



# Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 01:21 PM GMT

PDB ID : 3HDQ  
Title : Crystal structure of UDP-galactopyranose mutase (oxidized form) in complex with substrate  
Authors : Partha, S.K.; van Straaten, K.E.; Sanders, D.A.  
Deposited on : 2009-05-07  
Resolution : 2.36 Å(reported)

This is a full wwPDB validation report for a publicly released PDB entry.  
We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)  
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

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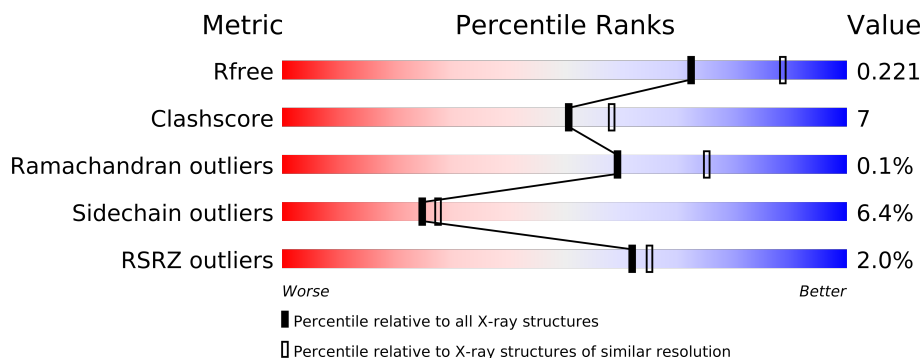
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance

The reported resolution of this entry is 2.36 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))
$R_{free}$	66092	3327 (2.40-2.32)
Clashscore	79885	1064 (2.38-2.34)
Ramachandran outliers	78287	1048 (2.38-2.34)
Sidechain outliers	78261	1049 (2.38-2.34)
RSRZ outliers	66119	3330 (2.40-2.32)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	397	
1	B	397	
1	C	397	
1	D	397	
1	E	397	
1	F	397	
1	G	397	
1	H	397	
1	I	397	
1	J	397	

## 2 Entry composition

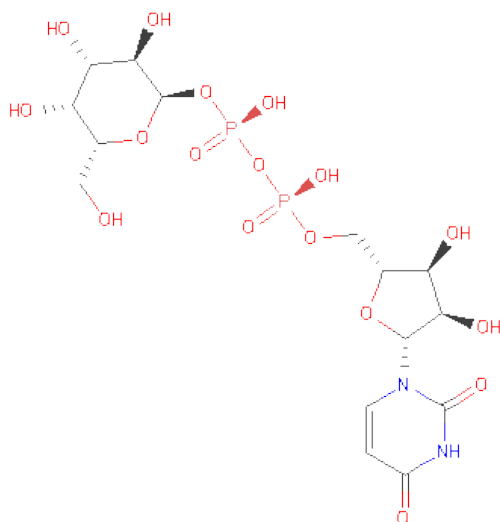
There are 4 unique types of molecules in this entry. The entry contains 31875 atoms, of which 0 are hydrogen and 0 are deuterium.

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.

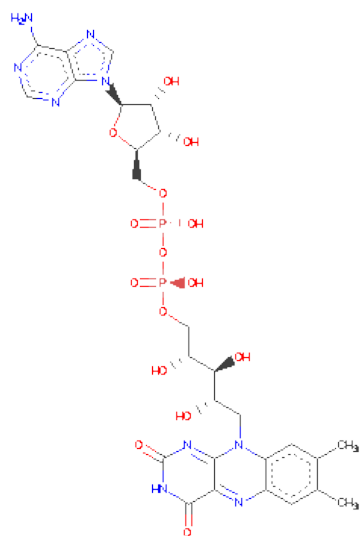
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	365	Total	C	N	O	S	0	1	0
			2992	1909	521	554	8			
1	B	364	Total	C	N	O	S	4	2	0
			2990	1909	522	551	8			
1	C	361	Total	C	N	O	S	23	1	0
			2964	1894	516	546	8			
1	D	360	Total	C	N	O	S	0	1	0
			2955	1888	514	545	8			
1	E	364	Total	C	N	O	S	8	0	0
			2975	1899	516	552	8			
1	F	363	Total	C	N	O	S	4	1	0
			2977	1901	519	549	8			
1	G	363	Total	C	N	O	S	4	1	0
			2974	1899	518	549	8			
1	H	364	Total	C	N	O	S	0	1	0
			2983	1904	520	551	8			
1	I	363	Total	C	N	O	S	4	1	0
			2975	1899	517	551	8			
1	J	361	Total	C	N	O	S	4	1	0
			2959	1890	515	546	8			

- Molecule 2 is SUGAR (GALACTOSE-URIDINE-5'-DIPHOSPHATE) (three-letter code: GDU) (formula: C<sub>15</sub>H<sub>24</sub>N<sub>2</sub>O<sub>17</sub>P<sub>2</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	B	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	C	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	D	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	E	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	F	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	G	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	H	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	I	1	Total	C	N	O	P	0	0
			36	15	2	17	2		
2	J	1	Total	C	N	O	P	0	0
			36	15	2	17	2		

- Molecule 3 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula:  $C_{27}H_{33}N_9O_{15}P_2$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	C	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	D	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	E	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	F	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	G	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	H	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	I	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
3	J	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	164	Total	O	0	0
			164	164		
4	B	104	Total	O	0	0
			104	104		

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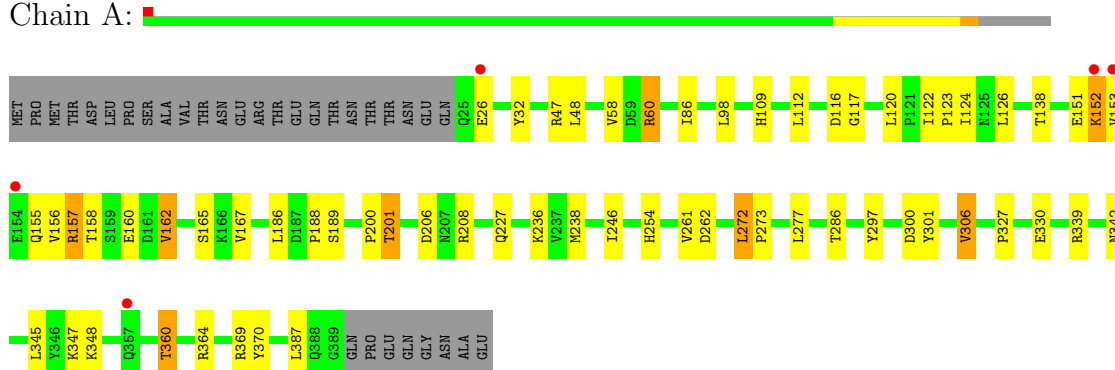
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	88	Total 88	O 88	0	0
4	D	86	Total 86	O 86	0	0
4	E	110	Total 110	O 110	0	0
4	F	143	Total 143	O 143	0	0
4	G	116	Total 116	O 116	0	0
4	H	143	Total 143	O 143	0	0
4	I	160	Total 160	O 160	0	0
4	J	127	Total 127	O 127	0	0

### 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.

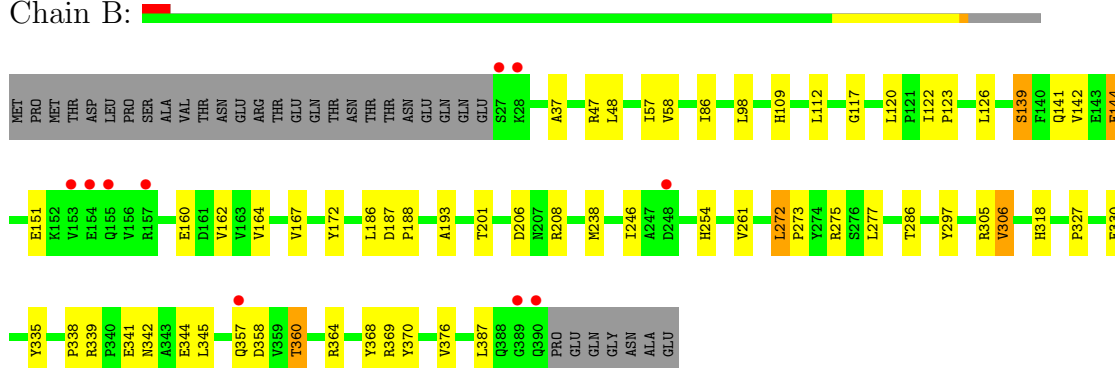
- Molecule 1: UDP-galactopyranose mutase

Chain A:



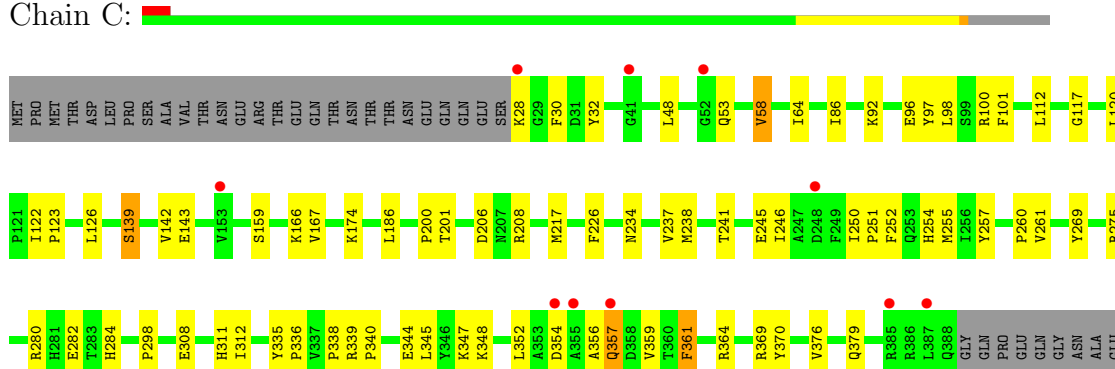
- Molecule 1: UDP-galactopyranose mutase

Chain B:



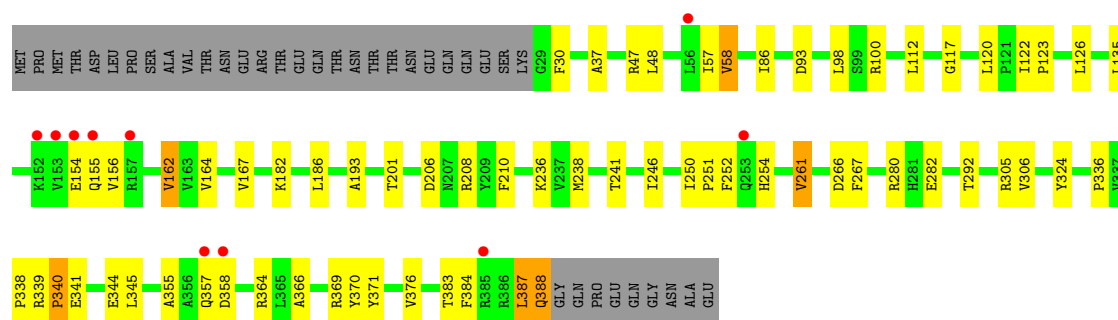
- Molecule 1: UDP-galactopyranose mutase

Chain C:



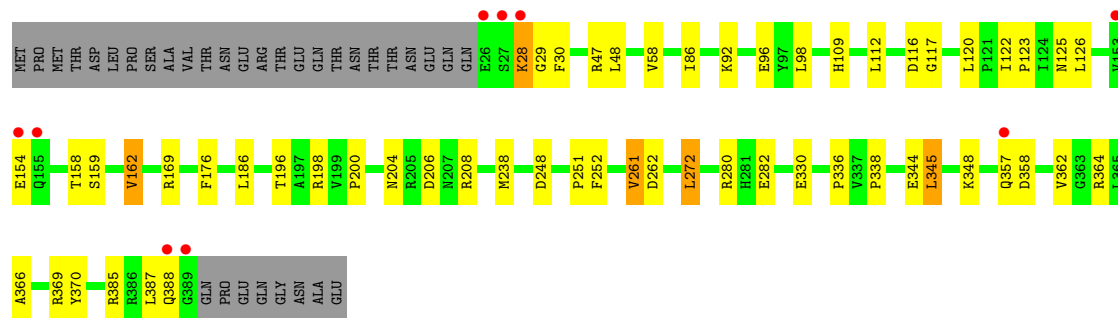
- Molecule 1: UDP-galactopyranose mutase

Chain D:



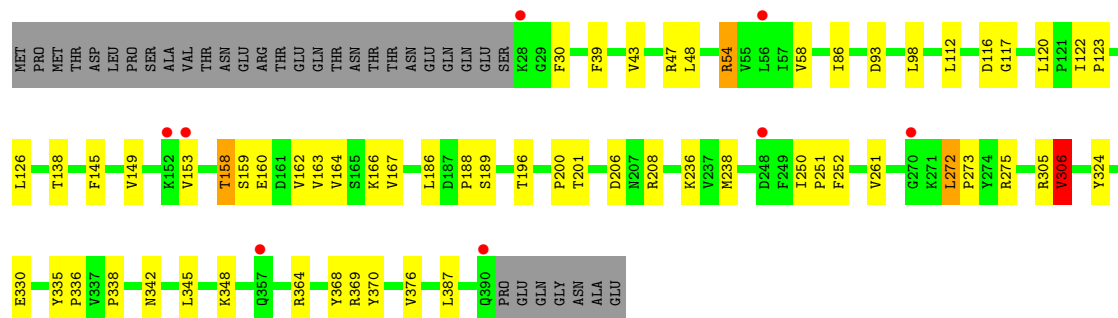
- Molecule 1: UDP-galactopyranose mutase

Chain E:



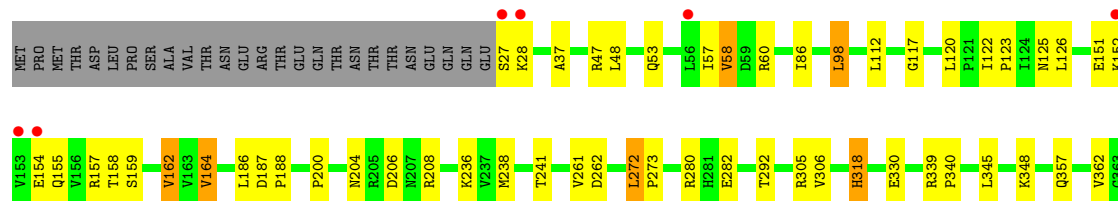
- Molecule 1: UDP-galactopyranose mutase

