



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 21, 2026 – 07:16 pm BST

PDB ID : 9SJJ / pdb_00009sjj
Title : Crystal structure of SusDdex (BT3089) with bound IMO5
Authors : Feasey, M.; Basle, A.; van den Berg, B.
Deposited on : 2025-08-31
Resolution : 1.70 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	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

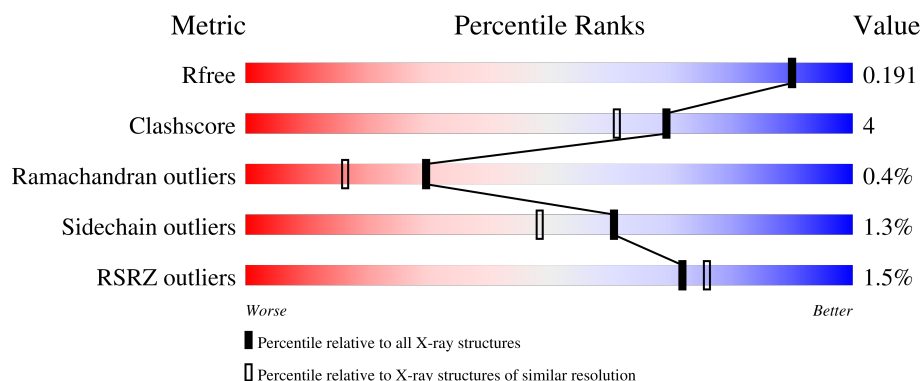
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.70 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	5551 (1.70-1.70)
Clashscore	190562	5924 (1.70-1.70)
Ramachandran outliers	187476	5846 (1.70-1.70)
Sidechain outliers	187428	5846 (1.70-1.70)
RSRZ outliers	180081	5554 (1.70-1.70)

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	478	
2	B	5	

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 4179 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 SusD homolog.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	462	3645	2294	622	707	22	0	0	0

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	27	MET	-	initiating methionine	UNP Q8A366
A	28	GLY	-	expression tag	UNP Q8A366
A	497	LEU	-	expression tag	UNP Q8A366
A	498	GLU	-	expression tag	UNP Q8A366
A	499	HIS	-	expression tag	UNP Q8A366
A	500	HIS	-	expression tag	UNP Q8A366
A	501	HIS	-	expression tag	UNP Q8A366
A	502	HIS	-	expression tag	UNP Q8A366
A	503	HIS	-	expression tag	UNP Q8A366
A	504	HIS	-	expression tag	UNP Q8A366

- Molecule 2 is an oligosaccharide called alpha-D-glucopyranose-(1-6)-alpha-D-glucopyranose-(1-6)-alpha-D-glucopyranose-(1-6)-alpha-D-glucopyranose.



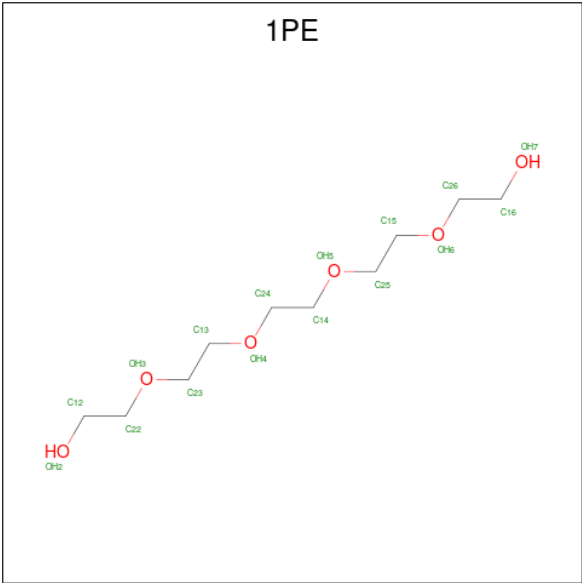
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
			Total	C	O			
2	B	5	56	30	26	0	0	0

- Molecule 3 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: C₈H₁₈O₅).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			13	8	5		
3	A	1	Total	C	O	0	0
			13	8	5		

- Molecule 4 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: C₁₀H₂₂O₆).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			16	10	6		
4	A	1	Total	C	O	0	0
			16	10	6		

Continued on next page...

Continued from previous page...

