



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 10:42 PM UTC

PDB ID : 5CEV / pdb_00005cev
Title : ARGINASE FROM BACILLUS CALDEVELOX, L-LYSINE COMPLEX
Authors : Bewley, M.C.; Jeffrey, P.D.; Patchett, M.L.; Kanyo, Z.F.; Baker, E.N.
Deposited on : 1999-03-16
Resolution : 2.50 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

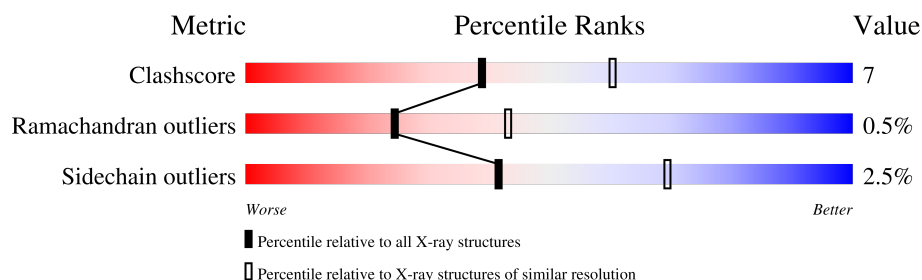
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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))
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	299	82% 16% .
1	B	299	85% 14% .
1	C	299	85% 13% .
1	D	299	80% 19% .
1	E	299	85% 13% .
1	F	299	82% 16% .

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 14082 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 PROTEIN (ARGINASE).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	298	Total	C	N	O	S	0	0	0
			2268	1425	401	431	11			
1	B	298	Total	C	N	O	S	0	0	0
			2268	1425	401	431	11			
1	C	298	Total	C	N	O	S	0	0	0
			2268	1425	401	431	11			
1	D	298	Total	C	N	O	S	0	0	0
			2268	1425	401	431	11			
1	E	298	Total	C	N	O	S	0	0	0
			2268	1425	401	431	11			
1	F	298	Total	C	N	O	S	0	0	0
			2268	1425	401	431	11			

- Molecule 2 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn).

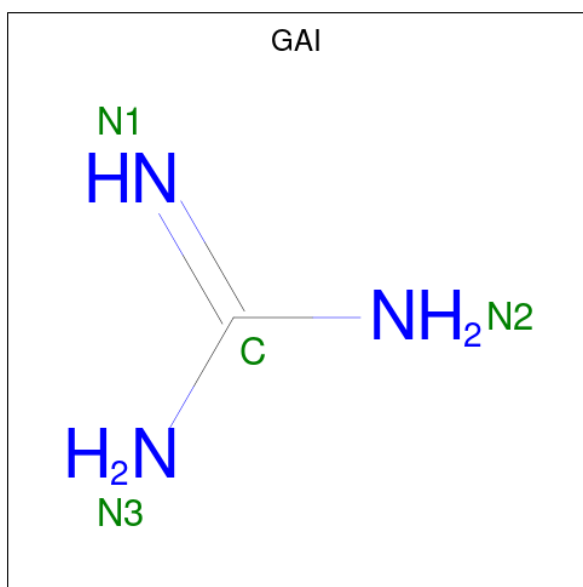
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Mn	0	0
			2	2		
2	B	2	Total	Mn	0	0
			2	2		
2	C	2	Total	Mn	0	0
			2	2		
2	D	2	Total	Mn	0	0
			2	2		
2	E	2	Total	Mn	0	0
			2	2		
2	F	2	Total	Mn	0	0
			2	2		

- Molecule 3 is LYSINE (CCD ID: LYS) (formula: C₆H₁₅N₂O₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			10	6	2	2		
3	B	1	Total	C	N	O	0	0
			10	6	2	2		
3	C	1	Total	C	N	O	0	0
			10	6	2	2		
3	D	1	Total	C	N	O	0	0
			10	6	2	2		
3	E	1	Total	C	N	O	0	0
			10	6	2	2		
3	F	1	Total	C	N	O	0	0
			10	6	2	2		

- Molecule 4 is GUANIDINE (CCD ID: GAI) (formula: CH_5N_3).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	N	0	0
			4	1	3		
4	B	1	Total	C	N	0	0
			4	1	3		
4	C	1	Total	C	N	0	0
			4	1	3		
4	D	1	Total	C	N	0	0
			4	1	3		
4	E	1	Total	C	N	0	0
			4	1	3		
4	F	1	Total	C	N	0	0
			4	1	3		

- Molecule 5 is water.

