



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 06:56 AM UTC

PDB ID : 7VC7 / pdb_00007vc7
Title : The structure of beta-xylosidase from Phanerochaete chrysosporium(PcBxl3)
Authors : Kojima, K.; Sunagawa, N.; Igarashi, K.
Deposited on : 2021-09-01
Resolution : 3.08 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
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (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

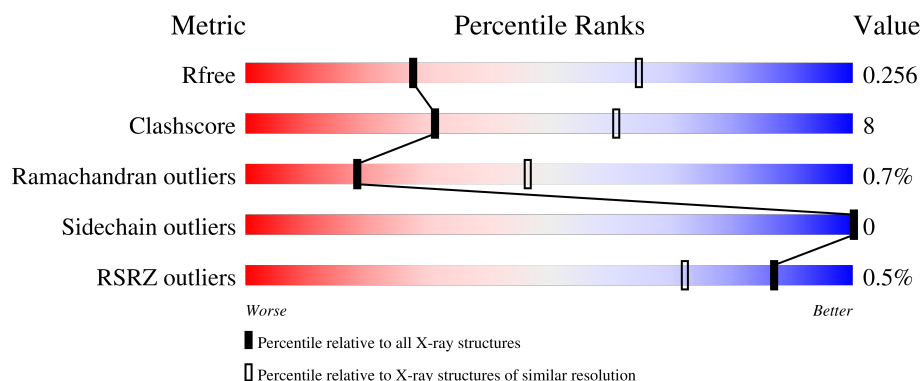
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.08 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	2010 (3.10-3.06)
Clashscore	190562	2102 (3.10-3.06)
Ramachandran outliers	187476	1982 (3.10-3.06)
Sidechain outliers	187428	1981 (3.10-3.06)
RSRZ outliers	180081	2010 (3.10-3.06)

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	743	

2 Entry composition [i](#)

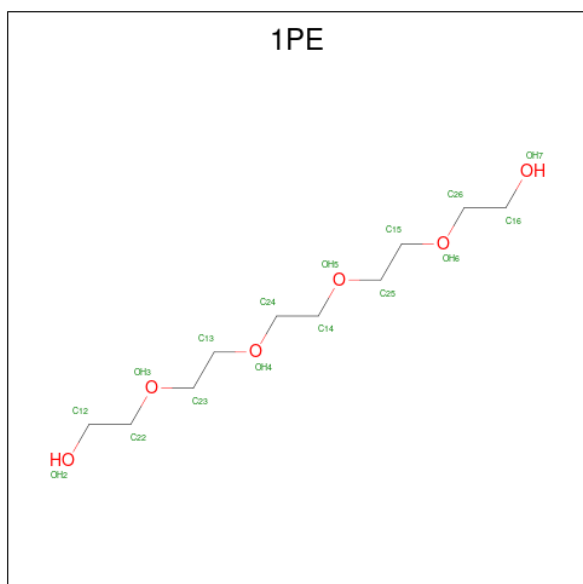
There are 7 unique types of molecules in this entry. The entry contains 6116 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 xylan 1,4-beta-xylosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	743	Total	C	N	O	S	0	0	0
			5609	3558	953	1081	17			

- Molecule 2 is PENTAETHYLENE GLYCOL (CCD ID: 1PE) (formula: $C_{10}H_{22}O_6$).



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

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

- Molecule 3 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



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

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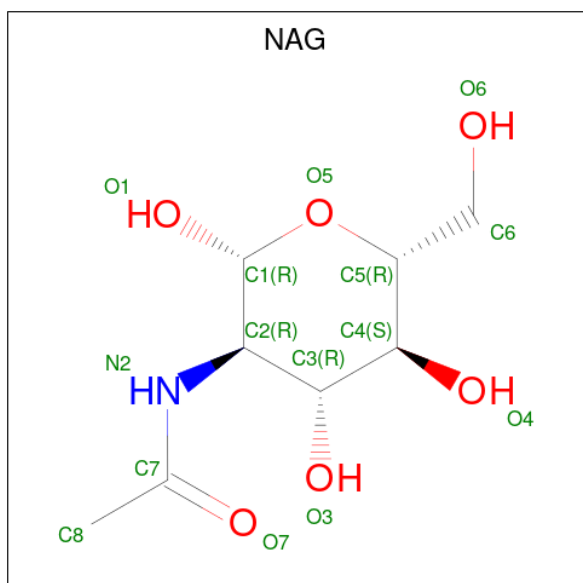
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			7	4	3		

