



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 31, 2023 – 10:39 AM EDT

PDB ID : 8T70
Title : Cryptococcus neoformans protein farnesyltransferase in complex with FPTII and TKCMIIM peptide
Authors : Wang, Y.; Beese, L.S.
Deposited on : 2023-06-19
Resolution : 1.89 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.34
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.34

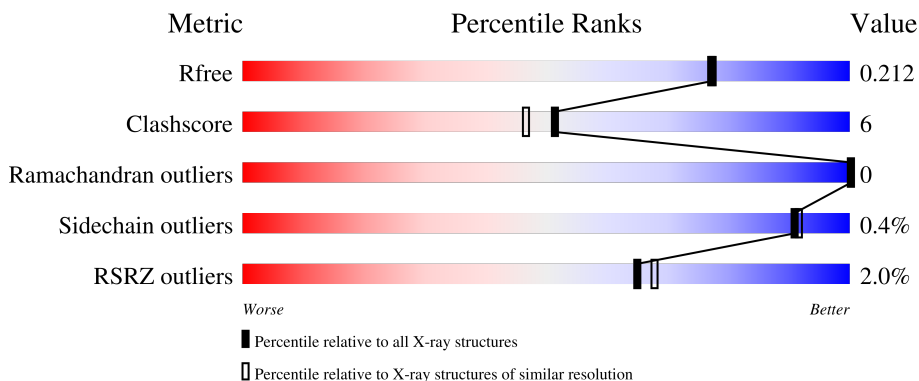
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.89 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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	349	 3% 84% 7% 9%
2	B	520	 % 82% 12% 7%
3	P	7	 14% 43% 14% 43%

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 6964 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 Protein farnesyltransferase/geranylgeranyltransferase type-1 subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	318	2648	1709	449	479	11	0	1	0

There are 14 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-13	MET	-	initiating methionine	UNP J9VSJ6
A	-12	GLY	-	expression tag	UNP J9VSJ6
A	-11	SER	-	expression tag	UNP J9VSJ6
A	-10	SER	-	expression tag	UNP J9VSJ6
A	-9	HIS	-	expression tag	UNP J9VSJ6
A	-8	HIS	-	expression tag	UNP J9VSJ6
A	-7	HIS	-	expression tag	UNP J9VSJ6
A	-6	HIS	-	expression tag	UNP J9VSJ6
A	-5	HIS	-	expression tag	UNP J9VSJ6
A	-4	HIS	-	expression tag	UNP J9VSJ6
A	-3	SER	-	expression tag	UNP J9VSJ6
A	-2	GLN	-	expression tag	UNP J9VSJ6
A	-1	ASP	-	expression tag	UNP J9VSJ6
A	0	LEU	-	expression tag	UNP J9VSJ6

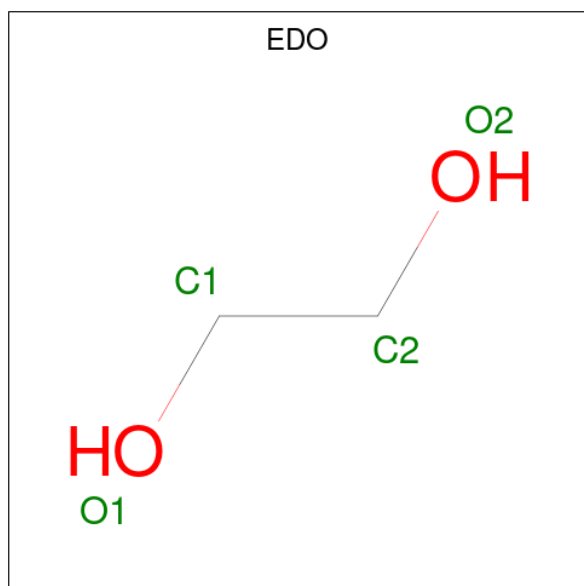
- Molecule 2 is a protein called Protein farnesyltransferase subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	486	3742	2373	650	704	15	0	3	0

- Molecule 3 is a protein called MET-ILE-ILE-MET.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	P	4	33	22	4	5	2	0	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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

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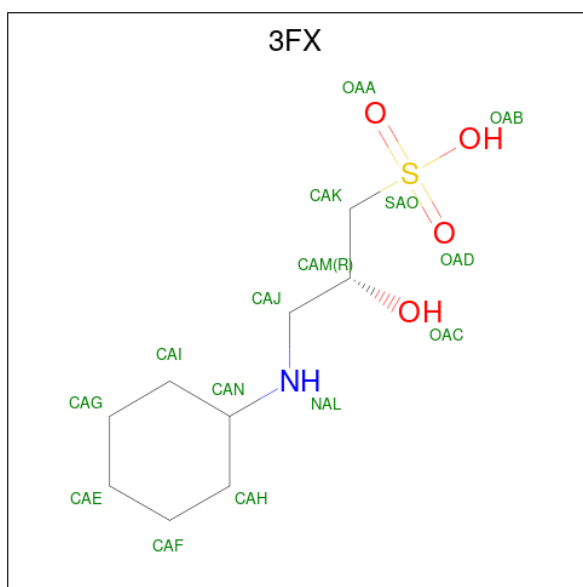
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0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

- Molecule 5 is ZINC ION (three-letter code: ZN) (formula: Zn).

