



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 14, 2016 – 08:14 PM EDT

PDB ID : 5A3S
Title : Crystal structure of the (SR) Calcium ATPase E2-vanadate complex bound to thapsigargin and TNP-ATP
Authors : Clausen, J.D.; Bublitz, M.; Arnou, B.; Olesen, C.; Andersen, J.P.; Moller, J.V.; Nissen, P.
Deposited on : 2015-06-03
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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7.1 (RC1), CSD as537be (2016)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20027107
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20027107

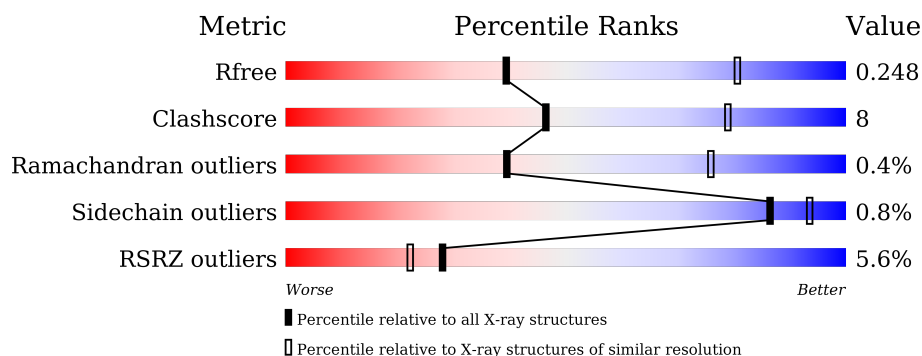
1 Overall quality at a glance

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}	91344	2060 (3.40-3.20)
Clashscore	102246	1058 (3.38-3.22)
Ramachandran outliers	100387	1038 (3.38-3.22)
Sidechain outliers	100360	1037 (3.38-3.22)
RSRZ outliers	91569	2070 (3.40-3.20)

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

Mol	Chain	Length	Quality of chain
1	A	995	
1	B	995	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	TG1	A	1000	-	-	-	X
2	TG1	B	1000	-	-	-	X
4	128	A	1002	X	-	-	-
4	128	B	1002	X	-	-	-
5	MG	A	1003	-	-	-	X

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 15554 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.

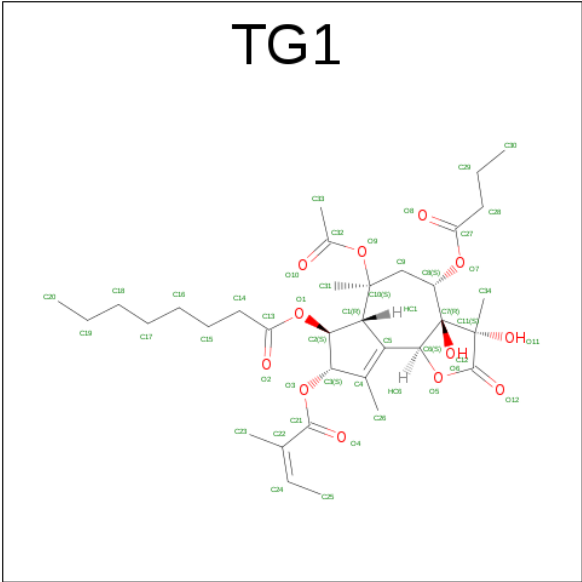
- Molecule 1 is a protein called SARCOPLASMIC RETICULUM CALCIUM ATPASE 1 MOLECULE SARCOPLASMIC/ENDOPLASMIC RETICULUM CALCIUM ATPASE 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	995	Total	C	N	O	S	0	0	0
			7672	4877	1287	1451	57			
1	B	995	Total	C	N	O	S	0	0	0
			7674	4878	1287	1452	57			

There are 2 discrepancies between the modelled and reference sequences:

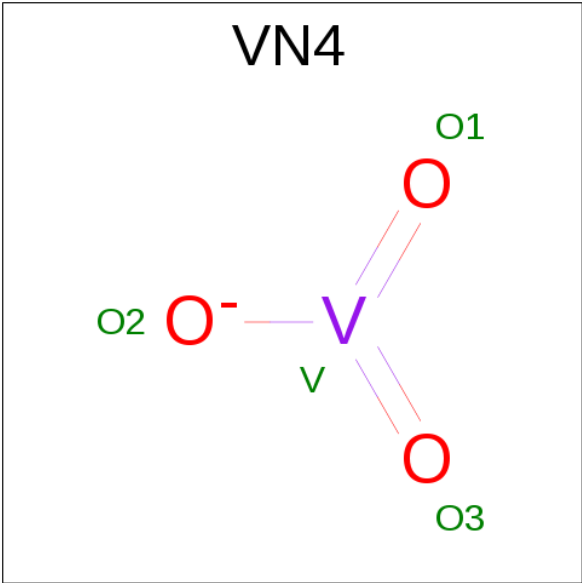
Chain	Residue	Modelled	Actual	Comment	Reference
A	0	ACE	-	ACETYLATION	UNP PO4191
B	0	ACE	-	ACETYLATION	UNP PO4191

- Molecule 2 is OCTANOIC ACID [3S-[3ALPHA, 3ABETA, 4ALPHA, 6BETA, 6ABETA, 7BETA, 8ALPHA(Z), 9BALPHA]]-6-(ACETYLOXY)-2,3,-3A,4,5,6,6A,7,8,9B-DECAHYDRO-3,3A-DIHYDROXY-3,6,9-TRIMETHYL-8-[(2-METHYL-1-OXO-2-BUTENYL)OXY]-2-OXO-4-(1-OXOBUTOXY)-AZULENO[4,5-B]FURAN-7-YL ESTER (three-letter code: TG1) (formula: C₃₄H₅₀O₁₂).



