



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 31, 2021 – 09:13 pm BST

PDB ID : 7NX7
Title : Crystal structure of the K417N mutant receptor binding domain of SARS-CoV-2 Spike glycoprotein in complex with COVOX-222 and EY6A Fabs
Authors : Zhou, D.; Ren, J.; Stuart, D.
Deposited on : 2021-03-17
Resolution : 2.30 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 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 : 2.18
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) : 2.18

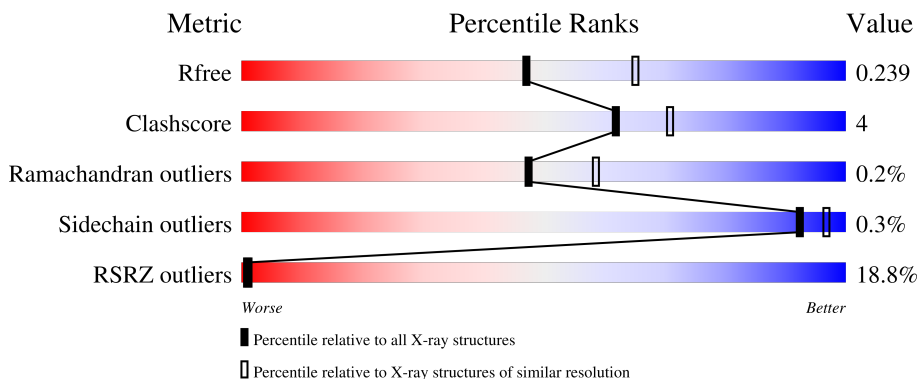
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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}	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	H	226	49% (Poor fit) 81% (0 outliers), 14% (1 outlier), 5% (2 outliers)
2	L	215	37% (Poor fit) 85% (0 outliers), 14% (1 outlier)
3	E	205	3% (Poor fit) 85% (0 outliers), 9% (1 outlier), 6% (2 outliers)
4	A	224	88% (0 outliers), 7% (1 outlier), . (2 outliers)
5	B	214	86% (0 outliers), 13% (1 outlier)

2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 8377 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 EY6A Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	H	214	1628	1036	272	314	6	0	0	0

- Molecule 2 is a protein called EY6A Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	214	1631	1019	272	335	5	0	0	0

- Molecule 3 is a protein called Spike protein S1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	E	193	1528	978	255	287	8	0	0	0

There are 11 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	324	GLU	-	expression tag	UNP P0DTC2
E	325	THR	-	expression tag	UNP P0DTC2
E	326	GLY	-	expression tag	UNP P0DTC2
E	327	HIS	-	expression tag	UNP P0DTC2
E	328	HIS	-	expression tag	UNP P0DTC2
E	329	HIS	-	expression tag	UNP P0DTC2
E	330	HIS	-	expression tag	UNP P0DTC2
E	331	HIS	-	expression tag	UNP P0DTC2
E	332	HIS	-	expression tag	UNP P0DTC2
E	417	ASN	LYS	engineered mutation	UNP P0DTC2
E	527	LYS	PRO	conflict	UNP P0DTC2

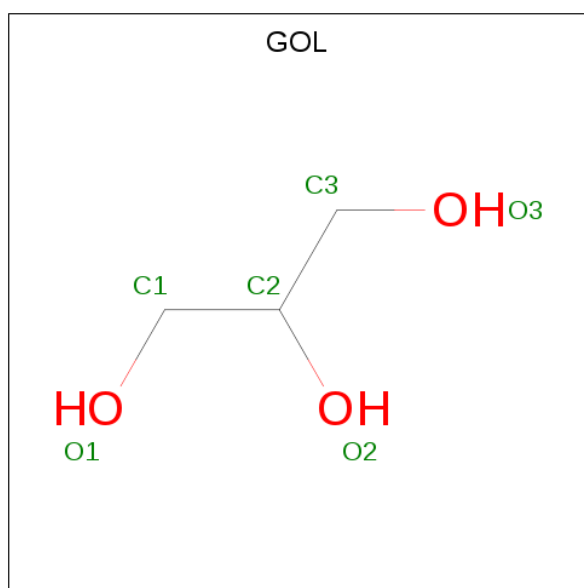
- Molecule 4 is a protein called COVOX-222 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	A	214	1577	995	263	313	6	0	0	0

