



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 28, 2021 – 04:38 PM EDT

PDB ID : 2O1S
Title : 1-deoxy-D-xylulose 5-phosphate synthase (DXS) from Escherichia coli
Authors : Xiang, S.; Usunow, G.; Lange, G.; Busch, M.; Tong, L.
Deposited on : 2006-11-29
Resolution : 2.40 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 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 : 2.22
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) : 2.22

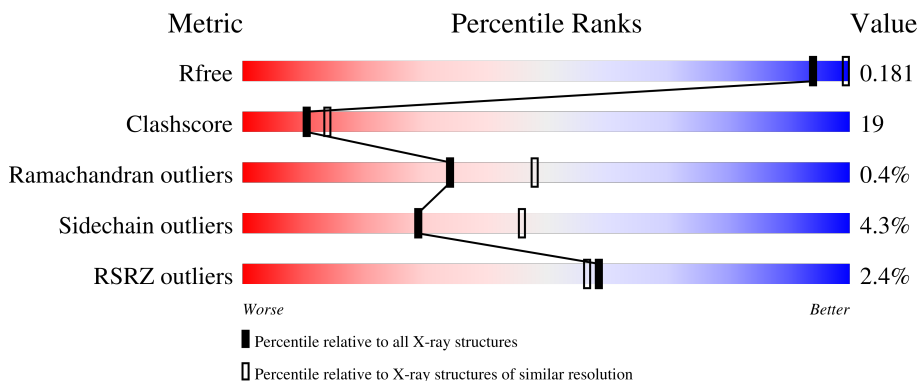
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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	621	 3% 62% 22% 14%
1	B	621	 3% 52% 26% 21%
1	C	621	 % 62% 22% 14%
1	D	621	 3% 50% 27% 22%

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 16515 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 1-deoxy-D-xylulose-5-phosphate synthase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	536	4122	2627	708	764	5	18	0	0	0
1	B	493	3800	2432	643	702	5	18	0	0	0
1	C	536	4123	2628	708	764	5	18	0	0	0
1	D	487	3734	2384	631	696	5	18	0	0	0

There are 88 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	MET	modified residue	UNP P77488
A	159	MSE	MET	modified residue	UNP P77488
A	164	MSE	MET	modified residue	UNP P77488
A	174	MSE	MET	modified residue	UNP P77488
A	183	MSE	MET	modified residue	UNP P77488
A	236	MSE	MET	modified residue	UNP P77488
A	269	MSE	MET	modified residue	UNP P77488
A	281	MSE	MET	modified residue	UNP P77488
A	340	MSE	MET	modified residue	UNP P77488
A	346	MSE	MET	modified residue	UNP P77488
A	352	MSE	MET	modified residue	UNP P77488
A	446	MSE	MET	modified residue	UNP P77488
A	449	MSE	MET	modified residue	UNP P77488
A	460	MSE	MET	modified residue	UNP P77488
A	515	MSE	MET	modified residue	UNP P77488
A	532	MSE	MET	modified residue	UNP P77488
A	546	MSE	MET	modified residue	UNP P77488
A	562	MSE	MET	modified residue	UNP P77488
A	574	MSE	MET	modified residue	UNP P77488
A	600	MSE	MET	modified residue	UNP P77488
A	611	MSE	MET	modified residue	UNP P77488

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Chain	Residue	Modelled	Actual	Comment	Reference
A	621	LEU	-	cloning artifact	UNP P77488
B	1	MSE	MET	modified residue	UNP P77488
B	159	MSE	MET	modified residue	UNP P77488
B	164	MSE	MET	modified residue	UNP P77488
B	174	MSE	MET	modified residue	UNP P77488
B	183	MSE	MET	modified residue	UNP P77488
B	236	MSE	MET	modified residue	UNP P77488
B	269	MSE	MET	modified residue	UNP P77488
B	281	MSE	MET	modified residue	UNP P77488
B	340	MSE	MET	modified residue	UNP P77488
B	346	MSE	MET	modified residue	UNP P77488
B	352	MSE	MET	modified residue	UNP P77488
B	446	MSE	MET	modified residue	UNP P77488
B	449	MSE	MET	modified residue	UNP P77488
B	460	MSE	MET	modified residue	UNP P77488
B	515	MSE	MET	modified residue	UNP P77488
B	532	MSE	MET	modified residue	UNP P77488
B	546	MSE	MET	modified residue	UNP P77488
B	562	MSE	MET	modified residue	UNP P77488
B	574	MSE	MET	modified residue	UNP P77488
B	600	MSE	MET	modified residue	UNP P77488
B	611	MSE	MET	modified residue	UNP P77488
B	621	LEU	-	cloning artifact	UNP P77488
C	1	MSE	MET	modified residue	UNP P77488
C	159	MSE	MET	modified residue	UNP P77488
C	164	MSE	MET	modified residue	UNP P77488
C	174	MSE	MET	modified residue	UNP P77488
C	183	MSE	MET	modified residue	UNP P77488
C	236	MSE	MET	modified residue	UNP P77488
C	269	MSE	MET	modified residue	UNP P77488
C	281	MSE	MET	modified residue	UNP P77488
C	340	MSE	MET	modified residue	UNP P77488
C	346	MSE	MET	modified residue	UNP P77488
C	352	MSE	MET	modified residue	UNP P77488
C	446	MSE	MET	modified residue	UNP P77488
C	449	MSE	MET	modified residue	UNP P77488
C	460	MSE	MET	modified residue	UNP P77488
C	515	MSE	MET	modified residue	UNP P77488
C	532	MSE	MET	modified residue	UNP P77488
C	546	MSE	MET	modified residue	UNP P77488
C	562	MSE	MET	modified residue	UNP P77488
C	574	MSE	MET	modified residue	UNP P77488

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Chain	Residue	Modelled	Actual	Comment	Reference
C	600	MSE	MET	modified residue	UNP P77488
C	611	MSE	MET	modified residue	UNP P77488
C	621	LEU	-	cloning artifact	UNP P77488
D	1	MSE	MET	modified residue	UNP P77488
D	159	MSE	MET	modified residue	UNP P77488
D	164	MSE	MET	modified residue	UNP P77488
D	174	MSE	MET	modified residue	UNP P77488
D	183	MSE	MET	modified residue	UNP P77488
D	236	MSE	MET	modified residue	UNP P77488
D	269	MSE	MET	modified residue	UNP P77488
D	281	MSE	MET	modified residue	UNP P77488
D	340	MSE	MET	modified residue	UNP P77488
D	346	MSE	MET	modified residue	UNP P77488
D	352	MSE	MET	modified residue	UNP P77488
D	446	MSE	MET	modified residue	UNP P77488
D	449	MSE	MET	modified residue	UNP P77488
D	460	MSE	MET	modified residue	UNP P77488
D	515	MSE	MET	modified residue	UNP P77488
D	532	MSE	MET	modified residue	UNP P77488
D	546	MSE	MET	modified residue	UNP P77488
D	562	MSE	MET	modified residue	UNP P77488
D	574	MSE	MET	modified residue	UNP P77488
D	600	MSE	MET	modified residue	UNP P77488
D	611	MSE	MET	modified residue	UNP P77488
D	621	LEU	-	cloning artifact	UNP P77488

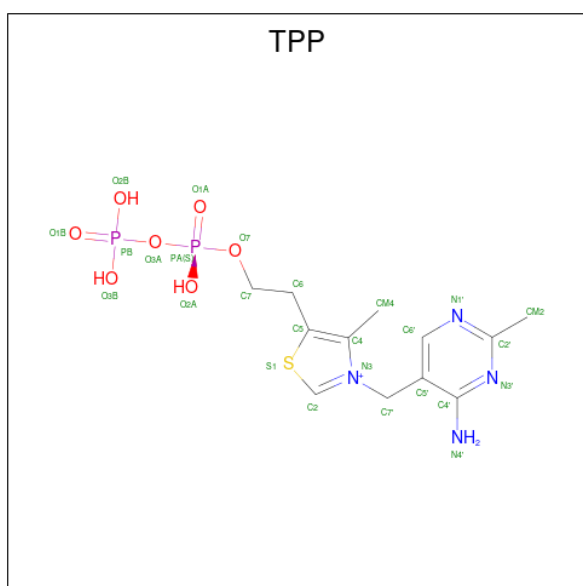
- Molecule 2 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

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

- Molecule 3 is POTASSIUM ION (three-letter code: K) (formula: K).

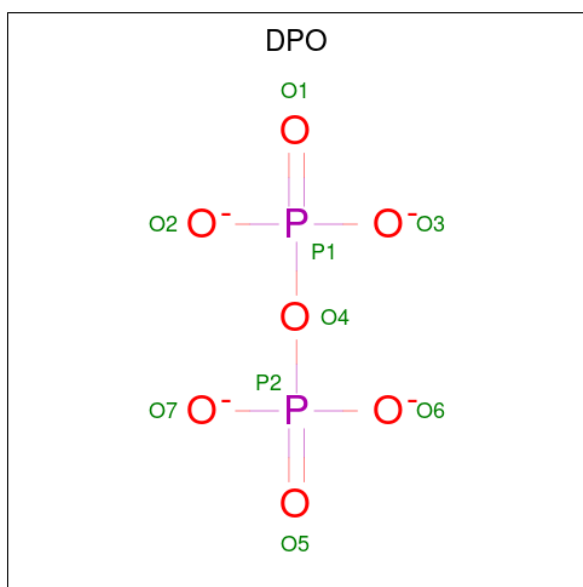
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total K 1 1	0	0
3	B	1	Total K 1 1	0	0
3	C	1	Total K 1 1	0	0
3	D	1	Total K 1 1	0	0

- Molecule 4 is THIAMINE DIPHOSPHATE (three-letter code: TPP) (formula: C₁₂H₁₉N₄O₇P₂S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			S
4	A	1	Total 26	12	4	7	2	1	0	0
4	C	1	Total 26	12	4	7	2	1	0	0

- Molecule 5 is DIPHOSPHATE (three-letter code: DPO) (formula: O₇P₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total O P 9 7 2	0	0
5	D	1	Total O P 9 7 2	0	0

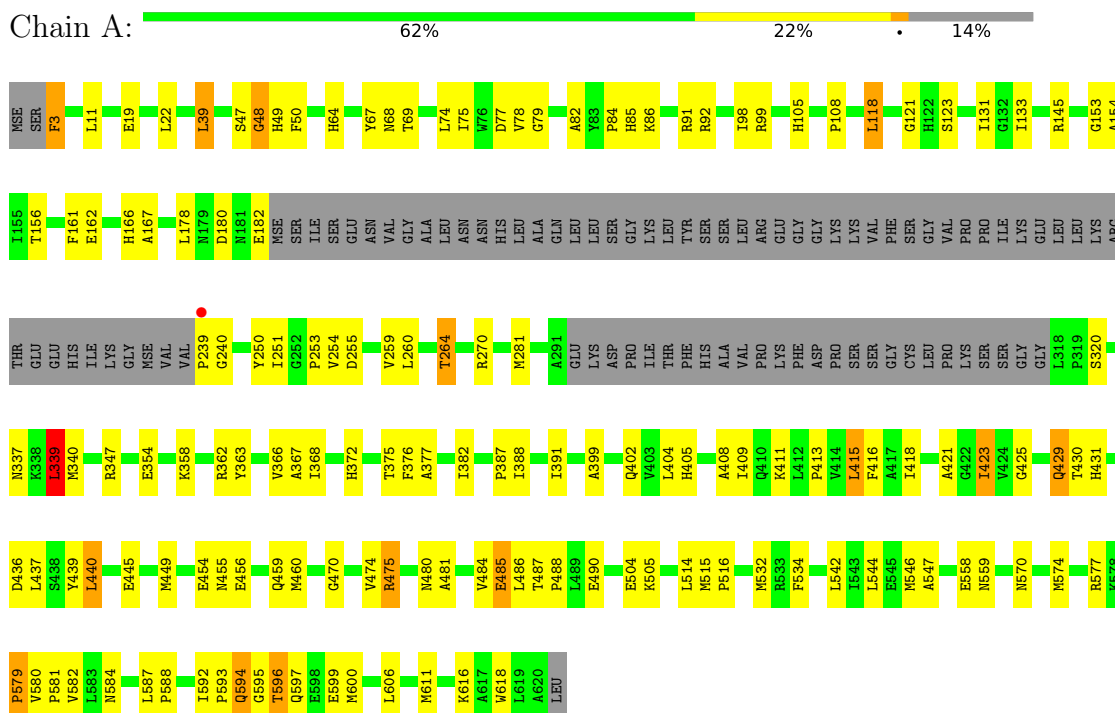
- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	210	Total O 210 210	0	0
6	B	134	Total O 134 134	0	0
6	C	186	Total O 186 186	0	0
6	D	128	Total O 128 128	0	0

