



Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 09:17 pm BST

PDB ID : 3ECQ
Title : Endo-alpha-N-acetylgalactosaminidase from Streptococcus pneumoniae:
SeMet structure
Authors : Caines, M.E.C.; Zhu, H.; Vuckovic, M.; Strynadka, N.C.J.
Deposited on : 2008-09-01
Resolution : 2.90 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.11
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

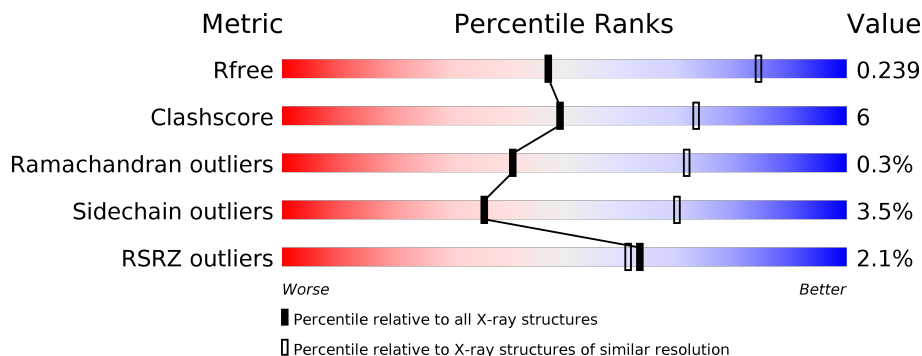
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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}	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

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 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	1531	 3% 74% 13% 13%
1	B	1531	 3% 74% 14% • 12%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 21372 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 Endo-alpha-N-acetylgalactosaminidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	Se			
1	A	1336	10586	6644	1831	2088	23	0	1	0
1	B	1347	10671	6695	1844	2108	24	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	37	GLY	-	EXPRESSION TAG	UNP Q8DR60
A	38	SER	-	EXPRESSION TAG	UNP Q8DR60
A	39	MSE	-	EXPRESSION TAG	UNP Q8DR60
B	37	GLY	-	EXPRESSION TAG	UNP Q8DR60
B	38	SER	-	EXPRESSION TAG	UNP Q8DR60
B	39	MSE	-	EXPRESSION TAG	UNP Q8DR60

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	2	Total	Ca	0	0
			2	2		
2	A	2	Total	Ca	0	0
			2	2		

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0

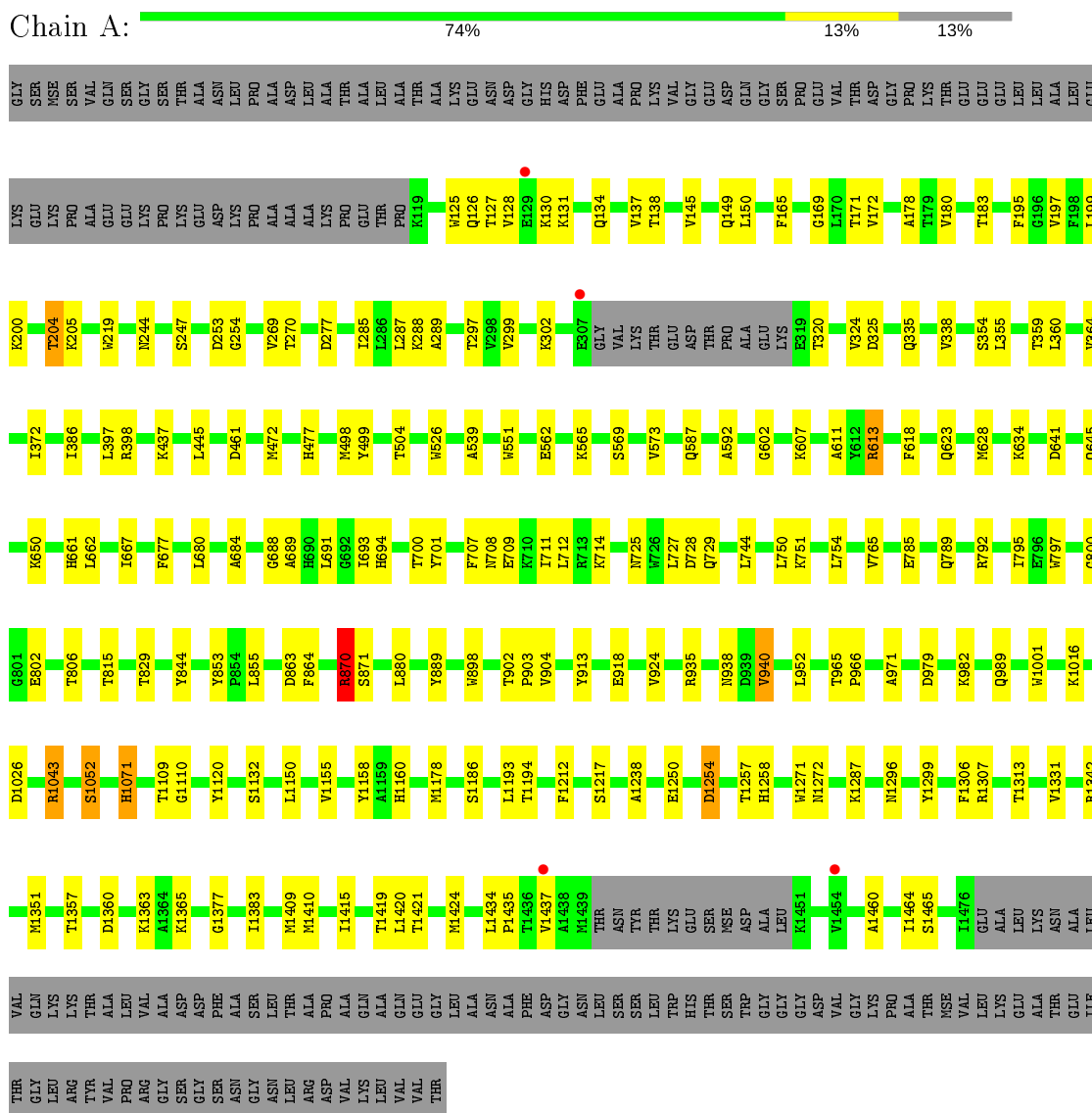
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	53	Total O 53 53	0	0
5	B	44	Total O 44 44	0	0