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



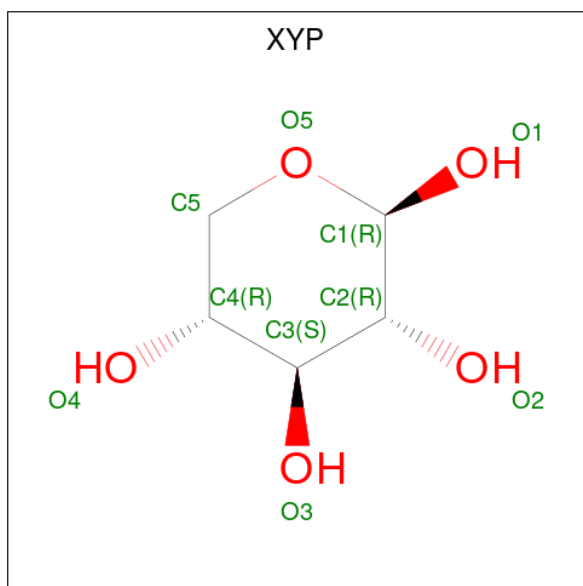
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 6 is beta-D-xylopyranose (CCD ID: XYP) (formula: C₅H₁₀O₅) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			10	5	5		

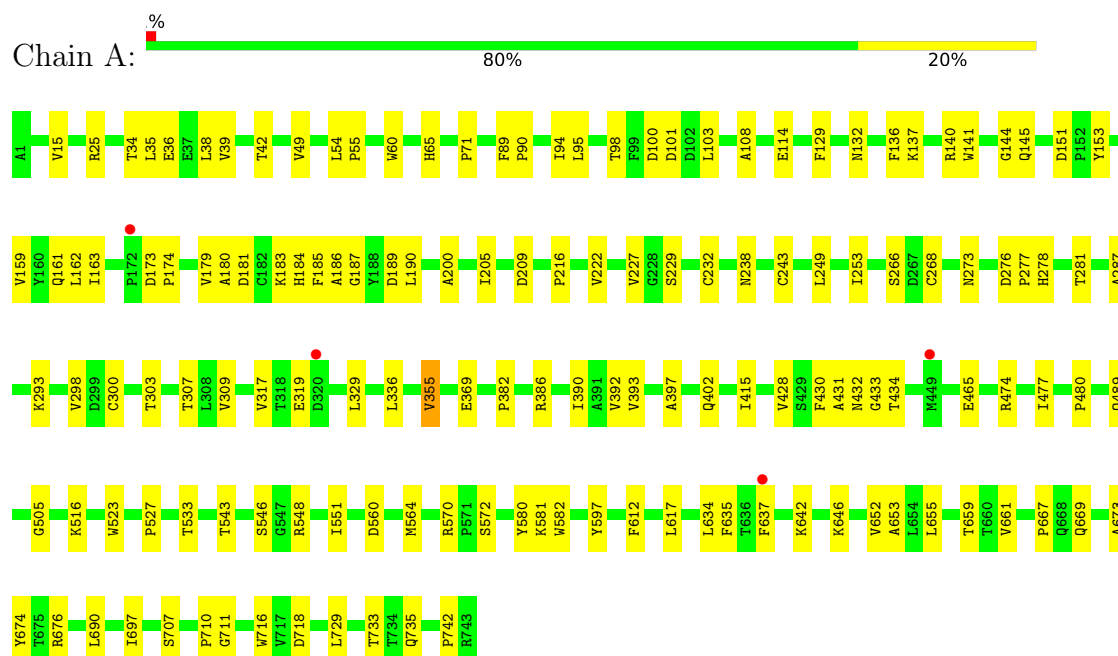
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	168	Total	O	0	0
			168	168		

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: xylan 1,4-beta-xylosidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	79.37Å 91.07Å 106.01Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	44.08 – 3.08 44.08 – 3.08	Depositor EDS
% Data completeness (in resolution range)	100.0 (44.08-3.08) 99.9 (44.08-3.08)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 3.06Å)	Xtriage
Refinement program	PHENIX (1.18.2-3874)	Depositor
R, R_{free}	0.204 , 0.261 0.202 , 0.256	Depositor DCC
R_{free} test set	721 reflections (1.38%)	wwPDB-VP
Wilson B-factor (Å ²)	48.5	Xtriage
Anisotropy	0.708	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 41.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	6116	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.68% 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: PEG, XYP, NAG, EDO, 1PE

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	0.12	0/5758	0.33	0/7879

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.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	173	ASP	Peptide

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	5609	0	5428	93	0
2	A	192	0	261	16	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	35	0	50	0	0
4	A	4	0	6	0	0
5	A	98	0	91	1	0
6	A	10	0	0	1	0
7	A	168	0	0	1	0
All	All	6116	0	5836	96	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 8.