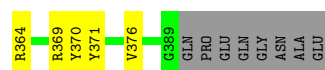
Chain F:



- Molecule 1: UDP-galactopyranose mutase

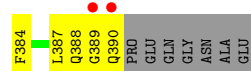
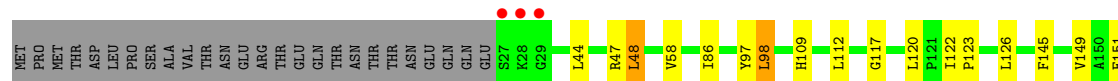
Chain G:





• Molecule 1: UDP-galactopyranose mutase

Chain H:



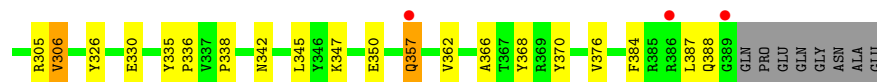
• Molecule 1: UDP-galactopyranose mutase

Chain I:



• Molecule 1: UDP-galactopyranose mutase

Chain J:



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	134.02Å 176.65Å 220.09Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.88 – 2.36 19.88 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (19.88-2.36) 97.8 (19.88-2.30)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.50 (at 2.30Å)	Xtriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, $R_{free}$	0.177 , 0.226 0.177 , 0.221	Depositor DCC
$R_{free}$ test set	11274 reflections (5.00%)	DCC
Wilson B-factor (Å <sup>2</sup> )	35.7	Xtriage
Anisotropy	0.109	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 29.8	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.29$	Xtriage
Outliers	0 of 225489 reflections	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	31875	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.70% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GDU, 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	0.43	0/3079	0.58	0/4185
1	B	0.39	0/3081	0.56	0/4188
1	C	0.35	0/3051	0.54	0/4148
1	D	0.40	0/3042	0.54	0/4137
1	E	0.34	0/3059	0.52	0/4159
1	F	0.38	0/3064	0.56	1/4165 (0.0%)
1	G	0.41	0/3061	0.54	0/4161
1	H	0.39	0/3070	0.54	0/4173
1	I	0.41	0/3059	0.57	1/4159 (0.0%)
1	J	0.39	0/3046	0.55	1/4142 (0.0%)
All	All	0.39	0/30612	0.55	3/41617 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	306	VAL	CB-CA-C	-5.47	101.01	111.40
1	F	306	VAL	CB-CA-C	-5.33	101.27	111.40
1	J	306	VAL	CB-CA-C	-5.05	101.81	111.40

There are no chirality outliers.

There are no planarity outliers.

### 5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the

chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2992	0	2867	50	0
1	B	2990	0	2868	44	0
1	C	2964	0	2845	56	0
1	D	2955	0	2832	45	0
1	E	2975	0	2846	36	0
1	F	2977	0	2856	41	0
1	G	2974	0	2853	36	0
1	H	2983	0	2861	47	0
1	I	2975	0	2847	50	0
1	J	2959	0	2835	67	0
2	A	36	0	22	0	0
2	B	36	0	22	3	0
2	C	36	0	22	1	0
2	D	36	0	22	3	0
2	E	36	0	22	1	0
2	F	36	0	22	2	0
2	G	36	0	22	3	0
2	H	36	0	22	1	0
2	I	36	0	22	4	0
2	J	36	0	22	2	0
3	A	53	0	30	1	0
3	B	53	0	31	2	0
3	C	53	0	30	1	0
3	D	53	0	31	0	0
3	E	53	0	31	0	0
3	F	53	0	29	1	0
3	G	53	0	31	3	0
3	H	53	0	31	0	0
3	I	53	0	31	1	0
3	J	53	0	30	1	0
4	A	164	0	0	2	0
4	B	104	0	0	3	0
4	C	88	0	0	2	0
4	D	86	0	0	1	0
4	E	110	0	0	3	0
4	F	143	0	0	0	0
4	G	116	0	0	1	0
4	H	143	0	0	0	0
4	I	160	0	0	2	0
4	J	127	0	0	0	0
All	All	31875	0	29035	438	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 7.

All (438) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:152:LYS:CD	1:A:153:VAL:H	1.54	1.18
1:J:357:GLN:HA	1:J:357:GLN:HE21	1.15	1.10
1:A:152:LYS:HD3	1:A:153:VAL:N	1.72	1.04
1:E:58:VAL:HG22	1:E:238:MET:HB3	1.42	1.01
1:H:152:LYS:HA	1:H:152:LYS:HE2	1.38	1.01
1:D:357:GLN:O	1:D:358:ASP:HB2	1.60	0.99
1:A:152:LYS:HD3	1:A:153:VAL:H	1.26	0.95
1:A:152:LYS:HD2	1:A:153:VAL:H	1.32	0.93
1:H:152:LYS:HA	1:H:152:LYS:CE	2.01	0.90
1:J:357:GLN:NE2	1:J:357:GLN:HA	1.88	0.89
1:A:152:LYS:CD	1:A:153:VAL:N	2.30	0.88
1:F:158:THR:HG22	1:F:160:GLU:H	1.42	0.84
1:A:158:THR:HG22	1:A:160:GLU:H	1.44	0.83
1:F:54:ARG:HH21	1:F:54:ARG:HG3	1.41	0.82
1:A:157:ARG:HH11	1:A:157:ARG:HG2	1.43	0.81
1:H:158:THR:HG22	1:H:161:ASP:H	1.44	0.81
1:J:155:GLN:CG	1:J:157:ARG:NH1	2.45	0.80
1:C:357:GLN:CD	1:C:357:GLN:H	1.83	0.80
1:A:152:LYS:HD2	1:A:153:VAL:O	1.82	0.80
1:B:167:VAL:HG11	1:B:201:THR:HG21	1.64	0.80
1:A:157:ARG:NH1	1:A:157:ARG:HG2	1.97	0.79
1:G:376:VAL:HG21	3:G:450:FAD:H5'2	1.64	0.79
1:A:158:THR:HG22	1:A:160:GLU:N	1.96	0.79
1:D:357:GLN:O	1:D:358:ASP:CB	2.30	0.79
1:D:167:VAL:HG11	1:D:201:THR:HG21	1.64	0.78
1:C:364:ARG:HG3	1:C:369:ARG:O	1.85	0.77
1:G:58:VAL:HG23	1:G:238:MET:HB3	1.66	0.77
1:J:152:LYS:HD2	1:J:153:VAL:H	1.50	0.77
1:A:167:VAL:HG11	1:A:201:THR:HG21	1.66	0.76
1:A:60:ARG:HD3	4:A:1219:HOH:O	1.86	0.76
1:J:155:GLN:HG3	1:J:157:ARG:CZ	2.15	0.75
1:G:151:GLU:HB2	1:G:164:VAL:HG13	1.69	0.75
1:J:155:GLN:HG3	1:J:157:ARG:NH1	2.02	0.74
1:A:227:GLN:HG2	4:A:633:HOH:O	1.86	0.74
1:H:388:GLN:HB2	1:H:389:GLY:HA2	1.69	0.74
1:D:364:ARG:HG3	1:D:369:ARG:O	1.88	0.74
1:H:246:ILE:HB	1:H:250:ILE:HD12	1.71	0.72
1:J:155:GLN:CG	1:J:157:ARG:CZ	2.68	0.72
1:J:158:THR:HG22	1:J:160:GLU:N	2.04	0.71

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:J:158:THR:HG22	1:J:160:GLU:H	1.54	0.71
1:I:254:HIS:HB2	4:I:1166:HOH:O	1.89	0.71
1:C:238:MET:HE2	1:C:246:ILE:HG21	1.72	0.71
1:J:58:VAL:HG12	1:J:238:MET:HB3	1.72	0.70
1:G:280[B]:ARG:NH1	1:G:282:GLU:OE2	2.24	0.70
1:G:60:ARG:HD3	4:G:1117:HOH:O	1.91	0.70
1:I:385:ARG:O	1:I:389:GLY:HA3	1.92	0.70
1:B:208:ARG:HD2	1:G:117:GLY:CA	2.21	0.70
1:E:117:GLY:HA3	1:I:208:ARG:HD2	1.74	0.69
1:D:336:PRO:O	1:D:338:PRO:HD3	1.92	0.69
1:F:158:THR:CG2	1:F:160:GLU:H	2.06	0.69
1:A:157:ARG:HH11	1:A:157:ARG:CG	2.06	0.69
1:E:117:GLY:CA	1:I:208:ARG:HD2	2.23	0.69
1:D:58:VAL:HG23	1:D:238:MET:HB3	1.75	0.69
1:F:158:THR:HG21	1:F:189:SER:HA	1.73	0.68
1:B:58:VAL:HG12	1:B:238:MET:HB3	1.74	0.68
1:C:356:ALA:HB1	1:C:359:VAL:CG1	2.22	0.68
1:C:53:GLN:O	1:C:234:ASN:HB3	1.94	0.67
1:J:151:GLU:HB2	1:J:164:VAL:HG13	1.76	0.67
1:A:158:THR:HG21	1:A:189:SER:HA	1.75	0.67
1:C:117:GLY:CA	1:J:208:ARG:HD2	2.25	0.67
1:F:158:THR:HG22	1:F:160:GLU:N	2.09	0.67
1:I:388:GLN:CB	1:I:389:GLY:HA2	2.25	0.66
1:H:58:VAL:HG23	1:H:238:MET:HB3	1.77	0.66
1:H:388:GLN:HA	1:H:388:GLN:NE2	2.11	0.66
1:E:206:ASP:OD1	1:E:208:ARG:HD3	1.95	0.66
1:I:280:ARG:HH11	1:I:280:ARG:CG	2.09	0.65
1:B:357:GLN:O	1:B:358:ASP:HB2	1.96	0.65
1:F:158:THR:CG2	1:F:189:SER:HA	2.26	0.65
1:J:158:THR:CG2	1:J:189:SER:HA	2.25	0.65
1:A:117:GLY:CA	1:G:208:ARG:HD2	2.26	0.64
1:I:162:VAL:CG1	1:I:193:ALA:HB1	2.27	0.64
1:E:280:ARG:NH1	1:E:282:GLU:OE2	2.29	0.64
1:D:280[B]:ARG:NH2	1:D:282:GLU:OE2	2.29	0.64
1:E:208:ARG:HD2	1:H:117:GLY:CA	2.28	0.64
1:B:117:GLY:CA	1:C:208:ARG:HD2	2.28	0.63
1:A:117:GLY:HA3	1:G:208:ARG:HD2	1.80	0.63
1:C:255:MET:O	1:C:359:VAL:HA	1.99	0.62
1:A:254:HIS:NE2	1:A:360:THR:HG22	2.14	0.62
1:D:254:HIS:ND1	1:D:358:ASP:HA	2.15	0.62
1:I:388:GLN:CB	1:I:389:GLY:CA	2.78	0.62
1:A:158:THR:CG2	1:A:189:SER:HA	2.30	0.62

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:J:206:ASP:OD1	1:J:208:ARG:HD3	1.99	0.61
1:C:97:TYR:CD2	1:C:98:LEU:HD12	2.35	0.61
1:C:357:GLN:NE2	1:C:357:GLN:H	1.98	0.61
1:F:206:ASP:OD1	1:F:208:ARG:HD3	2.01	0.61
1:A:167:VAL:CG1	1:A:201:THR:HG21	2.31	0.60
1:J:29:GLY:HA3	1:J:251:PRO:HG2	1.82	0.60
1:H:388:GLN:HA	1:H:388:GLN:HE21	1.67	0.60
1:F:117:GLY:CA	1:H:208:ARG:HD2	2.32	0.60
1:H:388:GLN:CB	1:H:389:GLY:HA2	2.31	0.60
1:D:206:ASP:OD1	1:D:208:ARG:HD3	2.01	0.60
1:B:364:ARG:HG3	1:B:369:ARG:O	2.01	0.60
1:B:305:ARG:HH12	2:B:500:GDU:H5'	1.66	0.60
1:G:305:ARG:NH1	2:G:500:GDU:H5'	2.17	0.60
1:C:336:PRO:O	1:C:338:PRO:HD3	2.02	0.60
1:G:206:ASP:OD1	1:G:208:ARG:HD3	2.02	0.60
1:D:388:GLN:NE2	1:D:388:GLN:HA	2.17	0.60
1:C:269:TYR:CE2	1:C:352:LEU:HD11	2.37	0.59
1:C:30:PHE:O	1:C:252:PHE:HA	2.02	0.59
1:D:388:GLN:HE21	1:D:388:GLN:HA	1.67	0.59
1:C:238:MET:HE2	1:C:241:THR:HG21	1.85	0.59
1:I:242:ASP:HB3	1:I:245:GLU:HG3	1.84	0.59
1:C:344:GLU:O	1:C:347:LYS:HB3	2.03	0.59
1:I:388:GLN:HB2	1:I:389:GLY:CA	2.33	0.59
1:I:280:ARG:HG2	1:I:280:ARG:HH11	1.67	0.59
1:J:376:VAL:HG21	3:J:450:FAD:H5'2	1.84	0.59
1:J:158:THR:CG2	1:J:160:GLU:H	2.15	0.58
1:B:318:HIS:CE1	1:H:316:ARG:HD3	2.38	0.58
1:C:97:TYR:O	1:C:100:ARG:HG3	2.03	0.58
1:J:155:GLN:HG2	1:J:157:ARG:NH1	2.17	0.58
1:D:208:ARG:HD2	1:I:117:GLY:CA	2.33	0.58
1:J:158:THR:HG21	1:J:189:SER:HA	1.85	0.58
1:D:117:GLY:HA2	1:F:208:ARG:HD2	1.84	0.58
1:E:29:GLY:HA3	1:E:251:PRO:HG2	1.86	0.58
1:I:388:GLN:HB2	1:I:389:GLY:HA2	1.86	0.58
1:C:143:GLU:HB2	4:C:1001:HOH:O	2.03	0.58
1:C:117:GLY:HA2	1:J:208:ARG:HD2	1.85	0.58
1:C:206:ASP:OD1	1:C:208:ARG:HD3	2.04	0.58
1:I:58:VAL:HG23	1:I:238:MET:HB3	1.85	0.57
1:C:123:PRO:HB3	1:C:200:PRO:O	2.04	0.57
1:A:158:THR:CG2	1:A:160:GLU:H	2.13	0.57
1:H:206:ASP:OD1	1:H:208:ARG:HD3	2.03	0.57
1:E:208:ARG:HD2	1:H:117:GLY:HA2	1.86	0.57

