



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 28, 2026 – 02:28 AM UTC

PDB ID : 2QFP / pdb_00002qfp
Title : Crystal structure of red kidney bean purple acid phosphatase in complex with fluoride
Authors : Guddat, L.W.; Schenk, G.S.; Gahan, L.R.; Elliot, T.W.; Leung, E.
Deposited on : 2007-06-27
Resolution : 2.20 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

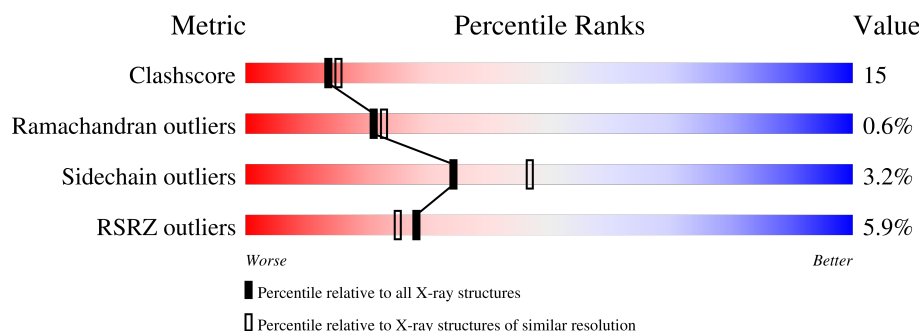
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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))
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

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 of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	424	4% 70% 27% .
1	B	424	4% 70% 26% .
1	C	424	8% 72% 25% .
1	D	424	6% 67% 30% .

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
6	NAG	B	438	X	-	-	-
6	NAG	B	439	X	-	-	-
6	NAG	C	439	X	-	-	-

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 14782 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Purple acid phosphatase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	424	Total	C	N	O	S	0	0	0
			3487	2240	603	634	10			
1	B	424	Total	C	N	O	S	0	0	0
			3487	2240	603	634	10			
1	C	424	Total	C	N	O	S	0	0	0
			3487	2240	603	634	10			
1	D	424	Total	C	N	O	S	0	0	0
			3487	2240	603	634	10			

- Molecule 2 is FE (III) ION (CCD ID: FE) (formula: Fe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Fe	0	0
			1	1		
2	B	1	Total	Fe	0	0
			1	1		
2	C	1	Total	Fe	0	0
			1	1		
2	D	1	Total	Fe	0	0
			1	1		

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		
3	B	1	Total	Zn	0	0
			1	1		
3	C	1	Total	Zn	0	0
			1	1		
3	D	1	Total	Zn	0	0
			1	1		

- Molecule 4 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

- Molecule 5 is FLUORIDE ION (CCD ID: F) (formula: F).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	F	0	0
			1	1		
5	B	1	Total	F	0	0
			1	1		
5	C	1	Total	F	0	0
			1	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	1	Total F 1 1	0	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C N O 14 8 1 5	0	0
6	A	1	Total C N O 14 8 1 5	0	0
6	A	1	Total C N O 14 8 1 5	0	0
6	A	1	Total C N O 14 8 1 5	0	0
6	B	1	Total C N O 14 8 1 5	0	0
6	B	1	Total C N O 14 8 1 5	0	0
6	B	1	Total C N O 14 8 1 5	0	0
6	B	1	Total C N O 14 8 1 5	0	0
6	C	1	Total C N O 14 8 1 5	0	0
6	C	1	Total C N O 14 8 1 5	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	C	1	Total	C	N	O	0	0
			14	8	1	5		
6	C	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		
6	D	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 7 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	3	Total	Na	0	0
			3	3		
7	B	3	Total	Na	0	0
			3	3		
7	C	3	Total	Na	0	0
			3	3		
7	D	2	Total	Na	0	0
			2	2		

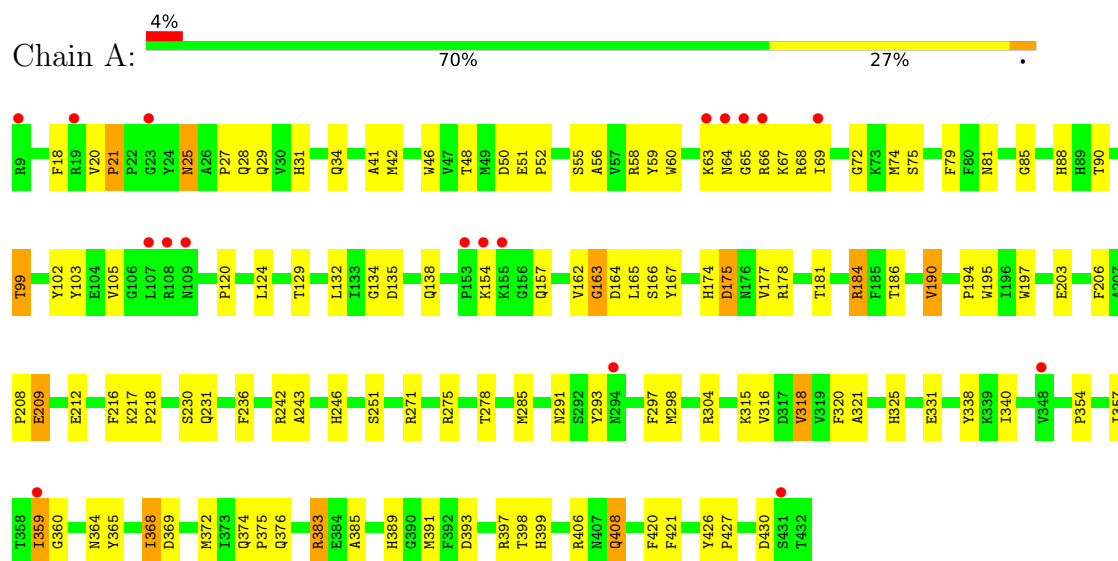
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	150	Total	O	0	0
			150	150		
8	B	168	Total	O	0	0
			168	168		
8	C	105	Total	O	0	0
			105	105		
8	D	124	Total	O	0	0
			124	124		

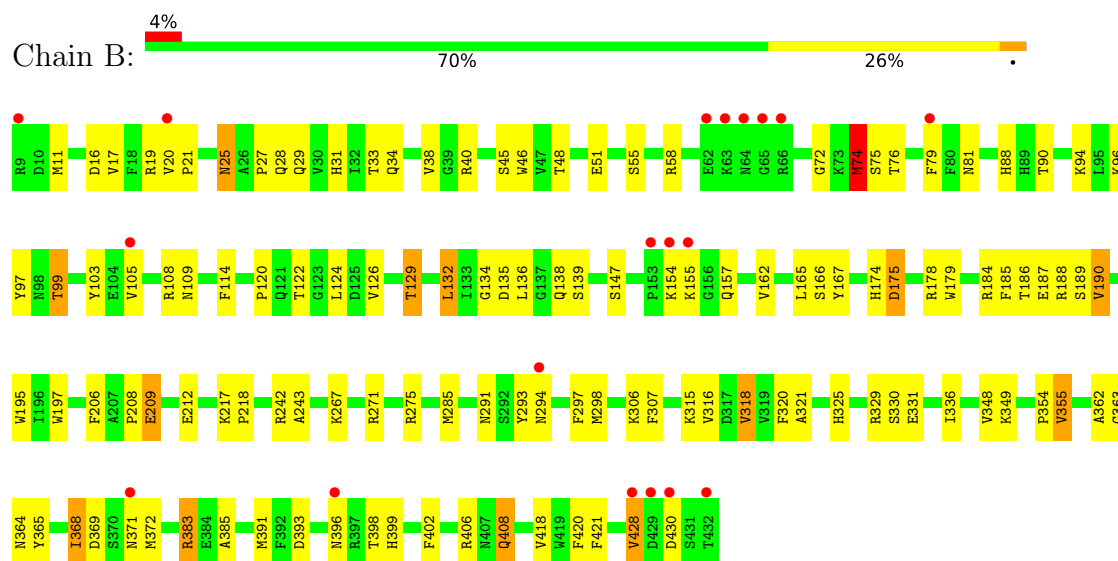
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

