



Full wwPDB X-ray Structure Validation Report ⓘ

May 22, 2020 – 03:17 am BST

PDB ID : 6G88
Title : Crystal structure of Enterococcus Faecium D63r Penicillin-Binding protein 5 (PBP5fm)
Authors : Sauvage, E.; El Gachi, M.; Herman, R.; Kerff, F.; Charlier, P.
Deposited on : 2018-04-08
Resolution : 3.30 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The 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
buster-report : 1.1.7 (2018)
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

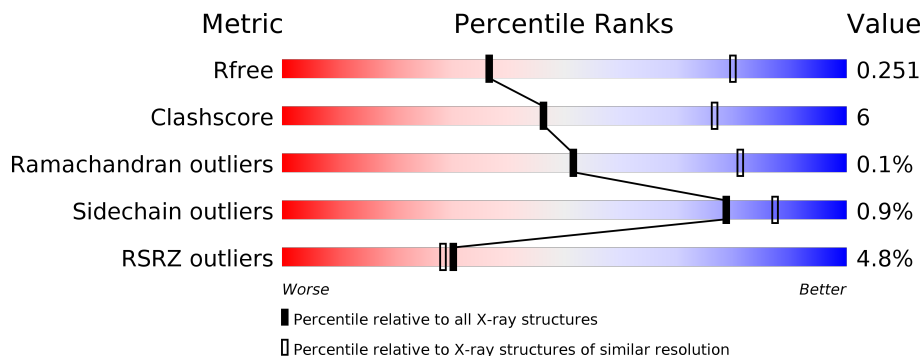
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 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}	130704	1149 (3.34-3.26)
Clashscore	141614	1205 (3.34-3.26)
Ramachandran outliers	138981	1183 (3.34-3.26)
Sidechain outliers	138945	1182 (3.34-3.26)
RSRZ outliers	127900	1115 (3.34-3.26)

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	649	 8% 81% 15%
1	B	649	 2% 78% 11% 11%
1	C	649	 4% 83% 9% 8%

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 26921 atoms, of which 13008 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.

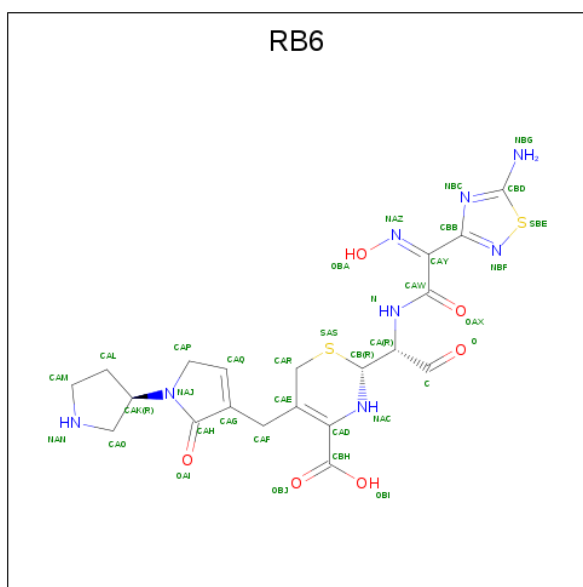
- Molecule 1 is a protein called Low affinity penicillin-binding protein 5 (PBP5).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	622	Total 9149	C 2981	H 4389	N 787	O 979	S 13	0	0	0
1	B	580	Total 8692	C 2791	H 4240	N 736	O 912	S 13	0	0	0
1	C	597	Total 8957	C 2870	H 4379	N 758	O 937	S 13	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

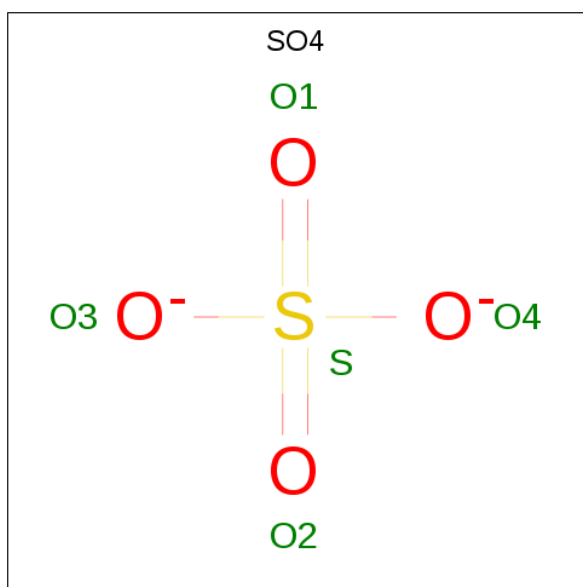
Chain	Residue	Modelled	Actual	Comment	Reference
A	32	MET	-	initiating methionine	UNP Q47759
A	33	GLY	-	expression tag	UNP Q47759
A	679	LEU	-	expression tag	UNP Q47759
A	680	GLU	-	expression tag	UNP Q47759
B	32	MET	-	initiating methionine	UNP Q47759
B	33	GLY	-	expression tag	UNP Q47759
B	679	LEU	-	expression tag	UNP Q47759
B	680	GLU	-	expression tag	UNP Q47759
C	32	MET	-	initiating methionine	UNP Q47759
C	33	GLY	-	expression tag	UNP Q47759
C	679	LEU	-	expression tag	UNP Q47759
C	680	GLU	-	expression tag	UNP Q47759

- Molecule 2 is (2R)-2-[(1R)-1-{{(2Z)-2-(5-amino-1,2,4-thiadiazol-3-yl)-2-(hydroxyimino)acetyl}amino}-2-oxoethyl]-5-({2-oxo-1-[(3R)-pyrrolidin-3-yl]-2,5-dihydro-1H-pyrrol-3-yl}methyl)-3,6-dihydro-2H-1,3-thiazine-4-carboxylic acid (three-letter code: RB6) (formula: C₂₀H₂₄N₈O₆S₂).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			36	20	8	6	2		
2	B	1	Total	C	N	O	S	0	0
			36	20	8	6	2		
2	C	1	Total	C	N	O	S	0	0
			36	20	8	6	2		

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



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

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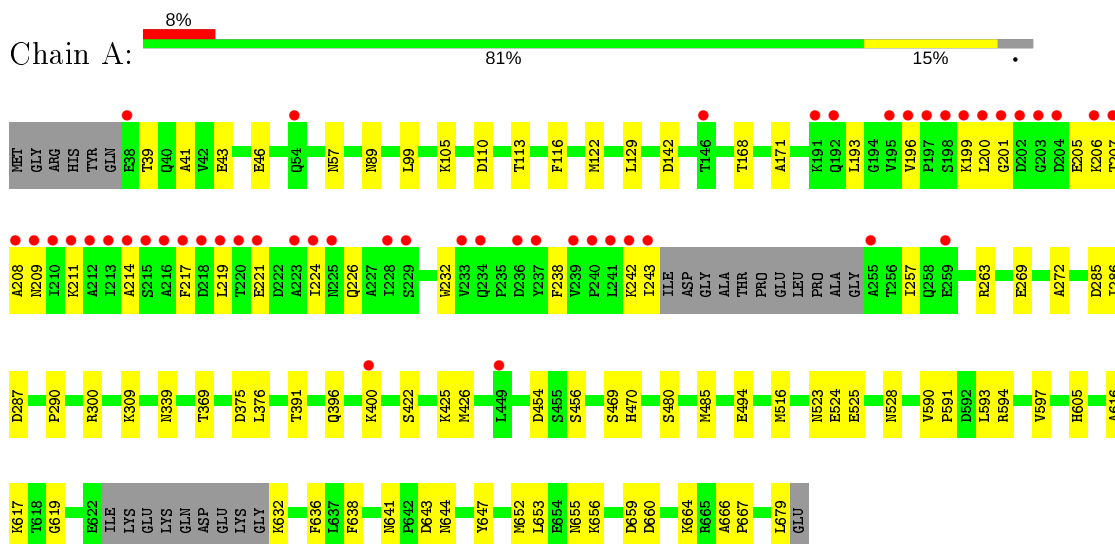
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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		

