	1950	0	1947	106	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	35	0	0	1	0
3	B	14	0	0	1	0
All	All	4055	0	3986	200	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 25.

All (200) 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:150:ARG:HD2	1:A:177:THR:HG21	1.31	1.09
1:A:90:THR:HG21	1:A:106:VAL:HG11	1.54	0.90
1:A:232:VAL:HG13	1:A:237:VAL:CG2	2.02	0.89
1:A:232:VAL:HG13	1:A:237:VAL:HG23	1.57	0.85
1:B:192:LEU:HA	1:B:223:ALA:HB2	1.59	0.83
1:A:68:MET:HE1	1:A:73:LYS:HE2	1.61	0.81
1:B:205:LEU:HB3	1:B:240:VAL:HG12	1.61	0.81
1:B:194:LEU:HB2	1:B:199:ILE:HD11	1.62	0.81
1:A:250:ILE:HG22	1:A:251:ARG:N	1.98	0.77
1:A:44:VAL:CG1	1:A:77:VAL:HG22	2.16	0.76
1:A:250:ILE:HD11	1:A:274:PRO:HD2	1.68	0.76
1:A:175:PHE:CE1	1:A:177:THR:HA	2.21	0.75
1:A:44:VAL:HG13	1:A:77:VAL:HG22	1.69	0.74
1:A:150:ARG:HD2	1:A:177:THR:CG2	2.14	0.74
1:A:73:LYS:HD2	1:A:73:LYS:O	1.88	0.73
1:B:251:ARG:HD3	1:B:254:LYS:NZ	2.04	0.72
1:B:1:MET:HB2	1:B:19:PRO:HG3	1.71	0.71
1:B:250:ILE:HD12	1:B:275:ARG:NH1	2.06	0.71
1:B:226:ASP:O	1:B:230:GLU:HG2	1.90	0.70
1:A:90:THR:HG21	1:A:106:VAL:CG1	2.22	0.70
1:B:255:SER:HA	1:B:258:LYS:HD2	1.72	0.70
1:A:185:LEU:C	1:A:185:LEU:HD23	2.17	0.69
1:A:185:LEU:HD23	1:A:186:THR:N	2.07	0.69
1:A:83:ASN:HD22	1:A:86:VAL:H	1.39	0.69
1:A:247:THR:O	1:A:250:ILE:HG12	1.94	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:254:LYS:O	1:A:254:LYS:HD3	1.94	0.67
1:A:30:VAL:HG13	1:A:31:SER:H	1.60	0.66
1:B:151:LYS:HE3	1:B:176:VAL:HG21	1.75	0.66
1:A:229:MET:HA	1:A:229:MET:HE2	1.77	0.66
1:B:185:LEU:HD23	1:B:186:THR:N	2.11	0.66
1:A:186:THR:HB	1:A:202:THR:HG21	1.77	0.66
1:B:233:LYS:HB2	1:B:264:MET:HE3	1.78	0.65
1:A:207:HIS:HD2	1:A:208:GLU:O	1.80	0.64
1:B:125:ARG:HG3	1:B:147:GLU:HB3	1.79	0.63
1:B:70:ASP:C	1:B:72:GLU:H	2.06	0.63
1:B:254:LYS:HB3	1:B:258:LYS:HZ3	1.64	0.62
1:A:192:LEU:CD2	1:A:215:ARG:HH12	2.12	0.62
1:B:52:ASP:HA	3:B:307:HOH:O	1.98	0.61
1:B:114:ARG:NH2	1:B:126:TYR:CE2	2.68	0.61
1:A:252:GLN:O	1:A:256:VAL:HG23	2.01	0.61
1:A:48:HIS:CD2	1:A:49:GLY:H	2.19	0.60
1:A:126:TYR:HB2	1:A:146:PHE:CE1	2.37	0.60
1:B:79:TYR:CE2	1:B:106:VAL:HG22	2.36	0.60
1:B:239:LYS:HG3	1:B:268:GLU:HB3	1.84	0.59
1:B:250:ILE:HG13	1:B:251:ARG:N	2.17	0.59
1:B:251:ARG:HD3	1:B:254:LYS:HZ1	1.66	0.59
