



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 04:27 AM UTC

PDB ID : 3DD1 / pdb_00003dd1
Title : Crystal structure of glycogen phosphorylase complexed with an anthranilimide based inhibitor GSK254
Authors : Nolte, R.T.
Deposited on : 2008-06-04
Resolution : 2.57 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

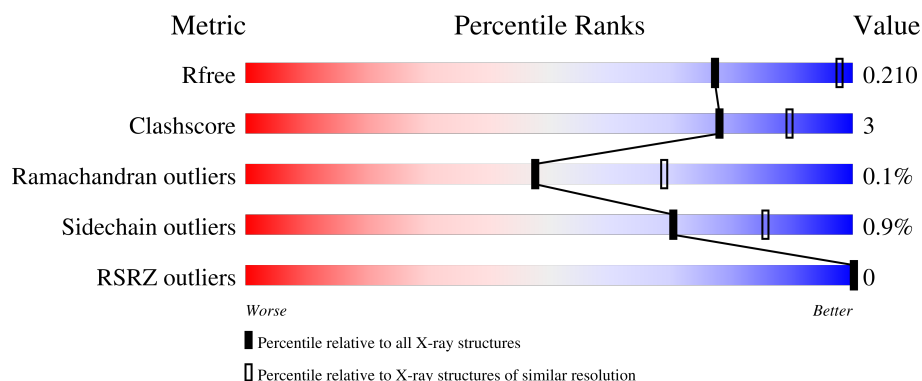
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

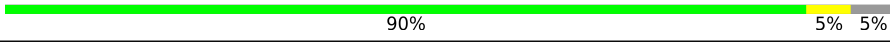
The reported resolution of this entry is 2.57 Å.

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	4770 (2.60-2.56)
Clashscore	190562	5124 (2.60-2.56)
Ramachandran outliers	187476	5046 (2.60-2.56)
Sidechain outliers	187428	5046 (2.60-2.56)
RSRZ outliers	180081	4770 (2.60-2.56)

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	848	
1	B	848	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	MPD	A	906	-	-	X	-

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 13886 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.

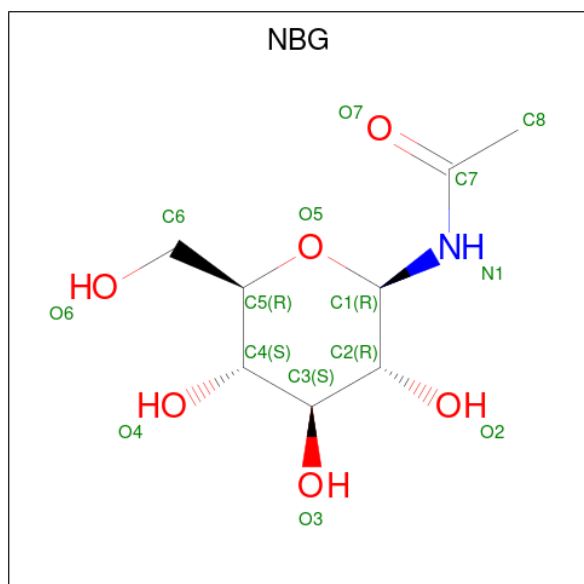
- Molecule 1 is a protein called Glycogen phosphorylase, liver form.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	811	Total	C	N	O	P	S	0	4	0
			6582	4217	1120	1214	1	30			
1	B	805	Total	C	N	O	S		0	3	0
			6538	4198	1107	1202	31				

There are 4 discrepancies between the modelled and reference sequences:

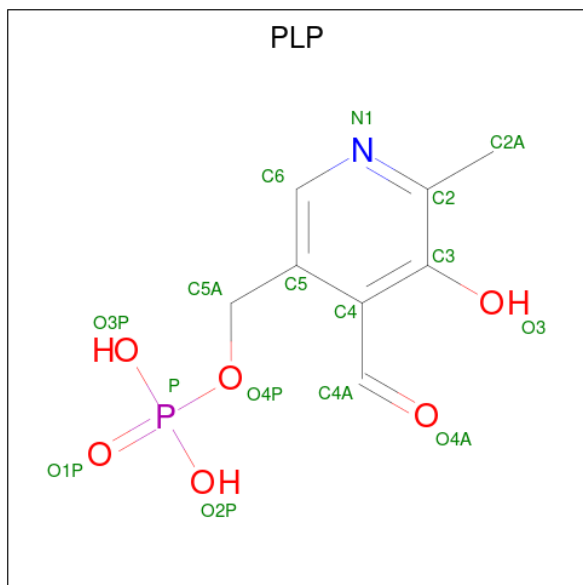
Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	GLY	-	expression tag	UNP P06737
A	0	GLY	-	expression tag	UNP P06737
B	-1	GLY	-	expression tag	UNP P06737
B	0	GLY	-	expression tag	UNP P06737

- Molecule 2 is N-acetyl-beta-D-glucopyranosylamine (CCD ID: NBG) (formula: $C_8H_{15}NO_6$).



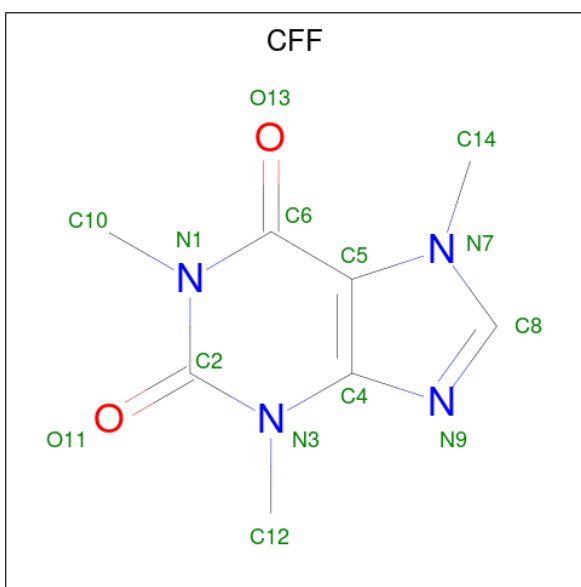
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			15	8	1	6		
2	B	1	Total	C	N	O	0	0
			15	8	1	6		

- Molecule 3 is PYRIDOXAL-5'-PHOSPHATE (CCD ID: PLP) (formula: $C_8H_{10}NO_6P$).



