



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 31, 2016 – 10:46 PM GMT

PDB ID : 1V0J
Title : UDP-GALACTOPYRANOSE MUTASE FROM MYCOBACTERIUM TUBERCULOSIS
Authors : Beis, K.; Naismith, J.H.
Deposited on : 2004-03-30
Resolution : 2.25 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

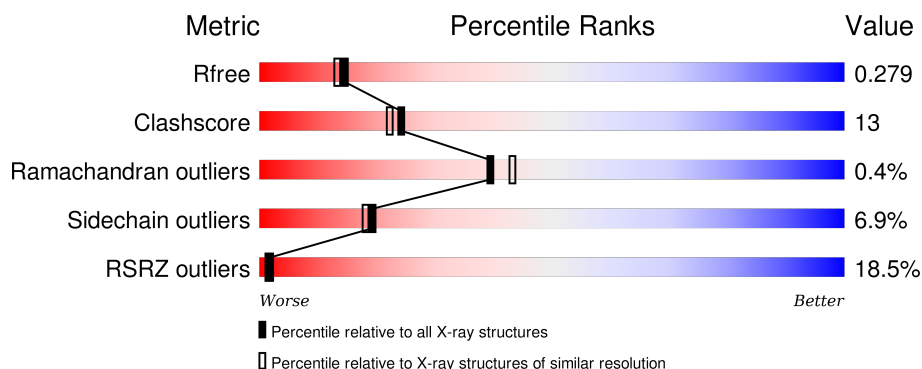
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.25 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}	91344	1640 (2.28-2.24)
Clashscore	102246	1095 (2.26-2.26)
Ramachandran outliers	100387	1063 (2.26-2.26)
Sidechain outliers	100360	1063 (2.26-2.26)
RSRZ outliers	91569	1647 (2.28-2.24)

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

Mol	Chain	Length	Quality of chain
1	A	399	<div> <div>16%</div> <div>76%</div> <div>17%</div> <div>• •</div> </div>
1	B	399	<div> <div>17%</div> <div>72%</div> <div>20%</div> <div>5% • •</div> </div>
1	C	399	<div> <div>19%</div> <div>74%</div> <div>20%</div> <div>• • •</div> </div>
1	D	399	<div> <div>21%</div> <div>75%</div> <div>18%</div> <div>• •</div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

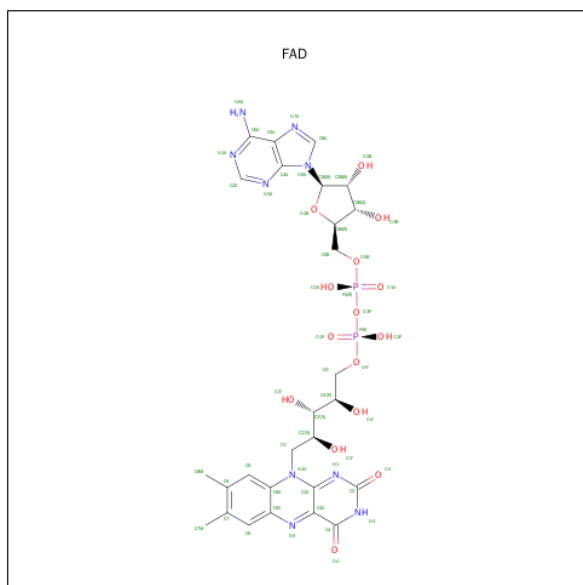
Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	BCN	A	1394	-	-	X	X

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 UDP-GALACTOPYRANOSE MUTASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	388	Total 3162	C 2020	N 548	O 585	S 9	0	0	0
1	B	388	Total 3162	C 2020	N 548	O 585	S 9	0	0	0
1	C	388	Total 3162	C 2020	N 548	O 585	S 9	0	0	0
1	D	388	Total 3162	C 2020	N 548	O 585	S 9	0	0	0

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $\text{C}_{27}\text{H}_{33}\text{N}_9\text{O}_{15}\text{P}_2$).



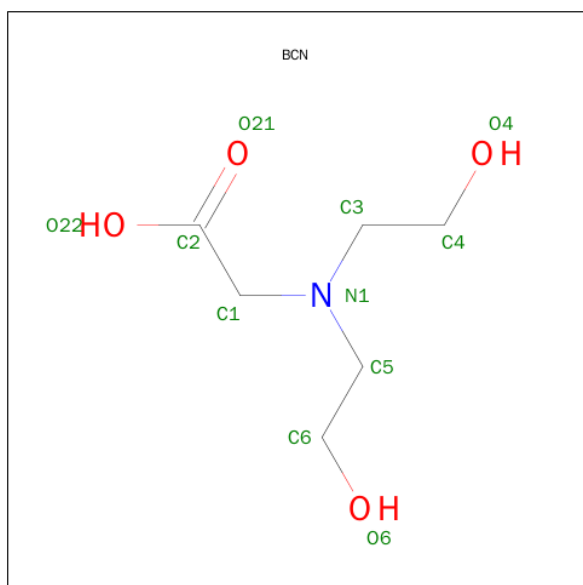
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 53	C 27	N 9	O 15	P 2	0	0
2	B	1	Total 53	C 27	N 9	O 15	P 2	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	D	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is BICINE (three-letter code: BCN) (formula: $C_6H_{13}NO_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			11	6	1	4		

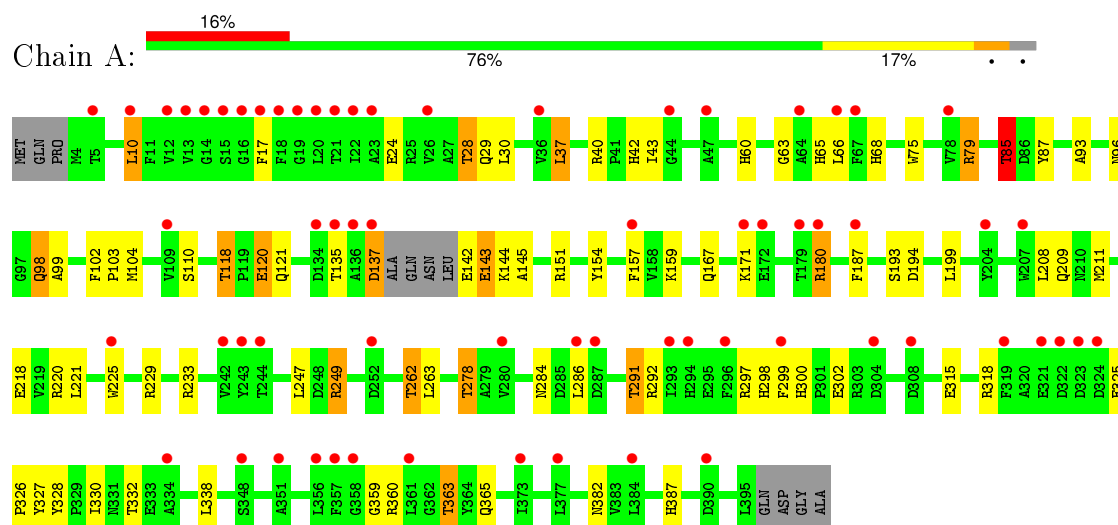
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	334	Total	O	0	0
			334	334		
4	B	238	Total	O	0	0
			238	238		
4	C	267	Total	O	0	0
			267	267		
4	D	182	Total	O	0	0
			182	182		