All (96) 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:238:ASN:HB2	2:A:1716:1PE:H261	1.55	0.88
1:A:661:VAL:HG11	1:A:711:GLY:HA3	1.59	0.83
1:A:489:GLN:HE22	2:A:1710:1PE:H262	1.50	0.77
1:A:386:ARG:HD3	2:A:1706:1PE:H222	1.67	0.76
1:A:642:LYS:HD2	2:A:1715:1PE:H121	1.67	0.76
1:A:268:CYS:HA	1:A:300:CYS:HB3	1.73	0.70
1:A:108:ALA:HB2	1:A:162:LEU:HD12	1.74	0.70
2:A:1706:1PE:OH2	7:A:1801:HOH:O	2.11	0.68
1:A:35:LEU:HD13	1:A:319:GLU:HG3	1.79	0.63
1:A:669:GLN:HG2	1:A:716:TRP:HZ2	1.65	0.61
1:A:393:VAL:HA	1:A:431:ALA:O	2.02	0.60
1:A:200:ALA:HB2	1:A:277:PRO:HG2	1.84	0.60
1:A:489:GLN:NE2	2:A:1710:1PE:H251	2.17	0.59
1:A:634:LEU:HD22	1:A:697:ILE:HG21	1.84	0.59
1:A:432:ASN:O	1:A:434:THR:N	2.32	0.57
1:A:15:VAL:HA	1:A:25:ARG:HB3	1.87	0.56
1:A:581:LYS:HG3	1:A:582:TRP:CD1	2.41	0.56
1:A:548:ARG:HD2	1:A:652:VAL:HB	1.88	0.55
1:A:646:LYS:NZ	2:A:1717:1PE:OH7	2.32	0.54
1:A:190:LEU:HD12	1:A:564:MET:HG2	1.90	0.53
1:A:392:VAL:HG13	1:A:430:PHE:HD1	1.73	0.53
1:A:114:GLU:HG2	1:A:355:VAL:HA	1.91	0.53
1:A:392:VAL:HG22	1:A:397:ALA:HB1	1.90	0.53
1:A:635:PHE:HE2	1:A:637:PHE:CE1	2.27	0.53
1:A:49:VAL:H	1:A:54:LEU:HB3	1.74	0.53
1:A:273:ASN:HA	1:A:276:ASP:O	2.08	0.53
1:A:65:HIS:ND1	1:A:89:PHE:O	2.29	0.52
1:A:153:TYR:HD1	2:A:1701:1PE:H141	1.74	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:132:ASN:HA	1:A:183:LYS:HB2	1.92	0.51
1:A:402:GLN:HG2	2:A:1711:1PE:H262	1.91	0.51
1:A:480:PRO:HA	5:A:1725:NAG:H82	1.93	0.51
1:A:634:LEU:HG	1:A:635:PHE:HD1	1.75	0.50
1:A:581:LYS:HB2	1:A:667:PRO:HB3	1.93	0.50
1:A:137:LYS:NZ	1:A:189:ASP:OD1	2.45	0.49
1:A:136:PHE:HD2	1:A:551:ILE:HG21	1.78	0.48
1:A:707:SER:HB3	1:A:735:GLN:HA	1.94	0.48
1:A:209:ASP:OD1	1:A:570:ARG:NH1	2.47	0.48
1:A:140:ARG:HB2	1:A:474:ARG:HB2	1.94	0.48
1:A:232:CYS:SG	1:A:266:SER:HA	2.54	0.48
1:A:101:ASP:HB3	1:A:161:GLN:HG3	1.96	0.48
1:A:582:TRP:CZ2	1:A:667:PRO:HG3	2.49	0.48
1:A:742:PRO:HG2	2:A:1716:1PE:H241	1.96	0.48
1:A:179:VAL:HG23	1:A:336:LEU:HD21	1.96	0.47
1:A:273:ASN:O	1:A:278:HIS:HB2	2.14	0.47
1:A:474:ARG:HH21	1:A:477:ILE:HA	1.80	0.47
1:A:159:VAL:O	1:A:163:ILE:HG12	2.14	0.47
1:A:516:LYS:HB2	2:A:1713:1PE:H161	1.96	0.47
1:A:222:VAL:HG12	1:A:227:VAL:CG1	2.44	0.47