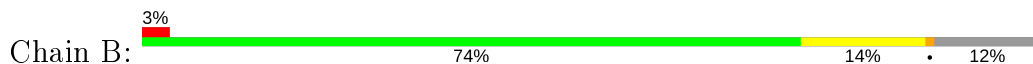
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Endo-alpha-N-acetylgalactosaminidase



- Molecule 1: Endo-alpha-N-acetylgalactosaminidase



GLY	LYS	D186	K280	I404	H661	F807	K982	H1263	V1454	GLY
SER	GLU	R194	N281	M408	L662	H608	M983	R1269	I1464	GLY
MSE	LYS	F195	E282	M408	V674	D613	P998	D1277	S1465	ASP
SER	PRO	G196	K283	D422	F677	V616	L1008	K1287	E1468	VAL
VAL	ALA	V197	K284	K437	T681	V619	D1026	L1291	A1469	GLY
GLN	ALA	K200	L285	I438	A684	D638	L1033	M1296	A1470	LYS
SER	GLY	L201	L286	S449	G688	S646	L1041	L1297	I1473	ALA
GLY	LYS	K202	L287	F450	A689	L655	Y1042	V1298	A1474	MSE
PRO	LYS	K205	L288	L451	A690	L691	R1043	Y1299	I1475	THR
ALA	ASP	H206	L289	V458	H692	Y859	M1051	F1306	I1476	VAL
ALA	ALA	N207	A289	M472	G692	S860	S1052	R1307	E1477	LEU
ASP	ALA	F209	K302	V486	I693	M661	Q1062	S1324	A1478	ALA
LEU	ALA	V210	E307	M498	S698	F864	Y1120	R1341	H1481	LEU
THR	ALA	D215	GLY	A508	Y701	M667	K1130	R1342	LEU	VAL
ALA	LYS	F218	VAL	M526	S704	R670	A1131	M1348	GLN	GLN
LEU	LYS	W219	LYS	I588	S704	S671	S1132	T1368	LYS	LYS
THR	THR	W219	THR	E562	S704	R670	Y1154	G1377	ARG	ARG
ALA	LYS	W219	GLU	K565	S704	S671	Y1154	R1377	ASP	ASP
LYS	VAL	K222	THR	S669	H708	R670	Y1154	R1342	GLY	GLY
GLU	VAL	SER	ASP	V573	I711	L880	Y1158	M1382	ASP	SER
ASN	T122	PRO	THR	I574	I711	F881	H1159	G1382	PHE	ASN
ASN	P123	THR	THR	T575	I722	F881	H1160	I1383	ALA	ALA
ASP	E124	PRO	THR	Q687	Y722	M667	D1170	G1398	SER	GLY
GLY	W125	PRO	THR	A592	Y724	R688	D1171	G1404	LEU	LEU
HIS	Q126	PRO	THR	L613	N725	M688	T1172	I1415	LEU	LEU
ASP	T127	PRO	THR	S620	N726	M688	M1178	I1415	ALA	ALA
PHE	E132	PRO	THR	K634	N728	M688	F1212	L1420	ALA	ALA
GLU	Q133	PRO	THR	H639	D728	M688	K1231	L1425	ASN	ASN
ALA	Q134	PRO	THR	P379	Q729	M688	A1238	L1425	ALA	ALA
LYS	E142	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
GLY	V145	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
ASP	N148	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
GLN	P162	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
GLY	A163	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
SER	L164	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
PRO	G169	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
VAL	L170	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
ASP	T171	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
GLY	V172	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
PRO	M177	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
LYS	A178	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
THR	T179	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
THR	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
GLY	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
GLU	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
GLY	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
LEU	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
LEU	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
ALA	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA
TRP	L271	PRO	THR	H639	H741	V904	A1238	L1425	ALA	ALA