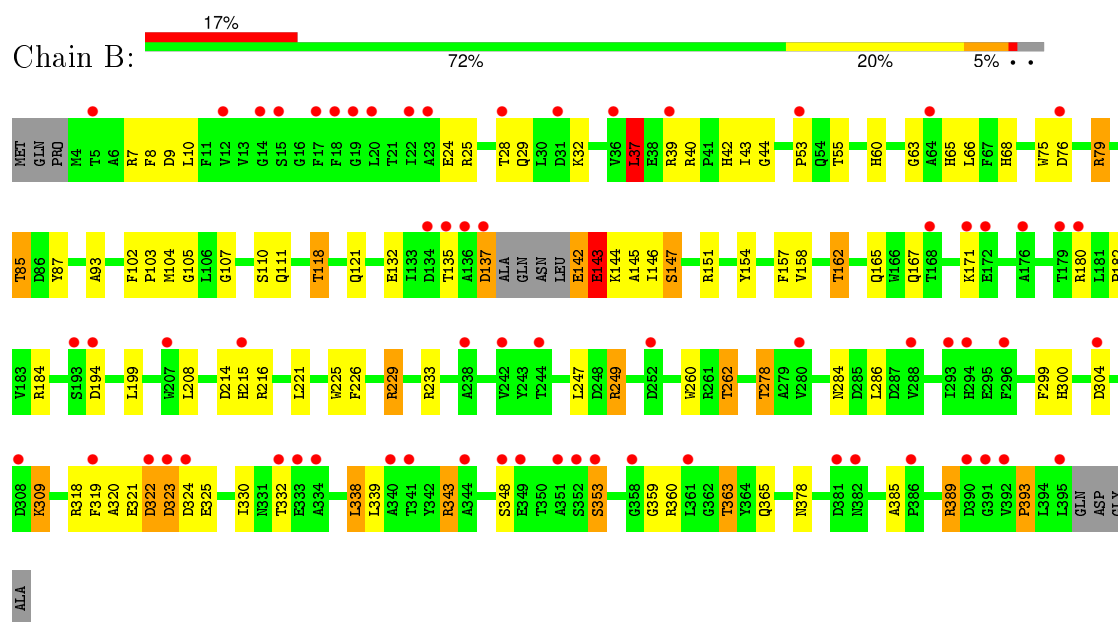
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: UDP-GALACTOPYRANOSE MUTASE

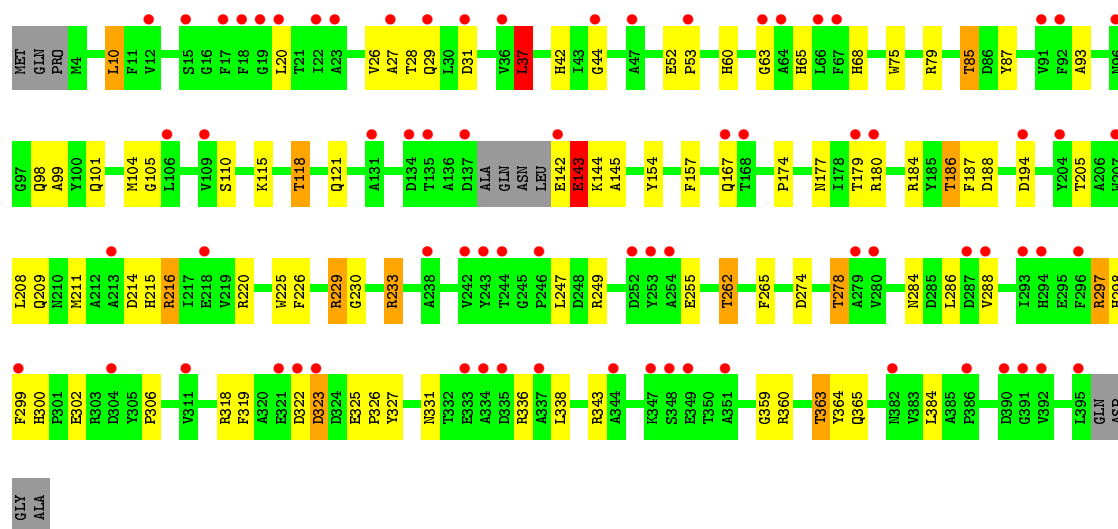


• Molecule 1: UDP-GALACTOPYRANOSE MUTASE




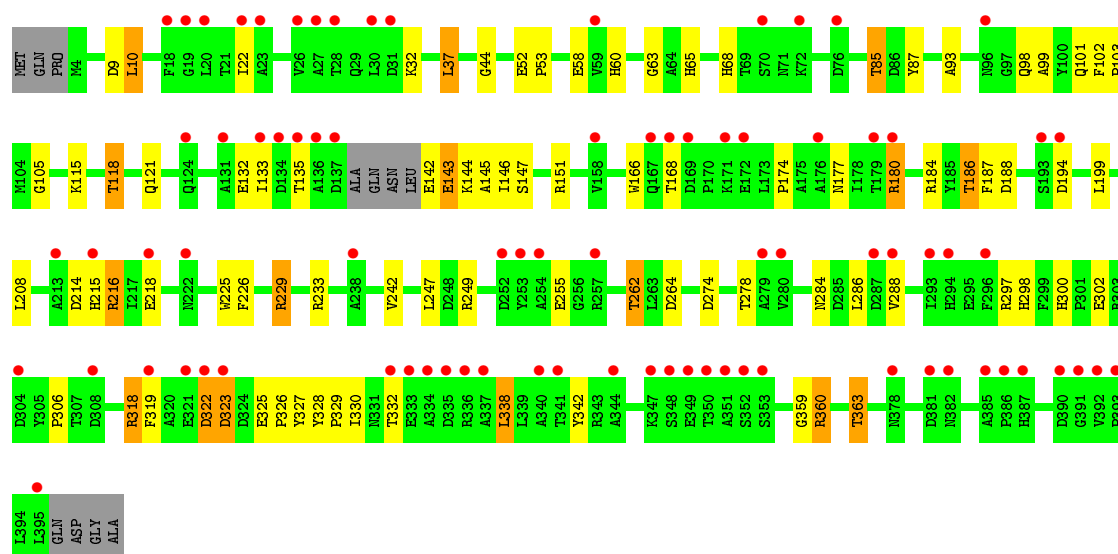
• Molecule 1: UDP-GALACTOPYRANOSE MUTASE

Chain C: 



• Molecule 1: UDP-GALACTOPYRANOSE MUTASE

Chain D: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	137.60Å 153.73Å 137.69Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	15.00 – 2.25 25.46 – 2.25	Depositor EDS
% Data completeness (in resolution range)	88.4 (15.00-2.25) 88.4 (25.46-2.25)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.75 (at 2.26Å)	Xtriage
Refinement program	REFMAC 5.2.0007	Depositor
R, R_{free}	0.225 , 0.266 0.244 , 0.279	Depositor DCC
R_{free} test set	6208 reflections (5.36%)	DCC
Wilson B-factor (Å ²)	43.9	Xtriage
Anisotropy	0.142	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.40 , 47.1	EDS
Estimated twinning fraction	0.018 for l,-k,h	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtriage
Outliers	1 of 122411 reflections (0.001%)	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	13892	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 45.64 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 1.2839e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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: BCN, FAD

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	0.69	0/3251	0.79	7/4417 (0.2%)
1	B	0.63	0/3251	0.73	2/4417 (0.0%)
1	C	0.77	3/3251 (0.1%)	0.79	3/4417 (0.1%)
1	D	0.67	1/3251 (0.0%)	0.70	1/4417 (0.0%)
All	All	0.69	4/13004 (0.0%)	0.75	13/17668 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	C	0	1
1	D	0	1
All	All	0	4

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	255	GLU	C-N	11.39	1.53	1.33
1	C	143	GLU	CD-OE2	5.86	1.32	1.25
1	C	255	GLU	C-N	5.76	1.43	1.33
1	C	364	TYR	CE1-CZ	5.40	1.45	1.38

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	297	ARG	NE-CZ-NH2	-7.95	116.32	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	79	ARG	NE-CZ-NH2	-6.94	116.83	120.30
1	A	297	ARG	NE-CZ-NH1	6.24	123.42	120.30
1	A	37	LEU	CA-CB-CG	-5.74	102.09	115.30
1	C	233	ARG	NE-CZ-NH2	-5.74	117.43	120.30
1	C	297	ARG	NE-CZ-NH2	-5.57	117.52	120.30
1	B	37	LEU	CA-CB-CG	-5.49	102.67	115.30
1	A	10	LEU	CA-CB-CG	5.45	127.83	115.30
1	C	37	LEU	CA-CB-CG	-5.41	102.86	115.30
1	A	85	THR	N-CA-CB	-5.32	100.20	110.30
1	A	79	ARG	NE-CZ-NH1	5.21	122.91	120.30
1	B	79	ARG	NE-CZ-NH2	-5.06	117.77	120.30
1	D	10	LEU	CA-CB-CG	5.00	126.81	115.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	143	GLU	Peptide
1	B	143	GLU	Peptide
1	C	143	GLU	Peptide
1	D	143	GLU	Peptide

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3162	0	3019	87	0
1	B	3162	0	3019	87	0
1	C	3162	0	3019	83	0
1	D	3162	0	3019	68	0
2	A	53	0	31	3	0
2	B	53	0	31	2	0
2	C	53	0	31	4	0
2	D	53	0	31	4	0
3	A	11	0	12	12	0
4	A	334	0	0	34	0
4	B	238	0	0	15	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	267	0	0	25	0
4	D	182	0	0	16	0
All	All	13892	0	12212	326	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 13.