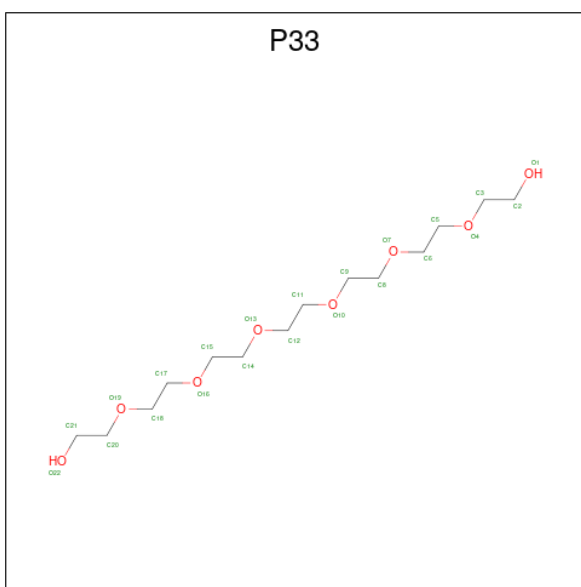
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			16	10	6		
4	A	1	Total	C	O	0	0
			16	10	6		

- Molecule 5 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



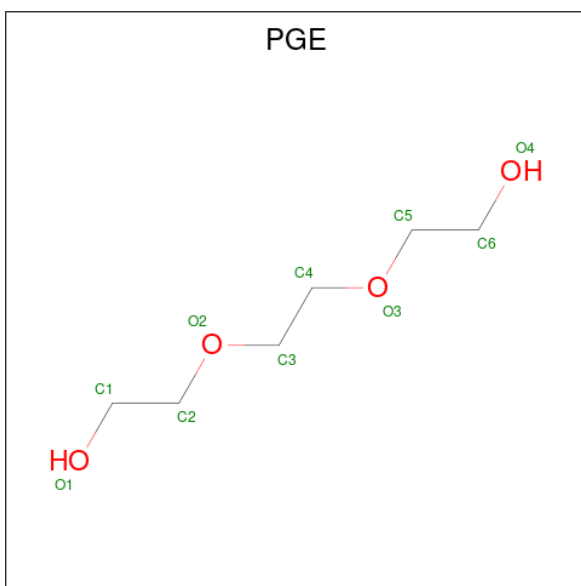
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			7	4	3		
5	A	1	Total	C	O	0	0
			7	4	3		
5	A	1	Total	C	O	0	0
			7	4	3		

- Molecule 6 is 3,6,9,12,15,18-HEXAOSAICOSANE-1,20-DIOL (CCD ID: P33) (formula: $C_{14}H_{30}O_8$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			22	14	8		

- Molecule 7 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: C₆H₁₄O₄).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			10	6	4		

- Molecule 8 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



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

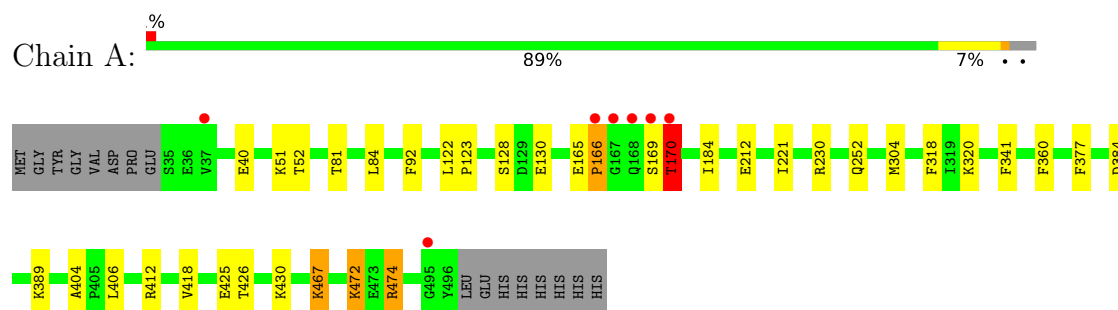
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	310	Total	O	0	0
			310	310		

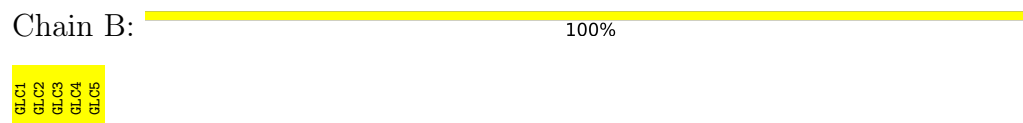
3 Residue-property plots

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: SusD homolog



- Molecule 2: alpha-D-glucopyranose-(1-6)-alpha-D-glucopyranose-(1-6)-alpha-D-glucopyranose-(1-6)-alpha-D-glucopyranose-(1-6)-alpha-D-glucopyranose



4 Data and refinement statistics

Property	Value
Space group	I 2 2 2
Cell constants a, b, c, α , β , γ	87.00Å 106.15Å 138.34Å 90.00° 90.00° 90.00°
Resolution (Å)	67.29 – 1.70 67.29 – 1.70
% Data completeness (in resolution range)	100.0 (67.29-1.70) 100.0 (67.29-1.70)
R_{merge}	0.10
R_{sym}	(Not available)
$\langle I/\sigma(I) \rangle$ ¹	1.51 (at 1.70Å)
Refinement program	REFMAC 5.8.0430 (refmacat 0.4.88), REFMAC 5.8.0430 (refmacat 0.4.88)
R, R_{free}	0.165 , 0.191 0.165 , 0.191
R_{free} test set	3544 reflections (5.02%)
Wilson B-factor (Å ²)	29.5
Anisotropy	0.192
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 37.4
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$
Estimated twinning fraction	No twinning to report.
F_o, F_c correlation	0.97
Total number of atoms	4179
Average B, all atoms (Å ²)	35.0

