



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 07:40 AM UTC

PDB ID : 3UF9 / pdb_00003uf9
Title : Crystal structure of SsoPox in complex with the phosphotriester fensulfothion
Authors : Elias, M.; Gotthard, G.; Hiblot, J.; Chabriere, E.
Deposited on : 2011-10-31
Resolution : 2.68 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)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

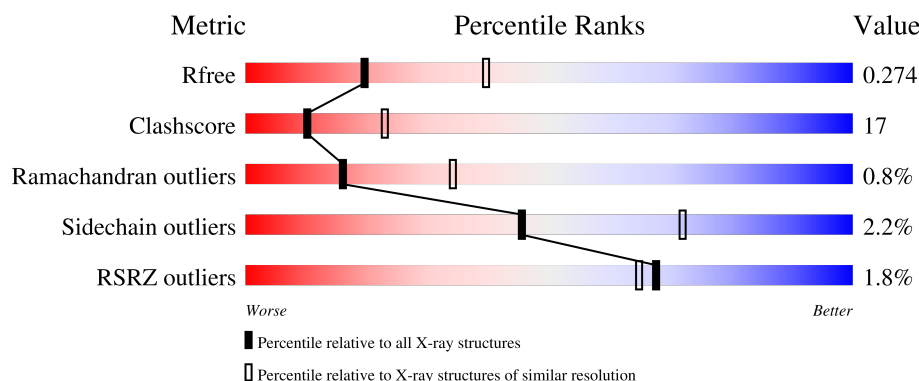
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.68 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	5070 (2.70-2.66)
Clashscore	190562	5409 (2.70-2.66)
Ramachandran outliers	187476	5324 (2.70-2.66)
Sidechain outliers	187428	5324 (2.70-2.66)
RSRZ outliers	180081	5070 (2.70-2.66)

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	314	3% 64% 34% .
1	B	314	% 72% 27% .
1	C	314	2% 61% 37% .
1	D	314	2% 68% 30% .

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
4	FST	A	317	-	-	X	-

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 10515 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 Aryldialkylphosphatase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	314	Total	C	N	O	S	0	8	0
			2589	1654	443	484	8			
1	B	314	Total	C	N	O	S	0	6	0
			2569	1643	438	480	8			
1	C	314	Total	C	N	O	S	0	3	0
			2538	1626	429	475	8			
1	D	314	Total	C	N	O	S	0	6	0
			2566	1641	437	481	7			

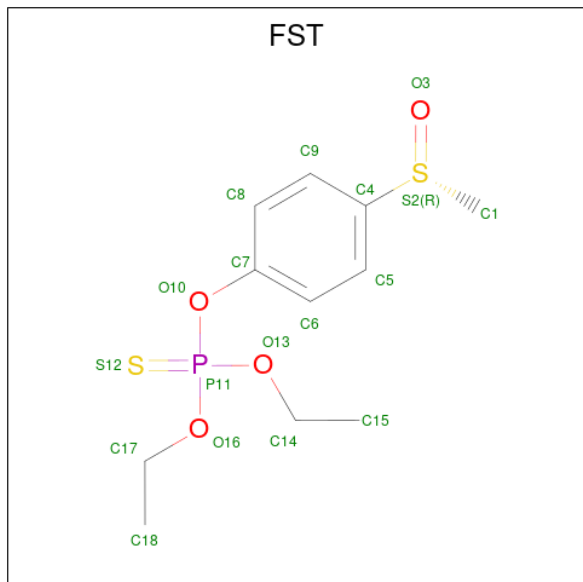
- Molecule 2 is FE (II) ION (CCD ID: FE2) (formula: Fe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Fe	0	0
			1	1		
2	B	1	Total	Fe	0	0
			1	1		
2	C	1	Total	Fe	0	0
			1	1		
2	D	1	Total	Fe	0	0
			1	1		

- Molecule 3 is COBALT (II) ION (CCD ID: CO) (formula: Co).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Co	0	0
			1	1		
3	B	1	Total	Co	0	0
			1	1		
3	C	1	Total	Co	0	0
			1	1		
3	D	1	Total	Co	0	0
			1	1		

- Molecule 4 is O,O-diethyl O-{4-[(R)-methylsulfinyl]phenyl} phosphorothioate (CCD ID: FST) (formula: $C_{11}H_{17}O_4PS_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	O	P	S	0	0
			18	11	4	1	2		
4	B	1	Total	C	O	P	S	0	0
			18	11	4	1	2		
4	C	1	Total	C	O	P	S	0	0
			18	11	4	1	2		
4	D	1	Total	C	O	P	S	0	0
			18	11	4	1	2		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

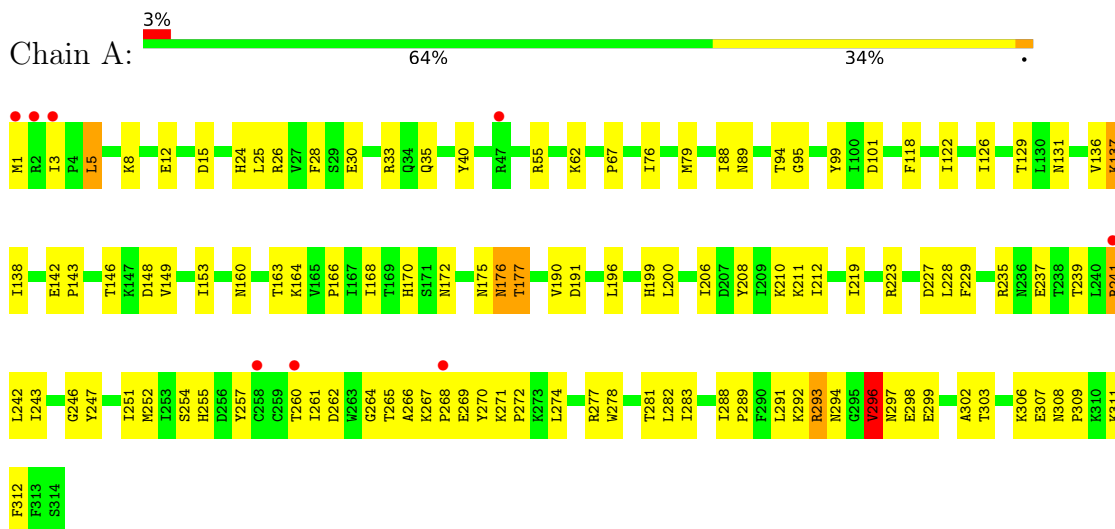
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	41	Total	O	0	0
			41	41		
6	B	48	Total	O	0	0
			48	48		
6	C	33	Total	O	0	0
			33	33		
6	D	33	Total	O	0	0
			33	33		

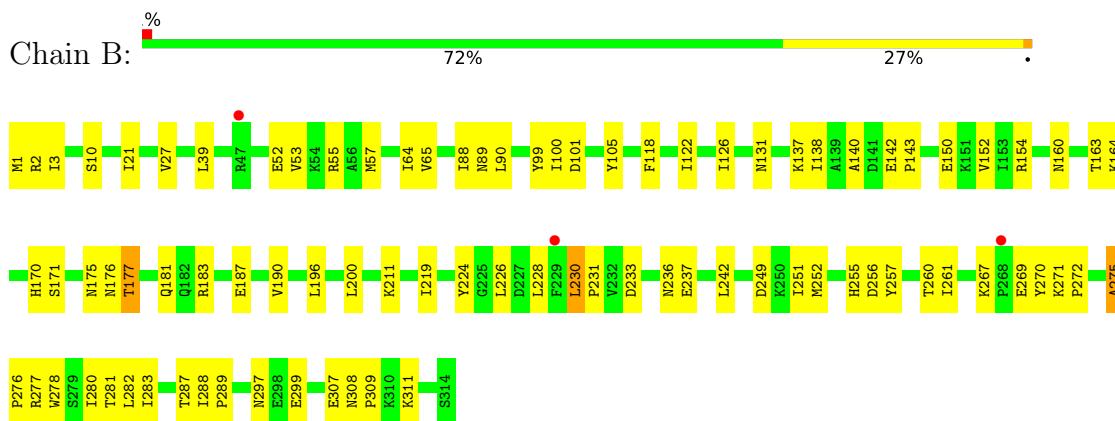
3 Residue-property plots [i](#)

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.

