



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 11:52 AM UTC

PDB ID : 3IIP / pdb_00003iip
Title : Evolutionary optimization of computationally designed enzymes: Kemp eliminases of the KE07 series
Authors : Khersonsky, O.; Dym, O.; Tawfik, D.S.
Deposited on : 2009-08-03
Resolution : 2.30 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

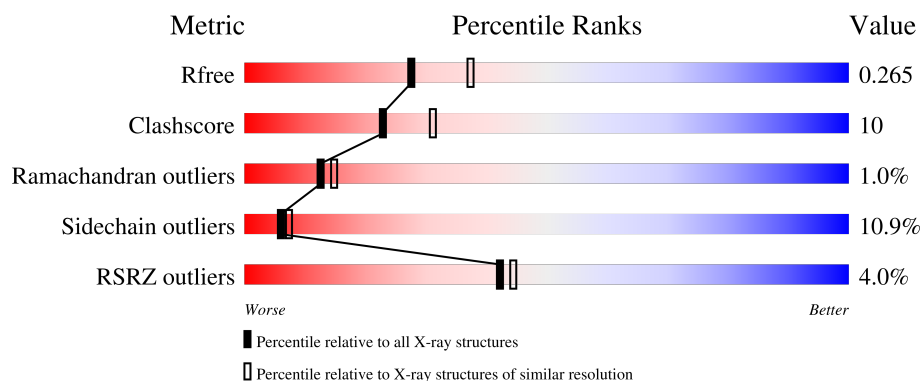
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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	256	4% 64% 22% 10% . .
1	B	256	5% 61% 28% 7% .
1	C	256	4% 60% 30% 6% . .
1	D	256	4% 66% 24% 5% . .
1	E	256	4% 65% 24% 7% . .

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Mol	Chain	Length	Quality of chain
1	F	256	4% 56% 31% 8%

2 Entry composition [i](#)

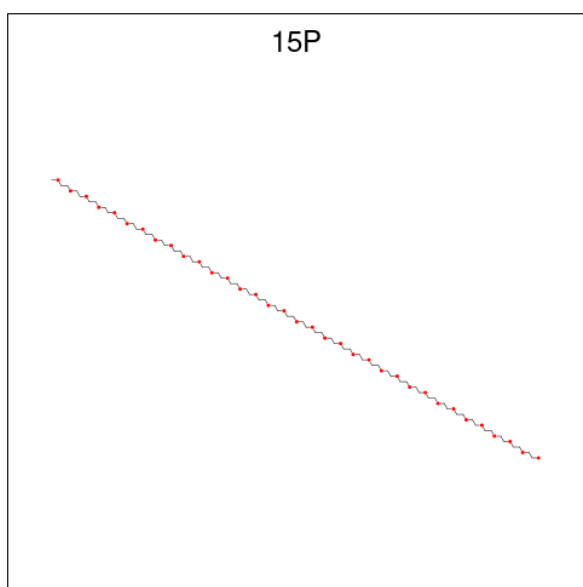
There are 3 unique types of molecules in this entry. The entry contains 11756 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 KE7 R6 3/7F.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	249	Total	C	N	O	S	0	0	0
			1935	1234	332	365	4			
1	B	248	Total	C	N	O	S	0	0	1
			1924	1226	331	363	4			
1	C	250	Total	C	N	O	S	0	0	0
			1939	1237	333	365	4			
1	D	247	Total	C	N	O	S	0	0	0
			1919	1224	330	361	4			
1	E	247	Total	C	N	O	S	0	0	0
			1921	1226	329	362	4			
1	F	247	Total	C	N	O	S	0	0	0
			1919	1225	329	361	4			

- Molecule 2 is POLYETHYLENE GLYCOL (N=34) (CCD ID: 15P) (formula: $C_{69}H_{140}O_{35}$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			10	7	3		
2	B	1	Total	C	O	0	0
			11	7	4		
2	E	1	Total	C	O	0	0
			11	7	4		

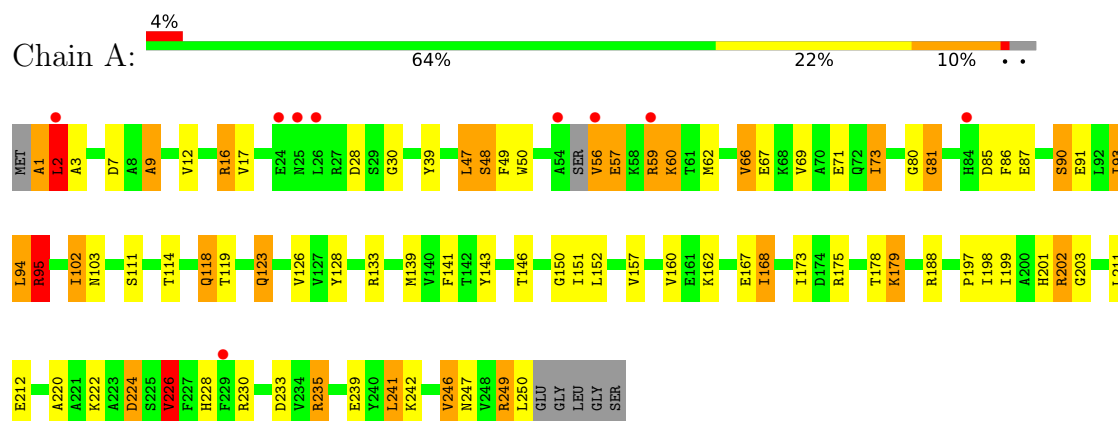
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	35	Total	O	0	0
			35	35		
3	B	23	Total	O	0	0
			23	23		
3	C	34	Total	O	0	0
			34	34		
3	D	21	Total	O	0	0
			21	21		
3	E	34	Total	O	0	0
			34	34		
3	F	20	Total	O	0	0
			20	20		

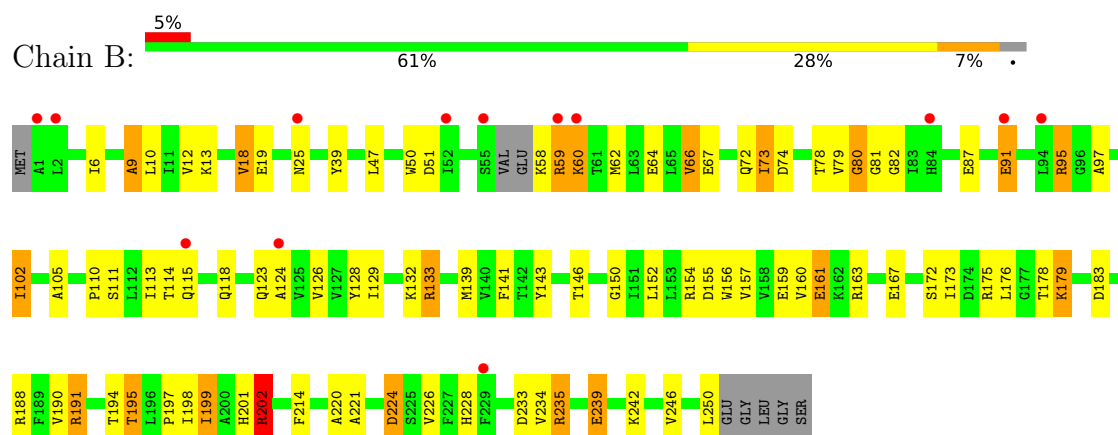
3 Residue-property plots

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.

