



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 31, 2023 – 08:11 AM EDT

PDB ID : 3KRO
Title : Mint heterotetrameric geranyl pyrophosphate synthase in complex with magnesium, IPP, and DMASPP (II)
Authors : Chang, T.-H.; Hsieh, F.-L.; Ko, T.-P.; Wang, A.H.-J.
Deposited on : 2009-11-19
Resolution : 1.95 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

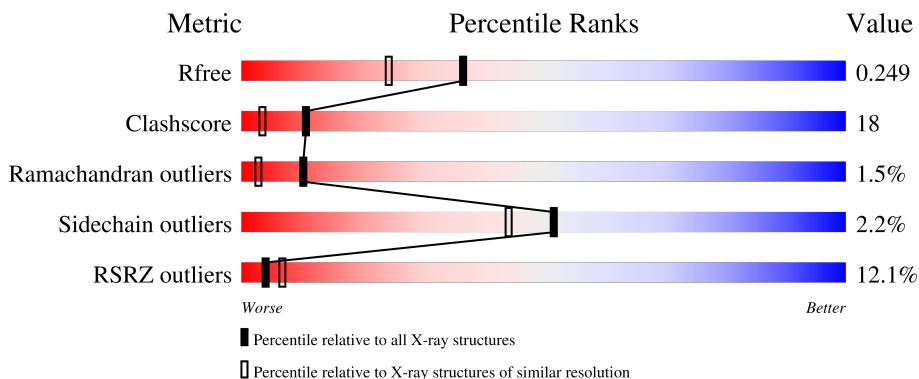
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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	295	<div style="display: flex; align-items: center;"> <div style="width: 7%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 74%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 20%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">7% 74% 20% • 5%</p>
1	D	295	<div style="display: flex; align-items: center;"> <div style="width: 8%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 73%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 26%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">8% 73% 26% •</p>
2	B	274	<div style="display: flex; align-items: center;"> <div style="width: 18%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 58%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 33%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">18% 58% 33% • • 5%</p>
2	C	274	<div style="display: flex; align-items: center;"> <div style="width: 14%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 65%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 26%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div> <p style="margin-left: 20px;">14% 65% 26% • 5%</p>

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 9441 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 Geranyl diphosphate synthase large subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	279	Total	C	N	O	S	0	0	0
			2120	1338	372	392	18			
1	D	295	Total	C	N	O	S	0	0	0
			2232	1406	391	417	18			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	EXPRESSION TAG	UNP Q9SBR3
D	1	MET	-	EXPRESSION TAG	UNP Q9SBR3

- Molecule 2 is a protein called Geranyl diphosphate synthase small subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	259	Total	C	N	O	S	0	0	0
			1954	1233	339	368	14			
2	C	259	Total	C	N	O	S	0	0	0
			1954	1233	339	368	14			

There are 18 discrepancies between the modelled and reference sequences:

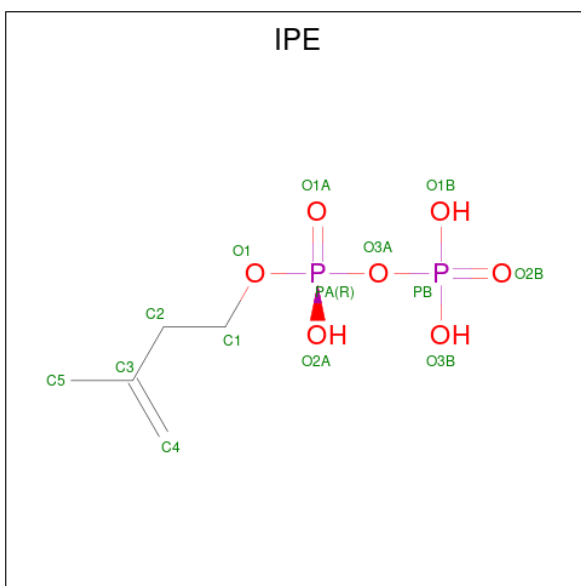
Chain	Residue	Modelled	Actual	Comment	Reference
B	1	MET	-	EXPRESSION TAG	UNP Q9SBR4
B	267	HIS	-	EXPRESSION TAG	UNP Q9SBR4
B	268	HIS	-	EXPRESSION TAG	UNP Q9SBR4
B	269	HIS	-	EXPRESSION TAG	UNP Q9SBR4
B	270	HIS	-	EXPRESSION TAG	UNP Q9SBR4
B	271	HIS	-	EXPRESSION TAG	UNP Q9SBR4
B	272	HIS	-	EXPRESSION TAG	UNP Q9SBR4
B	273	HIS	-	EXPRESSION TAG	UNP Q9SBR4
B	274	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	1	MET	-	EXPRESSION TAG	UNP Q9SBR4

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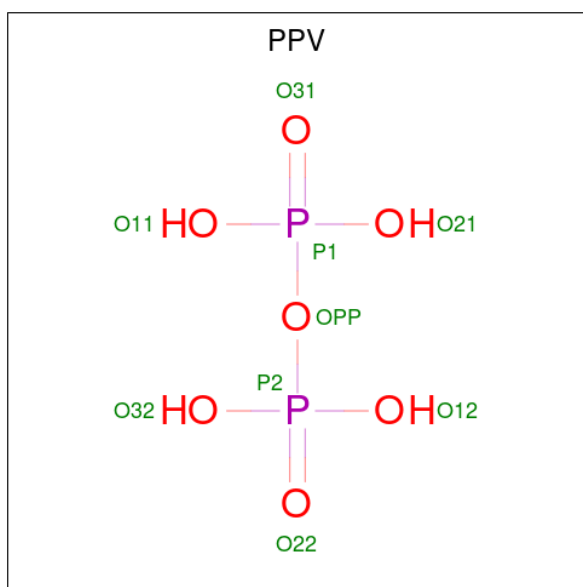
Chain	Residue	Modelled	Actual	Comment	Reference
C	267	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	268	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	269	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	270	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	271	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	272	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	273	HIS	-	EXPRESSION TAG	UNP Q9SBR4
C	274	HIS	-	EXPRESSION TAG	UNP Q9SBR4

- Molecule 3 is 3-METHYLBUT-3-ENYL TRIHYDROGEN DIPHOSPHATE (three-letter code: IPE) (formula: $C_5H_{12}O_7P_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O	P	0	0
			14	5	7	2		
3	D	1	Total	C	O	P	0	0
			14	5	7	2		

- Molecule 4 is PYROPHOSPHATE (three-letter code: PPV) (formula: $H_4O_7P_2$).