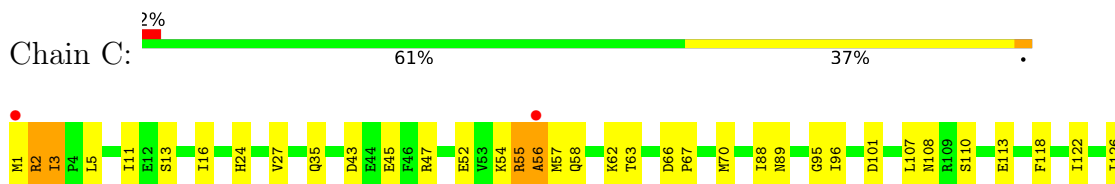
• Molecule 1: Aryldialkylphosphatase

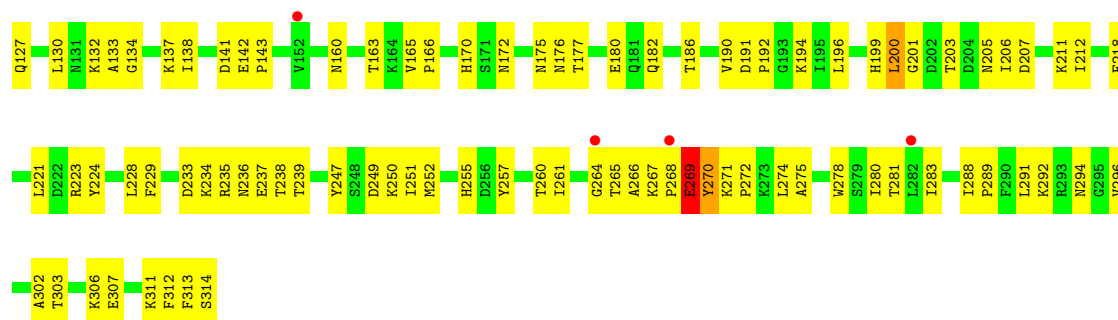


• Molecule 1: Aryldialkylphosphatase

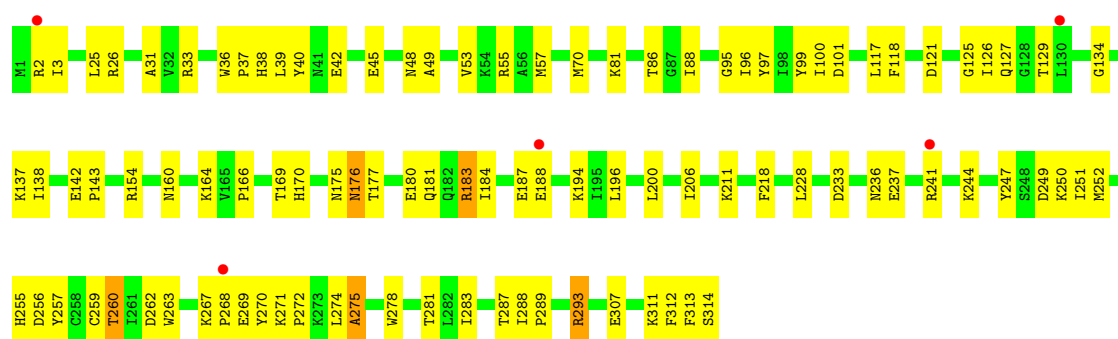


• Molecule 1: Aryldialkylphosphatase





● Molecule 1: Aryldialkylphosphatase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	85.73Å 103.76Å 151.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.47 – 2.68 45.47 – 2.68	Depositor EDS
% Data completeness (in resolution range)	99.8 (45.47-2.68) 99.8 (45.47-2.68)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.79 (at 2.69Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.239 , 0.275 0.240 , 0.274	Depositor DCC
R_{free} test set	1934 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	30.7	Xtriage
Anisotropy	0.370	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 41.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	10515	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.47% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CO, GOL, KCX, FE2, FST

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	0.49	0/2627	0.75	2/3544 (0.1%)
1	B	0.50	0/2607	0.76	5/3519 (0.1%)
1	C	0.49	0/2576	0.75	2/3479 (0.1%)
1	D	0.50	0/2607	0.73	2/3520 (0.1%)
All	All	0.50	0/10417	0.75	11/14062 (0.1%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	275	ALA	CA-C-N	8.52	128.10	119.24
1	B	275	ALA	C-N-CA	8.52	128.10	119.24
1	C	3	ILE	N-CA-C	7.99	116.84	107.73
1	B	3	ILE	N-CA-C	7.05	114.69	108.63
1	A	3	ILE	N-CA-C	6.61	114.31	108.63
1	A	296	VAL	N-CA-C	5.90	117.03	109.30
1	B	230	LEU	CA-C-N	5.23	125.51	119.92
1	B	230	LEU	C-N-CA	5.23	125.51	119.92
1	C	270	TYR	N-CA-C	-5.22	105.78	113.61
1	D	275	ALA	CA-C-N	5.07	124.68	119.05
1	D	275	ALA	C-N-CA	5.07	124.68	119.05

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2589	0	2605	102	0
1	B	2569	0	2589	62	1
1	C	2538	0	2560	112	0
1	D	2566	0	2583	89	1
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	18	0	17	8	0
4	B	18	0	17	3	0
4	C	18	0	17	2	0
4	D	18	0	17	0	0
5	A	12	0	16	3	0
5	B	6	0	8	0	0
6	A	41	0	0	3	0
6	B	48	0	0	1	0
6	C	33	0	0	1	0
6	D	33	0	0	4	0
All	All	10515	0	10429	358	1

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 17.

All (358) 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:175:ASN:O	1:D:176:ASN:HB2	1.45	1.12
1:A:1[B]:MET:HE3	1:A:1[B]:MET:HA	1.34	1.10
1:A:241[A]:ARG:HH11	1:A:241[A]:ARG:HG3	1.26	0.98
1:D:218:PHE:HB3	1:D:252:MET:HE2	1.48	0.96
1:C:55:ARG:HD2	1:C:281:THR:HG21	1.48	0.95
1:D:55[B]:ARG:HH11	1:D:55[B]:ARG:HG2	1.28	0.94
1:A:241[A]:ARG:HH11	1:A:241[A]:ARG:CG	1.83	0.89
1:B:21:ILE:HD12	1:B:65:VAL:HG21	1.55	0.88
1:D:218:PHE:CB	1:D:252:MET:HE2	2.03	0.88

