Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 09:34 AM EDT

PDB ID	:	6O1C
Title	:	Alpha-L-fucosidase AlfC D200A mutant in complex with 4-nitrophenyl-a-L-fucopyranoside substrate
Authors	:	Klontz, E.H.; Sundberg, E.J.
Deposited on	:	2019-02-19
Resolution	:	2.60 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:

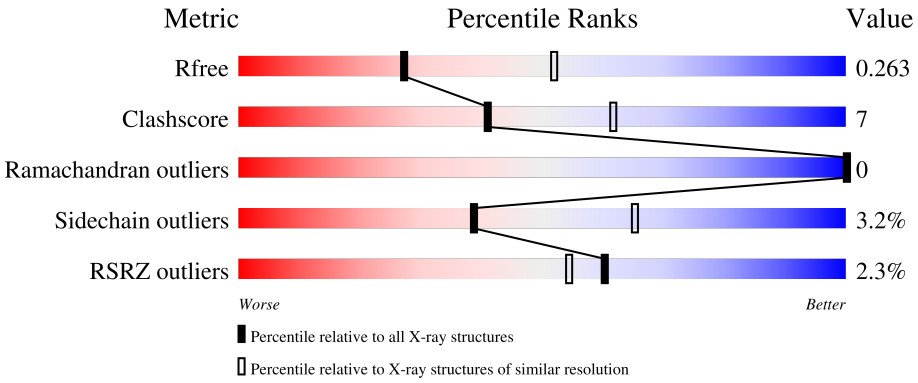
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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 <=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	345	% 81% 13% • 5%
1	B	345	2% 82% 11% • 6%
1	C	345	3% 81% 12% • 6%
1	D	345	% 81% 13% • 5%
1	E	345	2% 79% 12% • 7%

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Mol	Chain	Length	Quality of chain
1	F	345	2% 81% 10% • 7%
1	G	345	2% 80% 12% • 7%
1	H	345	5% 77% 13% • 8%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 20999 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 AlfC.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	328	Total	C	N	O	S	0	1	0
			2644	1691	435	506	12			
1	B	323	Total	C	N	O	S	0	0	0
			2569	1640	423	494	12			
1	C	324	Total	C	N	O	S	0	0	0
			2581	1648	424	497	12			
1	D	328	Total	C	N	O	S	0	1	0
			2618	1674	429	503	12			
1	E	322	Total	C	N	O	S	0	1	0
			2577	1651	422	492	12			
1	F	321	Total	C	N	O	S	0	0	0
			2560	1636	421	491	12			
1	G	322	Total	C	N	O	S	0	1	0
			2550	1630	419	489	12			
1	H	316	Total	C	N	O	S	0	0	0
			2508	1607	412	477	12			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	200	ALA	ASP	engineered mutation	UNP K0NB39
A	345	LEU	-	expression tag	UNP K0NB39
B	200	ALA	ASP	engineered mutation	UNP K0NB39
B	345	LEU	-	expression tag	UNP K0NB39
C	200	ALA	ASP	engineered mutation	UNP K0NB39
C	345	LEU	-	expression tag	UNP K0NB39
D	200	ALA	ASP	engineered mutation	UNP K0NB39
D	345	LEU	-	expression tag	UNP K0NB39
E	200	ALA	ASP	engineered mutation	UNP K0NB39
E	345	LEU	-	expression tag	UNP K0NB39
F	200	ALA	ASP	engineered mutation	UNP K0NB39
F	345	LEU	-	expression tag	UNP K0NB39
G	200	ALA	ASP	engineered mutation	UNP K0NB39

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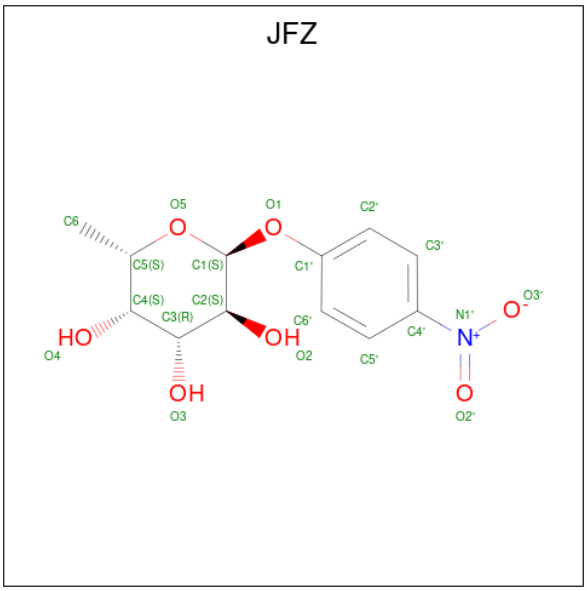
Chain	Residue	Modelled	Actual	Comment	Reference
G	345	LEU	-	expression tag	UNP K0NB39
H	200	ALA	ASP	engineered mutation	UNP K0NB39
H	345	LEU	-	expression tag	UNP K0NB39

- Molecule 2 is 4-nitrophenyl 6-deoxy-alpha-L-galactopyranoside (three-letter code: JFZ) (formula: $C_{12}H_{15}NO_7$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			20	12	1	7		
2	B	1	Total	C	N	O	0	0
			20	12	1	7		
2	C	1	Total	C	N	O	0	0
			20	12	1	7		
2	D	1	Total	C	N	O	0	0
			20	12	1	7		
2	E	1	Total	C	N	O	0	0
			20	12	1	7		
2	F	1	Total	C	N	O	0	0
			20	12	1	7		
2	G	1	Total	C	N	O	0	0
			20	12	1	7		
2	H	1	Total	C	N	O	0	0
			20	12	1	7		

- Molecule 3 is water.

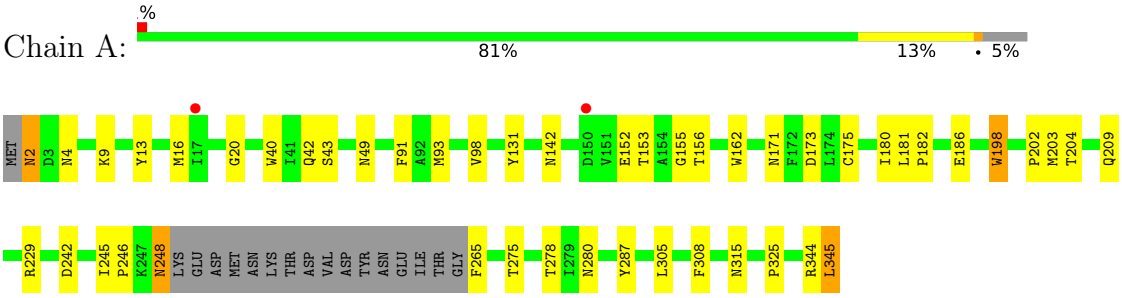
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	40	Total O 40 40	0	0
3	B	38	Total O 38 38	0	0
3	C	41	Total O 41 41	0	0
3	D	33	Total O 33 33	0	0
3	E	24	Total O 24 24	0	0
3	F	19	Total O 19 19	0	0
3	G	21	Total O 21 21	0	0
3	H	16	Total O 16 16	0	0

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.

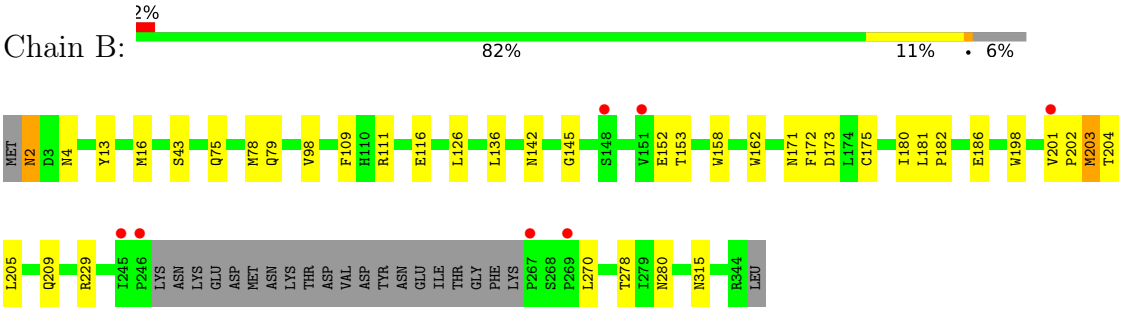
• Molecule 1: AlfC

Chain A:



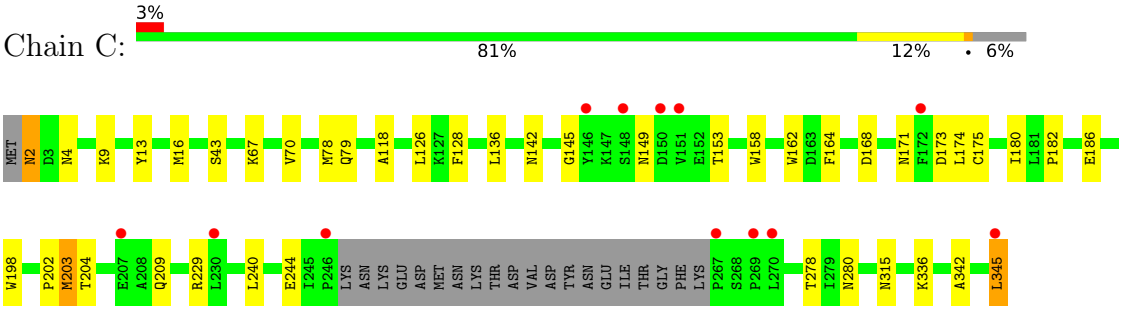
• Molecule 1: AlfC

Chain B:



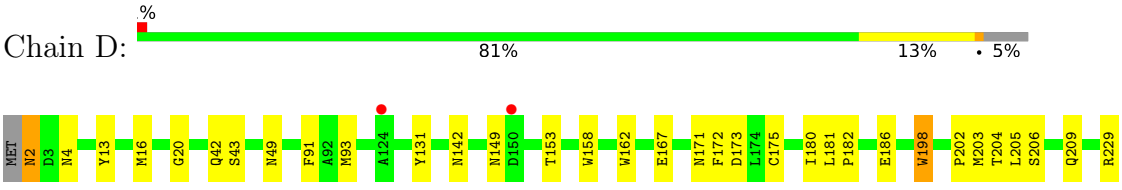
• Molecule 1: AlfC

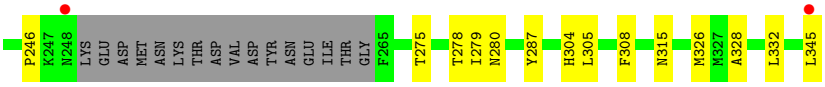
Chain C:



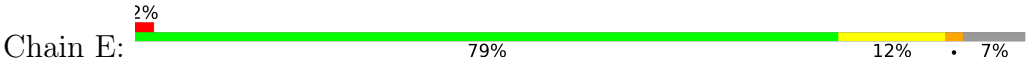
• Molecule 1: AlfC

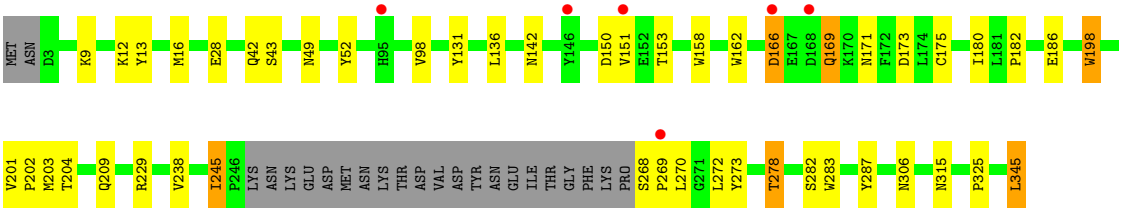
Chain D:



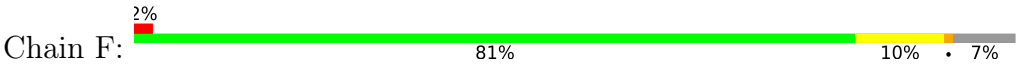


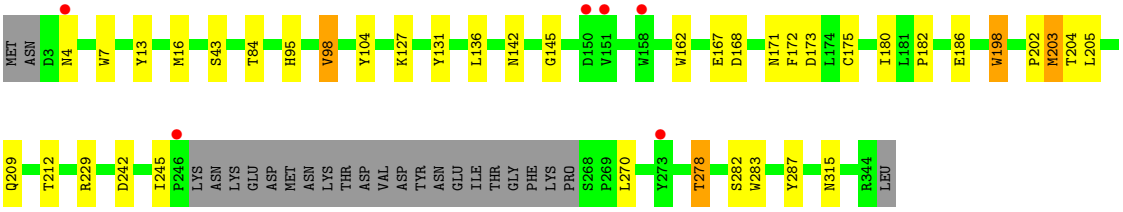
• Molecule 1: AlfC



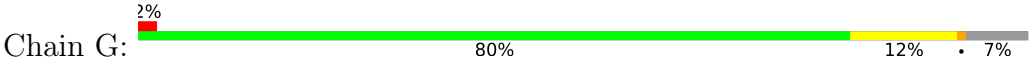


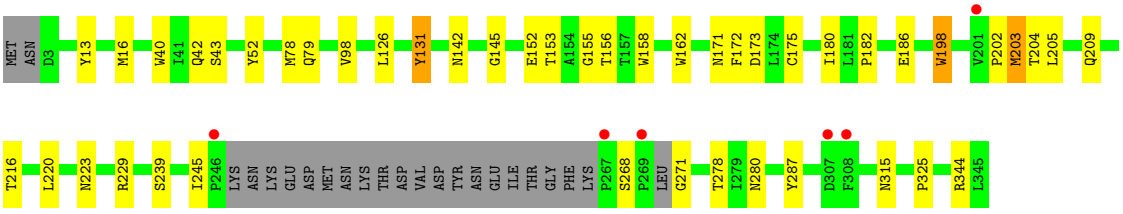
• Molecule 1: AlfC



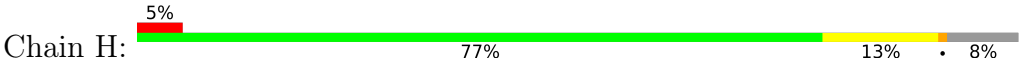


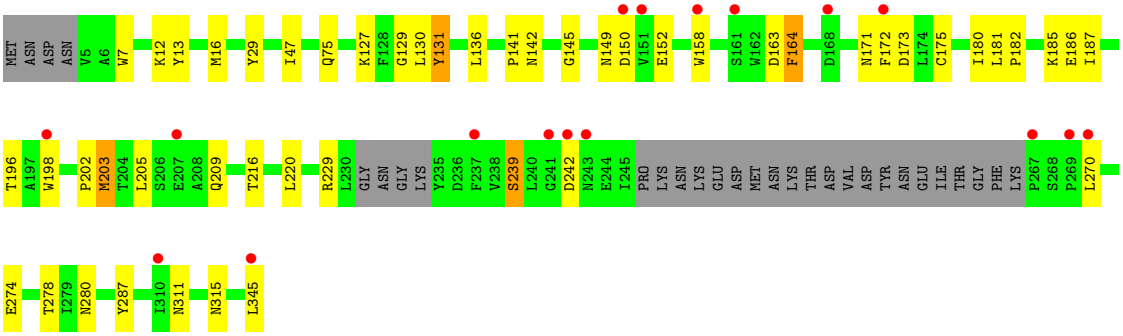
• Molecule 1: AlfC





• Molecule 1: AlfC





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	89.73Å 139.08Å 263.37Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.43 – 2.60 39.43 – 2.60	Depositor EDS
% Data completeness (in resolution range)	95.8 (39.43-2.60) 95.9 (39.43-2.60)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.61 (at 2.61Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.232 , 0.261 0.237 , 0.263	Depositor DCC
R_{free} test set	4999 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å^2)	58.5	Xtriage
Anisotropy	0.622	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 35.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	20999	wwPDB-VP
Average B, all atoms (Å^2)	77.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 19.11% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: JFZ

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	0.70	0/2719	0.78	0/3693
1	B	0.68	0/2642	0.77	0/3594
1	C	0.69	0/2654	0.76	0/3608
1	D	0.69	0/2693	0.78	0/3662
1	E	0.68	0/2653	0.77	0/3607
1	F	0.67	0/2632	0.77	1/3579 (0.0%)
1	G	0.68	0/2622	0.76	0/3567
1	H	0.68	0/2579	0.78	0/3508
All	All	0.68	0/21194	0.77	1/28818 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	G	0	2

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	F	98	VAL	CA-CB-CG1	5.16	118.63	110.90

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	G	245	ILE	Peptide

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Mol	Chain	Res	Type	Group
1	G	268	SER	Peptide

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2644	0	2482	36	0
1	B	2569	0	2386	31	0
1	C	2581	0	2404	38	0
1	D	2618	0	2421	38	0
1	E	2577	0	2415	46	0
1	F	2560	0	2390	25	0
1	G	2550	0	2354	31	0
1	H	2508	0	2326	45	0
2	A	20	0	0	0	0
2	B	20	0	0	0	0
2	C	20	0	0	0	0
2	D	20	0	0	0	0
2	E	20	0	0	0	0
2	F	20	0	0	0	0
2	G	20	0	0	0	0
2	H	20	0	0	0	0
3	A	40	0	0	1	0
3	B	38	0	0	1	0
3	C	41	0	0	14	0
3	D	33	0	0	1	0
3	E	24	0	0	0	0
3	F	19	0	0	0	0
3	G	21	0	0	1	0
3	H	16	0	0	0	0
All	All	20999	0	19178	285	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 7.