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	210.61Å 158.21Å 112.44Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	112.51 – 2.90 112.44 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.4 (112.51-2.90) 99.4 (112.44-2.90)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.30 (at 2.91Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.190 , 0.235 0.198 , 0.239	Depositor DCC
R_{free} test set	4164 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	56.7	Xtrriage
Anisotropy	0.136	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 43.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	21372	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.80% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, CA, NA

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	0.52	0/10800	0.64	4/14588 (0.0%)
1	B	0.50	0/10880	0.62	1/14691 (0.0%)
All	All	0.51	0/21680	0.63	5/29279 (0.0%)

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	1
1	B	0	1
All	All	0	2

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	607	LYS	CB-CA-C	-5.33	99.74	110.40
1	B	1307	ARG	NE-CZ-NH1	5.25	122.92	120.30
1	A	870	ARG	NE-CZ-NH1	5.16	122.88	120.30
1	A	1307	ARG	NE-CZ-NH1	5.08	122.84	120.30
1	A	613	ARG	NE-CZ-NH1	5.07	122.83	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1377	GLY	Peptide

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Mol	Chain	Res	Type	Group
1	B	1377	GLY	Peptide

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	10586	0	10172	123	0
1	B	10671	0	10253	124	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	6	0	8	0	0
4	B	6	0	8	0	0
5	A	53	0	0	0	0
5	B	44	0	0	0	0
All	All	21372	0	20441	247	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 6.

