Full wwPDB X-ray Structure Validation Report ⓘ

Jan 26, 2026 – 06:36 pm GMT

PDB ID	:	9G87 / pdb_00009g87
Title	:	3-methylbenzoyl-CoA reductase from Thauera chlorobenzoica (subunits MbdON)
Authors	:	Ermler, U.; Boll, M.; Demmer, U.; Fuchs, J.
Deposited on	:	2024-07-23
Resolution	:	1.90 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:

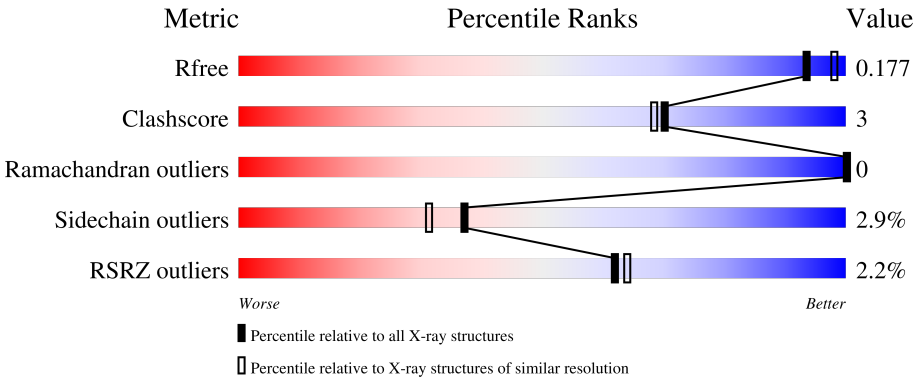
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.47

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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}	164625	7293 (1.90-1.90)
Clashscore	180529	8090 (1.90-1.90)
Ramachandran outliers	177936	8022 (1.90-1.90)
Sidechain outliers	177891	8022 (1.90-1.90)
RSRZ outliers	164620	7292 (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 <=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	445	2% 92% 6%
2	B	388	3% 88% 11%

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
5	GOL	B	404	-	X	-	-
5	GOL	B	405	-	X	-	-

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 7092 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.

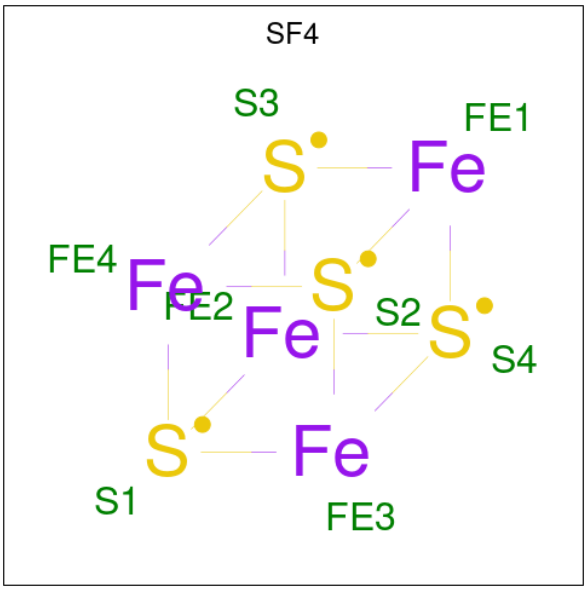
- Molecule 1 is a protein called 3-methylbenzoyl-CoA reductase beta subunit MbdO.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	437	Total	C	N	O	S	0	4	0
			3489	2210	609	652	18			

- Molecule 2 is a protein called 3-methylbenzoyl-CoA reductase gamma subunit MbdN.

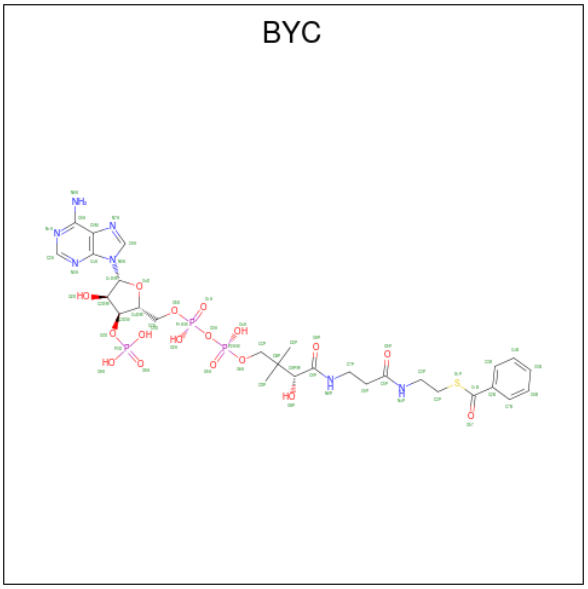
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	386	Total	C	N	O	S	0	1	0
			3090	1964	525	586	15			

- Molecule 3 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4) (labeled as "Ligand of Interest" by depositor).