All (285) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2:ASN:HD21	1:A:4:ASN:HB2	1.06	1.19
1:D:2:ASN:HD21	1:D:4:ASN:HB2	1.04	1.14
1:C:2:ASN:HD21	1:C:4:ASN:HB2	1.13	1.12
1:H:141:PRO:HA	1:H:164:PHE:CD2	1.85	1.10
1:C:128:PHE:CD2	3:C:539:HOH:O	2.05	1.09
1:E:278:THR:HG23	1:E:315:ASN:HB3	1.37	1.07
1:D:2:ASN:ND2	1:D:4:ASN:HB2	1.71	1.05
1:A:2:ASN:ND2	1:A:4:ASN:HB2	1.72	1.04
1:F:278:THR:HG23	1:F:315:ASN:HB3	1.37	1.04
1:C:2:ASN:ND2	1:C:4:ASN:HB2	1.73	1.02
1:B:2:ASN:ND2	1:B:4:ASN:HB2	1.73	1.02
1:H:198:TRP:CZ3	1:H:274:GLU:OE1	2.17	0.98
1:E:12:LYS:HE2	1:E:306:ASN:ND2	1.84	0.93
1:H:141:PRO:HA	1:H:164:PHE:CE2	2.05	0.92
1:C:240:LEU:HA	3:C:501:HOH:O	1.69	0.92
1:C:244:GLU:HB2	3:C:501:HOH:O	1.73	0.89
1:H:198:TRP:HZ3	1:H:274:GLU:OE1	1.56	0.86
1:D:328:ALA:O	1:D:332:LEU:CD1	2.25	0.83
1:E:238:VAL:CG2	1:E:273:TYR:CD1	2.61	0.83
1:D:2:ASN:HD21	1:D:4:ASN:CB	1.91	0.82
1:C:118:ALA:HA	3:C:539:HOH:O	1.79	0.81
1:F:278:THR:HG23	1:F:315:ASN:CB	2.11	0.81
1:C:2:ASN:HD21	1:C:4:ASN:CB	1.92	0.81
1:D:328:ALA:O	1:D:332:LEU:HD12	1.80	0.80
1:E:278:THR:HG23	1:E:315:ASN:CB	2.11	0.80
1:A:2:ASN:HD21	1:A:4:ASN:CB	1.92	0.79
1:E:238:VAL:HG21	1:E:273:TYR:CD1	2.18	0.79
1:E:278:THR:CG2	1:E:315:ASN:HD22	1.96	0.78
1:H:141:PRO:CA	1:H:164:PHE:CE2	2.67	0.78
1:G:153:THR:HG22	1:G:156:THR:O	1.84	0.77
1:A:153:THR:HG22	1:A:156:THR:O	1.83	0.77
1:C:244:GLU:OE2	3:C:501:HOH:O	2.03	0.77
1:H:141:PRO:HG3	1:H:164:PHE:HE2	1.52	0.75
1:C:79:GLN:C	1:C:126:LEU:HD22	2.08	0.73
1:D:149:ASN:HD21	1:D:158:TRP:H	1.36	0.73
1:G:79:GLN:C	1:G:126:LEU:HD13	2.08	0.73
1:H:141:PRO:CA	1:H:164:PHE:CD2	2.70	0.73
1:C:149:ASN:HD21	1:C:158:TRP:H	1.35	0.72
1:H:149:ASN:HD21	1:H:158:TRP:H	1.36	0.72
1:B:2:ASN:HD21	1:B:4:ASN:HB2	1.52	0.71
1:B:79:GLN:C	1:B:126:LEU:HD13	2.11	0.71
1:C:118:ALA:CB	3:C:539:HOH:O	2.39	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:344:ARG:O	1:A:345:LEU:HB2	1.90	0.70
1:F:7:TRP:CZ2	1:F:127:LYS:HG3	2.27	0.70
1:E:278:THR:HG21	1:E:283:TRP:HA	1.73	0.70
1:H:7:TRP:CZ2	1:H:127:LYS:HG3	2.26	0.70
1:E:278:THR:CG2	1:E:315:ASN:HB3	2.19	0.70
1:F:278:THR:CG2	1:F:315:ASN:HB3	2.19	0.69
1:C:336:LYS:HE2	3:C:509:HOH:O	1.91	0.69
1:A:153:THR:CG2	1:A:156:THR:O	2.41	0.69
1:A:91:PHE:HD1	1:A:93:MET:HE2	1.57	0.68
1:G:153:THR:CG2	1:G:156:THR:O	2.42	0.68
1:F:278:THR:HG21	1:F:283:TRP:HA	1.74	0.68
1:D:328:ALA:O	1:D:332:LEU:HD13	1.93	0.68
1:D:279:ILE:CD1	1:D:332:LEU:HD11	2.24	0.68
1:A:91:PHE:CD1	1:A:93:MET:HE2	2.30	0.67
1:H:131:TYR:CD2	1:H:198:TRP:CD1	2.84	0.66
1:G:205:LEU:HD22	1:G:209:GLN:HB3	1.78	0.65
1:H:131:TYR:CD2	1:H:198:TRP:HD1	2.15	0.65
1:E:166:ASP:OD1	1:E:166:ASP:N	2.25	0.65
1:D:91:PHE:CD1	1:D:93:MET:HE2	2.31	0.64
1:H:129:GLY:C	1:H:130:LEU:HD12	2.18	0.64
1:E:12:LYS:CE	1:E:306:ASN:ND2	2.59	0.64
1:E:245:ILE:HD12	1:E:245:ILE:C	2.18	0.64
1:D:91:PHE:HD1	1:D:93:MET:HE2	1.61	0.63
1:E:238:VAL:HG21	1:E:273:TYR:CE1	2.34	0.63
1:H:141:PRO:CG	1:H:164:PHE:HE2	2.12	0.63
1:E:238:VAL:CG2	1:E:273:TYR:HD1	2.12	0.63
1:A:287[B]:TYR:HB2	1:G:287[B]:TYR:HB2	1.80	0.62
1:D:20:GLY:HA2	1:D:93:MET:HE3	1.80	0.62
1:E:42:GLN:HE22	1:E:49:ASN:ND2	1.97	0.62
1:D:42:GLN:HE22	1:D:49:ASN:ND2	1.98	0.62
1:A:42:GLN:HE22	1:A:49:ASN:HD22	1.48	0.61
1:E:42:GLN:HE22	1:E:49:ASN:HD22	1.48	0.61
1:C:244:GLU:CB	3:C:501:HOH:O	2.39	0.61
1:A:42:GLN:HE22	1:A:49:ASN:ND2	1.98	0.61
1:B:2:ASN:HD22	1:B:4:ASN:H	1.47	0.61
1:H:29:TYR:CZ	1:H:47:ILE:HD12	2.35	0.61
1:B:111:ARG:HD2	1:B:116:GLU:OE2	2.01	0.60
1:D:42:GLN:HE22	1:D:49:ASN:HD22	1.47	0.60
1:G:172:PHE:HE2	1:G:205:LEU:HD23	1.67	0.60
1:G:40:TRP:CZ3	1:G:153:THR:OG1	2.55	0.59
1:C:67:LYS:O	1:C:70:VAL:HG22	2.02	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:216:THR:O	1:G:220:LEU:HD23	2.03	0.59
1:G:172:PHE:CE2	1:G:205:LEU:HD23	2.38	0.59
1:D:206:SER:HB3	3:D:511:HOH:O	2.02	0.59
1:B:2:ASN:ND2	1:B:4:ASN:CB	2.59	0.58
1:G:223:ASN:N	1:G:223:ASN:HD22	2.01	0.58
1:A:20:GLY:HA2	1:A:93:MET:HE3	1.86	0.58
1:F:142:ASN:HD22	1:F:171:ASN:H	1.51	0.58
1:D:142:ASN:HD22	1:D:171:ASN:H	1.51	0.58
1:A:40:TRP:CZ3	1:A:153:THR:OG1	2.54	0.58
1:C:240:LEU:CA	3:C:501:HOH:O	2.36	0.58
1:G:142:ASN:HD22	1:G:171:ASN:H	1.51	0.57
1:E:142:ASN:HD22	1:E:171:ASN:H	1.51	0.57
1:H:181:LEU:HD13	1:H:181:LEU:C	2.23	0.57
1:D:20:GLY:HA2	1:D:93:MET:CE	2.34	0.57
1:A:248:ASN:OD1	1:A:248:ASN:N	2.36	0.57
1:A:142:ASN:HD22	1:A:171:ASN:H	1.53	0.57
1:B:142:ASN:HD22	1:B:171:ASN:H	1.52	0.57
1:H:142:ASN:HD22	1:H:171:ASN:H	1.52	0.57
1:E:238:VAL:HG22	1:E:273:TYR:CD1	2.38	0.56
1:H:216:THR:O	1:H:220:LEU:HD23	2.05	0.56
1:C:118:ALA:CA	3:C:539:HOH:O	2.44	0.56
1:A:20:GLY:HA2	1:A:93:MET:CE	2.36	0.56
1:C:142:ASN:HD22	1:C:171:ASN:H	1.53	0.55
1:D:279:ILE:HD11	1:D:332:LEU:HD11	1.88	0.55
1:H:164:PHE:N	1:H:164:PHE:CD1	2.75	0.55
1:A:275:THR:HG22	1:A:305:LEU:HD13	1.88	0.55
1:H:278:THR:HG23	1:H:280:ASN:O	2.07	0.55
1:A:344:ARG:O	1:A:345:LEU:CB	2.55	0.55
1:A:278:THR:HG23	1:A:280:ASN:O	2.07	0.54
1:B:75:GLN:HG2	3:B:518:HOH:O	2.06	0.54
1:H:181:LEU:HD13	1:H:181:LEU:O	2.06	0.54
1:H:181:LEU:HD11	1:H:185:LYS:CE	2.37	0.54
1:D:278:THR:HG23	1:D:280:ASN:O	2.09	0.53
1:G:278:THR:HG23	1:G:280:ASN:O	2.08	0.53
1:A:2:ASN:ND2	1:A:4:ASN:CB	2.59	0.53
1:C:278:THR:HG23	1:C:280:ASN:O	2.08	0.53
1:B:278:THR:HG23	1:B:280:ASN:O	2.08	0.53
1:D:275:THR:HG22	1:D:305:LEU:HD13	1.89	0.53
1:D:279:ILE:HD13	1:D:332:LEU:HD11	1.90	0.53
1:F:84:THR:HG22	1:F:131:TYR:HD2	1.74	0.53
1:C:175:CYS:SG	1:C:180:ILE:CD1	2.98	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:175:CYS:SG	1:B:180:ILE:CD1	2.98	0.52
1:C:2:ASN:ND2	1:C:4:ASN:CB	2.58	0.52
1:C:78:MET:O	1:C:126:LEU:HD21	2.10	0.52
1:E:268:SER:OG	1:E:269:PRO:CD	2.58	0.52
1:E:268:SER:OG	1:E:269:PRO:HD3	2.10	0.52
1:E:278:THR:HG23	1:E:315:ASN:ND2	2.25	0.52
1:H:12:LYS:H	1:H:311:ASN:ND2	2.07	0.52
1:E:175:CYS:SG	1:E:180:ILE:CD1	2.99	0.51
1:E:278:THR:CG2	1:E:315:ASN:ND2	2.69	0.51
1:F:175:CYS:SG	1:F:180:ILE:CD1	2.99	0.51
1:C:2:ASN:HD22	1:C:4:ASN:H	1.56	0.51
1:D:175:CYS:SG	1:D:180:ILE:CD1	2.99	0.51
1:F:209:GLN:O	1:F:212:THR:OG1	2.25	0.50
1:A:175:CYS:SG	1:A:180:ILE:CD1	2.99	0.50
1:G:175:CYS:SG	1:G:180:ILE:CD1	3.00	0.50
1:H:163:ASP:HB2	1:H:164:PHE:CD1	2.47	0.50
1:H:175:CYS:SG	1:H:180:ILE:CD1	2.99	0.50
1:E:202:PRO:HD3	1:E:229:ARG:O	2.12	0.50
1:H:163:ASP:HB2	1:H:164:PHE:CE1	2.47	0.50
1:B:202:PRO:HD3	1:B:229:ARG:O	2.12	0.49
1:C:2:ASN:HB3	3:C:540:HOH:O	2.12	0.49
1:D:2:ASN:ND2	1:D:4:ASN:CB	2.58	0.49
1:B:2:ASN:HD21	1:B:4:ASN:CB	2.21	0.49
1:E:201:VAL:HG22	1:E:229:ARG:HD3	1.93	0.49
1:A:287[B]:TYR:OH	1:G:325:PRO:HB3	2.12	0.49
1:A:153:THR:HG23	1:A:155:GLY:H	1.78	0.49
1:D:326:MET:HE2	1:E:28:GLU:HG3	1.95	0.49
1:F:202:PRO:HD3	1:F:229:ARG:O	2.12	0.49
1:G:153:THR:HG23	1:G:155:GLY:H	1.77	0.49
1:G:202:PRO:HD3	1:G:229:ARG:O	2.14	0.48
1:H:202:PRO:HD3	1:H:229:ARG:O	2.13	0.48
1:A:265:PHE:N	3:A:501:HOH:O	2.47	0.48
1:E:245:ILE:HD12	1:E:245:ILE:O	2.12	0.48
1:B:78:MET:O	1:B:126:LEU:HD11	2.14	0.48
1:C:202:PRO:HD3	1:C:229:ARG:O	2.13	0.48
1:D:287[B]:TYR:OH	1:E:325:PRO:HB3	2.14	0.47
1:A:202:PRO:HD3	1:A:229:ARG:O	2.13	0.47
1:B:2:ASN:HD22	1:B:4:ASN:N	2.11	0.47
1:H:198:TRP:CH2	1:H:239:SER:OG	2.67	0.47
1:H:130:LEU:HD23	1:H:187:ILE:HB	1.97	0.47
1:H:198:TRP:CH2	1:H:274:GLU:OE1	2.65	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:2:ASN:HD22	1:C:2:ASN:C	2.18	0.47
1:A:246:PRO:HG2	1:A:308:PHE:CD2	2.49	0.47
1:C:240:LEU:CD2	3:C:501:HOH:O	2.62	0.47
1:E:278:THR:HG23	1:E:315:ASN:HD22	1.74	0.47
1:C:240:LEU:HD23	3:C:501:HOH:O	2.14	0.47
1:E:278:THR:HG21	1:E:282:SER:O	2.15	0.47
1:A:325:PRO:HB3	1:G:287[B]:TYR:OH	2.15	0.47
1:D:202:PRO:HD3	1:D:229:ARG:O	2.14	0.47
1:F:145:GLY:HA2	1:F:203:MET:HE3	1.98	0.46
1:A:242:ASP:HA	1:A:245:ILE:HD13	1.98	0.46
1:B:136:LEU:HD21	1:B:203:MET:HE2	1.98	0.46
1:H:145:GLY:HA2	1:H:203:MET:HE3	1.98	0.46
1:H:181:LEU:HD11	1:H:185:LYS:HE3	1.97	0.46
1:E:270:LEU:HD12	1:E:270:LEU:N	2.30	0.46
1:E:151:VAL:HG12	1:E:158:TRP:HE1	1.81	0.46
1:G:42:GLN:HB2	1:G:52:TYR:CE2	2.51	0.46
1:B:201:VAL:HG22	1:B:229:ARG:HD3	1.98	0.46
1:E:238:VAL:O	1:E:238:VAL:HG23	2.16	0.46
1:F:95:HIS:CE1	1:F:104:TYR:CD2	3.04	0.45
1:F:136:LEU:HD21	1:F:203:MET:HE2	1.98	0.45
1:H:181:LEU:HD11	1:H:185:LYS:HE2	1.96	0.45
1:C:136:LEU:HD21	1:C:203:MET:HE2	1.99	0.45
1:G:78:MET:O	1:G:126:LEU:HD11	2.16	0.45
1:G:145:GLY:HA2	1:G:203:MET:HE3	1.98	0.45
1:E:42:GLN:HB2	1:E:52:TYR:CE2	2.51	0.45
1:F:84:THR:HG22	1:F:131:TYR:CD2	2.51	0.45
1:B:111:ARG:HH11	1:B:116:GLU:CD	2.20	0.45
1:E:166:ASP:HB2	1:E:169:GLN:HG2	1.97	0.45
1:F:4:ASN:OD1	1:F:4:ASN:N	2.49	0.45
1:G:16:MET:HB3	1:G:315:ASN:HA	1.99	0.45
1:G:205:LEU:HD22	1:G:209:GLN:CB	2.44	0.45
1:B:145:GLY:HA2	1:B:203:MET:HE3	1.99	0.44
1:B:270:LEU:N	1:B:270:LEU:HD12	2.32	0.44
1:H:136:LEU:HD12	1:H:136:LEU:H	1.82	0.44
1:H:141:PRO:CB	1:H:164:PHE:CE2	3.01	0.44
1:E:151:VAL:CG1	1:E:158:TRP:HE1	2.31	0.44
1:E:98:VAL:HG23	1:E:186:GLU:OE2	2.18	0.44
1:F:270:LEU:N	1:F:270:LEU:HD12	2.32	0.44
1:C:2:ASN:HD22	1:C:4:ASN:N	2.16	0.44
1:C:145:GLY:HA2	1:C:203:MET:HE3	2.00	0.43
1:F:278:THR:HG21	1:F:282:SER:O	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:149:ASN:O	1:H:150:ASP:HB2	2.18	0.43
1:E:16:MET:HB3	1:E:315:ASN:HA	2.00	0.43
1:G:98:VAL:HG23	1:G:186:GLU:OE2	2.17	0.43
1:H:270:LEU:HD12	1:H:270:LEU:N	2.32	0.43
1:A:173:ASP:OD1	1:A:209:GLN:NE2	2.51	0.43
1:D:2:ASN:C	1:D:2:ASN:HD22	2.21	0.43
1:H:16:MET:HB3	1:H:315:ASN:HA	2.00	0.43
1:A:182:PRO:O	1:A:186:GLU:HG3	2.18	0.43
1:B:182:PRO:O	1:B:186:GLU:HG3	2.19	0.43
1:D:149:ASN:ND2	1:D:158:TRP:H	2.12	0.43
1:D:246:PRO:O	1:D:304:HIS:CE1	2.71	0.43
1:C:342:ALA:HA	1:C:345:LEU:HD12	1.99	0.43
1:A:16:MET:HB3	1:A:315:ASN:HA	2.01	0.43
1:B:16:MET:HB3	1:B:315:ASN:HA	2.00	0.43
1:E:173:ASP:OD1	1:E:209:GLN:NE2	2.51	0.43
1:E:182:PRO:O	1:E:186:GLU:HG3	2.19	0.43
1:G:173:ASP:OD1	1:G:209:GLN:NE2	2.51	0.43
1:B:109:PHE:CZ	1:B:111:ARG:NH2	2.87	0.43
1:B:2:ASN:HD22	1:B:4:ASN:HB2	1.72	0.43
1:B:111:ARG:NH1	1:B:116:GLU:OE1	2.51	0.43
1:C:182:PRO:O	1:C:186:GLU:HG3	2.19	0.43
1:F:182:PRO:O	1:F:186:GLU:HG3	2.18	0.43
1:G:182:PRO:O	1:G:186:GLU:HG3	2.19	0.43
1:B:98:VAL:HG23	1:B:186:GLU:OE2	2.18	0.42
1:D:16:MET:HB3	1:D:315:ASN:HA	2.01	0.42
1:D:182:PRO:O	1:D:186:GLU:HG3	2.19	0.42
1:H:182:PRO:O	1:H:186:GLU:HG3	2.19	0.42
1:B:79:GLN:C	1:B:126:LEU:CD1	2.85	0.42
1:D:173:ASP:OD1	1:D:209:GLN:NE2	2.53	0.42
1:F:173:ASP:OD1	1:F:209:GLN:NE2	2.52	0.42
1:G:43:SER:HA	1:G:162:TRP:CH2	2.55	0.42
1:H:173:ASP:OD1	1:H:209:GLN:NE2	2.52	0.42
1:E:345:LEU:HD13	1:E:345:LEU:HA	1.85	0.42
1:F:131:TYR:HD1	1:F:198:TRP:O	2.02	0.42
1:B:181:LEU:HB3	1:B:182:PRO:HD3	2.02	0.42
1:F:242:ASP:HA	1:F:245:ILE:HD13	2.01	0.42
1:H:181:LEU:HB3	1:H:182:PRO:HD3	2.02	0.42
1:B:173:ASP:OD1	1:B:209:GLN:NE2	2.52	0.42
1:A:98:VAL:HG23	1:A:186:GLU:OE2	2.19	0.42
1:A:2:ASN:C	1:A:2:ASN:HD22	2.23	0.42
1:D:43:SER:HA	1:D:162:TRP:CH2	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:172:PHE:CE2	1:D:205:LEU:HD12	2.55	0.42
1:E:136:LEU:HD12	1:E:136:LEU:H	1.84	0.42
1:E:153:THR:HG22	1:E:158:TRP:CE2	2.55	0.42
1:C:149:ASN:HD22	1:C:149:ASN:HA	1.72	0.41
1:H:163:ASP:CB	1:H:164:PHE:CE1	3.03	0.41
1:F:16:MET:HB3	1:F:315:ASN:HA	2.01	0.41
1:B:153:THR:HG22	1:B:158:TRP:CE2	2.55	0.41
1:B:172:PHE:CE2	1:B:205:LEU:HD12	2.55	0.41
1:F:43:SER:HA	1:F:162:TRP:CH2	2.55	0.41
1:A:131:TYR:HA	1:A:198:TRP:O	2.21	0.41
1:C:164:PHE:CZ	3:C:531:HOH:O	2.57	0.41
1:C:173:ASP:OD1	1:C:209:GLN:NE2	2.53	0.41
1:E:43:SER:HA	1:E:162:TRP:CH2	2.56	0.41
1:B:43:SER:HA	1:B:162:TRP:CH2	2.55	0.41
1:G:79:GLN:C	1:G:126:LEU:CD1	2.84	0.41
1:G:158:TRP:CG	1:G:203:MET:HE1	2.55	0.41
1:C:153:THR:HG22	1:C:158:TRP:CE2	2.55	0.41
1:H:131:TYR:HA	1:H:198:TRP:O	2.21	0.41
1:D:2:ASN:HD22	1:D:4:ASN:N	2.19	0.41
1:D:246:PRO:HG2	1:D:308:PHE:CD2	2.56	0.41
1:G:142:ASN:ND2	1:G:171:ASN:H	2.19	0.41
1:A:43:SER:HA	1:A:162:TRP:CH2	2.56	0.41
1:A:181:LEU:HB3	1:A:182:PRO:HD3	2.03	0.41
1:C:16:MET:HB3	1:C:315:ASN:HA	2.01	0.41
1:D:181:LEU:HB3	1:D:182:PRO:HD3	2.02	0.41
1:E:131:TYR:HA	1:E:198:TRP:O	2.21	0.41
1:G:131:TYR:HA	1:G:198:TRP:O	2.20	0.41
1:D:131:TYR:HA	1:D:198:TRP:O	2.21	0.41
1:D:153:THR:HG22	1:D:158:TRP:CE2	2.56	0.41
1:E:9:LYS:HG3	1:E:272:LEU:CD2	2.51	0.41
1:E:12:LYS:HE2	1:E:306:ASN:HD22	1.75	0.41
1:H:158:TRP:CG	1:H:203:MET:HE1	2.56	0.41
1:C:43:SER:HA	1:C:162:TRP:CH2	2.56	0.40
1:G:271:GLY:HA3	3:G:517:HOH:O	2.22	0.40
1:H:172:PHE:CE2	1:H:205:LEU:HD12	2.56	0.40
1:F:172:PHE:CE2	1:F:205:LEU:HD12	2.56	0.40
1:H:129:GLY:O	1:H:130:LEU:HD12	2.20	0.40
1:F:167:GLU:HG2	1:F:168:ASP:N	2.36	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	325/345 (94%)	306 (94%)	19 (6%)	0	100	100
1	B	319/345 (92%)	301 (94%)	18 (6%)	0	100	100
1	C	320/345 (93%)	300 (94%)	20 (6%)	0	100	100
1	D	325/345 (94%)	305 (94%)	20 (6%)	0	100	100
1	E	319/345 (92%)	301 (94%)	18 (6%)	0	100	100
1	F	317/345 (92%)	300 (95%)	17 (5%)	0	100	100
1	G	317/345 (92%)	298 (94%)	19 (6%)	0	100	100
1	H	310/345 (90%)	290 (94%)	20 (6%)	0	100	100
All	All	2552/2760 (92%)	2401 (94%)	151 (6%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	276/292 (94%)	267 (97%)	9 (3%)	38	64
1	B	265/292 (91%)	259 (98%)	6 (2%)	50	75
1	C	267/292 (91%)	258 (97%)	9 (3%)	37	63
1	D	268/292 (92%)	261 (97%)	7 (3%)	46	72
1	E	267/292 (91%)	255 (96%)	12 (4%)	27	52
1	F	265/292 (91%)	258 (97%)	7 (3%)	46	72