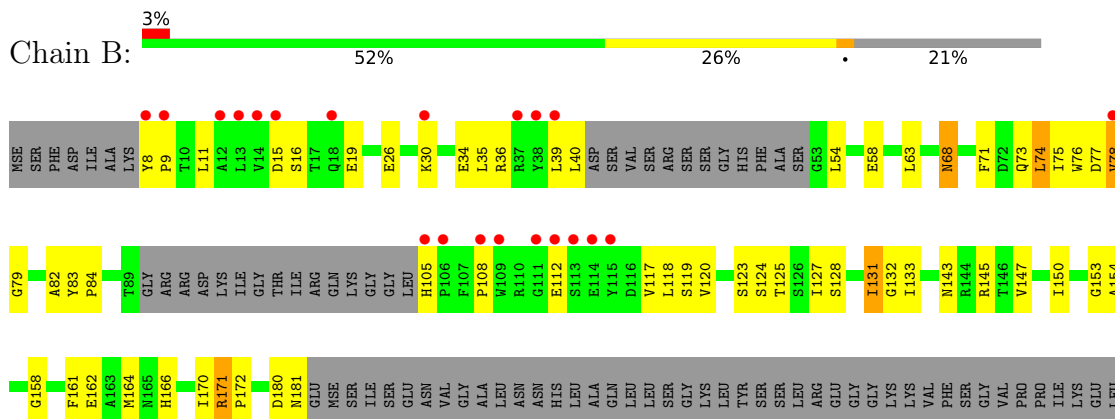
3 Residue-property plots i

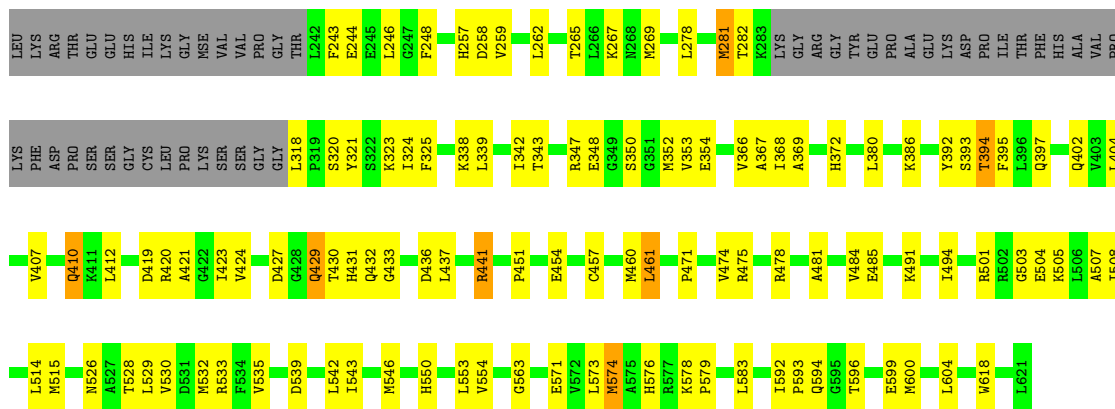
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: 1-deoxy-D-xylulose-5-phosphate synthase

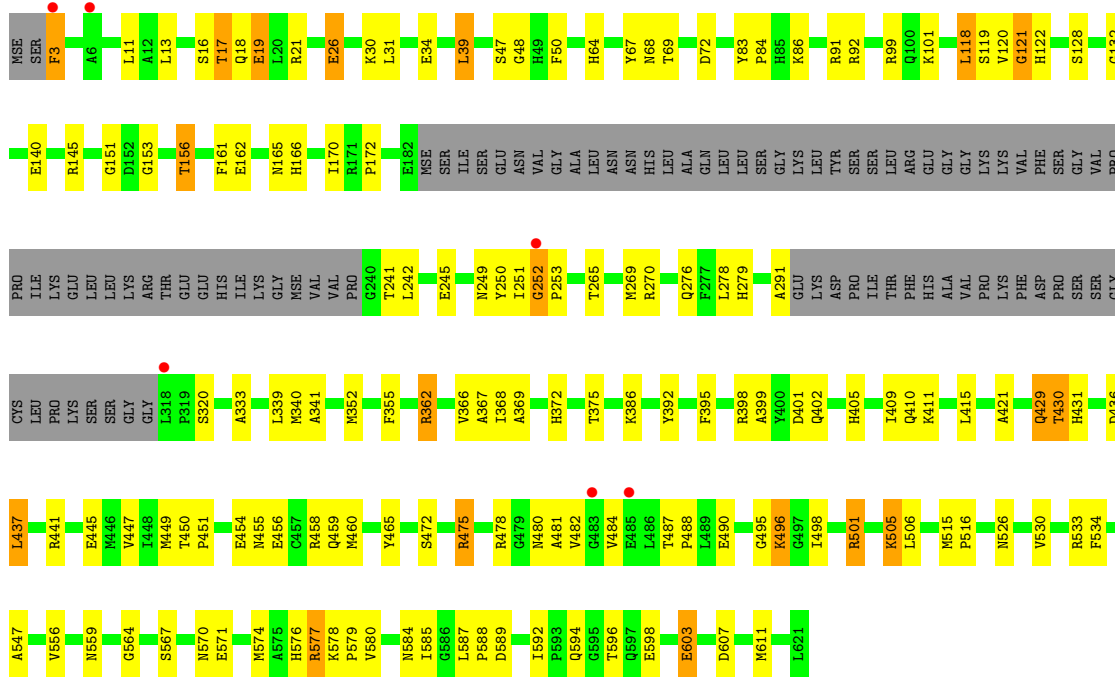


- Molecule 1: 1-deoxy-D-xylulose-5-phosphate synthase

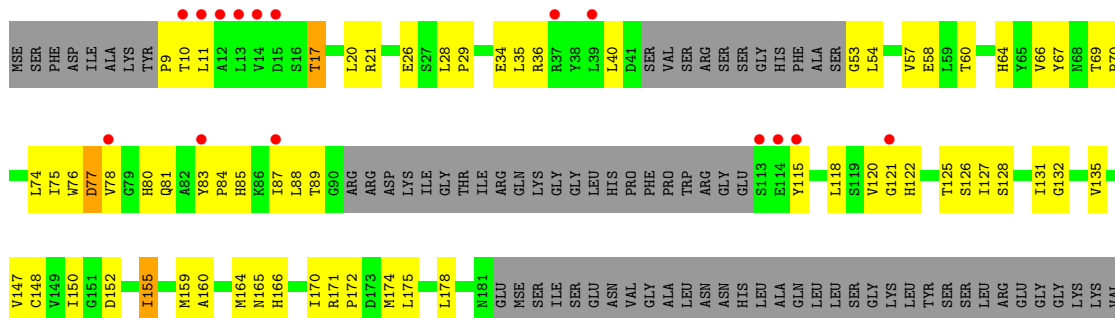


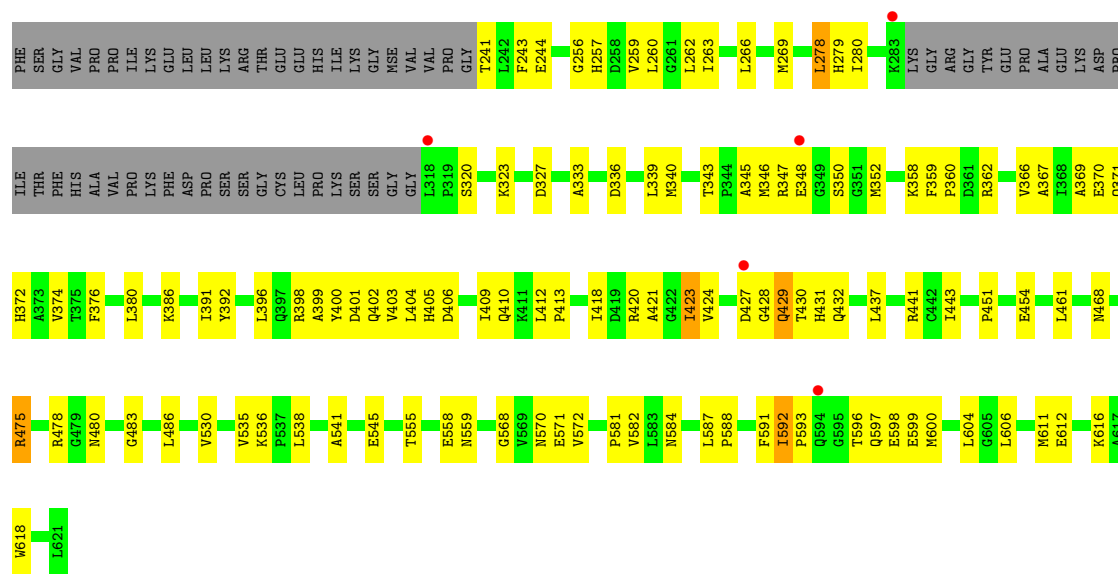


• Molecule 1: 1-deoxy-D-xylulose-5-phosphate synthase



• Molecule 1: 1-deoxy-D-xylulose-5-phosphate synthase





4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	86.79Å 171.15Å 94.80Å 90.00° 107.25° 90.00°	Depositor
Resolution (Å)	30.00 – 2.40 29.77 – 2.41	Depositor EDS
% Data completeness (in resolution range)	89.0 (30.00-2.40) 89.7 (29.77-2.41)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	7.30 (at 2.42Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	0.191 , 0.234 0.185 , 0.181	Depositor DCC
R_{free} test set	4603 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	15.5	Xtrriage
Anisotropy	0.312	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 42.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	16515	wwPDB-VP
Average B, all atoms (Å ²)	18.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.88% 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: MG, DPO, K, TPP

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	0.33	0/4191	0.61	1/5644 (0.0%)
1	B	0.33	0/3861	0.60	0/5203
1	C	0.33	0/4191	0.61	0/5644
1	D	0.31	0/3788	0.58	0/5101
All	All	0.32	0/16031	0.60	1/21592 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	339	LEU	CA-CB-CG	5.12	127.08	115.30

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	4122	0	4133	132	0
1	B	3800	0	3813	171	0
1	C	4123	0	4136	145	0
1	D	3734	0	3757	175	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	26	0	16	2	0
4	C	26	0	16	3	0
5	B	9	0	0	0	0
5	D	9	0	0	0	0
6	A	210	0	0	7	0
6	B	134	0	0	6	0
6	C	186	0	0	4	0
6	D	128	0	0	4	0
All	All	16515	0	15871	588	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 19.