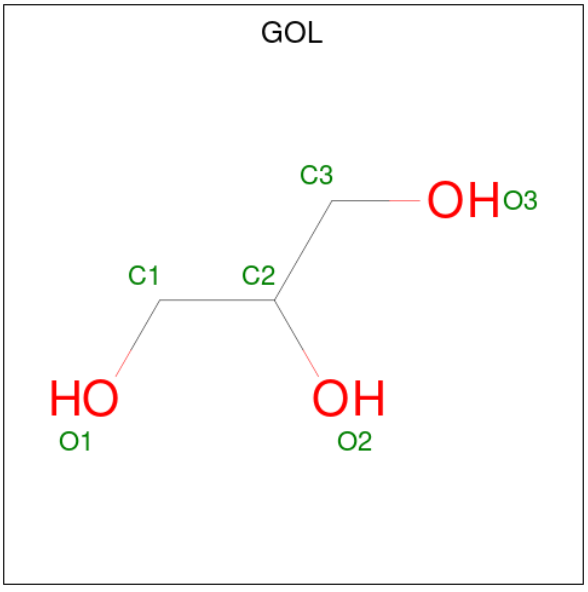
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	Fe	S		0	0
			8	4	4			
3	B	1	Total	Fe	S		0	0
			8	4	4			

- Molecule 4 is benzoyl coenzyme A (CCD ID: BYC) (formula: $C_{28}H_{40}N_7O_{17}P_3S$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	S	0	0
			56	28	7	17	3	1		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			6	3	3		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0

- Molecule 6 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total Cl 1 1	0	0

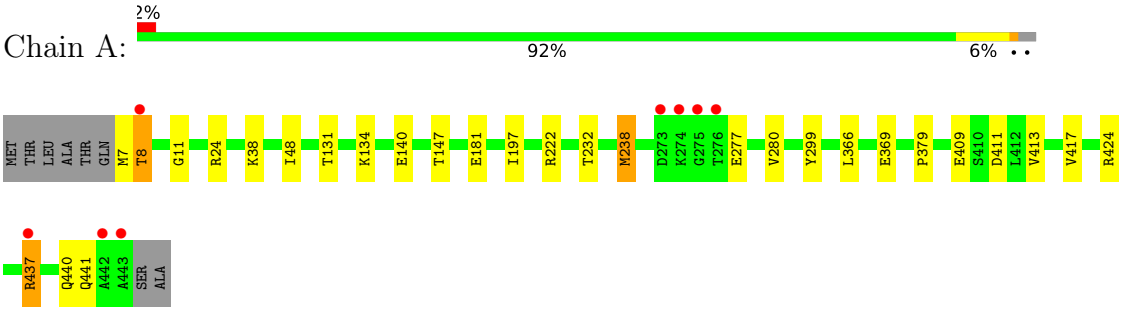
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	195	Total O 196 196	0	1
7	B	199	Total O 202 202	0	3

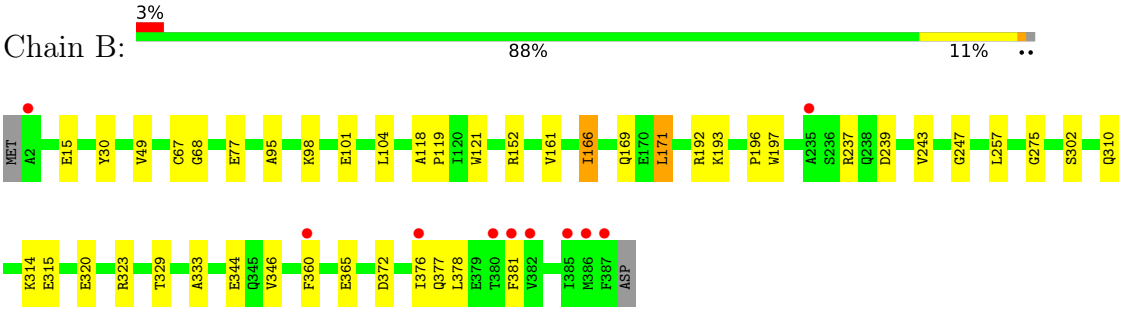
3 Residue-property plots (i)

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: 3-methylbenzoyl-CoA reductase beta subunit MbdO



• Molecule 2: 3-methylbenzoyl-CoA reductase gamma subunit MbdN



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 65	Depositor
Cell constants a, b, c, α, β, γ	149.63Å 149.63Å 97.73Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.98 – 1.90 48.98 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.98-1.90) 99.9 (48.98-1.90)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.97 (at 1.90Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.153 , 0.177 0.154 , 0.177	Depositor DCC
R_{free} test set	4971 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å^2)	35.0	Xtriage
Anisotropy	0.091	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 40.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.028 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	7092	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 3.05% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: SF4, GOL, CL, BYC

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	1/3564 (0.0%)	0.82	3/4815 (0.1%)
2	B	0.78	0/3156	0.77	0/4278
All	All	0.79	1/6720 (0.0%)	0.80	3/9093 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	238	MET	SD-CE	-5.33	1.66	1.79

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	411	ASP	CA-C-N	7.33	131.46	120.31
1	A	411	ASP	C-N-CA	7.33	131.46	120.31
1	A	24	ARG	CB-CA-C	-5.66	101.99	110.88

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	3489	0	3425	16	0
2	B	3090	0	3036	25	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	8	0	0	0	0
3	B	8	0	0	0	0
4	A	56	0	35	5	0
5	A	18	0	23	2	0
5	B	24	0	31	5	0
6	A	1	0	0	0	0
7	A	196	0	0	4	0
7	B	202	0	0	1	0
All	All	7092	0	6550	44	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 3.