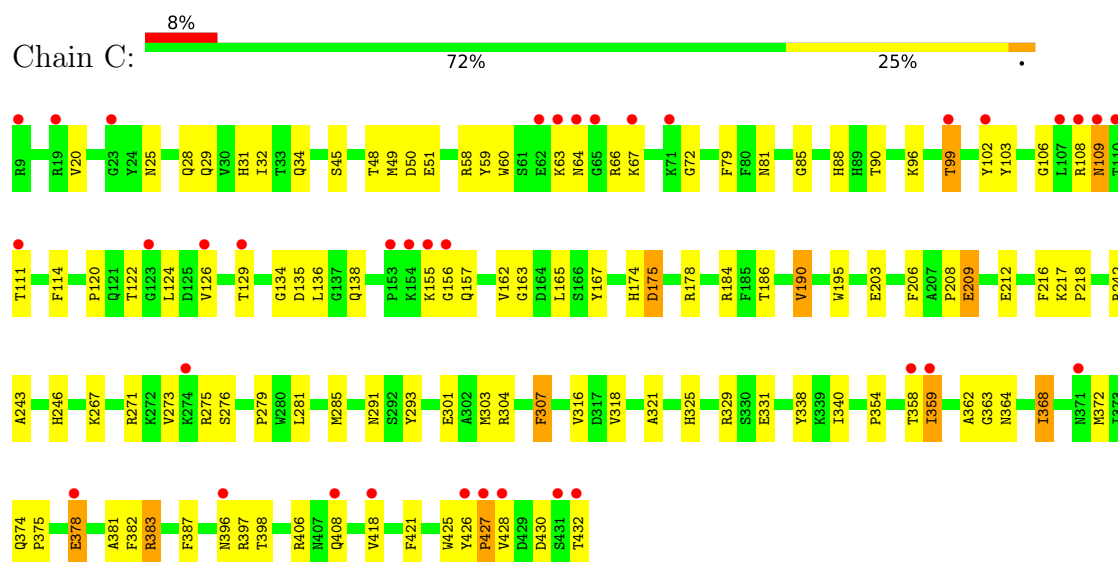
• Molecule 1: Purple acid phosphatase



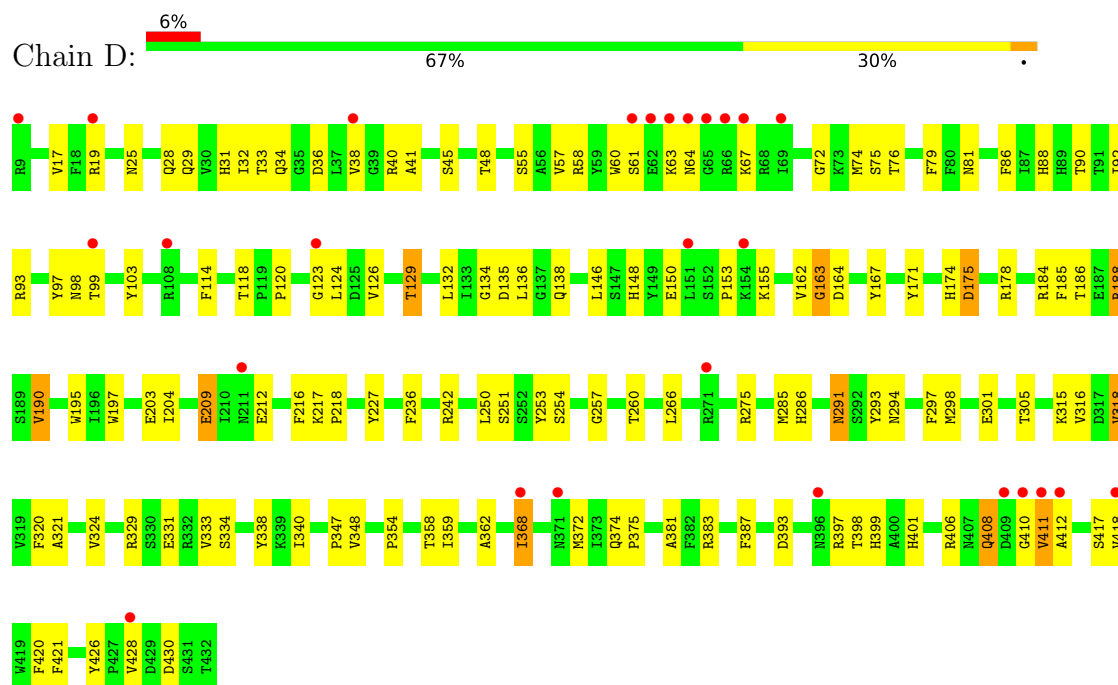
• Molecule 1: Purple acid phosphatase



• Molecule 1: Purple acid phosphatase



• Molecule 1: Purple acid phosphatase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	85.72Å 188.47Å 192.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	33.00 – 2.20 33.00 – 2.20	Depositor EDS
% Data completeness (in resolution range)	86.9 (33.00-2.20) 86.9 (33.00-2.20)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.42 (at 2.20Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.224 , 0.254 0.244 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	34.7	Xtriage
Anisotropy	0.162	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 41.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.014 for -h,l,k	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	14782	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.49% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 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: FE, SO4, ZN, NA, NAG, F

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	0/3606	0.89	10/4905 (0.2%)
1	B	0.44	1/3606 (0.0%)	0.89	11/4905 (0.2%)
1	C	0.38	0/3606	0.82	5/4905 (0.1%)
1	D	0.42	0/3606	0.84	5/4905 (0.1%)
All	All	0.42	1/14424 (0.0%)	0.86	31/19620 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	74	MET	SD-CE	-5.38	1.66	1.79

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	336	ILE	N-CA-C	7.51	119.31	112.17
1	A	163	GLY	N-CA-C	7.08	118.68	111.95
1	B	197	TRP	N-CA-C	6.53	120.14	109.76
1	A	331	GLU	N-CA-C	-6.37	101.35	110.59
1	C	81	ASN	N-CA-C	-6.36	105.80	112.93
1	A	21	PRO	CA-C-N	6.28	126.25	120.03
1	A	21	PRO	C-N-CA	6.28	126.25	120.03
1	B	166	SER	N-CA-C	6.25	120.11	112.23
1	B	179	TRP	N-CA-C	-6.25	103.77	112.45
1	C	397	ARG	N-CA-C	-6.23	105.64	113.18
1	C	163	GLY	N-CA-C	6.17	117.81	111.95
1	B	307	PHE	N-CA-C	6.16	121.72	113.72
1	D	81	ASN	N-CA-C	-6.14	105.63	112.57
1	A	177	VAL	N-CA-C	-5.99	104.51	110.62
1	A	197	TRP	N-CA-C	5.96	119.62	110.20
1	C	307	PHE	N-CA-C	5.92	120.78	113.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	306	LYS	N-CA-C	5.78	117.38	111.14
1	A	81	ASN	N-CA-C	-5.72	105.88	112.92
1	B	331	GLU	N-CA-C	-5.63	103.27	110.53
1	D	227	TYR	N-CA-C	5.48	117.25	111.28
1	D	197	TRP	N-CA-C	5.44	118.80	110.20
1	D	163	GLY	N-CA-C	5.38	118.32	112.29
1	B	21	PRO	CA-C-N	5.30	125.59	119.92
1	B	21	PRO	C-N-CA	5.30	125.59	119.92
1	A	166	SER	N-CA-C	5.26	118.85	112.23
1	B	355	VAL	N-CA-C	-5.23	100.92	108.87
1	A	85	GLY	N-CA-C	-5.20	103.40	112.55
1	A	243	ALA	CB-CA-C	-5.15	110.65	116.63
1	C	85	GLY	N-CA-C	-5.10	103.57	112.55
1	B	38	VAL	N-CA-C	5.09	119.48	113.22
1	D	254	SER	N-CA-C	-5.04	102.09	109.81

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	3487	0	3298	94	0
1	B	3487	0	3298	101	0
1	C	3487	0	3296	98	0
1	D	3487	0	3297	109	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	10	0	0	0	0
4	B	10	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	10	0	0	0	0
4	D	10	0	0	0	0
5	A	1	0	0	0	0
5	B	1	0	0	0	0
5	C	1	0	0	0	0
5	D	1	0	0	0	0
6	A	56	0	52	0	0
6	B	56	0	52	5	0
6	C	56	0	52	1	0
6	D	56	0	52	0	0
7	A	3	0	0	0	0
7	B	3	0	0	0	0
7	C	3	0	0	0	0
7	D	2	0	0	0	0
8	A	150	0	0	3	0
8	B	168	0	0	1	0
8	C	105	0	0	2	0
8	D	124	0	0	2	0
All	All	14782	0	13397	402	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 15.

