Full wwPDB X-ray Structure Validation Report (i)

Jun 16, 2026 – 10:29 AM JST

PDB ID	:	9VTC / pdb_00009vtc
Title	:	Crystal structure of DciF bound with DMASPP
Authors	:	Ito, S.; Hamada, K.; Inoue, S.; Suga, H.; Goto, Y.; Sengoku, T.
Deposited on	:	2025-07-10
Resolution	:	1.85 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 (i) 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 (i)) were used in the production of this report:

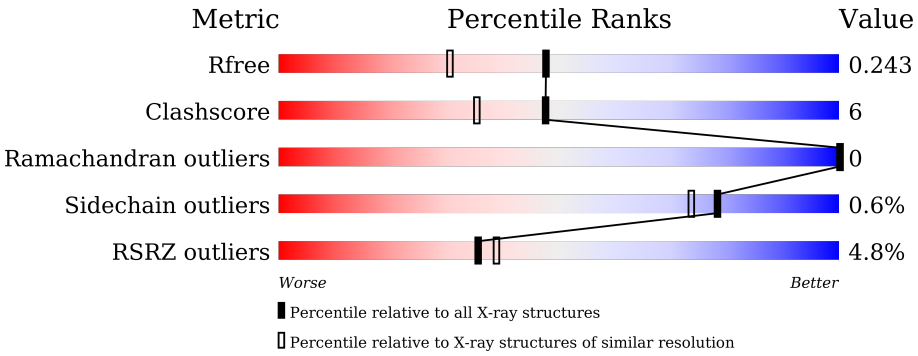
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
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 (i)

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

The reported resolution of this entry is 1.85 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	3428 (1.86-1.86)
Clashscore	190562	3579 (1.86-1.86)
Ramachandran outliers	187476	3553 (1.86-1.86)
Sidechain outliers	187428	3553 (1.86-1.86)
RSRZ outliers	180081	3429 (1.86-1.86)

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	289	2% 85% 12% ·
1	B	289	2% 88% 10% ·
1	C	289	11% 81% 15% ·
1	D	289	4% 87% 13%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 10250 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.

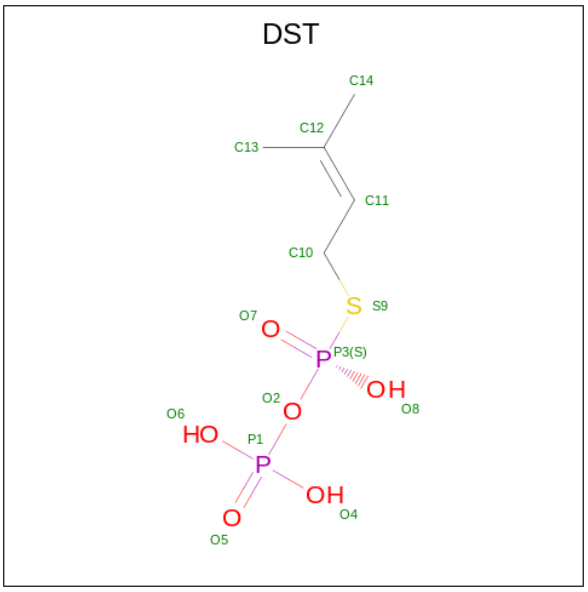
- Molecule 1 is a protein called DciF.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	282	Total	C	N	O	S	0	1	0
			2325	1508	379	428	10			
1	B	284	Total	C	N	O	S	0	1	0
			2339	1514	381	433	11			
1	C	279	Total	C	N	O	S	0	1	0
			2303	1495	375	422	11			
1	D	289	Total	C	N	O	S	0	1	0
			2377	1539	386	441	11			

- Molecule 2 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

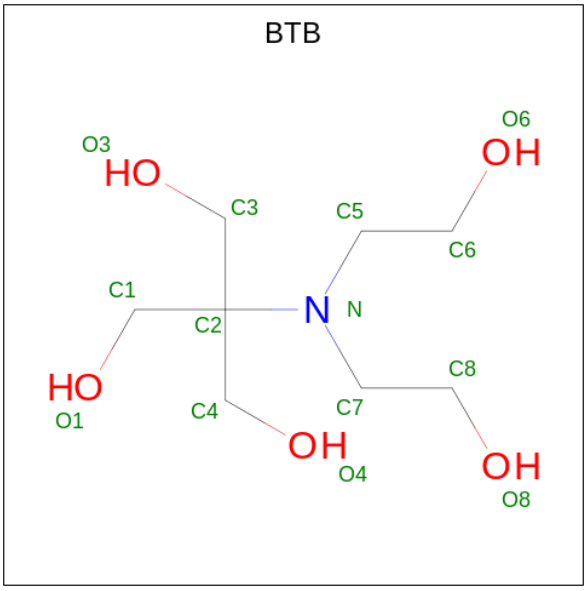
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Mg	0	0
			1	1		
2	B	1	Total	Mg	0	0
			1	1		
2	C	1	Total	Mg	0	0
			1	1		
2	D	1	Total	Mg	0	0
			1	1		

- Molecule 3 is DIMETHYLALLYL S-THIOLODIPHOSPHATE (CCD ID: DST) (formula: $C_5H_{12}O_6P_2S$) (labeled as "Ligand of Interest" by depositor).



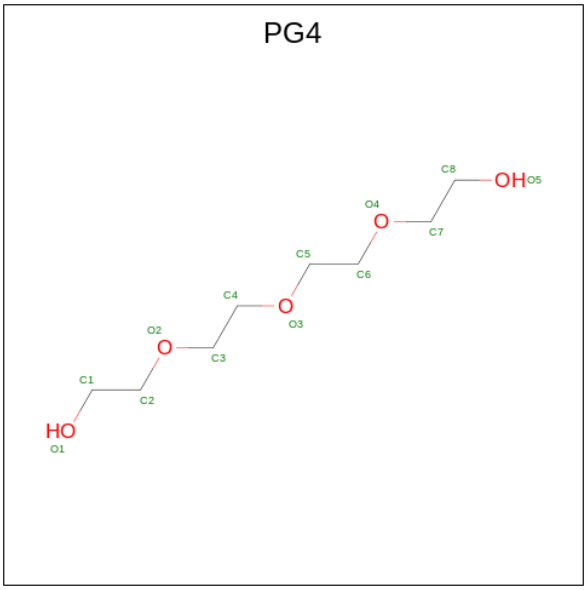
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	O	P	S	0	0
			14	5	6	2	1		
3	B	1	Total	C	O	P	S	0	0
			14	5	6	2	1		
3	C	1	Total	C	O	P	S	0	0
			14	5	6	2	1		
3	D	1	Total	C	O	P	S	0	0
			14	5	6	2	1		

- Molecule 4 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: BTB) (formula: $C_8H_{19}NO_5$).



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

- Molecule 5 is TETRAETHYLENE GLYCOL (CCD ID: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total C O 13 8 5	0	0
5	D	1	Total C O 13 8 5	0	0

- Molecule 6 is water.