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	G	260/292 (89%)	252 (97%)	8 (3%)	40 66
1	H	256/292 (88%)	245 (96%)	11 (4%)	29 54
All	All	2124/2336 (91%)	2055 (97%)	69 (3%)	39 65

All (69) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	ASN
1	A	9	LYS
1	A	13	TYR
1	A	152	GLU
1	A	198	TRP
1	A	203	MET
1	A	204	THR
1	A	248	ASN
1	A	345	LEU
1	B	2	ASN
1	B	13	TYR
1	B	152	GLU
1	B	198	TRP
1	B	203	MET
1	B	204	THR
1	C	2	ASN
1	C	9	LYS
1	C	13	TYR
1	C	168	ASP
1	C	174	LEU
1	C	198	TRP
1	C	203	MET
1	C	204	THR
1	C	345	LEU
1	D	2	ASN
1	D	13	TYR
1	D	167	GLU
1	D	198	TRP
1	D	203	MET
1	D	204	THR
1	D	345	LEU
1	E	13	TYR
1	E	150	ASP
1	E	166	ASP

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Mol	Chain	Res	Type
1	E	169	GLN
1	E	198	TRP
1	E	203	MET
1	E	204	THR
1	E	245	ILE
1	E	278	THR
1	E	287[A]	TYR
1	E	287[B]	TYR
1	E	345	LEU
1	F	13	TYR
1	F	98	VAL
1	F	198	TRP
1	F	203	MET
1	F	204	THR
1	F	278	THR
1	F	287	TYR
1	G	13	TYR
1	G	131	TYR
1	G	152	GLU
1	G	198	TRP
1	G	203	MET
1	G	204	THR
1	G	239	SER
1	G	344	ARG
1	H	13	TYR
1	H	75	GLN
1	H	131	TYR
1	H	152	GLU
1	H	164	PHE
1	H	196	THR
1	H	203	MET
1	H	239	SER
1	H	242	ASP
1	H	287	TYR
1	H	345	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (40) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	2	ASN
1	A	49	ASN
1	A	75	GLN

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Mol	Chain	Res	Type
1	A	102	ASN
1	A	142	ASN
1	B	2	ASN
1	B	142	ASN
1	C	2	ASN
1	C	142	ASN
1	C	149	ASN
1	C	306	ASN
1	C	315	ASN
1	D	2	ASN
1	D	49	ASN
1	D	102	ASN
1	D	142	ASN
1	D	149	ASN
1	D	304	HIS
1	D	306	ASN
1	E	49	ASN
1	E	54	ASN
1	E	102	ASN
1	E	142	ASN
1	E	306	ASN
1	E	315	ASN
1	F	42	GLN
1	F	142	ASN
1	F	304	HIS
1	F	306	ASN
1	G	4	ASN
1	G	102	ASN
1	G	142	ASN
1	G	223	ASN
1	G	306	ASN
1	H	142	ASN
1	H	149	ASN
1	H	221	GLN
1	H	306	ASN
1	H	311	ASN
1	H	315	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

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	JFZ	A	401	-	20,21,21	2.56	11 (55%)	28,30,30	3.22	9 (32%)
2	JFZ	C	401	-	20,21,21	2.74	15 (75%)	28,30,30	2.13	8 (28%)
2	JFZ	D	401	-	20,21,21	2.77	10 (50%)	28,30,30	2.06	7 (25%)
2	JFZ	E	401	-	20,21,21	2.81	13 (65%)	28,30,30	1.82	7 (25%)
2	JFZ	F	401	-	20,21,21	3.20	15 (75%)	28,30,30	1.92	7 (25%)
2	JFZ	B	401	-	20,21,21	3.00	14 (70%)	28,30,30	2.36	8 (28%)
2	JFZ	H	401	-	20,21,21	2.96	13 (65%)	28,30,30	2.02	7 (25%)
2	JFZ	G	401	-	20,21,21	2.65	11 (55%)	28,30,30	2.63	8 (28%)

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	JFZ	A	401	-	-	5/6/28/28	0/2/2/2
2	JFZ	C	401	-	-	2/6/28/28	0/2/2/2
2	JFZ	D	401	-	-	2/6/28/28	0/2/2/2
2	JFZ	E	401	-	-	4/6/28/28	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	JFZ	F	401	-	-	5/6/28/28	0/2/2/2
2	JFZ	B	401	-	-	0/6/28/28	0/2/2/2
2	JFZ	H	401	-	-	2/6/28/28	0/2/2/2
2	JFZ	G	401	-	-	5/6/28/28	0/2/2/2

All (102) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	401	JFZ	C4'-N1'	7.59	1.63	1.45
2	F	401	JFZ	C4'-N1'	7.52	1.63	1.45
2	B	401	JFZ	C4'-N1'	7.30	1.62	1.45
2	E	401	JFZ	C4'-N1'	6.68	1.61	1.45
2	D	401	JFZ	C4'-N1'	6.27	1.60	1.45
2	C	401	JFZ	C4'-N1'	6.11	1.59	1.45
2	A	401	JFZ	C4'-N1'	5.58	1.58	1.45
2	D	401	JFZ	C4-C5	5.39	1.64	1.52
2	G	401	JFZ	C4'-N1'	5.30	1.57	1.45
2	A	401	JFZ	O1-C1	4.23	1.47	1.41
2	B	401	JFZ	C4-C3	4.21	1.63	1.52
2	D	401	JFZ	C2'-C1'	4.19	1.47	1.38
2	F	401	JFZ	C2'-C1'	4.02	1.46	1.38
2	F	401	JFZ	O1-C1	4.01	1.47	1.41
2	F	401	JFZ	C3'-C2'	3.93	1.45	1.38
2	G	401	JFZ	C2'-C1'	3.90	1.46	1.38
2	E	401	JFZ	C2'-C1'	3.87	1.46	1.38
2	C	401	JFZ	O1-C1	-3.74	1.35	1.41
2	G	401	JFZ	C5'-C4'	3.69	1.45	1.38
2	C	401	JFZ	C4-C5	3.62	1.60	1.52
2	H	401	JFZ	C6'-C1'	3.61	1.45	1.38
2	G	401	JFZ	C6'-C1'	3.59	1.45	1.38
2	D	401	JFZ	C5'-C4'	3.51	1.45	1.38
2	F	401	JFZ	C4-C5	3.50	1.60	1.52
2	A	401	JFZ	C5'-C4'	3.50	1.45	1.38
2	B	401	JFZ	C6'-C1'	3.49	1.45	1.38
2	H	401	JFZ	C4-C5	3.47	1.60	1.52
2	H	401	JFZ	C2'-C1'	3.46	1.45	1.38
2	D	401	JFZ	O2'-N1'	-3.43	1.17	1.22
2	E	401	JFZ	C5'-C4'	3.42	1.45	1.38
2	G	401	JFZ	O2'-N1'	-3.42	1.17	1.22
2	C	401	JFZ	O2'-N1'	-3.40	1.17	1.22
2	E	401	JFZ	O2'-N1'	-3.40	1.17	1.22
2	E	401	JFZ	C6'-C1'	3.40	1.45	1.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	401	JFZ	O2'-N1'	-3.39	1.17	1.22
2	H	401	JFZ	O2'-N1'	-3.37	1.17	1.22
2	B	401	JFZ	C4-C5	3.32	1.60	1.52
2	E	401	JFZ	C3'-C4'	3.31	1.45	1.38
2	D	401	JFZ	C6-C5	3.28	1.59	1.51
2	B	401	JFZ	O2'-N1'	-3.22	1.17	1.22
2	A	401	JFZ	C6'-C1'	3.18	1.45	1.38
2	B	401	JFZ	C6'-C5'	3.15	1.44	1.38
2	G	401	JFZ	O5-C1	3.14	1.49	1.41
2	A	401	JFZ	O2'-N1'	-3.11	1.17	1.22
2	F	401	JFZ	C6'-C5'	3.04	1.44	1.38
2	B	401	JFZ	C5'-C4'	3.01	1.44	1.38
2	F	401	JFZ	C3'-C4'	2.99	1.44	1.38
2	H	401	JFZ	C6'-C5'	2.96	1.44	1.38
2	H	401	JFZ	C1-C2	2.95	1.61	1.52
2	B	401	JFZ	C6-C5	2.92	1.58	1.51
2	B	401	JFZ	C1-C2	2.89	1.60	1.52
2	E	401	JFZ	C3'-C2'	2.89	1.44	1.38
2	G	401	JFZ	O1-C1	2.88	1.45	1.41
2	D	401	JFZ	C3-C2	2.88	1.59	1.52
2	F	401	JFZ	O5-C1	2.87	1.49	1.41
2	H	401	JFZ	C5'-C4'	2.87	1.44	1.38
2	F	401	JFZ	C6'-C1'	2.86	1.44	1.38
2	F	401	JFZ	C4-C3	2.85	1.59	1.52
2	H	401	JFZ	C4-C3	2.85	1.59	1.52
2	F	401	JFZ	C6-C5	2.85	1.58	1.51
2	B	401	JFZ	O4-C4	-2.79	1.36	1.43
2	D	401	JFZ	C6'-C1'	2.78	1.44	1.38
2	C	401	JFZ	C6-C5	2.75	1.58	1.51
2	A	401	JFZ	C2'-C1'	2.75	1.44	1.38
2	E	401	JFZ	C6'-C5'	2.73	1.43	1.38
2	B	401	JFZ	O5-C5	-2.73	1.38	1.44
2	H	401	JFZ	O1-C1'	2.71	1.43	1.38
2	C	401	JFZ	O2-C2	-2.71	1.36	1.43
2	C	401	JFZ	C6'-C1'	2.70	1.44	1.38
2	A	401	JFZ	O4-C4	-2.70	1.36	1.43
2	B	401	JFZ	C3'-C2'	2.64	1.43	1.38
2	E	401	JFZ	C3-C2	2.62	1.59	1.52
2	F	401	JFZ	C5'-C4'	2.61	1.43	1.38
2	F	401	JFZ	C1-C2	2.61	1.60	1.52
2	E	401	JFZ	C4-C5	2.61	1.58	1.52
2	A	401	JFZ	C4-C3	2.59	1.58	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	401	JFZ	C6'-C5'	2.58	1.43	1.38
2	C	401	JFZ	O5-C5	-2.58	1.38	1.44
2	G	401	JFZ	O4-C4	-2.55	1.37	1.43
2	G	401	JFZ	C4-C5	2.54	1.58	1.52
2	B	401	JFZ	C3'-C4'	2.54	1.43	1.38
2	C	401	JFZ	C5'-C4'	2.53	1.43	1.38
2	A	401	JFZ	C6'-C5'	2.48	1.43	1.38
2	H	401	JFZ	C3'-C2'	2.47	1.43	1.38
2	B	401	JFZ	C2'-C1'	2.47	1.43	1.38
2	C	401	JFZ	C3'-C4'	2.47	1.43	1.38
2	E	401	JFZ	O4-C4	-2.47	1.37	1.43
2	C	401	JFZ	C2'-C1'	2.45	1.43	1.38
2	G	401	JFZ	C6-C5	2.41	1.57	1.51
2	A	401	JFZ	C3-C2	2.39	1.58	1.52
2	C	401	JFZ	O3-C3	-2.34	1.37	1.43
2	A	401	JFZ	C6-C5	2.28	1.57	1.51
2	F	401	JFZ	O1-C1'	2.20	1.42	1.38
2	E	401	JFZ	O1-C1	2.17	1.44	1.41
2	C	401	JFZ	C4-C3	2.17	1.57	1.52
2	D	401	JFZ	C3'-C4'	2.15	1.43	1.38
2	H	401	JFZ	C3'-C4'	2.14	1.43	1.38
2	H	401	JFZ	C3-C2	2.12	1.57	1.52
2	C	401	JFZ	C3'-C2'	2.11	1.42	1.38
2	E	401	JFZ	C6-C5	2.09	1.56	1.51
2	C	401	JFZ	C6'-C5'	2.03	1.42	1.38
2	D	401	JFZ	C4-C3	2.01	1.57	1.52