All (402) 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:B:316:VAL:HG23	1:B:354:PRO:HB3	1.36	1.04
1:D:74:MET:HE1	1:D:76:THR:HG23	1.38	1.03
1:D:316:VAL:HG23	1:D:354:PRO:HB3	1.50	0.90
1:C:217:LYS:HB3	1:C:218:PRO:HD3	1.51	0.90
1:A:316:VAL:HG23	1:A:354:PRO:HB3	1.56	0.88
1:D:28:GLN:HE21	1:D:29:GLN:HE21	1.20	0.87
1:D:153:PRO:HG3	1:D:412:ALA:HB2	1.55	0.86
1:C:316:VAL:HG23	1:C:354:PRO:HB3	1.58	0.85
1:C:378:GLU:H	1:C:378:GLU:CD	1.83	0.85
1:C:291:ASN:HD21	1:C:293:TYR:HB2	1.41	0.84
1:D:217:LYS:HB3	1:D:218:PRO:HD3	1.61	0.82
1:A:129:THR:HG22	1:A:393:ASP:OD1	1.79	0.81
1:D:74:MET:HE1	1:D:76:THR:CG2	2.08	0.81
1:B:40:ARG:HH12	1:B:94:LYS:HA	1.45	0.81
1:D:411:VAL:HG12	1:D:412:ALA:H	1.45	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:217:LYS:HB3	1:A:218:PRO:HD3	1.63	0.80
1:B:17:VAL:HG21	1:B:185:PHE:HD1	1.47	0.79
1:A:368:ILE:HD12	1:A:385:ALA:HB1	1.66	0.77
1:D:74:MET:HE2	1:D:75:SER:O	1.85	0.77
1:B:217:LYS:HB3	1:B:218:PRO:HD3	1.68	0.75
1:B:316:VAL:HG23	1:B:354:PRO:CB	2.14	0.75
1:C:28:GLN:HE21	1:C:29:GLN:HE21	1.33	0.75
1:D:61:SER:HB3	1:D:64:ASN:HB3	1.69	0.75
1:A:34:GLN:NE2	1:A:242:ARG:HE	1.86	0.73
1:C:63:LYS:HG3	1:C:64:ASN:H	1.54	0.73
1:D:34:GLN:NE2	1:D:242:ARG:HE	1.87	0.73
1:A:79:PHE:O	1:A:212:GLU:OE2	2.08	0.72
1:A:63:LYS:HG3	1:A:64:ASN:H	1.54	0.72
1:B:291:ASN:HD21	1:B:293:TYR:HB2	1.54	0.72
1:D:408:GLN:H	1:D:408:GLN:HE21	1.35	0.72
1:B:97:TYR:O	1:B:99:THR:HG22	1.89	0.71
1:A:154:LYS:HG3	1:A:391:MET:HE3	1.71	0.71
1:D:162:VAL:HG21	1:D:321:ALA:HA	1.73	0.71
1:D:291:ASN:HD21	1:D:293:TYR:HB2	1.56	0.70
1:C:303:MET:HE3	1:C:307:PHE:HD2	1.57	0.70
1:A:291:ASN:HD21	1:A:293:TYR:HB2	1.57	0.70
1:C:421:PHE:CD2	1:C:430:ASP:HB3	2.27	0.70
1:D:372:MET:SD	1:D:383:ARG:HD3	2.33	0.69
1:A:368:ILE:HD13	1:A:369:ASP:N	2.08	0.68
1:B:155:LYS:HD2	1:B:155:LYS:O	1.94	0.68
1:B:129:THR:HG22	1:B:157:GLN:HE21	1.58	0.67
1:D:316:VAL:HG23	1:D:354:PRO:CB	2.25	0.67
1:D:411:VAL:HG12	1:D:412:ALA:N	2.10	0.66
1:A:297:PHE:CE2	1:A:298:MET:HE2	2.31	0.66
1:A:316:VAL:HG23	1:A:354:PRO:CB	2.24	0.66
1:B:28:GLN:NE2	1:B:184:ARG:HE	1.93	0.66
1:D:329:ARG:CZ	1:D:418:VAL:HG21	2.26	0.66
1:C:96:LYS:HB2	1:C:99:THR:HG21	1.78	0.65
1:B:33:THR:HG21	8:B:572:HOH:O	1.96	0.65
1:D:286:HIS:CE1	8:D:567:HOH:O	2.49	0.65
1:D:28:GLN:NE2	1:D:29:GLN:HE21	1.92	0.65
1:B:368:ILE:HD12	1:B:385:ALA:HB1	1.77	0.65
1:B:40:ARG:NH1	1:B:94:LYS:HA	2.12	0.65
1:B:138:GLN:NE2	1:B:178:ARG:HH11	1.96	0.64
1:D:331:GLU:HG2	1:D:381:ALA:HB2	1.78	0.64
1:D:398:THR:OG1	1:D:399:HIS:HD2	1.81	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:147:SER:OG	6:B:438:NAG:H61	1.98	0.64
1:B:398:THR:OG1	1:B:399:HIS:HD2	1.81	0.64
1:B:421:PHE:CD2	1:B:428:VAL:HG13	2.33	0.64
1:B:74:MET:HE2	1:B:75:SER:CA	2.28	0.63
1:C:28:GLN:NE2	1:C:184:ARG:HE	1.96	0.63
1:C:316:VAL:O	1:C:354:PRO:HB3	1.98	0.63
1:C:316:VAL:HG23	1:C:354:PRO:CB	2.28	0.63
1:B:174:HIS:O	1:B:175:ASP:C	2.42	0.63
1:A:162:VAL:HG21	1:A:321:ALA:HA	1.81	0.63
1:B:129:THR:CG2	1:B:157:GLN:HE21	2.11	0.63
1:B:79:PHE:O	1:B:212:GLU:OE2	2.16	0.62
1:A:162:VAL:HG21	1:A:321:ALA:CA	2.29	0.62
1:B:17:VAL:HG21	1:B:185:PHE:CD1	2.33	0.62
1:D:79:PHE:O	1:D:212:GLU:OE2	2.16	0.62
1:D:33:THR:HG21	8:D:552:HOH:O	1.99	0.62
1:A:368:ILE:HD13	1:A:369:ASP:H	1.65	0.61
1:C:129:THR:H	1:C:157:GLN:HE21	1.46	0.61
1:C:60:TRP:HB3	1:C:67:LYS:HA	1.81	0.61
1:A:28:GLN:HE21	1:A:29:GLN:HE21	1.47	0.61
1:B:17:VAL:CG2	1:B:185:PHE:HD1	2.13	0.61
1:D:162:VAL:HG21	1:D:321:ALA:CA	2.30	0.61
1:A:275:ARG:NH2	1:A:315:LYS:O	2.30	0.61
1:B:297:PHE:CE2	1:B:298:MET:HE2	2.35	0.61
1:A:271:ARG:HG3	1:A:271:ARG:HH11	1.66	0.60
1:C:359:ILE:HD13	1:C:359:ILE:N	2.16	0.60
1:B:267:LYS:HE2	1:B:271:ARG:NH2	2.15	0.60
1:B:74:MET:HE2	1:B:75:SER:N	2.17	0.60
1:D:25:ASN:HD21	1:D:48:THR:HB	1.67	0.60
1:C:79:PHE:O	1:C:212:GLU:OE2	2.19	0.60
1:C:174:HIS:O	1:C:175:ASP:C	2.45	0.60
1:A:316:VAL:O	1:A:354:PRO:HB3	2.02	0.59
1:C:358:THR:HG21	8:C:455:HOH:O	2.02	0.59
1:A:138:GLN:NE2	1:A:178:ARG:HH11	1.99	0.59
1:D:421:PHE:CD2	1:D:430:ASP:HB3	2.37	0.59
1:A:42:MET:HE1	1:A:194:PRO:HD3	1.83	0.59
1:C:25:ASN:ND2	1:C:48:THR:HB	2.18	0.58
1:D:74:MET:HE3	1:D:86:PHE:HB3	1.85	0.58
1:C:217:LYS:HB3	1:C:218:PRO:CD	2.31	0.58
1:B:74:MET:CE	1:B:76:THR:HG23	2.33	0.58
1:C:25:ASN:ND2	1:C:51:GLU:H	2.02	0.58
1:C:108:ARG:C	1:C:109:ASN:HD22	2.11	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:17:VAL:HG21	1:D:185:PHE:HD1	1.68	0.58
1:A:359:ILE:HD13	1:A:359:ILE:N	2.19	0.58
1:D:63:LYS:HG3	1:D:64:ASN:H	1.69	0.58