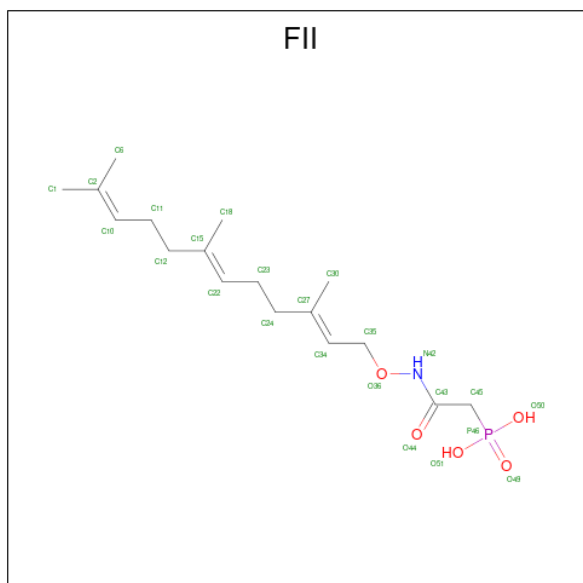
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total Zn 1 1	0	0

- Molecule 6 is (2R)-3-(cyclohexylamino)-2-hydroxypropane-1-sulfonic acid (three-letter code: 3FX) (formula: C₉H₁₉NO₄S).



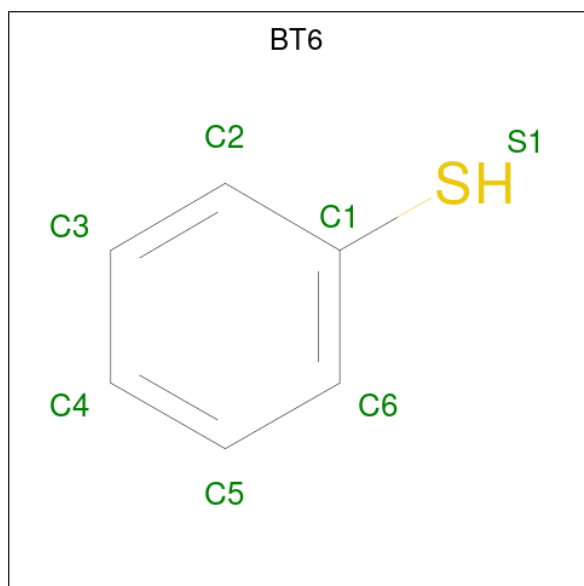
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	B	1	Total	C	N	O	S	0	0
			15	9	1	4	1		
6	B	1	Total	C	N	O	S	0	0
			15	9	1	4	1		
6	B	1	Total	C	N	O	S	0	0
			15	9	1	4	1		

- Molecule 7 is [(3,7,11-TRIMETHYL-DODECA-2,6,10-TRIENYLOXYCARBAMOYL)-METHYL]-PHOSPHONIC ACID (three-letter code: FII) (formula: C₁₇H₃₀NO₅P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
7	B	1	24	17	1	5	1	0	0

- Molecule 8 is benzenethiol (three-letter code: BT6) (formula: C₆H₆S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	S		
8	B	1	7	6	1	0	0

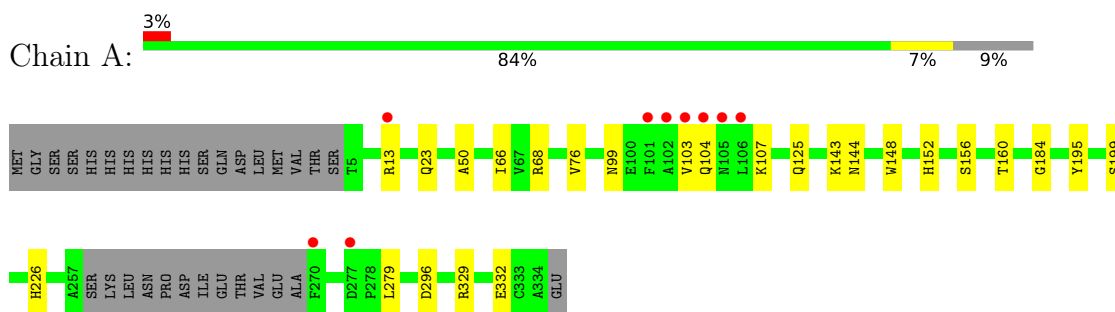
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	123	Total	O	0	0
			123	123		
9	B	245	Total	O	0	0
			245	245		
9	P	4	Total	O	0	0
			4	4		

