Full wwPDB X-ray Structure Validation Report (i)

Dec 9, 2023 – 12:45 pm GMT

PDB ID	:	1W8Y
Title	:	Crystal structure of the nitrocefin acyl-DD-peptidase from Actinomadura R39.
Authors	:	Sauvage, E.; Herman, R.; Petrella, S.; Duez, C.; Frere, J.M.; Charlier, P.
Deposited on	:	2004-10-01
Resolution	:	2.40 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

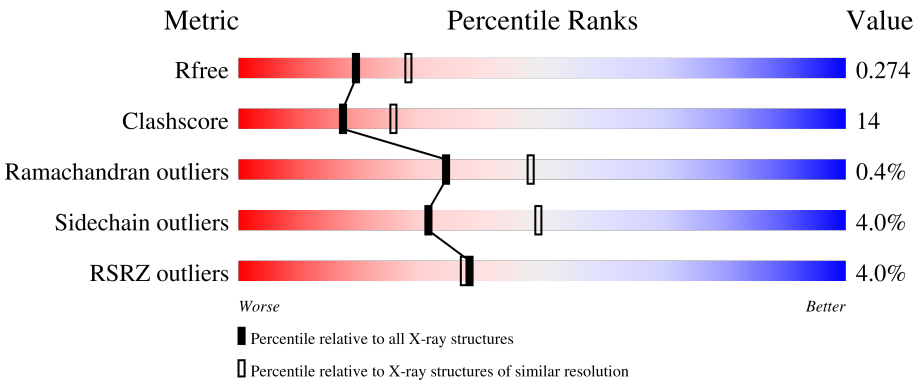
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.40 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	489	6% 64% 29% • •
1	B	489	2% 68% 26% • 5%
1	C	489	3% 65% 29% • 5%
1	D	489	3% 73% 21% • •

2 Entry composition (i)

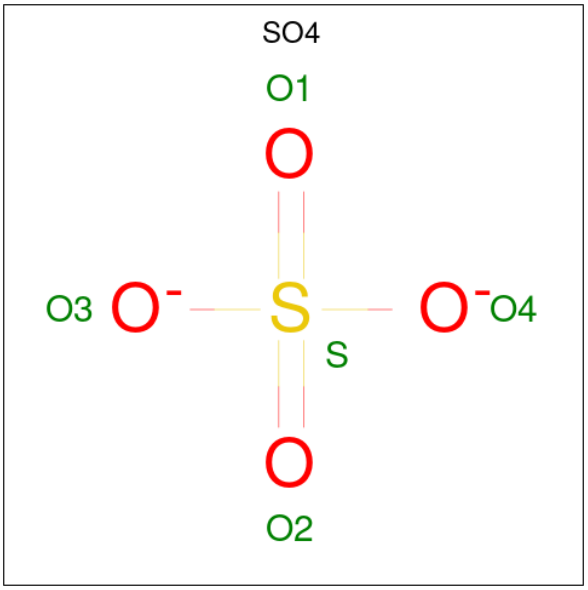
There are 5 unique types of molecules in this entry. The entry contains 14391 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 D-alanyl-D-alanine carboxypeptidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	467	3353	2076	565	706	6	0	0	1
1	B	466	3344	2071	564	703	6	0	0	1
1	C	466	3344	2071	564	703	6	0	0	1
1	D	467	3353	2076	565	706	6	0	0	1

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

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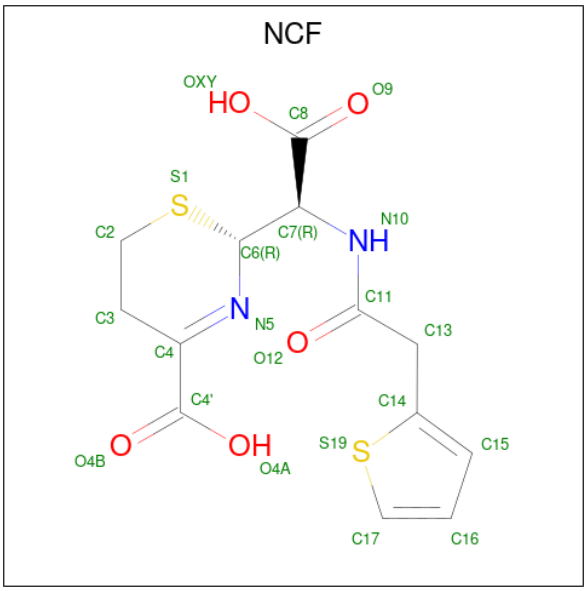
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	O	S		
2	A	1	5	4	1	0	0
			Total	O	S		
2	A	1	5	4	1	0	0
			Total	O	S		
2	B	1	5	4	1	0	0
			Total	O	S		
2	B	1	5	4	1	0	0
			Total	O	S		
2	B	1	5	4	1	0	0
			Total	O	S		
2	B	1	5	4	1	0	0
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	C	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0
			Total	O	S		
2	D	1	5	4	1	0	0

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
3	A	2	2	2	0	0
			Total	Mg		
3	D	2	2	2	0	0

- Molecule 4 is (2R)-2-{(1R)-2-OXO-1-[(2-THIENYLACETYL)AMINO]ETHYL}-5,6-DIHYDRO-2H-1,3-THIAZINE-4-CARBOXYLIC ACID (three-letter code: NCF) (formula: $C_{13}H_{14}N_2O_5S_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
4	A	1	21	13	2	4	2	0	0
			Total	C	N	O	S		
4	B	1	21	13	2	4	2	0	0
			Total	C	N	O	S		
4	C	1	21	13	2	4	2	0	0
			Total	C	N	O	S		
4	D	1	21	13	2	4	2	0	0

- Molecule 5 is water.

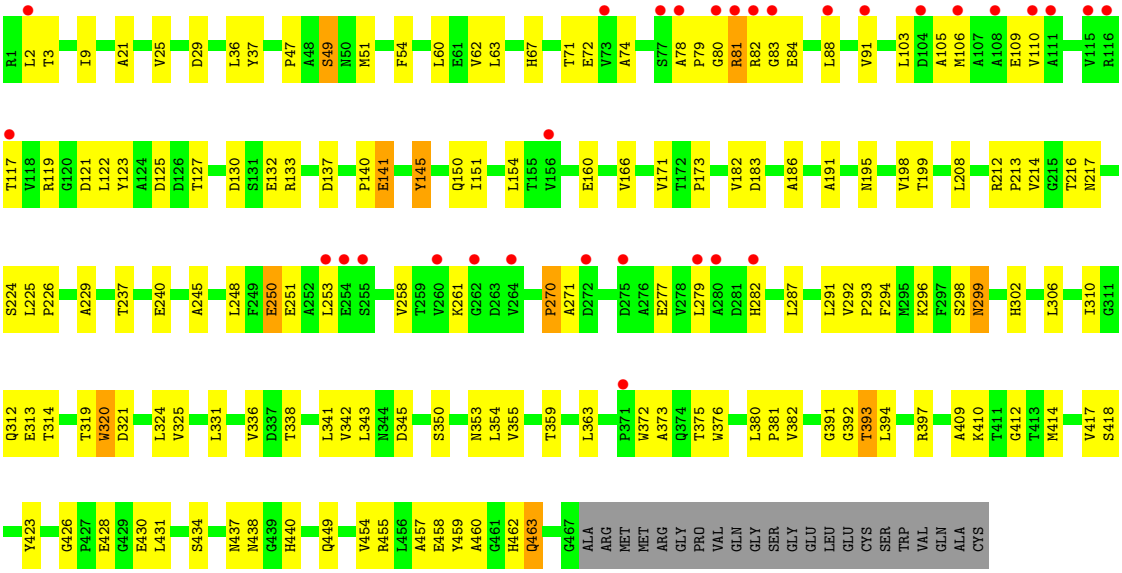
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	191	191	191	0	0
			Total	O		
5	B	222	222	222	0	0
			Total	O		
5	C	198	198	198	0	0
			Total	O		
5	D	218	218	218	0	0

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.

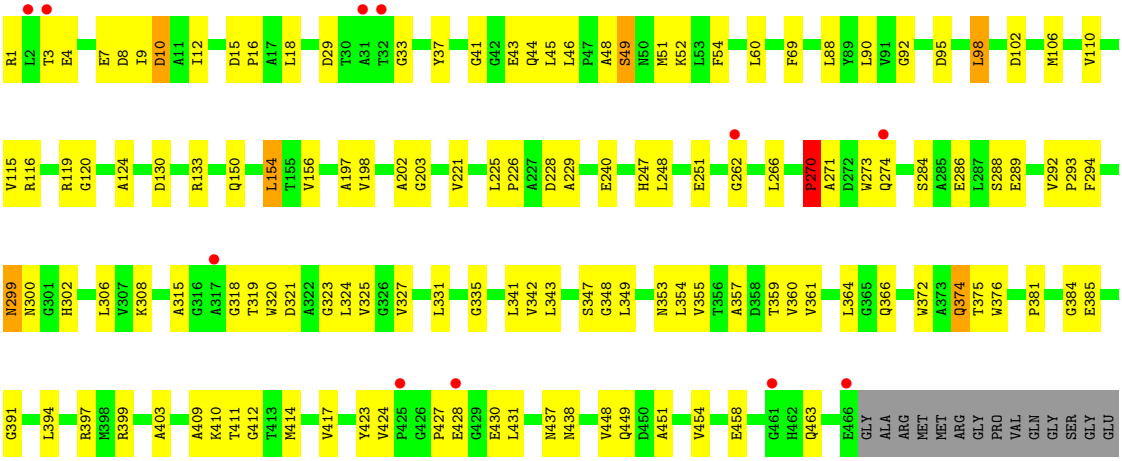
- Molecule 1: D-alanyl-D-alanine carboxypeptidase

Chain A:



- Molecule 1: D-alanyl-D-alanine carboxypeptidase

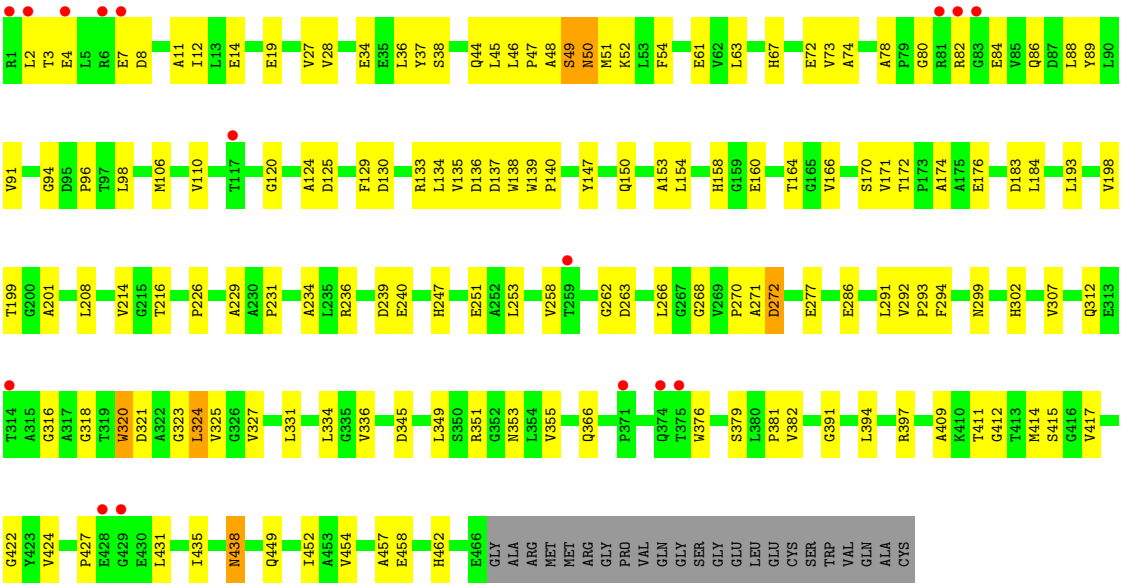
Chain B:



LEU GLU CYS SER TRP VAL GLN ALA CYS

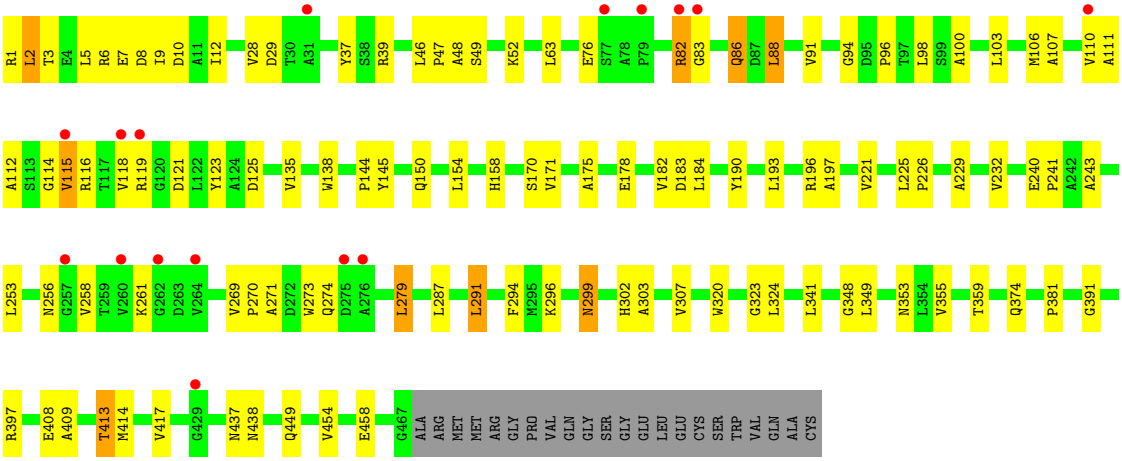
• Molecule 1: D-alanyl-D-alanine carboxypeptidase

Chain C:



• Molecule 1: D-alanyl-D-alanine carboxypeptidase

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	103.49Å 94.36Å 107.20Å 90.00° 94.58° 90.00°	Depositor
Resolution (Å)	19.94 – 2.40 40.66 – 2.40	Depositor EDS
% Data completeness (in resolution range)	86.3 (19.94-2.40) 86.5 (40.66-2.40)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.21 (at 2.39Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.220 , 0.277 0.216 , 0.274	Depositor DCC
R_{free} test set	3534 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	35.0	Xtriage
Anisotropy	0.542	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 54.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	0.028 for l,-k,h	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	14391	wwPDB-VP
Average B, all atoms (Å^2)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.73% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: NCF, SO4, MG

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	0.42	1/3412 (0.0%)	0.63	0/4668
1	B	0.42	1/3403 (0.0%)	0.63	0/4656
1	C	0.40	1/3403 (0.0%)	0.63	0/4656
1	D	0.44	1/3412 (0.0%)	0.65	0/4668
All	All	0.42	4/13630 (0.0%)	0.64	0/18648

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	49	SER	CB-OG	-12.35	1.26	1.42
1	D	49	SER	CB-OG	-11.99	1.26	1.42
1	C	49	SER	CB-OG	-11.92	1.26	1.42
1	A	49	SER	CB-OG	-11.86	1.26	1.42

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	145	TYR	Sidechain

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	3353	0	3200	114	0
1	B	3344	0	3194	87	0
1	C	3344	0	3194	91	0
1	D	3353	0	3200	76	0
2	A	20	0	0	2	0
2	B	20	0	0	0	0
2	C	20	0	0	1	0
2	D	20	0	0	0	0
3	A	2	0	0	0	0
3	D	2	0	0	0	0
4	A	21	0	12	1	0
4	B	21	0	12	0	0
4	C	21	0	12	1	0
4	D	21	0	12	1	0
5	A	191	0	0	7	0
5	B	222	0	0	8	0
5	C	198	0	0	6	0
5	D	218	0	0	5	0
All	All	14391	0	12836	366	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 14.