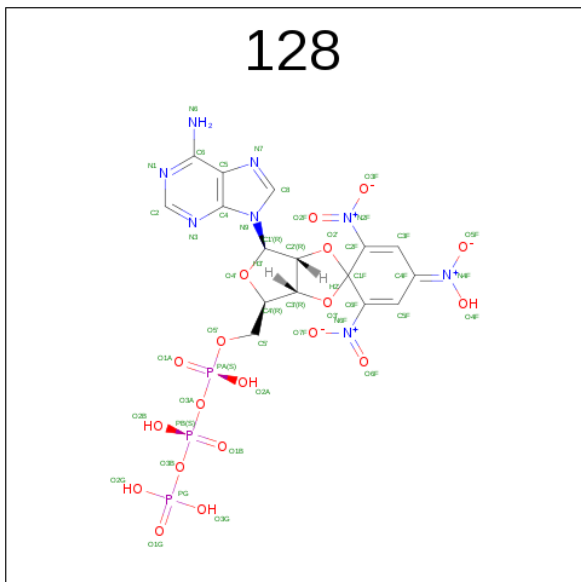
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			46	34	12		
2	B	1	Total	C	O	0	0
			46	34	12		

- Molecule 3 is OXIDO(DIOXO)VANADIUM (three-letter code: VN4) (formula: O₃V).



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

- Molecule 4 is SPIRO(2,4,6-TRINITROBENZENE[1,2A]-2O',3O'-METHYLENE-ADENIN E-TRIPHOSPHATE (three-letter code: 128) (formula: $C_{16}H_{17}N_8O_{19}P_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			46	16	8	19	3		
4	B	1	Total	C	N	O	P	0	0
			46	16	8	19	3		

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	2	Total	Mg	0	0
			2	2		
5	A	2	Total	Mg	0	0
			2	2		

- Molecule 6 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	1	Total	K	0	0
			1	1		
6	A	1	Total	K	0	0
			1	1		

- Molecule 7 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	B	1	Total 1	Cl 1	0	0
7	A	1	Total 1	Cl 1	0	0

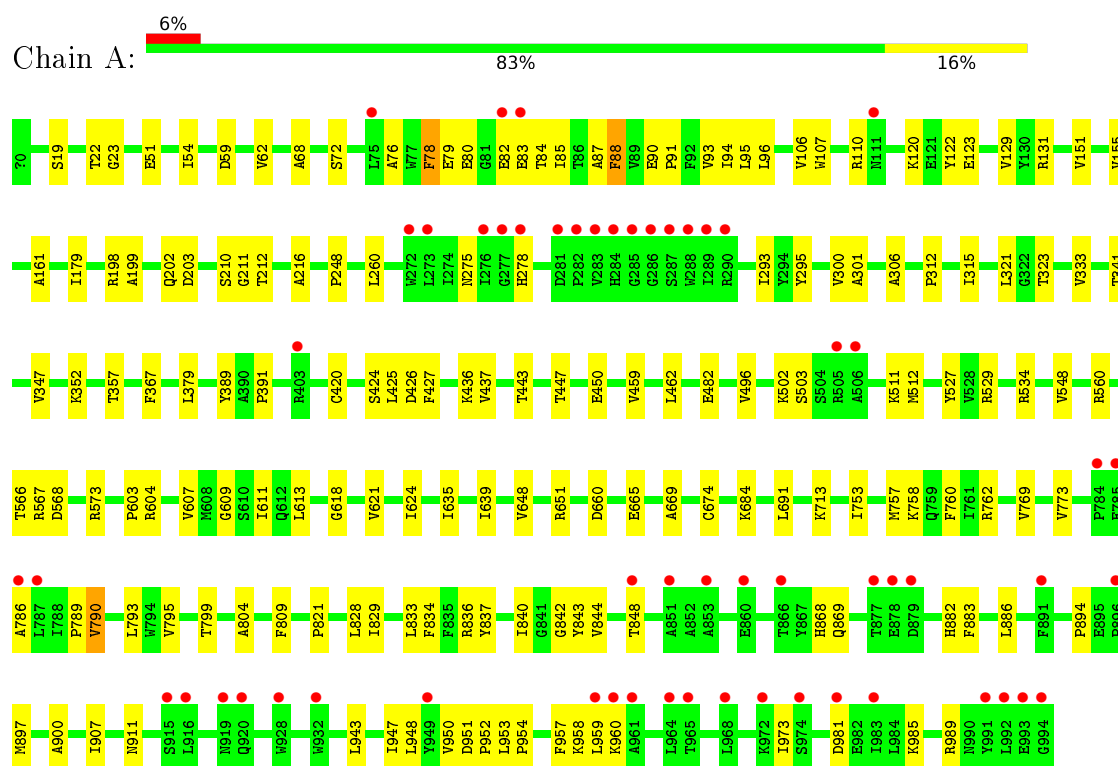
- Molecule 8 is water.