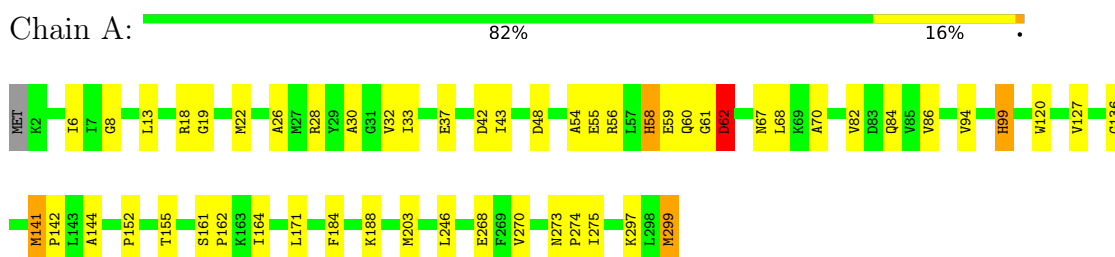
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	75	Total	O	0	0
			75	75		
5	B	61	Total	O	0	0
			61	61		
5	C	59	Total	O	0	0
			59	59		
5	D	59	Total	O	0	0
			59	59		
5	E	68	Total	O	0	0
			68	68		
5	F	56	Total	O	0	0
			56	56		

3 Residue-property plots

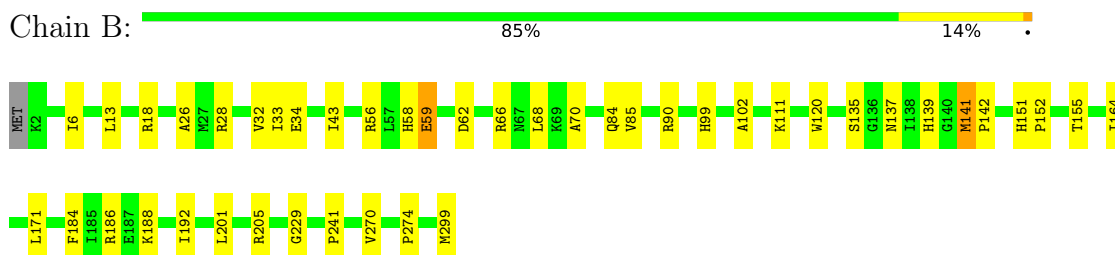
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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. 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.

Note EDS was not executed.

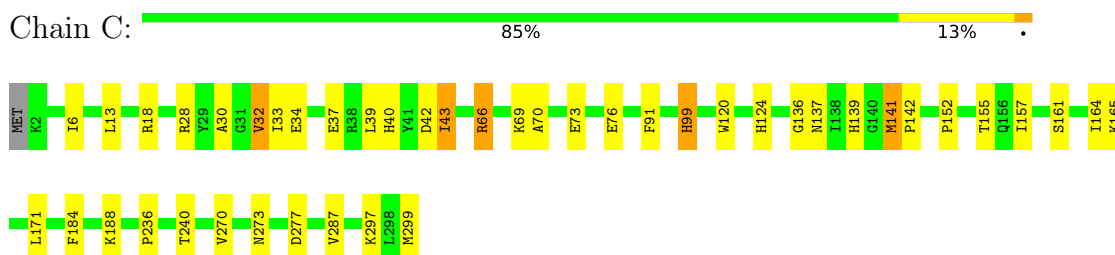
• Molecule 1: PROTEIN (ARGINASE)



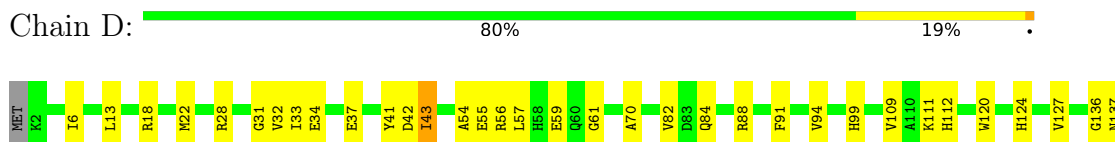
• Molecule 1: PROTEIN (ARGINASE)



• Molecule 1: PROTEIN (ARGINASE)



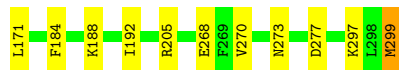
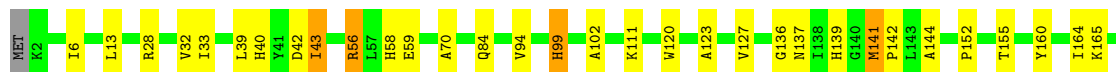
• Molecule 1: PROTEIN (ARGINASE)





• Molecule 1: PROTEIN (ARGINASE)

Chain E: 85% 13% .