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:J:155:GLN:HG2	1:J:157:ARG:CZ	2.34	0.57
1:J:158:THR:HB	1:J:161:ASP:OD2	2.04	0.57
1:B:208:ARG:HD2	1:G:117:GLY:HA3	1.86	0.57
1:I:223:THR:O	1:I:227[B]:GLN:HG3	2.04	0.57
1:F:54:ARG:HG3	1:F:54:ARG:NH2	2.14	0.57
1:B:201:THR:HG23	4:B:982:HOH:O	2.05	0.57
1:I:348:LYS:HE2	4:I:936:HOH:O	2.04	0.56
1:I:280:ARG:NH1	1:I:280:ARG:HG2	2.20	0.56
1:C:269:TYR:HE2	1:C:352:LEU:CD1	2.18	0.56
1:I:210:PHE:HZ	2:I:500:GDU:O4'	1.88	0.56
1:D:384:PHE:O	1:D:388:GLN:HG2	2.05	0.56
1:F:167:VAL:CG1	1:F:201:THR:HG21	2.35	0.56
1:H:151:GLU:HB2	1:H:164:VAL:CG1	2.36	0.56
1:H:158:THR:CG2	1:H:189:SER:HA	2.35	0.56
1:J:29:GLY:CA	1:J:251:PRO:HG2	2.36	0.56
1:C:356:ALA:HB1	1:C:359:VAL:HG13	1.87	0.56
1:J:158:THR:HG22	1:J:161:ASP:H	1.70	0.55
1:B:117:GLY:HA2	1:C:208:ARG:HD2	1.87	0.55
1:F:117:GLY:HA3	1:H:208:ARG:HD2	1.87	0.55
1:E:198:ARG:O	1:E:200:PRO:HD3	2.06	0.55
1:A:208:ARG:HD2	1:J:117:GLY:CA	2.35	0.55
1:H:151:GLU:HB2	1:H:164:VAL:HG13	1.89	0.55
1:J:151:GLU:O	1:J:165:SER:HA	2.06	0.55
1:J:123:PRO:HB3	1:J:200:PRO:O	2.06	0.55
1:D:210:PHE:HZ	2:D:500:GDU:HO4'	1.55	0.55
1:J:347:LYS:HE2	1:J:350:GLU:OE2	2.06	0.55
1:E:364:ARG:HG3	1:E:369:ARG:O	2.06	0.55
1:H:158:THR:CG2	1:H:160:GLU:H	2.19	0.55
1:C:359:VAL:HG22	1:C:361:PHE:CE1	2.42	0.54
1:H:44:LEU:HD13	1:H:256:ILE:HD13	1.89	0.54
1:A:152:LYS:HE2	1:A:165:SER:HB2	1.88	0.54
1:G:151:GLU:HB2	1:G:164:VAL:CG1	2.37	0.54
1:J:152:LYS:CD	1:J:153:VAL:H	2.20	0.54
1:B:305:ARG:NH1	2:B:500:GDU:H5'	2.23	0.54
1:I:261:VAL:HG13	1:I:366:ALA:O	2.08	0.54
1:B:272:LEU:HD22	1:B:368:TYR:CE1	2.42	0.54
1:D:135:LEU:HD23	1:F:138:THR:HG21	1.90	0.54
1:A:158:THR:HG23	1:A:188:PRO:O	2.07	0.54
1:H:86:ILE:HD13	2:H:500:GDU:H6'2	1.90	0.54
1:E:336:PRO:O	1:E:338:PRO:HD3	2.08	0.53
1:C:97:TYR:HD2	1:C:98:LEU:CD1	2.21	0.53
1:C:238:MET:CE	1:C:246:ILE:HG21	2.37	0.53

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:206:ASP:OD1	1:A:208:ARG:HD3	2.09	0.53
1:G:357:GLN:HA	1:G:357:GLN:HE21	1.73	0.53
1:D:167:VAL:CG1	1:D:201:THR:HG21	2.36	0.53
1:G:364:ARG:HG3	1:G:369:ARG:O	2.09	0.53
1:B:254[A]:HIS:NE2	1:B:360:THR:CG2	2.71	0.53
1:I:206:ASP:OD1	1:I:208:ARG:HD3	2.09	0.52
1:F:162:VAL:O	1:F:166:LYS:HD2	2.09	0.52
1:B:272:LEU:HD22	1:B:368:TYR:CZ	2.45	0.52
1:C:298:PRO:HG3	4:C:1238:HOH:O	2.09	0.52
1:J:158:THR:HG23	1:J:189:SER:HA	1.90	0.52
1:J:262:ASP:HB3	1:J:272:LEU:HB2	1.91	0.52
1:D:117:GLY:CA	1:F:208:ARG:HD2	2.38	0.52
1:J:243:TYR:O	1:J:246:ILE:HG22	2.10	0.52
1:D:208:ARG:HD2	1:I:117:GLY:HA2	1.91	0.52
1:I:115:VAL:HG11	1:I:174:LYS:HG2	1.91	0.52
1:B:117:GLY:HA3	1:C:208:ARG:HD2	1.92	0.51
1:F:376:VAL:HG21	3:F:450:FAD:H5'2	1.92	0.51
1:I:357:GLN:HA	1:I:357:GLN:OE1	2.10	0.51
1:J:280[B]:ARG:HD2	1:J:282:GLU:OE2	2.11	0.51
1:J:167:VAL:HG11	1:J:201:THR:HG21	1.91	0.51
1:J:242:ASP:HB3	1:J:245:GLU:HG3	1.90	0.51
1:C:58:VAL:HG23	1:C:238:MET:HB3	1.92	0.51
1:I:364:ARG:HG3	1:I:369:ARG:O	2.10	0.51
1:J:185:GLY:O	1:J:186:LEU:HD13	2.10	0.51
1:B:162:VAL:HG13	1:B:193:ALA:HB1	1.91	0.51
1:I:167:VAL:HG11	1:I:201:THR:HG21	1.93	0.51
1:H:357:GLN:CD	1:H:357:GLN:H	2.14	0.51
1:G:158:THR:O	1:G:162:VAL:HG22	2.11	0.51
1:E:262:ASP:HB3	1:E:272:LEU:HB2	1.92	0.51
1:C:308:GLU:HB3	1:C:311:HIS:HD2	1.76	0.51
1:B:208:ARG:HD2	1:G:117:GLY:HA2	1.92	0.50
1:B:376:VAL:HG21	3:B:450:FAD:H5'2	1.91	0.50
1:D:344:GLU:HG3	4:D:1032:HOH:O	2.11	0.50
1:J:280[B]:ARG:NH2	1:J:326:TYR:OH	2.44	0.50
1:G:262:ASP:HB3	1:G:272:LEU:HB2	1.93	0.50
1:G:123:PRO:HB3	1:G:200:PRO:O	2.12	0.50
1:H:249:PHE:O	1:H:251:PRO:HD3	2.12	0.50
1:B:201:THR:HG22	4:B:715:HOH:O	2.11	0.50
1:H:162:VAL:CG1	1:H:193:ALA:HB1	2.41	0.50
1:D:30:PHE:O	1:D:252:PHE:HA	2.11	0.50
1:I:280:ARG:NH1	1:I:324:TYR:CD2	2.74	0.50
1:A:254:HIS:NE2	1:A:360:THR:CG2	2.74	0.50

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:F:336:PRO:O	1:F:338:PRO:HD3	2.11	0.50
1:C:139:SER:O	1:C:142:VAL:HG12	2.11	0.50
1:D:86:ILE:HD12	1:D:86:ILE:N	2.25	0.50
1:A:123:PRO:HB3	1:A:200:PRO:O	2.11	0.50
1:A:122:ILE:HA	1:A:123:PRO:C	2.32	0.50
1:I:30:PHE:O	1:I:252:PHE:HA	2.12	0.50
1:H:162:VAL:HG13	1:H:193:ALA:HB1	1.93	0.50
1:J:280[B]:ARG:NH1	1:J:282:GLU:OE2	2.41	0.49
1:J:86:ILE:HG21	1:J:109:HIS:HB2	1.94	0.49
1:G:86:ILE:HD12	1:G:86:ILE:N	2.27	0.49
1:I:115:VAL:CG1	1:I:174:LYS:HG2	2.41	0.49
1:G:272:LEU:HD23	1:G:273:PRO:HD2	1.94	0.49
1:C:376:VAL:HG21	3:C:450:FAD:H5'2	1.94	0.49
1:E:357:GLN:HA	1:E:357:GLN:HE21	1.77	0.49
1:B:139:SER:O	1:B:142:VAL:HG12	2.12	0.49
1:B:254[A]:HIS:NE2	1:B:360:THR:HG22	2.26	0.49
1:F:122:ILE:HA	1:F:123:PRO:C	2.33	0.49
1:A:156:VAL:HG11	1:A:162:VAL:HG13	1.94	0.49
1:J:272:LEU:HD13	1:J:368:TYR:CD1	2.47	0.49
1:C:361:PHE:N	1:C:361:PHE:CD1	2.80	0.49
1:J:246:ILE:HG13	1:J:250:ILE:HD12	1.94	0.49
1:H:277:LEU:HD23	1:H:327:PRO:HA	1.95	0.49
1:H:122:ILE:HA	1:H:123:PRO:C	2.33	0.49
1:G:305:ARG:HH12	2:G:500:GDU:H5'	1.76	0.49
1:I:280:ARG:HB3	1:I:280:ARG:HH11	1.76	0.49
1:I:40:ALA:HB1	1:I:362:VAL:HG22	1.94	0.49
1:I:123:PRO:HB3	1:I:200:PRO:O	2.12	0.49
2:I:500:GDU:O4'	2:I:500:GDU:O6'	2.26	0.49
1:F:162:VAL:HG21	1:F:196:THR:OG1	2.13	0.49
1:E:86:ILE:HG21	1:E:109:HIS:HB2	1.94	0.49
1:J:261:VAL:CG1	1:J:366:ALA:O	2.61	0.49
1:G:37:ALA:HA	1:G:57:ILE:HD11	1.94	0.49
1:H:145:PHE:O	1:H:149:VAL:HG22	2.12	0.49
1:H:158:THR:HG21	1:H:189:SER:HA	1.95	0.48
1:J:29:GLY:HA3	1:J:251:PRO:O	2.14	0.48
1:E:159:SER:HB3	1:E:196:THR:HG23	1.95	0.48
1:E:357:GLN:NE2	1:E:357:GLN:HA	2.27	0.48
1:A:86:ILE:HG21	1:A:109:HIS:HB2	1.94	0.48
1:C:97:TYR:HD2	1:C:98:LEU:HD12	1.76	0.48
1:J:47:ARG:NE	1:J:47:ARG:HA	2.27	0.48
1:B:273:PRO:HG2	1:B:342:ASN:OD1	2.14	0.48
1:C:64:ILE:HD12	1:C:226:PHE:HB3	1.95	0.48

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:208:ARG:HD2	1:J:117:GLY:HA3	1.95	0.48
1:I:388:GLN:HB3	1:I:389:GLY:HA2	1.95	0.48
1:I:162:VAL:HG11	1:I:193:ALA:HB1	1.95	0.48
1:C:269:TYR:CE2	1:C:352:LEU:CD1	2.96	0.48
1:D:47:ARG:NH1	1:D:100:ARG:HH12	2.10	0.48
1:B:206:ASP:OD1	1:B:208:ARG:HD3	2.14	0.47
1:C:246:ILE:HD12	1:C:250:ILE:HD12	1.96	0.47
1:I:86:ILE:HG21	1:I:109:HIS:HB2	1.96	0.47
1:I:151:GLU:HB2	1:I:164:VAL:HG13	1.95	0.47
1:J:158:THR:HB	1:J:161:ASP:CG	2.34	0.47
1:A:236:LYS:HB3	1:I:238:MET:HE3	1.96	0.47
1:F:305:ARG:NH1	2:F:500:GDU:H5'	2.30	0.47
1:C:86:ILE:HD13	2:C:500:GDU:H6'2	1.97	0.47
1:G:318:HIS:NE2	1:H:285:ASP:OD2	2.44	0.46
1:E:47:ARG:NE	1:E:47:ARG:HA	2.30	0.46
1:H:158:THR:HG22	1:H:160:GLU:N	2.30	0.46
1:B:122:ILE:HA	1:B:123:PRO:C	2.36	0.46
1:F:305:ARG:HH12	2:F:500:GDU:H5'	1.80	0.46
1:C:282:GLU:OE1	1:C:284:HIS:CE1	2.69	0.46
1:C:32:TYR:CD1	1:C:254:HIS:HB3	2.51	0.46
1:D:246:ILE:HD13	1:D:250:ILE:HD12	1.97	0.46
1:D:37:ALA:HA	1:D:57:ILE:HD11	1.97	0.46
1:B:162:VAL:CG1	1:B:193:ALA:HB1	2.45	0.46
1:A:158:THR:CG2	1:A:160:GLU:HB3	2.46	0.46
1:C:122:ILE:HA	1:C:123:PRO:C	2.36	0.46
1:I:47:ARG:NH1	1:I:100:ARG:HH12	2.14	0.46
1:D:383:THR:HG22	1:D:387:LEU:HD22	1.97	0.46
1:D:122:ILE:HA	1:D:123:PRO:C	2.35	0.46
1:C:257:TYR:HE2	1:C:260:PRO:O	1.97	0.46
1:J:172:TYR:OH	1:J:188:PRO:HG2	2.16	0.46
1:G:357:GLN:HA	1:G:357:GLN:NE2	2.31	0.46
1:H:158:THR:HG23	1:H:189:SER:HA	1.97	0.46
1:I:280:ARG:CB	1:I:280:ARG:HH11	2.29	0.46
1:D:206:ASP:HA	1:I:116:ASP:O	2.16	0.46
3:A:450:FAD:O2'	3:A:450:FAD:O4'	2.30	0.46
1:H:86:ILE:HG21	1:H:109:HIS:HB2	1.99	0.45
1:B:167:VAL:CG1	1:B:201:THR:HG21	2.41	0.45
1:J:152:LYS:HD2	1:J:153:VAL:O	2.16	0.45
1:J:158:THR:O	1:J:162:VAL:HG22	2.17	0.45
1:E:208:ARG:HD2	1:H:117:GLY:HA3	1.98	0.45
1:F:273:PRO:HG2	1:F:342:ASN:OD1	2.15	0.45
1:I:376:VAL:HG21	3:I:450:FAD:H5'2	1.98	0.45

