



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 18, 2026 – 02:37 PM UTC

PDB ID : 3KRO / pdb_00003kro
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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

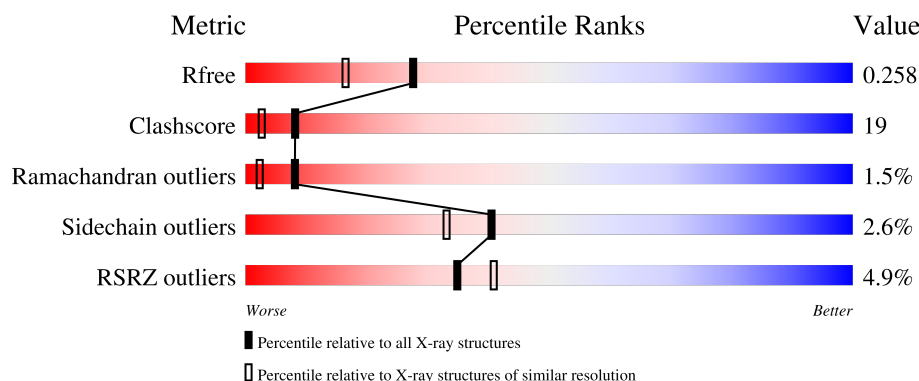
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 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}	180053	3494 (1.96-1.96)
Clashscore	190562	3612 (1.96-1.96)
Ramachandran outliers	187476	3587 (1.96-1.96)
Sidechain outliers	187428	3587 (1.96-1.96)
RSRZ outliers	180081	3495 (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	2% 71% 21% 5%
1	D	295	3% 70% 27% .
2	B	274	8% 56% 34% 5%
2	C	274	6% 59% 30% 5% 5%

2 Entry composition

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
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
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:

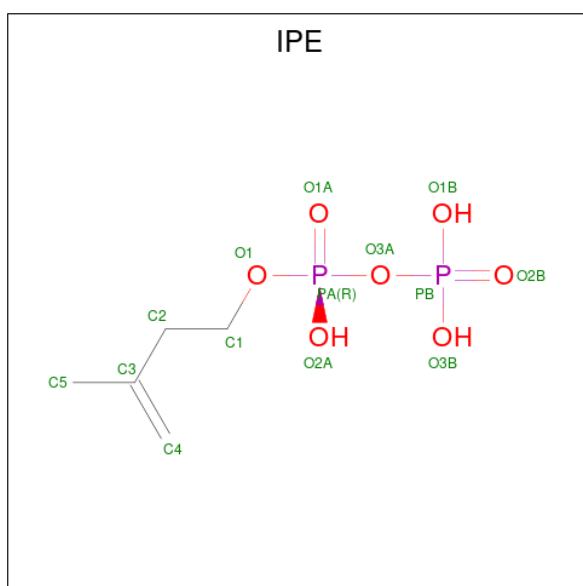
Chain	Residue	Modelled	Actual	Comment	Reference
B	1	MET	-	expression tag	UNP Q9SBR4
B	267	HIS	-	expression tag	UNP Q9SBR4
B	268	HIS	-	expression tag	UNP Q9SBR4
B	269	HIS	-	expression tag	UNP Q9SBR4
B	270	HIS	-	expression tag	UNP Q9SBR4
B	271	HIS	-	expression tag	UNP Q9SBR4
B	272	HIS	-	expression tag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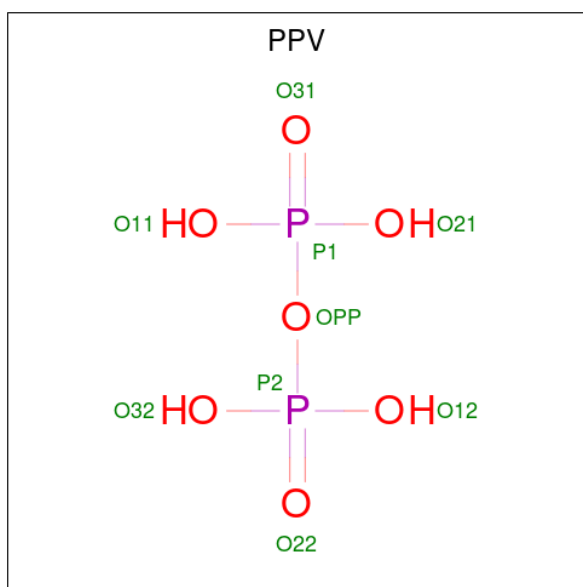
Chain	Residue	Modelled	Actual	Comment	Reference
C	267	HIS	-	expression tag	UNP Q9SBR4
C	268	HIS	-	expression tag	UNP Q9SBR4
C	269	HIS	-	expression tag	UNP Q9SBR4
C	270	HIS	-	expression tag	UNP Q9SBR4
C	271	HIS	-	expression tag	UNP Q9SBR4
C	272	HIS	-	expression tag	UNP Q9SBR4
C	273	HIS	-	expression tag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

- Molecule 3 is 3-METHYLBUT-3-ENYL TRIHYDROGEN DIPHOSPHATE (CCD ID: 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 (CCD ID: PPV) (formula: $H_4O_7P_2$).