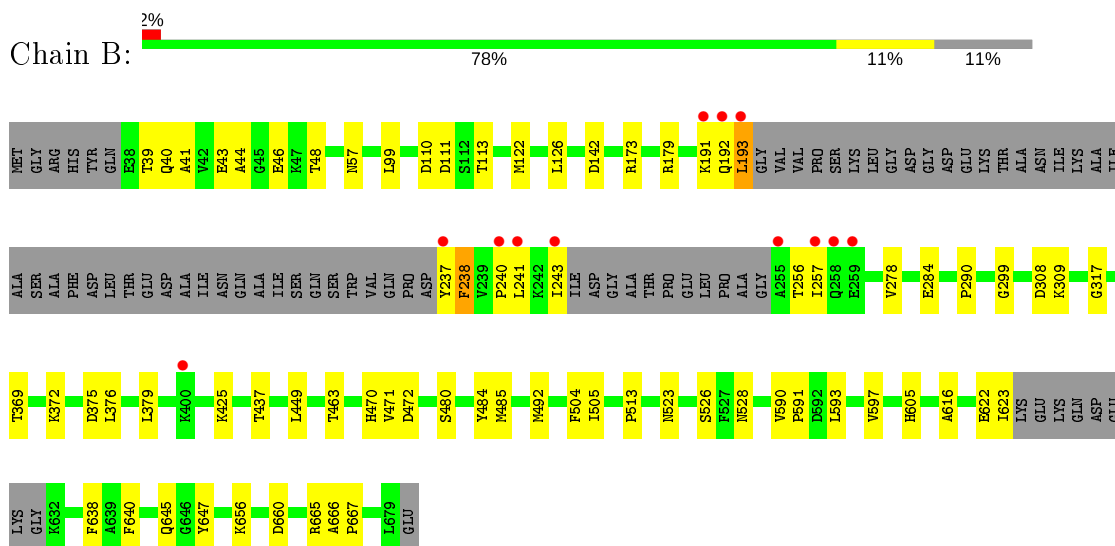
3 Residue-property plots [i](#)

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.

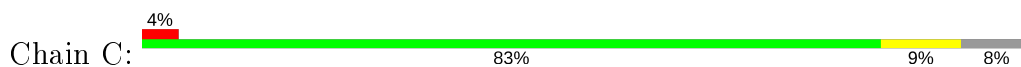
- Molecule 1: Low affinity penicillin-binding protein 5 (PBP5)

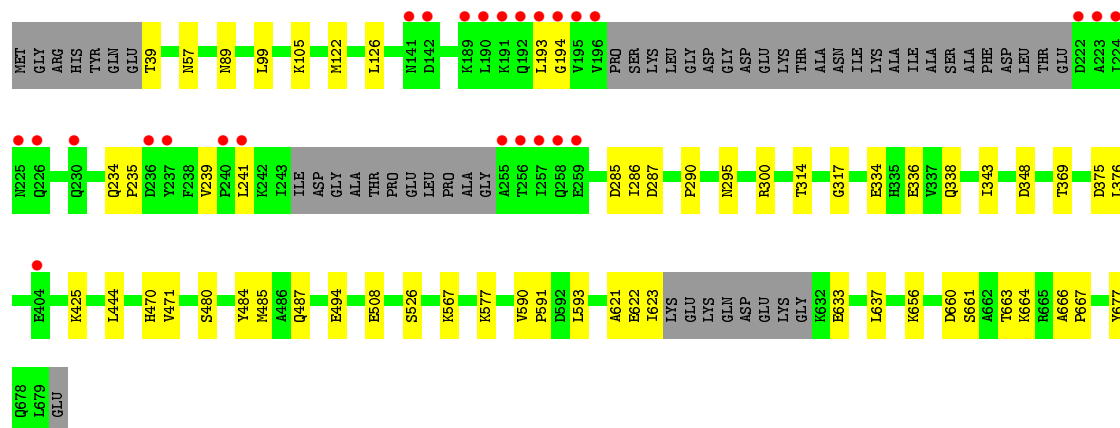


- Molecule 1: Low affinity penicillin-binding protein 5 (PBP5)



- Molecule 1: Low affinity penicillin-binding protein 5 (PBP5)





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	79.19Å 128.74Å 238.48Å 90.00° 94.04° 90.00°	Depositor
Resolution (Å)	47.58 – 3.30 47.58 – 3.30	Depositor EDS
% Data completeness (in resolution range)	99.7 (47.58-3.30) 99.7 (47.58-3.30)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.95 (at 3.33Å)	Xtrriage
Refinement program	PHENIX (1.13_2998: ???)	Depositor
R, R_{free}	0.200 , 0.251 0.201 , 0.251	Depositor DCC
R_{free} test set	1802 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	60.5	Xtrriage
Anisotropy	0.544	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 45.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	26921	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.44% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical 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: RB6, SO4

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	0.30	0/4832	0.53	0/6533
1	B	0.31	0/4518	0.56	0/6103
1	C	0.29	0/4647	0.53	0/6282
All	All	0.30	0/13997	0.54	0/18918

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	A	4760	4389	4698	67	0
1	B	4452	4240	4402	57	2
1	C	4578	4379	4523	39	2
2	A	36	0	22	8	0
2	B	36	0	22	10	0
2	C	36	0	22	7	0
3	A	5	0	0	1	0
3	B	5	0	0	0	0
3	C	5	0	0	0	0
All	All	13913	13008	13689	173	2

