



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 25, 2018 – 04:47 PM EST

PDB ID : 5MEW  
Title : The study of the X-ray induced enzymatic reduction of molecular oxygen to water for laccase from *Steccherinum murashkinskyi*. Second structure of the series with total exposition time 33 min.  
Authors : Polyakov, K.M.; Fedorova, T.N.; Gavryushov, S.; Popov, A.N.; Glazunova, O.A.  
Deposited on : 2016-11-16  
Resolution : 1.35 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 : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20030736  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
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) : rb-20030736

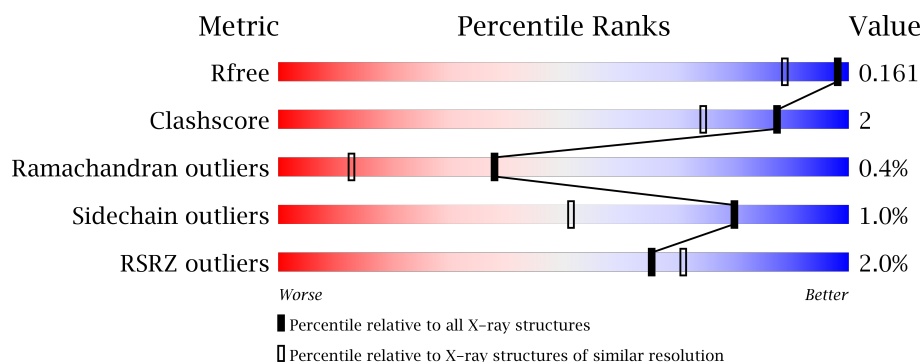
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.35 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))
$R_{free}$	100719	1024 (1.38-1.34)
Clashscore	112137	1063 (1.38-1.34)
Ramachandran outliers	110173	1048 (1.38-1.34)
Sidechain outliers	110143	1048 (1.38-1.34)
RSRZ outliers	101464	1025 (1.38-1.34)

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	499	<div> <div>2%</div> <div>93%</div> <div>6%</div> </div>

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	NAG	A	508	-	-	-	X
6	CIT	A	513	-	-	-	X

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 8160 atoms, of which 3412 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 Laccase 2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	499	Total	C	H	N	O	S	81	37	0
			7324	2470	3412	664	769	9			

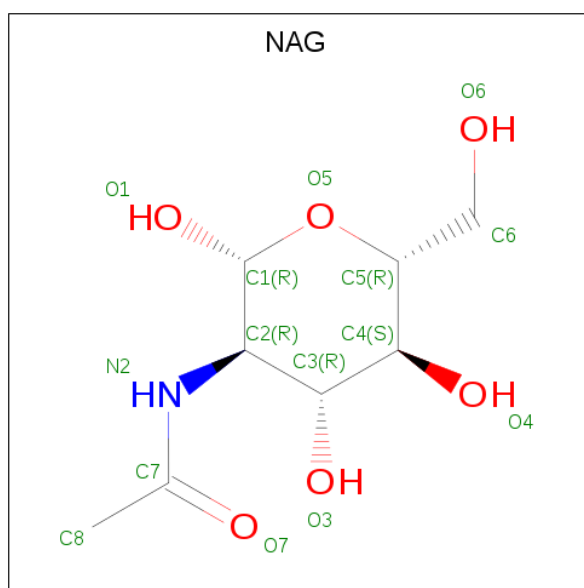
There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	499	ALA	-	expression tag	UNP I1VE66

- Molecule 2 is COPPER (II) ION (three-letter code: CU) (formula: Cu).