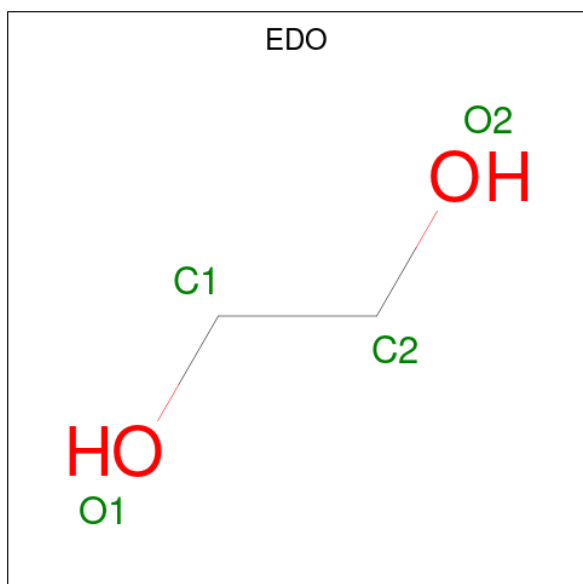


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	P	0	0
			9	7	2		

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

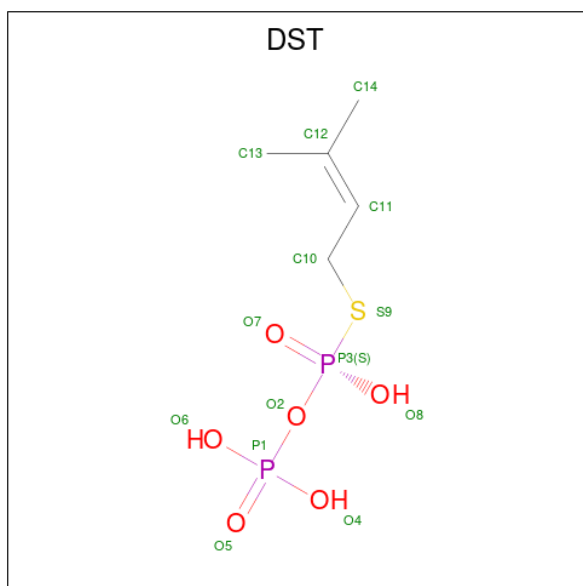
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	2	Total	Mg	0	0
			2	2		
5	D	2	Total	Mg	0	0
			2	2		

- Molecule 6 is 1,2-ETHANEDIOL (CCD ID: 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 (CCD ID: 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		

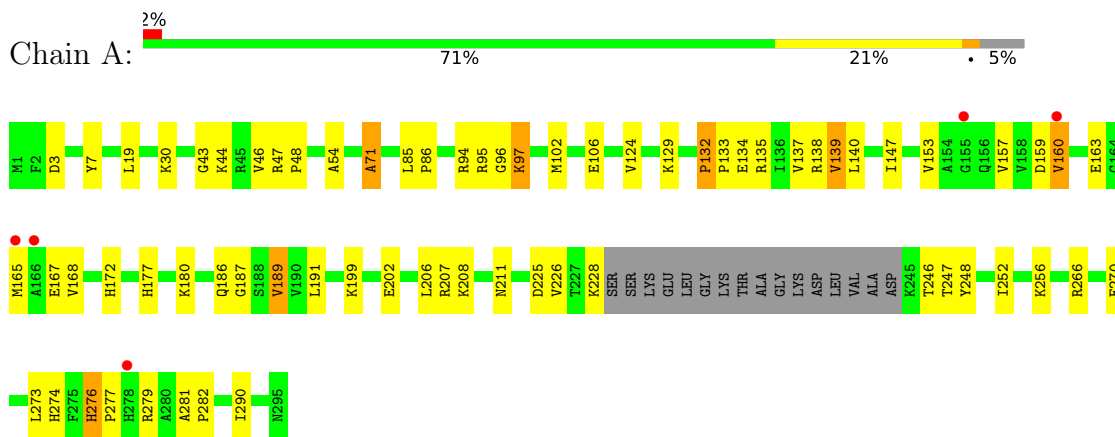
- Molecule 8 is water.