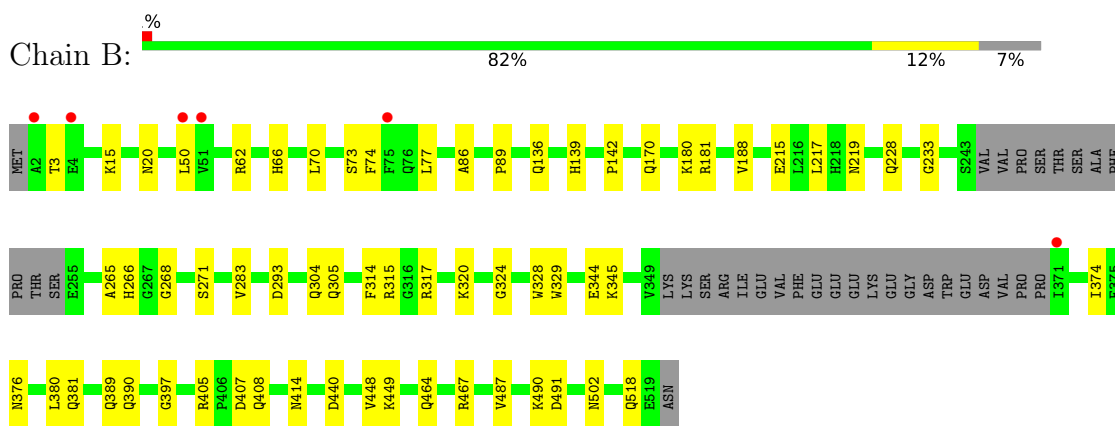
3 Residue-property plots [i](#)

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.

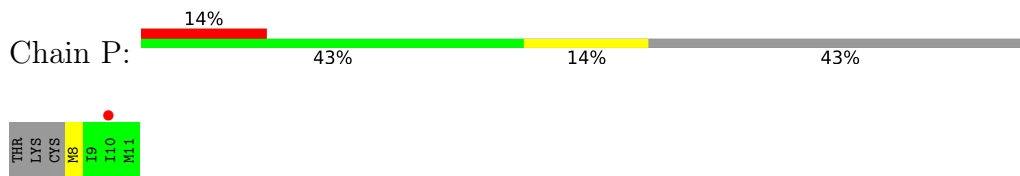
- Molecule 1: Protein farnesyltransferase/geranylgeranyltransferase type-1 subunit alpha



- Molecule 2: Protein farnesyltransferase subunit beta



- Molecule 3: MET-ILE-ILE-MET



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	140.77Å 140.77Å 129.50Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.77 – 1.89 78.92 – 1.89	Depositor EDS
% Data completeness (in resolution range)	99.0 (49.77-1.89) 91.6 (78.92-1.89)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.07 (at 1.90Å)	Xtrriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.185 , 0.212 0.185 , 0.212	Depositor DCC
R_{free} test set	5145 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	27.3	Xtrriage
Anisotropy	0.629	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 38.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	6964	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.39% 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: FII, EDO, ZN, BT6, 3FX

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	0.34	0/2735	0.53	0/3726
2	B	0.38	0/3845	0.57	0/5222
3	P	0.40	0/32	0.56	0/39
All	All	0.37	0/6612	0.55	0/8987

There are no bond length outliers.

There are no bond angle outliers.

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	2648	0	2567	20	0
2	B	3742	0	3672	50	0
3	P	33	0	39	2	0
4	A	32	0	48	2	0
4	B	60	0	90	7	0
5	B	1	0	0	0	0
6	B	45	0	57	3	0
7	B	24	0	28	6	0
8	B	7	0	5	3	0
9	A	123	0	0	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	B	245	0	0	2	0
9	P	4	0	0	1	0
All	All	6964	0	6506	73	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 6.

