



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 14, 2026 – 10:08 AM UTC

PDB ID : 2WBD / pdb_00002wbd
Title : FRUCTOSE-1,6-BISPHOSPHATASE(D-FRUCTOSE-1,6-BISPHOSPHATE
-1- PHOSPHOHYDROLASE) (E.C.3.1.3.11) COMPLEXED WITH AN AMP
SITE INHIBITOR
Authors : Ruf, A.; Joseph, C.; Benz, J.; Fol, B.; Tetaz, T.; Kitas, E.; Mohr, P.; Kuhn,
B.; Wessel, H.P.; Hebeisen, P.; Haap, W.; Huber, W.; Alvarez Sanchez, R.;
Paehler, A.; Bernadeau, A.; Gubler, M.; Schott, B.; Tozzo, E.
Deposited on : 2009-02-26
Resolution : 2.40 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	: 4-5-2 with Phenix2.0
Mogul	: 2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	: 2.0
EDS	: 3.0
Buster-report	: wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	: 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	: 9.0.010 (Gargrove)
Density-Fitness	: 1.0.12
Ideal geometry (proteins)	: Engh & Huber (2001)

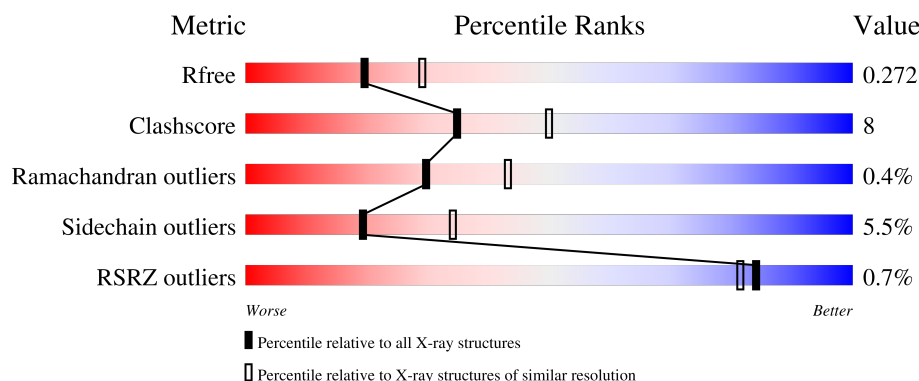
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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

Mol	Chain	Length	Quality of chain
1	A	338	
1	B	338	
1	C	338	

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Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

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Mol	Chain	Length	Quality of chain
1	D	338	 75% 18% • 6%
1	E	338	 % 75% 18% • 5%
1	F	338	 % 73% 17% • 6%
1	G	338	 % 78% 15% • 6%
1	H	338	 76% 17% • 6%

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	RO5	A	1337	-	-	X	-

2 Entry composition

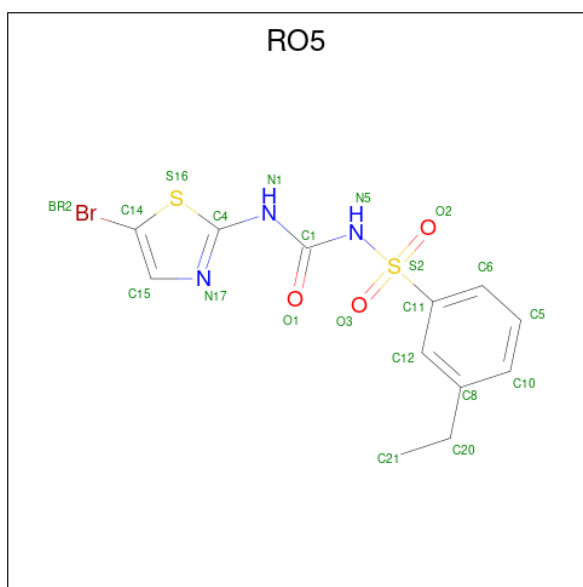
There are 3 unique types of molecules in this entry. The entry contains 20175 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 FRUCTOSE-1,6-BISPHOSPHATASE 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	320	Total	C	N	O	S	0	1	1
			2447	1558	413	459	17			
1	B	318	Total	C	N	O	S	0	1	1
			2432	1548	410	457	17			
1	C	318	Total	C	N	O	S	0	0	1
			2426	1545	407	457	17			
1	D	318	Total	C	N	O	S	0	1	1
			2432	1548	410	457	17			
1	E	320	Total	C	N	O	S	0	1	1
			2448	1559	413	459	17			
1	F	318	Total	C	N	O	S	0	1	1
			2431	1547	410	457	17			
1	G	318	Total	C	N	O	S	0	1	1
			2431	1547	410	457	17			
1	H	318	Total	C	N	O	S	0	0	1
			2426	1545	407	457	17			

- Molecule 2 is N-[(5-bromo-1,3-thiazol-2-yl)carbamoyl]-3-ethylbenzenesulfonamide (CCD ID: RO5) (formula: C₁₂H₁₂BrN₃O₃S₂).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		
2	B	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		
2	C	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		
2	D	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		
2	E	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		
2	F	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		
2	G	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		
2	H	1	Total	Br	C	N	O	S	0	0
			21	1	12	3	3	2		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	57	Total	O	0	0
			57	57		
3	B	60	Total	O	0	0
			60	60		
3	C	84	Total	O	0	0
			84	84		
3	D	95	Total	O	0	0
			95	95		

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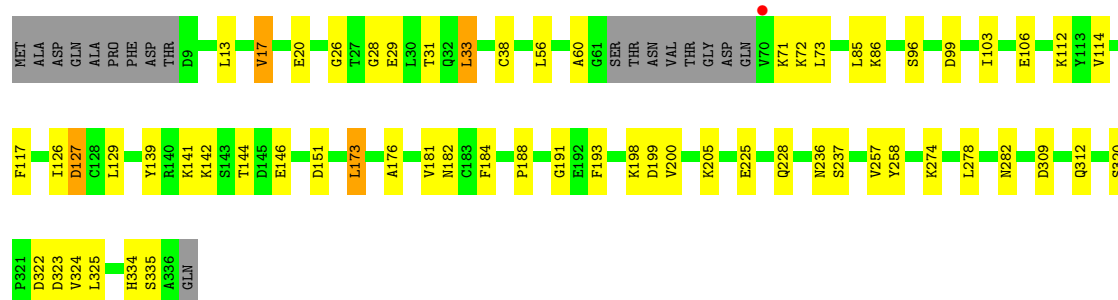
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	46	Total 46	O 46	0	0
3	F	45	Total 45	O 45	0	0
3	G	73	Total 73	O 73	0	0
3	H	74	Total 74	O 74	0	0

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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.

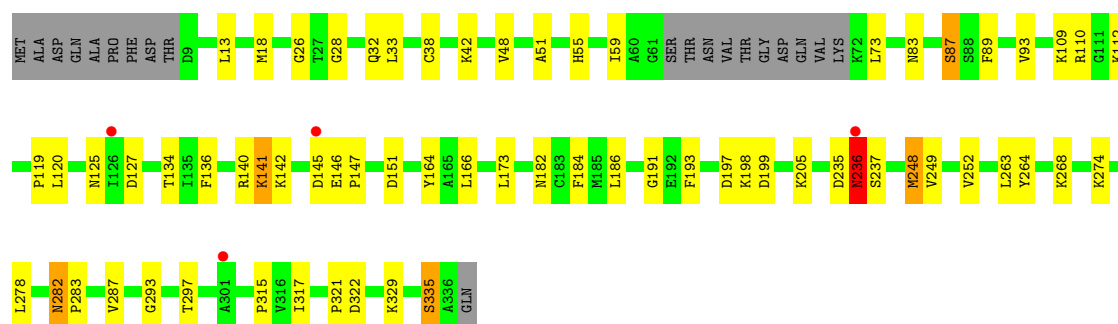
• Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1

Chain A: 



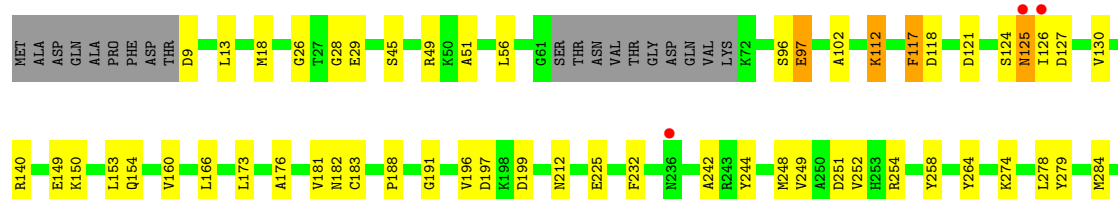
• Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1

Chain B: 



• Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1

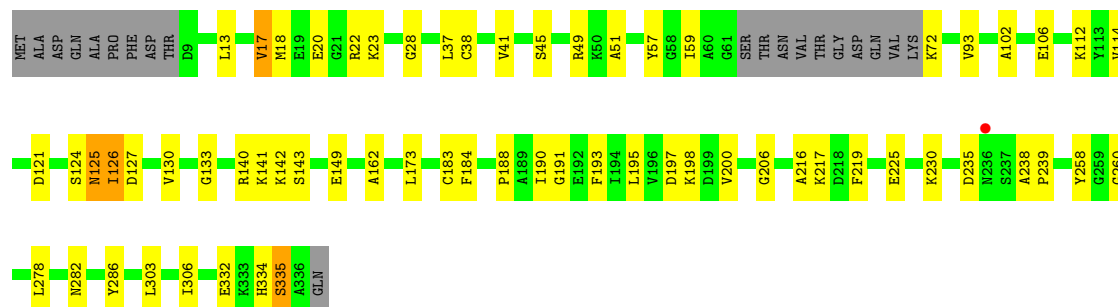
Chain C: 





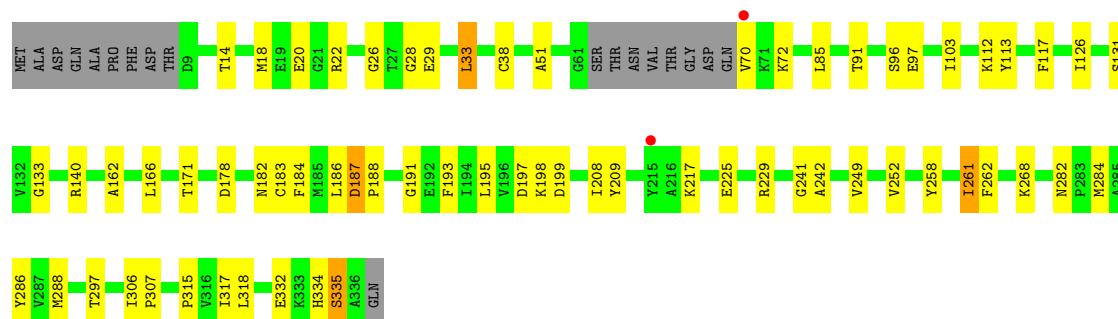
• Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1

Chain D: 75% 18% • 6%



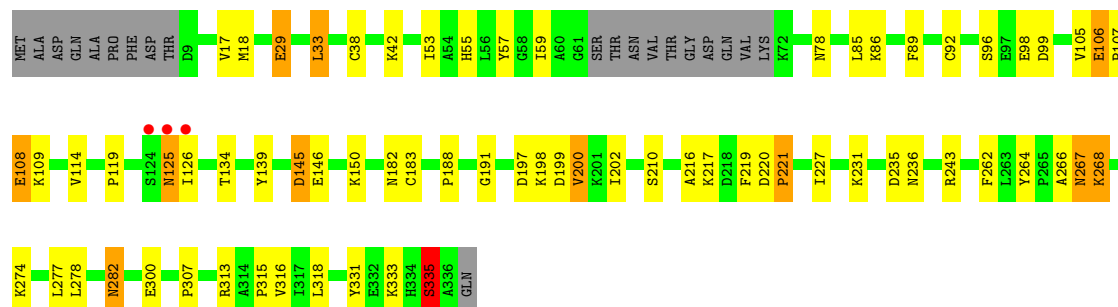
• Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1

Chain E: 75% 18% • 5%



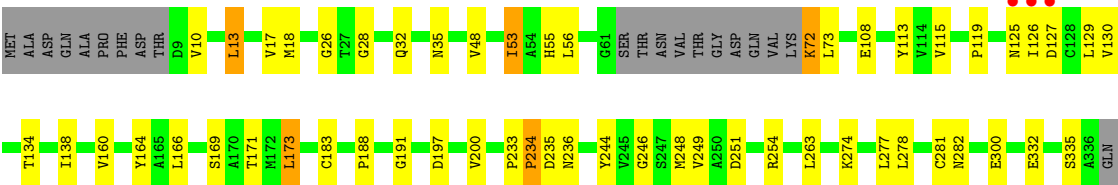
• Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1