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

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.

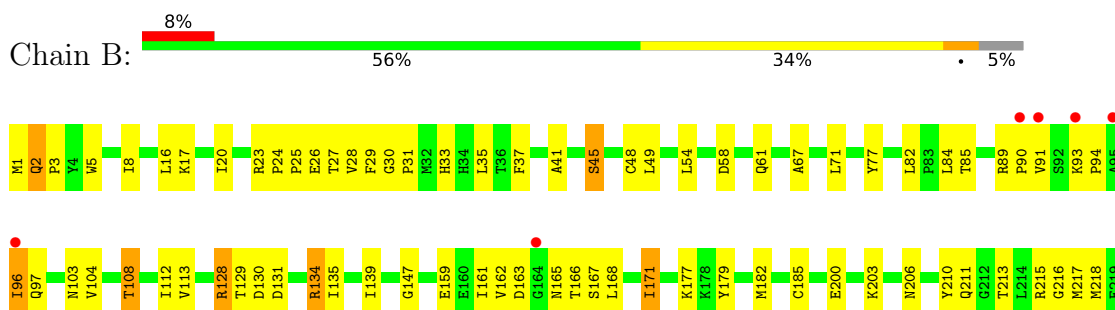
- Molecule 1: Geranyl diphosphate synthase large subunit



- Molecule 1: Geranyl diphosphate synthase large subunit

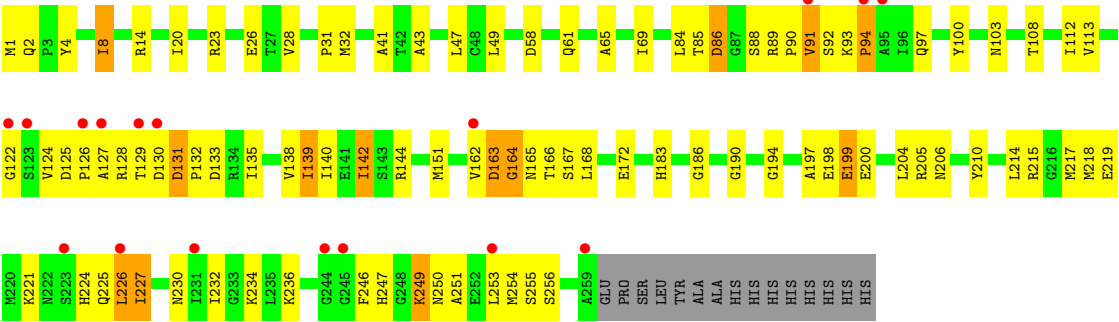


- Molecule 2: Geranyl diphosphate synthase small subunit





● 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 30.00 – 1.95	Depositor EDS
% Data completeness (in resolution range)	90.1 (30.00-1.95) 90.1 (30.00-1.95)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.34 (at 1.95Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.205 , 0.256 0.205 , 0.258	Depositor DCC
R_{free} test set	3599 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å ²)	30.2	Xtriage
Anisotropy	0.820	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 56.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
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

Xtriage'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: IPE, EDO, MG, PPV, DST

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	1.18	2/2155 (0.1%)	1.18	11/2903 (0.4%)
1	D	1.17	5/2268 (0.2%)	1.20	8/3055 (0.3%)
2	B	1.04	2/1993 (0.1%)	1.15	7/2695 (0.3%)
2	C	1.06	3/1993 (0.2%)	1.19	16/2695 (0.6%)
All	All	1.12	12/8409 (0.1%)	1.18	42/11348 (0.4%)

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	132	PRO	CA-C	9.53	1.57	1.51
1	A	46	VAL	CA-CB	8.96	1.65	1.54
2	B	113	VAL	CA-CB	7.86	1.58	1.54
1	D	102	MET	SD-CE	7.07	1.97	1.79
2	C	151	MET	SD-CE	-6.87	1.62	1.79
1	A	71	ALA	C-O	6.35	1.31	1.24
1	D	8	MET	SD-CE	6.22	1.95	1.79
1	D	69	ALA	CA-CB	-5.97	1.44	1.53
1	D	110	VAL	CA-CB	5.55	1.60	1.54
2	C	142	ILE	CA-CB	-5.36	1.48	1.54
2	B	96	ILE	CA-CB	5.18	1.60	1.54
2	C	186	GLY	C-O	-5.03	1.17	1.23

