Full wwPDB X-ray Structure Validation Report ⓘ

Aug 15, 2023 – 07:51 AM EDT

PDB ID	:	1TTH
Title	:	Aspartate Transcarbamoylase Catalytic Chain Mutant Glu50Ala Complexed with N-(Phosphonacetyl-L-Aspartate) (PALA)
Authors	:	Stieglitz, K.; Stec, B.; Baker, D.P.; Kantrowitz, E.R.
Deposited on	:	2004-06-22
Resolution	:	2.80 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:

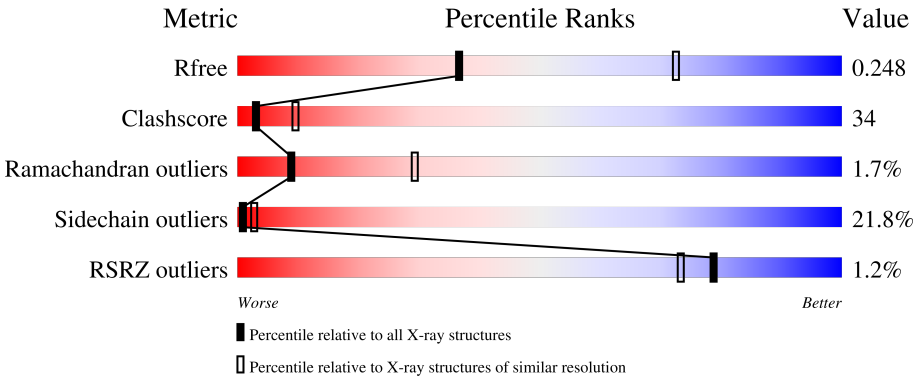
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35

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 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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	310	46% 46% 6% ·
1	C	310	49% 43% 8% ·
2	B	153	4% 25% 48% 22% 5%
2	D	153	3% 21% 54% 22% ·

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 7724 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 Aspartate carbamoyltransferase catalytic chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	310	Total	C	N	O	S	0	0	0
			2411	1525	423	454	9			
1	C	310	Total	C	N	O	S	0	0	0
			2411	1525	423	454	9			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	50	ALA	GLU	engineered mutation	UNP P0A786
C	50	ALA	GLU	engineered mutation	UNP P0A786

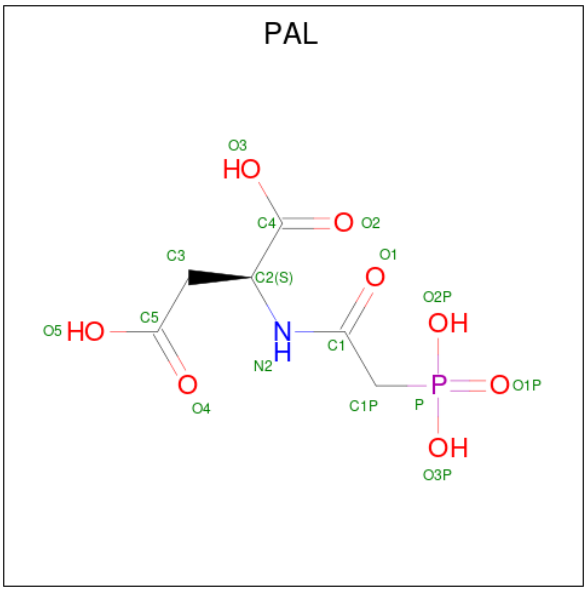
- Molecule 2 is a protein called Aspartate carbamoyltransferase regulatory chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	153	Total	C	N	O	S	0	0	0
			1200	752	213	229	6			
2	D	153	Total	C	N	O	S	0	0	0
			1201	752	213	230	6			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	MET	-	initiating methionine	UNP P0A7F3
D	1	MET	-	initiating methionine	UNP P0A7F3

- Molecule 3 is N-(PHOSPHONACETYL)-L-ASPARTIC ACID (three-letter code: PAL) (formula: $C_6H_{10}NO_8P$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O P 16 6 1 8 1	0	0
3	C	1	Total C N O P 16 6 1 8 1	0	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total Zn 1 1	0	0
4	D	1	Total Zn 1 1	0	0

- Molecule 5 is water.

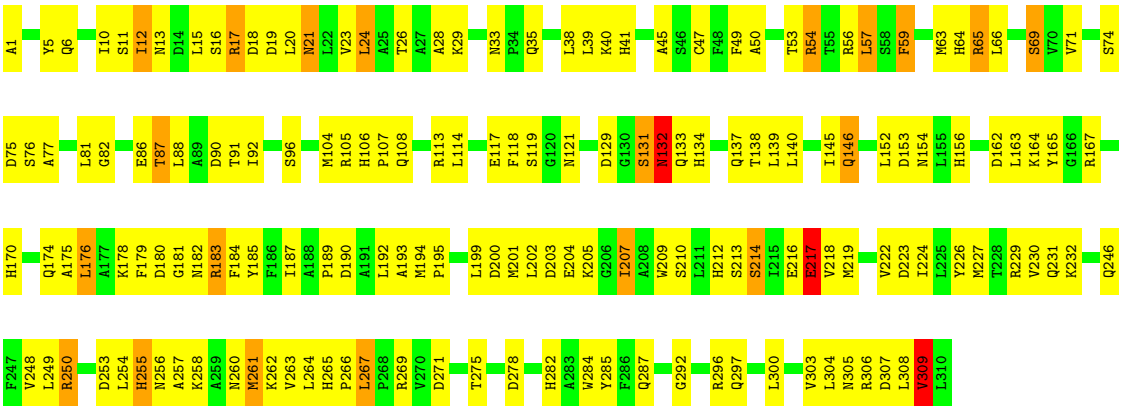
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	164	Total O 164 164	0	0
5	B	61	Total O 61 61	0	0
5	C	178	Total O 178 178	0	0
5	D	64	Total O 64 64	0	0

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.

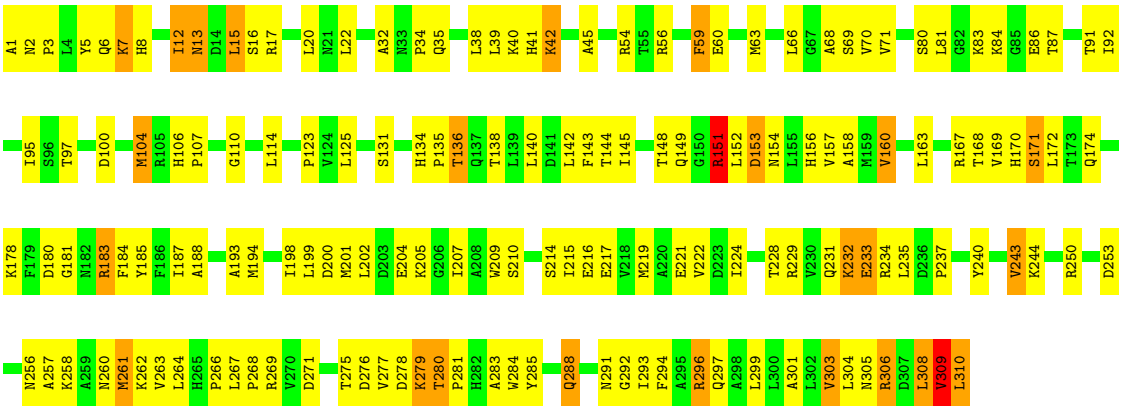
• Molecule 1: Aspartate carbamoyltransferase catalytic chain

Chain A:



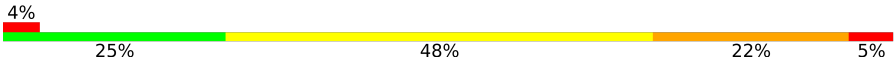
• Molecule 1: Aspartate carbamoyltransferase catalytic chain

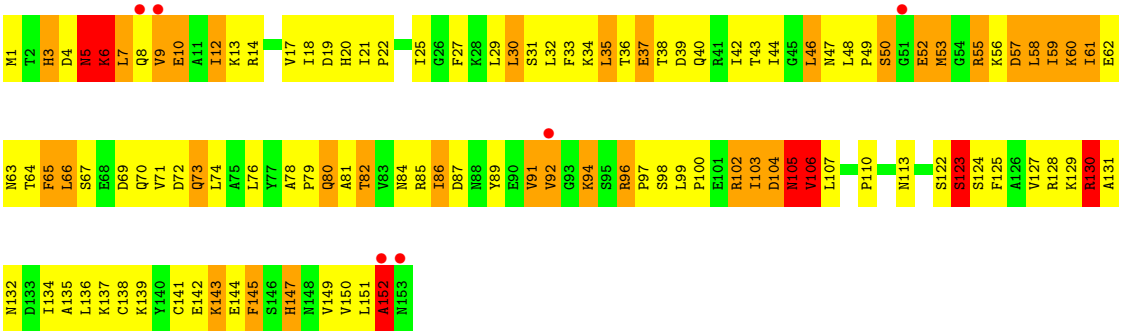
Chain C:



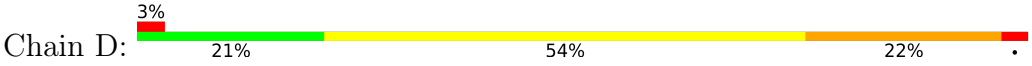
• Molecule 2: Aspartate carbamoyltransferase regulatory chain