Chain F: 73% 17% • 6%

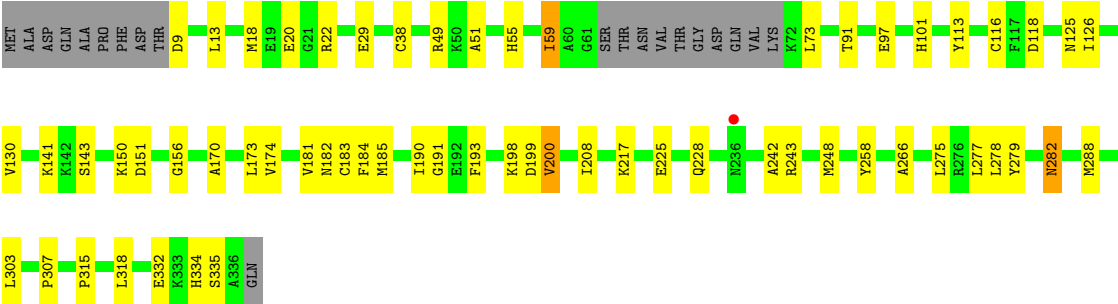


• Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1

Chain G: 78% 15% • 6%



● Molecule 1: FRUCTOSE-1,6-BISPHOSPHATASE 1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	66.84Å 285.40Å 83.55Å 90.00° 97.57° 90.00°	Depositor
Resolution (Å)	20.00 – 2.40 20.00 – 2.40	Depositor EDS
% Data completeness (in resolution range)	100.0 (20.00-2.40) 99.8 (20.00-2.40)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.63 (at 2.41Å)	Xtriage
Refinement program	REFMAC 5.5.0070	Depositor
R, R_{free}	0.220 , 0.277 0.216 , 0.272	Depositor DCC
R_{free} test set	6014 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	30.6	Xtriage
Anisotropy	0.127	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 29.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	20175	wwPDB-VP
Average B, all atoms (Å ²)	30.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.13% 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: RO5

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	0.71	1/2496 (0.0%)	0.96	1/3370 (0.0%)
1	B	0.69	1/2480 (0.0%)	0.91	0/3349
1	C	0.72	1/2469 (0.0%)	0.93	5/3335 (0.1%)
1	D	0.77	1/2480 (0.0%)	0.97	2/3349 (0.1%)
1	E	0.67	1/2496 (0.0%)	0.91	2/3370 (0.1%)
1	F	0.67	1/2480 (0.0%)	0.96	4/3349 (0.1%)
1	G	0.70	1/2480 (0.0%)	0.94	1/3349 (0.0%)
1	H	0.71	1/2469 (0.0%)	0.97	0/3335
All	All	0.70	8/19850 (0.0%)	0.94	15/26806 (0.1%)

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

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	H	335	SER	C-N	-7.34	1.23	1.33
1	B	335	SER	C-N	-7.22	1.23	1.33
1	A	335	SER	C-N	-7.08	1.23	1.33
1	C	335	SER	C-N	-6.92	1.23	1.33
1	F	335	SER	C-N	-6.90	1.23	1.33
1	G	335	SER	C-N	-6.59	1.24	1.33
1	D	335	SER	C-N	-6.47	1.24	1.33
1	E	335	SER	C-N	-6.43	1.24	1.33

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	73	LEU	N-CA-C	6.77	118.74	111.36
1	F	106	GLU	CA-C-N	5.88	125.08	118.97
1	F	106	GLU	C-N-CA	5.88	125.08	118.97
1	D	106	GLU	CA-C-N	5.72	125.84	119.32
1	D	106	GLU	C-N-CA	5.72	125.84	119.32
1	E	187	ASP	CA-C-N	5.57	125.93	119.47
1	E	187	ASP	C-N-CA	5.57	125.93	119.47
1	F	264	TYR	CA-C-N	5.40	125.38	120.03
1	F	264	TYR	C-N-CA	5.40	125.38	120.03
1	C	117	PHE	N-CA-C	5.31	117.16	108.76
1	C	154	GLN	CA-C-N	-5.25	114.84	120.03
1	C	154	GLN	C-N-CA	-5.25	114.84	120.03
1	G	113	TYR	N-CA-C	5.11	118.39	110.17
1	C	306	ILE	CA-C-N	5.05	125.03	120.03
1	C	306	ILE	C-N-CA	5.05	125.03	120.03

