



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 12:28 PM GMT

PDB ID : 3RAF  
Title : Quinazolidione-DNA cleavage complex of type IV topoisomerase from *S. pneumoniae*  
Authors : Laponogov, I.; Pan, X.-S.; Veselkov, D.A.; McAuley, K.E.; Fisher, L.M.; Sanderson, M.R.  
Deposited on : 2011-03-28  
Resolution : 3.24 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](mailto: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.

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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 : 1.7 (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

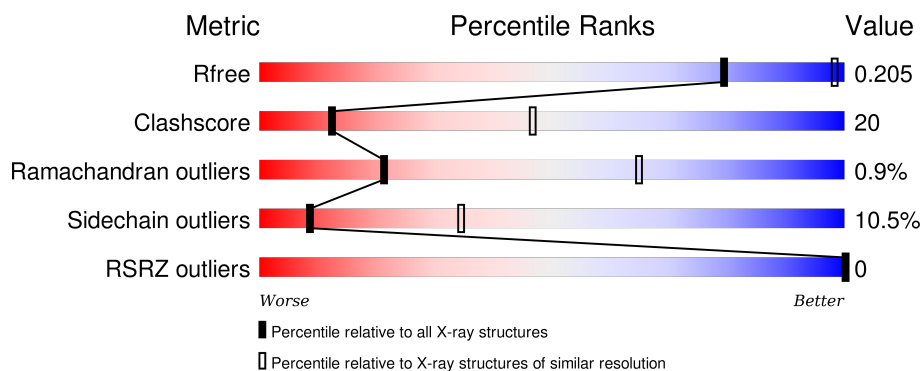
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 3.24 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	1092 (3.28-3.20)
Clashscore	102246	1227 (3.28-3.20)
Ramachandran outliers	100387	1204 (3.28-3.20)
Sidechain outliers	100360	1203 (3.28-3.20)
RSRZ outliers	91569	1097 (3.28-3.20)

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. 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	496	
1	B	496	
2	C	268	
2	D	268	
3	E	7	

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Mol	Chain	Length	Quality of chain
4	F	11	
5	G	7	
6	H	11	

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 criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
8	PDQ	F	0	-	-	-	X

## 2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 11277 atoms, of which 48 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called DNA topoisomerase 4 subunit A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	482	Total	C	N	O	S	0	0	0
			3726	2364	642	707	13			
1	B	482	Total	C	N	O	S	0	0	0
			3711	2356	638	704	13			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	257	THR	ILE	SEE REMARK 999	UNP P72525
A	489	LEU	-	EXPRESSION TAG	UNP P72525
A	490	GLU	-	EXPRESSION TAG	UNP P72525
A	491	HIS	-	EXPRESSION TAG	UNP P72525
A	492	HIS	-	EXPRESSION TAG	UNP P72525
A	493	HIS	-	EXPRESSION TAG	UNP P72525
A	494	HIS	-	EXPRESSION TAG	UNP P72525
A	495	HIS	-	EXPRESSION TAG	UNP P72525
A	496	HIS	-	EXPRESSION TAG	UNP P72525
B	257	THR	ILE	SEE REMARK 999	UNP P72525
B	489	LEU	-	EXPRESSION TAG	UNP P72525
B	490	GLU	-	EXPRESSION TAG	UNP P72525
B	491	HIS	-	EXPRESSION TAG	UNP P72525
B	492	HIS	-	EXPRESSION TAG	UNP P72525
B	493	HIS	-	EXPRESSION TAG	UNP P72525
B	494	HIS	-	EXPRESSION TAG	UNP P72525
B	495	HIS	-	EXPRESSION TAG	UNP P72525
B	496	HIS	-	EXPRESSION TAG	UNP P72525

- Molecule 2 is a protein called DNA topoisomerase 4 subunit B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	208	Total	C	N	O	S	0	0	0
			1479	940	259	274	6			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	210	Total	C	N	O	S	0	0	0
			1487	948	257	276	6			

There are 52 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	380	MET	-	EXPRESSION TAG	UNP Q59961
C	381	GLY	-	EXPRESSION TAG	UNP Q59961
C	382	HIS	-	EXPRESSION TAG	UNP Q59961
C	383	HIS	-	EXPRESSION TAG	UNP Q59961
C	384	HIS	-	EXPRESSION TAG	UNP Q59961
C	385	HIS	-	EXPRESSION TAG	UNP Q59961
C	386	HIS	-	EXPRESSION TAG	UNP Q59961
C	387	HIS	-	EXPRESSION TAG	UNP Q59961
C	388	HIS	-	EXPRESSION TAG	UNP Q59961
C	389	HIS	-	EXPRESSION TAG	UNP Q59961
C	390	HIS	-	EXPRESSION TAG	UNP Q59961
C	391	HIS	-	EXPRESSION TAG	UNP Q59961
C	392	SER	-	EXPRESSION TAG	UNP Q59961
C	393	SER	-	EXPRESSION TAG	UNP Q59961
C	394	GLY	-	EXPRESSION TAG	UNP Q59961
C	395	HIS	-	EXPRESSION TAG	UNP Q59961
C	396	ILE	-	EXPRESSION TAG	UNP Q59961
C	397	ASP	-	EXPRESSION TAG	UNP Q59961
C	398	ASP	-	EXPRESSION TAG	UNP Q59961
C	399	ASP	-	EXPRESSION TAG	UNP Q59961
C	400	ASP	-	EXPRESSION TAG	UNP Q59961
C	401	LYS	-	EXPRESSION TAG	UNP Q59961
C	402	HIS	-	EXPRESSION TAG	UNP Q59961
C	403	MET	-	EXPRESSION TAG	UNP Q59961
C	460	ILE	VAL	SEE REMARK 999	UNP Q59961
C	644	ALA	THR	SEE REMARK 999	UNP Q59961
D	380	MET	-	EXPRESSION TAG	UNP Q59961
D	381	GLY	-	EXPRESSION TAG	UNP Q59961
D	382	HIS	-	EXPRESSION TAG	UNP Q59961
D	383	HIS	-	EXPRESSION TAG	UNP Q59961
D	384	HIS	-	EXPRESSION TAG	UNP Q59961
D	385	HIS	-	EXPRESSION TAG	UNP Q59961
D	386	HIS	-	EXPRESSION TAG	UNP Q59961
D	387	HIS	-	EXPRESSION TAG	UNP Q59961
D	388	HIS	-	EXPRESSION TAG	UNP Q59961
D	389	HIS	-	EXPRESSION TAG	UNP Q59961

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Chain	Residue	Modelled	Actual	Comment	Reference
D	390	HIS	-	EXPRESSION TAG	UNP Q59961
D	391	HIS	-	EXPRESSION TAG	UNP Q59961
D	392	SER	-	EXPRESSION TAG	UNP Q59961
D	393	SER	-	EXPRESSION TAG	UNP Q59961
D	394	GLY	-	EXPRESSION TAG	UNP Q59961
D	395	HIS	-	EXPRESSION TAG	UNP Q59961
D	396	ILE	-	EXPRESSION TAG	UNP Q59961
D	397	ASP	-	EXPRESSION TAG	UNP Q59961
D	398	ASP	-	EXPRESSION TAG	UNP Q59961
D	399	ASP	-	EXPRESSION TAG	UNP Q59961
D	400	ASP	-	EXPRESSION TAG	UNP Q59961
D	401	LYS	-	EXPRESSION TAG	UNP Q59961
D	402	HIS	-	EXPRESSION TAG	UNP Q59961
D	403	MET	-	EXPRESSION TAG	UNP Q59961
D	460	ILE	VAL	SEE REMARK 999	UNP Q59961
D	644	ALA	THR	SEE REMARK 999	UNP Q59961

- Molecule 3 is a DNA chain called 5'-D(\*CP\*AP\*TP\*GP\*AP\*AP\*T)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	7	Total	C	N	O	P	0	0	0
			140	69	27	38	6			

- Molecule 4 is a DNA chain called 5'-D(P\*AP\*GP\*TP\*CP\*AP\*TP\*TP\*CP\*AP\*TP\*G)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	11	Total	C	N	O	P	0	0	0
			225	108	39	67	11			

- Molecule 5 is a DNA chain called 5'-D(\*CP\*GP\*TP\*GP\*CP\*AP\*T)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	G	7	Total	C	N	O	P	0	0	0
			139	68	25	40	6			