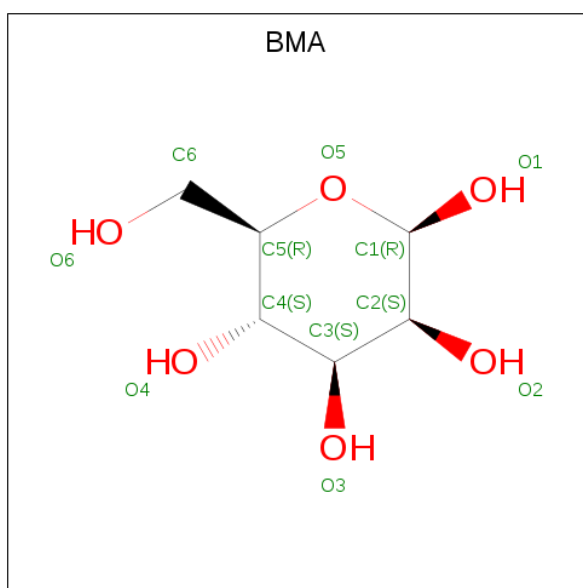
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	4	Total	Cu	0	2
			6	6		

- Molecule 3 is N-ACETYL-D-GLUCOSAMINE (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



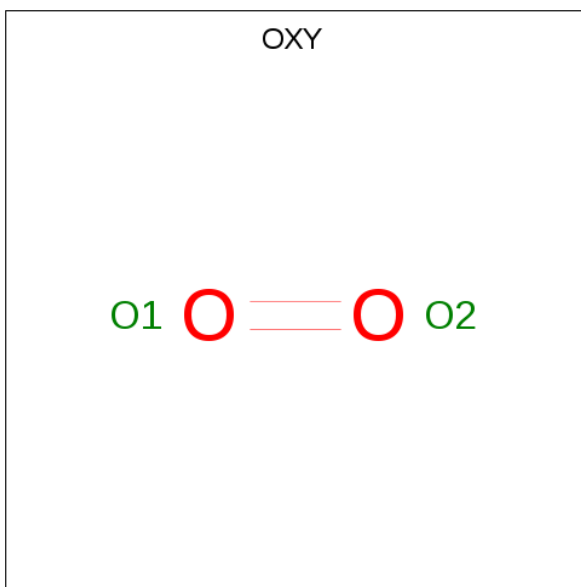
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	1
			18	10	2	6		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 4 is BETA-D-MANNOSE (three-letter code: BMA) (formula:  $C_6H_{12}O_6$ ).



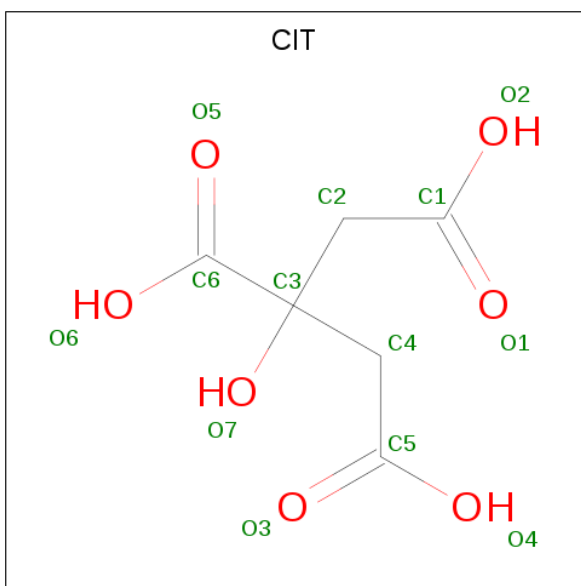
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			11	6	5		
4	A	1	Total	C	O	0	0
			11	6	5		

- Molecule 5 is OXYGEN MOLECULE (three-letter code: OXY) (formula:  $O_2$ ).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	O	0	0
			2	2		
5	A	1	Total	O	0	0
			2	2		

- Molecule 6 is CITRIC ACID (three-letter code: CIT) (formula:  $C_6H_8O_7$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			13	6	7		

- Molecule 7 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total 1	Na 1	0	0

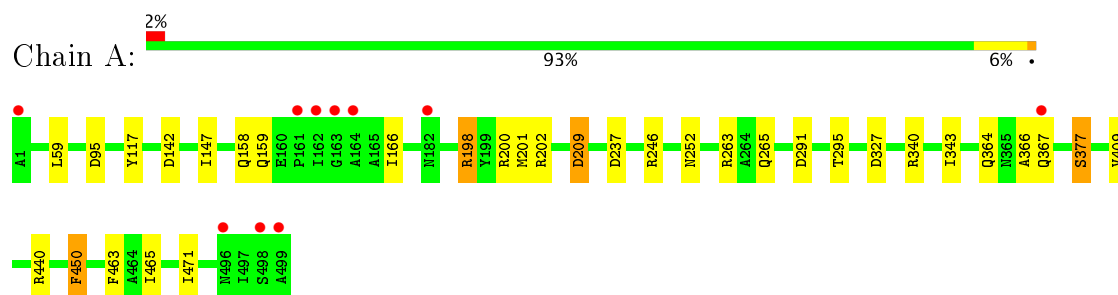
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	718	Total 730	O 730	0	12