All (588) 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:B:350:SER:HB2	1:B:352:MSE:HE2	1.34	1.10
1:B:503:GLY:H	1:B:528:THR:HG22	1.19	1.08
1:D:423:ILE:HD11	1:D:597:GLN:HA	1.39	1.04
1:A:581:PRO:HA	1:B:574:MSE:HE1	1.42	1.02
1:A:596:THR:HG22	1:A:599:GLU:H	1.19	1.01
1:B:420:ARG:HD3	1:B:478:ARG:HB2	1.45	0.99
1:A:570:ASN:HD21	1:A:584:ASN:HD21	1.08	0.99
1:C:429:GLN:H	1:C:429:GLN:HE21	1.03	0.98
1:B:265:THR:HG22	1:B:269:MSE:HE2	1.46	0.98
1:D:350:SER:HB2	1:D:352:MSE:HE2	1.45	0.97
1:C:269:MSE:HE1	1:C:278:LEU:HD22	1.48	0.96
1:C:570:ASN:HD21	1:C:584:ASN:HD21	1.16	0.94
1:A:429:GLN:H	1:A:429:GLN:NE2	1.66	0.93
1:B:437:LEU:HG	1:B:475:ARG:HH11	1.32	0.93
1:C:265:THR:HG22	1:C:269:MSE:HE2	1.51	0.93
1:C:402:GLN:HE21	1:D:159:MSE:HE1	1.33	0.92
1:A:156:THR:HG21	1:A:367:ALA:HB1	1.52	0.92
1:C:118:LEU:HD12	1:C:120:VAL:HG13	1.52	0.91
1:C:249:ASN:HD22	1:C:276:GLN:HE22	1.07	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:429:GLN:H	1:A:429:GLN:HE21	0.91	0.90
1:C:429:GLN:H	1:C:429:GLN:NE2	1.71	0.88
1:A:429:GLN:HE21	1:A:429:GLN:N	1.71	0.88
1:A:459:GLN:HE22	1:A:490:GLU:H	1.22	0.88
1:C:429:GLN:HE21	1:C:429:GLN:N	1.73	0.87
1:B:503:GLY:N	1:B:528:THR:HG22	1.89	0.86
1:D:420:ARG:HD3	1:D:478:ARG:HB2	1.58	0.86
1:D:570:ASN:HD21	1:D:584:ASN:HD21	1.23	0.85
1:B:574:MSE:HE3	1:B:574:MSE:HA	1.59	0.84
1:B:503:GLY:H	1:B:528:THR:CG2	1.90	0.84
1:C:17:THR:HG21	1:C:69:THR:HG23	1.59	0.84
1:D:404:LEU:HD13	1:D:443:ILE:HG12	1.62	0.82
1:B:574:MSE:HA	1:B:574:MSE:CE	2.10	0.82
1:C:64:HIS:ND1	1:C:69:THR:HG21	1.96	0.81
1:C:402:GLN:NE2	1:D:159:MSE:HE1	1.96	0.80
1:C:121:GLY:HA3	1:C:430:THR:OG1	1.81	0.80
1:D:596:THR:HB	1:D:599:GLU:HG3	1.64	0.80
1:B:63:LEU:HD13	1:B:74:LEU:HD21	1.64	0.79
1:B:437:LEU:HG	1:B:475:ARG:NH1	1.98	0.79
1:B:75:ILE:HD11	1:B:133:ILE:HD12	1.65	0.78
1:B:164:MSE:HE1	1:B:243:PHE:HD1	1.49	0.78
1:C:118:LEU:HD11	6:C:3003:HOH:O	1.82	0.77
1:B:269:MSE:HE1	1:B:278:LEU:HD22	1.64	0.77
1:D:36:ARG:HG3	1:D:54:LEU:HD22	1.64	0.77
1:D:343:THR:HB	1:D:352:MSE:HE1	1.66	0.77
1:C:437:LEU:HD13	1:C:475:ARG:HD3	1.65	0.76
1:C:437:LEU:CD1	1:C:475:ARG:HD3	2.14	0.76
1:B:508:ILE:HG12	1:B:554:VAL:CG1	2.16	0.75
1:B:421:ALA:HB1	1:B:475:ARG:HH21	1.49	0.75
1:C:556:VAL:HG13	1:C:611:MSE:HE1	1.68	0.75
1:C:118:LEU:HD12	1:C:120:VAL:CG1	2.17	0.74
1:C:156:THR:HG21	1:C:368:ILE:H	1.53	0.73
1:C:372:HIS:HE1	1:D:166:HIS:ND1	1.87	0.72
1:C:459:GLN:HE22	1:C:490:GLU:H	1.37	0.72
1:A:581:PRO:HA	1:B:574:MSE:CE	2.20	0.71
1:B:338:LYS:HB3	1:B:386:LYS:HG2	1.72	0.71
1:A:156:THR:HG21	1:A:367:ALA:CB	2.19	0.71
1:B:120:VAL:O	1:B:430:THR:HG21	1.90	0.71
1:A:166:HIS:ND1	1:B:372:HIS:HE1	1.87	0.71
1:B:437:LEU:CG	1:B:475:ARG:HH11	2.02	0.71
1:C:585:ILE:HG21	1:C:611:MSE:HE2	1.73	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:596:THR:HG22	1:B:599:GLU:HB2	1.73	0.71
1:B:596:THR:HG23	1:B:599:GLU:H	1.55	0.70
1:C:156:THR:HG21	1:C:367:ALA:HB1	1.74	0.70
1:A:459:GLN:NE2	1:A:490:GLU:H	1.90	0.69
1:C:366:VAL:HG12	1:C:369:ALA:HB3	1.75	0.69
1:A:456:GLU:O	1:A:460:MSE:HG3	1.92	0.69
1:C:26:GLU:CD	1:C:26:GLU:H	1.97	0.69
1:C:269:MSE:CE	1:C:278:LEU:HD22	2.21	0.69
1:D:420:ARG:CD	1:D:478:ARG:HB2	2.22	0.68
1:C:556:VAL:CG1	1:C:611:MSE:HE1	2.23	0.68
1:D:40:LEU:HD21	1:D:54:LEU:HD11	1.74	0.68
1:D:343:THR:CB	1:D:352:MSE:HE1	2.23	0.68
1:C:17:THR:HG23	1:C:21:ARG:NH1	2.09	0.68
1:B:508:ILE:HG12	1:B:554:VAL:HG11	1.74	0.67
1:C:596:THR:HG22	1:C:598:GLU:H	1.60	0.67
1:D:423:ILE:HD13	1:D:600:MSE:HB2	1.77	0.67
1:D:347:ARG:HA	1:D:352:MSE:HE3	1.77	0.67
1:C:410:GLN:HE22	1:D:118:LEU:HD12	1.60	0.67
1:B:420:ARG:CD	1:B:478:ARG:HB2	2.23	0.67
1:B:368:ILE:N	1:B:368:ILE:HD12	2.10	0.66
1:C:30:LYS:HE3	1:C:34:GLU:OE2	1.95	0.66
1:B:258:ASP:O	1:B:262:LEU:HD22	1.96	0.66
1:A:436:ASP:O	1:A:440:LEU:HB2	1.96	0.65
1:A:337:ASN:HA	1:A:362:ARG:NH2	2.12	0.65
1:A:423:ILE:HD11	1:A:597:GLN:HA	1.77	0.65
1:C:118:LEU:HD22	1:D:410:GLN:HE22	1.60	0.65
1:B:267:LYS:HB2	1:B:267:LYS:NZ	2.12	0.65
1:D:17:THR:HG23	1:D:21:ARG:NH1	2.12	0.65
1:D:429:GLN:NE2	1:D:429:GLN:H	1.95	0.64
1:B:421:ALA:HB1	1:B:475:ARG:NH2	2.13	0.64
1:C:386:LYS:HD3	1:C:465:TYR:CZ	2.33	0.63
1:A:570:ASN:HD21	1:A:584:ASN:ND2	1.90	0.63
1:B:164:MSE:HE1	1:B:243:PHE:CD1	2.33	0.63
1:D:17:THR:HG23	1:D:21:ARG:HH12	1.64	0.63
1:D:26:GLU:CD	1:D:26:GLU:H	2.00	0.63
1:D:35:LEU:CD1	1:D:87:ILE:HD13	2.29	0.63
1:B:343:THR:HB	1:B:352:MSE:HE1	1.81	0.63
1:C:441:ARG:HH12	1:C:567:SER:HB3	1.64	0.63
1:C:454:GLU:OE2	1:C:481:ALA:HB1	1.99	0.63
1:D:126:SER:OG	1:D:148:CYS:HB3	1.99	0.63
1:D:486:LEU:N	1:D:486:LEU:HD12	2.13	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:592:ILE:HG21	1:D:604:LEU:HD11	1.80	0.62
1:A:105:HIS:HA	1:A:594:GLN:HE22	1.63	0.62
1:A:153:GLY:O	1:A:156:THR:HB	1.98	0.62
1:B:421:ALA:HB1	1:B:475:ARG:HE	1.65	0.62
1:A:484:VAL:HG12	1:A:485:GLU:N	2.14	0.62
1:B:343:THR:CB	1:B:352:MSE:HE1	2.29	0.62
1:A:596:THR:CG2	1:A:599:GLU:H	2.06	0.62
1:C:482:VAL:CG2	1:C:484:VAL:HG13	2.30	0.62
1:A:595:GLY:HA3	1:A:600:MSE:CE	2.30	0.62
1:B:127:ILE:O	1:B:131:ILE:HG23	2.00	0.62
1:D:35:LEU:HD11	1:D:87:ILE:HG21	1.82	0.62
1:C:402:GLN:NE2	1:D:159:MSE:CE	2.63	0.61
1:C:153:GLY:O	1:C:156:THR:HB	2.00	0.61
1:D:150:ILE:HD12	1:D:150:ILE:O	2.01	0.61
1:C:16:SER:HB3	1:C:19:GLU:OE1	2.01	0.61
1:C:436:ASP:OD1	1:C:475:ARG:HD2	2.01	0.61
1:C:430:THR:OG1	1:C:431:HIS:HD2	1.84	0.60
1:C:607:ASP:O	1:C:611:MSE:HG3	2.01	0.60
1:B:429:GLN:H	1:B:429:GLN:NE2	1.98	0.60
1:C:437:LEU:HB2	1:C:559:ASN:CG	2.22	0.60
1:D:150:ILE:HD12	1:D:178:LEU:HA	1.83	0.60
1:A:596:THR:HG22	1:A:599:GLU:N	2.04	0.60
1:B:74:LEU:HD22	1:B:147:VAL:HG13	1.83	0.60
1:B:170:ILE:HG13	1:B:172:PRO:HD3	1.83	0.60
1:D:405:HIS:HA	1:D:409:ILE:HD12	1.83	0.60
1:B:105:HIS:HB2	1:B:112:GLU:OE1	2.02	0.60
1:C:291:ALA:C	1:C:478:ARG:HH12	2.06	0.60
1:A:595:GLY:HA3	1:A:600:MSE:HE3	1.84	0.60
1:B:79:GLY:HA3	1:B:108:PRO:HD2	1.82	0.60
1:C:17:THR:HG22	1:C:18:GLN:NE2	2.16	0.60
1:C:505:LYS:HG3	1:C:506:LEU:HD13	1.84	0.60
1:C:570:ASN:HD21	1:C:584:ASN:ND2	1.95	0.60
1:A:459:GLN:HE22	1:A:490:GLU:N	1.94	0.59
1:C:170:ILE:HG13	1:C:172:PRO:HD3	1.84	0.59
1:D:429:GLN:HG3	1:D:592:ILE:O	2.02	0.59
1:B:454:GLU:OE1	1:B:481:ALA:HB1	2.02	0.59
1:A:423:ILE:HD12	1:A:425:GLY:H	1.67	0.59
1:D:423:ILE:O	1:D:423:ILE:HG13	2.02	0.59
1:B:504:GLU:HG2	1:B:526:ASN:ND2	2.18	0.58
1:D:36:ARG:HH21	1:D:57:VAL:HB	1.68	0.58
1:C:454:GLU:CD	1:C:481:ALA:HB1	2.24	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:456:GLU:O	1:C:460:MSE:HG3	2.04	0.58
1:D:121:GLY:HA3	1:D:430:THR:CB	2.33	0.58
1:B:105:HIS:HA	1:B:594:GLN:NE2	2.19	0.58