1:A:51:VAL:HG13	1:B:58:TRP:CE2	2.37	0.59
1:B:254:LYS:HB3	1:B:258:LYS:NZ	2.18	0.58
1:A:259:LYS:HG2	1:A:263:GLU:OE2	2.04	0.58
1:A:30:VAL:HG13	1:A:31:SER:N	2.19	0.58
1:B:48:HIS:CG	1:B:49:GLY:H	2.22	0.58
1:A:1:MET:HG2	3:A:325:HOH:O	2.02	0.58
1:A:90:THR:CG2	1:A:106:VAL:HG11	2.32	0.58
1:A:211:PHE:CD1	1:A:215:ARG:HG3	2.39	0.58
1:A:51:VAL:HG13	1:B:58:TRP:CD2	2.39	0.57
1:B:132:THR:HB	1:B:191:SER:HB2	1.86	0.57
1:B:194:LEU:HB2	1:B:199:ILE:CD1	2.34	0.57
1:B:15:ILE:HD12	1:B:187:ILE:HD11	1.86	0.57
1:A:28:GLU:HB2	1:B:28:GLU:HB2	1.86	0.56
1:B:245:ILE:HD13	1:B:253:LEU:CD2	2.34	0.56
1:A:251:ARG:HH11	1:A:251:ARG:HG2	1.70	0.56
1:B:69:GLY:O	1:B:72:GLU:HB2	2.06	0.56
1:B:70:ASP:C	1:B:72:GLU:N	2.64	0.56
1:A:58:TRP:CD2	1:B:51:VAL:HG13	2.40	0.56
1:A:83:ASN:ND2	1:A:86:VAL:HG23	2.20	0.55
1:A:211:PHE:O	1:A:224:ALA:HA	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:259:LYS:HE3	1:B:263:GLU:OE1	2.07	0.54
1:B:119:ASN:HD22	1:B:124:LYS:HG2	1.72	0.54
1:A:177:THR:O	1:A:178:GLU:HB3	2.07	0.54
1:B:151:LYS:HB2	1:B:151:LYS:NZ	2.23	0.54
1:B:224:ALA:O	1:B:227:GLU:HB2	2.08	0.54
1:A:211:PHE:HA	1:A:249:TYR:HE2	1.73	0.54
1:B:35:GLY:O	1:B:38:VAL:HG22	2.09	0.54
1:A:209:CYS:O	1:A:245:ILE:HD13	2.08	0.53
1:B:48:HIS:CD2	1:B:49:GLY:H	2.26	0.53
1:B:250:ILE:HD12	1:B:275:ARG:HH11	1.74	0.53
1:A:176:VAL:O	1:A:177:THR:HB	2.08	0.53
1:A:34:LEU:O	1:A:35:GLY:C	2.50	0.53
1:B:87:GLU:O	1:B:91:GLU:HG3	2.08	0.53
1:A:113:GLU:O	1:A:129:PRO:HD2	2.08	0.52
1:A:232:VAL:HG13	1:A:237:VAL:HG22	1.85	0.52
1:B:71:ARG:O	1:B:72:GLU:C	2.52	0.52
1:B:194:LEU:HG	1:B:207:HIS:HE1	1.73	0.52
1:A:177:THR:HG23	1:A:178:GLU:N	2.24	0.52
1:A:192:LEU:HA	1:A:223:ALA:HB2	1.91	0.52
1:B:209:CYS:HB2	1:B:242:LEU:HD22	1.91	0.52
1:B:259:LYS:HD2	1:B:259:LYS:C	2.35	0.52
1:A:256:VAL:O	1:A:259:LYS:HB3	2.10	0.52
1:B:17:TYR:CE2	1:B:19:PRO:HB2	2.45	0.52
1:A:97:ASN:HB2	1:A:100:LEU:HD22	1.92	0.51
1:A:229:MET:SD	1:A:264:MET:HE1	2.50	0.51
1:B:140:SER:O	1:B:141:PHE:HD2	1.93	0.51
1:A:254:LYS:HE3	1:A:258:LYS:HE2	1.93	0.51
1:A:21:ARG:HD3	1:A:40:ALA:O	2.10	0.50
1:B:126:TYR:HB2	1:B:146:PHE:CE1	2.46	0.50
1:B:256:VAL:O	1:B:260:TYR:HD1	1.95	0.50
1:A:212:LEU:CD1	1:A:249:TYR:HB3	2.41	0.50
1:A:211:PHE:HA	1:A:249:TYR:CE2	2.47	0.49