All (247) 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:472:MSE:HE2	1:A:498:MSE:HE1	1.31	1.09
1:B:472:MSE:HE2	1:B:498:MSE:HE1	1.10	1.07
1:A:1419:THR:O	1:A:1424:MSE:HE3	1.73	0.87
1:B:219:TRP:CZ2	1:B:269:VAL:HG21	2.14	0.81
1:B:795:ILE:HD11	1:B:808:HIS:CD2	2.19	0.78
1:B:855:LEU:HD21	1:B:935:ARG:HB2	1.68	0.76
1:B:219:TRP:CE2	1:B:269:VAL:HG21	2.20	0.75
1:A:324:VAL:HG21	1:A:364:VAL:CG1	2.18	0.74
1:B:472:MSE:CE	1:B:498:MSE:HE1	2.05	0.72
1:A:751:LYS:NZ	1:A:789:GLN:O	2.22	0.72
1:B:1454:VAL:HG22	1:B:1476:ILE:HD13	1.71	0.71
1:A:815:THR:HG22	1:A:844:TYR:OH	1.91	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:904:VAL:CG2	1:A:940:VAL:HG22	2.22	0.69
1:B:693:ILE:HD11	1:B:750:LEU:HD21	1.75	0.67
1:A:684:ALA:HB1	1:A:689:ALA:HB3	1.76	0.67
1:A:1383:ILE:HD13	1:A:1410:MSE:HE1	1.76	0.66
1:A:1313:THR:HG21	1:A:1420:LEU:HD13	1.75	0.66
1:A:918:GLU:O	1:A:935:ARG:NH1	2.28	0.66
1:A:324:VAL:HG21	1:A:364:VAL:HG13	1.77	0.66
1:A:219:TRP:NE1	1:A:269:VAL:HG21	2.12	0.65
1:B:688:GLY:HA3	1:B:971:ALA:HB1	1.79	0.63
1:A:219:TRP:CE2	1:A:269:VAL:HG21	2.33	0.63
1:B:968:ASN:N	1:B:968:ASN:HD22	1.97	0.63
1:A:855:LEU:HD21	1:A:935:ARG:HB2	1.81	0.62
1:B:195:PHE:CE1	1:B:299:VAL:HG21	2.34	0.62
1:A:461:ASP:OD2	1:A:539:ALA:HB2	2.00	0.61
1:A:870:ARG:HH11	1:A:870:ARG:HG3	1.65	0.61
1:B:498:MSE:HE3	1:B:526:TRP:HB2	1.83	0.60
1:B:498:MSE:HE3	1:B:526:TRP:CD1	2.35	0.60
1:A:1360:ASP:OD1	1:A:1365:LYS:NZ	2.34	0.60
1:A:338:VAL:HG12	1:A:355:LEU:CD1	2.31	0.60
1:A:792:ARG:HD2	1:A:806:THR:OG1	2.02	0.60
1:A:1193:LEU:HD23	1:A:1194:THR:N	2.15	0.60
1:A:904:VAL:HG21	1:A:940:VAL:HG22	1.82	0.60
1:A:338:VAL:HG12	1:A:355:LEU:HD11	1.83	0.60
1:A:145:VAL:HG11	1:A:302:LYS:HD3	1.83	0.59
1:B:864:PHE:HA	1:B:871:SER:HA	1.84	0.59
1:B:968:ASN:H	1:B:968:ASN:ND2	2.01	0.59
1:B:1420:LEU:HD11	1:B:1425:LEU:HG	1.85	0.59
1:A:708:ASN:O	1:A:711:ILE:HG22	2.03	0.58
1:B:968:ASN:H	1:B:968:ASN:HD22	1.51	0.58
1:B:792:ARG:HD2	1:B:806:THR:OG1	2.03	0.58
1:B:1249:VAL:HG11	1:B:1291:LEU:HD13	1.86	0.57
1:B:795:ILE:CD1	1:B:808:HIS:CD2	2.86	0.57
1:A:611:ALA:HB2	1:A:880:LEU:HD21	1.87	0.57
1:A:688:GLY:HA3	1:A:971:ALA:HB1	1.86	0.57
1:B:1383:ILE:HD13	1:B:1410:MSE:HE1	1.86	0.57
1:B:727:LEU:HD22	1:B:1258:HIS:CG	2.40	0.56
1:A:693:ILE:HD11	1:A:750:LEU:HD21	1.88	0.56
1:A:1460:ALA:HB1	1:A:1464:ILE:CD1	2.35	0.56
1:A:902:THR:HG22	1:A:903:PRO:O	2.06	0.56
1:A:1460:ALA:HB1	1:A:1464:ILE:HD11	1.86	0.56
1:B:145:VAL:HG11	1:B:302:LYS:HD3	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1383:ILE:CD1	1:A:1410:MSE:HE1	2.36	0.56
1:A:853:TYR:O	1:A:935:ARG:NH2	2.39	0.56
1:B:1383:ILE:CD1	1:B:1410:MSE:HE1	2.36	0.55
1:B:661:HIS:CD2	1:B:701:TYR:HE2	2.23	0.55
1:A:1193:LEU:C	1:A:1193:LEU:HD23	2.26	0.55
1:B:1008:LEU:HD21	1:B:1033:LEU:HD11	1.89	0.55
1:B:333:THR:HG22	1:B:342:VAL:HG22	1.89	0.54
1:B:1212:PHE:CZ	1:B:1238:ALA:HB1	2.43	0.54
1:B:898:TRP:CZ2	1:B:918:GLU:HG2	2.42	0.54
1:B:397:LEU:HD11	1:B:408:MSE:HE2	1.90	0.54
1:B:881:PHE:CD1	1:B:885:VAL:HG21	2.43	0.54
1:A:498:MSE:HE3	1:A:526:TRP:HB2	1.90	0.54
1:B:661:HIS:CD2	1:B:701:TYR:CE2	2.96	0.54
1:B:498:MSE:CE	1:B:802:GLU:HG3	2.38	0.54
1:A:815:THR:HG22	1:A:844:TYR:CZ	2.43	0.54
1:B:684:ALA:HB1	1:B:689:ALA:HB3	1.90	0.53
1:B:726:TRP:CZ3	1:B:1256:ARG:HD2	2.44	0.53
1:A:1212:PHE:CE2	1:A:1238:ALA:HB1	2.43	0.53
1:A:125:TRP:O	1:A:137:VAL:HG11	2.09	0.53
1:B:180:VAL:HG21	1:B:197:VAL:HG11	1.89	0.53
1:B:613:ARG:N	1:B:861:MSE:HE3	2.24	0.53
1:B:904:VAL:HG22	1:B:915:TRP:O	2.09	0.53
1:B:968:ASN:N	1:B:968:ASN:ND2	2.56	0.53
1:B:1434:LEU:N	1:B:1435:PRO:HD2	2.25	0.52
1:A:150:LEU:HD13	1:A:165:PHE:CG	2.44	0.52
1:A:195:PHE:CE1	1:A:299:VAL:HG21	2.45	0.52
1:B:634:LYS:HB3	1:B:1051:MSE:HE2	1.92	0.52
1:A:1287:LYS:HE3	1:A:1409:MSE:HE3	1.92	0.51
1:A:197:VAL:HG22	1:A:287:LEU:HD22	1.92	0.51
1:A:1464:ILE:HG22	1:A:1465:SER:O	2.09	0.51