- Molecule 5 is a protein called COVOX-222 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	B	213	1640	1025	279	330	6	0	2	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
7	E	1	14	8	1	5	0	0

- Molecule 8 is SULFATE ION (three-letter code: SO₄) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	S		
8	E	1	5	4	1	0	0
8	E	1	5	4	1	0	0
8	E	1	5	4	1	0	0

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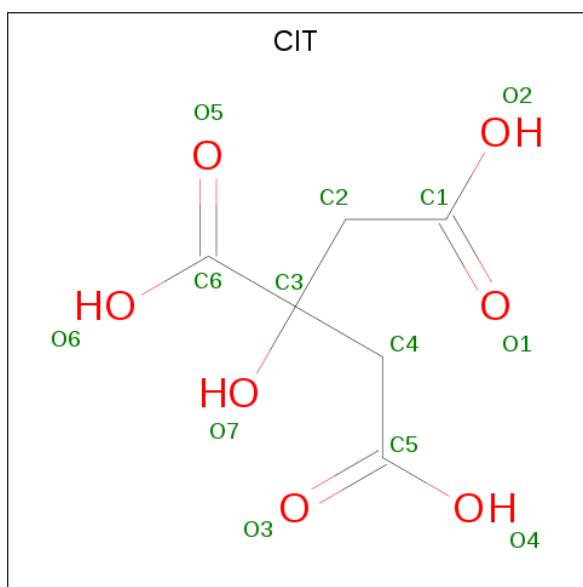
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total O S 5 4 1	0	0
8	A	1	Total O S 5 4 1	0	0
8	A	1	Total O S 5 4 1	0	0
8	B	1	Total O S 5 4 1	0	0
8	B	1	Total O S 5 4 1	0	0
8	B	1	Total O S 5 4 1	0	0
8	B	1	Total O S 5 4 1	0	0
8	B	1	Total O S 5 4 1	0	0
8	B	1	Total O S 5 4 1	0	0
8	B	1	Total O S 5 4 1	0	0

- Molecule 9 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total Cl 1 1	0	0

- Molecule 10 is CITRIC ACID (three-letter code: CIT) (formula: C₆H₈O₇).




Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	B	1	Total C O 13 6 7	0	0

- Molecule 11 is water.


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	H	1	Total O 1 1	0	0
11	L	13	Total O 13 13	0	0
11	E	62	Total O 62 62	0	0
11	A	95	Total O 95 95	0	0
11	B	91	Total O 91 91	0	0

- Molecule 4: COVOX-222 Fab heavy chain

Chain A:  88% 7%



- Molecule 5: COVOX-222 Fab light chain

Chain B:  86% 13%



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	54.71Å 122.36Å 213.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	80.49 – 2.30 80.49 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (80.49-2.30) 100.0 (80.49-2.30)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.99 (at 2.29Å)	Xtrriage
Refinement program	PHENIX 1.19_4092	Depositor
R, R_{free}	0.207 , 0.239 0.209 , 0.239	Depositor DCC
R_{free} test set	3234 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	51.7	Xtrriage
Anisotropy	0.136	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 51.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	8377	wwPDB-VP
Average B, all atoms (Å ²)	86.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.09% 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: SO4, GOL, CL, CIT, NAG

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	H	0.27	0/1670	0.50	0/2276
2	L	0.28	0/1664	0.49	0/2258
3	E	0.28	0/1571	0.49	0/2139
4	A	0.29	0/1615	0.52	0/2203
5	B	0.28	0/1683	0.54	0/2287
All	All	0.28	0/8203	0.51	0/11163

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 [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	H	1628	0	1582	15	0
2	L	1631	0	1591	19	0
3	E	1528	0	1438	9	0
4	A	1577	0	1534	10	0
5	B	1640	0	1594	16	0
6	A	6	0	8	0	0
6	B	6	0	8	1	0
6	E	6	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	E	14	0	13	1	0
8	A	15	0	0	0	0
8	B	35	0	0	1	0
8	E	15	0	0	0	0
9	A	1	0	0	1	0
10	B	13	0	5	2	0
11	A	95	0	0	1	0
11	B	91	0	0	2	0
11	E	62	0	0	0	0
11	H	1	0	0	0	0
11	L	13	0	0	0	0
All	All	8377	0	7781	70	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 4.