All (366) 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:226:PRO:HG2	1:A:229:ALA:HB2	1.26	1.16
1:B:226:PRO:HB3	5:B:2126:HOH:O	1.60	1.00
1:C:226:PRO:HG2	1:C:229:ALA:HB2	1.47	0.95
1:D:150:GLN:HE22	1:D:240:GLU:H	1.25	0.84
1:A:80:GLY:HA3	1:B:315:ALA:HA	1.59	0.84
1:B:1:ARG:HB3	1:B:4:GLU:HG3	1.62	0.82
1:A:2:LEU:HG	1:A:459:TYR:OH	1.81	0.81
1:B:124:ALA:HB3	1:B:266:LEU:HD23	1.65	0.78
1:D:144:PRO:HG2	1:D:145:TYR:CE1	2.19	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:299:ASN:HD22	1:A:302:HIS:H	1.31	0.77
1:D:150:GLN:NE2	1:D:240:GLU:H	1.85	0.74
1:B:454:VAL:O	1:B:458:GLU:HG3	1.89	0.73
1:C:394:LEU:HD11	1:C:411:THR:HG23	1.70	0.72
1:B:12:ILE:HG22	1:B:448:VAL:HG13	1.72	0.71
1:C:2:LEU:HD23	1:C:2:LEU:O	1.91	0.70
1:B:15:ASP:OD1	1:B:16:PRO:HD2	1.92	0.70
1:B:343:LEU:N	1:B:343:LEU:HD12	2.07	0.70
1:B:288:SER:HB2	1:B:375:THR:HG21	1.72	0.70
1:A:2:LEU:HD21	1:A:36:LEU:HD22	1.74	0.69
1:A:106:MET:O	1:A:110:VAL:HG23	1.93	0.69
1:A:397:ARG:HH12	1:A:449:GLN:HE21	1.40	0.69
1:A:414:MET:HB3	1:A:417:VAL:HB	1.75	0.69
1:B:397:ARG:HH12	1:B:449:GLN:HE21	1.41	0.68
1:C:253:LEU:HB3	1:C:258:VAL:HB	1.75	0.67
1:A:150:GLN:NE2	1:A:240:GLU:H	1.93	0.67
1:C:381:PRO:HB2	1:C:394:LEU:HD13	1.77	0.66
1:A:341:LEU:HG	1:A:359:THR:HG21	1.76	0.66
1:B:414:MET:HG2	1:B:417:VAL:HB	1.78	0.66
1:C:51:MET:HE2	1:C:353:ASN:HB3	1.78	0.66
1:A:125:ASP:OD2	1:A:127:THR:HG23	1.96	0.65
1:A:454:VAL:O	1:A:458:GLU:HG3	1.95	0.65
1:B:119:ARG:HG2	1:B:119:ARG:HH11	1.61	0.65
1:B:90:LEU:HG	1:B:154:LEU:HD11	1.78	0.65
1:D:83:GLY:HA3	1:D:116:ARG:HB3	1.79	0.65
1:C:129:PHE:HB2	1:C:153:ALA:HB2	1.79	0.65
1:A:426:GLY:HA3	1:A:460:ALA:HB1	1.78	0.65
1:C:49:SER:HB2	1:C:412:GLY:HA2	1.78	0.64
1:A:62:VAL:HG11	1:A:310:ILE:HG23	1.79	0.64
1:B:92:GLY:HA3	1:B:154:LEU:HG	1.81	0.63
1:A:298:SER:HG	1:A:410:LYS:HZ1	1.43	0.63
1:C:351:ARG:HH12	1:C:415:SER:HB2	1.63	0.63
1:A:82:ARG:HB2	1:A:84:GLU:HG3	1.81	0.62
1:D:115:VAL:HG12	1:D:258:VAL:HG13	1.81	0.62
1:A:341:LEU:CD2	1:A:355:VAL:HG12	2.30	0.62
1:A:49:SER:HB2	1:A:412:GLY:HA2	1.82	0.61
1:A:51:MET:HE2	1:A:353:ASN:HB3	1.81	0.61
1:B:397:ARG:HH12	1:B:449:GLN:NE2	1.97	0.61
1:C:8:ASP:O	1:C:12:ILE:HG13	1.99	0.61
1:D:52:LYS:HD3	1:D:294:PHE:CE2	2.36	0.61
1:A:119:ARG:CZ	1:A:261:LYS:HE3	2.32	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:282:HIS:HA	2:A:501:SO4:O1	2.00	0.60
1:B:156:VAL:HG21	1:B:248:LEU:HD12	1.83	0.60
1:C:270:PRO:C	1:C:272:ASP:H	2.05	0.60
1:C:106:MET:O	1:C:110:VAL:HG23	2.01	0.60
1:C:124:ALA:HB3	1:C:266:LEU:HD23	1.82	0.60
1:C:45:LEU:HD22	1:C:438:ASN:HB2	1.85	0.59
1:D:86:GLN:O	1:D:118:VAL:HG13	2.03	0.59
1:B:197:ALA:HB2	1:B:221:VAL:HG12	1.84	0.59
1:C:414:MET:HB2	1:C:417:VAL:HB	1.84	0.59
1:A:198:VAL:CG1	1:A:224:SER:HB3	2.33	0.58
1:C:46:LEU:HD13	1:C:353:ASN:O	2.03	0.58
1:C:351:ARG:NH1	1:C:415:SER:HB2	2.18	0.58
1:C:198:VAL:HG22	1:C:199:THR:N	2.19	0.58
1:A:154:LEU:CD1	1:A:245:ALA:HB3	2.33	0.58
1:A:198:VAL:HG22	1:A:199:THR:N	2.19	0.58
1:B:49:SER:HB2	1:B:412:GLY:HA2	1.85	0.57
1:B:424:VAL:HB	1:B:431:LEU:HB2	1.87	0.57
1:A:79:PRO:HB2	1:A:83:GLY:HA2	1.87	0.57
1:D:397:ARG:HH12	1:D:449:GLN:HE21	1.52	0.57
1:C:424:VAL:HB	1:C:431:LEU:HB2	1.86	0.57
1:C:382:VAL:O	1:C:391:GLY:HA2	2.05	0.57
1:D:1:ARG:HG2	5:D:2001:HOH:O	2.04	0.56
1:A:78:ALA:HB1	1:A:79:PRO:HD2	1.86	0.56
1:A:150:GLN:HE22	1:A:240:GLU:H	1.52	0.56
1:B:299:ASN:ND2	1:B:302:HIS:H	2.03	0.56
1:A:74:ALA:O	1:A:88:LEU:HD23	2.06	0.56
1:B:203:GLY:N	5:B:2126:HOH:O	2.39	0.56
1:C:11:ALA:O	1:C:14:GLU:HB2	2.06	0.55
1:B:106:MET:O	1:B:110:VAL:HG23	2.07	0.55
1:D:170:SER:HA	1:D:232:VAL:O	2.06	0.55
1:B:45:LEU:HB3	1:B:438:ASN:OD1	2.06	0.55
1:A:292:VAL:HB	1:A:293:PRO:CD	2.36	0.55
1:B:226:PRO:HB2	1:B:229:ALA:HB2	1.89	0.55
1:C:336:VAL:HG22	1:C:366:GLN:HG3	1.87	0.55
1:D:8:ASP:O	1:D:12:ILE:HG13	2.07	0.55
1:A:182:VAL:HG23	1:A:195:ASN:ND2	2.22	0.55
1:D:197:ALA:HB2	1:D:221:VAL:HG12	1.87	0.55
1:A:88:LEU:HD21	1:A:279:LEU:HD12	1.88	0.55
1:D:225:LEU:HD12	1:D:226:PRO:HD2	1.89	0.55
1:D:107:ALA:HB3	1:D:256:ASN:HD22	1.72	0.55
1:C:34:GLU:HB2	5:C:2011:HOH:O	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:176:GLU:HG3	1:C:201:ALA:HA	1.88	0.54
1:C:47:PRO:O	1:C:50:ASN:HB2	2.07	0.54
1:D:226:PRO:HB2	1:D:229:ALA:HB2	1.89	0.54
1:C:172:THR:HG22	1:C:231:PRO:HB3	1.90	0.54
1:D:2:LEU:HD22	1:D:6:ARG:HE	1.73	0.54
1:A:198:VAL:HG13	1:A:224:SER:HB3	1.89	0.54
1:D:107:ALA:HB3	1:D:256:ASN:ND2	2.23	0.54
1:A:321:ASP:O	1:A:325:VAL:HG23	2.07	0.54
1:C:158:HIS:HD2	5:C:2197:HOH:O	1.91	0.54
1:C:307:VAL:HG11	1:C:324:LEU:HD13	1.90	0.54
1:A:324:LEU:HD12	1:A:343:LEU:HB3	1.89	0.53
1:A:381:PRO:HD2	1:A:409:ALA:O	2.08	0.53
1:B:299:ASN:HD22	1:B:299:ASN:C	2.12	0.53
1:C:73:VAL:HG12	1:C:88:LEU:HD11	1.91	0.53
1:C:78:ALA:HB2	1:C:277:GLU:OE2	2.09	0.53
1:D:381:PRO:O	1:D:408:GLU:HA	2.07	0.53
1:C:44:GLN:HA	1:C:355:VAL:O	2.09	0.53
1:D:28:VAL:HG12	1:D:29:ASP:N	2.23	0.53
1:D:121:ASP:HB2	1:D:123:TYR:CE1	2.44	0.52
1:A:47:PRO:HB3	1:A:355:VAL:CG2	2.39	0.52
1:A:60:LEU:HD21	1:A:291:LEU:HD11	1.91	0.52
1:C:397:ARG:HH12	1:C:449:GLN:HE21	1.56	0.52
1:A:412:GLY:O	1:A:418:SER:HA	2.10	0.52
1:A:60:LEU:HD23	1:A:287:LEU:HD23	1.91	0.52
1:C:125:ASP:CG	1:C:268:GLY:HA2	2.30	0.52
1:D:150:GLN:HE21	1:D:241:PRO:HD3	1.74	0.52
1:D:190:TYR:OH	1:D:243:ALA:HB3	2.10	0.52
1:D:437:ASN:C	1:D:438:ASN:HD22	2.14	0.51
1:A:133:ARG:HB3	1:A:150:GLN:HB3	1.91	0.51
1:B:321:ASP:O	1:B:325:VAL:HG23	2.10	0.51
1:A:373:ALA:HB3	5:A:2151:HOH:O	2.09	0.51
1:B:119:ARG:HG2	1:B:119:ARG:NH1	2.24	0.51
1:B:397:ARG:NH1	1:B:449:GLN:HE21	2.08	0.51
1:D:296:LYS:HA	1:D:381:PRO:HG3	1.92	0.51
1:A:306:LEU:O	1:A:310:ILE:HG13	2.11	0.51
1:A:191:ALA:HA	1:A:217:ASN:ND2	2.26	0.51
1:C:3:THR:O	1:C:7:GLU:HG3	2.11	0.51
1:A:299:ASN:HB3	1:A:302:HIS:HB2	1.92	0.51
1:A:299:ASN:ND2	1:A:302:HIS:H	2.06	0.51
1:B:300:ASN:OD1	1:B:347:SER:HB2	2.10	0.51
1:B:381:PRO:HD2	1:B:409:ALA:O	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:160:GLU:HG2	2:A:504:SO4:O4	2.10	0.51
1:D:94:GLY:O	1:D:96:PRO:HD3	2.11	0.51
1:A:292:VAL:HB	1:A:293:PRO:HD3	1.92	0.50
1:C:91:VAL:HG22	1:C:125:ASP:HB3	1.92	0.50
1:C:394:LEU:CD1	1:C:411:THR:HG23	2.41	0.50
1:A:186:ALA:HB1	1:A:248:LEU:HD11	1.93	0.50
1:A:248:LEU:HD23	1:A:251:GLU:OE2	2.10	0.50
1:B:427:PRO:HG2	1:B:428:GLU:H	1.76	0.50
1:D:184:LEU:HD11	1:D:193:LEU:HD13	1.93	0.50
1:A:198:VAL:HG22	1:A:199:THR:H	1.74	0.50
1:C:312:GLN:O	1:C:316:GLY:HA2	2.12	0.50
1:C:323:GLY:O	1:C:327:VAL:HG23	2.12	0.50
1:C:454:VAL:O	1:C:458:GLU:HG3	2.11	0.50
1:D:100:ALA:O	1:D:103:LEU:HB2	2.12	0.50
1:A:119:ARG:HD2	1:A:261:LYS:HG3	1.93	0.50
1:A:140:PRO:HG2	1:A:141:GLU:OE1	2.12	0.50
1:A:437:ASN:C	1:A:438:ASN:HD22	2.15	0.50
1:A:62:VAL:HG21	1:A:310:ILE:HG23	1.94	0.50
1:A:91:VAL:HG22	1:A:125:ASP:HB3	1.93	0.50
1:A:253:LEU:HB3	1:A:258:VAL:HB	1.94	0.50
1:C:82:ARG:HD3	1:C:84:GLU:OE2	2.11	0.50
1:C:270:PRO:O	1:C:271:ALA:HB3	2.12	0.49
1:A:105:ALA:O	1:A:109:GLU:HG3	2.11	0.49
1:B:381:PRO:HB2	1:B:394:LEU:HD12	1.94	0.49
1:C:435:ILE:HD13	1:C:452:ILE:HD12	1.93	0.49
1:A:345:ASP:C	1:A:345:ASP:OD1	2.51	0.49
1:C:286:GLU:HG3	5:C:2153:HOH:O	2.12	0.49
1:B:46:LEU:HD23	1:B:414:MET:HE3	1.93	0.49
1:A:414:MET:HG3	4:A:520:NCF:H15	1.93	0.49
1:A:423:TYR:HA	1:A:431:LEU:O	2.12	0.49
1:B:288:SER:CB	1:B:375:THR:HG21	2.42	0.49
1:B:51:MET:HE2	1:B:353:ASN:HB3	1.93	0.49
1:C:263:ASP:HA	5:C:2140:HOH:O	2.12	0.49
1:B:133:ARG:HG3	1:B:150:GLN:NE2	2.28	0.49
1:C:129:PHE:CB	1:C:153:ALA:HB2	2.42	0.49
1:D:88:LEU:HD21	1:D:279:LEU:HD12	1.95	0.49
1:D:270:PRO:O	1:D:271:ALA:HB3	2.11	0.49
1:C:28:VAL:HG13	1:C:34:GLU:O	2.12	0.48
1:B:60:LEU:HD13	1:B:372:TRP:CE3	2.48	0.48
1:A:428:GLU:HB2	1:A:460:ALA:C	2.32	0.48
1:B:95:ASP:OD2	1:B:284:SER:HB3	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:270:PRO:HB2	1:D:273:TRP:CD1	2.48	0.48
1:B:9:ILE:HB	1:B:37:TYR:CE2	2.48	0.48
1:C:120:GLY:O	1:C:262:GLY:HA3	2.14	0.48
1:A:226:PRO:HG2	1:A:229:ALA:CB	2.19	0.48
1:B:247:HIS:O	1:B:251:GLU:HG3	2.13	0.48
1:B:270:PRO:O	1:B:271:ALA:HB3	2.14	0.48
1:D:121:ASP:HB2	1:D:123:TYR:HE1	1.79	0.48
1:B:44:GLN:HA	1:B:355:VAL:O	2.12	0.48
1:B:48:ALA:O	1:B:348:GLY:HA3	2.14	0.48
1:D:175:ALA:HB3	1:D:178:GLU:OE1	2.14	0.48
1:C:427:PRO:HA	1:D:112:ALA:HB1	1.94	0.48