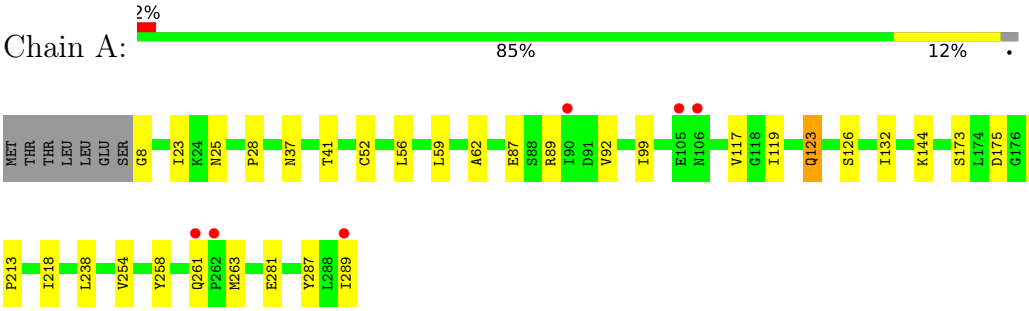
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	239	Total O 239 239	0	0
6	B	230	Total O 230 230	0	0
6	C	95	Total O 95 95	0	0
6	D	200	Total O 200 200	0	0

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.

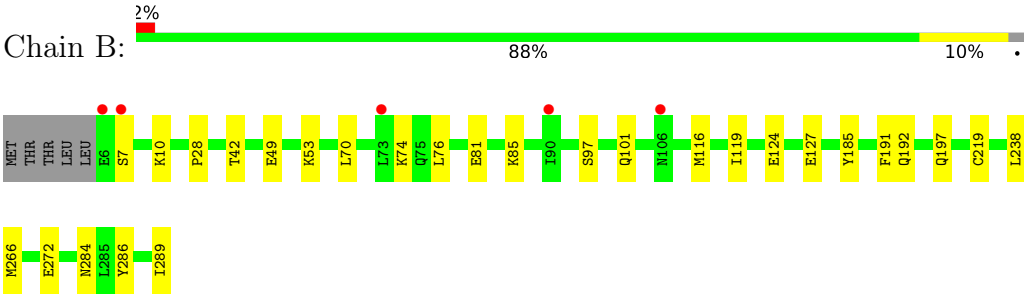
• Molecule 1: DciF

Chain A:



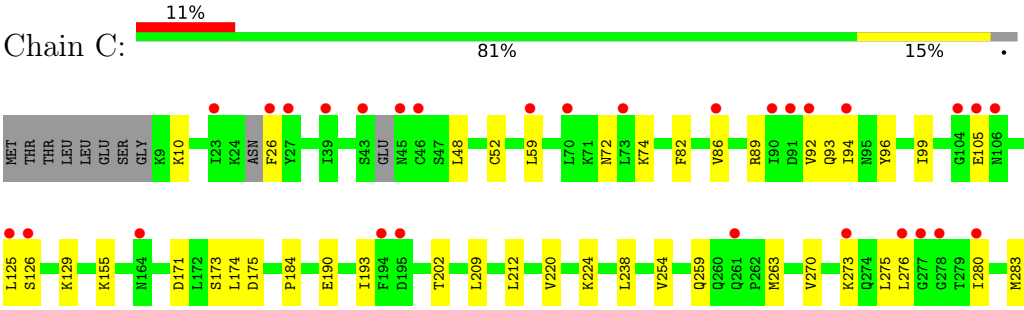
• Molecule 1: DciF

Chain B:



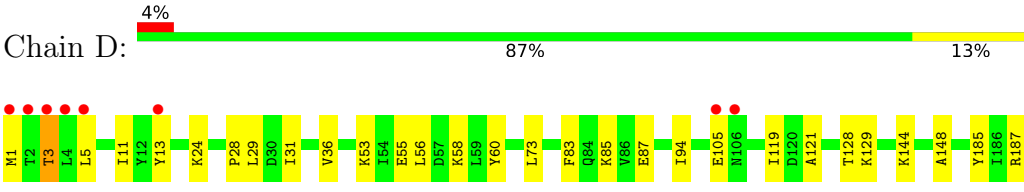
• Molecule 1: DciF

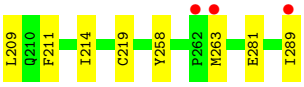
Chain C:



• Molecule 1: DciF

Chain D:




L209
Q210
F211
I214
C219
Y258
P262
M263
E281
I289

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	71.67Å 88.73Å 93.91Å 90.00° 104.05° 90.00°	Depositor
Resolution (Å)	49.75 – 1.85 49.75 – 1.85	Depositor EDS
% Data completeness (in resolution range)	100.0 (49.75-1.85) 100.0 (49.75-1.85)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.17 (at 1.86Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.193 , 0.243 0.193 , 0.243	Depositor DCC
R_{free} test set	2000 reflections (2.06%)	wwPDB-VP
Wilson B-factor (Å^2)	16.3	Xtriage
Anisotropy	0.970	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 51.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	10250	wwPDB-VP
Average B, all atoms (Å^2)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.34% 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: DST, PG4, BTB, MG

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	0.18	0/2371	0.38	0/3197
1	B	0.18	0/2385	0.40	0/3215
1	C	0.14	0/2347	0.38	0/3161
1	D	0.17	0/2423	0.39	0/3267
All	All	0.17	0/9526	0.39	0/12840

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	C	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	C	122	ARG	Sidechain

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2325	0	2339	26	0
1	B	2339	0	2346	22	0
1	C	2303	0	2318	28	0
1	D	2377	0	2394	25	1
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	14	0	10	0	0
3	B	14	0	10	3	0
3	C	14	0	10	0	0
3	D	14	0	10	0	0
4	A	14	0	19	1	0
4	B	14	0	19	3	0
4	C	14	0	19	1	0
4	D	14	0	19	3	0
5	B	13	0	18	1	0
5	D	13	0	18	2	1
6	A	239	0	0	7	0
6	B	230	0	0	2	0
6	C	95	0	0	4	0
6	D	200	0	0	1	0
All	All	10250	0	9549	107	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 6.