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.05% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PEG, P33, SO4, 1PE, GLC, PG4, PGE

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	0.80	0/3726	1.23	18/5060 (0.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	467	LYS	CB-CG-CD	11.00	136.61	111.30
1	A	474	ARG	CD-NE-CZ	9.23	137.32	124.40
1	A	252	GLN	CB-CA-C	-8.15	96.79	110.56
1	A	130	GLU	CB-CG-CD	7.70	125.69	112.60
1	A	92	PHE	CA-CB-CG	-7.52	106.28	113.80
1	A	212	GLU	CB-CA-C	-6.75	97.71	110.67
1	A	425	GLU	CB-CG-CD	6.37	123.42	112.60
1	A	467	LYS	CB-CA-C	6.36	121.67	112.12
1	A	341	PHE	CA-CB-CG	-6.17	107.63	113.80
1	A	377	PHE	CA-CB-CG	-5.63	108.17	113.80
1	A	318	PHE	CA-CB-CG	-5.45	108.35	113.80
1	A	360	PHE	N-CA-CB	-5.34	102.37	110.92
1	A	230	ARG	CG-CD-NE	-5.25	100.45	112.00
1	A	412	ARG	CA-CB-CG	-5.24	103.62	114.10
1	A	467	LYS	CA-CB-CG	-5.22	103.66	114.10
1	A	384	ASP	CA-CB-CG	5.16	117.76	112.60

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	230	ARG	CD-NE-CZ	5.15	131.61	124.40
1	A	304	MET	CG-SD-CE	-5.13	89.61	100.90

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	474	ARG	Sidechain

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	3645	0	3504	22	0
2	B	56	0	48	0	0
3	A	26	0	36	1	0
4	A	64	0	88	11	0
5	A	21	0	30	1	0
6	A	22	0	30	5	0
7	A	10	0	14	2	0
8	A	25	0	0	0	0
9	A	310	0	0	3	0
All	All	4179	0	3750	27	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 4.

All (27) 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:51:LYS:HZ3	4:A:603:1PE:H142	1.37	0.90
4:A:605:1PE:H262	3:A:608:PG4:H31	1.57	0.87
1:A:430:LYS:HE2	4:A:605:1PE:H221	1.57	0.85
6:A:607:P33:H172	9:A:801:HOH:O	1.86	0.73
1:A:51:LYS:NZ	4:A:603:1PE:H132	2.06	0.71

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:472:LYS:HZ3	6:A:607:P33:H81	1.56	0.70
6:A:607:P33:H142	9:A:951:HOH:O	1.93	0.68
1:A:430:LYS:CE	4:A:605:1PE:H221	2.27	0.62
5:A:606:PEG:H41	9:A:986:HOH:O	2.02	0.58
1:A:40:GLU:CD	1:A:40:GLU:H	2.14	0.56
1:A:320:LYS:NZ	7:A:610:PGE:H22	2.22	0.55
1:A:169:SER:O	1:A:170:THR:HB	2.07	0.54
1:A:426:THR:HG23	4:A:605:1PE:H222	1.93	0.51
1:A:389:LYS:NZ	4:A:604:1PE:H162	2.26	0.51
1:A:472:LYS:HZ3	6:A:607:P33:C8	2.22	0.51
1:A:81:THR:HA	1:A:84:LEU:HD22	1.95	0.49
1:A:165:GLU:CB	1:A:166:PRO:HD2	2.45	0.47
1:A:51:LYS:HZ1	4:A:603:1PE:H132	1.78	0.46
1:A:169:SER:O	1:A:170:THR:CB	2.64	0.46
7:A:610:PGE:H3	7:A:610:PGE:H52	1.42	0.45
1:A:122:LEU:N	1:A:123:PRO:CD	2.79	0.45
1:A:472:LYS:HD2	6:A:607:P33:H32	1.97	0.45
1:A:404:ALA:HB3	4:A:604:1PE:H251	1.99	0.45
1:A:406:LEU:HD23	1:A:418:VAL:HG21	1.98	0.44
1:A:51:LYS:CE	4:A:603:1PE:H132	2.49	0.42
1:A:430:LYS:HZ1	4:A:605:1PE:C22	2.32	0.42
1:A:184:ILE:HG22	1:A:221:ILE:HD13	2.03	0.41

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	460/478 (96%)	446 (97%)	12 (3%)	2 (0%)	30 16