1:D:174:HIS:O	1:D:175:ASP:C	2.47	0.58
1:D:97:TYR:O	1:D:99:THR:HG23	2.04	0.57
1:D:401:HIS:HE2	1:D:417:SER:HG	1.50	0.57
1:B:162:VAL:HG21	1:B:321:ALA:HA	1.86	0.57
1:A:138:GLN:HE21	1:A:178:ARG:HH11	1.53	0.57
1:B:72:GLY:HA3	1:B:90:THR:OG1	2.04	0.57
1:A:135:ASP:HB3	1:A:167:TYR:OH	2.04	0.57
1:A:357:ILE:HG22	1:A:359:ILE:CD1	2.35	0.57
1:A:398:THR:OG1	1:A:399:HIS:HD2	1.88	0.57
1:C:34:GLN:NE2	1:C:242:ARG:HE	2.02	0.57
1:A:421:PHE:CD2	1:A:430:ASP:HB3	2.40	0.57
1:C:398:THR:HB	1:C:426:TYR:HB2	1.86	0.57
1:D:136:LEU:HA	1:D:362:ALA:HB3	1.87	0.57
1:A:132:LEU:HD11	1:A:320:PHE:CZ	2.40	0.56
1:A:372:MET:SD	1:A:383:ARG:HD3	2.45	0.56
1:D:153:PRO:HG3	1:D:412:ALA:CB	2.34	0.56
1:C:25:ASN:HD21	1:C:48:THR:HB	1.71	0.56
1:A:29:GLN:O	1:A:31:HIS:HD2	1.88	0.56
1:A:174:HIS:O	1:A:175:ASP:C	2.48	0.56
1:B:421:PHE:CD2	1:B:430:ASP:HB3	2.40	0.56
1:A:34:GLN:HE21	1:A:242:ARG:HE	1.51	0.56
1:C:267:LYS:HE2	1:C:271:ARG:HH22	1.71	0.56
1:D:38:VAL:HG23	1:D:40:ARG:HG2	1.87	0.56
1:D:138:GLN:NE2	1:D:178:ARG:HH11	2.02	0.56
1:C:275:ARG:NH1	1:C:281:LEU:HB2	2.21	0.55
1:A:25:ASN:ND2	1:A:51:GLU:H	2.05	0.55
1:B:372:MET:SD	1:B:383:ARG:HD3	2.47	0.55
1:B:34:GLN:NE2	1:B:242:ARG:HE	2.03	0.55
1:C:134:GLY:HA3	1:C:162:VAL:HG12	1.89	0.55
1:D:25:ASN:ND2	1:D:48:THR:HB	2.21	0.55
1:D:134:GLY:CA	1:D:162:VAL:HG12	2.37	0.55
1:B:135:ASP:HB3	1:B:167:TYR:OH	2.07	0.55
1:D:333:VAL:HG12	1:D:334:SER:N	2.22	0.55
1:B:122:THR:HA	1:B:243:ALA:O	2.06	0.55
1:C:209:GLU:CD	1:C:209:GLU:H	2.14	0.55
1:C:129:THR:HG23	1:C:156:GLY:HA2	1.89	0.55
1:D:186:THR:O	1:D:190:VAL:HG23	2.06	0.55
1:A:124:LEU:HG	1:A:397:ARG:HD3	1.88	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:406:ARG:HB3	1:B:408:GLN:OE1	2.07	0.55
1:C:72:GLY:HA3	1:C:90:THR:OG1	2.07	0.54
1:D:72:GLY:HA3	1:D:90:THR:OG1	2.08	0.54
1:C:291:ASN:ND2	1:C:293:TYR:H	2.05	0.54
1:D:134:GLY:HA3	1:D:162:VAL:HG12	1.90	0.54
1:C:421:PHE:CD2	1:C:428:VAL:HG23	2.43	0.54
1:B:190:VAL:HG22	1:B:195:TRP:CE2	2.43	0.53
1:C:136:LEU:HA	1:C:362:ALA:HB3	1.89	0.53
1:C:186:THR:O	1:C:190:VAL:HG23	2.08	0.53
1:B:33:THR:HG23	1:B:195:TRP:O	2.08	0.53
1:C:129:THR:HG22	1:C:157:GLN:HE21	1.72	0.53
1:D:74:MET:HE2	1:D:75:SER:C	2.33	0.53
1:B:325:HIS:O	1:B:368:ILE:HD13	2.08	0.53
1:C:329:ARG:NE	1:C:418:VAL:HG21	2.23	0.53
1:C:426:TYR:N	1:C:427:PRO:HD3	2.22	0.53
1:C:303:MET:HE3	1:C:307:PHE:CD2	2.42	0.53
1:C:406:ARG:HB3	1:C:408:GLN:OE1	2.09	0.53
1:A:291:ASN:ND2	1:A:293:TYR:H	2.06	0.53
1:C:109:ASN:HD22	1:C:109:ASN:N	2.06	0.53
1:D:146:LEU:O	1:D:150:GLU:HG3	2.08	0.53
1:A:25:ASN:ND2	1:A:48:THR:HB	2.23	0.53
1:A:318:VAL:HG22	1:A:420:PHE:CE2	2.44	0.52
1:D:150:GLU:OE2	1:D:188:ARG:HD2	2.09	0.52
1:B:17:VAL:HG22	1:B:185:PHE:HA	1.92	0.52
1:B:25:ASN:ND2	1:B:51:GLU:H	2.08	0.52
1:B:28:GLN:HE22	1:B:184:ARG:HH21	1.57	0.52
1:B:329:ARG:NE	1:B:418:VAL:HG21	2.24	0.52
1:D:162:VAL:CG2	1:D:321:ALA:HA	2.40	0.52
1:A:165:LEU:HD12	1:A:165:LEU:N	2.25	0.52
1:D:60:TRP:HB3	1:D:67:LYS:HA	1.92	0.52
1:D:74:MET:HE3	1:D:86:PHE:CB	2.39	0.52
1:B:55:SER:OG	1:B:88:HIS:HD2	1.92	0.51
1:A:357:ILE:HG22	1:A:359:ILE:HD12	1.93	0.51
1:D:36:ASP:HB3	1:D:41:ALA:HB3	1.93	0.51
1:A:63:LYS:HE2	1:A:99:THR:HB	1.91	0.51
1:D:203:GLU:O	1:D:216:PHE:HA	2.10	0.51
1:D:333:VAL:HG13	1:D:348:VAL:O	2.10	0.51
1:A:120:PRO:HD3	8:A:582:HOH:O	2.10	0.51
1:B:330:SER:O	1:B:355:VAL:HG13	2.11	0.51
1:D:17:VAL:CG2	1:D:185:PHE:HD1	2.23	0.51
1:A:18:PHE:O	1:A:184:ARG:NH1	2.44	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:134:GLY:HA3	1:A:162:VAL:HG12	1.93	0.51
1:A:27:PRO:HG2	1:A:105:VAL:HG12	1.92	0.51
1:A:389:HIS:HD2	8:A:458:HOH:O	1.93	0.50
1:C:129:THR:CG2	1:C:157:GLN:HG3	2.40	0.50
1:D:34:GLN:HE21	1:D:242:ARG:HH21	1.59	0.50
1:D:359:ILE:O	1:D:359:ILE:HG13	2.09	0.50
1:C:338:TYR:CZ	1:C:340:ILE:HA	2.46	0.50
1:C:28:GLN:HE22	1:C:184:ARG:HE	1.60	0.50
1:B:294:ASN:HD22	1:B:371:ASN:CG	2.19	0.50
1:C:329:ARG:HH21	1:C:432:THR:HG21	1.76	0.50
1:B:74:MET:HE1	1:B:76:THR:HG23	1.93	0.50
1:C:325:HIS:O	1:C:368:ILE:HD13	2.11	0.50
1:D:148:HIS:CE1	1:D:410:GLY:HA2	2.47	0.50
1:D:33:THR:HG23	1:D:195:TRP:O	2.12	0.50
1:D:132:LEU:HD11	1:D:320:PHE:CZ	2.47	0.49
1:D:368:ILE:HG12	1:D:387:PHE:CZ	2.47	0.49
1:A:162:VAL:CG2	1:A:321:ALA:HA	2.41	0.49
1:B:27:PRO:HG2	1:B:105:VAL:HG12	1.94	0.49
1:D:410:GLY:C	1:D:411:VAL:HG23	2.37	0.49
1:A:162:VAL:HG21	1:A:321:ALA:C	2.37	0.49
1:A:203:GLU:O	1:A:216:PHE:HA	2.13	0.49
1:B:109:ASN:HD22	6:B:440:NAG:C7	2.25	0.49
1:C:31:HIS:CE1	1:C:45:SER:HB2	2.48	0.49
1:C:120:PRO:HG2	1:C:126:VAL:HG11	1.94	0.49