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 (173) 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:217:PHE:O	1:A:242:LYS:NZ	1.97	0.95
1:C:234:GLN:HB3	1:C:235:PRO:HD2	1.50	0.91
1:A:523:ASN:O	1:A:524:GLU:HG3	1.76	0.86
1:B:99:LEU:CD1	1:B:122:MET:HB3	2.14	0.78
2:A:700:RB6:H19	2:A:700:RB6:OAI	1.83	0.78
1:A:201:GLY:O	1:A:206:LYS:HB2	1.85	0.76
1:A:207:THR:O	1:A:211:LYS:HE2	1.86	0.76
1:C:99:LEU:HD13	1:C:122:MET:HB3	1.66	0.76
1:A:285:ASP:OD1	1:A:300:ARG:NH2	2.19	0.74
1:C:99:LEU:CD1	1:C:122:MET:HB3	2.17	0.74
1:A:480:SER:OG	2:A:700:RB6:H7	1.88	0.74
1:B:99:LEU:HD13	1:B:122:MET:HB3	1.70	0.73
1:A:594:ARG:NH2	1:A:643:ASP:OD1	2.22	0.72
1:B:192:GLN:HG3	1:B:238:PHE:HE2	1.53	0.72
1:C:234:GLN:HB3	1:C:235:PRO:CD	2.21	0.70
1:B:237:TYR:O	1:B:238:PHE:HB2	1.91	0.70
1:A:425:LYS:CD	1:A:485:MET:HG3	2.24	0.67
1:C:193:LEU:O	1:C:241:LEU:N	2.27	0.67
1:C:285:ASP:OD1	1:C:300:ARG:NH2	2.26	0.66
1:B:193:LEU:HB3	1:B:241:LEU:HB2	1.77	0.65
1:B:437:THR:HG21	1:B:492:MET:HB3	1.79	0.65
1:B:39:THR:HG22	1:B:41:ALA:H	1.63	0.64
2:B:700:RB6:H8	2:B:700:RB6:N	2.13	0.63
1:B:40:GLN:O	1:B:44:ALA:HB2	1.98	0.62
1:A:369:THR:HG22	1:A:376:LEU:HD23	1.80	0.62
1:B:193:LEU:HA	1:B:257:ILE:HG12	1.82	0.62
2:B:700:RB6:H8	2:B:700:RB6:OBA	2.00	0.61
2:A:700:RB6:H8	2:A:700:RB6:OBA	2.00	0.61
1:A:616:ALA:HB1	1:A:638:PHE:O	2.01	0.61
2:C:700:RB6:H12	2:C:700:RB6:OBJ	2.00	0.60
1:A:168:THR:O	1:C:295:ASN:ND2	2.35	0.59
1:C:508:GLU:OE2	1:C:577:LYS:NZ	2.35	0.59
2:A:700:RB6:H12	2:A:700:RB6:OBJ	2.02	0.59
1:A:196:VAL:O	1:A:200:LEU:HD13	2.02	0.59
1:B:110:ASP:OD1	1:B:111:ASP:N	2.35	0.59
1:B:480:SER:OG	2:B:700:RB6:H7	2.03	0.59
1:B:369:THR:HG22	1:B:376:LEU:HD23	1.84	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:173:ARG:NH2	1:B:308:ASP:OD2	2.32	0.57
1:A:494:GLU:N	3:A:701:SO4:O2	2.39	0.56
1:A:309:LYS:HB2	1:B:528:ASN:HA	1.87	0.56
1:A:632:LYS:HD3	1:A:655:ASN:OD1	2.05	0.56
1:A:425:LYS:HD2	1:A:485:MET:HG3	1.88	0.55
2:B:700:RB6:OBJ	2:B:700:RB6:H12	2.05	0.55
2:C:700:RB6:N	2:C:700:RB6:H8	2.22	0.55
1:C:286:ILE:HG23	1:C:290:PRO:HA	1.89	0.54
1:B:660:ASP:OD1	1:B:665:ARG:NH2	2.32	0.54
1:A:644:ASN:HB2	1:A:679:LEU:HD12	1.89	0.54
1:B:666:ALA:N	1:B:667:PRO:CD	2.70	0.54
2:A:700:RB6:N	2:A:700:RB6:H8	2.22	0.54
1:B:238:PHE:HE1	1:B:256:THR:O	1.90	0.54
1:A:201:GLY:HA3	1:A:205:GLU:C	2.27	0.54
1:A:523:ASN:C	1:A:524:GLU:HG3	2.28	0.54
1:C:369:THR:HG22	1:C:376:LEU:HD23	1.89	0.53
1:B:44:ALA:O	1:B:48:THR:OG1	2.26	0.53
1:A:525:GLU:HG3	1:B:513:PRO:HA	1.90	0.53
1:C:193:LEU:HG	1:C:241:LEU:HB2	1.92	0.52
1:A:89:ASN:ND2	1:C:287:ASP:OD2	2.42	0.52
1:A:171:ALA:HB1	1:A:339:ASN:HA	1.91	0.52
1:A:597:VAL:O	1:A:605:HIS:HA	2.09	0.52
1:A:226:GLN:OE1	1:A:396:GLN:NE2	2.42	0.52
1:B:192:GLN:CG	1:B:238:PHE:HE2	2.21	0.52
1:B:193:LEU:HD12	1:B:193:LEU:O	2.10	0.51
1:C:666:ALA:N	1:C:667:PRO:HD3	2.24	0.51
1:B:616:ALA:HB1	1:B:638:PHE:O	2.12	0.50
1:A:666:ALA:N	1:A:667:PRO:CD	2.74	0.50
1:A:243:ILE:HD12	1:A:243:ILE:N	2.27	0.50
1:A:652:MET:HG2	1:A:653:LEU:N	2.27	0.50
2:C:700:RB6:CAW	2:C:700:RB6:H8	2.42	0.50
1:C:661:SER:OG	1:C:664:LYS:HG3	2.12	0.50
1:A:43:GLU:HA	1:A:46:GLU:HB2	1.94	0.49
1:B:590:VAL:HB	1:B:591:PRO:HD3	1.93	0.49
1:B:666:ALA:N	1:B:667:PRO:HD3	2.27	0.49
1:C:590:VAL:HB	1:C:591:PRO:HD3	1.94	0.49
1:A:666:ALA:N	1:A:667:PRO:HD3	2.28	0.49
1:B:590:VAL:O	1:B:593:LEU:N	2.46	0.49
1:A:287:ASP:OD2	1:C:89:ASN:ND2	2.45	0.49
1:B:193:LEU:HD22	1:B:257:ILE:HD11	1.94	0.48
2:A:700:RB6:OBJ	2:A:700:RB6:CAF	2.61	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:480:SER:CB	2:B:700:RB6:H7	2.44	0.48
1:B:284:GLU:OE1	1:B:284:GLU:N	2.37	0.48
2:C:700:RB6:CAF	2:C:700:RB6:OBJ	2.59	0.48
2:B:700:RB6:CAR	2:B:700:RB6:N	2.76	0.48
1:C:494:GLU:OE2	1:C:526:SER:HA	2.13	0.48
1:C:348:ASP:OD2	1:C:677:TYR:OH	2.27	0.48
2:A:700:RB6:H8	2:A:700:RB6:CAW	2.44	0.48
1:B:192:GLN:HG3	1:B:192:GLN:O	2.12	0.48
2:C:700:RB6:OBA	2:C:700:RB6:H8	2.14	0.48
1:A:105:LYS:O	1:A:116:PHE:HA	2.14	0.48
1:B:597:VAL:O	1:B:605:HIS:HA	2.14	0.47
1:B:193:LEU:HG	1:B:241:LEU:HD12	1.96	0.47
1:A:205:GLU:O	1:A:209:ASN:HB2	2.15	0.47
1:A:286:ILE:HG23	1:A:290:PRO:HA	1.97	0.47
1:A:238:PHE:HB3	1:C:336:GLU:OE1	2.15	0.47
1:C:656:LYS:HD2	1:C:660:ASP:O	2.15	0.47
1:C:666:ALA:N	1:C:667:PRO:CD	2.78	0.47
1:B:622:GLU:HG3	2:B:700:RB6:NBC	2.30	0.47
1:B:425:LYS:HG2	1:B:485:MET:HG2	1.97	0.46
1:A:122:MET:HE2	1:A:129:LEU:HD12	1.97	0.46
1:A:422:SER:OG	1:A:425:LYS:NZ	2.47	0.46
1:B:43:GLU:HA	1:B:46:GLU:HB2	1.97	0.46
1:A:201:GLY:HA3	1:A:205:GLU:HG2	1.98	0.46
1:A:232:TRP:CE3	1:C:334:GLU:HB3	2.51	0.46
1:B:471:VAL:HG11	1:B:484:TYR:HB2	1.98	0.46
1:A:652:MET:HG2	1:A:653:LEU:H	1.80	0.45
1:C:622:GLU:O	1:C:623:ILE:HG13	2.16	0.45
1:C:621:ALA:O	1:C:633:GLU:HA	2.17	0.45
1:C:99:LEU:HD12	1:C:122:MET:HB3	1.96	0.45
1:A:263:ARG:HB3	1:A:391:THR:HG21	1.98	0.45
1:A:590:VAL:HB	1:A:591:PRO:HD3	1.98	0.45
1:B:126:LEU:HD21	1:B:317:GLY:HA3	1.99	0.45
1:C:194:GLY:CA	1:C:239:VAL:O	2.65	0.45
1:A:39:THR:HG22	1:A:41:ALA:H	1.82	0.45
1:C:369:THR:HA	1:C:375:ASP:O	2.17	0.45
1:A:516:MET:O	1:A:516:MET:HG3	2.18	0.44
2:B:700:RB6:H24	2:B:700:RB6:H15	1.65	0.44
1:B:192:GLN:HG3	1:B:238:PHE:CE2	2.41	0.44
1:B:376:LEU:HD22	1:B:379:LEU:HD21	2.00	0.44
1:A:193:LEU:HA	1:A:257:ILE:HG22	1.99	0.44
1:C:480:SER:OG	2:C:700:RB6:H7	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:375:ASP:OD1	1:C:567:LYS:HD2	2.18	0.44
1:B:656:LYS:HD2	1:B:660:ASP:O	2.17	0.44
1:C:57:ASN:OD1	1:C:99:LEU:HB3	2.18	0.44
1:A:528:ASN:HA	1:B:309:LYS:HB2	1.99	0.44
1:A:480:SER:CB	2:A:700:RB6:H7	2.48	0.43
1:B:99:LEU:HD12	1:B:122:MET:HB3	1.98	0.43
1:B:372:LYS:HD2	1:B:645:GLN:HB2	2.00	0.43
1:A:636:PHE:CE1	1:A:652:MET:HG3	2.54	0.43
1:B:523:ASN:OD1	1:B:523:ASN:N	2.52	0.43
1:A:99:LEU:HD13	1:A:122:MET:HB3	2.01	0.43
1:A:208:ALA:HA	1:A:211:LYS:HG2	2.01	0.43
1:A:214:ALA:HB2	1:A:224:ILE:CD1	2.49	0.43
1:B:192:GLN:OE1	1:B:240:PRO:HB3	2.18	0.43
1:B:57:ASN:OD1	1:B:99:LEU:CB	2.67	0.43
1:B:243:ILE:HD12	1:B:243:ILE:N	2.34	0.42
1:C:623:ILE:N	1:C:623:ILE:HD12	2.35	0.42
1:B:238:PHE:CE1	1:B:256:THR:O	2.70	0.42
1:B:57:ASN:OD1	1:B:99:LEU:HB2	2.19	0.42
2:C:700:RB6:H15	2:C:700:RB6:H24	1.62	0.42
1:A:217:PHE:HB3	1:A:242:LYS:NZ	2.34	0.42
1:B:191:LYS:HB3	1:B:257:ILE:HG21	2.01	0.42
1:A:57:ASN:OD1	1:A:99:LEU:HB2	2.19	0.42
1:A:110:ASP:OD1	1:A:113:THR:N	2.52	0.42
1:A:454:ASP:OD1	1:A:456:SER:OG	2.31	0.42
1:B:449:LEU:O	1:B:463:THR:HA	2.20	0.42
1:C:637:LEU:HD22	1:C:663:THR:HA	2.01	0.42
1:C:590:VAL:O	1:C:593:LEU:N	2.51	0.42
1:A:396:GLN:O	1:A:400:LYS:HG2	2.20	0.41
1:B:504:PHE:HB3	1:B:505:ILE:H	1.74	0.41
1:C:57:ASN:OD1	1:C:99:LEU:CB	2.68	0.41
1:A:590:VAL:O	1:A:593:LEU:N	2.52	0.41
1:A:656:LYS:HD2	1:A:660:ASP:O	2.20	0.41
1:B:623:ILE:HG22	1:B:623:ILE:O	2.19	0.41
1:A:200:LEU:HB3	1:A:201:GLY:H	1.62	0.41
1:C:425:LYS:HG2	1:C:485:MET:HG2	2.02	0.41
1:C:314:THR:OG1	1:C:338:GLN:HB2	2.20	0.41
1:A:641:ASN:HB2	1:A:647:TYR:CE1	2.56	0.41
1:A:422:SER:HB2	1:A:619:GLY:HA2	2.02	0.41
1:C:444:LEU:HD13	1:C:487:GLN:OE1	2.21	0.41
1:A:211:LYS:HA	1:A:221:GLU:OE2	2.20	0.41
1:A:369:THR:HA	1:A:375:ASP:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:480:SER:HB3	2:B:700:RB6:H7	2.03	0.41
1:C:126:LEU:HD21	1:C:317:GLY:HA3	2.02	0.41
1:B:640:PHE:HB2	1:B:647:TYR:O	2.21	0.41
1:C:471:VAL:HG12	1:C:484:TYR:CD1	2.56	0.41
1:A:199:LYS:C	1:A:200:LEU:HD12	2.41	0.40
1:B:278:VAL:HG12	1:B:299:GLY:HA2	2.03	0.40
1:A:269:GLU:HA	1:A:272:ALA:HB2	2.03	0.40
1:B:110:ASP:HB3	1:B:113:THR:HB	2.02	0.40
2:B:700:RB6:OBJ	2:B:700:RB6:CAF	2.66	0.40
1:A:110:ASP:OD1	1:A:113:THR:HB	2.21	0.40
1:A:426:MET:CE	1:A:617:LYS:HB3	2.52	0.40
1:A:659:ASP:O	1:A:664:LYS:HE3	2.22	0.40
1:B:369:THR:HA	1:B:375:ASP:O	2.22	0.40