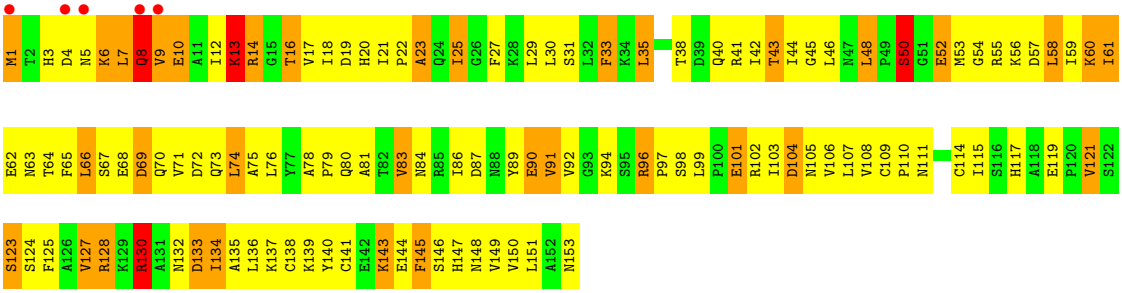
Chain B:





• Molecule 2: Aspartate carbamoyltransferase regulatory chain





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 3 2 1	Depositor
Cell constants a, b, c, α, β, γ	122.24Å 122.24Å 156.36Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.80 31.74 – 2.75	Depositor EDS
% Data completeness (in resolution range)	86.0 (30.00-2.80) 90.2 (31.74-2.75)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.08 (at 2.76Å)	Xtriage
Refinement program	SHELXL-97	Depositor
R, R_{free}	0.172 , 0.264 0.174 , 0.248	Depositor DCC
R_{free} test set	1626 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	40.7	Xtriage
Anisotropy	0.133	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.15 , 112.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	0.042 for -h,-k,l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	7724	wwPDB-VP
Average B, all atoms (Å^2)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.76% 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: ZN, PAL

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	2/2457 (0.1%)	0.87	3/3334 (0.1%)
1	C	0.39	1/2457 (0.0%)	0.88	2/3334 (0.1%)
2	B	0.75	7/1218 (0.6%)	0.87	4/1647 (0.2%)
2	D	0.55	4/1219 (0.3%)	0.87	7/1647 (0.4%)
All	All	0.50	14/7351 (0.2%)	0.87	16/9962 (0.2%)

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
2	B	0	2
2	D	0	3
All	All	0	6

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	132	ASN	C-N	-13.01	1.04	1.34
1	C	309	VAL	C-N	12.07	1.61	1.34
2	B	3	HIS	C-N	-11.84	1.06	1.34
2	B	152	ALA	C-N	-11.10	1.08	1.34
2	D	133	ASP	C-N	10.25	1.57	1.34
2	B	1	MET	C-N	10.03	1.57	1.34
2	B	131	ALA	C-N	8.15	1.52	1.34
2	B	4	ASP	C-N	7.73	1.51	1.34
2	D	13	LYS	C-N	7.71	1.51	1.34
2	B	106	VAL	C-N	-7.65	1.16	1.34
2	D	1	MET	C-N	-7.44	1.17	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	6	LYS	C-N	6.19	1.48	1.34
1	A	309	VAL	C-N	5.94	1.47	1.34
2	D	132	ASN	C-N	-5.26	1.22	1.34

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	104	ASP	O-C-N	-7.69	110.40	122.70
2	D	13	LYS	O-C-N	-7.68	110.42	122.70
1	A	217	GLU	C-N-CA	6.92	139.01	121.70
2	D	6	LYS	O-C-N	-6.78	111.84	122.70
1	C	151	ARG	NE-CZ-NH1	6.71	123.66	120.30
2	D	130	ARG	O-C-N	-6.71	111.97	122.70
2	B	104	ASP	C-N-CA	6.64	138.29	121.70
1	A	56	ARG	NE-CZ-NH1	-6.03	117.29	120.30
1	C	151	ARG	CD-NE-CZ	6.01	132.01	123.60
2	B	6	LYS	C-N-CA	5.75	136.07	121.70
2	B	130	ARG	O-C-N	-5.47	113.95	122.70
2	D	1	MET	O-C-N	5.36	131.28	122.70
2	D	133	ASP	CB-CG-OD2	5.33	123.10	118.30
2	D	4	ASP	CB-CG-OD2	5.29	123.06	118.30
2	D	23	ALA	C-N-CA	5.21	134.73	121.70
1	A	309	VAL	O-C-N	-5.00	114.69	122.70

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	309	VAL	Mainchain
2	B	104	ASP	Mainchain
2	B	152	ALA	Mainchain
2	D	13	LYS	Mainchain
2	D	130	ARG	Mainchain
2	D	6	LYS	Mainchain

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	2411	0	2420	118	0
1	C	2411	0	2421	129	2
2	B	1200	0	1216	132	0
2	D	1201	0	1218	130	0
3	A	16	0	6	1	0
3	C	16	0	6	2	0
4	B	1	0	0	0	0
4	D	1	0	0	0	0
5	A	164	0	0	20	0
5	B	61	0	0	10	0
5	C	178	0	0	21	2
5	D	64	0	0	3	0
All	All	7724	0	7287	494	2

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 34.