All (70) 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)
5:B:81:PRO:HA	5:B:106:ILE:HD13	1.69	0.74
1:H:6:GLU:H	1:H:113:GLN:HE22	1.36	0.72
4:A:22:CYS:HB3	4:A:78:LEU:HB3	1.75	0.68
2:L:37:GLN:HB2	2:L:47:LEU:HD11	1.74	0.67
3:E:340:GLU:OE1	3:E:356:LYS:NZ	2.30	0.65
4:A:149:LYS:NZ	4:A:177:GLN:OE1	2.30	0.65
1:H:83:MET:HB3	1:H:86:LEU:HD21	1.81	0.63
4:A:82:MET:HB3	4:A:85:LEU:HD21	1.81	0.63
5:B:169:LYS:HD2	6:B:401:GOL:H32	1.80	0.62
5:B:142:ARG:NH2	8:B:405:SO4:O2	2.36	0.58
1:H:100:GLY:HA3	1:H:107:TYR:CZ	2.38	0.58
3:E:339:GLY:HA3	7:E:702:NAG:H82	1.86	0.58
2:L:39:LYS:HD3	2:L:84:ALA:HB2	1.86	0.57
3:E:412:PRO:HG3	3:E:429:PHE:HB3	1.87	0.57
4:A:11:LEU:HB2	4:A:153:PRO:HG3	1.88	0.56
5:B:84:PHE:HB2	5:B:106:ILE:HD12	1.88	0.55
4:A:123:LYS:NZ	11:A:404:HOH:O	2.39	0.54
1:H:34:MET:HB3	1:H:79:LEU:HD22	1.92	0.52
10:B:402:CIT:O4	10:B:402:CIT:O7	2.22	0.52
2:L:147:VAL:HG21	2:L:176:LEU:HD22	1.92	0.51
3:E:403:ARG:HD2	3:E:505:TYR:HA	1.91	0.51
2:L:109:ARG:NH1	2:L:110:THR:O	2.44	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:388:ASN:HA	3:E:526:GLY:HA3	1.93	0.50
5:B:31:SER:HB2	10:B:402:CIT:H41	1.93	0.50
1:H:91:THR:HG23	1:H:118:THR:HA	1.94	0.50
2:L:104:LYS:NZ	2:L:166:GLU:OE1	2.40	0.49
2:L:120:PRO:HB3	2:L:210:PHE:CE2	2.47	0.49
1:H:152:ASP:OD1	1:H:179:GLN:NE2	2.46	0.49
2:L:187:TYR:O	2:L:193:TYR:OH	2.30	0.49
2:L:131:ALA:HB3	2:L:182:LEU:HD12	1.95	0.48
2:L:61:ARG:NE	2:L:82:ASP:OD2	2.41	0.48
2:L:109:ARG:HH12	2:L:112:ALA:HB2	1.79	0.47
3:E:379:CYS:SG	3:E:384:PRO:HG3	2.55	0.47
3:E:393:THR:HA	3:E:522:ALA:HA	1.97	0.46
5:B:55:ARG:HG2	5:B:59:ILE:HB	1.96	0.46
3:E:403:ARG:HG3	3:E:495:TYR:CE1	2.52	0.45
4:A:155:PRO:HA	9:A:305:CL:CL	2.53	0.45
1:H:39:GLN:HB2	1:H:45:LEU:HD23	1.99	0.45