All (326) 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)
3:A:1394:BCN:C4	4:A:2330:HOH:O	2.05	1.01
3:A:1394:BCN:O21	4:A:2329:HOH:O	1.77	1.01
1:A:28:THR:CG2	1:A:29:GLN:HE21	1.74	0.99
1:A:142:GLU:N	1:A:154:TYR:HH	1.61	0.98
1:C:93:ALA:HB1	1:C:284:ASN:HD21	1.29	0.98
1:C:142:GLU:O	1:C:143:GLU:HG2	1.63	0.97
1:A:262:THR:HG23	1:A:325:GLU:O	1.65	0.96
1:B:142:GLU:HB2	1:B:154:TYR:OH	1.66	0.95
1:B:300:HIS:HE1	4:B:2203:HOH:O	1.53	0.92
1:B:142:GLU:O	1:B:143:GLU:HG2	1.69	0.92
1:A:42:HIS:CD2	4:A:2034:HOH:O	2.21	0.91
3:A:1394:BCN:O4	4:A:2330:HOH:O	1.87	0.91
1:C:363:THR:HG21	4:C:2255:HOH:O	1.70	0.91
1:A:291:THR:HG22	1:A:292:ARG:HG3	1.52	0.90
1:C:85:THR:HG21	4:C:2223:HOH:O	1.69	0.90
1:A:142:GLU:O	1:A:143:GLU:HG2	1.71	0.90
1:D:60:HIS:HD2	1:D:65:HIS:H	1.15	0.90
1:B:262:THR:HG23	1:B:325:GLU:O	1.72	0.89
1:A:382:ASN:HD21	3:A:1394:BCN:H11	1.40	0.87
1:D:93:ALA:HB1	1:D:284:ASN:HD21	1.38	0.86
1:D:60:HIS:CD2	1:D:65:HIS:H	1.94	0.86
3:A:1394:BCN:H41	4:A:2330:HOH:O	1.67	0.86
1:A:363:THR:HG21	4:A:2135:HOH:O	1.74	0.86
1:C:322:ASP:O	1:C:323:ASP:HB3	1.74	0.85
1:A:28:THR:HG22	1:A:29:GLN:HE21	1.41	0.85
3:A:1394:BCN:O22	4:A:2331:HOH:O	1.95	0.84
3:A:1394:BCN:H32	4:A:2334:HOH:O	1.78	0.84
1:B:118:THR:HG22	1:B:121:GLN:H	1.42	0.84
1:B:339:LEU:O	1:B:343:ARG:HG3	1.79	0.83
1:A:93:ALA:HB1	1:A:284:ASN:HD21	1.42	0.82
1:B:42:HIS:CD2	4:B:2013:HOH:O	2.32	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:262:THR:HG23	1:C:325:GLU:O	1.77	0.82
1:D:327:TYR:HD2	2:D:1388:FAD:HM82	1.44	0.81
1:B:85:THR:HG21	4:B:2202:HOH:O	1.78	0.81
1:D:132:GLU:OE2	1:D:151:ARG:NH1	2.12	0.81
1:B:158:VAL:O	1:B:162:THR:HG22	1.81	0.81
1:A:382:ASN:HD21	3:A:1394:BCN:C1	1.94	0.81
1:A:382:ASN:ND2	3:A:1394:BCN:H11	1.94	0.80
1:B:143:GLU:N	4:B:2105:HOH:O	2.13	0.80
1:B:68:HIS:HD2	1:B:194:ASP:OD2	1.65	0.80
1:A:60:HIS:HD2	1:A:65:HIS:H	1.26	0.78
1:B:214:ASP:OD2	1:B:216:ARG:HD3	1.82	0.78
1:C:115:LYS:NZ	4:C:2101:HOH:O	2.14	0.78
1:D:118:THR:HG21	4:D:2015:HOH:O	1.84	0.78
1:C:60:HIS:HD2	1:C:65:HIS:H	1.33	0.77
1:D:142:GLU:O	1:D:143:GLU:HG2	1.85	0.77
1:A:120:GLU:HG2	4:A:2121:HOH:O	1.85	0.76
1:C:142:GLU:O	1:C:143:GLU:CG	2.33	0.76
1:C:322:ASP:O	1:C:323:ASP:CB	2.34	0.76
1:C:118:THR:HG21	4:C:2025:HOH:O	1.86	0.76
1:A:137:ASP:HB3	4:A:2144:HOH:O	1.84	0.76
1:A:85:THR:HG21	4:A:2267:HOH:O	1.84	0.75
1:B:37:LEU:HD13	1:B:225:TRP:CE3	2.21	0.75
1:C:60:HIS:CD2	1:C:65:HIS:H	2.05	0.74
1:C:143:GLU:N	4:C:2125:HOH:O	2.20	0.74
1:B:319:PHE:HB2	4:B:2209:HOH:O	1.86	0.74
1:B:93:ALA:HB1	1:B:284:ASN:HD21	1.51	0.74
1:B:262:THR:CG2	1:B:325:GLU:O	2.35	0.74
1:B:158:VAL:O	1:B:162:THR:CG2	2.36	0.74
1:B:76:ASP:HB2	4:B:2044:HOH:O	1.87	0.74
1:A:60:HIS:CD2	1:A:65:HIS:H	2.04	0.73
1:D:363:THR:HG21	4:D:2173:HOH:O	1.88	0.73
1:C:359:GLY:O	1:C:363:THR:HB	1.89	0.73
1:C:118:THR:HG22	1:C:121:GLN:H	1.54	0.73
1:A:98:GLN:HE21	1:A:99:ALA:H	1.36	0.73
1:B:60:HIS:CD2	1:B:65:HIS:H	2.07	0.72
1:A:382:ASN:HD21	3:A:1394:BCN:C2	2.02	0.72
1:C:327:TYR:CZ	4:C:2244:HOH:O	2.41	0.72
1:B:142:GLU:O	1:B:143:GLU:CG	2.39	0.71
1:A:68:HIS:HD2	1:A:194:ASP:OD2	1.73	0.71
1:A:300:HIS:HE1	4:A:2268:HOH:O	1.73	0.71
1:A:298:HIS:HD2	4:A:2266:HOH:O	1.73	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:142:GLU:O	1:A:143:GLU:CG	2.40	0.70
1:B:42:HIS:NE2	4:B:2013:HOH:O	2.24	0.70
1:D:214:ASP:OD2	1:D:216:ARG:HD3	1.92	0.70
1:B:363:THR:HG21	4:B:2099:HOH:O	1.92	0.70
1:D:300:HIS:HE1	4:D:2157:HOH:O	1.73	0.70
1:A:209:GLN:HG3	4:A:2203:HOH:O	1.90	0.69
1:D:300:HIS:HD2	1:D:302:GLU:OE1	1.75	0.69
1:A:359:GLY:O	1:A:363:THR:HB	1.92	0.69
1:A:291:THR:HG21	4:A:2276:HOH:O	1.91	0.69
1:B:28:THR:HG22	1:B:29:GLN:NE2	2.07	0.69
1:C:265:PHE:HE1	4:C:2244:HOH:O	1.75	0.68
1:D:68:HIS:HD2	1:D:194:ASP:OD2	1.76	0.68
1:A:98:GLN:HE22	1:C:110:SER:HB2	1.59	0.68
1:A:118:THR:HG22	1:A:121:GLN:H	1.58	0.67
1:C:68:HIS:HD2	1:C:194:ASP:OD2	1.76	0.67
1:A:24:GLU:O	1:A:28:THR:HB	1.94	0.67
1:B:60:HIS:HD2	1:B:65:HIS:H	1.41	0.67
3:A:1394:BCN:H61	4:A:2333:HOH:O	1.95	0.66
1:B:215:HIS:CE1	1:B:216:ARG:HD2	2.29	0.66
1:C:214:ASP:OD2	1:C:216:ARG:HD3	1.94	0.66
1:C:233:ARG:HD2	4:C:2182:HOH:O	1.94	0.65
1:C:186:THR:HG23	1:C:188:ASP:H	1.62	0.64
1:D:85:THR:HG21	4:D:2155:HOH:O	1.97	0.64
1:A:98:GLN:HE21	1:A:99:ALA:N	1.96	0.63
1:A:85:THR:HG23	1:A:87:TYR:H	1.62	0.63
1:B:233:ARG:HD2	4:B:2170:HOH:O	1.97	0.63
1:B:110:SER:HB2	1:D:98:GLN:HE22	1.63	0.63
1:A:233:ARG:HD2	4:A:2235:HOH:O	1.99	0.63
1:A:65:HIS:HE1	2:A:1393:FAD:O2'	1.82	0.63
1:A:135:THR:HG23	1:A:144:LYS:HD2	1.80	0.63
1:D:322:ASP:O	1:D:323:ASP:HB3	1.98	0.62
1:C:65:HIS:HE1	2:C:1388:FAD:O2'	1.80	0.62
1:A:360:ARG:HD2	4:A:2323:HOH:O	1.99	0.62
1:C:327:TYR:CE2	4:C:2244:HOH:O	2.53	0.62
1:A:17:PHE:CD2	1:A:211:MET:HE1	2.35	0.61
1:C:265:PHE:CE1	4:C:2244:HOH:O	2.51	0.61
1:D:288:VAL:HG13	4:D:2151:HOH:O	1.99	0.61
1:C:300:HIS:HE1	4:C:2039:HOH:O	1.82	0.61
1:B:322:ASP:O	1:B:323:ASP:HB2	1.99	0.61