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

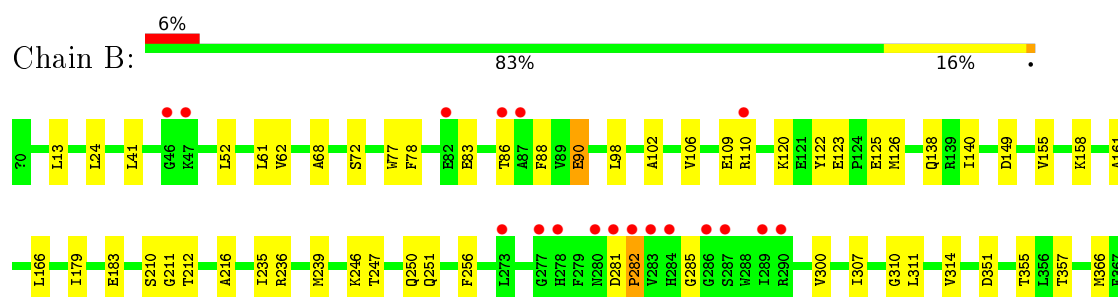
3 Residue-property plots

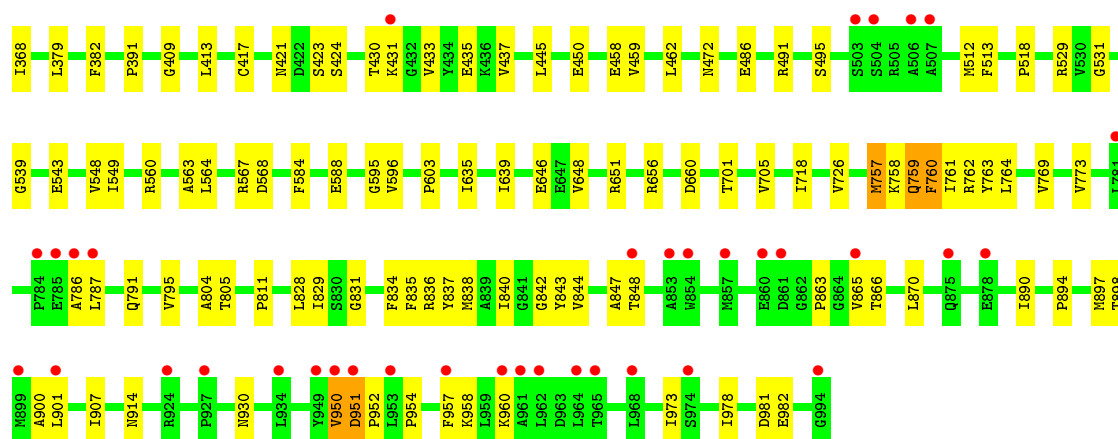
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according 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: SARCOPLASMIC RETICULUM CALCIUM ATPASE 1 MOLECULE SARCOPLASMIC/ENDOPLASMIC RETICULUM CALCIUM ATPASE 1



- Molecule 1: SARCOPLASMIC RETICULUM CALCIUM ATPASE 1 MOLECULE SARCOPLASMIC/ENDOPLASMIC RETICULUM CALCIUM ATPASE 1





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	130.56 Å 93.78 Å 135.69 Å 90.00° 107.26° 90.00°	Depositor
Resolution (Å)	78.91 – 3.30 78.90 – 3.30	Depositor EDS
% Data completeness (in resolution range)	99.8 (78.91-3.30) 99.8 (78.90-3.30)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.15 (at 3.33 Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.210 , 0.245 0.221 , 0.248	Depositor DCC
R_{free} test set	783 reflections (1.68%)	DCC
Wilson B-factor (Å ²)	97.1	Xtriage
Anisotropy	0.228	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 69.8	EDS
Estimated twinning fraction	0.015 for l,-k,h	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	0 of 47357 reflections	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	15554	wwPDB-VP
Average B, all atoms (Å ²)	135.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.57% 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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MG, TG1, ACE, CL, K, VN4, 128

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	0.26	0/7810	0.43	0/10588
1	B	0.26	0/7813	0.43	0/10594
All	All	0.26	0/15623	0.43	0/21182

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7672	0	7765	117	0
1	B	7674	0	7767	107	0
2	A	46	0	50	15	0
2	B	46	0	50	13	0
3	A	4	0	0	0	0
3	B	4	0	0	0	0
4	A	46	0	13	1	0
4	B	46	0	13	1	0
5	A	2	0	0	0	0
5	B	2	0	0	0	0
6	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	1	0	0	0	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
8	A	4	0	0	0	0
8	B	4	0	0	1	0
All	All	15554	0	15658	236	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 8.