All (44) 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)
4:A:502:BYC:O5D	4:A:502:BYC:C5D	1.67	1.43
2:B:67:CYS:SG	5:B:403:GOL:H31	2.08	0.94
1:A:379:PRO:HG2	1:A:409:GLU:HG2	1.65	0.79
2:B:68:GLY:O	5:B:403:GOL:H32	1.93	0.69
1:A:437[B]:ARG:O	1:A:440:GLN:HG3	1.94	0.67
1:A:437[A]:ARG:O	1:A:440:GLN:HG3	1.96	0.64
4:A:502:BYC:C5D	4:A:502:BYC:P1A	2.85	0.64
2:B:98:LYS:HE3	2:B:101:GLU:HG2	1.87	0.56
2:B:166:ILE:HD11	2:B:171:LEU:HD22	1.87	0.56
1:A:181:GLU:OE1	5:A:504:GOL:H11	2.08	0.54
1:A:222[B]:ARG:HD3	1:A:369:GLU:HB3	1.88	0.54
1:A:8:THR:HG22	1:A:11:GLY:H	1.73	0.53
1:A:48:ILE:HD11	4:A:502:BYC:H6B	1.89	0.53
2:B:49:VAL:O	2:B:275:GLY:HA3	2.09	0.52
2:B:197:TRP:CE3	2:B:237:ARG:HG2	2.45	0.52
2:B:257:LEU:HD23	2:B:257:LEU:C	2.35	0.52
1:A:366:LEU:HD21	5:A:505:GOL:H11	1.92	0.51
2:B:372:ASP:O	2:B:376:ILE:HG12	2.12	0.50
2:B:302:SER:HA	5:B:405:GOL:H2	1.94	0.49
2:B:196:PRO:HD2	2:B:197:TRP:CZ3	2.48	0.49
4:A:502:BYC:H3P	7:A:606:HOH:O	2.12	0.49
1:A:232:THR:HA	1:A:299:TYR:OH	2.13	0.48
2:B:30:TYR:OH	5:B:403:GOL:H2	2.14	0.47
2:B:360:PHE:CZ	2:B:378:LEU:HG	2.49	0.47
2:B:192:ARG:O	2:B:196:PRO:HB3	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:147:THR:HG22	7:A:762:HOH:O	2.15	0.46
2:B:104:LEU:HG	2:B:161:VAL:HG21	1.97	0.46
2:B:247:GLY:HA3	2:B:333:ALA:O	2.15	0.46
1:A:134:LYS:NZ	2:B:344:GLU:OE1	2.44	0.46
2:B:360:PHE:HZ	2:B:378:LEU:HG	1.81	0.45
4:A:502:BYC:O5D	4:A:502:BYC:C4D	2.53	0.45
2:B:118:ALA:HB3	2:B:119:PRO:HD3	1.98	0.44
2:B:378:LEU:HA	2:B:378:LEU:HD23	1.75	0.44
2:B:193:LYS:NZ	7:B:504:HOH:O	2.41	0.43
2:B:377:GLN:O	2:B:381:PHE:HB3	2.20	0.42
2:B:152:ARG:HE	5:B:404:GOL:H12	1.85	0.42
2:B:243:VAL:HG12	2:B:329:THR:OG1	2.20	0.42
1:A:140:GLU:CG	1:A:147:THR:HG21	2.50	0.42
1:A:238:MET:HB3	1:A:238:MET:HE3	1.81	0.42
1:A:197:ILE:HG22	7:A:704:HOH:O	2.19	0.41
1:A:424[B]:ARG:NH1	7:A:609:HOH:O	2.51	0.41
1:A:417:VAL:O	1:A:417:VAL:HG12	2.21	0.41
2:B:320:GLU:OE1	2:B:323:ARG:NH1	2.54	0.41
2:B:95:ALA:HB2	2:B:121:TRP:CZ2	2.56	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	439/445 (99%)	428 (98%)	11 (2%)	0	100	100
2	B	385/388 (99%)	379 (98%)	6 (2%)	0	100	100
All	All	824/833 (99%)	807 (98%)	17 (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	369/371 (100%)	359 (97%)	10 (3%)	40	34
2	B	335/336 (100%)	324 (97%)	11 (3%)	33	26
All	All	704/707 (100%)	683 (97%)	21 (3%)	37	30

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	7	MET
1	A	8	THR
1	A	38	LYS
1	A	131	THR
1	A	277	GLU
1	A	280	VAL
1	A	413	VAL
1	A	437[A]	ARG
1	A	437[B]	ARG
1	A	441	GLN
2	B	15	GLU
2	B	77	GLU
2	B	166	ILE
2	B	169	GLN
2	B	171	LEU
2	B	239	ASP
2	B	310	GLN
2	B	314	LYS
2	B	315	GLU
2	B	346	VAL
2	B	365	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	72	GLN

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Mol	Chain	Res	Type
1	A	202	GLN
1	A	267	HIS

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 11 ligands modelled in this entry, 1 is monoatomic - leaving 10 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	$\#\|Z\| > 2$
3	SF4	A	501	7,1	0,12,12	-	-	-		
4	BYC	A	502	-	51,59,59	2.34	13 (25%)	64,87,87	2.27	20 (31%)
5	GOL	B	404	-	5,5,5	1.43	1 (20%)	5,5,5	1.84	1 (20%)
5	GOL	A	505	-	5,5,5	1.63	1 (20%)	5,5,5	1.41	1 (20%)
3	SF4	B	401	2	0,12,12	-	-	-		
5	GOL	A	504	-	5,5,5	0.85	0	5,5,5	1.27	1 (20%)
5	GOL	B	403	-	5,5,5	0.13	0	5,5,5	0.59	0
5	GOL	A	503	-	5,5,5	1.64	1 (20%)	5,5,5	0.54	0
5	GOL	B	405	-	5,5,5	2.15	3 (60%)	5,5,5	1.33	1 (20%)
5	GOL	B	402	-	5,5,5	2.36	2 (40%)	5,5,5	0.64	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
3	SF4	A	501	7,1	-	-	0/6/5/5
4	BYC	A	502	-	-	25/51/71/71	0/4/4/4
5	GOL	B	404	-	-	4/4/4/4	-
5	GOL	A	505	-	-	2/4/4/4	-
3	SF4	B	401	2	-	-	0/6/5/5
5	GOL	A	504	-	-	4/4/4/4	-
5	GOL	B	403	-	-	2/4/4/4	-
5	GOL	A	503	-	-	0/4/4/4	-
5	GOL	B	405	-	-	2/4/4/4	-
5	GOL	B	402	-	-	0/4/4/4	-