5:B:1:ASP:N	11:B:501:HOH:O	2.29	0.45
2:L:114:PRO:HB3	2:L:140:PHE:CD2	2.52	0.45
4:A:59:TYR:HB2	4:A:64:LYS:HG2	1.98	0.45
1:H:29:PHE:O	1:H:72:ARG:NH2	2.50	0.45
4:A:36:TRP:CE2	4:A:80:LEU:HB2	2.52	0.44
1:H:208:HIS:CD2	1:H:210:PRO:HD2	2.53	0.44
1:H:131:PRO:HD3	1:H:217:LYS:HD3	2.00	0.43
5:B:120:PRO:HD3	5:B:132:VAL:HG22	1.99	0.43
5:B:90:GLN:HG2	5:B:97:ARG:O	2.18	0.43
4:A:60:ALA:O	4:A:64:LYS:HG3	2.19	0.43
1:H:88:ALA:HA	1:H:119:VAL:HB	2.00	0.43
2:L:35:TRP:CE2	2:L:73:LEU:HB2	2.54	0.43
5:B:93:ASP:OD1	5:B:94:THR:N	2.45	0.43
2:L:130:THR:HA	2:L:183:SER:HA	2.00	0.43
2:L:106:GLU:HB2	2:L:167:GLN:OE1	2.19	0.42
2:L:109:ARG:HG3	2:L:110:THR:O	2.18	0.42
1:H:24:ALA:HB1	1:H:27:PHE:CE1	2.55	0.42
5:B:145:LYS:HB3	5:B:197:THR:OG1	2.20	0.42
5:B:210:ASN:HB2	5:B:213:GLU:HB2	2.01	0.42
2:L:116:VAL:HA	2:L:136:LEU:O	2.20	0.41
2:L:11:LEU:O	2:L:106:GLU:HG2	2.19	0.41
2:L:131:ALA:N	2:L:182:LEU:O	2.50	0.41
5:B:62:ARG:HB2	5:B:77:SER:O	2.20	0.41
5:B:91:HIS:HD2	11:B:584:HOH:O	2.03	0.41
5:B:48:LEU:HB3	5:B:49:ILE:HD12	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:357:ARG:HG3	3:E:396:TYR:CE1	2.55	0.41
5:B:19:ALA:HB3	5:B:76:ILE:HB	2.02	0.41
1:H:147:GLY:HA2	1:H:162:TRP:CZ2	2.56	0.41
1:H:52:SER:HB3	1:H:57:ASN:HB2	2.04	0.40
1:H:69:THR:HB	1:H:82:GLN:HB3	2.03	0.40
2:L:176:LEU:HD23	2:L:177:SER:N	2.36	0.40
4:A:149:LYS:HG2	4:A:150:ASP:CG	2.42	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	H	210/226 (93%)	201 (96%)	8 (4%)	1 (0%)	29	35
2	L	212/215 (99%)	200 (94%)	12 (6%)	0	100	100
3	E	191/205 (93%)	186 (97%)	4 (2%)	1 (0%)	29	35
4	A	210/224 (94%)	203 (97%)	7 (3%)	0	100	100
5	B	213/214 (100%)	206 (97%)	7 (3%)	0	100	100
All	All	1036/1084 (96%)	996 (96%)	38 (4%)	2 (0%)	47	58