### 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 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 ( $\text{RSRZ} > 2$ ). 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: Laccase 2



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	56.38 Å 84.40 Å 112.49 Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 1.35 19.91 – 1.35	Depositor EDS
% Data completeness (in resolution range)	99.0 (30.00-1.35) 99.0 (19.91-1.35)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.19 (at 1.35 Å)	Xtriage
Refinement program	REFMAC 5.8.0049	Depositor
R, $R_{free}$	0.132 , 0.152 0.141 , 0.161	Depositor DCC
$R_{free}$ test set	5875 reflections (5.28%)	DCC
Wilson B-factor (Å <sup>2</sup> )	9.1	Xtriage
Anisotropy	0.119	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.43 , 51.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.98	EDS
Total number of atoms	8160	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	11.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.54% 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, 0.333 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: BMA, NAG, NA, CIT, CU, OXY

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	0.97	2/4178 (0.0%)	1.01	17/5747 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	377[A]	SER	CB-OG	-8.05	1.31	1.42
1	A	377[B]	SER	CB-OG	-8.05	1.31	1.42

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	237	ASP	CB-CG-OD1	11.83	128.94	118.30
1	A	202	ARG	NE-CZ-NH1	7.01	123.81	120.30
1	A	209	ASP	CB-CG-OD1	6.63	124.27	118.30
1	A	198[A]	ARG	NE-CZ-NH1	6.45	123.53	120.30
1	A	198[B]	ARG	NE-CZ-NH1	6.45	123.53	120.30
1	A	200	ARG	NE-CZ-NH1	6.33	123.46	120.30
1	A	263	ARG	NE-CZ-NH1	6.08	123.34	120.30
1	A	327	ASP	CB-CG-OD2	5.94	123.65	118.30
1	A	409[A]	VAL	CA-CB-CG2	5.92	119.77	110.90
1	A	409[B]	VAL	CA-CB-CG2	5.92	119.77	110.90
1	A	450	PHE	CB-CG-CD2	-5.88	116.68	120.80
1	A	440	ARG	NE-CZ-NH2	-5.87	117.37	120.30
1	A	450	PHE	CB-CG-CD1	5.76	124.84	120.80
1	A	95	ASP	CB-CG-OD1	5.73	123.46	118.30
1	A	142	ASP	CB-CG-OD1	5.62	123.36	118.30
1	A	291	ASP	CB-CG-OD2	-5.54	113.32	118.30
1	A	340	ARG	CG-CD-NE	5.12	122.54	111.80

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	3912	3412	3673	17	1
2	A	6	0	0	0	0
3	A	60	0	46	1	0
4	A	22	0	20	0	0
5	A	4	0	0	1	0
6	A	13	0	5	0	0
7	A	1	0	0	0	0
8	A	730	0	0	11	1
All	All	4748	3412	3744	19	1

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 2.