1:C:162:VAL:HG21	1:C:321:ALA:HA	1.93	0.49
1:C:425:TRP:C	1:C:427:PRO:HD3	2.36	0.49
1:B:275:ARG:NH2	1:B:315:LYS:O	2.35	0.49
1:B:27:PRO:CG	1:B:105:VAL:HG12	2.43	0.49
1:B:108:ARG:CB	6:B:440:NAG:H62	2.43	0.49
1:C:374:GLN:HG3	1:C:375:PRO:HA	1.94	0.49
1:A:316:VAL:CG2	1:A:354:PRO:HG3	2.43	0.48
1:C:103:TYR:CZ	1:C:114:PHE:HB2	2.48	0.48
1:D:17:VAL:HG21	1:D:185:PHE:CD1	2.47	0.48
1:C:59:TYR:HA	1:C:102:TYR:O	2.14	0.48
1:D:338:TYR:CZ	1:D:340:ILE:HA	2.47	0.48
1:A:163:GLY:O	1:A:164:ASP:HB2	2.13	0.48
1:C:363:GLY:O	1:C:364:ASN:C	2.55	0.48
1:A:190:VAL:HG13	1:A:195:TRP:CD1	2.48	0.48
1:B:33:THR:HG22	1:B:34:GLN:N	2.28	0.48
1:B:46:TRP:CE2	1:B:105:VAL:HG13	2.48	0.48
1:B:129:THR:HG22	1:B:157:GLN:NE2	2.24	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:364:ASN:OD1	1:B:365:TYR:N	2.45	0.48
1:C:281:LEU:CD2	1:C:316:VAL:HG12	2.43	0.48
1:C:25:ASN:HD22	1:C:50:ASP:H	1.60	0.48
1:B:96:LYS:HB2	1:B:99:THR:HG21	1.96	0.48
1:C:359:ILE:HD13	1:C:359:ILE:H	1.77	0.48
1:D:190:VAL:HG13	1:D:195:TRP:CD1	2.48	0.48
1:B:25:ASN:HD21	1:B:51:GLU:H	1.61	0.48
1:B:129:THR:HB	1:B:393:ASP:OD1	2.14	0.48
1:B:132:LEU:HD13	1:B:320:PHE:CE1	2.48	0.47
1:C:124:LEU:HD13	1:C:276:SER:O	2.14	0.47
1:A:21:PRO:HG2	8:A:524:HOH:O	2.13	0.47
1:C:190:VAL:HG13	1:C:195:TRP:CG	2.49	0.47
1:C:203:GLU:O	1:C:216:PHE:HA	2.14	0.47
1:D:74:MET:HE3	1:D:86:PHE:HA	1.97	0.47
1:B:28:GLN:NE2	1:B:184:ARG:NE	2.62	0.47
1:A:46:TRP:CE2	1:A:105:VAL:HG13	2.49	0.47
1:C:32:ILE:HG12	1:C:190:VAL:O	2.14	0.47
1:C:45:SER:HA	1:C:88:HIS:O	2.14	0.47
1:C:135:ASP:HB3	1:C:167:TYR:OH	2.15	0.47
1:D:34:GLN:HE22	1:D:242:ARG:HE	1.61	0.47
1:A:406:ARG:HB3	1:A:408:GLN:OE1	2.15	0.47
1:B:368:ILE:HD13	1:B:369:ASP:N	2.29	0.47
1:C:109:ASN:N	1:C:109:ASN:ND2	2.63	0.47
1:A:66:ARG:HH11	1:A:66:ARG:HG2	1.80	0.47
1:B:74:MET:HE3	1:B:76:THR:HG23	1.96	0.47
1:B:162:VAL:HG21	1:B:321:ALA:CA	2.44	0.47
1:D:58:ARG:O	1:D:103:TYR:HA	2.15	0.47
1:D:204:ILE:HD11	1:D:253:TYR:CG	2.50	0.47
1:D:333:VAL:HG11	1:D:347:PRO:HB3	1.96	0.47
1:A:129:THR:HG23	1:A:157:GLN:HE21	1.80	0.47
1:A:190:VAL:HG22	1:A:195:TRP:CE2	2.50	0.47
1:B:209:GLU:H	1:B:209:GLU:CD	2.21	0.47
1:C:206:PHE:CZ	1:C:208:PRO:HG3	2.49	0.47
1:C:58:ARG:O	1:C:103:TYR:HA	2.14	0.46
1:A:27:PRO:CG	1:A:105:VAL:HG12	2.45	0.46
1:A:162:VAL:O	1:A:162:VAL:HG22	2.15	0.46
1:B:33:THR:HG22	1:B:34:GLN:H	1.81	0.46
1:D:411:VAL:CG1	1:D:412:ALA:H	2.13	0.46
1:A:374:GLN:HE21	1:A:375:PRO:HA	1.80	0.46
1:C:124:LEU:HD12	1:C:279:PRO:HD3	1.97	0.46
1:D:103:TYR:CE1	1:D:114:PHE:HB2	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:325:HIS:HA	1:A:360:GLY:O	2.16	0.46
1:D:135:ASP:HB3	1:D:167:TYR:OH	2.15	0.46
1:D:103:TYR:CZ	1:D:114:PHE:HB2	2.50	0.45
1:D:275:ARG:NH2	1:D:315:LYS:O	2.39	0.45
1:B:74:MET:HE2	1:B:75:SER:HA	1.97	0.45
1:B:285:MET:O	1:B:321:ALA:HA	2.15	0.45
1:C:372:MET:SD	1:C:383:ARG:HD3	2.56	0.45
1:A:25:ASN:HD21	1:A:48:THR:HB	1.80	0.45
1:B:291:ASN:ND2	1:B:293:TYR:H	2.14	0.45
1:D:217:LYS:HB3	1:D:218:PRO:CD	2.38	0.45
1:C:134:GLY:CA	1:C:162:VAL:HG12	2.46	0.45
1:A:25:ASN:HD21	1:A:51:GLU:H	1.64	0.45
1:A:55:SER:OG	1:A:88:HIS:HD2	2.00	0.45
1:D:209:GLU:CD	1:D:209:GLU:H	2.23	0.45
1:D:406:ARG:HB3	1:D:408:GLN:NE2	2.31	0.45
1:A:184:ARG:HH11	1:A:184:ARG:HB2	1.82	0.45
1:B:129:THR:H	1:B:157:GLN:HE21	1.65	0.45
1:B:154:LYS:NZ	1:B:391:MET:HG3	2.32	0.45
1:A:60:TRP:HB3	1:A:67:LYS:HA	1.99	0.45
1:D:32:ILE:HG12	1:D:190:VAL:O	2.16	0.45
1:A:72:GLY:HA3	1:A:90:THR:OG1	2.16	0.45
1:A:134:GLY:CA	1:A:162:VAL:HG12	2.47	0.45
1:D:120:PRO:HG2	1:D:126:VAL:HG11	1.98	0.45
1:D:324:VAL:HB	1:D:358:THR:HG21	1.99	0.45
1:C:34:GLN:HE21	1:C:242:ARG:HE	1.65	0.44
1:C:368:ILE:HG12	1:C:387:PHE:CZ	2.52	0.44
1:C:396:ASN:CG	6:C:439:NAG:N2	2.75	0.44
1:D:333:VAL:HG11	1:D:347:PRO:CB	2.48	0.44
1:A:66:ARG:NH1	1:A:68:ARG:HG2	2.32	0.44
1:A:209:GLU:CD	1:A:209:GLU:H	2.25	0.44
1:B:109:ASN:ND2	6:B:440:NAG:C7	2.80	0.44
1:C:162:VAL:HG21	1:C:321:ALA:CA	2.47	0.44
1:B:25:ASN:ND2	1:B:48:THR:HB	2.32	0.44
1:C:285:MET:CE	1:C:303:MET:HE2	2.48	0.44
1:C:329:ARG:HB3	1:C:329:ARG:HH11	1.83	0.44
1:B:206:PHE:CZ	1:B:208:PRO:HG3	2.51	0.44
1:C:301:GLU:OE1	1:C:304:ARG:NH1	2.51	0.44
1:A:60:TRP:CE3	1:A:67:LYS:HG2	2.52	0.44
1:C:28:GLN:NE2	1:C:29:GLN:HE21	2.10	0.44
1:A:285:MET:O	1:A:321:ALA:HA	2.17	0.44
1:D:55:SER:OG	1:D:88:HIS:HD2	2.01	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:301:GLU:O	1:D:305:THR:HG23	2.17	0.44
1:B:134:GLY:CA	1:B:162:VAL:HG12	2.48	0.43
1:B:190:VAL:HG13	1:B:195:TRP:CG	2.53	0.43
