



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 01:58 PM UTC

PDB ID : 5X7O / pdb_00005x7o
Title : Crystal structure of Paenibacillus sp. 598K alpha-1,6-glucosyltransferase
Authors : Fujimoto, Z.; Suzuki, N.; Kishine, N.; Momma, M.; Ichinose, H.; Kimura, A.;
Funane, K.
Deposited on : 2017-02-27
Resolution : 2.00 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

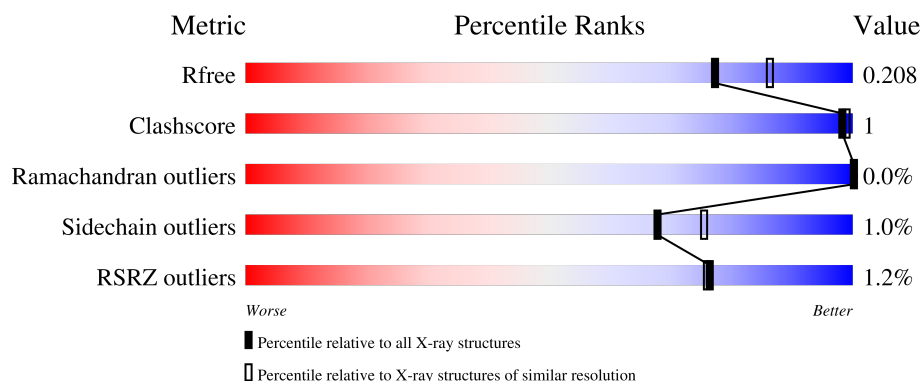
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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	1263	% 96% ..
1	B	1263	% 97% ..

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 21429 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 Glycoside hydrolase family 31 alpha-glucosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1247	Total	C	N	O	S	0	12	0
			9655	6057	1641	1934	23			
1	B	1247	Total	C	N	O	S	0	5	0
			9622	6036	1638	1926	22			

There are 34 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	19	HIS	-	expression tag	UNP A0A193PKW5
A	20	HIS	-	expression tag	UNP A0A193PKW5
A	21	HIS	-	expression tag	UNP A0A193PKW5
A	22	HIS	-	expression tag	UNP A0A193PKW5
A	23	HIS	-	expression tag	UNP A0A193PKW5
A	24	HIS	-	expression tag	UNP A0A193PKW5
A	25	SER	-	expression tag	UNP A0A193PKW5
A	26	SER	-	expression tag	UNP A0A193PKW5
A	27	GLY	-	expression tag	UNP A0A193PKW5
A	28	LEU	-	expression tag	UNP A0A193PKW5
A	29	VAL	-	expression tag	UNP A0A193PKW5
A	30	PRO	-	expression tag	UNP A0A193PKW5
A	31	ARG	-	expression tag	UNP A0A193PKW5
A	32	GLY	-	expression tag	UNP A0A193PKW5
A	33	SER	-	expression tag	UNP A0A193PKW5
A	34	HIS	-	expression tag	UNP A0A193PKW5
A	35	MET	-	expression tag	UNP A0A193PKW5
B	19	HIS	-	expression tag	UNP A0A193PKW5
B	20	HIS	-	expression tag	UNP A0A193PKW5
B	21	HIS	-	expression tag	UNP A0A193PKW5
B	22	HIS	-	expression tag	UNP A0A193PKW5
B	23	HIS	-	expression tag	UNP A0A193PKW5
B	24	HIS	-	expression tag	UNP A0A193PKW5
B	25	SER	-	expression tag	UNP A0A193PKW5
B	26	SER	-	expression tag	UNP A0A193PKW5

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Chain	Residue	Modelled	Actual	Comment	Reference
B	27	GLY	-	expression tag	UNP A0A193PKW5
B	28	LEU	-	expression tag	UNP A0A193PKW5
B	29	VAL	-	expression tag	UNP A0A193PKW5
B	30	PRO	-	expression tag	UNP A0A193PKW5
B	31	ARG	-	expression tag	UNP A0A193PKW5
B	32	GLY	-	expression tag	UNP A0A193PKW5
B	33	SER	-	expression tag	UNP A0A193PKW5
B	34	HIS	-	expression tag	UNP A0A193PKW5
B	35	MET	-	expression tag	UNP A0A193PKW5

- Molecule 2 is CALCIUM ION (CCD ID: CA) (formula: Ca).