All (236) 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:B:848:THR:HG23	1:B:900:ALA:HB1	1.58	0.86
1:A:950:VAL:HG12	1:A:952:PRO:HD2	1.60	0.83
1:A:82:GLU:CA	1:A:83:GLU:N	2.43	0.82
1:A:260:LEU:HD13	2:A:1000:TG1:H232	1.61	0.80
2:A:1000:TG1:H313	2:A:1000:TG1:H332	1.63	0.80
1:B:769:VAL:HG21	2:B:1000:TG1:H333	1.62	0.80
1:A:894:PRO:HB3	1:A:959:LEU:H	1.50	0.76
1:B:646:GLU:OE2	1:B:651:ARG:NH1	2.19	0.74
1:B:786:ALA:HA	1:B:897:MET:HA	1.70	0.73
1:A:790:VAL:HB	1:A:957:PHE:HE1	1.54	0.72
1:A:848:THR:HG23	1:A:900:ALA:HB1	1.71	0.72
1:A:947:ILE:HD13	1:A:953:LEU:HD13	1.70	0.71
1:A:829:ILE:HG21	2:A:1000:TG1:H333	1.72	0.70
1:B:811:PRO:HD3	1:B:930:ASN:HD21	1.57	0.69
1:A:23:GLY:HA3	1:A:131:ARG:HA	1.74	0.69
1:A:85:ILE:O	1:A:88:PHE:HB3	1.91	0.69
1:A:829:ILE:HA	1:A:833:LEU:HD23	1.75	0.68
1:A:773:VAL:HG22	2:A:1000:TG1:H202	1.76	0.66
1:A:773:VAL:HG11	1:A:842:GLY:HA2	1.77	0.66
1:A:894:PRO:HA	1:A:958:LYS:HD2	1.75	0.66
1:A:260:LEU:HD11	1:A:306:ALA:HB1	1.77	0.66
1:A:651:ARG:NH2	1:A:674:CYS:SG	2.69	0.66
1:A:769:VAL:HA	2:A:1000:TG1:H251	1.79	0.65
1:A:897:MET:HB2	1:A:958:LYS:HG3	1.81	0.63
1:B:829:ILE:HD12	2:B:1000:TG1:HC91	1.80	0.62
1:B:835:PHE:HA	1:B:838:MET:HB3	1.81	0.62
1:B:125:GLU:HG3	1:B:126:MET:HG2	1.81	0.62
1:A:790:VAL:HB	1:A:957:PHE:CE1	2.34	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:19:SER:HB3	1:A:22:THR:HG22	1.82	0.62
2:B:1000:TG1:HC92	2:B:1000:TG1:O10	1.99	0.62
1:B:866:THR:CG2	1:B:870:LEU:HB2	2.29	0.61
1:A:786:ALA:HA	1:A:897:MET:HG2	1.83	0.61
1:A:76:ALA:HB1	1:A:88:PHE:CD2	2.35	0.61
1:A:155:VAL:HG12	1:A:216:ALA:HA	1.81	0.61
1:A:665:GLU:O	1:A:669:ALA:HB2	2.01	0.60
1:B:648:VAL:HG13	1:B:651:ARG:HB2	1.83	0.60
1:A:90:GLU:HG3	1:A:91:PRO:HD3	1.83	0.60
1:B:368:ILE:HG21	1:B:409:GLY:HA3	1.83	0.60
1:A:603:PRO:HB3	1:A:639:ILE:HD11	1.84	0.59
1:A:836:ARG:NH1	1:A:981:ASP:OD1	2.35	0.59
1:A:834:PHE:CZ	2:A:1000:TG1:H142	2.38	0.58
1:B:109:GLU:HG2	1:B:110:ARG:H	1.69	0.58
1:A:91:PRO:O	1:A:95:LEU:N	2.34	0.57
1:B:183:GLU:OE2	8:B:2002:HOH:O	2.16	0.57
1:B:155:VAL:HG12	1:B:216:ALA:HA	1.86	0.57
1:A:948:LEU:HD13	1:A:960:LYS:HG3	1.86	0.57
1:B:424:SER:O	1:B:437:VAL:HB	2.05	0.57
1:B:486:GLU:O	1:B:491:ARG:NH2	2.36	0.57
1:B:529:ARG:NH2	1:B:568:ASP:OD1	2.37	0.57
1:A:459:VAL:HA	1:A:462:LEU:HG	1.87	0.56
2:B:1000:TG1:C24	2:B:1000:TG1:H311	2.36	0.56
1:A:757:MET:HA	1:A:760:PHE:CE2	2.41	0.56
1:B:705:VAL:HG22	1:B:726:VAL:HG11	1.88	0.55
1:A:837:TYR:HA	1:A:840:ILE:HG22	1.89	0.55
2:B:1000:TG1:H262	2:B:1000:TG1:H233	1.88	0.55
1:A:529:ARG:NH2	1:A:568:ASP:OD1	2.40	0.55
1:A:758:LYS:HG2	1:A:828:LEU:HD23	1.89	0.55
1:B:491:ARG:NH1	1:B:588:GLU:OE2	2.40	0.55
1:A:512:MET:HB2	1:A:567:ARG:HB3	1.89	0.54
1:B:512:MET:HB2	1:B:567:ARG:HB3	1.88	0.54
1:A:611:ILE:HG13	1:A:639:ILE:HG22	1.90	0.54
1:B:41:LEU:HB3	1:B:236:ARG:HD2	1.90	0.54
1:A:301:ALA:HB2	1:A:789:PRO:HG3	1.88	0.54
1:A:762:ARG:NH2	1:A:828:LEU:O	2.39	0.54
1:A:828:LEU:HD13	2:A:1000:TG1:H303	1.89	0.54
1:A:107:TRP:HA	1:A:110:ARG:HG2	1.89	0.53
1:B:246:LYS:HE2	1:B:251:GLN:HG2	1.88	0.53
1:B:773:VAL:HG11	1:B:842:GLY:HA2	1.89	0.53
1:B:914:ASN:HD21	1:B:978:ILE:HA	1.73	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:837:TYR:HA	1:B:840:ILE:HG22	1.89	0.53
1:A:560:ARG:HG3	4:A:1002:128:C2	2.39	0.53
1:B:357:THR:HA	1:B:603:PRO:HA	1.91	0.53
1:B:256:PHE:CE1	2:B:1000:TG1:H24	2.45	0.52
1:B:701:THR:HA	1:B:718:ILE:O	2.09	0.52
1:A:829:ILE:HG12	2:A:1000:TG1:HC8	1.92	0.52
1:A:59:ASP:HB3	1:A:62:VAL:HG12	1.92	0.52
1:A:943:LEU:O	1:A:947:ILE:HG12	2.11	0.51
1:A:72:SER:HB3	1:A:91:PRO:HB3	1.91	0.51
1:A:527:TYR:CD1	1:A:534:ARG:HD3	2.46	0.51