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:272:LEU:HD13	1:B:368:TYR:CD1	2.51	0.45
1:C:237:VAL:O	1:F:238:MET:HA	2.16	0.45
1:D:162:VAL:HG13	1:D:193:ALA:HB1	1.98	0.45
1:J:155:GLN:HG2	1:J:157:ARG:NH2	2.32	0.45
1:A:124:ILE:HB	1:A:201:THR:HG22	1.98	0.45
1:A:273:PRO:HG2	1:A:342:ASN:OD1	2.17	0.45
1:F:272:LEU:HD13	1:F:368:TYR:CD1	2.51	0.45
1:A:206:ASP:HA	1:J:116:ASP:O	2.17	0.45
1:C:245:GLU:OE2	1:F:236:LYS:HE3	2.16	0.45
1:B:318:HIS:NE2	1:H:316:ARG:HD3	2.30	0.45
1:B:37:ALA:HA	1:B:57:ILE:HD11	1.98	0.45
1:H:97:TYR:HD2	1:H:98:LEU:HD13	1.82	0.45
1:A:152:LYS:HD3	1:A:152:LYS:HA	1.26	0.45
1:A:158:THR:HG21	1:A:160:GLU:HB3	1.99	0.45
1:D:135:LEU:HD23	1:F:138:THR:CG2	2.46	0.45
1:A:158:THR:O	1:A:162:VAL:HG22	2.17	0.45
1:D:305:ARG:NH1	2:D:500:GDU:H5'	2.32	0.45
1:J:336:PRO:O	1:J:338:PRO:HD3	2.17	0.45
1:E:261:VAL:HG13	1:E:366:ALA:O	2.17	0.45
1:F:158:THR:HG23	1:F:188:PRO:O	2.17	0.44
1:G:58:VAL:HG22	1:G:241:THR:HB	1.99	0.44
1:C:117:GLY:HA3	1:J:208:ARG:HD2	1.98	0.44
1:C:167:VAL:CG1	1:C:201:THR:HG21	2.46	0.44
1:F:145:PHE:O	1:F:149:VAL:HG22	2.16	0.44
1:I:44:LEU:HD13	1:I:256:ILE:HD13	1.99	0.44
1:B:357:GLN:O	1:B:358:ASP:CB	2.65	0.44
1:C:97:TYR:CZ	1:C:101:PHE:HE1	2.35	0.44
1:D:208:ARG:HD2	1:I:117:GLY:HA3	1.98	0.44
1:D:371:TYR:HB3	1:D:376:VAL:HG23	1.98	0.44
1:G:339:ARG:HB2	1:G:340:PRO:HD2	1.99	0.44
1:H:246:ILE:HD12	1:H:250:ILE:HD12	1.98	0.44
1:J:246:ILE:HA	1:J:246:ILE:HD12	1.82	0.44
1:F:86:ILE:N	1:F:86:ILE:HD12	2.32	0.44
1:H:158:THR:HG23	1:H:160:GLU:H	1.81	0.44
1:D:388:GLN:CA	1:D:388:GLN:HE21	2.30	0.44
1:H:337:VAL:HB	1:H:342:ASN:ND2	2.33	0.44
1:I:384:PHE:CE1	1:I:388:GLN:HG3	2.52	0.44
2:I:500:GDU:HO4'	2:I:500:GDU:HO6'	1.61	0.44
1:E:116:ASP:O	1:I:206:ASP:HA	2.18	0.44
1:D:238:MET:HG2	1:D:241:THR:OG1	2.17	0.44
1:E:29:GLY:CA	1:E:251:PRO:HG2	2.48	0.44
1:D:250:ILE:HA	1:D:251:PRO:HD3	1.78	0.44

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:F:39:PHE:O	1:F:43:VAL:HG23	2.17	0.44
1:G:187:ASP:CG	1:G:188:PRO:HD2	2.38	0.44
1:D:156:VAL:CG1	1:D:162:VAL:HG13	2.47	0.44
1:C:92:LYS:O	1:C:96:GLU:HG3	2.18	0.44
1:A:151:GLU:O	1:A:165:SER:HA	2.17	0.43
1:H:152:LYS:NZ	1:H:153:VAL:H	2.16	0.43
1:E:169:ARG:HD2	4:E:520:HOH:O	2.18	0.43
1:A:277:LEU:HD23	1:A:327:PRO:HA	2.01	0.43
1:C:275:ARG:HB3	1:C:335:TYR:HB2	2.00	0.43
1:D:236:LYS:HA	1:D:236:LYS:HD3	1.89	0.43
1:H:47:ARG:HA	1:H:47:ARG:NE	2.34	0.43
1:A:116:ASP:O	1:G:206:ASP:HA	2.18	0.43
1:J:272:LEU:HD13	1:J:368:TYR:CE1	2.54	0.43
1:E:248:ASP:HB2	4:E:1050:HOH:O	2.18	0.43
1:F:30:PHE:O	1:F:252:PHE:HA	2.18	0.43
2:G:500:GDU:H2'	3:G:450:FAD:C4	2.49	0.43
1:J:122:ILE:HA	1:J:123:PRO:C	2.38	0.43
1:I:272:LEU:HD13	1:I:368:TYR:CD1	2.54	0.43
1:D:355:ALA:O	1:D:357:GLN:NE2	2.51	0.43
1:I:272:LEU:HD13	1:I:368:TYR:CE1	2.54	0.43
1:E:125:ASN:HB2	1:E:204:ASN:O	2.19	0.43
1:A:364:ARG:HG3	1:A:369:ARG:O	2.18	0.43
1:E:28:LYS:HA	1:E:28:LYS:HD2	1.84	0.43
1:G:47:ARG:HA	1:G:47:ARG:NE	2.33	0.43
1:J:127:ASP:O	1:J:131:ARG:HG3	2.19	0.43
1:E:122:ILE:HA	1:E:123:PRO:C	2.38	0.43
1:J:167:VAL:CG1	1:J:201:THR:HG21	2.49	0.43
1:A:300:ASP:O	1:A:301:TYR:HB2	2.19	0.43
1:C:257:TYR:CE2	1:C:260:PRO:O	2.72	0.43
1:A:138:THR:HG21	1:J:135:LEU:HD23	2.01	0.43
1:J:253:GLN:HE21	1:J:253:GLN:N	2.16	0.43
1:C:339:ARG:HB2	1:C:340:PRO:HD2	2.01	0.42
1:D:305:ARG:HH12	2:D:500:GDU:H5'	1.84	0.42
1:B:86:ILE:HG21	1:B:109:HIS:HB2	2.00	0.42
1:B:151:GLU:HB2	1:B:164:VAL:HG13	2.01	0.42
1:J:384:PHE:O	1:J:388:GLN:HG2	2.18	0.42
1:J:156:VAL:HG13	1:J:161:ASP:HB3	2.01	0.42
1:D:266:ASP:O	1:D:267:PHE:HB2	2.19	0.42
1:E:117:GLY:HA2	1:I:208:ARG:HD2	1.99	0.42
1:J:124:ILE:HB	1:J:201:THR:HG22	2.00	0.42
1:D:261:VAL:HG13	1:D:366:ALA:O	2.19	0.42
1:B:277:LEU:HD23	1:B:327:PRO:HA	2.01	0.42

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:H:48:LEU:HD13	1:H:384:PHE:CD1	2.54	0.42
1:E:388:GLN:HA	1:E:388:GLN:NE2	2.34	0.42
1:B:141:GLN:HA	1:B:144:GLU:HG3	2.01	0.42
1:F:162:VAL:CG2	1:F:196:THR:OG1	2.67	0.42
1:I:37:ALA:HA	1:I:57:ILE:HD11	2.00	0.42
1:E:58:VAL:CG2	1:E:238:MET:HB3	2.31	0.42
1:C:250:ILE:HA	1:C:251:PRO:HD3	1.71	0.42
1:D:162:VAL:CG1	1:D:193:ALA:HB1	2.49	0.42
1:G:125:ASN:HB2	1:G:204:ASN:O	2.19	0.42
1:E:345:LEU:O	1:E:345:LEU:HD22	2.20	0.42
1:F:123:PRO:HB3	1:F:200:PRO:O	2.20	0.42
1:F:47:ARG:NE	1:F:47:ARG:HA	2.35	0.42
1:E:357:GLN:O	1:E:358:ASP:HB2	2.20	0.42
1:H:341:GLU:HG2	1:H:342:ASN:N	2.34	0.42
1:B:187:ASP:CG	1:B:188:PRO:HD2	2.40	0.42
1:A:32:TYR:HA	1:A:254:HIS:O	2.20	0.41
1:B:344:GLU:HG3	4:B:764:HOH:O	2.21	0.41
1:D:306:VAL:HG22	1:D:324:TYR:CD1	2.55	0.41
1:A:47:ARG:HA	1:A:47:ARG:NE	2.35	0.41
1:E:176:PHE:HA	2:E:500:GDU:O2	2.20	0.41
3:G:450:FAD:O2'	3:G:450:FAD:O4'	2.30	0.41
1:A:262:ASP:HB3	1:A:272:LEU:HB2	2.02	0.41
1:A:58:VAL:HG23	1:A:238:MET:HB3	2.01	0.41
1:G:155:GLN:HB3	1:G:157:ARG:HH11	1.85	0.41
1:H:48:LEU:HD13	1:H:384:PHE:CE1	2.56	0.41
1:C:269:TYR:HE2	1:C:352:LEU:HD11	1.79	0.41
1:G:159:SER:HA	1:G:162:VAL:CG2	2.50	0.41
1:F:250:ILE:HA	1:F:251:PRO:HD3	1.87	0.41
1:F:116:ASP:O	1:H:206:ASP:HA	2.21	0.41
1:G:48:LEU:HD12	1:G:53:GLN:HG3	2.03	0.41
1:F:153:VAL:HG23	1:F:153:VAL:O	2.20	0.41
1:J:305:ARG:HH12	2:J:500:GDU:H5'	1.86	0.41
1:H:364:ARG:HG3	1:H:369:ARG:O	2.20	0.41
1:A:297:TYR:HE1	1:A:306:VAL:HG23	1.86	0.41
2:B:500:GDU:H2'	3:B:450:FAD:C4	2.51	0.41
1:G:98:LEU:HD12	1:G:98:LEU:HA	1.91	0.41
1:C:269:TYR:HE2	1:C:352:LEU:HD12	1.85	0.41
1:G:122:ILE:HA	1:G:123:PRO:C	2.40	0.41
1:J:305:ARG:NH1	2:J:500:GDU:H5'	2.35	0.41
1:J:275:ARG:HB3	1:J:335:TYR:HB2	2.03	0.41
1:G:236:LYS:HD3	1:G:236:LYS:HA	1.96	0.41
1:E:30:PHE:O	1:E:252:PHE:HA	2.21	0.41

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:C:356:ALA:CB	1:C:359:VAL:HG13	2.50	0.41
1:F:306:VAL:HG13	1:F:324:TYR:CE1	2.56	0.41
1:I:86:ILE:HD13	2:I:500:GDU:O6'	2.21	0.40
1:B:277:LEU:HD11	1:B:335:TYR:HE1	1.86	0.40
1:B:160:GLU:HG3	1:B:172:TYR:CZ	2.56	0.40
1:J:273:PRO:HG2	1:J:342:ASN:OD1	2.21	0.40
1:I:275:ARG:HB3	1:I:335:TYR:HB2	2.03	0.40
1:F:364:ARG:HG3	1:F:369:ARG:O	2.21	0.40
1:E:385:ARG:NH2	4:E:415:HOH:O	2.54	0.40
1:H:158:THR:HG22	1:H:161:ASP:N	2.24	0.40
1:B:275:ARG:HB3	1:B:335:TYR:HB2	2.03	0.40
1:E:92:LYS:HE2	1:E:96:GLU:OE2	2.21	0.40
1:D:339:ARG:O	1:D:340:PRO:C	2.60	0.40
1:B:47:ARG:HA	1:B:47:ARG:NE	2.35	0.40
1:F:275:ARG:HB3	1:F:335:TYR:HB2	2.02	0.40
1:B:297:TYR:HE1	1:B:306:VAL:HG23	1.85	0.40
1:B:272:LEU:HD23	1:B:273:PRO:HD2	2.02	0.40
1:E:158:THR:O	1:E:162:VAL:HG22	2.21	0.40
1:B:338:PRO:O	1:B:339:ARG:HB3	2.22	0.40
1:F:162:VAL:HG23	1:F:163:VAL:N	2.36	0.40
1:C:217:MET:HG3	1:C:312:ILE:O	2.21	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone ⓘ

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	364/397 (92%)	355 (98%)	9 (2%)	0	100	100
1	B	364/397 (92%)	352 (97%)	12 (3%)	0	100	100
1	C	360/397 (91%)	347 (96%)	13 (4%)	0	100	100
1	D	359/397 (90%)	345 (96%)	13 (4%)	1 (0%)	50	62
1	E	362/397 (91%)	353 (98%)	9 (2%)	0	100	100
1	F	362/397 (91%)	356 (98%)	6 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	362/397 (91%)	355 (98%)	6 (2%)	1 (0%)	50	62
1	H	363/397 (91%)	353 (97%)	10 (3%)	0	100	100
1	I	362/397 (91%)	353 (98%)	9 (2%)	0	100	100
1	J	360/397 (91%)	353 (98%)	7 (2%)	0	100	100
All	All	3618/3970 (91%)	3522 (97%)	94 (3%)	2 (0%)	59	75

