



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 8, 2024 – 01:08 am GMT

PDB ID : 5MSX  
Title : Glycoside hydrolase BT\_3662  
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Deposited on : 2017-01-06  
Resolution : 2.10 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

<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>.

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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 : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

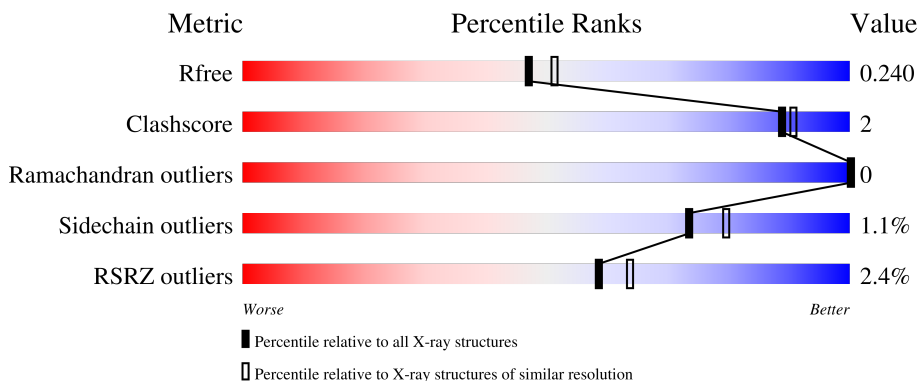
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.10 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))
$R_{free}$	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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  $\geq 3$ , 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	459	 92%
1	B	459	 92%
1	C	459	 89% 7%

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
4	EDO	C	510	-	-	-	X
4	EDO	C	514	-	-	X	-

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 10982 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 Putative endo-1,4-beta-xylanase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	439	Total 3525	C 2283	N 584	O 643	S 15	0	3	0
1	B	439	Total 3457	C 2237	N 569	O 636	S 15	0	1	0
1	C	440	Total 3488	C 2257	N 578	O 638	S 15	0	3	0

There are 57 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	2	MET	-	initiating methionine	UNP Q8A1J9
A	3	GLY	-	expression tag	UNP Q8A1J9
A	4	SER	-	expression tag	UNP Q8A1J9
A	5	SER	-	expression tag	UNP Q8A1J9
A	6	HIS	-	expression tag	UNP Q8A1J9
A	7	HIS	-	expression tag	UNP Q8A1J9
A	8	HIS	-	expression tag	UNP Q8A1J9
A	9	HIS	-	expression tag	UNP Q8A1J9
A	10	HIS	-	expression tag	UNP Q8A1J9
A	11	HIS	-	expression tag	UNP Q8A1J9
A	12	SER	-	expression tag	UNP Q8A1J9
A	13	SER	-	expression tag	UNP Q8A1J9
A	14	GLY	-	expression tag	UNP Q8A1J9
A	15	PRO	-	expression tag	UNP Q8A1J9
A	16	GLN	-	expression tag	UNP Q8A1J9
A	17	GLN	-	expression tag	UNP Q8A1J9
A	18	GLY	-	expression tag	UNP Q8A1J9
A	19	LEU	-	expression tag	UNP Q8A1J9
A	20	ARG	-	expression tag	UNP Q8A1J9
B	2	MET	-	initiating methionine	UNP Q8A1J9
B	3	GLY	-	expression tag	UNP Q8A1J9
B	4	SER	-	expression tag	UNP Q8A1J9
B	5	SER	-	expression tag	UNP Q8A1J9