1:A:834:PHE:HZ	2:A:1000:TG1:H142	1.74	0.51
1:A:179:ILE:HD13	1:A:212:THR:HA	1.91	0.51
1:A:120:LYS:O	1:A:123:GLU:HG2	2.10	0.51
1:A:68:ALA:HB1	1:A:300:VAL:HG23	1.93	0.51
1:B:256:PHE:HE1	2:B:1000:TG1:H24	1.77	0.50
1:B:656:ARG:NH1	1:B:660:ASP:OD1	2.45	0.50
1:B:836:ARG:NH1	1:B:981:ASP:OD1	2.45	0.50
1:B:68:ALA:HB1	1:B:300:VAL:HG23	1.93	0.50
1:B:844:VAL:HB	1:B:907:ILE:HG21	1.93	0.50
1:B:950:VAL:HG22	1:B:951:ASP:H	1.76	0.49
2:B:1000:TG1:C4	2:B:1000:TG1:H233	2.43	0.49
1:A:604:ARG:HB2	1:A:607:VAL:HG23	1.94	0.49
1:B:247:THR:O	1:B:250:GLN:HG2	2.13	0.49
1:B:68:ALA:O	1:B:72:SER:OG	2.24	0.49
1:B:757:MET:O	1:B:760:PHE:HD1	1.95	0.49
1:B:431:LYS:HG3	1:B:435:GLU:OE2	2.12	0.49
2:B:1000:TG1:H142	2:B:1000:TG1:H332	1.93	0.49
1:B:281:ASP:HB2	1:B:282:PRO:HD3	1.95	0.49
2:A:1000:TG1:H333	2:A:1000:TG1:HC91	1.94	0.48
1:A:795:VAL:HA	1:A:799:THR:HG22	1.95	0.48
1:B:866:THR:HG23	1:B:870:LEU:HB2	1.94	0.48
1:B:757:MET:O	1:B:758:LYS:C	2.52	0.48
1:B:950:VAL:HG13	1:B:954:PRO:HD3	1.95	0.48
1:B:901:LEU:HD23	1:B:957:PHE:CZ	2.48	0.48
1:B:847:ALA:HB2	1:B:973:ILE:HG21	1.95	0.48
1:B:539:GLY:O	1:B:543:GLU:HG2	2.13	0.48
1:B:898:THR:HG21	1:B:960:LYS:HB3	1.96	0.48
1:A:844:VAL:HB	1:A:907:ILE:HG21	1.95	0.48
1:A:907:ILE:O	1:A:911:ASN:HB2	2.13	0.48
1:A:323:THR:HG23	1:A:333:VAL:HB	1.95	0.47
1:A:436:LYS:HB2	1:A:443:THR:HG21	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1000:TG1:C26	2:B:1000:TG1:H233	2.43	0.47
1:A:94:ILE:HG12	1:A:793:LEU:HD21	1.95	0.47
1:B:762:ARG:NH2	1:B:828:LEU:O	2.46	0.47
1:A:357:THR:HA	1:A:603:PRO:HA	1.96	0.47
1:A:829:ILE:HG12	2:A:1000:TG1:C9	2.45	0.47
1:B:179:ILE:HD13	1:B:212:THR:HA	1.96	0.47
1:B:282:PRO:HB2	1:B:285:GLY:HA3	1.97	0.47
1:B:795:VAL:HG21	1:B:901:LEU:HD11	1.96	0.47
1:B:72:SER:HB3	1:B:90:GLU:OE1	2.14	0.47
1:A:950:VAL:HG12	1:A:951:ASP:N	2.29	0.47
1:A:950:VAL:O	1:A:954:PRO:HG2	2.14	0.47
1:A:84:THR:OG1	1:A:87:ALA:HB3	2.14	0.46
1:B:757:MET:O	1:B:760:PHE:CD1	2.69	0.46
1:A:837:TYR:HD2	2:A:1000:TG1:H331	1.81	0.46
1:A:611:ILE:HG13	1:A:639:ILE:CG2	2.46	0.46
1:B:391:PRO:HB3	1:B:450:GLU:HB3	1.96	0.46
1:A:950:VAL:CG1	1:A:952:PRO:HD2	2.39	0.46
1:B:366:MET:HG3	1:B:382:PHE:HB2	1.96	0.46
1:A:424:SER:O	1:A:437:VAL:HB	2.16	0.46
1:B:957:PHE:O	1:B:958:LYS:HB2	2.15	0.46
1:A:609:GLY:O	1:A:613:LEU:HG	2.16	0.46
1:A:951:ASP:HB3	1:A:952:PRO:HD3	1.98	0.46
1:B:61:LEU:HB2	1:B:307:ILE:HD12	1.96	0.46
1:B:459:VAL:HA	1:B:462:LEU:HG	1.97	0.46
1:A:78:PHE:CE2	1:A:293:ILE:HG21	2.50	0.46
1:B:758:LYS:HG2	1:B:828:LEU:HD22	1.97	0.46
1:A:76:ALA:HB1	1:A:88:PHE:HD2	1.78	0.46
1:A:512:MET:O	1:A:566:THR:HA	2.16	0.45
2:A:1000:TG1:C33	2:A:1000:TG1:HC91	2.46	0.45
1:A:352:LYS:HD2	1:A:635:ILE:HG13	1.97	0.45
1:A:868:HIS:ND1	1:A:869:GLN:HG3	2.32	0.45
1:A:129:VAL:HG12	1:A:151:VAL:HG22	1.98	0.45
1:A:312:PRO:HA	1:A:315:ILE:HG12	1.99	0.45
1:B:978:ILE:O	1:B:982:GLU:HB2	2.16	0.45
1:A:379:LEU:HD12	1:A:548:VAL:HG21	1.99	0.45
1:A:985:LYS:HG2	1:A:989:ARG:HH12	1.82	0.45
1:B:368:ILE:HD13	1:B:595:GLY:HA3	1.99	0.45
1:A:248:PRO:HD2	1:A:341:THR:HG22	1.99	0.44
1:A:78:PHE:CG	1:A:80:GLU:HG3	2.52	0.44
1:A:624:ILE:HG22	1:A:684:LYS:HE2	1.98	0.44
2:B:1000:TG1:C14	2:B:1000:TG1:H332	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:829:ILE:O	2:B:1000:TG1:H343	2.17	0.44
1:B:413:LEU:HD12	1:B:564:LEU:HD22	2.00	0.44
1:B:635:ILE:O	1:B:639:ILE:HG12	2.17	0.44
2:B:1000:TG1:O5	2:B:1000:TG1:H261	2.18	0.44
1:A:618:GLY:HA3	1:A:821:PRO:HD3	1.99	0.44
1:A:78:PHE:CZ	1:A:293:ILE:HG13	2.53	0.44
1:A:843:TYR:CE2	1:A:973:ILE:HG23	2.52	0.44
1:B:314:VAL:HG12	1:B:760:PHE:CE2	2.52	0.44