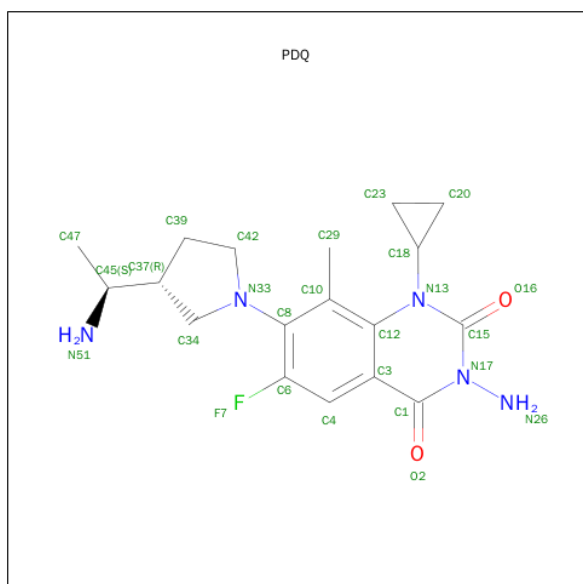
- Molecule 6 is a DNA chain called 5'-D(P\*GP\*AP\*CP\*TP\*AP\*TP\*GP\*CP\*AP\*CP\*G)-3'.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	H	11	Total	C	N	O	P	0	0	0
			226	107	43	65	11			

- Molecule 7 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	1	Total Mg 1 1	0	0
7	A	1	Total Mg 1 1	0	0
7	D	1	Total Mg 1 1	0	0
7	C	1	Total Mg 1 1	0	0

- Molecule 8 is 3-AMINO-7-[(3R)-3-[(1S)-1-AMINOETHYL]PYRROLIDIN-1-YL]-1-CYCLOPROPYL-6-FLUORO-8-METHYLQUINAZOLINE-2,4(1H,3H)-DIONE (three-letter code: PDQ) (formula: C<sub>18</sub>H<sub>24</sub>FN<sub>5</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	F	1	Total C F H N O 50 18 1 24 5 2	0	0
8	H	1	Total C F H N O 50 18 1 24 5 2	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	16	Total O 16 16	0	0
9	B	14	Total O 14 14	0	0
9	C	1	Total O 1 1	0	0

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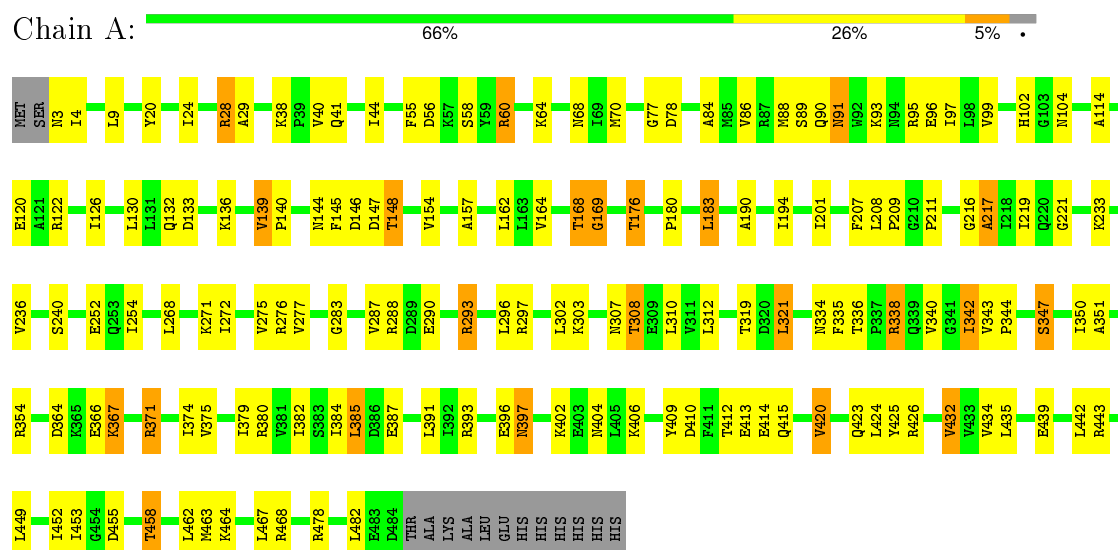
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	D	3	Total 3	O 3	0	0
9	E	3	Total 3	O 3	0	0
9	G	2	Total 2	O 2	0	0
9	H	1	Total 1	O 1	0	0

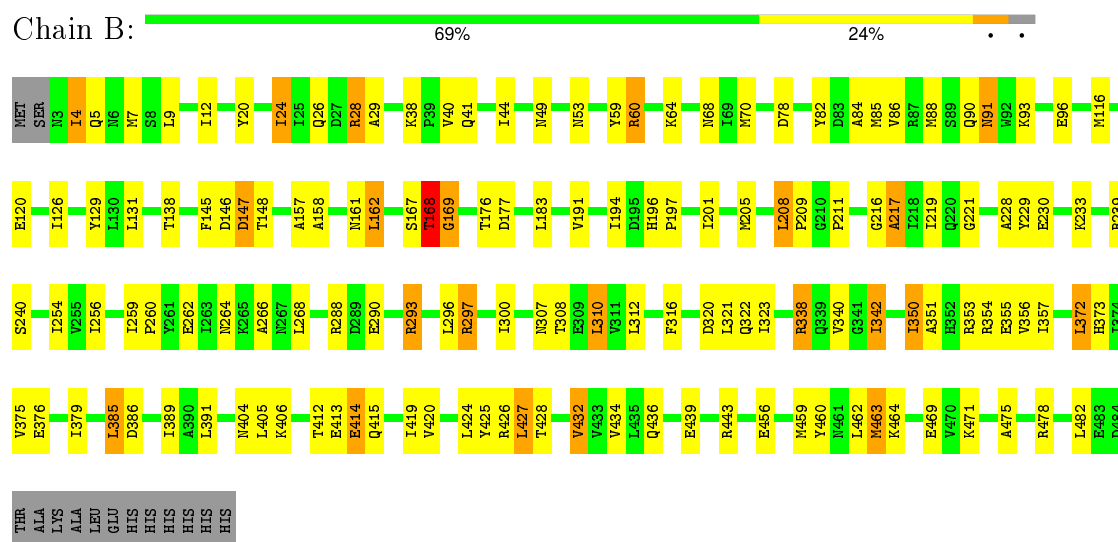
### 3 Residue-property plots

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: DNA topoisomerase 4 subunit A

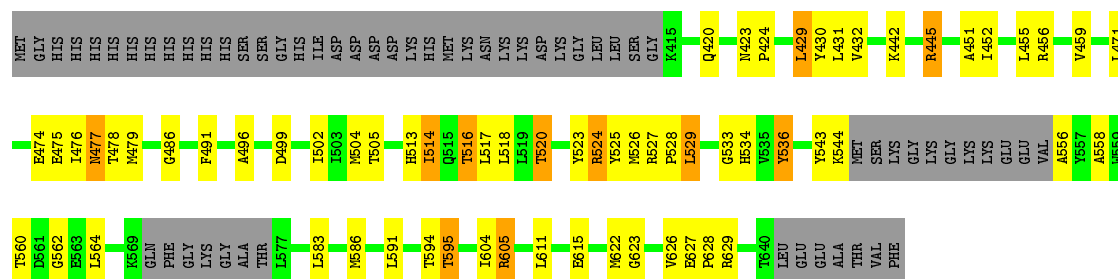


#### • Molecule 1: DNA topoisomerase 4 subunit A



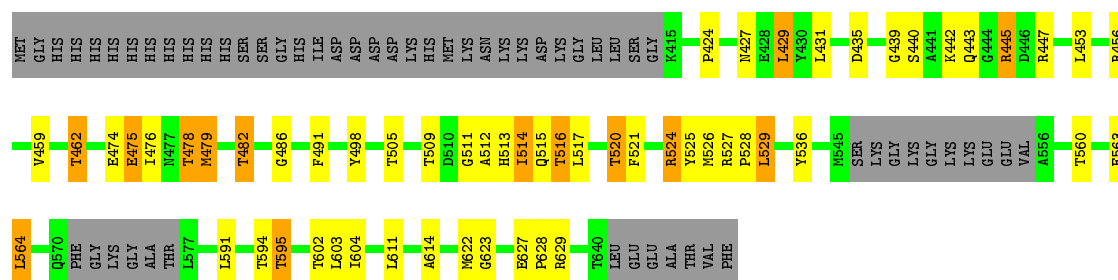
#### • Molecule 2: DNA topoisomerase 4 subunit B

Chain C:  53% 21% • 22%

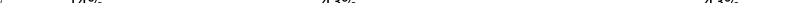


- Molecule 2: DNA topoisomerase 4 subunit B

Chain D: 