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Chain	Residue	Modelled	Actual	Comment	Reference
B	6	HIS	-	expression tag	UNP Q8A1J9
B	7	HIS	-	expression tag	UNP Q8A1J9
B	8	HIS	-	expression tag	UNP Q8A1J9
B	9	HIS	-	expression tag	UNP Q8A1J9
B	10	HIS	-	expression tag	UNP Q8A1J9
B	11	HIS	-	expression tag	UNP Q8A1J9
B	12	SER	-	expression tag	UNP Q8A1J9
B	13	SER	-	expression tag	UNP Q8A1J9
B	14	GLY	-	expression tag	UNP Q8A1J9
B	15	PRO	-	expression tag	UNP Q8A1J9
B	16	GLN	-	expression tag	UNP Q8A1J9
B	17	GLN	-	expression tag	UNP Q8A1J9
B	18	GLY	-	expression tag	UNP Q8A1J9
B	19	LEU	-	expression tag	UNP Q8A1J9
B	20	ARG	-	expression tag	UNP Q8A1J9
C	2	MET	-	initiating methionine	UNP Q8A1J9
C	3	GLY	-	expression tag	UNP Q8A1J9
C	4	SER	-	expression tag	UNP Q8A1J9
C	5	SER	-	expression tag	UNP Q8A1J9
C	6	HIS	-	expression tag	UNP Q8A1J9
C	7	HIS	-	expression tag	UNP Q8A1J9
C	8	HIS	-	expression tag	UNP Q8A1J9
C	9	HIS	-	expression tag	UNP Q8A1J9
C	10	HIS	-	expression tag	UNP Q8A1J9
C	11	HIS	-	expression tag	UNP Q8A1J9
C	12	SER	-	expression tag	UNP Q8A1J9
C	13	SER	-	expression tag	UNP Q8A1J9
C	14	GLY	-	expression tag	UNP Q8A1J9
C	15	PRO	-	expression tag	UNP Q8A1J9
C	16	GLN	-	expression tag	UNP Q8A1J9
C	17	GLN	-	expression tag	UNP Q8A1J9
C	18	GLY	-	expression tag	UNP Q8A1J9
C	19	LEU	-	expression tag	UNP Q8A1J9
C	20	ARG	-	expression tag	UNP Q8A1J9

- Molecule 2 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: C<sub>8</sub>H<sub>18</sub>N<sub>2</sub>O<sub>4</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
2	A	1	15	8	2	4	1	0	0

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Ca	0	0
			2	2		
3	B	2	Total	Ca	0	0
			2	2		
3	C	2	Total	Ca	0	0
			2	2		

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



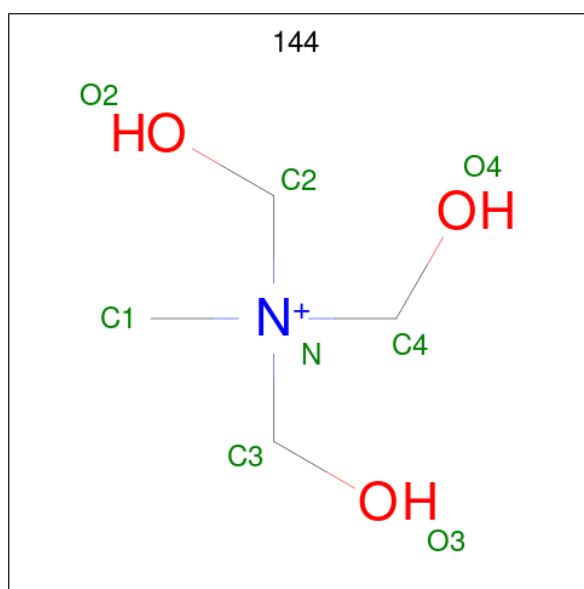
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0

- Molecule 5 is TRIS-HYDROXYMETHYL-METHYL-AMMONIUM (three-letter code: 144) (formula: C<sub>4</sub>H<sub>12</sub>NO<sub>3</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O 8 4 1 3	0	0

- Molecule 6 is water.

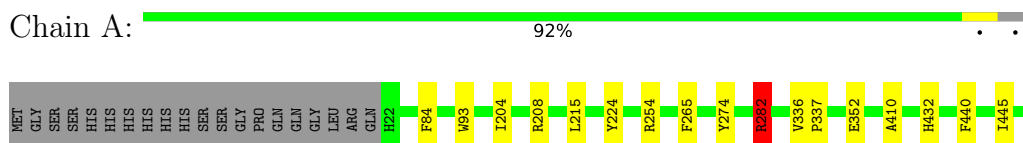


<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
6	A	128	Total 128	O 128	0	0
6	B	138	Total 139	O 139	0	1
6	C	128	Total 128	O 128	0	0

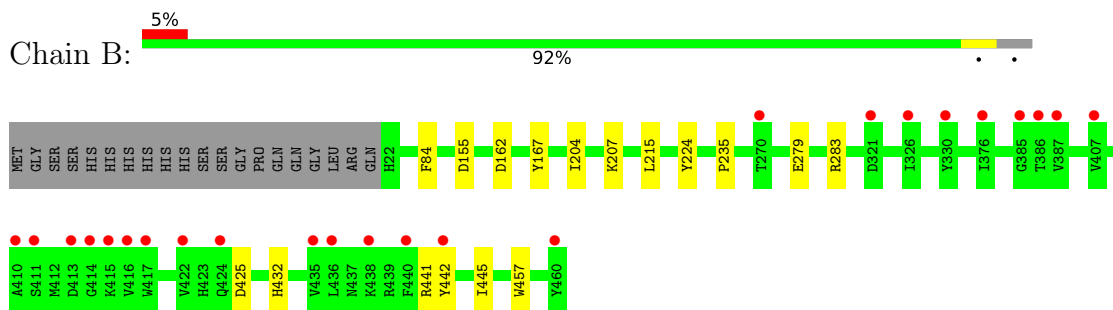
### 3 Residue-property plots i

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.