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

- Molecule 3 is NICKEL (II) ION (CCD ID: NI) (formula: Ni).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Ni 1 1	0	0
3	B	1	Total Ni 1 1	0	0

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	8	Total Mg 8 8	0	0
4	B	7	Total Mg 7 7	0	0

- Molecule 5 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



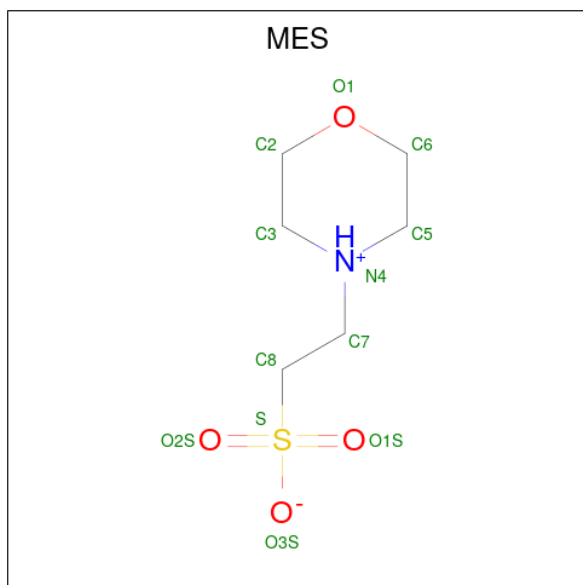
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	O	S	0	0
			5	4	1		
			Total	O	S		
			5	4	1		
			Total	O	S		
5	A	1	Total	O	S	0	0
			5	4	1		
			Total	O	S		
			5	4	1		
			Total	O	S		
5	A	1	Total	O	S	0	0
			5	4	1		
			Total	O	S		
			5	4	1		
			Total	O	S		
5	B	1	Total	O	S	0	0
			5	4	1		
			Total	O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

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

- Molecule 6 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (CCD ID: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
6	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
6	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
6	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 7 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



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

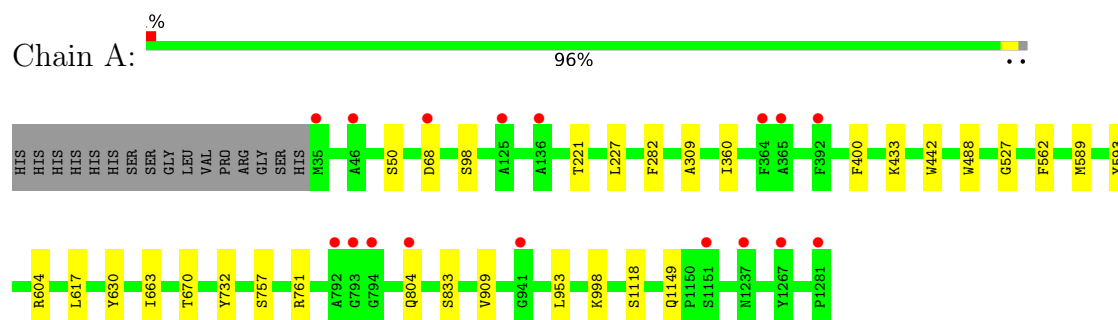
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	979	Total 979	O 979	0	0
8	B	975	Total 975	O 975	0	0

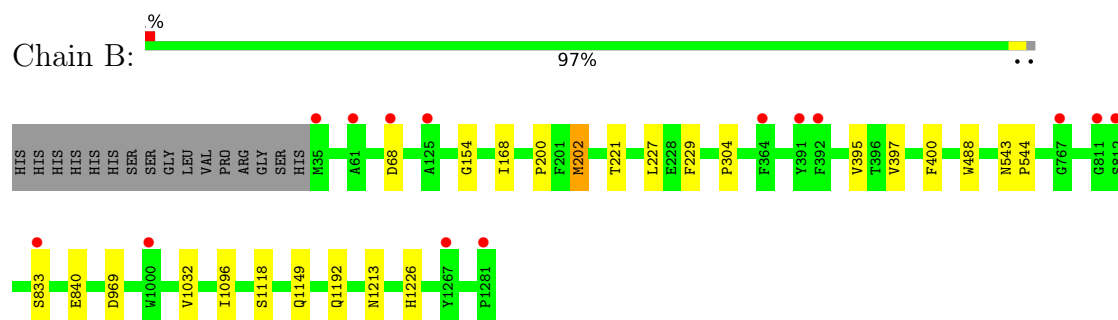
3 Residue-property plots [i](#)