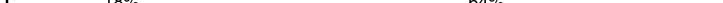


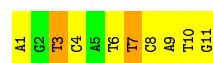
- Molecule 3: 5'-D(\*CP\*AP\*TP\*GP\*AP\*AP\*T)-3'

Chain E:  14% 43% 43%



- Molecule 4: 5'-D(P\*AP\*GP\*TP\*CP\*AP\*TP\*TP\*CP\*AP\*TP\*G)-3'

Chain F:  18% 64% 18%



- Molecule 5: 5'-D(\*CP\*GP\*TP\*GP\*CP\*AP\*T)-3'

Chain G:  43% 43% 14%



- Molecule 6: 5'-D(P\*GP\*AP\*CP\*TP\*AP\*TP\*GP\*CP\*AP\*CP\*G)-3'

Chain H:  27% 45% 27%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	158.55Å 158.55Å 210.33Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	114.98 – 3.24 114.98 – 2.94	Depositor EDS
% Data completeness (in resolution range)	99.8 (114.98-3.24) 99.9 (114.98-2.94)	Depositor EDS
$R_{merge}$	0.24	Depositor
$R_{sym}$	0.24	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 2.96Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.6.1_357)	Depositor
R, $R_{free}$	0.167 , 0.206 0.169 , 0.205	Depositor DCC
$R_{free}$ test set	1507 reflections (3.17%)	DCC
Wilson B-factor (Å <sup>2</sup> )	47.5	Xtriage
Anisotropy	0.636	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 50.5	EDS
Estimated twinning fraction	0.031 for -h,-k,l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	0 of 65382 reflections	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	11277	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.18% of the height of the origin peak. No significant pseudotranslation is detected.*

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

<sup>2</sup>Theoretical 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

### 5.1 Standard geometry

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

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	0.46	0/3787	0.63	0/5131
1	B	0.45	0/3772	0.62	0/5115
2	C	0.38	0/1505	0.58	0/2053
2	D	0.38	0/1513	0.59	0/2063
3	E	0.92	0/157	1.67	3/241 (1.2%)
4	F	0.95	0/251	2.19	17/385 (4.4%)
5	G	0.86	0/155	1.94	4/238 (1.7%)
6	H	0.95	0/253	2.18	19/388 (4.9%)
All	All	0.49	0/11393	0.83	43/15614 (0.3%)

There are no bond length outliers.

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	14	DA	O4'-C4'-C3'	-11.60	99.04	106.00
6	H	10	DC	O4'-C4'-C3'	-11.27	99.24	106.00
6	H	3	DC	O4'-C4'-C3'	-10.74	99.55	106.00
6	H	7	DG	N3-C2-N2	-9.49	113.26	119.90
4	F	11	DG	C5-C6-O6	-9.47	122.92	128.60
4	F	7	DT	N3-C2-O2	-8.92	116.95	122.30
4	F	6	DT	O4'-C4'-C3'	-8.90	100.66	106.00
5	G	14	DA	O4'-C4'-C3'	-8.87	100.67	106.00
4	F	8	DC	O4'-C4'-C3'	-8.60	100.84	106.00
4	F	11	DG	N3-C2-N2	-8.48	113.96	119.90
4	F	11	DG	C6-N1-C2	-8.20	120.18	125.10
5	G	10	DG	O4'-C1'-N9	-7.81	102.54	108.00
4	F	10	DT	O4'-C4'-C3'	-7.80	101.32	106.00
6	H	11	DG	N3-C2-N2	-7.39	114.73	119.90
6	H	7	DG	C5-C6-O6	-7.35	124.19	128.60
6	H	4	DT	O4'-C4'-C3'	-7.31	101.58	104.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	F	7	DT	N3-C4-O4	6.92	124.05	119.90
4	F	6	DT	C1'-O4'-C4'	-6.70	103.40	110.10
6	H	4	DT	C5-C4-O4	-6.40	120.42	124.90
6	H	10	DC	C1'-O4'-C4'	-6.02	104.08	110.10
6	H	1	DG	O4'-C1'-N9	6.02	112.21	108.00
6	H	11	DG	N1-C2-N2	6.00	121.60	116.20
4	F	3	DT	N3-C4-O4	5.99	123.49	119.90
5	G	15	DT	N3-C4-O4	5.86	123.42	119.90
4	F	7	DT	C5-C4-O4	-5.75	120.88	124.90
4	F	3	DT	C5-C4-O4	-5.73	120.89	124.90
6	H	7	DG	C6-N1-C2	-5.64	121.72	125.10
6	H	4	DT	N3-C4-O4	5.51	123.20	119.90
6	H	7	DG	N1-C2-N2	5.50	121.15	116.20
4	F	1	DA	O5'-P-OP1	-5.46	100.78	105.70
6	H	7	DG	N1-C6-O6	5.44	123.17	119.90
4	F	1	DA	C4'-C3'-C2'	-5.42	98.22	103.10
6	H	8	DC	C1'-O4'-C4'	-5.40	104.70	110.10
3	E	11	DT	N3-C4-O4	5.40	123.14	119.90
4	F	11	DG	N1-C6-O6	5.28	123.06	119.90
6	H	4	DT	C1'-O4'-C4'	-5.20	104.90	110.10
6	H	8	DC	O4'-C4'-C3'	-5.18	102.43	104.50
6	H	7	DG	N3-C4-N9	-5.11	122.93	126.00
3	E	12	DG	C4'-C3'-C2'	-5.11	98.50	103.10
5	G	15	DT	C5-C4-O4	-5.10	121.33	124.90
6	H	11	DG	N9-C4-C5	5.09	107.44	105.40
4	F	3	DT	O4'-C4'-C3'	-5.08	102.47	104.50
4	F	11	DG	C5-C6-N1	5.04	114.02	111.50

There are no chirality outliers.

There are no planarity outliers.

## 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	3726	0	3647	136	0
1	B	3711	0	3626	138	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	1479	0	1308	69	0
2	D	1487	0	1313	61	0
3	E	140	0	78	11	0
4	F	225	0	126	6	0
5	G	139	0	78	1	0
6	H	226	0	124	6	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
8	F	26	24	24	5	0
8	H	26	24	24	6	0
9	A	16	0	0	2	0
9	B	14	0	0	1	0
9	C	1	0	0	0	0
9	D	3	0	0	0	0
9	E	3	0	0	0	0
9	G	2	0	0	0	0
9	H	1	0	0	0	0
All	All	11229	48	10348	423	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 20.

All (423) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:146:ASP:HB3	1:A:148:THR:CG2	1.69	1.21
1:A:28:ARG:HG3	1:A:28:ARG:HH11	1.00	1.15
1:B:28:ARG:HG3	1:B:28:ARG:HH11	1.09	1.12
1:A:146:ASP:CB	1:A:148:THR:HG23	1.79	1.12
1:B:146:ASP:HB3	1:B:148:THR:HG23	1.19	1.10
8:F:0:PDQ:C20	8:F:0:PDQ:H29	1.85	1.07
8:H:0:PDQ:H29	8:H:0:PDQ:C20	1.91	1.00
2:D:474:GLU:O	2:D:478:THR:HG23	1.60	1.00
1:B:60:ARG:HH11	1:B:60:ARG:HG3	1.29	0.97
1:A:38:LYS:H	1:A:41:GLN:HE21	1.09	0.96
1:A:307:ASN:ND2	1:A:310:LEU:HB2	1.81	0.95
2:C:520:THR:HG21	2:C:622:MET:HG3	1.46	0.95
1:A:252:GLU:OE1	1:A:308:THR:HG21	1.66	0.95
1:B:70:MET:HE1	1:B:78:ASP:HB3	1.49	0.94