1:B:1298:VAL:HG12	1:B:1299:TYR:CD2	2.46	0.51
1:B:182:LEU:HD22	1:B:287:LEU:HD21	1.93	0.51
1:B:613:ARG:NH2	1:B:645:GLN:OE1	2.41	0.51
1:A:1001:TRP:CD2	1:A:1043:ARG:HD3	2.45	0.51
1:A:725:ASN:HB2	1:A:729:GLN:OE1	2.11	0.51
1:A:661:HIS:CD2	1:A:701:TYR:HE2	2.29	0.50
1:A:904:VAL:HG11	1:A:940:VAL:CG1	2.41	0.50
1:B:602:GLY:HA3	1:B:792:ARG:HG3	1.93	0.50
1:A:700:THR:HG23	1:A:707:PHE:HD2	1.76	0.50
1:B:1475:LYS:O	1:B:1478:ALA:HB3	2.11	0.50
1:A:709:GLU:HA	1:A:712:LEU:HD12	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:126:GLN:HA	1:A:137:VAL:HG21	1.94	0.49
1:A:573:VAL:HG21	1:A:592:ALA:HB1	1.93	0.49
1:B:377:ILE:HD11	1:B:404:ILE:HD13	1.95	0.49
1:A:727:LEU:HD22	1:A:1258:HIS:ND1	2.28	0.49
1:A:650:LYS:HE2	1:A:694:HIS:ND1	2.27	0.49
1:B:204:THR:HG23	1:B:205:LYS:HG3	1.94	0.49
1:A:338:VAL:CG1	1:A:355:LEU:HD11	2.41	0.49
1:A:904:VAL:HG11	1:A:940:VAL:HG13	1.94	0.49
1:A:795:ILE:HD11	1:A:800:GLY:O	2.12	0.49
1:A:197:VAL:HG22	1:A:287:LEU:CD2	2.43	0.48
1:B:1296:ASN:HD22	1:B:1297:LEU:H	1.61	0.48
1:A:634:LYS:NZ	1:A:1052:SER:O	2.46	0.48
1:B:708:ASN:O	1:B:711:ILE:HG22	2.13	0.48
1:B:1341:ARG:O	1:B:1342:ARG:C	2.51	0.48
1:B:1368:THR:HG22	1:B:1428:ASN:HD21	1.78	0.48
1:B:647:VAL:HB	1:B:691:LEU:HD23	1.94	0.48
1:A:1158:TYR:CE2	1:A:1160:HIS:HB2	2.48	0.48
1:B:1212:PHE:CE2	1:B:1238:ALA:HB1	2.48	0.48
1:A:979:ASP:N	1:A:979:ASP:OD1	2.47	0.48
1:B:371:PHE:HB2	1:B:449:SER:HB3	1.94	0.48
1:A:498:MSE:CE	1:A:802:GLU:HG3	2.44	0.48
1:B:354:SER:HB3	1:B:359:THR:HG22	1.96	0.48
1:A:1212:PHE:CZ	1:A:1238:ALA:HB1	2.49	0.47
1:A:587:GLN:OE1	1:A:898:TRP:N	2.44	0.47
1:B:558:ILE:HD12	1:B:741:HIS:CE1	2.49	0.47
1:B:498:MSE:HE2	1:B:802:GLU:HG3	1.96	0.47
1:A:1306:PHE:CZ	1:A:1415:ILE:HG21	2.50	0.47
1:B:1231:LYS:HG2	1:B:1414:GLN:HG3	1.96	0.47
1:B:725:ASN:HA	1:B:729:GLN:HA	1.97	0.47
1:A:904:VAL:HG21	1:A:940:VAL:HG13	1.96	0.47
1:A:613:ARG:NH2	1:A:645:GLN:OE1	2.46	0.47
1:A:870:ARG:HH11	1:A:870:ARG:CG	2.26	0.47
1:B:498:MSE:CE	1:B:526:TRP:HB2	2.46	0.47
1:A:180:VAL:HG21	1:A:197:VAL:HG11	1.97	0.46
1:A:904:VAL:HG22	1:A:940:VAL:HG22	1.97	0.46
1:A:178:ALA:HB1	1:A:199:LEU:HD23	1.97	0.46
1:A:254:GLY:O	1:A:270:THR:HA	2.16	0.46
1:B:1269:ARG:HG3	1:B:1277:ASP:OD1	2.16	0.46
1:B:379:PRO:HG2	1:B:395:MSE:HE2	1.98	0.46
1:B:867:TRP:O	1:B:870:ARG:HB2	2.15	0.46
1:A:680:LEU:HG	1:A:691:LEU:HD11	1.96	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:864:PHE:HA	1:A:871:SER:HA	1.97	0.46
1:B:1130:LYS:HD2	1:B:1145:TYR:CD1	2.51	0.46
1:B:1306:PHE:CZ	1:B:1415:ILE:HG21	2.50	0.46
1:B:172:VAL:HG22	1:B:178:ALA:HB2	1.97	0.46
1:B:1464:ILE:HG23	1:B:1468:GLU:HB2	1.98	0.46
1:B:610:THR:O	1:B:859:TYR:HE1	1.99	0.46
1:A:744:LEU:HD13	1:A:785:GLU:HG2	1.97	0.46
1:B:179:THR:HG21	1:B:819:TYR:CE1	2.50	0.46
1:B:145:VAL:HG11	1:B:302:LYS:CD	2.45	0.45
1:B:677:PHE:CD2	1:B:754:LEU:HD11	2.52	0.45
1:A:289:ALA:HB1	1:A:297:THR:HB	1.97	0.45
1:A:904:VAL:CG2	1:A:940:VAL:CG2	2.93	0.45
1:B:1154:TYR:O	1:B:1255:ASN:ND2	2.49	0.45
1:B:1287:LYS:HD2	1:B:1409:MSE:HE3	1.99	0.45
1:B:498:MSE:HE3	1:B:526:TRP:CG	2.50	0.45
1:A:1357:THR:HG22	1:A:1365:LYS:HD2	1.99	0.45
1:B:1368:THR:HG22	1:B:1428:ASN:ND2	2.31	0.45
1:B:681:ILE:HG21	1:B:757:GLY:HA3	1.99	0.45
1:B:437:LYS:HG3	1:B:438:ILE:N	2.30	0.45
1:A:1437:VAL:O	1:A:1437:VAL:CG1	2.65	0.45
1:B:1249:VAL:HG13	1:B:1250:GLU:HG3	1.99	0.45
1:A:1120:TYR:HA	1:A:1178:MSE:O	2.16	0.45
1:A:499:TYR:CE2	1:A:829:THR:HG23	2.52	0.45
1:A:498:MSE:HE3	1:A:526:TRP:CD1	2.52	0.45
1:B:145:VAL:CG1	1:B:302:LYS:CD	2.95	0.45
1:B:498:MSE:HE3	1:B:526:TRP:CB	2.47	0.45
1:B:704:SER:O	1:B:1263:HIS:ND1	2.51	0.44
1:A:1331:VAL:HG11	1:A:1351:MSE:HE2	1.99	0.44
1:B:338:VAL:O	1:B:355:LEU:HD12	2.17	0.44
1:A:360:LEU:HD21	1:A:504:THR:HG23	1.99	0.44
1:B:1382:GLY:C	1:B:1383:ILE:HD12	2.38	0.44
1:B:722:TYR:CD2	1:B:1398:GLY:HA3	2.53	0.44
