



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 09:56 AM UTC

PDB ID : 5MSX / pdb_00005msx
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

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

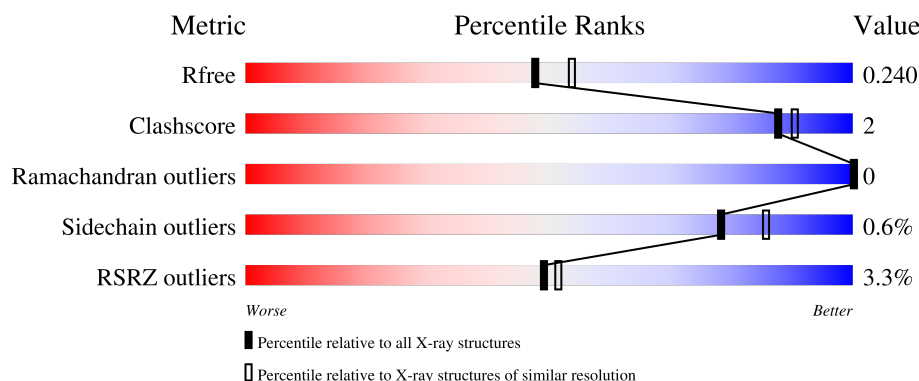
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	180053	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (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 ≥ 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	 7% 93%
1	C	459	 3% 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	514	-	-	X	-

2 Entry composition

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
1	A	439	Total	C	N	O	S	0	3	0
			3525	2283	584	643	15			
1	B	439	Total	C	N	O	S	0	1	0
			3457	2237	569	636	15			
1	C	440	Total	C	N	O	S	0	3	0
			3488	2257	578	638	15			

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 (CCD ID: EPE) (formula: $C_8H_{18}N_2O_4S$).



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

- Molecule 3 is CALCIUM ION (CCD ID: 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 (CCD ID: EDO) (formula: C₂H₆O₂).



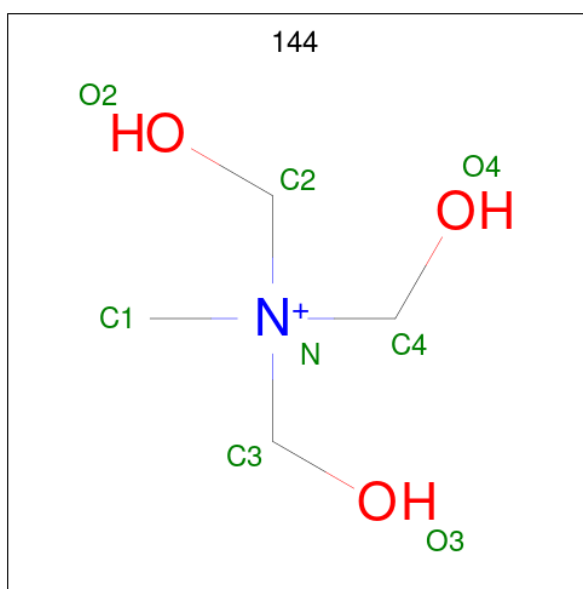
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total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

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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 (CCD ID: 144) (formula: $C_4H_{12}NO_3$).



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

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
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

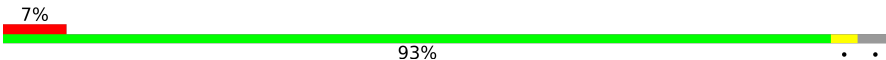
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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.

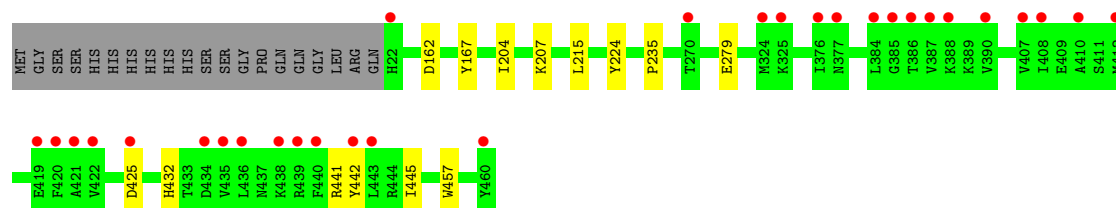
- Molecule 1: Putative endo-1,4-beta-xylanase