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:524:ARG:HH11	2:D:524:ARG:CB	1.80	0.93
2:D:478:THR:O	2:D:482:THR:HG23	1.68	0.93
1:A:28:ARG:HG3	1:A:28:ARG:NH1	1.79	0.90
1:B:7:MET:HB3	1:B:12:ILE:HD11	1.53	0.90
1:A:28:ARG:CG	1:A:28:ARG:HH11	1.85	0.89
2:C:524:ARG:HH11	2:C:524:ARG:CG	1.85	0.89
2:D:524:ARG:HH11	2:D:524:ARG:HB3	1.34	0.89
1:B:406:LYS:NZ	1:B:413:GLU:HB2	1.88	0.89
1:B:194:ILE:HG12	1:B:350:ILE:HD13	1.55	0.87
1:B:28:ARG:NH1	1:B:28:ARG:HG3	1.89	0.87
1:B:194:ILE:CD1	1:B:463:MET:HE2	2.05	0.87
1:B:146:ASP:HB3	1:B:148:THR:CG2	2.02	0.86
2:D:520:THR:HG21	2:D:622:MET:HG3	1.56	0.86
1:A:70:MET:HE1	1:A:78:ASP:HB3	1.57	0.86
2:C:524:ARG:HH11	2:C:524:ARG:HG3	1.40	0.84
1:A:60:ARG:HH11	1:A:60:ARG:CG	1.92	0.83
1:B:194:ILE:HD11	1:B:463:MET:CE	2.09	0.83
1:A:288:ARG:HD2	1:A:290:GLU:OE2	1.79	0.83
2:D:478:THR:O	2:D:482:THR:CG2	2.28	0.82
1:A:168:THR:HA	1:A:176:THR:HG22	1.61	0.82
1:B:293:ARG:HB3	1:B:293:ARG:HH11	1.44	0.81
2:C:526:MET:CE	2:C:529:LEU:HD12	2.10	0.81
1:B:60:ARG:NH1	1:B:60:ARG:HG3	1.95	0.81
1:B:191:VAL:HG13	1:B:464:LYS:HG2	1.64	0.80
1:A:272:ILE:HG22	1:A:287:VAL:HG21	1.61	0.80
1:A:38:LYS:H	1:A:41:GLN:NE2	1.81	0.79
8:F:0:PDQ:C18	8:F:0:PDQ:H29	2.13	0.79
1:B:256:ILE:HD13	1:B:321:LEU:HD21	1.63	0.78
1:A:201:ILE:H	1:A:201:ILE:HD12	1.50	0.77
2:D:611:LEU:O	2:D:611:LEU:HD13	1.84	0.77
1:B:201:ILE:HG12	1:B:230:GLU:HG3	1.67	0.76
2:D:524:ARG:NH1	2:D:524:ARG:HB3	2.01	0.76
1:B:194:ILE:HD11	1:B:463:MET:HE2	1.67	0.75
1:A:350:ILE:HA	1:A:463:MET:HE1	1.67	0.75
2:D:524:ARG:HH11	2:D:524:ARG:CG	1.98	0.75
1:B:194:ILE:CG1	1:B:350:ILE:HD13	2.14	0.75
8:F:0:PDQ:C20	8:F:0:PDQ:C29	2.63	0.75
2:C:516:THR:O	2:C:520:THR:HG23	1.87	0.75
1:B:406:LYS:HZ1	1:B:413:GLU:HB2	1.49	0.74
1:B:354:ARG:HG3	1:B:459:MET:HE1	1.69	0.74
1:A:146:ASP:HB3	1:A:148:THR:HG23	0.82	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:29:ALA:O	1:B:38:LYS:HE2	1.86	0.74
1:B:201:ILE:HD12	1:B:201:ILE:N	2.03	0.74
1:B:70:MET:CE	1:B:78:ASP:HB3	2.17	0.74
1:B:201:ILE:HD12	1:B:201:ILE:H	1.51	0.74
8:H:0:PDQ:H29	8:H:0:PDQ:C18	2.17	0.73
1:A:169:GLY:CA	1:A:176:THR:HG22	2.18	0.73
1:B:256:ILE:CD1	1:B:321:LEU:HD21	2.18	0.73
1:B:194:ILE:HD13	1:B:463:MET:HE2	1.70	0.73
1:B:412:THR:H	1:B:415:GLN:HE21	1.35	0.73
1:B:44:ILE:HD12	1:B:88:MET:CE	2.19	0.73
2:D:520:THR:O	2:D:524:ARG:HG2	1.88	0.73
2:C:524:ARG:CB	2:C:524:ARG:HH11	2.01	0.72
1:A:271:LYS:HE3	1:A:319:THR:HB	1.71	0.72
1:B:167:SER:C	1:B:168:THR:HG22	2.09	0.72
2:D:611:LEU:C	2:D:611:LEU:HD13	2.09	0.72
3:E:10:DA:H5'	3:E:10:DA:C8	2.25	0.72
2:C:525:TYR:O	2:C:526:MET:HG3	1.89	0.71
1:B:194:ILE:CG1	1:B:350:ILE:CD1	2.68	0.71
1:A:169:GLY:HA3	1:A:176:THR:HG22	1.72	0.71
1:B:194:ILE:HG12	1:B:350:ILE:CD1	2.21	0.71
1:B:28:ARG:CG	1:B:28:ARG:HH11	1.95	0.71
8:H:0:PDQ:C29	8:H:0:PDQ:C20	2.68	0.71
1:B:432:VAL:O	1:B:436:GLN:HG3	1.90	0.71
2:D:456:ARG:HB2	8:H:0:PDQ:HN51	1.55	0.71
2:C:529:LEU:CD2	2:C:534:HIS:HB2	2.21	0.69
3:E:13:DA:H2''	3:E:14:DA:O5'	1.92	0.69
3:E:10:DA:H5'	3:E:10:DA:H8	1.56	0.69
2:D:462:THR:HG21	2:D:521:PHE:HD2	1.57	0.69
1:A:211:PRO:O	1:A:478:ARG:NH2	2.25	0.69
2:C:523:TYR:OH	2:C:615:GLU:HB2	1.92	0.68
2:C:486:GLY:O	2:C:491:PHE:HD2	1.76	0.68
2:C:524:ARG:HB2	2:C:525:TYR:CD1	2.29	0.67
1:A:77:GLY:HA3	9:A:808:HOH:O	1.95	0.67
1:A:216:GLY:O	1:A:217:ALA:HB3	1.95	0.67
1:A:391:LEU:HD21	1:A:404:ASN:CB	2.24	0.67
2:C:513:HIS:O	2:C:517:LEU:HD12	1.94	0.67
1:A:60:ARG:HH11	1:A:60:ARG:HG3	1.59	0.67
2:C:475:GLU:O	2:C:479:MET:HG3	1.94	0.66
8:F:0:PDQ:H20	8:F:0:PDQ:H29	1.75	0.66
1:B:194:ILE:HD11	1:B:463:MET:HE1	1.78	0.66
2:D:524:ARG:HB2	2:D:525:TYR:HD1	1.61	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:516:THR:HG22	2:D:517:LEU:N	2.10	0.65
1:B:211:PRO:O	1:B:478:ARG:NH2	2.30	0.65
1:B:60:ARG:HH11	1:B:60:ARG:CG	2.07	0.65
1:A:375:VAL:O	1:A:379:ILE:HG13	1.97	0.65
1:A:307:ASN:HD22	1:A:310:LEU:HB2	1.62	0.65
2:C:524:ARG:C	2:C:525:TYR:CD1	2.71	0.64
1:A:391:LEU:HD21	1:A:404:ASN:HB2	1.79	0.64
1:B:406:LYS:HZ3	1:B:413:GLU:HB2	1.60	0.64
1:B:201:ILE:H	1:B:201:ILE:CD1	2.11	0.64
2:C:505:THR:HG21	2:C:514:ILE:HG22	1.80	0.64
1:B:288:ARG:NH1	1:B:290:GLU:OE2	2.30	0.64
1:B:24:ILE:HG13	1:B:28:ARG:HD2	1.80	0.64
2:C:471:LEU:O	2:C:477:ASN:ND2	2.31	0.64
2:C:526:MET:HE3	2:C:529:LEU:HD12	1.78	0.63
1:B:375:VAL:O	1:B:379:ILE:HG13	1.98	0.63
2:D:491:PHE:HE1	2:D:528:PRO:HB2	1.63	0.63
1:A:452:ILE:HA	1:A:458:THR:HG22	1.80	0.63
1:A:272:ILE:O	1:A:275:VAL:HB	1.98	0.63
1:B:194:ILE:HG13	1:B:350:ILE:CD1	2.28	0.63
2:C:594:THR:OG1	2:C:595:THR:HG22	1.97	0.63
2:D:491:PHE:HD1	2:D:528:PRO:HG2	1.63	0.63
2:C:626:VAL:O	2:C:629:ARG:HB3	2.00	0.62
2:D:516:THR:O	2:D:520:THR:HG23	2.00	0.62
1:A:449:LEU:O	1:A:453:ILE:HD12	2.00	0.62
1:B:412:THR:HG23	1:B:415:GLN:NE2	2.14	0.62
1:B:354:ARG:HG3	1:B:459:MET:CE	2.29	0.61
1:B:38:LYS:H	1:B:41:GLN:NE2	1.97	0.61
2:D:602:THR:O	2:D:603:LEU:HD23	1.99	0.61
1:A:375:VAL:HG13	1:A:435:LEU:HD22	1.83	0.61
1:B:40:VAL:O	1:B:44:ILE:HG13	2.00	0.61
5:G:13:DC:H2"	5:G:14:DA:O5'	2.00	0.61
3:E:9:DC:H2"	3:E:10:DA:C5'	2.31	0.61
1:B:219:ILE:HB	1:B:482:LEU:HD23	1.83	0.61
2:D:431:LEU:HD22	2:D:479:MET:CE	2.30	0.61
1:B:169:GLY:HA2	1:B:176:THR:HG22	1.83	0.60
2:C:524:ARG:HB2	2:C:525:TYR:HD1	1.63	0.60
6:H:11:DG:C8	6:H:11:DG:H5"	2.37	0.60
1:B:44:ILE:HD12	1:B:88:MET:HE2	1.83	0.59
3:E:9:DC:H2"	3:E:10:DA:H5"	1.84	0.59
2:C:524:ARG:NH1	2:C:524:ARG:HG3	2.09	0.58
1:A:307:ASN:ND2	1:A:310:LEU:CB	2.63	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:367:LYS:HB3	1:A:367:LYS:NZ	2.19	0.58
2:D:525:TYR:O	2:D:526:MET:HG3	2.03	0.58
1:A:60:ARG:HH11	1:A:60:ARG:HG2	1.69	0.58
1:A:455:ASP:OD2	1:A:458:THR:HB	2.03	0.58
2:D:431:LEU:HD22	2:D:479:MET:HE3	1.86	0.58
2:D:456:ARG:HB2	8:H:0:PDQ:N51	2.19	0.57
1:B:20:TYR:CD1	2:D:513:HIS:HB2	2.39	0.57
2:D:524:ARG:HB2	2:D:525:TYR:CD1	2.38	0.57
2:C:527:ARG:N	2:C:528:PRO:CD	2.68	0.57
1:A:216:GLY:O	1:A:217:ALA:CB	2.52	0.57
1:A:452:ILE:HA	1:A:458:THR:CG2	2.34	0.57
1:A:29:ALA:O	1:A:38:LYS:HE2	2.04	0.57
1:A:20:TYR:CD1	2:C:513:HIS:HB2	2.40	0.57
1:A:379:ILE:HG23	1:A:432:VAL:HG22	1.87	0.57