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	E	371	SER
1	H	155	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	H	180/191 (94%)	180 (100%)	0	100	100
2	L	187/188 (100%)	187 (100%)	0	100	100
3	E	166/177 (94%)	165 (99%)	1 (1%)	86	94
4	A	176/186 (95%)	176 (100%)	0	100	100
5	B	186/185 (100%)	184 (99%)	2 (1%)	73	86
All	All	895/927 (96%)	892 (100%)	3 (0%)	92	97

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	E	469	SER
5	B	26	SER
5	B	34	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
3	E	501	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 monosaccharides in this entry.

5.6 Ligand geometry i

Of 19 ligands modelled in this entry, 1 is monoatomic - leaving 18 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
8	SO4	B	405	-	4,4,4	0.14	0	6,6,6	0.07	0
10	CIT	B	402	-	3,12,12	1.29	0	3,17,17	1.50	1 (33%)
8	SO4	E	704	-	4,4,4	0.14	0	6,6,6	0.08	0
8	SO4	A	304	-	4,4,4	0.15	0	6,6,6	0.05	0
6	GOL	E	701	-	5,5,5	0.88	0	5,5,5	1.02	0
8	SO4	B	408	-	4,4,4	0.15	0	6,6,6	0.05	0
8	SO4	B	409	-	4,4,4	0.15	0	6,6,6	0.06	0
8	SO4	B	404	-	4,4,4	0.14	0	6,6,6	0.10	0
8	SO4	A	302	-	4,4,4	0.14	0	6,6,6	0.09	0
8	SO4	B	406	-	4,4,4	0.15	0	6,6,6	0.09	0
7	NAG	E	702	3	14,14,15	0.35	0	17,19,21	0.58	0
8	SO4	A	303	-	4,4,4	0.14	0	6,6,6	0.07	0
6	GOL	B	401	-	5,5,5	0.87	0	5,5,5	1.07	0
8	SO4	E	705	-	4,4,4	0.14	0	6,6,6	0.06	0
8	SO4	B	407	-	4,4,4	0.14	0	6,6,6	0.05	0
8	SO4	E	703	-	4,4,4	0.15	0	6,6,6	0.06	0
8	SO4	B	403	-	4,4,4	0.14	0	6,6,6	0.06	0
6	GOL	A	301	-	5,5,5	0.91	0	5,5,5	0.95	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
10	CIT	B	402	-	-	4/6/16/16	-
6	GOL	E	701	-	-	2/4/4/4	-
7	NAG	E	702	3	-	2/6/23/26	0/1/1/1
6	GOL	B	401	-	-	3/4/4/4	-
6	GOL	A	301	-	-	4/4/4/4	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
10	B	402	CIT	C3-C4-C5	-2.26	111.37	114.98

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	E	701	GOL	O1-C1-C2-C3
7	E	702	NAG	O5-C5-C6-O6
6	A	301	GOL	O1-C1-C2-C3
6	A	301	GOL	C1-C2-C3-O3
6	B	401	GOL	O1-C1-C2-C3
6	B	401	GOL	C1-C2-C3-O3
6	E	701	GOL	O1-C1-C2-O2
6	A	301	GOL	O1-C1-C2-O2
6	B	401	GOL	O2-C2-C3-O3
7	E	702	NAG	C4-C5-C6-O6
6	A	301	GOL	O2-C2-C3-O3
10	B	402	CIT	C6-C3-C4-C5
10	B	402	CIT	C1-C2-C3-O7
10	B	402	CIT	O7-C3-C4-C5
10	B	402	CIT	C2-C3-C4-C5

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	B	405	SO4	1	0
10	B	402	CIT	2	0
7	E	702	NAG	1	0
6	B	401	GOL	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	H	214/226 (94%)	2.81	111 (51%) 0 0	72, 142, 188, 207	0
2	L	214/215 (99%)	2.05	79 (36%) 0 0	57, 117, 179, 199	0
3	E	193/205 (94%)	0.49	6 (3%) 49 56	39, 57, 117, 145	0
4	A	214/224 (95%)	0.45	1 (0%) 91 94	39, 50, 81, 127	0
5	B	213/214 (99%)	0.34	0 100 100	42, 54, 75, 111	0
All	All	1048/1084 (96%)	1.24	197 (18%) 1 1	39, 67, 176, 207	0

All (197) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	135	SER	16.0
2	L	194	ALA	14.6
1	H	160	VAL	13.3
1	H	192	VAL	11.9
2	L	193	TYR	11.4
1	H	134	PRO	10.6
1	H	144	ALA	10.2
1	H	162	TRP	10.0
1	H	161	SER	9.5
2	L	136	LEU	9.5
2	L	181	THR	9.3
1	H	190	VAL	8.6
1	H	11	VAL	8.6
1	H	203	ILE	8.5
1	H	218	ARG	8.1
1	H	216	ASP	7.9
1	H	204	CYS	7.8
2	L	127	LYS	7.8
1	H	131	PRO	7.8
2	L	210	PHE	7.7