1:B:182:LYS:HE2	1:B:203:GLU:OE2	2.11	0.49
1:A:251:ARG:HG2	1:A:251:ARG:NH1	2.28	0.49
1:B:253:LEU:O	1:B:254:LYS:C	2.56	0.49
1:B:260:TYR:C	1:B:262:GLU:H	2.19	0.49
1:B:249:TYR:O	1:B:253:LEU:HB2	2.12	0.48
1:A:194:LEU:H	1:A:207:HIS:HE1	1.59	0.48
1:B:251:ARG:HD3	1:B:254:LYS:HZ3	1.77	0.48
1:A:132:THR:HB	1:A:191:SER:HB2	1.94	0.48
1:B:146:PHE:HA	1:B:182:LYS:O	2.14	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:28:GLU:CD	1:B:29:GLY:H	2.21	0.48
1:B:123:PHE:CD2	1:B:149:ARG:HG2	2.49	0.48
1:A:177:THR:O	1:A:178:GLU:CB	2.61	0.48
1:A:80:PRO:HB3	1:A:141:PHE:CE1	2.48	0.48
1:A:191:SER:OG	1:A:192:LEU:N	2.47	0.47
1:B:147:GLU:OE1	1:B:182:LYS:HD3	2.15	0.47
1:A:35:GLY:O	1:A:38:VAL:HG22	2.14	0.47
1:A:199:ILE:HD13	1:A:205:LEU:HD22	1.97	0.47
1:B:61:VAL:HG11	1:B:104:PHE:CE2	2.50	0.47
1:A:190:ASP:HA	1:A:208:GLU:OE1	2.15	0.47
1:B:83:ASN:HD22	1:B:83:ASN:N	2.12	0.47
1:B:199:ILE:HG22	1:B:199:ILE:O	2.13	0.47
1:A:226:ASP:OD2	1:A:226:ASP:N	2.41	0.46
1:B:61:VAL:HG11	1:B:104:PHE:CD2	2.51	0.46
1:A:133:LYS:HG3	1:A:192:LEU:HB2	1.96	0.46
1:B:2:ASN:HA	1:B:280:MET:O	2.14	0.46
1:B:2:ASN:HB3	1:B:18:SER:HB3	1.98	0.46
1:A:24:PHE:O	1:A:25:ASP:HB2	2.16	0.46
1:A:34:LEU:HB3	1:A:37:LYS:HB2	1.98	0.46
1:A:272:MET:HE3	1:A:278:PHE:HB3	1.97	0.46
1:B:70:ASP:O	1:B:72:GLU:N	2.49	0.46
1:B:146:PHE:C	1:B:146:PHE:CD1	2.94	0.46
1:A:11:PHE:CE2	1:B:63:ILE:HG13	2.52	0.45
1:B:23:LEU:HB3	1:B:44:VAL:HG22	1.98	0.45
1:B:185:LEU:HD23	1:B:185:LEU:C	2.41	0.45
1:A:212:LEU:HB2	1:A:249:TYR:CE1	2.51	0.45
1:A:245:ILE:HB	1:A:274:PRO:HG3	1.99	0.45
1:A:248:ARG:C	1:A:250:ILE:H	2.25	0.45
1:B:119:ASN:HD22	1:B:124:LYS:CG	2.29	0.45
1:B:264:MET:O	1:B:266:ASP:N	2.49	0.45
1:B:251:ARG:HA	1:B:254:LYS:NZ	2.32	0.45
1:B:132:THR:HB	1:B:191:SER:CB	2.47	0.45
1:B:258:LYS:O	1:B:262:GLU:HG3	2.16	0.45
1:A:79:TYR:OH	1:A:108:PRO:HG3	2.18	0.44
1:A:175:PHE:CD1	1:A:175:PHE:O	2.70	0.44
1:B:259:LYS:HD2	1:B:259:LYS:O	2.16	0.44
1:A:101:ARG:HG3	1:A:101:ARG:HH11	1.80	0.44
1:A:258:LYS:O	1:A:262:GLU:HG3	2.17	0.44
1:A:116:PHE:HB2	1:A:126:TYR:CE2	2.52	0.44
1:B:248:ARG:NH2	1:B:249:TYR:OH	2.47	0.44
1:B:254:LYS:C	1:B:258:LYS:HZ3	2.25	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:80:PRO:HB3	1:A:141:PHE:CD1	2.52	0.44
1:B:80:PRO:O	1:B:81:GLU:C	2.60	0.44