All (19) 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:265[B]:GLN:NE2	8:A:606:HOH:O	1.66	1.20
1:A:158[B]:GLN:NE2	8:A:608:HOH:O	1.76	1.18
1:A:159[B]:GLN:HG3	8:A:625:HOH:O	1.60	1.02
1:A:159[B]:GLN:CG	8:A:625:HOH:O	2.18	0.87
1:A:147:ILE:HD11	1:A:201[B]:MET:HE2	1.70	0.71
1:A:198[B]:ARG:CZ	8:A:610:HOH:O	2.39	0.71
1:A:147:ILE:HD11	1:A:201[B]:MET:CE	2.36	0.55
1:A:364[B]:GLN:HB3	8:A:915:HOH:O	2.05	0.55
5:A:512:OXY:O1	8:A:607:HOH:O	0.49	0.49
1:A:198[B]:ARG:NE	8:A:610:HOH:O	2.46	0.48
1:A:364[B]:GLN:HA	1:A:471:ILE:HG21	1.96	0.47
1:A:198[B]:ARG:HG2	1:A:252[B]:ASN:ND2	2.30	0.47
1:A:166[B]:ILE:HA	8:A:686:HOH:O	2.15	0.46
1:A:198[B]:ARG:NH1	8:A:615:HOH:O	2.51	0.43
1:A:343:ILE:HB	1:A:465[B]:ILE:HG23	2.01	0.43
1:A:198[B]:ARG:NH2	8:A:610:HOH:O	2.52	0.41
1:A:366:ALA:HB2	1:A:377[A]:SER:HB3	2.04	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:295:THR:CG2	8:A:1026:HOH:O[4_555]	2.04	0.16

## 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	536/499 (107%)	524 (98%)	10 (2%)	2 (0%)	38 13

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	209	ASP
1	A	59	LEU

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	443/408 (109%)	439 (99%)	4 (1%)	82 55

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	117	TYR

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Mol	Chain	Res	Type
1	A	246	ARG
1	A	450	PHE
1	A	463	PHE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	44	ASN
1	A	134	ASN
1	A	182	ASN
1	A	444	ASN
1	A	482	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

5 non-standard protein/DNA/RNA residues 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	NAG	A	505	1,3	14,14,15	1.57	4 (28%)	15,19,21	1.23	1 (6%)
3	NAG	A	506[A]	-	14,14,15	1.60	4 (28%)	15,19,21	2.64	6 (40%)
3	NAG	A	506[B]	-	14,14,15	1.99	4 (28%)	15,19,21	2.50	5 (33%)
3	NAG	A	508	1,3	14,14,15	0.93	0	15,19,21	1.15	2 (13%)
3	NAG	A	509	3,4	14,14,15	1.00	1 (7%)	15,19,21	2.27	3 (20%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	A	505	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	506[A]	-	-	0/6/23/26	0/1/1/1
3	NAG	A	506[B]	-	-	0/6/23/26	0/1/1/1
3	NAG	A	508	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	509	3,4	-	0/6/23/26	0/1/1/1

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	505	NAG	O5-C1	-2.94	1.38	1.43
3	A	506[B]	NAG	C3-C2	2.01	1.56	1.52
3	A	506[A]	NAG	C3-C2	2.01	1.56	1.52
3	A	505	NAG	C4-C5	2.09	1.57	1.53
3	A	505	NAG	O3-C3	2.30	1.48	1.43
3	A	509	NAG	C1-C2	2.52	1.55	1.52
3	A	506[B]	NAG	C4-C3	2.55	1.58	1.52
3	A	506[A]	NAG	C4-C3	2.55	1.58	1.52
3	A	506[B]	NAG	C1-C2	2.90	1.56	1.52
3	A	506[A]	NAG	C1-C2	2.90	1.56	1.52
3	A	505	NAG	C1-C2	3.08	1.56	1.52
3	A	506[A]	NAG	C2-N2	3.16	1.51	1.46
3	A	506[B]	NAG	C2-N2	5.26	1.55	1.46

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	509	NAG	C1-O5-C5	-7.15	102.31	112.17
3	A	506[A]	NAG	O7-C7-C8	-2.91	116.76	122.06
3	A	506[B]	NAG	O7-C7-C8	-2.69	117.15	122.06
3	A	508	NAG	C1-C2-N2	-2.51	106.21	110.49
3	A	509	NAG	O7-C7-C8	-2.43	117.63	122.06
3	A	508	NAG	O5-C1-C2	-2.15	108.48	111.47
3	A	505	NAG	C1-O5-C5	-2.07	109.32	112.17
3	A	506[B]	NAG	O4-C4-C3	2.01	114.73	110.36
3	A	506[A]	NAG	O4-C4-C3	2.01	114.73	110.36
3	A	509	NAG	C1-C2-N2	2.73	115.15	110.49
3	A	506[A]	NAG	C8-C7-N2	3.27	122.01	116.11
3	A	506[B]	NAG	O5-C1-C2	3.71	116.64	111.47
3	A	506[A]	NAG	O5-C1-C2	3.71	116.64	111.47
3	A	506[B]	NAG	C3-C4-C5	4.36	117.90	110.22
3	A	506[A]	NAG	C3-C4-C5	4.36	117.90	110.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	506[B]	NAG	C1-C2-N2	6.12	120.95	110.49
3	A	506[A]	NAG	C2-N2-C7	6.34	132.19	122.94