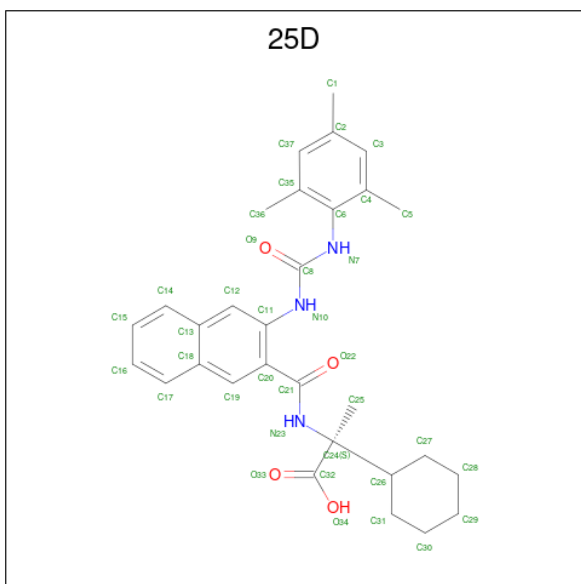
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			15	8	1	5	1		
3	B	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 4 is CAFFEINE (CCD ID: CFF) (formula: $C_8H_{10}N_4O_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	4	2		
4	B	1	Total	C	N	O	0	0
			14	8	4	2		

- Molecule 5 is 2-cyclohexyl-N-[(3-[(2,4,6-trimethylphenyl)carbamoyl]amino)naphthalen-2-yl)carbonyl]-D-alanine (CCD ID: 25D) (formula: $C_{30}H_{35}N_3O_4$).



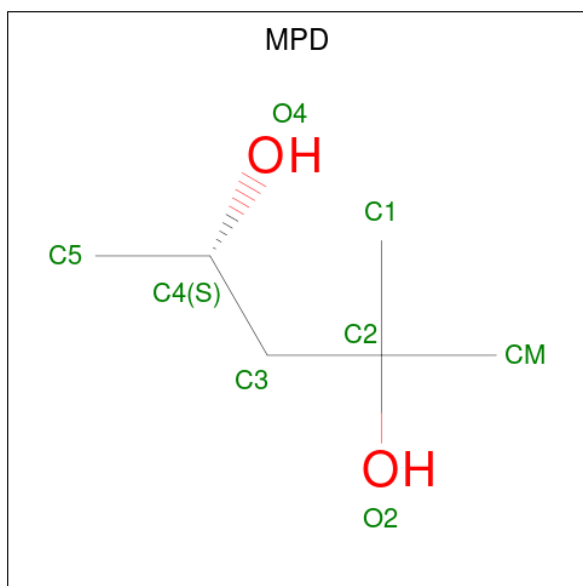
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			37	30	3	4		

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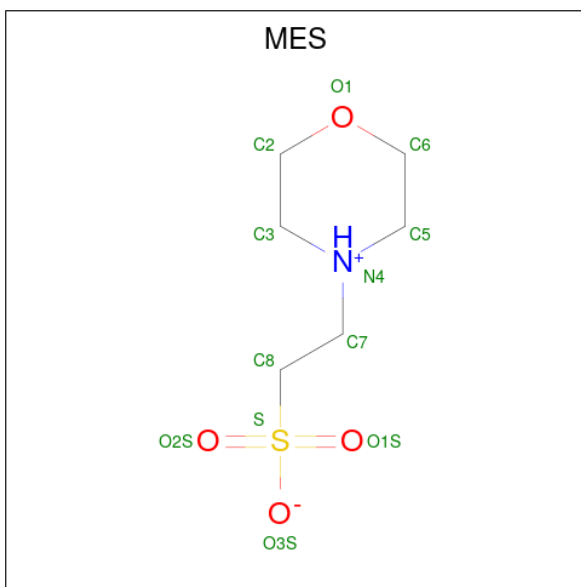
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	N	O	0	0
			37	30	3	4		

- Molecule 6 is (4S)-2-METHYL-2,4-PENTANEDIOL (CCD ID: MPD) (formula: C₆H₁₄O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			8	6	2		
6	A	1	Total	C	O	0	0
			8	6	2		
6	A	1	Total	C	O	0	0
			8	6	2		
6	B	1	Total	C	O	0	0
			8	6	2		
6	B	1	Total	C	O	0	0
			8	6	2		

- Molecule 7 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (CCD ID: MES) (formula: C₆H₁₃NO₄S).



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

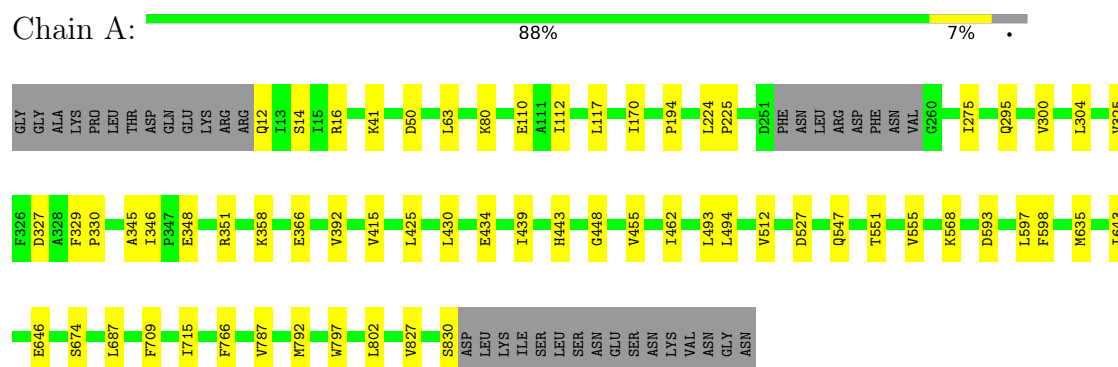
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	272	Total	O	0	0
			272	272		
8	B	268	Total	O	0	0
			268	268		