All (2) 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:B:472:ASP:OD2	1:C:105:LYS:HZ1[3_555]	1.44	0.16
1:B:472:ASP:OD2	1:C:105:LYS:NZ[3_555]	2.18	0.02

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	616/649 (95%)	579 (94%)	37 (6%)	0	100 100
1	B	572/649 (88%)	540 (94%)	31 (5%)	1 (0%)	47 77
1	C	589/649 (91%)	556 (94%)	33 (6%)	0	100 100
All	All	1777/1947 (91%)	1675 (94%)	101 (6%)	1 (0%)	51 81

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	238	PHE

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	516/537 (96%)	512 (99%)	4 (1%)	81 89
1	B	483/537 (90%)	477 (99%)	6 (1%)	71 83
1	C	497/537 (93%)	494 (99%)	3 (1%)	86 91
All	All	1496/1611 (93%)	1483 (99%)	13 (1%)	78 87

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

Mol	Chain	Res	Type
1	A	142	ASP
1	A	219	LEU
1	A	469	SER
1	A	470	HIS
1	B	142	ASP
1	B	179	ARG
1	B	193	LEU
1	B	290	PRO
1	B	470	HIS
1	B	526	SER
1	C	39	THR
1	C	343	ILE
1	C	470	HIS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	226	GLN
1	A	396	GLN
1	A	520	GLN
1	A	605	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

6 ligands are modelled in this entry.