• Molecule 1: PROTEIN (ARGINASE)

Chain F: 82% 16% .



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	106.40Å 277.00Å 138.80Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.50	Depositor
% Data completeness (in resolution range)	94.5 (8.00-2.50)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	X-PLOR 3.1	Depositor
R, R_{free}	0.212 , 0.261	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	14082	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MN, GAI

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	0.64	0/2307	1.01	7/3116 (0.2%)
1	B	0.64	0/2307	1.01	3/3116 (0.1%)
1	C	0.63	0/2307	1.01	8/3116 (0.3%)
1	D	0.67	0/2307	0.99	7/3116 (0.2%)
1	E	0.65	0/2307	1.01	8/3116 (0.3%)
1	F	0.64	1/2307 (0.0%)	1.01	7/3116 (0.2%)
All	All	0.64	1/13842 (0.0%)	1.01	40/18696 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	240	THR	CA-CB	5.57	1.59	1.53

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	270	VAL	N-CA-C	8.57	119.28	108.82
1	C	270	VAL	N-CA-C	8.07	118.67	108.82
1	F	270	VAL	N-CA-C	7.86	118.41	108.82
1	A	270	VAL	N-CA-C	7.72	119.92	108.96
1	B	270	VAL	N-CA-C	7.64	119.80	108.96
1	D	270	VAL	N-CA-C	6.85	118.69	108.96
1	F	42	ASP	N-CA-C	-6.79	96.05	107.99
1	D	42	ASP	N-CA-C	-6.54	96.48	107.99
1	E	42	ASP	N-CA-C	-6.44	96.66	107.99
1	D	295	GLY	N-CA-C	6.00	123.72	115.27
1	D	61	GLY	N-CA-C	5.92	121.33	114.16
1	F	295	GLY	N-CA-C	5.92	123.62	115.27
1	A	273	ASN	CA-C-N	5.82	125.51	119.05
1	A	273	ASN	C-N-CA	5.82	125.51	119.05

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	42	ASP	N-CA-C	-5.79	97.80	107.99
1	C	42	ASP	N-CA-C	-5.78	97.81	107.99
1	F	165	LYS	CA-C-N	5.75	125.87	119.32
1	F	165	LYS	C-N-CA	5.75	125.87	119.32
1	E	99	HIS	N-CA-C	5.73	119.75	112.87
1	E	273	ASN	CA-C-N	5.70	125.55	119.28
1	E	273	ASN	C-N-CA	5.70	125.55	119.28
1	E	123	ALA	N-CA-C	-5.59	106.30	113.23
1	D	136	GLY	N-CA-C	-5.57	107.57	115.43
1	C	273	ASN	CA-C-N	5.48	125.31	119.28
1	C	273	ASN	C-N-CA	5.48	125.31	119.28
1	F	49	ILE	CB-CA-C	-5.46	105.86	110.94
1	A	136	GLY	N-CA-C	-5.37	107.86	115.43
1	E	192	ILE	N-CA-C	5.31	115.92	108.17
1	C	32	VAL	N-CA-C	5.18	115.90	110.62
1	B	192	ILE	N-CA-C	5.16	116.09	108.45
1	C	99	HIS	N-CA-C	5.15	119.05	112.87
1	C	165	LYS	CA-C-N	5.15	125.19	119.32
1	C	165	LYS	C-N-CA	5.15	125.19	119.32
1	A	30	ALA	N-CA-C	-5.14	106.98	113.20
1	A	99	HIS	N-CA-C	5.11	119.00	112.87
1	B	229	GLY	N-CA-C	-5.07	106.57	113.37
1	F	123	ALA	N-CA-C	-5.07	106.94	113.23
1	E	136	GLY	N-CA-C	-5.04	108.37	115.32
1	D	165	LYS	CA-C-N	5.02	125.04	119.32
1	D	165	LYS	C-N-CA	5.02	125.04	119.32