All (73) 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:99:ASN:O	1:A:103:VAL:HG23	1.76	0.85
2:B:440:ASP:H	2:B:518:GLN:HE22	1.19	0.84
2:B:170:GLN:HE22	2:B:449:LYS:H	1.23	0.84
2:B:62:ARG:H	2:B:389:GLN:HE22	1.25	0.83
2:B:228:GLN:HE22	2:B:293:ASP:H	1.26	0.81
2:B:464:GLN:HE22	2:B:467:ARG:HH11	1.24	0.81
2:B:305:GLN:HE22	2:B:376:ASN:H	1.26	0.79
1:A:143:LYS:HD3	2:B:320:LYS:HD3	1.68	0.75
1:A:226:HIS:H	2:B:20:ASN:HD21	1.37	0.71
2:B:66:HIS:HD1	2:B:397:GLY:H	1.37	0.70
2:B:405:ARG:HG2	4:B:618:EDO:H12	1.74	0.68
1:A:23:GLN:NE2	4:B:615:EDO:O1	2.29	0.65
1:A:156:SER:O	1:A:160[A]:THR:HG23	2.00	0.62
2:B:266:HIS:HD2	2:B:268:GLY:H	1.49	0.61
2:B:440:ASP:H	2:B:518:GLN:NE2	1.97	0.61
2:B:266:HIS:CD2	2:B:268:GLY:H	2.19	0.60
2:B:89:PRO:HG2	2:B:142:PRO:HB3	1.83	0.60
1:A:143:LYS:CD	2:B:320:LYS:HD3	2.32	0.59
1:A:296:ASP:OD1	1:A:329:ARG:NH2	2.31	0.58
2:B:381:GLN:HE22	2:B:487:VAL:H	1.50	0.58
1:A:148:TRP:O	1:A:152:HIS:HD2	1.88	0.56
2:B:317:ARG:HG3	2:B:320:LYS:HG3	1.87	0.56
1:A:68:ARG:HH12	1:A:104:GLN:HE22	1.53	0.56
2:B:62:ARG:H	2:B:389:GLN:NE2	1.98	0.56
1:A:226:HIS:H	2:B:20:ASN:ND2	2.03	0.55
3:P:8:MET:N	9:P:101:HOH:O	2.40	0.54
1:A:152:HIS:HE1	9:A:574:HOH:O	1.89	0.54
2:B:170:GLN:NE2	2:B:449:LYS:H	1.99	0.54
2:B:490:LYS:NZ	9:B:706:HOH:O	2.41	0.53
1:A:125:GLN:NE2	9:A:504:HOH:O	2.41	0.51
2:B:381:GLN:NE2	2:B:487:VAL:H	2.08	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:B:602:3FX:HAJA	9:B:917:HOH:O	2.12	0.49
2:B:86:ALA:HA	2:B:136:GLN:HE22	1.78	0.48
2:B:139:HIS:CE1	2:B:188:VAL:HB	2.48	0.48
2:B:70:LEU:O	2:B:74:PHE:HB2	2.14	0.48
2:B:407:ASP:HB2	3:P:8:MET:HE2	1.95	0.48
2:B:304:GLN:HE21	2:B:315:ARG:HG3	1.79	0.47
1:A:107:LYS:HE3	1:A:144:ASN:HD21	1.79	0.47
1:A:332:GLU:OE2	2:B:345:LYS:HE2	2.14	0.47
2:B:324:GLY:HA3	2:B:414:ASN:HD21	1.80	0.47
2:B:374:ILE:HA	2:B:374:ILE:HD12	1.70	0.47
2:B:344:GLU:HG2	4:B:621:EDO:H22	1.95	0.47
2:B:390:GLN:HE22	4:B:618:EDO:H11	1.79	0.46
2:B:491:ASP:OD2	6:B:602:3FX:NAL	2.46	0.46
2:B:305:GLN:HE22	2:B:376:ASN:N	2.05	0.46
2:B:328:TRP:CZ2	2:B:502:ASN:HB2	2.51	0.46
7:B:605:FII:C27	8:B:606:BT6:H4	2.45	0.46
7:B:605:FII:H232	7:B:605:FII:H181	1.59	0.46
7:B:605:FII:HN1	8:B:606:BT6:C4	2.29	0.46
2:B:170:GLN:HE22	2:B:449:LYS:N	2.04	0.45
7:B:605:FII:H301	7:B:605:FII:H352	1.57	0.43
1:A:66:ILE:HG21	1:A:76:VAL:HG21	2.00	0.43
1:A:226:HIS:O	4:A:402:EDO:O1	2.34	0.43
2:B:3:THR:HG22	2:B:3:THR:O	2.19	0.42
2:B:73:SER:HB2	2:B:77:LEU:HD21	2.00	0.42
2:B:180:LYS:HE2	2:B:215:GLU:O	2.19	0.42
2:B:448:VAL:HG22	4:B:611:EDO:O1	2.20	0.42
2:B:181:ARG:HG2	4:B:619:EDO:O1	2.20	0.42
1:A:184:GLY:H	4:A:405:EDO:H21	1.83	0.42
2:B:390:GLN:HE22	4:B:618:EDO:C1	2.32	0.42
2:B:73:SER:HB2	2:B:408:GLN:NE2	2.35	0.42
2:B:271:SER:HB2	2:B:329:TRP:O	2.19	0.41
2:B:139:HIS:HB3	2:B:142:PRO:HD2	2.02	0.41
1:A:50:ALA:HB3	6:B:604:3FX:HAF	2.02	0.41
2:B:217:LEU:HD12	2:B:283:VAL:HG11	2.03	0.41
2:B:219:ASN:HD22	2:B:219:ASN:HA	1.68	0.41
1:A:279:LEU:HD23	1:A:279:LEU:HA	1.93	0.41
7:B:605:FII:H232	8:B:606:BT6:H4	2.03	0.41
1:A:195:TYR:HA	1:A:199:SER:OG	2.21	0.41
7:B:605:FII:H111	7:B:605:FII:H11	1.85	0.40
2:B:314:PHE:HE2	2:B:380:LEU:HD22	1.86	0.40
2:B:464:GLN:HE22	2:B:467:ARG:NH1	2.04	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:233:GLY:HA3	2:B:265:ALA:HB1	2.03	0.40