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	60	ALA	Peptide

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	2447	0	2496	35	0
1	B	2432	0	2478	39	0
1	C	2426	0	2469	40	0
1	D	2432	0	2478	45	0
1	E	2448	0	2500	46	0
1	F	2431	0	2474	48	0
1	G	2431	0	2474	31	0
1	H	2426	0	2469	45	0
2	A	21	0	12	9	0
2	B	21	0	12	2	0
2	C	21	0	12	5	0
2	D	21	0	12	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	E	21	0	12	6	0
2	F	21	0	12	1	0
2	G	21	0	12	5	0
2	H	21	0	12	2	0
3	A	57	0	0	0	0
3	B	60	0	0	0	0
3	C	84	0	0	3	0
3	D	95	0	0	7	0
3	E	46	0	0	0	0
3	F	45	0	0	1	0
3	G	73	0	0	3	0
3	H	74	0	0	2	0
All	All	20175	0	19934	298	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 (298) 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:D:72:LYS:HB3	3:D:2020:HOH:O	1.26	1.32
1:D:38:CYS:HB2	3:D:2005:HOH:O	1.47	1.11
1:E:140[B]:ARG:CG	1:E:140[B]:ARG:HH11	1.74	1.00
1:E:140[B]:ARG:HH11	1:E:140[B]:ARG:HG3	1.27	0.97
1:H:13:LEU:HD22	1:H:173:LEU:HD22	1.47	0.95
1:D:20:GLU:HB2	2:D:1337:RO5:H212	1.60	0.83
1:D:126:ILE:HG13	3:D:2035:HOH:O	1.80	0.80
1:C:127:ASP:HB2	1:D:258:TYR:OH	1.83	0.78
1:G:13:LEU:HD21	1:G:173:LEU:HD22	1.64	0.77
1:E:191:GLY:HA3	1:G:191:GLY:HA3	1.67	0.75
1:F:191:GLY:HA3	1:H:191:GLY:HA3	1.70	0.73
1:E:140[B]:ARG:CG	1:E:140[B]:ARG:NH1	2.43	0.73
1:G:108:GLU:HG2	3:G:2013:HOH:O	1.89	0.73
1:E:225:GLU:OE1	1:E:334:HIS:HE1	1.72	0.72
1:D:141:LYS:HE3	1:D:143:SER:O	1.90	0.72
1:H:20:GLU:HB2	2:H:1337:RO5:H212	1.70	0.71
1:F:29:GLU:HG3	1:H:22:ARG:HH12	1.56	0.70
1:A:225:GLU:OE1	1:A:334:HIS:HE1	1.76	0.68
1:G:127:ASP:HB2	1:H:258:TYR:OH	1.94	0.67
1:F:262:PHE:HB3	1:F:318:LEU:HD12	1.76	0.66
1:A:182:ASN:HD22	1:A:198:LYS:HA	1.60	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:97:GLU:HG2	1:H:279:TYR:CE1	2.32	0.65
1:D:130:VAL:O	3:D:2035:HOH:O	2.14	0.64
1:D:38:CYS:CB	3:D:2005:HOH:O	2.22	0.64
1:F:33:LEU:HD12	1:F:33:LEU:C	2.23	0.63
1:G:13:LEU:CD2	1:G:173:LEU:HD22	2.28	0.63
1:H:225:GLU:OE1	1:H:334:HIS:HE1	1.80	0.63
1:F:333:LYS:C	1:F:335:SER:H	2.07	0.62
1:E:183:CYS:HB2	1:E:197:ASP:HB2	1.80	0.62
1:E:182:ASN:HD22	1:E:198:LYS:HA	1.65	0.62
1:G:115:VAL:HG22	1:G:138:ILE:HG12	1.80	0.62
1:F:18:MET:HE3	1:H:18:MET:CE	2.29	0.61
1:G:129:LEU:HD22	1:H:170:ALA:HB3	1.83	0.61
1:C:51:ALA:HA	1:D:188:PRO:HD2	1.83	0.61
1:G:73:LEU:HD23	1:G:126:ILE:HD13	1.83	0.61
2:A:1337:RO5:S16	2:A:1337:RO5:O1	2.59	0.61
1:E:288:MET:HE3	1:E:318:LEU:HD13	1.83	0.61
1:H:97:GLU:HG2	1:H:279:TYR:HE1	1.65	0.60
1:C:45:SER:O	1:C:49:ARG:HD3	2.01	0.60
1:C:225:GLU:OE1	1:C:334:HIS:HE1	1.84	0.60
1:F:262:PHE:HB3	1:F:318:LEU:CD1	2.32	0.60
1:C:232:PHE:CE2	1:D:217:LYS:HB2	2.38	0.59
1:D:282:ASN:HD22	1:D:303:LEU:HD23	1.67	0.59
1:B:264:TYR:OH	1:B:274:LYS:HD3	2.02	0.59
1:C:28:GLY:HA2	2:C:1337:RO5:C1	2.33	0.58
1:F:42:LYS:HD2	1:H:190:ILE:O	2.03	0.58
1:G:125:ASN:O	1:G:130:VAL:HG12	2.04	0.58
1:E:26:GLY:CA	2:E:1337:RO5:HA	2.16	0.58
1:B:191:GLY:HA3	1:D:191:GLY:HA3	1.86	0.58
1:F:18:MET:HE3	1:H:18:MET:HE2	1.84	0.58
1:B:32:GLN:OE1	1:D:22:ARG:NH1	2.37	0.58
1:F:183:CYS:HB2	1:F:197:ASP:HB2	1.85	0.58
1:C:212:ASN:HB2	1:C:244:TYR:CE2	2.39	0.57
1:G:55:HIS:HB3	3:G:2008:HOH:O	2.03	0.57
1:E:51:ALA:HA	1:F:188:PRO:HD2	1.86	0.57
1:E:140[B]:ARG:HH11	1:E:140[B]:ARG:HG2	1.66	0.57
1:D:112:LYS:HB2	1:D:140[B]:ARG:NH2	2.20	0.57
1:C:183:CYS:HB2	1:C:197:ASP:HB2	1.87	0.57
1:B:18:MET:CE	1:D:18:MET:HE3	2.34	0.57
1:C:242:ALA:HB1	3:C:2051:HOH:O	2.05	0.56
1:C:305:VAL:O	1:C:307:PRO:HD3	2.05	0.56
1:G:234:PRO:O	1:G:236:ASN:N	2.38	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:13:LEU:HD22	1:H:173:LEU:CD2	2.29	0.56
1:E:297:THR:HB	1:E:315:PRO:HG2	1.87	0.56
1:B:235:ASP:O	1:B:236:ASN:CB	2.54	0.55
1:E:140[B]:ARG:NH1	1:E:140[B]:ARG:HG2	2.20	0.55
1:A:191:GLY:HA3	1:C:191:GLY:HA3	1.88	0.55
1:E:14:THR:HG22	1:E:18:MET:HE3	1.87	0.55
1:D:45:SER:O	1:D:49:ARG:HD3	2.07	0.55
1:B:297:THR:HB	1:B:315:PRO:HG2	1.89	0.54
1:C:264:TYR:CZ	1:C:274:LYS:HG2	2.43	0.54
1:F:55:HIS:HA	1:F:59:ILE:HG22	1.88	0.54
1:E:184:PHE:CE2	1:E:195:LEU:HD13	2.42	0.54
1:A:182:ASN:ND2	1:A:199:ASP:H	2.06	0.54
1:D:102:ALA:HB3	1:D:149:GLU:HG2	1.89	0.54
1:B:89:PHE:HA	1:B:109:LYS:O	2.07	0.54
1:G:251:ASP:OD1	1:G:254:ARG:NH2	2.40	0.54
1:A:13:LEU:HD22	1:A:173:LEU:HD22	1.90	0.54
1:E:182:ASN:ND2	1:E:199:ASP:H	2.06	0.53
2:C:1337:RO5:O1	2:C:1337:RO5:S16	2.65	0.53
1:B:83:ASN:O	1:B:87:SER:OG	2.26	0.53
1:H:182:ASN:ND2	1:H:199:ASP:H	2.06	0.53
1:B:145:ASP:O	1:B:146:GLU:C	2.52	0.53
1:A:17:VAL:O	2:A:1337:RO5:H212	2.09	0.53
1:A:26:GLY:HA3	2:A:1337:RO5:HA	1.74	0.53
1:E:261:ILE:HD11	1:E:317:ILE:HG23	1.90	0.53
1:A:129:LEU:HD12	1:B:166:LEU:HD23	1.91	0.53
1:E:26:GLY:HA3	2:E:1337:RO5:HA	1.73	0.53
1:H:141:LYS:HE3	1:H:143:SER:O	2.09	0.53
1:A:205:LYS:HD2	1:A:322:ASP:HB3	1.90	0.52
1:D:13:LEU:HD22	1:D:173:LEU:HD22	1.91	0.52
1:A:29:GLU:OE1	1:A:112:LYS:HG2	2.09	0.52
1:E:33:LEU:HD13	1:E:85:LEU:CD2	2.39	0.52
1:F:274:LYS:HA	1:F:313:ARG:HD3	1.90	0.52
1:F:227:ILE:HG22	1:F:231:LYS:HE3	1.91	0.52
1:C:188:PRO:HD2	1:D:51:ALA:HA	1.91	0.52
1:B:13:LEU:HD22	1:B:173:LEU:HD22	1.91	0.51
1:B:205:LYS:HD2	1:B:322:ASP:HB3	1.91	0.51
1:E:33:LEU:C	1:E:33:LEU:HD12	2.36	0.51
1:B:42:LYS:HD2	1:D:190:ILE:O	2.11	0.51
1:C:182:ASN:ND2	1:C:199:ASP:H	2.08	0.51
1:C:102:ALA:HB2	1:C:149:GLU:HG3	1.93	0.51
1:A:20:GLU:HB2	2:A:1337:RO5:H213	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:277:LEU:HD23	1:H:307:PRO:HB3	1.92	0.50
1:F:53:ILE:HD11	1:F:57:TYR:HE1	1.75	0.50
1:B:293:GLY:HA2	1:B:321:PRO:HD3	1.93	0.50
2:F:1337:RO5:S16	2:F:1337:RO5:O1	2.69	0.50
1:A:17:VAL:HG22	2:A:1337:RO5:H211	1.92	0.50
1:E:258:TYR:OH	1:F:125:ASN:HA	2.11	0.50
1:D:37:LEU:O	1:D:41:VAL:HG23	2.12	0.50
1:G:18:MET:HG2	2:G:1337:RO5:BR2	2.66	0.50
1:C:329:LYS:O	1:C:332:GLU:HB3	2.12	0.50
1:F:197:ASP:HB3	1:F:200:VAL:HG21	1.94	0.50
1:G:125:ASN:HB3	1:G:130:VAL:HG11	1.93	0.50
1:B:186:LEU:HB2	1:B:193:PHE:CE1	2.46	0.50
1:D:183:CYS:HB2	1:D:197:ASP:HB2	1.93	0.50
1:C:29:GLU:OE2	1:C:112:LYS:HG2	2.11	0.50
1:G:26:GLY:C	2:G:1337:RO5:HA	2.20	0.50
1:F:217:LYS:O	1:F:217:LYS:HG2	2.12	0.49
1:H:242:ALA:O	1:H:243:ARG:NH1	2.33	0.49
1:E:261:ILE:HD11	1:E:317:ILE:CG2	2.43	0.49
1:C:13:LEU:HD22	1:C:173:LEU:HD22	1.94	0.49
1:E:20:GLU:HB2	2:E:1337:RO5:H212	1.95	0.49
1:G:28:GLY:HA2	2:G:1337:RO5:C1	2.42	0.49
1:D:112:LYS:HB2	1:D:140[B]:ARG:CZ	2.42	0.49
1:A:33:LEU:HD13	1:A:85:LEU:HD22	1.94	0.49
1:E:208:ILE:HA	1:E:241:GLY:O	2.13	0.49
1:F:277:LEU:N	3:F:2037:HOH:O	2.45	0.49
1:G:183:CYS:HB2	1:G:197:ASP:HB2	1.94	0.49
1:B:93:VAL:HG21	1:B:151:ASP:HB2	1.95	0.48
1:A:17:VAL:HG12	1:A:31:THR:HG23	1.95	0.48
1:F:119:PRO:HA	1:F:134:THR:HG23	1.95	0.48
1:G:10:VAL:O	1:G:10:VAL:HG13	2.13	0.48
1:A:103:ILE:N	1:A:103:ILE:HD12	2.27	0.48
1:F:266:ALA:HB2	1:F:315:PRO:HG3	1.96	0.48
1:C:125:ASN:HB3	1:C:130:VAL:HG11	1.95	0.48
1:C:225:GLU:OE1	1:C:334:HIS:CE1	2.67	0.48
1:F:78:ASN:OD1	1:F:98:GLU:HB2	2.13	0.48
2:G:1337:RO5:O1	2:G:1337:RO5:S16	2.72	0.48
1:A:85:LEU:O	1:A:86:LYS:C	2.56	0.48
1:A:188:PRO:HD2	1:B:51:ALA:HA	1.96	0.48
1:F:210:SER:OG	1:F:243:ARG:O	2.20	0.48
1:E:171:THR:HB	1:E:186:LEU:HB3	1.95	0.48
1:C:258:TYR:OH	1:D:127:ASP:HB2	2.13	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:118:ASP:OD1	3:C:2024:HOH:O	2.20	0.47
1:C:112:LYS:HB2	1:C:140:ARG:NH1	2.28	0.47
1:C:251:ASP:OD1	1:C:254:ARG:NH2	2.40	0.47
1:F:33:LEU:C	1:F:33:LEU:CD1	2.86	0.47
1:F:197:ASP:HB3	1:F:200:VAL:CG2	2.44	0.47
1:C:96:SER:HA	1:C:117:PHE:O	2.15	0.47
1:B:182:ASN:HD22	1:B:198:LYS:HA	1.80	0.47
1:C:196:VAL:HG12	1:D:57:TYR:CZ	2.50	0.47
1:F:89:PHE:HA	1:F:109:LYS:O	2.14	0.47
1:F:92:CYS:HA	1:F:105:VAL:HB	1.96	0.47
1:H:73:LEU:HD12	1:H:73:LEU:HA	1.62	0.47
1:C:212:ASN:ND2	3:C:2049:HOH:O	2.42	0.47
1:D:93:VAL:HB	1:D:114:VAL:HG13	1.96	0.47
1:G:53:ILE:HD12	1:H:185:MET:HG2	1.96	0.46
1:C:97:GLU:HG2	1:C:279:TYR:CE1	2.51	0.46
1:E:184:PHE:HB3	1:E:193:PHE:HB3	1.96	0.46
1:G:72:LYS:HG3	3:G:2002:HOH:O	2.15	0.46
1:H:141:LYS:NZ	1:H:151:ASP:OD2	2.48	0.46
1:B:263:LEU:HG	1:B:317:ILE:HG23	1.97	0.46
1:E:26:GLY:C	2:E:1337:RO5:HA	2.23	0.46
1:H:248:MET:HE3	1:H:275:LEU:HD13	1.97	0.46
1:A:309:ASP:HB3	1:A:312:GLN:HB3	1.97	0.46
1:F:106:GLU:HB2	1:F:107:PRO:CD	2.45	0.46
1:H:116:CYS:SG	1:H:278:LEU:HD23	2.55	0.46
1:H:182:ASN:ND2	3:H:2035:HOH:O	2.49	0.46
1:B:136:PHE:O	1:B:283:PRO:HB3	2.16	0.46
1:D:17:VAL:HG22	2:D:1337:RO5:H211	1.97	0.46
1:D:20:GLU:CB	2:D:1337:RO5:H212	2.38	0.46
1:B:164:TYR:CD1	1:B:249:VAL:HG13	2.51	0.46
1:G:119:PRO:HA	1:G:134:THR:HG23	1.97	0.46
1:C:13:LEU:CD2	1:C:173:LEU:HD22	2.45	0.46
1:H:126:ILE:HG13	3:H:2023:HOH:O	2.15	0.46
1:E:225:GLU:O	1:E:229:ARG:HG3	2.16	0.45
1:F:182:ASN:ND2	1:F:199:ASP:H	2.14	0.45
1:D:72:LYS:HD2	3:D:2021:HOH:O	2.16	0.45
1:E:182:ASN:ND2	1:E:198:LYS:HA	2.29	0.45
1:B:18:MET:CE	1:D:18:MET:CE	2.95	0.45
1:E:22:ARG:NH1	1:G:32:GLN:OE1	2.48	0.45
1:G:17:VAL:O	2:G:1337:RO5:H212	2.16	0.45
1:H:184:PHE:HB3	1:H:193:PHE:HB3	1.99	0.45
1:C:26:GLY:C	2:C:1337:RO5:HA	2.25	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:274:LYS:HG2	1:F:313:ARG:NH1	2.32	0.45
1:B:28:GLY:HA2	2:B:1337:RO5:C1	2.46	0.45
1:D:206:GLY:HA3	1:D:260:GLY:N	2.32	0.45
1:B:119:PRO:HA	1:B:134:THR:HG23	1.98	0.44
1:B:182:ASN:ND2	1:B:199:ASP:H	2.14	0.44
1:G:166:LEU:O	1:G:171:THR:HA	2.16	0.44
1:G:277:LEU:HA	1:G:281:CYS:HB2	1.98	0.44
1:A:114:VAL:HB	1:A:139:TYR:HB2	1.99	0.44
1:F:277:LEU:HD23	1:F:307:PRO:HB3	1.98	0.44
1:B:283:PRO:O	1:B:287:VAL:HG23	2.17	0.44
1:D:216:ALA:HA	1:D:219:PHE:CD1	2.52	0.44
1:E:33:LEU:CD1	1:E:85:LEU:CD2	2.95	0.44
1:G:234:PRO:C	1:G:236:ASN:H	2.25	0.44
1:A:17:VAL:CG1	1:A:31:THR:HG23	2.47	0.44
1:D:278:LEU:HG	3:D:2041:HOH:O	2.17	0.44
1:C:252:VAL:HB	1:C:284:MET:HE3	1.99	0.44
1:D:230:LYS:HA	1:D:230:LYS:HE2	2.00	0.44
1:F:18:MET:HE3	1:H:18:MET:HE3	2.00	0.44
1:H:141:LYS:HZ2	1:H:151:ASP:CG	2.26	0.44
1:E:33:LEU:HD12	1:E:33:LEU:O	2.17	0.43
1:F:182:ASN:HD22	1:F:198:LYS:HA	1.83	0.43
1:H:266:ALA:HB2	1:H:315:PRO:HG3	2.00	0.43
1:A:184:PHE:HB3	1:A:193:PHE:HB3	2.00	0.43
1:B:184:PHE:HB3	1:B:193:PHE:HB3	1.99	0.43
1:H:174:VAL:HG22	1:H:183:CYS:SG	2.58	0.43
1:H:282:ASN:HD22	1:H:282:ASN:HA	1.55	0.43
1:C:318:LEU:HD12	1:C:318:LEU:C	2.44	0.43
1:E:140[B]:ARG:HG3	1:E:140[B]:ARG:NH1	2.08	0.43
1:H:181:VAL:HB	1:H:200:VAL:HG22	2.01	0.43
1:D:125:ASN:O	1:D:130:VAL:HG12	2.19	0.43
1:E:261:ILE:HG13	1:E:262:PHE:N	2.34	0.43
1:H:20:GLU:HB2	2:H:1337:RO5:C21	2.45	0.43
1:A:142:LYS:HD2	1:A:142:LYS:HA	1.82	0.43
1:A:176:ALA:HB2	1:A:181:VAL:HG22	1.99	0.43
1:B:55:HIS:HA	1:B:59:ILE:HG22	2.00	0.43
1:C:176:ALA:HB2	1:C:181:VAL:HG22	2.01	0.43
1:E:33:LEU:HD13	1:E:85:LEU:HD22	1.99	0.43
1:B:248:MET:HE2	1:B:252:VAL:HG21	2.00	0.43
1:D:28:GLY:HA2	2:D:1337:RO5:C1	2.48	0.43
1:H:91:THR:HA	1:H:113:TYR:O	2.19	0.43
1:E:131:SER:HB3	1:E:166:LEU:HD11	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:227:ILE:CG2	1:F:231:LYS:HE3	2.49	0.43
1:B:235:ASP:O	1:B:236:ASN:HB3	2.18	0.42
1:C:150:LYS:HA	1:C:153:LEU:HD12	2.00	0.42
1:D:162:ALA:HB3	1:D:286:TYR:CD1	2.54	0.42
1:E:209:TYR:CZ	1:E:242:ALA:HB2	2.55	0.42
1:G:169:SER:O	1:H:49:ARG:NH1	2.48	0.42
1:A:28:GLY:HA2	2:A:1337:RO5:O1	2.20	0.42
1:A:258:TYR:OH	1:B:125:ASN:HA	2.20	0.42
1:B:112:LYS:O	1:B:141:LYS:HB3	2.18	0.42
1:A:26:GLY:CA	2:A:1337:RO5:HA	2.31	0.42
1:H:198:LYS:O	1:H:199:ASP:C	2.62	0.42
1:H:277:LEU:O	1:H:282:ASN:HB2	2.18	0.42
1:C:127:ASP:HB2	1:D:258:TYR:CZ	2.54	0.42
1:D:225:GLU:OE1	1:D:334:HIS:HE1	2.03	0.42
1:B:110:ARG:HD3	1:B:147:PRO:HG3	2.01	0.42
1:C:327:PHE:CD2	1:C:327:PHE:C	2.96	0.42
1:D:195:LEU:HD21	1:D:198:LYS:HG2	2.01	0.42
1:A:141:LYS:HG3	1:A:151:ASP:OD1	2.20	0.42
1:F:108:GLU:H	1:F:108:GLU:CD	2.28	0.42
1:A:127:ASP:OD1	1:A:127:ASP:N	2.51	0.42
1:C:118:ASP:OD2	1:C:121:ASP:OD1	2.37	0.42
1:E:28:GLY:HA2	2:E:1337:RO5:C1	2.50	0.42
1:E:96:SER:HB2	1:E:117:PHE:CZ	2.55	0.42
1:E:258:TYR:HH	1:F:125:ASN:HA	1.85	0.41
1:F:282:ASN:HD22	1:F:282:ASN:HA	1.71	0.41
1:F:331:TYR:C	1:F:333:LYS:H	2.26	0.41
1:B:18:MET:HE3	1:D:18:MET:HE3	2.02	0.41
1:F:18:MET:CE	1:H:18:MET:HE2	2.49	0.41
1:F:216:ALA:HA	1:F:219:PHE:CD2	2.55	0.41
1:G:244:TYR:CE2	1:G:246:GLY:HA2	2.55	0.41
1:A:96:SER:HB2	1:A:117:PHE:CZ	2.55	0.41
1:F:96:SER:HB3	1:F:99:ASP:OD2	2.21	0.41
1:F:114:VAL:HB	1:F:139:TYR:HB2	2.03	0.41
1:G:233:PRO:HA	1:G:234:PRO:HD3	1.97	0.41
1:H:55:HIS:HA	1:H:59:ILE:HG22	2.01	0.41
1:H:156:GLY:C	1:H:303:LEU:HD22	2.44	0.41
1:D:216:ALA:HA	1:D:219:PHE:CG	2.55	0.41
1:E:162:ALA:HB3	1:E:286:TYR:CD1	2.56	0.41
1:A:28:GLY:HA2	2:A:1337:RO5:C1	2.51	0.41
1:C:166:LEU:HD13	1:C:249:VAL:HG12	2.01	0.41
1:E:133:GLY:HA3	1:E:249:VAL:HG21	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:20:GLU:HB2	2:A:1337:RO5:C21	2.50	0.41
1:A:324:VAL:O	1:A:325:LEU:C	2.62	0.41
1:D:238:ALA:HA	1:D:239:PRO:HD3	1.98	0.41
1:H:97:GLU:HG3	1:H:118:ASP:OD2	2.20	0.41
1:H:182:ASN:HD22	1:H:198:LYS:HA	1.85	0.41
1:H:288:MET:HG3	1:H:318:LEU:HD13	2.02	0.41
1:A:320:SER:HB2	1:A:323:ASP:OD2	2.20	0.41
1:B:282:ASN:HD22	1:B:282:ASN:HA	1.73	0.41
1:F:198:LYS:O	1:F:199:ASP:C	2.63	0.41
1:G:164:TYR:CD2	1:G:249:VAL:HG13	2.56	0.41
1:A:257:VAL:HG12	1:A:258:TYR:CD1	2.56	0.41
1:B:120:LEU:HD12	1:B:120:LEU:HA	1.81	0.41
1:E:252:VAL:HB	1:E:284:MET:HE3	2.03	0.41
1:G:188:PRO:HD2	1:H:51:ALA:HA	2.03	0.41
1:D:121:ASP:N	1:D:133:GLY:O	2.38	0.41
1:E:187:ASP:HA	1:E:188:PRO:HD2	1.85	0.41
2:E:1337:RO5:O1	2:E:1337:RO5:S16	2.78	0.41
1:C:26:GLY:CA	2:C:1337:RO5:HA	2.34	0.41
1:F:220:ASP:HA	1:F:221:PRO:HD2	1.81	0.41
1:A:258:TYR:CE1	1:B:127:ASP:HB2	2.56	0.40
1:C:18:MET:HG2	2:C:1337:RO5:BR2	2.76	0.40
1:E:91:THR:HA	1:E:113:TYR:O	2.22	0.40
1:F:267:ASN:HB2	1:F:268:LYS:H	1.72	0.40
1:H:125:ASN:O	1:H:130:VAL:HG12	2.21	0.40
1:D:184:PHE:HB3	1:D:193:PHE:HB3	2.03	0.40
1:F:85:LEU:O	1:F:86:LYS:C	2.63	0.40
1:F:145:ASP:O	1:F:146:GLU:C	2.64	0.40
1:B:26:GLY:C	2:B:1337:RO5:HA	2.29	0.40
1:B:48:VAL:HA	1:B:73:LEU:HD21	2.02	0.40
1:E:306:ILE:HA	1:E:307:PRO:HD3	1.89	0.40
1:F:29:GLU:HG3	1:H:22:ARG:NH1	2.31	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	317/338 (94%)	309 (98%)	8 (2%)	0	100	100
1	B	315/338 (93%)	296 (94%)	16 (5%)	3 (1%)	12	20
1	C	314/338 (93%)	306 (98%)	8 (2%)	0	100	100
1	D	315/338 (93%)	307 (98%)	7 (2%)	1 (0%)	36	50
1	E	317/338 (94%)	299 (94%)	18 (6%)	0	100	100
1	F	315/338 (93%)	285 (90%)	26 (8%)	4 (1%)	9	14
1	G	315/338 (93%)	300 (95%)	13 (4%)	2 (1%)	21	32
1	H	314/338 (93%)	297 (95%)	17 (5%)	0	100	100
All	All	2522/2704 (93%)	2399 (95%)	113 (4%)	10 (0%)	30	43