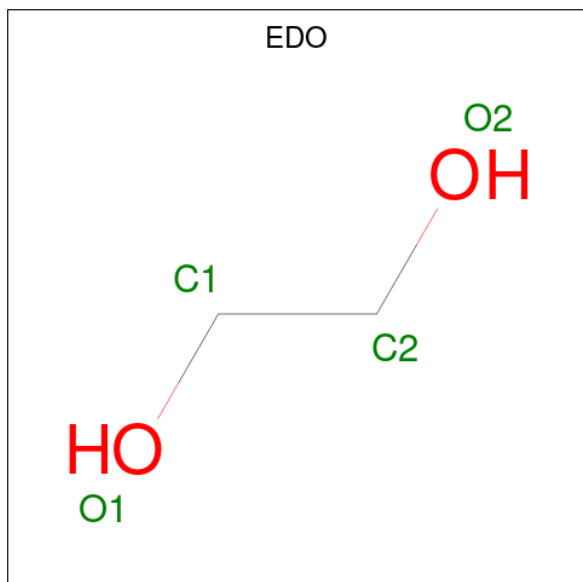


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O P 9 7 2	0	0

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

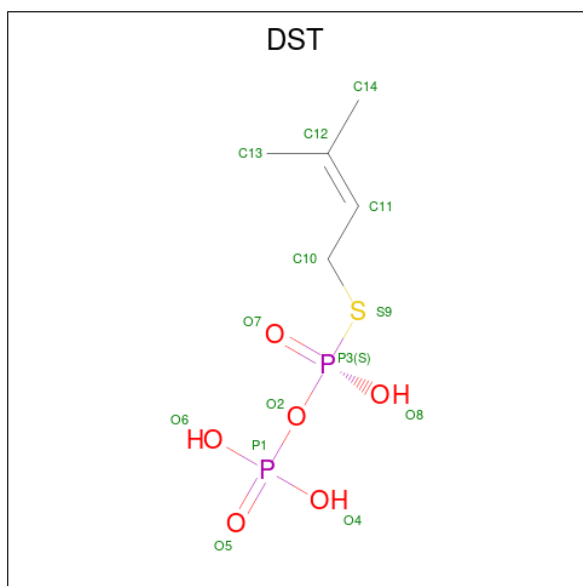
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	2	Total Mg 2 2	0	0
5	D	2	Total Mg 2 2	0	0

- Molecule 6 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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

- Molecule 7 is DIMETHYLALLYL S-THIOLODIPHOSPHATE (three-letter code: DST) (formula: $C_5H_{12}O_6P_2S$).



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

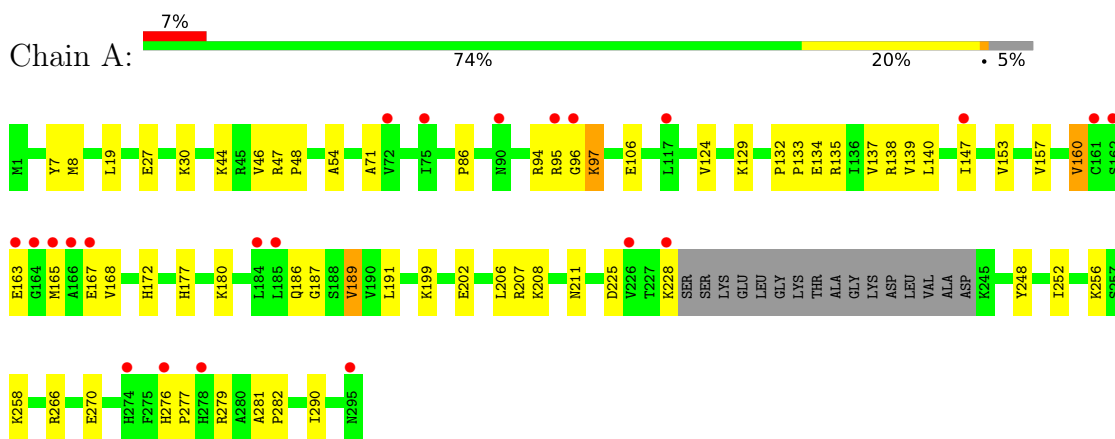
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	268	Total	O	0	0
			268	268		
8	B	243	Total	O	0	0
			243	243		
8	C	294	Total	O	0	0
			294	294		
8	D	317	Total	O	0	0
			317	317		

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.

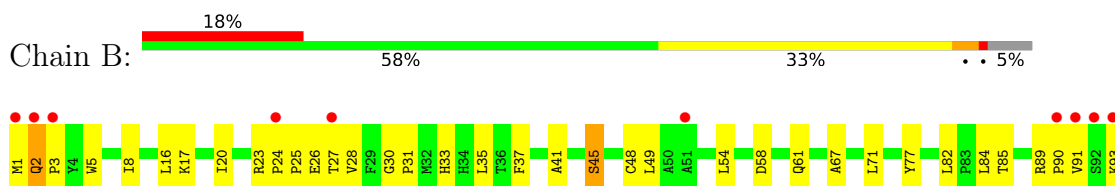
- Molecule 1: Geranyl diphosphate synthase large subunit

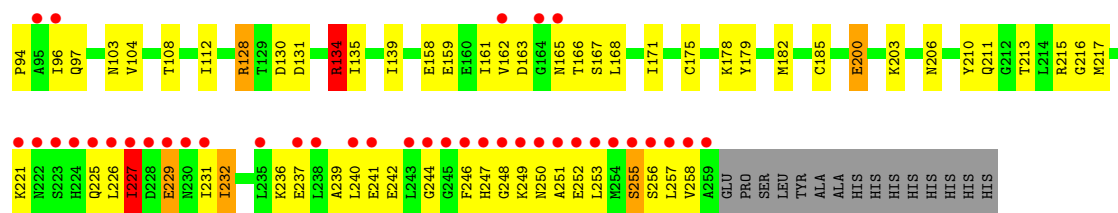


- Molecule 1: Geranyl diphosphate synthase large subunit

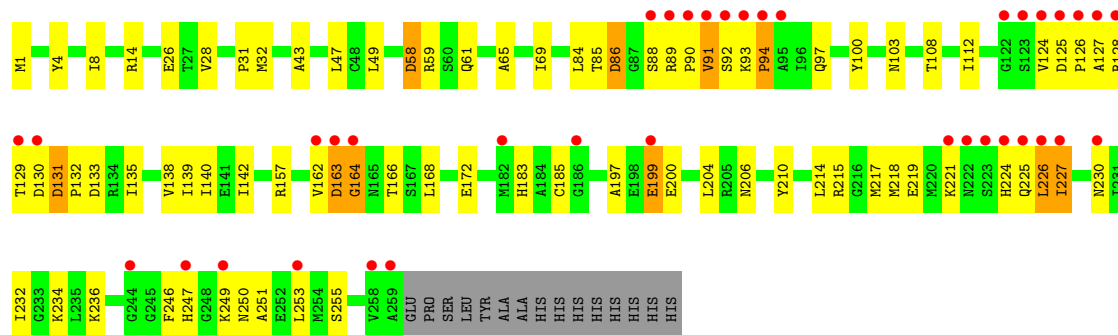


- Molecule 2: Geranyl diphosphate synthase small subunit





● Molecule 2: Geranyl diphosphate synthase small subunit



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	53.44Å 108.70Å 182.28Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 1.95 29.02 – 1.94	Depositor EDS
% Data completeness (in resolution range)	90.1 (30.00-1.95) 89.6 (29.02-1.94)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.34 (at 1.95Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	0.205 , 0.256 0.196 , 0.249	Depositor DCC
R_{free} test set	3599 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	30.2	Xtrriage
Anisotropy	0.820	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 57.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	9441	wwPDB-VP
Average B, all atoms (Å ²)	51.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.96% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PPV, IPE, DST, EDO, 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	0.96	2/2155 (0.1%)	0.85	0/2903
1	D	0.93	0/2268	0.87	3/3055 (0.1%)
2	B	0.83	2/1993 (0.1%)	0.82	1/2695 (0.0%)
2	C	0.84	1/1993 (0.1%)	0.83	1/2695 (0.0%)
All	All	0.89	5/8409 (0.1%)	0.84	5/11348 (0.0%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	175	CYS	CB-SG	5.74	1.92	1.82
1	A	27	GLU	CG-CD	5.23	1.59	1.51
1	A	46	VAL	CA-CB	5.20	1.65	1.54
2	B	200	GLU	CG-CD	5.15	1.59	1.51
2	C	185	CYS	CB-SG	-5.05	1.73	1.81

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	47	ARG	NE-CZ-NH2	-6.67	116.96	120.30
2	C	157	ARG	NE-CZ-NH1	-6.08	117.26	120.30
1	D	45	ARG	NE-CZ-NH2	-5.75	117.43	120.30
1	D	61	ASP	CB-CG-OD2	-5.44	113.41	118.30
2	B	134	ARG	NE-CZ-NH1	5.32	122.96	120.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2120	0	2146	51	0
1	D	2232	0	2264	79	0
2	B	1954	0	1948	103	0
2	C	1954	0	1948	83	0
3	A	14	0	9	1	0
3	D	14	0	9	0	0
4	A	9	0	0	0	0
5	A	2	0	0	0	0
5	D	2	0	0	0	0
6	C	4	0	6	0	0
7	D	14	0	10	3	0
8	A	268	0	0	14	1
8	B	243	0	0	13	1
8	C	294	0	0	15	1
8	D	317	0	0	15	1
All	All	9441	0	8340	307	2

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 18.