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2268	0	2290	37	0
1	B	2268	0	2290	29	0
1	C	2268	0	2290	27	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2268	0	2290	33	0
1	E	2268	0	2290	23	0
1	F	2268	0	2290	40	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
3	A	10	0	12	0	0
3	B	10	0	12	0	0
3	C	10	0	12	0	0
3	D	10	0	12	0	0
3	E	10	0	12	0	0
3	F	10	0	12	0	0
4	B	8	0	8	0	0
4	C	4	0	4	0	0
4	D	4	0	4	0	0
4	E	4	0	4	0	0
4	F	4	0	4	0	0
5	A	75	0	0	2	0
5	B	61	0	0	1	0
5	C	59	0	0	2	0
5	D	59	0	0	2	0
5	E	68	0	0	1	0
5	F	56	0	0	1	0
All	All	14082	0	13836	186	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 7.

All (186) 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:62:ASP:HB2	1:B:66:ARG:HA	1.38	1.03
1:F:55:GLU:HB3	1:F:60:GLN:NE2	1.77	0.99
1:F:62:ASP:HB3	1:F:65:LEU:HB2	1.43	0.96
1:F:64:ARG:HG3	1:F:130:ALA:HB1	1.53	0.87
1:F:55:GLU:HB3	1:F:60:GLN:HE22	1.36	0.85
1:D:201:LEU:HB3	1:D:205:ARG:HG2	1.61	0.82
1:D:84:GLN:HE21	1:D:88:ARG:HE	1.30	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:120:TRP:HB3	1:C:171:LEU:HD23	1.64	0.79
1:F:60:GLN:HA	1:F:69:LYS:HZ3	1.48	0.78
1:B:62:ASP:HB2	1:B:66:ARG:CA	2.15	0.76
1:B:201:LEU:HB3	1:B:205:ARG:HG2	1.66	0.75
1:A:120:TRP:HB3	1:A:171:LEU:HD23	1.69	0.74
1:B:120:TRP:HB3	1:B:171:LEU:HD23	1.71	0.73
1:F:120:TRP:HB3	1:F:171:LEU:HD23	1.71	0.72
1:E:120:TRP:HB3	1:E:171:LEU:HD23	1.72	0.72
1:D:120:TRP:HB3	1:D:171:LEU:HD23	1.73	0.69
1:F:56:ARG:HB3	1:F:59:GLU:HB3	1.75	0.68
1:F:60:GLN:HA	1:F:60:GLN:HE21	1.57	0.68
1:E:58:HIS:HD2	1:E:59:GLU:HG3	1.59	0.65
1:B:56:ARG:HD2	1:B:56:ARG:H	1.62	0.64
1:A:54:ALA:HB1	1:A:67:ASN:OD1	1.99	0.63
1:C:152:PRO:HA	1:C:155:THR:OG1	2.00	0.62
1:F:60:GLN:NE2	1:F:60:GLN:HA	2.16	0.61
1:A:22:MET:SD	1:A:275:ILE:HD11	2.41	0.60
1:A:141:MET:N	1:A:142:PRO:HD2	2.17	0.59
1:D:141:MET:N	1:D:142:PRO:HD2	2.19	0.58
1:C:152:PRO:HA	1:C:155:THR:HG1	1.69	0.58
1:A:56:ARG:HG2	1:A:58:HIS:ND1	2.19	0.57
1:F:34:GLU:CD	1:F:34:GLU:H	2.13	0.57
1:E:152:PRO:HA	1:E:155:THR:OG1	2.04	0.56
1:F:165:LYS:HG3	5:F:328:HOH:O	2.05	0.56
1:C:66:ARG:HG3	1:C:136:GLY:O	2.06	0.55
1:D:41:TYR:HA	5:D:458:HOH:O	2.06	0.55
1:A:13:LEU:HD22	1:A:54:ALA:HB2	1.89	0.55
1:B:66:ARG:NH1	1:B:135:SER:O	2.40	0.55
1:F:141:MET:N	1:F:142:PRO:HD2	2.21	0.55