All (107) 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:D:1:MET:HE3	1:D:289:ILE:HG21	1.62	0.80
1:A:238:LEU:HD22	1:A:263:MET:HE3	1.68	0.76
1:B:53:LYS:NZ	3:B:302:DST:S9	2.60	0.75
1:A:28:PRO:HD2	1:A:119:ILE:HD11	1.67	0.75
1:D:28:PRO:HD2	1:D:119:ILE:HD11	1.69	0.75
1:C:263:MET:HE1	1:C:287:TYR:HD2	1.56	0.71
1:C:96:TYR:HD1	1:C:99:ILE:HD11	1.55	0.70
1:D:148:ALA:HB2	5:D:304:PG4:H12	1.72	0.69
1:C:26:PHE:N	6:C:404:HOH:O	2.25	0.68
1:A:189:GLN:O	6:A:401:HOH:O	2.11	0.67
4:A:303:BTB:H81	4:A:303:BTB:H62	1.78	0.66
1:A:8:GLY:N	6:A:405:HOH:O	2.29	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:24:LYS:NZ	6:D:401:HOH:O	2.29	0.65
1:B:28:PRO:HD2	1:B:119:ILE:HD11	1.80	0.64
1:B:42:THR:HG22	1:B:74:LYS:NZ	2.12	0.64
1:A:258:TYR:OH	6:A:402:HOH:O	2.14	0.62
1:B:49:GLU:OE1	4:B:303:BTB:O3	2.14	0.62
1:C:224:LYS:NZ	6:C:407:HOH:O	2.31	0.62
1:D:144:LYS:HG3	5:D:304:PG4:H31	1.82	0.60
1:B:289:ILE:O	6:B:401:HOH:O	2.17	0.60
1:A:263:MET:SD	1:A:287:TYR:HD2	2.25	0.60
1:D:83:PHE:O	1:D:87:GLU:HG3	2.01	0.59
1:C:273:LYS:O	1:C:276:LEU:HG	2.03	0.57
1:A:37:ASN:O	1:A:41:THR:HG23	2.04	0.57
1:B:81:GLU:O	1:B:85:LYS:HG2	2.04	0.57
1:C:209:LEU:HA	1:C:212:LEU:HD13	1.88	0.56
1:C:10:LYS:HD3	1:C:48:LEU:HB2	1.87	0.56
1:C:193:ILE:HG23	1:D:73:LEU:HD11	1.87	0.56
1:B:42:THR:HG22	1:B:74:LYS:HZ3	1.70	0.56
1:A:25:ASN:ND2	6:A:406:HOH:O	2.37	0.55
1:B:70:LEU:HD11	1:B:76:LEU:HD22	1.87	0.55
1:C:10:LYS:NZ	6:C:411:HOH:O	2.38	0.55
1:B:192:GLN:HE21	1:B:192:GLN:HA	1.73	0.54
1:C:173:SER:OG	1:C:175:ASP:OD1	2.24	0.54
1:A:123:GLN:H	1:A:123:GLN:CD	2.16	0.53
1:D:105:GLU:N	1:D:105:GLU:OE1	2.41	0.53
1:C:270:VAL:HG21	1:C:275:LEU:HD21	1.89	0.53
1:B:124:GLU:HG2	1:B:127:GLU:HB2	1.90	0.53
1:B:97:SER:O	1:B:101:GLN:HG3	2.10	0.52
1:D:3:THR:HG23	1:D:5:LEU:H	1.74	0.51
1:D:11:ILE:HD11	1:D:36:VAL:HB	1.94	0.50
1:B:238:LEU:HD12	1:B:266:MET:HB3	1.94	0.50
1:C:92:VAL:HG12	1:C:125:LEU:HD22	1.94	0.50
1:C:238:LEU:HD21	1:C:259:GLN:HG2	1.93	0.49
1:A:52:CYS:SG	1:A:254:VAL:HG11	2.53	0.49
1:B:191:PHE:O	1:B:197:GLN:HG3	2.13	0.48
1:D:53:LYS:HE2	1:D:55:GLU:OE1	2.13	0.48
1:C:89:ARG:O	1:C:92:VAL:HG22	2.14	0.47
1:D:31:ILE:HD13	1:D:85:LYS:HG3	1.94	0.47
4:D:303:BTB:H71	4:D:303:BTB:H62	1.49	0.47
1:A:173:SER:OG	1:A:175:ASP:OD1	2.27	0.46
1:C:155:LYS:NZ	1:C:202:THR:HG22	2.30	0.46
1:D:29:LEU:HD23	1:D:119:ILE:HD13	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:303:BTB:O3	4:D:303:BTB:H51	2.13	0.46
3:B:302:DST:O5	4:B:303:BTB:O4	2.32	0.46
1:A:23:ILE:HD12	1:A:62:ALA:HB2	1.97	0.45
1:D:87:GLU:HG2	1:D:94:ILE:HD12	1.97	0.45
1:C:190:GLU:HA	1:C:193:ILE:HD12	1.97	0.45
4:D:303:BTB:H12	4:D:303:BTB:H82	1.97	0.45
1:D:185:TYR:CD2	1:D:219:CYS:HB3	2.51	0.45
1:A:212:LEU:HD21	1:A:218:ILE:HD13	1.98	0.45
1:A:56:LEU:HD12	1:A:281:GLU:HB3	1.99	0.45
1:A:87:GLU:HA	1:A:92:VAL:HG21	1.99	0.45
1:C:82:PHE:O	1:C:86:VAL:HG23	2.17	0.45
1:C:129:LYS:HD3	1:C:171:ASP:HB3	1.98	0.45
1:C:125:LEU:O	1:C:174:LEU:HB2	2.17	0.44
1:C:280:ILE:HG22	1:C:283:MET:HE2	1.98	0.44
1:D:58:LYS:HG2	1:D:60:TYR:CZ	2.52	0.44
1:B:116:MET:HE2	1:B:116:MET:HB3	1.81	0.44
1:C:105:GLU:N	1:C:105:GLU:CD	2.76	0.44
1:D:1:MET:HE3	1:D:289:ILE:CG2	2.39	0.44
1:D:56:LEU:HD23	1:D:281:GLU:HB3	2.00	0.44
1:D:187:ARG:O	1:D:190:GLU:HG2	2.17	0.44
1:C:184:PRO:HD2	1:C:220:VAL:O	2.18	0.43
1:C:125:LEU:HD12	1:C:126:SER:N	2.32	0.43
1:C:155:LYS:NZ	1:C:202:THR:O	2.51	0.43
4:C:303:BTB:H62	4:C:303:BTB:H71	1.60	0.43
1:A:238:LEU:CD2	1:A:263:MET:HE3	2.45	0.43
1:C:263:MET:HE2	1:C:263:MET:HB2	1.59	0.43
1:B:249:ASP:O	1:B:253:ARG:HG2	2.18	0.43
1:B:253:ARG:HD3	1:B:253:ARG:HA	1.78	0.43
1:B:286:TYR:CE2	4:B:303:BTB:H52	2.53	0.43
1:A:52:CYS:HB3	6:A:402:HOH:O	2.18	0.43
1:D:258:TYR:O	1:D:263:MET:HE1	2.18	0.43
5:B:304:PG4:H42	5:B:304:PG4:H62	1.64	0.42
1:B:272:GLU:HG3	6:B:423:HOH:O	2.18	0.42
1:D:121:ALA:HA	1:D:128:THR:HG23	2.01	0.42
1:D:129:LYS:HE2	1:D:129:LYS:HB2	1.89	0.42
1:A:117:VAL:HG22	1:A:132:ILE:HD13	2.00	0.42
1:C:93:GLN:C	1:C:94:ILE:HD13	2.45	0.42
1:B:7:SER:O	1:B:10:LYS:HG3	2.20	0.42
1:A:261:GLN:HG2	6:A:522:HOH:O	2.20	0.42
1:A:87:GLU:HA	1:A:92:VAL:CG2	2.50	0.41
1:A:126:SER:O	1:A:177:ARG:NH1	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:212:LEU:N	1:A:213:PRO:HD2	2.35	0.41
1:B:238:LEU:CD1	1:B:266:MET:HB3	2.49	0.41
1:D:11:ILE:HD13	1:D:11:ILE:HA	1.88	0.41
1:A:144:LYS:HG2	6:A:452:HOH:O	2.19	0.41
1:D:201:ALA:HA	1:D:209:LEU:HD11	2.03	0.41
1:A:89:ARG:O	1:A:92:VAL:HG22	2.20	0.41
1:D:211:PHE:O	1:D:214:ILE:HG12	2.20	0.41
1:A:59:LEU:HD13	1:A:254:VAL:HG21	2.03	0.41
1:A:144:LYS:HA	1:A:144:LYS:HD3	1.91	0.41
1:B:185:TYR:CD2	1:B:219:CYS:HB3	2.56	0.41
1:C:52[A]:CYS:SG	1:C:254:VAL:HG11	2.61	0.41
1:B:284:ASN:CG	3:B:302:DST:H143	2.46	0.40
1:C:74:LYS:NZ	6:C:415:HOH:O	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:D:13:TYR:CE2	5:D:304:PG4:C8[2_644]	1.49	0.71