1:B:494:ILE:HD12	1:B:494:ILE:N	2.19	0.58
1:A:339:LEU:O	1:A:340:MSE:HE2	2.04	0.58
1:B:494:ILE:HD12	1:B:494:ILE:H	1.69	0.58
1:B:484:VAL:HG12	1:B:485:GLU:N	2.19	0.58
1:C:122:HIS:H	1:D:405:HIS:CE1	2.21	0.58
1:D:596:THR:HB	1:D:599:GLU:CG	2.34	0.58
1:A:423:ILE:HD12	1:A:425:GLY:N	2.19	0.57
1:B:131:ILE:HD11	1:B:166:HIS:ND1	2.19	0.57
1:C:166:HIS:ND1	1:D:372:HIS:HE1	2.02	0.57
1:B:368:ILE:HD12	1:B:368:ILE:H	1.67	0.57
1:C:269:MSE:HE1	1:C:278:LEU:HB2	1.86	0.57
1:A:405:HIS:HE1	1:B:430:THR:HB	1.68	0.57
1:C:402:GLN:HE21	1:D:159:MSE:CE	2.14	0.57
1:B:58:GLU:HG3	1:B:259:VAL:HG22	1.86	0.57
1:C:333:ALA:O	1:C:362:ARG:NH2	2.38	0.57
1:D:84:PRO:HG2	6:D:4010:HOH:O	2.03	0.57
1:D:345:ALA:HB2	1:D:367:ALA:HA	1.86	0.57
1:B:267:LYS:HB2	1:B:267:LYS:HZ3	1.70	0.57
1:A:64:HIS:HE1	1:A:85:HIS:ND1	2.03	0.56
1:C:17:THR:HG23	1:C:21:ARG:HH12	1.69	0.56
1:D:256:GLY:HA3	1:D:280:ILE:HG23	1.86	0.56
1:A:547:ALA:HB1	1:A:580:VAL:HG21	1.86	0.56
1:A:39:LEU:HD22	1:A:50:PHE:HB2	1.87	0.56
1:A:366:VAL:O	1:A:367:ALA:HB3	2.06	0.56
1:B:26:GLU:CD	1:B:26:GLU:H	2.09	0.56
1:C:441:ARG:NH2	1:C:571:GLU:OE1	2.38	0.56
1:A:372:HIS:HE1	1:B:166:HIS:ND1	2.03	0.56
1:B:437:LEU:HD21	1:B:475:ARG:HD2	1.88	0.56
1:D:84:PRO:HA	1:D:87:ILE:HG22	1.88	0.56
1:A:411:LYS:HE2	1:A:445:GLU:CD	2.26	0.56
1:D:451:PRO:HD2	1:D:475:ARG:O	2.06	0.56
1:B:108:PRO:HG2	1:B:120:VAL:HG22	1.88	0.56
1:C:366:VAL:O	1:C:366:VAL:CG1	2.54	0.56
1:D:131:ILE:HG13	1:D:132:GLY:N	2.20	0.56
1:A:372:HIS:HD2	1:B:128:SER:OG	1.89	0.55
1:B:392:TYR:CE2	1:B:420:ARG:HG3	2.42	0.55
1:C:269:MSE:HE1	1:C:278:LEU:CD2	2.29	0.55
1:D:36:ARG:NH2	1:D:58:GLU:OE1	2.39	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:78:VAL:HB	1:D:80:HIS:ND1	2.21	0.55
1:A:75:ILE:HD11	1:A:133:ILE:HD12	1.88	0.55
1:C:495:GLY:O	1:C:496:LYS:HD2	2.06	0.55
4:A:3001:TPP:C2	4:A:3001:TPP:HN42	2.19	0.55
1:B:429:GLN:NE2	1:B:593:PRO:HA	2.21	0.55
4:A:3001:TPP:HN42	4:A:3001:TPP:H2	1.72	0.55
1:B:507:ALA:HB3	1:B:553:LEU:HD23	1.88	0.55
1:A:156:THR:HG21	1:A:368:ILE:H	1.71	0.55
1:A:437:LEU:HB2	1:A:559:ASN:CG	2.27	0.55
1:A:454:GLU:OE2	1:A:481:ALA:HB1	2.05	0.55
1:C:410:GLN:HE22	1:D:118:LEU:CD1	2.20	0.55
1:D:131:ILE:HG22	1:D:174:MSE:SE	2.56	0.55
1:D:155:ILE:HG13	1:D:178:LEU:HD13	1.89	0.55
1:D:127:ILE:O	1:D:131:ILE:HG23	2.07	0.54
1:D:428:GLY:O	1:D:432:GLN:HG2	2.07	0.54
1:D:118:LEU:HD21	1:D:125:THR:HG22	1.88	0.54
1:B:281:MSE:HE3	1:B:281:MSE:HA	1.89	0.54
1:B:437:LEU:HD22	1:B:535:VAL:HG21	1.89	0.54
1:B:451:PRO:HD2	1:B:475:ARG:O	2.07	0.54
1:C:128:SER:OG	1:D:372:HIS:HD2	1.91	0.54
1:C:454:GLU:O	1:C:458:ARG:HG3	2.07	0.54
4:C:3002:TPP:HN42	4:C:3002:TPP:C2	2.20	0.54
1:D:339:LEU:HD23	1:D:339:LEU:C	2.28	0.54
1:A:577:ARG:HH11	1:A:577:ARG:HG2	1.72	0.54
1:D:9:PRO:HB2	1:D:34:GLU:OE1	2.06	0.54
1:A:145:ARG:HD2	6:A:3183:HOH:O	2.07	0.54
1:D:11:LEU:O	1:D:11:LEU:HD23	2.08	0.54
1:D:256:GLY:CA	1:D:280:ILE:HG23	2.38	0.54
1:C:501:ARG:NH2	1:C:526:ASN:HA	2.22	0.54
1:C:592:ILE:HD12	1:C:592:ILE:N	2.22	0.54
1:A:542:LEU:HD13	1:A:542:LEU:O	2.07	0.53
1:D:386:LYS:NZ	1:D:468:ASN:HD21	2.06	0.53
1:B:432:GLN:HE21	1:B:432:GLN:HA	1.73	0.53
1:D:89:THR:HG23	1:D:115:TYR:CD1	2.43	0.53
1:B:508:ILE:HA	1:B:554:VAL:HG13	1.90	0.53
1:D:241:THR:HG23	1:D:244:GLU:H	1.74	0.53
1:C:441:ARG:NH1	1:C:567:SER:HB3	2.24	0.53
1:D:58:GLU:HG2	1:D:257:HIS:O	2.08	0.53
1:D:159:MSE:HE3	1:D:398:ARG:CZ	2.39	0.53
1:A:47:SER:O	1:A:49:HIS:N	2.35	0.53
1:A:411:LYS:HD3	1:A:445:GLU:HG3	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:366:VAL:O	1:C:367:ALA:HB3	2.08	0.53
1:D:121:GLY:HA3	1:D:430:THR:HB	1.91	0.53
1:A:154:ALA:HA	1:A:368:ILE:HD12	1.90	0.53
1:B:410:GLN:HB2	1:B:412:LEU:HG	1.91	0.53
1:A:239:PRO:HG2	1:A:240:GLY:H	1.74	0.52
1:A:430:THR:OG1	1:A:431:HIS:HD2	1.91	0.52
1:B:347:ARG:HA	1:B:352:MSE:HE3	1.90	0.52
1:D:320:SER:HA	1:D:480:ASN:HA	1.91	0.52
1:D:427:ASP:HB3	1:D:431:HIS:HB2	1.91	0.52
1:C:576:HIS:O	1:C:578:LYS:HG2	2.10	0.52
1:A:250:TYR:C	1:A:251:ILE:HD12	2.30	0.52
1:B:171:ARG:HD2	6:B:4009:HOH:O	2.08	0.52
1:C:366:VAL:HG12	1:C:366:VAL:O	2.09	0.52
1:C:447:VAL:HG22	1:C:472:SER:HA	1.91	0.52
1:D:66:VAL:HG21	1:D:266:LEU:HB3	1.90	0.52
1:B:366:VAL:O	1:B:367:ALA:HB3	2.10	0.52
1:A:166:HIS:ND1	1:B:372:HIS:CE1	2.76	0.52
1:A:375:THR:HG21	1:B:125:THR:HG23	1.92	0.52
1:A:574:MSE:HE1	1:A:579:PRO:HA	1.92	0.52
1:A:347:ARG:HB2	1:A:363:TYR:OH	2.09	0.51
1:B:423:ILE:HG23	1:B:592:ILE:HD11	1.91	0.51
1:D:486:LEU:HD11	6:D:4126:HOH:O	2.11	0.51
1:C:411:LYS:HE2	1:C:445:GLU:OE1	2.10	0.51
1:B:592:ILE:O	1:B:592:ILE:HG13	2.10	0.51
1:B:324:ILE:HG13	1:B:325:PHE:N	2.24	0.51
1:C:17:THR:CG2	1:C:21:ARG:HH12	2.22	0.51
1:B:424:VAL:H	1:B:432:GLN:HE22	1.59	0.51
1:C:441:ARG:NH1	1:C:564:GLY:O	2.42	0.51
1:C:459:GLN:NE2	1:C:490:GLU:H	2.07	0.51
1:C:547:ALA:HB1	1:C:580:VAL:HG21	1.91	0.51
1:C:253:PRO:HA	1:C:279:HIS:O	2.09	0.51
1:C:375:THR:HG21	1:D:125:THR:HG23	1.93	0.51
1:C:577:ARG:HG2	1:D:618:TRP:CE2	2.45	0.51
1:A:606:LEU:C	1:A:611:MSE:HE3	2.31	0.51
1:D:66:VAL:HG23	1:D:67:TYR:CD2	2.46	0.51
1:C:455:ASN:O	1:C:459:GLN:HG2	2.11	0.51
1:A:606:LEU:O	1:A:611:MSE:HE3	2.11	0.50
1:B:150:ILE:CG1	1:B:154:ALA:HB3	2.41	0.50
1:C:487:THR:HB	1:C:488:PRO:HD2	1.93	0.50
1:D:77:ASP:OD2	1:D:150:ILE:HG22	2.12	0.50
1:D:421:ALA:HB1	1:D:475:ARG:CZ	2.41	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:260:LEU:O	1:A:264:THR:HG22	2.11	0.50
1:A:253:PRO:HB2	1:A:281:MSE:HE2	1.93	0.50
1:D:241:THR:HG22	1:D:244:GLU:HB2	1.92	0.50
1:A:161:PHE:HB2	1:B:161:PHE:CD2	2.47	0.50
1:B:394:THR:HG21	1:B:431:HIS:HA	1.94	0.50
1:C:392:TYR:HB2	1:C:395:PHE:CD2	2.47	0.50
1:C:405:HIS:HA	1:C:409:ILE:HD12	1.94	0.50
1:C:459:GLN:HE22	1:C:490:GLU:N	2.07	0.50
1:D:570:ASN:HD21	1:D:584:ASN:ND2	2.03	0.50
1:A:436:ASP:OD2	1:A:475:ARG:HD2	2.12	0.50
1:B:539:ASP:O	1:B:543:ILE:HG13	2.11	0.50
1:A:339:LEU:HD21	1:A:388:ILE:HD12	1.94	0.50
1:A:596:THR:HG21	6:A:3048:HOH:O	2.11	0.50
1:B:421:ALA:HB1	1:B:475:ARG:NE	2.25	0.50
1:A:399:ALA:HA	1:A:402:GLN:NE2	2.26	0.49
1:A:596:THR:HG23	6:A:3185:HOH:O	2.12	0.49
1:C:251:ILE:O	1:C:252:GLY:O	2.30	0.49
1:D:348:GLU:H	1:D:348:GLU:CD	2.16	0.49
1:A:487:THR:HB	1:A:488:PRO:HD2	1.94	0.49
1:B:437:LEU:HD21	1:B:475:ARG:CD	2.41	0.49
1:D:20:LEU:HD12	1:D:88:LEU:HD22	1.94	0.49
1:C:430:THR:OG1	1:C:431:HIS:CD2	2.65	0.49
1:B:441:ARG:NH1	1:B:563:GLY:O	2.46	0.49
1:C:366:VAL:CG1	1:C:369:ALA:HB3	2.42	0.49
1:A:67:TYR:CE2	1:A:270:ARG:HD2	2.47	0.49
1:A:84:PRO:HG2	6:A:3002:HOH:O	2.12	0.49
1:A:250:TYR:O	1:A:251:ILE:HD12	2.11	0.49
1:B:454:GLU:CD	1:B:481:ALA:HB1	2.32	0.49
1:B:407:VAL:HG12	1:B:471:PRO:HB3	1.95	0.49