1:A:298:VAL:HB	1:A:329:LEU:HD21	1.97	0.47
1:A:548:ARG:NH1	1:A:718:ASP:OD1	2.46	0.47
1:A:187:GLY:HA3	1:A:205:ILE:HD11	1.97	0.46
1:A:216:PRO:HB3	2:A:1701:1PE:H132	1.96	0.46
1:A:655:LEU:HB3	1:A:673:ALA:HB3	1.96	0.46
1:A:183:LYS:HD3	1:A:184:HIS:CE1	2.51	0.46
1:A:38:LEU:O	1:A:42:THR:HG23	2.15	0.46
1:A:151:ASP:OD1	1:A:580:TYR:OH	2.25	0.46
1:A:612:PHE:HB3	1:A:617:LEU:HD11	1.98	0.45
1:A:95:LEU:O	1:A:98:THR:OG1	2.30	0.45
1:A:415:ILE:HG21	1:A:533:THR:HG23	1.99	0.45
1:A:634:LEU:HG	1:A:635:PHE:CD1	2.52	0.45
1:A:281:THR:HG21	1:A:287:ALA:HA	1.99	0.44
1:A:382:PRO:HG3	1:A:597:TYR:CD2	2.51	0.44
1:A:655:LEU:HB2	1:A:690:LEU:HD13	2.00	0.44
1:A:185:PHE:CD1	1:A:253:ILE:HD11	2.53	0.44
1:A:710:PRO:HD3	1:A:733:THR:HG22	1.98	0.43
1:A:612:PHE:HB2	1:A:729:LEU:HD23	1.99	0.43
1:A:181:ASP:OD1	1:A:229:SER:OG	2.23	0.43
1:A:293:LYS:HG3	1:A:317:VAL:HG12	2.00	0.43
1:A:653:ALA:O	1:A:674:TYR:HA	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:136:PHE:CD1	1:A:144:GLY:HA3	2.53	0.43
1:A:190:LEU:HA	1:A:564:MET:HE2	2.00	0.43
1:A:474:ARG:NH1	1:A:505:GLY:HA3	2.34	0.43
1:A:659:THR:OG1	1:A:661:VAL:HG22	2.19	0.43
1:A:546:SER:OG	1:A:676:ARG:NH2	2.52	0.42
1:A:560:ASP:OD2	2:A:1712:1PE:OH7	2.24	0.42
2:A:1710:1PE:H262	2:A:1710:1PE:H251	1.74	0.42
1:A:34:THR:HG22	1:A:36:GLU:H	1.85	0.42
1:A:369:GLU:HB3	1:A:543:THR:HG21	2.00	0.42
1:A:489:GLN:HG2	2:A:1710:1PE:H222	2.02	0.42
2:A:1717:1PE:H242	2:A:1717:1PE:H251	1.78	0.42
1:A:94:ILE:HD12	1:A:523:TRP:CZ3	2.54	0.42
1:A:129:PHE:O	1:A:183:LYS:HE3	2.19	0.42
1:A:183:LYS:HE2	6:A:1726:XYP:O4	2.20	0.42
1:A:390:ILE:O	1:A:428:VAL:HA	2.20	0.42
1:A:180:ALA:O	1:A:229:SER:HB3	2.20	0.42
1:A:136:PHE:CE1	1:A:141:TRP:HB3	2.55	0.41
1:A:54:LEU:HD12	1:A:55:PRO:HD2	2.01	0.41
1:A:60:TRP:CE3	1:A:71:PRO:HG2	2.55	0.41
1:A:222:VAL:HG12	1:A:227:VAL:HG12	2.02	0.41
1:A:145:GLN:NE2	1:A:465:GLU:OE2	2.52	0.41
1:A:276:ASP:HA	1:A:277:PRO:HA	1.86	0.40
1:A:39:VAL:HG11	1:A:309:VAL:HG23	2.03	0.40
1:A:90:PRO:HB3	1:A:527:PRO:HA	2.03	0.40
1:A:303:THR:O	1:A:307:THR:OG1	2.28	0.40
1:A:100:ASP:HB3	1:A:103:LEU:HB3	2.04	0.40
1:A:243:CYS:HA	1:A:249:LEU:HD11	2.02	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	741/743 (100%)	697 (94%)	39 (5%)	5 (1%)	18	46