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:172:ASN:H	1:A:177:THR:HG21	1.40	0.87
1:C:55:ARG:O	1:C:57:MET:N	2.08	0.86
1:A:126:ILE:O	1:A:129:THR:HG22	1.76	0.85
1:C:228:LEU:HD11	1:C:229:PHE:CE1	2.13	0.82
1:A:175:ASN:OD1	1:A:177:THR:HB	1.80	0.82
1:D:244:LYS:HE3	6:D:346:HOH:O	1.80	0.81
1:D:228:LEU:HD12	1:D:274:LEU:HB3	1.63	0.80
1:A:1[A]:MET:HE1	6:D:343:HOH:O	1.82	0.79
1:D:177:THR:O	1:D:181:GLN:HG3	1.82	0.79
1:D:196:LEU:HD13	1:D:252:MET:HE3	1.64	0.79
1:B:175:ASN:O	1:B:176:ASN:HB2	1.81	0.79
1:D:55[A]:ARG:HD2	1:D:281:THR:HG21	1.63	0.78
1:A:1[B]:MET:HE3	1:A:1[B]:MET:CA	2.11	0.78
1:B:288:ILE:HB	1:B:289:PRO:HD3	1.65	0.77
1:D:55[B]:ARG:HG2	1:D:55[B]:ARG:NH1	2.00	0.76
1:A:265:THR:HG22	1:C:108:ASN:OD1	1.85	0.76
1:A:237[B]:GLU:O	1:A:241[B]:ARG:HG3	1.85	0.75
1:A:1[B]:MET:HA	1:A:1[B]:MET:CE	2.13	0.75
1:B:256:ASP:OD1	6:B:367:HOH:O	2.05	0.75
1:B:230:LEU:HD12	1:B:231:PRO:HD2	1.70	0.73
1:C:228:LEU:HD23	1:C:274:LEU:HB3	1.71	0.73
1:C:265:THR:HG21	4:C:317:FST:H15A	1.71	0.73
1:D:175:ASN:O	1:D:176:ASN:CB	2.31	0.72
1:C:126:ILE:HD11	1:C:133:ALA:HB2	1.72	0.71
1:A:172:ASN:H	1:A:177:THR:CG2	2.04	0.71
1:C:95:GLY:HA2	1:C:118:PHE:CE1	2.26	0.70
1:C:55:ARG:O	1:C:58:GLN:N	2.23	0.70
1:A:148:ASP:HB2	6:A:339:HOH:O	1.91	0.69
1:B:27:VAL:CG2	1:B:261:ILE:HG13	2.22	0.69
1:B:267:LYS:HE3	1:B:270:TYR:HE1	1.56	0.69
1:C:234:LYS:O	1:C:238:THR:OG1	2.09	0.69
1:B:228:LEU:HD11	4:B:317:FST:H14A	1.74	0.69
4:A:317:FST:S12	4:A:317:FST:H15B	2.33	0.69
1:C:175:ASN:O	1:C:176:ASN:CB	2.39	0.69
1:C:267:LYS:O	1:C:269:GLU:N	2.22	0.69
1:A:261:ILE:HD13	4:A:317:FST:H14A	1.74	0.69
1:B:257:TYR:HA	1:B:278:TRP:CZ2	2.29	0.68
1:A:261:ILE:CD1	4:A:317:FST:H14A	2.24	0.68
1:A:241[A]:ARG:CG	1:A:241[A]:ARG:NH1	2.51	0.68
1:D:293:ARG:HG3	1:D:293:ARG:O	1.92	0.68
1:A:88:ILE:HG13	1:A:89:ASN:N	2.09	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1[A]:MET:HG2	1:A:12:GLU:HG2	1.76	0.68
1:A:163:THR:O	1:A:164:LYS:HB2	1.93	0.67
1:B:242:LEU:HB3	1:B:251:ILE:HD11	1.76	0.66
1:D:249[B]:ASP:HB3	1:D:250:LYS:HG2	1.76	0.66
1:C:307:GLU:O	1:C:311:LYS:HG3	1.95	0.66
1:C:228:LEU:CD1	1:C:229:PHE:CD1	2.77	0.66
1:C:55:ARG:HD2	1:C:281:THR:CG2	2.22	0.66
1:D:288:ILE:HB	1:D:289:PRO:HD3	1.76	0.66
1:A:210:LYS:HE2	1:A:247:TYR:CE1	2.30	0.65
1:C:199:HIS:ND1	1:C:223:ARG:HD2	2.11	0.65
1:A:266:ALA:HB2	4:A:317:FST:H15	1.77	0.65
1:D:218:PHE:CG	1:D:252:MET:HE2	2.31	0.65
1:C:200:LEU:HD21	1:C:212:ILE:HD12	1.78	0.64
1:B:138:ILE:C	1:B:138:ILE:HD12	2.22	0.64
1:D:206:ILE:HD13	1:D:241[A]:ARG:HG2	1.78	0.64
1:D:137:KCX:OQ2	1:D:170:HIS:HB2	1.98	0.64
1:B:137:KCX:OQ2	1:B:170:HIS:HB2	1.98	0.64
1:D:180:GLU:OE2	1:D:180:GLU:HA	1.98	0.63
1:A:191:ASP:N	5:A:318:GOL:O3	2.23	0.63
1:A:257:TYR:HA	1:A:278:TRP:CZ2	2.33	0.63
1:D:228:LEU:HD12	1:D:274:LEU:HD13	1.80	0.63
1:B:230:LEU:HD12	1:B:231:PRO:CD	2.29	0.63
1:D:228:LEU:CD1	1:D:274:LEU:HD13	2.29	0.63
1:D:160:ASN:O	1:D:164:LYS:N	2.28	0.63
1:A:266:ALA:HB2	4:A:317:FST:C15	2.28	0.62
1:A:223:ARG:NH2	1:A:229:PHE:CE1	2.67	0.62
1:B:140:ALA:O	1:B:171:SER:HA	1.98	0.62
1:B:196:LEU:HD13	1:B:252:MET:HE3	1.81	0.62
1:A:292:LYS:O	1:A:294:ASN:O	2.17	0.62
1:A:297:ASN:C	1:A:297:ASN:OD1	2.41	0.61
1:C:228:LEU:HD12	1:C:229:PHE:N	2.14	0.61
1:B:228:LEU:HD11	4:B:317:FST:C14	2.30	0.61
4:A:317:FST:S12	4:A:317:FST:C15	2.87	0.61
1:D:271:LYS:HB3	1:D:272:PRO:HD3	1.83	0.61
1:D:138:ILE:C	1:D:138:ILE:HD12	2.26	0.60
1:D:307[B]:GLU:O	1:D:311:LYS:HG3	2.00	0.60
1:A:95:GLY:HA2	1:A:118:PHE:CE1	2.37	0.60
1:D:237:GLU:O	1:D:241[B]:ARG:HG3	2.01	0.60
1:A:288:ILE:O	1:A:292:LYS:HG2	2.02	0.60
1:C:196:LEU:HD13	1:C:252:MET:HE3	1.83	0.60
1:C:228:LEU:HD12	1:C:229:PHE:CD1	2.36	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:257:TYR:HA	1:D:278:TRP:CZ2	2.37	0.60
1:A:297:ASN:OD1	1:A:299:GLU:N	2.29	0.59
1:C:5:LEU:HD12	1:C:11:ILE:HG23	1.84	0.59
1:C:3:ILE:HD11	1:C:313:PHE:HB3	1.84	0.59
1:C:175:ASN:O	1:C:176:ASN:HB2	2.01	0.59
1:D:48:ASN:ND2	1:D:260:THR:HG23	2.18	0.59
1:B:163:THR:O	1:B:164:LYS:HB2	2.02	0.59
1:C:55:ARG:NH2	1:C:281:THR:OG1	2.35	0.59
1:C:228:LEU:CD1	1:C:229:PHE:CE1	2.86	0.59
1:A:35:GLN:OE1	1:C:127:GLN:NE2	2.35	0.58
1:A:303:THR:HA	1:A:307[A]:GLU:HB2	1.86	0.58
1:C:180:GLU:HA	1:C:180:GLU:OE1	2.03	0.58
1:A:160:ASN:HD22	1:A:190:VAL:HG22	1.69	0.58
1:C:257:TYR:HA	1:C:278:TRP:CZ2	2.38	0.58
1:D:3:ILE:HD11	1:D:313:PHE:HB3	1.85	0.58
1:D:183:ARG:O	1:D:187:GLU:HG3	2.02	0.58
1:C:16:ILE:O	1:C:63:THR:OG1	2.17	0.58
1:A:142:GLU:N	1:A:143:PRO:CD	2.66	0.58
1:B:233:ASP:O	1:B:237:GLU:HG2	2.04	0.58
1:B:142[A]:GLU:N	1:B:143:PRO:CD	2.67	0.57
1:C:175:ASN:ND2	1:C:177:THR:HG23	2.19	0.57
1:D:271:LYS:CB	1:D:272:PRO:HD3	2.34	0.57
1:C:172:ASN:HB3	1:C:175:ASN:OD1	2.05	0.57
1:C:3:ILE:HD11	1:C:313:PHE:CB	2.34	0.56
1:C:200:LEU:HD21	1:C:212:ILE:CD1	2.35	0.56
1:A:291:LEU:HB3	1:A:296:VAL:HG21	1.88	0.56
1:B:275:ALA:N	1:B:276:PRO:HD3	2.19	0.56
1:D:126:ILE:O	1:D:129:THR:OG1	2.20	0.56
1:D:3:ILE:HD11	1:D:313:PHE:CB	2.36	0.56
1:B:276:PRO:HB2	1:B:277:ARG:HG3	1.86	0.56
1:B:1[B]:MET:HB2	1:B:10:SER:OG	2.06	0.56
1:C:27:VAL:CG2	1:C:261:ILE:HG13	2.36	0.56
1:D:183:ARG:HH12	1:D:184:ILE:HG12	1.69	0.56
1:A:15:ASP:O	1:A:62:LYS:NZ	2.25	0.55
1:B:275:ALA:N	1:B:276:PRO:CD	2.69	0.55
1:A:292:LYS:C	1:A:294:ASN:N	2.64	0.55
1:C:55:ARG:CD	1:C:281:THR:HG21	2.32	0.55
1:B:52:GLU:CD	1:B:55[A]:ARG:HH12	2.14	0.55
1:D:95:GLY:HA2	1:D:118:PHE:CE1	2.41	0.55
1:B:21:ILE:O	1:B:65:VAL:HB	2.07	0.54
1:C:142[A]:GLU:HB3	1:C:143:PRO:HD3	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:70:MET:HE2	1:D:96:ILE:HG23	1.88	0.54
1:B:142[B]:GLU:N	1:B:143:PRO:CD	2.70	0.54
1:D:48:ASN:HB3	1:D:259:CYS:HB3	1.89	0.54
1:A:291:LEU:HB3	1:A:296:VAL:CG2	2.37	0.54
1:D:218:PHE:HB3	1:D:252:MET:CE	2.30	0.54
1:D:233:ASP:O	1:D:237:GLU:HG2	2.08	0.54
1:C:142[B]:GLU:HB2	1:C:143:PRO:HD3	1.90	0.53
1:A:292:LYS:HE3	1:A:298:GLU:OE2	2.09	0.53
1:A:196:LEU:HD13	1:A:252:MET:HE3	1.90	0.53
1:B:101[B]:ASP:OD2	1:D:101[B]:ASP:OD2	2.27	0.53
1:D:194:LYS:HE2	1:D:314:SER:O	2.08	0.53
1:D:262:ASP:OD2	1:D:263:TRP:HD1	1.92	0.53
1:B:126:ILE:HG13	1:B:131:ASN:O	2.09	0.53
1:D:48:ASN:HD22	1:D:260:THR:HG23	1.74	0.53
1:D:121:ASP:HA	1:D:125:GLY:O	2.07	0.53
1:B:297:ASN:HD21	1:B:299:GLU:HB2	1.74	0.53
1:D:31:ALA:CB	6:D:342:HOH:O	2.57	0.53
1:D:70:MET:CE	1:D:96:ILE:HG23	2.38	0.53
1:A:5:LEU:HB3	1:A:8:LYS:HB2	1.91	0.52
1:A:308:ASN:HB2	1:A:309:PRO:HD3	1.91	0.52
1:C:24:HIS:CD2	4:C:317:FST:O3	2.61	0.52
1:A:292:LYS:NZ	1:A:298:GLU:OE2	2.42	0.52
1:D:170:HIS:C	1:D:170:HIS:CD2	2.87	0.52
1:B:308:ASN:HB2	1:B:309:PRO:HD3	1.90	0.52
1:C:45:GLU:HG2	1:C:260:THR:HG21	1.90	0.52
1:C:218:PHE:CG	1:C:252:MET:HE2	2.45	0.52
1:D:55[A]:ARG:HD2	1:D:281:THR:CG2	2.37	0.52
1:D:270:TYR:HB3	1:D:274:LEU:HD12	1.90	0.52
1:A:24:HIS:CE1	1:A:67:PRO:HG2	2.44	0.52
1:C:55:ARG:O	1:C:56:ALA:C	2.51	0.52
1:C:291:LEU:O	1:C:296:VAL:HB	2.09	0.52
1:B:230:LEU:CD1	1:B:231:PRO:HD2	2.40	0.52
1:D:196:LEU:HD13	1:D:252:MET:CE	2.35	0.52
1:C:233:ASP:O	1:C:237:GLU:HG3	2.10	0.52
1:A:76:ILE:HG12	1:A:129:THR:HG21	1.91	0.51
1:A:28:PHE:HA	1:A:262:ASP:CG	2.34	0.51
1:C:175:ASN:HD21	1:C:177:THR:HG23	1.75	0.51
1:C:271:LYS:HD3	1:C:275:ALA:O	2.10	0.51
1:D:257:TYR:HA	1:D:278:TRP:CE2	2.46	0.51
1:A:293:ARG:NH2	6:A:333:HOH:O	2.04	0.51
1:A:261:ILE:HD13	4:A:317:FST:C14	2.38	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:126:ILE:HG22	1:D:127:GLN:HG3	1.93	0.51
1:A:235:ARG:O	1:A:239:THR:HG22	2.10	0.51
1:C:3:ILE:CD1	1:C:313:PHE:HB3	2.41	0.51
1:C:163:THR:OG1	1:C:165:VAL:HG22	2.11	0.51
1:C:228:LEU:HD11	1:C:229:PHE:CD1	2.42	0.51
1:D:31:ALA:HB2	6:D:342:HOH:O	2.11	0.51
1:A:190:VAL:HA	5:A:318:GOL:O3	2.11	0.50
1:B:64:ILE:O	1:B:90:LEU:HD12	2.11	0.50
1:A:265:THR:CG2	1:C:108:ASN:OD1	2.57	0.50
1:A:26:ARG:HG3	1:A:260:THR:HG23	1.93	0.50