1:B:596:THR:HG22	1:B:599:GLU:CD	2.32	0.49
1:D:75:ILE:N	1:D:75:ILE:HD12	2.27	0.49
1:D:429:GLN:HB3	1:D:591:PHE:HB3	1.95	0.49
1:D:323:LYS:HE3	1:D:327:ASP:OD2	2.13	0.49
1:D:53:GLY:HA2	6:D:4037:HOH:O	2.13	0.48
1:A:423:ILE:HG23	1:A:558:GLU:OE1	2.13	0.48
1:B:505:LYS:O	1:B:550:HIS:HB3	2.12	0.48
1:C:67:TYR:CD1	1:C:270:ARG:HD2	2.48	0.48
1:D:77:ASP:HB2	1:D:150:ILE:HG22	1.95	0.48
1:D:159:MSE:HE3	1:D:398:ARG:NH1	2.28	0.48
1:B:54:LEU:C	1:B:54:LEU:HD12	2.34	0.48
1:C:118:LEU:CD2	1:D:410:GLN:HE22	2.26	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:441:ARG:NH2	1:B:571:GLU:CD	2.66	0.48
1:B:542:LEU:O	1:B:546:MSE:HG2	2.13	0.48
1:C:437:LEU:HD11	1:C:475:ARG:HD3	1.95	0.48
1:B:77:ASP:O	1:B:78:VAL:HB	2.13	0.48
1:B:429:GLN:H	1:B:429:GLN:HE21	1.59	0.48
1:B:576:HIS:O	1:B:578:LYS:HD2	2.13	0.48
1:D:121:GLY:HA3	1:D:430:THR:OG1	2.14	0.48
1:D:535:VAL:O	1:D:538:LEU:HD13	2.14	0.48
1:D:359:PHE:HB3	1:D:362:ARG:HG3	1.94	0.48
1:D:568:GLY:O	1:D:572:VAL:HG23	2.14	0.48
1:A:582:VAL:H	1:B:574:MSE:HE2	1.79	0.48
1:C:156:THR:HG21	1:C:368:ILE:N	2.27	0.48
1:D:159:MSE:CE	1:D:398:ARG:CZ	2.92	0.48
1:D:160:ALA:O	1:D:164:MSE:HG3	2.13	0.48
1:A:484:VAL:CG1	1:A:485:GLU:N	2.77	0.48
1:B:244:GLU:HA	1:B:248:PHE:O	2.14	0.48
1:D:83:TYR:N	1:D:84:PRO:HD2	2.29	0.48
1:D:259:VAL:HG13	1:D:260:LEU:N	2.29	0.48
1:D:366:VAL:O	1:D:367:ALA:HB3	2.13	0.48
1:A:437:LEU:H	1:A:559:ASN:ND2	2.12	0.47
1:A:454:GLU:CD	1:A:481:ALA:HB1	2.34	0.47
1:B:143:ASN:ND2	1:B:145:ARG:HH12	2.12	0.47
1:A:39:LEU:CD2	1:A:50:PHE:HB2	2.44	0.47
1:B:475:ARG:O	1:B:475:ARG:HG3	2.14	0.47
1:B:494:ILE:H	1:B:494:ILE:CD1	2.26	0.47
1:C:249:ASN:HD22	1:C:276:GLN:NE2	1.91	0.47
1:D:89:THR:O	1:D:89:THR:HG22	2.12	0.47
1:B:83:TYR:N	1:B:84:PRO:HD2	2.29	0.47
1:D:423:ILE:HD11	1:D:597:GLN:CA	2.29	0.47
1:A:259:VAL:HG13	1:A:260:LEU:N	2.29	0.47
4:C:3002:TPP:HN42	4:C:3002:TPP:H2	1.80	0.47
1:A:546:MSE:HE2	1:A:546:MSE:HA	1.97	0.47
1:B:324:ILE:HD11	1:B:457:CYS:SG	2.54	0.47
1:C:118:LEU:HD13	1:C:119:SER:N	2.29	0.47
1:C:386:LYS:NZ	1:C:465:TYR:O	2.47	0.47
1:C:436:ASP:OD1	1:C:475:ARG:CD	2.62	0.47
1:D:64:HIS:HE1	1:D:85:HIS:ND1	2.13	0.47
1:D:164:MSE:HE1	1:D:243:PHE:HD1	1.78	0.47
1:D:437:LEU:HB2	1:D:559:ASN:CG	2.35	0.47
1:B:350:SER:CB	1:B:352:MSE:HE2	2.26	0.47
1:A:118:LEU:HD23	1:B:410:GLN:OE1	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:158:GLY:O	1:B:162:GLU:HG3	2.15	0.47
1:C:399:ALA:HA	1:C:402:GLN:OE1	2.15	0.47
1:C:250:TYR:CE1	1:C:252:GLY:HA2	2.50	0.47
1:C:339:LEU:C	1:C:339:LEU:HD23	2.35	0.47
1:C:589:ASP:OD2	1:D:536:LYS:NZ	2.48	0.47
1:D:17:THR:CG2	1:D:21:ARG:HH22	2.28	0.47
1:D:81:GLN:O	1:D:81:GLN:HG2	2.15	0.47
1:C:398:ARG:HA	1:D:401:ASP:HB2	1.97	0.46
1:D:262:LEU:O	1:D:266:LEU:HD13	2.15	0.46
1:A:182:GLU:OE2	1:A:182:GLU:HA	2.15	0.46
1:A:542:LEU:HD13	1:A:546:MSE:HG2	1.97	0.46
1:C:587:LEU:HA	1:C:588:PRO:HD3	1.76	0.46
1:B:16:SER:OG	1:B:19:GLU:HG3	2.16	0.46
1:C:161:PHE:CZ	1:D:165:ASN:ND2	2.83	0.46
1:D:405:HIS:HD2	1:D:406:ASP:OD1	1.97	0.46
1:A:98:ILE:O	1:A:99:ARG:HB2	2.16	0.46
1:B:441:ARG:NH2	1:B:571:GLU:OE2	2.44	0.46
1:C:13:LEU:O	1:C:19:GLU:HG2	2.16	0.46
1:D:423:ILE:CD1	1:D:600:MSE:HB2	2.42	0.46
1:A:3:PHE:CE1	1:A:92:ARG:HD2	2.51	0.46
1:A:180:ASP:O	1:A:281:MSE:HA	2.15	0.46
1:A:579:PRO:HB2	1:B:579:PRO:O	2.16	0.46
1:D:20:LEU:C	1:D:20:LEU:HD23	2.36	0.46
1:D:64:HIS:HD2	1:D:69:THR:OG1	1.98	0.46
1:D:386:LYS:HZ3	1:D:468:ASN:HD21	1.62	0.46
1:D:437:LEU:HD12	1:D:559:ASN:HB2	1.96	0.46
1:B:74:LEU:HD12	1:B:76:TRP:NE1	2.31	0.46
1:B:265:THR:HG22	1:B:269:MSE:CE	2.33	0.46
1:B:596:THR:CG2	1:B:599:GLU:HB2	2.43	0.46
1:C:341:ALA:HB1	1:C:352:MSE:HE3	1.98	0.46
1:C:161:PHE:HZ	1:D:165:ASN:HD21	1.61	0.46
1:C:498:ILE:HG13	1:C:498:ILE:O	2.15	0.46
1:D:164:MSE:HE1	1:D:243:PHE:CD1	2.51	0.46
1:A:154:ALA:C	1:A:156:THR:H	2.17	0.46
1:D:374:VAL:HG11	1:D:399:ALA:HB1	1.97	0.46
1:A:421:ALA:HB1	1:A:475:ARG:CZ	2.46	0.46
1:C:372:HIS:CE1	1:D:166:HIS:ND1	2.77	0.46
1:B:181:ASN:HA	1:B:282:THR:O	2.16	0.45
1:C:340:MSE:HE2	1:C:362:ARG:HD2	1.97	0.45
1:D:35:LEU:HD11	1:D:87:ILE:HD13	1.97	0.45
1:D:486:LEU:N	1:D:486:LEU:CD1	2.78	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:77:ASP:O	1:A:78:VAL:HB	2.17	0.45
1:C:3:PHE:CE1	1:C:92:ARG:HD2	2.52	0.45
1:C:132:GLY:HA2	1:D:376:PHE:CE1	2.51	0.45
1:B:321:TYR:HA	1:B:324:ILE:HG12	1.98	0.45
1:C:83:TYR:HB2	1:C:84:PRO:HD3	1.97	0.45
1:D:423:ILE:HG23	1:D:558:GLU:OE1	2.17	0.45
1:D:555:THR:OG1	1:D:584:ASN:HA	2.17	0.45
1:C:455:ASN:HD21	1:C:487:THR:H	1.62	0.45
1:C:556:VAL:HG13	1:C:611:MSE:CE	2.44	0.45
1:D:336:ASP:O	1:D:362:ARG:NH2	2.40	0.45
1:D:606:LEU:O	1:D:611:MSE:HE3	2.16	0.45
1:B:105:HIS:HA	1:B:594:GLN:HE21	1.81	0.45
1:C:340:MSE:CE	1:C:362:ARG:HD2	2.47	0.45
1:D:178:LEU:HD23	1:D:279:HIS:CD2	2.52	0.45
1:D:392:TYR:CD2	1:D:420:ARG:HG3	2.51	0.45
1:A:423:ILE:O	1:A:423:ILE:HG13	2.17	0.45
1:B:451:PRO:HG3	1:B:460:MSE:SE	2.67	0.45
1:A:156:THR:HG21	1:A:368:ILE:N	2.32	0.45
1:D:74:LEU:HD22	1:D:76:TRP:NE1	2.32	0.45
1:A:64:HIS:HD2	1:A:69:THR:OG1	1.99	0.45
1:A:153:GLY:O	1:A:368:ILE:HD12	2.16	0.45
1:A:485:GLU:OE1	1:A:485:GLU:HA	2.17	0.45
1:A:515:MSE:HB3	1:A:516:PRO:HD3	1.99	0.45
1:B:368:ILE:N	1:B:368:ILE:CD1	2.80	0.45
1:D:541:ALA:O	1:D:545:GLU:HG3	2.17	0.45
1:A:48:GLY:HA3	6:A:3067:HOH:O	2.16	0.44
1:C:401:ASP:OD1	1:D:122:HIS:CE1	2.70	0.44
1:D:70:PRO:HD3	1:D:115:TYR:CZ	2.52	0.44
1:D:404:LEU:CD1	1:D:443:ILE:HG23	2.47	0.44
1:B:484:VAL:HG12	1:B:485:GLU:H	1.81	0.44
1:D:89:THR:O	1:D:89:THR:CG2	2.65	0.44
1:B:118:LEU:HD13	1:B:119:SER:O	2.18	0.44
1:C:456:GLU:OE1	1:C:533:ARG:HD3	2.17	0.44
1:D:333:ALA:O	1:D:362:ARG:NH2	2.50	0.44
1:A:339:LEU:CD2	1:A:388:ILE:HD12	2.47	0.44
1:B:320:SER:O	1:B:323:LYS:HB3	2.16	0.44
1:A:131:ILE:HD11	1:A:167:ALA:HB2	1.99	0.44
1:A:354:GLU:CG	1:A:358:LYS:HE2	2.48	0.44
1:A:580:VAL:O	1:A:582:VAL:HG23	2.18	0.44
1:B:393:SER:HB3	1:B:433:GLY:HA3	1.99	0.44
1:C:72:ASP:OD2	1:C:270:ARG:NH1	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:84:PRO:O	1:D:87:ILE:HG22	2.17	0.44
1:B:30:LYS:O	1:B:34:GLU:HG3	2.17	0.44
1:B:596:THR:HG22	1:B:599:GLU:CB	2.45	0.44
1:C:320:SER:HA	1:C:480:ASN:HA	1.99	0.44
1:C:577:ARG:HG3	1:C:577:ARG:HH11	1.82	0.44
1:A:413:PRO:HA	1:A:470:GLY:O	2.18	0.44
1:A:592:ILE:HA	1:A:593:PRO:HD3	1.85	0.44
1:B:74:LEU:HD13	1:B:75:ILE:N	2.32	0.44
1:B:429:GLN:HG3	1:B:592:ILE:O	2.17	0.44
1:C:579:PRO:HG3	1:D:581:PRO:HD3	1.99	0.44
1:D:75:ILE:HG23	1:D:118:LEU:HB3	2.00	0.44
1:D:175:LEU:HD11	1:D:278:LEU:HB2	2.00	0.44
1:B:407:VAL:CG1	1:B:471:PRO:HB3	2.48	0.43
1:B:528:THR:CG2	1:B:550:HIS:NE2	2.80	0.43
1:D:339:LEU:HD23	1:D:340:MSE:N	2.33	0.43