Chain A:  92%

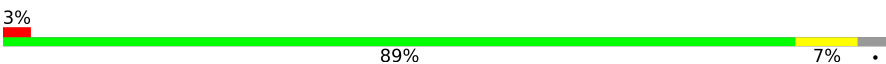


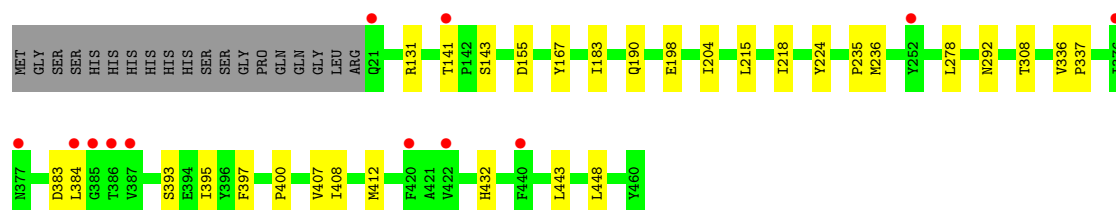
- Molecule 1: Putative endo-1,4-beta-xylanase

Chain B:  93%



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

Chain C:  89% 7% 3%



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	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) 99.2 (49.44-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.23 (at 2.10Å)	Xtriage
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 (4.86%)	wwPDB-VP
Wilson B-factor (Å ²)	25.0	Xtriage
Anisotropy	0.392	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 38.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10982	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtriage'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.*

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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.78	1/3636 (0.0%)	0.84	1/4938 (0.0%)
1	B	0.78	0/3567	0.85	0/4858
1	C	0.80	0/3605	0.83	0/4905
All	All	0.79	1/10808 (0.0%)	0.84	1/14701 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	199	TYR	CA-C	5.11	1.59	1.52

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	282	ARG	NE-CZ-NH2	6.15	124.73	119.20

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	9	0
1	B	3457	0	3282	7	0
1	C	3488	0	3333	23	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
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	41	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 (41) 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:190:GLN:HG3	1:C:236:MET:HE2	1.86	0.57
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:278:LEU:HD12	1:C:278:LEU:C	2.38	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:397:PHE:HB2	4:C:514:EDO:H11	1.98	0.46
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:A:324:MET:HE1	1:A:390:VAL:HA	2.00	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

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	438/459 (95%)	419 (96%)	19 (4%)	0	100	100
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%)	368 (100%)	1 (0%)	86	91
1	B	355/390 (91%)	353 (99%)	2 (1%)	78	86
1	C	360/390 (92%)	357 (99%)	3 (1%)	73	81
All	All	1084/1170 (93%)	1078 (99%)	6 (1%)	78	86

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	224	TYR
1	B	224	TYR
1	B	279	GLU
1	C	224	TYR
1	C	393	SER
1	C	412	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	225	GLN
1	A	272	ASN
1	A	432	HIS
1	A	458	ASN
1	B	28	ASN

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Mol	Chain	Res	Type
1	B	432	HIS
1	C	165	GLN
1	C	225	GLN
1	C	266	HIS
1	C	292	ASN
1	C	432	HIS
1	C	437	ASN
1	C	458	ASN