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	315/349 (90%)	304 (96%)	11 (4%)	0	100	100
2	B	483/520 (93%)	476 (99%)	7 (1%)	0	100	100
3	P	2/7 (29%)	2 (100%)	0	0	100	100
All	All	800/876 (91%)	782 (98%)	18 (2%)	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	288/316 (91%)	287 (100%)	1 (0%)	92	93
2	B	407/436 (93%)	405 (100%)	2 (0%)	88	89
3	P	4/7 (57%)	4 (100%)	0	100	100
All	All	699/759 (92%)	696 (100%)	3 (0%)	91	91

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	ARG
2	B	15	LYS
2	B	50	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	23	GLN
1	A	73	HIS
1	A	104	GLN
1	A	110	GLN
1	A	146	HIS
1	A	152	HIS
1	A	187	ASN
1	A	211	GLN
2	B	20	ASN
2	B	39	GLN
2	B	64	GLN
2	B	136	GLN
2	B	170	GLN
2	B	219	ASN
2	B	228	GLN
2	B	266	HIS
2	B	304	GLN
2	B	305	GLN
2	B	319	ASN
2	B	381	GLN
2	B	389	GLN
2	B	414	ASN
2	B	464	GLN
2	B	495	ASN
2	B	518	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 [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 29 ligands modelled in this entry, 1 is monoatomic - leaving 28 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
6	3FX	B	603	-	15,15,15	1.05	2 (13%)	16,20,20	2.07	4 (25%)
4	EDO	B	620	-	3,3,3	0.45	0	2,2,2	0.41	0
4	EDO	A	401	-	3,3,3	0.38	0	2,2,2	0.45	0
4	EDO	B	609	-	3,3,3	0.54	0	2,2,2	0.14	0
4	EDO	A	403	-	3,3,3	0.48	0	2,2,2	0.42	0
4	EDO	B	607	-	3,3,3	0.56	0	2,2,2	0.35	0
8	BT6	B	606	5	7,7,7	0.35	0	8,8,8	0.90	0
4	EDO	B	608	-	3,3,3	0.55	0	2,2,2	0.20	0
6	3FX	B	604	-	15,15,15	1.08	2 (13%)	16,20,20	1.81	4 (25%)
4	EDO	B	614	-	3,3,3	0.44	0	2,2,2	0.54	0
4	EDO	B	615	-	3,3,3	0.54	0	2,2,2	0.25	0
4	EDO	B	616	-	3,3,3	0.57	0	2,2,2	0.26	0
6	3FX	B	602	-	15,15,15	1.09	1 (6%)	16,20,20	2.51	3 (18%)
4	EDO	A	408	-	3,3,3	0.47	0	2,2,2	0.40	0
4	EDO	A	405	-	3,3,3	0.40	0	2,2,2	0.51	0
4	EDO	B	617	-	3,3,3	0.46	0	2,2,2	0.26	0
4	EDO	B	618	-	3,3,3	0.47	0	2,2,2	0.31	0
4	EDO	B	610	-	3,3,3	0.54	0	2,2,2	0.24	0
7	FII	B	605	-	23,23,23	2.49	4 (17%)	27,29,29	1.97	7 (25%)
4	EDO	A	406	-	3,3,3	0.48	0	2,2,2	0.32	0
4	EDO	B	619	-	3,3,3	0.47	0	2,2,2	0.47	0
4	EDO	A	402	-	3,3,3	0.46	0	2,2,2	0.52	0
4	EDO	A	407	-	3,3,3	0.52	0	2,2,2	0.18	0
4	EDO	B	612	-	3,3,3	0.49	0	2,2,2	0.50	0
4	EDO	A	404	-	3,3,3	0.48	0	2,2,2	0.39	0
4	EDO	B	621	-	3,3,3	0.45	0	2,2,2	0.26	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	EDO	B	611	-	3,3,3	0.47	0	2,2,2	0.47	0
4	EDO	B	613	-	3,3,3	0.50	0	2,2,2	0.10	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
6	3FX	B	603	-	-	3/10/18/18	0/1/1/1
4	EDO	B	620	-	-	0/1/1/1	-
4	EDO	A	401	-	-	0/1/1/1	-
4	EDO	B	609	-	-	0/1/1/1	-
4	EDO	A	403	-	-	0/1/1/1	-
4	EDO	B	607	-	-	0/1/1/1	-
8	BT6	B	606	5	-	-	0/1/1/1
4	EDO	B	608	-	-	0/1/1/1	-
6	3FX	B	604	-	-	5/10/18/18	0/1/1/1
4	EDO	B	614	-	-	0/1/1/1	-
4	EDO	B	615	-	-	1/1/1/1	-
4	EDO	B	616	-	-	1/1/1/1	-
6	3FX	B	602	-	-	4/10/18/18	0/1/1/1
4	EDO	A	408	-	-	0/1/1/1	-
4	EDO	A	405	-	-	1/1/1/1	-
4	EDO	B	617	-	-	1/1/1/1	-
4	EDO	B	618	-	-	0/1/1/1	-
4	EDO	B	610	-	-	0/1/1/1	-
7	FII	B	605	-	-	2/23/24/24	-
4	EDO	A	406	-	-	1/1/1/1	-
4	EDO	B	619	-	-	0/1/1/1	-
4	EDO	A	402	-	-	0/1/1/1	-
4	EDO	A	407	-	-	0/1/1/1	-
4	EDO	B	612	-	-	1/1/1/1	-
4	EDO	A	404	-	-	0/1/1/1	-
4	EDO	B	621	-	-	1/1/1/1	-
4	EDO	B	611	-	-	0/1/1/1	-
4	EDO	B	613	-	-	0/1/1/1	-