1:A:391:ILE:O	1:A:418:ILE:HA	2.18	0.43
1:A:404:LEU:O	1:A:408:ALA:HB3	2.17	0.43
1:B:491:LYS:HE3	6:B:4039:HOH:O	2.17	0.43
1:B:153:GLY:O	1:B:368:ILE:HD13	2.18	0.43
1:B:348:GLU:HG2	1:B:353:VAL:CG2	2.49	0.43
1:B:437:LEU:CD1	1:B:475:ARG:HH11	2.32	0.43
1:D:77:ASP:O	1:D:120:VAL:HB	2.18	0.43
1:D:170:ILE:HG13	1:D:172:PRO:HD3	1.99	0.43
1:D:441:ARG:HH22	1:D:571:GLU:CD	2.22	0.43
1:D:454:GLU:OE2	1:D:483:GLY:N	2.48	0.43
1:C:341:ALA:HB3	1:C:355:PHE:CE2	2.53	0.43
1:C:495:GLY:C	1:C:496:LYS:HD2	2.39	0.43
1:C:515:MSE:HB3	1:C:516:PRO:HD3	2.00	0.43
1:D:587:LEU:HA	1:D:588:PRO:HD3	1.81	0.43
1:B:392:TYR:HB2	1:B:395:PHE:CD2	2.54	0.43
1:D:147:VAL:HA	1:D:175:LEU:O	2.18	0.43
1:A:47:SER:OG	1:A:99:ARG:HG3	2.18	0.43
1:B:368:ILE:HG22	1:B:368:ILE:O	2.19	0.43
1:D:120:VAL:HG23	1:D:120:VAL:O	2.19	0.43
1:A:79:GLY:HA3	1:A:108:PRO:HD2	2.01	0.43
1:C:242:LEU:C	1:C:242:LEU:HD23	2.39	0.43
1:D:66:VAL:CG1	1:D:263:ILE:HG23	2.48	0.43
1:A:64:HIS:CE1	1:A:85:HIS:ND1	2.85	0.43
1:A:98:ILE:O	1:A:99:ARG:CB	2.66	0.43
1:A:339:LEU:HD13	1:A:340:MSE:N	2.33	0.43
1:B:36:ARG:O	1:B:40:LEU:HG	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:74:LEU:HD12	1:B:76:TRP:CD1	2.54	0.43
1:B:461:LEU:HD13	1:B:474:VAL:HG11	2.00	0.43
1:B:514:LEU:HB2	6:B:4016:HOH:O	2.18	0.43
1:C:250:TYR:HE1	1:C:252:GLY:HA2	1.84	0.43
1:D:424:VAL:HG22	1:D:432:GLN:OE1	2.18	0.43
1:A:382:ILE:CD1	1:B:118:LEU:HD23	2.48	0.42
1:B:429:GLN:HE21	1:B:429:GLN:N	2.16	0.42
1:C:151:GLY:HA3	4:C:3002:TPP:O2A	2.19	0.42
1:D:256:GLY:HA3	1:D:280:ILE:CG2	2.48	0.42
1:A:78:VAL:HG22	1:A:123:SER:HB3	2.00	0.42
1:B:592:ILE:HA	1:B:593:PRO:HD3	1.80	0.42
1:D:17:THR:HG23	1:D:21:ARG:CZ	2.49	0.42
1:A:587:LEU:HA	1:A:588:PRO:HD3	1.81	0.42
1:B:73:GLN:NE2	1:B:117:VAL:HG13	2.33	0.42
1:B:342:ILE:HD11	1:B:380:LEU:HD12	2.00	0.42
1:B:394:THR:O	1:B:397:GLN:HB2	2.19	0.42
1:B:515:MSE:SE	1:B:529:LEU:HD21	2.69	0.42
1:B:600:MSE:O	1:B:604:LEU:HG	2.19	0.42
1:C:505:LYS:HE2	1:C:506:LEU:HD13	2.02	0.42
1:D:76:TRP:O	1:D:120:VAL:HG21	2.20	0.42
1:D:396:LEU:HD11	1:D:403:VAL:HG21	2.01	0.42
1:B:339:LEU:HD23	1:B:339:LEU:C	2.39	0.42
1:C:47:SER:OG	1:C:99:ARG:HG3	2.20	0.42
1:D:60:THR:HG21	1:D:85:HIS:HA	2.01	0.42
1:A:532:MSE:O	1:A:534:PHE:N	2.49	0.42
1:A:577:ARG:HG2	1:A:577:ARG:NH1	2.33	0.42
1:B:419:ASP:OD2	1:B:420:ARG:N	2.50	0.42
1:B:421:ALA:HB1	1:B:475:ARG:CZ	2.49	0.42
1:B:553:LEU:HD12	1:B:573:LEU:HD11	2.02	0.42
1:D:358:LYS:C	1:D:360:PRO:HD3	2.40	0.42
1:B:318:LEU:HD12	1:B:318:LEU:HA	1.91	0.42
1:C:421:ALA:HB1	1:C:475:ARG:CZ	2.50	0.42
1:D:35:LEU:HD12	1:D:87:ILE:HD13	2.01	0.42
1:D:131:ILE:O	1:D:135:VAL:HG23	2.20	0.42
1:A:339:LEU:HD13	1:A:339:LEU:C	2.40	0.42
1:A:437:LEU:HD21	1:A:475:ARG:HD3	2.02	0.42
1:A:484:VAL:HG12	1:A:485:GLU:H	1.85	0.42
1:C:456:GLU:OE1	1:C:533:ARG:CD	2.67	0.42
1:D:269:MSE:SE	1:D:278:LEU:HG	2.69	0.42
1:D:370:GLU:O	1:D:374:VAL:HG12	2.20	0.42
1:B:58:GLU:HG2	1:B:257:HIS:O	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:3:PHE:C	1:C:3:PHE:CD2	2.93	0.42
1:C:162:GLU:CD	1:D:369:ALA:HB1	2.40	0.42
1:D:612:GLU:O	1:D:616:LYS:HD3	2.20	0.42
1:B:427:ASP:HB3	1:B:431:HIS:HB2	2.01	0.42
1:A:67:TYR:CD2	1:A:270:ARG:HD2	2.55	0.41
1:B:441:ARG:NH2	1:B:571:GLU:OE1	2.53	0.41
1:C:86:LYS:O	1:C:91:ARG:HB2	2.20	0.41
1:C:99:ARG:HD3	6:C:3032:HOH:O	2.20	0.41
1:D:278:LEU:HD13	1:D:280:ILE:HG12	2.01	0.41
1:A:86:LYS:O	1:A:91:ARG:HB2	2.20	0.41
1:A:254:VAL:CG1	1:A:255:ASP:N	2.84	0.41
1:D:131:ILE:HD12	1:D:170:ILE:HD11	2.02	0.41
1:D:345:ALA:O	1:D:346:MSE:HG2	2.20	0.41
1:D:596:THR:HG22	1:D:598:GLU:N	2.35	0.41
1:B:8:TYR:N	1:B:9:PRO:CD	2.83	0.41
1:D:412:LEU:HA	1:D:413:PRO:HD3	1.79	0.41
1:D:592:ILE:HA	1:D:593:PRO:HD3	1.74	0.41
1:A:162:GLU:CD	1:B:369:ALA:HB1	2.40	0.41
1:A:377:ALA:O	1:A:387:PRO:HG3	2.20	0.41
1:B:35:LEU:O	1:B:39:LEU:HG	2.20	0.41
1:B:77:ASP:O	1:B:78:VAL:CB	2.68	0.41
1:B:78:VAL:HG22	1:B:123:SER:HB3	2.03	0.41
1:B:393:SER:OG	1:B:436:ASP:HB2	2.19	0.41
1:A:504:GLU:O	1:A:505:LYS:HB3	2.20	0.41
1:B:354:GLU:HB2	6:B:4098:HOH:O	2.20	0.41
1:C:241:THR:O	1:C:245:GLU:HG2	2.20	0.41
1:B:180:ASP:O	1:B:281:MSE:HE3	2.20	0.41
1:D:28:LEU:HB2	1:D:29:PRO:HD3	2.01	0.41
1:A:320:SER:HA	1:A:480:ASN:HA	2.02	0.41
1:A:405:HIS:HA	1:A:409:ILE:HD12	2.03	0.41
1:C:372:HIS:HD2	1:D:128:SER:OG	2.02	0.41
6:C:3116:HOH:O	1:D:371:GLN:HG3	2.20	0.41
1:D:84:PRO:HA	1:D:87:ILE:CG2	2.49	0.41
1:D:374:VAL:HG11	1:D:402:GLN:HB2	2.02	0.41
1:B:343:THR:OG1	1:B:352:MSE:HE1	2.20	0.41
1:C:17:THR:CG2	1:C:21:ARG:NH1	2.79	0.41
1:C:101:LYS:HE3	1:C:603:GLU:HG3	2.01	0.41
1:D:400:TYR:CE2	1:D:443:ILE:HD11	2.55	0.41
1:D:432:GLN:HB2	6:D:4097:HOH:O	2.20	0.41
1:A:82:ALA:HA	6:A:3002:HOH:O	2.20	0.41
1:A:436:ASP:OD2	1:A:475:ARG:CD	2.68	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:449:MSE:HE3	1:A:474:VAL:HG22	2.03	0.41
1:A:455:ASN:OD1	1:A:486:LEU:HA	2.21	0.41
1:B:402:GLN:NE2	1:B:402:GLN:H	2.19	0.41
1:B:528:THR:HG21	1:B:550:HIS:NE2	2.36	0.41
1:C:156:THR:CG2	1:C:368:ILE:H	2.28	0.41
1:C:570:ASN:O	1:C:574:MSE:HG2	2.21	0.41
1:D:9:PRO:HB2	1:D:10:THR:H	1.71	0.41
1:D:391:ILE:O	1:D:418:ILE:HA	2.21	0.41
1:D:392:TYR:CE2	1:D:420:ARG:HG3	2.56	0.41
1:B:68:ASN:O	1:B:71:PHE:HB3	2.21	0.41
1:B:74:LEU:CD1	1:B:76:TRP:NE1	2.84	0.41
1:C:450:THR:HA	1:C:451:PRO:HD2	1.88	0.41
1:A:19:GLU:O	1:A:22:LEU:HB2	2.21	0.40
1:A:415:LEU:HD23	1:A:416:PHE:N	2.36	0.40
1:A:542:LEU:HD13	1:A:542:LEU:C	2.42	0.40
1:B:404:LEU:C	1:B:404:LEU:HD23	2.41	0.40
1:B:507:ALA:HA	1:B:528:THR:OG1	2.20	0.40
1:B:583:LEU:HB2	1:B:618:TRP:CE3	2.57	0.40
1:C:16:SER:OG	1:C:18:GLN:OE1	2.39	0.40
1:C:592:ILE:N	1:C:592:ILE:CD1	2.83	0.40
1:D:429:GLN:H	1:D:429:GLN:CD	2.25	0.40
1:D:437:LEU:HD12	1:D:559:ASN:CB	2.51	0.40
1:A:254:VAL:HG11	6:A:3013:HOH:O	2.21	0.40
1:B:532:MSE:O	1:B:533:ARG:HB2	2.21	0.40
1:C:39:LEU:HD22	1:C:50:PHE:HB2	2.03	0.40
1:C:140:GLU:HB3	6:C:3086:HOH:O	2.21	0.40
1:B:82:ALA:HA	6:B:4080:HOH:O	2.22	0.40
1:B:501:ARG:HB3	1:B:529:LEU:HB3	2.03	0.40
1:A:376:PHE:CE1	1:B:132:GLY:HA2	2.57	0.40
1:A:439:TYR:CE2	1:A:440:LEU:HD13	2.56	0.40
1:A:581:PRO:HB2	1:A:618:TRP:CH2	2.57	0.40
1:B:84:PRO:HG2	6:B:4080:HOH:O	2.22	0.40
1:B:118:LEU:HD13	1:B:118:LEU:C	2.42	0.40
1:B:368:ILE:H	1:B:368:ILE:CD1	2.33	0.40
1:C:449:MSE:HG2	1:C:534:PHE:CE1	2.57	0.40
1:D:171:ARG:N	1:D:172:PRO:HD3	2.36	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	530/621 (85%)	501 (94%)	26 (5%)	3 (1%)	25	36
1	B	483/621 (78%)	463 (96%)	19 (4%)	1 (0%)	47	62
1	C	530/621 (85%)	507 (96%)	19 (4%)	4 (1%)	19	29
1	D	477/621 (77%)	458 (96%)	18 (4%)	1 (0%)	47	62
All	All	2020/2484 (81%)	1929 (96%)	82 (4%)	9 (0%)	34	48