All (307) 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)
2:B:2:GLN:HB2	2:B:3:PRO:HD3	1.21	1.20
2:B:229:GLU:HG3	8:B:289:HOH:O	1.39	1.17
2:C:250:ASN:HB3	8:C:1039:HOH:O	1.57	1.03
2:C:230:ASN:O	2:C:234:LYS:HG3	1.58	1.02
2:C:28:VAL:HG22	1:D:157:VAL:CG2	1.96	0.94
2:C:61:GLN:HE21	2:C:128:ARG:HH22	0.94	0.93
2:B:221:LYS:HG3	2:B:227:ILE:HG12	1.47	0.93
1:D:4:PHE:HB2	1:D:8:MET:HE3	1.51	0.92
1:D:208:LYS:HE2	8:D:1010:HOH:O	1.70	0.90
1:D:10:ARG:HD3	8:D:583:HOH:O	1.72	0.88
2:B:58:ASP:H	2:B:61:GLN:HE21	1.21	0.88
2:C:61:GLN:NE2	2:C:128:ARG:HH22	1.72	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:28:VAL:HG22	1:D:157:VAL:HG21	1.56	0.87
2:B:25:PRO:HB2	2:B:27:THR:HG22	1.57	0.86
1:D:4:PHE:HB2	1:D:8:MET:CE	2.06	0.85
2:B:26:GLU:HB3	8:B:435:HOH:O	1.75	0.85
2:B:2:GLN:HB2	2:B:3:PRO:CD	2.04	0.84
1:A:97:LYS:HD2	1:A:97:LYS:N	1.91	0.84
2:B:240:LEU:HD21	2:B:258:VAL:HG21	1.59	0.84
2:B:5:TRP:HZ2	2:B:253:LEU:HG	1.42	0.83
2:B:227:ILE:HG23	8:B:290:HOH:O	1.77	0.83
2:B:249:LYS:HD3	2:B:253:LEU:HB2	1.59	0.83
2:B:94:PRO:HB2	8:B:968:HOH:O	1.79	0.82
2:B:5:TRP:CZ2	2:B:253:LEU:HG	2.13	0.82
2:C:221:LYS:HB2	2:C:227:ILE:HD12	1.61	0.82
2:B:23:ARG:HB2	2:B:24:PRO:HD2	1.62	0.81
2:C:221:LYS:HD3	2:C:227:ILE:HB	1.62	0.80
2:B:162:VAL:H	2:B:166:THR:CG2	1.95	0.80
2:C:247:HIS:HB3	8:C:1129:HOH:O	1.80	0.80
1:A:163:GLU:HG2	8:A:702:HOH:O	1.80	0.79
2:C:61:GLN:HE21	2:C:128:ARG:NH2	1.78	0.79
2:B:229:GLU:OE1	2:B:232:ILE:HD11	1.81	0.78
2:B:77:TYR:OH	2:B:96:ILE:HD13	1.83	0.78
2:B:128:ARG:HH11	2:B:128:ARG:CG	1.96	0.78
2:B:71:LEU:HD22	2:B:112:ILE:HG23	1.67	0.77
2:B:253:LEU:HD12	2:B:256:SER:OG	1.84	0.77
1:D:173:LEU:HD13	1:D:246:THR:HG22	1.64	0.77
2:C:8:ILE:HG22	2:C:49:LEU:HD12	1.66	0.76
2:B:249:LYS:O	2:B:253:LEU:N	2.18	0.76
2:B:206:ASN:CB	2:B:242:GLU:HG2	2.15	0.76
2:C:214:LEU:HD11	2:C:232:ILE:HG23	1.69	0.75
1:A:168:VAL:HG13	1:A:172:HIS:HB3	1.68	0.75
2:B:128:ARG:HH11	2:B:128:ARG:HG2	1.52	0.75
2:B:206:ASN:HB2	2:B:242:GLU:HG2	1.70	0.74
1:D:170:LEU:HD23	1:D:251:LEU:HD13	1.69	0.74
1:A:256:LYS:HE2	8:A:547:HOH:O	1.87	0.74
2:C:227:ILE:CG1	8:C:1126:HOH:O	2.35	0.74
2:C:250:ASN:HA	2:C:253:LEU:HD12	1.70	0.73
2:C:93:LYS:N	2:C:94:PRO:HD2	2.04	0.73
1:A:134:GLU:HG3	8:A:930:HOH:O	1.88	0.72
2:B:97:GLN:OE1	8:B:851:HOH:O	2.09	0.71
2:B:162:VAL:H	2:B:166:THR:HG21	1.57	0.70
1:D:132:PRO:HG2	1:D:135:ARG:HB2	1.74	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:135:ARG:HG3	1:D:135:ARG:HH11	1.55	0.70
2:B:250:ASN:HA	2:B:253:LEU:HB3	1.74	0.70
1:D:163:GLU:O	1:D:244:ASP:HB3	1.92	0.69
1:D:68:ALA:HA	1:D:124:VAL:HG22	1.73	0.69
1:D:180:LYS:HE3	7:D:2002:DST:S9	2.32	0.69
8:C:355:HOH:O	1:D:161:CYS:SG	2.51	0.69
1:A:187:GLY:O	1:A:191:LEU:HG	1.92	0.68
1:D:187:GLY:O	1:D:191:LEU:HG	1.94	0.68
1:A:133:PRO:O	1:A:137:VAL:HG23	1.94	0.67
1:A:160:VAL:HA	1:A:163:GLU:OE2	1.94	0.67
2:C:124:VAL:HG22	2:C:135:ILE:HD12	1.75	0.67
1:D:138:ARG:HD2	8:D:397:HOH:O	1.94	0.66
2:B:28:VAL:O	2:B:31:PRO:HD2	1.94	0.66
2:B:2:GLN:CB	2:B:3:PRO:HD3	2.12	0.66
2:B:82:LEU:H	2:B:89:ARG:HH12	1.44	0.65
2:B:236:LYS:HG2	2:B:240:LEU:CD1	2.27	0.64
2:B:249:LYS:HZ3	2:B:253:LEU:HD13	1.63	0.64
2:C:4:TYR:CZ	2:C:8:ILE:HD11	2.32	0.64
1:D:233:LEU:HD12	1:D:237:ALA:HB2	1.79	0.64
2:C:43:ALA:O	2:C:47:LEU:HB2	1.97	0.64
2:B:203:LYS:HD2	2:B:246:PHE:CE2	2.32	0.63
2:C:227:ILE:HG12	8:C:1126:HOH:O	1.98	0.63
2:C:61:GLN:HG2	2:C:128:ARG:NH2	2.13	0.63
1:A:138:ARG:HD2	8:A:697:HOH:O	1.99	0.62
2:B:26:GLU:CB	8:B:435:HOH:O	2.39	0.62
1:D:149:SER:HB2	8:D:361:HOH:O	2.00	0.61
2:C:130:ASP:OD2	8:C:292:HOH:O	2.16	0.61
2:B:215:ARG:NH1	8:B:458:HOH:O	2.25	0.61
2:B:16:LEU:HD21	2:B:67:ALA:HB1	1.83	0.61
2:B:166:THR:OG1	2:B:171:ILE:HD11	2.01	0.61
1:D:165:MET:HE2	1:D:168:VAL:HA	1.81	0.60
2:C:197:ALA:HB3	2:C:199:GLU:OE1	2.00	0.60
2:C:172:GLU:HG3	2:C:217:MET:HE3	1.83	0.60
1:D:281:ALA:HB3	1:D:282:PRO:HD3	1.83	0.60
1:D:294:ASP:OD2	8:D:953:HOH:O	2.17	0.60
2:C:221:LYS:HD3	2:C:227:ILE:CB	2.31	0.60
2:B:168:LEU:HB3	2:B:231:ILE:HD11	1.82	0.60
2:C:215:ARG:HH11	2:C:215:ARG:HG2	1.65	0.60
2:B:103:ASN:OD1	2:B:104:VAL:HG23	2.02	0.60
2:C:125:ASP:HB3	2:C:128:ARG:HG3	1.82	0.59
2:C:92:SER:C	2:C:94:PRO:HD2	2.22	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:43:ALA:HB3	2:C:183:HIS:HE1	1.67	0.59
2:B:249:LYS:HZ2	2:B:253:LEU:HD22	1.65	0.59
1:D:61:ASP:OD2	1:D:61:ASP:N	2.35	0.59
2:B:206:ASN:HB3	2:B:242:GLU:HG2	1.83	0.58
2:C:221:LYS:CB	2:C:227:ILE:HD12	2.31	0.58
1:D:156:GLN:NE2	7:D:2002:DST:H143	2.18	0.58