1:B:843:TYR:CE2	1:B:973:ILE:HG23	2.53	0.44
1:A:106:VAL:O	1:A:110:ARG:HG2	2.17	0.44
1:B:560:ARG:HG3	4:B:1002:128:N1	2.33	0.44
1:A:275:ASN:HB2	1:A:278:HIS:HB2	2.00	0.43
1:A:198:ARG:NH2	1:A:660:ASP:OD1	2.51	0.43
1:A:760:PHE:HB2	1:A:804:ALA:HB1	2.00	0.43
1:B:760:PHE:HD1	1:B:761:ILE:N	2.16	0.43
1:A:391:PRO:HB3	1:A:450:GLU:HB3	1.99	0.43
1:B:311:LEU:HD13	1:B:764:LEU:HD12	2.01	0.43
1:B:379:LEU:HD12	1:B:548:VAL:HG21	1.99	0.43
1:B:897:MET:HB2	1:B:958:LYS:HE3	2.00	0.43
1:A:78:PHE:HE2	1:A:293:ILE:HG21	1.84	0.43
1:A:753:ILE:O	1:A:757:MET:HG3	2.18	0.43
1:B:894:PRO:HA	1:B:958:LYS:HD2	2.01	0.43
1:A:502:LYS:HG3	1:A:503:SER:H	1.83	0.43
1:B:417:CYS:HB3	1:B:445:LEU:HB3	1.99	0.43
1:A:648:VAL:HG13	1:A:651:ARG:HB2	2.01	0.43
1:B:759:GLN:OE1	1:B:762:ARG:NH1	2.43	0.43
1:A:347:VAL:HG11	1:A:691:LEU:HD13	2.01	0.42
1:A:883:PHE:HB3	1:A:886:LEU:HD11	2.01	0.42
1:A:90:GLU:O	1:A:94:ILE:HG13	2.18	0.42
1:B:122:TYR:O	1:B:211:GLY:HA2	2.19	0.42
1:B:13:LEU:HD21	1:B:166:LEU:HD21	2.01	0.42
1:B:235:ILE:O	1:B:239:MET:HG3	2.19	0.42
1:B:549:ILE:HD11	1:B:596:VAL:HG21	1.99	0.42
1:B:62:VAL:HG23	1:B:98:LEU:HD22	2.01	0.42
1:A:426:ASP:OD1	1:A:427:PHE:N	2.52	0.42
1:A:51:GLU:HA	1:A:54:ILE:HG22	2.02	0.42
1:A:161:ALA:HA	1:A:210:SER:HB2	2.01	0.42
1:A:278:HIS:CE1	1:A:295:TYR:HH	2.27	0.42
1:A:511:LYS:CD	1:A:568:ASP:HA	2.50	0.42
1:B:310:GLY:O	1:B:314:VAL:HG23	2.20	0.42
1:A:199:ALA:HB1	1:A:203:ASP:HB2	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:83:GLU:HB2	1:B:86:THR:HB	2.02	0.42
1:A:611:ILE:HD12	1:A:621:VAL:HG11	2.02	0.42
1:B:52:LEU:HD23	1:B:52:LEU:O	2.20	0.42
1:B:760:PHE:CD1	1:B:761:ILE:N	2.88	0.42
1:B:760:PHE:HD2	1:B:804:ALA:O	2.01	0.42
1:B:760:PHE:O	1:B:763:TYR:HB3	2.20	0.42
1:B:865:VAL:O	1:B:866:THR:HB	2.20	0.42
2:A:1000:TG1:H203	2:A:1000:TG1:H172	1.77	0.42
1:A:122:TYR:O	1:A:211:GLY:HA2	2.20	0.42
1:A:950:VAL:HG12	1:A:951:ASP:H	1.85	0.42
1:B:495:SER:HA	1:B:513:PHE:O	2.19	0.42
1:B:950:VAL:CG1	1:B:954:PRO:HD3	2.50	0.42
1:A:93:VAL:HA	1:A:96:LEU:HG	2.02	0.42
1:A:389:TYR:HB3	1:A:425:LEU:HD11	2.01	0.41
1:A:88:PHE:O	1:A:91:PRO:HD2	2.20	0.41
1:B:138:GLN:HB3	1:B:140:ILE:HG23	2.02	0.41
1:A:90:GLU:OE1	1:A:789:PRO:HB2	2.18	0.41
1:B:834:PHE:O	1:B:838:MET:HB2	2.20	0.41
1:A:367:PHE:CD1	1:A:379:LEU:HD13	2.56	0.41
1:B:102:ALA:O	1:B:106:VAL:HG23	2.21	0.41
1:A:829:ILE:CG1	2:A:1000:TG1:HC8	2.50	0.41
1:A:713:LYS:HD2	1:A:713:LYS:HA	1.88	0.41
1:B:491:ARG:NH1	1:B:584:PHE:HB3	2.35	0.41
1:B:158:LYS:HB2	1:B:158:LYS:HE3	1.92	0.41
1:B:314:VAL:HG13	1:B:805:THR:OG1	2.21	0.41
1:A:202:GLN:OE1	1:A:202:GLN:N	2.53	0.41
1:A:420:CYS:HA	1:A:496:VAL:HG21	2.03	0.41
1:B:24:LEU:HG	1:B:149:ASP:HA	2.03	0.41
1:B:787:LEU:HD21	1:B:848:THR:HG21	2.03	0.41
1:A:321:LEU:HD13	1:A:809:PHE:HZ	1.85	0.41
1:B:120:LYS:O	1:B:123:GLU:HG2	2.21	0.41
1:B:907:ILE:HD11	1:B:973:ILE:HG22	2.03	0.41
1:A:443:THR:O	1:A:447:THR:HG22	2.21	0.41
1:B:351:ASP:O	1:B:355:THR:HB	2.21	0.41
1:B:314:VAL:HG12	1:B:760:PHE:HE2	1.85	0.40
1:B:77:TRP:HD1	1:B:78:PHE:CE1	2.38	0.40
1:B:791:GLN:HG2	1:B:957:PHE:CE1	2.56	0.40
1:A:482:GLU:OE2	1:A:573:ARG:NH1	2.54	0.40
1:B:431:LYS:HB3	1:B:433:VAL:HG12	2.03	0.40
1:B:423:SER:HB2	1:B:437:VAL:O	2.20	0.40
1:B:863:PRO:HG2	1:B:890:ILE:HG21	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:518:PRO:HA	1:B:563:ALA:HB2	2.03	0.40
1:B:161:ALA:HA	1:B:210:SER:HB2	2.04	0.40
1:B:958:LYS:HE2	1:B:958:LYS:HB2	1.89	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	991/995 (100%)	925 (93%)	66 (7%)	0	100	100
1	B	993/995 (100%)	931 (94%)	55 (6%)	7 (1%)	26	66
All	All	1984/1990 (100%)	1856 (94%)	121 (6%)	7 (0%)	39	76