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	170	THR
1	A	166	PRO

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	388/402 (96%)	383 (99%)	5 (1%)	61	48

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	52	THR
1	A	128	SER
1	A	170	THR
1	A	467	LYS
1	A	472	LYS

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

Mol	Chain	Res	Type
1	A	88	GLN
1	A	95	GLN
1	A	242	GLN
1	A	265	ASN
1	A	274	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

5 monosaccharides 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
2	GLC	B	1	2	12,12,12	0.86	0	17,17,17	1.10	2 (11%)
2	GLC	B	2	2	11,11,12	0.58	0	15,15,17	0.99	1 (6%)
2	GLC	B	3	2	11,11,12	1.42	2 (18%)	15,15,17	1.20	1 (6%)
2	GLC	B	4	2	11,11,12	0.73	0	15,15,17	1.16	2 (13%)
2	GLC	B	5	2	11,11,12	0.87	1 (9%)	15,15,17	0.88	1 (6%)

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
2	GLC	B	1	2	-	0/2/22/22	0/1/1/1
2	GLC	B	2	2	-	0/2/19/22	0/1/1/1
2	GLC	B	3	2	-	0/2/19/22	0/1/1/1
2	GLC	B	4	2	-	2/2/19/22	0/1/1/1
2	GLC	B	5	2	-	0/2/19/22	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	3	GLC	C2-C3	3.45	1.57	1.52
2	B	3	GLC	O5-C5	2.77	1.49	1.43
2	B	5	GLC	O5-C5	2.45	1.48	1.43

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	3	GLC	C1-O5-C5	3.99	117.60	112.19

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2	GLC	C1-O5-C5	2.87	116.08	112.19
2	B	4	GLC	C1-C2-C3	2.53	112.78	109.67
2	B	4	GLC	C1-O5-C5	2.41	115.45	112.19
2	B	1	GLC	O3-C3-C2	-2.40	104.81	110.35
2	B	5	GLC	O3-C3-C2	2.36	114.52	109.99
2	B	1	GLC	O2-C2-C3	-2.09	105.52	110.35

There are no chirality outliers.

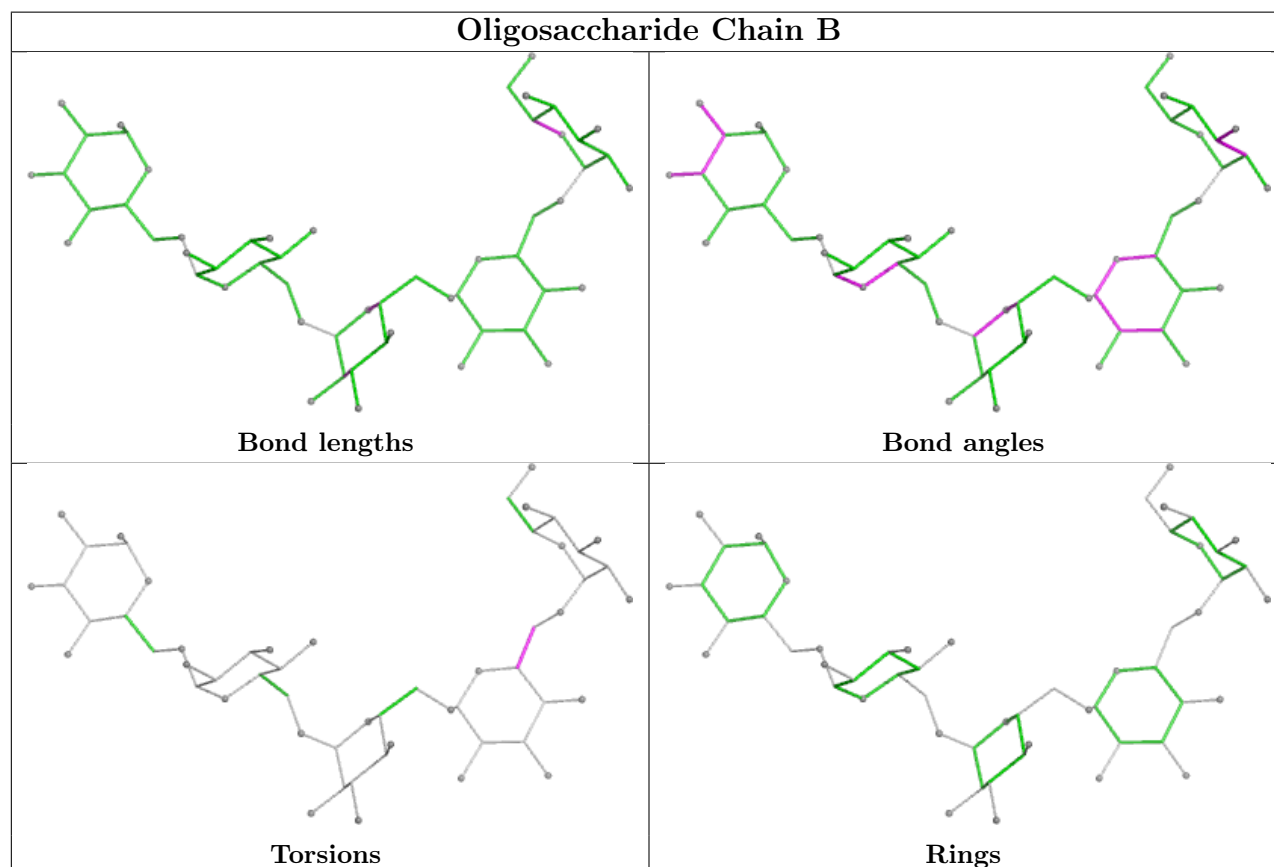
All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	4	GLC	O5-C5-C6-O6
2	B	4	GLC	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