1:C:122:ILE:HD13	1:C:165:VAL:HG21	1.94	0.50
1:A:191:ASP:HB3	5:A:318:GOL:H32	1.94	0.50
1:C:224:TYR:CE2	1:C:236:ASN:ND2	2.80	0.50
1:C:267:LYS:HB3	1:C:269:GLU:HG2	1.92	0.50
1:C:288:ILE:HB	1:C:289:PRO:HD3	1.94	0.50
1:D:101[B]:ASP:OD2	1:D:101[B]:ASP:N	2.45	0.50
1:B:226:LEU:HD22	4:B:317:FST:H17	1.94	0.49
1:C:130:LEU:O	1:C:132:LYS:HD2	2.12	0.49
1:B:271:LYS:CB	1:B:272:PRO:HD3	2.42	0.49
1:D:166:PRO:HB2	1:D:312:PHE:CZ	2.47	0.49
1:B:88:ILE:HG13	1:B:89:ASN:N	2.27	0.49
1:B:196:LEU:HD22	1:B:252:MET:HE3	1.94	0.49
1:D:55[B]:ARG:NH1	1:D:55[B]:ARG:CG	2.70	0.49
1:A:246:GLY:HA2	6:A:360:HOH:O	2.12	0.49
1:A:292:LYS:O	1:A:294:ASN:N	2.46	0.49
1:D:134:GLY:O	1:D:166:PRO:HD2	2.13	0.49
1:D:142[B]:GLU:N	1:D:143:PRO:CD	2.76	0.49
1:D:206:ILE:CD1	1:D:241[A]:ARG:HG2	2.43	0.49
1:B:101[B]:ASP:OD1	1:D:100:ILE:HD12	2.13	0.49
1:D:247:TYR:O	1:D:251:ILE:HG13	2.13	0.49
1:A:228:LEU:H	1:A:228:LEU:HD23	1.78	0.48
1:C:224:TYR:HE2	1:C:236:ASN:ND2	2.11	0.48
1:B:177:THR:O	1:B:181:GLN:HG3	2.12	0.48
1:C:137:KCX:OQ2	1:C:170:HIS:HB2	2.13	0.48
1:D:154:ARG:NH1	1:D:188:GLU:OE1	2.47	0.48
1:A:175:ASN:O	1:A:176:ASN:CB	2.61	0.48
1:C:1[B]:MET:O	1:C:2:ARG:C	2.57	0.48
1:D:25:LEU:HD22	1:D:49:ALA:HB1	1.96	0.48
1:A:200:LEU:CD1	1:A:219:ILE:HG22	2.44	0.48
1:B:271:LYS:CB	1:B:272:PRO:CD	2.92	0.48
1:B:280:ILE:HG23	1:B:281:THR:HG23	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:255:HIS:CE1	1:B:283:ILE:HG12	2.50	0.47
1:A:242:LEU:HB3	1:A:251:ILE:HD11	1.97	0.47
1:C:138:ILE:HD12	1:C:138:ILE:C	2.40	0.47
1:D:142[A]:GLU:N	1:D:143:PRO:CD	2.77	0.47
1:D:180:GLU:O	1:D:184:ILE:HG13	2.15	0.47
1:A:271:LYS:CB	1:A:272:PRO:HD3	2.45	0.47
1:C:271:LYS:HB3	1:C:272:PRO:HD3	1.97	0.47
1:B:118:PHE:O	1:B:122:ILE:HG13	2.15	0.47
1:C:160:ASN:ND2	1:C:190:VAL:HG13	2.31	0.46
1:C:201:GLY:O	1:C:235:ARG:NH2	2.48	0.46
1:C:307:GLU:HB3	1:C:311:LYS:HE3	1.98	0.46
1:A:239:THR:O	1:A:243:ILE:HG13	2.15	0.46
1:C:255:HIS:NE2	1:C:283:ILE:HG23	2.30	0.46
1:C:302:ALA:O	1:C:306:LYS:HB2	2.14	0.46
1:D:55[A]:ARG:CD	1:D:281:THR:HG21	2.40	0.46
1:A:206:ILE:HD11	1:A:210:LYS:HE3	1.98	0.46
1:A:264:GLY:HA3	1:C:107:LEU:O	2.15	0.46
1:C:166:PRO:HB2	1:C:312:PHE:CZ	2.51	0.46
1:C:170:HIS:C	1:C:170:HIS:CD2	2.94	0.46
1:A:208:TYR:CZ	1:A:212:ILE:HD11	2.51	0.46
1:A:55[A]:ARG:HG2	1:A:281:THR:HG21	1.98	0.46
1:A:277:ARG:HG2	1:A:282:LEU:HD13	1.98	0.46
1:C:223:ARG:HA	1:C:255:HIS:O	2.15	0.46
1:C:271:LYS:CB	1:C:272:PRO:HD3	2.46	0.46
1:D:255:HIS:NE2	1:D:283:ILE:HG23	2.31	0.46
1:B:39:LEU:HD11	1:D:117:LEU:HD21	1.97	0.46
1:D:53:VAL:O	1:D:57:MET:HG3	2.16	0.46
1:A:270:TYR:HB3	1:A:274:LEU:HD12	1.97	0.45
1:A:292:LYS:O	1:A:293:ARG:C	2.59	0.45
1:B:105:TYR:OH	1:D:39:LEU:HD21	2.16	0.45
1:C:54:LYS:O	1:C:55:ARG:O	2.34	0.45
1:C:175:ASN:HD21	1:C:177:THR:CG2	2.30	0.45
1:D:249[A]:ASP:OD1	1:D:250:LYS:HG2	2.16	0.45
1:D:288:ILE:HB	1:D:289:PRO:CD	2.45	0.45
1:C:142[A]:GLU:N	1:C:143:PRO:CD	2.80	0.45
1:C:142[B]:GLU:CB	1:C:143:PRO:HD3	2.46	0.45
1:B:183:ARG:O	1:B:187:GLU:HG3	2.17	0.45
1:C:303:THR:HA	1:C:307:GLU:HB2	1.99	0.45
1:D:307[A]:GLU:O	1:D:311:LYS:HG3	2.17	0.45
1:A:1[B]:MET:HG3	1:A:12:GLU:HG2	1.99	0.45
1:B:224:TYR:OH	1:B:236:ASN:ND2	2.48	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:43:ASP:HB3	1:C:47:ARG:NH1	2.32	0.45
1:A:267:LYS:HA	1:A:268:PRO:HD3	1.87	0.45
1:C:70:MET:HE2	1:C:96:ILE:HG23	1.99	0.45
1:A:255:HIS:NE2	1:A:283:ILE:HG12	2.32	0.44
1:C:141:ASP:OD1	1:C:142[B]:GLU:N	2.49	0.44
1:C:199:HIS:ND1	1:C:223:ARG:CD	2.79	0.44
1:B:226:LEU:HB3	1:B:228:LEU:CD2	2.48	0.44
1:C:267:LYS:C	1:C:269:GLU:H	2.21	0.44
1:C:218:PHE:CB	1:C:252:MET:HE2	2.48	0.44
1:B:307[B]:GLU:O	1:B:311:LYS:HG3	2.17	0.44
1:C:2:ARG:HG3	1:C:13:SER:H	1.83	0.44
1:A:288:ILE:HB	1:A:289:PRO:HD3	2.00	0.44
1:C:66:ASP:HA	1:C:67:PRO:HD3	1.85	0.44
1:C:264:GLY:C	1:C:266:ALA:H	2.26	0.44
1:D:228:LEU:HD12	1:D:274:LEU:CB	2.40	0.44
1:B:299:GLU:OE2	1:B:299:GLU:HA	2.18	0.44
1:C:141:ASP:OD1	1:C:142[A]:GLU:N	2.51	0.44
1:C:194:LYS:HE2	1:C:314:SER:O	2.18	0.44
1:B:160:ASN:ND2	1:B:190:VAL:HG13	2.32	0.43
1:C:134:GLY:O	1:C:166:PRO:HD2	2.18	0.43
1:D:97:TYR:HH	1:D:99:TYR:HH	1.65	0.43
1:A:118:PHE:O	1:A:122:ILE:HG13	2.18	0.43
1:C:5:LEU:HD11	1:C:11:ILE:HD13	1.99	0.43
1:C:62:LYS:O	1:C:89:ASN:HB2	2.18	0.43
1:D:37:PRO:C	1:D:39:LEU:H	2.26	0.43
1:A:30:GLU:OE2	1:C:35:GLN:NE2	2.43	0.43
1:A:261:ILE:HD11	4:A:317:FST:H14A	1.99	0.43
1:A:292:LYS:CE	1:A:298:GLU:OE2	2.65	0.43
1:D:267:LYS:HA	1:D:268:PRO:HD3	1.90	0.43
1:A:307[B]:GLU:O	1:A:311:LYS:HG3	2.19	0.43
1:C:247:TYR:O	1:C:251:ILE:HG13	2.18	0.43
1:A:223:ARG:HD3	1:A:229:PHE:CD1	2.53	0.43
1:C:182:GLN:O	1:C:186:THR:HG23	2.19	0.43
1:A:137:KCX:OQ1	1:A:170:HIS:HB2	2.17	0.43
1:A:196:LEU:HD22	1:A:252:MET:HE3	2.00	0.43
1:A:261:ILE:HG23	1:A:266:ALA:CB	2.47	0.43
1:B:219:ILE:HD11	1:B:251:ILE:HG12	2.01	0.43
1:C:52:GLU:O	1:C:280:ILE:HG21	2.18	0.43
1:D:218:PHE:CB	1:D:252:MET:CE	2.86	0.43
1:C:221:LEU:CD1	1:C:239:THR:HG23	2.48	0.43
1:D:26:ARG:HD2	1:D:45:GLU:CD	2.44	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:33:ARG:HA	1:D:40:TYR:CE1	2.53	0.43
1:A:101[B]:ASP:OD2	1:A:101[B]:ASP:N	2.52	0.43
1:A:271:LYS:CB	1:A:272:PRO:CD	2.96	0.43
1:B:175:ASN:O	1:B:176:ASN:CB	2.56	0.43
1:B:138:ILE:HD12	1:B:138:ILE:O	2.19	0.42
1:C:206:ILE:HG13	1:C:207:ASP:N	2.34	0.42
1:D:36:TRP:HB3	1:D:38:HIS:CE1	2.55	0.42
1:B:53:VAL:O	1:B:57:MET:HG3	2.20	0.42
1:C:142[B]:GLU:N	1:C:143:PRO:CD	2.83	0.42
1:D:236:ASN:ND2	1:D:287:THR:HG23	2.34	0.42
1:C:292:LYS:C	1:C:294:ASN:H	2.27	0.42
1:D:81:LYS:HE3	1:D:81:LYS:HB2	1.80	0.42
1:A:28:PHE:HA	1:A:262:ASP:OD2	2.19	0.42
1:B:230:LEU:HA	1:B:231:PRO:HD3	1.81	0.42
1:B:236:ASN:HD21	1:B:287:THR:HG23	1.85	0.42
1:C:191:ASP:OD2	1:C:192:PRO:HD2	2.20	0.42
1:C:228:LEU:HD12	1:C:228:LEU:C	2.44	0.42
1:D:33:ARG:HG3	1:D:40:TYR:CD1	2.54	0.42
1:D:142[A]:GLU:HB3	1:D:143:PRO:HD3	2.01	0.42
1:A:270:TYR:O	1:A:271:LYS:C	2.62	0.42
1:B:99:TYR:HB3	1:B:143:PRO:HG2	2.01	0.42
1:A:99:TYR:HB3	1:A:143:PRO:HG2	2.02	0.42
1:B:150:GLU:O	1:B:154:ARG:HG3	2.20	0.42
1:C:101[B]:ASP:OD2	1:C:101[B]:ASP:N	2.53	0.41
1:A:137:KCX:HA	1:A:168:ILE:O	2.21	0.41
1:A:170:HIS:HE1	1:A:223:ARG:HH12	1.68	0.41
1:B:138:ILE:HG22	1:B:152:VAL:HG12	2.01	0.41
1:A:25:LEU:HD12	1:A:79:MET:HG2	2.03	0.41
1:C:196:LEU:HD22	1:C:252:MET:HE3	2.03	0.41
1:D:275:ALA:HB1	1:D:278:TRP:HB2	2.01	0.41
1:A:303:THR:HA	1:A:307[B]:GLU:HB2	2.03	0.41
1:C:3:ILE:CD1	1:C:313:PHE:CB	2.98	0.41
1:A:175:ASN:OD1	1:A:175:ASN:C	2.62	0.41
1:C:264:GLY:C	1:C:266:ALA:N	2.75	0.41
1:C:270:TYR:N	1:C:270:TYR:CD1	2.88	0.41
1:A:129:THR:HG23	1:A:131:ASN:H	1.86	0.41
1:C:205:ASN:OD1	1:C:205:ASN:C	2.63	0.41
1:A:138:ILE:HD12	1:A:153:ILE:HG12	2.03	0.41
1:A:1[B]:MET:CA	1:A:1[B]:MET:CE	2.85	0.41
1:A:94:THR:O	1:A:136:VAL:HA	2.20	0.41
1:B:138:ILE:C	1:B:138:ILE:CD1	2.91	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:236:ASN:HD22	1:B:236:ASN:HA	1.67	0.41
1:C:110:SER:HB2	6:C:332:HOH:O	2.20	0.41
1:C:265:THR:HG22	1:C:265:THR:O	2.21	0.41
1:D:42:GLU:HA	1:D:45:GLU:OE1	2.20	0.41
1:C:203:THR:OG1	1:C:205:ASN:HB3	2.21	0.41
1:D:86:THR:OG1	1:D:88:ILE:HG22	2.21	0.41
1:A:33:ARG:HG3	1:A:40:TYR:CD1	2.55	0.40
1:A:142:GLU:N	1:A:143:PRO:HD2	2.36	0.40
1:A:199:HIS:CE1	1:A:223:ARG:NE	2.89	0.40
1:D:255:HIS:O	1:D:256:ASP:HB3	2.22	0.40
1:A:146:THR:OG1	1:A:149:VAL:HG23	2.20	0.40
1:C:27:VAL:HG23	1:C:261:ILE:HG13	2.03	0.40
1:C:249:ASP:OD1	1:C:250:LYS:HG2	2.21	0.40
1:D:126:ILE:CG2	1:D:127:GLN:HG3	2.51	0.40
1:A:166:PRO:HB2	1:A:312:PHE:CZ	2.56	0.40
1:A:302:ALA:O	1:A:306:LYS:HB2	2.21	0.40
1:C:292:LYS:HG2	1:C:296:VAL:O	2.21	0.40
1:C:88:ILE:HG13	1:C:89:ASN:N	2.37	0.40
1:A:267:LYS:O	1:A:269:GLU:N	2.46	0.40
1:B:282:LEU:HD12	1:B:282:LEU:O	2.21	0.40
1:C:271:LYS:N	1:C:272:PRO:CD	2.85	0.40