1:E:39:LEU:O	1:E:40:HIS:HB2	2.06	0.55
1:C:137:ASN:HB3	1:C:139:HIS:CD2	2.42	0.55
1:D:28:ARG:HA	1:D:32:VAL:HG12	1.89	0.55
1:F:141:MET:N	1:F:142:PRO:CD	2.70	0.55
1:D:56:ARG:O	1:D:59:GLU:HG2	2.06	0.54
1:B:141:MET:N	1:B:142:PRO:HD2	2.22	0.54
1:A:61:GLY:O	1:A:62:ASP:HB3	2.07	0.54
1:B:58:HIS:CE1	1:B:59:GLU:HG3	2.42	0.54
1:B:141:MET:N	1:B:142:PRO:CD	2.71	0.54
1:C:141:MET:N	1:C:142:PRO:CD	2.71	0.54
1:C:236:PRO:HG2	1:C:277:ASP:OD1	2.07	0.54
1:D:13:LEU:HD22	1:D:54:ALA:HB2	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:6:ILE:HG13	1:C:43:ILE:HD11	1.89	0.53
1:F:60:GLN:CA	1:F:69:LYS:HZ3	2.20	0.53
1:E:56:ARG:HH21	1:E:58:HIS:HB3	1.73	0.53
1:E:58:HIS:CD2	1:E:59:GLU:HG3	2.41	0.53
1:F:59:GLU:O	1:F:59:GLU:HG2	2.09	0.53
1:C:39:LEU:O	1:C:40:HIS:HB2	2.09	0.53
1:E:28:ARG:HA	1:E:32:VAL:HG12	1.91	0.53
1:A:141:MET:N	1:A:142:PRO:CD	2.72	0.53
1:B:6:ILE:CD1	1:B:43:ILE:HD11	2.38	0.53
1:C:13:LEU:HD13	1:C:70:ALA:CB	2.39	0.52
1:A:6:ILE:HG13	1:A:43:ILE:HD11	1.91	0.52
1:D:141:MET:N	1:D:142:PRO:CD	2.73	0.52
1:A:58:HIS:ND1	1:A:58:HIS:N	2.57	0.52
1:F:152:PRO:HA	1:F:155:THR:OG1	2.09	0.52
1:A:152:PRO:HA	1:A:155:THR:OG1	2.09	0.52
1:B:56:ARG:HB2	1:B:59:GLU:CD	2.35	0.51
1:C:141:MET:N	1:C:142:PRO:HD2	2.24	0.51
1:C:33:ILE:O	1:C:37:GLU:HG3	2.11	0.51
1:D:91:PHE:C	1:D:91:PHE:CD1	2.89	0.51
1:F:61:GLY:N	1:F:69:LYS:HE2	2.26	0.51
1:A:13:LEU:HD13	1:A:70:ALA:CB	2.40	0.51
1:A:299:MET:HE3	1:B:186:ARG:NH1	2.25	0.51
1:F:184:PHE:O	1:F:188:LYS:HG2	2.12	0.50
1:A:13:LEU:HD13	1:A:70:ALA:HB1	1.93	0.50
1:B:56:ARG:HD2	1:B:56:ARG:N	2.25	0.50
1:A:127:VAL:HA	1:A:144:ALA:HB2	1.94	0.50
1:B:34:GLU:CD	1:B:34:GLU:H	2.20	0.49
1:C:240:THR:HB	5:C:429:HOH:O	2.12	0.49
1:F:127:VAL:HA	1:F:144:ALA:HB2	1.94	0.49
1:A:33:ILE:O	1:A:37:GLU:HG3	2.13	0.49
1:A:155:THR:O	1:A:161:SER:HB3	2.12	0.49
1:D:84:GLN:NE2	1:D:88:ARG:HE	2.06	0.49
1:F:33:ILE:O	1:F:37:GLU:HG3	2.13	0.49
1:B:28:ARG:HA	1:B:32:VAL:HG12	1.96	0.48
1:B:62:ASP:CB	1:B:66:ARG:HA	2.28	0.48
1:C:13:LEU:HD13	1:C:70:ALA:HB1	1.94	0.48
1:D:124:HIS:HB3	5:D:416:HOH:O	2.13	0.48
1:A:22:MET:SD	1:A:275:ILE:CD1	3.02	0.47
1:B:6:ILE:HG13	1:B:43:ILE:HD11	1.96	0.47
1:D:184:PHE:O	1:D:188:LYS:HG2	2.15	0.47
1:C:33:ILE:HB	1:C:34:GLU:OE1	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:55:GLU:HB2	1:D:59:GLU:OE2	2.15	0.47