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	340	PRO
1	G	154	GLU

### 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	318/346 (92%)	292 (92%)	26 (8%)	17	18
1	B	318/346 (92%)	299 (94%)	19 (6%)	27	32
1	C	315/346 (91%)	294 (93%)	21 (7%)	23	26
1	D	314/346 (91%)	294 (94%)	20 (6%)	25	27
1	E	316/346 (91%)	298 (94%)	18 (6%)	29	34
1	F	316/346 (91%)	296 (94%)	20 (6%)	25	29
1	G	316/346 (91%)	294 (93%)	22 (7%)	21	23
1	H	317/346 (92%)	301 (95%)	16 (5%)	34	42
1	I	316/346 (91%)	294 (93%)	22 (7%)	21	23
1	J	314/346 (91%)	295 (94%)	19 (6%)	26	31
All	All	3160/3460 (91%)	2957 (94%)	203 (6%)	25	27

All (203) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	26	GLU

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Mol	Chain	Res	Type
1	A	48	LEU
1	A	60	ARG
1	A	98	LEU
1	A	112	LEU
1	A	120	LEU
1	A	126	LEU
1	A	152	LYS
1	A	155	GLN
1	A	157	ARG
1	A	162	VAL
1	A	186	LEU
1	A	201	THR
1	A	246	ILE
1	A	261	VAL
1	A	272	LEU
1	A	286	THR
1	A	306	VAL
1	A	330	GLU
1	A	339	ARG
1	A	345	LEU
1	A	347	LYS
1	A	348	LYS
1	A	360	THR
1	A	370	TYR
1	A	387	LEU
1	B	48	LEU
1	B	98	LEU
1	B	112	LEU
1	B	120	LEU
1	B	126	LEU
1	B	139	SER
1	B	144	GLU
1	B	186	LEU
1	B	246	ILE
1	B	261	VAL
1	B	272	LEU
1	B	286	THR
1	B	306	VAL
1	B	330	GLU
1	B	341	GLU
1	B	345	LEU
1	B	360	THR

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Mol	Chain	Res	Type
1	B	370	TYR
1	B	387	LEU
1	C	28	LYS
1	C	48	LEU
1	C	58	VAL
1	C	112	LEU
1	C	120	LEU
1	C	126	LEU
1	C	139	SER
1	C	159	SER
1	C	166	LYS
1	C	174	LYS
1	C	186	LEU
1	C	261	VAL
1	C	280[A]	ARG
1	C	280[B]	ARG
1	C	345	LEU
1	C	348	LYS
1	C	354	ASP
1	C	357	GLN
1	C	361	PHE
1	C	370	TYR
1	C	379	GLN
1	D	48	LEU
1	D	58	VAL
1	D	93	ASP
1	D	98	LEU
1	D	112	LEU
1	D	120	LEU
1	D	126	LEU
1	D	154	GLU
1	D	155	GLN
1	D	162	VAL
1	D	164	VAL
1	D	182	LYS
1	D	186	LEU
1	D	261	VAL
1	D	292	THR
1	D	341	GLU
1	D	345	LEU
1	D	370	TYR
1	D	387	LEU

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Mol	Chain	Res	Type
1	D	388	GLN
1	E	28	LYS
1	E	48	LEU
1	E	98	LEU
1	E	112	LEU
1	E	120	LEU
1	E	126	LEU
1	E	154	GLU
1	E	162	VAL
1	E	186	LEU
1	E	261	VAL
1	E	272	LEU
1	E	330	GLU
1	E	344	GLU
1	E	345	LEU
1	E	348	LYS
1	E	362	VAL
1	E	370	TYR
1	E	387	LEU
1	F	48	LEU
1	F	54	ARG
1	F	58	VAL
1	F	93	ASP
1	F	98	LEU
1	F	112	LEU
1	F	120	LEU
1	F	126	LEU
1	F	158	THR
1	F	159	SER
1	F	164	VAL
1	F	186	LEU
1	F	261	VAL
1	F	272	LEU
1	F	306	VAL
1	F	330	GLU
1	F	345	LEU
1	F	348	LYS
1	F	370	TYR
1	F	387	LEU
1	G	27	SER
1	G	28	LYS
1	G	58	VAL

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Mol	Chain	Res	Type
1	G	98	LEU
1	G	112	LEU
1	G	120	LEU
1	G	126	LEU
1	G	152	LYS
1	G	162	VAL
1	G	164	VAL
1	G	186	LEU
1	G	261	VAL
1	G	272	LEU
1	G	292	THR
1	G	306	VAL
1	G	318	HIS
1	G	330	GLU
1	G	345	LEU
1	G	348	LYS
1	G	362	VAL
1	G	370	TYR
1	G	371	TYR
1	H	48	LEU
1	H	98	LEU
1	H	112	LEU
1	H	120	LEU
1	H	126	LEU
1	H	152	LYS
1	H	158	THR
1	H	162	VAL
1	H	186	LEU
1	H	261	VAL
1	H	272	LEU
1	H	330	GLU
1	H	345	LEU
1	H	370	TYR
1	H	387	LEU
1	H	390	GLN
1	I	48	LEU
1	I	58	VAL
1	I	98	LEU
1	I	112	LEU
1	I	120	LEU
1	I	126	LEU
1	I	159	SER

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Mol	Chain	Res	Type
1	I	164	VAL
1	I	174	LYS
1	I	186	LEU
1	I	201	THR
1	I	261	VAL
1	I	272	LEU
1	I	280	ARG
1	I	286	THR
1	I	292	THR
1	I	306	VAL
1	I	339	ARG
1	I	345	LEU
1	I	362	VAL
1	I	370	TYR
1	I	387	LEU
1	J	48	LEU
1	J	98	LEU
1	J	112	LEU
1	J	120	LEU
1	J	126	LEU
1	J	143	GLU
1	J	152	LYS
1	J	162	VAL
1	J	186	LEU
1	J	201	THR
1	J	212	ASP
1	J	272	LEU
1	J	306	VAL
1	J	330	GLU
1	J	345	LEU
1	J	357	GLN
1	J	362	VAL
1	J	370	TYR
1	J	387	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	284	HIS
1	C	311	HIS
1	C	357	GLN
1	D	388	GLN

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Mol	Chain	Res	Type
1	E	357	GLN
1	E	388	GLN
1	F	390	GLN
1	G	357	GLN
1	H	284	HIS
1	H	388	GLN
1	J	253	GLN
1	J	357	GLN

### 5.3.3 RNA ⓘ

There are no RNA chains in this entry.

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

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

### 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

### 5.6 Ligand geometry ⓘ

20 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	$\# Z  > 2$
3	FAD	A	450	-	58,58,58	1.78	17 (29%)	85,89,89	2.13	15 (17%)
2	GDU	A	500	-	38,38,38	2.76	5 (13%)	54,58,58	4.07	14 (25%)
3	FAD	B	450	-	58,58,58	1.69	14 (24%)	85,89,89	2.02	17 (20%)
2	GDU	B	500	-	38,38,38	2.72	4 (10%)	54,58,58	4.14	16 (29%)
3	FAD	C	450	-	58,58,58	1.82	18 (31%)	85,89,89	2.04	22 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GDU	C	500	-	38,38,38	2.75	6 (15%)	54,58,58	4.15	16 (29%)
3	FAD	D	450	-	58,58,58	1.70	14 (24%)	85,89,89	2.15	20 (23%)
2	GDU	D	500	-	38,38,38	2.76	6 (15%)	54,58,58	4.23	19 (35%)
3	FAD	E	450	-	58,58,58	1.68	12 (20%)	85,89,89	1.95	17 (20%)
2	GDU	E	500	-	38,38,38	2.75	5 (13%)	54,58,58	4.14	16 (29%)
3	FAD	F	450	-	58,58,58	1.76	16 (27%)	85,89,89	1.87	14 (16%)
2	GDU	F	500	-	38,38,38	2.76	5 (13%)	54,58,58	4.18	18 (33%)
3	FAD	G	450	-	58,58,58	1.59	11 (18%)	85,89,89	1.88	16 (18%)
2	GDU	G	500	-	38,38,38	2.70	5 (13%)	54,58,58	4.20	18 (33%)
3	FAD	H	450	-	58,58,58	1.77	15 (25%)	85,89,89	1.74	14 (16%)
2	GDU	H	500	-	38,38,38	2.82	6 (15%)	54,58,58	4.03	14 (25%)
3	FAD	I	450	-	58,58,58	1.73	16 (27%)	85,89,89	1.92	15 (17%)
2	GDU	I	500	-	38,38,38	2.73	5 (13%)	54,58,58	4.31	17 (31%)
3	FAD	J	450	-	58,58,58	1.78	13 (22%)	85,89,89	1.85	14 (16%)
2	GDU	J	500	-	38,38,38	2.77	5 (13%)	54,58,58	4.22	15 (27%)

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	FAD	A	450	-	-	0/34/50/50	0/1/6/6
2	GDU	A	500	-	-	0/21/59/59	0/3/3/3
3	FAD	B	450	-	-	0/34/50/50	0/1/6/6
2	GDU	B	500	-	-	0/21/59/59	0/3/3/3
3	FAD	C	450	-	-	0/34/50/50	0/1/6/6
2	GDU	C	500	-	-	0/21/59/59	0/3/3/3
3	FAD	D	450	-	-	0/34/50/50	0/1/6/6
2	GDU	D	500	-	-	0/21/59/59	0/3/3/3
3	FAD	E	450	-	-	0/34/50/50	0/1/6/6
2	GDU	E	500	-	-	0/21/59/59	0/3/3/3
3	FAD	F	450	-	-	0/34/50/50	0/1/6/6
2	GDU	F	500	-	-	0/21/59/59	0/3/3/3
3	FAD	G	450	-	-	0/34/50/50	0/1/6/6
2	GDU	G	500	-	-	0/21/59/59	0/3/3/3
3	FAD	H	450	-	-	0/34/50/50	0/1/6/6
2	GDU	H	500	-	-	0/21/59/59	0/3/3/3
3	FAD	I	450	-	-	0/34/50/50	0/1/6/6

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GDU	I	500	-	-	0/21/59/59	0/3/3/3
3	FAD	J	450	-	-	0/34/50/50	0/1/6/6
2	GDU	J	500	-	-	0/21/59/59	0/3/3/3