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	281/289 (97%)	275 (98%)	6 (2%)	0	100	100
1	B	283/289 (98%)	279 (99%)	4 (1%)	0	100	100
1	C	274/289 (95%)	269 (98%)	5 (2%)	0	100	100
1	D	288/289 (100%)	284 (99%)	4 (1%)	0	100	100
All	All	1126/1156 (97%)	1107 (98%)	19 (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	258/264 (98%)	255 (99%)	3 (1%)	63 55
1	B	260/264 (98%)	260 (100%)	0	100 100
1	C	256/264 (97%)	254 (99%)	2 (1%)	73 67
1	D	265/264 (100%)	264 (100%)	1 (0%)	84 82
All	All	1039/1056 (98%)	1033 (99%)	6 (1%)	78 73

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	99	ILE
1	A	123	GLN
1	A	289	ILE
1	C	59	LEU
1	C	72	ASN
1	D	3	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	101	GLN
1	A	259	GLN
1	B	72	ASN
1	B	101	GLN
1	B	192	GLN
1	B	210	GLN
1	B	261	GLN
1	C	156	ASN
1	C	226	ASN
1	C	239	ASN
1	C	259	GLN
1	C	271	GLN
1	D	123	GLN

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Mol	Chain	Res	Type
1	D	197	GLN
1	D	284	ASN

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 14 ligands modelled in this entry, 4 are 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	$\#\|Z\| > 2$
4	BTB	C	303	-	13,13,13	0.70	0	7,16,16	1.29	1 (14%)
3	DST	C	302	2	9,13,13	1.14	1 (11%)	11,19,19	0.79	0
5	PG4	B	304	-	12,12,12	0.13	0	11,11,11	0.60	0
5	PG4	D	304	-	12,12,12	0.10	0	11,11,11	0.64	0
4	BTB	B	303	-	13,13,13	0.62	0	7,16,16	1.18	0
3	DST	B	302	2	9,13,13	1.13	1 (11%)	11,19,19	0.90	1 (9%)
4	BTB	A	303	-	13,13,13	0.90	1 (7%)	7,16,16	1.82	2 (28%)
3	DST	D	302	2	9,13,13	1.14	1 (11%)	11,19,19	0.91	1 (9%)
3	DST	A	302	2	9,13,13	1.14	1 (11%)	11,19,19	0.84	1 (9%)
4	BTB	D	303	-	13,13,13	0.95	1 (7%)	7,16,16	1.49	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
4	BTB	C	303	-	-	10/21/21/21	-
3	DST	C	302	2	-	0/7/13/13	-
5	PG4	B	304	-	-	6/10/10/10	-
5	PG4	D	304	-	-	5/10/10/10	-
4	BTB	B	303	-	-	10/21/21/21	-
3	DST	B	302	2	-	0/7/13/13	-
4	BTB	A	303	-	-	15/21/21/21	-
3	DST	D	302	2	-	0/7/13/13	-
3	DST	A	302	2	-	0/7/13/13	-
4	BTB	D	303	-	-	9/21/21/21	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	302	DST	P3-O8	-2.86	1.49	1.56
3	A	302	DST	P3-O8	-2.79	1.49	1.56
3	C	302	DST	P3-O8	-2.78	1.49	1.56
3	D	302	DST	P3-O8	-2.78	1.49	1.56
4	D	303	BTB	C7-N	2.24	1.51	1.48
4	A	303	BTB	C5-N	2.14	1.51	1.48

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	303	BTB	C6-C5-N	3.76	126.25	111.59
4	D	303	BTB	C8-C7-N	3.36	124.72	111.59
4	A	303	BTB	C8-C7-N	2.52	121.43	111.59
3	D	302	DST	O8-P3-O7	2.48	115.82	109.82
3	B	302	DST	O8-P3-O7	2.45	115.75	109.82
4	C	303	BTB	C8-C7-N	2.36	120.81	111.59
3	A	302	DST	O8-P3-O7	2.23	115.23	109.82

There are no chirality outliers.

All (55) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	303	BTB	O1-C1-C2-C3
4	A	303	BTB	O1-C1-C2-C4
4	A	303	BTB	O1-C1-C2-N
4	A	303	BTB	C1-C2-C3-O3
4	A	303	BTB	C4-C2-C3-O3
4	A	303	BTB	N-C2-C3-O3
4	A	303	BTB	C1-C2-N-C7
4	A	303	BTB	C3-C2-N-C5
4	A	303	BTB	C3-C2-N-C7
4	A	303	BTB	C4-C2-N-C7
4	A	303	BTB	C8-C7-N-C5
4	B	303	BTB	O1-C1-C2-C3
4	B	303	BTB	O1-C1-C2-C4
4	B	303	BTB	O1-C1-C2-N
4	B	303	BTB	C1-C2-C3-O3
4	B	303	BTB	C4-C2-C3-O3
4	B	303	BTB	N-C2-C3-O3
4	B	303	BTB	C6-C5-N-C7
4	B	303	BTB	C8-C7-N-C2
4	C	303	BTB	O1-C1-C2-C3
4	C	303	BTB	O1-C1-C2-C4
4	C	303	BTB	O1-C1-C2-N
4	C	303	BTB	C1-C2-C3-O3
4	C	303	BTB	C4-C2-C3-O3
4	C	303	BTB	N-C2-C3-O3
4	C	303	BTB	C6-C5-N-C7
4	C	303	BTB	C8-C7-N-C2
4	D	303	BTB	C1-C2-N-C5
4	D	303	BTB	C3-C2-N-C5
4	D	303	BTB	C4-C2-N-C5
4	D	303	BTB	C6-C5-N-C7
4	D	303	BTB	C8-C7-N-C2
4	D	303	BTB	N-C5-C6-O6
5	B	304	PG4	O4-C7-C8-O5
5	D	304	PG4	O4-C7-C8-O5
5	B	304	PG4	O2-C3-C4-O3
4	C	303	BTB	N-C7-C8-O8
5	B	304	PG4	C6-C5-O3-C4
4	B	303	BTB	N-C5-C6-O6
4	C	303	BTB	N-C5-C6-O6
5	D	304	PG4	C3-C4-O3-C5
5	B	304	PG4	C8-C7-O4-C6
5	D	304	PG4	C8-C7-O4-C6