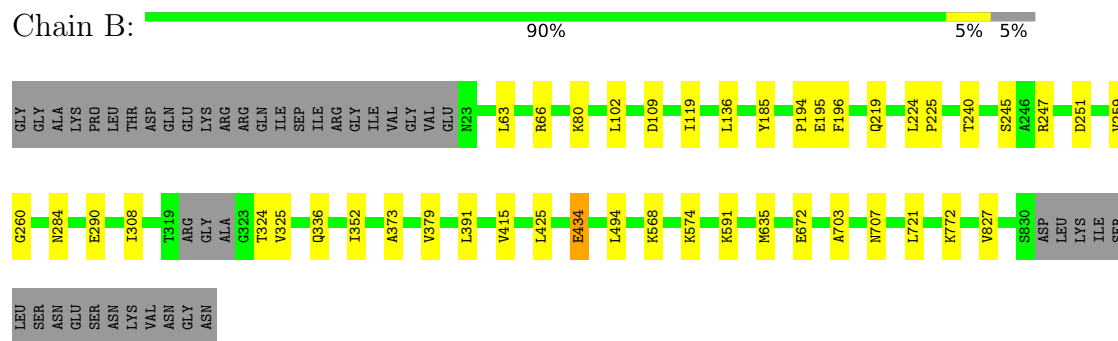
3 Residue-property plots [i](#)

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: Glycogen phosphorylase, liver form



- Molecule 1: Glycogen phosphorylase, liver form



4 Data and refinement statistics

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, α , β , γ	124.10Å 124.10Å 123.22Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.27 – 2.57 49.27 – 2.57	Depositor EDS
% Data completeness (in resolution range)	100.0 (49.27-2.57) 99.9 (49.27-2.57)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.39 (at 2.57Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.167 , 0.207 0.171 , 0.210	Depositor DCC
R_{free} test set	2049 reflections (3.03%)	wwPDB-VP
Wilson B-factor (Å ²)	38.4	Xtriage
Anisotropy	0.165	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 11.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	0.026 for -h,-k,l 0.097 for h,-h-k,-l 0.028 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	13886	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.92% 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: CFF, MES, PLP, SEP, NBG, MPD, 25D

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	0.47	0/6716	0.71	0/9084
1	B	0.48	0/6685	0.71	0/9044
All	All	0.47	0/13401	0.71	0/18128

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

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	6582	0	6547	37	1
1	B	6538	0	6500	25	0
2	A	15	0	15	0	0
2	B	15	0	15	1	0
3	A	15	0	7	0	0
3	B	15	0	7	0	0
4	A	14	0	10	1	0
4	B	14	0	10	1	0
5	A	37	0	34	1	0
5	B	37	0	34	1	0
6	A	24	0	42	10	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	16	0	28	4	0
7	B	24	0	24	0	0
8	A	272	0	0	2	0
8	B	268	0	0	1	1
All	All	13886	0	13273	74	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (74) 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)
6:A:906:MPD:H53	6:A:906:MPD:HM1	1.37	1.07
6:A:907:MPD:H52	6:A:907:MPD:H11	1.67	0.76
6:A:906:MPD:HM1	6:A:906:MPD:C5	2.16	0.73
1:B:194:PRO:HA	1:B:224:LEU:HD13	1.73	0.70
1:B:109[A]:ASP:OD1	1:B:119:ILE:HD13	1.92	0.69
1:B:308:ILE:HD13	1:B:352:ILE:HG21	1.82	0.60
1:B:415:VAL:HG22	1:B:425:LEU:HD11	1.85	0.58
6:B:907:MPD:HM3	6:B:907:MPD:H52	1.88	0.54
1:B:224:LEU:HD23	1:B:247:ARG:NH1	2.23	0.53
1:A:351:ARG:HH12	6:A:906:MPD:HM2	1.72	0.53
1:A:766:PHE:CD1	6:A:908:MPD:H52	2.44	0.53
1:A:392:VAL:HG21	1:A:439:ILE:HD12	1.90	0.53
1:A:224:LEU:HD12	1:A:225:PRO:HD2	1.92	0.52
6:A:906:MPD:CM	8:A:1080:HOH:O	2.56	0.52
1:A:415:VAL:HG22	1:A:425:LEU:HD11	1.92	0.51
1:B:379:VAL:HG22	8:B:1083:HOH:O	2.10	0.51
1:B:336:GLN:OE1	1:B:373:ALA:HB3	2.12	0.50
1:A:346:ILE:HD13	1:A:448:GLY:HA3	1.94	0.50
1:B:284:ASN:OD1	2:B:901:NBG:H82	2.12	0.49
6:B:908:MPD:H12	6:B:908:MPD:H52	1.94	0.49
1:B:80:LYS:HB3	1:B:827:VAL:HG12	1.93	0.49
1:B:136:LEU:C	1:B:136:LEU:HD23	2.37	0.48
1:A:194:PRO:HB3	1:B:185:TYR:CD1	2.48	0.48
1:A:300:VAL:HG13	1:A:345:ALA:HA	1.94	0.48
1:B:109[A]:ASP:OD1	1:B:119:ILE:HG21	2.14	0.48
1:B:259:VAL:HG12	1:B:260:GLY:N	2.28	0.48
1:B:494:LEU:C	1:B:494:LEU:HD23	2.38	0.48
1:A:547:GLN:O	1:A:551:THR:HG23	2.13	0.47
1:A:80:LYS:HB3	1:A:827:VAL:HG12	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:766:PHE:CE1	6:A:908:MPD:H52	2.50	0.47
1:A:687:LEU:HD12	1:A:797:TRP:CH2	2.50	0.46
1:A:415:VAL:HG23	1:A:425:LEU:HD21	1.97	0.46
1:A:493:LEU:HD21	1:A:512:VAL:HG11	1.96	0.46
4:B:903:CFF:H141	4:B:903:CFF:O13	2.16	0.46
1:A:358:LYS:CG	6:A:907:MPD:H53	2.45	0.46
1:A:709:PHE:CD2	1:A:787:VAL:HG22	2.51	0.46
6:A:906:MPD:H53	6:A:906:MPD:CM	2.25	0.45
1:A:455:VAL:HG23	1:A:674:SER:HB2	1.99	0.45
6:B:907:MPD:H52	6:B:907:MPD:H11	1.99	0.45
1:B:63:LEU:C	1:B:63:LEU:HD12	2.42	0.45
1:A:170:ILE:HG12	1:A:646:GLU:HG2	1.97	0.45
1:A:304:LEU:HD12	1:A:348:GLU:CG	2.47	0.44
1:B:66:ARG:NH2	1:B:102:LEU:HD22	2.32	0.44
1:A:329:PHE:HB3	1:A:330:PRO:HD3	1.99	0.44
1:A:555:VAL:HG21	1:A:643:ILE:CD1	2.48	0.44
1:A:802:LEU:O	1:A:802:LEU:HD12	2.18	0.44
1:B:591:LYS:HE3	1:B:635[A]:MET:HE3	1.99	0.44
1:B:721:LEU:HD23	1:B:772:LYS:HD3	1.98	0.44
1:B:195:GLU:HG2	1:B:196:PHE:CD2	2.53	0.44
1:A:63:LEU:C	1:A:63:LEU:HD12	2.43	0.44
1:A:300:VAL:CG1	1:A:345:ALA:HA	2.48	0.44
4:A:903:CFF:O13	4:A:903:CFF:H141	2.18	0.43
1:B:224:LEU:HD12	1:B:225:PRO:HD2	2.00	0.43
1:A:275:ILE:O	1:A:295:GLN:HG2	2.18	0.43
6:A:906:MPD:HM3	8:A:1080:HOH:O	2.18	0.43
1:A:434:GLU:OE1	1:A:434:GLU:N	2.52	0.43
1:B:574:LYS:NZ	1:B:672:GLU:OE1	2.52	0.43
6:B:907:MPD:H11	6:B:907:MPD:C5	2.49	0.43
5:A:905:25D:O22	5:A:905:25D:N10	2.49	0.42
1:B:703:ALA:O	1:B:707:ASN:ND2	2.46	0.42
1:B:194:PRO:CA	1:B:224:LEU:HD13	2.46	0.42
1:A:597:LEU:HD12	1:A:598:PHE:N	2.34	0.42
1:A:41:LYS:NZ	1:A:50:ASP:OD2	2.52	0.42
1:B:290:GLU:HG3	1:B:391:LEU:HD11	2.01	0.42
1:A:430:LEU:HD22	1:A:443:HIS:HB3	2.02	0.41
1:A:527:ASP:OD1	1:A:527:ASP:C	2.64	0.41
1:A:597:LEU:HD21	1:A:792:MET:SD	2.61	0.41
1:A:325:VAL:HG12	1:A:327:ASP:H	1.86	0.41
1:A:462:ILE:HD11	1:A:715:ILE:CD1	2.51	0.41
1:A:112:ILE:HG23	1:A:117:LEU:HB2	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:635[B]:MET:HA	1:A:635[B]:MET:HE2	2.03	0.40
1:A:687:LEU:HD12	1:A:797:TRP:CZ3	2.56	0.40
1:B:240:THR:HG21	5:B:906:25D:H1	2.02	0.40
1:A:494:LEU:HD23	1:A:494:LEU:C	2.46	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:110:GLU:OE1	8:B:974:HOH:O[2_535]	2.15	0.05