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
3	SO4	C	701	-	4,4,4	0.14	0	6,6,6	0.05	0
3	SO4	B	701	-	4,4,4	0.13	0	6,6,6	0.07	0
3	SO4	A	701	-	4,4,4	0.14	0	6,6,6	0.06	0
2	RB6	A	700	1	25,39,39	4.63	8 (32%)	25,55,55	4.09	10 (40%)
2	RB6	C	700	1	25,39,39	4.53	8 (32%)	25,55,55	3.90	9 (36%)
2	RB6	B	700	1	25,39,39	4.65	7 (28%)	25,55,55	4.09	11 (44%)

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	RB6	C	700	1	-	8/18/65/65	0/3/4/4
2	RB6	B	700	1	-	9/18/65/65	0/3/4/4
2	RB6	A	700	1	-	8/18/65/65	0/3/4/4

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	700	RB6	CBH-CAD	-11.67	1.34	1.52
2	A	700	RB6	CBH-CAD	-11.54	1.34	1.52
2	A	700	RB6	CAH-CAG	-11.52	1.31	1.49
2	B	700	RB6	CAH-CAG	-11.39	1.32	1.49
2	C	700	RB6	CAH-CAG	-11.14	1.32	1.49
2	C	700	RB6	CBH-CAD	-10.99	1.35	1.52
2	B	700	RB6	CAF-CAG	-9.40	1.33	1.50
2	C	700	RB6	CAY-CAW	-9.20	1.32	1.50
2	A	700	RB6	CAF-CAG	-9.13	1.34	1.50
2	A	700	RB6	CAY-CAW	-8.97	1.33	1.50
2	B	700	RB6	CAQ-CAG	8.85	1.51	1.33
2	C	700	RB6	CAQ-CAG	8.84	1.51	1.33
2	B	700	RB6	CAY-CAW	-8.81	1.33	1.50
2	C	700	RB6	CAF-CAG	-8.75	1.34	1.50
2	A	700	RB6	CAQ-CAG	8.74	1.51	1.33
2	B	700	RB6	CAF-CAE	-3.57	1.46	1.50
2	A	700	RB6	CAF-CAE	-3.19	1.47	1.50
2	A	700	RB6	CAR-SAS	-3.00	1.75	1.82
2	C	700	RB6	CAR-SAS	-2.85	1.75	1.82
2	B	700	RB6	CAR-SAS	-2.83	1.75	1.82
2	C	700	RB6	CAF-CAE	-2.51	1.48	1.50
2	C	700	RB6	CAP-CAQ	2.50	1.54	1.49
2	A	700	RB6	CAP-CAQ	2.22	1.53	1.49

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	700	RB6	CAP-CAQ-CAG	-12.16	103.36	112.33
2	A	700	RB6	CAP-CAQ-CAG	-12.08	103.42	112.33
2	C	700	RB6	CAP-CAQ-CAG	-11.78	103.64	112.33
2	B	700	RB6	NBC-CBB-NBF	-9.55	104.53	122.26
2	C	700	RB6	NBC-CBB-NBF	-9.12	105.33	122.26
2	A	700	RB6	NBC-CBB-NBF	-9.08	105.41	122.26
2	C	700	RB6	CAP-NAJ-CAH	8.43	118.69	112.91
2	B	700	RB6	CAP-NAJ-CAH	7.96	118.36	112.91
2	A	700	RB6	CAP-NAJ-CAH	7.79	118.25	112.91
2	A	700	RB6	OAI-CAH-CAG	-4.89	123.16	128.12
2	B	700	RB6	CB-NAC-CAD	4.87	129.78	118.32
2	C	700	RB6	CB-NAC-CAD	4.31	128.46	118.32
2	C	700	RB6	CAR-SAS-CB	4.28	102.86	94.47
2	B	700	RB6	CAK-NAJ-CAH	4.22	127.49	122.96
2	A	700	RB6	CAR-SAS-CB	4.16	102.62	94.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	700	RB6	OAI-CAH-CAG	-4.15	123.91	128.12
2	A	700	RB6	CB-NAC-CAD	4.09	127.94	118.32
2	A	700	RB6	CAK-NAJ-CAH	4.07	127.33	122.96
2	B	700	RB6	CAR-SAS-CB	3.81	101.95	94.47
2	A	700	RB6	OAI-CAH-NAJ	3.45	130.44	125.59
2	A	700	RB6	CAE-CAR-SAS	-3.36	108.84	115.08
2	B	700	RB6	OAI-CAH-NAJ	3.26	130.18	125.59
2	A	700	RB6	OBA-NAZ-CAY	3.25	121.46	113.65
2	C	700	RB6	CAE-CAR-SAS	-3.18	109.18	115.08
2	B	700	RB6	CAE-CAR-SAS	-3.14	109.25	115.08
2	C	700	RB6	OAI-CAH-CAG	-3.11	124.97	128.12
2	C	700	RB6	OBA-NAZ-CAY	3.07	121.01	113.65
2	B	700	RB6	OBA-NAZ-CAY	2.47	119.58	113.65
2	B	700	RB6	CAF-CAG-CAQ	-2.38	122.54	129.48
2	C	700	RB6	OAI-CAH-NAJ	2.10	128.54	125.59

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	700	RB6	CAW-CAY-NAZ-OBA
2	A	700	RB6	CAL-CAK-NAJ-CAH
2	A	700	RB6	CAO-CAK-NAJ-CAP
2	C	700	RB6	OAX-CAW-N-CA
2	C	700	RB6	CAY-CAW-N-CA
2	C	700	RB6	CAW-CAY-NAZ-OBA
2	C	700	RB6	CAO-CAK-NAJ-CAH
2	C	700	RB6	CAL-CAK-NAJ-CAP
2	C	700	RB6	CAO-CAK-NAJ-CAP
2	B	700	RB6	CAY-CAW-N-CA
2	B	700	RB6	CAW-CAY-NAZ-OBA
2	B	700	RB6	CAL-CAK-NAJ-CAH
2	B	700	RB6	CAL-CAK-NAJ-CAP
2	B	700	RB6	OAX-CAW-N-CA
2	A	700	RB6	OAX-CAW-N-CA
2	A	700	RB6	CAO-CAK-NAJ-CAH
2	B	700	RB6	CAO-CAK-NAJ-CAH
2	A	700	RB6	CAY-CAW-N-CA
2	C	700	RB6	OAX-CAW-CAY-NAZ
2	B	700	RB6	OAX-CAW-CAY-NAZ
2	B	700	RB6	N-CAW-CAY-NAZ
2	A	700	RB6	OAX-CAW-CAY-CBB