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: Glycoside hydrolase family 31 alpha-glucosidase



- Molecule 1: Glycoside hydrolase family 31 alpha-glucosidase



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	184.16Å 271.93Å 134.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	152.48 – 2.00 152.48 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.3 (152.48-2.00) 99.3 (152.48-2.00)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.33 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.166 , 0.199 0.176 , 0.208	Depositor DCC
R_{free} test set	11201 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	28.6	Xtriage
Anisotropy	0.713	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 37.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	21429	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.14% 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: SO4, NI, MG, MES, EDO, CA

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	0.60	0/9966	0.73	0/13612
1	B	0.62	0/9903	0.73	1/13527 (0.0%)
All	All	0.61	0/19869	0.73	1/27139 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	154	GLY	N-CA-C	5.63	117.77	110.45

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	9655	0	8998	17	0
1	B	9622	0	8974	10	0
2	A	3	0	0	0	0
2	B	3	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	8	0	0	0	0
4	B	7	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	30	0	0	0	0
5	B	45	0	0	0	0
6	A	24	0	26	0	0
6	B	24	0	26	0	0
7	A	28	0	42	0	0
7	B	24	0	36	0	0
8	A	979	0	0	2	0
8	B	975	0	0	0	0
All	All	21429	0	18102	23	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 1.

All (23) 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:617:LEU:HD12	1:A:630[B]:TYR:CD2	2.25	0.71
1:A:360:ILE:HD13	1:B:397:VAL:HG12	1.77	0.66
1:A:663:ILE:HG12	1:A:670[A]:THR:HG22	1.89	0.55
1:A:617:LEU:HD12	1:A:630[B]:TYR:CE2	2.43	0.53
1:A:221:THR:HG22	1:A:227:LEU:HD12	1.92	0.50
1:B:543:ASN:HB3	1:B:544:PRO:HD2	1.94	0.50
1:A:360:ILE:HD12	1:B:395[A]:VAL:CG1	2.43	0.49
1:A:433:LYS:HD2	1:A:442:TRP:CE2	2.50	0.47
1:A:909:VAL:HG21	1:A:953:LEU:HD12	1.96	0.47
1:B:168:ILE:HD11	1:B:202:MET:HE3	1.97	0.45
1:A:282:PHE:CG	1:A:309:ALA:HB3	2.52	0.45
1:A:360:ILE:HD12	1:B:395[A]:VAL:HG11	1.99	0.44
1:A:604:ARG:HD3	1:A:732:TYR:CD1	2.53	0.44
1:A:562:PHE:HE2	1:A:589[B]:MET:SD	2.41	0.43
1:B:200:PRO:HB3	1:B:229:PHE:CE1	2.55	0.42
1:B:1032:VAL:HG21	1:B:1096:ILE:HD12	2.01	0.42
1:A:488:TRP:HA	1:A:527:GLY:O	2.19	0.42
1:B:221:THR:HG22	1:B:227:LEU:HD12	2.02	0.41
1:A:761:ARG:NH1	8:A:2012:HOH:O	2.47	0.41
1:A:593:TYR:CE1	1:B:304:PRO:HB2	2.56	0.41
1:A:604:ARG:HD2	1:A:732:TYR:CE1	2.56	0.41
1:B:1226:HIS:CD2	1:B:1226:HIS:H	2.38	0.41
1:A:998:LYS:NZ	8:A:2038:HOH:O	2.53	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	1257/1263 (100%)	1233 (98%)	24 (2%)	0	100	100
1	B	1250/1263 (99%)	1221 (98%)	28 (2%)	1 (0%)	48	46
All	All	2507/2526 (99%)	2454 (98%)	52 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	1213	ASN