All (198) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	500	GDU	C2-N1	-11.82	1.25	1.38
2	J	500	GDU	C2-N1	-11.65	1.25	1.38
2	H	500	GDU	C2-N1	-11.57	1.25	1.38
2	F	500	GDU	C2-N1	-11.38	1.26	1.38
2	I	500	GDU	C2-N1	-11.37	1.26	1.38
2	G	500	GDU	C2-N1	-11.07	1.26	1.38
2	E	500	GDU	C2-N1	-11.05	1.26	1.38
2	B	500	GDU	C2-N1	-11.00	1.26	1.38
2	C	500	GDU	C2-N1	-10.78	1.26	1.38
2	D	500	GDU	C2-N1	-10.68	1.26	1.38
2	D	500	GDU	O2-C2	9.55	1.43	1.23
2	G	500	GDU	O2-C2	9.53	1.43	1.23
2	E	500	GDU	O2-C2	9.51	1.43	1.23
2	C	500	GDU	O2-C2	9.43	1.43	1.23
2	F	500	GDU	O2-C2	9.32	1.43	1.23
2	H	500	GDU	O2-C2	9.32	1.43	1.23
2	B	500	GDU	O2-C2	9.18	1.42	1.23
2	I	500	GDU	O2-C2	9.15	1.42	1.23
2	A	500	GDU	O2-C2	9.00	1.42	1.23
2	J	500	GDU	O2-C2	8.84	1.42	1.23
2	H	500	GDU	C2-N3	-5.82	1.26	1.37
2	C	500	GDU	C2-N3	-5.64	1.26	1.37
2	E	500	GDU	C2-N3	-5.51	1.26	1.37
2	I	500	GDU	C2-N3	-5.49	1.26	1.37
2	A	500	GDU	C2-N3	-5.40	1.26	1.37
2	J	500	GDU	C2-N3	-5.37	1.26	1.37
2	F	500	GDU	C2-N3	-5.33	1.27	1.37
2	B	500	GDU	C2-N3	-5.32	1.27	1.37
2	D	500	GDU	C2-N3	-5.31	1.27	1.37
2	G	500	GDU	C2-N3	-5.09	1.27	1.37
3	J	450	FAD	C6-C5X	-4.79	1.36	1.41
3	C	450	FAD	C6-C5X	-4.78	1.36	1.41
3	B	450	FAD	C6-C5X	-4.59	1.36	1.41
3	J	450	FAD	C4-C4X	-4.43	1.34	1.41
3	D	450	FAD	C4-C4X	-4.42	1.34	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	450	FAD	C4-C4X	-4.19	1.34	1.41
3	E	450	FAD	C6-C5X	-4.15	1.36	1.41
3	G	450	FAD	C6-C5X	-4.09	1.36	1.41
3	D	450	FAD	C6-C5X	-4.06	1.36	1.41
3	I	450	FAD	C6-C5X	-3.94	1.37	1.41
3	H	450	FAD	C4-C4X	-3.93	1.34	1.41
3	I	450	FAD	C4-C4X	-3.79	1.35	1.41
3	A	450	FAD	C4-C4X	-3.79	1.35	1.41
3	J	450	FAD	O4-C4	-3.78	1.17	1.24
3	H	450	FAD	C6-C5X	-3.77	1.37	1.41
3	B	450	FAD	C4-C4X	-3.72	1.35	1.41
3	F	450	FAD	C6-C5X	-3.60	1.37	1.41
3	F	450	FAD	C4-C4X	-3.56	1.35	1.41
3	I	450	FAD	O4-C4	-3.46	1.17	1.24
3	F	450	FAD	O4-C4	-3.28	1.18	1.24
3	A	450	FAD	C4X-C10	-3.27	1.35	1.40
3	A	450	FAD	C6-C5X	-3.26	1.37	1.41
3	H	450	FAD	P-O2P	-3.26	1.40	1.55
3	B	450	FAD	C9A-C5X	-3.21	1.36	1.42
3	J	450	FAD	P-O2P	-3.21	1.40	1.55
3	I	450	FAD	P-O2P	-3.17	1.40	1.55
3	A	450	FAD	PA-O2A	-3.17	1.40	1.55
3	H	450	FAD	O4-C4	-3.16	1.18	1.24
3	E	450	FAD	O4-C4	-3.16	1.18	1.24
2	A	500	GDU	C5-C4	3.15	1.48	1.40
3	F	450	FAD	P-O2P	-3.11	1.41	1.55
3	D	450	FAD	C9A-C5X	-3.10	1.36	1.42
3	C	450	FAD	C4X-C10	-3.10	1.35	1.40
3	E	450	FAD	C4-C4X	-3.08	1.36	1.41
3	E	450	FAD	C4X-C10	-3.04	1.35	1.40
2	B	500	GDU	C5-C4	3.03	1.48	1.40
3	F	450	FAD	PA-O2A	-2.99	1.41	1.55
3	G	450	FAD	P-O2P	-2.98	1.41	1.55
3	A	450	FAD	P-O2P	-2.97	1.41	1.55
3	B	450	FAD	P-O2P	-2.94	1.41	1.55
3	I	450	FAD	PA-O2A	-2.93	1.42	1.55
3	I	450	FAD	C4A-N9A	-2.93	1.33	1.37
3	G	450	FAD	C9A-C5X	-2.93	1.36	1.42
2	F	500	GDU	C5-C4	2.91	1.48	1.40
3	F	450	FAD	O4'-C4'	-2.90	1.36	1.43
3	G	450	FAD	PA-O2A	-2.89	1.42	1.55
3	A	450	FAD	O4-C4	-2.87	1.18	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	450	FAD	PA-O2A	-2.87	1.42	1.55
3	C	450	FAD	PA-O2A	-2.83	1.42	1.55
3	D	450	FAD	PA-O2A	-2.82	1.42	1.55
2	I	500	GDU	C5-C4	2.81	1.47	1.40
2	J	500	GDU	O4D-C1D	2.80	1.45	1.41
2	E	500	GDU	C5-C4	2.77	1.47	1.40
3	F	450	FAD	C4A-N9A	-2.76	1.33	1.37
3	A	450	FAD	O3'-C3'	-2.76	1.36	1.43
2	D	500	GDU	C5-C4	2.76	1.47	1.40
3	E	450	FAD	P-O2P	-2.75	1.42	1.55
3	C	450	FAD	C9A-C5X	-2.75	1.36	1.42
3	E	450	FAD	C9A-C5X	-2.75	1.36	1.42
3	B	450	FAD	PA-O2A	-2.74	1.42	1.55
3	G	450	FAD	O4B-C4B	-2.73	1.38	1.45
3	J	450	FAD	PA-O2A	-2.73	1.42	1.55
3	A	450	FAD	O4B-C4B	-2.72	1.38	1.45
3	E	450	FAD	PA-O2A	-2.70	1.43	1.55
2	E	500	GDU	O4D-C1D	2.70	1.45	1.41
3	F	450	FAD	PA-O1A	-2.70	1.41	1.51
3	C	450	FAD	O3B-C3B	-2.69	1.36	1.43
2	C	500	GDU	C5-C4	2.66	1.47	1.40
2	D	500	GDU	O4D-C1D	2.65	1.45	1.41
3	J	450	FAD	C9A-C5X	-2.64	1.37	1.42
3	C	450	FAD	O2'-C2'	-2.63	1.37	1.43
3	G	450	FAD	P-O1P	-2.63	1.41	1.51
3	F	450	FAD	O3'-C3'	-2.63	1.36	1.43
3	A	450	FAD	P-O1P	-2.63	1.41	1.51
3	C	450	FAD	O4-C4	-2.62	1.19	1.24
3	H	450	FAD	C4X-C10	-2.59	1.36	1.40
3	I	450	FAD	C9A-C5X	-2.59	1.37	1.42
2	G	500	GDU	C5-C4	2.56	1.47	1.40
3	J	450	FAD	O3'-C3'	-2.56	1.36	1.43
3	B	450	FAD	C4A-N9A	-2.56	1.34	1.37
3	D	450	FAD	O4-C4	-2.55	1.19	1.24
3	A	450	FAD	PA-O1A	-2.52	1.41	1.51
3	H	450	FAD	C9A-C5X	-2.51	1.37	1.42
2	J	500	GDU	C5-C4	2.51	1.47	1.40
3	F	450	FAD	O4B-C4B	-2.51	1.39	1.45
3	H	450	FAD	O4'-C4'	-2.51	1.37	1.43
2	I	500	GDU	O4D-C1D	2.51	1.45	1.41
3	E	450	FAD	O4B-C4B	-2.50	1.39	1.45
3	I	450	FAD	O3'-C3'	-2.49	1.37	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	J	450	FAD	O4B-C1B	-2.48	1.37	1.41
3	C	450	FAD	C5X-N5	-2.48	1.31	1.35
3	E	450	FAD	O3'-C3'	-2.48	1.37	1.43
3	C	450	FAD	P-O2P	-2.48	1.44	1.55
2	H	500	GDU	C5-C4	2.47	1.46	1.40
3	B	450	FAD	O4-C4	-2.47	1.19	1.24
3	D	450	FAD	P-O2P	-2.47	1.44	1.55
3	C	450	FAD	C2A-N3A	2.46	1.37	1.32
3	F	450	FAD	P-O1P	-2.46	1.42	1.51
3	I	450	FAD	PA-O1A	-2.43	1.42	1.51
3	B	450	FAD	PA-O1A	-2.42	1.42	1.51
3	J	450	FAD	C4X-C10	-2.40	1.36	1.40
2	D	500	GDU	O3B-C1'	2.38	1.46	1.42
3	I	450	FAD	P-O1P	-2.35	1.42	1.51
3	G	450	FAD	O3'-C3'	-2.34	1.37	1.43
3	D	450	FAD	O4B-C4B	-2.33	1.39	1.45
3	H	450	FAD	O4B-C1B	-2.33	1.37	1.41
2	G	500	GDU	O4D-C1D	2.32	1.44	1.41
3	I	450	FAD	O4B-C4B	-2.31	1.39	1.45
2	C	500	GDU	O3B-C1'	2.28	1.46	1.42
2	F	500	GDU	O4D-C1D	2.28	1.44	1.41
3	H	450	FAD	O3'-C3'	-2.28	1.37	1.43
3	F	450	FAD	C4X-C10	-2.28	1.37	1.40
3	G	450	FAD	O2-C2	-2.28	1.18	1.23
2	C	500	GDU	O4D-C1D	2.27	1.44	1.41
3	E	450	FAD	O2'-C2'	-2.26	1.38	1.43
3	H	450	FAD	P-O1P	-2.24	1.42	1.51
3	C	450	FAD	O2-C2	-2.24	1.18	1.23
2	H	500	GDU	O4D-C1D	2.24	1.44	1.41
3	E	450	FAD	O2-C2	-2.23	1.18	1.23
3	H	450	FAD	O4B-C4B	-2.23	1.39	1.45
3	C	450	FAD	C10-N10	-2.22	1.34	1.38
3	D	450	FAD	C4X-C10	-2.22	1.37	1.40
3	A	450	FAD	C4'-C3'	-2.20	1.48	1.53
3	E	450	FAD	C10-N10	-2.19	1.34	1.38
3	C	450	FAD	C2B-C1B	-2.18	1.50	1.53
3	J	450	FAD	C2A-N3A	2.17	1.36	1.32
3	D	450	FAD	P-O1P	-2.16	1.43	1.51
3	D	450	FAD	O4'-C4'	-2.14	1.38	1.43
3	H	450	FAD	C10-N10	-2.14	1.34	1.38
3	F	450	FAD	O2'-C2'	-2.14	1.38	1.43
3	I	450	FAD	C4A-N3A	-2.13	1.32	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	450	FAD	C9A-C5X	-2.13	1.38	1.42
3	B	450	FAD	O4'-C4'	-2.13	1.38	1.43
3	B	450	FAD	O4B-C4B	-2.12	1.40	1.45
3	D	450	FAD	C4'-C3'	-2.12	1.49	1.53
3	C	450	FAD	O3'-C3'	-2.11	1.37	1.43
3	G	450	FAD	O4-C4	-2.10	1.20	1.24
3	A	450	FAD	C2B-C1B	-2.11	1.50	1.53
3	F	450	FAD	O3B-C3B	-2.10	1.37	1.43
3	C	450	FAD	PA-O1A	-2.10	1.43	1.51
3	D	450	FAD	O3'-C3'	-2.10	1.37	1.43
3	J	450	FAD	O4'-C4'	-2.09	1.38	1.43
3	B	450	FAD	O4B-C1B	-2.09	1.38	1.41
3	F	450	FAD	C5A-N7A	-2.08	1.32	1.40
3	I	450	FAD	C2B-C1B	-2.08	1.50	1.53
3	C	450	FAD	C9A-N10	-2.08	1.35	1.38
3	A	450	FAD	C9A-C5X	-2.08	1.38	1.42
3	A	450	FAD	O4B-C1B	-2.07	1.38	1.41
3	J	450	FAD	O2-C2	-2.06	1.19	1.23
3	H	450	FAD	C5A-N7A	-2.06	1.32	1.40
3	A	450	FAD	O2'-C2'	-2.05	1.38	1.43
3	D	450	FAD	C4A-N9A	-2.05	1.34	1.37
3	B	450	FAD	O3'-C3'	-2.05	1.38	1.43
3	A	450	FAD	O2B-C2B	-2.05	1.38	1.43
3	I	450	FAD	O2'-C2'	-2.05	1.38	1.43
2	A	500	GDU	O4D-C1D	2.05	1.44	1.41
3	I	450	FAD	C5A-N7A	-2.04	1.32	1.40
3	C	450	FAD	C5A-C4A	-2.03	1.35	1.40
3	D	450	FAD	C2A-N3A	2.03	1.36	1.32
3	G	450	FAD	C4A-N9A	-2.02	1.34	1.37
3	H	450	FAD	PA-O1A	-2.02	1.43	1.51
2	H	500	GDU	C4'-C5'	2.02	1.57	1.53
3	J	450	FAD	O4B-C4B	-2.02	1.40	1.45
3	B	450	FAD	P-O1P	-2.02	1.43	1.51
3	G	450	FAD	C2A-N3A	2.01	1.36	1.32
3	B	450	FAD	C4X-C10	-2.01	1.37	1.40
3	A	450	FAD	C5A-N7A	-2.01	1.32	1.40
3	I	450	FAD	O3B-C3B	-2.00	1.38	1.43

All (327) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	I	500	GDU	N3-C2-N1	25.17	136.98	115.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	500	GDU	N3-C2-N1	25.11	136.93	115.97
2	J	500	GDU	N3-C2-N1	25.09	136.91	115.97
2	F	500	GDU	N3-C2-N1	24.79	136.66	115.97
2	B	500	GDU	N3-C2-N1	24.76	136.64	115.97
2	G	500	GDU	N3-C2-N1	24.70	136.58	115.97
2	E	500	GDU	N3-C2-N1	24.57	136.47	115.97
2	H	500	GDU	N3-C2-N1	24.19	136.16	115.97
2	D	500	GDU	N3-C2-N1	24.10	136.09	115.97
2	C	500	GDU	N3-C2-N1	23.85	135.88	115.97
2	D	500	GDU	C2-N1-C1D	13.35	126.58	118.21
2	C	500	GDU	C2-N1-C1D	12.84	126.26	118.21
2	E	500	GDU	C2-N1-C1D	12.47	126.03	118.21
2	J	500	GDU	C2-N1-C1D	12.26	125.90	118.21
2	I	500	GDU	C2-N1-C1D	12.21	125.87	118.21
2	G	500	GDU	C2-N1-C1D	11.93	125.69	118.21
3	B	450	FAD	N3A-C2A-N1A	-11.55	119.06	128.71
2	H	500	GDU	C2-N1-C1D	11.53	125.44	118.21
2	B	500	GDU	C2-N1-C1D	11.31	125.30	118.21
3	D	450	FAD	N3A-C2A-N1A	-11.09	119.44	128.71
3	C	450	FAD	N3A-C2A-N1A	-11.06	119.46	128.71
3	J	450	FAD	N3A-C2A-N1A	-11.03	119.49	128.71
3	A	450	FAD	N3A-C2A-N1A	-10.88	119.61	128.71
3	G	450	FAD	N3A-C2A-N1A	-10.81	119.67	128.71
2	F	500	GDU	C2-N1-C1D	10.28	124.65	118.21
2	A	500	GDU	C2-N1-C1D	9.89	124.41	118.21
3	F	450	FAD	N3A-C2A-N1A	-9.54	120.73	128.71
3	E	450	FAD	N3A-C2A-N1A	-9.53	120.74	128.71
3	H	450	FAD	N3A-C2A-N1A	-9.05	121.14	128.71
3	I	450	FAD	N3A-C2A-N1A	-8.76	121.39	128.71
3	D	450	FAD	O4B-C1B-N9A	7.84	115.73	108.44
3	A	450	FAD	C2-N1-C10	7.54	122.57	114.98
3	E	450	FAD	O4B-C1B-N9A	7.43	115.35	108.44
2	I	500	GDU	O5'-C1'-O3B	-6.38	103.03	111.36
3	A	450	FAD	O4B-C1B-N9A	6.02	114.04	108.44
3	F	450	FAD	C2-N1-C10	5.82	120.84	114.98
2	D	500	GDU	O5'-C5'-C4'	5.41	119.77	109.76
3	I	450	FAD	O4B-C1B-N9A	5.32	113.39	108.44
2	H	500	GDU	O5'-C5'-C4'	5.22	119.43	109.76
2	E	500	GDU	O5'-C5'-C4'	5.13	119.25	109.76
2	A	500	GDU	O5'-C5'-C4'	5.08	119.17	109.76
2	F	500	GDU	O5'-C5'-C4'	5.07	119.15	109.76
3	I	450	FAD	C4X-C10-N10	-4.96	118.03	120.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	450	FAD	C4X-C10-N1	-4.93	117.80	122.73
2	F	500	GDU	O5'-C1'-O3B	-4.90	104.96	111.36
2	G	500	GDU	O3A-PB-O3B	4.88	115.81	103.48
2	C	500	GDU	O5'-C5'-C4'	4.87	118.78	109.76
2	B	500	GDU	O5'-C5'-C4'	4.86	118.76	109.76
2	E	500	GDU	O3A-PB-O3B	4.85	115.75	103.48
2	J	500	GDU	O5'-C5'-C4'	4.82	118.69	109.76
3	D	450	FAD	C2-N1-C10	4.73	119.75	114.98
2	I	500	GDU	O3A-PB-O3B	4.72	115.42	103.48
2	I	500	GDU	O5'-C5'-C4'	4.72	118.50	109.76
2	D	500	GDU	O3A-PB-O3B	4.63	115.19	103.48
2	G	500	GDU	C6-N1-C2	-4.61	113.09	119.51
3	I	450	FAD	C2-N1-C10	4.60	119.61	114.98
2	G	500	GDU	O5'-C5'-C4'	4.57	118.23	109.76
3	H	450	FAD	N3A-C4A-N9A	4.52	133.59	125.43
3	I	450	FAD	C5X-C9A-N10	4.49	121.22	116.80
3	E	450	FAD	C2-N1-C10	4.43	119.45	114.98
3	G	450	FAD	C2-N1-C10	4.42	119.43	114.98
2	I	500	GDU	C6-N1-C2	-4.40	113.39	119.51
3	J	450	FAD	N3A-C4A-N9A	4.35	133.29	125.43
3	B	450	FAD	C4X-C10-N10	-4.35	118.34	120.51
2	C	500	GDU	PB-O3B-C1'	4.29	137.73	119.58
3	H	450	FAD	C2-N1-C10	4.25	119.26	114.98
3	A	450	FAD	O3'-C3'-C4'	-4.23	98.04	108.74
3	D	450	FAD	C4X-C10-N1	-4.22	118.52	122.73
3	B	450	FAD	C2-N1-C10	4.21	119.22	114.98
2	F	500	GDU	O3A-PB-O3B	4.18	114.06	103.48
2	J	500	GDU	C6-N1-C2	-4.12	113.78	119.51
2	H	500	GDU	C6-N1-C2	-4.11	113.79	119.51
2	E	500	GDU	C6-N1-C2	-4.11	113.80	119.51
2	D	500	GDU	C6-N1-C2	-4.09	113.82	119.51
2	C	500	GDU	O3A-PB-O3B	4.08	113.79	103.48
3	C	450	FAD	N3A-C4A-N9A	4.08	132.79	125.43
2	A	500	GDU	O3A-PB-O3B	4.04	113.69	103.48
3	J	450	FAD	C2-N1-C10	4.04	119.05	114.98
2	B	500	GDU	O3A-PB-O3B	4.02	113.64	103.48
2	F	500	GDU	PB-O3B-C1'	4.02	136.56	119.58
2	D	500	GDU	O5'-C1'-O3B	-4.01	106.12	111.36
2	C	500	GDU	O3B-C1'-C2'	3.99	115.70	108.38
3	H	450	FAD	C5X-C9A-N10	3.99	120.73	116.80
3	D	450	FAD	N3A-C4A-N9A	3.96	132.58	125.43
3	I	450	FAD	C4X-C10-N1	-3.95	118.78	122.73