5.6 Ligand geometry

16 ligands 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	$\# Z > 2$
5	PEG	A	611	-	6,6,6	0.22	0	5,5,5	0.13	0
4	1PE	A	602	-	15,15,15	0.31	0	14,14,14	0.52	0
3	PG4	A	601	-	12,12,12	0.21	0	11,11,11	0.25	0
4	1PE	A	604	-	15,15,15	0.35	0	14,14,14	0.19	0
4	1PE	A	605	-	15,15,15	0.47	0	14,14,14	0.46	0
8	SO4	A	615	-	4,4,4	0.37	0	6,6,6	0.08	0
8	SO4	A	616	-	4,4,4	0.43	0	6,6,6	0.13	0
5	PEG	A	609	-	6,6,6	0.21	0	5,5,5	0.18	0
3	PG4	A	608	-	12,12,12	0.27	0	11,11,11	0.24	0
8	SO4	A	612	-	4,4,4	0.36	0	6,6,6	0.12	0
8	SO4	A	614	-	4,4,4	0.36	0	6,6,6	0.12	0
5	PEG	A	606	-	6,6,6	0.13	0	5,5,5	0.11	0
7	PGE	A	610	-	9,9,9	0.19	0	8,8,8	0.14	0
6	P33	A	607	-	21,21,21	0.28	0	20,20,20	0.39	0
4	1PE	A	603	-	15,15,15	0.30	0	14,14,14	0.37	0
8	SO4	A	613	-	4,4,4	0.37	0	6,6,6	0.13	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
5	PEG	A	611	-	-	3/4/4/4	-
4	1PE	A	602	-	-	1/13/13/13	-
3	PG4	A	601	-	-	5/10/10/10	-
4	1PE	A	604	-	-	4/13/13/13	-
4	1PE	A	605	-	-	4/13/13/13	-
5	PEG	A	609	-	-	3/4/4/4	-
3	PG4	A	608	-	-	6/10/10/10	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	PEG	A	606	-	-	2/4/4/4	-
7	PGE	A	610	-	-	5/7/7/7	-
6	P33	A	607	-	-	10/19/19/19	-
4	1PE	A	603	-	-	4/13/13/13	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (47) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	607	P33	C5-C6-O7-C8
7	A	610	PGE	C3-C4-O3-C5
4	A	605	1PE	OH4-C13-C23-OH3
4	A	603	1PE	OH4-C13-C23-OH3
6	A	607	P33	O10-C11-C12-O13
6	A	607	P33	O7-C8-C9-O10
3	A	608	PG4	O4-C7-C8-O5
3	A	608	PG4	O3-C5-C6-O4
4	A	605	1PE	OH2-C12-C22-OH3
6	A	607	P33	O1-C2-C3-O4
5	A	611	PEG	O1-C1-C2-O2
3	A	608	PG4	O1-C1-C2-O2
5	A	609	PEG	O1-C1-C2-O2
5	A	606	PEG	O1-C1-C2-O2
5	A	606	PEG	O2-C3-C4-O4
3	A	601	PG4	O3-C5-C6-O4
3	A	601	PG4	O1-C1-C2-O2
7	A	610	PGE	C6-C5-O3-C4
6	A	607	P33	C18-C17-O16-C15
4	A	605	1PE	C14-C24-OH4-C13
4	A	604	1PE	C12-C22-OH3-C23
5	A	611	PEG	C4-C3-O2-C2
3	A	601	PG4	C6-C5-O3-C4
3	A	608	PG4	C4-C3-O2-C2
6	A	607	P33	C8-C9-O10-C11
4	A	605	1PE	C13-C23-OH3-C22
4	A	604	1PE	OH6-C15-C25-OH5
3	A	608	PG4	C5-C6-O4-C7
6	A	607	P33	O16-C17-C18-O19