All (494) 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:C:6:GLN:HG3	5:C:1463:HOH:O	1.55	1.07
1:A:189:PRO:HG2	1:A:192:LEU:HB2	1.45	0.97
1:A:50:ALA:HB3	1:A:105:ARG:HG2	1.47	0.96
2:B:47:ASN:HB3	2:B:55:ARG:HD2	1.50	0.93
1:A:132:ASN:O	1:A:167:ARG:HB2	1.68	0.92
2:B:105:ASN:O	2:B:106:VAL:HG13	1.70	0.92
2:B:85:ARG:HB3	2:B:92:VAL:HG22	1.53	0.90
2:B:103:ILE:HD12	2:B:107:LEU:HD12	1.52	0.89
2:D:41:ARG:HH22	2:D:43:THR:HB	1.38	0.88
2:B:6:LYS:HD2	5:B:212:HOH:O	1.72	0.87
1:A:205:LYS:HB3	1:A:207:ILE:HG12	1.57	0.84
2:B:151:LEU:HD22	5:B:188:HOH:O	1.78	0.81
2:B:33:PHE:HB2	2:B:35:LEU:HD21	1.62	0.81
2:D:66:LEU:HD12	2:D:71:VAL:HG22	1.64	0.79
1:C:3:PRO:HD3	5:C:1433:HOH:O	1.83	0.78
1:A:200:ASP:O	1:A:204:GLU:HG3	1.84	0.78
2:B:79:PRO:HB2	5:B:206:HOH:O	1.83	0.77
2:D:18:ILE:O	2:D:58:LEU:HD12	1.83	0.77
2:B:21:ILE:HD12	2:B:58:LEU:HA	1.65	0.77
1:C:292:GLY:O	1:C:296:ARG:HB2	1.86	0.76
1:C:271:ASP:HA	5:C:1373:HOH:O	1.85	0.75
1:A:154:ASN:HA	1:A:181:GLY:O	1.87	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:134:HIS:HB2	1:C:167:ARG:HG3	1.69	0.75
1:C:301:ALA:HB1	1:C:308:LEU:HD11	1.67	0.75
1:C:91:THR:O	1:C:95:ILE:HD12	1.86	0.74
2:D:87:ASP:HB3	2:D:92:VAL:HG11	1.68	0.74
1:C:199:LEU:HA	1:C:202:LEU:HD12	1.68	0.74
2:B:19:ASP:HA	2:B:58:LEU:HD12	1.69	0.74
1:C:279:LYS:HG2	5:C:1374:HOH:O	1.85	0.74
2:B:12:ILE:HG21	2:B:62:GLU:HG3	1.69	0.74
2:B:30:LEU:HA	2:B:35:LEU:HD12	1.70	0.74
1:C:275:THR:O	1:C:279:LYS:HE3	1.88	0.74
1:A:54:ARG:HH11	1:A:54:ARG:HB2	1.53	0.73
2:D:146:SER:O	2:D:149:VAL:HG22	1.88	0.73
2:D:55:ARG:HG2	5:D:201:HOH:O	1.89	0.73
1:C:80:SER:HA	1:C:84:LYS:HG3	1.70	0.73
1:A:214:SER:OG	1:A:216:GLU:HB2	1.89	0.73
2:D:10:GLU:OE1	2:D:60:LYS:HD2	1.88	0.73
2:D:128:ARG:HD2	2:D:144:GLU:OE2	1.88	0.73
1:A:59:PHE:O	1:A:63:MET:HG3	1.89	0.72
1:C:144:THR:HG21	1:C:288:GLN:HB2	1.70	0.72
1:A:132:ASN:O	1:A:167:ARG:CB	2.37	0.72
1:A:1:ALA:HB2	1:A:306:ARG:HG3	1.71	0.72
1:A:163:LEU:HB3	1:A:194:MET:HE1	1.72	0.72
2:B:6:LYS:N	5:B:212:HOH:O	2.23	0.71
2:B:8:GLN:NE2	2:B:10:GLU:HB2	2.06	0.71
1:C:2:ASN:HA	5:C:1433:HOH:O	1.90	0.70
1:A:81:LEU:HA	1:A:86:GLU:HB3	1.72	0.70
1:A:66:LEU:HD21	1:A:297:GLN:HE21	1.56	0.70
2:D:106:VAL:HG23	2:D:107:LEU:HD23	1.71	0.70
1:C:240:TYR:O	1:C:243:VAL:HG22	1.92	0.70
2:B:58:LEU:HD21	2:B:60:LYS:HE3	1.74	0.70
2:B:99:LEU:HD11	2:B:127:VAL:HG11	1.74	0.70
1:A:87:THR:HG21	5:A:1328:HOH:O	1.91	0.69
2:D:21:ILE:HB	2:D:57:ASP:O	1.92	0.69
2:D:96:ARG:HD2	2:D:97:PRO:HD2	1.74	0.69
1:A:26:THR:HG23	1:A:309:VAL:HG21	1.74	0.69
1:A:88:LEU:HD23	1:A:114:LEU:HD12	1.75	0.69
2:B:9:VAL:HB	2:D:8:GLN:HA	1.73	0.69
1:C:163:LEU:HG	1:C:188:ALA:HB2	1.75	0.68
1:A:258:LYS:HD2	1:A:260:ASN:HD21	1.58	0.68
2:D:19:ASP:OD1	2:D:58:LEU:HD13	1.93	0.68
2:D:42:ILE:HD13	2:D:61:ILE:HG23	1.76	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:233:GLU:HA	5:C:1479:HOH:O	1.93	0.67
2:D:101:GLU:O	2:D:127:VAL:HG23	1.95	0.67
1:C:214:SER:OG	1:C:217:GLU:HG3	1.94	0.67
1:C:136:THR:HB	1:C:296:ARG:HH21	1.59	0.66
2:B:12:ILE:HD12	2:B:12:ILE:H	1.61	0.66
1:A:1:ALA:HB3	5:A:1441:HOH:O	1.95	0.66
1:A:219:MET:HG3	1:A:219:MET:O	1.96	0.66
1:C:277:VAL:O	1:C:280:THR:HG23	1.96	0.66
2:D:74:LEU:HG	2:D:74:LEU:O	1.94	0.66
1:A:11:SER:HB2	1:A:133:GLN:HG3	1.78	0.66
1:A:249:LEU:HD11	1:A:254:LEU:HD21	1.78	0.66
2:D:48:LEU:HB2	2:D:56:LYS:O	1.96	0.66
1:C:59:PHE:O	1:C:63:MET:HG3	1.96	0.65
2:B:48:LEU:HB3	2:D:41:ARG:HG3	1.78	0.65
2:B:107:LEU:HD22	2:B:150:VAL:HG12	1.79	0.65
2:D:90:GLU:HA	2:D:90:GLU:OE1	1.95	0.65
1:C:216:GLU:HB2	5:C:1399:HOH:O	1.97	0.64
2:B:79:PRO:HA	2:B:97:PRO:HG2	1.79	0.64
1:A:23:VAL:HG11	1:A:139:LEU:HD13	1.80	0.64
1:A:258:LYS:HB3	1:A:260:ASN:ND2	2.12	0.64
2:B:70:GLN:O	2:B:73:GLN:HG3	1.98	0.64
2:D:134:ILE:HG12	2:D:147:HIS:HB3	1.79	0.64
2:D:23:ALA:O	2:D:25:ILE:HG12	1.96	0.64
2:B:107:LEU:HD23	2:B:152:ALA:HB2	1.80	0.64
2:D:17:VAL:HG22	2:D:60:LYS:HG3	1.80	0.64
1:C:229:ARG:HA	5:C:1323:HOH:O	1.97	0.64
2:B:102:ARG:HB2	2:B:125:PHE:O	1.98	0.63
2:B:10:GLU:HB3	2:B:60:LYS:HE2	1.80	0.63
1:A:216:GLU:HB2	5:A:1463:HOH:O	1.97	0.63
2:D:30:LEU:HD12	2:D:35:LEU:HD12	1.79	0.63
2:B:138:CYS:HB3	2:B:141:CYS:SG	2.38	0.62
1:C:237:PRO:HA	1:C:240:TYR:CD2	2.33	0.62
1:C:15:LEU:O	1:C:178:LYS:HE2	2.00	0.62
1:A:261:MET:HE3	1:A:282:HIS:ND1	2.15	0.62
2:B:103:ILE:HG21	2:B:107:LEU:HD12	1.82	0.62
2:D:107:LEU:HD13	2:D:150:VAL:HG12	1.82	0.62
1:C:160:VAL:HA	1:C:187:ILE:O	2.00	0.62
1:C:45:ALA:HA	1:C:71:VAL:O	2.00	0.62
1:C:42:LYS:HA	1:C:100:ASP:OD2	2.00	0.61
1:C:158:ALA:HB2	1:C:222:VAL:HG11	1.81	0.61
2:B:31:SER:O	2:B:34:LYS:HG3	2.01	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:293:ILE:O	1:C:297:GLN:HG3	2.00	0.60
1:C:204:GLU:O	1:C:204:GLU:HG2	2.01	0.60
1:C:276:ASP:HB2	5:C:1420:HOH:O	2.02	0.60
2:D:50:SER:OG	2:D:53:MET:HB2	2.02	0.60
2:B:66:LEU:HD12	2:B:71:VAL:HG23	1.83	0.60
2:B:69:ASP:O	2:B:73:GLN:HG2	2.02	0.60
2:D:145:PHE:HB2	2:D:150:VAL:HG23	1.83	0.60
2:D:141:CYS:SG	2:D:143:LYS:HG3	2.43	0.59
1:C:56:ARG:O	1:C:60:GLU:HG3	2.02	0.59
5:C:1439:HOH:O	2:D:139:LYS:HE3	2.02	0.59
1:C:39:LEU:O	1:C:42:LYS:HB2	2.03	0.59
1:C:154:ASN:HA	1:C:181:GLY:O	2.02	0.59
2:D:114:CYS:HB3	2:D:117:HIS:CD2	2.38	0.59
2:D:19:ASP:OD1	2:D:56:LYS:HE3	2.02	0.59
2:D:75:ALA:HA	2:D:97:PRO:HB2	1.85	0.59
1:C:193:ALA:HB1	5:C:1356:HOH:O	2.03	0.59
5:A:1330:HOH:O	2:B:143:LYS:HE3	2.03	0.58
1:A:202:LEU:HD23	1:A:207:ILE:HB	1.85	0.58
2:B:85:ARG:O	2:B:92:VAL:HG13	2.03	0.58
1:A:303:VAL:HG12	1:A:304:LEU:HD23	1.85	0.58
1:C:8:HIS:CE1	1:C:123:PRO:HA	2.38	0.58
1:A:1:ALA:CB	1:A:306:ARG:HG3	2.34	0.58
2:B:151:LEU:HD23	2:B:152:ALA:N	2.19	0.57
1:C:219:MET:SD	1:C:257:ALA:HB2	2.44	0.57
1:A:199:LEU:O	1:A:202:LEU:HB2	2.04	0.57
2:D:46:LEU:HA	2:D:57:ASP:OD1	2.05	0.57
2:D:14:ARG:HA	2:D:86:ILE:O	2.05	0.57
1:A:284:TRP:HA	1:A:287:GLN:OE1	2.04	0.56
1:C:54:ARG:HE	3:C:1312:PAL:C1P	2.19	0.56
2:D:125:PHE:HB3	2:D:136:LEU:HB3	1.88	0.56
2:B:19:ASP:OD1	2:B:56:LYS:HE3	2.06	0.56
1:A:227:MET:O	1:A:266:PRO:HD2	2.06	0.56
2:B:10:GLU:HB3	2:B:60:LYS:CE	2.35	0.56
2:D:117:HIS:HA	5:D:185:HOH:O	2.06	0.56
1:C:167:ARG:HG2	5:C:1327:HOH:O	2.04	0.56
2:B:136:LEU:O	2:B:144:GLU:HA	2.05	0.56
2:B:103:ILE:HD13	2:B:103:ILE:O	2.05	0.56
2:D:13:LYS:HD2	2:D:89:TYR:OH	2.06	0.56
1:C:184:PHE:O	1:C:209:TRP:HA	2.05	0.55
2:D:48:LEU:O	2:D:55:ARG:HA	2.06	0.55
1:C:35:GLN:HG3	1:C:38:LEU:HD22	1.87	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:16:THR:OG1	2:D:65:PHE:HA	2.07	0.55
1:A:257:ALA:HB1	1:A:261:MET:HE2	1.89	0.55
2:B:5:ASN:CA	5:B:212:HOH:O	2.55	0.55
2:D:67:SER:HB2	2:D:70:GLN:HB2	1.88	0.55
2:B:99:LEU:HD11	2:B:127:VAL:CG1	2.36	0.55
2:D:145:PHE:HB2	2:D:150:VAL:CG2	2.37	0.55
1:A:49:PHE:CD2	1:A:76:SER:HB3	2.43	0.54
2:B:79:PRO:O	2:B:96:ARG:HD3	2.07	0.54
2:B:103:ILE:HD11	2:B:106:VAL:HG23	1.89	0.54
1:C:7:LYS:N	1:C:7:LYS:HD3	2.21	0.54
2:B:5:ASN:C	5:B:212:HOH:O	2.45	0.54
1:C:194:MET:SD	1:C:198:ILE:HG21	2.47	0.54
2:B:81:ALA:O	2:B:97:PRO:HD2	2.08	0.54
1:A:129:ASP:OD1	1:A:132:ASN:HB3	2.08	0.54
1:A:185:TYR:HD2	1:A:212:HIS:HE2	1.56	0.54
1:C:12:ILE:HD11	1:C:138:THR:HB	1.89	0.54
1:A:45:ALA:HA	1:A:71:VAL:O	2.08	0.53
1:C:281:PRO:HD3	5:C:1422:HOH:O	2.07	0.53
1:C:266:PRO:O	1:C:267:LEU:HB2	2.08	0.53