1:B:294:ASN:ND2	1:B:371:ASN:CG	2.76	0.43
1:A:230:SER:O	1:A:231:GLN:HB2	2.18	0.43
1:D:257:GLY:O	1:D:260:THR:HG23	2.18	0.43
1:D:28:GLN:NE2	1:D:184:ARG:HE	2.16	0.43
1:B:162:VAL:HG22	1:B:162:VAL:O	2.18	0.43
1:C:122:THR:HA	1:C:243:ALA:O	2.18	0.43
1:B:187:GLU:O	1:B:189:SER:N	2.51	0.43
1:C:138:GLN:NE2	1:C:178:ARG:HH11	2.17	0.43
1:D:136:LEU:HA	1:D:362:ALA:CB	2.49	0.43
1:D:163:GLY:O	1:D:164:ASP:HB2	2.18	0.43
1:B:28:GLN:HG3	1:B:29:GLN:HG3	2.01	0.43
1:B:316:VAL:O	1:B:354:PRO:HB3	2.18	0.43
1:D:93:ARG:HB3	1:D:93:ARG:NH1	2.33	0.43
1:A:374:GLN:HG3	1:A:375:PRO:HA	2.00	0.43
1:C:106:GLY:O	1:C:111:THR:HG22	2.18	0.43
1:B:136:LEU:HA	1:B:362:ALA:HB3	2.01	0.43
1:B:187:GLU:C	1:B:189:SER:N	2.76	0.43
1:B:391:MET:O	1:B:402:PHE:HA	2.19	0.43
1:D:19:ARG:HG2	1:D:19:ARG:HH11	1.84	0.43
1:D:124:LEU:HD23	1:D:397:ARG:CZ	2.49	0.43
1:D:190:VAL:HG13	1:D:195:TRP:CG	2.53	0.43
1:A:364:ASN:OD1	1:A:365:TYR:N	2.52	0.43
1:D:236:PHE:O	1:D:251:SER:HB2	2.19	0.43
1:C:329:ARG:CZ	1:C:418:VAL:HG21	2.49	0.42
1:C:331:GLU:HG2	1:C:381:ALA:HB2	2.01	0.42
1:D:57:VAL:HG11	1:D:92:ILE:HD11	2.00	0.42
1:B:318:VAL:HG22	1:B:420:PHE:CE2	2.55	0.42
1:A:186:THR:O	1:A:190:VAL:HG23	2.18	0.42
1:D:61:SER:HB3	1:D:64:ASN:CB	2.42	0.42
1:D:318:VAL:HG22	1:D:420:PHE:CE2	2.55	0.42
1:A:56:ALA:HB1	1:A:69:ILE:HD11	2.01	0.42
1:A:74:MET:SD	1:A:75:SER:N	2.93	0.42
1:C:120:PRO:HD3	8:C:525:HOH:O	2.18	0.42
1:A:376:GLN:NE2	1:A:383:ARG:HG2	2.35	0.42
1:A:58:ARG:O	1:A:103:TYR:HA	2.19	0.42
1:B:186:THR:O	1:B:190:VAL:HG23	2.19	0.42
1:C:60:TRP:CE3	1:C:67:LYS:HG2	2.55	0.42
1:C:64:ASN:C	1:C:66:ARG:H	2.28	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:421:PHE:HB3	1:D:426:TYR:O	2.20	0.42
1:A:190:VAL:HG13	1:A:195:TRP:CG	2.55	0.42
1:C:165:LEU:HD12	1:C:165:LEU:N	2.35	0.42
1:C:329:ARG:HH12	1:C:382:PHE:CB	2.33	0.42
1:A:206:PHE:CZ	1:A:208:PRO:HG3	2.55	0.42
1:B:11:MET:HE2	1:B:139:SER:O	2.20	0.42
1:B:103:TYR:CZ	1:B:114:PHE:HB2	2.55	0.42
1:B:363:GLY:O	1:B:364:ASN:C	2.63	0.42
1:D:31:HIS:CE1	1:D:45:SER:HB2	2.55	0.42
1:D:171:TYR:CE1	1:D:178:ARG:HG3	2.55	0.42
1:D:250:LEU:HD21	1:D:266:LEU:HD13	2.01	0.42
1:A:208:PRO:HD2	1:A:209:GLU:OE2	2.20	0.41
1:D:285:MET:O	1:D:321:ALA:HA	2.19	0.41
1:B:16:ASP:O	1:B:19:ARG:HB2	2.20	0.41
1:B:165:LEU:HD12	1:B:165:LEU:N	2.35	0.41
1:C:329:ARG:HB3	1:C:329:ARG:NH1	2.36	0.41
1:A:59:TYR:HA	1:A:102:TYR:O	2.20	0.41
1:C:63:LYS:HG3	1:C:64:ASN:N	2.30	0.41
1:C:136:LEU:HA	1:C:362:ALA:CB	2.50	0.41
1:D:29:GLN:O	1:D:31:HIS:HD2	2.02	0.41
1:A:25:ASN:HD22	1:A:50:ASP:H	1.69	0.41
1:A:41:ALA:O	1:A:42:MET:HG2	2.20	0.41
1:A:46:TRP:CG	1:A:105:VAL:HG11	2.56	0.41
1:A:51:GLU:HB2	1:A:52:PRO:HD2	2.02	0.41
1:A:132:LEU:HD13	1:A:320:PHE:CE1	2.55	0.41
1:B:120:PRO:HG2	1:B:126:VAL:HG11	2.03	0.41
1:B:134:GLY:HA3	1:B:162:VAL:HG12	2.02	0.41
1:D:291:ASN:ND2	1:D:293:TYR:H	2.18	0.41
1:A:18:PHE:CD1	1:A:181:THR:HB	2.56	0.41
1:B:34:GLN:HE21	1:B:242:ARG:HE	1.66	0.41
1:C:267:LYS:HE2	1:C:271:ARG:NH2	2.35	0.41
1:D:98:ASN:HA	1:D:118:THR:O	2.21	0.41
1:A:426:TYR:N	1:A:427:PRO:HD3	2.35	0.41
1:B:58:ARG:O	1:B:103:TYR:HA	2.21	0.41
1:A:338:TYR:CZ	1:A:340:ILE:HA	2.56	0.41
1:B:74:MET:CE	1:B:75:SER:C	2.94	0.41
1:B:187:GLU:C	1:B:189:SER:H	2.29	0.41
1:C:60:TRP:CD2	1:C:67:LYS:HG2	2.56	0.41
1:C:242:ARG:O	1:C:243:ALA:HB3	2.21	0.41
1:C:285:MET:O	1:C:321:ALA:HA	2.21	0.41
1:D:74:MET:HE3	1:D:86:PHE:CA	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:129:THR:HB	1:D:393:ASP:OD1	2.21	0.41
1:D:178:ARG:HD3	1:D:178:ARG:HA	1.96	0.41
1:D:316:VAL:HG23	1:D:354:PRO:CG	2.50	0.41
1:D:316:VAL:O	1:D:354:PRO:HB3	2.21	0.41
1:B:28:GLN:HE21	1:B:29:GLN:HE21	1.67	0.41
1:B:81:ASN:ND2	6:B:437:NAG:C7	2.83	0.41
1:C:246:HIS:CE1	1:C:273:VAL:HG22	2.56	0.41
1:A:236:PHE:O	1:A:251:SER:HB2	2.21	0.40
1:C:129:THR:HG22	1:C:157:GLN:HG3	2.02	0.40
1:A:246:HIS:HB2	1:A:278:THR:OG1	2.20	0.40
1:C:190:VAL:HG13	1:C:195:TRP:CD1	2.56	0.40
1:C:275:ARG:HH12	1:C:281:LEU:H	1.69	0.40
1:B:138:GLN:HE21	1:B:178:ARG:HH11	1.67	0.40
1:D:374:GLN:HG3	1:D:375:PRO:HA	2.03	0.40
1:B:31:HIS:CE1	1:B:45:SER:HB2	2.57	0.40
1:B:348:VAL:HG22	1:B:349:LYS:N	2.37	0.40
1:D:123:GLY:HA3	1:D:126:VAL:HG23	2.03	0.40
1:D:297:PHE:CE2	1:D:298:MET:HE2	2.56	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	422/424 (100%)	396 (94%)	24 (6%)	2 (0%)	24	27
1	B	422/424 (100%)	395 (94%)	25 (6%)	2 (0%)	24	27
1	C	422/424 (100%)	391 (93%)	28 (7%)	3 (1%)	18	19
1	D	422/424 (100%)	392 (93%)	27 (6%)	3 (1%)	18	19
All	All	1688/1696 (100%)	1574 (93%)	104 (6%)	10 (1%)	21	23