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	132	PRO	CA-C-N	9.10	128.71	119.24
1	A	132	PRO	C-N-CA	9.10	128.71	119.24
2	C	23	ARG	CA-C-N	-8.37	111.76	120.38
2	C	23	ARG	C-N-CA	-8.37	111.76	120.38
2	B	254	MET	N-CA-C	-7.81	102.77	111.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2	GLN	CA-C-N	7.15	126.99	119.05
2	C	2	GLN	C-N-CA	7.15	126.99	119.05
1	D	219	VAL	N-CA-C	-6.75	103.94	110.42
2	B	253	LEU	N-CA-C	-6.74	105.34	113.97
2	C	167	SER	N-CA-C	6.29	118.66	110.43
1	D	29	LEU	N-CA-C	6.14	117.64	111.07
1	D	124	VAL	CB-CA-C	-6.10	102.37	112.26
2	C	194	GLY	N-CA-C	-5.86	105.27	112.77
1	A	43	GLY	N-CA-C	-5.86	102.89	110.69
1	A	276	HIS	CA-C-N	5.84	125.97	119.32
1	A	276	HIS	C-N-CA	5.84	125.97	119.32
1	A	274	HIS	N-CA-C	5.72	119.96	112.92
1	A	3	ASP	N-CA-C	5.67	119.07	111.24
2	C	205	ARG	N-CA-C	-5.64	104.82	110.97
1	D	97	LYS	CA-C-N	-5.60	113.99	119.76
1	D	97	LYS	C-N-CA	-5.60	113.99	119.76
1	D	190	VAL	N-CA-C	5.55	116.28	110.62
2	C	165	ASN	N-CA-C	5.53	117.61	110.65
2	B	129	THR	N-CA-C	5.51	119.10	112.38
2	C	8	ILE	CB-CA-C	-5.51	104.92	111.97
2	C	190	GLY	N-CA-C	-5.50	106.13	112.50
1	D	150	GLU	N-CA-C	-5.46	105.31	112.41
2	B	108	THR	N-CA-C	-5.24	105.65	111.36
1	A	102	MET	N-CA-C	-5.22	105.65	112.23
1	D	292	TYR	N-CA-C	5.21	119.60	112.88
2	B	29	PHE	N-CA-C	5.19	118.87	112.54
2	B	147	GLY	CA-C-N	5.15	125.45	119.47
2	B	147	GLY	C-N-CA	5.15	125.45	119.47
2	C	139	ILE	N-CA-C	-5.10	105.57	110.72
1	A	273	LEU	N-CA-C	5.08	116.82	111.28
2	C	41	ALA	N-CA-C	-5.08	102.97	110.48
2	C	113	VAL	CA-C-N	-5.06	114.45	119.56
2	C	113	VAL	C-N-CA	-5.06	114.45	119.56
2	C	20	ILE	CB-CA-C	-5.01	105.26	111.32
1	A	85	LEU	CA-C-N	5.01	124.45	119.24
1	A	85	LEU	C-N-CA	5.01	124.45	119.24
2	C	254	MET	N-CA-C	-5.00	105.83	111.28

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	2120	0	2146	52	0
1	D	2232	0	2264	88	0
2	B	1954	0	1948	107	0
2	C	1954	0	1948	86	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	12	1
8	B	243	0	0	13	1
8	C	294	0	0	14	1
8	D	317	0	0	16	1
All	All	9441	0	8340	323	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 19.