1:C:98:GLN:HE21	1:C:99:ALA:H	1.48	0.61
1:A:28:THR:HG23	1:A:29:GLN:HE21	1.62	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:135:THR:HG23	1:D:144:LYS:HD2	1.81	0.61
1:C:143:GLU:CA	4:C:2125:HOH:O	2.49	0.60
1:D:360:ARG:HD2	2:D:1388:FAD:O4'	2.01	0.60
1:A:387:HIS:HE1	4:A:2234:HOH:O	1.84	0.60
1:A:315:GLU:OE1	4:A:2275:HOH:O	2.15	0.60
1:A:42:HIS:HD2	4:A:2034:HOH:O	1.72	0.60
1:B:28:THR:HG22	1:B:29:GLN:HE21	1.67	0.59
1:B:143:GLU:CA	4:B:2105:HOH:O	2.47	0.59
1:A:66:LEU:HD11	1:A:299:PHE:CE2	2.38	0.58
1:B:37:LEU:HD13	1:B:225:TRP:HE3	1.64	0.58
1:C:319:PHE:HA	4:C:2239:HOH:O	2.03	0.58
1:A:300:HIS:HD2	1:A:302:GLU:OE1	1.87	0.58
1:A:382:ASN:ND2	3:A:1394:BCN:C1	2.61	0.57
1:D:85:THR:HG22	1:D:199:LEU:H	1.69	0.57
1:C:42:HIS:CD2	4:C:2023:HOH:O	2.56	0.57
1:B:63:GLY:O	1:B:65:HIS:HD2	1.87	0.57
1:C:93:ALA:HB1	1:C:284:ASN:ND2	2.11	0.57
1:D:215:HIS:CE1	1:D:216:ARG:HD2	2.38	0.57
1:D:330:ILE:HG22	1:D:332:THR:HG23	1.87	0.57
1:B:142:GLU:N	1:B:146:ILE:HD12	2.19	0.57
1:A:110:SER:HB2	1:C:98:GLN:HE22	1.68	0.57
1:D:359:GLY:O	1:D:363:THR:HB	2.05	0.57
1:A:17:PHE:CE2	1:A:211:MET:HE2	2.40	0.56
1:D:186:THR:HG22	1:D:188:ASP:H	1.70	0.56
1:D:186:THR:CG2	1:D:188:ASP:H	2.19	0.56
1:C:298:HIS:HD2	4:C:2097:HOH:O	1.89	0.56
1:A:142:GLU:HG2	1:A:171:LYS:HG2	1.87	0.56
1:B:142:GLU:HB2	1:B:154:TYR:CZ	2.39	0.56
1:C:262:THR:CG2	1:C:325:GLU:O	2.52	0.56
1:B:28:THR:CG2	1:B:29:GLN:HE21	2.18	0.55
1:A:249:ARG:HG3	4:A:2095:HOH:O	2.06	0.55
1:C:319:PHE:HB2	4:C:2237:HOH:O	2.06	0.55
1:B:65:HIS:HE1	2:B:1390:FAD:O2'	1.89	0.55
1:C:262:THR:HA	1:C:327:TYR:HD1	1.72	0.55
1:A:118:THR:HG21	4:A:2124:HOH:O	2.06	0.55
1:D:133:ILE:HD12	1:D:146:ILE:HG21	1.89	0.55
1:B:66:LEU:HD11	1:B:299:PHE:CE1	2.41	0.55
1:C:142:GLU:HB3	1:C:154:TYR:CE2	2.42	0.55
1:D:37:LEU:HD13	1:D:225:TRP:CE3	2.41	0.55
1:A:291:THR:HG22	1:A:292:ARG:CG	2.32	0.55
1:D:37:LEU:HD13	1:D:225:TRP:HE3	1.72	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:63:GLY:O	1:C:65:HIS:HD2	1.90	0.54
1:A:167:GLN:HG3	1:A:318:ARG:HA	1.89	0.54
1:B:359:GLY:O	1:B:363:THR:HB	2.09	0.53
1:A:118:THR:HG23	4:C:2203:HOH:O	2.09	0.53
1:C:363:THR:HG22	1:C:365:GLN:HB2	1.90	0.53
1:D:65:HIS:HE1	2:D:1388:FAD:O2'	1.91	0.53
1:B:85:THR:HB	1:B:199:LEU:O	2.09	0.53
1:A:360:ARG:HD2	2:A:1393:FAD:O4'	2.07	0.53
1:C:143:GLU:HB3	1:C:145:ALA:H	1.74	0.53
1:C:174:PRO:O	1:C:177:ASN:HB2	2.09	0.53
1:A:63:GLY:O	1:A:65:HIS:HD2	1.92	0.53
1:B:233:ARG:CD	4:B:2170:HOH:O	2.56	0.53
1:A:40:ARG:NH2	4:A:2030:HOH:O	2.41	0.53
1:D:133:ILE:HD12	1:D:146:ILE:CG2	2.39	0.53
1:C:10:LEU:HD12	1:C:26:VAL:HG11	1.91	0.52
1:B:278:THR:CG2	4:D:2027:HOH:O	2.57	0.52
1:A:330:ILE:HG22	1:A:332:THR:HG23	1.91	0.52
1:B:360:ARG:HB2	1:B:365:GLN:O	2.09	0.52
1:C:326:PRO:O	1:C:360:ARG:NH2	2.42	0.52
1:C:299:PHE:CG	4:C:2073:HOH:O	2.63	0.52
1:D:180:ARG:HD3	4:D:2092:HOH:O	2.09	0.52
1:B:85:THR:CG2	1:B:87:TYR:H	2.22	0.52
1:A:365:GLN:HG3	4:A:2302:HOH:O	2.08	0.52
1:D:44:GLY:HA2	1:D:208:LEU:HD22	1.90	0.52
1:A:37:LEU:HD13	1:A:225:TRP:CE3	2.44	0.51
1:C:288:VAL:HG22	4:C:2218:HOH:O	2.10	0.51
1:B:102:PHE:CG	1:B:103:PRO:HA	2.45	0.51
1:B:118:THR:HG23	4:D:2141:HOH:O	2.10	0.51
1:D:142:GLU:O	1:D:143:GLU:CG	2.58	0.51
1:A:278:THR:HG22	4:C:2051:HOH:O	2.11	0.51
1:B:43:ILE:HG23	1:B:221:LEU:HD21	1.93	0.51
1:A:28:THR:CG2	1:A:29:GLN:NE2	2.59	0.51
1:C:143:GLU:HB2	4:C:2125:HOH:O	2.11	0.50
1:D:93:ALA:HB1	1:D:284:ASN:ND2	2.16	0.50
1:B:28:THR:CG2	1:B:29:GLN:NE2	2.74	0.50
1:D:322:ASP:O	1:D:323:ASP:CB	2.59	0.50
1:C:274:ASP:OD1	1:C:298:HIS:HE1	1.94	0.50
1:D:133:ILE:HG22	1:D:147:SER:HB3	1.94	0.50
1:D:300:HIS:CD2	1:D:302:GLU:OE1	2.61	0.50
1:A:278:THR:CG2	4:C:2051:HOH:O	2.58	0.50
1:C:101:GLN:NE2	4:C:2092:HOH:O	2.45	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:205:THR:O	1:C:209:GLN:HG2	2.11	0.50
1:A:159:LYS:HD3	4:A:2156:HOH:O	2.11	0.50
1:A:365:GLN:CG	4:A:2302:HOH:O	2.59	0.50
1:B:142:GLU:HG3	1:B:171:LYS:HG3	1.93	0.50
1:A:17:PHE:CE2	1:A:211:MET:CE	2.94	0.50
1:A:85:THR:CG2	1:A:87:TYR:H	2.23	0.50
1:B:278:THR:HG23	1:D:187:PHE:HB2	1.94	0.50
1:D:226:PHE:HA	1:D:229:ARG:HD2	1.94	0.50
1:D:338:LEU:HD22	1:D:342:TYR:CE1	2.47	0.49
1:B:107:GLY:O	1:B:111:GLN:HG3	2.13	0.49
1:A:298:HIS:CD2	4:A:2266:HOH:O	2.58	0.49
1:A:365:GLN:CB	4:A:2302:HOH:O	2.61	0.49
1:C:142:GLU:O	1:C:143:GLU:CB	2.61	0.49
1:B:249:ARG:C	1:B:249:ARG:HD3	2.33	0.49
1:D:166:TRP:O	1:D:168:THR:HG23	2.11	0.49
1:B:137:ASP:HB2	4:B:2101:HOH:O	2.12	0.49
1:D:60:HIS:HD2	1:D:65:HIS:N	1.98	0.49
1:B:167:GLN:HG3	1:B:318:ARG:HA	1.95	0.49
1:A:93:ALA:HB1	1:A:284:ASN:ND2	2.21	0.48
1:C:68:HIS:HE1	4:C:2257:HOH:O	1.96	0.48
1:B:233:ARG:HH22	1:B:353:SER:HB2	1.78	0.48
1:C:297:ARG:NH2	1:C:306:PRO:O	2.40	0.48
1:C:104:MET:CE	1:C:157:PHE:HB2	2.43	0.48
1:D:102:PHE:CG	1:D:103:PRO:HA	2.48	0.48
1:D:143:GLU:CB	1:D:145:ALA:H	2.27	0.48
1:D:174:PRO:O	1:D:177:ASN:HB2	2.14	0.48
1:B:104:MET:CE	1:B:157:PHE:HB2	2.43	0.48