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	810/848 (96%)	791 (98%)	19 (2%)	0	100	100
1	B	804/848 (95%)	783 (97%)	20 (2%)	1 (0%)	48	69
All	All	1614/1696 (95%)	1574 (98%)	39 (2%)	1 (0%)	48	69

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	434	GLU

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	706/738 (96%)	700 (99%)	6 (1%)	73	87
1	B	704/738 (95%)	697 (99%)	7 (1%)	68	84
All	All	1410/1476 (96%)	1397 (99%)	13 (1%)	70	85

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	12	GLN
1	A	16	ARG
1	A	366	GLU
1	A	568	LYS
1	A	593	ASP
1	A	830	SER
1	B	219	GLN
1	B	245	SER
1	B	251	ASP
1	B	324	THR
1	B	325	VAL
1	B	434	GLU
1	B	568	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	250	ASN
1	A	305	GLN
1	A	408	GLN
1	A	481	ASN
1	A	804	ASN
1	A	823	ASN
1	B	71	GLN
1	B	97	ASN
1	B	305	GLN
1	B	376	ASN
1	B	481	ASN
1	B	707	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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	$\# Z > 2$
1	SEP	A	14	1	8,9,10	1.70	1 (12%)	7,12,14	1.21	1 (14%)

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
1	SEP	A	14	1	-	2/6/8/10	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	14	SEP	P-O1P	3.72	1.62	1.50

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	14	SEP	OG-CB-CA	2.51	110.58	108.14

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	14	SEP	CB-OG-P-O2P

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
1	A	14	SEP	CB-OG-P-O3P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

15 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
7	MES	B	904	-	12,12,12	2.12	1 (8%)	15,16,16	2.25	4 (26%)
6	MPD	A	906	-	7,7,7	0.32	0	9,10,10	0.52	0
6	MPD	B	908	-	7,7,7	0.30	0	9,10,10	0.28	0
2	NBG	A	901	-	15,15,15	0.72	1 (6%)	21,21,21	0.70	0
6	MPD	A	908	-	7,7,7	0.29	0	9,10,10	0.34	0
6	MPD	B	907	-	7,7,7	0.32	0	9,10,10	0.34	0
5	25D	A	905	-	40,40,40	1.05	0	56,58,58	1.36	8 (14%)
6	MPD	A	907	-	7,7,7	0.37	0	9,10,10	0.40	0
4	CFF	A	903	-	15,15,15	1.49	2 (13%)	23,23,23	2.18	8 (34%)
5	25D	B	906	-	40,40,40	1.14	2 (5%)	56,58,58	1.03	3 (5%)
3	PLP	A	902	1	15,15,16	1.09	2 (13%)	21,22,23	1.03	1 (4%)
7	MES	B	905	-	12,12,12	2.18	1 (8%)	15,16,16	2.29	6 (40%)
2	NBG	B	901	-	15,15,15	0.61	1 (6%)	21,21,21	0.67	0
3	PLP	B	902	1	15,15,16	1.00	1 (6%)	21,22,23	1.03	1 (4%)
4	CFF	B	903	-	15,15,15	1.53	3 (20%)	23,23,23	2.23	8 (34%)