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	174	PRO
1	A	186	ALA
1	A	433	GLY
1	A	572	SER
1	A	355	VAL

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	600/600 (100%)	600 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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	157	GLN
1	A	256	HIS
1	A	313	ASN
1	A	404	GLN
1	A	489	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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](#)

26 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	$\# Z > 2$
2	1PE	A	1706	-	15,15,15	0.23	0	14,14,14	0.12	0
2	1PE	A	1710	-	15,15,15	0.16	0	14,14,14	0.13	0
3	PEG	A	1702	-	6,6,6	0.14	0	5,5,5	0.08	0
5	NAG	A	1720	1	14,14,15	0.20	0	17,19,21	0.43	0
5	NAG	A	1724	1	14,14,15	0.54	0	17,19,21	0.96	1 (5%)
3	PEG	A	1718	-	6,6,6	0.12	0	5,5,5	0.07	0
2	1PE	A	1713	-	15,15,15	0.15	0	14,14,14	0.13	0
5	NAG	A	1721	1	14,14,15	0.62	1 (7%)	17,19,21	0.82	1 (5%)
4	EDO	A	1704	-	3,3,3	0.43	0	2,2,2	0.38	0
3	PEG	A	1703	-	6,6,6	0.15	0	5,5,5	0.11	0
2	1PE	A	1708	-	15,15,15	0.17	0	14,14,14	0.12	0
2	1PE	A	1714	-	15,15,15	0.20	0	14,14,14	0.10	0
2	1PE	A	1712	-	15,15,15	0.20	0	14,14,14	0.12	0
2	1PE	A	1701	-	15,15,15	0.16	0	14,14,14	0.19	0
6	XYP	A	1726	-	10,10,10	0.49	0	14,14,14	0.89	1 (7%)
5	NAG	A	1725	1	14,14,15	0.54	0	17,19,21	0.87	1 (5%)
3	PEG	A	1707	-	6,6,6	0.13	0	5,5,5	0.08	0
2	1PE	A	1715	-	15,15,15	0.19	0	14,14,14	0.09	0
2	1PE	A	1711	-	15,15,15	0.16	0	14,14,14	0.15	0
5	NAG	A	1719	1	14,14,15	0.27	0	17,19,21	0.44	0
2	1PE	A	1717	-	15,15,15	0.16	0	14,14,14	0.17	0
5	NAG	A	1722	1	14,14,15	0.39	0	17,19,21	0.38	0
5	NAG	A	1723	1	14,14,15	0.27	0	17,19,21	0.45	0
2	1PE	A	1716	-	15,15,15	0.21	0	14,14,14	0.22	0
3	PEG	A	1705	-	6,6,6	0.12	0	5,5,5	0.06	0
2	1PE	A	1709	-	15,15,15	0.18	0	14,14,14	0.17	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
2	1PE	A	1706	-	-	7/13/13/13	-
2	1PE	A	1710	-	-	5/13/13/13	-
3	PEG	A	1702	-	-	0/4/4/4	-
5	NAG	A	1720	1	-	2/6/23/26	0/1/1/1
5	NAG	A	1724	1	-	2/6/23/26	0/1/1/1
3	PEG	A	1718	-	-	1/4/4/4	-
2	1PE	A	1713	-	-	2/13/13/13	-
5	NAG	A	1721	1	-	2/6/23/26	0/1/1/1
4	EDO	A	1704	-	-	1/1/1/1	-
3	PEG	A	1703	-	-	3/4/4/4	-
2	1PE	A	1708	-	-	5/13/13/13	-
2	1PE	A	1714	-	-	3/13/13/13	-
2	1PE	A	1712	-	-	4/13/13/13	-
2	1PE	A	1701	-	-	4/13/13/13	-
6	XYP	A	1726	-	-	-	0/1/1/1
5	NAG	A	1725	1	-	0/6/23/26	0/1/1/1
3	PEG	A	1707	-	-	0/4/4/4	-
2	1PE	A	1715	-	-	3/13/13/13	-
2	1PE	A	1711	-	-	3/13/13/13	-
5	NAG	A	1719	1	-	0/6/23/26	0/1/1/1
2	1PE	A	1717	-	-	7/13/13/13	-
5	NAG	A	1722	1	-	0/6/23/26	0/1/1/1
5	NAG	A	1723	1	-	2/6/23/26	0/1/1/1
2	1PE	A	1716	-	-	6/13/13/13	-
3	PEG	A	1705	-	-	1/4/4/4	-
2	1PE	A	1709	-	-	7/13/13/13	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1721	NAG	C1-C2	2.00	1.55	1.52

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1724	NAG	C1-O5-C5	3.24	116.53	112.19
5	A	1721	NAG	C1-O5-C5	2.98	116.19	112.19
5	A	1725	NAG	C1-O5-C5	2.81	115.95	112.19
6	A	1726	XYP	C5-C4-C3	2.42	113.16	109.64

There are no chirality outliers.