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	502	BYC	C9P-N8P	7.04	1.49	1.33
4	A	502	BYC	C5P-N4P	6.86	1.49	1.33
4	A	502	BYC	O5D-C5D	5.80	1.67	1.44
4	A	502	BYC	C1B-S1P	4.95	1.86	1.76
4	A	502	BYC	O57-C1B	4.34	1.30	1.21
5	B	402	GOL	O2-C2	-4.14	1.31	1.43
4	A	502	BYC	C6A-N6A	4.05	1.48	1.34
4	A	502	BYC	O4D-C1D	3.80	1.46	1.41
4	A	502	BYC	C5D-C4D	-3.66	1.40	1.51
5	B	405	GOL	C1-C2	-3.05	1.39	1.51
4	A	502	BYC	C6P-C5P	3.03	1.57	1.51
4	A	502	BYC	P3D-O3D	2.72	1.64	1.59
5	B	402	GOL	C3-C2	2.64	1.62	1.51
4	A	502	BYC	C2B-C1B	-2.62	1.44	1.49
5	B	404	GOL	C3-C2	2.60	1.62	1.51
5	A	503	GOL	C1-C2	2.56	1.62	1.51
5	B	405	GOL	C3-C2	2.40	1.61	1.51
5	A	505	GOL	C1-C2	2.31	1.61	1.51
4	A	502	BYC	O3D-C3D	2.22	1.52	1.44
5	B	405	GOL	O1-C1	2.21	1.51	1.42
4	A	502	BYC	C3D-C4D	2.18	1.58	1.52

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	502	BYC	N3A-C2A-N1A	-7.98	116.21	128.68
4	A	502	BYC	C2P-S1P-C1B	6.42	107.86	99.80
4	A	502	BYC	C6P-C5P-N4P	4.62	124.20	116.42
4	A	502	BYC	C2A-N1A-C6A	4.39	126.27	118.75
4	A	502	BYC	O4D-C4D-C5D	3.99	122.51	109.37
4	A	502	BYC	O5P-C5P-N4P	-3.81	115.83	123.01
5	B	404	GOL	C3-C2-C1	-3.42	98.40	111.70
4	A	502	BYC	C1D-N9A-C4A	-3.23	120.96	126.64
4	A	502	BYC	O57-C1B-C2B	-3.12	114.40	122.13
4	A	502	BYC	O6A-CCP-CBP	3.04	115.44	110.55
4	A	502	BYC	C7P-C6P-C5P	2.92	117.23	112.36
4	A	502	BYC	C7P-N8P-C9P	2.91	127.78	122.59
4	A	502	BYC	O57-C1B-S1P	2.84	129.06	122.58
4	A	502	BYC	O2A-P1A-O1A	-2.68	98.97	112.24
4	A	502	BYC	O2D-C2D-C1D	-2.65	101.06	110.85
4	A	502	BYC	O4A-P2A-O5A	-2.52	99.76	112.24
4	A	502	BYC	O7A-P3D-O3D	2.39	116.69	105.99
5	A	505	GOL	C3-C2-C1	-2.35	102.57	111.70
5	B	405	GOL	O1-C1-C2	-2.33	99.02	110.20
4	A	502	BYC	C5D-C4D-C3D	2.24	121.81	114.40
5	A	504	GOL	C3-C2-C1	-2.18	103.23	111.70
4	A	502	BYC	CEP-CBP-CAP	2.17	112.59	108.82
4	A	502	BYC	O7A-P3D-O8A	-2.11	102.44	110.68
4	A	502	BYC	O9A-P3D-O3D	2.09	115.34	105.99

There are no chirality outliers.

All (39) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	502	BYC	C2B-C1B-S1P-C2P
4	A	502	BYC	O57-C1B-S1P-C2P
4	A	502	BYC	CCP-O6A-P2A-O4A
4	A	502	BYC	CCP-O6A-P2A-O5A
4	A	502	BYC	S1P-C2P-C3P-N4P
4	A	502	BYC	O4D-C4D-C5D-O5D
4	A	502	BYC	C5P-C6P-C7P-N8P
4	A	502	BYC	C9P-CAP-CBP-CCP
4	A	502	BYC	C9P-CAP-CBP-CDP
4	A	502	BYC	C9P-CAP-CBP-CEP
4	A	502	BYC	OAP-CAP-CBP-CCP
4	A	502	BYC	OAP-CAP-CBP-CDP
4	A	502	BYC	OAP-CAP-CBP-CEP
4	A	502	BYC	CAP-CBP-CCP-O6A

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Mol	Chain	Res	Type	Atoms
5	A	504	GOL	C1-C2-C3-O3
5	A	505	GOL	C1-C2-C3-O3
5	B	403	GOL	O1-C1-C2-O2
5	B	403	GOL	O1-C1-C2-C3
5	B	404	GOL	C1-C2-C3-O3
5	B	405	GOL	O1-C1-C2-C3
4	A	502	BYC	C3D-C4D-C5D-O5D
5	A	504	GOL	O1-C1-C2-C3
5	B	404	GOL	O1-C1-C2-C3
5	A	504	GOL	O2-C2-C3-O3
5	B	404	GOL	O1-C1-C2-O2
5	B	404	GOL	O2-C2-C3-O3
5	A	504	GOL	O1-C1-C2-O2
4	A	502	BYC	CDP-CBP-CCP-O6A
5	A	505	GOL	O2-C2-C3-O3
5	B	405	GOL	O1-C1-C2-O2
4	A	502	BYC	CEP-CBP-CCP-O6A
4	A	502	BYC	O9P-C9P-CAP-CBP
4	A	502	BYC	N8P-C9P-CAP-CBP
4	A	502	BYC	C3P-C2P-S1P-C1B
4	A	502	BYC	P2A-O3A-P1A-O2A
4	A	502	BYC	CCP-O6A-P2A-O3A
4	A	502	BYC	C3D-O3D-P3D-O9A
4	A	502	BYC	P2A-O3A-P1A-O1A
4	A	502	BYC	P1A-O3A-P2A-O5A

There are no ring outliers.