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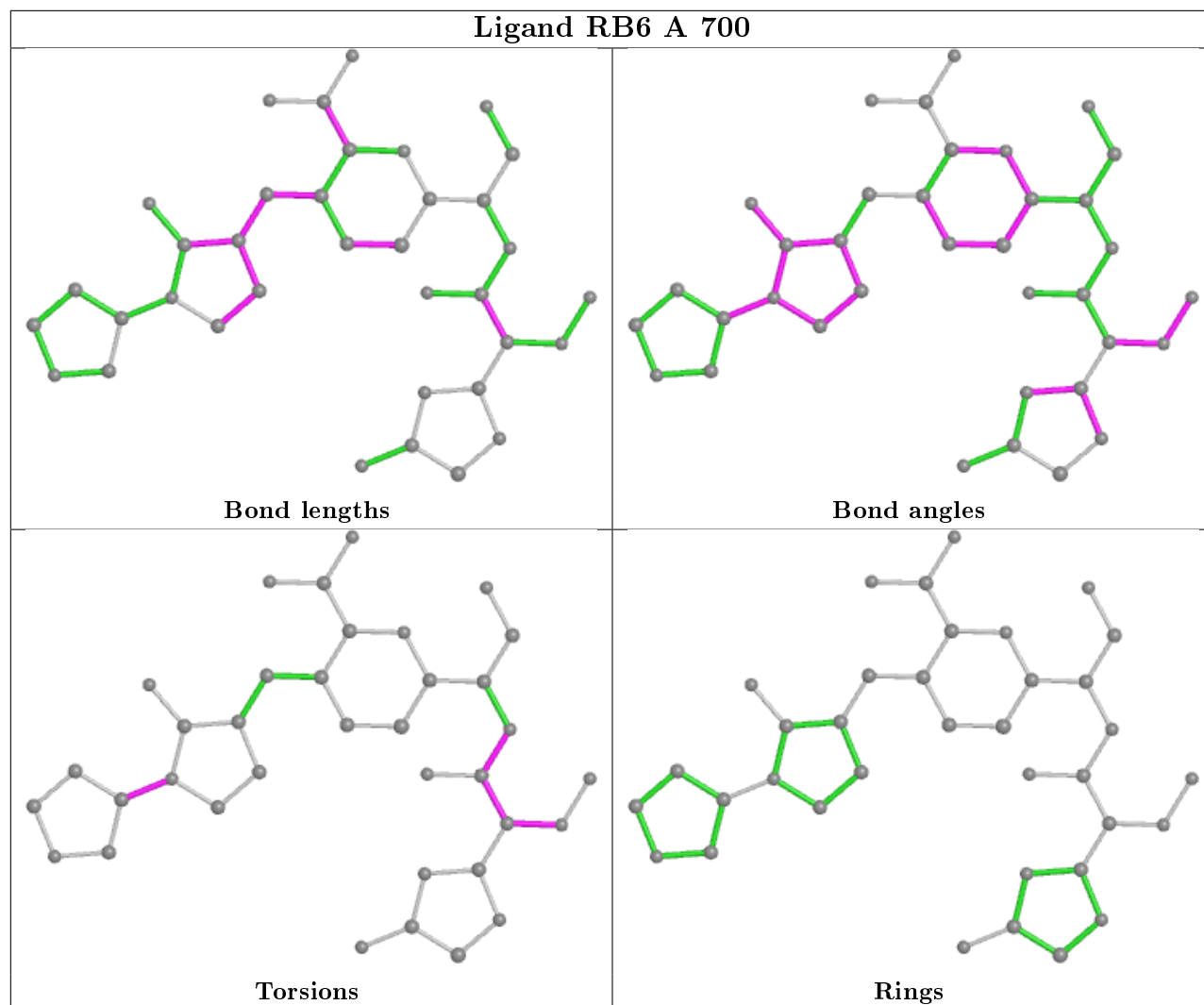
Mol	Chain	Res	Type	Atoms
2	C	700	RB6	N-CAW-CAY-NAZ
2	B	700	RB6	OAX-CAW-CAY-CBB
2	A	700	RB6	OAX-CAW-CAY-NAZ

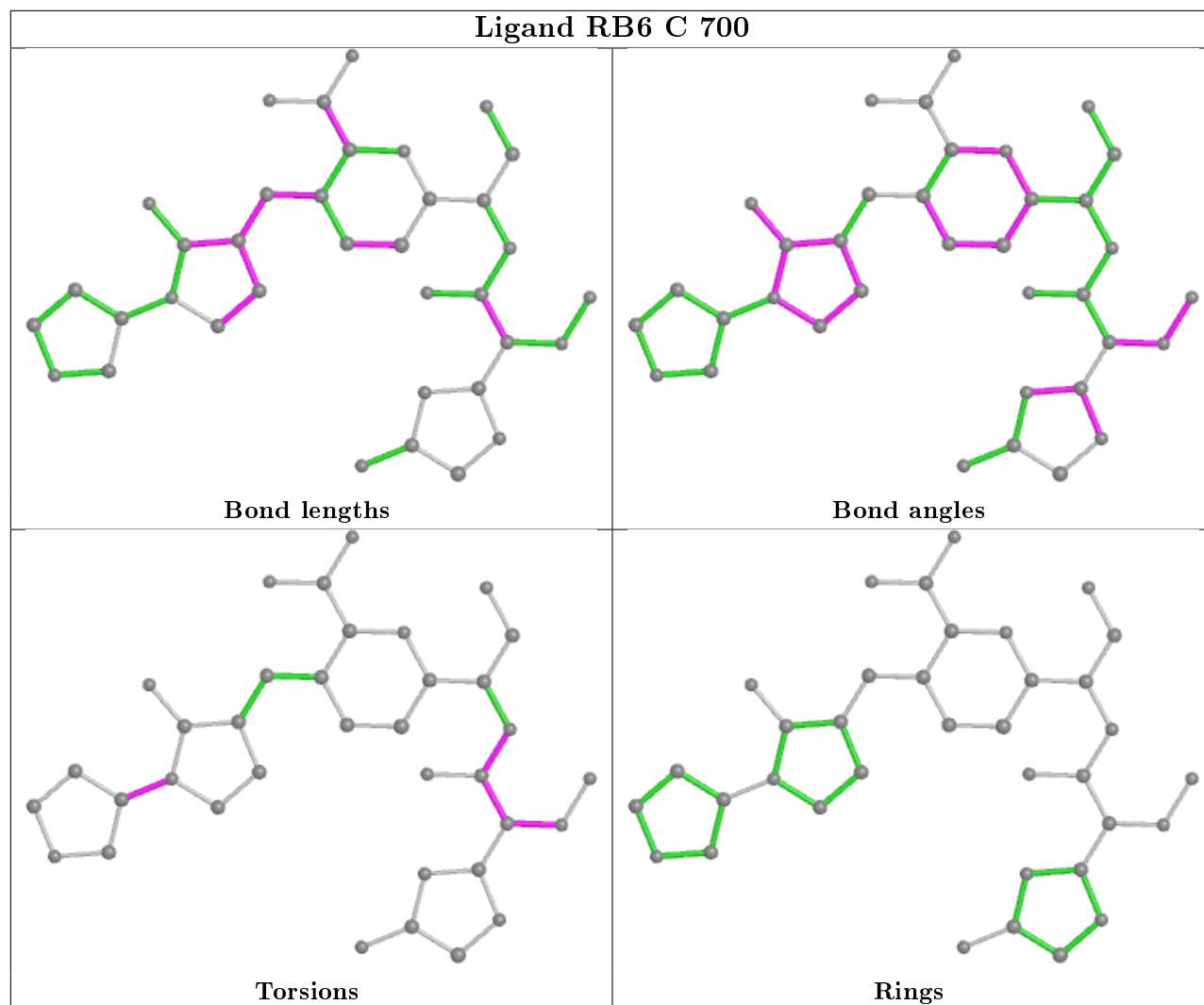
There are no ring outliers.