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	175	ASP
1	B	175	ASP
1	D	175	ASP
1	D	411	VAL
1	C	155	LYS
1	C	175	ASP
1	A	65	GLY
1	B	188	ARG
1	D	155	LYS
1	C	427	PRO

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	372/373 (100%)	360 (97%)	12 (3%)	34	47
1	B	372/373 (100%)	357 (96%)	15 (4%)	28	38
1	C	372/373 (100%)	361 (97%)	11 (3%)	36	49
1	D	372/373 (100%)	362 (97%)	10 (3%)	39	53
All	All	1488/1492 (100%)	1440 (97%)	48 (3%)	34	47

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	VAL
1	A	25	ASN
1	A	99	THR
1	A	184	ARG
1	A	190	VAL
1	A	209	GLU
1	A	304	ARG
1	A	318	VAL
1	A	359	ILE
1	A	368	ILE
1	A	383	ARG
1	A	408	GLN

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Mol	Chain	Res	Type
1	B	20	VAL
1	B	25	ASN
1	B	74	MET
1	B	99	THR
1	B	124	LEU
1	B	129	THR
1	B	132	LEU
1	B	190	VAL
1	B	209	GLU
1	B	318	VAL
1	B	368	ILE
1	B	383	ARG
1	B	396	ASN
1	B	408	GLN
1	B	428	VAL
1	C	20	VAL
1	C	49	MET
1	C	99	THR
1	C	109	ASN
1	C	190	VAL
1	C	209	GLU
1	C	318	VAL
1	C	359	ILE
1	C	368	ILE
1	C	378	GLU
1	C	383	ARG
1	D	129	THR
1	D	188	ARG
1	D	190	VAL
1	D	209	GLU
1	D	291	ASN
1	D	294	ASN
1	D	318	VAL
1	D	368	ILE
1	D	408	GLN
1	D	428	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (62) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	25	ASN
1	A	28	GLN

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Mol	Chain	Res	Type
1	A	31	HIS
1	A	34	GLN
1	A	64	ASN
1	A	88	HIS
1	A	138	GLN
1	A	157	GLN
1	A	176	ASN
1	A	291	ASN
1	A	335	ASN
1	A	371	ASN
1	A	374	GLN
1	A	376	GLN
1	A	389	HIS
1	A	399	HIS
1	A	405	ASN
1	A	424	HIS
1	B	25	ASN
1	B	28	GLN
1	B	34	GLN
1	B	64	ASN
1	B	88	HIS
1	B	138	GLN
1	B	157	GLN
1	B	193	GLN
1	B	211	ASN
1	B	291	ASN
1	B	294	ASN
1	B	376	GLN
1	B	399	HIS
1	B	424	HIS
1	C	25	ASN
1	C	28	GLN
1	C	34	GLN
1	C	64	ASN
1	C	88	HIS
1	C	121	GLN
1	C	138	GLN
1	C	157	GLN
1	C	173	ASN
1	C	211	ASN
1	C	246	HIS
1	C	291	ASN

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Mol	Chain	Res	Type
1	C	294	ASN
1	C	399	HIS
1	D	25	ASN
1	D	28	GLN
1	D	31	HIS
1	D	34	GLN
1	D	88	HIS
1	D	138	GLN
1	D	173	ASN
1	D	211	ASN
1	D	291	ASN
1	D	371	ASN
1	D	376	GLN
1	D	389	HIS
1	D	399	HIS
1	D	405	ASN
1	D	407	ASN
1	D	408	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 47 ligands modelled in this entry, 23 are monoatomic - leaving 24 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	$\# Z > 2$
4	SO4	C	441	7	4,4,4	0.37	0	6,6,6	0.08	0
4	SO4	D	435	7	4,4,4	0.37	0	6,6,6	0.09	0
6	NAG	D	437	1	14,14,15	0.64	0	17,19,21	0.79	0
6	NAG	A	437	1	14,14,15	0.58	0	17,19,21	0.76	1 (5%)
4	SO4	D	441	7	4,4,4	0.36	0	6,6,6	0.07	0
4	SO4	A	435	7	4,4,4	0.37	0	6,6,6	0.09	0
6	NAG	A	438	1	14,14,15	0.52	0	17,19,21	0.70	1 (5%)
6	NAG	D	439	1	14,14,15	0.76	1 (7%)	17,19,21	0.82	0
6	NAG	D	438	1	14,14,15	0.52	0	17,19,21	0.68	0
6	NAG	B	437	1	14,14,15	0.66	0	17,19,21	0.73	1 (5%)
4	SO4	B	441	7	4,4,4	0.38	0	6,6,6	0.09	0
6	NAG	A	439	1	14,14,15	0.72	0	17,19,21	0.78	0
6	NAG	B	438	1	14,14,15	0.64	0	17,19,21	0.76	1 (5%)
6	NAG	C	439	1	14,14,15	0.69	0	17,19,21	0.72	1 (5%)
6	NAG	B	440	1	14,14,15	0.60	0	17,19,21	0.68	1 (5%)
6	NAG	C	440	1	14,14,15	0.62	0	17,19,21	0.71	0
6	NAG	C	438	1	14,14,15	0.50	0	17,19,21	0.67	0
6	NAG	B	439	1	14,14,15	0.73	1 (7%)	17,19,21	0.96	1 (5%)
4	SO4	C	435	7	4,4,4	0.38	0	6,6,6	0.08	0
4	SO4	B	435	7	4,4,4	0.37	0	6,6,6	0.07	0
6	NAG	D	440	1	14,14,15	0.56	0	17,19,21	0.76	0
4	SO4	A	441	7	4,4,4	0.37	0	6,6,6	0.09	0
6	NAG	A	440	1	14,14,15	0.57	0	17,19,21	0.71	0
6	NAG	C	437	1	14,14,15	0.62	0	17,19,21	0.72	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	A	437	1	-	4/6/23/26	0/1/1/1
6	NAG	A	439	1	-	4/6/23/26	0/1/1/1
6	NAG	C	437	1	-	4/6/23/26	0/1/1/1
6	NAG	B	438	1	1/1/5/7	4/6/23/26	0/1/1/1
6	NAG	C	439	1	1/1/5/7	4/6/23/26	0/1/1/1
6	NAG	D	440	1	-	4/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	B	440	1	-	4/6/23/26	0/1/1/1
6	NAG	C	440	1	-	4/6/23/26	0/1/1/1
6	NAG	A	438	1	-	0/6/23/26	0/1/1/1
6	NAG	C	438	1	-	2/6/23/26	0/1/1/1
6	NAG	A	440	1	-	3/6/23/26	0/1/1/1
6	NAG	D	439	1	-	2/6/23/26	0/1/1/1
6	NAG	D	437	1	-	2/6/23/26	0/1/1/1
6	NAG	D	438	1	-	2/6/23/26	0/1/1/1
6	NAG	B	437	1	-	2/6/23/26	0/1/1/1
6	NAG	B	439	1	1/1/5/7	2/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	D	439	NAG	C1-C2	2.42	1.55	1.52
6	B	439	NAG	C1-C2	2.18	1.55	1.52

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	439	NAG	C2-N2-C7	-2.35	119.75	122.90
6	C	439	NAG	C2-N2-C7	-2.34	119.77	122.90
6	A	438	NAG	C2-N2-C7	-2.17	119.99	122.90
6	B	438	NAG	C2-N2-C7	-2.17	119.99	122.90
6	A	437	NAG	C2-N2-C7	-2.14	120.04	122.90
6	B	437	NAG	C2-N2-C7	-2.05	120.16	122.90
6	B	440	NAG	C2-N2-C7	-2.00	120.22	122.90

All (3) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
6	B	438	NAG	C1
6	B	439	NAG	C1
6	C	439	NAG	C1

All (47) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	437	NAG	C8-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
6	A	437	NAG	O7-C7-N2-C2
6	A	440	NAG	C8-C7-N2-C2
6	A	440	NAG	O7-C7-N2-C2
6	C	438	NAG	C8-C7-N2-C2
6	C	438	NAG	O7-C7-N2-C2
6	C	439	NAG	C8-C7-N2-C2
6	C	439	NAG	O7-C7-N2-C2
6	C	440	NAG	C8-C7-N2-C2
6	C	440	NAG	O7-C7-N2-C2
6	D	440	NAG	C8-C7-N2-C2
6	D	440	NAG	O7-C7-N2-C2
6	C	440	NAG	O5-C5-C6-O6
6	B	437	NAG	C8-C7-N2-C2
6	C	437	NAG	C8-C7-N2-C2
6	C	440	NAG	C4-C5-C6-O6
6	C	437	NAG	O7-C7-N2-C2
6	B	439	NAG	O5-C5-C6-O6
6	C	437	NAG	O5-C5-C6-O6
6	C	439	NAG	O5-C5-C6-O6
6	B	437	NAG	O7-C7-N2-C2
6	D	437	NAG	C8-C7-N2-C2
6	B	439	NAG	C4-C5-C6-O6
6	A	437	NAG	O5-C5-C6-O6
6	B	438	NAG	O5-C5-C6-O6
6	D	438	NAG	C4-C5-C6-O6
6	D	437	NAG	O7-C7-N2-C2
6	A	439	NAG	C4-C5-C6-O6
6	B	440	NAG	C4-C5-C6-O6
6	D	438	NAG	O5-C5-C6-O6
6	B	440	NAG	C8-C7-N2-C2
6	A	439	NAG	C8-C7-N2-C2
6	A	439	NAG	O5-C5-C6-O6
6	C	437	NAG	C4-C5-C6-O6
6	B	440	NAG	O5-C5-C6-O6
6	A	440	NAG	O5-C5-C6-O6
6	A	437	NAG	C4-C5-C6-O6
6	C	439	NAG	C4-C5-C6-O6
6	D	440	NAG	C4-C5-C6-O6
6	B	440	NAG	O7-C7-N2-C2
6	D	439	NAG	C4-C5-C6-O6
6	B	438	NAG	C8-C7-N2-C2
6	A	439	NAG	O7-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
6	D	439	NAG	O5-C5-C6-O6
6	B	438	NAG	C4-C5-C6-O6
6	B	438	NAG	O7-C7-N2-C2
6	D	440	NAG	O5-C5-C6-O6

There are no ring outliers.