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Mol	Chain	Res	Type	Atoms
5	B	304	PG4	C3-C4-O3-C5
4	A	303	BTB	N-C7-C8-O8
4	A	303	BTB	C1-C2-N-C5
4	A	303	BTB	C4-C2-N-C5
4	B	303	BTB	C3-C2-N-C7
4	D	303	BTB	N-C2-C3-O3
4	D	303	BTB	C1-C2-N-C7
4	D	303	BTB	C4-C2-N-C7
5	B	304	PG4	O1-C1-C2-O2
5	D	304	PG4	C1-C2-O2-C3
5	D	304	PG4	O3-C5-C6-O4
4	A	303	BTB	C6-C5-N-C7

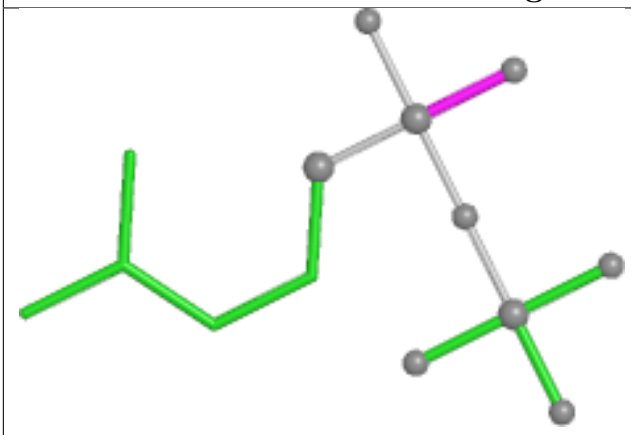
There are no ring outliers.

7 monomers are involved in 14 short contacts:

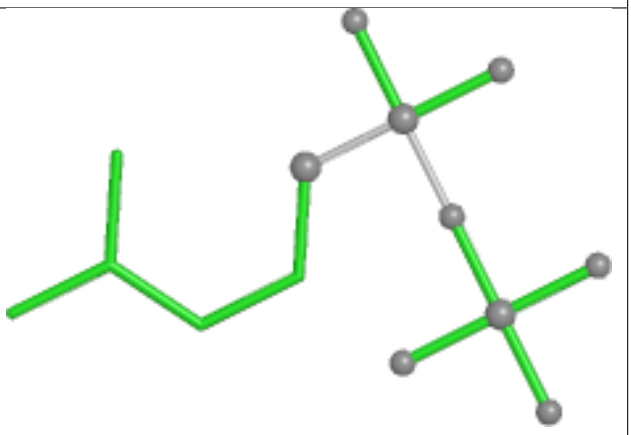
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	303	BTB	1	0
5	B	304	PG4	1	0
5	D	304	PG4	2	1
4	B	303	BTB	3	0
3	B	302	DST	3	0
4	A	303	BTB	1	0
4	D	303	BTB	3	0

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.