All (70) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1721	NAG	O5-C5-C6-O6
5	A	1721	NAG	C4-C5-C6-O6
2	A	1717	1PE	OH6-C15-C25-OH5
2	A	1717	1PE	OH4-C13-C23-OH3
2	A	1708	1PE	OH5-C14-C24-OH4
2	A	1701	1PE	OH5-C14-C24-OH4
2	A	1706	1PE	OH5-C14-C24-OH4
5	A	1723	NAG	O5-C5-C6-O6
3	A	1703	PEG	C4-C3-O2-C2
5	A	1724	NAG	O5-C5-C6-O6
5	A	1723	NAG	C4-C5-C6-O6
3	A	1703	PEG	O1-C1-C2-O2
2	A	1706	1PE	OH6-C15-C25-OH5
2	A	1713	1PE	OH6-C15-C25-OH5
2	A	1715	1PE	OH5-C14-C24-OH4
2	A	1717	1PE	OH5-C14-C24-OH4
2	A	1717	1PE	C23-C13-OH4-C24
5	A	1720	NAG	C4-C5-C6-O6
2	A	1710	1PE	OH5-C14-C24-OH4
3	A	1703	PEG	O2-C3-C4-O4
2	A	1714	1PE	OH4-C13-C23-OH3
2	A	1709	1PE	C15-C25-OH5-C14
2	A	1716	1PE	OH4-C13-C23-OH3
2	A	1706	1PE	C23-C13-OH4-C24
2	A	1715	1PE	C14-C24-OH4-C13
2	A	1709	1PE	C12-C22-OH3-C23
2	A	1713	1PE	C25-C15-OH6-C26
2	A	1708	1PE	C12-C22-OH3-C23
5	A	1720	NAG	O5-C5-C6-O6
2	A	1701	1PE	C24-C14-OH5-C25
2	A	1706	1PE	C16-C26-OH6-C15
2	A	1716	1PE	C13-C23-OH3-C22
2	A	1706	1PE	C14-C24-OH4-C13
2	A	1706	1PE	C15-C25-OH5-C14

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Mol	Chain	Res	Type	Atoms
5	A	1724	NAG	C4-C5-C6-O6
2	A	1708	1PE	C16-C26-OH6-C15
2	A	1711	1PE	C25-C15-OH6-C26
2	A	1716	1PE	C16-C26-OH6-C15
2	A	1708	1PE	C23-C13-OH4-C24
2	A	1710	1PE	C25-C15-OH6-C26
2	A	1715	1PE	C16-C26-OH6-C15
2	A	1709	1PE	C13-C23-OH3-C22
2	A	1716	1PE	OH5-C14-C24-OH4
2	A	1701	1PE	C15-C25-OH5-C14
2	A	1716	1PE	C25-C15-OH6-C26
3	A	1705	PEG	C4-C3-O2-C2
3	A	1718	PEG	C4-C3-O2-C2
2	A	1717	1PE	C13-C23-OH3-C22
2	A	1714	1PE	C14-C24-OH4-C13
2	A	1712	1PE	C15-C25-OH5-C14
2	A	1712	1PE	C25-C15-OH6-C26
2	A	1709	1PE	C24-C14-OH5-C25
2	A	1710	1PE	OH6-C15-C25-OH5
2	A	1717	1PE	C24-C14-OH5-C25
2	A	1711	1PE	C23-C13-OH4-C24
2	A	1709	1PE	OH6-C15-C25-OH5
2	A	1709	1PE	OH2-C12-C22-OH3
2	A	1708	1PE	C14-C24-OH4-C13
2	A	1712	1PE	C24-C14-OH5-C25
2	A	1717	1PE	C25-C15-OH6-C26
2	A	1714	1PE	OH5-C14-C24-OH4
2	A	1706	1PE	OH4-C13-C23-OH3
4	A	1704	EDO	O1-C1-C2-O2
2	A	1701	1PE	OH6-C15-C25-OH5
2	A	1710	1PE	C14-C24-OH4-C13
2	A	1716	1PE	C24-C14-OH5-C25
2	A	1711	1PE	OH5-C14-C24-OH4
2	A	1710	1PE	C13-C23-OH3-C22
2	A	1712	1PE	OH6-C15-C25-OH5
2	A	1709	1PE	OH4-C13-C23-OH3

There are no ring outliers.