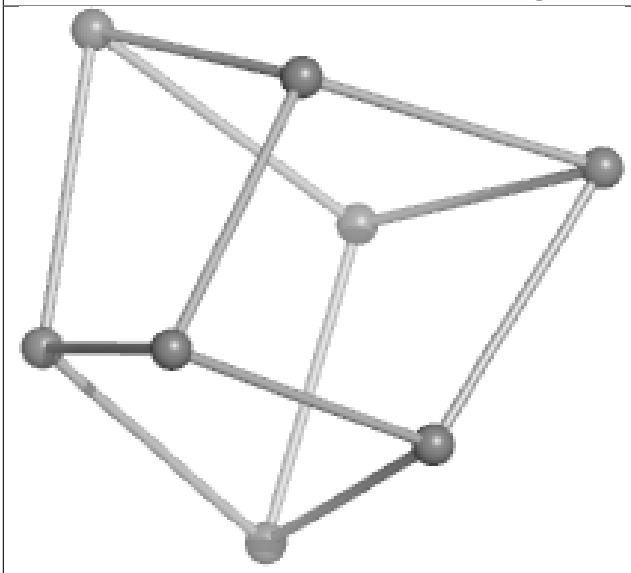
6 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	502	BYC	5	0
5	B	404	GOL	1	0
5	A	505	GOL	1	0
5	A	504	GOL	1	0
5	B	403	GOL	3	0
5	B	405	GOL	1	0

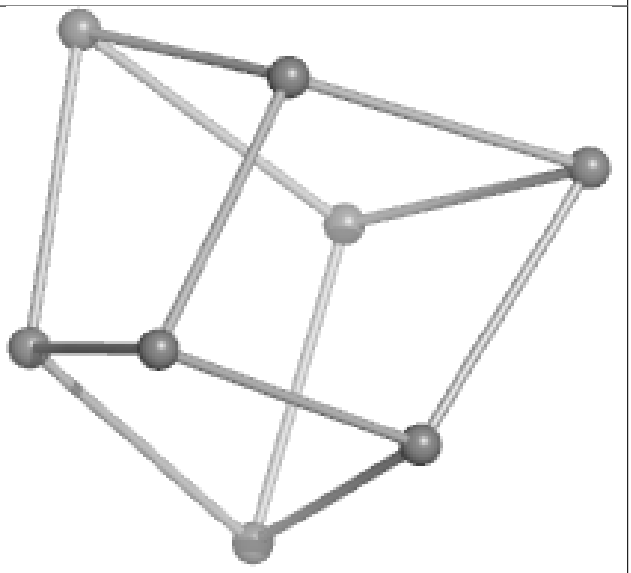
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 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.