4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	437	NAG	1	0
6	B	438	NAG	1	0
6	C	439	NAG	1	0
6	B	440	NAG	3	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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å ²)	Q<0.9
1	A	424/424 (100%)	0.27	18 (4%)	40	37	21, 32, 49, 79	0
1	B	424/424 (100%)	0.21	19 (4%)	38	35	21, 31, 48, 73	0
1	C	424/424 (100%)	0.71	36 (8%)	16	14	25, 39, 61, 84	0
1	D	424/424 (100%)	0.51	27 (6%)	25	22	22, 35, 51, 81	0
All	All	1696/1696 (100%)	0.42	100 (5%)	28	25	21, 34, 55, 84	0

All (100) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	411	VAL	6.0
1	D	64	ASN	5.3
1	A	64	ASN	5.2
1	A	155	LYS	5.1
1	B	65	GLY	4.3
1	C	64	ASN	4.2
1	D	410	GLY	4.2
1	A	431	SER	4.2
1	C	155	LYS	4.1
1	D	154	LYS	4.1
1	C	109	ASN	4.1
1	A	65	GLY	4.0
1	D	396	ASN	3.9
1	C	154	LYS	3.9
1	B	64	ASN	3.9
1	C	396	ASN	3.8
1	B	432	THR	3.8
1	C	110	THR	3.7
1	C	19	ARG	3.6
1	C	63	LYS	3.5
1	B	154	LYS	3.5

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Mol	Chain	Res	Type	RSRZ
1	D	61	SER	3.5
1	D	65	GLY	3.5
1	D	63	LYS	3.4
1	A	66	ARG	3.4
1	B	371	ASN	3.4
1	C	111	THR	3.4
1	B	430	ASP	3.3
1	A	69	ILE	3.2
1	D	66	ARG	3.2
1	A	153	PRO	3.2
1	C	153	PRO	3.1
1	C	129	THR	3.1
1	C	431	SER	3.1
1	D	9	ARG	3.1
1	C	71	LYS	3.0
1	B	63	LYS	3.0
1	C	108	ARG	2.9
1	C	65	GLY	2.9
1	A	23	GLY	2.8
1	A	63	LYS	2.8
1	D	19	ARG	2.8
1	C	123	GLY	2.8
1	C	102	TYR	2.8
1	A	109	ASN	2.7
1	D	99	THR	2.7
1	B	396	ASN	2.6
1	D	409	ASP	2.6
1	B	105	VAL	2.6
1	A	154	LYS	2.6
1	C	9	ARG	2.6
1	B	428	VAL	2.6
1	C	426	TYR	2.6
1	C	62	GLU	2.5
1	B	429	ASP	2.5
1	C	371	ASN	2.5
1	C	427	PRO	2.5
1	C	418	VAL	2.5
1	D	428	VAL	2.5
1	D	371	ASN	2.5
1	D	38	VAL	2.5
1	A	19	ARG	2.5
1	C	408	GLN	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	23	GLY	2.5
1	B	20	VAL	2.4
1	B	79	PHE	2.4
1	C	99	THR	2.4
1	B	66	ARG	2.4
1	C	378	GLU	2.4
1	D	67	LYS	2.4
1	C	274	LYS	2.4
1	D	418	VAL	2.4
1	B	9	ARG	2.4
1	A	348	VAL	2.3
1	A	107	LEU	2.3
1	B	294	ASN	2.3
1	C	67	LYS	2.3
1	B	153	PRO	2.3
1	A	359	ILE	2.3
1	C	359	ILE	2.3
1	C	428	VAL	2.3
1	C	107	LEU	2.2
1	A	294	ASN	2.2
1	D	211	ASN	2.2
1	A	9	ARG	2.2
1	D	412	ALA	2.2
1	C	358	THR	2.2
1	C	126	VAL	2.1
1	B	155	LYS	2.1
1	D	151	LEU	2.1
1	D	123	GLY	2.1
1	A	108	ARG	2.1
1	C	432	THR	2.1
1	D	69	ILE	2.1
1	C	156	GLY	2.1
1	D	271	ARG	2.1
1	D	368	ILE	2.1
1	B	62	GLU	2.0
1	D	62	GLU	2.0
1	D	108	ARG	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 oligosaccharides 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. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
6	NAG	A	440	14/15	0.29	0.25	74,75,78,79	0
6	NAG	D	440	14/15	0.41	0.26	77,79,80,80	0
6	NAG	B	440	14/15	0.51	0.26	70,72,72,73	0
6	NAG	C	440	14/15	0.56	0.24	79,81,82,82	0
4	SO4	A	441	5/5	0.69	0.17	94,94,95,95	0
4	SO4	D	441	5/5	0.70	0.20	94,94,94,95	0
6	NAG	B	439	14/15	0.74	0.18	38,44,47,49	0
7	NA	A	443	1/1	0.78	0.40	103,103,103,103	0
6	NAG	C	439	14/15	0.80	0.21	63,65,66,67	0
6	NAG	D	439	14/15	0.80	0.15	41,48,50,50	0
6	NAG	C	438	14/15	0.81	0.17	55,57,62,62	0
6	NAG	B	437	14/15	0.81	0.17	53,54,56,57	0
7	NA	B	443	1/1	0.81	0.36	81,81,81,81	0
7	NA	D	442	1/1	0.81	0.43	73,73,73,73	0
6	NAG	A	439	14/15	0.82	0.16	43,48,49,52	0
4	SO4	D	435	5/5	0.83	0.18	93,94,94,95	0
6	NAG	B	438	14/15	0.83	0.14	36,41,44,47	0
7	NA	B	444	1/1	0.83	0.17	98,98,98,98	0
6	NAG	A	437	14/15	0.83	0.15	55,58,60,61	0
4	SO4	A	435	5/5	0.84	0.17	82,82,82,82	0
6	NAG	D	437	14/15	0.84	0.16	57,59,60,61	0
6	NAG	D	438	14/15	0.84	0.13	44,50,52,55	0
7	NA	C	444	1/1	0.85	0.20	106,106,106,106	0
7	NA	D	443	1/1	0.85	0.32	95,95,95,95	0
4	SO4	B	441	5/5	0.86	0.15	87,87,87,88	0
4	SO4	B	435	5/5	0.86	0.18	92,92,92,93	0
6	NAG	C	437	14/15	0.88	0.14	53,56,59,60	0
6	NAG	A	438	14/15	0.88	0.11	36,37,40,42	0
4	SO4	C	441	5/5	0.89	0.12	87,88,88,88	0
4	SO4	C	435	5/5	0.89	0.15	87,87,87,87	0
7	NA	C	442	1/1	0.89	0.27	75,75,75,75	0
7	NA	A	444	1/1	0.91	0.16	68,68,68,68	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	NA	C	443	1/1	0.92	0.23	89,89,89,89	0
7	NA	B	442	1/1	0.94	0.19	90,90,90,90	0
7	NA	A	442	1/1	0.94	0.12	69,69,69,69	0
5	F	A	436	1/1	0.97	0.11	40,40,40,40	0
2	FE	A	433	1/1	0.98	0.04	47,47,47,47	0
5	F	C	436	1/1	0.98	0.05	38,38,38,38	0
5	F	D	436	1/1	0.98	0.07	39,39,39,39	0
2	FE	D	433	1/1	0.99	0.04	50,50,50,50	0
2	FE	B	433	1/1	0.99	0.04	46,46,46,46	0
2	FE	C	433	1/1	0.99	0.04	51,51,51,51	0
5	F	B	436	1/1	1.00	0.03	38,38,38,38	0
3	ZN	B	434	1/1	1.00	0.03	34,34,34,34	0
3	ZN	C	434	1/1	1.00	0.02	33,33,33,33	0
3	ZN	D	434	1/1	1.00	0.02	33,33,33,33	0
3	ZN	A	434	1/1	1.00	0.04	32,32,32,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.