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	1009/1011 (100%)	1000 (99%)	9 (1%)	70	78
1	B	1001/1011 (99%)	991 (99%)	10 (1%)	68	75
All	All	2010/2022 (99%)	1991 (99%)	19 (1%)	68	78

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	50	SER
1	A	68	ASP
1	A	98	SER
1	A	400	PHE
1	A	757	SER

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Mol	Chain	Res	Type
1	A	804	GLN
1	A	833	SER
1	A	1118	SER
1	A	1149	GLN
1	B	68	ASP
1	B	202	MET
1	B	400	PHE
1	B	488	TRP
1	B	833	SER
1	B	840	GLU
1	B	969	ASP
1	B	1118	SER
1	B	1149	GLN
1	B	1192	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	302	ASN
1	A	405	GLN
1	A	414	HIS
1	A	565	HIS
1	A	695	GLN
1	A	876	HIS
1	A	977	ASN
1	A	1109	ASN
1	A	1176	GLN
1	A	1226	HIS
1	A	1234	ASN
1	A	1237	ASN
1	A	1250	ASN
1	B	302	ASN
1	B	440	GLN
1	B	503	ASN
1	B	565	HIS
1	B	711	GLN
1	B	777	HIS
1	B	876	HIS
1	B	977	ASN
1	B	1109	ASN
1	B	1149	GLN
1	B	1200	ASN

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Mol	Chain	Res	Type
1	B	1226	HIS
1	B	1237	ASN
1	B	1250	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 55 ligands modelled in this entry, 23 are monoatomic - leaving 32 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	$\# Z > 2$
5	SO4	B	1704	-	4,4,4	0.45	0	6,6,6	0.09	0
7	EDO	B	1801	-	3,3,3	0.44	0	2,2,2	0.05	0
5	SO4	B	1706	-	4,4,4	0.41	0	6,6,6	0.47	0
5	SO4	A	1705	-	4,4,4	0.39	0	6,6,6	0.41	0
5	SO4	A	1704	-	4,4,4	0.44	0	6,6,6	0.17	0
5	SO4	B	1702	-	4,4,4	0.41	0	6,6,6	0.18	0
5	SO4	A	1702	-	4,4,4	0.42	0	6,6,6	0.17	0
5	SO4	B	1708	-	4,4,4	0.49	0	6,6,6	0.14	0
7	EDO	B	1806	-	3,3,3	0.56	0	2,2,2	0.11	0
5	SO4	B	1705	-	4,4,4	0.49	0	6,6,6	0.11	0
5	SO4	B	1701	-	4,4,4	0.48	0	6,6,6	0.21	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	SO4	A	1706	-	4,4,4	0.47	0	6,6,6	0.25	0
5	SO4	B	1709	-	4,4,4	0.46	0	6,6,6	0.11	0
7	EDO	B	1804	-	3,3,3	0.41	0	2,2,2	0.51	0
6	MES	A	1708	-	12,12,12	2.29	1 (8%)	15,16,16	1.45	1 (6%)
6	MES	B	1711	-	12,12,12	2.23	1 (8%)	15,16,16	0.90	0
7	EDO	B	1803	-	3,3,3	0.33	0	2,2,2	0.49	0
7	EDO	A	1805	-	3,3,3	0.38	0	2,2,2	0.47	0
7	EDO	A	1806	-	3,3,3	0.51	0	2,2,2	0.05	0
5	SO4	A	1701	-	4,4,4	0.49	0	6,6,6	0.18	0
6	MES	B	1710	-	12,12,12	2.26	1 (8%)	15,16,16	1.17	1 (6%)
7	EDO	A	1804	-	3,3,3	0.44	0	2,2,2	0.64	0
7	EDO	B	1802	-	3,3,3	0.36	0	2,2,2	0.38	0
7	EDO	B	1805	-	3,3,3	0.46	0	2,2,2	0.32	0
5	SO4	B	1703	-	4,4,4	0.47	0	6,6,6	0.17	0
5	SO4	B	1707	-	4,4,4	0.49	0	6,6,6	0.31	0
6	MES	A	1707	-	12,12,12	2.38	1 (8%)	15,16,16	1.18	1 (6%)
7	EDO	A	1801	-	3,3,3	0.34	0	2,2,2	0.42	0
7	EDO	A	1802	-	3,3,3	0.34	0	2,2,2	0.50	0
7	EDO	A	1807	-	3,3,3	0.59	0	2,2,2	0.13	0
7	EDO	A	1803	-	3,3,3	0.33	0	2,2,2	0.49	0
5	SO4	A	1703	-	4,4,4	0.47	0	6,6,6	0.27	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
7	EDO	B	1801	-	-	0/1/1/1	-
7	EDO	B	1805	-	-	1/1/1/1	-
7	EDO	B	1804	-	-	1/1/1/1	-
6	MES	A	1708	-	-	3/6/14/14	0/1/1/1
6	MES	B	1711	-	-	0/6/14/14	0/1/1/1
6	MES	A	1707	-	-	0/6/14/14	0/1/1/1
7	EDO	B	1803	-	-	1/1/1/1	-
7	EDO	A	1801	-	-	0/1/1/1	-
7	EDO	B	1806	-	-	1/1/1/1	-
7	EDO	A	1805	-	-	0/1/1/1	-
7	EDO	A	1802	-	-	0/1/1/1	-
7	EDO	A	1806	-	-	0/1/1/1	-
7	EDO	A	1803	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	EDO	A	1807	-	-	0/1/1/1	-
6	MES	B	1710	-	-	0/6/14/14	0/1/1/1
7	EDO	A	1804	-	-	0/1/1/1	-
7	EDO	B	1802	-	-	0/1/1/1	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	1707	MES	C8-S	-7.84	1.66	1.77
6	A	1708	MES	C8-S	-7.62	1.66	1.77
6	B	1710	MES	C8-S	-7.54	1.67	1.77
6	B	1711	MES	C8-S	-7.30	1.67	1.77