All (61) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	401	JFZ	C5'-C4'-N1'	9.76	126.72	119.38
2	A	401	JFZ	C3'-C4'-N1'	-9.31	112.37	119.38
2	G	401	JFZ	C3'-C4'-N1'	-7.96	113.39	119.38
2	G	401	JFZ	C5'-C4'-N1'	7.23	124.81	119.38
2	B	401	JFZ	C5'-C4'-N1'	7.17	124.77	119.38
2	A	401	JFZ	C1'-O1-C1	-5.93	109.09	117.79
2	F	401	JFZ	C1-O5-C5	5.88	123.78	113.67
2	H	401	JFZ	C5'-C4'-N1'	5.72	123.68	119.38
2	D	401	JFZ	C3'-C4'-N1'	-5.54	115.20	119.38
2	G	401	JFZ	C1-O5-C5	5.50	123.12	113.67
2	B	401	JFZ	C3'-C4'-N1'	-5.42	115.29	119.38
2	D	401	JFZ	C5'-C4'-N1'	5.40	123.44	119.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	401	JFZ	C1-O5-C5	5.17	122.55	113.67
2	C	401	JFZ	C5'-C4'-N1'	5.09	123.21	119.38
2	C	401	JFZ	C1'-O1-C1	4.60	124.53	117.79
2	C	401	JFZ	C3'-C4'-N1'	-4.49	116.00	119.38
2	H	401	JFZ	C3'-C4'-N1'	-4.33	116.12	119.38
2	E	401	JFZ	C5'-C4'-N1'	4.32	122.63	119.38
2	E	401	JFZ	C1-O5-C5	4.18	120.85	113.67
2	E	401	JFZ	C3'-C4'-N1'	-3.97	116.39	119.38
2	B	401	JFZ	C1'-O1-C1	3.86	123.45	117.79
2	F	401	JFZ	O2'-N1'-C4'	3.85	124.25	118.80
2	B	401	JFZ	O2'-N1'-C4'	3.84	124.23	118.80
2	H	401	JFZ	O5-C5-C6	3.71	114.71	106.70
2	E	401	JFZ	O2'-N1'-C4'	3.68	124.01	118.80
2	H	401	JFZ	O2'-N1'-C4'	3.66	123.98	118.80
2	C	401	JFZ	O5-C5-C6	3.64	114.57	106.70
2	C	401	JFZ	O2'-N1'-C4'	3.64	123.94	118.80
2	H	401	JFZ	C1'-O1-C1	3.60	123.08	117.79
2	D	401	JFZ	O5-C5-C6	3.55	114.36	106.70
2	D	401	JFZ	O2'-N1'-C4'	3.47	123.70	118.80
2	F	401	JFZ	C5'-C4'-N1'	3.42	121.95	119.38
2	A	401	JFZ	O5-C5-C6	3.06	113.31	106.70
2	G	401	JFZ	O2'-N1'-C4'	3.03	123.09	118.80
2	F	401	JFZ	O5-C5-C6	3.01	113.20	106.70
2	C	401	JFZ	C6-C5-C4	-2.96	107.61	113.07
2	A	401	JFZ	C6-C5-C4	-2.90	107.70	113.07
2	B	401	JFZ	C1-O5-C5	2.90	118.65	113.67
2	G	401	JFZ	O5-C5-C6	2.87	112.91	106.70
2	B	401	JFZ	O5-C5-C6	2.73	112.60	106.70
2	G	401	JFZ	C4-C3-C2	-2.73	106.06	110.82
2	F	401	JFZ	C6-C5-C4	-2.72	108.05	113.07
2	C	401	JFZ	C1-O5-C5	2.71	118.33	113.67
2	D	401	JFZ	C1-O5-C5	2.70	118.31	113.67
2	H	401	JFZ	C6-C5-C4	-2.63	108.20	113.07
2	B	401	JFZ	C4-C3-C2	-2.62	106.25	110.82
2	E	401	JFZ	O5-C5-C6	2.61	112.33	106.70
2	B	401	JFZ	C6-C5-C4	-2.57	108.33	113.07
2	G	401	JFZ	C6-C5-C4	-2.46	108.52	113.07
2	D	401	JFZ	C6-C5-C4	-2.39	108.66	113.07
2	A	401	JFZ	O2'-N1'-C4'	2.38	122.16	118.80
2	G	401	JFZ	O5-C1-O1	2.34	114.24	108.29
2	E	401	JFZ	C6-C5-C4	-2.32	108.79	113.07
2	A	401	JFZ	O5-C1-O1	2.30	114.14	108.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	H	401	JFZ	C4-C3-C2	-2.25	106.89	110.82
2	A	401	JFZ	O1-C1-C2	2.21	110.34	107.14
2	E	401	JFZ	C1'-O1-C1	-2.19	114.58	117.79
2	C	401	JFZ	C4-C3-C2	-2.10	107.15	110.82
2	F	401	JFZ	O1-C1-C2	2.08	110.16	107.14
2	D	401	JFZ	O5-C1-C2	2.03	114.65	110.35
2	F	401	JFZ	O5-C1-O1	2.00	113.38	108.29

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	JFZ	O5-C1-O1-C1'
2	A	401	JFZ	C3'-C4'-N1'-O2'
2	A	401	JFZ	C5'-C4'-N1'-O2'
2	E	401	JFZ	C3'-C4'-N1'-O2'
2	E	401	JFZ	C5'-C4'-N1'-O2'
2	F	401	JFZ	O5-C1-O1-C1'
2	F	401	JFZ	C3'-C4'-N1'-O2'
2	F	401	JFZ	C5'-C4'-N1'-O2'
2	G	401	JFZ	O5-C1-O1-C1'
2	G	401	JFZ	C3'-C4'-N1'-O2'
2	G	401	JFZ	C5'-C4'-N1'-O2'
2	D	401	JFZ	C2'-C1'-O1-C1
2	D	401	JFZ	C6'-C1'-O1-C1
2	H	401	JFZ	C3'-C4'-N1'-O2'
2	G	401	JFZ	C2'-C1'-O1-C1
2	H	401	JFZ	C5'-C4'-N1'-O2'
2	A	401	JFZ	C6'-C1'-O1-C1
2	C	401	JFZ	C2'-C1'-O1-C1
2	C	401	JFZ	C6'-C1'-O1-C1
2	G	401	JFZ	C6'-C1'-O1-C1
2	E	401	JFZ	C6'-C1'-O1-C1
2	A	401	JFZ	C2'-C1'-O1-C1
2	E	401	JFZ	C2'-C1'-O1-C1
2	F	401	JFZ	C6'-C1'-O1-C1
2	F	401	JFZ	C2'-C1'-O1-C1

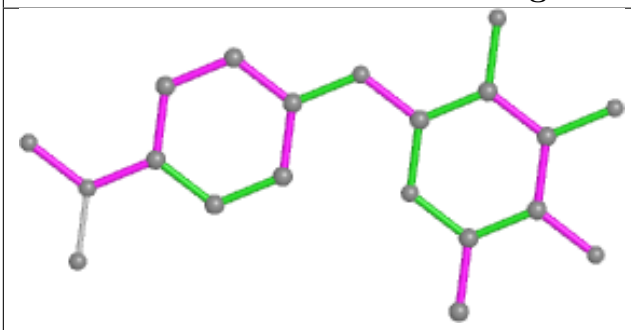
There are no ring outliers.

No monomer is involved in short contacts.

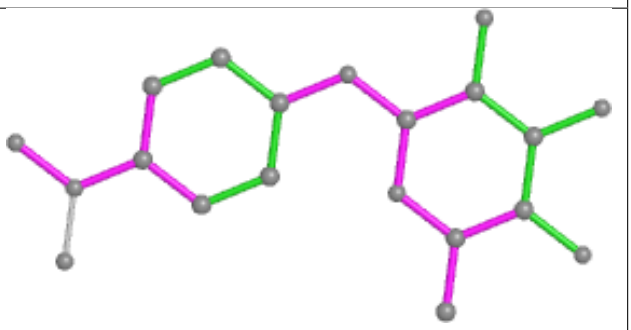
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

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 then 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.