1:D:135:VAL:HB	1:D:138:TRP:CD1	2.49	0.48
1:B:343:LEU:HD12	1:B:343:LEU:H	1.77	0.48
1:C:214:VAL:O	1:C:216:THR:HG23	2.13	0.48
1:B:7:GLU:HA	1:B:10:ASP:HB2	1.95	0.48
1:B:12:ILE:HD13	1:B:451:ALA:HB1	1.96	0.48
1:A:9:ILE:HD12	1:A:37:TYR:CD2	2.49	0.48
1:A:137:ASP:OD1	1:A:350:SER:OG	2.32	0.48
1:D:270:PRO:HG2	1:D:273:TRP:CE2	2.49	0.48
1:A:151:ILE:HG22	5:A:2127:HOH:O	2.13	0.47
1:C:80:GLY:C	1:C:82:ARG:H	2.16	0.47
1:C:321:ASP:O	1:C:325:VAL:HG23	2.13	0.47
1:A:397:ARG:HH12	1:A:449:GLN:NE2	2.09	0.47
1:D:138:TRP:CZ2	1:D:349:LEU:HD12	2.49	0.47
1:B:92:GLY:CA	1:B:154:LEU:HG	2.43	0.47
1:D:414:MET:HB3	1:D:417:VAL:HB	1.96	0.47
1:B:130:ASP:OD2	1:B:319:THR:HG22	2.14	0.47
1:B:292:VAL:HB	1:B:293:PRO:CD	2.44	0.47
1:C:63:LEU:O	1:C:67:HIS:HB2	2.13	0.47
1:D:307:VAL:HG12	1:D:323:GLY:HA3	1.95	0.47
1:A:21:ALA:HB2	1:A:440:HIS:CA	2.45	0.47
1:C:133:ARG:HB3	1:C:150:GLN:HB3	1.96	0.47
1:D:303:ALA:O	1:D:307:VAL:HG23	2.14	0.47
1:A:71:THR:O	1:A:72:GLU:OE2	2.32	0.47
1:A:320:TRP:O	1:A:324:LEU:HD23	2.14	0.47
1:D:381:PRO:HB3	1:D:391:GLY:O	2.15	0.47
1:A:154:LEU:HD11	1:A:245:ALA:HB3	1.96	0.47
1:A:103:LEU:HA	1:A:106:MET:HE3	1.97	0.47
1:A:154:LEU:HD13	1:A:245:ALA:HB3	1.97	0.47
1:A:313:GLU:HG3	5:A:2132:HOH:O	2.14	0.46
1:A:29:ASP:HA	1:A:431:LEU:HD12	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:166:VAL:HG12	1:A:237:THR:HA	1.96	0.46
1:A:132:GLU:HG2	1:A:320:TRP:HZ3	1.81	0.46
1:B:133:ARG:HB3	1:B:150:GLN:HB3	1.97	0.46
1:B:202:ALA:HA	1:B:228:ASP:OD1	2.15	0.46
1:B:360:VAL:O	1:B:364:LEU:HG	2.15	0.46
1:C:184:LEU:HD21	1:C:193:LEU:HD13	1.97	0.46
1:A:119:ARG:NH1	1:A:261:LYS:HE3	2.30	0.46
1:A:291:LEU:O	1:A:294:PHE:HB3	2.16	0.46
1:B:410:LYS:NZ	1:B:411:THR:O	2.47	0.46
1:D:76:GLU:OE2	1:D:76:GLU:HA	2.15	0.46
1:A:382:VAL:O	1:A:391:GLY:HA2	2.15	0.46
1:C:164:THR:O	1:C:166:VAL:HG13	2.16	0.46
1:A:298:SER:N	5:A:2125:HOH:O	2.49	0.46
1:D:3:THR:O	1:D:7:GLU:HG3	2.15	0.46
1:D:82:ARG:HD3	1:D:82:ARG:N	2.31	0.46
1:B:69:PHE:HA	5:B:2030:HOH:O	2.15	0.45
1:C:171:VAL:HG11	1:C:208:LEU:HD21	1.99	0.45
1:C:381:PRO:CB	1:C:394:LEU:HD13	2.44	0.45
1:C:129:PHE:CG	1:C:153:ALA:HB2	2.51	0.45
1:C:234:ALA:HB1	1:C:236:ARG:HH12	1.81	0.45
1:D:119:ARG:NH1	1:D:261:LYS:HE3	2.32	0.45
1:C:89:TYR:CZ	1:C:270:PRO:HD3	2.52	0.45
1:A:392:GLY:O	1:A:394:LEU:N	2.50	0.45
1:D:299:ASN:ND2	1:D:302:HIS:H	2.14	0.45
1:B:286:GLU:HG2	5:B:2163:HOH:O	2.16	0.45
1:D:397:ARG:HH12	1:D:449:GLN:NE2	2.13	0.45
1:D:413:THR:HG23	4:D:520:NCF:O4B	2.17	0.45
1:B:403:ALA:HB2	1:B:454:VAL:HA	1.98	0.45
1:C:170:SER:HB2	1:C:183:ASP:HB3	1.99	0.45
1:B:270:PRO:HB2	1:B:273:TRP:CD1	2.52	0.45
1:D:253:LEU:HB3	1:D:258:VAL:HB	1.99	0.45
1:B:52:LYS:HD3	1:B:294:PHE:CE2	2.52	0.44
1:B:54:PHE:HB3	1:B:331:LEU:HD11	1.99	0.44
1:B:323:GLY:O	1:B:327:VAL:HG23	2.17	0.44
1:B:361:VAL:HA	1:B:364:LEU:HD12	1.98	0.44
1:D:299:ASN:HD22	1:D:302:HIS:H	1.64	0.44
1:A:54:PHE:CD2	1:A:363:LEU:HD22	2.52	0.44
1:A:342:VAL:HB	1:A:354:LEU:HB2	1.99	0.44
1:B:289:GLU:HG3	5:B:2051:HOH:O	2.16	0.44
1:C:98:LEU:HA	5:C:2049:HOH:O	2.16	0.44
1:A:117:THR:HG21	1:A:119:ARG:HH11	1.82	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:10:ASP:OD1	1:D:39:ARG:NH2	2.51	0.44
1:B:1:ARG:HD2	1:B:3:THR:OG1	2.17	0.44
1:C:47:PRO:O	1:C:48:ALA:HB3	2.17	0.44
1:D:2:LEU:O	1:D:6:ARG:HG3	2.17	0.44
1:A:392:GLY:C	1:A:394:LEU:H	2.21	0.44
1:B:120:GLY:O	1:B:262:GLY:HA3	2.18	0.44
1:A:130:ASP:OD2	1:A:319:THR:HA	2.18	0.43
1:A:320:TRP:O	1:A:324:LEU:CD2	2.66	0.43
1:A:463:GLN:HE21	1:A:463:GLN:HB2	1.65	0.43
1:C:292:VAL:HB	1:C:293:PRO:CD	2.48	0.43
1:A:145:TYR:CD1	1:A:145:TYR:N	2.86	0.43
1:B:41:GLY:HA2	1:B:357:ALA:HB3	2.00	0.43
1:C:247:HIS:O	1:C:251:GLU:HG3	2.18	0.43
1:D:91:VAL:HG22	1:D:125:ASP:HB3	1.99	0.43
1:D:225:LEU:HD12	1:D:226:PRO:CD	2.46	0.43
1:A:372:TRP:O	1:A:375:THR:HG22	2.18	0.43
1:B:384:GLY:HA2	1:B:399:ARG:HG2	2.00	0.43
1:C:291:LEU:O	1:C:379:SER:HB2	2.19	0.43
1:C:74:ALA:O	1:C:88:LEU:HD12	2.18	0.43
1:C:320:TRP:O	1:C:324:LEU:HD22	2.19	0.43
1:B:342:VAL:HB	1:B:354:LEU:HB2	1.99	0.43
1:B:374:GLN:OE1	1:B:375:THR:HG23	2.19	0.43
1:D:271:ALA:C	1:D:273:TRP:H	2.20	0.43
1:B:335:GLY:HA3	1:B:366:GLN:HE21	1.83	0.43
1:C:51:MET:CE	1:C:353:ASN:HB3	2.45	0.43
1:B:385:GLU:O	1:B:391:GLY:HA3	2.19	0.43
1:C:54:PHE:HB3	1:C:331:LEU:HD11	2.00	0.43
1:A:21:ALA:HB2	1:A:440:HIS:N	2.34	0.42
1:A:54:PHE:HB3	1:A:331:LEU:HD11	2.01	0.42
1:D:28:VAL:CG1	1:D:29:ASP:N	2.82	0.42
1:D:47:PRO:O	1:D:48:ALA:HB3	2.18	0.42
1:C:27:VAL:HG12	1:C:36:LEU:HD12	2.01	0.42
1:C:52:LYS:HD3	1:C:294:PHE:CE2	2.54	0.42
1:B:437:ASN:C	1:B:438:ASN:HD22	2.22	0.42
1:A:47:PRO:HB3	1:A:355:VAL:HG21	2.00	0.42
1:B:98:LEU:HD23	1:B:102:ASP:HB2	2.01	0.42
1:B:430:GLU:HG2	5:B:2010:HOH:O	2.19	0.42
1:D:114:GLY:O	1:D:115:VAL:C	2.57	0.42
1:A:122:LEU:HD23	1:A:250:GLU:HB2	2.01	0.42
1:B:29:ASP:O	1:B:33:GLY:N	2.53	0.42
1:A:9:ILE:HB	1:A:37:TYR:CE2	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:25:VAL:HA	1:A:434:SER:O	2.20	0.42
1:A:47:PRO:HB3	1:A:355:VAL:HG22	2.01	0.42
1:A:270:PRO:O	1:A:271:ALA:HB3	2.19	0.42
1:A:271:ALA:HA	5:A:2115:HOH:O	2.20	0.42
1:C:239:ASP:O	1:C:240:GLU:HB2	2.20	0.42
1:C:130:ASP:HB2	1:C:318:GLY:O	2.19	0.42
1:D:82:ARG:HD3	1:D:82:ARG:H	1.83	0.42
1:D:171:VAL:HG22	1:D:182:VAL:HG22	2.02	0.42
1:A:296:LYS:O	1:A:393:THR:HG23	2.20	0.42
1:B:150:GLN:NE2	1:B:240:GLU:H	2.17	0.42
1:C:139:TRP:HA	1:C:140:PRO:HD3	1.90	0.42
1:C:147:TYR:CD2	4:C:520:NCF:H15	2.55	0.42
1:D:454:VAL:O	1:D:458:GLU:HG3	2.19	0.42
1:B:116:ARG:HB3	1:B:116:ARG:HH21	1.85	0.42
1:D:111:ALA:HB2	1:D:258:VAL:HG23	2.02	0.42
1:B:270:PRO:HG2	1:B:273:TRP:CE2	2.55	0.42
1:C:160:GLU:HG2	2:C:504:SO4:O4	2.19	0.42
1:C:174:ALA:O	1:C:199:THR:HG21	2.20	0.42
1:B:288:SER:HB2	1:B:375:THR:CG2	2.47	0.41
1:C:94:GLY:O	1:C:96:PRO:HD3	2.19	0.41
1:D:145:TYR:CD1	1:D:145:TYR:N	2.88	0.41
1:D:397:ARG:NH1	1:D:449:GLN:HE21	2.16	0.41
1:A:171:VAL:HG21	1:A:208:LEU:HD21	2.02	0.41
1:B:225:LEU:HA	1:B:226:PRO:HD3	1.93	0.41
1:D:341:LEU:HG	1:D:359:THR:HG21	2.02	0.41
1:B:116:ARG:HB3	1:B:116:ARG:NH2	2.36	0.41
1:B:306:LEU:HD23	1:B:306:LEU:HA	1.85	0.41
1:D:106:MET:O	1:D:110:VAL:HG23	2.19	0.41
1:A:63:LEU:HB3	1:A:67:HIS:CG	2.56	0.41
1:A:78:ALA:HB2	1:A:277:GLU:HG2	2.03	0.41
1:A:198:VAL:HG12	1:A:224:SER:HB3	2.02	0.41
1:A:430:GLU:O	1:A:431:LEU:HD12	2.20	0.41
1:C:457:ALA:O	1:C:462:HIS:HB2	2.21	0.41
1:C:4:GLU:HG2	1:C:8:ASP:OD2	2.21	0.41
1:C:86:GLN:HB3	5:C:2038:HOH:O	2.20	0.41
1:C:270:PRO:C	1:C:272:ASP:N	2.72	0.41
1:D:269:VAL:HB	5:D:2127:HOH:O	2.20	0.41
1:D:413:THR:HG22	5:D:2188:HOH:O	2.21	0.41
1:A:121:ASP:HB2	1:A:123:TYR:CE1	2.56	0.41
1:D:9:ILE:HB	1:D:37:TYR:CE2	2.54	0.41
1:B:3:THR:HB	5:B:2001:HOH:O	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:308:LYS:O	1:B:318:GLY:HA2	2.20	0.41
1:C:198:VAL:HG22	1:C:199:THR:H	1.85	0.41
1:A:81:ARG:C	1:A:83:GLY:H	2.24	0.41
1:A:336:VAL:O	1:A:338:THR:HG23	2.20	0.41
1:C:135:VAL:HB	1:C:138:TRP:CD1	2.55	0.41
1:C:234:ALA:HB1	1:C:236:ARG:NH1	2.36	0.41
1:D:274:GLN:HA	5:D:2130:HOH:O	2.19	0.41
1:D:381:PRO:HD2	1:D:409:ALA:O	2.21	0.41
1:A:173:PRO:HG3	1:A:225:LEU:HD23	2.03	0.41
1:A:457:ALA:O	1:A:462:HIS:HB2	2.20	0.41
1:C:136:ASP:OD1	1:C:137:ASP:N	2.54	0.41
1:C:345:ASP:OD1	1:C:345:ASP:C	2.59	0.41
1:A:314:THR:HA	5:A:2132:HOH:O	2.21	0.40
1:D:158:HIS:HD2	5:D:2084:HOH:O	2.04	0.40
1:A:214:VAL:HG12	5:A:2101:HOH:O	2.20	0.40
1:A:380:LEU:HA	1:A:381:PRO:HD3	1.92	0.40
1:B:376:TRP:HE1	1:B:423:TYR:HE2	1.69	0.40
1:C:37:TYR:CD1	1:C:38:SER:N	2.89	0.40
1:C:409:ALA:HA	1:C:422:GLY:HA3	2.04	0.40
1:D:184:LEU:HD13	1:D:193:LEU:HD22	2.04	0.40
1:A:212:ARG:O	1:A:213:PRO:C	2.60	0.40
1:B:341:LEU:HG	1:B:359:THR:HG21	2.03	0.40
1:B:399:ARG:NH1	5:B:2196:HOH:O	2.54	0.40
1:C:61:GLU:OE1	1:C:334:LEU:HD13	2.20	0.40
1:D:287:LEU:O	1:D:291:LEU:HB2	2.22	0.40
1:D:348:GLY:HA2	1:D:353:ASN:ND2	2.36	0.40
1:D:5:LEU:O	1:D:9:ILE:HG13	2.21	0.40
1:B:110:VAL:HG12	1:B:115:VAL:HB	2.02	0.40
1:D:341:LEU:CD2	1:D:355:VAL:HG12	2.51	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	465/489 (95%)	423 (91%)	39 (8%)	3 (1%)	25	36
1	B	464/489 (95%)	430 (93%)	32 (7%)	2 (0%)	34	48
1	C	464/489 (95%)	434 (94%)	30 (6%)	0	100	100
1	D	465/489 (95%)	430 (92%)	32 (7%)	3 (1%)	25	36
All	All	1858/1956 (95%)	1717 (92%)	133 (7%)	8 (0%)	34	48