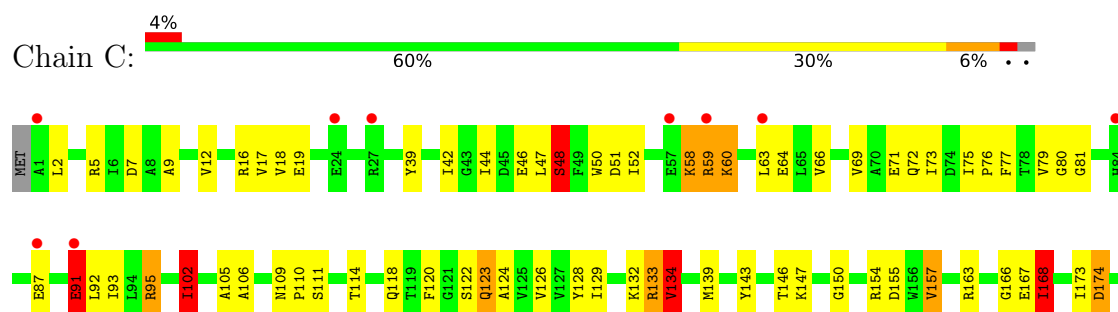
• Molecule 1: KE7 R6 3/7F



• Molecule 1: KE7 R6 3/7F

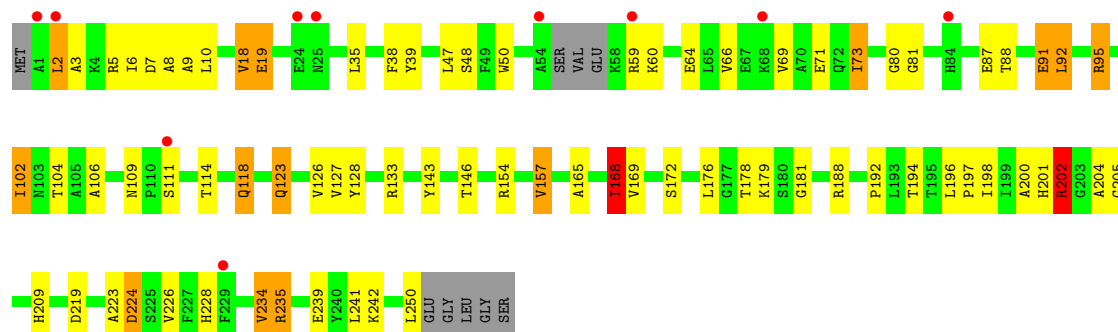


• Molecule 1: KE7 R6 3/7F

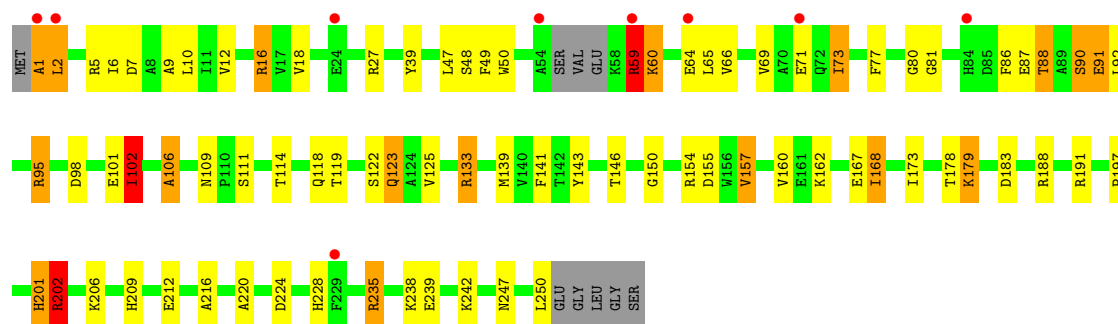




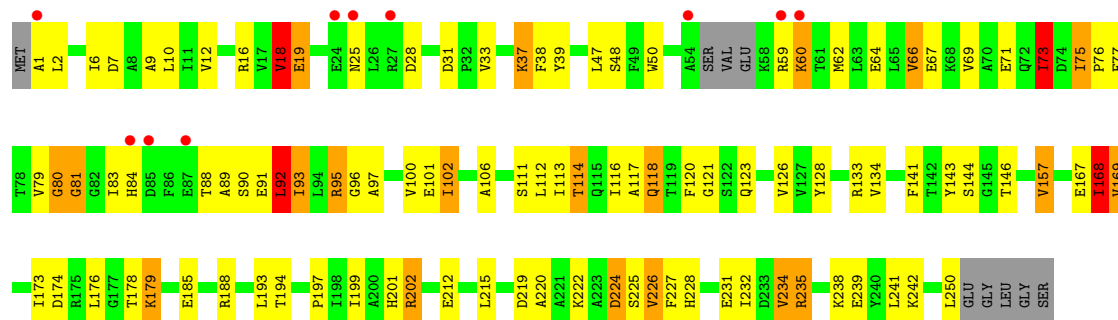
• Molecule 1: KE7 R6 3/7F



• Molecule 1: KE7 R6 3/7F



• Molecule 1: KE7 R6 3/7F



4 Data and refinement statistics

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, α , β , γ	106.87Å 106.87Å 127.66Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 2.30 50.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.8 (50.00-2.30) 100.0 (50.00-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.27 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.4.0067	Depositor
R, R_{free}	0.218 , 0.266 0.217 , 0.265	Depositor DCC
R_{free} test set	3672 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	27.6	Xtriage
Anisotropy	0.045	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 28.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.000 for -h,-k,l 0.028 for h,-h-k,-l 0.000 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	11756	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 48.73 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.2518e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 15P

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	1.84	31/1965 (1.6%)	1.54	30/2650 (1.1%)
1	B	1.90	28/1954 (1.4%)	1.58	21/2635 (0.8%)
1	C	1.84	37/1970 (1.9%)	1.58	31/2658 (1.2%)
1	D	1.76	28/1949 (1.4%)	1.52	17/2628 (0.6%)
1	E	1.77	21/1950 (1.1%)	1.55	24/2627 (0.9%)
1	F	1.91	36/1948 (1.8%)	1.60	28/2624 (1.1%)
All	All	1.84	181/11736 (1.5%)	1.56	151/15822 (1.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	2	4
1	B	0	1
1	C	1	0
1	E	0	1
1	F	0	2
All	All	3	8