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Mol	Chain	Res	Type	RSRZ
1	H	215	VAL	7.7
1	H	168	THR	7.5
2	L	151	VAL	7.4
2	L	206	VAL	7.3
1	H	130	PHE	7.2
2	L	145	ALA	7.1
1	H	205	ASN	7.0
1	H	79	LEU	7.0
2	L	117	PHE	7.0
2	L	152	ASP	6.7
2	L	137	LEU	6.7
1	H	2	VAL	6.6
1	H	206	VAL	6.5
1	H	202	TYR	6.5
1	H	146	LEU	6.4
1	H	148	CYS	6.1
1	H	173	THR	6.1
1	H	219	VAL	6.0
2	L	187	TYR	5.9
2	L	189	LYS	5.8
1	H	164	SER	5.8
2	L	134	VAL	5.5
1	H	198	GLY	5.5
2	L	195	CYS	5.5
1	H	6	GLU	5.4
1	H	193	PRO	5.4
2	L	182	LEU	5.4
1	H	80	TYR	5.4
2	L	200	GLN	5.3
3	E	369	TYR	5.3
2	L	202	LEU	5.3
1	H	159	THR	5.2
1	H	158	VAL	5.2
1	H	210	PRO	5.2
1	H	132	LEU	5.1
1	H	189	VAL	5.1
2	L	198	THR	5.1
1	H	30	SER	5.1
2	L	126	LEU	5.0
2	L	197	VAL	5.0
1	H	117	VAL	4.9
1	H	201	THR	4.9

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Mol	Chain	Res	Type	RSRZ
2	L	147	VAL	4.8
2	L	135	CYS	4.8
1	H	156	GLU	4.8
1	H	167	LEU	4.8
1	H	217	LYS	4.7
2	L	208	LYS	4.7
1	H	150	VAL	4.6
1	H	133	ALA	4.6
1	H	200	GLN	4.5
2	L	115	SER	4.5
2	L	132	SER	4.5
1	H	195	SER	4.5
2	L	121	PRO	4.4
2	L	119	PHE	4.4
1	H	31	SER	4.4
2	L	165	THR	4.3
2	L	120	PRO	4.2
1	H	209	LYS	4.2
1	H	171	VAL	4.2
1	H	129	VAL	4.2
2	L	209	SER	4.2
2	L	185	ALA	4.1
2	L	149	TRP	4.0
1	H	12	VAL	4.0
1	H	166	ALA	3.9
2	L	130	THR	3.9
1	H	155	PRO	3.9
2	L	150	LYS	3.9
2	L	123	ASP	3.8
1	H	163	ASN	3.8
1	H	27	PHE	3.7
2	L	87	TYR	3.7
2	L	199	HIS	3.7
3	E	518	LEU	3.7
1	H	26	ALA	3.7
2	L	213	GLY	3.6
3	E	368	LEU	3.6
1	H	5	VAL	3.6
1	H	18	LEU	3.6
1	H	20	LEU	3.6
1	H	10	GLY	3.5
2	L	21	ILE	3.5

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Mol	Chain	Res	Type	RSRZ
1	H	78	THR	3.5
1	H	29	PHE	3.5
1	H	7	SER	3.5
2	L	138	ASN	3.5
2	L	203	SER	3.5
1	H	212	ASN	3.4
2	L	155	LEU	3.4
1	H	145	ALA	3.4
1	H	157	PRO	3.4
2	L	184	LYS	3.4
1	H	28	THR	3.4
1	H	197	LEU	3.4
2	L	176	LEU	3.3
1	H	221	PRO	3.2
1	H	66	GLY	3.2
1	H	188	SER	3.2
2	L	112	ALA	3.2
2	L	161	GLN	3.2
1	H	194	SER	3.2
2	L	157	SER	3.2
2	L	191	LYS	3.2
1	H	124	THR	3.1
1	H	191	THR	3.1
3	E	521	PRO	3.1
1	H	9	GLY	3.1
2	L	146	LYS	3.1
2	L	141	TYR	3.0
1	H	118	THR	3.0
2	L	133	VAL	3.0
1	H	214	LYS	3.0
1	H	149	LEU	2.9
1	H	196	SER	2.9
1	H	115	THR	2.9
2	L	192	VAL	2.9
2	L	156	GLN	2.9
2	L	19	VAL	2.9
2	L	204	SER	2.9
2	L	148	GLN	2.9
2	L	211	ASN	2.8
1	H	110	TYR	2.8
1	H	184	TYR	2.8
2	L	179	THR	2.8