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 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	B	505	-	3,3,3	0.44	0	2,2,2	0.47	0
4	EDO	C	511	-	3,3,3	0.55	0	2,2,2	0.25	0
4	EDO	B	504	-	3,3,3	0.40	0	2,2,2	0.10	0
4	EDO	B	508	-	3,3,3	0.40	0	2,2,2	0.55	0
4	EDO	B	509	-	3,3,3	0.50	0	2,2,2	0.27	0
4	EDO	C	514	-	3,3,3	0.50	0	2,2,2	0.79	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	EPE	A	501	-	15,15,15	1.91	2 (13%)	19,20,20	1.69	5 (26%)
4	EDO	A	504	-	3,3,3	0.38	0	2,2,2	0.72	0
4	EDO	C	505	-	3,3,3	0.45	0	2,2,2	0.19	0
4	EDO	C	515	-	3,3,3	0.43	0	2,2,2	0.40	0
4	EDO	C	506	-	3,3,3	0.40	0	2,2,2	0.48	0
4	EDO	C	509	-	3,3,3	0.34	0	2,2,2	0.44	0
4	EDO	C	504	-	3,3,3	0.43	0	2,2,2	0.13	0
4	EDO	C	507	-	3,3,3	0.51	0	2,2,2	0.14	0
4	EDO	B	506	-	3,3,3	0.44	0	2,2,2	0.49	0
4	EDO	B	510	-	3,3,3	0.84	0	2,2,2	0.59	0
4	EDO	B	503	-	3,3,3	0.43	0	2,2,2	0.51	0
5	144	A	505	-	1,7,7	0.42	0	3,9,9	1.47	0
4	EDO	C	512	-	3,3,3	0.69	0	2,2,2	0.56	0
4	EDO	B	507	-	3,3,3	0.44	0	2,2,2	0.40	0
4	EDO	C	508	-	3,3,3	0.48	0	2,2,2	0.30	0
4	EDO	C	510	-	3,3,3	0.44	0	2,2,2	0.43	0
4	EDO	C	513	-	3,3,3	0.58	0	2,2,2	0.39	0
4	EDO	C	503	-	3,3,3	0.32	0	2,2,2	0.36	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
4	EDO	B	505	-	-	0/1/1/1	-
4	EDO	C	511	-	-	1/1/1/1	-
4	EDO	B	504	-	-	1/1/1/1	-
4	EDO	B	508	-	-	0/1/1/1	-
4	EDO	B	509	-	-	0/1/1/1	-
4	EDO	C	514	-	-	0/1/1/1	-
2	EPE	A	501	-	-	6/9/19/19	0/1/1/1
4	EDO	A	504	-	-	0/1/1/1	-
4	EDO	C	505	-	-	1/1/1/1	-
4	EDO	C	515	-	-	0/1/1/1	-
4	EDO	C	506	-	-	0/1/1/1	-
4	EDO	C	509	-	-	0/1/1/1	-
4	EDO	C	504	-	-	1/1/1/1	-
4	EDO	C	507	-	-	1/1/1/1	-
4	EDO	B	506	-	-	1/1/1/1	-
4	EDO	B	510	-	-	0/1/1/1	-
4	EDO	B	503	-	-	1/1/1/1	-

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

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	EPE	C10-S	-6.54	1.68	1.77
2	A	501	EPE	O1S-S	2.34	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	3.68	113.21	106.00
2	A	501	EPE	C7-N4-C5	2.41	117.65	111.24
2	A	501	EPE	C6-N1-C2	2.29	113.77	108.84
2	A	501	EPE	O1S-S-C10	-2.27	103.29	106.73
2	A	501	EPE	C3-C2-N1	2.24	115.16	110.65

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
2	A	501	EPE	C9-C10-S-O3S
4	C	510	EDO	O1-C1-C2-O2
4	C	511	EDO	O1-C1-C2-O2
4	C	507	EDO	O1-C1-C2-O2
2	A	501	EPE	C9-C10-S-O1S
4	B	506	EDO	O1-C1-C2-O2
2	A	501	EPE	C8-C7-N4-C3
4	B	503	EDO	O1-C1-C2-O2
4	C	505	EDO	O1-C1-C2-O2
4	C	503	EDO	O1-C1-C2-O2
4	C	504	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	B	504	EDO	O1-C1-C2-O2
4	C	513	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
4	C	514	EDO	7	0
5	A	505	144	1	0
4	C	510	EDO	3	0
4	C	503	EDO	2	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, 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	439/459 (95%)	-0.19	2 (0%) 87 88	11, 24, 41, 56	3 (0%)
1	B	439/459 (95%)	0.21	30 (6%) 23 25	15, 28, 58, 72	1 (0%)
1	C	440/459 (95%)	0.15	12 (2%) 56 59	11, 27, 53, 65	3 (0%)
All	All	1318/1377 (95%)	0.06	44 (3%) 49 51	11, 26, 53, 72	7 (0%)