1:B:391:LEU:HD21	1:B:404:ASN:CB	2.34	0.57
1:A:168:THR:HA	1:A:176:THR:CG2	2.32	0.56
1:A:254:ILE:HD13	1:A:312:LEU:HD13	1.87	0.56
1:B:24:ILE:CD1	1:B:28:ARG:HE	2.18	0.56
2:C:583:LEU:HA	2:C:586:MET:HE3	1.87	0.56
2:D:513:HIS:O	2:D:516:THR:HB	2.06	0.56
1:B:216:GLY:O	1:B:217:ALA:HB3	2.04	0.56
2:C:526:MET:C	2:C:528:PRO:HD2	2.26	0.56
1:B:82:TYR:O	1:B:86:VAL:HG23	2.06	0.56
1:A:276:ARG:HH21	1:A:277:VAL:HG23	1.70	0.56
1:A:55:PHE:HA	1:A:122:ARG:HD2	1.88	0.56
1:A:64:LYS:HE3	1:B:68:ASN:HD22	1.71	0.56
8:H:0:PDQ:H29	8:H:0:PDQ:H20	1.83	0.55
1:A:86:VAL:O	1:A:90:GLN:HG3	2.06	0.55
1:B:293:ARG:CB	1:B:293:ARG:HH11	2.16	0.55
1:B:169:GLY:CA	1:B:176:THR:HG22	2.36	0.55
1:A:391:LEU:HD21	1:A:404:ASN:HB3	1.88	0.55
1:A:423:GLN:NE2	1:A:425:TYR:HE1	2.05	0.55
1:B:24:ILE:HD11	1:B:28:ARG:HE	1.71	0.55
3:E:10:DA:H2''	3:E:11:DT:O5'	2.06	0.55
2:C:524:ARG:CB	2:C:525:TYR:CD1	2.90	0.55
1:A:70:MET:CE	1:A:78:ASP:HB3	2.35	0.55
2:C:429:LEU:HD13	2:C:431:LEU:HD21	1.88	0.55
1:A:350:ILE:HG23	1:A:463:MET:CE	2.37	0.54
1:B:84:ALA:O	1:B:88:MET:HG3	2.06	0.54
1:A:70:MET:HE1	1:A:78:ASP:CB	2.32	0.54
1:A:207:PHE:O	1:A:209:PRO:HD3	2.05	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:F:3:DT:H4'	4:F:4:DC:OP1	2.08	0.54
1:B:44:ILE:HD13	1:B:85:MET:HB2	1.90	0.54
3:E:13:DA:H61	4:F:7:DT:H3	1.56	0.54
1:A:24:ILE:HD12	1:A:28:ARG:HD2	1.90	0.54
1:A:91:ASN:N	1:A:91:ASN:HD22	2.06	0.54
2:D:475:GLU:O	2:D:479:MET:HG2	2.07	0.53
1:A:44:ILE:HD12	1:A:88:MET:CE	2.38	0.53
2:C:611:LEU:HD12	2:C:611:LEU:O	2.08	0.53
2:C:474:GLU:O	2:C:478:THR:HG23	2.07	0.53
1:A:60:ARG:CG	1:A:60:ARG:NH1	2.62	0.53
1:B:201:ILE:N	1:B:201:ILE:CD1	2.70	0.53
2:D:526:MET:CE	2:D:529:LEU:HD12	2.38	0.53
2:C:529:LEU:HD22	2:C:534:HIS:HB2	1.90	0.53
1:B:4:ILE:HG13	1:B:5:GLN:N	2.20	0.53
2:C:520:THR:CG2	2:C:622:MET:HG3	2.30	0.53
1:A:96:GLU:HG2	1:A:126:ILE:HD13	1.91	0.53
2:C:491:PHE:HD1	2:C:528:PRO:HG2	1.74	0.53
1:A:60:ARG:HG3	1:A:60:ARG:NH1	2.24	0.52
2:C:524:ARG:NH1	2:C:525:TYR:HE1	2.06	0.52
1:B:194:ILE:HG13	1:B:350:ILE:HD11	1.91	0.52
6:H:3:DC:H4'	6:H:4:DT:OP1	2.09	0.52
1:B:353:ARG:O	1:B:357:ILE:HG13	2.09	0.52
1:B:145:PHE:CD1	1:B:146:ASP:N	2.77	0.52
1:A:393:ARG:NH1	1:B:386:ASP:OD2	2.41	0.52
1:B:256:ILE:CD1	1:B:321:LEU:HD11	2.40	0.52
2:C:536:TYR:N	2:C:536:TYR:CD2	2.78	0.52
1:A:276:ARG:HH21	1:A:277:VAL:CG2	2.22	0.52
1:B:228:ALA:HA	1:B:233:LYS:O	2.09	0.52
1:A:139:VAL:HG22	1:A:154:VAL:HG13	1.92	0.51
2:C:544:LYS:HA	2:C:556:ALA:O	2.10	0.51
2:C:527:ARG:N	2:C:528:PRO:HD2	2.25	0.51
2:C:459:VAL:O	2:C:517:LEU:HD22	2.10	0.51
1:A:84:ALA:O	1:A:88:MET:HG3	2.11	0.51
1:A:139:VAL:HG22	1:A:140:PRO:HD2	1.92	0.51
1:A:382:ILE:HD12	1:A:432:VAL:HG23	1.92	0.51
1:A:334:ASN:O	1:A:335:PHE:HB2	2.10	0.51
1:B:24:ILE:CD1	1:B:28:ARG:NE	2.74	0.51
2:D:524:ARG:NH1	2:D:524:ARG:CG	2.66	0.51
1:A:434:VAL:HG13	1:A:435:LEU:N	2.26	0.51
2:C:505:THR:HG21	2:C:514:ILE:CG2	2.41	0.50
1:B:256:ILE:HD13	1:B:321:LEU:CD2	2.35	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:526:MET:HE1	2:D:529:LEU:HD12	1.92	0.50
1:A:296:LEU:C	1:A:296:LEU:HD23	2.32	0.50
1:A:296:LEU:HD23	1:A:297:ARG:N	2.26	0.50
1:A:136:LYS:HE2	1:A:364:ASP:OD1	2.12	0.50
3:E:9:DC:C2'	3:E:10:DA:H5''	2.41	0.50
1:A:420:VAL:HG13	1:B:425:TYR:HB3	1.94	0.50
2:D:491:PHE:CD1	2:D:528:PRO:HG2	2.46	0.50
2:C:623:GLY:O	2:C:629:ARG:NH2	2.40	0.50
1:B:290:GLU:OE1	1:B:297:ARG:NH1	2.40	0.49
1:A:3:ASN:O	1:A:4:ILE:HG12	2.11	0.49
1:B:229:TYR:CD1	1:B:342:ILE:HD13	2.47	0.49
1:B:96:GLU:HG2	1:B:126:ILE:HD13	1.94	0.49
1:A:371:ARG:HG2	1:A:442:LEU:HD11	1.93	0.49
2:D:491:PHE:CE1	2:D:528:PRO:HB2	2.45	0.49
1:B:162:LEU:HD22	1:B:162:LEU:O	2.11	0.49
1:B:138:THR:HB	1:B:356:VAL:HG13	1.93	0.49
2:C:491:PHE:HE1	2:C:528:PRO:HB2	1.77	0.49
6:H:4:DT:H2''	6:H:5:DA:H5'	1.95	0.49
1:B:59:TYR:HB3	1:B:120:GLU:HB3	1.93	0.49
2:C:627:GLU:N	2:C:628:PRO:CD	2.75	0.49
1:A:302:LEU:CD1	1:A:308:THR:HB	2.42	0.49
2:D:486:GLY:O	2:D:491:PHE:HD2	1.96	0.49
2:D:516:THR:HG23	2:D:622:MET:SD	2.53	0.49
2:C:524:ARG:CB	2:C:524:ARG:NH1	2.75	0.49
1:B:391:LEU:HD21	1:B:404:ASN:HB3	1.95	0.49
1:B:96:GLU:HG2	1:B:126:ILE:CD1	2.42	0.49
1:A:28:ARG:CZ	3:E:14:DA:H4'	2.43	0.48
2:C:514:ILE:HA	2:C:517:LEU:HD12	1.94	0.48
1:B:53:ASN:ND2	1:B:60:ARG:HD2	2.29	0.48
1:A:271:LYS:HE3	1:A:319:THR:CB	2.42	0.48
1:B:216:GLY:O	1:B:217:ALA:CB	2.61	0.48
1:A:190:ALA:O	1:A:194:ILE:HG13	2.13	0.48
3:E:12:DG:H2'	3:E:12:DG:O5'	2.13	0.48
1:A:146:ASP:CB	1:A:148:THR:CG2	2.61	0.48
2:D:524:ARG:NH1	2:D:525:TYR:HE1	2.11	0.48
2:C:524:ARG:C	2:C:525:TYR:HD1	2.14	0.48
1:B:256:ILE:HD13	1:B:321:LEU:HD11	1.95	0.48
1:B:201:ILE:HG12	1:B:230:GLU:CG	2.41	0.48
1:B:372:LEU:HD22	1:B:376:GLU:HG3	1.96	0.48
1:B:161:ASN:ND2	9:B:872:HOH:O	2.46	0.48
2:D:524:ARG:HH11	2:D:524:ARG:HG3	1.79	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:529:LEU:CD2	2:C:534:HIS:CB	2.90	0.48
1:B:391:LEU:HD21	1:B:404:ASN:HB2	1.95	0.48
1:B:209:PRO:HB2	1:B:482:LEU:CD1	2.44	0.48
2:C:526:MET:HE2	2:C:529:LEU:HD12	1.94	0.47
1:A:38:LYS:N	1:A:41:GLN:HE21	1.93	0.47
1:B:471:LYS:O	1:B:475:ALA:HB2	2.14	0.47
2:D:623:GLY:O	2:D:629:ARG:NH2	2.44	0.47
1:A:439:GLU:O	1:A:443:ARG:HG3	2.14	0.47
1:A:194:ILE:CD1	1:A:463:MET:HG2	2.45	0.47
2:D:462:THR:HG21	2:D:521:PHE:CD2	2.44	0.47
2:D:564:LEU:O	2:D:564:LEU:HD22	2.14	0.47
1:A:219:ILE:HB	1:A:482:LEU:HD23	1.97	0.47
1:B:167:SER:C	1:B:168:THR:CG2	2.81	0.47
1:B:129:TYR:HB3	1:B:158:ALA:HB3	1.97	0.47
1:B:157:ALA:O	1:B:353:ARG:HD3	2.15	0.47
2:C:529:LEU:HD23	2:C:534:HIS:HB2	1.97	0.47
1:B:338:ARG:O	1:B:340:VAL:HG13	2.15	0.47
4:F:3:DT:H2''	4:F:4:DC:O4'	2.15	0.47
1:A:3:ASN:O	1:A:4:ILE:CG1	2.63	0.47
2:C:627:GLU:N	2:C:628:PRO:HD2	2.30	0.47
1:A:240:SER:OG	1:A:321:LEU:CD2	2.63	0.46
2:D:427:ASN:O	2:D:498:TYR:HB3	2.15	0.46
1:B:24:ILE:CG1	1:B:28:ARG:HD2	2.46	0.46
1:A:169:GLY:HA3	1:A:176:THR:O	2.15	0.46
1:B:167:SER:O	1:B:168:THR:HG22	2.13	0.46
1:A:104:ASN:HB3	1:A:114:ALA:HB2	1.97	0.46
1:A:169:GLY:HA2	1:A:176:THR:HG22	1.92	0.46
1:A:402:LYS:HE3	1:A:413:GLU:OE1	2.16	0.46
1:A:412:THR:OG1	1:A:415:GLN:HG3	2.14	0.46
1:B:240:SER:OG	1:B:321:LEU:HD22	2.15	0.46
1:A:194:ILE:HG12	1:A:350:ILE:HD13	1.98	0.46