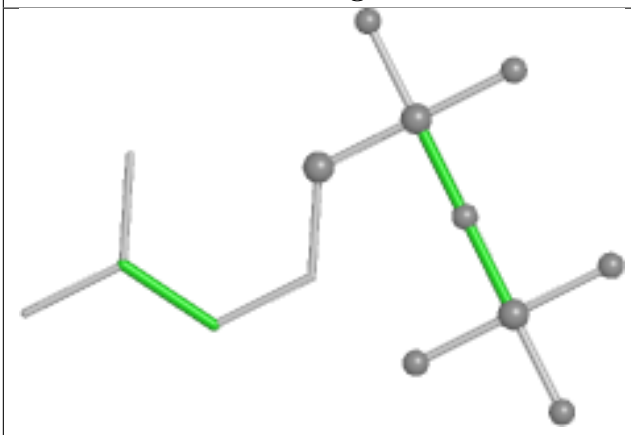
Ligand DST C 302



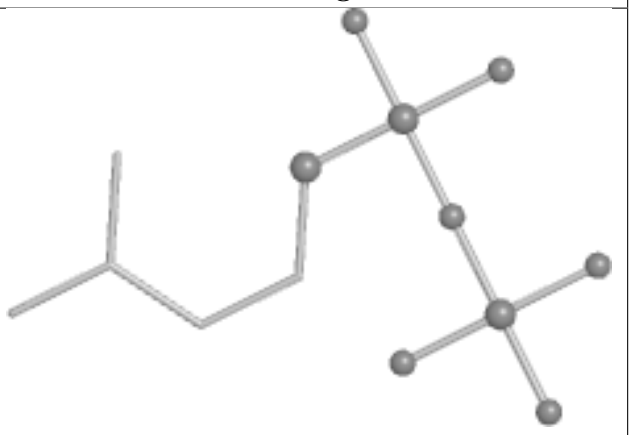
Bond lengths



Bond angles

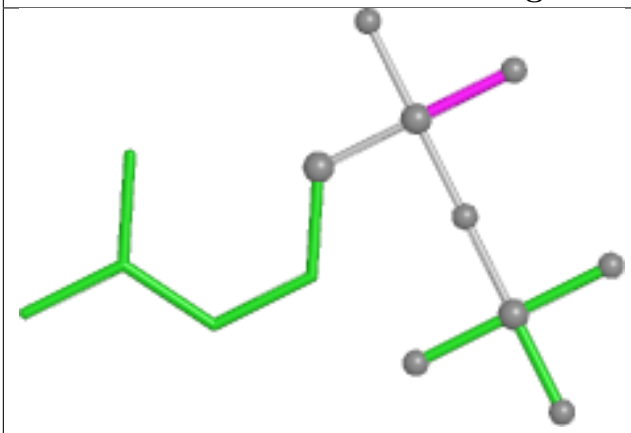


Torsions

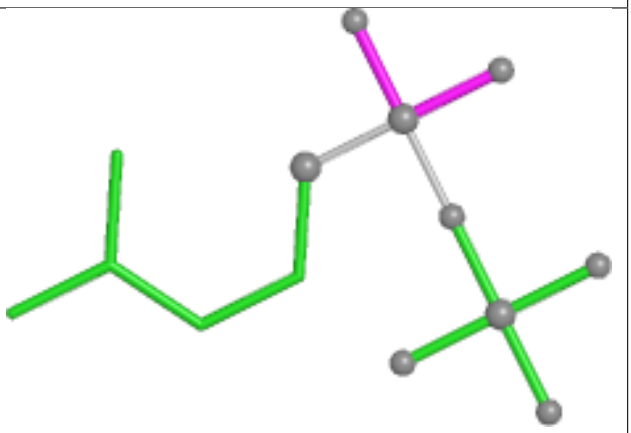


Rings

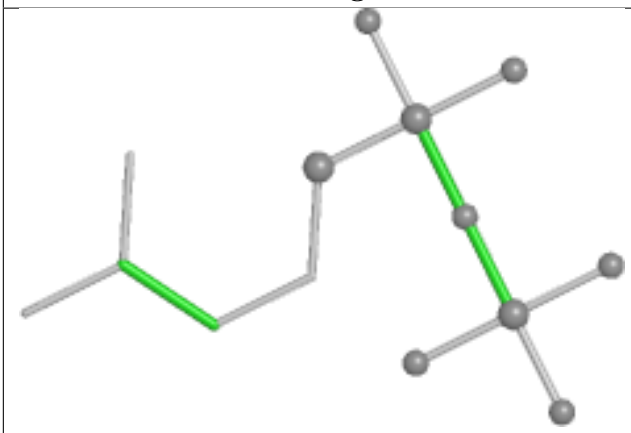
Ligand DST B 302



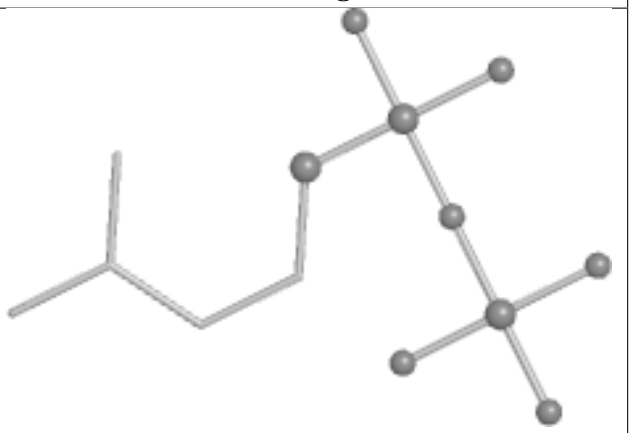
Bond lengths



Bond angles

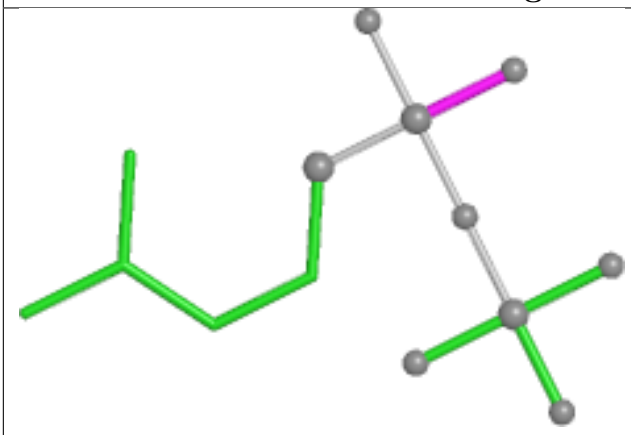


Torsions

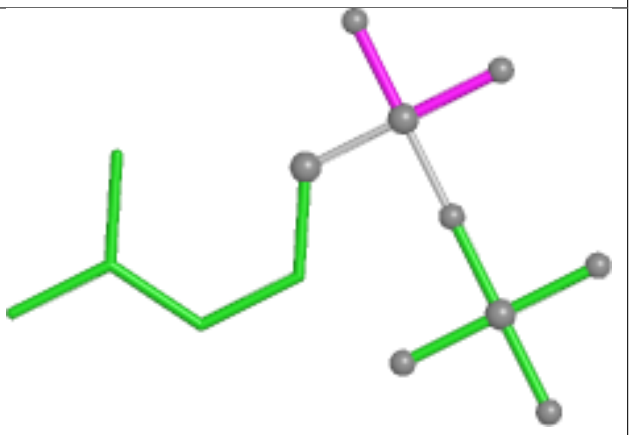


Rings

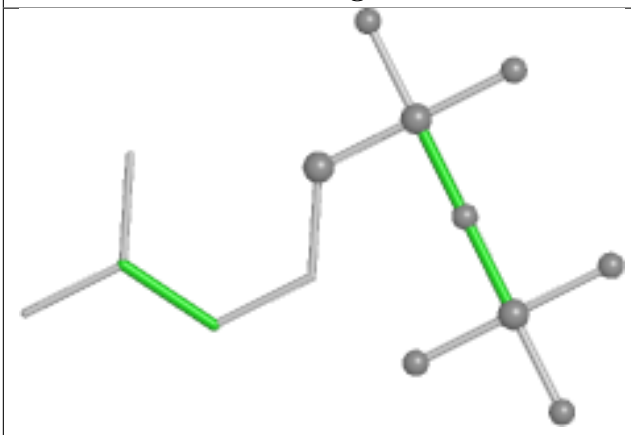
Ligand DST D 302



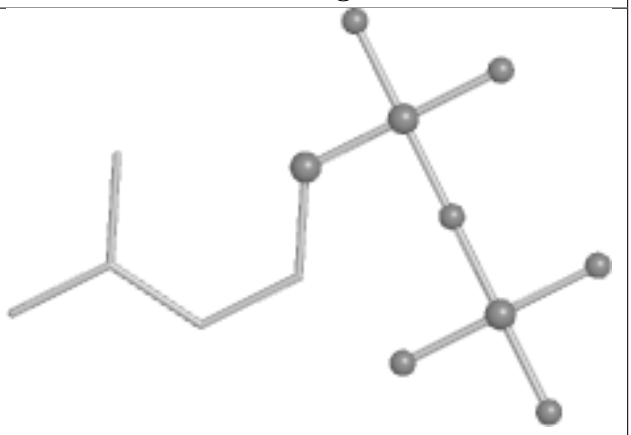
Bond lengths



Bond angles

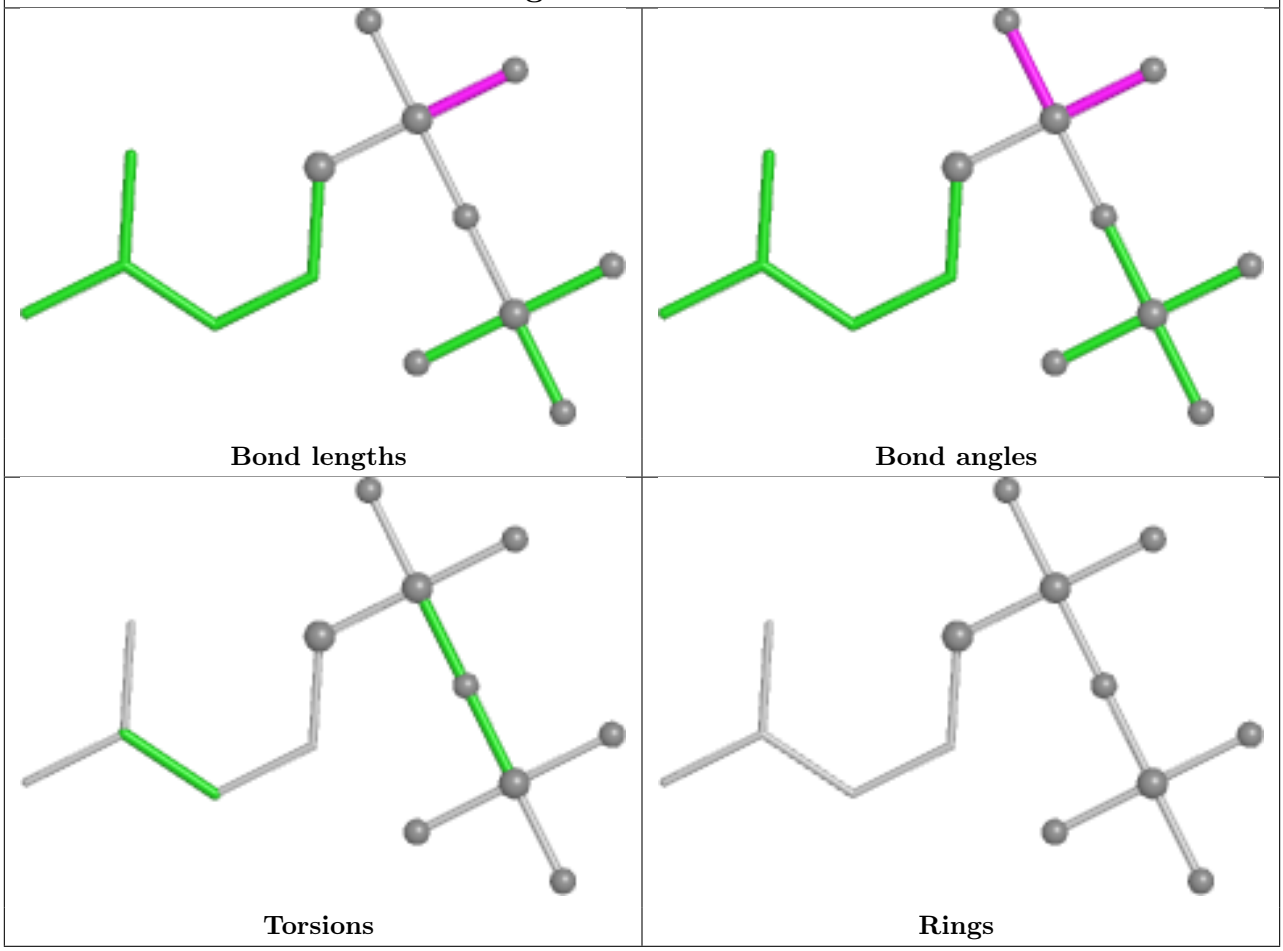


Torsions



Rings

Ligand DST A 302



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

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	282/289 (97%)	-0.17	6 (2%) 63 67	6, 18, 36, 66	1 (0%)
1	B	284/289 (98%)	-0.09	5 (1%) 67 71	9, 20, 38, 56	1 (0%)
1	C	279/289 (96%)	0.81	32 (11%) 9 9	14, 38, 62, 84	1 (0%)
1	D	289/289 (100%)	0.04	11 (3%) 44 48	9, 22, 42, 79	1 (0%)
All	All	1134/1156 (98%)	0.14	54 (4%) 35 39	6, 23, 52, 84	4 (0%)

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	90	ILE	4.4