All (1) 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:249:ASP:OD1	1:D:293:ARG:NH1[2_354]	2.09	0.11

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	318/314 (101%)	291 (92%)	25 (8%)	2 (1%)	21	41
1	B	316/314 (101%)	293 (93%)	21 (7%)	2 (1%)	21	41
1	C	313/314 (100%)	285 (91%)	23 (7%)	5 (2%)	7	18
1	D	317/314 (101%)	295 (93%)	21 (7%)	1 (0%)	36	57
All	All	1264/1256 (101%)	1164 (92%)	90 (7%)	10 (1%)	16	34

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	2	ARG
1	C	55	ARG
1	C	56	ALA
1	A	293	ARG
1	D	176	ASN
1	A	227	ASP
1	C	268	PRO
1	C	269	GLU
1	B	2	ARG
1	B	100	ILE

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	280/272 (103%)	272 (97%)	8 (3%)	37	64
1	B	278/272 (102%)	273 (98%)	5 (2%)	51	76
1	C	275/272 (101%)	271 (98%)	4 (2%)	57	79
1	D	278/272 (102%)	270 (97%)	8 (3%)	37	64
All	All	1111/1088 (102%)	1086 (98%)	25 (2%)	45	71

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	LEU

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Mol	Chain	Res	Type
1	A	176	ASN
1	A	177	THR
1	A	211	LYS
1	A	241[A]	ARG
1	A	241[B]	ARG
1	A	254	SER
1	A	296	VAL
1	B	177	THR
1	B	200	LEU
1	B	211	LYS
1	B	260	THR
1	B	269	GLU
1	C	113	GLU
1	C	200	LEU
1	C	211	LYS
1	C	269	GLU
1	D	2	ARG
1	D	169	THR
1	D	183	ARG
1	D	200	LEU
1	D	211	LYS
1	D	260	THR
1	D	269	GLU
1	D	293	ARG