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	531	GLY
1	B	831	GLY
1	B	950	VAL
1	B	282	PRO
1	B	458	GLU
1	B	951	ASP
1	B	952	PRO

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	840/840 (100%)	835 (99%)	5 (1%)	90	95
1	B	840/840 (100%)	832 (99%)	8 (1%)	82	91
All	All	1680/1680 (100%)	1667 (99%)	13 (1%)	86	93

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	78	PHE
1	A	79	GLU
1	A	88	PHE
1	A	790	VAL
1	A	882	HIS
1	B	88	PHE
1	B	90	GLU
1	B	421	ASN
1	B	430	THR
1	B	472	ASN
1	B	757	MET
1	B	759	GLN
1	B	760	PHE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	810	ASN
1	B	930	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry

Of 14 ligands modelled in this entry, 8 are monoatomic - leaving 6 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	TG1	A	1000	-	40,48,48	0.93	1 (2%)	46,72,72	1.33	4 (8%)
3	VN4	A	1001	1,8,5	0,3,3	0.00	-	0,3,3	0.00	-
4	128	A	1002	5	35,50,50	1.39	6 (17%)	31,80,80	1.18	2 (6%)
2	TG1	B	1000	-	40,48,48	0.90	1 (2%)	46,72,72	0.85	1 (2%)
3	VN4	B	1001	1,8,5	0,3,3	0.00	-	0,3,3	0.00	-
4	128	B	1002	5	35,50,50	1.40	6 (17%)	31,80,80	1.20	3 (9%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	TG1	A	1000	-	-	2/33/99/99	0/3/3/3
3	VN4	A	1001	1,8,5	-	0/0/0/0	0/0/0/0
4	128	A	1002	5	1/1/14/16	0/26/80/80	0/5/5/5
2	TG1	B	1000	-	-	1/33/99/99	0/3/3/3
3	VN4	B	1001	1,8,5	-	0/0/0/0	0/0/0/0
4	128	B	1002	5	1/1/14/16	0/26/80/80	0/5/5/5

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1002	128	PG-O3G	-2.61	1.45	1.54
4	A	1002	128	PG-O3G	-2.55	1.46	1.54
4	A	1002	128	C8-N7	-2.25	1.30	1.34
4	B	1002	128	C8-N7	-2.20	1.30	1.34
4	A	1002	128	C5F-C4F	-2.16	1.32	1.40
4	B	1002	128	C5F-C4F	-2.08	1.32	1.40
4	A	1002	128	PA-O1A	2.10	1.59	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1002	128	PA-O1A	2.11	1.59	1.51
2	A	1000	TG1	C1-C5	2.25	1.54	1.51
2	B	1000	TG1	C1-C5	2.27	1.54	1.51
4	A	1002	128	PG-O1G	2.98	1.60	1.50
4	B	1002	128	PG-O1G	3.01	1.60	1.50
4	A	1002	128	C5F-C6F	4.51	1.50	1.37
4	B	1002	128	C5F-C6F	4.61	1.51	1.37

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	1002	128	O3'-C3'-C2'	2.04	106.83	103.64
2	A	1000	TG1	C11-C7-C8	2.05	118.12	115.36
2	A	1000	TG1	O7-C8-C9	2.07	110.92	107.45
2	A	1000	TG1	O1-C13-C14	2.22	116.21	111.53
4	B	1002	128	O2B-PB-O3A	2.37	115.42	105.27
4	A	1002	128	O2B-PB-O3A	2.44	115.74	105.27
2	B	1000	TG1	C10-O9-C32	2.63	127.15	121.92
4	B	1002	128	C4'-O4'-C1'	2.93	112.75	109.64
4	A	1002	128	C4'-O4'-C1'	3.04	112.86	109.64
2	A	1000	TG1	C10-O9-C32	4.70	131.25	121.92

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	A	1002	128	C4F
4	B	1002	128	C4F

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1000	TG1	C3-O3-C21-C22
2	A	1000	TG1	C10-O9-C32-C33
2	A	1000	TG1	C10-O9-C32-O10

There are no ring outliers.