1:B:9:ASP:HB2	1:B:32:LYS:HB3	1.94	0.48
1:D:118:THR:HG22	1:D:121:GLN:H	1.79	0.48
1:B:182:PRO:HD2	4:B:2127:HOH:O	2.14	0.48
1:D:63:GLY:O	1:D:65:HIS:HD2	1.97	0.48
1:B:55:THR:HG22	1:B:309:LYS:HG2	1.96	0.48
1:A:43:ILE:HG23	1:A:221:LEU:HD21	1.95	0.48
1:D:166:TRP:HZ3	1:D:330:ILE:HG23	1.77	0.47
1:C:37:LEU:HD13	1:C:225:TRP:CE3	2.48	0.47
1:B:142:GLU:O	1:B:143:GLU:CB	2.62	0.47
1:B:322:ASP:O	1:B:323:ASP:CB	2.62	0.47
1:B:110:SER:HB2	1:D:98:GLN:NE2	2.27	0.47
1:B:142:GLU:N	1:B:146:ILE:CD1	2.78	0.47
1:B:330:ILE:HG22	1:B:332:THR:HG23	1.96	0.47
1:D:319:PHE:HD2	4:D:2088:HOH:O	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:233:ARG:HD2	4:D:2133:HOH:O	2.15	0.47
1:D:101:GLN:NE2	4:D:2055:HOH:O	2.47	0.47
4:A:2254:HOH:O	1:C:118:THR:HG23	2.14	0.47
1:A:327:TYR:HA	1:A:360:ARG:NH2	2.28	0.47
1:C:360:ARG:HD3	2:C:1388:FAD:O4'	2.15	0.47
1:A:208:LEU:HD23	1:A:211:MET:HE3	1.97	0.46
1:A:199:LEU:HD12	1:A:299:PHE:O	2.15	0.46
1:D:85:THR:HG23	1:D:87:TYR:H	1.81	0.46
1:C:226:PHE:HA	1:C:229:ARG:HD2	1.97	0.46
1:D:262:THR:HG23	1:D:325:GLU:O	2.16	0.46
1:C:208:LEU:HD23	1:C:211:MET:CE	2.46	0.46
1:D:98:GLN:HE21	1:D:99:ALA:H	1.63	0.46
1:A:278:THR:HG23	1:C:187:PHE:HB2	1.98	0.46
1:B:75:TRP:O	1:B:79:ARG:HD3	2.16	0.46
1:D:297:ARG:NH2	1:D:306:PRO:O	2.42	0.46
1:D:22:ILE:HG21	1:D:242:VAL:HG21	1.98	0.46
1:C:262:THR:HG22	1:C:327:TYR:HE1	1.81	0.46
1:B:338:LEU:HA	1:B:338:LEU:HD23	1.84	0.46
1:B:249:ARG:O	1:B:249:ARG:HD3	2.16	0.45
1:B:143:GLU:HB3	1:B:145:ALA:H	1.80	0.45
1:A:143:GLU:HB3	1:A:145:ALA:H	1.82	0.45
1:D:262:THR:CG2	1:D:325:GLU:O	2.65	0.45
1:C:44:GLY:HA3	1:C:208:LEU:HD13	1.99	0.45
1:B:44:GLY:HA3	1:B:208:LEU:HD13	1.98	0.45
1:C:143:GLU:CB	1:C:145:ALA:H	2.30	0.45
1:B:135:THR:HG23	1:B:144:LYS:HD2	1.99	0.45
1:C:215:HIS:CE1	1:C:216:ARG:HD2	2.52	0.45
1:A:387:HIS:CE1	4:A:2234:HOH:O	2.64	0.45
1:B:158:VAL:O	1:B:162:THR:HG23	2.15	0.44
1:A:102:PHE:CG	1:A:103:PRO:HA	2.52	0.44
1:B:40:ARG:NH2	4:B:2009:HOH:O	2.50	0.44
1:C:85:THR:CG2	1:C:87:TYR:H	2.31	0.44
1:C:28:THR:HG22	1:C:29:GLN:HE21	1.82	0.44
1:A:17:PHE:HE2	1:A:211:MET:HE2	1.82	0.44
1:B:142:GLU:N	1:B:142:GLU:CD	2.70	0.44
1:A:208:LEU:HD23	1:A:211:MET:CE	2.47	0.44
1:C:229:ARG:HG2	1:C:230:GLY:N	2.33	0.44
1:B:24:GLU:CD	1:B:25:ARG:HH11	2.20	0.44
1:A:187:PHE:HB2	1:C:278:THR:HG23	2.00	0.44
1:C:105:GLY:HA2	1:C:184:ARG:O	2.18	0.44
1:C:360:ARG:NH1	2:C:1388:FAD:O2A	2.51	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:274:ASP:OD1	1:D:298:HIS:HE1	2.00	0.44
1:C:98:GLN:HE21	1:C:99:ALA:N	2.13	0.43
1:B:226:PHE:HA	1:B:229:ARG:HD2	2.00	0.43
1:B:85:THR:HG22	1:B:87:TYR:H	1.82	0.43
1:C:27:ALA:O	1:C:31:ASP:HA	2.18	0.43
1:A:365:GLN:HB3	4:A:2302:HOH:O	2.18	0.43
1:D:52:GLU:HA	1:D:53:PRO:HD3	1.87	0.43
1:A:104:MET:CE	1:A:157:PHE:HB2	2.48	0.43
1:D:105:GLY:HA2	1:D:184:ARG:O	2.18	0.43
1:D:264:ASP:OD2	1:D:318:ARG:HD3	2.19	0.43
1:B:385:ALA:O	1:B:389:ARG:HB2	2.18	0.43
1:C:20:LEU:HD23	1:C:20:LEU:HA	1.89	0.43
1:C:300:HIS:HD2	1:C:302:GLU:OE1	2.02	0.43
1:C:262:THR:HG22	1:C:327:TYR:CE1	2.54	0.43
1:D:319:PHE:HA	4:D:2164:HOH:O	2.18	0.43
1:A:28:THR:HG22	1:A:29:GLN:HG2	2.00	0.42
1:B:278:THR:HG22	4:D:2027:HOH:O	2.19	0.42
1:D:327:TYR:CD2	2:D:1388:FAD:HM82	2.36	0.42
1:B:7:ARG:HG2	1:B:8:PHE:CE1	2.54	0.42
1:B:105:GLY:HA2	1:B:184:ARG:O	2.20	0.42
1:D:326:PRO:O	1:D:360:ARG:NH2	2.47	0.42
1:C:75:TRP:O	1:C:79:ARG:HD3	2.19	0.42
1:A:326:PRO:O	1:A:360:ARG:NH2	2.48	0.42
1:C:331:ASN:O	1:C:336:ARG:NH1	2.53	0.42
1:C:360:ARG:CD	2:C:1388:FAD:O4'	2.68	0.42
1:D:9:ASP:HB2	1:D:32:LYS:HB3	2.02	0.42
1:B:118:THR:HG21	4:D:2050:HOH:O	2.19	0.42
1:A:328:TYR:OH	2:A:1393:FAD:HM73	2.19	0.42
1:B:321:GLU:O	1:B:324:ASP:HB2	2.19	0.42
1:D:218:GLU:HG2	4:D:2116:HOH:O	2.19	0.42
1:C:104:MET:HG3	4:C:2096:HOH:O	2.20	0.42
1:B:135:THR:HG1	1:B:147:SER:HG	1.49	0.42
1:B:93:ALA:HB1	1:B:284:ASN:ND2	2.27	0.42
1:C:186:THR:CG2	1:C:188:ASP:H	2.30	0.42
1:C:208:LEU:HD23	1:C:211:MET:HE2	2.02	0.42
1:B:165:GLN:NE2	4:B:2115:HOH:O	2.52	0.42
1:C:37:LEU:HD13	1:C:225:TRP:HE3	1.86	0.41
1:A:180:ARG:HD3	4:A:2166:HOH:O	2.19	0.41
1:A:75:TRP:O	1:A:79:ARG:HD3	2.20	0.41
1:C:52:GLU:HA	1:C:53:PRO:HD3	1.96	0.41
1:D:58:GLU:CD	4:D:2021:HOH:O	2.59	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1390:FAD:H9	2:B:1390:FAD:H1'1	1.83	0.41
1:B:260:TRP:O	1:B:320:ALA:HB3	2.21	0.41
1:B:132:GLU:OE2	1:B:151:ARG:NH1	2.54	0.41
1:C:167:GLN:HG3	1:C:318:ARG:HA	2.03	0.41
1:A:263:LEU:HD12	4:A:2052:HOH:O	2.22	0.40
1:A:143:GLU:CB	1:A:145:ALA:H	2.34	0.40
1:B:135:THR:OG1	1:B:147:SER:OG	2.23	0.40
1:D:328:TYR:HA	1:D:329:PRO:HD3	1.98	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	384/399 (96%)	372 (97%)	12 (3%)	0	100	100
1	B	384/399 (96%)	372 (97%)	8 (2%)	4 (1%)	19	16
1	C	384/399 (96%)	370 (96%)	12 (3%)	2 (0%)	34	34
1	D	384/399 (96%)	377 (98%)	7 (2%)	0	100	100
All	All	1536/1596 (96%)	1491 (97%)	39 (2%)	6 (0%)	39	43