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	506[A]	NAG	1	0

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 17 ligands modelled in this entry, 7 are monoatomic - leaving 10 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	NAG	A	505	1,3	14,14,15	1.57	4 (28%)	15,19,21	1.23	1 (6%)
3	NAG	A	506[A]	-	14,14,15	1.60	4 (28%)	15,19,21	2.64	6 (40%)
3	NAG	A	506[B]	-	14,14,15	1.99	4 (28%)	15,19,21	2.50	5 (33%)
4	BMA	A	507	3	11,11,12	0.44	0	13,15,17	1.84	4 (30%)
3	NAG	A	508	1,3	14,14,15	0.93	0	15,19,21	1.15	2 (13%)
3	NAG	A	509	3,4	14,14,15	1.00	1 (7%)	15,19,21	2.27	3 (20%)
4	BMA	A	510	3	11,11,12	0.61	0	13,15,17	1.93	3 (23%)
5	OXY	A	511	2	1,1,1	0.23	0	0,0,0	0.00	-
5	OXY	A	512	-	1,1,1	0.19	0	0,0,0	0.00	-
6	CIT	A	513	-	3,12,12	1.41	1 (33%)	3,17,17	0.40	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
3	NAG	A	505	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	506[A]	-	-	0/6/23/26	0/1/1/1
3	NAG	A	506[B]	-	-	0/6/23/26	0/1/1/1
4	BMA	A	507	3	-	0/2/19/22	0/1/1/1
3	NAG	A	508	1,3	-	0/6/23/26	0/1/1/1
3	NAG	A	509	3,4	-	0/6/23/26	0/1/1/1
4	BMA	A	510	3	-	0/2/19/22	0/1/1/1
5	OXY	A	511	2	-	0/0/0/0	0/0/0/0
5	OXY	A	512	-	-	0/0/0/0	0/0/0/0
6	CIT	A	513	-	-	0/6/16/16	0/0/0/0

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	505	NAG	O5-C1	-2.94	1.38	1.43
3	A	506[A]	NAG	C3-C2	2.01	1.56	1.52
3	A	506[B]	NAG	C3-C2	2.01	1.56	1.52
3	A	505	NAG	C4-C5	2.09	1.57	1.53
3	A	505	NAG	O3-C3	2.30	1.48	1.43
6	A	513	CIT	O7-C3	2.42	1.46	1.43
3	A	509	NAG	C1-C2	2.52	1.55	1.52
3	A	506[A]	NAG	C4-C3	2.55	1.58	1.52
3	A	506[B]	NAG	C4-C3	2.55	1.58	1.52
3	A	506[A]	NAG	C1-C2	2.90	1.56	1.52
3	A	506[B]	NAG	C1-C2	2.90	1.56	1.52
3	A	505	NAG	C1-C2	3.08	1.56	1.52
3	A	506[A]	NAG	C2-N2	3.16	1.51	1.46
3	A	506[B]	NAG	C2-N2	5.26	1.55	1.46

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	509	NAG	C1-O5-C5	-7.15	102.31	112.17
4	A	510	BMA	C6-C5-C4	-4.18	103.23	113.00
4	A	510	BMA	C2-C3-C4	-3.47	104.82	110.88
4	A	507	BMA	O2-C2-C1	-3.23	102.60	109.18
3	A	506[A]	NAG	O7-C7-C8	-2.91	116.76	122.06
3	A	506[B]	NAG	O7-C7-C8	-2.69	117.15	122.06