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	450	FAD	C4-C4X-C10	3.95	123.33	116.95
3	F	450	FAD	N3A-C4A-N9A	3.94	132.54	125.43
2	J	500	GDU	O3A-PB-O3B	3.93	113.40	103.48
2	F	500	GDU	O4D-C1D-C2D	-3.92	100.76	106.77
3	E	450	FAD	C5X-C9A-N10	3.91	120.66	116.80
2	D	500	GDU	PB-O3B-C1'	3.91	136.13	119.58
3	G	450	FAD	C4X-C10-N1	-3.91	118.83	122.73
2	B	500	GDU	C6-N1-C2	-3.91	114.07	119.51
2	A	500	GDU	C6-N1-C2	-3.91	114.08	119.51
3	A	450	FAD	N3A-C4A-N9A	3.85	132.39	125.43
2	G	500	GDU	PB-O3B-C1'	3.84	135.82	119.58
2	C	500	GDU	C6-N1-C2	-3.83	114.19	119.51
2	J	500	GDU	PB-O3B-C1'	3.81	135.68	119.58
2	F	500	GDU	C6-N1-C2	-3.80	114.23	119.51
3	A	450	FAD	C4X-C10-N1	-3.79	118.94	122.73
3	G	450	FAD	O4B-C1B-N9A	3.72	111.90	108.44
2	H	500	GDU	O3A-PB-O3B	3.72	112.88	103.48
3	F	450	FAD	C5X-C9A-N10	3.71	120.45	116.80
3	F	450	FAD	O4B-C1B-N9A	3.69	111.87	108.44
3	C	450	FAD	O4B-C1B-N9A	3.66	111.84	108.44
3	B	450	FAD	C5X-C9A-N10	3.65	120.40	116.80
3	H	450	FAD	C1'-N10-C9A	3.63	122.41	118.87
3	D	450	FAD	C4X-C10-N10	-3.62	118.70	120.51
3	C	450	FAD	C4X-C10-N1	-3.62	119.11	122.73
3	F	450	FAD	C4X-C10-N1	-3.58	119.15	122.73
3	G	450	FAD	N3A-C4A-N9A	3.58	131.89	125.43
3	F	450	FAD	C1'-N10-C9A	3.56	122.34	118.87
2	B	500	GDU	PB-O3B-C1'	3.55	134.59	119.58
3	F	450	FAD	C9A-N10-C10	-3.47	118.36	121.77
2	C	500	GDU	O5'-C1'-O3B	-3.45	106.85	111.36
2	J	500	GDU	C4-N3-C2	-3.45	112.64	123.56
2	G	500	GDU	O5'-C1'-O3B	-3.44	106.87	111.36
2	D	500	GDU	O3B-C1'-C2'	3.44	114.68	108.38
2	B	500	GDU	O5'-C1'-O3B	-3.43	106.88	111.36
2	I	500	GDU	C4-N3-C2	-3.40	112.80	123.56
2	F	500	GDU	C4-N3-C2	-3.40	112.80	123.56
3	G	450	FAD	C4X-N5-C5X	3.38	120.49	116.69
2	G	500	GDU	C1'-C2'-C3'	-3.38	103.43	110.00
2	B	500	GDU	C4-N3-C2	-3.37	112.89	123.56
2	F	500	GDU	O2'-C2'-C3'	3.36	117.88	110.35
3	H	450	FAD	C9A-N10-C10	-3.35	118.48	121.77
2	B	500	GDU	C1'-C2'-C3'	-3.35	103.48	110.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	450	FAD	C2-N1-C10	3.34	118.35	114.98
2	A	500	GDU	O5'-C1'-O3B	-3.33	107.01	111.36
3	J	450	FAD	C4B-O4B-C1B	-3.33	106.14	109.75
2	A	500	GDU	C4-N3-C2	-3.32	113.05	123.56
2	C	500	GDU	C4-N3-C2	-3.31	113.07	123.56
2	D	500	GDU	C4-N3-C2	-3.30	113.10	123.56
3	A	450	FAD	C5X-C9A-N10	3.30	120.05	116.80
3	E	450	FAD	C4-N3-C2	-3.30	118.62	125.39
2	H	500	GDU	PB-O3B-C1'	3.28	133.47	119.58
3	G	450	FAD	C4A-C5A-N7A	-3.27	106.72	109.52
2	A	500	GDU	PB-O3B-C1'	3.27	133.40	119.58
3	E	450	FAD	C4A-C5A-N7A	-3.27	106.72	109.52
3	C	450	FAD	C6-C5X-N5	-3.22	115.22	118.97
3	C	450	FAD	C4-C4X-C10	3.22	122.15	116.95
2	J	500	GDU	O4D-C1D-N1	3.22	114.85	108.06
3	J	450	FAD	C4-N3-C2	-3.22	118.79	125.39
3	J	450	FAD	C5X-C9A-N10	3.22	119.97	116.80
2	I	500	GDU	O4D-C1D-N1	3.21	114.83	108.06
3	B	450	FAD	N3A-C4A-N9A	3.21	131.22	125.43
2	J	500	GDU	O2B-PB-O3A	3.17	120.19	105.14
2	E	500	GDU	C4-N3-C2	-3.17	113.53	123.56
2	G	500	GDU	C4-N3-C2	-3.15	113.58	123.56
2	I	500	GDU	PB-O3B-C1'	3.14	132.85	119.58
2	J	500	GDU	O5'-C1'-O3B	-3.14	107.26	111.36
2	I	500	GDU	O4D-C1D-C2D	-3.12	101.98	106.77
2	I	500	GDU	O2B-PB-O3A	3.12	119.94	105.14
2	F	500	GDU	C2D-C1D-N1	3.12	121.29	113.26
3	C	450	FAD	O2'-C2'-C3'	-3.11	101.31	109.05
3	D	450	FAD	C4-C4X-C10	3.11	121.96	116.95
3	C	450	FAD	C4-N3-C2	-3.09	119.06	125.39
2	G	500	GDU	O4D-C1D-N1	3.08	114.56	108.06
2	H	500	GDU	C4-N3-C2	-3.07	113.84	123.56
2	A	500	GDU	PB-O3A-PA	-3.06	122.70	131.68
3	A	450	FAD	C9A-N10-C10	-3.06	118.76	121.77
2	H	500	GDU	O4D-C1D-N1	3.05	114.49	108.06
2	F	500	GDU	O3B-C1'-C2'	3.05	113.96	108.38
3	C	450	FAD	C6-C5X-C9A	3.03	123.21	119.02
3	H	450	FAD	C2'-C1'-N10	3.02	116.46	112.45
3	C	450	FAD	C9A-N10-C10	-3.02	118.81	121.77
3	B	450	FAD	N1-C10-N10	3.00	123.86	115.97
3	E	450	FAD	N3A-C4A-N9A	3.00	130.85	125.43
3	A	450	FAD	C1'-N10-C9A	3.00	121.79	118.87

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	J	450	FAD	C4X-C10-N1	-2.97	119.76	122.73
2	F	500	GDU	O2B-PB-O3A	2.95	119.12	105.14
2	C	500	GDU	O2B-PB-O3A	2.91	118.96	105.14
2	B	500	GDU	O2'-C2'-C3'	2.90	116.85	110.35
3	D	450	FAD	C5X-C9A-N10	2.90	119.66	116.80
3	I	450	FAD	N3A-C4A-N9A	2.89	130.65	125.43
2	D	500	GDU	O2B-PB-O3A	2.88	118.79	105.14
2	G	500	GDU	O4D-C4D-C5D	2.87	119.60	109.36
3	D	450	FAD	C4A-C5A-N7A	-2.86	107.07	109.52
2	C	500	GDU	O2A-PA-O3A	2.86	118.69	105.14
3	C	450	FAD	C1'-N10-C9A	2.85	121.65	118.87
3	C	450	FAD	C5'-C4'-C3'	-2.85	106.69	112.06
2	H	500	GDU	O2A-PA-O3A	2.85	118.64	105.14
3	I	450	FAD	C9A-N10-C10	-2.84	118.98	121.77
2	E	500	GDU	PB-O3B-C1'	2.83	131.56	119.58
3	G	450	FAD	C4-C4X-C10	2.82	121.50	116.95
3	G	450	FAD	C4-N3-C2	-2.81	119.63	125.39
3	B	450	FAD	C9A-N10-C10	-2.80	119.02	121.77
2	F	500	GDU	C4'-C3'-C2'	-2.79	105.66	110.82
3	E	450	FAD	C1B-N9A-C4A	-2.79	121.82	126.64
2	H	500	GDU	O4D-C4D-C5D	2.78	119.29	109.36
2	I	500	GDU	O4D-C4D-C5D	2.76	119.21	109.36
3	I	450	FAD	C4-N3-C2	-2.75	119.74	125.39
2	C	500	GDU	C2D-C1D-N1	2.75	120.34	113.26
3	I	450	FAD	C4A-C5A-N7A	-2.74	107.17	109.52
3	I	450	FAD	N1-C10-N10	2.74	123.19	115.97
2	H	500	GDU	O2B-PB-O3A	2.74	118.12	105.14
2	B	500	GDU	O2B-PB-O3A	2.73	118.11	105.14
3	B	450	FAD	C6-C5X-C9A	2.71	122.77	119.02
3	E	450	FAD	C1'-N10-C9A	2.70	121.50	118.87
3	C	450	FAD	C5X-C9A-N10	2.69	119.45	116.80
2	G	500	GDU	C4'-C3'-C2'	-2.69	105.85	110.82
2	F	500	GDU	O4D-C1D-N1	2.69	113.73	108.06
2	E	500	GDU	O4D-C4D-C5D	2.67	118.88	109.36
2	E	500	GDU	O2B-PB-O3A	2.67	117.79	105.14
2	A	500	GDU	O4D-C1D-N1	2.67	113.69	108.06
3	B	450	FAD	O4B-C1B-N9A	2.66	110.92	108.44
3	E	450	FAD	C4X-N5-C5X	2.66	119.67	116.69
2	D	500	GDU	O4D-C1D-N1	2.66	113.67	108.06
3	D	450	FAD	C5A-C4A-N3A	-2.65	119.92	125.70
3	B	450	FAD	C4X-N5-C5X	2.64	119.65	116.69
3	H	450	FAD	C5A-C4A-N3A	-2.64	119.96	125.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	500	GDU	O4D-C4D-C5D	2.62	118.71	109.36
2	G	500	GDU	O4D-C1D-C2D	-2.62	102.76	106.77
2	J	500	GDU	O4D-C4D-C5D	2.62	118.70	109.36
3	E	450	FAD	C4X-C10-N1	-2.61	120.12	122.73
3	D	450	FAD	N1-C10-N10	2.59	122.77	115.97
3	C	450	FAD	O3B-C3B-C4B	-2.58	103.47	111.08
3	A	450	FAD	C2A-N3A-C4A	2.58	121.35	114.01
3	J	450	FAD	C9A-N10-C10	-2.57	119.25	121.77
3	D	450	FAD	C4-N3-C2	-2.56	120.14	125.39
3	D	450	FAD	C9A-N10-C10	-2.55	119.26	121.77
3	F	450	FAD	C4-N3-C2	-2.55	120.16	125.39
2	A	500	GDU	O4D-C1D-C2D	-2.54	102.88	106.77
3	C	450	FAD	C8A-N9A-C4A	2.54	108.83	106.90
2	B	500	GDU	O4D-C4D-C5D	2.52	118.34	109.36
3	G	450	FAD	C5X-C9A-N10	2.51	119.28	116.80
3	I	450	FAD	C6-C5X-C9A	2.51	122.49	119.02
2	G	500	GDU	O2B-PB-O3A	2.51	117.03	105.14
2	A	500	GDU	O2B-PB-O3A	2.50	117.01	105.14
3	C	450	FAD	N7A-C8A-N9A	-2.50	107.29	114.36
3	A	450	FAD	C5A-C4A-N3A	-2.49	120.27	125.70
2	I	500	GDU	O2A-PA-O3A	2.49	116.97	105.14
3	C	450	FAD	C5A-C4A-N3A	-2.49	120.27	125.70
2	E	500	GDU	C4'-C3'-C2'	-2.48	106.22	110.82
2	D	500	GDU	O3A-PA-O5D	2.47	114.46	103.41
3	D	450	FAD	C2A-N3A-C4A	2.47	121.04	114.01
3	C	450	FAD	C2A-N3A-C4A	2.47	121.03	114.01
2	J	500	GDU	O2A-PA-O3A	2.46	116.83	105.14
2	H	500	GDU	C1'-C2'-C3'	-2.45	105.23	110.00
3	A	450	FAD	O3'-C3'-C2'	2.45	114.92	108.74
3	I	450	FAD	C4-C4X-C10	2.44	120.89	116.95
3	G	450	FAD	C2A-N3A-C4A	2.43	120.94	114.01
2	C	500	GDU	O4D-C1D-N1	2.42	113.18	108.06
3	A	450	FAD	C4X-N5-C5X	2.42	119.41	116.69
3	B	450	FAD	C4B-O4B-C1B	-2.42	107.12	109.75
2	D	500	GDU	O4D-C4D-C5D	2.41	117.96	109.36
2	B	500	GDU	C2D-C1D-N1	2.41	119.45	113.26
3	J	450	FAD	C5A-C4A-N3A	-2.40	120.47	125.70
2	I	500	GDU	C2D-C1D-N1	2.39	119.42	113.26
2	E	500	GDU	C1'-C2'-C3'	-2.39	105.35	110.00
3	G	450	FAD	N7A-C8A-N9A	-2.38	107.63	114.36
2	B	500	GDU	O2A-PA-O3A	2.38	116.42	105.14
3	F	450	FAD	C4X-N5-C5X	2.38	119.36	116.69