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	MES	B	904	-	-	4/6/14/14	0/1/1/1
6	MPD	A	906	-	-	1/5/5/5	-
6	MPD	B	908	-	-	3/5/5/5	-
2	NBG	A	901	-	-	0/6/26/26	0/1/1/1
6	MPD	A	908	-	-	1/5/5/5	-
6	MPD	B	907	-	-	2/5/5/5	-
5	25D	A	905	-	-	17/29/37/37	0/4/4/4
6	MPD	A	907	-	-	4/5/5/5	-
4	CFF	A	903	-	-	-	0/2/2/2
5	25D	B	906	-	-	3/29/37/37	0/4/4/4
3	PLP	A	902	1	-	1/6/6/8	0/1/1/1
7	MES	B	905	-	-	1/6/14/14	0/1/1/1
2	NBG	B	901	-	-	0/6/26/26	0/1/1/1
3	PLP	B	902	1	-	1/6/6/8	0/1/1/1
4	CFF	B	903	-	-	-	0/2/2/2

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	B	905	MES	C8-S	-7.24	1.67	1.77
7	B	904	MES	C8-S	-7.04	1.67	1.77
4	B	903	CFF	C5-N7	-3.14	1.32	1.38
4	A	903	CFF	C5-N7	-2.91	1.33	1.38
3	A	902	PLP	C2-N1	2.85	1.38	1.33
5	B	906	25D	C21-N23	2.76	1.39	1.34
2	A	901	NBG	C1-N1	2.53	1.46	1.43
3	B	902	PLP	C2-N1	2.44	1.38	1.33
4	B	903	CFF	C2-N3	-2.23	1.34	1.39
2	B	901	NBG	C1-N1	2.16	1.46	1.43
4	A	903	CFF	C2-N3	-2.16	1.34	1.39
4	B	903	CFF	C8-N9	2.12	1.38	1.32
3	A	902	PLP	C6-N1	2.03	1.38	1.34
5	B	906	25D	C18-C13	-2.02	1.37	1.42

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	904	MES	C5-N4-C3	5.37	120.41	108.84
7	B	905	MES	C5-N4-C3	4.89	119.38	108.84
4	B	903	CFF	C14-N7-C8	4.11	133.99	126.28
4	B	903	CFF	C14-N7-C5	-4.03	118.17	127.77
4	A	903	CFF	C14-N7-C8	3.90	133.59	126.28
4	A	903	CFF	C6-N1-C2	-3.83	119.43	125.66
4	A	903	CFF	C14-N7-C5	-3.82	118.67	127.77
4	A	903	CFF	C5-C6-N1	3.76	118.95	112.06
4	B	903	CFF	C6-N1-C2	-3.74	119.57	125.66
5	A	905	25D	C26-C24-C32	3.70	114.57	108.93
4	B	903	CFF	C5-C6-N1	3.65	118.75	112.06
7	B	905	MES	C7-N4-C3	3.46	120.47	111.24
5	A	905	25D	C26-C24-N23	-3.43	101.90	107.50
7	B	904	MES	O2S-S-C8	3.42	111.89	106.73
7	B	905	MES	C7-N4-C5	3.34	120.15	111.24
7	B	904	MES	C7-N4-C3	3.31	120.07	111.24
4	B	903	CFF	O13-C6-C5	-3.23	119.76	126.38
4	A	903	CFF	O13-C6-C5	-3.20	119.82	126.38
5	A	905	25D	C28-C27-C26	-3.11	106.84	112.21
7	B	904	MES	C7-N4-C5	3.11	119.52	111.24
4	A	903	CFF	C6-C5-C4	-2.98	119.17	122.92
4	B	903	CFF	C6-C5-C4	-2.92	119.25	122.92
5	A	905	25D	C25-C24-N23	2.81	113.85	109.61
4	B	903	CFF	N3-C2-N1	2.72	120.54	117.14
4	B	903	CFF	C12-N3-C2	2.69	122.02	117.33
5	B	906	25D	C26-C24-N23	2.63	111.80	107.50
7	B	905	MES	C2-C3-N4	-2.56	106.24	110.12
7	B	905	MES	C6-C5-N4	-2.55	106.24	110.12
5	A	905	25D	C30-C31-C26	-2.53	107.83	112.21
4	A	903	CFF	N3-C2-N1	2.53	120.30	117.14
4	A	903	CFF	C12-N3-C2	2.47	121.63	117.33
5	B	906	25D	C35-C37-C2	-2.43	119.82	122.13
7	B	905	MES	O2S-S-C8	2.41	110.37	106.73
5	A	905	25D	C35-C37-C2	-2.19	120.05	122.13
5	B	906	25D	C4-C3-C2	-2.12	120.11	122.13
3	A	902	PLP	C5-C6-N1	-2.08	120.45	123.83
5	A	905	25D	C32-C24-N23	-2.04	103.98	108.70
3	B	902	PLP	O4P-C5A-C5	-2.03	105.55	109.36
5	A	905	25D	C4-C3-C2	-2.00	120.23	122.13

There are no chirality outliers.