2:C:4:TYR:CE2	2:C:8:ILE:HD11	2.38	0.58
2:C:43:ALA:HB3	2:C:183:HIS:CE1	2.39	0.58
1:D:254:VAL:O	1:D:257:SER:HB2	2.03	0.58
2:B:249:LYS:NZ	2:B:253:LEU:HD22	2.19	0.58
1:D:174:GLU:HG2	8:D:661:HOH:O	2.03	0.58
1:D:295:ASN:HD22	1:D:295:ASN:C	2.07	0.57
2:B:161:ILE:HA	2:B:166:THR:HG21	1.87	0.57
2:B:211:GLN:NE2	2:B:257:LEU:HB3	2.19	0.57
2:C:8:ILE:CG2	2:C:49:LEU:HD12	2.34	0.57
1:A:199:LYS:HE3	8:A:906:HOH:O	2.04	0.57
1:D:177:HIS:HD2	1:D:248:TYR:HE2	1.53	0.57
1:D:240:ASP:OD1	1:D:245:LYS:HD2	2.05	0.56
2:C:219:GLU:HG2	8:C:780:HOH:O	2.06	0.56
2:C:168:LEU:HD11	2:C:226:LEU:HG	1.86	0.56
2:B:58:ASP:H	2:B:61:GLN:NE2	1.99	0.56
2:C:221:LYS:HD3	2:C:227:ILE:HD12	1.86	0.56
1:D:185:LEU:HD13	1:D:214:GLY:HA2	1.88	0.56
1:A:258:LYS:NZ	8:A:550:HOH:O	2.27	0.55
2:B:91:VAL:HG23	8:B:882:HOH:O	2.05	0.55
2:B:131:ASP:O	2:B:135:ILE:HG13	2.05	0.55
1:A:277:PRO:O	8:A:303:HOH:O	2.18	0.55
1:A:44:LYS:HE3	8:A:715:HOH:O	2.06	0.55
1:A:47:ARG:HB2	1:A:48:PRO:HD3	1.88	0.54
2:C:91:VAL:O	2:C:91:VAL:HG23	2.07	0.54
2:C:172:GLU:HG3	2:C:217:MET:CE	2.38	0.54
1:A:180:LYS:HD2	8:A:296:HOH:O	2.08	0.54
1:D:30:LYS:NZ	8:D:645:HOH:O	2.40	0.54
1:D:31:ILE:O	1:D:35:MET:HG3	2.08	0.54
1:D:270:GLU:HG2	8:D:1011:HOH:O	2.06	0.54
2:C:108:THR:O	2:C:112:ILE:HG12	2.07	0.54
2:B:248:GLY:O	2:B:252:GLU:HB2	2.08	0.54
1:D:266:ARG:NH1	8:D:1051:HOH:O	2.41	0.54
1:D:267:GLU:OE1	8:D:869:HOH:O	2.18	0.54
2:B:82:LEU:N	2:B:89:ARG:HH12	2.05	0.53
1:D:241:LEU:HD13	8:D:1050:HOH:O	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:94:ARG:O	1:A:95:ARG:HB2	2.07	0.53
1:D:176:ILE:O	1:D:180:LYS:HB3	2.07	0.53
2:C:125:ASP:HB3	2:C:128:ARG:CG	2.39	0.53
1:D:30:LYS:HD2	1:D:108:VAL:HG21	1.90	0.53
1:D:124:VAL:O	1:D:124:VAL:HG12	2.07	0.53
1:D:177:HIS:HD2	1:D:248:TYR:CE2	2.25	0.53
1:A:138:ARG:CD	8:A:697:HOH:O	2.55	0.53
1:D:135:ARG:HG3	1:D:135:ARG:NH1	2.19	0.53
2:B:25:PRO:HB2	2:B:27:THR:CG2	2.36	0.52
2:C:162:VAL:O	2:C:164:GLY:N	2.42	0.52
2:C:218:MET:O	2:C:221:LYS:HB3	2.09	0.52
1:D:165:MET:CE	1:D:168:VAL:HA	2.38	0.52
1:A:147:ILE:O	1:A:153:VAL:HG23	2.09	0.52
1:A:186:GLN:HG3	1:A:207:ARG:HG3	1.92	0.52
2:B:229:GLU:OE1	2:B:229:GLU:HA	2.09	0.52
1:A:266:ARG:O	1:A:270:GLU:HG3	2.10	0.52
2:B:203:LYS:HD2	2:B:246:PHE:HE2	1.75	0.52
1:D:170:LEU:HD11	8:D:627:HOH:O	2.08	0.51
2:B:94:PRO:CB	8:B:968:HOH:O	2.48	0.51
1:A:165:MET:HG2	1:A:167:GLU:H	1.73	0.51
2:B:200:GLU:HG3	8:B:459:HOH:O	2.10	0.51
2:B:90:PRO:HG3	2:B:159:GLU:HA	1.92	0.51
2:B:249:LYS:HZ3	2:B:253:LEU:CD1	2.22	0.51
2:C:221:LYS:CD	2:C:227:ILE:HB	2.36	0.51
2:B:94:PRO:CG	8:B:968:HOH:O	2.59	0.51
2:B:182:MET:O	2:B:185:CYS:HB3	2.11	0.51
1:D:263:ARG:HB2	1:D:263:ARG:HH11	1.76	0.51
2:B:236:LYS:HG2	2:B:240:LEU:HD12	1.92	0.50
2:B:168:LEU:HD13	2:B:231:ILE:HD11	1.92	0.50
2:C:93:LYS:N	2:C:94:PRO:CD	2.74	0.50
2:C:97:GLN:HG3	8:C:319:HOH:O	2.12	0.50
2:B:17:LYS:HG3	2:B:37:PHE:CZ	2.47	0.50
1:D:208:LYS:HD3	1:D:271:GLN:OE1	2.12	0.50
2:B:54:LEU:HD11	2:B:251:ALA:HA	1.94	0.50
2:C:131:ASP:N	2:C:132:PRO:HD2	2.27	0.50
2:C:126:PRO:C	2:C:128:ARG:H	2.14	0.50
2:B:128:ARG:O	2:B:131:ASP:HB2	2.12	0.50
2:C:4:TYR:O	2:C:8:ILE:HG13	2.12	0.50
1:A:186:GLN:OE1	1:A:207:ARG:CD	2.60	0.49
2:C:84:LEU:HD12	2:C:89:ARG:HG2	1.93	0.49
2:C:200:GLU:OE2	2:C:246:PHE:HE1	1.95	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:7:TYR:C	1:A:7:TYR:CD2	2.85	0.49
2:B:130:ASP:O	2:B:134:ARG:HG3	2.12	0.49
1:A:86:PRO:HG2	1:A:106:GLU:OE2	2.13	0.49
2:C:163:ASP:HA	2:C:224:HIS:CE1	2.46	0.49
1:A:140:LEU:HD13	2:B:139:ILE:HG21	1.94	0.49
1:D:177:HIS:ND1	1:D:218:GLN:HG2	2.27	0.48
1:A:54:ALA:HB2	1:A:189:VAL:HG22	1.95	0.48
2:B:211:GLN:HE22	2:B:257:LEU:HB3	1.77	0.48
1:A:276:HIS:HB2	1:A:279:ARG:HD2	1.95	0.48
1:D:173:LEU:HD22	1:D:251:LEU:HD12	1.94	0.48
2:B:236:LYS:HG3	2:B:258:VAL:HB	1.95	0.48
1:D:156:GLN:HE22	7:D:2002:DST:H112	1.78	0.48
2:B:162:VAL:H	2:B:166:THR:HG23	1.74	0.48
2:C:227:ILE:HG13	8:C:1126:HOH:O	2.06	0.48
1:A:163:GLU:HB3	8:A:370:HOH:O	2.13	0.47
1:A:186:GLN:NE2	1:A:211:ASN:OD1	2.47	0.47
2:C:103:ASN:HB3	1:D:87:CYS:O	2.13	0.47
1:D:186:GLN:HE21	1:D:211:ASN:CB	2.27	0.47
1:A:168:VAL:HG13	1:A:172:HIS:CB	2.42	0.47
2:B:211:GLN:CD	2:B:257:LEU:HD23	2.35	0.47
1:A:157:VAL:O	1:A:160:VAL:HG12	2.13	0.47
2:B:20:ILE:O	2:B:33:HIS:HD2	1.97	0.47
2:B:227:ILE:HD12	2:B:227:ILE:N	2.29	0.47
2:B:236:LYS:HG2	2:B:240:LEU:HD11	1.95	0.47
1:D:170:LEU:CD2	1:D:251:LEU:HD13	2.43	0.47
2:B:1:MET:O	2:B:1:MET:HG2	2.15	0.47
1:A:30:LYS:HE2	1:A:30:LYS:HB3	1.80	0.46
1:D:243:ALA:C	1:D:245:LYS:H	2.18	0.46