1:B:206:ILE:HG22	1:B:243:TYR:CE2	2.53	0.44
1:B:251:ARG:HA	1:B:254:LYS:HZ3	1.83	0.44
1:B:250:ILE:HG13	1:B:251:ARG:HG2	1.99	0.43
1:B:79:TYR:HE2	1:B:106:VAL:HG22	1.81	0.43
1:B:250:ILE:HG13	1:B:251:ARG:H	1.82	0.43
1:B:30:VAL:HG13	1:B:31:SER:N	2.32	0.43
1:A:49:GLY:HA3	1:A:83:ASN:HD21	1.84	0.43
1:A:84:ARG:O	1:A:88:GLU:HG3	2.19	0.43
1:A:92:PHE:CE1	1:A:96:ALA:HB2	2.54	0.43
1:A:72:GLU:O	1:A:72:GLU:HG3	2.18	0.43
1:A:20:GLU:OE1	1:A:125:ARG:HG2	2.19	0.43
1:A:257:ILE:O	1:A:258:LYS:C	2.62	0.43
1:B:241:ILE:HA	1:B:270:LEU:O	2.19	0.43
1:B:257:ILE:HD12	1:B:269:ILE:HG21	2.01	0.43
1:B:264:MET:C	1:B:266:ASP:H	2.27	0.43
1:B:273:ASP:C	1:B:275:ARG:H	2.27	0.43
1:A:58:TRP:CE2	1:B:51:VAL:HG22	2.54	0.42
1:B:144:HIS:CE1	1:B:198:GLU:O	2.72	0.42
1:A:39:TYR:OH	1:A:67:GLY:HA3	2.19	0.42
1:B:229:MET:HE1	1:B:269:ILE:HG12	2.01	0.42
1:B:230:GLU:OE2	1:B:230:GLU:HA	2.19	0.42
1:B:45:PHE:CE2	1:B:127:VAL:HG11	2.54	0.42
1:B:116:PHE:HB2	1:B:126:TYR:CE2	2.54	0.42
1:A:272:MET:HG2	1:A:278:PHE:CG	2.54	0.42
1:B:48:HIS:CG	1:B:49:GLY:N	2.87	0.42
1:B:149:ARG:HB2	1:B:180:TYR:CE2	2.55	0.42
1:A:117:LEU:HD21	1:A:127:VAL:HG23	2.02	0.42
1:B:246:SER:OG	1:B:248:ARG:HD3	2.20	0.42
1:A:110:LYS:O	1:A:113:GLU:HB3	2.20	0.42
1:A:129:PRO:HB3	1:A:143:TYR:CE2	2.55	0.42
1:A:212:LEU:HD12	1:A:249:TYR:HB3	2.00	0.42
1:B:260:TYR:C	1:B:262:GLU:N	2.78	0.42
1:B:15:ILE:HD12	1:B:187:ILE:CD1	2.50	0.41
1:B:224:ALA:H	1:B:227:GLU:CD	2.28	0.41
1:B:250:ILE:C	1:B:252:GLN:H	2.28	0.41
1:B:149:ARG:NH1	1:B:182:LYS:NZ	2.69	0.41
1:B:255:SER:O	1:B:258:LYS:HB2	2.20	0.41
1:A:212:LEU:HB2	1:A:249:TYR:CD1	2.56	0.41
1:A:215:ARG:NH1	1:A:222:HIS:O	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:206:ILE:HG22	1:A:243:TYR:CD2	2.55	0.41
1:B:233:LYS:CB	1:B:264:MET:HE3	2.49	0.41
1:B:151:LYS:C	1:B:176:VAL:HG23	2.45	0.41
1:B:207:HIS:HD2	1:B:208:GLU:O	2.03	0.41
1:A:83:ASN:O	1:A:87:GLU:HG3	2.20	0.41
1:A:215:ARG:HG2	1:A:215:ARG:HH11	1.86	0.41
1:B:228:VAL:O	1:B:232:VAL:HG23	2.21	0.40
1:A:250:ILE:CD1	1:A:274:PRO:HD2	2.46	0.40
1:A:149:ARG:O	1:A:179:GLU:HA	2.21	0.40
1:A:199:ILE:HD13	1:A:205:LEU:CD2	2.51	0.40
1:A:199:ILE:O	1:A:202:THR:OG1	2.39	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:1:MET:SD	1:A:1:MET:SD[2_655]	1.96	0.24