All (38) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	902	PLP	C4-C5-C5A-O4P
3	B	902	PLP	C4-C5-C5A-O4P
5	A	905	25D	C20-C21-N23-C24
5	A	905	25D	O22-C21-N23-C24
5	A	905	25D	C25-C24-N23-C21
5	A	905	25D	C26-C24-N23-C21
5	A	905	25D	C32-C24-N23-C21
5	A	905	25D	N23-C24-C26-C27
5	A	905	25D	N23-C24-C26-C31
5	A	905	25D	C25-C24-C26-C27
5	A	905	25D	C25-C24-C26-C31
5	A	905	25D	C32-C24-C26-C27
5	A	905	25D	C32-C24-C26-C31
6	A	906	MPD	C2-C3-C4-C5
6	A	907	MPD	C1-C2-C3-C4
7	B	904	MES	C7-C8-S-O1S
7	B	904	MES	C7-C8-S-O2S
7	B	904	MES	C7-C8-S-O3S
7	B	905	MES	C8-C7-N4-C3
5	A	905	25D	O9-C8-N7-C6
5	A	905	25D	N10-C8-N7-C6
5	B	906	25D	O9-C8-N7-C6
5	B	906	25D	N10-C8-N7-C6
5	A	905	25D	C25-C24-C32-O34
7	B	904	MES	C8-C7-N4-C3
6	A	907	MPD	O2-C2-C3-C4
6	A	907	MPD	CM-C2-C3-C4
6	A	907	MPD	C2-C3-C4-C5
6	B	908	MPD	C2-C3-C4-C5
5	A	905	25D	C25-C24-C32-O33
5	A	905	25D	N23-C24-C32-O34
5	B	906	25D	N23-C24-C32-O34
6	B	907	MPD	O2-C2-C3-C4
6	A	908	MPD	C2-C3-C4-O4
6	B	907	MPD	C1-C2-C3-C4
6	B	908	MPD	C1-C2-C3-C4
6	B	908	MPD	CM-C2-C3-C4
5	A	905	25D	C26-C24-C32-O34

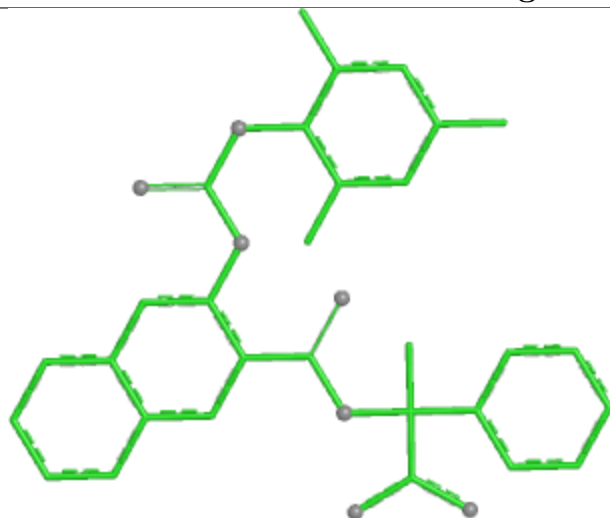
There are no ring outliers.

10 monomers are involved in 19 short contacts:

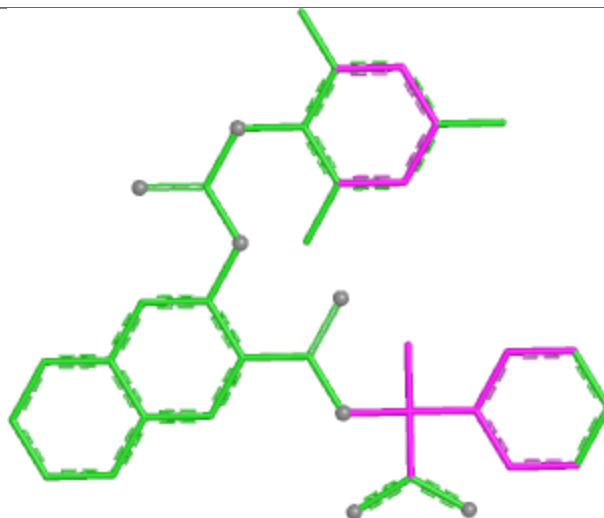
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	906	MPD	6	0
6	B	908	MPD	1	0
6	A	908	MPD	2	0
6	B	907	MPD	3	0
5	A	905	25D	1	0
6	A	907	MPD	2	0
4	A	903	CFF	1	0
5	B	906	25D	1	0
2	B	901	NBG	1	0
4	B	903	CFF	1	0

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.