1:E:141:MET:N	1:E:142:PRO:CD	2.78	0.47
1:D:13:LEU:HD13	1:D:70:ALA:CB	2.44	0.47
1:F:63:SER:C	1:F:65:LEU:H	2.21	0.47
1:D:192:ILE:HD13	1:F:299:MET:HG2	1.96	0.47
1:F:61:GLY:H	1:F:69:LYS:HE2	1.80	0.46
1:C:28:ARG:HA	1:C:32:VAL:HG12	1.97	0.46
1:E:6:ILE:CD1	1:E:43:ILE:HD11	2.46	0.46
1:E:205:ARG:HG2	1:E:205:ARG:NH1	2.29	0.46
1:E:141:MET:N	1:E:142:PRO:HD2	2.31	0.46
1:F:281:LYS:O	1:F:285:VAL:HG23	2.15	0.46
1:A:61:GLY:HA3	1:A:68:LEU:HD23	1.98	0.46
1:D:6:ILE:HG13	1:D:43:ILE:HD11	1.97	0.46
1:E:137:ASN:HB3	1:E:139:HIS:CD2	2.51	0.46
1:A:82:VAL:O	1:A:86:VAL:HG23	2.15	0.46
1:D:33:ILE:O	1:D:37:GLU:HG3	2.16	0.45
1:A:55:GLU:HB3	1:A:60:GLN:NE2	2.32	0.45
1:B:18:ARG:HD3	1:B:18:ARG:HA	1.75	0.45
1:E:111:LYS:HB3	1:E:160:TYR:CZ	2.51	0.45
1:F:91:PHE:CD1	1:F:91:PHE:C	2.94	0.45
1:F:28:ARG:HA	1:F:32:VAL:HG12	1.97	0.45
1:F:137:ASN:HB3	1:F:139:HIS:CD2	2.51	0.45
1:B:152:PRO:HA	1:B:155:THR:OG1	2.16	0.45
1:B:137:ASN:HB3	1:B:139:HIS:CD2	2.51	0.45
1:D:31:GLY:HA2	1:D:34:GLU:OE1	2.17	0.45
1:B:184:PHE:O	1:B:188:LYS:HG2	2.17	0.45
1:D:84:GLN:HE21	1:D:88:ARG:NE	2.07	0.45
1:B:68:LEU:HD21	1:B:151:HIS:CE1	2.52	0.45
1:C:91:PHE:C	1:C:91:PHE:CD1	2.94	0.44
1:C:155:THR:O	1:C:161:SER:HB3	2.17	0.44
1:D:152:PRO:HA	1:D:155:THR:OG1	2.17	0.44
1:E:299:MET:HE2	1:F:185:ILE:HG22	1.99	0.44
1:A:18:ARG:HA	1:A:18:ARG:HD3	1.82	0.44
1:C:6:ILE:CD1	1:C:43:ILE:HD11	2.47	0.44
1:D:18:ARG:HA	1:D:18:ARG:HD3	1.78	0.44
1:A:94:VAL:O	1:A:268:GLU:HA	2.17	0.44
1:E:127:VAL:HA	1:E:144:ALA:HB2	1.98	0.44
1:A:6:ILE:HD12	1:A:33:ILE:CD1	2.48	0.44
1:E:184:PHE:O	1:E:188:LYS:HG2	2.18	0.44
1:D:137:ASN:HB3	1:D:139:HIS:CD2	2.53	0.44
1:F:15:GLN:HE22	1:F:18:ARG:HH12	1.66	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:297:LYS:HB3	1:F:297:LYS:HE2	1.86	0.43
1:B:241:PRO:HA	5:B:421:HOH:O	2.18	0.43
1:A:297:LYS:HB3	1:A:297:LYS:HE2	1.81	0.43
1:D:111:LYS:HG3	1:D:112:HIS:CD2	2.54	0.43
1:C:297:LYS:HE2	1:C:297:LYS:HB3	1.84	0.43
1:A:184:PHE:O	1:A:188:LYS:HG2	2.17	0.43
1:E:6:ILE:HD12	1:E:33:ILE:CD1	2.49	0.43
1:A:55:GLU:HB3	1:A:60:GLN:HG2	2.00	0.43
1:B:13:LEU:HD13	1:B:70:ALA:HB1	2.01	0.43
1:D:13:LEU:HD13	1:D:70:ALA:HB1	2.01	0.43
1:E:102:ALA:HB3	1:E:142:PRO:HB2	2.01	0.42
1:F:64:ARG:H	1:F:64:ARG:HG2	1.58	0.42