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	1708	MES	O2S-S-C8	4.05	112.85	106.73
6	A	1707	MES	O3S-S-C8	2.71	111.31	106.00
6	B	1710	MES	O1S-S-C8	2.45	110.44	106.73

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	1708	MES	C7-C8-S-O3S
7	B	1804	EDO	O1-C1-C2-O2
7	B	1803	EDO	O1-C1-C2-O2
6	A	1708	MES	C7-C8-S-O1S
6	A	1708	MES	C7-C8-S-O2S
7	A	1803	EDO	O1-C1-C2-O2
7	B	1806	EDO	O1-C1-C2-O2
7	B	1805	EDO	O1-C1-C2-O2

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	1247/1263 (98%)	0.07	17 (1%) 73 73	17, 33, 48, 83	12 (0%)
1	B	1247/1263 (98%)	0.02	14 (1%) 78 77	17, 33, 47, 71	5 (0%)
All	All	2494/2526 (98%)	0.05	31 (1%) 76 76	17, 33, 48, 83	17 (0%)

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	364	PHE	5.9
1	A	792	ALA	4.9
1	B	1281	PRO	4.4
1	B	35	MET	3.4
1	B	364	PHE	3.3
1	A	1281	PRO	3.1
1	B	391	TYR	2.7
1	B	812	SER	2.7
1	A	35	MET	2.6
1	A	392	PHE	2.6
1	B	392	PHE	2.6
1	A	793	GLY	2.5
1	A	794	GLY	2.5
1	A	1267	TYR	2.5
1	A	136	ALA	2.4
1	A	46	ALA	2.4
1	A	1151	SER	2.4
1	B	1000	TRP	2.4
1	A	125	ALA	2.3
1	B	1267	TYR	2.3
1	B	811	GLY	2.3
1	B	833	SER	2.3
1	B	61	ALA	2.2
1	A	68	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	125	ALA	2.2
1	A	941	GLY	2.1
1	B	767	GLY	2.1
1	B	68	ASP	2.1
1	A	365	ALA	2.1
1	A	804	GLN	2.1
1	A	1237	ASN	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 oligosaccharides 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, 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
5	SO4	B	1705	5/5	0.70	0.16	83,90,91,93	0
5	SO4	B	1703	5/5	0.76	0.12	82,84,88,91	0
6	MES	B	1710	12/12	0.76	0.20	86,91,97,101	0
5	SO4	B	1709	5/5	0.77	0.12	83,83,88,88	0
6	MES	A	1708	12/12	0.78	0.22	86,88,91,93	0
5	SO4	B	1707	5/5	0.80	0.13	54,62,72,73	0
5	SO4	A	1704	5/5	0.80	0.13	84,90,91,94	0
5	SO4	A	1703	5/5	0.81	0.11	81,81,84,85	0
5	SO4	B	1708	5/5	0.82	0.14	77,80,82,86	0
5	SO4	A	1706	5/5	0.83	0.12	71,77,85,92	0
5	SO4	B	1702	5/5	0.86	0.10	70,74,75,76	0