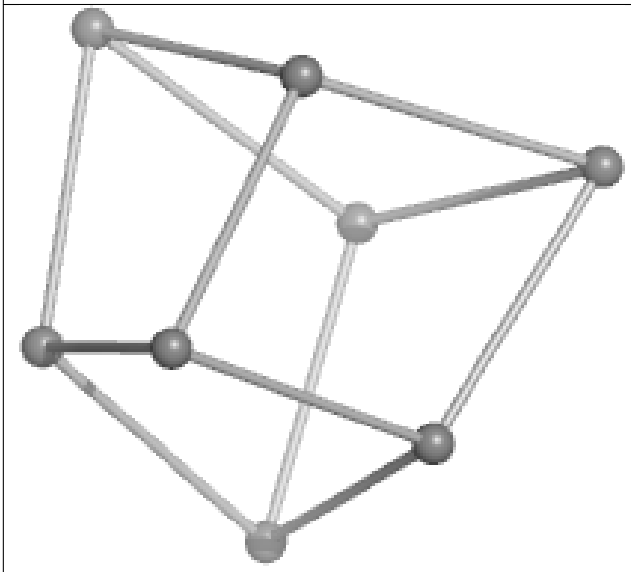
Ligand SF4 A 501



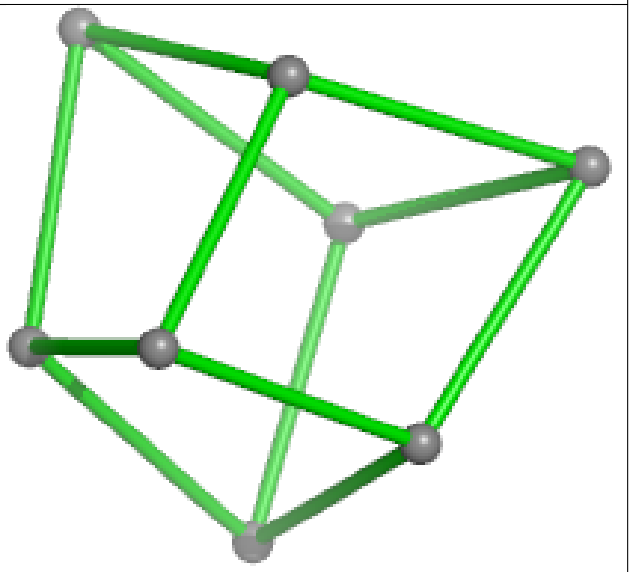
Bond lengths



Bond angles

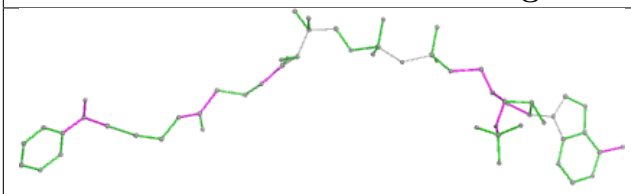


Torsions

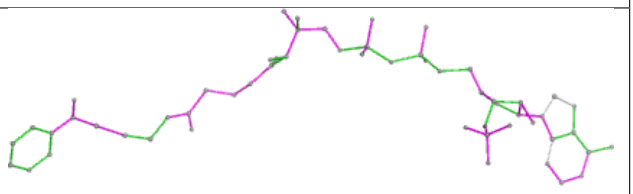


Rings

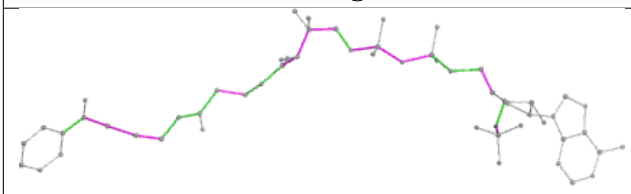
Ligand BYC A 502



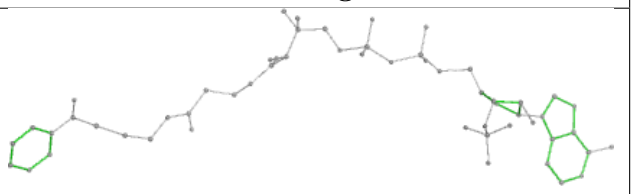
Bond lengths



Bond angles

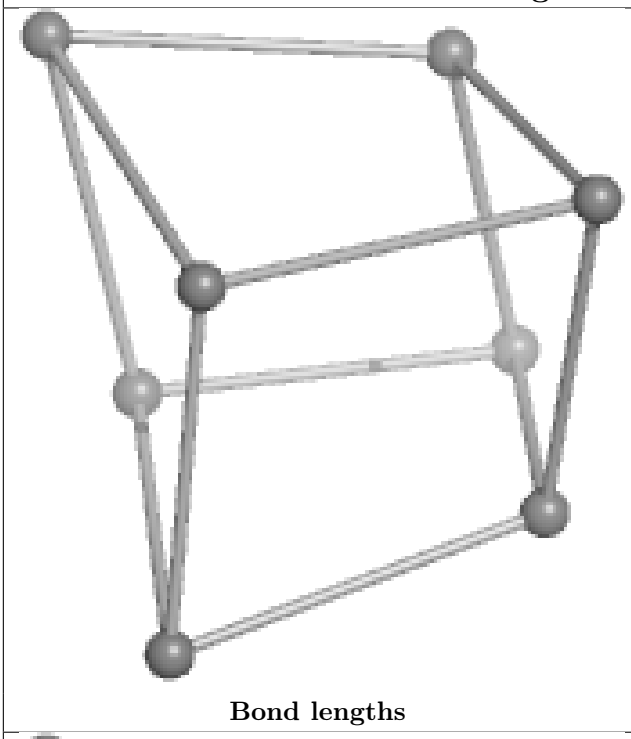


Torsions

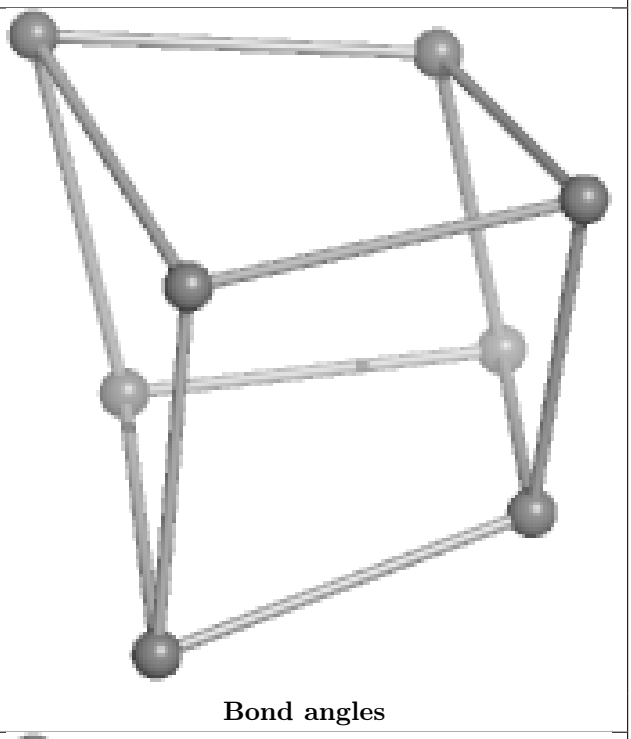


Rings

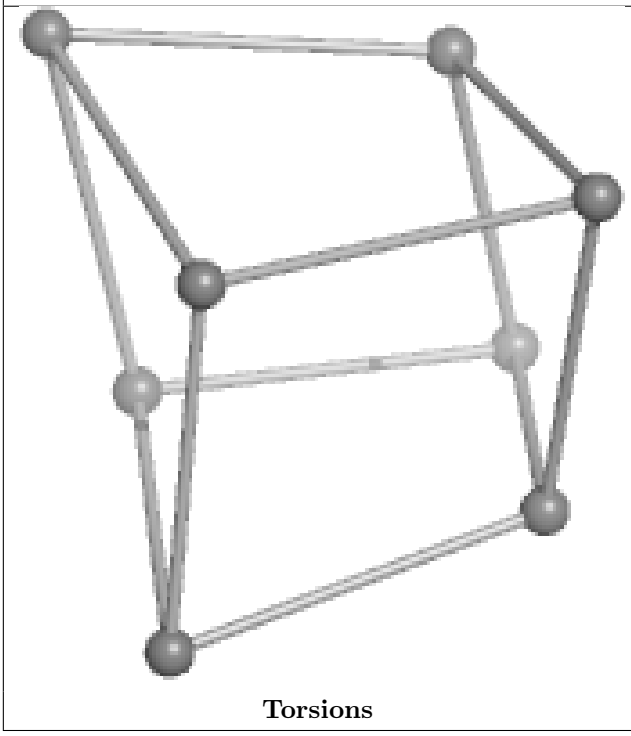
Ligand SF4 B 401



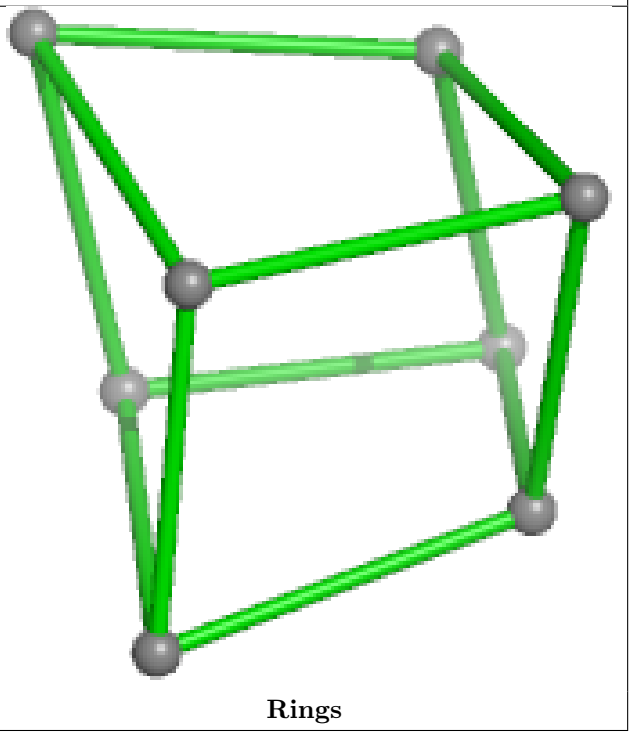
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

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

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} 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	437/445 (98%)	-0.29	8 (1%)	67	70	18, 38, 60, 104	4 (0%)
2	B	386/388 (99%)	-0.21	10 (2%)	57	59	21, 40, 70, 126	1 (0%)
All	All	823/833 (98%)	-0.25	18 (2%)	62	64	18, 39, 68, 126	5 (0%)

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	387	PHE	6.4
1	A	443	ALA	4.2
1	A	276	THR	4.0
2	B	360	PHE	3.9