2:C:227:ILE:HG22	2:C:227:ILE:O	2.14	0.46
1:A:252:ILE:O	1:A:256:LYS:HB2	2.15	0.46
2:B:210:TYR:HB2	2:B:239:ALA:HB2	1.98	0.46
2:B:215:ARG:HD3	8:B:733:HOH:O	2.15	0.46
1:D:163:GLU:HG3	1:D:245:LYS:HG2	1.97	0.46
1:D:186:GLN:HA	1:D:210:ALA:HB1	1.97	0.46
2:B:171:ILE:HG22	2:B:217:MET:CE	2.46	0.46
1:D:222:ASP:HB3	1:D:249:PRO:HD2	1.98	0.46
2:C:129:THR:O	2:C:132:PRO:HD2	2.17	0.45
2:C:204:LEU:HA	2:C:204:LEU:HD23	1.69	0.45
2:C:90:PRO:O	2:C:92:SER:N	2.49	0.45
1:D:173:LEU:CD1	1:D:246:THR:HG22	2.43	0.45
2:C:232:ILE:O	2:C:236:LYS:HB2	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:250:ASN:HA	2:C:253:LEU:CD1	2.44	0.45
1:D:9:LEU:HD12	1:D:9:LEU:HA	1.65	0.45
1:A:177:HIS:HD2	1:A:248:TYR:OH	2.00	0.45
2:C:58:ASP:HB3	8:C:1080:HOH:O	2.15	0.45
1:A:228:LYS:O	8:A:372:HOH:O	2.21	0.45
2:B:45:SER:O	2:B:48:CYS:HB3	2.17	0.45
2:B:167:SER:OG	1:D:33:GLU:OE2	2.18	0.45
2:C:247:HIS:CB	8:C:1129:HOH:O	2.53	0.45
2:B:179:TYR:CD1	2:B:216:GLY:HA3	2.52	0.45
2:B:213:THR:O	2:B:217:MET:HB2	2.16	0.44
2:C:32:MET:HG3	2:C:112:ILE:HD11	1.99	0.44
1:D:186:GLN:NE2	1:D:211:ASN:HB2	2.32	0.44
2:C:140:ILE:HD13	1:D:126:ALA:HB2	2.00	0.44
1:D:173:LEU:HD11	1:D:177:HIS:NE2	2.32	0.44
1:A:132:PRO:HA	1:A:133:PRO:HD3	1.84	0.44
2:C:221:LYS:HD3	2:C:227:ILE:CG1	2.48	0.44
1:A:208:LYS:HE2	1:A:208:LYS:HB3	1.89	0.44
2:B:221:LYS:NZ	2:B:232:ILE:HD13	2.33	0.44
1:D:97:LYS:HE2	1:D:97:LYS:HB3	1.63	0.44
2:B:35:LEU:HD12	2:B:108:THR:HG21	1.99	0.44
2:B:240:LEU:HD22	2:B:255:SER:HB3	1.99	0.44
2:C:133:ASP:OD2	1:D:133:PRO:HG2	2.18	0.44
2:C:31:PRO:HG3	2:C:100:TYR:CE1	2.52	0.44
1:D:277:PRO:O	8:D:1053:HOH:O	2.21	0.44
1:A:71:ALA:HB2	1:A:124:VAL:HG23	2.00	0.43
2:C:93:LYS:O	2:C:94:PRO:C	2.57	0.43
2:B:30:GLY:N	2:B:31:PRO:CD	2.81	0.43
2:B:82:LEU:O	2:B:84:LEU:HG	2.17	0.43
2:B:90:PRO:CD	2:B:159:GLU:HB3	2.48	0.43
2:B:221:LYS:CG	2:B:227:ILE:HG12	2.34	0.43
2:C:26:GLU:HG2	8:C:803:HOH:O	2.17	0.43
1:D:182:ALA:O	1:D:186:GLN:HG3	2.18	0.43
1:D:255:GLU:HA	1:D:255:GLU:OE1	2.19	0.43
1:A:96:GLY:C	1:A:97:LYS:HD2	2.39	0.43
2:B:23:ARG:HB2	2:B:24:PRO:CD	2.40	0.43
2:B:41:ALA:HB1	8:B:316:HOH:O	2.18	0.43
2:B:128:ARG:CG	2:B:128:ARG:NH1	2.67	0.43
1:D:222:ASP:HB3	1:D:249:PRO:CD	2.49	0.43
1:D:68:ALA:HA	1:D:124:VAL:CG2	2.45	0.43
2:B:236:LYS:O	2:B:240:LEU:HG	2.18	0.43
1:D:292:TYR:HE2	8:D:381:HOH:O	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1:MET:HG3	2:B:256:SER:HB3	2.01	0.42
2:C:85:THR:OG1	2:C:86:ASP:N	2.52	0.42
1:A:290:ILE:CD1	3:A:2003:IPE:H51	2.49	0.42
1:D:124:VAL:O	1:D:124:VAL:CG1	2.67	0.42
1:A:199:LYS:N	1:A:202:GLU:OE1	2.47	0.42
2:B:237:GLU:O	2:B:241:GLU:HG3	2.19	0.42
2:B:240:LEU:CD2	2:B:255:SER:HB3	2.49	0.42
2:C:138:VAL:HG12	2:C:142:ILE:HD12	2.01	0.42
2:B:71:LEU:CD2	2:B:112:ILE:HG23	2.44	0.42
2:C:249:LYS:O	2:C:253:LEU:HG	2.19	0.42
1:A:167:GLU:O	1:A:167:GLU:HG2	2.20	0.42
2:C:162:VAL:C	2:C:164:GLY:N	2.73	0.42
1:D:71:ALA:HB1	1:D:120:ALA:HB1	2.02	0.42
2:B:171:ILE:HG22	2:B:217:MET:HE3	2.01	0.42
1:D:97:LYS:HB2	1:D:98:PRO:CD	2.49	0.42
1:A:281:ALA:HB3	1:A:282:PRO:HD3	2.02	0.42
2:B:8:ILE:HG23	2:B:49:LEU:HD12	2.01	0.42
1:D:139:VAL:HG21	1:D:195:LEU:HG	2.00	0.42
1:D:233:LEU:HD12	1:D:237:ALA:CB	2.49	0.42
1:A:129:LYS:CE	8:A:415:HOH:O	2.68	0.42
2:B:247:HIS:C	2:B:251:ALA:HB3	2.41	0.41
2:C:1:MET:N	8:C:920:HOH:O	2.52	0.41
2:C:251:ALA:O	2:C:255:SER:HB2	2.18	0.41
1:D:139:VAL:HG13	1:D:191:LEU:HD22	2.01	0.41
1:D:186:GLN:HA	1:D:210:ALA:CB	2.50	0.41
2:C:112:ILE:HA	2:C:112:ILE:HD13	1.78	0.41
2:B:161:ILE:HD13	2:B:171:ILE:HD12	2.02	0.41
2:B:158:GLU:OE1	2:B:178:LYS:NZ	2.49	0.41
2:C:14:ARG:NE	8:C:922:HOH:O	2.42	0.41
1:A:206:LEU:HD23	1:A:206:LEU:HA	1.85	0.41
1:A:225:ASP:O	1:A:228:LYS:HD2	2.21	0.41
2:C:88:SER:OG	1:D:107:SER:HB2	2.20	0.41
1:A:19:LEU:HD23	1:A:19:LEU:HA	1.85	0.41
2:B:232:ILE:H	2:B:232:ILE:HG12	1.66	0.41
2:C:1:MET:HE2	8:C:919:HOH:O	2.21	0.41
2:C:206:ASN:O	2:C:210:TYR:CD1	2.73	0.41
2:C:217:MET:O	2:C:227:ILE:HD11	2.21	0.41
1:A:8:MET:HE3	8:A:317:HOH:O	2.19	0.41
2:C:65:ALA:O	2:C:69:ILE:HG13	2.21	0.41
1:A:139:VAL:HG13	1:A:191:LEU:HD22	2.03	0.40
1:A:168:VAL:HG13	1:A:172:HIS:CG	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:32:MET:HG3	2:C:112:ILE:CD1	2.52	0.40
2:C:139:ILE:HG21	1:D:140:LEU:HD13	2.03	0.40
1:D:170:LEU:CD1	8:D:627:HOH:O	2.69	0.40
1:D:225:ASP:OD2	1:D:240:ASP:HB2	2.22	0.40
1:A:186:GLN:OE1	1:A:207:ARG:HD3	2.21	0.40
2:B:165:ASN:O	2:B:165:ASN:CG	2.60	0.40
2:B:93:LYS:N	2:B:94:PRO:HD2	2.36	0.40
2:C:162:VAL:H	2:C:166:THR:HG21	1.87	0.40