2:B:105:ASN:O	2:B:106:VAL:CG1	2.49	0.53
1:C:40:LYS:O	1:C:41:HIS:HB2	2.07	0.53
1:C:136:THR:CB	1:C:296:ARG:HH21	2.22	0.53
1:C:163:LEU:HG	1:C:188:ALA:CB	2.39	0.53
1:A:145:ILE:HG12	1:A:224:ILE:HG12	1.91	0.53
2:B:34:LYS:HB3	2:B:37:GLU:HG3	1.91	0.53
1:A:12:ILE:HD12	1:A:175:ALA:HB2	1.91	0.53
1:A:88:LEU:CD2	1:A:114:LEU:HD12	2.38	0.53
1:C:138:THR:O	1:C:142:LEU:HG	2.09	0.53
1:A:17:ARG:O	1:A:21:ASN:HB2	2.08	0.52
1:C:16:SER:O	1:C:20:LEU:HG	2.08	0.52
1:C:235:LEU:HD12	1:C:243:VAL:HG13	1.91	0.52
1:C:138:THR:OG1	1:C:171:SER:HB3	2.09	0.52
1:C:299:LEU:O	1:C:303:VAL:HG23	2.09	0.52
1:A:164:LYS:HE2	1:A:165:TYR:CZ	2.45	0.52
1:C:278:ASP:HB3	5:C:1424:HOH:O	2.09	0.52
2:B:7:LEU:HG	2:D:9:VAL:O	2.10	0.52
1:C:35:GLN:CB	1:C:38:LEU:HD22	2.40	0.52
1:C:63:MET:SD	1:C:70:VAL:HG22	2.49	0.52
2:B:5:ASN:CG	5:B:212:HOH:O	2.47	0.52
2:D:102:ARG:HB2	2:D:125:PHE:O	2.10	0.52
2:D:125:PHE:HA	2:D:137:LYS:O	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:90:ASP:HA	5:A:1317:HOH:O	2.10	0.52
1:A:226:TYR:CE2	1:A:266:PRO:HD3	2.45	0.52
2:B:47:ASN:O	2:B:55:ARG:HG2	2.10	0.52
2:B:103:ILE:O	2:B:103:ILE:HG23	2.10	0.52
1:A:40:LYS:O	1:A:41:HIS:HB2	2.10	0.51
1:C:5:TYR:O	1:C:6:GLN:HB2	2.09	0.51
1:A:18:ASP:HB3	5:A:1437:HOH:O	2.09	0.51
1:A:253:ASP:HB3	5:A:1368:HOH:O	2.10	0.51
2:B:66:LEU:HB3	2:B:71:VAL:HG23	1.92	0.51
1:A:137:GLN:O	1:A:140:LEU:HG	2.10	0.51
2:D:87:ASP:HB2	2:D:92:VAL:HG21	1.91	0.51
2:D:134:ILE:HG12	2:D:147:HIS:CB	2.40	0.51
2:B:46:LEU:HG	2:B:57:ASP:OD1	2.10	0.51
2:B:78:ALA:O	2:B:97:PRO:HG3	2.10	0.51
1:A:164:LYS:HD3	1:A:165:TYR:CE2	2.46	0.51
2:B:128:ARG:O	2:B:134:ILE:HA	2.11	0.51
1:C:232:LYS:HA	1:C:235:LEU:HG	1.92	0.51
2:D:19:ASP:O	2:D:20:HIS:HB2	2.10	0.51
2:D:134:ILE:HD13	2:D:134:ILE:H	1.76	0.51
1:A:132:ASN:HD21	2:B:142:GLU:HB2	1.76	0.51
1:A:184:PHE:O	1:A:209:TRP:HA	2.11	0.51
2:D:133:ASP:HB2	2:D:147:HIS:CD2	2.45	0.51
1:A:309:VAL:HG23	1:A:309:VAL:O	2.11	0.51
2:D:114:CYS:O	2:D:117:HIS:HD2	1.94	0.51
2:B:84:ASN:OD1	2:B:94:LYS:HE3	2.11	0.51
2:B:86:ILE:HD12	2:B:91:VAL:HA	1.94	0.50
1:C:276:ASP:HA	1:C:279:LYS:HE3	1.92	0.50
2:D:115:ILE:HD11	2:D:119:GLU:HG2	1.94	0.50
2:B:20:HIS:HE1	2:B:52:GLU:OE1	1.94	0.50
2:B:91:VAL:HG22	2:B:91:VAL:O	2.11	0.50
2:B:103:ILE:HD12	2:B:107:LEU:CD1	2.34	0.50
1:A:156:HIS:HB2	1:A:222:VAL:HA	1.93	0.50
1:A:76:SER:O	1:A:82:GLY:HA3	2.11	0.50
2:D:143:LYS:HB2	2:D:145:PHE:CZ	2.47	0.50
1:A:187:ILE:HG13	1:A:212:HIS:HB2	1.93	0.50
1:C:39:LEU:HD12	1:C:66:LEU:CD1	2.41	0.50
1:C:215:ILE:HD12	5:C:1404:HOH:O	2.11	0.50
2:B:9:VAL:CB	2:D:8:GLN:HA	2.42	0.50
2:B:66:LEU:HD12	2:B:71:VAL:CG2	2.41	0.50
1:A:65:ARG:HG3	5:A:1382:HOH:O	2.12	0.50
2:B:48:LEU:HD12	2:B:48:LEU:O	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:277:VAL:HG12	1:C:283:ALA:HB2	1.92	0.50
2:D:41:ARG:HH12	2:D:43:THR:CB	2.24	0.50
2:D:69:ASP:HA	2:D:72:ASP:OD2	2.12	0.49
2:B:19:ASP:O	2:B:81:ALA:HB1	2.11	0.49
2:B:70:GLN:HG3	5:B:178:HOH:O	2.12	0.49
1:A:292:GLY:O	1:A:296:ARG:HB2	2.12	0.49
1:C:309:VAL:HG22	1:C:309:VAL:O	2.11	0.49
2:D:104:ASP:HB3	2:D:123:SER:O	2.11	0.49
1:A:5:TYR:CE2	1:A:306:ARG:HB2	2.47	0.49
1:A:53:THR:O	1:A:57:LEU:HB2	2.13	0.49
1:A:207:ILE:HD13	5:A:1474:HOH:O	2.12	0.49
2:B:40:GLN:HB3	2:B:62:GLU:O	2.12	0.49
2:D:22:PRO:HD2	2:D:78:ALA:HB1	1.94	0.49
2:D:79:PRO:HD2	2:D:80:GLN:OE1	2.11	0.49
1:C:12:ILE:CD1	1:C:135:PRO:HA	2.42	0.49
2:D:20:HIS:HB3	2:D:80:GLN:O	2.12	0.49
1:C:148:THR:HG21	1:C:262:LYS:HG3	1.95	0.49
1:A:156:HIS:CB	1:A:222:VAL:HA	2.43	0.49
2:B:42:ILE:HB	2:D:46:LEU:HB2	1.94	0.49
2:D:104:ASP:O	2:D:105:ASN:HB2	2.11	0.49
1:A:255:HIS:HB2	5:A:1466:HOH:O	2.12	0.49
2:B:13:LYS:HB2	2:B:89:TYR:CZ	2.47	0.49
1:C:279:LYS:CG	5:C:1374:HOH:O	2.52	0.49
2:B:44:ILE:O	2:D:44:ILE:HD12	2.12	0.48
1:C:5:TYR:CE2	1:C:6:GLN:HG2	2.47	0.48
1:C:262:LYS:HD2	1:C:284:TRP:CE3	2.48	0.48
2:D:138:CYS:HB3	2:D:141:CYS:SG	2.53	0.48
1:A:162:ASP:HB2	1:A:230:VAL:HA	1.95	0.48
2:B:44:ILE:HG12	2:B:59:ILE:HG23	1.95	0.48
2:D:12:ILE:HD11	2:D:17:VAL:HG23	1.94	0.48
1:A:10:ILE:HB	5:A:1332:HOH:O	2.12	0.48
1:C:114:LEU:HD12	2:D:121:VAL:HG21	1.95	0.48
2:D:12:ILE:CG2	2:D:62:GLU:HB2	2.43	0.48
2:B:7:LEU:HD12	2:B:8:GLN:N	2.29	0.48
2:D:14:ARG:O	2:D:63:ASN:N	2.41	0.48
1:C:39:LEU:HB3	1:C:68:ALA:HB2	1.95	0.48
1:C:153:ASP:HB3	1:C:180:ASP:O	2.13	0.48
1:A:5:TYR:CG	1:A:306:ARG:HA	2.49	0.48
2:B:47:ASN:O	2:B:55:ARG:HD2	2.14	0.48
2:B:87:ASP:HB3	2:B:92:VAL:HG11	1.95	0.48
1:A:11:SER:CB	1:A:133:GLN:HG3	2.43	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:35:GLN:CB	1:A:38:LEU:HD13	2.44	0.48
1:C:3:PRO:HD2	1:C:22:LEU:CD2	2.44	0.48
1:C:59:PHE:CZ	1:C:136:THR:HG21	2.49	0.48
2:D:16:THR:OG1	2:D:64:THR:O	2.30	0.48
1:A:39:LEU:HD21	1:A:304:LEU:HB2	1.96	0.48
2:B:107:LEU:CD2	2:B:152:ALA:HB2	2.43	0.48
2:D:43:THR:HG22	2:D:60:LYS:HB2	1.95	0.48
2:D:96:ARG:CD	2:D:97:PRO:HD2	2.42	0.48
1:A:69:SER:HB2	5:A:1404:HOH:O	2.13	0.47
1:C:275:THR:O	1:C:278:ASP:HB2	2.14	0.47
2:D:147:HIS:O	2:D:151:LEU:HG	2.13	0.47
2:B:80:GLN:HA	2:B:96:ARG:CZ	2.44	0.47
1:C:301:ALA:O	1:C:305:ASN:HB2	2.14	0.47
2:B:102:ARG:HD3	2:B:102:ARG:N	2.30	0.47
2:D:106:VAL:HG23	2:D:107:LEU:CD2	2.43	0.47
1:A:28:ALA:HB1	5:A:1439:HOH:O	2.15	0.47
2:B:44:ILE:HB	2:D:44:ILE:HD13	1.95	0.47
2:B:40:GLN:HG3	2:B:62:GLU:O	2.14	0.47
2:B:58:LEU:HD21	2:B:60:LYS:CE	2.43	0.47
2:B:128:ARG:HH11	2:B:128:ARG:HG2	1.79	0.47
1:A:205:LYS:HB3	1:A:207:ILE:CG1	2.37	0.47
1:A:16:SER:O	1:A:19:ASP:HB2	2.15	0.47
2:B:107:LEU:HD22	2:B:150:VAL:CG1	2.44	0.47
1:C:291:ASN:HA	1:C:294:PHE:CD2	2.50	0.47
2:D:91:VAL:HG12	2:D:91:VAL:O	2.15	0.46
1:A:250:ARG:HH11	1:A:250:ARG:HG2	1.80	0.46
2:B:19:ASP:HB3	2:B:82:THR:OG1	2.14	0.46
1:C:138:THR:HG23	1:C:172:LEU:HA	1.97	0.46
2:D:84:ASN:OD1	2:D:94:LYS:HE3	2.15	0.46
2:D:50:SER:HB3	2:D:53:MET:H	1.81	0.46
1:A:258:LYS:CD	1:A:260:ASN:HD21	2.26	0.46
2:B:21:ILE:CD1	2:B:59:ILE:HG13	2.45	0.46
2:B:65:PHE:CE1	2:B:85:ARG:HG3	2.50	0.46
1:C:156:HIS:HD2	1:C:185:TYR:OH	1.99	0.46
2:D:83:VAL:HG22	2:D:83:VAL:O	2.15	0.46
1:A:176:LEU:HA	1:A:179:PHE:HD2	1.81	0.46
1:A:203:ASP:HA	5:A:1397:HOH:O	2.14	0.46
2:B:106:VAL:HG23	2:B:106:VAL:O	2.16	0.46
2:B:143:LYS:HD3	2:B:143:LYS:N	2.30	0.46
1:C:262:LYS:HA	1:C:262:LYS:HD3	1.82	0.46
1:C:13:ASN:HD22	1:C:13:ASN:HA	1.54	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:88:LEU:O	1:A:91:THR:HB	2.15	0.46
1:C:39:LEU:HD12	1:C:66:LEU:HD13	1.97	0.46
2:B:99:LEU:HA	2:B:100:PRO:HD3	1.76	0.45
1:C:151:ARG:HG2	1:C:151:ARG:HH11	1.81	0.45
2:D:96:ARG:CG	2:D:97:PRO:HD2	2.46	0.45
1:A:185:TYR:HD2	1:A:212:HIS:NE2	2.14	0.45
2:B:107:LEU:HD23	2:B:107:LEU:HA	1.57	0.45
2:B:136:LEU:HB2	2:B:145:PHE:O	2.17	0.45
1:C:106:HIS:CG	1:C:107:PRO:HD2	2.51	0.45
2:D:21:ILE:CD1	2:D:59:ILE:HG13	2.46	0.45
2:D:50:SER:N	2:D:54:GLY:O	2.50	0.45
1:A:117:GLU:HB2	1:A:118:PHE:CE2	2.52	0.45
2:B:10:GLU:HB3	2:B:60:LYS:NZ	2.31	0.45
1:C:152:LEU:N	5:C:1418:HOH:O	2.50	0.45
1:C:170:HIS:O	1:C:174:GLN:HG3	2.17	0.45
1:C:200:ASP:OD2	2:D:130:ARG:NH1	2.50	0.45
1:C:250:ARG:NH2	1:C:276:ASP:OD2	2.50	0.45
2:D:43:THR:HG22	2:D:43:THR:O	2.16	0.45
2:D:45:GLY:O	2:D:57:ASP:HA	2.17	0.45
1:A:170:HIS:O	1:A:174:GLN:HG3	2.16	0.45
1:A:217:GLU:HG2	5:A:1465:HOH:O	2.17	0.45
1:C:149:GLN:OE1	1:C:260:ASN:ND2	2.50	0.45