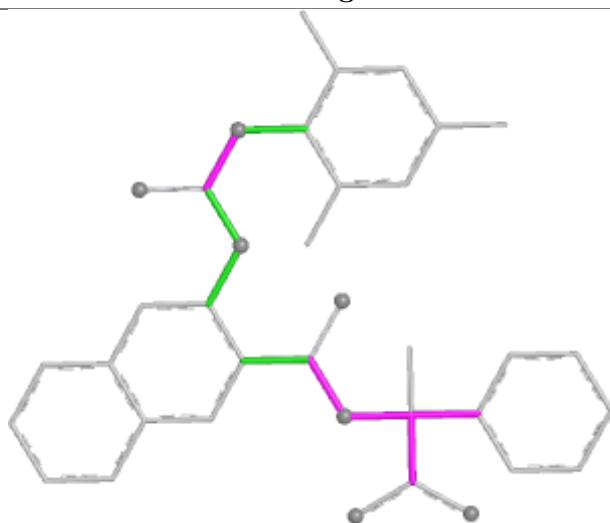
Ligand 25D A 905



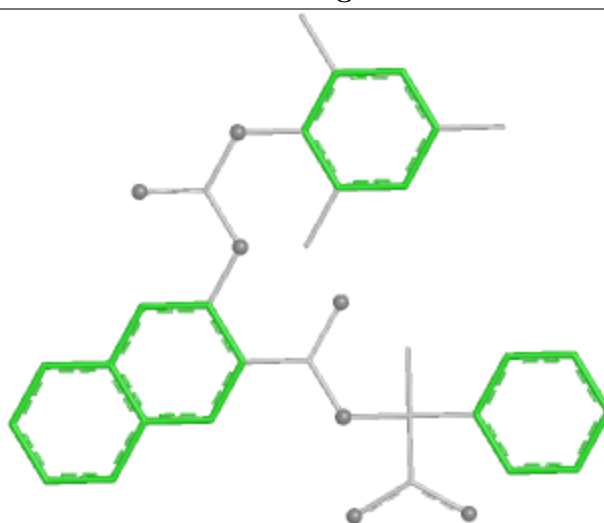
Bond lengths



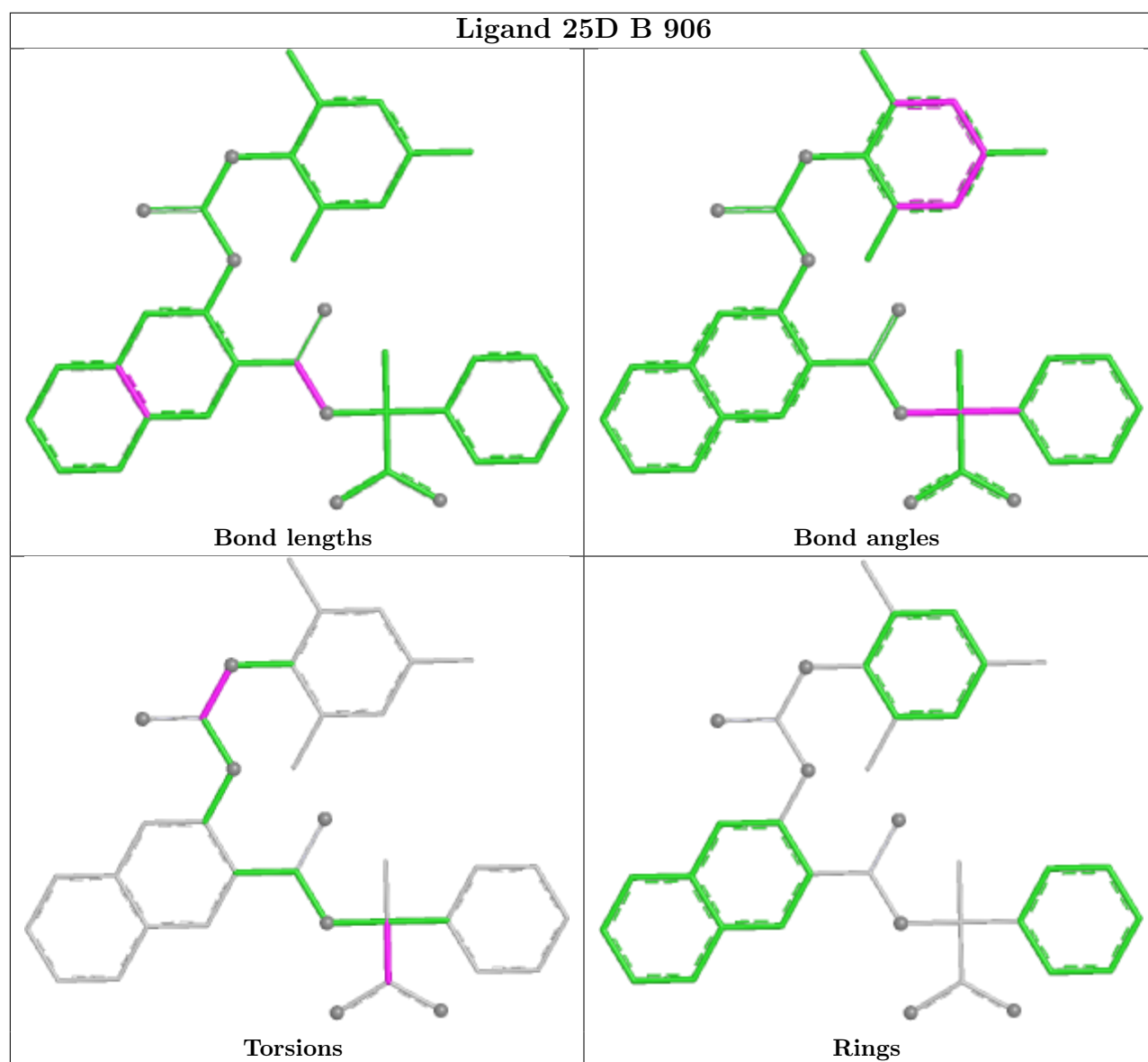
Bond angles



Torsions



Rings



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	810/848 (95%)	-1.74	0 100 100	20, 43, 62, 79	4 (0%)
1	B	805/848 (94%)	-1.73	0 100 100	20, 43, 61, 74	3 (0%)
All	All	1615/1696 (95%)	-1.73	0 100 100	20, 43, 61, 79	7 (0%)

There are no RSRZ outliers to report.

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	SEP	A	14	10/11	0.98	0.03	76,77,79,79	0

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
6	MPD	B	908	8/8	0.97	0.08	102,102,102,102	0