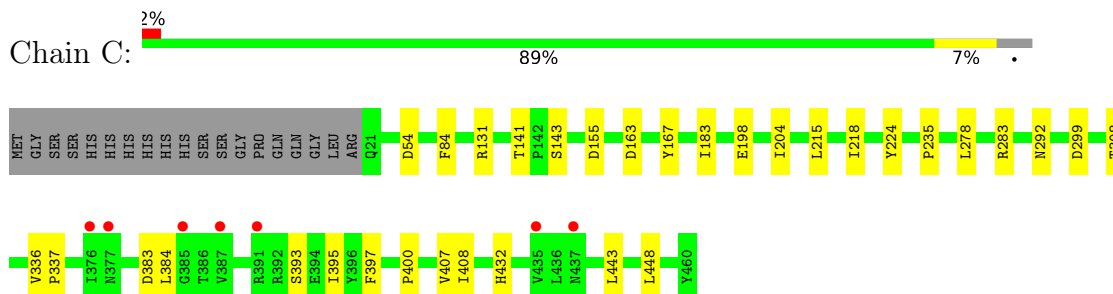
- Molecule 1: Putative endo-1,4-beta-xylanase



- Molecule 1: Putative endo-1,4-beta-xylanase



- Molecule 1: Putative endo-1,4-beta-xylanase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	76.83Å 129.18Å 158.08Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.44 – 2.10 49.44 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.2 (49.44-2.10) 99.3 (49.44-2.10)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.23 (at 2.10Å)	Xtrriage
Refinement program	REFMAC 5.8.0155	Depositor
R, $R_{free}$	0.187 , 0.235 0.195 , 0.240	Depositor DCC
$R_{free}$ test set	4494 reflections (4.90%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	25.0	Xtrriage
Anisotropy	0.392	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 49.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	10982	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.29% 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 [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: EPE, CA, EDO, 144