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	B	605	FII	C43-N42	9.74	1.47	1.32
7	B	605	FII	P46-C45	4.65	1.87	1.79
7	B	605	FII	O44-C43	-2.34	1.18	1.23
6	B	604	3FX	OAD-SAO	2.28	1.51	1.45
6	B	602	3FX	OAD-SAO	2.26	1.51	1.45
6	B	604	3FX	OAA-SAO	2.21	1.51	1.45
6	B	603	3FX	OAA-SAO	2.19	1.51	1.45
6	B	603	3FX	OAD-SAO	2.15	1.51	1.45
7	B	605	FII	C24-C27	2.01	1.55	1.51

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	602	3FX	OAD-SAO-CAK	8.21	116.70	106.94
6	B	603	3FX	OAD-SAO-CAK	5.34	113.28	106.94
6	B	603	3FX	OAB-SAO-OAD	-4.52	100.24	111.27
7	B	605	FII	C45-C43-N42	4.38	119.36	115.19
7	B	605	FII	C35-C34-C27	-4.26	118.67	126.04
6	B	604	3FX	OAA-SAO-CAK	4.17	111.89	106.94
6	B	602	3FX	OAB-SAO-OAA	-3.95	101.63	111.27
6	B	604	3FX	OAD-SAO-OAA	-3.55	101.68	113.95
7	B	605	FII	C23-C22-C15	-3.40	119.48	127.66
6	B	604	3FX	OAB-SAO-CAK	3.35	111.08	105.74
6	B	602	3FX	OAA-SAO-CAK	3.22	110.77	106.94
7	B	605	FII	C30-C27-C24	2.85	120.06	115.27
6	B	603	3FX	OAA-SAO-CAK	2.85	110.32	106.94
7	B	605	FII	O36-N42-C43	2.66	122.07	118.52
7	B	605	FII	C6-C2-C1	2.58	120.29	114.60
6	B	604	3FX	OAD-SAO-CAK	2.40	109.79	106.94
7	B	605	FII	O51-P46-O49	-2.10	106.84	112.39
6	B	603	3FX	CAM-CAJ-NAL	-2.08	106.65	112.17

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	602	3FX	CAM-CAK-SAO-OAB
6	B	604	3FX	NAL-CAJ-CAM-OAC
6	B	604	3FX	NAL-CAJ-CAM-CAK
4	A	406	EDO	O1-C1-C2-O2
4	B	615	EDO	O1-C1-C2-O2
6	B	604	3FX	CAH-CAN-NAL-CAJ

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Mol	Chain	Res	Type	Atoms
6	B	604	3FX	CAI-CAN-NAL-CAJ
7	B	605	FII	C11-C12-C15-C18
4	B	621	EDO	O1-C1-C2-O2
7	B	605	FII	C11-C12-C15-C22
6	B	602	3FX	SAO-CAK-CAM-OAC
6	B	603	3FX	SAO-CAK-CAM-OAC
6	B	603	3FX	CAM-CAK-SAO-OAA
4	B	617	EDO	O1-C1-C2-O2
6	B	603	3FX	SAO-CAK-CAM-CAJ
4	A	405	EDO	O1-C1-C2-O2
4	B	612	EDO	O1-C1-C2-O2
4	B	616	EDO	O1-C1-C2-O2
6	B	604	3FX	SAO-CAK-CAM-OAC
6	B	602	3FX	NAL-CAJ-CAM-OAC
6	B	602	3FX	CAM-CAK-SAO-OAD