All (323) 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:172:GLU:HG3	2:C:217:MET:HE1	1.43	0.99
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: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
1:D:4:PHE:HB2	1:D:8:MET:HE3	1.67	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:132:PRO:HG2	1:D:135:ARG:HB2	1.74	0.70
1:D:135:ARG:HG3	1:D:135:ARG:HH11	1.55	0.70
1:D:165:MET:HE2	1:D:168:VAL:HA	1.74	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
2:B:249:LYS:HZ2	2:B:253:LEU:HD22	1.57	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:C:92:SER:C	2:C:94:PRO:HD2	2.22	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:295:ASN:HD22	1:D:295:ASN:C	2.07	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
2:C:197:ALA:HB3	2:C:199:GLU:OE1	2.00	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:125:ASP:HB3	2:C:128:ARG:HG3	1.82	0.59
2:B:249:LYS:HZ3	2:B:253:LEU:HD13	1.66	0.59
2:C:43:ALA:HB3	2:C:183:HIS:HE1	1.67	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
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
1:D:4:PHE:HB2	1:D:8:MET:HE1	1.88	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
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
2:C:126:PRO:C	2:C:128:ARG:H	2.14	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
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
1:A:7:TYR:C	1:A:7:TYR:CD2	2.85	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:241:LEU:HD13	8:D:1050:HOH:O	2.08	0.53
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:211:GLN:CD	2:B:257:LEU:HD23	2.35	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
2:B:171:ILE:HG22	2:B:217:MET:HE1	1.91	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
1:D:243:ALA:C	1:D:245:LYS:H	2.18	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: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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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
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
2:C:93:LYS:O	2:C:94:PRO:C	2.57	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:96:GLY:C	1:A:97:LYS:HD2	2.39	0.47
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
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
2:B:249:LYS:HZ3	2:B:253:LEU:CD1	2.27	0.47
1:A:30:LYS:HE2	1:A:30:LYS:HB3	1.80	0.46
2:B:247:HIS:C	2:B:251:ALA:HB3	2.41	0.46
2:C:227:ILE:HG22	2:C:227:ILE:O	2.14	0.46
1:A:159:ASP:CG	1:A:180:LYS:HZ3	2.24	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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:B:165:ASN:CG	2:B:165:ASN:O	2.60	0.45
2:C:232:ILE:O	2:C:236:LYS:HB2	2.16	0.45
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:B:218:MET:C	2:B:220:MET:N	2.75	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
1:A:246:THR:C	1:A:247:THR:HG23	2.42	0.44
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:159:ASP:CG	1:A:180:LYS:NZ	2.76	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
2:C:162:VAL:C	2:C:164:GLY:N	2.73	0.44
1:D:277:PRO:O	8:D:1053:HOH:O	2.21	0.44
1:D:102:MET:HE2	1:D:102:MET:HB3	1.95	0.43
1:D:248:TYR:C	1:D:250:LYS:H	2.26	0.43
1:A:71:ALA:HB2	1:A:124:VAL:HG23	2.00	0.43
2:C:197:ALA:O	2:C:198:GLU:C	2.60	0.43
2:C:144:ARG:HG2	1:D:122:GLU:CD	2.44	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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
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
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
2:C:129:THR:C	2:C:131:ASP:H	2.26	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:B:254:MET:C	2:B:256:SER:H	2.28	0.42
1:D:71:ALA:HB1	1:D:120:ALA:HB1	2.02	0.42
1:D:97:LYS:HB2	1:D:98:PRO:CD	2.49	0.42
1:D:248:TYR:C	1:D:250:LYS:N	2.76	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:C:253:LEU:O	2:C:256:SER:OG	2.33	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:221:LYS:C	2:B:223:SER:H	2.28	0.41
2:C:14:ARG:NE	8:C:922:HOH:O	2.42	0.41
1:D:175:PHE:CD1	1:D:175:PHE:C	2.99	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:272:LEU:C	1:D:274:HIS:H	2.29	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:D:208:LYS:NZ	8:D:1009:HOH:O	2.53	0.41
2:C:122:GLY:C	2:C:124:VAL:H	2.27	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:B:249:LYS:O	2:B:252:GLU:C	2.64	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
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
1:D:272:LEU:C	1:D:274:HIS:N	2.78	0.40
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:93:LYS:N	2:B:94:PRO:HD2	2.36	0.40
2:B:218:MET:HE3	2:B:232:ILE:HG21	2.03	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

5.3.1 Protein backbone

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%)	36	28
2	B	257/274 (94%)	237 (92%)	14 (5%)	6 (2%)	5	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%)	8	2

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	227	ILE
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 ⓘ

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%)	216 (97%)	6 (3%)	39	32
1	D	234/234 (100%)	231 (99%)	3 (1%)	61	58

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	201/214 (94%)	191 (95%)	10 (5%)	22	11
2	C	201/214 (94%)	198 (98%)	3 (2%)	57	54
All	All	858/896 (96%)	836 (97%)	22 (3%)	40	33

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	97	LYS
1	A	135	ARG
1	A	139	VAL
1	A	160	VAL
1	A	189	VAL
1	A	226	VAL
2	B	45	SER
2	B	85	THR
2	B	128	ARG
2	B	134	ARG
2	B	171	ILE
2	B	177	LYS
2	B	227	ILE
2	B	229	GLU
2	B	232	ILE
2	B	255	SER
2	C	131	ASP
2	C	199	GLU
2	C	249	LYS
1	D	139	VAL
1	D	174	GLU
1	D	295	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	76	HIS
1	A	177	HIS
1	A	218	GLN
1	A	269	GLN
1	A	276	HIS
2	B	33	HIS
2	B	61	GLN

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Mol	Chain	Res	Type
2	B	165	ASN
2	B	202	GLN
2	C	61	GLN
2	C	225	GLN
2	C	230	ASN
1	D	90	ASN
1	D	156	GLN
1	D	186	GLN
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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