2	B	2	ALA	3.8
1	A	8	THR	3.8
2	B	382	VAL	3.1
2	B	381	PHE	2.5
2	B	235	ALA	2.5
2	B	385	ILE	2.4
2	B	376	ILE	2.3
1	A	275	GLY	2.2
2	B	386	MET	2.2
1	A	437[A]	ARG	2.1
2	B	380	THR	2.1
1	A	273	ASP	2.1
1	A	274	LYS	2.0
1	A	442	ALA	2.0

6.2 Non-standard residues in protein, DNA, RNA chains

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)

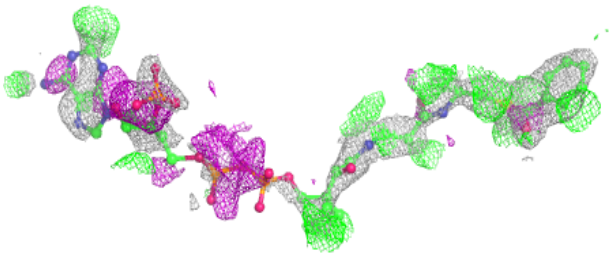
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

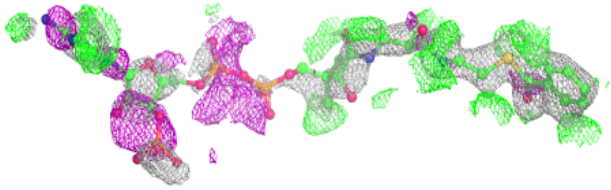
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	BYC	A	502	56/56	0.61	0.24	38,95,142,143	0
5	GOL	A	504	6/6	0.83	0.17	46,67,74,75	0
5	GOL	A	505	6/6	0.88	0.16	48,54,59,64	0
5	GOL	B	403	6/6	0.89	0.15	32,52,54,61	0
5	GOL	B	405	6/6	0.91	0.13	36,48,57,71	0
5	GOL	B	404	6/6	0.95	0.10	37,43,52,53	0
5	GOL	B	402	6/6	0.97	0.07	36,42,46,46	0
5	GOL	A	503	6/6	0.97	0.06	29,34,34,34	0
6	CL	A	506	1/1	0.99	0.04	38,38,38,38	0
3	SF4	B	401	8/8	1.00	0.02	29,30,31,32	0
3	SF4	A	501	8/8	1.00	0.02	28,29,29,30	0

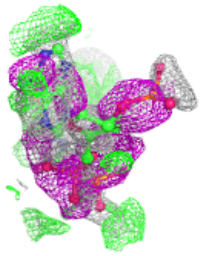
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around BYC A 502:

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

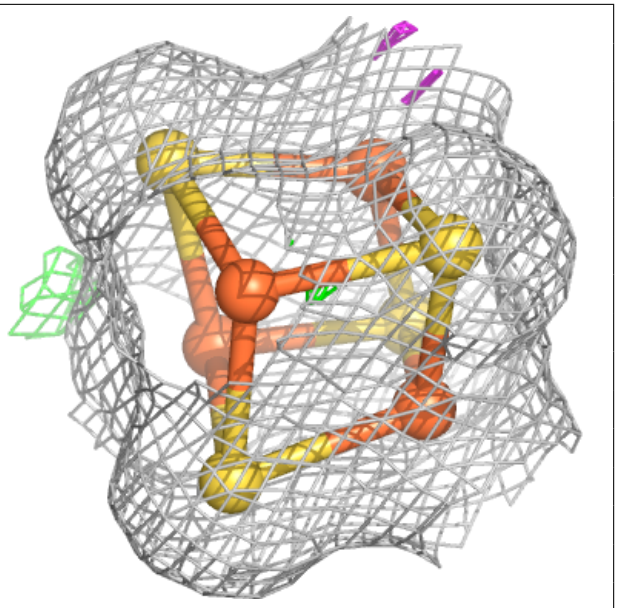


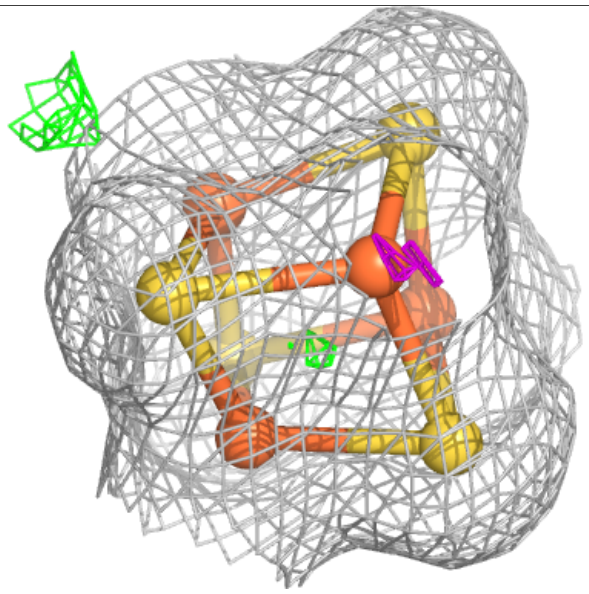


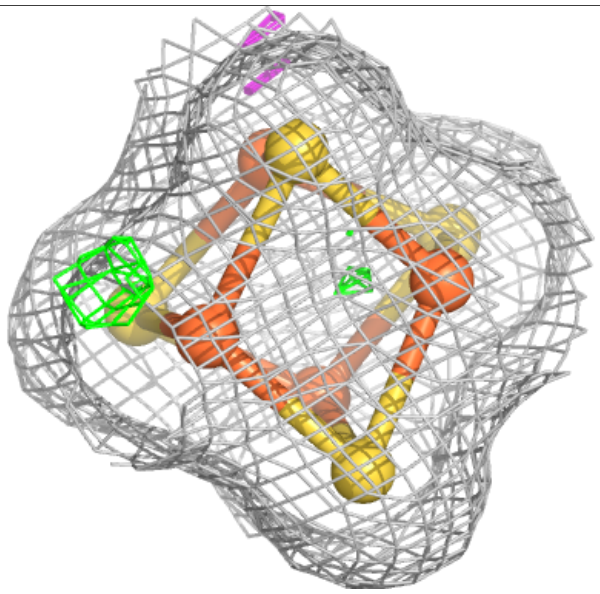


Electron density around SF4 B 401:

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

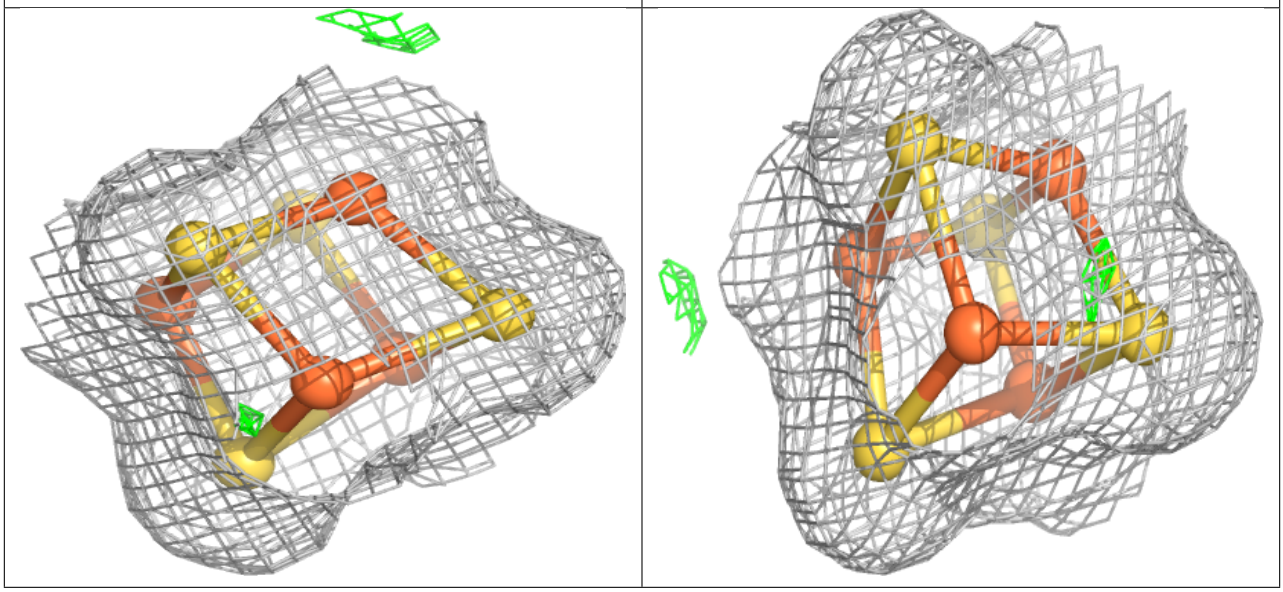






Electron density around SF4 A 501:

$2mF_o$-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.