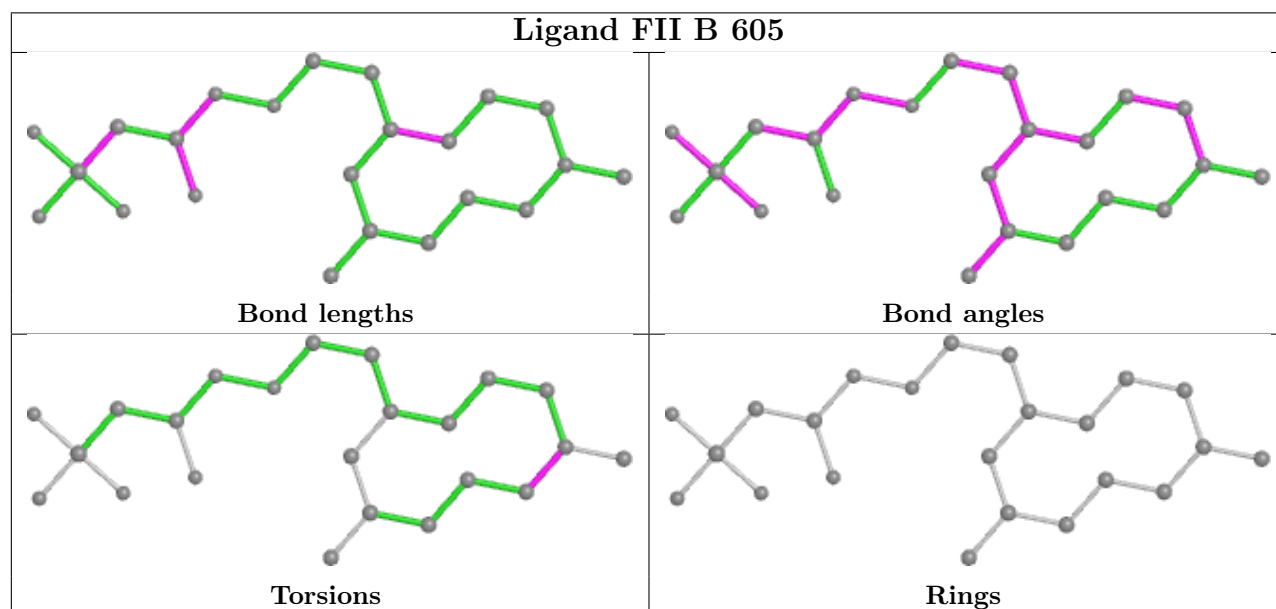
There are no ring outliers.

11 monomers are involved in 18 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	B	606	BT6	3	0
6	B	604	3FX	1	0
4	B	615	EDO	1	0
6	B	602	3FX	2	0
4	A	405	EDO	1	0
4	B	618	EDO	3	0
7	B	605	FII	6	0
4	B	619	EDO	1	0
4	A	402	EDO	1	0
4	B	621	EDO	1	0
4	B	611	EDO	1	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	318/349 (91%)	0.18	9 (2%) 53 56	25, 38, 62, 90	0
2	B	486/520 (93%)	0.10	6 (1%) 79 81	22, 31, 54, 81	0
3	P	4/7 (57%)	1.27	1 (25%) 0 0	37, 41, 46, 49	0
All	All	808/876 (92%)	0.14	16 (1%) 65 68	22, 34, 59, 90	0

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	103	VAL	6.6
1	A	105	ASN	5.4
2	B	50	LEU	4.9
2	B	371	ILE	4.8
2	B	2	ALA	4.5
1	A	106	LEU	4.5
1	A	270	PHE	4.4
1	A	13	ARG	4.4
1	A	277	ASP	3.8
2	B	51	VAL	3.0
1	A	101	PHE	3.0
1	A	102	ALA	2.7
1	A	104	GLN	2.7
2	B	75	PHE	2.3
2	B	4	GLU	2.2
3	P	10	ILE	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