All (2) 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)
8:A:843:HOH:O	8:C:805:HOH:O[4_555]	1.99	0.21
8:B:589:HOH:O	8:D:588:HOH:O[3_555]	2.07	0.13

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	275/295 (93%)	263 (96%)	12 (4%)	0	100 100
1	D	293/295 (99%)	280 (96%)	12 (4%)	1 (0%)	41 30
2	B	257/274 (94%)	237 (92%)	14 (5%)	6 (2%)	6 1
2	C	257/274 (94%)	230 (90%)	18 (7%)	9 (4%)	3 0
All	All	1082/1138 (95%)	1010 (93%)	56 (5%)	16 (2%)	10 3

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	227	ILE

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Mol	Chain	Res	Type
2	C	91	VAL
2	C	163	ASP
2	C	227	ILE
2	B	2	GLN
2	B	163	ASP
2	B	225	GLN
2	C	86	ASP
2	C	164	GLY
1	D	42	GLY
2	C	94	PRO
2	C	127	ALA
2	C	225	GLN
2	C	226	LEU
2	B	226	LEU
2	B	244	GLY

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	222/234 (95%)	218 (98%)	4 (2%)	59	53
1	D	234/234 (100%)	231 (99%)	3 (1%)	69	65
2	B	201/214 (94%)	193 (96%)	8 (4%)	31	19
2	C	201/214 (94%)	197 (98%)	4 (2%)	55	48
All	All	858/896 (96%)	839 (98%)	19 (2%)	52	44

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	97	LYS
1	A	135	ARG
1	A	160	VAL
1	A	189	VAL
2	B	45	SER
2	B	85	THR

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Mol	Chain	Res	Type
2	B	128	ARG
2	B	134	ARG
2	B	227	ILE
2	B	229	GLU
2	B	232	ILE
2	B	255	SER
2	C	58	ASP
2	C	59	ARG
2	C	131	ASP
2	C	199	GLU
1	D	174	GLU
1	D	199	LYS
1	D	295	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	177	HIS
2	B	33	HIS
2	B	61	GLN
2	C	183	HIS
2	C	225	GLN
2	C	230	ASN
1	D	156	GLN
1	D	186	GLN
1	D	211	ASN
1	D	295	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 monosaccharides in this entry.

5.6 Ligand geometry

Of 9 ligands modelled in this entry, 4 are monoatomic - leaving 5 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
7	DST	D	2002	5	9,13,13	1.16	0	11,19,19	2.92	4 (36%)
4	PPV	A	2004	5	6,8,8	1.41	1 (16%)	13,13,13	1.98	1 (7%)
3	IPE	D	2001	-	11,13,13	3.45	2 (18%)	15,19,19	1.68	4 (26%)
6	EDO	C	2005	-	3,3,3	0.71	0	2,2,2	0.44	0
3	IPE	A	2003	-	11,13,13	3.56	4 (36%)	15,19,19	2.09	6 (40%)

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	DST	D	2002	5	-	3/7/13/13	-
4	PPV	A	2004	5	-	0/6/6/6	-
3	IPE	D	2001	-	-	3/13/13/13	-
6	EDO	C	2005	-	-	1/1/1/1	-
3	IPE	A	2003	-	-	2/13/13/13	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	2001	IPE	C2-C3	-8.39	1.36	1.51
3	A	2003	IPE	C4-C3	7.98	1.55	1.33
3	A	2003	IPE	C2-C3	-7.95	1.36	1.51
3	D	2001	IPE	C4-C3	7.39	1.54	1.33
3	A	2003	IPE	PA-O1A	2.38	1.59	1.50
4	A	2004	PPV	P2-O22	2.21	1.57	1.50
3	A	2003	IPE	PA-O1	2.06	1.67	1.59