1:B:677:PHE:CE2	1:B:754:LEU:HD11	2.52	0.44
1:A:727:LEU:HD22	1:A:1258:HIS:CG	2.51	0.44
1:A:138:THR:HG23	1:A:149:GLN:HB3	1.98	0.44
1:A:904:VAL:HG22	1:A:940:VAL:CG2	2.48	0.44
1:B:1158:TYR:CE2	1:B:1160:HIS:HB2	2.52	0.44
1:A:618:PHE:CE2	1:A:1254:ASP:HB3	2.53	0.44
1:A:1299:TYR:OH	1:A:1410:MSE:HE3	2.18	0.44
1:B:777:TRP:O	1:B:781:VAL:HG23	2.17	0.44
1:B:838:ASP:OD2	1:B:888:LYS:NZ	2.49	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:641:ASP:O	1:A:982:LYS:NZ	2.51	0.44
1:A:667:ILE:N	1:A:667:ILE:HD12	2.32	0.44
1:B:1170:ASP:O	1:B:1172:THR:HG23	2.18	0.44
1:B:354:SER:HA	1:B:358:HIS:O	2.18	0.44
1:A:1271:TRP:CE3	1:A:1272:ASN:HB2	2.53	0.43
1:A:1424:MSE:HE2	1:A:1424:MSE:HB2	2.00	0.43
1:A:372:ILE:HG12	1:A:397:LEU:HD13	2.00	0.43
1:A:169:GLY:O	1:A:171:THR:HG22	2.17	0.43
1:A:172:VAL:HG21	1:A:200:LYS:HG2	2.01	0.43
1:A:324:VAL:HG21	1:A:364:VAL:HG12	1.97	0.43
1:B:458:VAL:CG1	1:B:486:VAL:HG21	2.48	0.43
1:B:587:GLN:NE2	1:B:898:TRP:O	2.45	0.43
1:B:1041:LEU:HD12	1:B:1041:LEU:N	2.33	0.43
1:B:169:GLY:C	1:B:910:GLY:HA2	2.39	0.43
1:A:1109:THR:CG2	1:A:1110:GLY:N	2.81	0.43
1:A:204:THR:HG23	1:A:205:LYS:HG3	1.99	0.43
1:B:145:VAL:CG1	1:B:302:LYS:HD2	2.49	0.43
1:B:698:SER:HA	1:B:771:SER:HB3	2.00	0.43
1:A:677:PHE:CD2	1:A:754:LEU:HD21	2.54	0.42
1:B:508:ALA:O	1:B:575:THR:HG22	2.19	0.42
1:A:661:HIS:CD2	1:A:701:TYR:CE2	3.07	0.42
1:B:1464:ILE:HG22	1:B:1465:SER:O	2.19	0.42
1:A:372:ILE:HG23	1:A:445:LEU:CD1	2.50	0.42
1:B:195:PHE:CD1	1:B:299:VAL:HG11	2.55	0.42
1:A:1257:THR:HG21	1:A:1299:TYR:CD2	2.55	0.42
1:A:324:VAL:CG1	1:A:325:ASP:N	2.83	0.42
1:B:1120:TYR:HA	1:B:1178:MSE:O	2.19	0.42
1:B:727:LEU:HD22	1:B:1258:HIS:ND1	2.35	0.42
1:B:289:ALA:HB1	1:B:297:THR:HB	2.01	0.42
1:A:623:GLN:HE21	1:A:1155:VAL:CG1	2.33	0.42
1:A:171:THR:CA	1:A:285:ILE:HD12	2.50	0.42
1:B:813:ASP:OD1	1:B:813:ASP:C	2.56	0.42
1:A:1001:TRP:CE2	1:A:1043:ARG:HD3	2.55	0.42
1:B:377:ILE:HD11	1:B:404:ILE:CD1	2.50	0.42
1:B:983:MSE:HE1	1:B:998:PRO:CD	2.50	0.42
1:A:130:LYS:O	1:A:134:GLN:HG3	2.20	0.41
1:A:1383:ILE:CD1	1:A:1410:MSE:CE	2.98	0.41
1:A:889:TYR:OH	1:A:952:LEU:HD22	2.19	0.41
1:B:238:PRO:HB3	1:B:244:ASN:HD21	1.85	0.41
1:B:939:ASP:O	1:B:945:TYR:HB2	2.20	0.41
1:A:1421:THR:O	1:A:1424:MSE:HB3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:573:VAL:HG21	1:B:592:ALA:HB1	2.01	0.41
1:A:1299:TYR:HE1	1:A:1383:ILE:HD13	1.85	0.41
1:B:1298:VAL:HG12	1:B:1299:TYR:HD2	1.84	0.41
1:A:1212:PHE:N	1:A:1212:PHE:CD1	2.88	0.41
1:B:1404:GLY:HA2	1:B:1407:ASP:OD2	2.20	0.41
1:B:1450:LEU:O	1:B:1454:VAL:HG23	2.20	0.41
1:B:498:MSE:CE	1:B:526:TRP:CD1	3.04	0.41
1:A:562:GLU:OE2	1:A:565:LYS:NZ	2.48	0.41
1:A:602:GLY:HA3	1:A:792:ARG:HG3	2.02	0.41
1:A:477:HIS:CE1	1:A:913:TYR:CE1	3.09	0.41
1:B:250:LEU:HD11	1:B:271:LEU:CD1	2.51	0.41
1:A:150:LEU:HD22	1:A:165:PHE:CD2	2.55	0.41
1:A:965:THR:HG22	1:A:966:PRO:O	2.21	0.41
1:A:1434:LEU:N	1:A:1435:PRO:HD2	2.36	0.41
1:A:650:LYS:HA	1:A:694:HIS:HB3	2.03	0.41
1:B:257:ASN:OD1	1:B:268:THR:HG23	2.21	0.41
1:A:1383:ILE:HD13	1:A:1410:MSE:CE	2.49	0.41
1:A:183:THR:HA	1:A:244:ASN:O	2.21	0.41
1:A:498:MSE:HE1	1:A:802:GLU:HG3	2.02	0.41
1:A:1071[B]:HIS:CD2	1:A:1071[B]:HIS:H	2.39	0.40
1:B:219:TRP:NE1	1:B:269:VAL:HG21	2.36	0.40
1:A:127:THR:HG23	1:A:128:VAL:O	2.21	0.40
1:B:422:ASP:OD1	1:B:569:SER:OG	2.29	0.40
1:B:562:GLU:OE2	1:B:565:LYS:NZ	2.45	0.40
1:B:726:TRP:CH2	1:B:1256:ARG:HD2	2.57	0.40
1:B:1383:ILE:CD1	1:B:1410:MSE:CE	2.99	0.40
1:B:1433:TYR:O	1:B:1437:VAL:HG23	2.21	0.40
1:B:641:ASP:O	1:B:982:LYS:NZ	2.54	0.40
1:B:1212:PHE:CD1	1:B:1212:PHE:N	2.90	0.40
1:B:388:GLU:N	1:B:388:GLU:OE2	2.53	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	1331/1531 (87%)	1272 (96%)	55 (4%)	4 (0%)	41	71
1	B	1341/1531 (88%)	1276 (95%)	60 (4%)	5 (0%)	34	66
All	All	2672/3062 (87%)	2548 (95%)	115 (4%)	9 (0%)	41	71