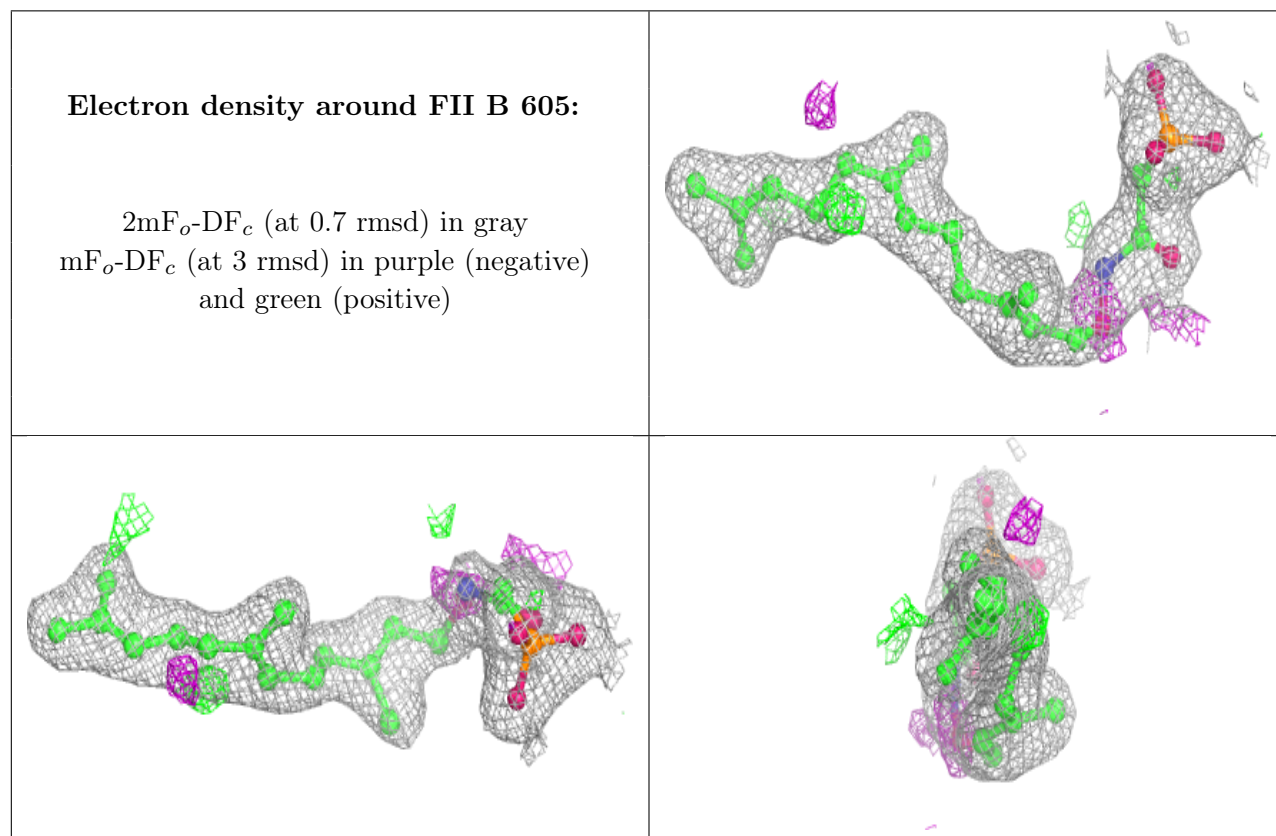
6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
4	EDO	B	616	4/4	0.75	0.26	41,43,49,56	0
4	EDO	B	615	4/4	0.77	0.26	38,44,44,49	0
6	3FX	B	604	15/15	0.85	0.21	40,57,75,77	0
4	EDO	B	621	4/4	0.87	0.15	44,44,45,49	0
4	EDO	B	619	4/4	0.88	0.20	42,45,46,50	0
4	EDO	A	408	4/4	0.90	0.12	42,44,49,53	0
4	EDO	B	620	4/4	0.90	0.29	47,47,53,66	0
4	EDO	B	617	4/4	0.90	0.28	40,43,48,54	0
4	EDO	B	618	4/4	0.90	0.24	46,55,60,63	0
4	EDO	B	612	4/4	0.91	0.14	36,40,41,47	0
4	EDO	B	614	4/4	0.91	0.20	35,43,47,48	0
4	EDO	A	406	4/4	0.91	0.21	41,43,43,44	0
4	EDO	A	407	4/4	0.91	0.11	39,41,42,44	0
4	EDO	A	401	4/4	0.91	0.10	35,39,41,50	0
4	EDO	B	611	4/4	0.92	0.13	31,35,38,46	0
4	EDO	A	405	4/4	0.93	0.12	43,45,52,57	0
4	EDO	B	609	4/4	0.93	0.13	38,39,40,49	0
4	EDO	B	613	4/4	0.93	0.10	33,37,39,39	0
4	EDO	B	610	4/4	0.93	0.13	34,36,37,40	0
4	EDO	B	608	4/4	0.94	0.17	30,37,39,40	0
4	EDO	A	402	4/4	0.94	0.17	36,37,40,42	0
4	EDO	A	404	4/4	0.94	0.22	34,36,38,46	0
4	EDO	A	403	4/4	0.95	0.09	37,37,38,41	0
7	FII	B	605	24/24	0.95	0.16	27,38,45,51	0
6	3FX	B	603	15/15	0.96	0.14	35,46,54,54	0
8	BT6	B	606	7/7	0.97	0.15	31,44,46,50	0
4	EDO	B	607	4/4	0.98	0.13	26,29,31,32	0
6	3FX	B	602	15/15	0.98	0.14	24,28,36,36	0
5	ZN	B	601	1/1	1.00	0.16	28,28,28,28	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.