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	323	ASP
1	B	393	PRO
1	C	143	GLU
1	B	143	GLU
1	B	53	PRO
1	B	323	ASP

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	326/334 (98%)	303 (93%)	23 (7%)	18	17
1	B	326/334 (98%)	299 (92%)	27 (8%)	14	12
1	C	326/334 (98%)	306 (94%)	20 (6%)	23	23
1	D	326/334 (98%)	306 (94%)	20 (6%)	23	23
All	All	1304/1336 (98%)	1214 (93%)	90 (7%)	19	18

All (90) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	LEU
1	A	28	THR
1	A	30	LEU
1	A	85	THR
1	A	96	ASN
1	A	98	GLN
1	A	118	THR
1	A	120	GLU
1	A	137	ASP
1	A	151	ARG
1	A	180	ARG
1	A	193	SER
1	A	218	GLU
1	A	220	ARG
1	A	229	ARG
1	A	247	LEU
1	A	249	ARG
1	A	262	THR
1	A	278	THR
1	A	286	LEU
1	A	291	THR
1	A	338	LEU
1	A	363	THR
1	B	10	LEU

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Mol	Chain	Res	Type
1	B	37	LEU
1	B	39	ARG
1	B	85	THR
1	B	118	THR
1	B	137	ASP
1	B	142	GLU
1	B	147	SER
1	B	162	THR
1	B	180	ARG
1	B	229	ARG
1	B	247	LEU
1	B	249	ARG
1	B	262	THR
1	B	278	THR
1	B	286	LEU
1	B	304	ASP
1	B	309	LYS
1	B	322	ASP
1	B	338	LEU
1	B	343	ARG
1	B	348	SER
1	B	353	SER
1	B	363	THR
1	B	378	ASN
1	B	389	ARG
1	B	393	PRO
1	C	10	LEU
1	C	37	LEU
1	C	85	THR
1	C	118	THR
1	C	144	LYS
1	C	179	THR
1	C	180	ARG
1	C	186	THR
1	C	216	ARG
1	C	220	ARG
1	C	229	ARG
1	C	247	LEU
1	C	249	ARG
1	C	262	THR
1	C	278	THR
1	C	286	LEU

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Mol	Chain	Res	Type
1	C	338	LEU
1	C	343	ARG
1	C	363	THR
1	C	384	LEU
1	D	10	LEU
1	D	37	LEU
1	D	85	THR
1	D	115	LYS
1	D	118	THR
1	D	180	ARG
1	D	186	THR
1	D	216	ARG
1	D	229	ARG
1	D	247	LEU
1	D	249	ARG
1	D	262	THR
1	D	278	THR
1	D	286	LEU
1	D	318	ARG
1	D	322	ASP
1	D	323	ASP
1	D	338	LEU
1	D	360	ARG
1	D	363	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (49) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	29	GLN
1	A	60	HIS
1	A	65	HIS
1	A	68	HIS
1	A	80	GLN
1	A	98	GLN
1	A	165	GLN
1	A	284	ASN
1	A	298	HIS
1	A	300	HIS
1	A	382	ASN
1	A	387	HIS
1	B	29	GLN
1	B	60	HIS

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Mol	Chain	Res	Type
1	B	65	HIS
1	B	68	HIS
1	B	101	GLN
1	B	165	GLN
1	B	215	HIS
1	B	284	ASN
1	B	298	HIS
1	B	300	HIS
1	B	387	HIS
1	C	29	GLN
1	C	60	HIS
1	C	65	HIS
1	C	68	HIS
1	C	80	GLN
1	C	98	GLN
1	C	101	GLN
1	C	165	GLN
1	C	215	HIS
1	C	284	ASN
1	C	298	HIS
1	C	300	HIS
1	C	331	ASN
1	D	60	HIS
1	D	65	HIS
1	D	68	HIS
1	D	80	GLN
1	D	98	GLN
1	D	101	GLN
1	D	124	GLN
1	D	165	GLN
1	D	215	HIS
1	D	284	ASN
1	D	298	HIS
1	D	300	HIS
1	D	387	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

5 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	FAD	A	1393	-	48,58,58	1.36	5 (10%)	54,89,89	2.14	9 (16%)
3	BCN	A	1394	-	7,10,10	0.47	0	8,11,11	1.95	2 (25%)
2	FAD	B	1390	-	48,58,58	1.36	6 (12%)	54,89,89	2.14	10 (18%)
2	FAD	C	1388	-	48,58,58	1.48	7 (14%)	54,89,89	2.35	9 (16%)
2	FAD	D	1388	-	48,58,58	1.49	7 (14%)	54,89,89	2.20	7 (12%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FAD	A	1393	-	-	0/30/50/50	0/6/6/6
3	BCN	A	1394	-	-	0/8/10/10	0/0/0/0
2	FAD	B	1390	-	-	0/30/50/50	0/6/6/6
2	FAD	C	1388	-	-	0/30/50/50	0/6/6/6
2	FAD	D	1388	-	-	0/30/50/50	0/6/6/6