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	235	ASP
1	F	235	ASP
1	B	237	SER
1	B	335	SER
1	D	235	ASP
1	F	335	SER
1	B	236	ASN
1	F	236	ASN
1	G	234	PRO
1	F	221	PRO

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	267/281 (95%)	247 (92%)	20 (8%)	12	21
1	B	265/281 (94%)	251 (95%)	14 (5%)	20	36

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	264/281 (94%)	253 (96%)	11 (4%)	26	45
1	D	265/281 (94%)	254 (96%)	11 (4%)	26	45
1	E	267/281 (95%)	251 (94%)	16 (6%)	17	31
1	F	265/281 (94%)	248 (94%)	17 (6%)	16	28
1	G	265/281 (94%)	249 (94%)	16 (6%)	17	31
1	H	264/281 (94%)	252 (96%)	12 (4%)	24	42
All	All	2122/2248 (94%)	2005 (94%)	117 (6%)	19	34

All (117) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	VAL
1	A	33	LEU
1	A	38	CYS
1	A	56	LEU
1	A	71	LYS
1	A	72	LYS
1	A	99	ASP
1	A	106	GLU
1	A	126	ILE
1	A	127	ASP
1	A	144	THR
1	A	146	GLU
1	A	173	LEU
1	A	200	VAL
1	A	228	GLN
1	A	236	ASN
1	A	237	SER
1	A	274	LYS
1	A	278	LEU
1	A	282	ASN
1	B	33	LEU
1	B	38	CYS
1	B	87	SER
1	B	140[A]	ARG
1	B	140[B]	ARG
1	B	141	LYS
1	B	142	LYS
1	B	197	ASP
1	B	236	ASN

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Mol	Chain	Res	Type
1	B	248	MET
1	B	268	LYS
1	B	278	LEU
1	B	282	ASN
1	B	329	LYS
1	C	9	ASP
1	C	56	LEU
1	C	97	GLU
1	C	112	LYS
1	C	124	SER
1	C	125	ASN
1	C	126	ILE
1	C	160	VAL
1	C	248	MET
1	C	278	LEU
1	C	302	VAL
1	D	17	VAL
1	D	23	LYS
1	D	59	ILE
1	D	124	SER
1	D	125	ASN
1	D	126	ILE
1	D	142	LYS
1	D	200	VAL
1	D	306	ILE
1	D	332	GLU
1	D	335	SER
1	E	29	GLU
1	E	33	LEU
1	E	38	CYS
1	E	70	VAL
1	E	72	LYS
1	E	97	GLU
1	E	103	ILE
1	E	112	LYS
1	E	126	ILE
1	E	178	ASP
1	E	217	LYS
1	E	261	ILE
1	E	268	LYS
1	E	282	ASN
1	E	332	GLU

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Mol	Chain	Res	Type
1	E	335	SER
1	F	17	VAL
1	F	29	GLU
1	F	33	LEU
1	F	38	CYS
1	F	108	GLU
1	F	125	ASN
1	F	126	ILE
1	F	145	ASP
1	F	150	LYS
1	F	200	VAL
1	F	202	ILE
1	F	267	ASN
1	F	268	LYS
1	F	278	LEU
1	F	282	ASN
1	F	300	GLU
1	F	316	VAL
1	G	13	LEU
1	G	35	ASN
1	G	48	VAL
1	G	53	ILE
1	G	56	LEU
1	G	72	LYS
1	G	160	VAL
1	G	173	LEU
1	G	200	VAL
1	G	248	MET
1	G	263	LEU
1	G	274	LYS
1	G	278	LEU
1	G	282	ASN
1	G	300	GLU
1	G	332	GLU
1	H	9	ASP
1	H	29	GLU
1	H	38	CYS
1	H	59	ILE
1	H	101	HIS
1	H	150	LYS
1	H	200	VAL
1	H	208	ILE

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Mol	Chain	Res	Type
1	H	217	LYS
1	H	228	GLN
1	H	282	ASN
1	H	332	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (36) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	35	ASN
1	A	78	ASN
1	A	125	ASN
1	A	182	ASN
1	A	228	GLN
1	A	282	ASN
1	A	334	HIS
1	B	125	ASN
1	B	182	ASN
1	B	236	ASN
1	B	282	ASN
1	C	125	ASN
1	C	182	ASN
1	C	282	ASN
1	C	334	HIS
1	D	35	ASN
1	D	182	ASN
1	D	282	ASN
1	D	334	HIS
1	E	125	ASN
1	E	182	ASN
1	E	334	HIS
1	F	11	ASN
1	F	125	ASN
1	F	182	ASN
1	F	282	ASN
1	G	11	ASN
1	G	101	HIS
1	G	125	ASN
1	G	182	ASN
1	G	272	ASN
1	G	282	ASN
1	G	334	HIS
1	H	182	ASN

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Mol	Chain	Res	Type
1	H	282	ASN
1	H	334	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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
2	RO5	C	1337	-	22,22,22	1.58	4 (18%)	30,31,31	3.86	11 (36%)
2	RO5	D	1337	-	22,22,22	1.73	5 (22%)	30,31,31	4.09	14 (46%)
2	RO5	F	1337	-	22,22,22	1.66	5 (22%)	30,31,31	3.96	11 (36%)
2	RO5	A	1337	-	22,22,22	1.66	5 (22%)	30,31,31	3.68	12 (40%)
2	RO5	B	1337	-	22,22,22	1.72	4 (18%)	30,31,31	4.27	12 (40%)
2	RO5	E	1337	-	22,22,22	1.64	4 (18%)	30,31,31	4.02	12 (40%)
2	RO5	H	1337	-	22,22,22	1.74	5 (22%)	30,31,31	4.43	13 (43%)
2	RO5	G	1337	-	22,22,22	1.61	5 (22%)	30,31,31	4.03	10 (33%)

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	RO5	C	1337	-	-	0/17/17/17	0/2/2/2
2	RO5	D	1337	-	-	3/17/17/17	0/2/2/2
2	RO5	F	1337	-	-	2/17/17/17	0/2/2/2
2	RO5	A	1337	-	-	2/17/17/17	0/2/2/2
2	RO5	B	1337	-	-	0/17/17/17	0/2/2/2
2	RO5	E	1337	-	-	2/17/17/17	0/2/2/2
2	RO5	H	1337	-	-	0/17/17/17	0/2/2/2
2	RO5	G	1337	-	-	0/17/17/17	0/2/2/2

All (37) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	1337	RO5	C4-N1	-4.03	1.32	1.38
2	F	1337	RO5	C4-N1	-4.02	1.32	1.38
2	A	1337	RO5	C4-N1	-4.02	1.32	1.38
2	E	1337	RO5	C4-N1	-4.02	1.32	1.38
2	B	1337	RO5	C4-N1	-4.01	1.32	1.38
2	D	1337	RO5	C1-N5	-3.90	1.30	1.39
2	H	1337	RO5	C4-N1	-3.77	1.32	1.38
2	H	1337	RO5	C1-N5	-3.76	1.31	1.39
2	B	1337	RO5	C15-N17	-3.75	1.30	1.37
2	C	1337	RO5	C15-N17	-3.74	1.30	1.37
2	E	1337	RO5	C15-N17	-3.71	1.30	1.37
2	G	1337	RO5	C4-N1	-3.70	1.32	1.38
2	H	1337	RO5	C15-N17	-3.70	1.30	1.37
2	E	1337	RO5	C1-N5	-3.63	1.31	1.39
2	B	1337	RO5	C1-N5	-3.58	1.31	1.39
2	A	1337	RO5	C1-N5	-3.57	1.31	1.39
2	G	1337	RO5	C15-N17	-3.56	1.30	1.37
2	D	1337	RO5	C15-N17	-3.55	1.30	1.37
2	A	1337	RO5	C15-N17	-3.48	1.30	1.37
2	F	1337	RO5	C15-N17	-3.35	1.31	1.37
2	F	1337	RO5	BR2-C14	3.26	1.93	1.87
2	C	1337	RO5	C4-N1	-3.21	1.33	1.38
2	C	1337	RO5	C1-N5	-3.17	1.32	1.39
2	H	1337	RO5	C1-N1	-2.95	1.32	1.39
2	G	1337	RO5	C1-N5	-2.95	1.32	1.39
2	A	1337	RO5	C1-N1	-2.89	1.33	1.39
2	G	1337	RO5	BR2-C14	2.84	1.92	1.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1337	RO5	C1-N1	-2.81	1.33	1.39
2	H	1337	RO5	BR2-C14	2.76	1.92	1.87
2	D	1337	RO5	C1-N1	-2.71	1.33	1.39
2	C	1337	RO5	C1-N1	-2.70	1.33	1.39
2	E	1337	RO5	C1-N1	-2.56	1.33	1.39
2	G	1337	RO5	C1-N1	-2.48	1.33	1.39
2	F	1337	RO5	C1-N1	-2.44	1.34	1.39
2	F	1337	RO5	C1-N5	-2.42	1.33	1.39
2	D	1337	RO5	BR2-C14	2.10	1.91	1.87
2	A	1337	RO5	BR2-C14	2.02	1.91	1.87