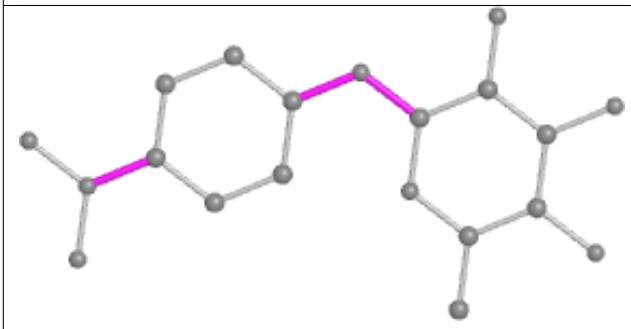
Ligand JFZ A 401



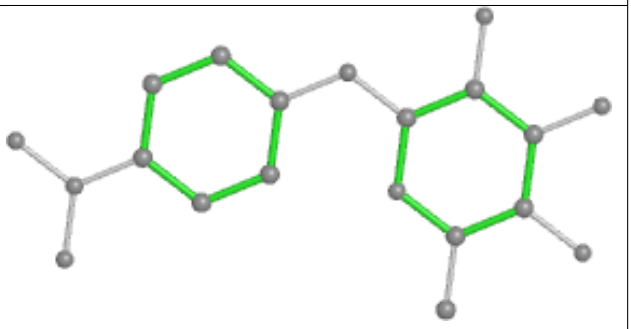
Bond lengths



Bond angles

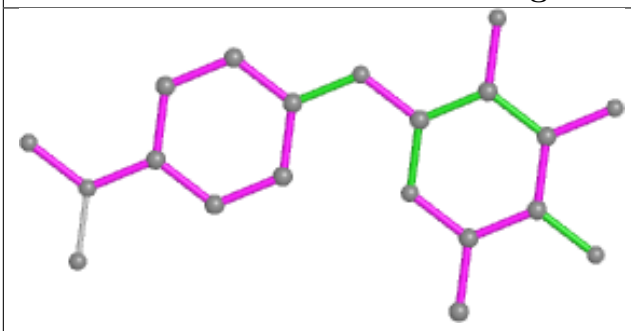


Torsions

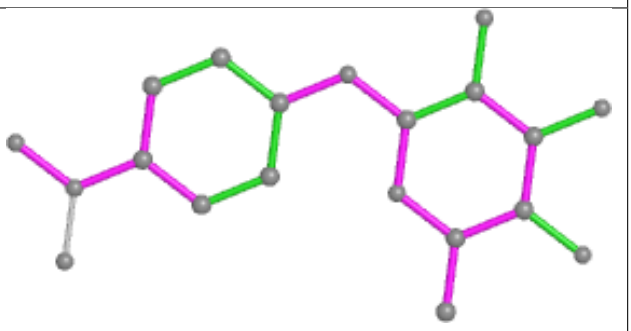


Rings

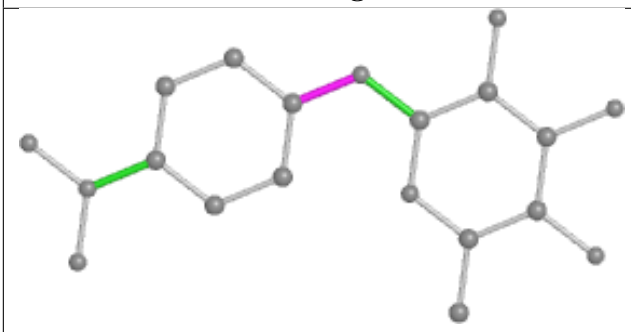
Ligand JFZ C 401



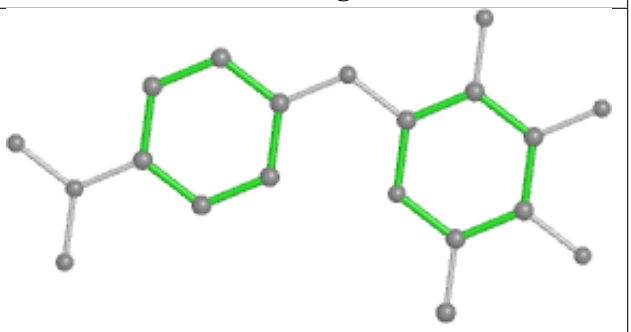
Bond lengths



Bond angles

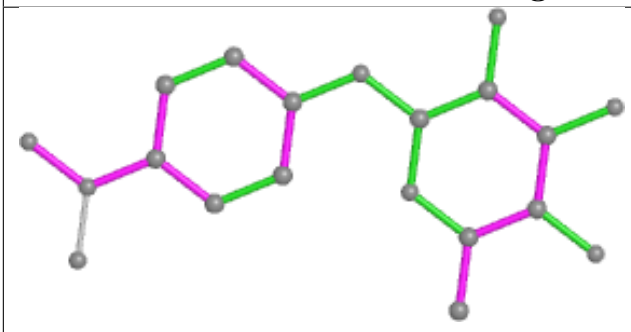


Torsions

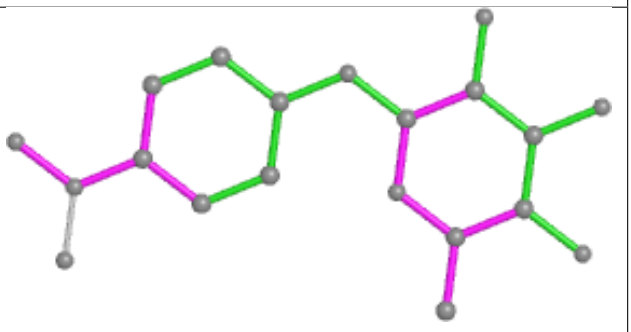


Rings

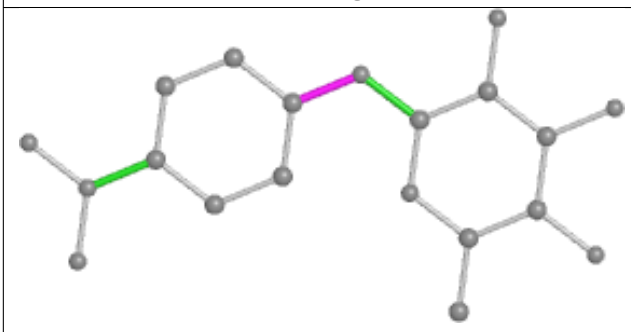
Ligand JFZ D 401



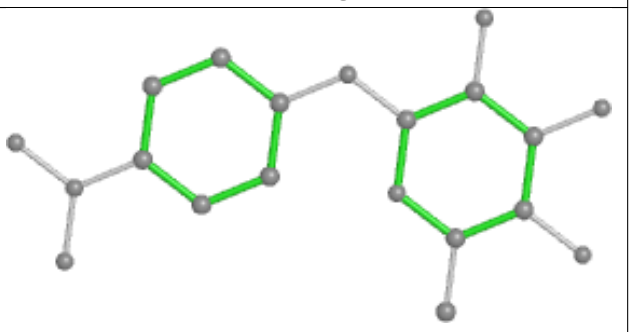
Bond lengths



Bond angles

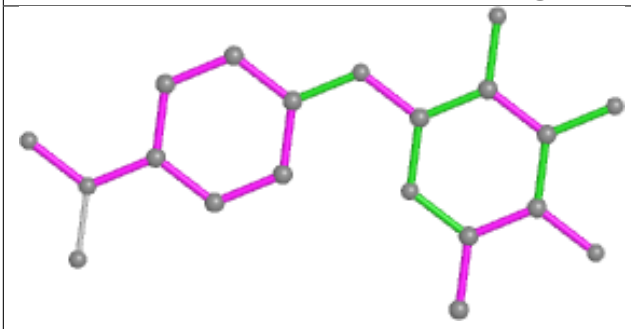


Torsions

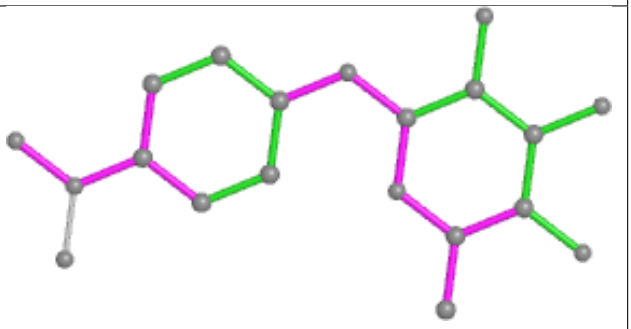


Rings

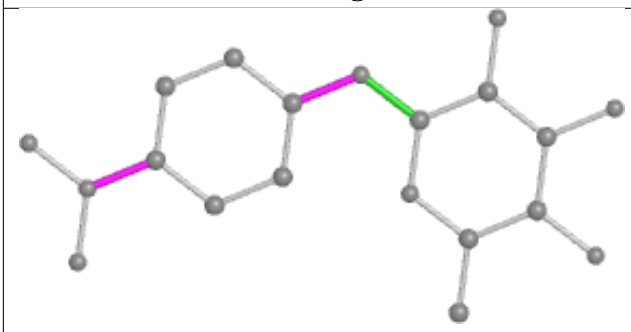
Ligand JFZ E 401



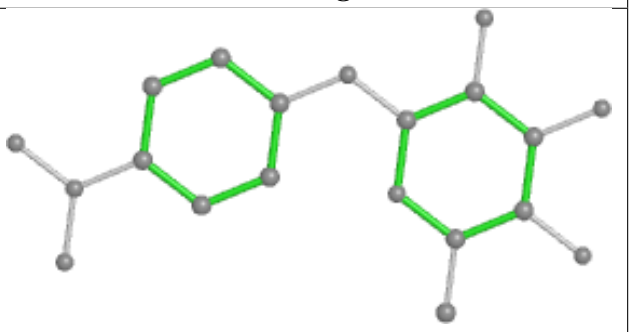
Bond lengths



Bond angles

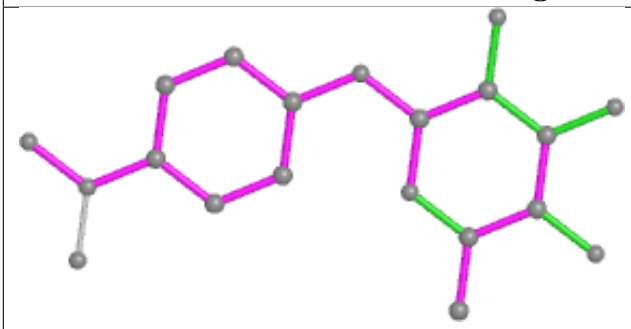


Torsions

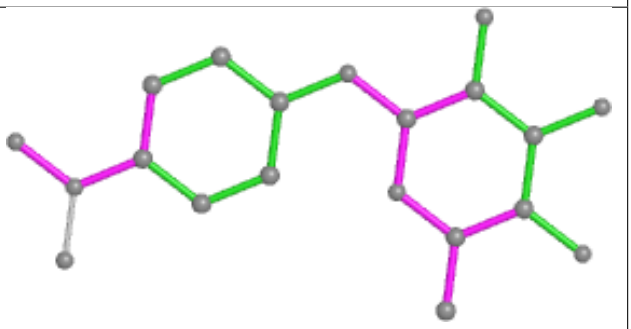


Rings

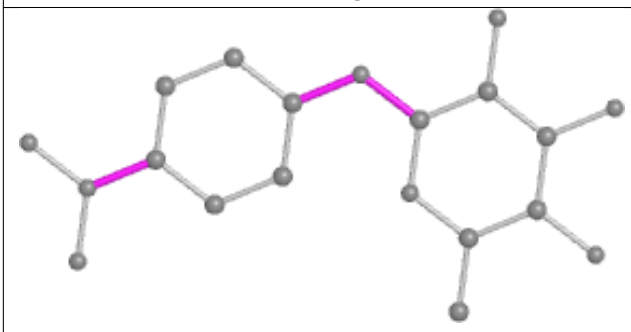
Ligand JFZ F 401



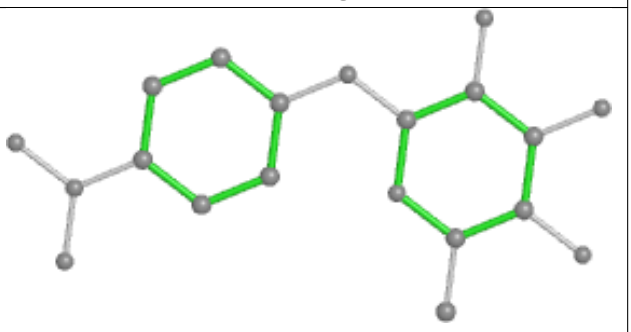
Bond lengths



Bond angles

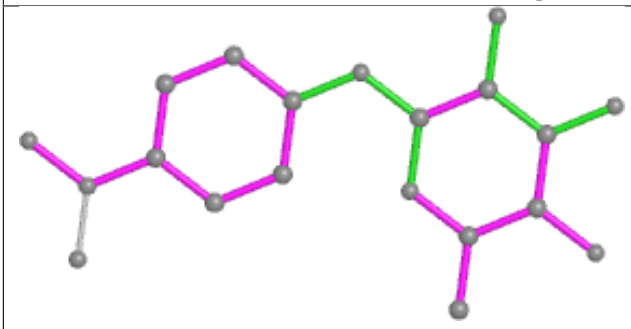


Torsions

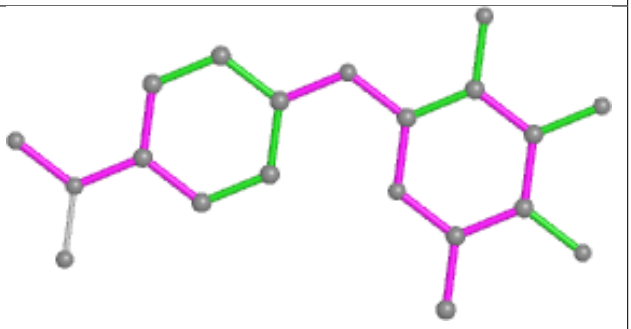


Rings

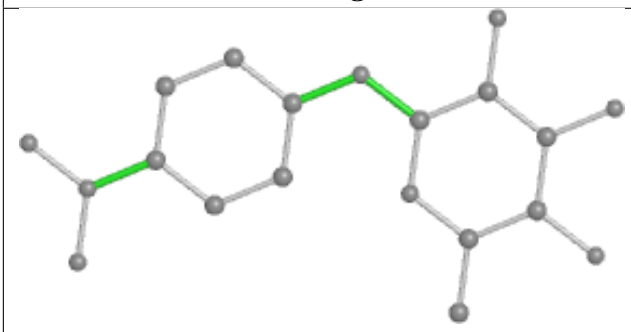
Ligand JFZ B 401



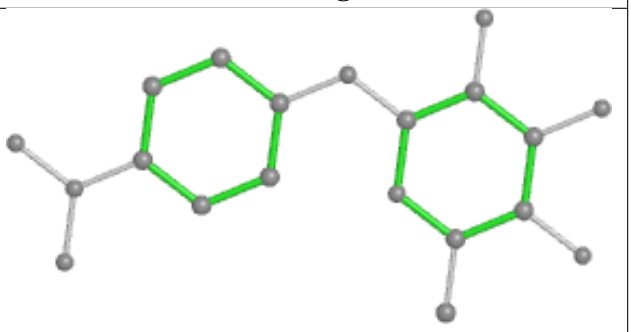
Bond lengths



Bond angles

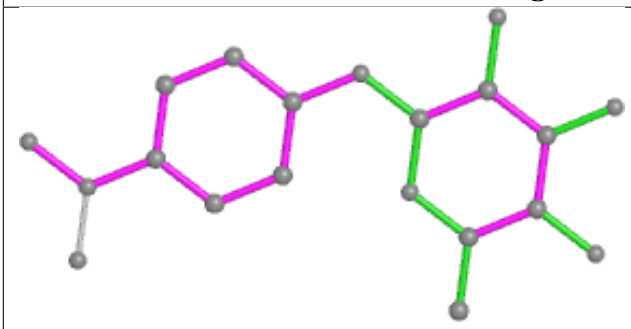


Torsions

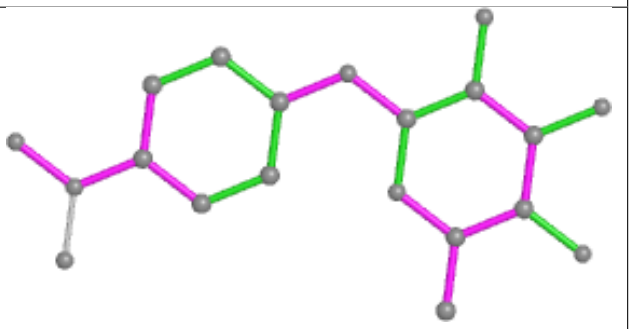


Rings

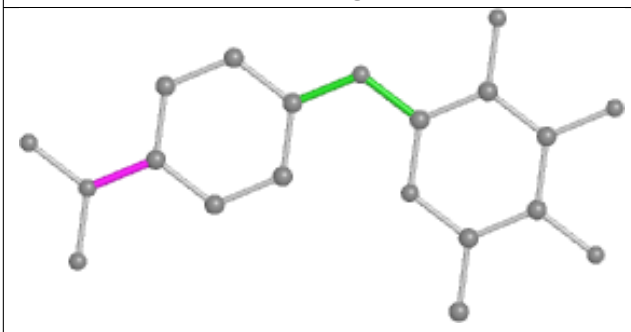
Ligand JFZ H 401



Bond lengths



Bond angles



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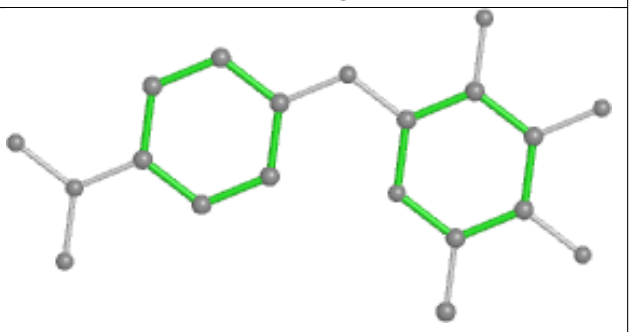
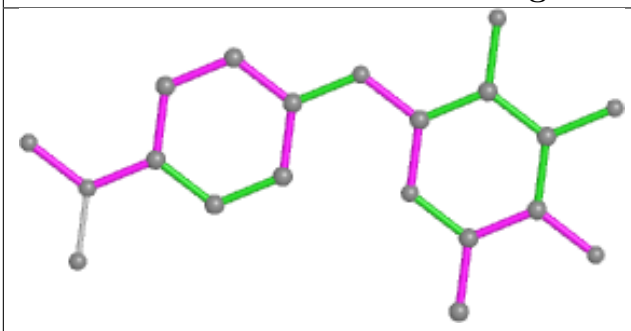
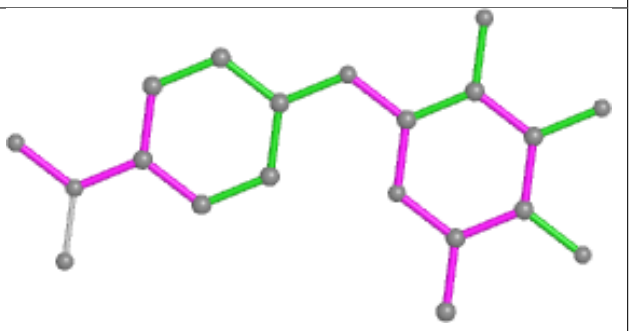


Rings

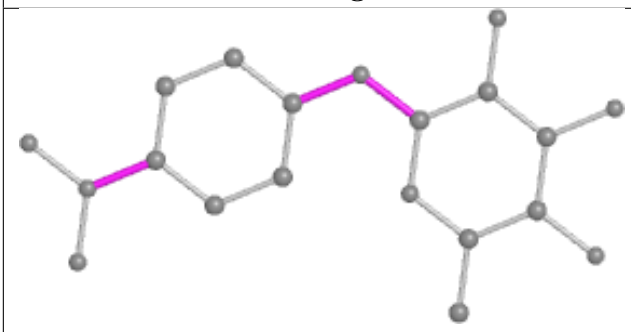
Ligand JFZ G 401



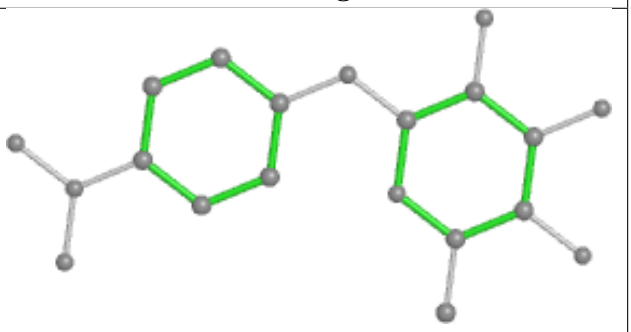
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

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, 95^{th} 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	328/345 (95%)	-0.15	2 (0%)	89	88	50, 65, 89, 110	0
1	B	323/345 (93%)	0.00	7 (2%)	62	56	48, 67, 99, 119	0
1	C	324/345 (93%)	0.08	12 (3%)	41	34	50, 71, 101, 127	0
1	D	328/345 (95%)	-0.05	4 (1%)	79	76	52, 73, 102, 117	0
1	E	322/345 (93%)	-0.01	6 (1%)	66	62	59, 79, 108, 125	0
1	F	321/345 (93%)	-0.09	6 (1%)	66	62	52, 81, 115, 129	0