1:A:161:SER:HB2	5:A:441:HOH:O	2.19	0.42
1:D:175:ARG:HD3	1:D:195:MET:HG3	2.01	0.42
1:C:69:LYS:O	1:C:73:GLU:HB2	2.18	0.42
1:A:19:GLY:HA2	1:A:275:ILE:HD12	2.00	0.42
1:E:13:LEU:HD13	1:E:70:ALA:CB	2.49	0.42
1:F:15:GLN:NE2	1:F:18:ARG:HH12	2.18	0.42
1:D:203:MET:CE	1:D:246:LEU:HD22	2.50	0.42
1:C:184:PHE:O	1:C:188:LYS:HG2	2.20	0.42
1:E:94:VAL:O	1:E:268:GLU:HA	2.20	0.42
1:C:76:GLU:OE2	1:C:157:ILE:HA	2.19	0.42
1:D:22:MET:SD	1:D:275:ILE:HD11	2.60	0.42
1:D:297:LYS:HB3	1:D:297:LYS:HE2	1.90	0.41
1:E:297:LYS:HB3	1:E:297:LYS:HE2	1.77	0.41
1:F:8:GLY:O	1:F:48:ASP:HA	2.19	0.41
1:F:34:GLU:CD	1:F:34:GLU:N	2.77	0.41
1:F:60:GLN:C	1:F:69:LYS:HZ3	2.29	0.41
1:A:8:GLY:O	1:A:48:ASP:HA	2.20	0.41
1:A:162:PRO:HA	5:A:441:HOH:O	2.19	0.41
1:B:6:ILE:HD12	1:B:33:ILE:CD1	2.50	0.41
1:C:30:ALA:HB3	1:C:287:VAL:HG21	2.01	0.41
1:D:94:VAL:O	1:D:268:GLU:HA	2.20	0.41
1:E:277:ASP:HB3	5:E:426:HOH:O	2.20	0.41
1:F:60:GLN:HG3	1:F:61:GLY:H	1.85	0.41
1:B:85:VAL:HG13	1:B:90:ARG:HB2	2.01	0.41
1:C:66:ARG:HG2	1:C:66:ARG:NH1	2.35	0.41
1:F:82:VAL:HG11	1:F:109:VAL:HG23	2.03	0.41
1:F:155:THR:O	1:F:161:SER:HB3	2.20	0.41
1:A:84:GLN:NE2	1:A:84:GLN:HA	2.35	0.41
1:A:141:MET:H	1:A:142:PRO:CD	2.34	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:26:ALA:HB2	1:B:274:PRO:HG3	2.03	0.41
1:D:127:VAL:HA	1:D:144:ALA:HB2	2.03	0.41
1:B:62:ASP:O	1:B:66:ARG:N	2.53	0.41
1:E:6:ILE:HG13	1:E:43:ILE:HD11	2.03	0.41
1:C:18:ARG:HD3	1:C:18:ARG:HA	1.77	0.41
1:D:82:VAL:HG11	1:D:109:VAL:HG23	2.03	0.41
1:F:62:ASP:CB	1:F:65:LEU:HB2	2.32	0.41
1:A:26:ALA:HB2	1:A:274:PRO:HG3	2.03	0.41
1:A:28:ARG:HA	1:A:32:VAL:HG12	2.03	0.41
1:C:124:HIS:HB3	5:C:419:HOH:O	2.20	0.41
1:F:61:GLY:HA3	1:F:68:LEU:HB3	2.03	0.41
1:A:203:MET:CE	1:A:246:LEU:HD22	2.51	0.40
1:D:205:ARG:O	1:D:209:GLU:HG3	2.20	0.40
1:A:58:HIS:HB2	1:A:59:GLU:OE2	2.21	0.40
1:B:102:ALA:HB3	1:B:142:PRO:HB2	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	296/299 (99%)	285 (96%)	9 (3%)	2 (1%)	18	34
1	B	296/299 (99%)	283 (96%)	11 (4%)	2 (1%)	18	34
1	C	296/299 (99%)	287 (97%)	8 (3%)	1 (0%)	36	55
1	D	296/299 (99%)	288 (97%)	7 (2%)	1 (0%)	36	55
1	E	296/299 (99%)	286 (97%)	9 (3%)	1 (0%)	36	55
1	F	296/299 (99%)	281 (95%)	13 (4%)	2 (1%)	18	34
All	All	1776/1794 (99%)	1710 (96%)	57 (3%)	9 (0%)	24	43