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	22	HIS	4.6
1	B	440	PHE	4.4
1	C	21	GLN	4.2
1	C	141	THR	3.7
1	B	387	VAL	3.7
1	B	408	ILE	3.7
1	A	420	PHE	3.5
1	B	435	VAL	3.4
1	C	387	VAL	3.4
1	B	410	ALA	3.4
1	B	377	ASN	3.3
1	B	270	THR	3.3
1	B	22	HIS	3.2
1	B	436	LEU	3.1
1	C	376	ILE	3.1
1	B	384	LEU	2.9
1	B	376	ILE	2.9
1	C	252[A]	TYR	2.9
1	B	420	PHE	2.8
1	B	443	LEU	2.8
1	B	422	VAL	2.8
1	C	420	PHE	2.7
1	C	440	PHE	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	386	THR	2.6
1	C	422	VAL	2.6
1	B	419	GLU	2.6
1	C	384	LEU	2.4
1	B	439	ARG	2.4
1	B	385	GLY	2.4
1	C	385	GLY	2.4
1	B	412	MET	2.3
1	B	324	MET	2.3
1	B	388	LYS	2.2
1	C	386	THR	2.2
1	B	421	ALA	2.2
1	B	325	LYS	2.2
1	B	390	VAL	2.1
1	B	407	VAL	2.1
1	B	460	TYR	2.1
1	B	434	ASP	2.1
1	B	442	TYR	2.1
1	B	438	LYS	2.1
1	C	377	ASN	2.0
1	B	425	ASP	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($\text{\AA}^2$)	Q<0.9
4	EDO	C	510	4/4	0.65	0.39	75,78,82,85	0
4	EDO	C	511	4/4	0.69	0.22	61,64,64,66	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	C	513	4/4	0.76	0.21	46,49,50,52	0
4	EDO	C	515	4/4	0.81	0.17	49,49,50,50	0
4	EDO	B	509	4/4	0.82	0.17	51,54,54,55	0
4	EDO	C	506	4/4	0.83	0.19	48,48,49,49	0
4	EDO	C	507	4/4	0.83	0.14	40,41,42,44	0
4	EDO	C	514	4/4	0.88	0.25	29,32,33,33	0
5	144	A	505	8/8	0.88	0.14	30,41,44,44	0
4	EDO	B	503	4/4	0.89	0.13	26,27,30,31	0
4	EDO	C	504	4/4	0.89	0.14	31,32,33,33	0
4	EDO	C	508	4/4	0.90	0.12	41,43,44,44	0
4	EDO	B	506	4/4	0.91	0.11	27,35,38,44	0
4	EDO	B	507	4/4	0.91	0.10	32,33,34,35	0
4	EDO	B	508	4/4	0.91	0.11	33,37,37,41	0
2	EPE	A	501	15/15	0.91	0.13	32,34,46,47	0
4	EDO	C	503	4/4	0.91	0.11	32,35,36,38	0
4	EDO	C	505	4/4	0.92	0.10	32,35,35,36	0
4	EDO	C	509	4/4	0.92	0.10	39,41,42,44	0
4	EDO	B	505	4/4	0.93	0.11	30,35,36,40	0
4	EDO	B	504	4/4	0.93	0.10	32,33,35,37	0
4	EDO	C	512	4/4	0.94	0.08	22,24,25,26	0
4	EDO	B	510	4/4	0.95	0.07	21,23,24,24	0
4	EDO	A	504	4/4	0.96	0.07	29,30,32,33	0
3	CA	C	502	1/1	0.98	0.06	34,34,34,34	0
3	CA	B	502	1/1	0.98	0.10	33,33,33,33	0
3	CA	B	501	1/1	0.99	0.02	16,16,16,16	0
3	CA	A	503	1/1	0.99	0.06	25,25,25,25	0
3	CA	A	502	1/1	1.00	0.01	14,14,14,14	0
3	CA	C	501	1/1	1.00	0.03	14,14,14,14	0

6.5 Other polymers [i](#)

There are no such residues in this entry.