1:B:389:ILE:HD11	1:B:427:LEU:HD13	1.98	0.46
1:B:385:LEU:HA	1:B:385:LEU:HD23	1.60	0.46
1:B:351:ALA:O	1:B:354:ARG:HB3	2.15	0.46
1:A:132:GLN:O	1:A:133:ASP:HB2	2.15	0.46
2:D:527:ARG:N	2:D:528:PRO:CD	2.79	0.46
1:B:86:VAL:O	1:B:90:GLN:HG3	2.16	0.46
1:B:323:ILE:HD12	1:B:323:ILE:C	2.36	0.46
1:A:350:ILE:CA	1:A:463:MET:HE1	2.42	0.46
1:B:426:ARG:C	1:B:428:THR:H	2.19	0.46
1:B:414:GLU:CD	1:B:414:GLU:H	2.17	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:296:LEU:HD23	1:B:296:LEU:C	2.36	0.46
1:A:145:PHE:CD1	1:A:146:ASP:N	2.84	0.46
2:D:527:ARG:N	2:D:528:PRO:HD2	2.31	0.46
1:A:423:GLN:HE21	1:A:425:TYR:HE1	1.62	0.46
6:H:3:DC:H2''	6:H:4:DT:O4'	2.16	0.46
1:B:424:LEU:HA	1:B:424:LEU:HD23	1.76	0.46
2:C:543:TYR:HB2	2:C:558:ALA:HB3	1.99	0.45
4:F:3:DT:H2'	4:F:4:DC:C6	2.51	0.45
1:A:68:ASN:HD22	1:B:64:LYS:HG3	1.81	0.45
1:A:144:ASN:HA	9:A:807:HOH:O	2.16	0.45
2:C:533:GLY:HA3	2:C:605:ARG:HE	1.82	0.45
1:A:385:LEU:HD23	1:A:385:LEU:HA	1.69	0.45
1:B:9:LEU:HD22	2:D:614:ALA:HB1	1.98	0.45
2:D:594:THR:OG1	2:D:595:THR:HG22	2.17	0.45
6:H:11:DG:H8	6:H:11:DG:H5''	1.80	0.45
1:A:293:ARG:HB3	1:A:293:ARG:HH11	1.82	0.45
2:D:520:THR:CG2	2:D:622:MET:HG3	2.39	0.45
1:B:338:ARG:HB3	1:B:340:VAL:CG1	2.47	0.45
1:A:464:LYS:O	1:A:468:ARG:HG3	2.17	0.45
2:D:429:LEU:HA	2:D:429:LEU:HD23	1.61	0.45
1:A:343:VAL:O	1:A:347:SER:HB3	2.17	0.45
1:A:40:VAL:HG11	3:E:13:DA:H5'	1.99	0.45
1:A:350:ILE:HG23	1:A:463:MET:HE2	1.98	0.45
1:A:91:ASN:HD22	1:A:91:ASN:H	1.63	0.44
2:C:455:LEU:HD13	2:C:518:LEU:HD11	1.99	0.44
1:A:343:VAL:HG12	1:A:344:PRO:N	2.32	0.44
1:B:456:GLU:HG3	1:B:460:TYR:CE2	2.51	0.44
2:D:511:GLY:O	2:D:515:GLN:HG3	2.18	0.44
1:A:139:VAL:CG2	1:A:154:VAL:HG13	2.47	0.44
1:A:130:LEU:HD23	1:A:157:ALA:HA	1.99	0.44
1:A:379:ILE:HG23	1:A:432:VAL:CG2	2.46	0.44
1:A:434:VAL:CG1	1:A:435:LEU:N	2.80	0.44
1:A:396:GLU:O	1:A:397:ASN:HB3	2.17	0.44
1:A:409:TYR:O	1:A:410:ASP:HB2	2.16	0.44
1:B:290:GLU:HB2	1:B:297:ARG:HG2	1.99	0.44
2:D:476:ILE:HG23	2:D:521:PHE:CE2	2.53	0.44
2:C:430:TYR:CE2	2:C:502:ILE:HD12	2.52	0.44
1:B:439:GLU:O	1:B:443:ARG:HG3	2.17	0.44
1:B:201:ILE:O	1:B:205:MET:HG3	2.17	0.44
1:A:130:LEU:HD23	1:A:130:LEU:HA	1.86	0.44
1:B:405:LEU:HA	1:B:405:LEU:HD23	1.81	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:524:ARG:HB2	2:C:525:TYR:CE1	2.53	0.43
1:A:367:LYS:HZ3	1:A:367:LYS:HB3	1.82	0.43
1:A:283:GLY:HA2	1:A:303:LYS:HD2	2.00	0.43
2:D:509:THR:O	2:D:512:ALA:HB3	2.18	0.43
1:B:91:ASN:H	1:B:91:ASN:HD22	1.65	0.43
1:A:406:LYS:HE3	1:A:413:GLU:HA	1.99	0.43
1:A:340:VAL:HB	1:A:344:PRO:HG2	2.01	0.43
2:D:505:THR:HG21	2:D:514:ILE:HG22	1.99	0.43
2:C:525:TYR:O	2:C:526:MET:CG	2.64	0.43
1:A:102:HIS:HB2	1:A:120:GLU:HG3	2.00	0.43
1:A:24:ILE:HD12	1:A:28:ARG:CD	2.49	0.43
2:D:560:THR:O	2:D:563:GLU:N	2.50	0.43
2:D:459:VAL:O	2:D:517:LEU:HD13	2.19	0.43
1:A:338:ARG:HD2	1:A:340:VAL:HG12	2.00	0.43
1:A:351:ALA:O	1:A:354:ARG:HB3	2.19	0.43
2:D:431:LEU:CD2	2:D:479:MET:CE	2.95	0.43
2:C:560:THR:C	2:C:562:GLY:N	2.71	0.43
1:A:338:ARG:HD2	1:A:340:VAL:CG1	2.48	0.42
1:A:384:ILE:HB	1:A:387:GLU:HG2	2.01	0.42
1:B:239:ARG:HG3	1:B:316:PHE:CE2	2.54	0.42
1:B:24:ILE:HD11	1:B:28:ARG:NE	2.34	0.42
1:B:146:ASP:O	1:B:147:ASP:HB2	2.18	0.42
2:D:529:LEU:HD23	2:D:529:LEU:HA	1.88	0.42
2:C:524:ARG:CB	2:C:525:TYR:CE1	3.02	0.42
2:C:524:ARG:CB	2:C:525:TYR:HD1	2.28	0.42
1:B:196:HIS:N	1:B:197:PRO:HD3	2.34	0.42
1:B:208:LEU:HD23	1:B:208:LEU:HA	1.81	0.42
2:C:491:PHE:CD1	2:C:528:PRO:HG2	2.53	0.42
1:B:463:MET:HE2	1:B:463:MET:HB3	1.48	0.42
2:C:442:LYS:O	2:C:445:ARG:HD3	2.19	0.42
6:H:3:DC:H2'	6:H:4:DT:C6	2.55	0.42
1:B:373:HIS:CE1	1:B:412:THR:HG21	2.54	0.42
1:B:169:GLY:HA3	1:B:176:THR:O	2.19	0.42
2:C:431:LEU:CD1	2:C:479:MET:HE1	2.50	0.42
1:B:254:ILE:HB	1:B:300:ILE:HB	2.02	0.42
8:F:0:PDQ:H34	8:F:0:PDQ:H29B	2.02	0.42
1:B:44:ILE:HD12	1:B:88:MET:HE1	2.00	0.42
1:A:321:LEU:HD23	1:A:321:LEU:HA	1.83	0.42
1:A:467:LEU:HD23	1:A:467:LEU:HA	1.89	0.42
2:C:432:VAL:HG22	2:C:504:MET:CE	2.50	0.42
1:B:355:GLU:OE2	1:B:355:GLU:HA	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:56:ASP:N	1:A:56:ASP:OD1	2.51	0.42
2:C:431:LEU:HB3	2:C:455:LEU:HD11	2.02	0.42
1:B:91:ASN:N	1:B:91:ASN:HD22	2.18	0.42
1:B:312:LEU:HG	1:B:316:PHE:CE1	2.55	0.42
2:D:439:GLY:O	2:D:443:GLN:HG3	2.19	0.42
1:B:320:ASP:C	1:B:322:GLN:N	2.73	0.42
2:C:629:ARG:HD2	4:F:9:DA:OP1	2.20	0.41
1:B:168:THR:HA	1:B:176:THR:O	2.20	0.41
1:A:139:VAL:HG22	1:A:140:PRO:CD	2.49	0.41
1:B:162:LEU:HA	1:B:162:LEU:HD23	1.68	0.41
1:A:342:ILE:HA	1:A:342:ILE:HD12	1.50	0.41
1:A:95:ARG:HB2	1:A:180:PRO:HB3	2.01	0.41
2:D:524:ARG:NH1	2:D:524:ARG:HG3	2.34	0.41
1:B:307:ASN:HB3	1:B:310:LEU:HB2	2.02	0.41
1:B:259:ILE:HB	1:B:260:PRO:CD	2.50	0.41
1:B:194:ILE:CD1	1:B:463:MET:CE	2.76	0.41
1:B:459:MET:C	1:B:459:MET:SD	2.99	0.41
1:B:49:ASN:CG	1:B:131:LEU:HD13	2.40	0.41
1:B:7:MET:HB2	2:D:604:ILE:HG23	2.02	0.41
2:C:525:TYR:CD1	2:C:525:TYR:N	2.89	0.41
2:D:611:LEU:C	2:D:611:LEU:CD1	2.82	0.41
2:C:423:ASN:OD1	2:C:423:ASN:C	2.59	0.41
1:A:424:LEU:HD12	1:B:419:ILE:O	2.20	0.41
1:A:164:VAL:HG21	1:A:183:LEU:HD23	2.02	0.41
2:C:516:THR:HG22	2:C:517:LEU:N	2.36	0.41
1:A:44:ILE:CD1	1:A:88:MET:CE	2.99	0.41
1:A:201:ILE:N	1:A:201:ILE:HD12	2.25	0.41
1:A:64:LYS:HE3	1:B:68:ASN:ND2	2.36	0.41
1:A:240:SER:OG	1:A:321:LEU:HD23	2.21	0.41
1:B:264:ASN:OD1	1:B:266:ALA:HB3	2.20	0.41
2:D:442:LYS:O	2:D:445:ARG:HD3	2.21	0.41
1:A:201:ILE:H	1:A:201:ILE:CD1	2.23	0.41
2:C:536:TYR:HA	2:C:604:ILE:O	2.21	0.41
2:D:627:GLU:O	2:D:628:PRO:C	2.58	0.41
1:A:406:LYS:CE	1:A:413:GLU:HA	2.52	0.40
2:D:536:TYR:CD2	2:D:536:TYR:N	2.89	0.40
4:F:3:DT:H2''	4:F:4:DC:O5'	2.21	0.40
2:C:451:ALA:O	2:C:452:ILE:HD13	2.22	0.40
2:C:476:ILE:HD12	2:C:476:ILE:HG23	1.88	0.40
1:A:89:SER:HA	1:A:99:VAL:O	2.22	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	480/496 (97%)	451 (94%)	25 (5%)	4 (1%)	24	66
1	B	480/496 (97%)	446 (93%)	29 (6%)	5 (1%)	19	62
2	C	202/268 (75%)	189 (94%)	11 (5%)	2 (1%)	19	62
2	D	204/268 (76%)	189 (93%)	14 (7%)	1 (0%)	34	75
All	All	1366/1528 (89%)	1275 (93%)	79 (6%)	12 (1%)	21	65