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	2004	PPV	P2-OPP-P1	-6.39	110.91	132.83
7	D	2002	DST	O8-P3-O7	6.00	124.36	109.82
7	D	2002	DST	O4-P1-O2	5.64	123.54	104.64
3	A	2003	IPE	O1B-PB-O3A	4.25	118.88	104.64
3	A	2003	IPE	PA-O3A-PB	-3.89	119.49	132.83
3	D	2001	IPE	O1B-PB-O3A	3.51	116.41	104.64
7	D	2002	DST	O4-P1-O5	-3.30	97.75	110.68
3	A	2003	IPE	O3B-PB-O3A	3.19	115.33	104.64
3	D	2001	IPE	O3B-PB-O3A	2.63	113.47	104.64
3	D	2001	IPE	PA-O3A-PB	-2.59	123.95	132.83
3	A	2003	IPE	O3B-PB-O1B	-2.55	97.90	107.64
7	D	2002	DST	C14-C12-C11	-2.53	115.35	122.65
3	A	2003	IPE	O1-C1-C2	2.39	118.42	108.64
3	D	2001	IPE	C5-C3-C4	-2.39	116.71	121.98
3	A	2003	IPE	O2A-PA-O1A	2.01	122.17	112.24

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2003	IPE	C1-O1-PA-O1A
7	D	2002	DST	P3-O2-P1-O4
3	A	2003	IPE	PA-O3A-PB-O3B
3	D	2001	IPE	PB-O3A-PA-O2A
7	D	2002	DST	P1-O2-P3-O8
7	D	2002	DST	P1-O2-P3-O7
6	C	2005	EDO	O1-C1-C2-O2
3	D	2001	IPE	PB-O3A-PA-O1A
3	D	2001	IPE	C1-O1-PA-O1A

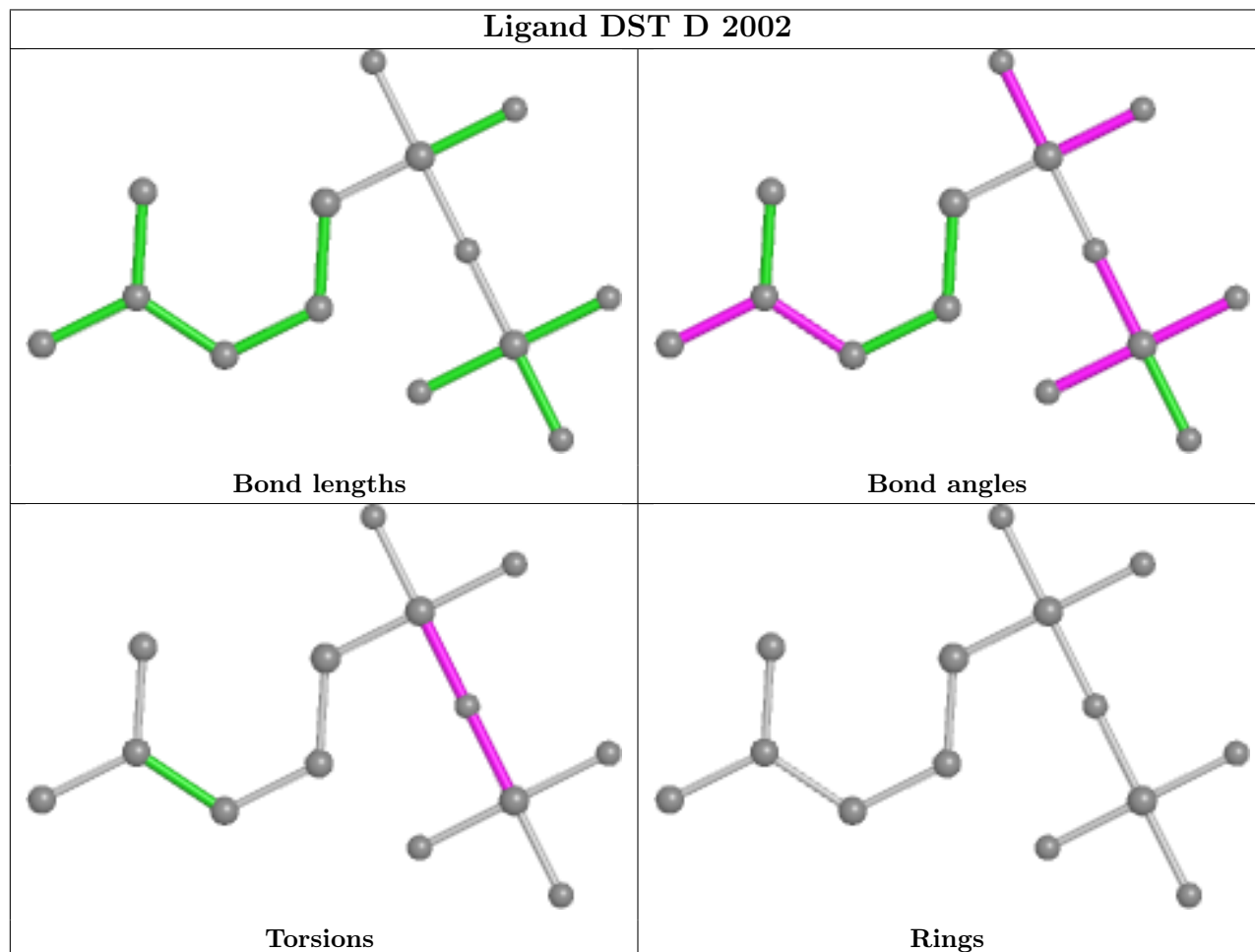
There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	D	2002	DST	3	0
3	A	2003	IPE	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	279/295 (94%)	0.28	22 (7%) 12 19	27, 39, 68, 99	0
1	D	295/295 (100%)	0.45	25 (8%) 10 17	26, 40, 91, 109	0
2	B	259/274 (94%)	0.93	48 (18%) 1 1	29, 46, 116, 126	0
2	C	259/274 (94%)	0.82	37 (14%) 2 4	27, 46, 96, 115	0
All	All	1092/1138 (95%)	0.61	132 (12%) 4 7	26, 42, 98, 126	0

All (132) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	251	LEU	12.2
2	B	257	LEU	10.4
2	B	248	GLY	10.2
2	B	246	PHE	9.5
2	B	250	ASN	8.8
2	C	129	THR	8.4
2	B	249	LYS	8.3
2	C	127	ALA	7.5
1	A	166	ALA	7.3
2	C	91	VAL	7.2
2	B	228	ASP	7.0
2	B	1	MET	7.0
2	C	126	PRO	6.8
1	D	243	ALA	6.6
2	B	226	LEU	6.5
1	A	165	MET	6.5
1	A	164	GLY	6.5
1	D	165	MET	6.4
2	B	93	LYS	6.4
1	D	168	VAL	6.4
2	C	93	LYS	6.1

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Mol	Chain	Res	Type	RSRZ
1	D	166	ALA	6.1
2	B	225	GLN	6.0
1	D	244	ASP	5.9
2	C	249	LYS	5.9
1	D	167	GLU	5.9
2	B	251	ALA	5.7
1	D	242	VAL	5.7
2	B	3	PRO	5.5
2	C	225	GLN	5.2
2	B	221	LYS	5.1
2	B	222	ASN	4.9
2	B	223	SER	4.9
2	C	222	ASN	4.7
2	B	256	SER	4.7
2	C	128	ARG	4.6
1	D	246	THR	4.6
2	C	259	ALA	4.6
1	D	252	ILE	4.6
2	C	226	LEU	4.5
2	B	96	ILE	4.5
2	C	94	PRO	4.2
2	B	258	VAL	4.2
1	D	170	LEU	4.2
2	C	124	VAL	4.2
2	B	231	ILE	4.1
2	B	254	MET	4.0
2	B	238	LEU	4.0
1	D	171	ASP	4.0
2	C	130	ASP	4.0
2	B	90	PRO	4.0
2	C	125	ASP	3.9
2	C	223	SER	3.8
2	B	224	HIS	3.8
1	D	164	GLY	3.8
2	C	162	VAL	3.8
1	D	254	VAL	3.8
1	A	167	GLU	3.6
2	B	24	PRO	3.6
1	D	245	LYS	3.6
2	C	224	HIS	3.5
2	B	2	GLN	3.5
2	C	221	LYS	3.5