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1388	FAD	C10-N1	2.05	1.39	1.35
2	D	1388	FAD	C10-N1	2.13	1.39	1.35
2	B	1390	FAD	C5X-N5	2.26	1.38	1.35
2	C	1388	FAD	C5X-N5	2.31	1.39	1.35
2	D	1388	FAD	C5X-N5	2.45	1.39	1.35
2	B	1390	FAD	C2A-N1A	2.54	1.38	1.33
2	A	1393	FAD	C2A-N1A	2.61	1.38	1.33
2	C	1388	FAD	C2A-N1A	2.99	1.39	1.33
2	C	1388	FAD	C4-N3	3.05	1.38	1.33
2	D	1388	FAD	C2A-N1A	3.10	1.39	1.33
2	B	1390	FAD	C4-N3	3.15	1.39	1.33
2	A	1393	FAD	C4-N3	3.23	1.39	1.33
2	D	1388	FAD	C4-N3	3.25	1.39	1.33
2	A	1393	FAD	C4X-N5	3.26	1.38	1.33
2	C	1388	FAD	C4X-N5	3.52	1.38	1.33
2	B	1390	FAD	C4X-N5	3.61	1.39	1.33
2	A	1393	FAD	C1'-N10	3.92	1.52	1.48
2	B	1390	FAD	C1'-N10	3.94	1.52	1.48
2	C	1388	FAD	C1'-N10	4.14	1.52	1.48
2	D	1388	FAD	C4X-N5	4.23	1.40	1.33
2	D	1388	FAD	C2A-N3A	4.33	1.39	1.32
2	D	1388	FAD	C1'-N10	4.47	1.53	1.48
2	B	1390	FAD	C2A-N3A	4.57	1.40	1.32
2	A	1393	FAD	C2A-N3A	4.67	1.40	1.32
2	C	1388	FAD	C2A-N3A	4.76	1.40	1.32

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1388	FAD	N3A-C2A-N1A	-12.35	119.44	128.89
2	D	1388	FAD	N3A-C2A-N1A	-11.21	120.31	128.89
2	A	1393	FAD	N3A-C2A-N1A	-11.08	120.41	128.89
2	B	1390	FAD	N3A-C2A-N1A	-10.14	121.13	128.89
3	A	1394	BCN	C1-N1-C3	-4.42	102.04	111.28
2	D	1388	FAD	C4X-C4-N3	-3.61	118.66	123.59
2	C	1388	FAD	C4X-C4-N3	-3.46	118.85	123.59
2	C	1388	FAD	O4'-C4'-C5'	-3.06	103.53	110.19
2	B	1390	FAD	C4X-C4-N3	-3.00	119.49	123.59
3	A	1394	BCN	C5-N1-C3	-2.96	104.33	111.45
2	A	1393	FAD	O4'-C4'-C5'	-2.89	103.90	110.19
2	A	1393	FAD	C4X-C4-N3	-2.84	119.71	123.59
2	C	1388	FAD	C1B-N9A-C4A	-2.58	123.05	126.94
2	C	1388	FAD	C4B-O4B-C1B	-2.53	106.94	109.72

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1390	FAD	O4'-C4'-C5'	-2.31	105.16	110.19
2	D	1388	FAD	O4'-C4'-C5'	-2.26	105.28	110.19
2	B	1390	FAD	C9A-C5X-N5	-2.22	119.07	122.36
2	D	1388	FAD	C1B-N9A-C4A	-2.10	123.77	126.94
2	B	1390	FAD	O2A-PA-O3P	2.05	114.39	105.09
2	B	1390	FAD	O3P-P-O5'	2.11	108.52	102.94
2	B	1390	FAD	O4B-C1B-N9A	2.16	112.63	108.10
2	A	1393	FAD	O3P-PA-O5B	2.38	109.25	102.94
2	A	1393	FAD	C2B-C1B-N9A	2.45	118.03	114.29
2	C	1388	FAD	O3P-P-O5'	2.52	109.63	102.94
2	A	1393	FAD	O3P-P-O5'	2.62	109.88	102.94
2	B	1390	FAD	C4X-N5-C5X	2.66	119.82	116.76
2	D	1388	FAD	C4X-N5-C5X	2.81	120.00	116.76
2	C	1388	FAD	C4X-N5-C5X	3.29	120.55	116.76
2	C	1388	FAD	C5X-C9A-N10	3.60	120.36	117.62
2	A	1393	FAD	C4X-N5-C5X	3.70	121.02	116.76
2	A	1393	FAD	C5X-C9A-N10	3.97	120.64	117.62
2	D	1388	FAD	C5X-C9A-N10	4.67	121.17	117.62
2	B	1390	FAD	C5X-C9A-N10	4.70	121.19	117.62
2	A	1393	FAD	C4-N3-C2	4.81	119.41	115.25
2	B	1390	FAD	C4-N3-C2	6.38	120.76	115.25
2	D	1388	FAD	C4-N3-C2	6.89	121.20	115.25
2	C	1388	FAD	C4-N3-C2	6.99	121.29	115.25

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 25 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1393	FAD	3	0
3	A	1394	BCN	12	0
2	B	1390	FAD	2	0
2	C	1388	FAD	4	0
2	D	1388	FAD	4	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	388/399 (97%)	0.86	65 (16%) 2 2	29, 39, 55, 64	0
1	B	388/399 (97%)	0.80	66 (17%) 2 2	30, 40, 56, 64	0
1	C	388/399 (97%)	0.90	74 (19%) 2 1	30, 40, 55, 64	0
1	D	388/399 (97%)	1.00	82 (21%) 1 1	31, 40, 55, 64	0
All	All	1552/1596 (97%)	0.89	287 (18%) 2 1	29, 40, 55, 64	0

All (287) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	76	ASP	8.6
1	D	344	ALA	6.5
1	B	351	ALA	6.0
1	B	390	ASP	6.0
1	A	179	THR	5.6
1	D	390	ASP	5.6
1	D	347	LYS	5.3
1	C	20	LEU	5.3
1	D	323	ASP	5.3
1	D	341	THR	5.1
1	A	135	THR	5.1
1	B	20	LEU	5.0
1	D	22	ILE	5.0
1	B	386	PRO	5.0
1	D	352	SER	5.0
1	C	323	ASP	5.0
1	D	348	SER	4.8
1	A	180	ARG	4.7
1	C	137	ASP	4.7
1	D	136	ALA	4.6
1	B	304	ASP	4.6

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Mol	Chain	Res	Type	RSRZ
1	C	322	ASP	4.6
1	B	322	ASP	4.6
1	D	392	VAL	4.5
1	D	322	ASP	4.5
1	D	238	ALA	4.5
1	C	337	ALA	4.5
1	A	322	ASP	4.3
1	D	254	ALA	4.3
1	C	304	ASP	4.2
1	C	180	ARG	4.2
1	D	20	LEU	4.2
1	B	323	ASP	4.2
1	A	19	GLY	4.2
1	B	392	VAL	4.1
1	A	22	ILE	4.1
1	A	323	ASP	4.1
1	C	390	ASP	4.1
1	D	395	LEU	4.1
1	A	20	LEU	4.1
1	D	76	ASP	4.1
1	A	134	ASP	4.0
1	D	288	VAL	4.0
1	A	334	ALA	4.0
1	A	5	THR	3.9
1	D	135	THR	3.9
1	B	333	GLU	3.8
1	D	391	GLY	3.8
1	D	386	PRO	3.8
1	D	252	ASP	3.8
1	B	179	THR	3.8
1	C	347	LYS	3.7
1	C	22	ILE	3.7
1	C	386	PRO	3.7
1	C	392	VAL	3.7
1	B	22	ILE	3.7
1	D	137	ASP	3.7
1	D	218	GLU	3.7
1	C	348	SER	3.6
1	B	18	PHE	3.6
1	C	19	GLY	3.6
1	D	321	GLU	3.5
1	D	353	SER	3.5