1:A:194:MET:HA	1:A:195:PRO:HD3	1.80	0.45
2:B:105:ASN:O	2:B:106:VAL:HG22	2.16	0.45
2:D:33:PHE:HB3	2:D:35:LEU:CD2	2.47	0.45
2:D:104:ASP:OD2	2:D:104:ASP:N	2.50	0.45
2:B:123:SER:O	2:B:124:SER:HB2	2.17	0.45
2:D:123:SER:O	2:D:124:SER:HB2	2.15	0.45
1:A:47:CYS:O	1:A:104:MET:HA	2.17	0.45
1:A:263:VAL:O	1:A:264:LEU:HD23	2.17	0.45
2:B:38:THR:HB	5:B:213:HOH:O	2.16	0.45
2:B:73:GLN:HG2	2:B:73:GLN:H	1.44	0.45
1:C:280:THR:N	5:C:1359:HOH:O	2.50	0.45
1:A:54:ARG:NH1	3:A:1311:PAL:O2P	2.50	0.45
1:A:257:ALA:HB1	1:A:261:MET:CE	2.47	0.45
2:B:134:ILE:HG22	2:B:147:HIS:HB3	1.97	0.45
2:D:96:ARG:HG3	2:D:97:PRO:HD2	1.99	0.45
1:A:230:VAL:O	1:A:232:LYS:N	2.49	0.44
2:B:30:LEU:HB3	2:D:27:PHE:CZ	2.52	0.44
2:B:110:PRO:HG2	2:B:145:PHE:CE1	2.52	0.44
1:C:231:GLN:OE1	1:C:234:ARG:NH2	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:110:PRO:HG2	2:D:145:PHE:CE1	2.52	0.44
1:A:54:ARG:HB2	1:A:54:ARG:NH1	2.25	0.44
1:A:131:SER:O	1:A:170:HIS:ND1	2.50	0.44
2:B:141:CYS:O	2:B:142:GLU:HB2	2.17	0.44
1:A:210:SER:OG	1:A:212:HIS:NE2	2.50	0.44
1:A:265:HIS:HA	1:A:266:PRO:HD2	1.83	0.44
1:C:125:LEU:N	1:C:125:LEU:HD12	2.32	0.44
1:C:271:ASP:OD1	1:C:271:ASP:N	2.50	0.44
2:D:52:GLU:OE2	2:D:53:MET:HE1	2.17	0.44
1:A:164:LYS:HB2	1:A:193:ALA:O	2.18	0.44
1:A:183:ARG:HD3	5:A:1408:HOH:O	2.16	0.44
2:D:12:ILE:HG21	2:D:62:GLU:HB2	1.99	0.44
2:D:19:ASP:CG	2:D:58:LEU:HD13	2.37	0.44
1:A:21:ASN:HD22	1:A:21:ASN:HA	1.45	0.44
2:B:58:LEU:HG	2:B:59:ILE:N	2.33	0.44
2:D:79:PRO:O	2:D:96:ARG:NH1	2.50	0.44
1:A:146:GLN:HB2	1:A:152:LEU:HD21	2.00	0.44
2:B:33:PHE:HB2	2:B:35:LEU:CD2	2.39	0.44
1:C:35:GLN:NE2	1:C:310:LEU:HD22	2.32	0.44
1:C:144:THR:HG21	1:C:288:GLN:CB	2.45	0.44
2:B:38:THR:HG23	2:B:40:GLN:H	1.82	0.44
1:C:54:ARG:NH2	1:C:268:PRO:HG3	2.33	0.44
1:C:81:LEU:HA	1:C:86:GLU:HB3	1.99	0.44
2:D:150:VAL:HG12	2:D:150:VAL:O	2.16	0.44
2:D:102:ARG:HA	2:D:127:VAL:HG23	2.00	0.44
2:B:47:ASN:O	2:B:49:PRO:HD3	2.18	0.44
1:C:42:LYS:HD3	5:C:1414:HOH:O	2.18	0.44
2:B:151:LEU:HD23	2:B:152:ALA:O	2.18	0.43
2:B:151:LEU:CD2	5:B:188:HOH:O	2.46	0.43
2:D:29:LEU:HD23	2:D:29:LEU:HA	1.81	0.43
2:D:134:ILE:HG12	2:D:147:HIS:CG	2.53	0.43
1:A:216:GLU:CB	5:A:1463:HOH:O	2.63	0.43
2:B:145:PHE:HB2	2:B:150:VAL:CG2	2.48	0.43
1:C:221:GLU:N	5:C:1413:HOH:O	2.51	0.43
1:C:39:LEU:HD21	1:C:304:LEU:HB2	1.99	0.43
1:C:185:TYR:HA	1:C:210:SER:O	2.17	0.43
2:B:18:ILE:N	2:B:18:ILE:HD13	2.34	0.43
1:C:240:TYR:HD1	1:C:240:TYR:HA	1.61	0.43
2:D:35:LEU:H	2:D:35:LEU:HG	1.73	0.43
1:A:108:GLN:HA	2:B:113:ASN:ND2	2.33	0.43
1:A:174:GLN:HG2	1:A:201:MET:HE2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:67:SER:HB3	2:B:70:GLN:NE2	2.33	0.43
2:D:30:LEU:HA	2:D:35:LEU:CD1	2.47	0.43
1:A:113:ARG:HA	1:A:113:ARG:HD3	1.64	0.43
2:D:41:ARG:NH1	2:D:43:THR:OG1	2.50	0.43
1:A:179:PHE:HB2	1:A:182:ASN:ND2	2.34	0.43
2:B:61:ILE:HB	2:B:64:THR:HB	2.00	0.43
2:B:74:LEU:N	2:B:74:LEU:HD23	2.33	0.43
2:D:108:VAL:CG2	2:D:153:ASN:HB3	2.48	0.43
1:A:106:HIS:HE1	1:A:108:GLN:OE1	2.01	0.43
1:C:131:SER:HA	1:C:167:ARG:HB3	2.01	0.43
2:D:17:VAL:HG22	2:D:60:LYS:CG	2.47	0.43
2:D:69:ASP:O	2:D:72:ASP:HB2	2.18	0.43
2:B:71:VAL:O	2:B:74:LEU:HG	2.19	0.43
1:C:1:ALA:HA	1:C:306:ARG:O	2.19	0.43
1:C:157:VAL:HG22	1:C:224:ILE:HB	2.01	0.43
1:C:183:ARG:HH12	1:C:210:SER:CB	2.32	0.43
2:B:62:GLU:O	2:B:63:ASN:HB2	2.18	0.42
2:D:13:LYS:HA	2:D:89:TYR:CD2	2.53	0.42
2:D:110:PRO:HG2	2:D:145:PHE:CD1	2.53	0.42
1:A:199:LEU:HA	1:A:202:LEU:HD12	2.02	0.42
1:A:248:VAL:HG13	1:A:271:ASP:O	2.19	0.42
1:A:275:THR:O	1:A:278:ASP:HB2	2.18	0.42
2:D:44:ILE:HD12	2:D:44:ILE:N	2.34	0.42
1:A:174:GLN:O	1:A:178:LYS:HG3	2.19	0.42
1:A:266:PRO:O	1:A:267:LEU:HB2	2.19	0.42
2:B:145:PHE:HB2	2:B:150:VAL:HG23	2.01	0.42
1:C:80:SER:CA	1:C:84:LYS:HG3	2.47	0.42
1:C:261:MET:O	1:C:261:MET:HG3	2.15	0.42
2:B:9:VAL:HG11	2:D:7:LEU:O	2.20	0.42
2:B:38:THR:HG23	2:B:39:ASP:N	2.32	0.42
2:D:50:SER:CB	2:D:53:MET:HB2	2.49	0.42
1:A:106:HIS:CG	1:A:107:PRO:HD2	2.54	0.42
2:B:9:VAL:O	2:D:8:GLN:HG3	2.20	0.42
2:B:53:MET:HB3	2:B:56:LYS:HB3	2.02	0.42
1:C:140:LEU:CD1	1:C:288:GLN:HG3	2.50	0.42
2:D:109:CYS:HA	2:D:110:PRO:HD2	1.85	0.42
2:D:50:SER:HB3	2:D:54:GLY:N	2.34	0.42
2:B:13:LYS:HG3	2:B:89:TYR:CE2	2.55	0.42
1:C:42:LYS:HD2	5:C:1331:HOH:O	2.20	0.42
1:C:134:HIS:CD2	1:C:168:THR:HG22	2.54	0.42
2:D:78:ALA:HB1	2:D:81:ALA:HB2	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:35:GLN:CG	1:C:38:LEU:HD22	2.49	0.42
1:C:104:MET:HE3	1:C:104:MET:HB3	1.87	0.42
1:C:293:ILE:HD13	1:C:293:ILE:HA	1.88	0.42
1:A:81:LEU:CA	1:A:86:GLU:HB3	2.45	0.42
2:B:17:VAL:HB	2:B:84:ASN:HB2	2.01	0.42
2:D:135:ALA:O	2:D:136:LEU:HD23	2.20	0.42
2:D:143:LYS:HE2	2:D:143:LYS:HB3	1.31	0.42
1:A:20:LEU:O	1:A:24:LEU:HD22	2.20	0.42
1:A:64:HIS:HE1	5:A:1347:HOH:O	2.02	0.42
2:B:22:PRO:O	2:B:25:ILE:HB	2.20	0.42
2:B:25:ILE:O	2:B:29:LEU:HG	2.20	0.42
1:C:80:SER:OG	1:C:84:LYS:HD2	2.19	0.42
1:C:91:THR:HG22	1:C:95:ILE:CD1	2.50	0.42
2:D:109:CYS:SG	2:D:111:ASN:HB3	2.60	0.42
1:A:15:LEU:O	1:A:178:LYS:HE3	2.21	0.41
2:B:31:SER:O	2:B:34:LYS:N	2.50	0.41
1:A:300:LEU:HA	1:A:300:LEU:HD23	1.85	0.41
2:B:130:ARG:HG3	2:B:135:ALA:HB2	2.01	0.41
1:C:256:ASN:OD1	1:C:256:ASN:N	2.50	0.41
2:D:42:ILE:CD1	2:D:61:ILE:HG23	2.46	0.41
1:A:167:ARG:HG2	5:A:1336:HOH:O	2.18	0.41
2:B:12:ILE:HD12	2:B:12:ILE:N	2.32	0.41
1:C:156:HIS:CB	1:C:222:VAL:HA	2.50	0.41
1:A:12:ILE:CD1	1:A:138:THR:HG21	2.50	0.41
2:B:35:LEU:H	2:B:35:LEU:HG	1.66	0.41
2:B:71:VAL:HG12	2:B:72:ASP:N	2.35	0.41
1:C:235:LEU:HD23	1:C:235:LEU:HA	1.86	0.41
2:B:136:LEU:HD23	2:B:136:LEU:HA	1.80	0.41
1:C:263:VAL:C	1:C:264:LEU:HD23	2.40	0.41
1:C:136:THR:HB	1:C:296:ARG:NH2	2.28	0.41
1:A:75:ASP:OD2	1:A:77:ALA:HB3	2.20	0.41
1:A:223:ASP:O	1:A:261:MET:HG2	2.21	0.41
2:D:81:ALA:O	2:D:96:ARG:NH1	2.53	0.41
2:B:27:PHE:O	2:B:30:LEU:HB2	2.21	0.41
1:C:12:ILE:HD12	1:C:135:PRO:HA	2.01	0.41
1:C:276:ASP:HA	1:C:279:LYS:CE	2.51	0.41
2:D:21:ILE:CG2	2:D:57:ASP:HB2	2.50	0.41
2:D:107:LEU:HD23	2:D:107:LEU:N	2.36	0.41
1:A:88:LEU:O	1:A:92:ILE:HG12	2.21	0.41
2:B:80:GLN:O	2:B:80:GLN:HG2	2.20	0.41
1:C:110:GLY:HA3	2:D:140:TYR:HB3	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:262:LYS:HD2	1:C:284:TRP:HB2	2.03	0.41
2:D:66:LEU:HD22	2:D:66:LEU:HA	1.84	0.41
2:D:99:LEU:HD12	2:D:127:VAL:HG11	2.02	0.41
2:B:66:LEU:HD12	2:B:71:VAL:CA	2.51	0.41
2:B:128:ARG:HG2	2:B:128:ARG:NH1	2.36	0.41
1:C:143:PHE:HD2	1:C:291:ASN:HB3	1.86	0.40
2:D:17:VAL:O	2:D:17:VAL:HG12	2.20	0.40
2:D:30:LEU:HA	2:D:35:LEU:HD12	2.03	0.40
1:C:169:VAL:CG1	1:C:228:THR:HG21	2.51	0.40
2:D:17:VAL:CG2	2:D:86:ILE:HD12	2.51	0.40
1:A:138:THR:HA	5:A:1350:HOH:O	2.20	0.40
1:C:54:ARG:HE	3:C:1312:PAL:H1P1	1.86	0.40
2:D:48:LEU:N	2:D:56:LYS:O	2.53	0.40
2:D:78:ALA:HA	2:D:79:PRO:HD2	1.80	0.40
2:B:50:SER:OG	2:B:56:LYS:HG2	2.22	0.40
1:C:32:ALA:O	1:C:34:PRO:HD3	2.21	0.40
2:D:25:ILE:O	2:D:25:ILE:HG22	2.22	0.40
2:D:117:HIS:CD2	2:D:117:HIS:H	2.39	0.40
2:D:134:ILE:HD13	2:D:134:ILE:N	2.35	0.40
2:D:143:LYS:HD2	5:D:162:HOH:O	2.20	0.40
2:B:79:PRO:CA	2:B:97:PRO:HG2	2.49	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:41:HIS:NE2	5:C:1415:HOH:O[2_655]	1.81	0.39
1:C:41:HIS:CE1	5:C:1415:HOH:O[2_655]	2.01	0.19