11 monomers are involved in 18 short contacts:

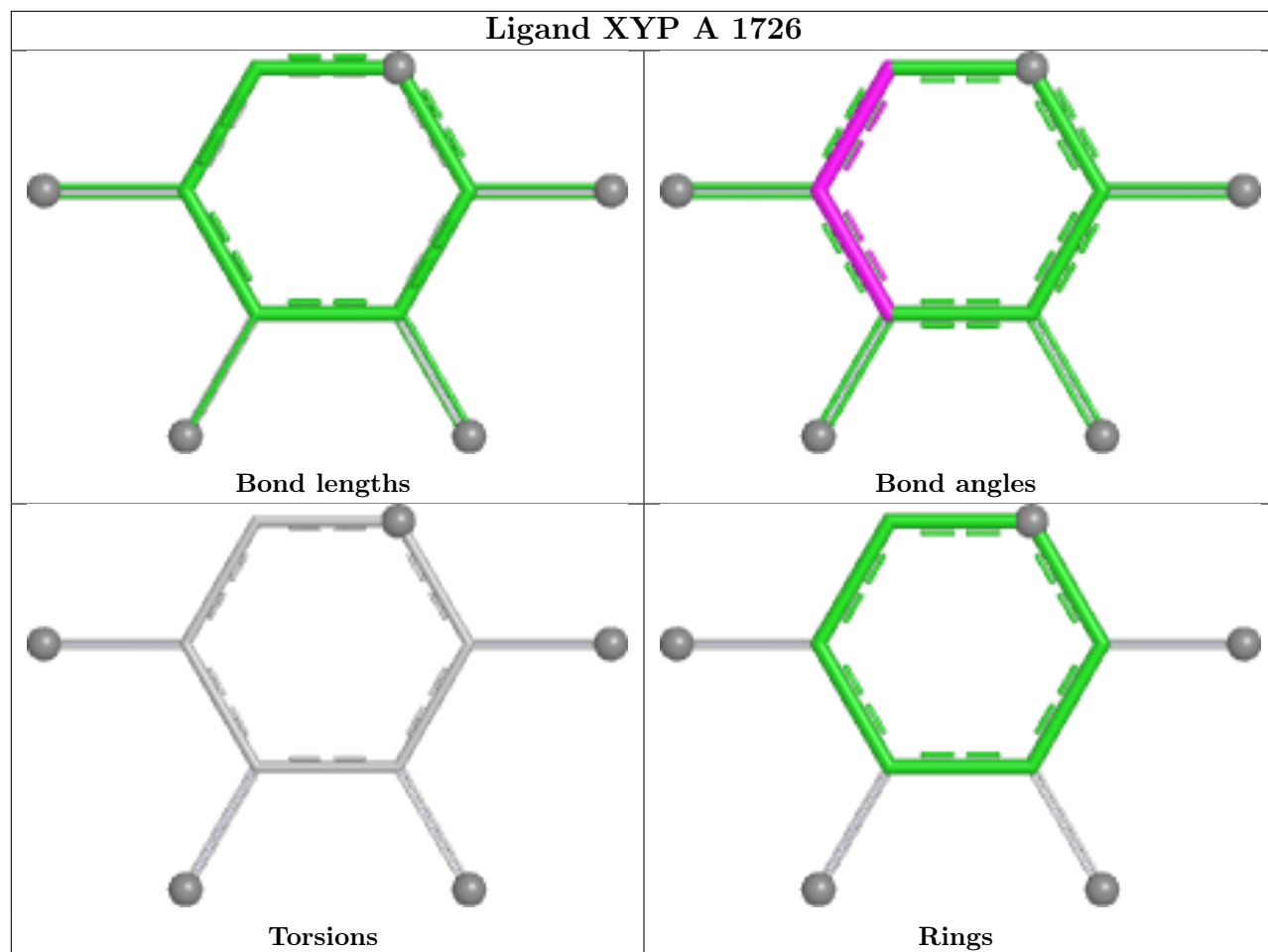
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1706	1PE	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1710	1PE	4	0
2	A	1713	1PE	1	0
2	A	1712	1PE	1	0
2	A	1701	1PE	2	0
6	A	1726	XYP	1	0
5	A	1725	NAG	1	0
2	A	1715	1PE	1	0
2	A	1711	1PE	1	0
2	A	1717	1PE	2	0
2	A	1716	1PE	2	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	743/743 (100%)	-0.19	4 (0%) 87 72	28, 41, 55, 76	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	449	MET	2.5
1	A	320	ASP	2.2
1	A	637	PHE	2.1
1	A	172	PRO	2.1

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	NAG	A	1721	14/15	0.38	0.15	74,98,101,108	0
5	NAG	A	1722	14/15	0.47	0.15	73,84,90,100	0
2	1PE	A	1709	16/16	0.61	0.18	59,73,86,87	0