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	81	ARG
1	A	393	THR
1	D	86	GLN
1	A	270	PRO
1	B	270	PRO
1	B	374	GLN
1	D	279	LEU
1	D	115	VAL

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	339/356 (95%)	328 (97%)	11 (3%)	39	59
1	B	338/356 (95%)	323 (96%)	15 (4%)	28	45
1	C	338/356 (95%)	325 (96%)	13 (4%)	33	51
1	D	339/356 (95%)	324 (96%)	15 (4%)	28	45
All	All	1354/1424 (95%)	1300 (96%)	54 (4%)	31	49

All (54) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	THR
1	A	141	GLU
1	A	183	ASP

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Mol	Chain	Res	Type
1	A	216	THR
1	A	250	GLU
1	A	299	ASN
1	A	312	GLN
1	A	320	TRP
1	A	376	TRP
1	A	455	ARG
1	A	463	GLN
1	B	8	ASP
1	B	10	ASP
1	B	18	LEU
1	B	43	GLU
1	B	88	LEU
1	B	98	LEU
1	B	154	LEU
1	B	198	VAL
1	B	270	PRO
1	B	274	GLN
1	B	299	ASN
1	B	320	TRP
1	B	324	LEU
1	B	349	LEU
1	B	463	GLN
1	C	19	GLU
1	C	50	ASN
1	C	72	GLU
1	C	134	LEU
1	C	154	LEU
1	C	272	ASP
1	C	299	ASN
1	C	302	HIS
1	C	320	TRP
1	C	324	LEU
1	C	349	LEU
1	C	376	TRP
1	C	438	ASN
1	D	2	LEU
1	D	46	LEU
1	D	63	LEU
1	D	82	ARG
1	D	88	LEU
1	D	98	LEU

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Mol	Chain	Res	Type
1	D	154	LEU
1	D	183	ASP
1	D	196	ARG
1	D	291	LEU
1	D	299	ASN
1	D	320	TRP
1	D	324	LEU
1	D	374	GLN
1	D	413	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	50	ASN
1	A	150	GLN
1	A	158	HIS
1	A	299	ASN
1	A	312	GLN
1	A	437	ASN
1	A	449	GLN
1	A	463	GLN
1	B	44	GLN
1	B	50	ASN
1	B	150	GLN
1	B	299	ASN
1	B	302	HIS
1	B	366	GLN
1	B	396	ASN
1	B	437	ASN
1	B	449	GLN
1	B	463	GLN
1	C	50	ASN
1	C	158	HIS
1	C	256	ASN
1	C	299	ASN
1	C	366	GLN
1	C	437	ASN
1	C	449	GLN
1	D	50	ASN
1	D	150	GLN
1	D	158	HIS
1	D	256	ASN

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Mol	Chain	Res	Type
1	D	299	ASN
1	D	437	ASN
1	D	449	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 24 ligands modelled in this entry, 4 are monoatomic - leaving 20 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	$\#\|Z\| > 2$
2	SO4	C	504	-	4,4,4	0.27	0	6,6,6	0.10	0
4	NCF	B	520	1	16,22,23	2.42	5 (31%)	10,29,31	2.15	3 (30%)
2	SO4	A	503	-	4,4,4	0.26	0	6,6,6	0.05	0
2	SO4	D	503	-	4,4,4	0.26	0	6,6,6	0.09	0
2	SO4	B	502	-	4,4,4	0.30	0	6,6,6	0.06	0
2	SO4	A	502	-	4,4,4	0.27	0	6,6,6	0.14	0
2	SO4	B	501	-	4,4,4	0.26	0	6,6,6	0.07	0
4	NCF	C	520	1	16,22,23	2.60	6 (37%)	10,29,31	2.23	3 (30%)
2	SO4	A	504	-	4,4,4	0.32	0	6,6,6	0.09	0
2	SO4	B	503	-	4,4,4	0.28	0	6,6,6	0.07	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	SO4	C	503	-	4,4,4	0.26	0	6,6,6	0.12	0
2	SO4	C	501	-	4,4,4	0.29	0	6,6,6	0.09	0
2	SO4	D	504	-	4,4,4	0.31	0	6,6,6	0.11	0
2	SO4	A	501	-	4,4,4	0.30	0	6,6,6	0.08	0
2	SO4	B	504	-	4,4,4	0.34	0	6,6,6	0.13	0
2	SO4	D	501	-	4,4,4	0.25	0	6,6,6	0.13	0
2	SO4	C	502	-	4,4,4	0.28	0	6,6,6	0.12	0
4	NCF	A	520	1	16,22,23	2.29	6 (37%)	10,29,31	1.92	2 (20%)
4	NCF	D	520	1	16,22,23	2.63	7 (43%)	10,29,31	2.05	2 (20%)
2	SO4	D	502	-	4,4,4	0.30	0	6,6,6	0.08	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NCF	D	520	1	-	1/9/28/30	0/1/2/2
4	NCF	C	520	1	-	0/9/28/30	0/1/2/2
4	NCF	B	520	1	-	0/9/28/30	0/1/2/2
4	NCF	A	520	1	-	1/9/28/30	0/1/2/2