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	217	ALA
1	B	168	THR
1	B	217	ALA
1	A	397	ASN
1	B	169	GLY
2	C	496	ALA
1	A	169	GLY
1	B	221	GLY
1	B	427	LEU
2	D	424	PRO
1	A	221	GLY
2	C	424	PRO

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	378/431 (88%)	341 (90%)	37 (10%)	10	38
1	B	376/431 (87%)	344 (92%)	32 (8%)	13	46
2	C	120/224 (54%)	104 (87%)	16 (13%)	5	22
2	D	119/224 (53%)	100 (84%)	19 (16%)	3	14
All	All	993/1310 (76%)	889 (90%)	104 (10%)	8	34

All (104) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	LEU
1	A	28	ARG
1	A	58	SER
1	A	60	ARG
1	A	91	ASN
1	A	93	LYS
1	A	97	ILE
1	A	139	VAL
1	A	147	ASP
1	A	148	THR
1	A	162	LEU
1	A	168	THR
1	A	176	THR
1	A	183	LEU
1	A	208	LEU
1	A	233	LYS
1	A	236	VAL
1	A	268	LEU
1	A	293	ARG
1	A	308	THR
1	A	321	LEU
1	A	336	THR
1	A	338	ARG
1	A	342	ILE
1	A	347	SER
1	A	366	GLU
1	A	367	LYS
1	A	371	ARG
1	A	374	ILE
1	A	380	ARG
1	A	385	LEU
1	A	414	GLU
1	A	420	VAL