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Mol	Chain	Res	Type	RSRZ
1	H	186	LEU	2.8
2	L	178	SER	2.8
2	L	183	SER	2.8
1	H	199	THR	2.8
1	H	94	TYR	2.8
1	H	119	VAL	2.8
2	L	139	ASN	2.8
2	L	153	ASN	2.8
1	H	211	SER	2.8
2	L	142	PRO	2.8
1	H	111	TRP	2.8
1	H	143	THR	2.7
2	L	207	THR	2.7
1	H	86	LEU	2.7
2	L	111	VAL	2.7
3	E	365	TYR	2.6
4	A	1	GLU	2.6
2	L	75	ILE	2.6
1	H	181	SER	2.6
2	L	140	PHE	2.6
2	L	128	SER	2.5
1	H	187	SER	2.5
1	H	36	TRP	2.5
2	L	116	VAL	2.5
1	H	213	THR	2.5
1	H	97	ALA	2.4
1	H	96	CYS	2.4
1	H	16	ARG	2.4
1	H	22	CYS	2.4
2	L	188	GLU	2.4
1	H	50	VAL	2.3
2	L	24	ARG	2.3
2	L	212	ARG	2.3
1	H	81	LEU	2.3
2	L	214	GLU	2.3
1	H	142	GLY	2.3
2	L	190	HIS	2.3
1	H	121	SER	2.3
1	H	4	LEU	2.2
2	L	31	SER	2.2
3	E	335	LEU	2.2
1	H	178	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
2	L	201	GLY	2.2
1	H	207	ASN	2.2
1	H	122	ALA	2.1
1	H	174	PHE	2.1
2	L	118	ILE	2.1
1	H	87	ARG	2.0
1	H	21	SER	2.0
1	H	76	LYS	2.0
1	H	82	GLN	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 monosaccharides 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(Å ²)	Q<0.9
6	GOL	B	401	6/6	0.69	0.21	76,88,90,91	0
8	SO4	A	304	5/5	0.69	0.35	94,101,113,167	0
8	SO4	B	403	5/5	0.72	0.22	112,115,137,153	0
7	NAG	E	702	14/15	0.76	0.24	108,117,124,126	0
10	CIT	B	402	13/13	0.77	0.20	74,89,124,125	0
8	SO4	B	408	5/5	0.78	0.15	140,144,153,194	0
8	SO4	E	704	5/5	0.78	0.26	105,117,121,130	0
8	SO4	E	705	5/5	0.81	0.22	114,121,139,175	0
8	SO4	B	405	5/5	0.84	0.22	86,99,107,125	0
8	SO4	A	303	5/5	0.87	0.18	81,83,87,160	0
8	SO4	B	406	5/5	0.87	0.24	84,89,122,161	0
6	GOL	E	701	6/6	0.88	0.14	64,68,75,83	0
8	SO4	B	407	5/5	0.88	0.29	115,122,163,164	0
8	SO4	B	409	5/5	0.89	0.19	98,109,140,141	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
8	SO4	B	404	5/5	0.89	0.12	73,85,101,103	0
8	SO4	E	703	5/5	0.90	0.23	83,87,123,134	0
6	GOL	A	301	6/6	0.91	0.23	50,58,62,77	0
9	CL	A	305	1/1	0.97	0.11	64,64,64,64	0
8	SO4	A	302	5/5	0.97	0.14	64,74,82,84	0

6.5 Other polymers [i](#)

There are no such residues in this entry.