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	520	NCF	C11-N10	6.30	1.47	1.34
4	B	520	NCF	C11-N10	5.98	1.46	1.34
4	A	520	NCF	C11-N10	5.52	1.45	1.34
4	D	520	NCF	C11-N10	5.46	1.45	1.34
4	C	520	NCF	C7-N10	4.49	1.52	1.46
4	D	520	NCF	C13-C14	-4.27	1.48	1.51
4	A	520	NCF	C15-C14	4.22	1.48	1.37
4	B	520	NCF	C15-C14	4.19	1.48	1.37
4	C	520	NCF	C15-C14	4.12	1.48	1.37
4	D	520	NCF	C14-S19	-4.00	1.65	1.73
4	D	520	NCF	C15-C14	3.99	1.48	1.37
4	B	520	NCF	C7-N10	3.68	1.51	1.46
4	D	520	NCF	O4A-C4'	-3.29	1.21	1.30
4	A	520	NCF	C14-S19	-3.14	1.67	1.73
4	C	520	NCF	C14-S19	-3.07	1.67	1.73
4	B	520	NCF	O4A-C4'	-2.94	1.22	1.30
4	A	520	NCF	C7-N10	2.88	1.50	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	520	NCF	O4A-C4'	-2.79	1.22	1.30
4	D	520	NCF	C7-N10	2.61	1.50	1.46
4	B	520	NCF	C14-S19	-2.53	1.68	1.73
4	D	520	NCF	C3-C4	2.46	1.54	1.50
4	A	520	NCF	O4A-C4'	-2.24	1.24	1.30
4	C	520	NCF	C3-C4	2.15	1.54	1.50
4	A	520	NCF	C3-C4	2.03	1.54	1.50

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	C	520	NCF	C16-C17-S19	-4.85	109.04	112.98
4	B	520	NCF	C16-C17-S19	-4.40	109.41	112.98
4	D	520	NCF	C16-C17-S19	-4.32	109.47	112.98
4	A	520	NCF	C16-C17-S19	-4.09	109.66	112.98
4	B	520	NCF	C3-C2-S1	3.46	120.69	111.84
4	C	520	NCF	C3-C2-S1	3.36	120.43	111.84
4	D	520	NCF	C3-C2-S1	3.26	120.18	111.84
4	A	520	NCF	C3-C2-S1	3.00	119.51	111.84
4	B	520	NCF	C7-N10-C11	-2.76	120.18	123.13
4	C	520	NCF	C7-N10-C11	-2.71	120.22	123.13

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	520	NCF	C8-C7-N10-C11
4	D	520	NCF	C8-C7-N10-C11

There are no ring outliers.

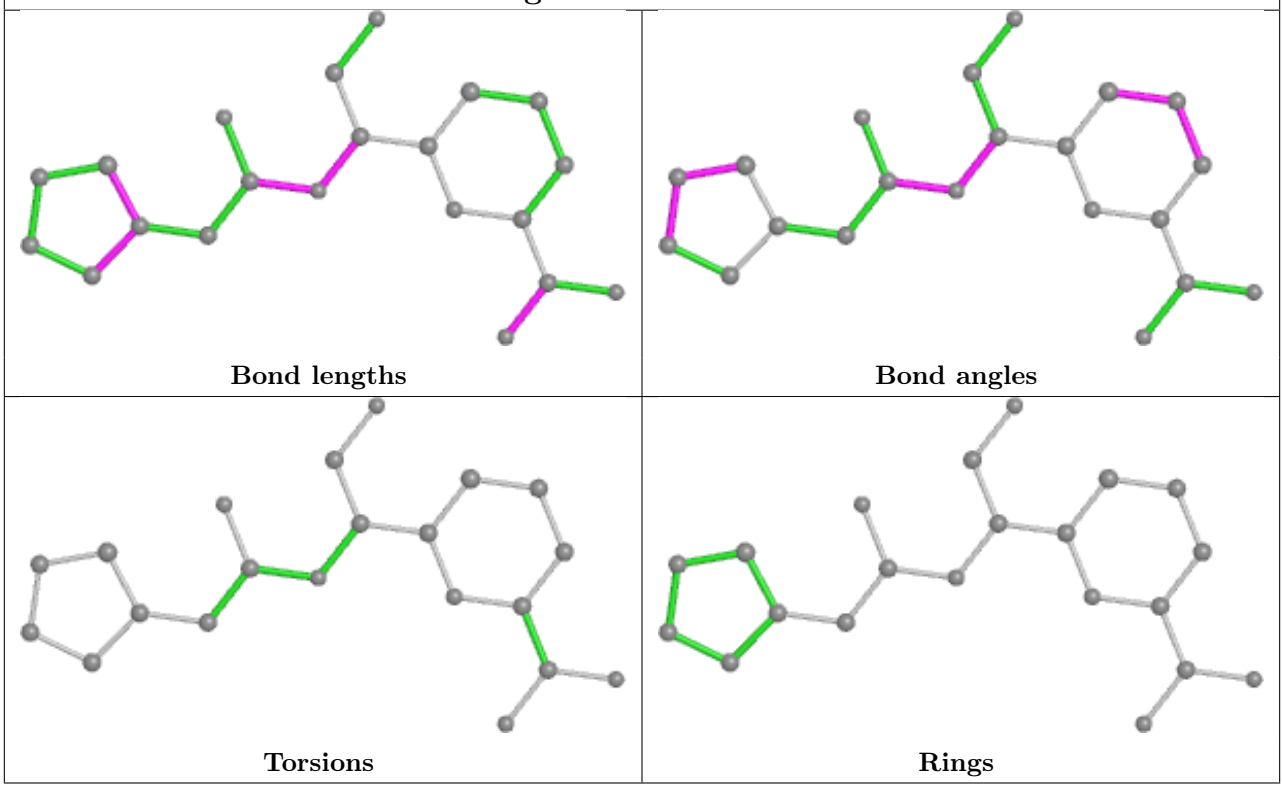
6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	504	SO4	1	0
4	C	520	NCF	1	0
2	A	504	SO4	1	0
2	A	501	SO4	1	0
4	A	520	NCF	1	0
4	D	520	NCF	1	0

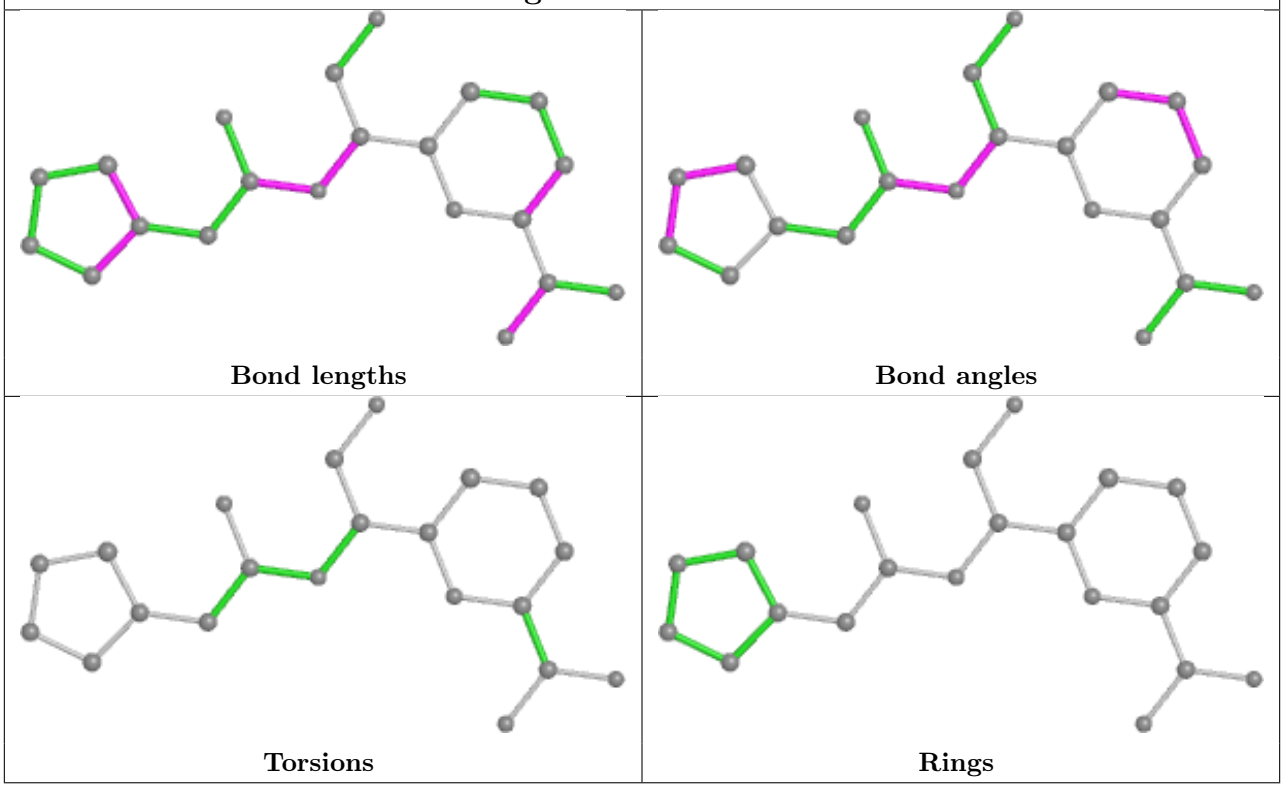
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

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 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.