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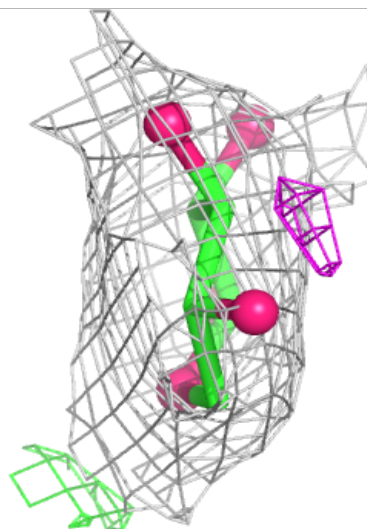
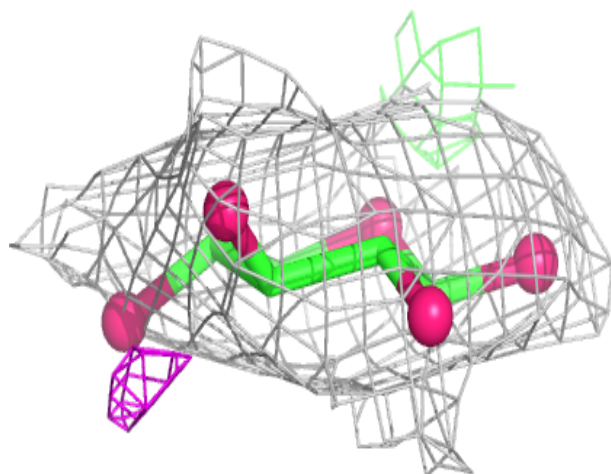
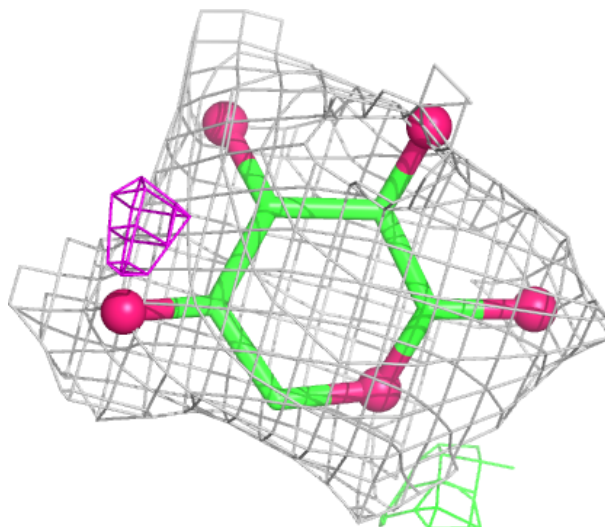
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	PEG	A	1707	7/7	0.63	0.20	41,55,63,70	0
5	NAG	A	1724	14/15	0.64	0.18	55,66,75,77	0
2	1PE	A	1711	16/16	0.71	0.18	61,74,83,86	0
2	1PE	A	1717	16/16	0.77	0.14	61,70,78,79	0
3	PEG	A	1703	7/7	0.77	0.17	60,62,69,72	0
2	1PE	A	1712	16/16	0.77	0.15	49,66,75,76	0
2	1PE	A	1716	16/16	0.78	0.15	51,65,82,88	0
2	1PE	A	1715	16/16	0.78	0.15	53,61,67,75	0
5	NAG	A	1719	14/15	0.78	0.12	44,55,61,62	0
5	NAG	A	1725	14/15	0.78	0.14	50,70,80,82	0
2	1PE	A	1714	16/16	0.79	0.14	53,66,69,72	0
5	NAG	A	1720	14/15	0.79	0.12	65,80,89,89	0
2	1PE	A	1706	16/16	0.80	0.17	56,70,75,76	0
2	1PE	A	1710	16/16	0.80	0.12	49,55,66,66	0
3	PEG	A	1705	7/7	0.81	0.14	66,72,81,82	0
3	PEG	A	1718	7/7	0.81	0.14	55,59,67,69	0
2	1PE	A	1713	16/16	0.82	0.12	41,53,60,69	0
4	EDO	A	1704	4/4	0.82	0.13	35,40,43,45	0
3	PEG	A	1702	7/7	0.85	0.13	40,42,45,50	0
2	1PE	A	1708	16/16	0.85	0.14	41,58,71,76	0
6	XYP	A	1726	10/10	0.88	0.10	41,44,46,54	0
5	NAG	A	1723	14/15	0.90	0.10	26,40,48,49	0
2	1PE	A	1701	16/16	0.90	0.12	40,48,54,55	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.

Electron density around XYP A 1726:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers [i](#)

There are no such residues in this entry.