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	252	GLY
1	A	48	GLY
1	C	505	LYS
1	D	77	ASP
1	C	48	GLY
1	B	78	VAL
1	A	121	GLY
1	C	121	GLY
1	A	579	PRO

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	433/485 (89%)	413 (95%)	20 (5%)	27	43
1	B	401/485 (83%)	385 (96%)	16 (4%)	31	49

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	433/485 (89%)	409 (94%)	24 (6%)	21	35
1	D	395/485 (81%)	383 (97%)	12 (3%)	41	61
All	All	1662/1940 (86%)	1590 (96%)	72 (4%)	29	46

All (72) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	PHE
1	A	11	LEU
1	A	39	LEU
1	A	68	ASN
1	A	74	LEU
1	A	118	LEU
1	A	178	LEU
1	A	264	THR
1	A	339	LEU
1	A	415	LEU
1	A	423	ILE
1	A	429	GLN
1	A	440	LEU
1	A	475	ARG
1	A	485	GLU
1	A	514	LEU
1	A	544	LEU
1	A	594	GLN
1	A	596	THR
1	A	616	LYS
1	B	11	LEU
1	B	15	ASP
1	B	68	ASN
1	B	74	LEU
1	B	124	SER
1	B	131	ILE
1	B	171	ARG
1	B	246	LEU
1	B	281	MSE
1	B	394	THR
1	B	410	GLN
1	B	429	GLN
1	B	441	ARG
1	B	461	LEU

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Mol	Chain	Res	Type
1	B	530	VAL
1	B	574	MSE
1	C	3	PHE
1	C	11	LEU
1	C	17	THR
1	C	19	GLU
1	C	26	GLU
1	C	31	LEU
1	C	39	LEU
1	C	68	ASN
1	C	118	LEU
1	C	145	ARG
1	C	156	THR
1	C	165	ASN
1	C	362	ARG
1	C	415	LEU
1	C	429	GLN
1	C	430	THR
1	C	437	LEU
1	C	475	ARG
1	C	496	LYS
1	C	501	ARG
1	C	530	VAL
1	C	577	ARG
1	C	594	GLN
1	C	603	GLU
1	D	17	THR
1	D	152	ASP
1	D	155	ILE
1	D	278	LEU
1	D	380	LEU
1	D	423	ILE
1	D	429	GLN
1	D	461	LEU
1	D	475	ARG
1	D	530	VAL
1	D	582	VAL
1	D	592	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (58) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	64	HIS
1	A	68	ASN
1	A	100	GLN
1	A	268	ASN
1	A	371	GLN
1	A	372	HIS
1	A	402	GLN
1	A	405	HIS
1	A	429	GLN
1	A	431	HIS
1	A	459	GLN
1	A	480	ASN
1	A	510	ASN
1	A	559	ASN
1	A	584	ASN
1	A	594	GLN
1	A	597	GLN
1	B	68	ASN
1	B	73	GLN
1	B	143	ASN
1	B	249	ASN
1	B	268	ASN
1	B	372	HIS
1	B	397	GLN
1	B	402	GLN
1	B	429	GLN
1	B	432	GLN
1	B	480	ASN
1	B	510	ASN
1	B	576	HIS
1	C	68	ASN
1	C	143	ASN
1	C	276	GLN
1	C	279	HIS
1	C	371	GLN
1	C	372	HIS
1	C	402	GLN
1	C	410	GLN
1	C	429	GLN
1	C	431	HIS
1	C	455	ASN
1	C	459	GLN
1	C	480	ASN

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Mol	Chain	Res	Type
1	C	510	ASN
1	C	584	ASN
1	D	64	HIS
1	D	68	ASN
1	D	165	ASN
1	D	181	ASN
1	D	257	HIS
1	D	372	HIS
1	D	405	HIS
1	D	429	GLN
1	D	431	HIS
1	D	468	ASN
1	D	480	ASN
1	D	510	ASN
1	D	584	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 [i](#)

Of 12 ligands modelled in this entry, 8 are monoatomic - leaving 4 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
5	DPO	B	4001	2	6,8,8	1.97	1 (16%)	13,13,13	1.36	2 (15%)
4	TPP	C	3002	2	22,27,27	2.30	4 (18%)	29,40,40	2.00	11 (37%)
5	DPO	D	4002	2	6,8,8	1.98	1 (16%)	13,13,13	1.34	2 (15%)
4	TPP	A	3001	2	22,27,27	2.16	3 (13%)	29,40,40	1.88	8 (27%)

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
5	DPO	B	4001	2	-	0/6/6/6	-
4	TPP	C	3002	2	-	2/16/17/17	0/2/2/2
5	DPO	D	4002	2	-	0/6/6/6	-
4	TPP	A	3001	2	-	3/16/17/17	0/2/2/2

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	3001	TPP	C4-N3	-6.35	1.34	1.39
4	C	3002	TPP	C4-N3	-6.21	1.34	1.39
4	C	3002	TPP	C6-C5	5.96	1.53	1.50
4	A	3001	TPP	C6-C5	5.69	1.53	1.50
5	D	4002	DPO	P2-O5	3.40	1.61	1.50
5	B	4001	DPO	P2-O5	3.39	1.61	1.50
4	C	3002	TPP	PB-O1B	3.37	1.61	1.50
4	C	3002	TPP	PA-O1A	2.94	1.61	1.50
4	A	3001	TPP	PA-O1A	2.93	1.61	1.50

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	3002	TPP	C5-C4-N3	3.78	115.14	107.57
4	A	3001	TPP	C5-C4-N3	3.74	115.06	107.57
4	C	3002	TPP	PA-O3A-PB	-3.64	120.32	132.83
4	A	3001	TPP	C6-C5-C4	3.64	130.35	127.43
5	B	4001	DPO	P2-O4-P1	-3.62	120.39	132.83
5	D	4002	DPO	P2-O4-P1	-3.42	121.09	132.83
4	C	3002	TPP	N1'-C2'-N3'	-3.28	119.89	125.54
4	A	3001	TPP	N1'-C2'-N3'	-3.20	120.04	125.54
4	C	3002	TPP	C6-C5-C4	3.19	130.00	127.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	3001	TPP	C6'-N1'-C2'	3.09	121.21	115.96
4	C	3002	TPP	C6'-N1'-C2'	3.09	121.21	115.96
4	A	3001	TPP	PA-O3A-PB	-2.85	123.06	132.83
4	C	3002	TPP	CM4-C4-C5	-2.71	121.68	127.60
4	A	3001	TPP	CM4-C4-C5	-2.68	121.74	127.60
4	C	3002	TPP	O3B-PB-O3A	2.68	113.63	104.64
4	A	3001	TPP	C7'-N3-C2	-2.60	120.65	125.35
4	C	3002	TPP	C7'-N3-C2	-2.52	120.80	125.35
4	A	3001	TPP	CM2-C2'-N1'	2.46	119.84	117.14
4	C	3002	TPP	CM2-C2'-N1'	2.45	119.83	117.14
5	D	4002	DPO	O7-P2-O4	2.32	112.43	104.64
5	B	4001	DPO	O7-P2-O4	2.25	112.19	104.64
4	C	3002	TPP	N4'-C4'-N3'	2.01	119.87	117.03
4	C	3002	TPP	CM2-C2'-N3'	2.00	120.28	117.15

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	3001	TPP	C4'-C5'-C7'-N3
4	C	3002	TPP	C4'-C5'-C7'-N3
4	A	3001	TPP	PB-O3A-PA-O7
4	A	3001	TPP	C4-C5-C6-C7
4	C	3002	TPP	C4-C5-C6-C7

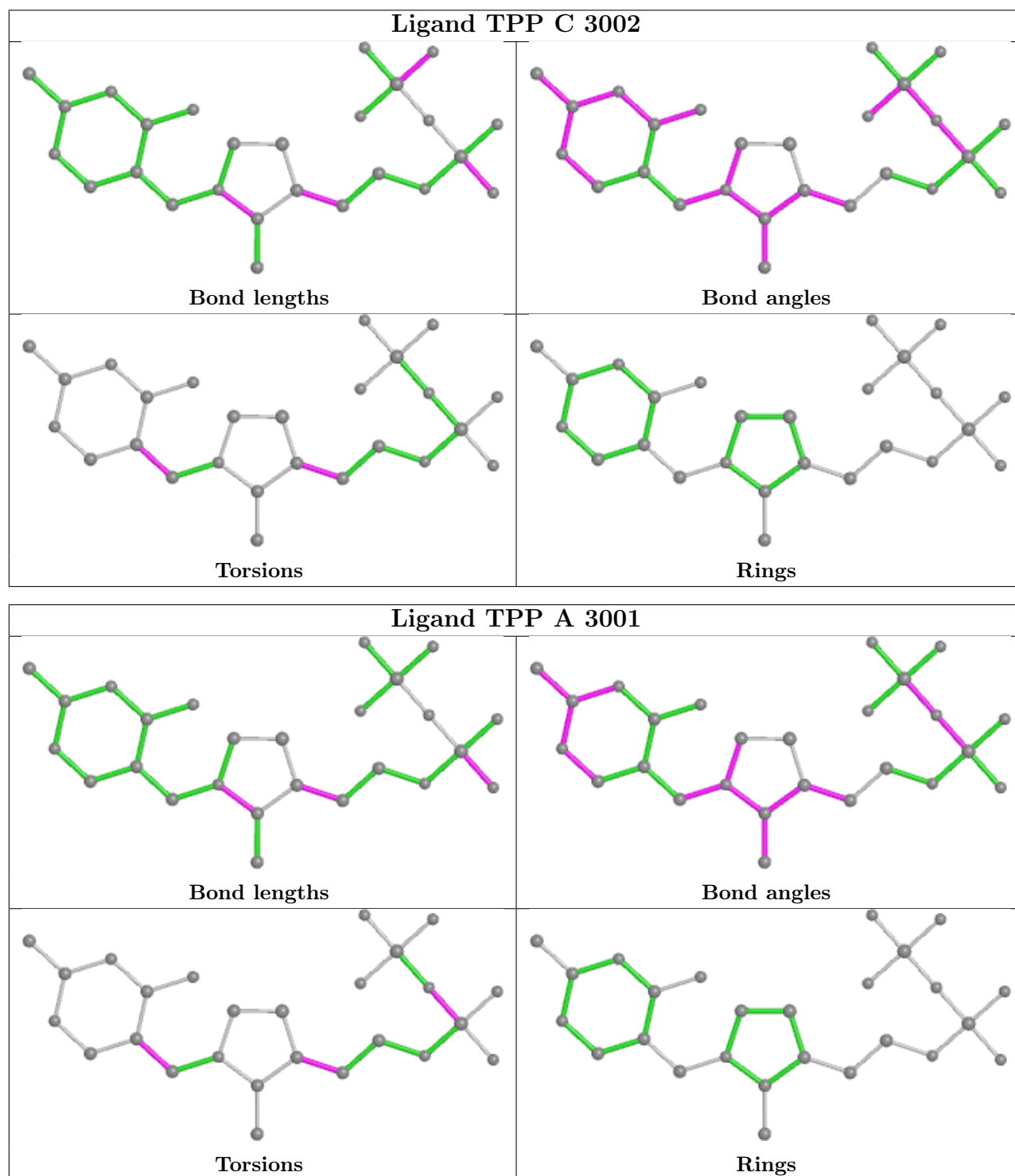
There are no ring outliers.