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
7	A	610	PGE	C1-C2-O2-C3
4	A	604	1PE	OH5-C14-C24-OH4
6	A	607	P33	O13-C14-C15-O16
3	A	608	PG4	C6-C5-O3-C4
7	A	610	PGE	C4-C3-O2-C2
4	A	603	1PE	OH6-C15-C25-OH5
5	A	609	PEG	O2-C3-C4-O4
4	A	604	1PE	C24-C14-OH5-C25
6	A	607	P33	C2-C3-O4-C5
4	A	603	1PE	C13-C23-OH3-C22
3	A	601	PG4	C8-C7-O4-C6
4	A	602	1PE	C12-C22-OH3-C23
5	A	611	PEG	C1-C2-O2-C3
5	A	609	PEG	C4-C3-O2-C2
3	A	601	PG4	C1-C2-O2-C3
7	A	610	PGE	O2-C3-C4-O3
4	A	603	1PE	C15-C25-OH5-C14
6	A	607	P33	O4-C5-C6-O7

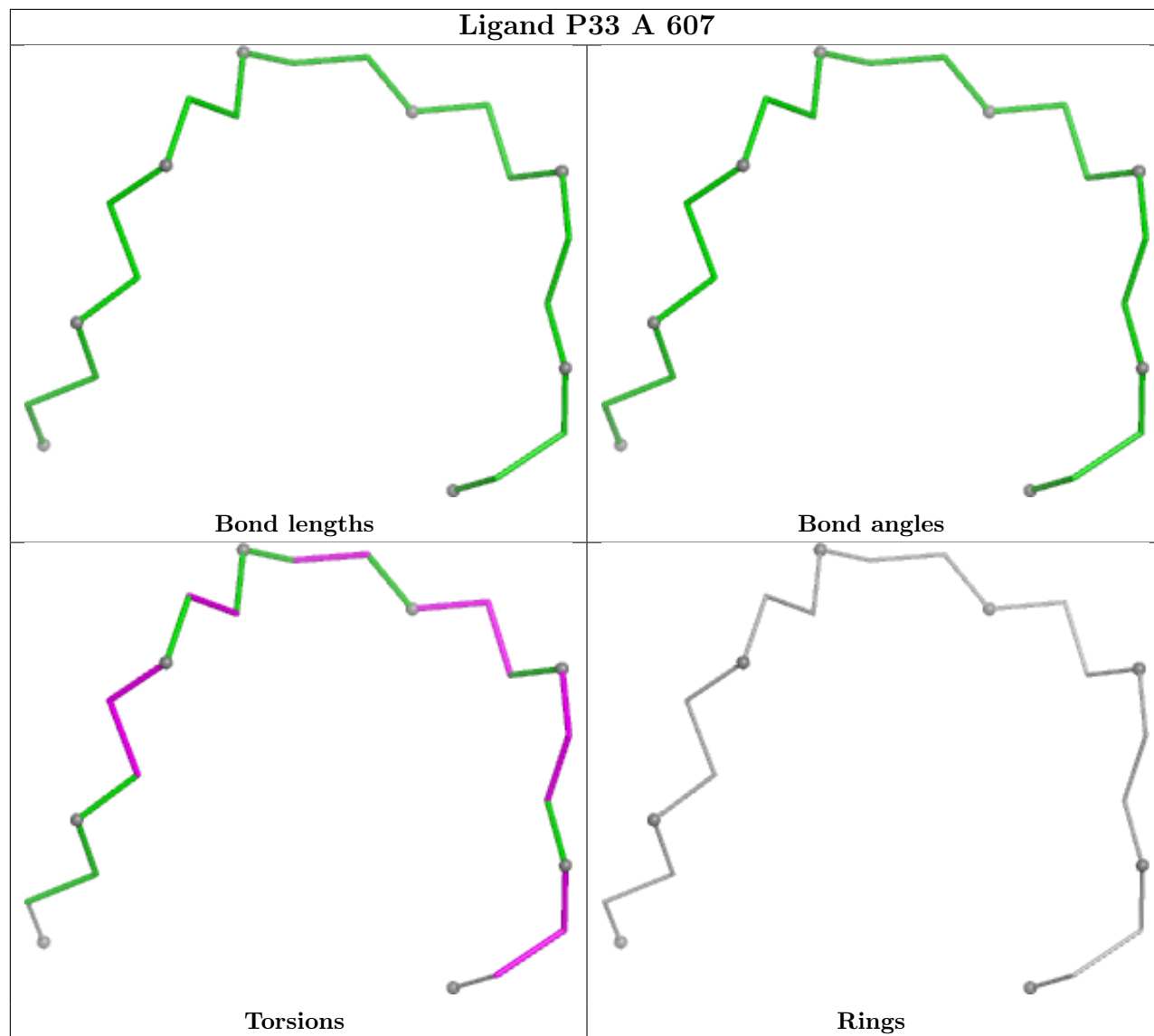
There are no ring outliers.