All (181) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	91	GLU	CB-CG	-10.43	1.21	1.52
1	C	174	ASP	CG-OD1	-9.31	1.07	1.25
1	B	161	GLU	CA-C	9.21	1.64	1.52
1	E	178	THR	C-O	9.00	1.35	1.24
1	B	102	ILE	CA-CB	8.78	1.67	1.54
1	F	91	GLU	CB-CG	-8.50	1.26	1.52
1	D	165	ALA	CA-CB	8.45	1.66	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	178	THR	C-O	8.43	1.35	1.24
1	B	80	GLY	N-CA	8.25	1.52	1.45
1	E	168	ILE	CA-C	8.09	1.62	1.52
1	E	102	ILE	CA-CB	7.83	1.66	1.54
1	E	98	ASP	C-O	-7.81	1.15	1.24
1	A	93	ILE	CA-CB	-7.72	1.45	1.54
1	C	157	VAL	CA-CB	7.71	1.64	1.54
1	F	202	ARG	CZ-NH1	-7.70	1.22	1.32
1	F	6	ILE	CA-CB	7.58	1.62	1.53
1	A	126	VAL	CA-CB	7.50	1.63	1.54
1	F	178	THR	C-O	7.41	1.33	1.24
1	A	202	ARG	CZ-NH2	-7.38	1.23	1.33
1	F	79	VAL	CA-C	7.38	1.61	1.52
1	D	6	ILE	CA-CB	7.36	1.63	1.53
1	F	75	ILE	CA-CB	7.28	1.63	1.54
1	F	169	VAL	CA-CB	-7.26	1.45	1.54
1	D	5	ARG	CA-C	-7.13	1.44	1.52
1	A	69	VAL	CA-CB	7.11	1.64	1.54
1	B	199	ILE	C-O	-7.10	1.16	1.24
1	E	80	GLY	N-CA	7.00	1.51	1.45
1	F	133	ARG	CA-C	6.98	1.62	1.52
1	C	92	LEU	C-O	-6.97	1.16	1.24
1	A	80	GLY	N-CA	6.97	1.52	1.45
1	A	249	ARG	C-O	-6.96	1.15	1.24
1	D	234	VAL	CA-CB	6.96	1.63	1.54
1	A	175	ARG	C-O	-6.94	1.14	1.23
1	A	91	GLU	CB-CG	-6.93	1.31	1.52
1	A	160	VAL	CA-C	6.90	1.61	1.52
1	B	79	VAL	CA-CB	6.90	1.63	1.54
1	A	59	ARG	CA-CB	-6.88	1.42	1.53
1	D	35	LEU	CA-C	6.88	1.61	1.52
1	B	239	GLU	C-O	-6.81	1.16	1.24
1	D	127	VAL	CA-CB	-6.80	1.46	1.54
1	A	233	ASP	N-CA	-6.79	1.37	1.46
1	C	80	GLY	N-CA	6.79	1.51	1.45
1	F	157	VAL	CA-CB	6.69	1.62	1.54
1	B	172	SER	C-O	-6.67	1.15	1.24
1	A	48	SER	CB-OG	-6.62	1.28	1.42
1	D	126	VAL	CA-CB	6.62	1.62	1.54
1	F	202	ARG	C-O	6.56	1.32	1.24
1	D	3	ALA	CA-CB	6.53	1.63	1.53
1	D	241	LEU	C-O	-6.53	1.16	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	69	VAL	CA-CB	6.49	1.63	1.54
1	D	80	GLY	N-CA	6.45	1.51	1.45
1	D	91	GLU	CB-CG	-6.42	1.33	1.52
1	A	102	ILE	C-O	-6.38	1.17	1.24
1	F	169	VAL	N-CA	6.34	1.53	1.46
1	F	93	ILE	CA-C	6.32	1.60	1.52
1	F	6	ILE	CA-C	6.32	1.60	1.52
1	B	13	LYS	N-CA	6.31	1.53	1.46
1	C	124	ALA	CA-CB	6.28	1.65	1.53
1	F	194	THR	C-O	6.28	1.31	1.23
1	D	178	THR	C-O	6.26	1.32	1.24
1	A	69	VAL	C-O	-6.26	1.16	1.24
1	B	214	PHE	C-O	-6.23	1.16	1.24
1	C	44	ILE	CA-C	-6.20	1.46	1.52
1	E	109	ASN	CA-C	6.20	1.60	1.52
1	B	124	ALA	CA-CB	6.19	1.64	1.53
1	D	204	ALA	CA-CB	-6.16	1.43	1.53
1	C	218	ALA	CA-CB	6.12	1.63	1.53
1	C	5	ARG	CA-C	-6.12	1.45	1.52
1	A	202	ARG	N-CA	6.11	1.54	1.46
1	E	122	SER	C-O	-6.10	1.16	1.24
1	E	191	ARG	CA-C	6.10	1.59	1.52
1	E	101	GLU	N-CA	-6.09	1.38	1.46
1	A	47	LEU	N-CA	-6.09	1.38	1.45
1	D	223	ALA	CA-C	6.07	1.60	1.52
1	B	233	ASP	N-CA	-6.05	1.38	1.46
1	F	185	GLU	C-O	6.04	1.31	1.24
1	B	105	ALA	CA-CB	6.00	1.62	1.53
1	F	222	LYS	CG-CD	6.00	1.70	1.52
1	A	211	LEU	C-O	-5.99	1.17	1.24
1	E	91	GLU	CA-CB	-5.97	1.43	1.53
1	F	202	ARG	CZ-NH2	-5.97	1.25	1.33
1	A	162	LYS	C-O	-5.93	1.16	1.24
1	B	6	ILE	CA-CB	5.93	1.61	1.54
1	C	126	VAL	C-O	5.93	1.30	1.24
1	B	129	ILE	CA-C	5.92	1.60	1.52
1	A	151	ILE	N-CA	5.91	1.53	1.46
1	B	221	ALA	N-CA	5.88	1.53	1.46
1	F	114	THR	CA-C	5.86	1.60	1.52
1	C	102	ILE	CA-CB	5.85	1.62	1.54
1	F	193	LEU	C-O	-5.83	1.16	1.24
1	B	126	VAL	CA-CB	5.83	1.61	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	97	ALA	N-CA	5.79	1.53	1.46
1	E	106	ALA	CA-CB	-5.79	1.44	1.53
1	B	91	GLU	CB-CG	-5.75	1.35	1.52
1	C	52	ILE	CA-C	5.75	1.60	1.52
1	C	220	ALA	N-CA	5.75	1.53	1.45
1	F	215	LEU	C-O	-5.74	1.17	1.24
1	C	244	HIS	C-O	-5.73	1.16	1.24
1	A	188	ARG	C-O	-5.70	1.17	1.24
1	F	91	GLU	CA-C	-5.70	1.45	1.52
1	E	125	VAL	CA-CB	5.67	1.61	1.54
1	C	157	VAL	C-O	-5.66	1.17	1.24
1	E	202	ARG	CZ-NH2	-5.66	1.26	1.33
1	B	78	THR	N-CA	5.65	1.52	1.45
1	B	9	ALA	CA-CB	-5.63	1.45	1.53
1	B	198	ILE	N-CA	5.61	1.53	1.46
1	C	69	VAL	CA-CB	5.61	1.61	1.54
1	D	104	THR	CA-CB	5.61	1.62	1.53
1	D	196	LEU	C-O	5.59	1.31	1.23
1	E	69	VAL	CA-CB	5.56	1.62	1.54
1	B	246	VAL	CA-CB	-5.56	1.47	1.54
1	A	3	ALA	CA-CB	5.56	1.61	1.53
1	A	126	VAL	N-CA	5.55	1.52	1.46
1	B	191	ARG	CA-C	5.53	1.58	1.52
1	C	174	ASP	N-CA	5.52	1.53	1.46
1	E	49	PHE	N-CA	5.51	1.52	1.46
1	A	103	ASN	C-O	-5.48	1.17	1.24
1	E	201	HIS	CE1-NE2	-5.48	1.27	1.32
1	F	12	VAL	C-O	5.48	1.29	1.24
1	C	48	SER	CB-OG	-5.48	1.31	1.42
1	D	205	GLY	N-CA	5.47	1.53	1.45
1	B	175	ARG	CZ-NH1	5.46	1.40	1.32
1	F	93	ILE	C-O	5.46	1.30	1.24
1	F	38	PHE	CA-C	5.44	1.59	1.52
1	C	232	ILE	CA-CB	5.43	1.61	1.54
1	F	73	ILE	CA-CB	5.42	1.63	1.55
1	D	38	PHE	CA-C	5.42	1.59	1.52
1	C	76	PRO	CA-C	5.42	1.59	1.52
1	F	134	VAL	C-O	5.42	1.29	1.24
1	C	17	VAL	CA-CB	5.38	1.59	1.53
1	E	92	LEU	N-CA	-5.36	1.40	1.46
1	A	7	ASP	N-CA	5.36	1.52	1.46
1	F	97	ALA	CA-CB	5.35	1.61	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	202	ARG	CZ-NH2	-5.32	1.26	1.33
1	A	152	LEU	C-O	-5.31	1.17	1.23
1	D	109	ASN	CA-C	5.30	1.59	1.52
1	F	33	VAL	CA-CB	5.29	1.60	1.54
1	C	178	THR	C-O	5.28	1.31	1.24
1	D	8	ALA	CA-CB	5.28	1.60	1.53
1	F	10	LEU	N-CA	5.27	1.52	1.46
1	F	225	SER	N-CA	5.27	1.52	1.46
1	B	12	VAL	C-O	5.26	1.29	1.24
1	F	18	VAL	C-O	5.25	1.30	1.24
1	C	91	GLU	CD-OE2	5.24	1.35	1.25
1	D	64	GLU	C-O	5.24	1.30	1.24
1	C	203	GLY	C-O	-5.24	1.17	1.24
1	F	31	ASP	N-CA	5.23	1.53	1.46
1	B	113	ILE	CA-CB	5.22	1.60	1.54
1	E	162	LYS	C-O	-5.22	1.18	1.24
1	E	6	ILE	CA-CB	5.22	1.60	1.53
1	D	202	ARG	CZ-NH1	-5.21	1.25	1.32
1	D	200	ALA	CA-CB	-5.20	1.44	1.53
1	D	168	ILE	CG1-CD1	5.20	1.72	1.51
1	A	9	ALA	CA-CB	-5.18	1.46	1.53
1	C	147	LYS	CA-C	-5.18	1.46	1.52
1	F	232	ILE	CA-CB	5.18	1.60	1.54
1	A	198	ILE	C-O	-5.16	1.18	1.24
1	A	246	VAL	C-O	-5.16	1.17	1.24
1	C	166	GLY	C-O	-5.16	1.17	1.23
1	A	222	LYS	CG-CD	5.14	1.67	1.52
1	E	7	ASP	CG-OD2	5.14	1.35	1.25
1	C	191	ARG	C-O	5.13	1.29	1.24
1	D	194	THR	C-O	5.13	1.30	1.23
1	C	219	ASP	C-O	-5.13	1.17	1.24
1	D	157	VAL	CA-CB	5.12	1.61	1.54
1	F	241	LEU	CA-CB	5.12	1.61	1.53
1	C	186	MET	SD-CE	5.12	1.92	1.79
1	C	198	ILE	C-O	-5.12	1.18	1.24
1	A	49	PHE	CA-C	-5.12	1.46	1.52
1	C	46	GLU	N-CA	5.11	1.52	1.45
1	A	203	GLY	C-O	-5.09	1.17	1.24
1	B	152	LEU	C-O	5.06	1.30	1.23
1	C	76	PRO	C-O	-5.06	1.17	1.23
1	D	192	PRO	C-O	-5.04	1.17	1.24
1	C	91	GLU	CB-CG	-5.04	1.37	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	100	VAL	CA-CB	5.04	1.61	1.54
1	C	42	ILE	CA-C	5.04	1.59	1.52
1	C	129	ILE	C-O	5.04	1.29	1.24
1	C	209	HIS	N-CA	5.04	1.52	1.46
1	C	79	VAL	CA-C	5.01	1.58	1.52
1	F	76	PRO	CA-C	5.00	1.58	1.52