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Mol	Chain	Res	Type
1	A	426	ARG
1	A	432	VAL
1	A	458	THR
1	A	462	LEU
1	B	4	ILE
1	B	24	ILE
1	B	26	GLN
1	B	28	ARG
1	B	60	ARG
1	B	91	ASN
1	B	93	LYS
1	B	116	MET
1	B	147	ASP
1	B	162	LEU
1	B	168	THR
1	B	177	ASP
1	B	183	LEU
1	B	208	LEU
1	B	262	GLU
1	B	268	LEU
1	B	293	ARG
1	B	297	ARG
1	B	308	THR
1	B	310	LEU
1	B	338	ARG
1	B	342	ILE
1	B	350	ILE
1	B	372	LEU
1	B	385	LEU
1	B	414	GLU
1	B	420	VAL
1	B	432	VAL
1	B	434	VAL
1	B	462	LEU
1	B	463	MET
1	B	469	GLU
2	C	420	GLN
2	C	429	LEU
2	C	445	ARG
2	C	456	ARG
2	C	477	ASN
2	C	499	ASP

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Mol	Chain	Res	Type
2	C	514	ILE
2	C	516	THR
2	C	520	THR
2	C	524	ARG
2	C	529	LEU
2	C	536	TYR
2	C	564	LEU
2	C	591	LEU
2	C	595	THR
2	C	605	ARG
2	D	429	LEU
2	D	435	ASP
2	D	440	SER
2	D	445	ARG
2	D	447	ARG
2	D	453	LEU
2	D	462	THR
2	D	475	GLU
2	D	478	THR
2	D	479	MET
2	D	482	THR
2	D	514	ILE
2	D	516	THR
2	D	520	THR
2	D	524	ARG
2	D	529	LEU
2	D	564	LEU
2	D	591	LEU
2	D	595	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	41	GLN
1	A	68	ASN
1	A	91	ASN
1	A	267	ASN
1	A	307	ASN
1	A	328	ASN
1	A	423	GLN
1	B	41	GLN
1	B	53	ASN

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Mol	Chain	Res	Type
1	B	68	ASN
1	B	91	ASN
1	B	132	GLN
1	B	267	ASN
1	B	313	ASN
1	B	328	ASN
1	B	404	ASN
1	B	415	GLN
2	C	477	ASN
2	D	636	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules 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 ⓘ

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
8	PDQ	F	0	-	22,29,29	4.75	10 (45%)	19,45,45	2.37	8 (42%)
8	PDQ	H	0	-	22,29,29	4.72	10 (45%)	19,45,45	3.25	6 (31%)

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
8	PDQ	F	0	-	-	0/7/23/23	0/3/4/4
8	PDQ	H	0	-	-	0/7/23/23	0/3/4/4

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	F	0	PDQ	C3-C12	-10.53	1.33	1.41
8	H	0	PDQ	C3-C12	-9.67	1.34	1.41
8	F	0	PDQ	C34-C37	-8.47	1.39	1.53
8	H	0	PDQ	C34-C37	-7.95	1.40	1.53
8	H	0	PDQ	C18-N13	-7.14	1.38	1.49
8	F	0	PDQ	C39-C37	-5.83	1.38	1.53
8	F	0	PDQ	C18-N13	-5.72	1.40	1.49
8	H	0	PDQ	C39-C37	-5.70	1.38	1.53
8	H	0	PDQ	O2-C1	-3.99	1.15	1.24
8	F	0	PDQ	O2-C1	-3.68	1.16	1.24
8	F	0	PDQ	C45-N51	-2.95	1.41	1.46
8	H	0	PDQ	C45-N51	-2.81	1.42	1.46
8	F	0	PDQ	C8-N33	2.21	1.47	1.40
8	H	0	PDQ	C8-N33	2.38	1.47	1.40
8	F	0	PDQ	C8-C6	6.96	1.51	1.39
8	H	0	PDQ	C4-C3	7.45	1.56	1.41
8	H	0	PDQ	C8-C6	7.64	1.52	1.39
8	F	0	PDQ	C4-C3	7.80	1.56	1.41
8	H	0	PDQ	C1-C3	9.44	1.57	1.41
8	F	0	PDQ	C1-C3	9.46	1.57	1.41

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	H	0	PDQ	C23-C18-N13	-10.50	107.43	118.25
8	H	0	PDQ	C20-C18-N13	-7.00	111.04	118.25
8	F	0	PDQ	C23-C18-N13	-5.93	112.14	118.25
8	F	0	PDQ	C20-C18-N13	-4.40	113.71	118.25
8	H	0	PDQ	C4-C3-C1	-3.38	118.05	122.22
8	H	0	PDQ	F7-C6-C4	-2.84	115.95	119.74
8	F	0	PDQ	F7-C6-C4	-2.59	116.28	119.74
8	F	0	PDQ	C42-C39-C37	-2.46	99.62	103.93

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	F	0	PDQ	C10-C12-C3	-2.40	117.90	120.20
8	F	0	PDQ	C4-C3-C1	-2.23	119.47	122.22
8	F	0	PDQ	C29-C10-C8	-2.15	117.03	121.47
8	H	0	PDQ	F7-C6-C8	2.04	121.13	118.32
8	H	0	PDQ	C10-C8-N33	2.30	125.03	119.91
8	F	0	PDQ	C10-C8-N33	3.10	126.81	119.91

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	F	0	PDQ	5	0
8	H	0	PDQ	6	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	482/496 (97%)	-0.43	0 100 100	9, 33, 63, 92	0
1	B	482/496 (97%)	-0.41	0 100 100	14, 34, 60, 84	0
2	C	208/268 (77%)	-0.38	0 100 100	34, 58, 80, 99	0
2	D	210/268 (78%)	-0.35	0 100 100	33, 55, 82, 91	0
3	E	7/7 (100%)	0.17	0 100 100	27, 36, 61, 94	0
4	F	11/11 (100%)	0.07	0 100 100	35, 47, 59, 85	0
5	G	7/7 (100%)	0.34	0 100 100	30, 39, 65, 96	0
6	H	11/11 (100%)	0.22	0 100 100	38, 47, 59, 86	0
All	All	1418/1564 (90%)	-0.39	0 100 100	9, 40, 75, 99	0

There are no RSRZ outliers to report.

### 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, 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	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
8	PDQ	F	0	26/26	0.96	0.33	2.82	30,42,58,59	0
8	PDQ	H	0	26/26	0.95	0.28	1.21	25,37,62,71	0
7	MG	B	700	1/1	0.82	0.20	0.06	41,41,41,41	0
7	MG	A	700	1/1	0.85	0.10	-3.66	41,41,41,41	0
7	MG	D	742	1/1	0.93	0.18	-	23,23,23,23	0
7	MG	C	742	1/1	0.98	0.15	-	33,33,33,33	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.