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1254	ASP
1	B	1254	ASP
1	B	662	LEU
1	B	816	TYR
1	A	662	LEU
1	A	551	TRP
1	B	1062	GLN
1	B	765	VAL
1	A	765	VAL

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	1132/1257 (90%)	1094 (97%)	38 (3%)	37	71
1	B	1140/1257 (91%)	1098 (96%)	42 (4%)	34	68
All	All	2272/2514 (90%)	2192 (96%)	80 (4%)	36	70

All (80) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	131	LYS
1	A	204	THR
1	A	247	SER
1	A	253	ASP

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Mol	Chain	Res	Type
1	A	277	ASP
1	A	288	LYS
1	A	320	THR
1	A	335	GLN
1	A	354	SER
1	A	359	THR
1	A	386	ILE
1	A	398	ARG
1	A	437	LYS
1	A	569	SER
1	A	628	MSE
1	A	714	LYS
1	A	728	ASP
1	A	797	TRP
1	A	863	ASP
1	A	870	ARG
1	A	924	VAL
1	A	938	ASN
1	A	940	VAL
1	A	989	GLN
1	A	1016	LYS
1	A	1026	ASP
1	A	1043	ARG
1	A	1052	SER
1	A	1071[A]	HIS
1	A	1071[B]	HIS
1	A	1132	SER
1	A	1150	LEU
1	A	1186	SER
1	A	1217	SER
1	A	1250	GLU
1	A	1296	ASN
1	A	1342	ARG
1	A	1363	LYS
1	B	127	THR
1	B	142	GLU
1	B	194	ARG
1	B	249	THR
1	B	252	SER
1	B	270	THR
1	B	288	LYS
1	B	296	ARG