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	0.59	0/3636	0.76	3/4938 (0.1%)
1	B	0.59	0/3567	0.74	1/4858 (0.0%)
1	C	0.60	0/3605	0.74	2/4905 (0.0%)
All	All	0.60	0/10808	0.75	6/14701 (0.0%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	282	ARG	NE-CZ-NH2	8.86	124.73	120.30
1	B	155	ASP	CB-CG-OD1	5.69	123.42	118.30
1	A	254	ARG	NE-CZ-NH1	5.31	122.95	120.30
1	C	163	ASP	CB-CG-OD1	5.21	122.99	118.30
1	C	299	ASP	CB-CG-OD1	5.03	122.82	118.30
1	A	208	ARG	NE-CZ-NH1	5.02	122.81	120.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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	3525	0	3408	8	0
1	B	3457	0	3282	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3488	0	3333	22	0
2	A	15	0	18	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
3	C	2	0	0	0	0
4	A	4	0	6	0	0
4	B	32	0	48	0	0
4	C	52	0	78	10	0
5	A	8	0	12	1	0
6	A	128	0	0	1	0
6	B	139	0	0	2	1
6	C	128	0	0	0	1
All	All	10982	0	10185	39	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 (39) 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)
4:C:503:EDO:HO1	4:C:510:EDO:HO1	1.04	0.88
1:A:282:ARG:HD3	1:A:352:GLU:OE1	1.89	0.71
1:C:432:HIS:CE1	4:C:514:EDO:H21	2.25	0.71
4:C:503:EDO:O1	4:C:510:EDO:O1	1.91	0.71
1:C:198:GLU:HG2	1:C:218[A]:ILE:HD12	1.77	0.67
1:C:408:ILE:HD11	1:C:443:LEU:HD23	1.85	0.59
1:B:162:ASP:OD2	1:B:207:LYS:NZ	2.35	0.59
1:C:400:PRO:CB	4:C:514:EDO:H12	2.34	0.58
1:C:400:PRO:HB3	4:C:514:EDO:H12	1.87	0.57
1:C:407:VAL:HG23	1:C:448:LEU:HD11	1.88	0.55
1:C:141:THR:HG22	1:C:143:SER:H	1.73	0.53
1:A:432:HIS:HD2	6:A:720:HOH:O	1.91	0.53
1:C:432:HIS:HE1	4:C:514:EDO:H21	1.74	0.52
1:A:204:ILE:HB	1:A:215:LEU:HB2	1.93	0.50
1:C:400:PRO:HB3	4:C:514:EDO:C1	2.40	0.50
1:A:336:VAL:HG22	1:A:337:PRO:HD2	1.93	0.49
1:B:204:ILE:HB	1:B:215:LEU:HB2	1.94	0.49
1:C:131:ARG:CG	1:C:183:ILE:HD12	2.44	0.48
1:C:432:HIS:CE1	4:C:514:EDO:C2	2.97	0.48
1:B:425:ASP:CB	6:B:714:HOH:O	2.63	0.47
1:C:397:PHE:HB2	4:C:514:EDO:H11	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:441:ARG:HD3	1:B:442:TYR:CE2	2.52	0.45
1:C:198:GLU:CG	1:C:218[A]:ILE:HG23	2.47	0.45
1:B:167:TYR:CE1	1:B:235:PRO:HG2	2.52	0.44
1:C:278:LEU:HD12	1:C:278:LEU:C	2.38	0.44
1:C:395:ILE:HG21	1:C:397:PHE:CZ	2.53	0.44
1:C:131:ARG:HG3	1:C:183:ILE:HD12	1.99	0.44
1:A:410:ALA:HB1	1:A:440[B]:PHE:CG	2.53	0.43
1:C:155:ASP:OD1	4:C:510:EDO:H22	2.20	0.42
1:B:445:ILE:HD11	1:B:457:TRP:CE2	2.55	0.42
1:A:93:TRP:CE3	5:A:505:144:H11	2.55	0.42
1:C:336:VAL:HG22	1:C:337:PRO:HD2	2.01	0.41
1:C:383:ASP:OD1	1:C:384:LEU:O	2.39	0.41
1:C:292:ASN:HD21	1:C:308:THR:H	1.67	0.41
1:A:445:ILE:HD11	1:A:457:TRP:CE2	2.55	0.41
1:B:432:HIS:HE1	6:B:621:HOH:O	2.03	0.41
1:A:265:PHE:CE1	1:A:274:TYR:HB2	2.56	0.41
1:C:167:TYR:CE1	1:C:235:PRO:HG2	2.55	0.40
1:C:204:ILE:HB	1:C:215:LEU:HB2	2.03	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)
6:B:720:HOH:O	6:C:674:HOH:O[2_664]	1.68	0.52

## 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	440/459 (96%)	425 (97%)	15 (3%)	0	100 100
1	B	438/459 (95%)	419 (96%)	19 (4%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	C	441/459 (96%)	424 (96%)	17 (4%)	0	100	100
All	All	1319/1377 (96%)	1268 (96%)	51 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 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	369/390 (95%)	366 (99%)	3 (1%)	81	86
1	B	355/390 (91%)	351 (99%)	4 (1%)	73	79
1	C	360/390 (92%)	355 (99%)	5 (1%)	67	73
All	All	1084/1170 (93%)	1072 (99%)	12 (1%)	73	79

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	84	PHE
1	A	224	TYR
1	A	282	ARG
1	B	84	PHE
1	B	224	TYR
1	B	279	GLU
1	B	283	ARG
1	C	54	ASP
1	C	84	PHE
1	C	224	TYR
1	C	283	ARG
1	C	393	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	272	ASN
1	A	432	HIS
1	B	286	ASN
1	B	432	HIS
1	C	292	ASN
1	C	432	HIS