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Mol	Chain	Res	Type	RSRZ
1	A	278	HIS	3.4
1	A	276	HIS	3.4
1	A	161	CYS	3.3
2	B	91	VAL	3.3
2	C	123	SER	3.2
2	B	162	VAL	3.2
2	C	163	ASP	3.1
1	D	184	LEU	3.1
2	C	244	GLY	3.1
2	C	95	ALA	3.0
1	A	96	GLY	2.9
2	C	230	ASN	2.9
2	B	95	ALA	2.9
2	B	240	LEU	2.9
1	A	95	ARG	2.8
2	B	165	ASN	2.8
2	B	235	LEU	2.8
1	A	184	LEU	2.8
2	C	92	SER	2.8
2	B	245	GLY	2.8
1	D	259	GLU	2.8
2	C	247	HIS	2.8
2	B	227	ILE	2.7
1	A	185	LEU	2.7
1	A	295	ASN	2.7
2	B	259	ALA	2.7
2	B	243	LEU	2.7
2	B	164	GLY	2.6
2	B	244	GLY	2.6
1	A	228	LYS	2.6
2	B	237	GLU	2.6
2	B	27	THR	2.5
1	A	72	VAL	2.5
2	C	253	LEU	2.5
2	B	229	GLU	2.5
2	B	92	SER	2.5
2	C	227	ILE	2.5
1	A	117	LEU	2.5
1	D	239	LYS	2.4
1	A	75	ILE	2.4
2	B	230	ASN	2.4
2	B	252	GLU	2.4

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Mol	Chain	Res	Type	RSRZ
2	C	164	GLY	2.4
1	D	185	LEU	2.4
1	A	147	ILE	2.4
2	B	255	SER	2.3
2	B	253	LEU	2.3
2	B	247	HIS	2.3
1	D	147	ILE	2.3
2	C	182	MET	2.3
1	A	162	SER	2.3
2	C	186	GLY	2.3
1	A	274	HIS	2.2
2	C	199	GLU	2.2
2	C	122	GLY	2.2
1	A	163	GLU	2.2
1	D	163	GLU	2.2
2	B	241	GLU	2.2
1	D	161	CYS	2.2
2	C	90	PRO	2.1
2	C	258	VAL	2.1
2	C	89	ARG	2.1
1	D	238	GLY	2.1
2	C	88	SER	2.1
1	D	240	ASP	2.0
1	D	162	SER	2.0
1	A	226	VAL	2.0
2	B	51	ALA	2.0
1	A	90	ASN	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

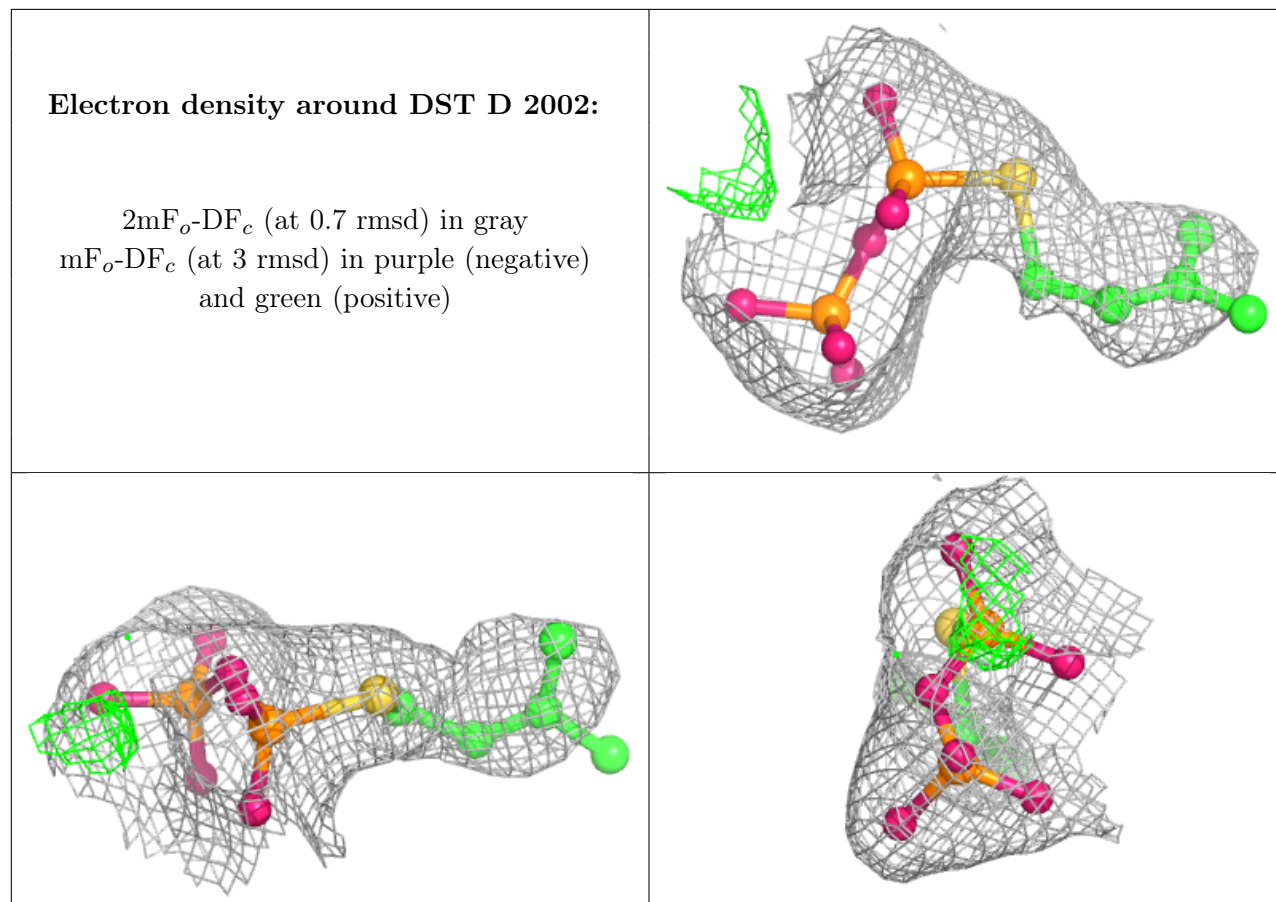
6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	MG	A	3004	1/1	0.81	0.07	58,58,58,58	0
3	IPE	A	2003	14/14	0.88	0.20	72,81,88,88	0
4	PPV	A	2004	9/9	0.93	0.10	76,76,77,78	0
5	MG	A	3003	1/1	0.94	0.11	50,50,50,50	0
5	MG	D	3001	1/1	0.94	0.06	53,53,53,53	0
5	MG	D	3002	1/1	0.95	0.06	49,49,49,49	0
6	EDO	C	2005	4/4	0.96	0.20	36,37,37,38	0
7	DST	D	2002	14/14	0.96	0.15	49,55,62,62	0
3	IPE	D	2001	14/14	0.98	0.13	39,40,45,48	0

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



6.5 Other polymers [i](#)

There are no such residues in this entry.