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Mol	Chain	Res	Type
1	B	320	THR
1	B	366	GLN
1	B	388	GLU
1	B	396	LYS
1	B	451	LEU
1	B	620	SER
1	B	639	HIS
1	B	674	VAL
1	B	724	TRP
1	B	816	TYR
1	B	846	SER
1	B	880	LEU
1	B	908	ASP
1	B	918	GLU
1	B	924	VAL
1	B	938	ASN
1	B	944	GLN
1	B	965	THR
1	B	968	ASN
1	B	1026	ASP
1	B	1043	ARG
1	B	1052	SER
1	B	1132	SER
1	B	1143	THR
1	B	1150	LEU
1	B	1255	ASN
1	B	1296	ASN
1	B	1324	SER
1	B	1348	ASN
1	B	1368	THR
1	B	1409	MSE
1	B	1440	THR
1	B	1464	ILE
1	B	1470	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	413	GLN
1	A	787	ASN
1	A	821	ASN
1	A	909	ASN

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Mol	Chain	Res	Type
1	A	1296	ASN
1	B	148	ASN
1	B	175	ASN
1	B	413	GLN
1	B	657	HIS
1	B	661	HIS
1	B	694	HIS
1	B	787	ASN
1	B	953	ASN
1	B	968	ASN
1	B	1296	ASN
1	B	1300	GLN
1	B	1428	ASN
1	B	1432	ASN
1	B	1456	ASN

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 6 are monoatomic - leaving 2 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
4	GOL	B	2003	-	5,5,5	0.46	0	5,5,5	0.30	0
4	GOL	A	2003	-	5,5,5	0.46	0	5,5,5	0.57	0

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
4	GOL	B	2003	-	-	2/4/4/4	-
4	GOL	A	2003	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	2003	GOL	C1-C2-C3-O3
4	A	2003	GOL	C1-C2-C3-O3
4	A	2003	GOL	O2-C2-C3-O3
4	B	2003	GOL	O2-C2-C3-O3

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	1313/1531 (85%)	0.00	4 (0%) 94 94	29, 49, 83, 128	0
1	B	1323/1531 (86%)	0.21	52 (3%) 39 35	32, 55, 103, 146	0
All	All	2636/3062 (86%)	0.11	56 (2%) 63 61	29, 52, 96, 146	0

All (56) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	281	ASN	5.4
1	B	271	LEU	5.0
1	B	202	LYS	4.1
1	B	275	VAL	3.9
1	B	282	GLU	3.9
1	B	197	VAL	3.8
1	B	229	TRP	3.7
1	B	170	LEU	3.5
1	B	210	VAL	3.4
1	B	169	GLY	3.2
1	B	133	GLN	3.1
1	B	285	ILE	3.1
1	B	239	GLU	3.1
1	B	201	PHE	3.0
1	B	215	ASP	3.0
1	B	280	LYS	2.9
1	B	286	LEU	2.9
1	A	1454	VAL	2.8
1	B	726	TRP	2.8
1	B	1473	ILE	2.8
1	B	200	LYS	2.8
1	B	273	ALA	2.8
1	B	268	THR	2.8
1	B	237	ALA	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	272	PRO	2.7
1	B	284	LYS	2.7
1	A	129	GLU	2.6
1	B	132	GLU	2.5
1	B	184	PHE	2.5
1	B	186	ASP	2.5
1	B	171	THR	2.5
1	B	124	GLU	2.4
1	B	256	LEU	2.4
1	B	148	ASN	2.4
1	B	264	ASN	2.4
1	B	209	PHE	2.3
1	B	164	LEU	2.3
1	B	218	PHE	2.3
1	B	219	TRP	2.3
1	B	162	PRO	2.3
1	A	307	GLU	2.3
1	B	177	ASN	2.2
1	B	134	GLN	2.2
1	A	1437	VAL	2.2
1	B	242	SER	2.2
1	B	292	TYR	2.2
1	B	307	GLU	2.1
1	B	871	SER	2.1
1	B	207	ASN	2.1
1	B	204	THR	2.1
1	B	196	GLY	2.1
1	B	296	ARG	2.1
1	B	279	LEU	2.1
1	B	125	TRP	2.1
1	B	178	ALA	2.0
1	B	180	VAL	2.0

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

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

6.3 Carbohydrates [i](#)

There are no 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. 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(\AA^2)	Q<0.9
4	GOL	A	2003	6/6	0.73	0.30	81,82,82,82	0
4	GOL	B	2003	6/6	0.79	0.21	60,64,65,66	0
3	NA	B	2002	1/1	0.79	0.15	41,41,41,41	0
2	CA	A	2000	1/1	0.85	0.15	63,63,63,63	0
3	NA	A	2002	1/1	0.95	0.14	20,20,20,20	0
2	CA	B	2000	1/1	0.98	0.13	54,54,54,54	0
2	CA	A	2001	1/1	0.99	0.14	42,42,42,42	0
2	CA	B	2001	1/1	0.99	0.14	36,36,36,36	0

6.5 Other polymers [i](#)

There are no such residues in this entry.