4 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1000	TG1	15	0
4	A	1002	128	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1000	TG1	13	0
4	B	1002	128	1	0

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	994/995 (99%)	0.25	57 (5%) 27 22	51, 110, 250, 425	0
1	B	994/995 (99%)	0.20	55 (5%) 29 23	50, 126, 250, 377	0
All	All	1988/1990 (99%)	0.23	112 (5%) 28 22	50, 119, 250, 425	0

All (112) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	961	ALA	12.9
1	A	284	HIS	10.0
1	A	878	GLU	9.8
1	B	281	ASP	8.8
1	A	283	VAL	8.8
1	A	994	GLY	8.3
1	B	282	PRO	8.1
1	B	283	VAL	8.0
1	A	505	ARG	7.5
1	A	993	GLU	7.0
1	A	285	GLY	7.0
1	B	47	LYS	6.6
1	A	965	THR	6.6
1	B	962	LEU	6.6
1	B	46	GLY	6.5
1	B	278	HIS	5.6
1	B	280	ASN	5.4
1	A	286	GLY	5.3
1	B	957	PHE	5.0
1	A	287	SER	5.0
1	A	992	LEU	4.9
1	A	282	PRO	4.8
1	B	110	ARG	4.6
1	A	289	ILE	4.5

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Mol	Chain	Res	Type	RSRZ
1	A	853	ALA	4.5
1	A	281	ASP	4.5
1	B	960	LYS	4.4
1	B	878	GLU	4.4
1	A	877	THR	4.3
1	A	277	GLY	4.2
1	B	284	HIS	4.0
1	A	276	ILE	4.0
1	B	860	GLU	3.9
1	B	289	ILE	3.9
1	A	961	ALA	3.9
1	B	875	GLN	3.7
1	A	972	LYS	3.7
1	A	278	HIS	3.6
1	B	286	GLY	3.6
1	B	949	TYR	3.5
1	B	507	ALA	3.5
1	B	974	SER	3.4
1	A	964	LEU	3.4
1	A	82	GLU	3.4
1	A	949	TYR	3.4
1	B	86	THR	3.3
1	B	854	TRP	3.3
1	B	431	LYS	3.3
1	A	932	TRP	3.3
1	A	506	ALA	3.3
1	A	915	SER	3.2
1	A	879	ASP	3.2
1	B	87	ALA	3.1
1	A	960	LYS	3.0
1	B	861	ASP	3.0
1	B	924	ARG	3.0
1	A	111	ASN	2.9
1	B	287	SER	2.9
1	A	981	ASP	2.9
1	B	901	LEU	2.8
1	A	272	TRP	2.8
1	B	277	GLY	2.8
1	A	786	ALA	2.8
1	A	974	SER	2.8
1	B	785	GLU	2.8
1	B	950	VAL	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	928	TRP	2.7
1	A	991	TYR	2.7
1	A	866	THR	2.7
1	A	959	LEU	2.7
1	B	968	LEU	2.7
1	B	784	PRO	2.7
1	B	273	LEU	2.6
1	A	290	ARG	2.6
1	B	994	GLY	2.6
1	B	865	VAL	2.6
1	B	853	ALA	2.6
1	B	290	ARG	2.5
1	B	506	ALA	2.5
1	B	965	THR	2.5
1	B	503	SER	2.4
1	A	916	LEU	2.4
1	B	82	GLU	2.4
1	A	784	PRO	2.4
1	B	781	LEU	2.4
1	A	787	LEU	2.4
1	A	851	ALA	2.4
1	A	919	ASN	2.3
1	A	860	GLU	2.3
1	A	848	THR	2.3
1	B	787	LEU	2.3
1	A	968	LEU	2.3
1	A	896	PRO	2.2
1	A	983	ILE	2.2
1	B	953	LEU	2.2
1	A	403	ARG	2.2
1	A	75	LEU	2.2
1	A	83	GLU	2.1
1	A	273	LEU	2.1
1	B	857	MET	2.1
1	A	785	GLU	2.1
1	A	891	PHE	2.1
1	A	920	GLN	2.1
1	B	899	MET	2.1
1	B	848	THR	2.1
1	B	927	PRO	2.1
1	B	964	LEU	2.1
1	B	786	ALA	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	934	LEU	2.0
1	A	288	TRP	2.0
1	B	504	SER	2.0
1	B	951	ASP	2.0

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
5	MG	A	1003	1/1	0.96	0.28	3.15	92,92,92,92	0
2	TG1	B	1000	46/46	0.85	0.41	2.92	157,200,218,226	0
2	TG1	A	1000	46/46	0.91	0.47	2.53	122,165,182,193	0
3	VN4	A	1001	4/4	0.99	0.26	1.68	85,95,118,119	0
4	128	B	1002	46/46	0.84	0.23	0.78	153,187,205,208	0
3	VN4	B	1001	4/4	0.99	0.23	0.65	88,92,121,134	0
4	128	A	1002	46/46	0.90	0.20	-0.20	107,144,157,169	0
6	K	A	1008	1/1	0.97	0.12	-1.69	94,94,94,94	0
5	MG	B	1003	1/1	0.98	0.12	-1.88	102,102,102,102	0
6	K	B	1008	1/1	0.89	0.08	-2.84	106,106,106,106	0
5	MG	A	1004	1/1	0.87	0.15	-	142,142,142,142	0
7	CL	A	1009	1/1	0.96	0.14	-	74,74,74,74	0
7	CL	B	1009	1/1	0.89	0.10	-	74,74,74,74	0
5	MG	B	1004	1/1	0.92	0.11	-	195,195,195,195	0

6.5 Other polymers [i](#)

There are no such residues in this entry.