2 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	3002	TPP	3	0
4	A	3001	TPP	2	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

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	518/621 (83%)	-0.50	1 (0%) 95 94	3, 14, 31, 43	0
1	B	475/621 (76%)	-0.24	21 (4%) 34 33	3, 17, 53, 62	0
1	C	518/621 (83%)	-0.47	6 (1%) 79 77	4, 13, 30, 42	0
1	D	469/621 (75%)	-0.19	20 (4%) 35 33	5, 19, 45, 58	0
All	All	1980/2484 (79%)	-0.36	48 (2%) 59 57	3, 15, 40, 62	0

All (48) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	15	ASP	4.5
1	B	8	TYR	4.0
1	B	109	TRP	3.7
1	B	111	GLY	3.7
1	B	9	PRO	3.6
1	D	39	LEU	3.5
1	C	252	GLY	3.3
1	B	39	LEU	3.3
1	B	106	PRO	3.2
1	C	3	PHE	3.1
1	D	12	ALA	3.1
1	D	115	TYR	3.1
1	B	105	HIS	3.0
1	B	38	TYR	2.9
1	C	6	ALA	2.9
1	D	13	LEU	2.8
1	B	15	ASP	2.8
1	D	10	THR	2.8
1	D	14	VAL	2.7
1	B	112	GLU	2.7
1	D	78	VAL	2.7

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Mol	Chain	Res	Type	RSRZ
1	D	37	ARG	2.6
1	D	121	GLY	2.6
1	C	318	LEU	2.6
1	D	11	LEU	2.6
1	D	113	SER	2.5
1	B	37	ARG	2.5
1	B	18	GLN	2.5
1	B	12	ALA	2.4
1	D	87	ILE	2.4
1	B	13	LEU	2.4
1	B	114	GLU	2.4
1	D	318	LEU	2.3
1	C	485	GLU	2.3
1	B	78	VAL	2.3
1	C	483	GLY	2.3
1	D	348	GLU	2.3
1	D	83	TYR	2.3
1	D	594	GLN	2.3
1	B	30	LYS	2.3
1	D	283	LYS	2.3
1	A	239	PRO	2.3
1	D	114	GLU	2.3
1	B	113	SER	2.2
1	B	14	VAL	2.1
1	B	108	PRO	2.1
1	B	115	TYR	2.1
1	D	427	ASP	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.

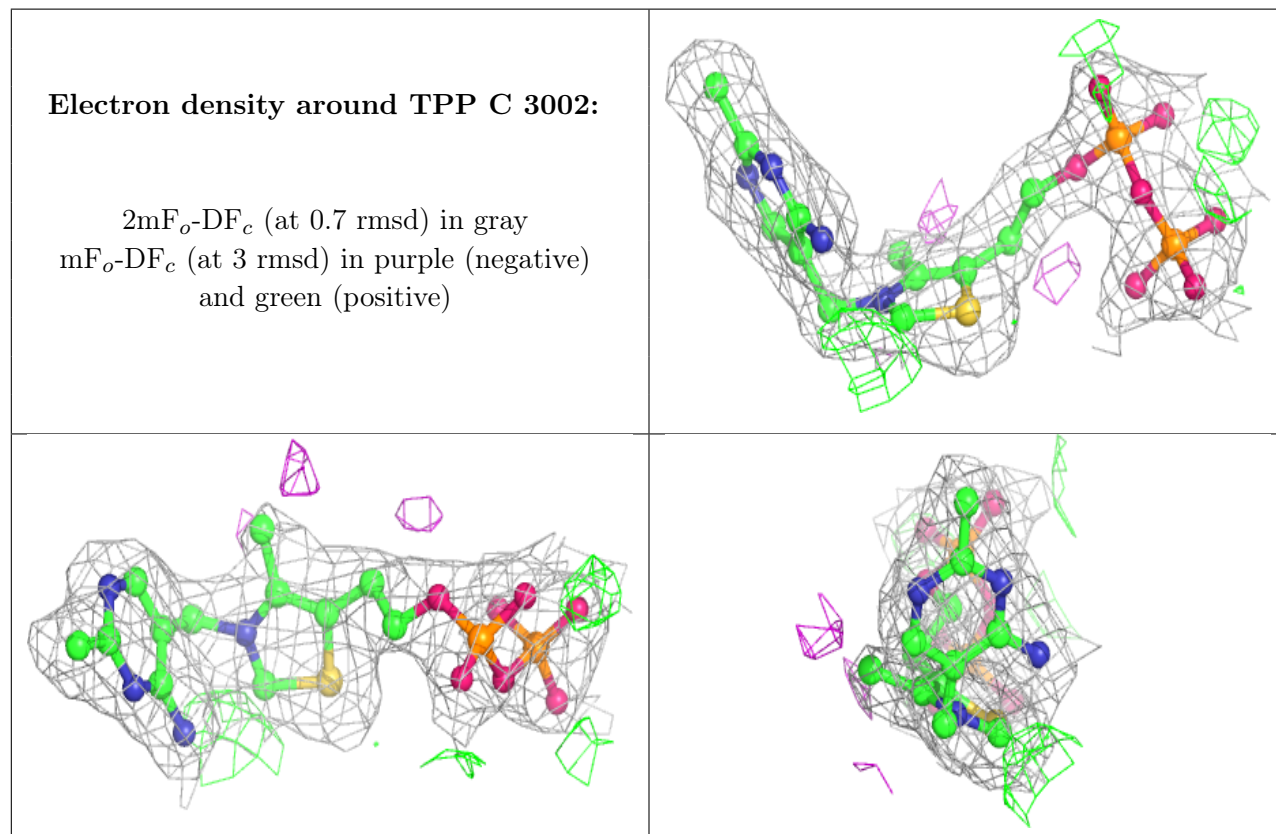
6.4 Ligands [i](#)

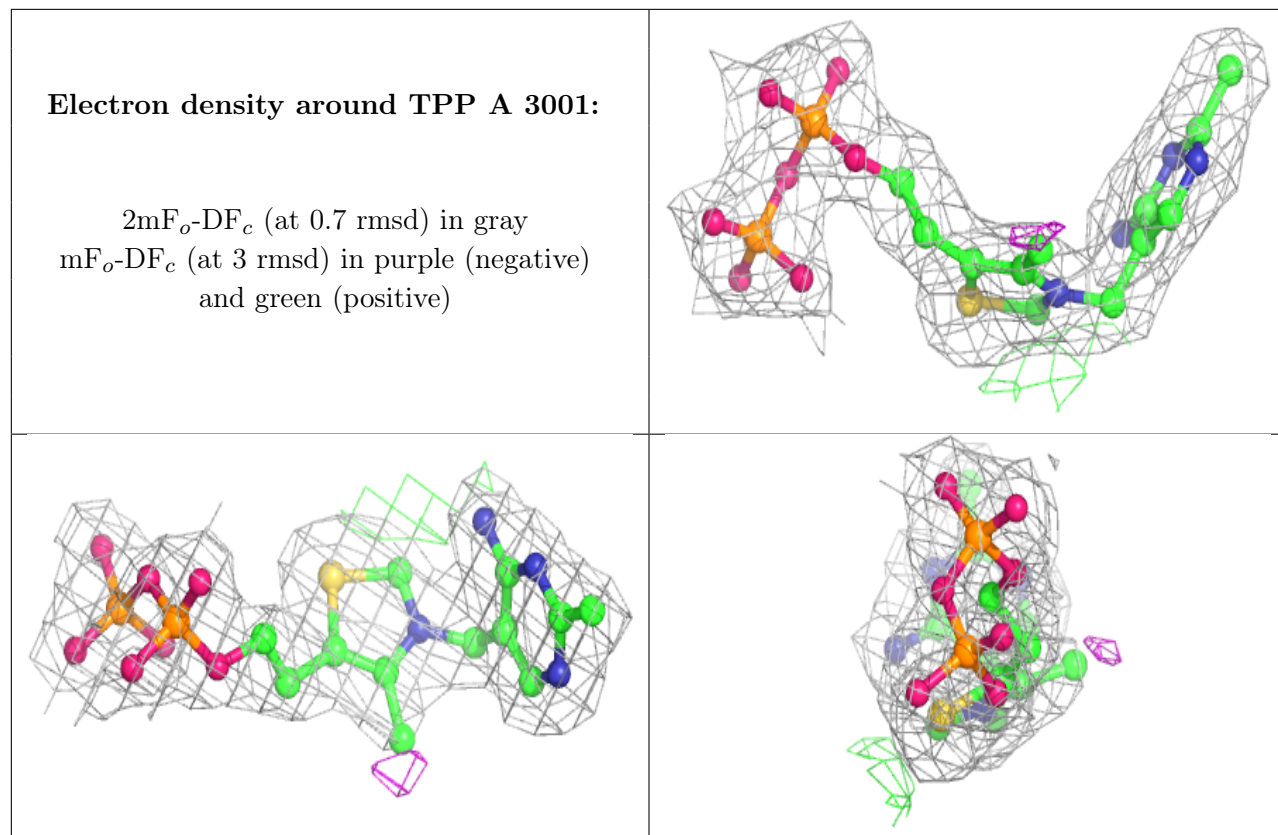
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

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
2	MG	C	1003	1/1	0.75	0.15	26,26,26,26	0
2	MG	D	1004	1/1	0.75	0.10	61,61,61,61	0
2	MG	B	1002	1/1	0.86	0.12	48,48,48,48	0
5	DPO	D	4002	9/9	0.91	0.19	50,51,54,54	0
5	DPO	B	4001	9/9	0.92	0.17	50,51,55,56	0
3	K	D	2004	1/1	0.95	0.09	34,34,34,34	0
3	K	B	2002	1/1	0.96	0.07	14,14,14,14	0
4	TPP	C	3002	26/26	0.98	0.10	4,13,16,18	0
2	MG	A	1001	1/1	0.98	0.07	9,9,9,9	0
4	TPP	A	3001	26/26	0.98	0.10	5,13,16,16	0
3	K	C	2003	1/1	0.99	0.10	24,24,24,24	0
3	K	A	2001	1/1	0.99	0.08	23,23,23,23	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.