1	C	26	PHE	4.2
1	C	94	ILE	4.0
1	B	7	SER	3.9
1	C	92	VAL	3.9
1	B	73	LEU	3.7
1	D	5	LEU	3.7
1	D	4	LEU	3.7
1	C	278	GLY	3.6
1	C	276	LEU	3.4
1	B	106	ASN	3.2
1	C	125	LEU	3.1
1	C	46	CYS	3.0
1	A	90	ILE	2.9
1	D	289	ILE	2.9
1	C	73	LEU	2.9
1	D	3	THR	2.8
1	C	194	PHE	2.8
1	D	13	TYR	2.7
1	C	289	ILE	2.7
1	C	164	ASN	2.7

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Mol	Chain	Res	Type	RSRZ
1	D	2	THR	2.7
1	C	70	LEU	2.7
1	C	23	ILE	2.7
1	C	86	VAL	2.7
1	C	277	GLY	2.6
1	A	289	ILE	2.5
1	C	45	ASN	2.5
1	D	1	MET	2.5
1	C	105	GLU	2.5
1	A	262	PRO	2.5
1	C	104	GLY	2.4
1	C	91	ASP	2.4
1	C	113	THR	2.3
1	A	106	ASN	2.3
1	C	195	ASP	2.3
1	C	273	LYS	2.3
1	A	105	GLU	2.3
1	D	263	MET	2.3
1	A	261	GLN	2.3
1	C	59	LEU	2.3
1	B	6	GLU	2.2
1	D	105	GLU	2.2
1	C	27	TYR	2.2
1	C	124	GLU	2.2
1	C	280	ILE	2.2
1	D	106	ASN	2.2
1	D	262	PRO	2.2
1	C	43	SER	2.1
1	C	261	GLN	2.1
1	C	106	ASN	2.1
1	C	126	SER	2.1
1	B	90	ILE	2.0
1	C	39	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 oligosaccharides in this entry.

6.4 Ligands (i)

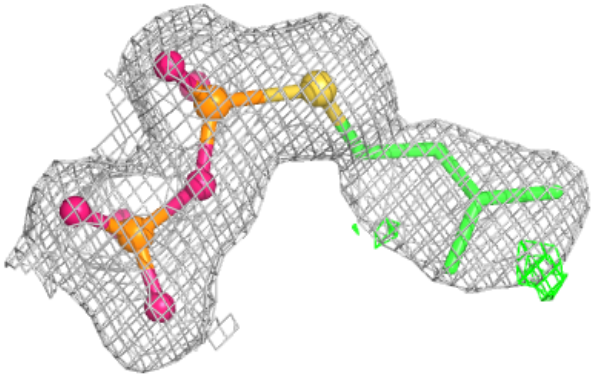
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