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	308/310 (99%)	286 (93%)	18 (6%)	4 (1%)	12 36
1	C	308/310 (99%)	291 (94%)	17 (6%)	0	100 100
2	B	151/153 (99%)	117 (78%)	28 (18%)	6 (4%)	3 9
2	D	151/153 (99%)	121 (80%)	24 (16%)	6 (4%)	3 9
All	All	918/926 (99%)	815 (89%)	87 (10%)	16 (2%)	9 29

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	218	VAL
2	B	106	VAL
2	B	130	ARG
2	D	91	VAL
1	A	132	ASN
2	B	105	ASN
2	D	33	PHE
1	A	231	GLN
2	B	123	SER
2	D	38	THR
2	D	50	SER
2	D	123	SER
2	B	5	ASN
2	D	8	GLN
2	B	9	VAL
1	A	267	LEU

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	260/260 (100%)	218 (84%)	42 (16%)	2 7
1	C	260/260 (100%)	219 (84%)	41 (16%)	2 8
2	B	137/137 (100%)	88 (64%)	49 (36%)	0 0
2	D	137/137 (100%)	96 (70%)	41 (30%)	0 1

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	794/794 (100%)	621 (78%)	173 (22%)	1 3

All (173) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	GLN
1	A	12	ILE
1	A	13	ASN
1	A	17	ARG
1	A	21	ASN
1	A	24	LEU
1	A	29	LYS
1	A	33	ASN
1	A	54	ARG
1	A	57	LEU
1	A	59	PHE
1	A	65	ARG
1	A	69	SER
1	A	74	SER
1	A	87	THR
1	A	96	SER
1	A	119	SER
1	A	121	ASN
1	A	131	SER
1	A	134	HIS
1	A	146	GLN
1	A	153	ASP
1	A	176	LEU
1	A	180	ASP
1	A	183	ARG
1	A	190	ASP
1	A	207	ILE
1	A	213	SER
1	A	214	SER
1	A	217	GLU
1	A	229	ARG
1	A	246	GLN
1	A	250	ARG
1	A	255	HIS
1	A	256	ASN
1	A	261	MET
1	A	262	LYS