7 monomers are involved in 19 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	604	1PE	2	0
4	A	605	1PE	5	0
3	A	608	PG4	1	0
5	A	606	PEG	1	0
7	A	610	PGE	2	0
6	A	607	P33	5	0
4	A	603	1PE	4	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient

equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	462/478 (96%)	-0.11	7 (1%) 72 76	23, 30, 55, 109	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	166	PRO	4.7
1	A	170	THR	3.1
1	A	168	GLN	2.7
1	A	167	GLY	2.6
1	A	495	GLY	2.4
1	A	169	SER	2.2
1	A	37	VAL	2.0

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

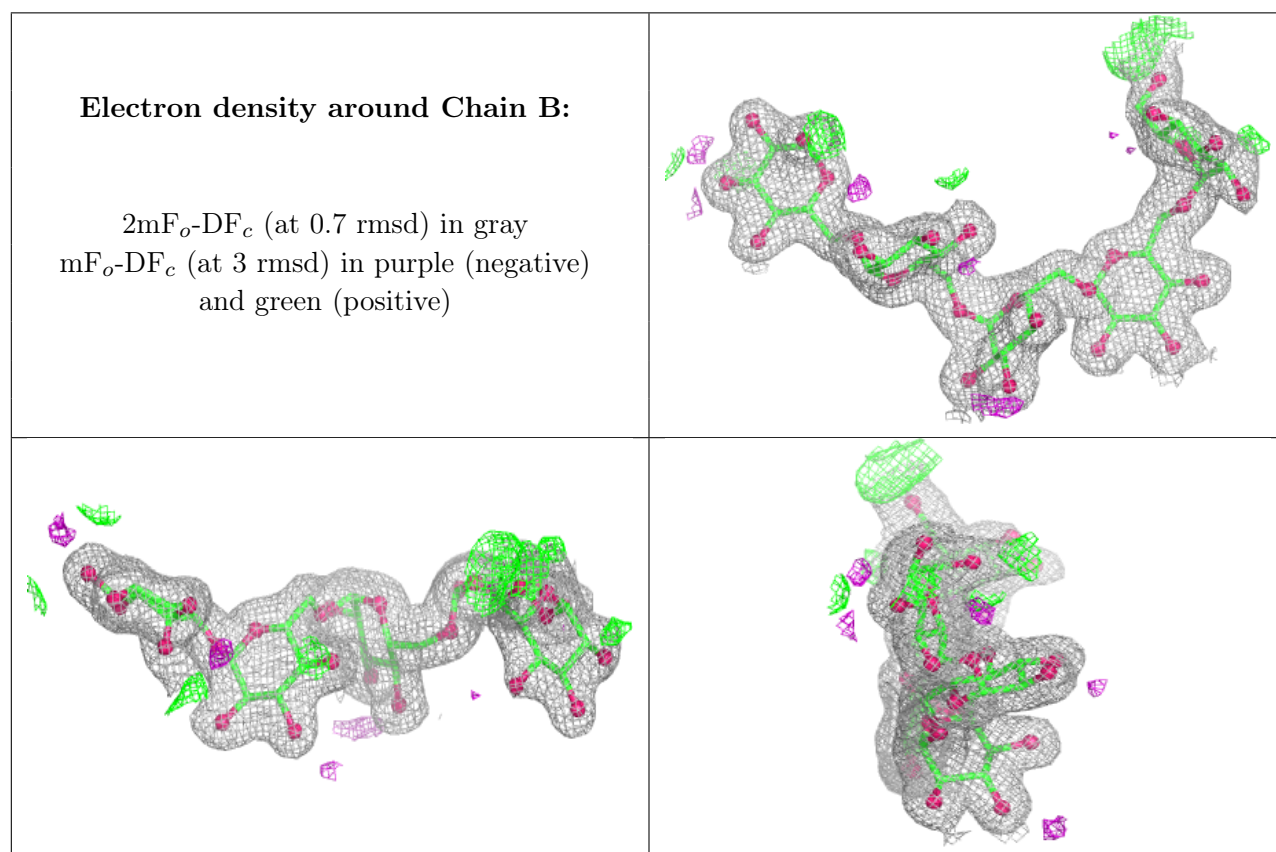
There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

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
2	GLC	B	5	11/12	0.80	0.12	44,55,63,66	0
2	GLC	B	1	12/12	0.95	0.08	30,32,42,43	0
2	GLC	B	2	11/12	0.97	0.06	28,33,38,39	0
2	GLC	B	4	11/12	0.98	0.05	24,26,30,43	0
2	GLC	B	3	11/12	0.98	0.05	27,28,29,29	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



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.