7	EDO	B	1805	4/4	0.86	0.15	58,58,60,61	0
7	EDO	A	1807	4/4	0.88	0.16	48,49,50,51	0
5	SO4	A	1701	5/5	0.88	0.12	60,62,66,69	0
5	SO4	A	1702	5/5	0.89	0.10	64,66,66,68	0
7	EDO	A	1804	4/4	0.89	0.16	35,44,44,50	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	MG	A	1604	1/1	0.90	0.09	84,84,84,84	0
7	EDO	B	1803	4/4	0.90	0.17	53,59,59,63	0
7	EDO	A	1805	4/4	0.90	0.10	59,59,59,60	0
7	EDO	B	1806	4/4	0.90	0.15	47,47,49,52	0
5	SO4	B	1704	5/5	0.91	0.10	76,77,80,81	0
7	EDO	A	1803	4/4	0.91	0.14	50,53,54,55	0
7	EDO	A	1802	4/4	0.92	0.12	39,39,40,42	0
7	EDO	B	1804	4/4	0.92	0.11	34,37,38,45	0
7	EDO	A	1806	4/4	0.93	0.10	49,51,52,53	0
7	EDO	A	1801	4/4	0.93	0.10	35,38,38,38	0
4	MG	B	1601	1/1	0.94	0.11	61,61,61,61	0
5	SO4	B	1701	5/5	0.94	0.09	61,63,67,71	0
4	MG	B	1606	1/1	0.94	0.07	77,77,77,77	0
7	EDO	B	1802	4/4	0.94	0.09	36,39,41,43	0
6	MES	B	1711	12/12	0.95	0.09	38,41,44,45	0
4	MG	A	1607	1/1	0.95	0.10	74,74,74,74	0
7	EDO	B	1801	4/4	0.95	0.09	35,36,37,38	0
6	MES	A	1707	12/12	0.95	0.10	37,41,42,43	0
5	SO4	B	1706	5/5	0.96	0.08	44,45,47,47	0
2	CA	A	1303	1/1	0.96	0.07	34,34,34,34	0
5	SO4	A	1705	5/5	0.96	0.07	40,43,46,46	0
2	CA	B	1303	1/1	0.97	0.09	36,36,36,36	0
4	MG	A	1608	1/1	0.97	0.09	64,64,64,64	0
2	CA	A	1302	1/1	0.97	0.09	40,40,40,40	0
2	CA	B	1302	1/1	0.98	0.10	40,40,40,40	0
4	MG	A	1605	1/1	0.98	0.06	65,65,65,65	0
4	MG	B	1604	1/1	0.98	0.05	61,61,61,61	0
4	MG	A	1603	1/1	0.98	0.11	60,60,60,60	0
4	MG	B	1602	1/1	0.99	0.04	42,42,42,42	0
4	MG	B	1603	1/1	0.99	0.06	62,62,62,62	0
3	NI	A	1501	1/1	0.99	0.08	51,51,51,51	0
3	NI	B	1501	1/1	0.99	0.09	49,49,49,49	0
4	MG	A	1606	1/1	0.99	0.03	48,48,48,48	0
4	MG	A	1601	1/1	0.99	0.07	33,33,33,33	0
4	MG	A	1602	1/1	0.99	0.03	39,39,39,39	0
4	MG	B	1607	1/1	0.99	0.05	27,27,27,27	0
2	CA	A	1301	1/1	0.99	0.03	35,35,35,35	0
4	MG	B	1605	1/1	1.00	0.04	39,39,39,39	0
2	CA	B	1301	1/1	1.00	0.02	32,32,32,32	0

6.5 Other polymers [i](#)

There are no such residues in this entry.