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

Mol	Chain	Res	Type
1	A	108	ASN
1	A	131	ASN
1	A	160	ASN
1	A	236	ASN
1	B	160	ASN
1	B	182	GLN
1	B	236	ASN
1	B	297	ASN
1	C	89	ASN
1	C	131	ASN
1	C	160	ASN
1	C	172	ASN
1	C	182	GLN
1	C	236	ASN

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Mol	Chain	Res	Type
1	D	48	ASN
1	D	131	ASN
1	D	160	ASN
1	D	182	GLN
1	D	236	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues 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
1	KCX	B	137	1,2,3	10,11,12	0.51	0	6,12,14	0.67	0
1	KCX	C	137	1,2,3	10,11,12	0.47	0	6,12,14	0.93	0
1	KCX	D	137	1,2,3	10,11,12	0.48	0	6,12,14	0.73	0
1	KCX	A	137	1,2,3	10,11,12	2.11	1 (10%)	6,12,14	1.57	1 (16%)

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
1	KCX	B	137	1,2,3	-	4/9/10/12	-
1	KCX	C	137	1,2,3	-	2/9/10/12	-
1	KCX	D	137	1,2,3	-	3/9/10/12	-
1	KCX	A	137	1,2,3	-	4/9/10/12	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	137	KCX	OQ1-CX	6.34	1.33	1.21

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	137	KCX	OQ1-CX-NZ	-3.74	119.24	124.92

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	137	KCX	N-CA-CB-CG
1	A	137	KCX	C-CA-CB-CG
1	B	137	KCX	C-CA-CB-CG
1	C	137	KCX	N-CA-CB-CG
1	C	137	KCX	C-CA-CB-CG
1	D	137	KCX	N-CA-CB-CG
1	D	137	KCX	C-CA-CB-CG
1	B	137	KCX	CA-CB-CG-CD
1	A	137	KCX	CA-CB-CG-CD
1	B	137	KCX	CG-CD-CE-NZ
1	B	137	KCX	N-CA-CB-CG
1	A	137	KCX	CG-CD-CE-NZ
1	D	137	KCX	CA-CB-CG-CD

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	137	KCX	1	0
1	C	137	KCX	1	0
1	D	137	KCX	1	0
1	A	137	KCX	2	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 15 ligands modelled in this entry, 8 are monoatomic - leaving 7 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$
5	GOL	B	318	-	5,5,5	0.28	0	5,5,5	0.33	0
4	FST	D	317	-	18,18,18	2.26	6 (33%)	24,24,24	1.19	2 (8%)
5	GOL	A	319	-	5,5,5	0.31	0	5,5,5	0.27	0
4	FST	C	317	-	18,18,18	2.28	6 (33%)	24,24,24	1.23	2 (8%)
5	GOL	A	318	-	5,5,5	0.27	0	5,5,5	0.30	0
4	FST	A	317	2	18,18,18	2.29	6 (33%)	24,24,24	1.31	2 (8%)
4	FST	B	317	2	18,18,18	2.30	6 (33%)	24,24,24	1.35	2 (8%)

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
5	GOL	B	318	-	-	4/4/4/4	-
4	FST	D	317	-	-	3/17/17/17	0/1/1/1
5	GOL	A	319	-	-	2/4/4/4	-
4	FST	C	317	-	-	1/17/17/17	0/1/1/1
5	GOL	A	318	-	-	4/4/4/4	-
4	FST	A	317	2	-	7/17/17/17	0/1/1/1
4	FST	B	317	2	-	6/17/17/17	0/1/1/1

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	317	FST	O3-S2	5.95	1.65	1.49
4	A	317	FST	O3-S2	5.85	1.65	1.49
4	D	317	FST	C4-S2	-5.74	1.60	1.79
4	C	317	FST	C4-S2	-5.72	1.60	1.79
4	A	317	FST	C4-S2	-5.52	1.60	1.79
4	C	317	FST	O3-S2	5.44	1.64	1.49
4	B	317	FST	C4-S2	-5.41	1.61	1.79

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	317	FST	O3-S2	5.39	1.63	1.49
4	C	317	FST	C1-S2	-2.75	1.66	1.78
4	D	317	FST	C1-S2	-2.75	1.66	1.78
4	C	317	FST	P11-O13	2.66	1.61	1.57
4	A	317	FST	C1-S2	-2.65	1.67	1.78
4	B	317	FST	P11-O13	2.64	1.61	1.57
4	B	317	FST	P11-O16	2.62	1.61	1.57
4	B	317	FST	C1-S2	-2.57	1.67	1.78
4	C	317	FST	P11-O16	2.56	1.61	1.57
4	A	317	FST	P11-O13	2.54	1.61	1.57
4	A	317	FST	P11-O16	2.54	1.61	1.57
4	D	317	FST	P11-O13	2.54	1.61	1.57
4	D	317	FST	P11-O16	2.52	1.61	1.57
4	D	317	FST	P11-S12	2.20	1.95	1.90
4	A	317	FST	P11-S12	2.19	1.95	1.90
4	C	317	FST	P11-S12	2.16	1.95	1.90
4	B	317	FST	P11-S12	2.16	1.95	1.90

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	317	FST	C1-S2-C4	4.40	109.85	97.82
4	D	317	FST	C1-S2-C4	4.31	109.60	97.82
4	A	317	FST	C1-S2-C4	4.24	109.40	97.82
4	B	317	FST	C1-S2-C4	4.06	108.91	97.82
4	A	317	FST	O3-S2-C1	2.37	109.74	105.52
4	C	317	FST	O3-S2-C1	2.26	109.55	105.52
4	D	317	FST	O3-S2-C1	2.25	109.54	105.52
4	B	317	FST	O3-S2-C1	2.15	109.35	105.52

There are no chirality outliers.

All (27) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	317	FST	C9-C4-S2-O3
4	A	317	FST	C7-O10-P11-S12
4	A	317	FST	C7-O10-P11-O13
4	A	317	FST	C15-C14-O13-P11
4	B	317	FST	C5-C4-S2-O3
4	B	317	FST	C9-C4-S2-O3
5	A	318	GOL	O1-C1-C2-C3
5	A	319	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
5	B	318	GOL	O1-C1-C2-C3
5	A	318	GOL	C1-C2-C3-O3
5	B	318	GOL	C1-C2-C3-O3
5	A	318	GOL	O1-C1-C2-O2
5	A	319	GOL	O1-C1-C2-O2
5	B	318	GOL	O1-C1-C2-O2
4	A	317	FST	C5-C4-S2-O3
4	A	317	FST	C17-O16-P11-S12
4	B	317	FST	C14-O13-P11-S12
4	B	317	FST	C17-O16-P11-S12
4	B	317	FST	C14-O13-P11-O16
5	B	318	GOL	O2-C2-C3-O3
4	A	317	FST	C17-O16-P11-O13
4	D	317	FST	C7-O10-P11-O16
4	D	317	FST	C7-O10-P11-O13
4	D	317	FST	C7-O10-P11-S12
5	A	318	GOL	O2-C2-C3-O3
4	B	317	FST	C17-O16-P11-O10
4	C	317	FST	C5-C4-S2-C1

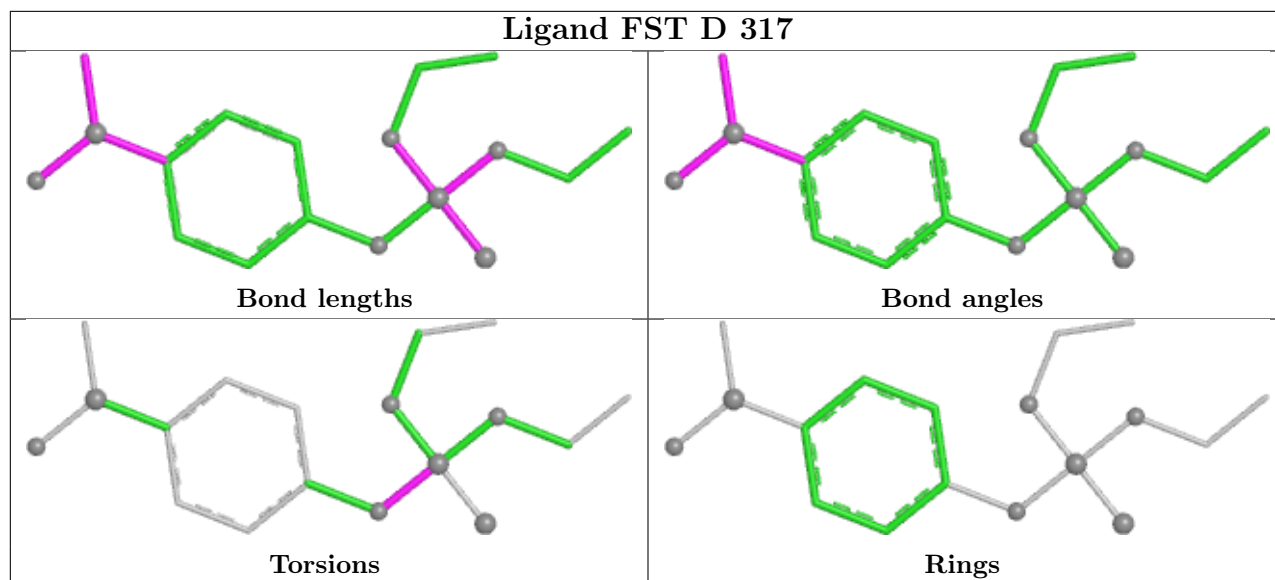
There are no ring outliers.