All (95) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	1337	RO5	S16-C4-N17	-11.93	102.52	115.58
2	E	1337	RO5	O2-S2-O3	-11.93	105.03	119.52
2	F	1337	RO5	S16-C4-N17	-11.74	102.72	115.58
2	D	1337	RO5	S16-C4-N17	-11.67	102.80	115.58
2	B	1337	RO5	O2-S2-O3	-11.61	105.42	119.52
2	C	1337	RO5	O2-S2-O3	-11.40	105.67	119.52
2	G	1337	RO5	O2-S2-O3	-11.38	105.69	119.52
2	E	1337	RO5	S16-C4-N17	-11.22	103.30	115.58
2	G	1337	RO5	S16-C4-N17	-11.05	103.49	115.58
2	B	1337	RO5	S16-C4-N17	-10.90	103.64	115.58
2	C	1337	RO5	S16-C4-N17	-10.22	104.39	115.58
2	A	1337	RO5	O2-S2-O3	-10.08	107.27	119.52
2	H	1337	RO5	O2-S2-O3	-9.93	107.46	119.52
2	A	1337	RO5	S16-C4-N17	-9.92	104.72	115.58
2	E	1337	RO5	C15-N17-C4	9.24	120.27	109.66
2	D	1337	RO5	O2-S2-O3	-9.09	108.48	119.52
2	D	1337	RO5	C15-N17-C4	8.90	119.87	109.66
2	F	1337	RO5	O2-S2-O3	-8.72	108.93	119.52
2	H	1337	RO5	C15-N17-C4	8.62	119.56	109.66
2	H	1337	RO5	BR2-C14-S16	8.46	130.40	119.68
2	B	1337	RO5	C15-N17-C4	8.31	119.19	109.66
2	G	1337	RO5	C15-N17-C4	8.30	119.19	109.66
2	F	1337	RO5	C15-C14-S16	-8.26	101.08	113.45
2	F	1337	RO5	C15-N17-C4	8.21	119.08	109.66
2	H	1337	RO5	C15-C14-S16	-7.89	101.63	113.45
2	C	1337	RO5	C15-N17-C4	7.61	118.39	109.66
2	A	1337	RO5	C15-N17-C4	7.58	118.36	109.66
2	D	1337	RO5	C15-C14-S16	-7.19	102.68	113.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	1337	RO5	C15-C14-S16	-7.10	102.80	113.45
2	D	1337	RO5	BR2-C14-S16	6.87	128.38	119.68
2	F	1337	RO5	BR2-C14-S16	6.84	128.35	119.68
2	B	1337	RO5	BR2-C14-S16	6.54	127.96	119.68
2	B	1337	RO5	C15-C14-S16	-6.40	103.86	113.45
2	C	1337	RO5	C15-C14-S16	-6.14	104.25	113.45
2	H	1337	RO5	C11-S2-N5	6.11	115.80	106.06
2	E	1337	RO5	C15-C14-S16	-6.03	104.41	113.45
2	A	1337	RO5	C15-C14-S16	-5.88	104.64	113.45
2	B	1337	RO5	O3-S2-C11	5.73	115.21	107.98
2	G	1337	RO5	C11-S2-N5	5.66	115.09	106.06
2	C	1337	RO5	C11-S2-N5	5.58	114.95	106.06
2	G	1337	RO5	BR2-C14-S16	5.55	126.71	119.68
2	B	1337	RO5	C11-S2-N5	5.28	114.48	106.06
2	C	1337	RO5	BR2-C14-S16	5.07	126.10	119.68
2	D	1337	RO5	S16-C4-N1	4.62	129.91	123.72
2	A	1337	RO5	BR2-C14-S16	4.40	125.26	119.68
2	H	1337	RO5	C12-C11-S2	-4.40	114.56	119.06
2	H	1337	RO5	S16-C4-N1	4.37	129.57	123.72
2	E	1337	RO5	BR2-C14-S16	4.34	125.18	119.68
2	A	1337	RO5	C4-N1-C1	-4.31	117.32	124.54
2	A	1337	RO5	O3-S2-C11	4.28	113.38	107.98
2	G	1337	RO5	N1-C4-N17	4.22	129.18	121.19
2	F	1337	RO5	C14-C15-N17	4.03	119.09	111.92
2	E	1337	RO5	N1-C4-N17	3.99	128.74	121.19
2	D	1337	RO5	C12-C11-S2	-3.92	115.06	119.06
2	B	1337	RO5	C6-C11-S2	3.91	124.06	119.76
2	F	1337	RO5	N1-C4-N17	3.83	128.45	121.19
2	H	1337	RO5	C14-C15-N17	3.76	118.62	111.92
2	C	1337	RO5	N1-C4-N17	3.66	128.12	121.19
2	B	1337	RO5	S16-C4-N1	3.64	128.60	123.72
2	F	1337	RO5	S16-C4-N1	3.57	128.50	123.72
2	H	1337	RO5	C6-C11-S2	3.57	123.68	119.76
2	H	1337	RO5	N1-C4-N17	3.46	127.75	121.19
2	B	1337	RO5	N1-C4-N17	3.34	127.52	121.19
2	D	1337	RO5	O3-S2-C11	3.30	112.14	107.98
2	B	1337	RO5	C12-C11-S2	-3.30	115.69	119.06
2	G	1337	RO5	C14-C15-N17	3.27	117.75	111.92
2	C	1337	RO5	C14-C15-N17	3.27	117.74	111.92
2	A	1337	RO5	N1-C4-N17	3.26	127.37	121.19
2	E	1337	RO5	C11-S2-N5	3.22	111.19	106.06
2	B	1337	RO5	C14-C15-N17	3.18	117.59	111.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	1337	RO5	O3-S2-C11	3.14	111.94	107.98
2	D	1337	RO5	C14-C15-N17	3.09	117.42	111.92
2	D	1337	RO5	N1-C4-N17	3.06	126.99	121.19
2	E	1337	RO5	S16-C4-N1	3.03	127.77	123.72
2	D	1337	RO5	C6-C11-S2	3.00	123.06	119.76
2	A	1337	RO5	S16-C4-N1	2.94	127.66	123.72
2	A	1337	RO5	C14-C15-N17	2.92	117.11	111.92
2	F	1337	RO5	BR2-C14-C15	2.78	130.58	126.99
2	A	1337	RO5	C11-S2-N5	2.76	110.46	106.06
2	G	1337	RO5	BR2-C14-C15	2.71	130.49	126.99
2	C	1337	RO5	S16-C4-N1	2.69	127.32	123.72
2	E	1337	RO5	BR2-C14-C15	2.65	130.41	126.99
2	E	1337	RO5	O3-S2-C11	2.58	111.24	107.98
2	D	1337	RO5	C4-N1-C1	-2.56	120.25	124.54
2	C	1337	RO5	C4-N1-C1	-2.48	120.39	124.54
2	A	1337	RO5	BR2-C14-C15	2.42	130.10	126.99
2	D	1337	RO5	C11-S2-N5	2.33	109.78	106.06
2	E	1337	RO5	O2-S2-C11	2.30	110.87	107.98
2	G	1337	RO5	S16-C4-N1	2.26	126.75	123.72
2	F	1337	RO5	C11-S2-N5	2.23	109.61	106.06
2	E	1337	RO5	C14-C15-N17	2.21	115.86	111.92
2	H	1337	RO5	C20-C8-C12	-2.15	116.07	120.87
2	C	1337	RO5	BR2-C14-C15	2.06	129.65	126.99
2	D	1337	RO5	C20-C8-C12	-2.04	116.32	120.87
2	F	1337	RO5	C4-N1-C1	-2.01	121.17	124.54

There are no chirality outliers.

All (9) torsion outliers are listed below:

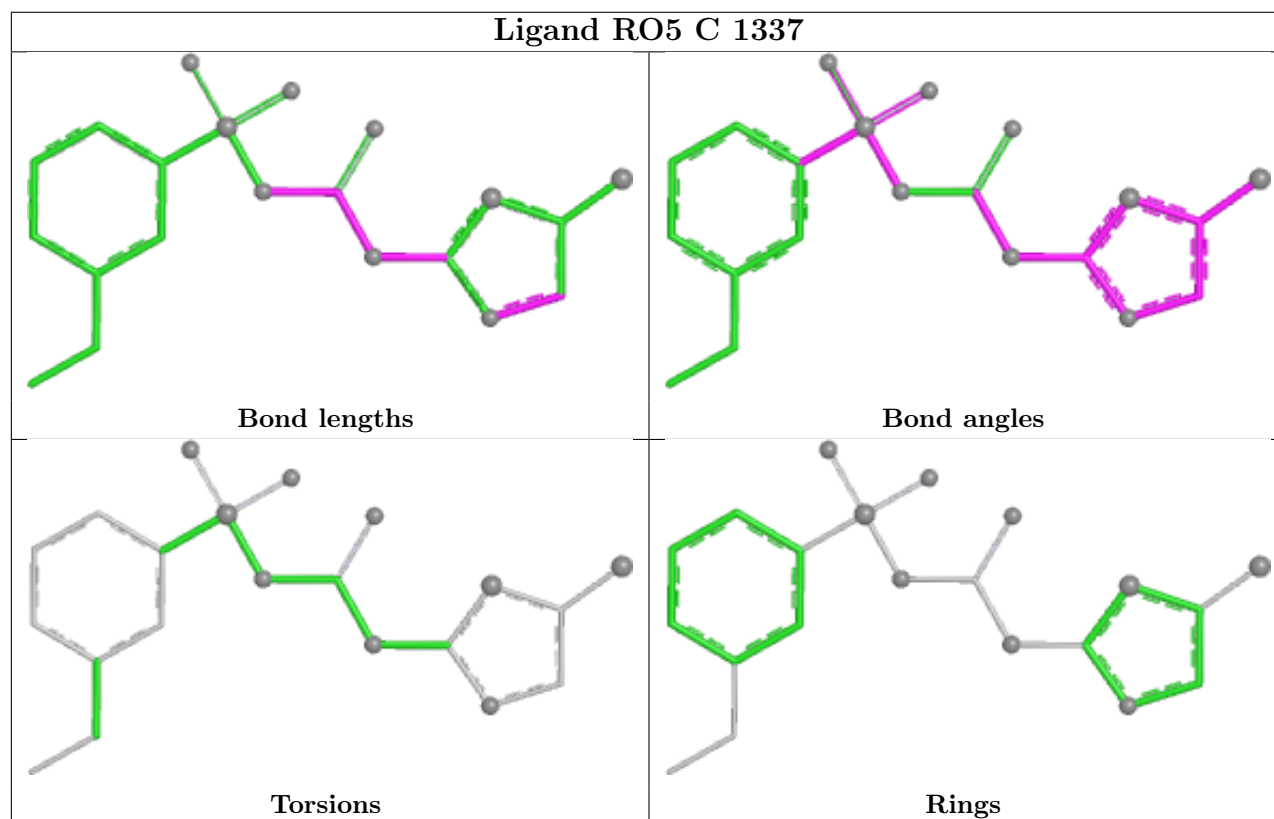
Mol	Chain	Res	Type	Atoms
2	D	1337	RO5	N17-C4-N1-C1
2	A	1337	RO5	N17-C4-N1-C1
2	D	1337	RO5	C1-N5-S2-O3
2	A	1337	RO5	C1-N5-S2-O3
2	D	1337	RO5	S16-C4-N1-C1
2	F	1337	RO5	C1-N5-S2-O3
2	E	1337	RO5	C21-C20-C8-C12
2	E	1337	RO5	C21-C20-C8-C10
2	F	1337	RO5	C12-C11-S2-O3