All (151) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	178	THR	N-CA-C	12.07	127.44	112.23
1	F	2	LEU	N-CA-C	11.05	126.56	110.42
1	D	178	THR	N-CA-C	10.71	126.51	113.23
1	A	133	ARG	NE-CZ-NH2	-9.97	110.22	119.20
1	A	178	THR	N-CA-C	9.80	125.39	113.23
1	F	178	THR	N-CA-C	9.68	124.42	112.23
1	C	178	THR	N-CA-C	9.57	124.76	112.89
1	E	80	GLY	O-C-N	-9.14	115.68	123.73
1	E	59	ARG	CA-CB-CG	-9.06	95.98	114.10
1	C	174	ASP	CB-CG-OD1	-8.97	97.77	118.40
1	A	179	LYS	N-CA-C	8.73	123.60	113.38
1	C	174	ASP	N-CA-C	8.67	122.96	112.38
1	D	80	GLY	O-C-N	-8.65	116.12	123.73
1	F	202	ARG	NE-CZ-NH2	8.57	126.92	119.20
1	B	195	THR	OG1-CB-CG2	-8.47	92.36	109.30
1	B	178	THR	N-CA-C	8.45	123.97	112.90
1	F	80	GLY	O-C-N	-8.38	116.35	123.73
1	C	174	ASP	CB-CG-OD2	8.37	137.65	118.40
1	E	133	ARG	NE-CZ-NH2	-8.05	111.96	119.20
1	E	202	ARG	NE-CZ-NH1	7.96	129.46	121.50
1	B	80	GLY	O-C-N	-7.86	116.81	123.73
1	A	202	ARG	NH1-CZ-NH2	-7.66	109.34	119.30
1	C	80	GLY	O-C-N	-7.57	117.07	123.73
1	C	72	GLN	N-CA-C	7.57	122.61	113.23
1	B	175	ARG	N-CA-C	-7.49	103.73	113.17
1	D	202	ARG	CB-CG-CD	7.48	128.51	111.30
1	A	133	ARG	NE-CZ-NH1	7.48	128.98	121.50
1	E	202	ARG	CB-CG-CD	7.43	128.40	111.30
1	C	174	ASP	N-CA-CB	7.41	122.92	110.32
1	C	111	SER	N-CA-C	-7.39	103.52	112.54
1	B	234	VAL	N-CA-C	7.39	117.51	110.42
1	C	238	LYS	N-CA-C	7.36	120.23	111.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	133	ARG	NE-CZ-NH2	-7.23	112.69	119.20
1	D	133	ARG	NE-CZ-NH2	-7.20	112.72	119.20
1	C	59	ARG	N-CA-C	7.19	118.77	111.07
1	A	59	ARG	CB-CG-CD	-7.16	94.84	111.30
1	D	7	ASP	CB-CA-C	-7.09	97.58	109.48
1	C	134	VAL	CB-CA-C	7.06	119.13	110.73
1	A	249	ARG	N-CA-C	6.96	125.63	110.80
1	C	87	GLU	N-CA-C	6.94	119.44	111.11
1	F	179	LYS	N-CA-C	6.87	123.11	113.56
1	F	118	GLN	N-CA-C	6.87	120.54	111.75
1	F	89	ALA	N-CA-C	-6.86	103.42	111.03
1	D	2	LEU	CA-CB-CG	-6.83	92.40	116.30
1	E	2	LEU	N-CA-C	6.80	125.28	110.80
1	B	155	ASP	N-CA-C	-6.77	104.66	113.12
1	B	74	ASP	CB-CA-C	-6.76	99.30	110.72
1	D	80	GLY	CA-C-N	6.69	133.74	121.70
1	D	80	GLY	C-N-CA	6.69	133.74	121.70
1	D	71	GLU	N-CA-C	-6.61	105.34	113.41
1	E	16	ARG	NE-CZ-NH1	-6.60	114.90	121.50
1	B	91	GLU	CB-CA-C	-6.52	99.96	110.79
1	E	212	GLU	N-CA-C	6.52	119.22	111.33
1	E	27	ARG	N-CA-C	6.52	118.39	111.28
1	B	179	LYS	N-CA-C	6.49	122.58	113.56
1	A	2	LEU	N-CA-C	6.47	124.59	110.80
1	C	109	ASN	CA-C-N	-6.45	112.98	119.56
1	C	109	ASN	C-N-CA	-6.45	112.98	119.56
1	A	80	GLY	O-C-N	-6.43	116.48	123.29
1	B	133	ARG	NE-CZ-NH2	-6.34	113.50	119.20
1	E	91	GLU	CA-CB-CG	6.34	126.78	114.10
1	A	48	SER	N-CA-CB	-6.33	99.54	111.00
1	B	113	ILE	N-CA-C	-6.31	104.60	110.53
1	C	188	ARG	NE-CZ-NH1	-6.26	115.24	121.50
1	A	230	ARG	N-CA-C	6.22	124.05	110.80
1	B	82	GLY	N-CA-C	-6.22	105.33	114.90
1	D	133	ARG	NE-CZ-NH1	6.20	127.70	121.50
1	A	59	ARG	CA-CB-CG	-6.16	101.78	114.10
1	A	133	ARG	CD-NE-CZ	6.14	132.99	124.40
1	E	91	GLU	CB-CG-CD	-6.10	102.23	112.60
1	C	133	ARG	NE-CZ-NH2	-6.08	113.73	119.20
1	F	202	ARG	NH1-CZ-NH2	-6.06	111.42	119.30
1	A	118	GLN	N-CA-C	6.06	118.85	111.82
1	A	133	ARG	CG-CD-NE	-5.99	98.82	112.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	7	ASP	CB-CA-C	-5.99	99.42	109.48
1	F	113	ILE	N-CA-C	-5.92	104.85	110.42
1	A	188	ARG	NE-CZ-NH1	-5.90	115.60	121.50
1	C	168	ILE	N-CA-CB	-5.89	103.29	111.41
1	A	59	ARG	N-CA-C	5.85	117.33	111.07
1	D	109	ASN	CA-C-N	-5.85	112.84	119.28
1	D	109	ASN	C-N-CA	-5.85	112.84	119.28
1	A	202	ARG	NE-CZ-NH2	5.79	124.42	119.20
1	E	133	ARG	CD-NE-CZ	5.79	132.50	124.40
1	F	92	LEU	N-CA-C	-5.73	104.41	111.40
1	B	188	ARG	NE-CZ-NH2	5.71	124.33	119.20
1	B	59	ARG	CA-CB-CG	-5.69	102.72	114.10
1	E	48	SER	N-CA-CB	-5.68	100.97	110.80
1	F	133	ARG	CG-CD-NE	-5.68	99.50	112.00
1	A	85	ASP	N-CA-C	5.67	117.80	109.24
1	A	226	VAL	CB-CA-C	-5.67	104.49	112.14
1	D	133	ARG	CD-NE-CZ	5.65	132.31	124.40
1	E	80	GLY	CA-C-N	5.64	131.85	121.70
1	E	80	GLY	C-N-CA	5.64	131.85	121.70
1	C	179	LYS	N-CA-C	5.61	121.36	113.56
1	B	79	VAL	CA-C-N	5.60	129.19	122.03
1	B	79	VAL	C-N-CA	5.60	129.19	122.03
1	F	80	GLY	CA-C-N	5.59	131.75	121.70
1	F	80	GLY	C-N-CA	5.59	131.75	121.70
1	E	119	THR	N-CA-C	5.58	117.44	111.36
1	C	87	GLU	N-CA-CB	-5.56	101.66	109.94
1	A	57	GLU	N-CA-C	-5.55	106.51	113.28
1	B	194	THR	CA-C-N	-5.55	113.64	122.29
1	B	194	THR	C-N-CA	-5.55	113.64	122.29
1	C	91	GLU	CG-CD-OE1	-5.48	105.79	118.40
1	E	7	ASP	CB-CA-C	-5.48	100.71	109.75
1	F	226	VAL	CB-CA-C	-5.47	103.67	112.16
1	C	91	GLU	N-CA-CB	-5.46	102.08	110.16
1	E	238	LYS	N-CA-C	5.44	117.21	111.28
1	C	202	ARG	NE-CZ-NH1	5.44	126.94	121.50
1	C	133	ARG	CD-NE-CZ	5.41	131.98	124.40
1	A	212	GLU	N-CA-C	5.40	117.86	111.33
1	E	133	ARG	NE-CZ-NH1	5.39	126.89	121.50
1	A	241	LEU	N-CA-C	-5.38	105.33	111.14
1	E	91	GLU	CB-CA-C	-5.37	99.42	110.38
1	D	188	ARG	NE-CZ-NH1	-5.36	116.14	121.50
1	F	96	GLY	N-CA-C	5.36	122.09	114.85

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	157	VAL	N-CA-CB	-5.36	104.28	110.55
1	A	67	GLU	N-CA-C	5.36	116.80	111.07
1	A	80	GLY	CA-C-N	5.33	131.30	121.70
1	A	80	GLY	C-N-CA	5.33	131.30	121.70
1	F	188	ARG	NE-CZ-NH1	-5.33	116.17	121.50
1	F	7	ASP	CB-CA-C	-5.31	101.08	109.80
1	F	234	VAL	N-CA-C	5.29	117.71	111.09
1	F	91	GLU	CB-CA-C	-5.29	99.60	110.38
1	C	202	ARG	CB-CG-CD	5.28	123.44	111.30
1	A	16	ARG	NE-CZ-NH1	-5.28	116.22	121.50
1	F	227	PHE	CA-C-N	5.27	127.65	120.54
1	F	227	PHE	C-N-CA	5.27	127.65	120.54
1	F	212	GLU	N-CA-C	5.27	117.70	111.33
1	A	226	VAL	N-CA-CB	5.26	117.69	110.54
1	B	115	GLN	CB-CA-C	-5.24	102.66	110.88
1	C	202	ARG	CA-C-N	-5.23	117.75	123.30
1	C	202	ARG	C-N-CA	-5.23	117.75	123.30
1	F	168	ILE	N-CA-CB	-5.22	104.72	111.82
1	C	249	ARG	CA-CB-CG	-5.21	103.67	114.10
1	B	91	GLU	CG-CD-OE1	-5.20	106.44	118.40
1	F	174	ASP	N-CA-C	5.19	118.39	111.75
1	E	168	ILE	N-CA-CB	-5.19	103.95	111.52
1	A	119	THR	N-CA-C	5.18	118.06	111.69
1	D	133	ARG	CG-CD-NE	-5.17	100.63	112.00
1	B	72	GLN	N-CA-C	5.14	119.68	113.41
1	D	234	VAL	N-CA-C	5.13	115.85	110.62
1	F	238	LYS	N-CA-C	5.09	116.83	111.28
1	C	168	ILE	CB-CG1-CD1	-5.07	103.16	113.80
1	C	105	ALA	N-CA-C	5.06	116.80	111.28
1	F	111	SER	N-CA-C	-5.04	106.23	112.38
1	D	198	ILE	N-CA-C	5.03	115.09	107.80
1	C	91	GLU	OE1-CD-OE2	5.01	134.94	122.90
1	A	95	ARG	N-CA-C	-5.00	106.86	113.17
1	E	179	LYS	N-CA-C	5.00	120.52	113.56
1	F	114	THR	N-CA-C	5.00	117.11	111.11

All (3) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	94	LEU	CA
1	A	249	ARG	CA
1	C	174	ASP	CA

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1	ALA	Peptide
1	A	56	VAL	Peptide
1	A	81	GLY	Peptide
1	A	93	ILE	Peptide
1	B	80	GLY	Peptide
1	E	1	ALA	Peptide
1	F	1	ALA	Peptide
1	F	81	GLY	Peptide

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	1935	0	1959	34	0
1	B	1924	0	1948	39	1
1	C	1939	0	1965	47	1
1	D	1919	0	1944	33	0
1	E	1921	0	1946	43	0
1	F	1919	0	1944	45	0
2	A	10	0	10	0	0
2	B	11	0	15	4	0
2	E	11	0	12	0	0
3	A	35	0	0	2	0
3	B	23	0	0	1	0
3	C	34	0	0	0	0
3	D	21	0	0	0	0
3	E	34	0	0	0	0
3	F	20	0	0	0	0
All	All	11756	0	11743	242	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