### 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 monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 30 ligands modelled in this entry, 6 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	EDO	C	511	-	3,3,3	0.58	0	2,2,2	0.20	0
4	EDO	B	503	-	3,3,3	0.44	0	2,2,2	0.48	0
5	144	A	505	-	1,7,7	0.43	0	3,9,9	0.54	0
4	EDO	C	512	-	3,3,3	0.70	0	2,2,2	0.64	0
4	EDO	C	505	-	3,3,3	0.48	0	2,2,2	0.15	0
4	EDO	C	504	-	3,3,3	0.45	0	2,2,2	0.07	0
4	EDO	A	504	-	3,3,3	0.40	0	2,2,2	0.70	0
4	EDO	B	506	-	3,3,3	0.46	0	2,2,2	0.45	0
4	EDO	B	504	-	3,3,3	0.43	0	2,2,2	0.05	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	EDO	C	507	-	3,3,3	0.55	0	2,2,2	0.11	0
4	EDO	C	513	-	3,3,3	0.61	0	2,2,2	0.35	0
4	EDO	C	515	-	3,3,3	0.46	0	2,2,2	0.37	0
4	EDO	C	506	-	3,3,3	0.42	0	2,2,2	0.45	0
4	EDO	B	509	-	3,3,3	0.53	0	2,2,2	0.26	0
4	EDO	C	503	-	3,3,3	0.34	0	2,2,2	0.32	0
4	EDO	B	505	-	3,3,3	0.48	0	2,2,2	0.44	0
4	EDO	C	509	-	3,3,3	0.35	0	2,2,2	0.41	0
4	EDO	B	508	-	3,3,3	0.41	0	2,2,2	0.52	0
4	EDO	C	508	-	3,3,3	0.51	0	2,2,2	0.25	0
4	EDO	B	510	-	3,3,3	0.86	0	2,2,2	0.69	0
4	EDO	C	514	-	3,3,3	0.54	0	2,2,2	0.90	0
4	EDO	C	510	-	3,3,3	0.48	0	2,2,2	0.39	0
4	EDO	B	507	-	3,3,3	0.46	0	2,2,2	0.36	0
2	EPE	A	501	-	15,15,15	1.86	2 (13%)	18,20,20	1.91	5 (27%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	C	511	-	-	1/1/1/1	-
4	EDO	B	503	-	-	1/1/1/1	-
5	144	A	505	-	-	0/0/9/9	-
4	EDO	C	512	-	-	0/1/1/1	-
4	EDO	C	505	-	-	1/1/1/1	-
4	EDO	C	504	-	-	1/1/1/1	-
4	EDO	A	504	-	-	0/1/1/1	-
4	EDO	B	506	-	-	1/1/1/1	-
4	EDO	B	504	-	-	1/1/1/1	-
4	EDO	C	507	-	-	1/1/1/1	-
4	EDO	C	513	-	-	1/1/1/1	-
4	EDO	C	515	-	-	0/1/1/1	-
4	EDO	C	506	-	-	0/1/1/1	-
4	EDO	B	509	-	-	0/1/1/1	-
4	EDO	C	503	-	-	1/1/1/1	-
4	EDO	B	505	-	-	0/1/1/1	-
4	EDO	C	509	-	-	0/1/1/1	-
4	EDO	B	508	-	-	0/1/1/1	-
4	EDO	C	508	-	-	0/1/1/1	-
4	EDO	B	510	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	C	514	-	-	0/1/1/1	-
4	EDO	C	510	-	-	1/1/1/1	-
4	EDO	B	507	-	-	0/1/1/1	-
2	EPE	A	501	-	-	6/9/19/19	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	EPE	C10-S	-6.39	1.68	1.77
2	A	501	EPE	O1S-S	2.26	1.51	1.45

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	EPE	O3S-S-C10	4.60	113.21	105.77
2	A	501	EPE	O1S-S-C10	-3.01	103.29	106.92
2	A	501	EPE	C7-N4-C5	2.51	117.65	111.23
2	A	501	EPE	C3-C2-N1	2.20	115.16	110.64
2	A	501	EPE	C6-N1-C2	2.19	113.77	108.83

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	EPE	C10-C9-N1-C2
2	A	501	EPE	C8-C7-N4-C5
2	A	501	EPE	C9-C10-S-O2S
4	C	510	EDO	O1-C1-C2-O2
2	A	501	EPE	C9-C10-S-O3S
4	C	507	EDO	O1-C1-C2-O2
4	C	511	EDO	O1-C1-C2-O2
4	B	506	EDO	O1-C1-C2-O2
2	A	501	EPE	C9-C10-S-O1S
4	B	503	EDO	O1-C1-C2-O2
4	C	505	EDO	O1-C1-C2-O2
2	A	501	EPE	C8-C7-N4-C3
4	C	503	EDO	O1-C1-C2-O2
4	B	504	EDO	O1-C1-C2-O2
4	C	513	EDO	O1-C1-C2-O2
4	C	504	EDO	O1-C1-C2-O2

There are no ring outliers.