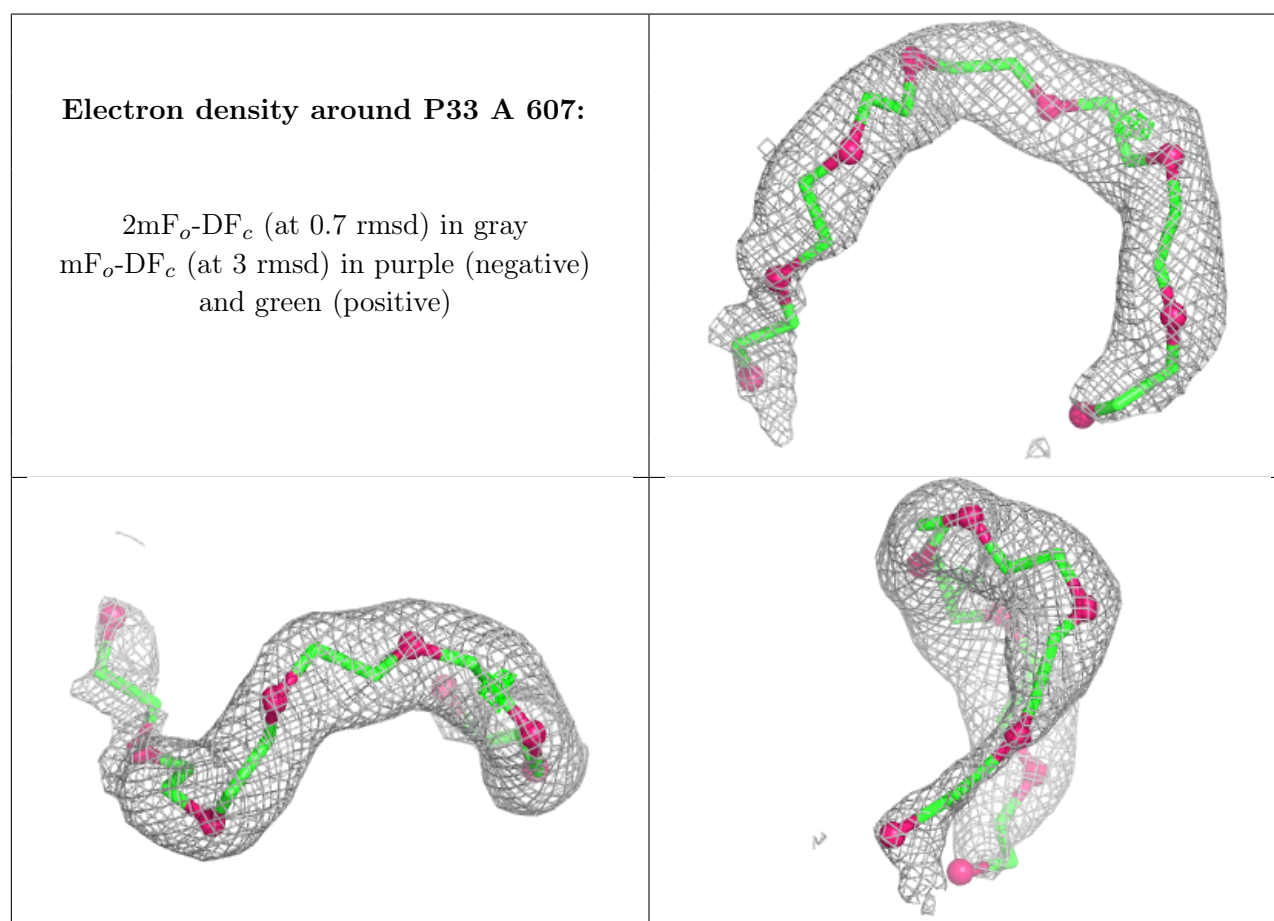
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	PEG	A	611	7/7	0.70	0.18	74,89,98,102	0
8	SO4	A	614	5/5	0.77	0.12	85,88,93,111	0
8	SO4	A	613	5/5	0.82	0.11	64,77,89,97	0
3	PG4	A	608	13/13	0.82	0.19	44,60,76,80	0
4	1PE	A	604	16/16	0.84	0.18	44,58,69,80	0
8	SO4	A	615	5/5	0.86	0.10	72,81,81,88	0
4	1PE	A	603	16/16	0.88	0.15	43,61,70,70	0
8	SO4	A	612	5/5	0.89	0.09	56,56,70,71	0
5	PEG	A	609	7/7	0.89	0.15	51,58,64,69	0
4	1PE	A	605	16/16	0.89	0.15	43,53,62,64	0
7	PGE	A	610	10/10	0.89	0.16	53,65,77,79	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	PEG	A	606	7/7	0.91	0.13	57,68,76,87	0
8	SO4	A	616	5/5	0.91	0.07	58,71,88,89	0
6	P33	A	607	22/22	0.92	0.13	40,56,86,91	0
3	PG4	A	601	13/13	0.93	0.14	49,57,67,82	0
4	1PE	A	602	16/16	0.94	0.11	42,46,49,50	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



6.5 Other polymers [i](#)

There are no such residues in this entry.