All (242) 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:60:LYS:O	1:B:64:GLU:HG3	1.48	1.12
1:F:83:ILE:C	1:F:84:HIS:CA	2.28	1.06
1:F:143:TYR:O	1:F:146:THR:HG23	1.52	1.05
1:E:143:TYR:O	1:E:146:THR:HG23	1.57	1.03
1:C:39:TYR:OH	1:C:228:HIS:HD2	1.45	0.99
1:D:201:HIS:O	1:D:202:ARG:HB2	1.61	0.98
1:C:91:GLU:OE2	1:C:95:ARG:NH1	1.95	0.98
1:E:64:GLU:C	1:E:65:LEU:CA	2.40	0.94
1:D:143:TYR:O	1:D:146:THR:HG23	1.75	0.87
1:E:201:HIS:O	1:E:202:ARG:HB2	1.69	0.87
1:F:60:LYS:O	1:F:64:GLU:HG3	1.75	0.86
1:D:95:ARG:HB2	1:D:95:ARG:HH11	1.41	0.84
1:C:47:LEU:HD12	1:C:73:ILE:HD13	1.62	0.80
1:D:39:TYR:OH	1:D:228:HIS:HD2	1.64	0.80
1:C:60:LYS:O	1:C:64:GLU:HG3	1.82	0.80
1:A:81:GLY:HA2	3:A:270:HOH:O	1.81	0.79
1:C:143:TYR:O	1:C:146:THR:HG23	1.82	0.79
1:D:95:ARG:HB2	1:D:95:ARG:NH1	1.97	0.79
1:B:39:TYR:OH	1:B:228:HIS:HD2	1.68	0.76
1:F:143:TYR:O	1:F:146:THR:CG2	2.33	0.76
1:F:47:LEU:HD12	1:F:73:ILE:HD13	1.67	0.76
1:E:50:TRP:CH2	1:E:81:GLY:HA3	2.22	0.75
1:E:235:ARG:O	1:E:239:GLU:HG3	1.87	0.74
1:C:235:ARG:O	1:C:239:GLU:HG3	1.88	0.74
1:C:39:TYR:OH	1:C:228:HIS:CD2	2.36	0.73
1:D:50:TRP:CH2	1:D:81:GLY:HA3	2.24	0.73
1:E:39:TYR:OH	1:E:228:HIS:HD2	1.72	0.72
1:E:60:LYS:O	1:E:64:GLU:HG3	1.89	0.72
1:E:59:ARG:HH11	1:E:59:ARG:HB3	1.53	0.71
1:A:47:LEU:HD12	1:A:73:ILE:HD13	1.72	0.71
1:A:235:ARG:O	1:A:239:GLU:HG3	1.89	0.71
1:C:63:LEU:HD12	1:C:64:GLU:N	2.05	0.71
1:B:114:THR:O	1:B:118:GLN:HG2	1.89	0.71
1:F:235:ARG:O	1:F:239:GLU:HG3	1.89	0.71
1:B:143:TYR:O	1:B:146:THR:HG23	1.92	0.70
1:C:60:LYS:HA	1:C:63:LEU:CD2	2.22	0.70
1:C:60:LYS:HA	1:C:63:LEU:HD21	1.75	0.68
1:B:10:LEU:N	1:B:10:LEU:HD12	2.08	0.67
1:B:47:LEU:HD12	1:B:73:ILE:HD13	1.75	0.67
2:B:256:15P:H672	1:C:122:SER:OG	1.95	0.67
1:E:1:ALA:HB3	1:E:247:ASN:HD22	1.60	0.66
1:B:95:ARG:HH11	1:B:95:ARG:HB2	1.61	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:39:TYR:OH	1:F:228:HIS:HD2	1.80	0.65
1:B:95:ARG:HB2	1:B:95:ARG:NH1	2.12	0.65
1:E:59:ARG:HH11	1:E:59:ARG:CB	2.09	0.64
1:D:47:LEU:HD12	1:D:73:ILE:CD1	2.28	0.64
1:A:114:THR:O	1:A:118:GLN:HG2	1.98	0.63
1:F:9:ALA:HA	1:F:48:SER:HB3	1.79	0.63
1:A:57:GLU:OE2	1:A:57:GLU:HA	1.97	0.63
1:C:114:THR:O	1:C:118:GLN:HG2	1.98	0.63
1:A:39:TYR:OH	1:A:228:HIS:HD2	1.82	0.62
1:E:59:ARG:NE	1:E:88:THR:HG23	2.14	0.62
1:D:128:TYR:OH	1:D:201:HIS:HD2	1.83	0.62
1:B:235:ARG:O	1:B:239:GLU:HG3	2.00	0.62
1:C:201:HIS:HE1	1:C:224:ASP:OD1	1.83	0.62
1:E:47:LEU:HD12	1:E:73:ILE:HD13	1.82	0.62
1:E:114:THR:O	1:E:118:GLN:HG2	1.99	0.61
1:D:102:ILE:HG13	1:D:106:ALA:HB2	1.81	0.61
1:D:114:THR:O	1:D:118:GLN:HG2	2.01	0.61
1:F:201:HIS:HE1	1:F:224:ASP:OD1	1.83	0.61
1:A:47:LEU:HD12	1:A:73:ILE:CD1	2.31	0.60
1:E:1:ALA:HB3	1:E:247:ASN:ND2	2.16	0.60
1:C:47:LEU:HD12	1:C:73:ILE:CD1	2.30	0.60
1:D:235:ARG:O	1:D:239:GLU:HG3	2.01	0.60
1:E:47:LEU:HD12	1:E:73:ILE:CD1	2.32	0.60
1:F:128:TYR:OH	1:F:201:HIS:HD2	1.84	0.60
1:D:18:VAL:O	1:D:19:GLU:HB2	2.02	0.59
1:A:1:ALA:HB3	1:A:247:ASN:HD22	1.67	0.58
1:B:9:ALA:C	1:B:10:LEU:HD12	2.30	0.57
1:D:39:TYR:OH	1:D:228:HIS:CD2	2.52	0.57
1:D:88:THR:O	1:D:92:LEU:HD22	2.05	0.57
1:E:143:TYR:O	1:E:146:THR:CG2	2.44	0.57
1:A:2:LEU:HD22	1:A:2:LEU:N	2.19	0.57
1:A:1:ALA:HB3	1:A:247:ASN:ND2	2.19	0.56
1:D:50:TRP:CZ3	1:D:81:GLY:HA3	2.40	0.56
1:A:9:ALA:HA	1:A:48:SER:HB3	1.88	0.56
1:D:201:HIS:O	1:D:202:ARG:CB	2.45	0.56
1:F:93:ILE:HG21	1:F:120:PHE:CD1	2.41	0.56
1:E:59:ARG:HE	1:E:88:THR:HG23	1.71	0.55
1:B:139:MET:HE1	1:B:150:GLY:C	2.31	0.55
1:C:63:LEU:HD12	1:C:63:LEU:C	2.31	0.55
1:D:10:LEU:N	1:D:10:LEU:HD12	2.20	0.55
1:A:141:PHE:HB2	1:A:173:ILE:HD11	1.88	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2:LEU:H	1:A:2:LEU:CD2	2.20	0.55
1:D:47:LEU:HD12	1:D:73:ILE:HD13	1.88	0.54
1:F:83:ILE:O	1:F:84:HIS:CA	2.54	0.54
1:B:133:ARG:NH2	1:B:183:ASP:OD2	2.37	0.54
1:B:161:GLU:OE2	2:B:256:15P:HCM2	2.08	0.54
1:B:128:TYR:OH	1:B:201:HIS:HD2	1.90	0.54
1:A:123:GLN:H	1:A:123:GLN:NE2	2.06	0.54
1:F:95:ARG:NH1	1:F:95:ARG:HB2	2.23	0.54
1:D:201:HIS:HE1	1:D:224:ASP:OD1	1.91	0.54
1:B:139:MET:HE1	1:B:150:GLY:O	2.08	0.53
1:F:117:ALA:O	1:F:121:GLY:N	2.40	0.53
1:A:226:VAL:HG22	3:A:260:HOH:O	2.09	0.53
1:D:197:PRO:HA	1:D:219:ASP:OD2	2.09	0.53
1:D:95:ARG:HH11	1:D:95:ARG:CB	2.19	0.52
1:F:73:ILE:HD12	1:F:75:ILE:HG13	1.91	0.52
1:F:47:LEU:HD12	1:F:73:ILE:CD1	2.39	0.52
1:E:139:MET:CE	1:E:150:GLY:HA2	2.39	0.52
1:A:199:ILE:HG12	1:A:220:ALA:HB3	1.92	0.52
1:C:128:TYR:OH	1:C:201:HIS:HD2	1.93	0.51
1:C:139:MET:HE2	1:C:150:GLY:HA2	1.93	0.51
1:A:2:LEU:N	1:A:2:LEU:CD2	2.74	0.51
1:B:139:MET:CE	1:B:150:GLY:C	2.84	0.51
1:B:47:LEU:HD12	1:B:73:ILE:CD1	2.41	0.51
1:C:197:PRO:HA	1:C:219:ASP:OD2	2.11	0.51
1:D:172:SER:O	1:D:202:ARG:HG2	2.10	0.50
1:F:114:THR:O	1:F:118:GLN:HG2	2.10	0.50
1:C:102:ILE:HG13	1:C:106:ALA:HB2	1.93	0.50
1:C:201:HIS:C	1:C:202:ARG:HG2	2.36	0.50
1:F:90:SER:HB2	1:F:120:PHE:HE2	1.75	0.50
1:E:39:TYR:OH	1:E:228:HIS:CD2	2.60	0.50
1:A:241:LEU:HB3	1:A:246:VAL:HB	1.94	0.50
1:F:141:PHE:HB2	1:F:173:ILE:HD11	1.93	0.50
1:B:95:ARG:O	1:B:95:ARG:HG3	2.12	0.50
1:C:199:ILE:HG12	1:C:220:ALA:HB3	1.94	0.49
1:A:60:LYS:O	1:A:60:LYS:HG3	2.09	0.49
1:C:50:TRP:CH2	1:C:81:GLY:HA3	2.47	0.49
1:A:143:TYR:O	1:A:146:THR:HG23	2.13	0.49
1:C:133:ARG:NH2	1:C:183:ASP:OD2	2.44	0.49
1:E:167:GLU:HG3	1:E:197:PRO:HB2	1.94	0.49