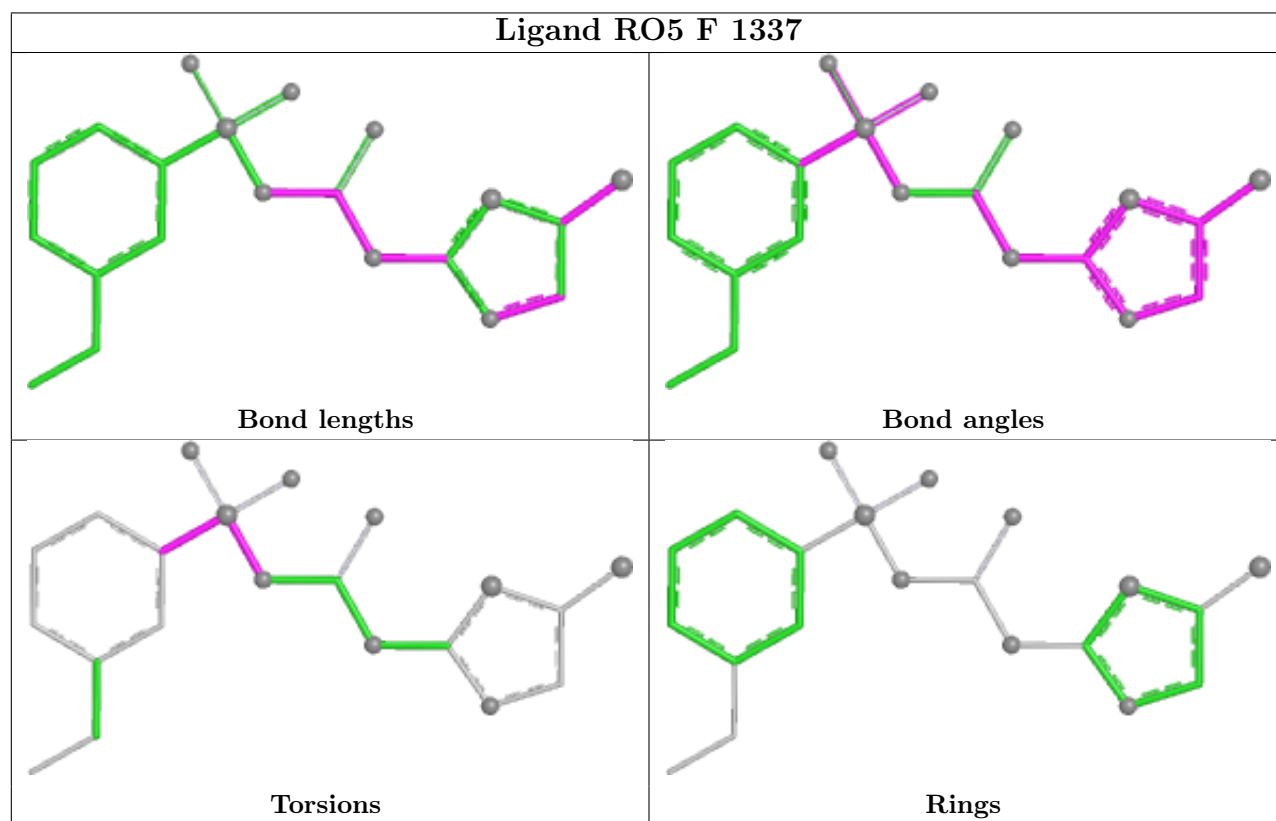
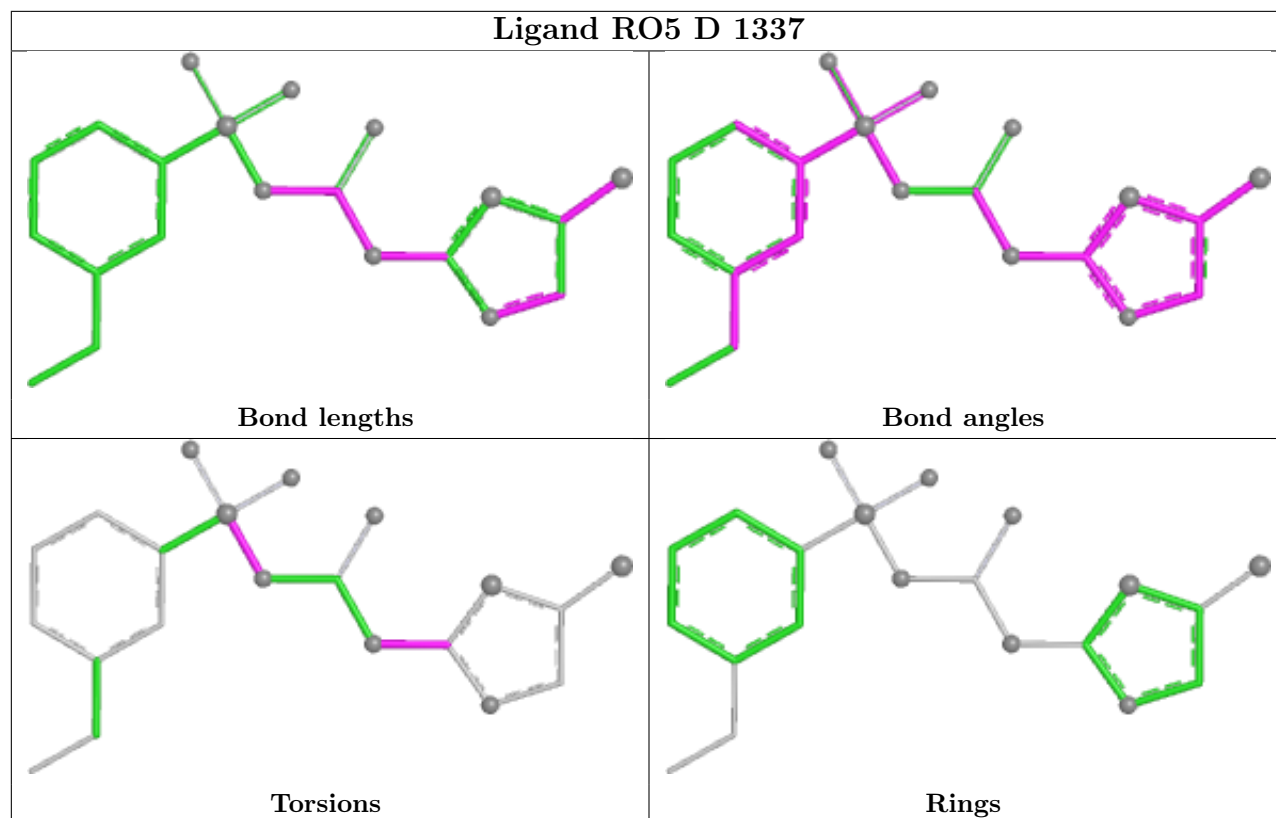
There are no ring outliers.

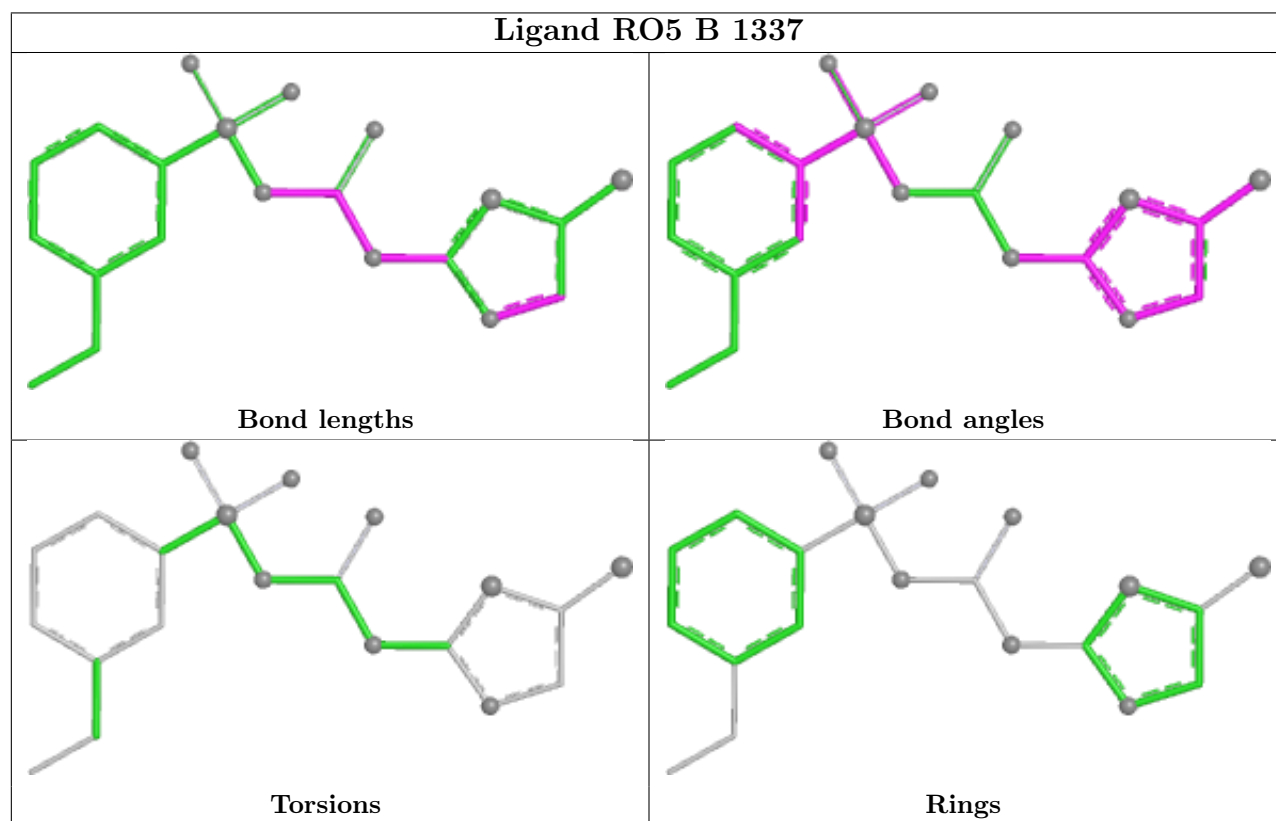
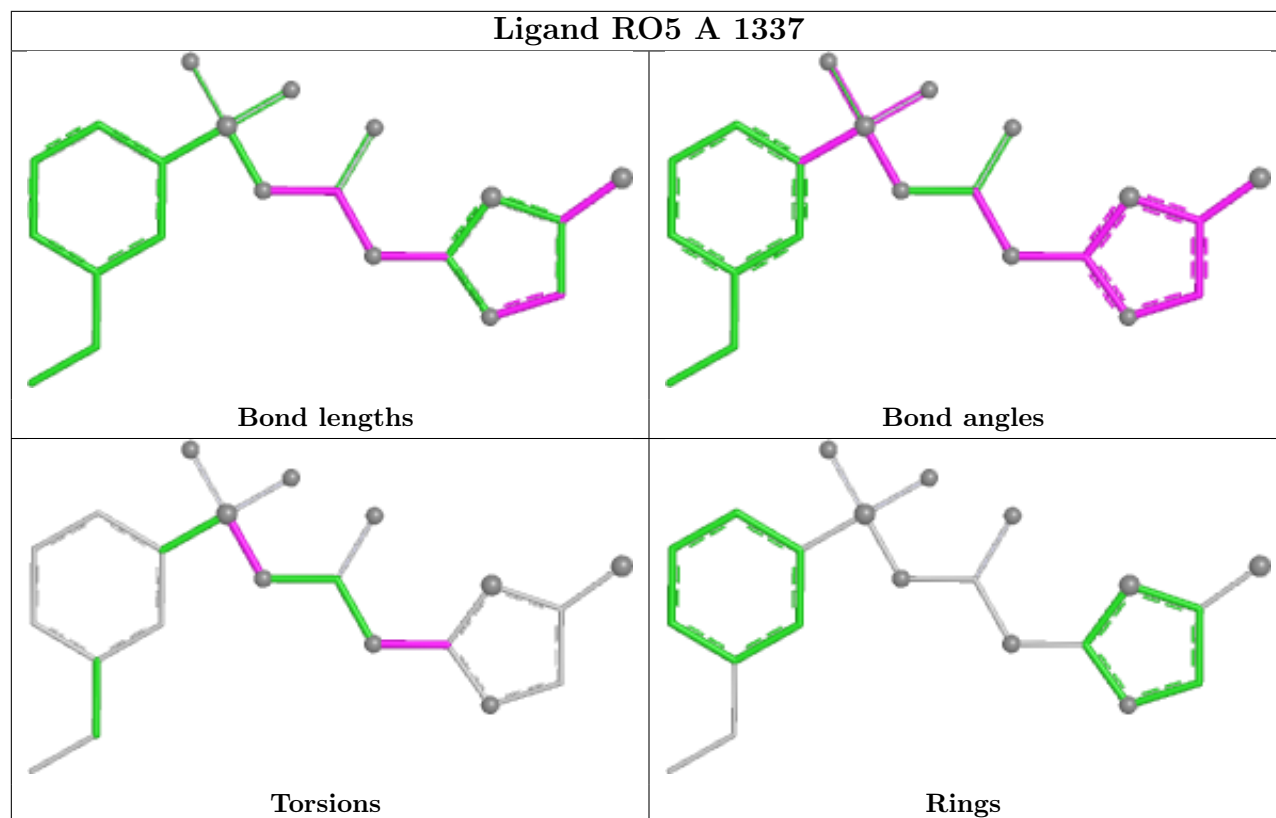
8 monomers are involved in 34 short contacts:

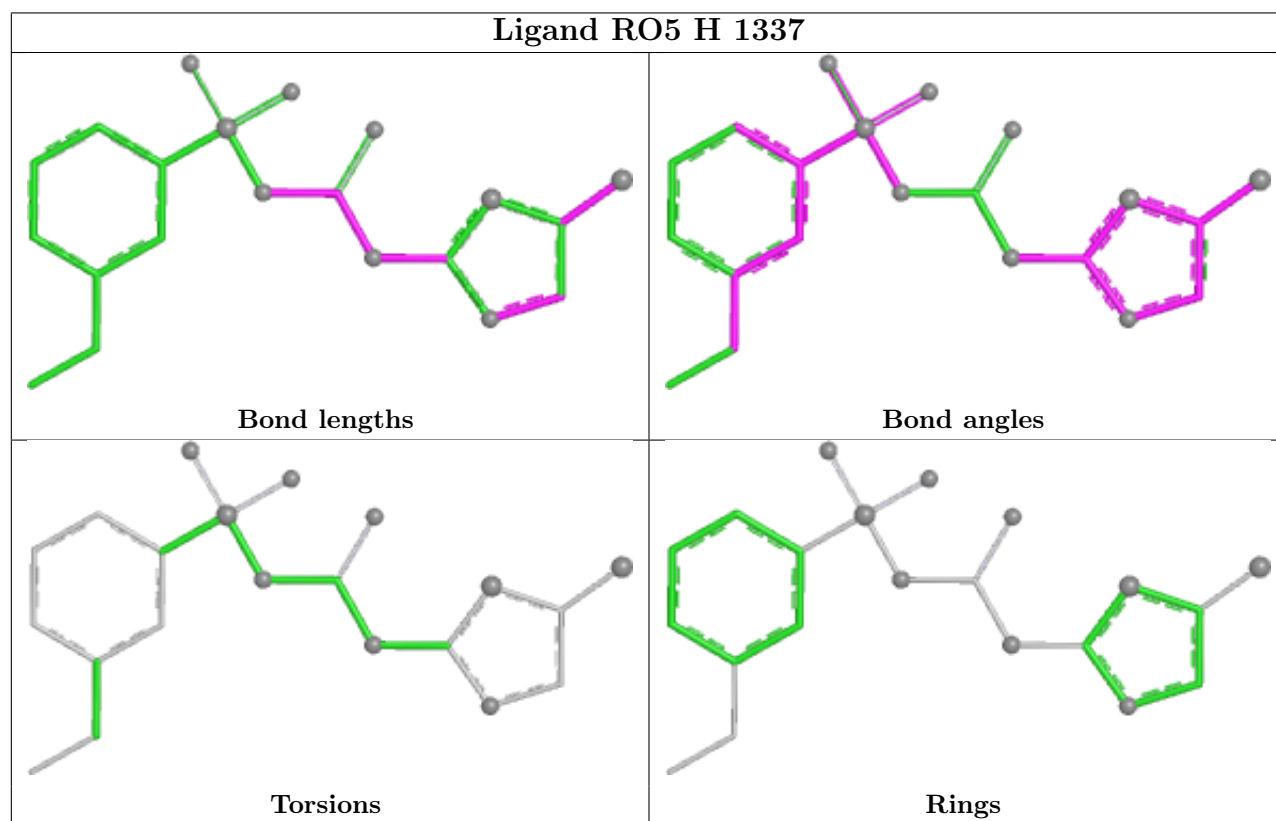
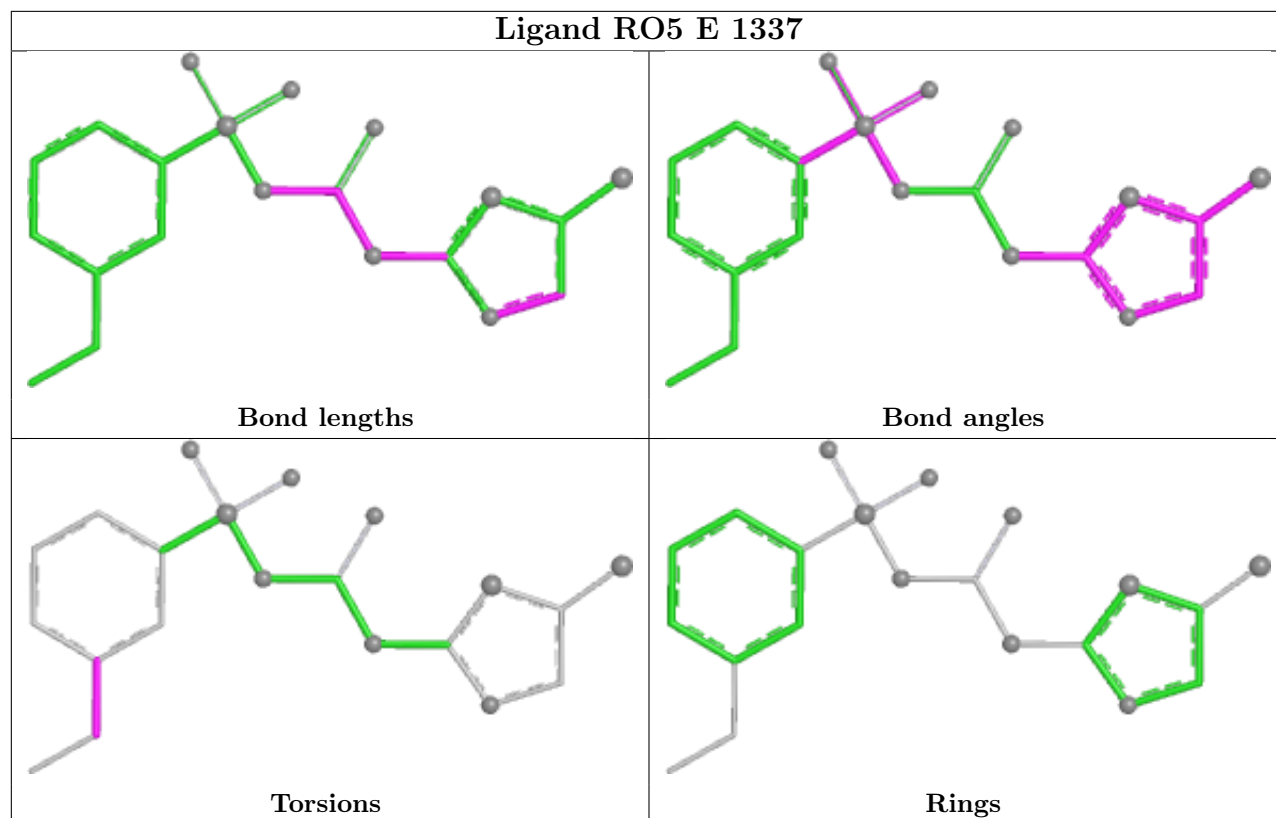
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1337	RO5	5	0
2	D	1337	RO5	4	0
2	F	1337	RO5	1	0
2	A	1337	RO5	9	0
2	B	1337	RO5	2	0
2	E	1337	RO5	6	0
2	H	1337	RO5	2	0
2	G	1337	RO5	5	0

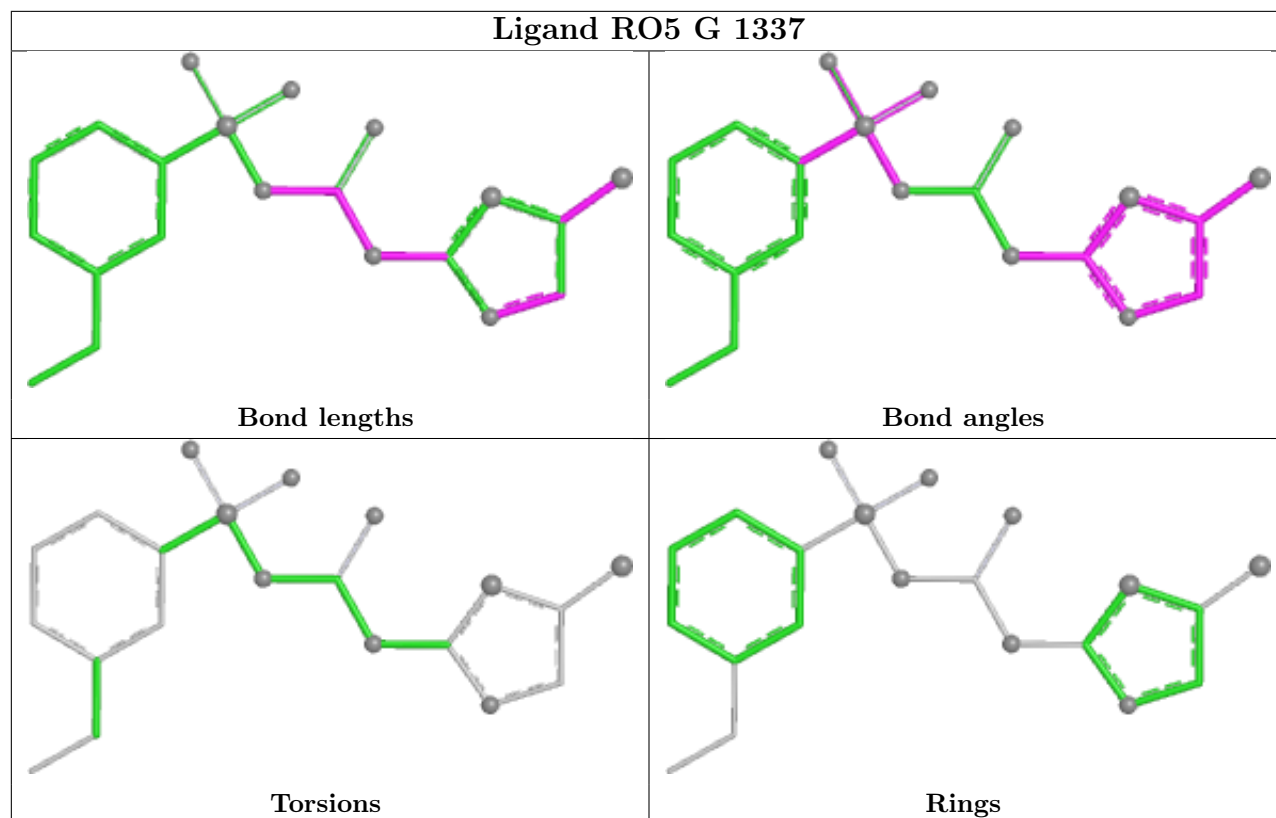
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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	320/338 (94%)	-0.24	1 (0%) 90 88	16, 29, 46, 55	1 (0%)
1	B	318/338 (94%)	-0.16	4 (1%) 75 71	15, 31, 49, 55	1 (0%)
1	C	318/338 (94%)	-0.32	3 (0%) 81 78	12, 26, 42, 51	0
1	D	318/338 (94%)	-0.43	1 (0%) 90 88	12, 23, 39, 46	1 (0%)
1	E	320/338 (94%)	-0.07	2 (0%) 85 83	18, 34, 51, 58	1 (0%)
1	F	318/338 (94%)	-0.04	3 (0%) 81 78	20, 34, 52, 57	1 (0%)
1	G	318/338 (94%)	-0.28	3 (0%) 81 78	16, 27, 44, 53	1 (0%)
1	H	318/338 (94%)	-0.22	1 (0%) 90 88	17, 29, 43, 51	0
All	All	2548/2704 (94%)	-0.22	18 (0%) 84 81	12, 29, 48, 58	6 (0%)

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	126	ILE	4.3
1	G	126	ILE	4.1
1	A	70	VAL	3.5
1	F	126	ILE	3.0
1	B	145	ASP	2.9
1	E	70	VAL	2.8
1	D	236	ASN	2.7
1	F	125	ASN	2.6
1	C	236	ASN	2.6
1	H	236	ASN	2.5
1	E	215	TYR	2.3
1	G	125	ASN	2.2
1	B	126	ILE	2.2
1	F	124	SER	2.2
1	C	125	ASN	2.1
1	G	127	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	301	ALA	2.0
1	B	236	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 oligosaccharides in this entry.

6.4 Ligands [i](#)

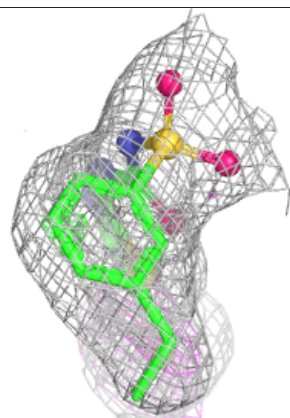
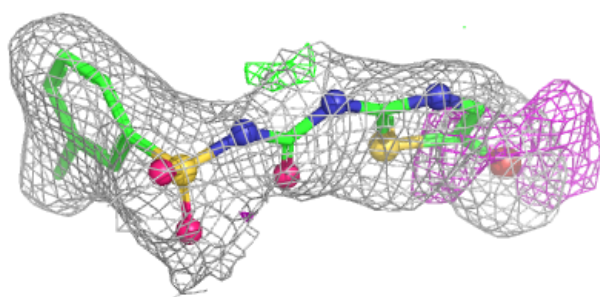
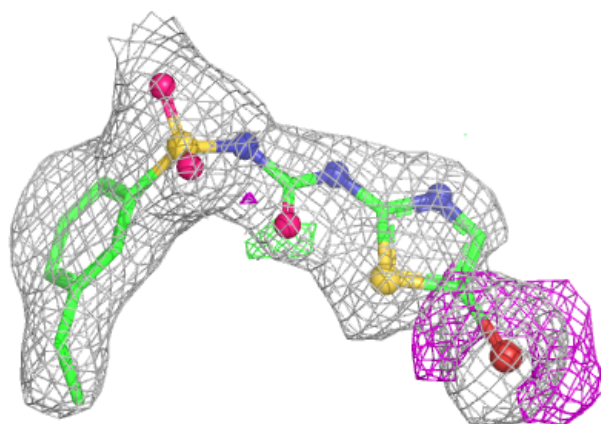
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	RO5	A	1337	21/21	0.95	0.09	24,27,41,44	0
2	RO5	B	1337	21/21	0.96	0.09	25,29,44,51	0
2	RO5	C	1337	21/21	0.96	0.08	25,29,38,43	0
2	RO5	E	1337	21/21	0.96	0.09	25,30,38,42	0
2	RO5	F	1337	21/21	0.96	0.09	33,37,44,51	0
2	RO5	G	1337	21/21	0.96	0.08	28,31,44,46	0
2	RO5	H	1337	21/21	0.96	0.08	34,36,45,52	0
2	RO5	D	1337	21/21	0.98	0.06	25,30,40,44	0

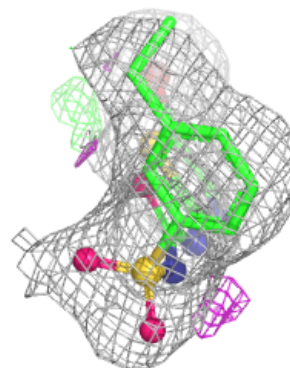
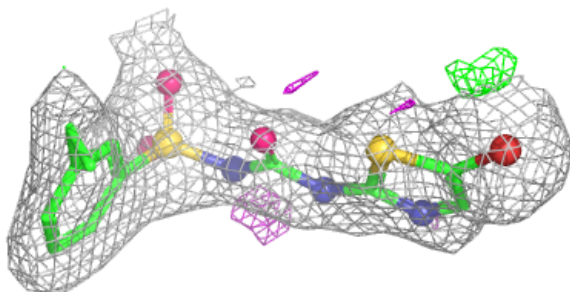
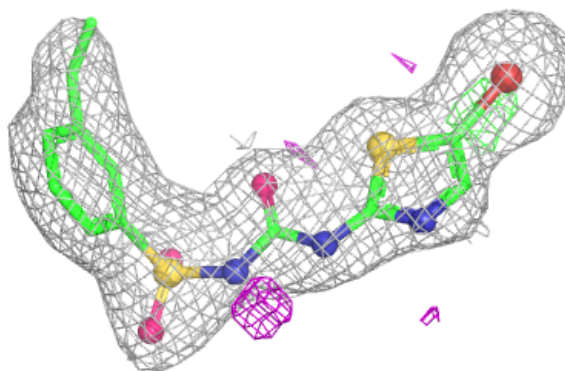
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around RO5 A 1337:

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

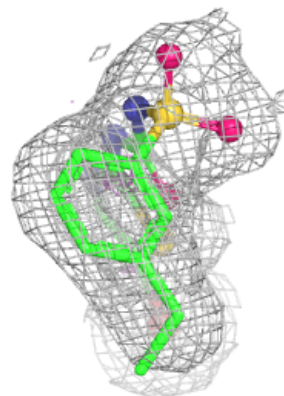
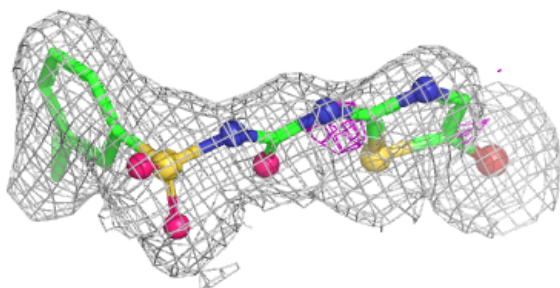
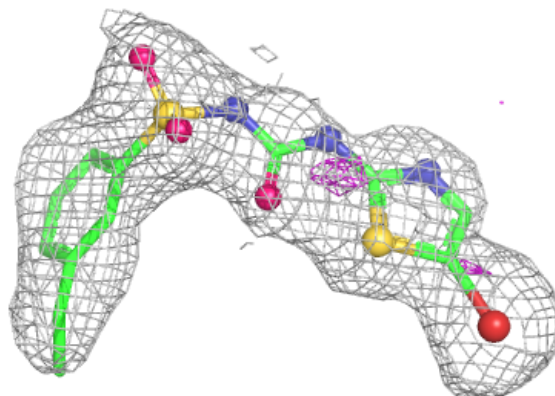
**Electron density around RO5 B 1337:**

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

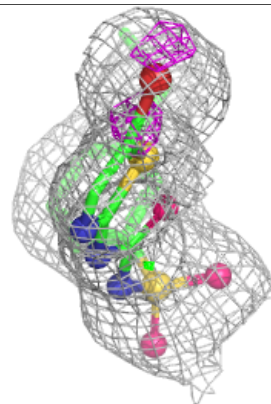
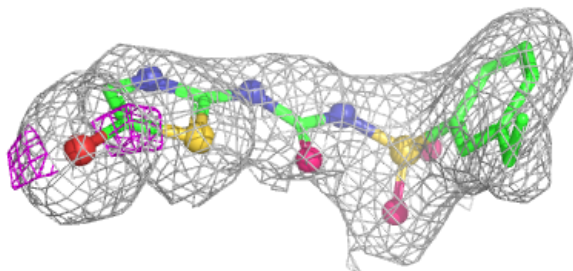
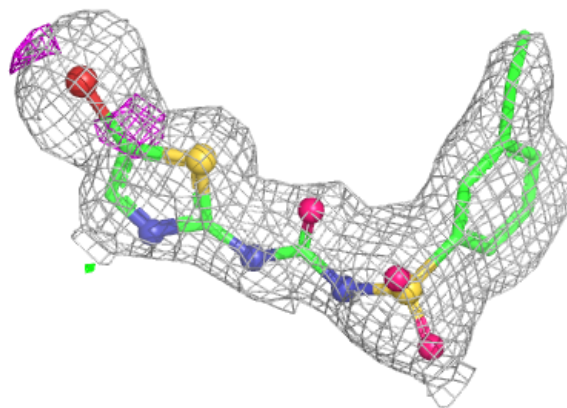


Electron density around RO5 C 1337:

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

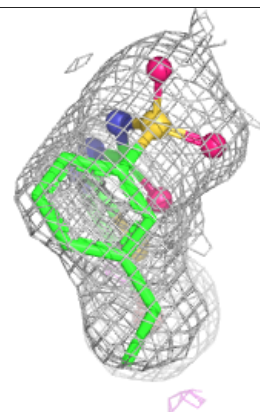
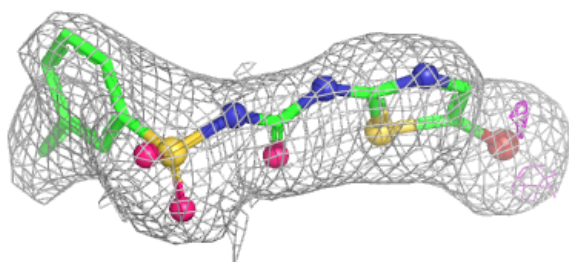
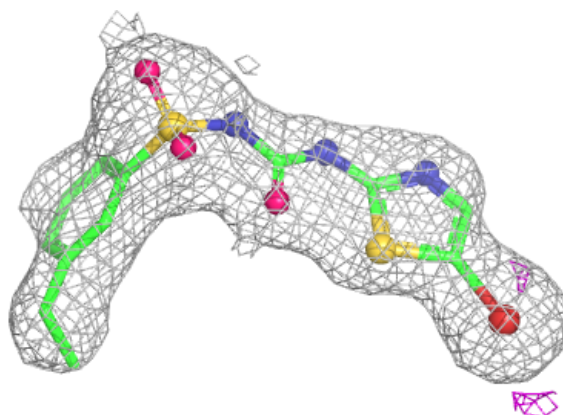
**Electron density around RO5 E 1337:**

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

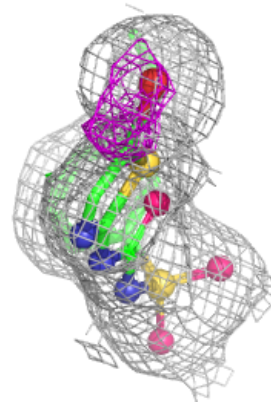
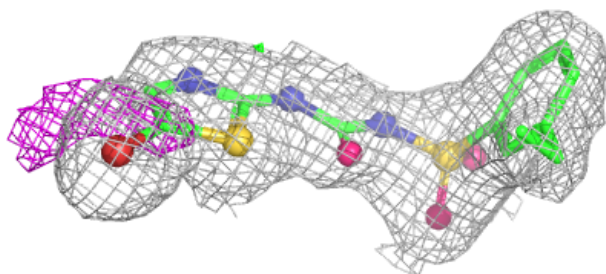
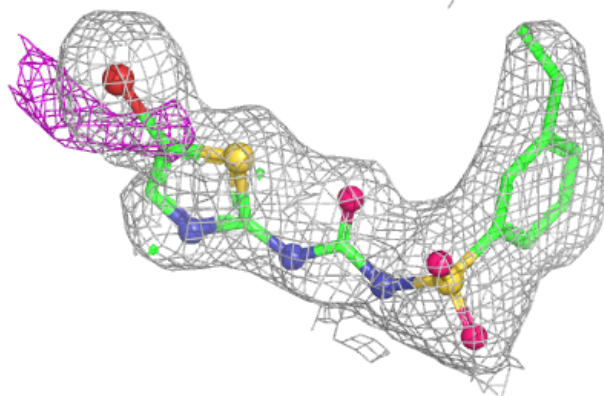


Electron density around RO5 F 1337:

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

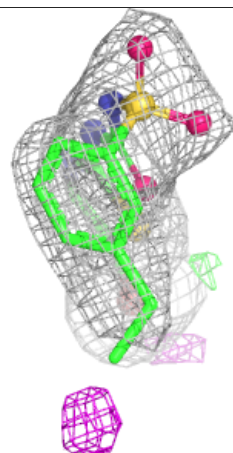
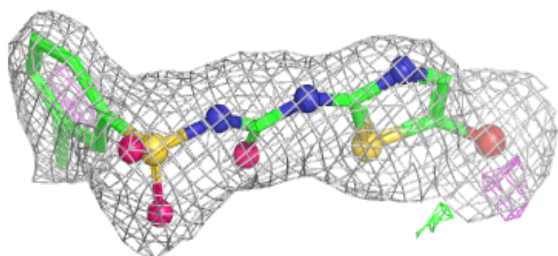
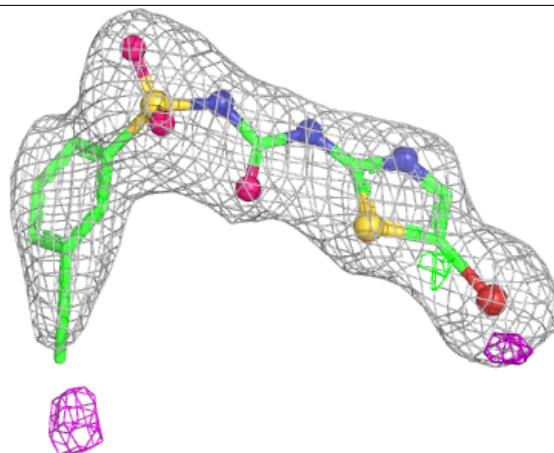
**Electron density around RO5 G 1337:**

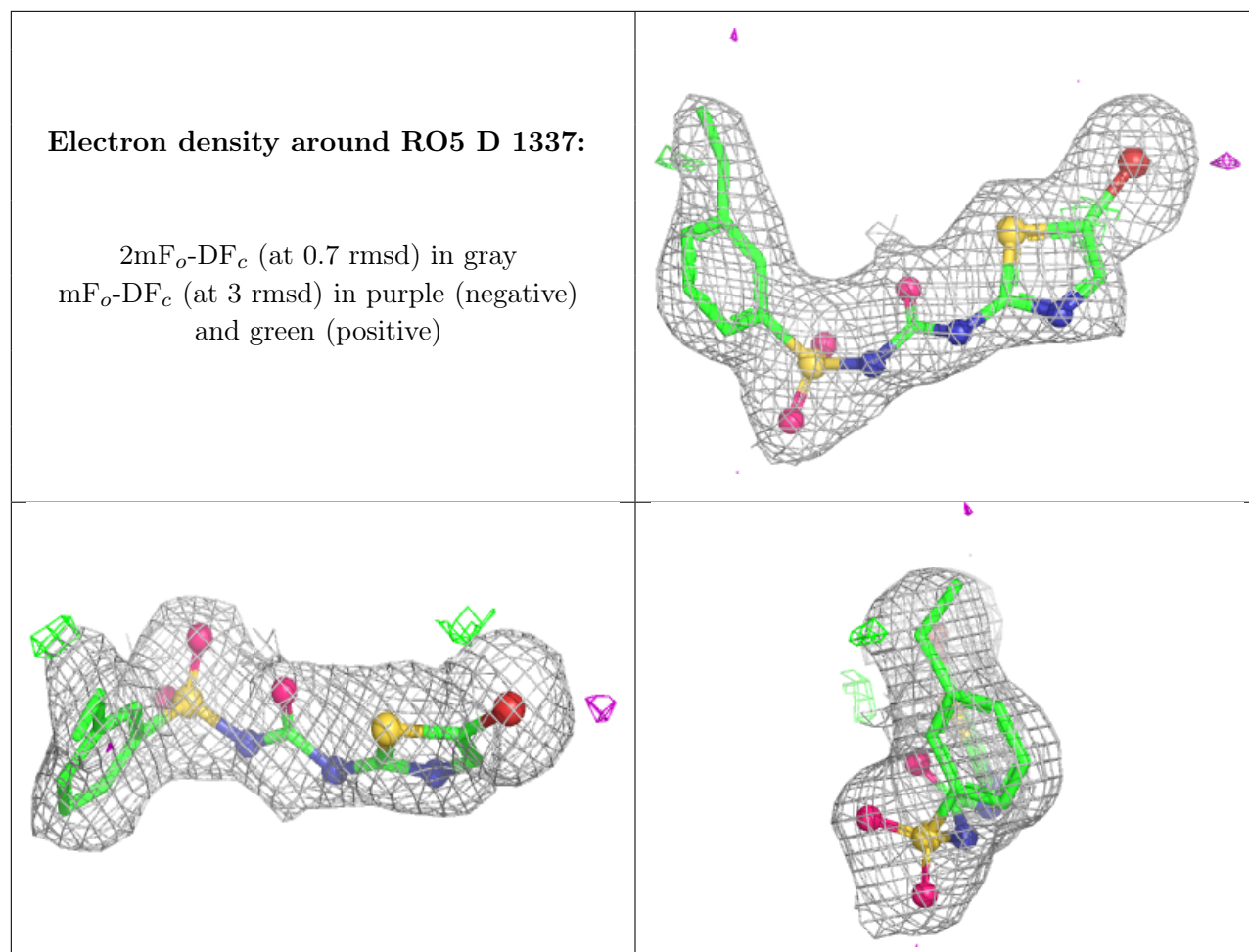
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around RO5 H 1337:

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





6.5 Other polymers [i](#)

There are no such residues in this entry.