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	242/280 (86%)	216 (89%)	20 (8%)	6 (2%)	4	8
1	B	230/280 (82%)	204 (89%)	20 (9%)	6 (3%)	4	7
All	All	472/560 (84%)	420 (89%)	40 (8%)	12 (2%)	4	8

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	9	ALA
1	A	177	THR

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Mol	Chain	Res	Type
1	A	250	ILE
1	B	69	GLY
1	B	72	GLU
1	A	178	GLU
1	A	213	ASP
1	A	249	TYR
1	B	71	ARG
1	B	190	ASP
1	B	254	LYS
1	B	265	PRO

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	220/248 (89%)	210 (96%)	10 (4%)	24	50
1	B	209/248 (84%)	200 (96%)	9 (4%)	26	51
All	All	429/496 (86%)	410 (96%)	19 (4%)	25	50

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	44	VAL
1	A	51	VAL
1	A	73	LYS
1	A	106	VAL
1	A	194	LEU
1	A	202	THR
1	A	204	LEU
1	A	226	ASP
1	A	242	LEU
1	A	254	LYS
1	B	73	LYS
1	B	83	ASN
1	B	139	VAL

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Mol	Chain	Res	Type
1	B	151	LYS
1	B	192	LEU
1	B	204	LEU
1	B	208	GLU
1	B	225	ILE
1	B	259	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	48	HIS
1	A	83	ASN
1	A	97	ASN
1	A	107	HIS
1	A	207	HIS
1	B	48	HIS
1	B	83	ASN
1	B	107	HIS
1	B	119	ASN
1	B	128	GLN
1	B	207	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, 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	250/280 (89%)	0.17	7 (2%) 55 49	33, 58, 101, 122	0
1	B	238/280 (85%)	0.52	21 (8%) 15 12	36, 69, 126, 138	0
All	All	488/560 (87%)	0.34	28 (5%) 29 24	33, 62, 113, 138	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	176	VAL	5.0
1	B	223	ALA	4.9
1	A	175	PHE	3.9
1	B	178	GLU	3.8
1	B	126	TYR	3.6
1	B	146	PHE	3.6
1	A	176	VAL	3.5
1	A	214	ALA	3.2
1	B	210	THR	3.2
1	B	224	ALA	3.1
1	B	177	THR	2.9
1	B	71	ARG	2.8
1	A	69	GLY	2.8
1	B	209	CYS	2.8
1	B	69	GLY	2.7
1	B	81	GLU	2.6
1	A	177	THR	2.5
1	B	189	GLY	2.4
1	B	190	ASP	2.4
1	B	250	ILE	2.4
1	A	216	ASP	2.3
1	B	235	ALA	2.2
1	B	140	SER	2.2
1	B	116	PHE	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	73	LYS	2.1
1	B	72	GLU	2.1
1	B	193	ALA	2.1
1	A	210	THR	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, 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($\text{\AA}^2$)	Q<0.9
2	ZN	B	302	1/1	0.94	0.10	117,117,117,117	0
2	ZN	A	301	1/1	0.96	0.07	100,100,100,100	0

6.5 Other polymers [i](#)

There are no such residues in this entry.