1:A:16:ARG:NH1	1:A:28:ASP:OD2	2.34	0.49
1:A:128:TYR:OH	1:A:201:HIS:HD2	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:167:GLU:HG3	1:B:197:PRO:HB2	1.95	0.48
1:D:143:TYR:O	1:D:146:THR:CG2	2.55	0.48
1:E:139:MET:HE1	1:E:150:GLY:C	2.38	0.48
1:A:167:GLU:HG3	1:A:197:PRO:HB2	1.94	0.48
1:B:60:LYS:HD2	1:B:64:GLU:OE2	2.13	0.48
1:A:50:TRP:CH2	1:A:81:GLY:HA3	2.49	0.48
1:C:47:LEU:CD1	1:C:73:ILE:HD13	2.41	0.47
1:C:51:ASP:OD2	1:C:58:LYS:NZ	2.47	0.47
1:E:133:ARG:NH2	1:E:183:ASP:OD2	2.37	0.47
1:F:50:TRP:CH2	1:F:81:GLY:HA3	2.50	0.47
1:E:141:PHE:HB2	1:E:173:ILE:HD11	1.97	0.47
1:C:9:ALA:O	1:C:228:HIS:HE1	1.97	0.47
1:F:18:VAL:HG12	1:F:19:GLU:HG3	1.96	0.47
1:C:60:LYS:O	1:C:63:LEU:HG	2.15	0.47
1:C:167:GLU:HG3	1:C:197:PRO:HB2	1.97	0.47
1:F:101:GLU:HA	1:F:126:VAL:O	2.14	0.47
1:B:201:HIS:HE1	1:B:224:ASP:OD1	1.98	0.47
1:F:95:ARG:HB2	1:F:95:ARG:HH11	1.79	0.47
1:D:123:GLN:NE2	1:D:123:GLN:H	2.12	0.46
1:C:123:GLN:H	1:C:123:GLN:NE2	2.14	0.46
1:D:176:LEU:HD12	1:D:202:ARG:CZ	2.45	0.46
1:E:86:PHE:O	1:E:90:SER:HB3	2.15	0.46
1:B:141:PHE:HB2	1:B:173:ILE:HD11	1.95	0.46
1:E:50:TRP:CZ3	1:E:81:GLY:HA3	2.50	0.46
1:F:88:THR:O	1:F:92:LEU:HD22	2.16	0.46
1:E:95:ARG:HB2	1:E:95:ARG:NH1	2.31	0.46
1:A:201:HIS:HE1	1:A:224:ASP:OD1	1.99	0.46
1:E:206:LYS:O	1:E:209:HIS:HB2	2.16	0.46
1:C:201:HIS:CE1	1:C:224:ASP:OD1	2.67	0.46
1:D:18:VAL:O	1:D:19:GLU:CB	2.64	0.46
1:E:154:ARG:HG3	1:E:155:ASP:N	2.30	0.46
1:E:47:LEU:O	1:E:77:PHE:HA	2.16	0.46
1:F:80:GLY:HA2	1:F:83:ILE:HD12	1.98	0.46
2:B:256:15P:H682	3:B:269:HOH:O	2.16	0.45
1:F:16:ARG:NH1	1:F:28:ASP:OD2	2.37	0.45
1:B:10:LEU:N	1:B:10:LEU:CD1	2.76	0.45
1:D:181:GLY:HA2	1:D:209:HIS:CG	2.51	0.45
1:E:95:ARG:O	1:E:95:ARG:HG3	2.16	0.45
1:B:159:GLU:O	1:B:163:ARG:HG2	2.15	0.45
1:C:12:VAL:HA	1:C:16:ARG:O	2.15	0.45
1:C:154:ARG:HG3	1:C:155:ASP:N	2.29	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:199:ILE:HG12	1:B:220:ALA:HB3	1.97	0.45
1:F:144:SER:O	1:F:146:THR:CG2	2.65	0.45
1:A:86:PHE:O	1:A:90:SER:HB3	2.17	0.45
1:B:51:ASP:OD2	1:B:58:LYS:NZ	2.50	0.45
1:B:156:TRP:O	1:B:160:VAL:HG23	2.16	0.45
1:B:176:LEU:HD12	1:B:202:ARG:CZ	2.47	0.45
1:F:167:GLU:HG3	1:F:197:PRO:HB2	1.98	0.45
1:F:197:PRO:HA	1:F:219:ASP:OD2	2.17	0.45
1:B:39:TYR:OH	1:B:228:HIS:CD2	2.59	0.44
1:B:159:GLU:O	1:B:163:ARG:CG	2.65	0.44
1:C:93:ILE:HG21	1:C:120:PHE:CD1	2.52	0.44
1:F:37:LYS:O	1:F:37:LYS:HG3	2.15	0.44
1:C:47:LEU:O	1:C:77:PHE:HA	2.17	0.44
1:E:123:GLN:H	1:E:123:GLN:NE2	2.15	0.44
1:F:95:ARG:HG3	1:F:95:ARG:O	2.17	0.44
1:F:128:TYR:OH	1:F:201:HIS:CD2	2.70	0.44
1:F:102:ILE:HG13	1:F:106:ALA:HB2	1.99	0.43
1:F:176:LEU:HD12	1:F:202:ARG:CZ	2.48	0.43
1:D:95:ARG:O	1:D:95:ARG:HG3	2.17	0.43
1:A:141:PHE:HB2	1:A:173:ILE:CD1	2.48	0.43
1:C:132:LYS:HB2	1:C:173:ILE:HD12	2.01	0.43
1:E:12:VAL:HA	1:E:16:ARG:O	2.19	0.43
1:A:66:VAL:CG2	1:A:95:ARG:HB3	2.49	0.43
1:C:60:LYS:HA	1:C:63:LEU:CG	2.48	0.43
1:E:95:ARG:HB2	1:E:95:ARG:HH11	1.84	0.43
1:A:123:GLN:H	1:A:123:GLN:HE21	1.64	0.43
1:C:9:ALA:HA	1:C:48:SER:HB3	1.99	0.43
1:C:73:ILE:HD12	1:C:75:ILE:HG13	2.00	0.43
1:D:9:ALA:O	1:D:228:HIS:HE1	2.02	0.43
1:E:59:ARG:HB3	1:E:59:ARG:NH1	2.27	0.43
1:B:50:TRP:CH2	1:B:81:GLY:HA3	2.54	0.42
1:E:102:ILE:HG13	1:E:106:ALA:HB2	2.00	0.42
1:F:62:MET:O	1:F:66:VAL:HG13	2.19	0.42
1:B:132:LYS:HB2	1:B:173:ILE:HD12	2.01	0.42
1:F:199:ILE:HG12	1:F:220:ALA:HB3	2.01	0.42
1:F:66:VAL:CG2	1:F:67:GLU:N	2.81	0.42
1:D:168:ILE:HD13	1:D:168:ILE:HG21	1.79	0.42
1:E:188:ARG:HG3	1:E:216:ALA:HB1	2.01	0.42
1:C:60:LYS:HA	1:C:63:LEU:HG	2.01	0.42
1:F:201:HIS:CE1	1:F:224:ASP:OD1	2.69	0.42
1:B:110:PRO:HB2	1:B:163:ARG:CZ	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:18:VAL:O	1:C:19:GLU:HB2	2.20	0.42
1:A:62:MET:O	1:A:66:VAL:HG13	2.20	0.42
1:B:62:MET:O	1:B:66:VAL:HG13	2.20	0.42
1:C:110:PRO:HB2	1:C:163:ARG:CZ	2.50	0.42
1:B:9:ALA:O	1:B:228:HIS:CE1	2.73	0.42
1:C:134:VAL:HG13	1:C:139:MET:CG	2.50	0.42
1:E:9:ALA:O	1:E:228:HIS:CE1	2.73	0.42
1:F:18:VAL:O	1:F:19:GLU:HB2	2.20	0.42
1:B:66:VAL:CG2	1:B:67:GLU:N	2.81	0.41
1:A:139:MET:HE1	1:A:150:GLY:C	2.46	0.41
1:C:139:MET:CE	1:C:150:GLY:HA2	2.49	0.41
1:A:12:VAL:HA	1:A:16:ARG:O	2.20	0.41
1:B:190:VAL:O	1:B:191:ARG:C	2.63	0.41
1:C:249:ARG:HH11	1:C:249:ARG:HD2	1.68	0.41
1:D:18:VAL:HG12	1:D:19:GLU:HG3	2.01	0.41
1:E:10:LEU:N	1:E:10:LEU:HD12	2.35	0.41
1:F:90:SER:HB2	1:F:120:PHE:CE2	2.55	0.41
1:F:144:SER:O	1:F:146:THR:HG23	2.20	0.41
1:C:168:ILE:HG21	1:C:168:ILE:HD13	1.87	0.41
1:B:161:GLU:OE2	2:B:256:15P:CM	2.68	0.41
1:D:123:GLN:H	1:D:123:GLN:HE21	1.69	0.41
1:F:69:VAL:HG12	1:F:77:PHE:CE2	2.56	0.41
1:A:168:ILE:HG21	1:A:168:ILE:HD13	1.75	0.41
1:C:9:ALA:O	1:C:228:HIS:CE1	2.73	0.41
1:B:18:VAL:HG12	1:B:19:GLU:HG3	2.02	0.41
1:F:112:LEU:O	1:F:116:ILE:HD12	2.21	0.41
1:E:5:ARG:O	1:E:220:ALA:HA	2.21	0.40
1:F:60:LYS:HD2	1:F:64:GLU:OE2	2.20	0.40
1:D:102:ILE:HD12	1:D:102:ILE:HG21	1.89	0.40
1:A:17:VAL:HG23	1:A:30:GLY:O	2.20	0.40
1:E:2:LEU:CD2	1:E:2:LEU:H	2.34	0.40
1:E:2:LEU:CD2	1:E:2:LEU:N	2.84	0.40
1:E:2:LEU:N	1:E:2:LEU:HD22	2.36	0.40
1:E:9:ALA:O	1:E:228:HIS:HE1	2.05	0.40
1:C:188:ARG:HH11	1:C:188:ARG:HD3	1.63	0.40
1:F:168:ILE:HG21	1:F:168:ILE:HD13	1.81	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:95:ARG:NH2	1:C:95:ARG:NH1[3_664]	2.19	0.01