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	$\# Z > 2$
6	EDO	C	2005	-	3,3,3	0.68	0	2,2,2	0.47	0
4	PPV	A	2004	5	6,8,8	1.48	1 (16%)	12,13,13	0.91	0
3	IPE	A	2003	-	12,13,13	3.70	5 (41%)	16,19,19	2.07	6 (37%)
3	IPE	D	2001	-	12,13,13	3.98	3 (25%)	16,19,19	1.79	4 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	DST	D	2002	5	10,13,13	1.42	1 (10%)	12,19,19	2.84	4 (33%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	EDO	C	2005	-	-	1/1/1/1	-
4	PPV	A	2004	5	-	0/6/6/6	-
3	IPE	A	2003	-	-	2/13/13/13	-
3	IPE	D	2001	-	-	3/13/13/13	-
7	DST	D	2002	5	-	3/7/13/13	-

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	2001	IPE	C2-C3	-9.14	1.36	1.51
3	A	2003	IPE	C2-C3	-8.66	1.36	1.51
3	A	2003	IPE	C4-C3	7.90	1.55	1.33
3	D	2001	IPE	C4-C3	7.32	1.54	1.33
3	D	2001	IPE	PA-O3A	-6.86	1.52	1.59
3	A	2003	IPE	PA-O3A	-3.63	1.55	1.59
7	D	2002	DST	P3-O7	2.75	1.52	1.46
3	A	2003	IPE	PA-O1A	2.46	1.59	1.50
4	A	2004	PPV	P2-O22	2.31	1.57	1.50
3	A	2003	IPE	PA-O1	2.11	1.67	1.59

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	D	2002	DST	O8-P3-O7	6.08	124.36	109.86
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	O3A-PA-O1A	-4.13	98.28	110.70
3	D	2001	IPE	O3A-PA-O1A	-3.51	100.14	110.70
3	D	2001	IPE	O1B-PB-O3A	3.51	116.41	104.64
7	D	2002	DST	O4-P1-O5	-3.36	97.75	110.83
3	A	2003	IPE	O3B-PB-O3A	3.19	115.33	104.64
3	A	2003	IPE	O3B-PB-O1B	-2.64	97.90	107.80
3	D	2001	IPE	O3B-PB-O3A	2.63	113.47	104.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	2003	IPE	O1-C1-C2	2.44	118.42	108.63
7	D	2002	DST	C14-C12-C11	-2.43	115.35	122.66
3	D	2001	IPE	C5-C3-C4	-2.19	116.71	122.23
3	A	2003	IPE	O2A-PA-O1A	2.09	122.17	112.44

There are no chirality outliers.

All (9) torsion outliers are listed below:

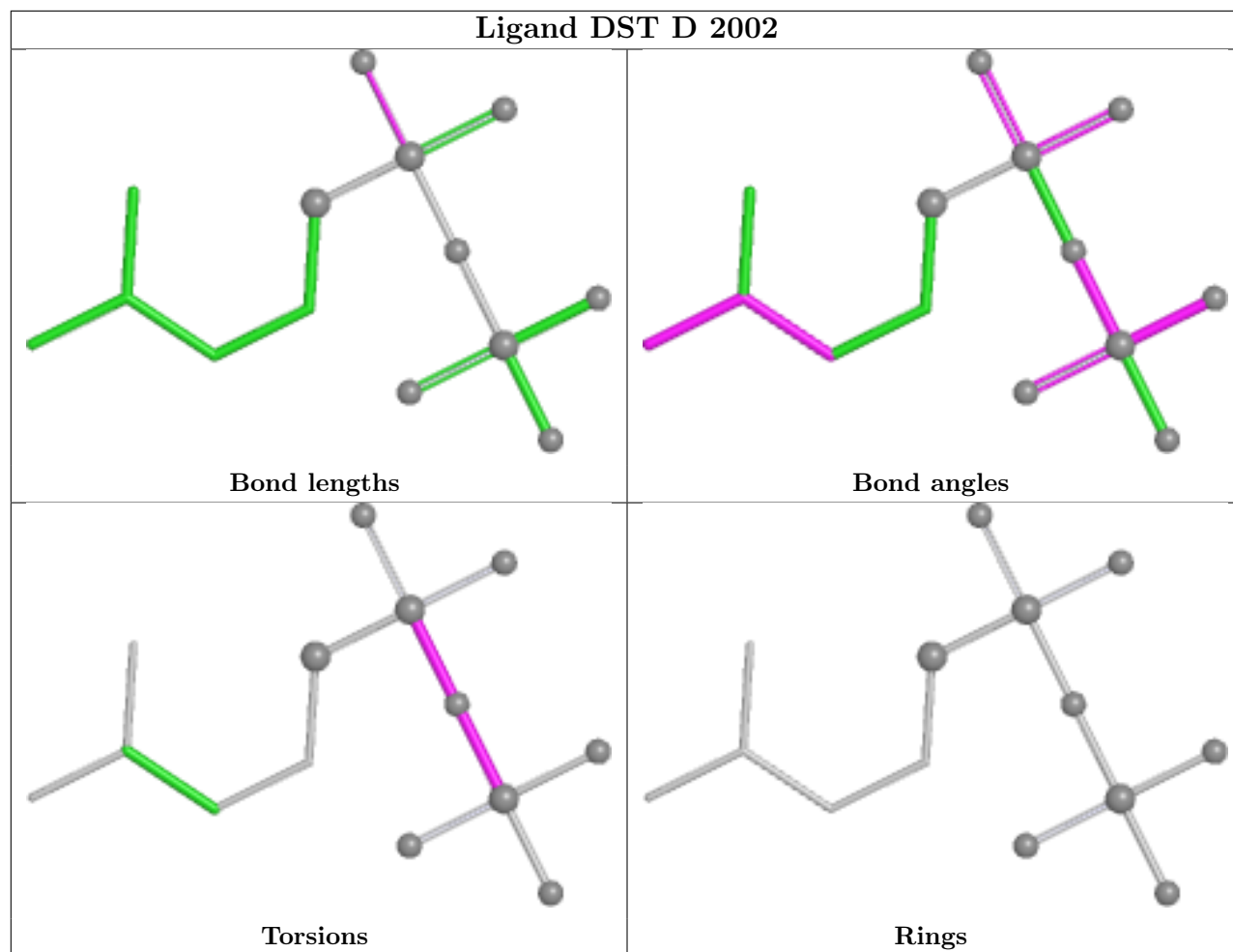
Mol	Chain	Res	Type	Atoms
3	A	2003	IPE	C1-O1-PA-O1A
7	D	2002	DST	P3-O2-P1-O4
3	A	2003	IPE	PA-O3A-PB-O3B
3	D	2001	IPE	PB-O3A-PA-O2A
7	D	2002	DST	P1-O2-P3-O8
3	D	2001	IPE	C1-O1-PA-O1A
7	D	2002	DST	P1-O2-P3-O7
6	C	2005	EDO	O1-C1-C2-O2
3	D	2001	IPE	PB-O3A-PA-O1A

There are no ring outliers.

2 monomers are involved in 4 short contacts:

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

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, 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%)	-0.12	5 (1%) 67 75	27, 39, 68, 99	0
1	D	295/295 (100%)	0.12	10 (3%) 48 54	26, 40, 91, 109	0
2	B	259/274 (94%)	0.44	22 (8%) 16 19	29, 46, 116, 126	0
2	C	259/274 (94%)	0.34	17 (6%) 24 28	27, 46, 96, 115	0
All	All	1092/1138 (95%)	0.19	54 (4%) 35 41	26, 42, 98, 126	0

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	251	ALA	6.5
2	B	259	ALA	4.8
2	B	250	ASN	4.7
2	C	91	VAL	4.2
2	C	226	LEU	3.6
2	B	246	PHE	3.3
2	B	231	ILE	3.2
2	B	257	LEU	3.1
2	B	240	LEU	3.1
2	B	233	GLY	3.0
2	B	226	LEU	2.9
1	D	243	ALA	2.8
1	D	160	VAL	2.8
2	C	223	SER	2.8
2	B	164	GLY	2.8
2	B	254	MET	2.8
1	A	166	ALA	2.7
1	D	242	VAL	2.7
2	B	90	PRO	2.7
2	C	94	PRO	2.7
2	B	249	LYS	2.7

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Mol	Chain	Res	Type	RSRZ
2	C	162	VAL	2.7
2	C	245	GLY	2.6
2	B	96	ILE	2.6
2	C	95	ALA	2.6
1	D	244	ASP	2.6
2	B	227	ILE	2.6
1	D	246	THR	2.6
1	D	168	VAL	2.5
2	C	127	ALA	2.4
1	D	251	LEU	2.4
2	C	129	THR	2.4
2	B	95	ALA	2.4
2	B	239	ALA	2.4
1	A	155	GLY	2.3
1	A	278	HIS	2.3
1	A	160	VAL	2.3
2	B	91	VAL	2.3
2	C	122	GLY	2.2
2	C	259	ALA	2.2
1	D	166	ALA	2.2
2	C	123	SER	2.2
2	C	126	PRO	2.2
1	A	165	MET	2.1
1	D	248	TYR	2.1
2	C	231	ILE	2.1
2	B	228	ASP	2.1
2	C	130	ASP	2.1
2	C	244	GLY	2.1
2	C	253	LEU	2.1
2	B	232	ILE	2.1
1	D	241	LEU	2.1
2	B	93	LYS	2.0
2	B	256	SER	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 ⓘ