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	500	GDU	O2A-PA-O3A	2.37	116.38	105.14
2	J	500	GDU	C1'-C2'-C3'	-2.36	105.40	110.00
3	J	450	FAD	C2A-N3A-C4A	2.34	120.68	114.01
2	J	500	GDU	C2D-C1D-N1	2.33	119.27	113.26
2	B	500	GDU	C4'-C3'-C2'	-2.33	106.51	110.82
3	G	450	FAD	C9A-N10-C10	-2.33	119.48	121.77
2	F	500	GDU	O2A-PA-O3A	2.32	116.17	105.14
3	A	450	FAD	C4-N3-C2	-2.32	120.62	125.39
2	H	500	GDU	O4D-C1D-C2D	-2.32	103.22	106.77
3	G	450	FAD	C5A-C4A-N3A	-2.31	120.66	125.70
3	E	450	FAD	C5'-C4'-C3'	2.31	116.42	112.06
3	E	450	FAD	N7A-C8A-N9A	-2.31	107.82	114.36
3	E	450	FAD	C9A-N10-C10	-2.30	119.51	121.77
2	E	500	GDU	O4D-C1D-N1	2.30	112.91	108.06
2	J	500	GDU	O4D-C1D-C2D	-2.29	103.25	106.77
2	C	500	GDU	O4D-C4D-C5D	2.27	117.48	109.36
2	A	500	GDU	O4D-C4D-C5D	2.27	117.47	109.36
2	D	500	GDU	O4D-C1D-C2D	-2.26	103.30	106.77
2	E	500	GDU	O2A-PA-O3A	2.26	115.88	105.14
3	H	450	FAD	C4B-O4B-C1B	-2.26	107.29	109.75
2	D	500	GDU	C2D-C1D-N1	2.26	119.08	113.26
3	I	450	FAD	C4X-N5-C5X	2.26	119.23	116.69
3	D	450	FAD	O3'-C3'-C4'	-2.26	103.03	108.74
3	F	450	FAD	C5A-C4A-N3A	-2.25	120.79	125.70
3	B	450	FAD	C4-N3-C2	-2.25	120.78	125.39
3	C	450	FAD	C4A-C5A-N7A	-2.25	107.60	109.52
3	J	450	FAD	O4B-C1B-C2B	-2.25	103.33	106.77
2	G	500	GDU	C2D-C1D-N1	2.24	119.04	113.26
2	G	500	GDU	O2'-C2'-C3'	2.24	115.38	110.35
3	J	450	FAD	N7A-C8A-N9A	-2.24	108.02	114.36
2	C	500	GDU	O4D-C1D-C2D	-2.22	103.37	106.77
2	E	500	GDU	O5'-C1'-O3B	-2.21	108.47	111.36
2	E	500	GDU	C2D-C1D-N1	2.20	118.93	113.26
2	C	500	GDU	O2'-C2'-C3'	2.20	115.29	110.35
2	E	500	GDU	O2'-C2'-C3'	2.20	115.28	110.35
2	D	500	GDU	O2'-C2'-C3'	2.20	115.28	110.35
3	J	450	FAD	C1'-N10-C9A	2.19	121.01	118.87
3	H	450	FAD	C4-N3-C2	-2.19	120.89	125.39
3	A	450	FAD	C5'-C4'-C3'	-2.18	107.94	112.06
3	D	450	FAD	N7A-C8A-N9A	-2.16	108.26	114.36
2	F	500	GDU	C1'-C2'-C3'	-2.15	105.80	110.00
3	H	450	FAD	C4X-N5-C5X	2.14	119.09	116.69

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	H	450	FAD	N7A-C8A-N9A	-2.13	108.34	114.36
3	H	450	FAD	C2A-N3A-C4A	2.12	120.06	114.01
3	D	450	FAD	C4X-N5-C5X	2.12	119.08	116.69
2	A	500	GDU	C1'-C2'-C3'	-2.11	105.88	110.00
2	B	500	GDU	PB-O3A-PA	-2.11	125.49	131.68
3	D	450	FAD	C6-C5X-C9A	2.11	121.94	119.02
2	D	500	GDU	O2'-C2'-C1'	2.09	114.61	110.04
3	G	450	FAD	C8A-N7A-C5A	2.09	110.07	103.58
2	I	500	GDU	O3B-C1'-C2'	2.09	112.21	108.38
3	G	450	FAD	N1-C10-N10	2.08	121.45	115.97
3	E	450	FAD	C2A-N3A-C4A	2.08	119.93	114.01
3	I	450	FAD	C5A-C4A-N3A	-2.08	121.17	125.70
2	I	500	GDU	C4'-C3'-C2'	-2.08	106.97	110.82
2	G	500	GDU	PB-O3A-PA	-2.07	125.60	131.68
3	D	450	FAD	C5'-C4'-C3'	-2.07	108.15	112.06
3	H	450	FAD	O3'-C3'-C4'	-2.06	103.52	108.74
2	G	500	GDU	O2A-PA-O3A	2.06	114.91	105.14
3	B	450	FAD	C8A-N9A-C4A	2.05	108.47	106.90
3	B	450	FAD	C2A-N3A-C4A	2.05	119.84	114.01
3	F	450	FAD	N7A-C8A-N9A	-2.05	108.56	114.36
2	I	500	GDU	O4'-C4'-C3'	-2.04	105.78	110.35
2	H	500	GDU	PB-O3A-PA	-2.04	125.70	131.68
3	F	450	FAD	C2B-C1B-N9A	-2.04	108.03	113.27
3	D	450	FAD	C1'-N10-C9A	2.03	120.85	118.87
3	C	450	FAD	N1-C10-N10	2.03	121.29	115.97
3	E	450	FAD	C9A-C5X-N5	-2.02	119.27	122.37
2	D	500	GDU	C1'-C2'-C3'	-2.02	106.06	110.00
3	C	450	FAD	O4B-C1B-C2B	-2.02	103.68	106.77
3	E	450	FAD	C8A-N7A-C5A	2.01	109.81	103.58
3	B	450	FAD	N7A-C8A-N9A	-2.00	108.70	114.36
3	J	450	FAD	C4-C4X-C10	2.00	120.18	116.95
3	F	450	FAD	C2A-N3A-C4A	2.00	119.71	114.01

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues

There are no chain breaks in this entry.

## 6 Fit of model and data ⓘ

### 6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	365/397 (91%)	-0.45	5 (1%) 72 76	20, 30, 46, 75	0
1	B	364/397 (91%)	-0.33	10 (2%) 52 55	23, 34, 54, 80	1 (0%)
1	C	361/397 (90%)	-0.08	10 (2%) 50 54	25, 39, 64, 82	6 (1%)
1	D	360/397 (90%)	-0.17	10 (2%) 50 54	20, 41, 65, 81	0
1	E	364/397 (91%)	-0.32	9 (2%) 54 58	24, 37, 57, 98	2 (0%)
1	F	363/397 (91%)	-0.39	8 (2%) 59 62	20, 32, 51, 75	1 (0%)
1	G	363/397 (91%)	-0.32	6 (1%) 67 70	20, 35, 55, 78	1 (0%)
1	H	364/397 (91%)	-0.37	7 (1%) 64 66	20, 32, 52, 76	0
1	I	363/397 (91%)	-0.41	3 (0%) 83 86	20, 32, 47, 70	1 (0%)
1	J	361/397 (90%)	-0.26	5 (1%) 72 76	20, 35, 59, 81	1 (0%)
All	All	3628/3970 (91%)	-0.31	73 (2%) 62 65	20, 34, 58, 98	13 (0%)

All (73) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	26	GLU	7.2
1	D	357	GLN	5.7
1	D	153	VAL	5.7
1	H	27	SER	5.4
1	F	153	VAL	5.2
1	G	27	SER	5.0
1	H	28	LYS	4.9
1	B	28	LYS	4.5
1	A	26	GLU	4.5
1	B	390	GLN	4.4
1	A	154	GLU	4.2
1	H	389	GLY	4.1
1	H	390	GLN	4.0

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Mol	Chain	Res	Type	RSRZ
1	C	385	ARG	4.0
1	B	27	SER	3.9
1	C	357	GLN	3.9
1	E	27	SER	3.7
1	G	153	VAL	3.7
1	H	357	GLN	3.7
1	J	389	GLY	3.6
1	B	357	GLN	3.6
1	E	155	GLN	3.6
1	I	357	GLN	3.6
1	B	154	GLU	3.5
1	A	153	VAL	3.4
1	F	248	ASP	3.3
1	D	157	ARG	3.3
1	C	28	LYS	3.3
1	G	28	LYS	3.3
1	A	357	GLN	3.2
1	E	28	LYS	3.2
1	B	389	GLY	3.2
1	D	385	ARG	3.1
1	H	29	GLY	3.0
1	H	154	GLU	3.0
1	F	357	GLN	3.0
1	F	152	LYS	3.0
1	C	153	VAL	3.0
1	E	357	GLN	3.0
1	D	154	GLU	3.0
1	B	155	GLN	2.9
1	J	357	GLN	2.9
1	C	355	ALA	2.9
1	G	152	LYS	2.8
1	G	154	GLU	2.6
1	J	386	ARG	2.6
1	F	270	GLY	2.5
1	C	354	ASP	2.5
1	J	155	GLN	2.5
1	I	153	VAL	2.5
1	D	358	ASP	2.5
1	D	155	GLN	2.5
1	E	154	GLU	2.5
1	I	152	LYS	2.4
1	B	157	ARG	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	248	ASP	2.4
1	C	52	GLY	2.4
1	J	153	VAL	2.3
1	F	28	LYS	2.3
1	D	152	LYS	2.3
1	B	248	ASP	2.3
1	D	253	GLN	2.3
1	E	388	GLN	2.3
1	E	153	VAL	2.2
1	E	389	GLY	2.2
1	C	387	LEU	2.2
1	F	56	LEU	2.2
1	F	390	GLN	2.2
1	G	56	LEU	2.2
1	A	152	LYS	2.1
1	D	56	LEU	2.0
1	B	153	VAL	2.0
1	C	41	GLY	2.0

## 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 carbohydrates in this entry.

## 6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. 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, 95<sup>th</sup> 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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	GDU	I	500	36/36	0.15	1.92	29,34,54,58	0
2	GDU	B	500	36/36	0.15	1.68	31,39,57,61	0
2	GDU	D	500	36/36	0.15	1.43	35,44,65,69	0

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Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	GDU	H	500	36/36	0.14	1.40	25,31,48,52	0
2	GDU	E	500	36/36	0.14	1.33	28,36,55,58	0
2	GDU	J	500	36/36	0.14	1.25	25,32,54,57	0
2	GDU	G	500	36/36	0.13	0.95	31,36,40,43	11
2	GDU	F	500	36/36	0.13	0.83	26,35,50,53	0
2	GDU	A	500	36/36	0.12	0.70	25,29,32,34	12
2	GDU	C	500	36/36	0.13	0.41	29,39,63,64	0
3	FAD	C	450	53/53	0.13	-0.06	23,29,36,51	0
3	FAD	E	450	53/53	0.10	-0.35	23,29,36,51	0
3	FAD	D	450	53/53	0.10	-0.46	23,29,36,51	0
3	FAD	J	450	53/53	0.11	-0.48	23,29,36,51	0
3	FAD	G	450	53/53	0.10	-0.59	23,29,36,51	0
3	FAD	B	450	53/53	0.08	-0.73	23,29,36,51	0
3	FAD	H	450	53/53	0.09	-0.78	23,29,36,51	0
3	FAD	F	450	53/53	0.08	-1.02	23,29,36,51	0
3	FAD	I	450	53/53	0.08	-1.15	23,29,36,51	0
3	FAD	A	450	53/53	0.08	-1.17	23,29,36,51	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.