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Mol	Chain	Res	Type
1	A	269	ARG
1	A	285	TYR
1	A	305	ASN
1	A	307	ASP
1	A	308	LEU
2	B	3	HIS
2	B	5	ASN
2	B	6	LYS
2	B	7	LEU
2	B	10	GLU
2	B	12	ILE
2	B	14	ARG
2	B	30	LEU
2	B	32	LEU
2	B	35	LEU
2	B	36	THR
2	B	37	GLU
2	B	43	THR
2	B	46	LEU
2	B	50	SER
2	B	52	GLU
2	B	53	MET
2	B	55	ARG
2	B	57	ASP
2	B	58	LEU
2	B	59	ILE
2	B	60	LYS
2	B	61	ILE
2	B	65	PHE
2	B	66	LEU
2	B	73	GLN
2	B	76	LEU
2	B	80	GLN
2	B	82	THR
2	B	86	ILE
2	B	91	VAL
2	B	92	VAL
2	B	94	LYS
2	B	96	ARG
2	B	98	SER
2	B	102	ARG
2	B	103	ILE

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Mol	Chain	Res	Type
2	B	105	ASN
2	B	122	SER
2	B	123	SER
2	B	129	LYS
2	B	130	ARG
2	B	132	ASN
2	B	137	LYS
2	B	139	LYS
2	B	143	LYS
2	B	145	PHE
2	B	147	HIS
2	B	149	VAL
1	C	7	LYS
1	C	12	ILE
1	C	13	ASN
1	C	15	LEU
1	C	17	ARG
1	C	42	LYS
1	C	59	PHE
1	C	69	SER
1	C	83	LYS
1	C	87	THR
1	C	92	ILE
1	C	97	THR
1	C	104	MET
1	C	136	THR
1	C	145	ILE
1	C	151	ARG
1	C	153	ASP
1	C	160	VAL
1	C	171	SER
1	C	183	ARG
1	C	201	MET
1	C	205	LYS
1	C	207	ILE
1	C	232	LYS
1	C	233	GLU
1	C	243	VAL
1	C	244	LYS
1	C	253	ASP
1	C	258	LYS
1	C	261	MET

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Mol	Chain	Res	Type
1	C	269	ARG
1	C	279	LYS
1	C	280	THR
1	C	285	TYR
1	C	288	GLN
1	C	296	ARG
1	C	303	VAL
1	C	306	ARG
1	C	308	LEU
1	C	309	VAL
1	C	310	LEU
2	D	1	MET
2	D	3	HIS
2	D	5	ASN
2	D	7	LEU
2	D	8	GLN
2	D	9	VAL
2	D	10	GLU
2	D	14	ARG
2	D	16	THR
2	D	25	ILE
2	D	31	SER
2	D	35	LEU
2	D	40	GLN
2	D	43	THR
2	D	48	LEU
2	D	50	SER
2	D	52	GLU
2	D	58	LEU
2	D	60	LYS
2	D	61	ILE
2	D	66	LEU
2	D	68	GLU
2	D	69	ASP
2	D	73	GLN
2	D	74	LEU
2	D	76	LEU
2	D	83	VAL
2	D	90	GLU
2	D	96	ARG
2	D	98	SER
2	D	101	GLU

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Mol	Chain	Res	Type
2	D	103	ILE
2	D	104	ASP
2	D	121	VAL
2	D	127	VAL
2	D	128	ARG
2	D	130	ARG
2	D	134	ILE
2	D	143	LYS
2	D	145	PHE
2	D	148	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	6	GLN
1	A	13	ASN
1	A	21	ASN
1	A	64	HIS
1	A	78	ASN
1	A	146	GLN
1	A	174	GLN
1	A	260	ASN
1	A	291	ASN
1	A	297	GLN
1	A	305	ASN
2	B	8	GLN
2	B	47	ASN
2	B	70	GLN
2	B	132	ASN
1	C	13	ASN
1	C	21	ASN
1	C	35	GLN
1	C	64	HIS
1	C	108	GLN
1	C	149	GLN
1	C	156	HIS
1	C	260	ASN
1	C	291	ASN
2	D	40	GLN
2	D	63	ASN
2	D	73	GLN
2	D	113	ASN

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Mol	Chain	Res	Type
2	D	117	HIS
2	D	147	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	$\#\|Z\| > 2$
3	PAL	C	1312	-	15,15,15	1.61	4 (26%)	20,21,21	1.65	4 (20%)
3	PAL	A	1311	-	15,15,15	1.64	4 (26%)	20,21,21	1.69	4 (20%)

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
3	PAL	C	1312	-	-	1/17/17/17	-
3	PAL	A	1311	-	-	1/17/17/17	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1311	PAL	P-O3P	3.39	1.62	1.54
3	C	1312	PAL	P-O3P	3.32	1.62	1.54
3	A	1311	PAL	P-O2P	-3.09	1.47	1.54
3	C	1312	PAL	P-O2P	-3.01	1.48	1.54
3	A	1311	PAL	O2-C4	2.28	1.29	1.22
3	A	1311	PAL	P-O1P	2.20	1.54	1.50
3	C	1312	PAL	O2-C4	2.20	1.28	1.22
3	C	1312	PAL	P-O1P	2.15	1.54	1.50

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	1311	PAL	O2P-P-C1P	4.60	116.50	106.84
3	C	1312	PAL	O2P-P-C1P	4.52	116.33	106.84
3	A	1311	PAL	O3P-P-O1P	-3.75	102.46	112.39
3	C	1312	PAL	O3P-P-O1P	-3.67	102.69	112.39
3	A	1311	PAL	C4-C2-N2	2.84	117.28	110.55
3	C	1312	PAL	C4-C2-N2	2.67	116.87	110.55
3	A	1311	PAL	O3P-P-C1P	-2.21	102.19	106.84
3	C	1312	PAL	O3P-P-C1P	-2.21	102.20	106.84

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1311	PAL	O1-C1-N2-C2
3	C	1312	PAL	O1-C1-N2-C2

There are no ring outliers.

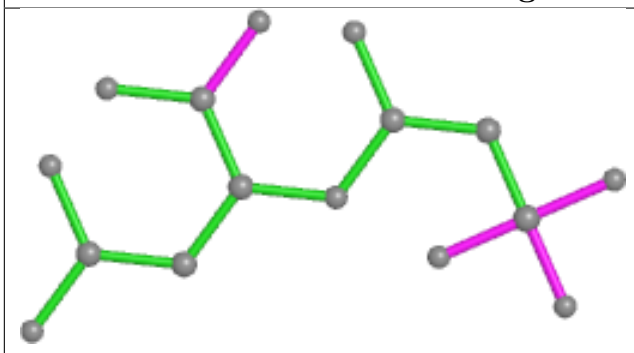
2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1312	PAL	2	0
3	A	1311	PAL	1	0

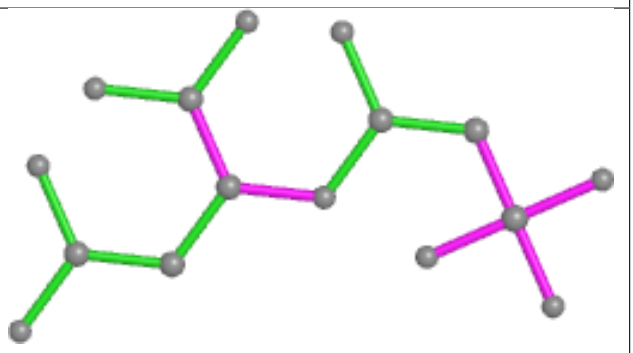
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