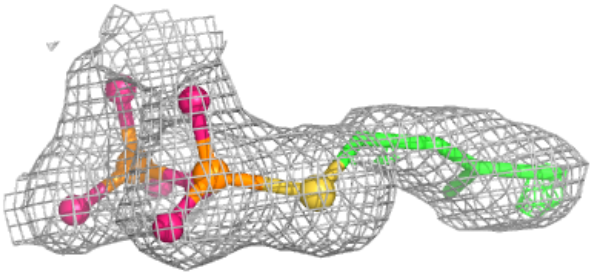
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	PG4	D	304	13/13	0.83	0.12	27,35,39,45	0
4	BTB	C	303	14/14	0.84	0.13	20,26,37,41	0
4	BTB	B	303	14/14	0.84	0.13	13,25,30,39	0
5	PG4	B	304	13/13	0.87	0.11	26,35,42,48	0
4	BTB	D	303	14/14	0.89	0.10	14,24,29,32	0
4	BTB	A	303	14/14	0.92	0.09	12,16,29,35	0
3	DST	C	302	14/14	0.96	0.09	18,30,37,39	0
3	DST	B	302	14/14	0.97	0.07	12,18,25,26	0
2	MG	C	301	1/1	0.98	0.03	28,28,28,28	0
3	DST	D	302	14/14	0.98	0.06	12,20,28,31	0
3	DST	A	302	14/14	0.98	0.05	10,18,28,28	0
2	MG	B	301	1/1	0.98	0.02	15,15,15,15	0
2	MG	A	301	1/1	0.99	0.04	15,15,15,15	0
2	MG	D	301	1/1	0.99	0.01	16,16,16,16	0

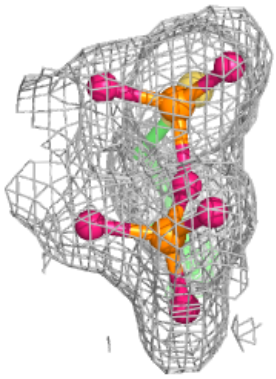
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around DST C 302:

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

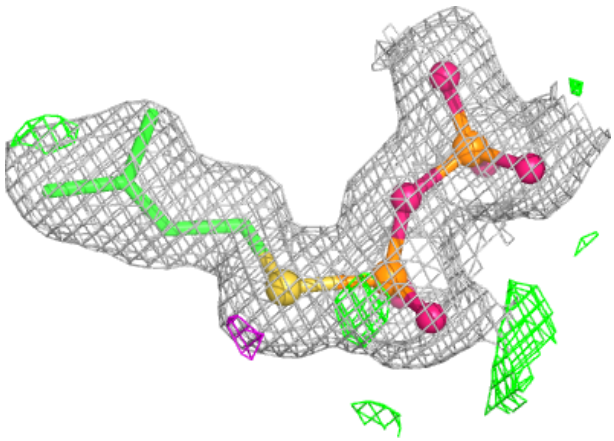


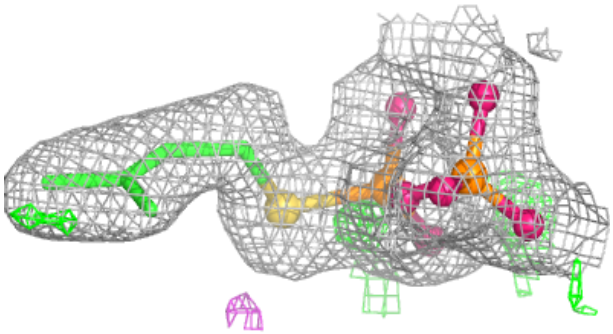


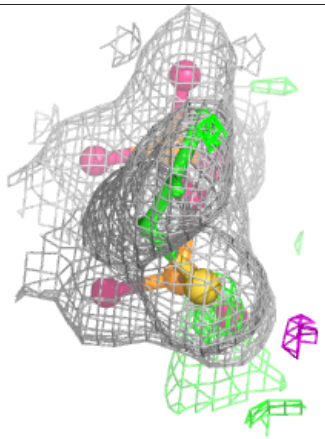


Electron density around DST B 302:

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

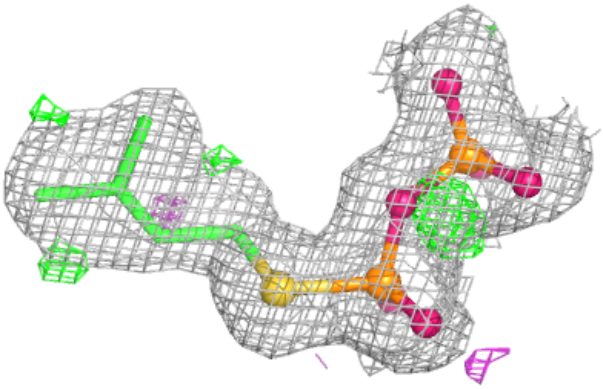


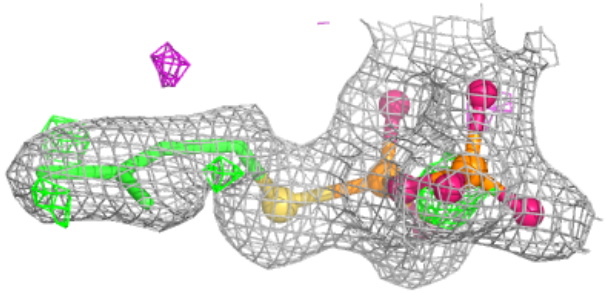


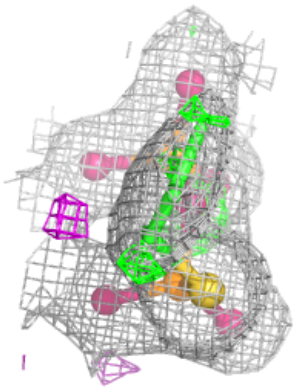


Electron density around DST D 302:

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

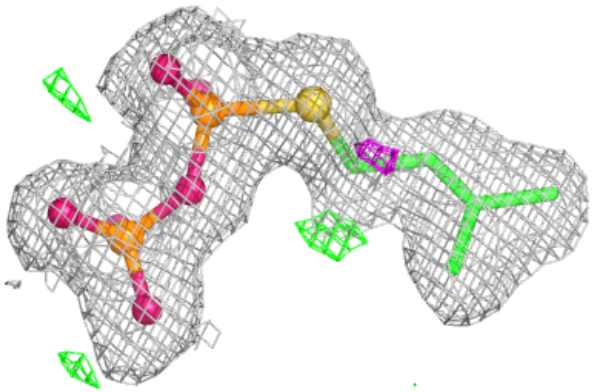


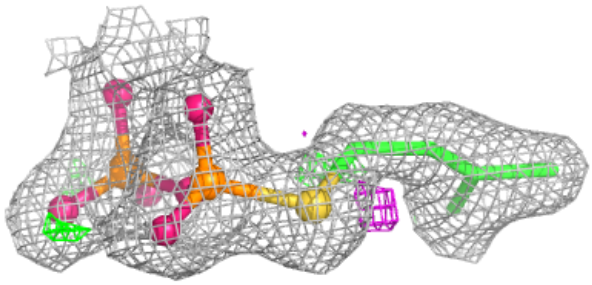


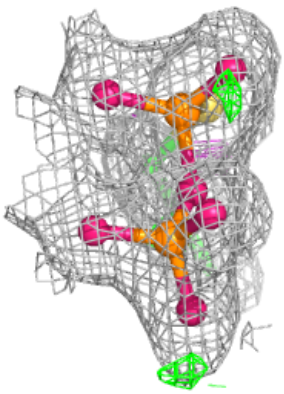


Electron density around DST A 302:

$2mF_o$-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.