4 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	505	144	1	0
4	C	503	EDO	2	0
4	C	514	EDO	7	0
4	C	510	EDO	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

### 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	439/459 (95%)	-0.40	0 <span style="border: 1px solid blue; padding: 2px;">100</span> <span style="border: 1px solid blue; padding: 2px;">100</span>	15, 24, 41, 56	0
1	B	439/459 (95%)	-0.03	24 (5%) <span style="border: 1px solid red; padding: 2px;">25</span> <span style="border: 1px solid red; padding: 2px;">31</span>	15, 28, 58, 72	0
1	C	440/459 (95%)	-0.08	7 (1%) <span style="border: 1px solid blue; padding: 2px;">72</span> <span style="border: 1px solid blue; padding: 2px;">75</span>	13, 27, 53, 65	0
All	All	1318/1377 (95%)	-0.17	31 (2%) <span style="border: 1px solid blue; padding: 2px;">59</span> <span style="border: 1px solid blue; padding: 2px;">64</span>	13, 26, 53, 72	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	436	LEU	4.7
1	B	422	VAL	3.9
1	C	387	VAL	3.5
1	B	435	VAL	3.5
1	B	376	ILE	3.2
1	B	410	ALA	3.0
1	B	440	PHE	3.0
1	C	377	ASN	2.9
1	B	411	SER	2.8
1	B	407	VAL	2.8
1	B	386	THR	2.6
1	B	415	LYS	2.6
1	B	442	TYR	2.6
1	B	438	LYS	2.6
1	B	417	TRP	2.6
1	C	376	ILE	2.5
1	B	416	VAL	2.5
1	B	414	GLY	2.3
1	B	387	VAL	2.3
1	B	385	GLY	2.3
1	B	424	GLN	2.3
1	B	330	TYR	2.2
1	C	391	ARG	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	413	ASP	2.2
1	C	385	GLY	2.2
1	C	435	VAL	2.1
1	B	460	TYR	2.1
1	B	270	THR	2.1
1	B	326	ILE	2.0
1	C	437	ASN	2.0
1	B	321	ASP	2.0

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides 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. 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	B-factors(Å <sup>2</sup> )	Q<0.9
4	EDO	C	511	4/4	0.21	0.38	61,64,64,66	0
4	EDO	C	510	4/4	0.62	0.41	75,78,82,85	0
4	EDO	C	513	4/4	0.70	0.23	46,49,50,52	0
4	EDO	C	507	4/4	0.74	0.18	40,41,42,44	0
5	144	A	505	8/8	0.83	0.17	30,41,44,44	0
4	EDO	C	506	4/4	0.85	0.16	48,48,49,49	0
4	EDO	B	509	4/4	0.89	0.13	51,54,54,55	0
4	EDO	B	506	4/4	0.90	0.12	27,35,38,44	0
4	EDO	C	503	4/4	0.90	0.16	32,35,36,38	0
4	EDO	C	514	4/4	0.91	0.36	29,32,33,33	0
4	EDO	B	508	4/4	0.92	0.15	33,37,37,41	0
4	EDO	B	504	4/4	0.92	0.14	32,33,35,37	0
4	EDO	C	509	4/4	0.92	0.14	39,41,42,44	0
4	EDO	C	515	4/4	0.92	0.11	49,49,50,50	0
4	EDO	B	507	4/4	0.92	0.15	32,33,34,35	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	EDO	C	508	4/4	0.93	0.11	41,43,44,44	0
4	EDO	C	504	4/4	0.93	0.21	31,32,33,33	0
2	EPE	A	501	15/15	0.93	0.14	32,34,46,47	0
4	EDO	B	503	4/4	0.93	0.19	26,27,30,31	0
4	EDO	B	505	4/4	0.94	0.13	30,35,36,40	0
4	EDO	B	510	4/4	0.95	0.12	21,23,24,24	0
4	EDO	C	512	4/4	0.95	0.11	22,24,25,26	0
4	EDO	C	505	4/4	0.96	0.09	32,35,35,36	0
4	EDO	A	504	4/4	0.97	0.12	29,30,32,33	0
3	CA	C	502	1/1	0.98	0.06	34,34,34,34	0
3	CA	A	503	1/1	0.99	0.06	25,25,25,25	0
3	CA	B	501	1/1	0.99	0.12	16,16,16,16	0
3	CA	B	502	1/1	0.99	0.07	33,33,33,33	0
3	CA	A	502	1/1	1.00	0.12	14,14,14,14	0
3	CA	C	501	1/1	1.00	0.09	14,14,14,14	0

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

There are no such residues in this entry.