4 monomers are involved in 16 short contacts:

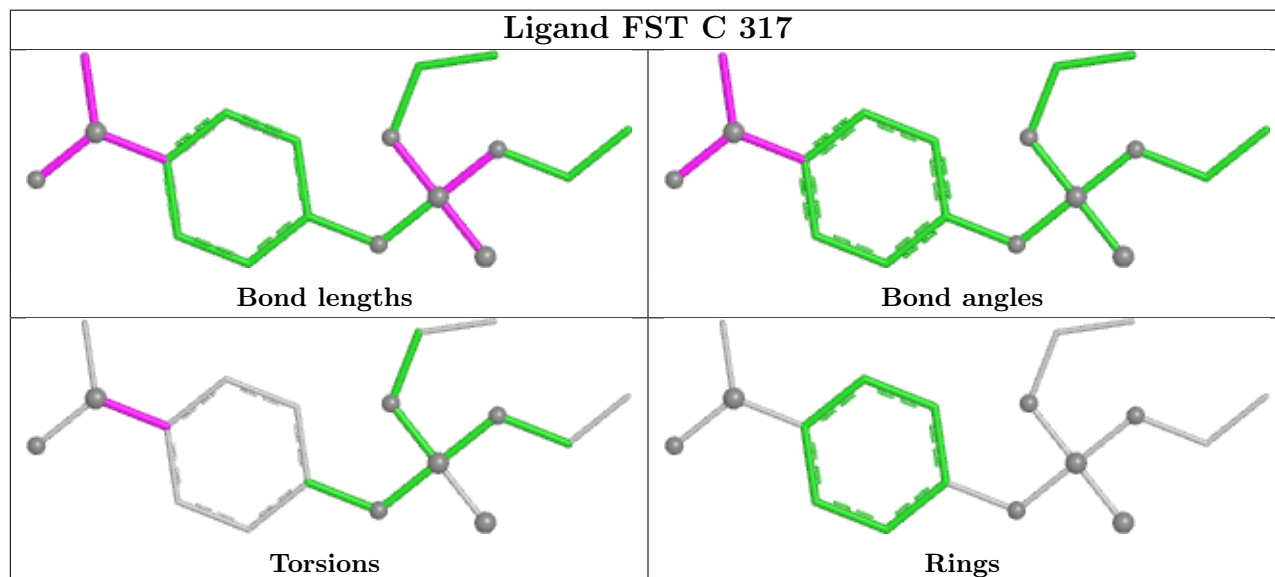
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	317	FST	2	0
5	A	318	GOL	3	0
4	A	317	FST	8	0
4	B	317	FST	3	0

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.

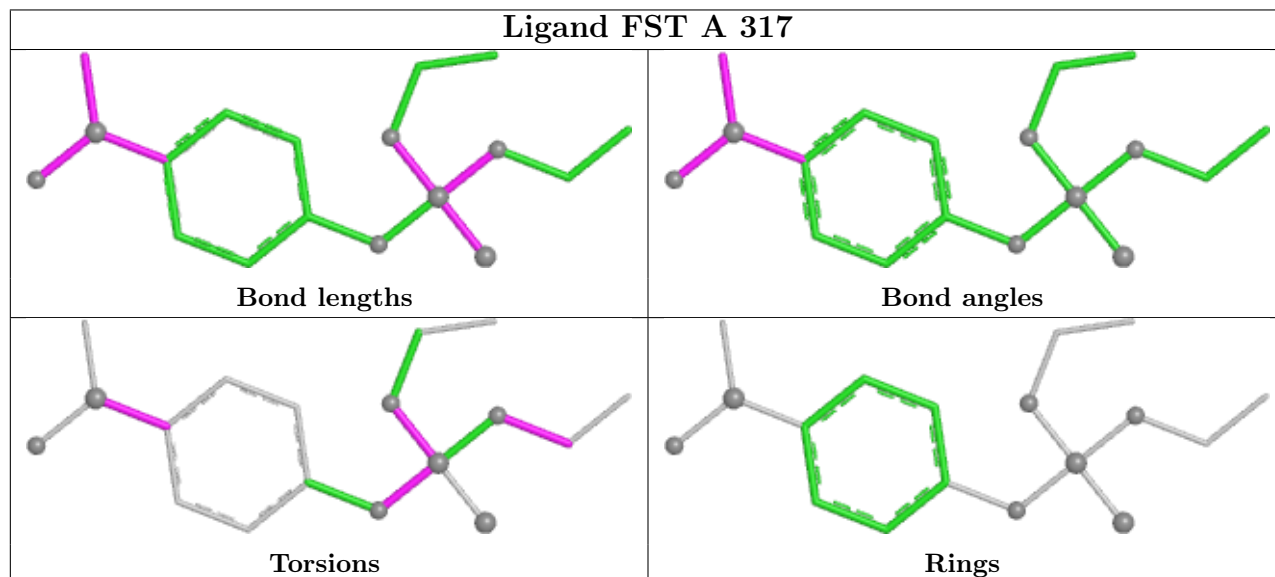
Ligand FST D 317

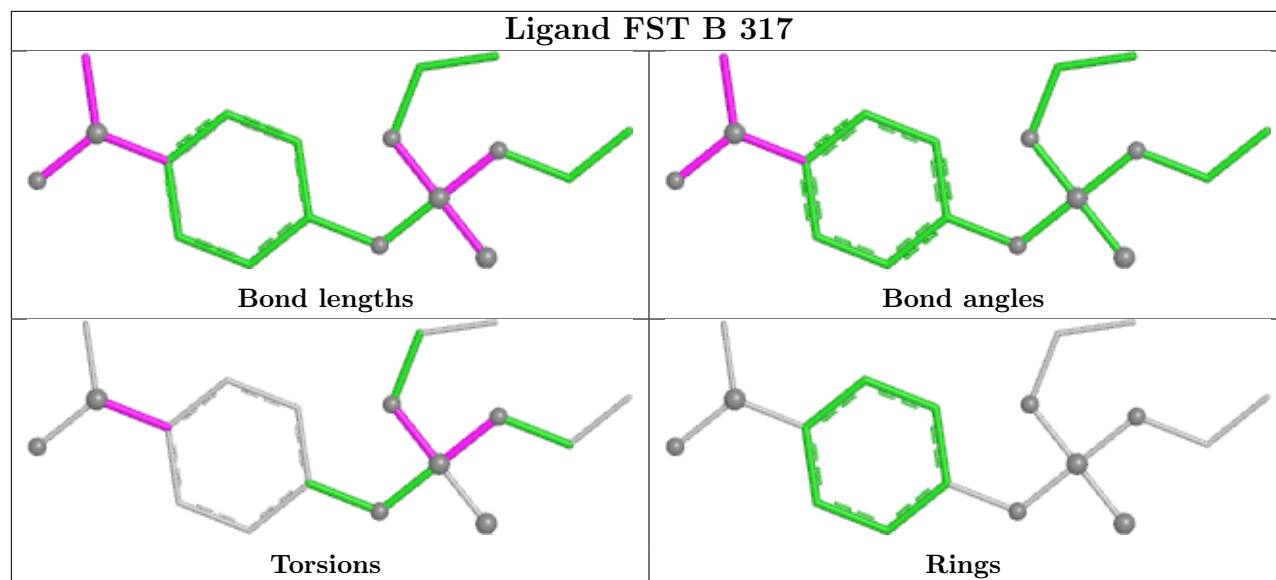


Ligand FST C 317



Ligand FST A 317





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	313/314 (99%)	0.46	8 (2%) 57 53	12, 31, 44, 64	13 (4%)
1	B	313/314 (99%)	0.29	3 (0%) 79 77	12, 29, 42, 56	11 (3%)
1	C	313/314 (99%)	0.48	6 (1%) 66 63	16, 36, 52, 71	8 (2%)
1	D	313/314 (99%)	0.53	5 (1%) 70 68	13, 36, 52, 66	11 (3%)
All	All	1252/1256 (99%)	0.44	22 (1%) 67 65	12, 33, 50, 71	43 (3%)

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	268	PRO	4.4
1	B	268	PRO	3.9
1	A	241[A]	ARG	3.9
1	A	260	THR	3.3
1	C	268	PRO	3.3
1	A	47[A]	ARG	2.9
1	A	1[A]	MET	2.9
1	D	241[A]	ARG	2.8
1	C	282	LEU	2.8
1	C	1[A]	MET	2.8
1	D	130	LEU	2.5
1	D	188	GLU	2.4
1	D	268	PRO	2.4
1	C	152	VAL	2.3
1	B	47[A]	ARG	2.2
1	C	56	ALA	2.2
1	C	264	GLY	2.2
1	A	258	CYS	2.1
1	D	2	ARG	2.1
1	A	2	ARG	2.1
1	A	3	ILE	2.1
1	B	229	PHE	2.0

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

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
1	KCX	D	137	12/13	0.86	0.15	21,25,26,28	0
1	KCX	C	137	12/13	0.89	0.13	24,29,31,31	0
1	KCX	B	137	12/13	0.91	0.11	17,18,19,19	0
1	KCX	A	137	12/13	0.94	0.10	18,19,20,21	0

6.3 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

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.