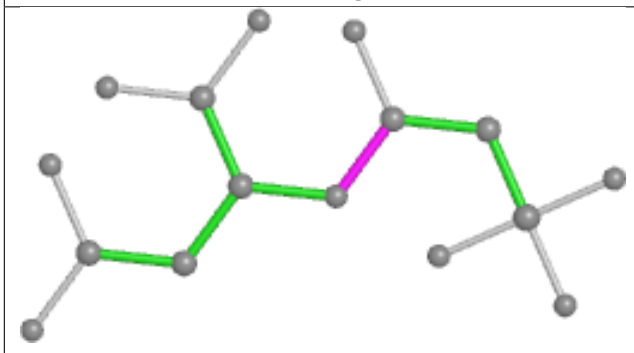
Ligand PAL C 1312



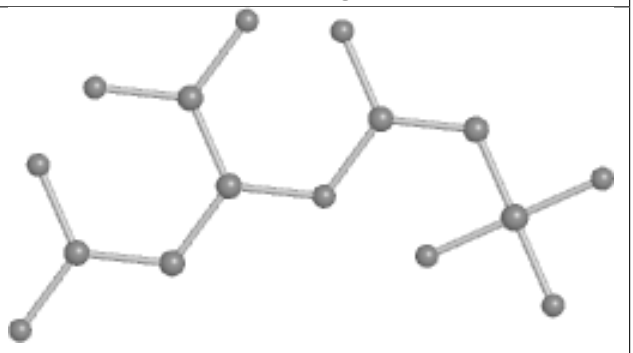
Bond lengths



Bond angles

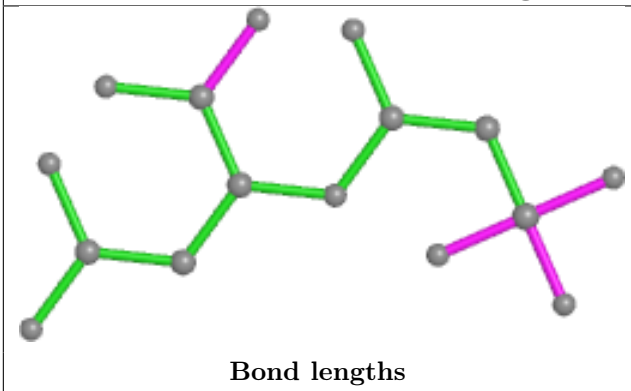


Torsions

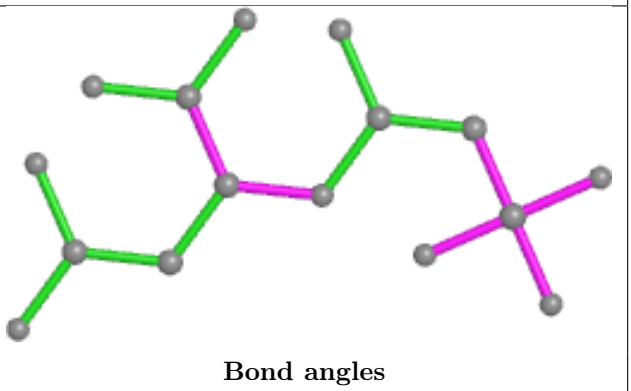


Rings

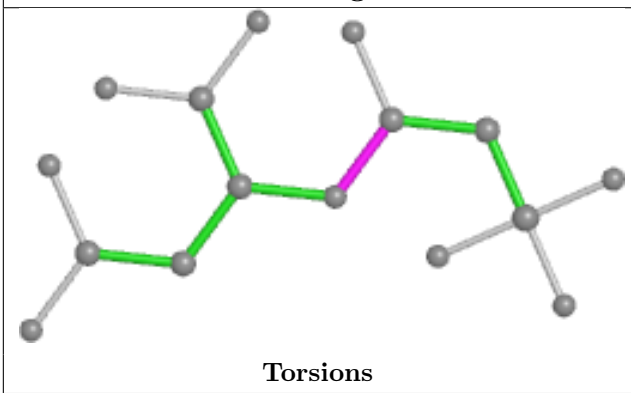
Ligand PAL A 1311



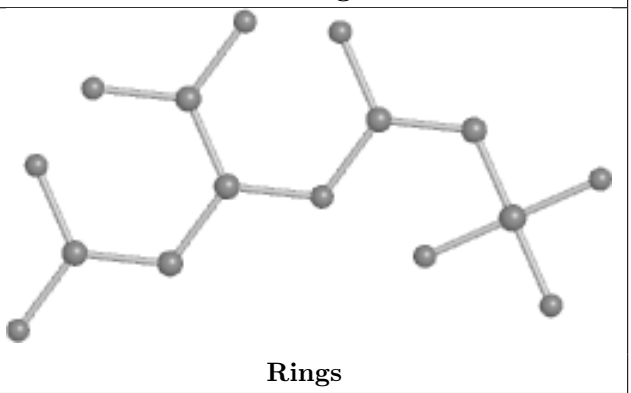
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	B	3
1	C	1
2	D	1
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	C	309:VAL	C	310:LEU	N	1.61
1	B	106:VAL	C	107:LEU	N	1.16
1	D	1:MET	C	2:THR	N	1.16
1	B	152:ALA	C	153:ASN	N	1.08
1	B	3:HIS	C	4:ASP	N	1.06

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	132:ASN	C	133:GLN	N	1.04

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	310/310 (100%)	-1.12	0 100 100	6, 30, 74, 158	0
1	C	310/310 (100%)	-1.14	0 100 100	9, 28, 67, 95	0
2	B	153/153 (100%)	-0.41	6 (3%) 39 29	20, 84, 158, 158	0
2	D	153/153 (100%)	-0.53	5 (3%) 46 36	22, 91, 158, 158	1 (0%)
All	All	926/926 (100%)	-0.91	11 (1%) 79 73	6, 40, 138, 158	1 (0%)

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	9	VAL	6.1
2	B	153	ASN	4.0
2	D	1	MET	3.6
2	B	51	GLY	3.5
2	D	5	ASN	3.4
2	B	9	VAL	3.2
2	B	8	GLN	3.2
2	D	4	ASP	3.2
2	B	152	ALA	2.8
2	B	92	VAL	2.3
2	D	8	GLN	2.1

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

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands (i)

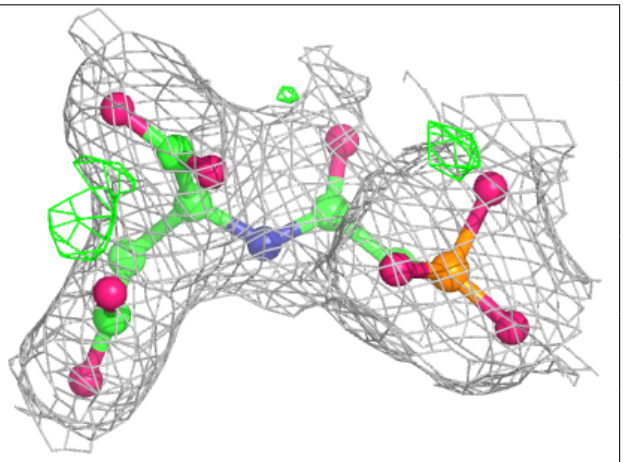
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

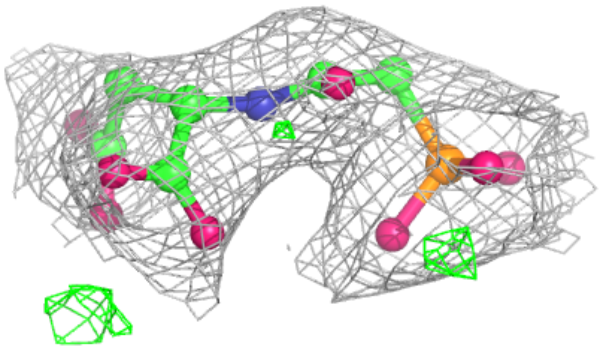
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	PAL	A	1311	16/16	0.99	0.18	7,27,41,51	0
3	PAL	C	1312	16/16	0.99	0.15	10,24,41,59	0
4	ZN	B	154	1/1	0.99	0.02	38,38,38,38	0
4	ZN	D	155	1/1	0.99	0.02	30,30,30,30	0

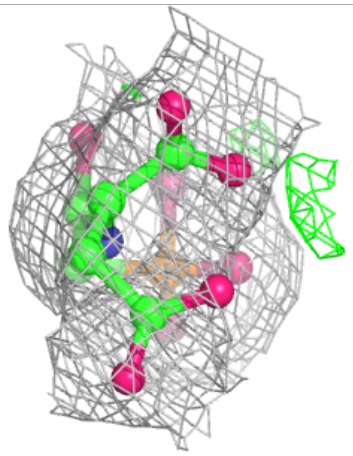
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around PAL A 1311:

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

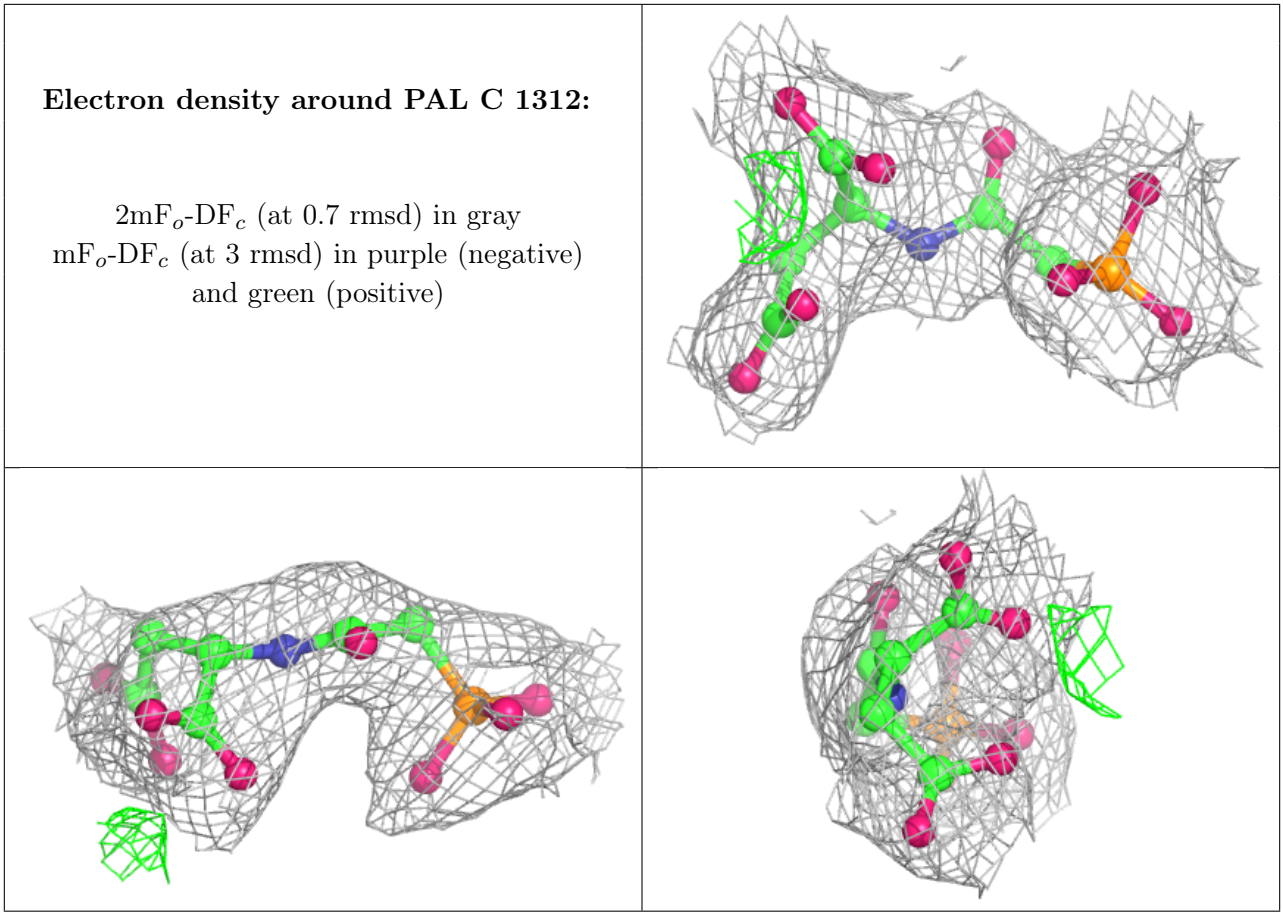






Electron density around PAL C 1312:

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



6.5 Other polymers

There are no such residues in this entry.