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	507	BMA	C6-C5-C4	-2.69	106.71	113.00
3	A	508	NAG	C1-C2-N2	-2.51	106.21	110.49
3	A	509	NAG	O7-C7-C8	-2.43	117.63	122.06
3	A	508	NAG	O5-C1-C2	-2.15	108.48	111.47
3	A	505	NAG	C1-O5-C5	-2.07	109.32	112.17
3	A	506[A]	NAG	O4-C4-C3	2.01	114.73	110.36
3	A	506[B]	NAG	O4-C4-C3	2.01	114.73	110.36
4	A	507	BMA	C1-C2-C3	2.53	112.86	109.65
3	A	509	NAG	C1-C2-N2	2.73	115.15	110.49
4	A	507	BMA	C1-O5-C5	2.89	116.15	112.17
4	A	510	BMA	C1-O5-C5	3.12	116.47	112.17
3	A	506[A]	NAG	C8-C7-N2	3.27	122.01	116.11
3	A	506[A]	NAG	O5-C1-C2	3.71	116.64	111.47
3	A	506[B]	NAG	O5-C1-C2	3.71	116.64	111.47
3	A	506[A]	NAG	C3-C4-C5	4.36	117.90	110.22
3	A	506[B]	NAG	C3-C4-C5	4.36	117.90	110.22
3	A	506[B]	NAG	C1-C2-N2	6.12	120.95	110.49
3	A	506[A]	NAG	C2-N2-C7	6.34	132.19	122.94

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	506[A]	NAG	1	0
5	A	512	OXY	1	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 ⓘ

### 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	499/499 (100%)	-0.43	10 (2%) 65 71	5, 9, 18, 46	0

All (10) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	499	ALA	6.6
1	A	162[A]	ILE	6.5
1	A	498	SER	4.7
1	A	1	ALA	4.5
1	A	163[A]	GLY	4.0
1	A	161[A]	PRO	3.0
1	A	496	ASN	2.9
1	A	182	ASN	2.2
1	A	164[A]	ALA	2.1
1	A	367	GLN	2.0

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

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(Å <sup>2</sup> )	Q<0.9
3	NAG	A	508	14/15	0.97	0.06	2.01	8,10,12,13	0
3	NAG	A	505	14/15	0.96	0.07	1.67	10,11,14,15	0
3	NAG	A	506[B]	14/15	0.76	0.20	-	16,20,30,33	4
3	NAG	A	506[A]	14/15	0.76	0.20	-	18,20,30,33	4
3	NAG	A	509	14/15	0.95	0.10	-	12,14,23,25	0

### 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(Å <sup>2</sup> )	Q<0.9
6	CIT	A	513	13/13	0.90	0.15	3.73	17,22,29,32	0
3	NAG	A	508	14/15	0.97	0.06	2.01	8,10,12,13	0
5	OXY	A	511	2/2	0.99	0.06	1.99	7,7,7,7	2
3	NAG	A	505	14/15	0.96	0.07	1.67	10,11,14,15	0
5	OXY	A	512	2/2	0.98	0.05	0.13	7,7,7,9	2
2	CU	A	503	1/1	1.00	0.04	-0.29	6,6,6,6	1
2	CU	A	502[B]	1/1	1.00	0.04	-2.17	5,5,5,5	1
2	CU	A	504	1/1	1.00	0.04	-2.23	5,5,5,5	0
2	CU	A	502[A]	1/1	1.00	0.04	-2.31	8,8,8,8	1
2	CU	A	501[A]	1/1	1.00	0.04	-2.81	5,5,5,5	1
2	CU	A	501[B]	1/1	1.00	0.04	-3.40	6,6,6,6	1
3	NAG	A	506[A]	14/15	0.76	0.20	-	18,20,30,33	4
4	BMA	A	510	11/12	0.65	0.21	-	22,28,32,32	11
3	NAG	A	509	14/15	0.95	0.10	-	12,14,23,25	0
4	BMA	A	507	11/12	0.59	0.24	-	24,27,28,31	11
3	NAG	A	506[B]	14/15	0.76	0.20	-	16,20,30,33	4
7	NA	A	514	1/1	0.97	0.06	-	16,16,16,16	1

### 6.5 Other polymers [i](#)

There are no such residues in this entry.