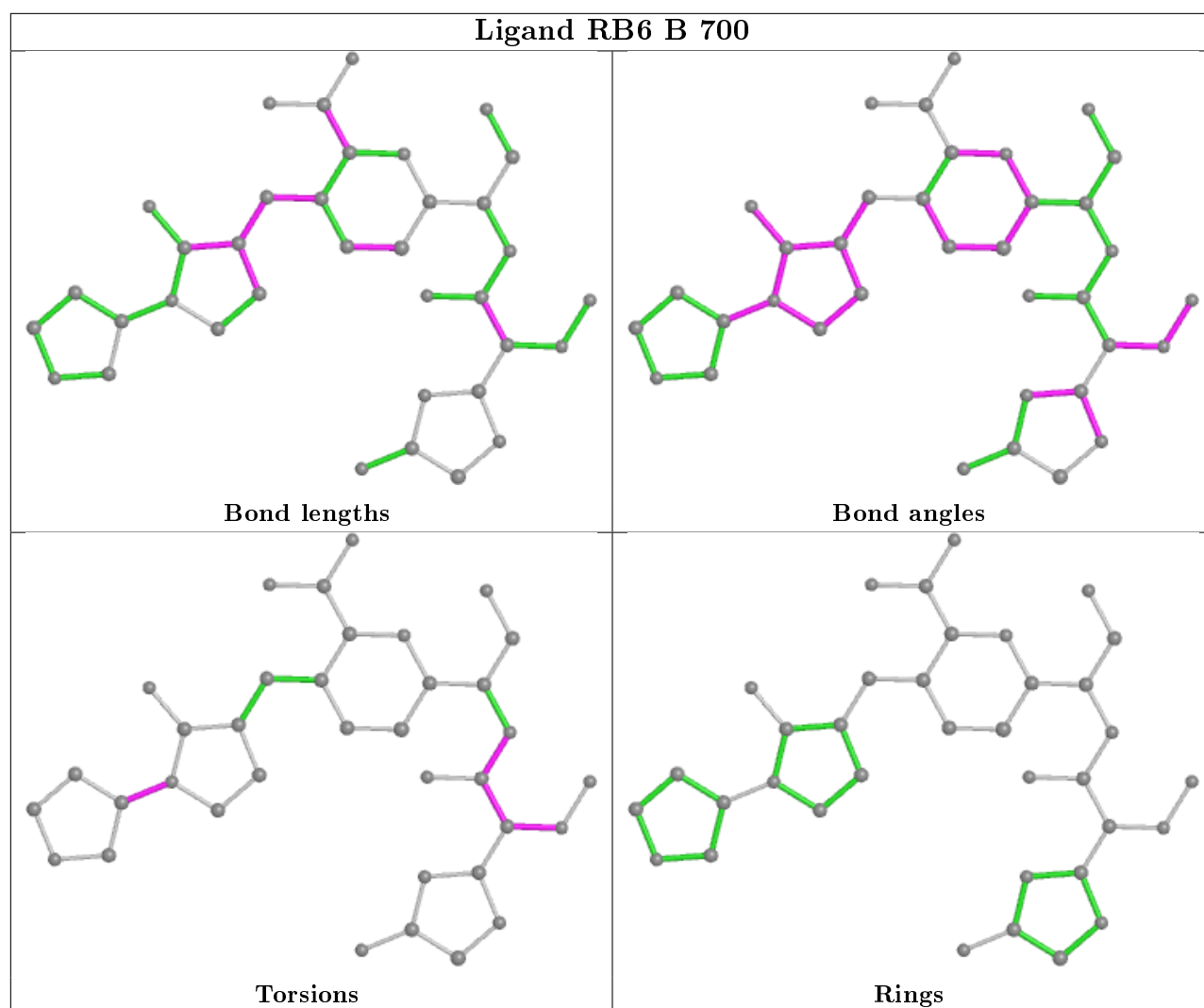
4 monomers are involved in 26 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	701	SO4	1	0
2	A	700	RB6	8	0
2	C	700	RB6	7	0
2	B	700	RB6	10	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.







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	622/649 (95%)	0.39	49 (7%) 12 12	34, 61, 120, 152	0
1	B	580/649 (89%)	0.15	12 (2%) 63 62	28, 52, 83, 146	0
1	C	597/649 (91%)	0.31	26 (4%) 34 33	34, 64, 105, 140	0
All	All	1799/1947 (92%)	0.29	87 (4%) 30 28	28, 59, 105, 152	0

All (87) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	255	ALA	8.1
1	C	195	VAL	7.0
1	A	207	THR	6.5
1	A	210	ILE	5.8
1	A	195	VAL	5.6
1	A	203	GLY	5.4
1	C	255	ALA	5.3
1	A	224	ILE	5.2
1	A	204	ASP	5.0
1	B	237	TYR	4.8
1	A	200	LEU	4.8
1	A	197	PRO	4.6
1	A	213	ILE	4.5
1	C	259	GLU	4.4
1	A	212	ALA	4.3
1	B	192	GLN	4.3
1	A	196	VAL	4.3
1	C	256	THR	4.2
1	A	219	LEU	4.1
1	C	196	VAL	4.0
1	A	208	ALA	4.0
1	A	202	ASP	3.9
1	A	206	LYS	3.7

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Mol	Chain	Res	Type	RSRZ
1	C	236	ASP	3.5
1	A	217	PHE	3.5
1	A	221	GLU	3.5
1	A	241	LEU	3.4
1	C	224	ILE	3.4
1	B	243	ILE	3.4
1	A	201	GLY	3.3
1	A	198	SER	3.3
1	A	215	SER	3.3
1	A	243	ILE	3.2
1	A	225	ASN	3.1
1	A	218	ASP	3.1
1	C	258	GLN	3.1
1	A	223	ALA	3.0
1	C	223	ALA	3.0
1	C	241	LEU	3.0
1	C	222	ASP	3.0
1	A	211	LYS	2.9
1	C	237	TYR	2.9
1	B	259	GLU	2.8
1	C	193	LEU	2.8
1	A	239	VAL	2.8
1	A	233	VAL	2.8
1	C	191	LYS	2.8
1	B	257	ILE	2.8
1	A	209	ASN	2.8
1	A	255	ALA	2.8
1	A	242	LYS	2.8
1	A	240	PRO	2.7
1	A	192	GLN	2.7
1	C	230	GLN	2.7
1	A	237	TYR	2.7
1	A	216	ALA	2.6
1	C	240	PRO	2.6
1	C	226	GLN	2.6
1	B	193	LEU	2.6
1	B	241	LEU	2.6
1	A	38	GLU	2.6
1	C	225	ASN	2.6
1	A	191	LYS	2.5
1	B	258	GLN	2.5
1	C	192	GLN	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	400	LYS	2.5
1	C	142	ASP	2.4
1	A	199	LYS	2.4
1	A	214	ALA	2.4
1	A	228	ILE	2.4
1	C	257	ILE	2.4
1	A	236	ASP	2.4
1	C	189	LYS	2.4
1	A	146	THR	2.4
1	A	220	THR	2.3
1	A	229	SER	2.3
1	B	240	PRO	2.3
1	A	400	LYS	2.3
1	C	194	GLY	2.3
1	C	404	GLU	2.3
1	A	259	GLU	2.2
1	A	54	GLN	2.2
1	A	449	LEU	2.2
1	A	234	GLN	2.1
1	B	191	LYS	2.1
1	C	190	LEU	2.1
1	C	141	ASN	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.