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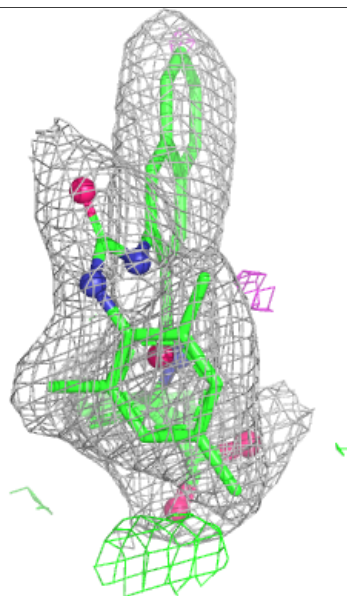
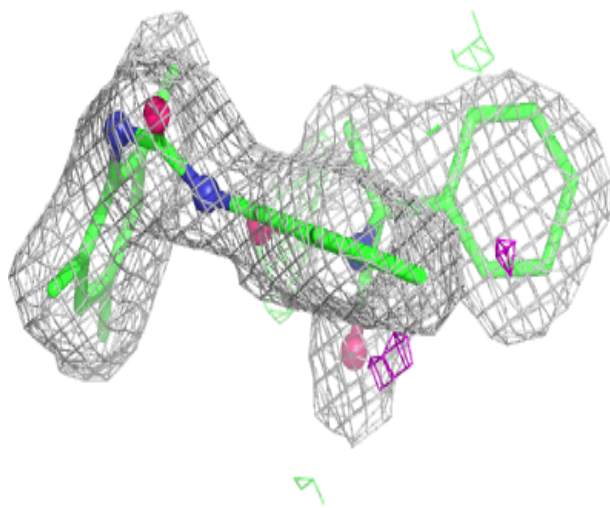
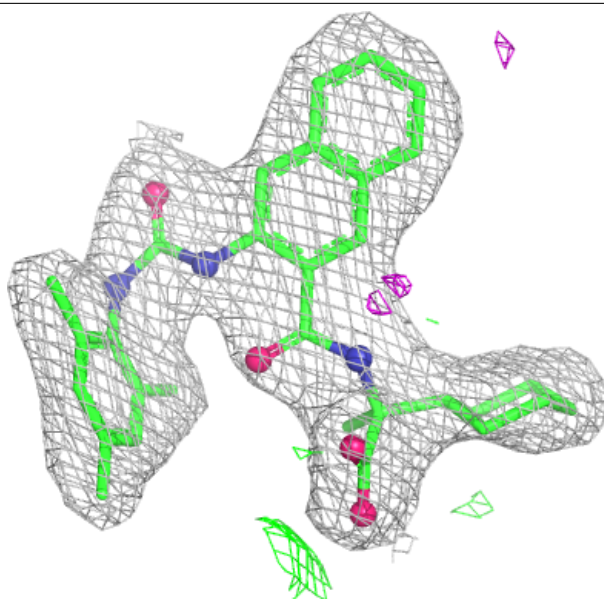
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
6	MPD	B	907	8/8	0.98	0.06	88,89,89,89	0
7	MES	B	904	12/12	0.98	0.04	74,74,75,75	0
7	MES	B	905	12/12	0.98	0.05	83,83,84,84	0
6	MPD	A	908	8/8	0.99	0.05	77,77,77,77	0
2	NBG	A	901	15/15	0.99	0.03	62,64,65,65	0
2	NBG	B	901	15/15	0.99	0.04	77,78,79,79	0
6	MPD	A	906	8/8	0.99	0.04	59,60,60,60	0
6	MPD	A	907	8/8	0.99	0.05	67,68,68,69	0
3	PLP	B	902	15/16	1.00	0.02	38,39,40,40	0
4	CFF	A	903	14/14	1.00	0.02	49,49,50,50	0
4	CFF	B	903	14/14	1.00	0.02	51,51,51,51	0
5	25D	A	905	37/37	1.00	0.02	37,41,47,47	0
5	25D	B	906	37/37	1.00	0.02	37,41,48,48	0
3	PLP	A	902	15/16	1.00	0.02	35,35,37,37	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.

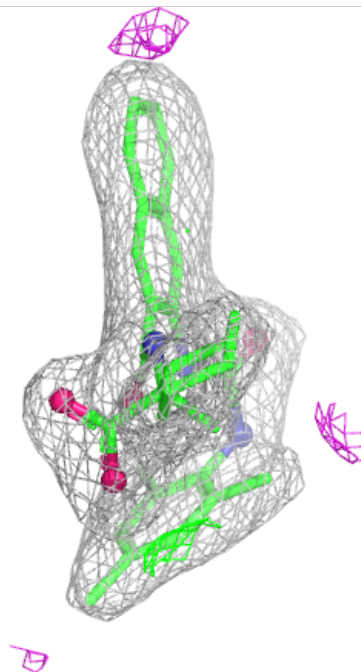
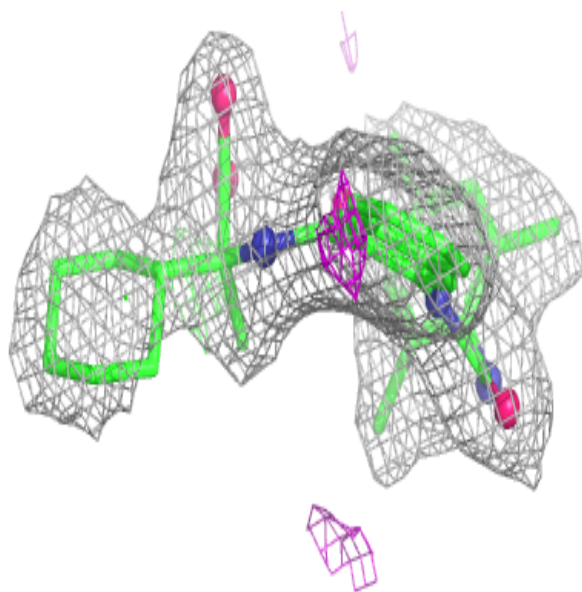
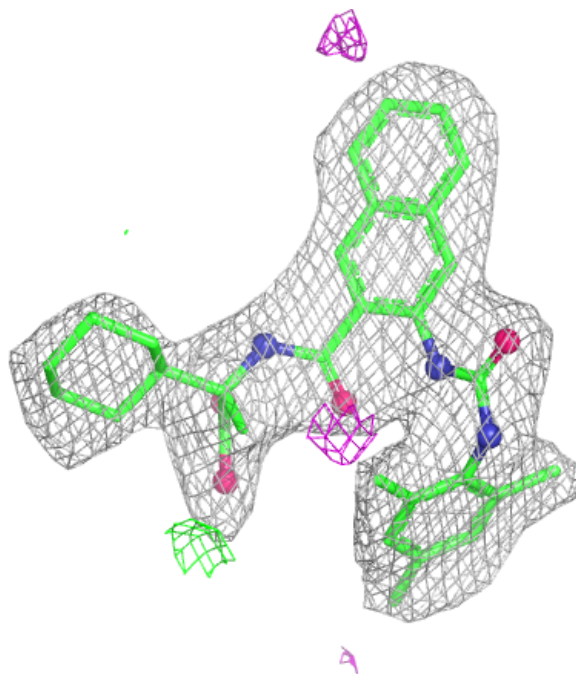
Electron density around 25D A 905:

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



Electron density around 25D B 906:

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



6.5 Other polymers ⓘ

There are no such residues in this entry.