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	62	ASP
1	B	59	GLU
1	F	56	ARG
1	F	141	MET
1	A	141	MET
1	B	141	MET
1	E	141	MET
1	C	141	MET
1	D	141	MET

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	239/240 (100%)	234 (98%)	5 (2%)	47	74
1	B	239/240 (100%)	234 (98%)	5 (2%)	47	74
1	C	239/240 (100%)	234 (98%)	5 (2%)	47	74
1	D	239/240 (100%)	233 (98%)	6 (2%)	42	69
1	E	239/240 (100%)	232 (97%)	7 (3%)	37	65
1	F	239/240 (100%)	231 (97%)	8 (3%)	33	61
All	All	1434/1440 (100%)	1398 (98%)	36 (2%)	42	69

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	58	HIS
1	A	62	ASP
1	A	99	HIS
1	A	164	ILE
1	A	299	MET
1	B	84	GLN
1	B	99	HIS
1	B	111	LYS
1	B	164	ILE
1	B	299	MET

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Mol	Chain	Res	Type
1	C	43	ILE
1	C	66	ARG
1	C	99	HIS
1	C	164	ILE
1	C	299	MET
1	D	43	ILE
1	D	57	LEU
1	D	99	HIS
1	D	164	ILE
1	D	205	ARG
1	D	299	MET
1	E	43	ILE
1	E	56	ARG
1	E	84	GLN
1	E	99	HIS
1	E	164	ILE
1	E	165	LYS
1	E	299	MET
1	F	43	ILE
1	F	62	ASP
1	F	64	ARG
1	F	84	GLN
1	F	99	HIS
1	F	164	ILE
1	F	165	LYS
1	F	299	MET

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

Mol	Chain	Res	Type
1	A	137	ASN
1	A	156	GLN
1	A	168	HIS
1	B	60	GLN
1	B	137	ASN
1	C	137	ASN
1	C	168	HIS
1	D	58	HIS
1	D	84	GLN
1	D	137	ASN
1	E	60	GLN
1	E	168	HIS

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Mol	Chain	Res	Type
1	F	58	HIS
1	F	60	GLN
1	F	67	ASN
1	F	156	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 24 ligands modelled in this entry, 12 are monoatomic - leaving 12 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	$\# Z > 2$
3	LYS	F	406	-	8,9,9	0.65	0	7,10,10	0.37	0
3	LYS	B	402	-	8,9,9	0.65	0	7,10,10	0.27	0
3	LYS	E	405	-	8,9,9	0.70	0	7,10,10	0.32	0
4	GAI	B	407	-	3,3,3	0.98	0	3,3,3	1.17	0
4	GAI	B	408	-	3,3,3	1.16	0	3,3,3	1.05	0
4	GAI	C	409	-	3,3,3	1.23	0	3,3,3	0.96	0
4	GAI	F	411	-	3,3,3	1.03	0	3,3,3	1.13	0
4	GAI	D	412	-	3,3,3	1.04	0	3,3,3	1.23	0
3	LYS	D	404	-	8,9,9	0.69	0	7,10,10	0.36	0
4	GAI	E	410	-	3,3,3	0.95	0	3,3,3	1.22	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	LYS	A	401	-	8,9,9	0.66	0	7,10,10	0.34	0
3	LYS	C	403	-	8,9,9	0.63	0	7,10,10	0.34	0

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
3	LYS	F	406	-	-	0/9/9/9	-
3	LYS	B	402	-	-	0/9/9/9	-
3	LYS	E	405	-	-	0/9/9/9	-
3	LYS	D	404	-	-	0/9/9/9	-
3	LYS	A	401	-	-	0/9/9/9	-
3	LYS	C	403	-	-	0/9/9/9	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section is therefore empty.

6.4 Ligands ⓘ

EDS was not executed - this section is therefore empty.

6.5 Other polymers ⓘ

EDS was not executed - this section is therefore empty.