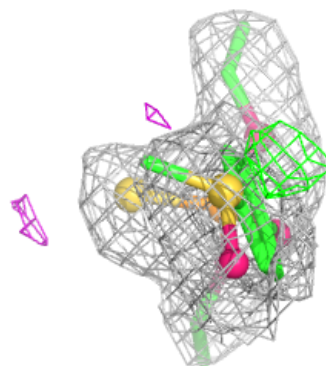
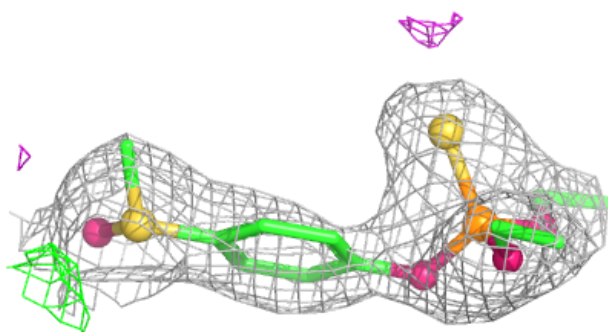
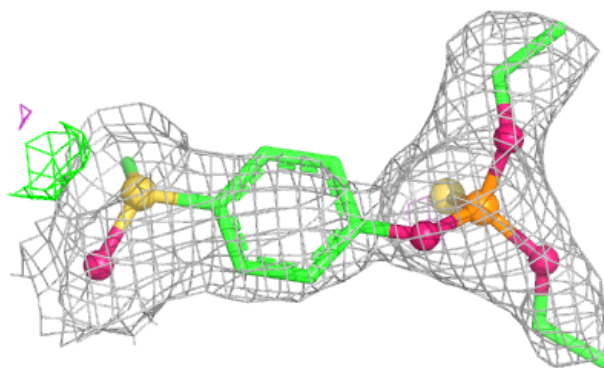
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	GOL	A	319	6/6	0.80	0.14	33,36,37,38	0
5	GOL	B	318	6/6	0.80	0.14	44,45,47,47	0
5	GOL	A	318	6/6	0.86	0.12	27,31,32,33	0
4	FST	C	317	18/18	0.91	0.12	23,27,30,31	18
4	FST	A	317	18/18	0.92	0.13	28,35,41,47	0
4	FST	D	317	18/18	0.93	0.12	28,34,41,42	0
2	FE2	B	315	1/1	0.93	0.06	15,15,15,15	0
4	FST	B	317	18/18	0.94	0.10	24,29,33,33	0
2	FE2	D	315	1/1	0.97	0.05	13,13,13,13	0
2	FE2	C	315	1/1	0.97	0.05	20,20,20,20	0
3	CO	C	316	1/1	0.98	0.04	21,21,21,21	0
3	CO	D	316	1/1	0.98	0.04	15,15,15,15	0
3	CO	A	316	1/1	0.98	0.06	12,12,12,12	0
3	CO	B	316	1/1	0.99	0.04	14,14,14,14	0
2	FE2	A	315	1/1	0.99	0.03	19,19,19,19	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.

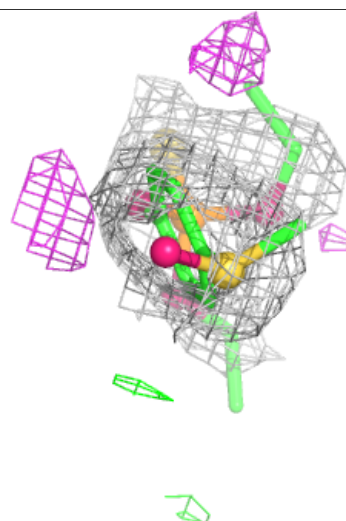
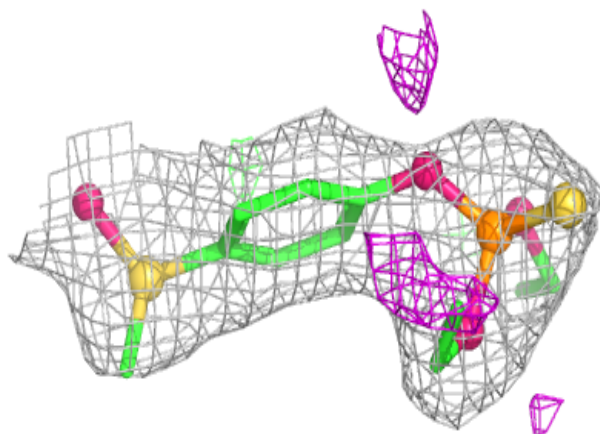
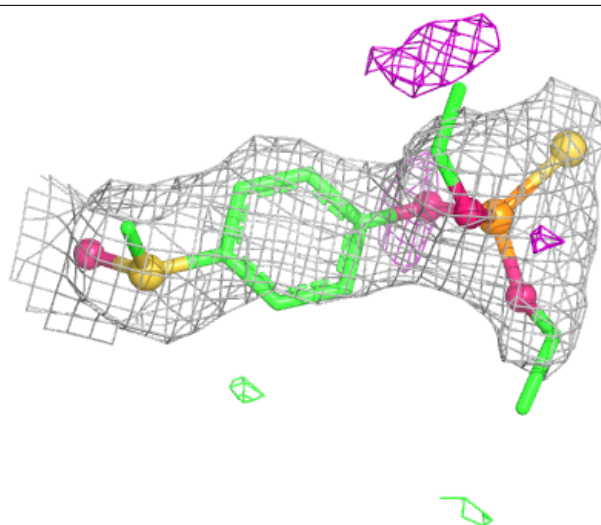
Electron density around FST C 317:

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



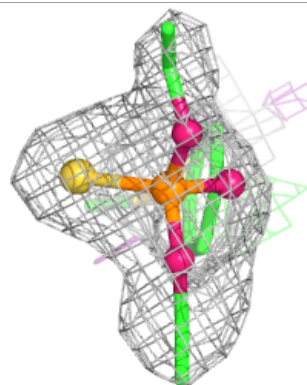
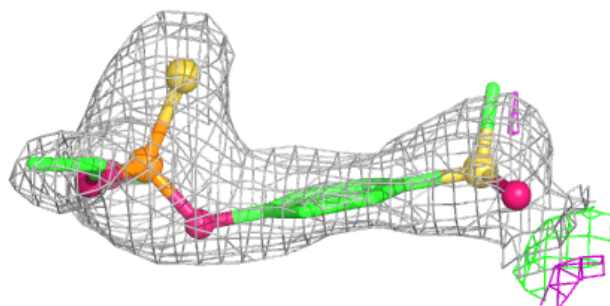
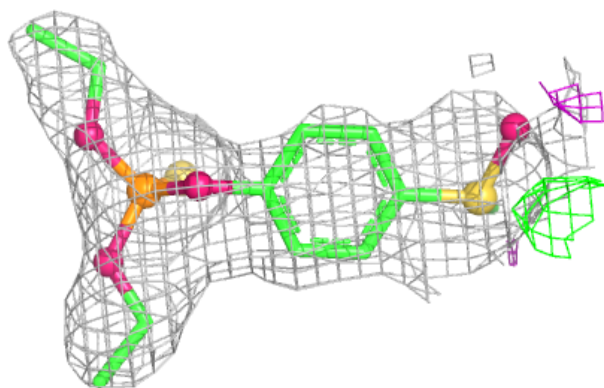
Electron density around FST A 317:

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

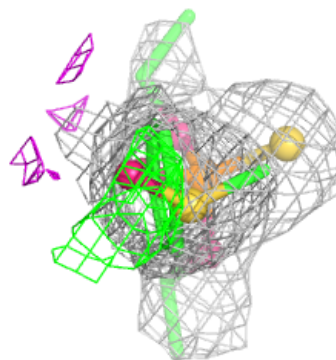
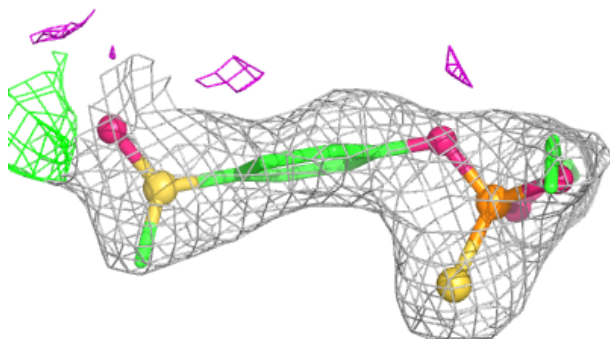
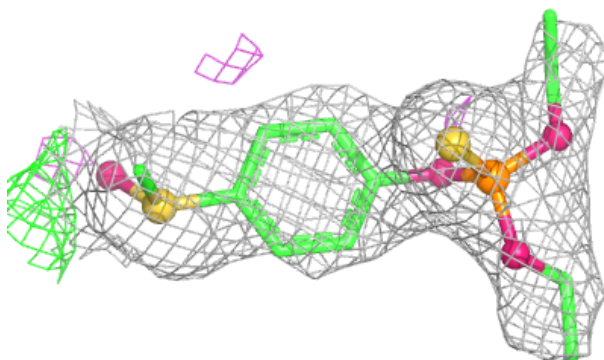


Electron density around FST D 317:

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

**Electron density around FST B 317:**

$2mF_o - DF_c$ (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.