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Mol	Chain	Res	Type	RSRZ
1	D	172	GLU	3.5
1	A	136	ALA	3.5
1	B	252	ASP	3.5
1	C	280	VAL	3.5
1	B	28	THR	3.5
1	D	134	ASP	3.4
1	B	319	PHE	3.4
1	B	340	ALA	3.4
1	A	304	ASP	3.4
1	D	133	ILE	3.4
1	D	179	THR	3.4
1	D	337	ALA	3.4
1	A	286	LEU	3.4
1	B	358	GLY	3.4
1	A	17	PHE	3.3
1	C	31	ASP	3.3
1	D	304	ASP	3.3
1	A	296	PHE	3.3
1	A	244	THR	3.3
1	D	213	ALA	3.3
1	D	393	PRO	3.3
1	A	319	PHE	3.3
1	A	351	ALA	3.3
1	B	382	ASN	3.2
1	A	13	VAL	3.2
1	A	242	VAL	3.2
1	D	215	HIS	3.2
1	D	382	ASN	3.2
1	B	172	GLU	3.2
1	B	19	GLY	3.2
1	B	180	ARG	3.2
1	D	19	GLY	3.2
1	C	288	VAL	3.2
1	D	280	VAL	3.2
1	C	168	THR	3.2
1	C	334	ALA	3.2
1	C	18	PHE	3.1
1	D	18	PHE	3.1
1	D	124	GLN	3.1
1	C	12	VAL	3.1
1	A	157	PHE	3.1
1	A	66	LEU	3.1

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Mol	Chain	Res	Type	RSRZ
1	B	12	VAL	3.1
1	A	18	PHE	3.1
1	B	17	PHE	3.1
1	C	64	ALA	3.1
1	C	252	ASP	3.1
1	A	44	GLY	3.0
1	A	10	LEU	3.0
1	B	134	ASP	3.0
1	B	193	SER	3.0
1	B	308	ASP	3.0
1	C	207	TRP	3.0
1	A	348	SER	3.0
1	D	194	ASP	2.9
1	C	254	ALA	2.9
1	A	171	LYS	2.9
1	C	179	THR	2.9
1	A	207	TRP	2.9
1	A	12	VAL	2.9
1	B	334	ALA	2.9
1	B	171	LYS	2.9
1	A	252	ASP	2.9
1	C	299	PHE	2.9
1	C	395	LEU	2.9
1	D	31	ASP	2.9
1	B	215	HIS	2.9
1	D	180	ARG	2.9
1	D	287	ASP	2.9
1	D	193	SER	2.9
1	A	36	VAL	2.8
1	D	308	ASP	2.8
1	A	14	GLY	2.8
1	C	27	ALA	2.8
1	C	36	VAL	2.8
1	D	351	ALA	2.8
1	C	96	ASN	2.8
1	A	23	ALA	2.8
1	C	351	ALA	2.8
1	D	340	ALA	2.8
1	A	109	VAL	2.7
1	D	171	LYS	2.7
1	A	390	ASP	2.7
1	A	280	VAL	2.7

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Mol	Chain	Res	Type	RSRZ
1	C	29	GLN	2.7
1	C	344	ALA	2.7
1	D	253	TYR	2.7
1	D	334	ALA	2.7
1	A	21	THR	2.7
1	B	31	ASP	2.7
1	A	172	GLU	2.7
1	B	135	THR	2.7
1	D	96	ASN	2.7
1	B	280	VAL	2.7
1	C	47	ALA	2.7
1	D	176	ALA	2.7
1	C	242	VAL	2.7
1	A	137	ASP	2.6
1	B	344	ALA	2.6
1	A	78	VAL	2.6
1	C	44	GLY	2.6
1	B	176	ALA	2.6
1	D	30	LEU	2.6
1	C	67	PHE	2.6
1	C	287	ASP	2.6
1	A	26	VAL	2.6
1	C	349	GLU	2.6
1	D	294	HIS	2.6
1	C	244	THR	2.6
1	A	324	ASP	2.5
1	B	341	THR	2.5
1	B	36	VAL	2.5
1	D	59	VAL	2.5
1	C	293	ILE	2.5
1	D	72	LYS	2.5
1	D	333	GLU	2.5
1	D	167	GLN	2.5
1	D	336	ARG	2.5
1	A	384	LEU	2.5
1	A	373	ILE	2.5
1	D	222	ASN	2.5
1	A	187	PHE	2.5
1	B	381	ASP	2.5
1	A	64	ALA	2.5
1	B	391	GLY	2.5
1	C	135	THR	2.5

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Mol	Chain	Res	Type	RSRZ
1	D	28	THR	2.5
1	D	378	ASN	2.5
1	C	134	ASP	2.5
1	D	381	ASP	2.5
1	B	64	ALA	2.4
1	C	23	ALA	2.4
1	B	244	THR	2.4
1	B	348	SER	2.4
1	A	294	HIS	2.4
1	C	296	PHE	2.4
1	C	391	GLY	2.4
1	A	47	ALA	2.4
1	D	293	ILE	2.4
1	B	332	THR	2.4
1	C	333	GLU	2.4
1	D	70	SER	2.4
1	D	279	ALA	2.4
1	D	349	GLU	2.4
1	B	288	VAL	2.4
1	D	23	ALA	2.4
1	A	204	TYR	2.4
1	B	293	ILE	2.4
1	C	238	ALA	2.4
1	D	131	ALA	2.4
1	B	352	SER	2.3
1	C	92	PHE	2.3
1	C	279	ALA	2.3
1	C	17	PHE	2.3
1	A	356	LEU	2.3
1	B	324	ASP	2.3
1	C	382	ASN	2.3
1	D	296	PHE	2.3
1	B	207	TRP	2.3
1	C	194	ASP	2.3
1	D	27	ALA	2.3
1	B	349	GLU	2.3
1	C	294	HIS	2.3
1	B	5	THR	2.3
1	A	243	TYR	2.3
1	C	213	ALA	2.3
1	A	15	SER	2.3
1	D	257	ARG	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	136	ALA	2.2
1	C	15	SER	2.2
1	C	243	TYR	2.2
1	D	319	PHE	2.2
1	C	218	GLU	2.2
1	C	66	LEU	2.2
1	A	16	GLY	2.2
1	B	238	ALA	2.2
1	B	296	PHE	2.2
1	D	332	THR	2.2
1	D	350	THR	2.2
1	B	15	SER	2.2
1	B	194	ASP	2.2
1	B	361	LEU	2.2
1	C	53	PRO	2.2
1	D	335	ASP	2.2
1	C	109	VAL	2.2
1	A	357	PHE	2.2
1	A	308	ASP	2.2
1	A	361	LEU	2.2
1	C	106	LEU	2.2
1	B	294	HIS	2.2
1	D	158	VAL	2.2
1	B	14	GLY	2.2
1	C	335	ASP	2.2
1	C	167	GLN	2.2
1	C	246	PRO	2.2
1	B	353	SER	2.2
1	D	168	THR	2.1
1	B	23	ALA	2.1
1	A	293	ILE	2.1
1	C	131	ALA	2.1
1	C	63	GLY	2.1
1	D	387	HIS	2.1
1	A	299	PHE	2.1
1	C	142	GLU	2.1
1	B	168	THR	2.1
1	A	358	GLY	2.1
1	B	242	VAL	2.1
1	C	253	TYR	2.1
1	A	225	TRP	2.1
1	B	395	LEU	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	53	PRO	2.1
1	C	91	VAL	2.1
1	A	67	PHE	2.1
1	A	377	LEU	2.1
1	C	204	TYR	2.1
1	D	385	ALA	2.1
1	C	321	GLU	2.0
1	A	287	ASP	2.0
1	B	39	ARG	2.0
1	C	311	VAL	2.0
1	D	26	VAL	2.0
1	D	169	ASP	2.0
1	B	137	ASP	2.0
1	A	321	GLU	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
3	BCN	A	1394	11/11	0.83	0.30	3.29	48,58,65,66	0
2	FAD	D	1388	53/53	0.91	0.15	-0.55	45,50,54,56	0
2	FAD	C	1388	53/53	0.91	0.17	-0.58	43,51,56,56	0
2	FAD	A	1393	53/53	0.94	0.16	-0.79	40,46,53,55	0
2	FAD	B	1390	53/53	0.94	0.13	-0.94	36,44,48,49	0

6.5 Other polymers

There are no such residues in this entry.