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	245/256 (96%)	232 (95%)	10 (4%)	3 (1%)	10	12
1	B	244/256 (95%)	230 (94%)	11 (4%)	3 (1%)	10	12
1	C	248/256 (97%)	240 (97%)	7 (3%)	1 (0%)	30	38
1	D	243/256 (95%)	234 (96%)	6 (2%)	3 (1%)	10	12
1	E	241/256 (94%)	231 (96%)	8 (3%)	2 (1%)	16	20
1	F	241/256 (94%)	228 (95%)	10 (4%)	3 (1%)	10	12
All	All	1462/1536 (95%)	1395 (95%)	52 (4%)	15 (1%)	12	15

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	94	LEU
1	D	19	GLU
1	D	202	ARG
1	F	18	VAL
1	F	19	GLU
1	F	25	ASN
1	A	2	LEU
1	A	202	ARG
1	B	25	ASN
1	B	202	ARG
1	C	202	ARG
1	E	18	VAL
1	E	202	ARG
1	B	18	VAL
1	D	18	VAL

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	203/209 (97%)	181 (89%)	22 (11%)	6	7
1	B	202/209 (97%)	182 (90%)	20 (10%)	7	9
1	C	203/209 (97%)	182 (90%)	21 (10%)	7	8
1	D	201/209 (96%)	175 (87%)	26 (13%)	4	4
1	E	201/209 (96%)	179 (89%)	22 (11%)	6	7
1	F	200/209 (96%)	179 (90%)	21 (10%)	6	8
All	All	1210/1254 (96%)	1078 (89%)	132 (11%)	6	7

All (132) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	56	VAL
1	A	59	ARG
1	A	60	LYS
1	A	66	VAL
1	A	71	GLU
1	A	73	ILE
1	A	87	GLU
1	A	90	SER
1	A	94	LEU
1	A	95	ARG
1	A	102	ILE
1	A	111	SER
1	A	123	GLN
1	A	157	VAL
1	A	168	ILE
1	A	179	LYS
1	A	224	ASP
1	A	226	VAL
1	A	235	ARG
1	A	242	LYS
1	A	249	ARG
1	A	250	LEU

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Mol	Chain	Res	Type
1	B	59	ARG
1	B	60	LYS
1	B	66	VAL
1	B	73	ILE
1	B	87	GLU
1	B	91	GLU
1	B	95	ARG
1	B	102	ILE
1	B	111	SER
1	B	123	GLN
1	B	154	ARG
1	B	157	VAL
1	B	179	LYS
1	B	195	THR
1	B	202	ARG
1	B	224	ASP
1	B	226	VAL
1	B	235	ARG
1	B	242	LYS
1	B	250	LEU
1	C	2	LEU
1	C	48	SER
1	C	58	LYS
1	C	59	ARG
1	C	60	LYS
1	C	66	VAL
1	C	71	GLU
1	C	91	GLU
1	C	95	ARG
1	C	102	ILE
1	C	123	GLN
1	C	134	VAL
1	C	157	VAL
1	C	168	ILE
1	C	174	ASP
1	C	179	LYS
1	C	202	ARG
1	C	224	ASP
1	C	235	ARG
1	C	242	LYS
1	C	250	LEU
1	D	2	LEU

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Mol	Chain	Res	Type
1	D	48	SER
1	D	59	ARG
1	D	60	LYS
1	D	66	VAL
1	D	73	ILE
1	D	87	GLU
1	D	91	GLU
1	D	92	LEU
1	D	95	ARG
1	D	102	ILE
1	D	111	SER
1	D	118	GLN
1	D	123	GLN
1	D	154	ARG
1	D	157	VAL
1	D	168	ILE
1	D	169	VAL
1	D	179	LYS
1	D	202	ARG
1	D	224	ASP
1	D	226	VAL
1	D	234	VAL
1	D	235	ARG
1	D	242	LYS
1	D	250	LEU
1	E	59	ARG
1	E	60	LYS
1	E	66	VAL
1	E	71	GLU
1	E	73	ILE
1	E	87	GLU
1	E	88	THR
1	E	90	SER
1	E	91	GLU
1	E	95	ARG
1	E	102	ILE
1	E	111	SER
1	E	123	GLN
1	E	157	VAL
1	E	160	VAL
1	E	168	ILE
1	E	179	LYS

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Mol	Chain	Res	Type
1	E	202	ARG
1	E	224	ASP
1	E	235	ARG
1	E	242	LYS
1	E	250	LEU
1	F	37	LYS
1	F	59	ARG
1	F	60	LYS
1	F	66	VAL
1	F	71	GLU
1	F	73	ILE
1	F	92	LEU
1	F	95	ARG
1	F	102	ILE
1	F	123	GLN
1	F	157	VAL
1	F	168	ILE
1	F	169	VAL
1	F	179	LYS
1	F	224	ASP
1	F	226	VAL
1	F	231	GLU
1	F	234	VAL
1	F	235	ARG
1	F	242	LYS
1	F	250	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	123	GLN
1	A	201	HIS
1	A	228	HIS
1	A	247	ASN
1	B	118	GLN
1	B	123	GLN
1	B	201	HIS
1	B	228	HIS
1	B	247	ASN
1	C	123	GLN
1	C	201	HIS
1	C	228	HIS

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Mol	Chain	Res	Type
1	D	115	GLN
1	D	123	GLN
1	D	201	HIS
1	D	228	HIS
1	E	123	GLN
1	E	228	HIS
1	E	244	HIS
1	E	247	ASN
1	F	201	HIS
1	F	228	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

3 ligands are modelled in this entry.

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	$\# Z > 2$
2	15P	A	256	-	9,9,103	0.90	0	8,8,102	1.13	0
2	15P	E	256	-	10,10,103	0.78	0	9,9,102	0.97	1 (11%)
2	15P	B	256	-	10,10,103	0.83	0	9,9,102	1.62	2 (22%)

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
2	15P	A	256	-	-	4/7/7/101	-
2	15P	E	256	-	-	5/8/8/101	-
2	15P	B	256	-	-	3/8/8/101	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	256	15P	O32-C64-C63	-3.57	94.39	110.11
2	B	256	15P	O32-C65-C66	2.45	121.53	110.35
2	E	256	15P	O33-C67-C68	-2.23	100.27	110.11

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	256	15P	O31-C63-C64-O32
2	E	256	15P	C64-C63-O31-C62
2	B	256	15P	O32-C65-C66-O33
2	B	256	15P	C65-C66-O33-C67
2	A	256	15P	C68-C67-O33-C66
2	E	256	15P	O33-C67-C68-O34
2	E	256	15P	C68-C67-O33-C66
2	A	256	15P	C65-C66-O33-C67
2	B	256	15P	O31-C63-C64-O32
2	A	256	15P	O32-C65-C66-O33
2	E	256	15P	O32-C65-C66-O33
2	E	256	15P	O31-C63-C64-O32