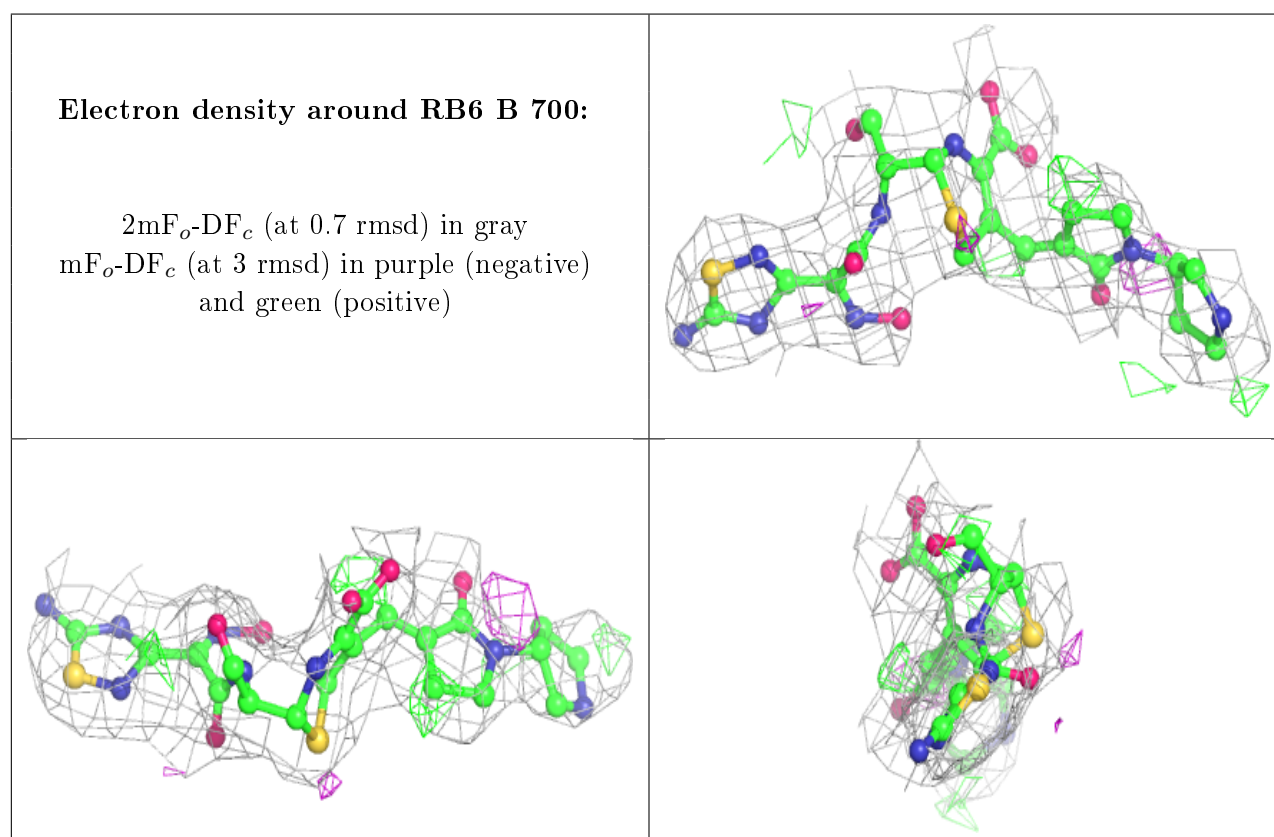
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	SO4	A	701	5/5	0.80	0.30	101,102,102,102	0

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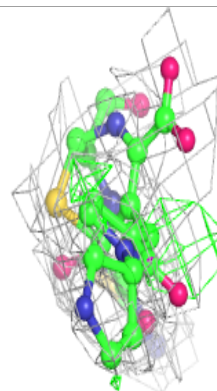
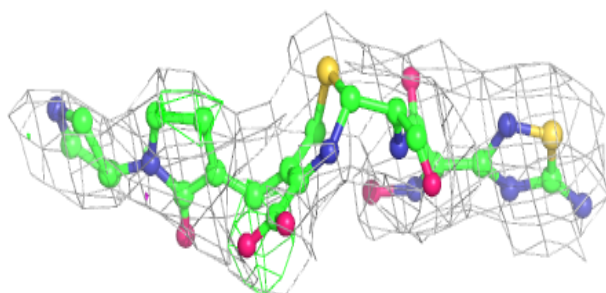
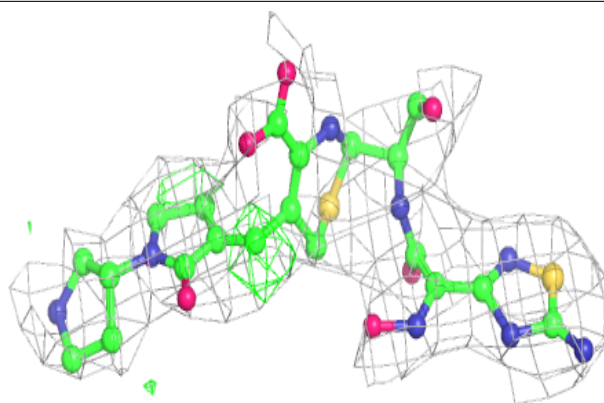
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	SO4	B	701	5/5	0.88	0.33	97,98,98,99	0
3	SO4	C	701	5/5	0.89	0.29	105,105,105,106	0
2	RB6	B	700	36/36	0.89	0.22	39,51,63,64	0
2	RB6	C	700	36/36	0.90	0.22	47,60,67,68	0
2	RB6	A	700	36/36	0.92	0.19	48,58,66,71	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

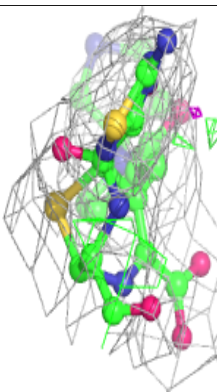
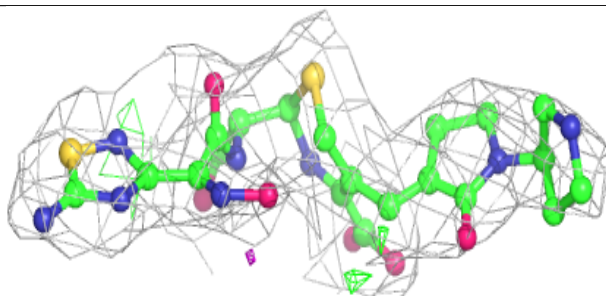
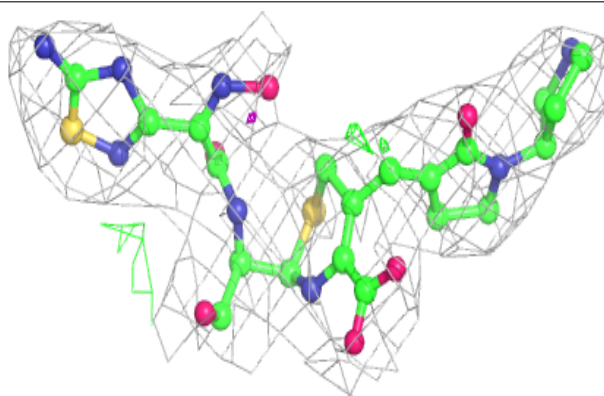


Electron density around RB6 C 700:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around RB6 A 700:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers

There are no such residues in this entry.