1	G	322/345 (93%)	0.03	6 (1%)	66	62	58, 84, 117, 133	0
1	H	316/345 (91%)	0.13	17 (5%)	25	20	56, 86, 124, 139	0
All	All	2584/2760 (93%)	-0.01	60 (2%)	60	54	48, 74, 113, 139	0

All (60) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	345	LEU	7.0
1	C	246	PRO	5.0
1	B	267	PRO	5.0
1	G	267	PRO	4.4
1	B	269	PRO	4.0
1	H	158	TRP	3.7
1	B	245	ILE	3.5
1	C	270	LEU	3.4
1	B	246	PRO	3.4
1	H	150	ASP	3.4
1	E	166	ASP	3.4
1	H	151	VAL	3.4
1	H	345	LEU	3.4
1	C	151	VAL	3.2
1	F	4	ASN	3.2
1	H	237	PHE	3.1

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Mol	Chain	Res	Type	RSRZ
1	F	151	VAL	3.1
1	H	310	ILE	2.9
1	G	246	PRO	2.9
1	F	273	TYR	2.8
1	C	267	PRO	2.8
1	B	201	VAL	2.8
1	G	269	PRO	2.8
1	H	241	GLY	2.7
1	C	230	LEU	2.7
1	E	146	TYR	2.7
1	F	150	ASP	2.7
1	H	269	PRO	2.7
1	G	308	PHE	2.7
1	F	158	TRP	2.7
1	C	150	ASP	2.7
1	H	270	LEU	2.7
1	C	269	PRO	2.6
1	D	150	ASP	2.6
1	C	148	SER	2.5
1	H	242	ASP	2.5
1	H	207	GLU	2.4
1	D	345	LEU	2.3
1	H	168	ASP	2.3
1	H	172	PHE	2.3
1	F	246	PRO	2.3
1	H	161	SER	2.3
1	E	168	ASP	2.3
1	B	148	SER	2.3
1	H	267	PRO	2.2
1	G	307	ASP	2.2
1	D	248	ASN	2.2
1	D	124	ALA	2.1
1	C	172	PHE	2.1
1	C	207	GLU	2.1
1	A	17	ILE	2.1
1	E	151	VAL	2.1
1	E	269	PRO	2.1
1	H	243	ASN	2.1
1	E	95	HIS	2.1
1	A	150	ASP	2.1
1	B	151	VAL	2.0
1	H	198	TRP	2.0

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Mol	Chain	Res	Type	RSRZ
1	G	201	VAL	2.0
1	C	146	TYR	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

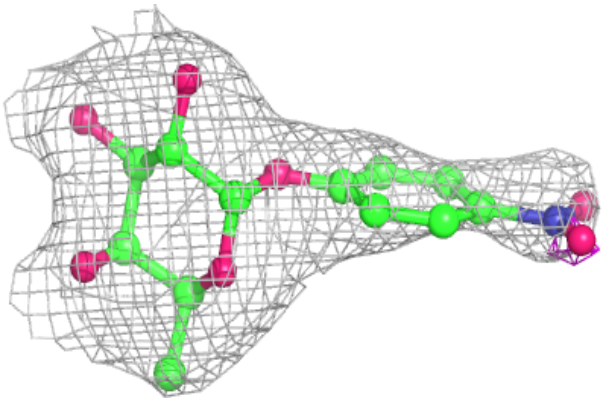
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

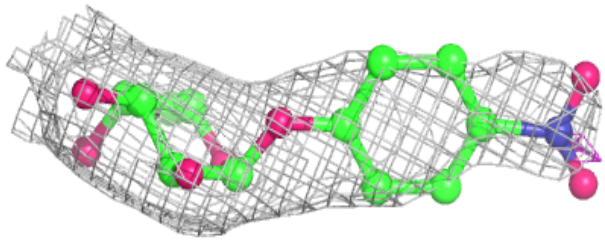
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	JFZ	B	401	20/20	0.84	0.28	50,58,92,95	0
2	JFZ	A	401	20/20	0.87	0.24	50,58,90,91	0
2	JFZ	G	401	20/20	0.87	0.20	59,69,105,107	0
2	JFZ	F	401	20/20	0.88	0.17	72,80,116,122	0
2	JFZ	H	401	20/20	0.88	0.24	81,87,111,111	0
2	JFZ	D	401	20/20	0.92	0.19	57,62,109,110	0
2	JFZ	C	401	20/20	0.92	0.22	55,60,91,96	0
2	JFZ	E	401	20/20	0.93	0.17	58,65,105,112	0

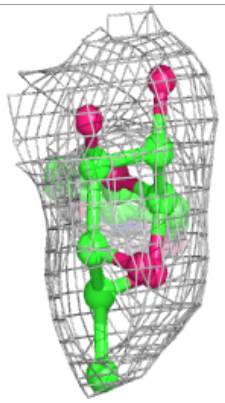
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around JFZ B 401:

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

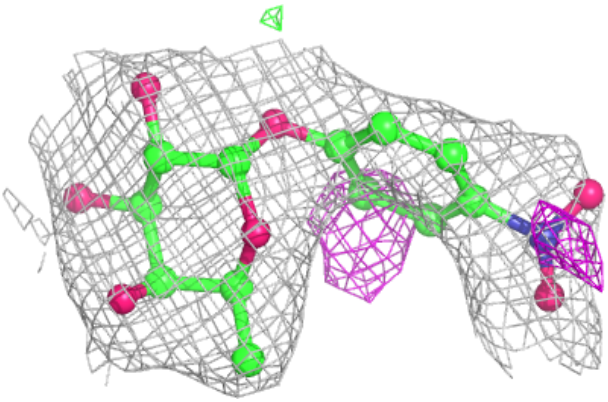


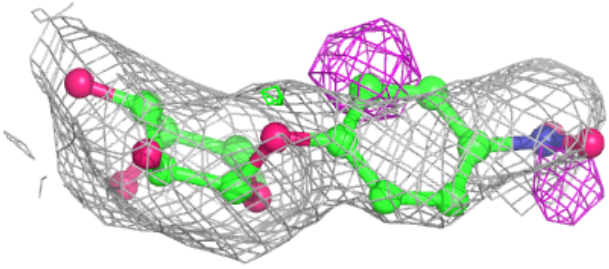


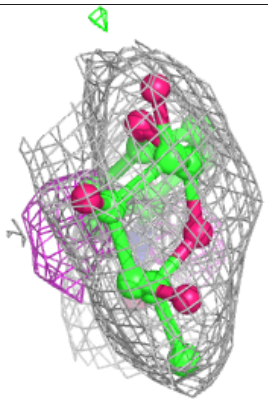


Electron density around JFZ A 401:

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

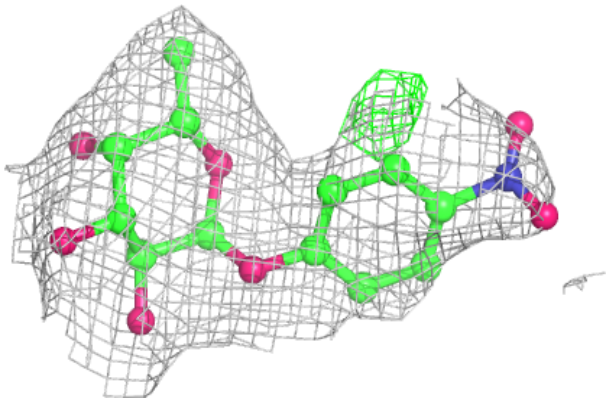


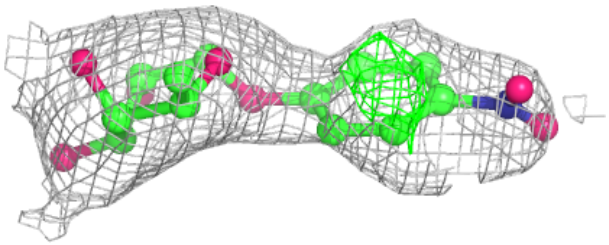


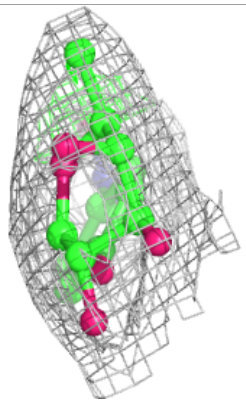


Electron density around JFZ G 401:

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

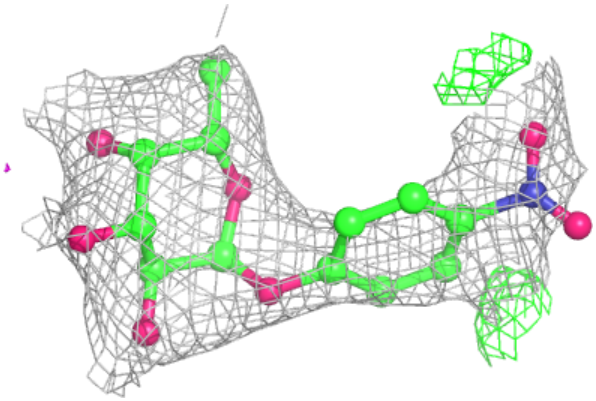


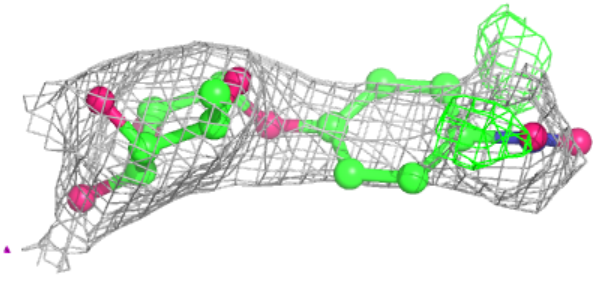


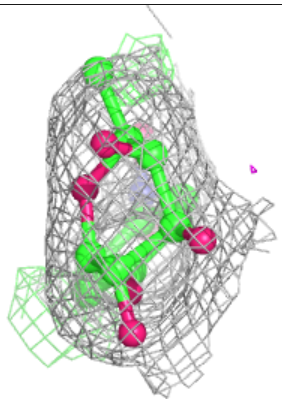


Electron density around JFZ F 401:

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

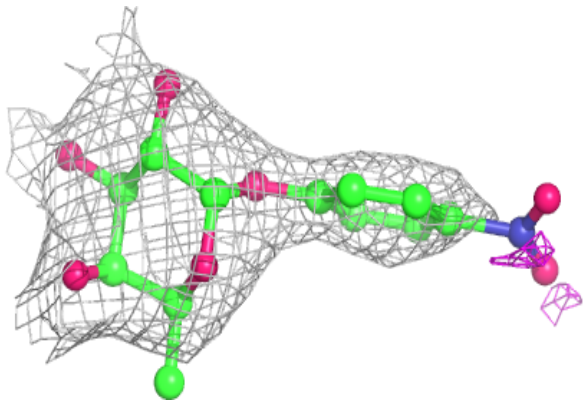


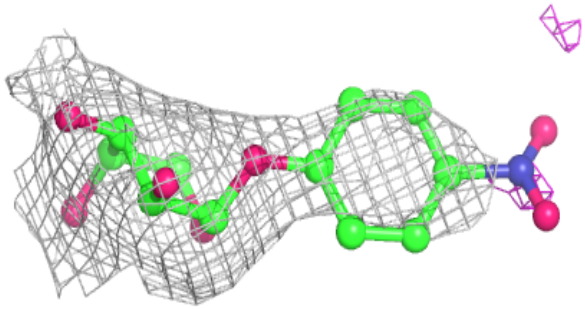


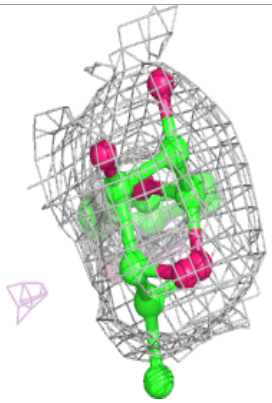


Electron density around JFZ H 401:

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

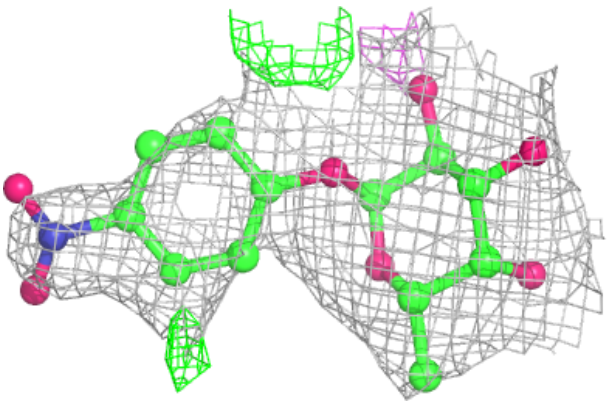


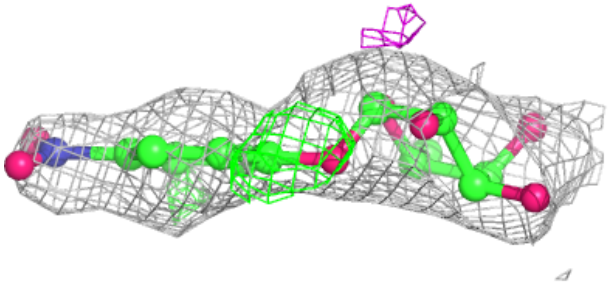


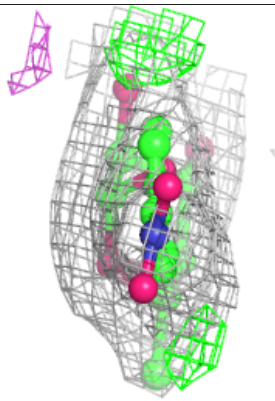


Electron density around JFZ D 401:

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

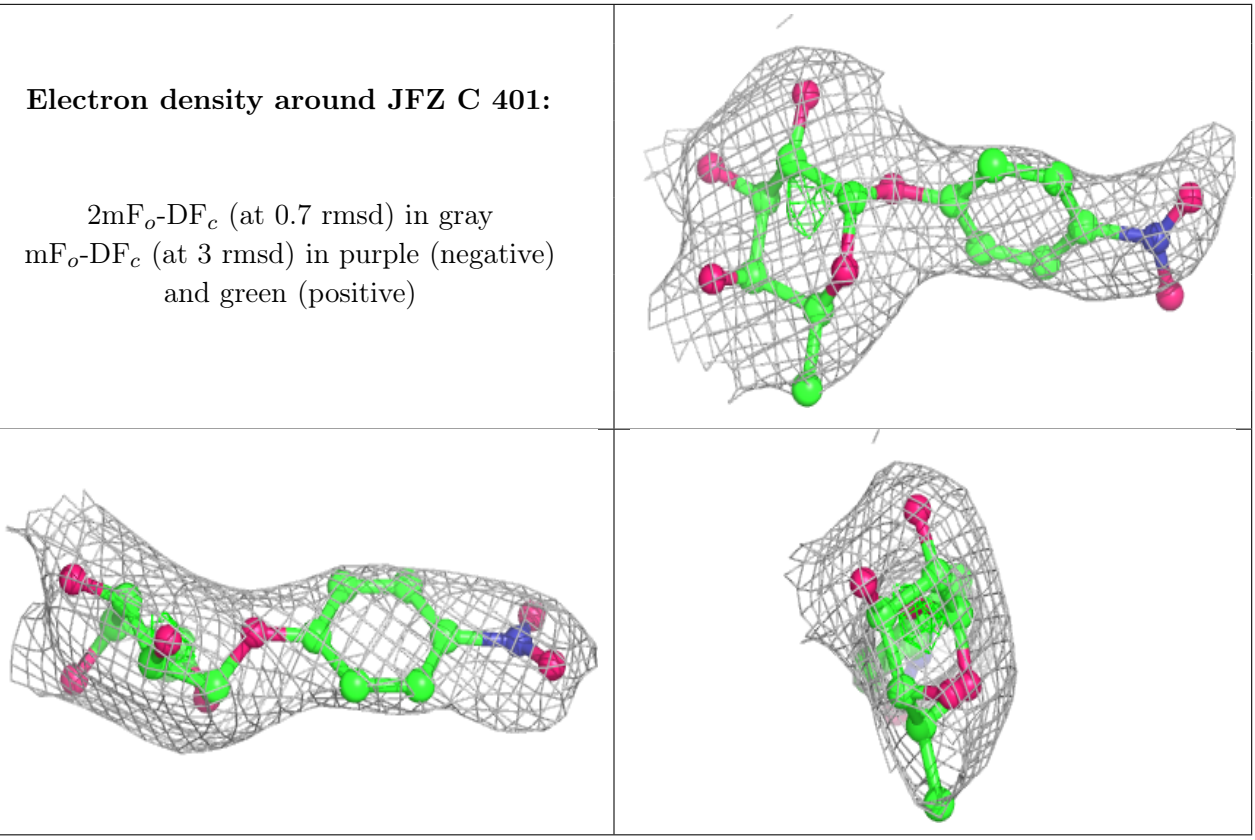






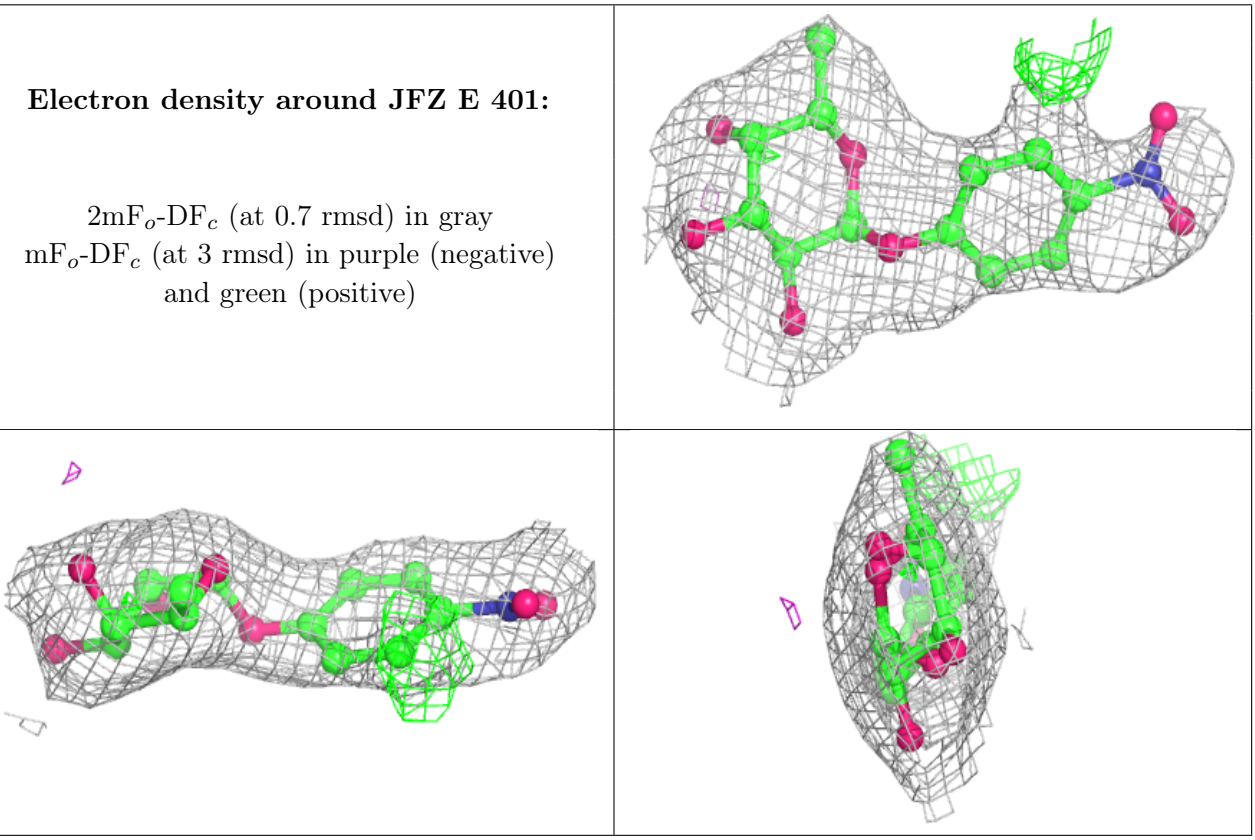
Electron density around JFZ C 401:

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



Electron density around JFZ E 401:

$2mF_o$-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.