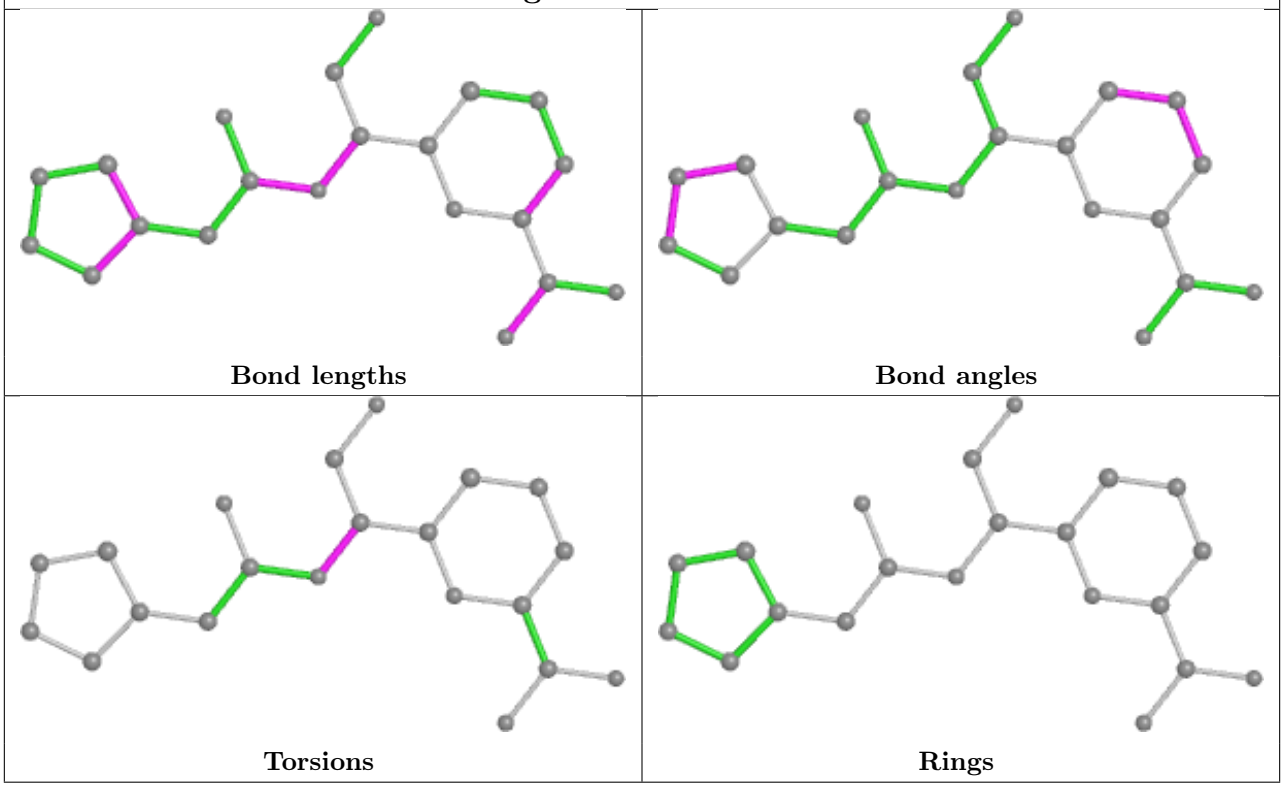
Ligand NCF B 520

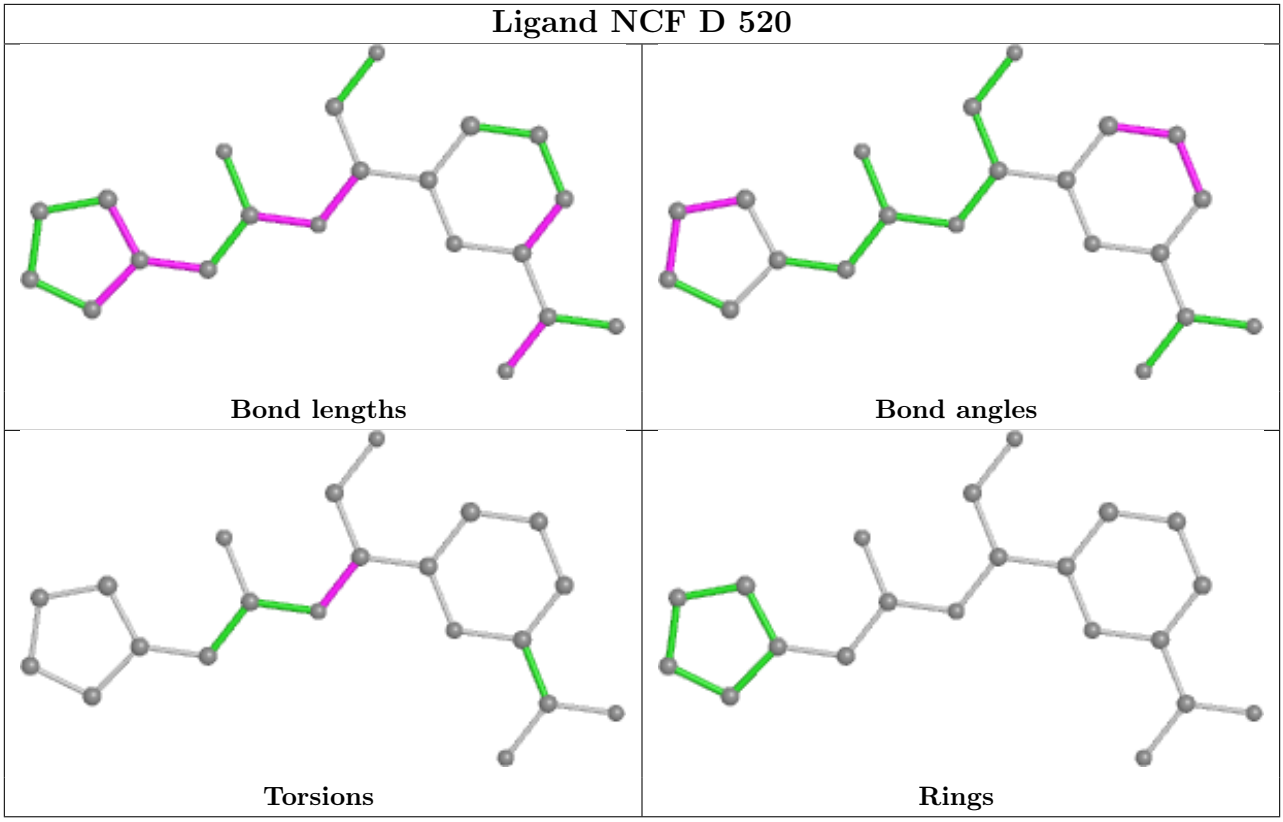


Ligand NCF C 520



Ligand NCF A 520





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 (i)

6.1 Protein, DNA and RNA chains (i)

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	467/489 (95%)	0.36	31 (6%)	18	17	24, 46, 67, 82	0
1	B	466/489 (95%)	0.02	11 (2%)	59	57	21, 42, 66, 83	0
1	C	466/489 (95%)	0.01	16 (3%)	45	44	21, 43, 65, 81	0
1	D	467/489 (95%)	0.06	16 (3%)	45	44	19, 34, 68, 81	0
All	All	1866/1956 (95%)	0.11	74 (3%)	38	37	19, 42, 67, 83	0

All (74) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	466	GLU	7.8
1	A	279	LEU	5.8
1	D	82	ARG	5.1
1	A	73	VAL	5.0
1	A	110	VAL	4.3
1	D	260	VAL	4.2
1	A	81	ARG	4.1
1	D	262	GLY	3.8
1	D	119	ARG	3.8
1	B	2	LEU	3.7
1	C	82	ARG	3.7
1	C	83	GLY	3.6
1	D	264	VAL	3.5
1	B	274	GLN	3.5
1	D	429	GLY	3.4
1	C	81	ARG	3.4
1	A	108	ALA	3.2
1	A	111	ALA	3.1
1	C	374	GLN	3.1
1	A	275	ASP	3.0
1	A	78	ALA	3.0

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Mol	Chain	Res	Type	RSRZ
1	D	115	VAL	3.0
1	A	83	GLY	3.0
1	A	253	LEU	3.0
1	A	77	SER	3.0
1	C	6	ARG	2.9
1	C	371	PRO	2.9
1	A	260	VAL	2.8
1	A	82	ARG	2.8
1	A	2	LEU	2.8
1	C	429	GLY	2.8
1	A	272	ASP	2.8
1	D	275	ASP	2.8
1	D	257	GLY	2.7
1	A	116	ARG	2.7
1	B	32	THR	2.7
1	C	1	ARG	2.7
1	A	255	SER	2.7
1	B	31	ALA	2.7
1	A	91	VAL	2.7
1	D	77	SER	2.6
1	A	115	VAL	2.6
1	A	117	THR	2.6
1	C	117	THR	2.6
1	D	79	PRO	2.5
1	A	280	ALA	2.5
1	B	428	GLU	2.5
1	C	7	GLU	2.5
1	C	2	LEU	2.4
1	A	80	GLY	2.4
1	A	88	LEU	2.4
1	A	106	MET	2.4
1	C	428	GLU	2.4
1	D	83	GLY	2.3
1	C	4	GLU	2.3
1	C	314	THR	2.3
1	A	264	VAL	2.3
1	D	31	ALA	2.3
1	B	425	PRO	2.2
1	D	118	VAL	2.2
1	D	276	ALA	2.2
1	A	282	HIS	2.2
1	B	461	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	262	GLY	2.2
1	B	3	THR	2.2
1	A	254	GLU	2.2
1	A	156	VAL	2.2
1	A	371	PRO	2.2
1	D	110	VAL	2.1
1	B	262	GLY	2.1
1	B	317	ALA	2.1
1	C	375	THR	2.1
1	A	104	ASP	2.1
1	C	259	THR	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	SO4	D	502	5/5	0.84	0.23	79,80,82,82	0
2	SO4	A	502	5/5	0.88	0.20	74,75,75,76	0
4	NCF	C	520	21/22	0.88	0.18	35,44,48,51	0
2	SO4	B	504	5/5	0.89	0.21	75,76,78,78	0
4	NCF	A	520	21/22	0.91	0.24	31,37,44,49	0
2	SO4	A	504	5/5	0.93	0.13	80,81,81,82	0
2	SO4	A	501	5/5	0.94	0.16	67,67,69,70	0
4	NCF	B	520	21/22	0.94	0.19	35,41,45,49	0
2	SO4	D	504	5/5	0.94	0.12	73,74,74,75	0
4	NCF	D	520	21/22	0.94	0.23	27,32,41,45	0
2	SO4	B	502	5/5	0.95	0.11	75,75,76,77	0
2	SO4	C	501	5/5	0.95	0.13	65,65,66,66	0