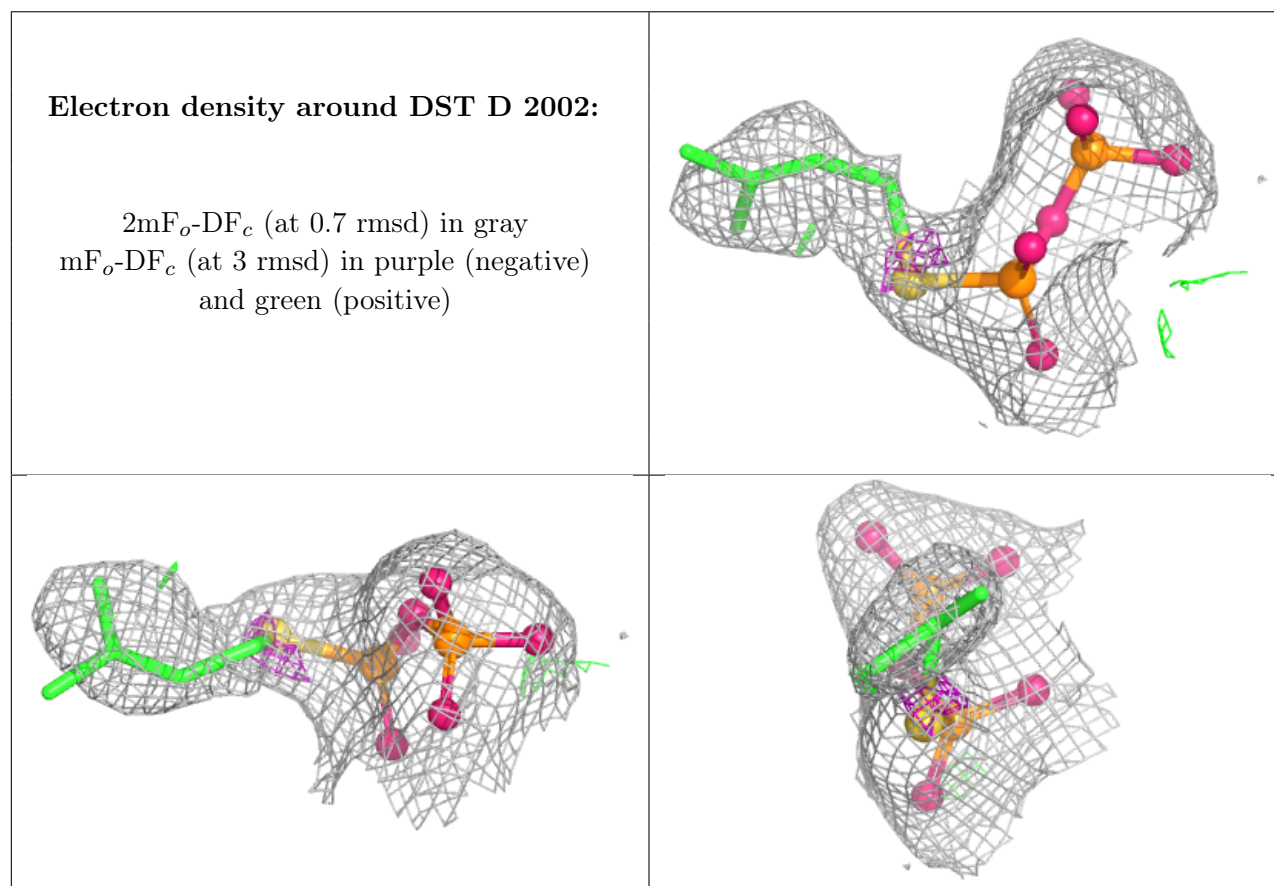
There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

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
3	IPE	A	2003	14/14	0.83	0.12	72,81,88,88	0
4	PPV	A	2004	9/9	0.87	0.09	76,76,77,78	0
5	MG	A	3004	1/1	0.92	0.07	58,58,58,58	0
6	EDO	C	2005	4/4	0.94	0.07	36,37,37,38	0
7	DST	D	2002	14/14	0.95	0.09	49,55,62,62	0
5	MG	D	3001	1/1	0.97	0.04	53,53,53,53	0
5	MG	A	3003	1/1	0.97	0.07	50,50,50,50	0
3	IPE	D	2001	14/14	0.97	0.07	39,40,45,48	0
5	MG	D	3002	1/1	0.98	0.03	49,49,49,49	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.