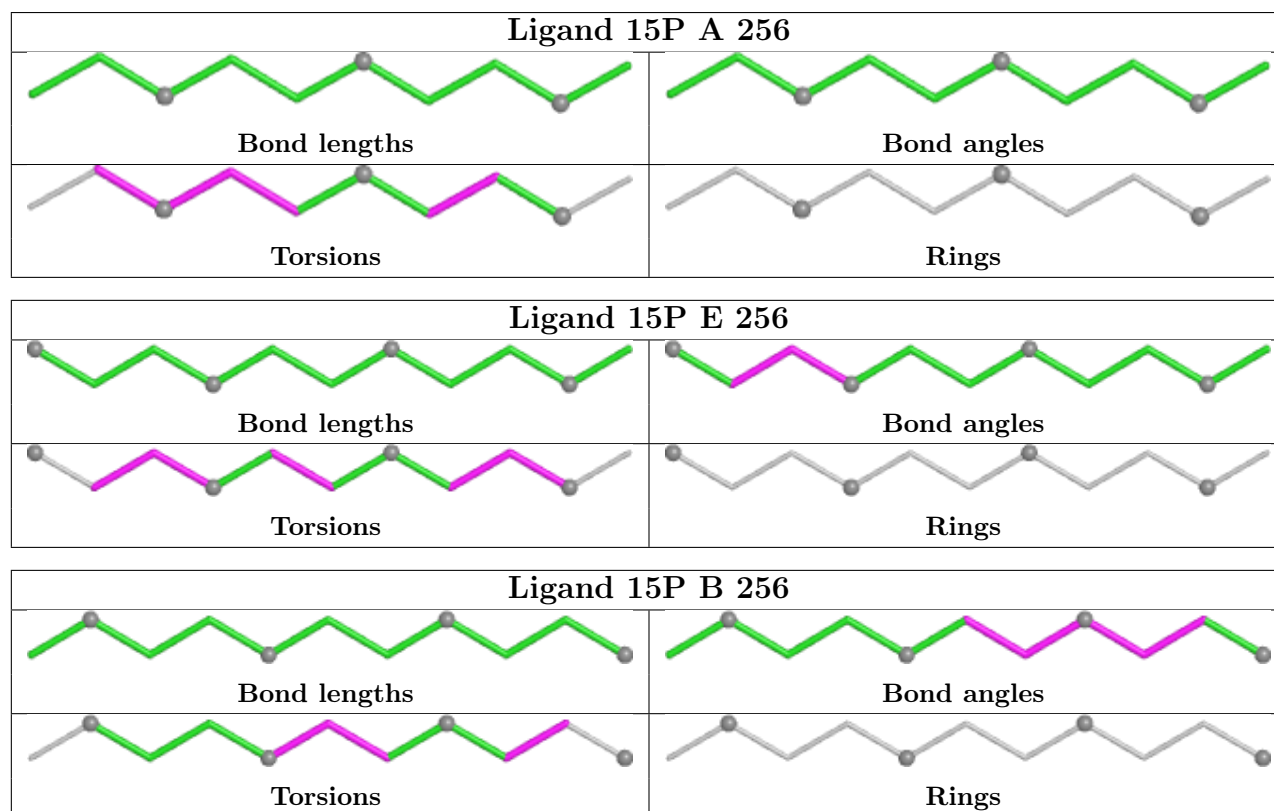
There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	256	15P	4	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 ⓘ

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	249/256 (97%)	0.15	9 (3%)	46	48	11, 26, 42, 59	0
1	B	248/256 (96%)	0.31	13 (5%)	33	34	11, 26, 42, 59	0
1	C	250/256 (97%)	0.17	9 (3%)	46	48	11, 26, 43, 59	0
1	D	247/256 (96%)	0.12	10 (4%)	42	44	11, 26, 42, 59	0
1	E	247/256 (96%)	0.16	9 (3%)	46	48	10, 26, 42, 59	0
1	F	247/256 (96%)	0.35	10 (4%)	42	44	11, 26, 42, 59	0
All	All	1488/1536 (96%)	0.21	60 (4%)	42	44	10, 26, 43, 59	0

All (60) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	63	LEU	5.4
1	D	59	ARG	3.9
1	C	84	HIS	3.8
1	D	54	ALA	3.7
1	A	56	VAL	3.3
1	A	84	HIS	3.3
1	E	1	ALA	3.2
1	F	60	LYS	3.1
1	F	24	GLU	3.1
1	F	25	ASN	3.1
1	F	54	ALA	3.1
1	D	24	GLU	3.0
1	F	27	ARG	2.9
1	A	229	PHE	2.9
1	A	59	ARG	2.9
1	B	59	ARG	2.9
1	F	84	HIS	2.9
1	E	59	ARG	2.8
1	E	24	GLU	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	25	ASN	2.7
1	B	115	GLN	2.7
1	A	24	GLU	2.7
1	D	111	SER	2.7
1	B	25	ASN	2.6
1	B	60	LYS	2.5
1	B	84	HIS	2.5
1	B	229	PHE	2.5
1	C	87	GLU	2.5
1	C	59	ARG	2.4
1	B	1	ALA	2.4
1	E	2	LEU	2.4
1	E	54	ALA	2.4
1	C	91	GLU	2.4
1	C	27	ARG	2.3
1	D	84	HIS	2.3
1	E	84	HIS	2.3
1	C	1	ALA	2.3
1	B	91	GLU	2.3
1	A	2	LEU	2.3
1	A	26	LEU	2.3
1	B	52	ILE	2.3
1	D	229	PHE	2.2
1	E	229	PHE	2.2
1	D	25	ASN	2.2
1	D	68	LYS	2.2
1	F	85	ASP	2.2
1	E	64	GLU	2.2
1	F	59	ARG	2.1
1	B	2	LEU	2.1
1	D	2	LEU	2.1
1	B	94	LEU	2.1
1	E	71	GLU	2.1
1	A	54	ALA	2.1
1	C	24	GLU	2.1
1	B	124	ALA	2.0
1	F	1	ALA	2.0
1	F	87	GLU	2.0
1	B	55	SER	2.0
1	C	57	GLU	2.0
1	D	1	ALA	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

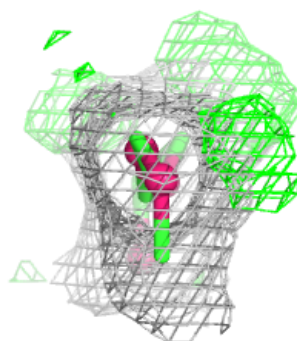
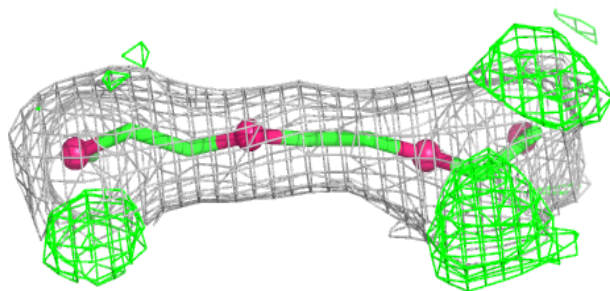
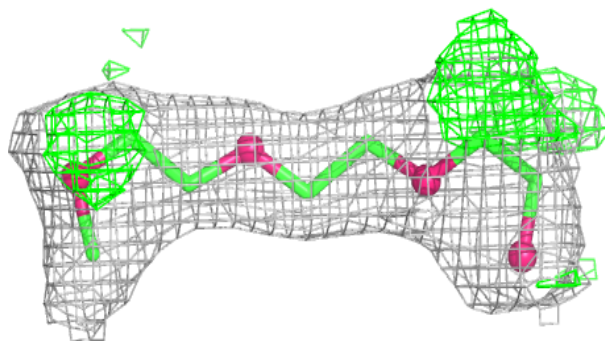
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	15P	E	256	11/104	0.72	0.17	33,42,48,49	0
2	15P	B	256	11/104	0.80	0.16	33,38,41,42	0
2	15P	A	256	10/104	0.80	0.17	33,39,40,42	0

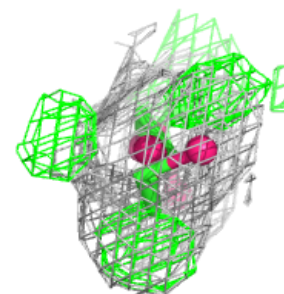
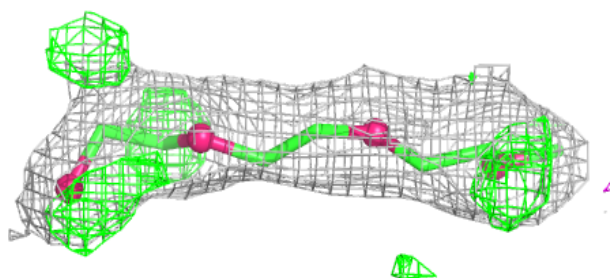
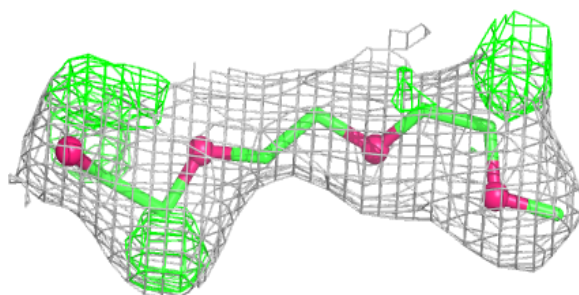
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 15P E 256:

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

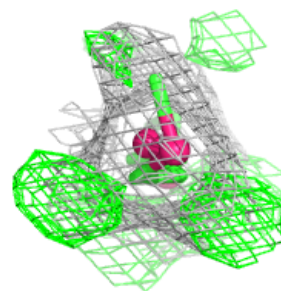
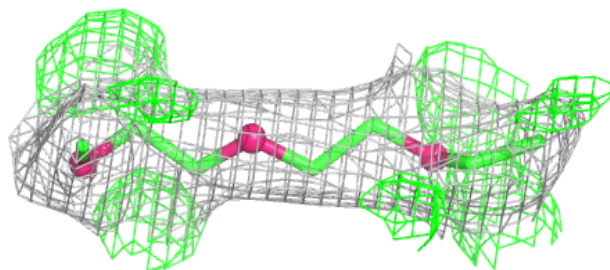
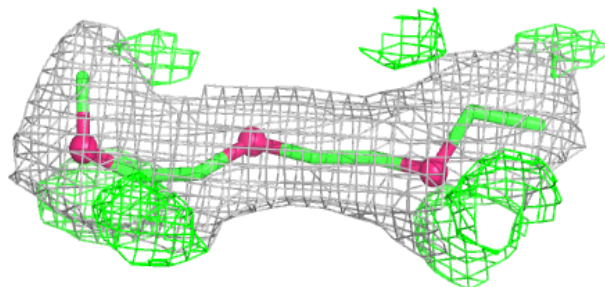
**Electron density around 15P B 256:**

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



Electron density around 15P A 256:

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



6.5 Other polymers [i](#)

There are no such residues in this entry.