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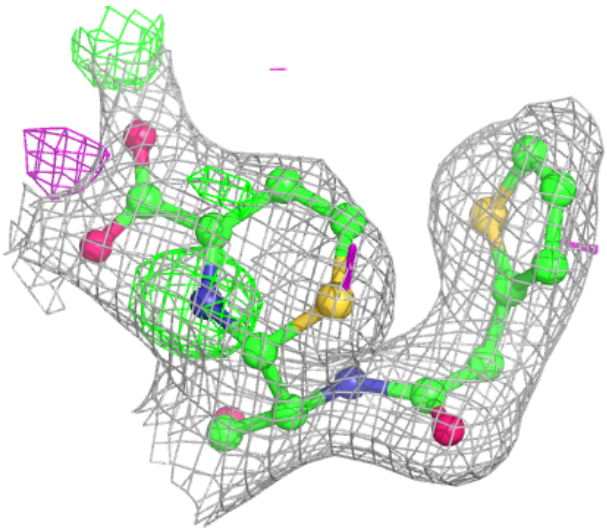
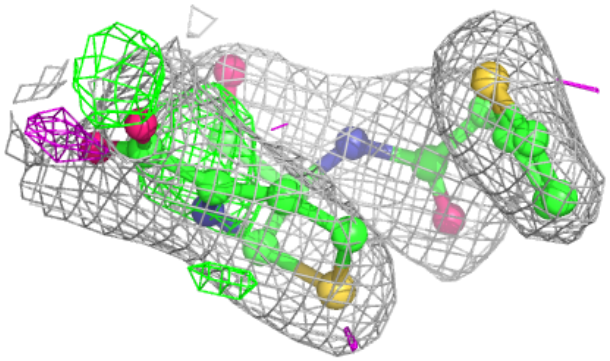
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	SO4	C	504	5/5	0.96	0.16	74,75,75,76	0
2	SO4	D	501	5/5	0.96	0.11	62,63,64,65	0
2	SO4	D	503	5/5	0.97	0.18	55,56,57,59	0
2	SO4	C	503	5/5	0.97	0.14	56,57,57,58	0
2	SO4	A	503	5/5	0.97	0.12	73,73,74,74	0
2	SO4	B	501	5/5	0.98	0.14	69,70,70,70	0
2	SO4	C	502	5/5	0.98	0.10	61,61,62,63	0
3	MG	A	510	1/1	0.98	0.16	28,28,28,28	0
3	MG	D	510	1/1	0.98	0.20	21,21,21,21	0
2	SO4	B	503	5/5	0.99	0.13	59,59,61,61	0
3	MG	D	511	1/1	0.99	0.22	12,12,12,12	0
3	MG	A	511	1/1	0.99	0.21	24,24,24,24	0

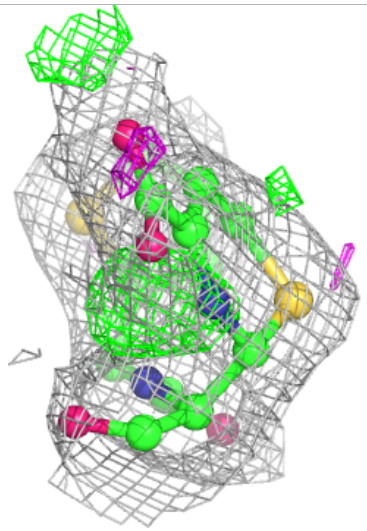
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around NCF C 520:

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

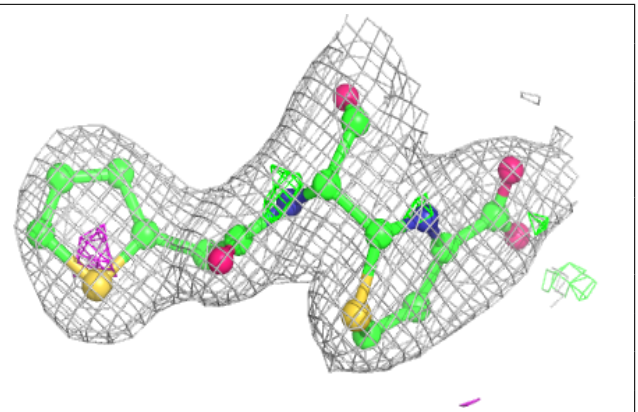


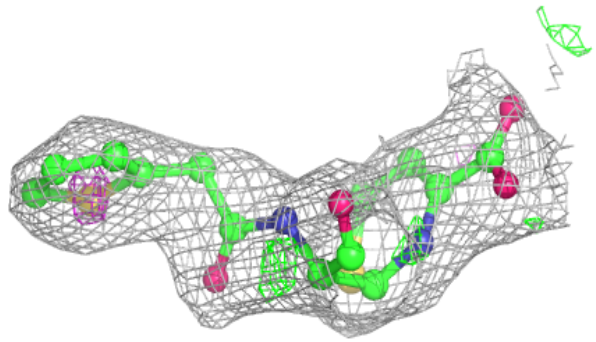


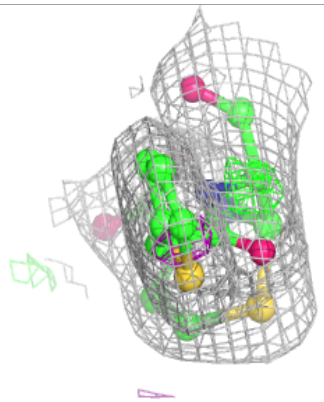


Electron density around NCF A 520:

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

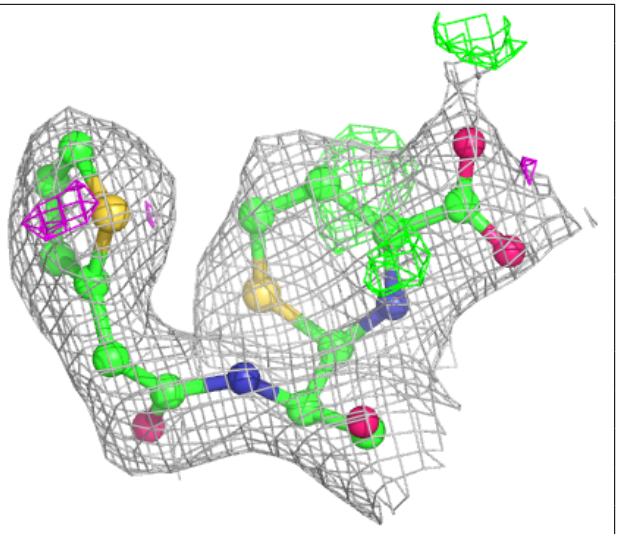


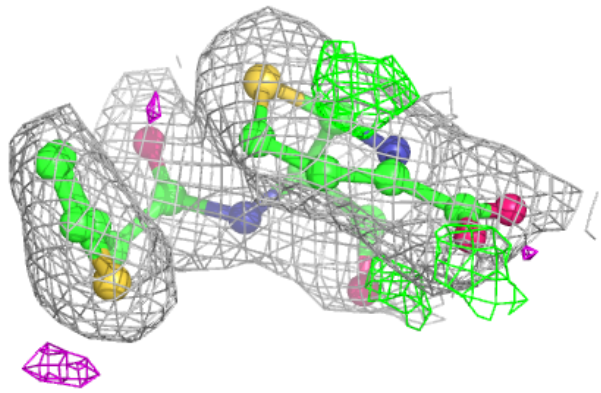


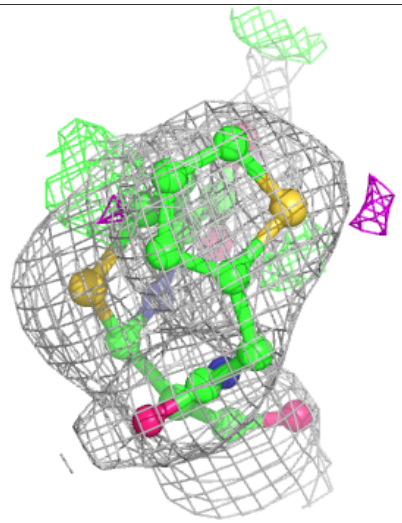


Electron density around NCF B 520:

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

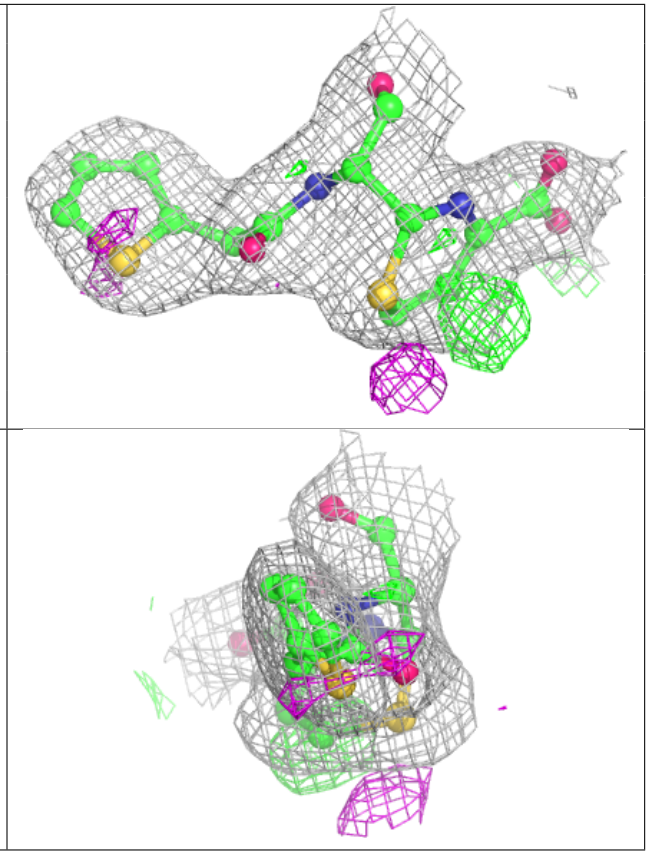






Electron density around NCF D 520:

$2mF_o$-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.