



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 09:45 AM UTC

PDB ID : 7Y5L / pdb_00007y5l
Title : Crystal structure of human CAF-1 core complex in spacegroup C2
Authors : Liu, C.P.; Wang, M.Z.; Xu, R.M.
Deposited on : 2022-06-17
Resolution : 3.42 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
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

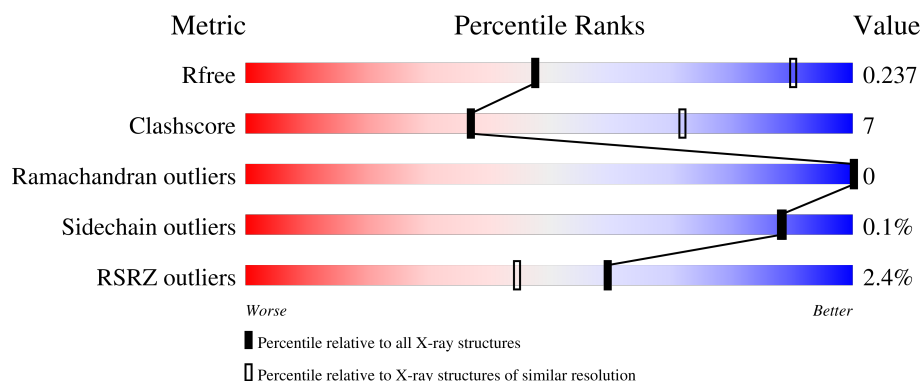
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.42 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	1210 (3.48-3.36)
Clashscore	190562	1234 (3.48-3.36)
Ramachandran outliers	187476	1222 (3.48-3.36)
Sidechain outliers	187428	1222 (3.48-3.36)
RSRZ outliers	180081	1210 (3.48-3.36)

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	273	2% 61% 11% 28%
1	D	273	2% 59% 13% 28%
2	B	419	3% 72% 19% 9%
2	E	419	3% 72% 19% 9%
3	C	425	81% 14% 5%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	F	425	2% 79% 16% 5%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 15550 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 Chromatin assembly factor 1 subunit A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	197	Total	C	N	O	S	0	0	0
			1595	1008	294	285	8			
1	D	197	Total	C	N	O	S	0	0	0
			1595	1008	294	285	8			

- Molecule 2 is a protein called Chromatin assembly factor 1 subunit B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	380	Total	C	N	O	S	0	0	0
			2965	1894	511	544	16			
2	E	380	Total	C	N	O	S	0	0	0
			2967	1894	511	546	16			

- Molecule 3 is a protein called Histone-binding protein RBBP4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	405	Total	C	N	O	S	0	0	0
			3197	2018	543	626	10			
3	F	405	Total	C	N	O	S	0	0	0
			3197	2018	543	626	10			

- Molecule 4 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



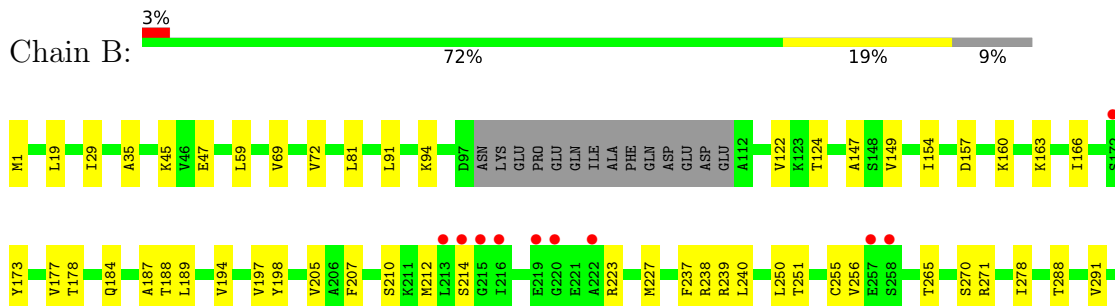
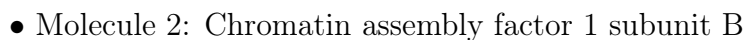
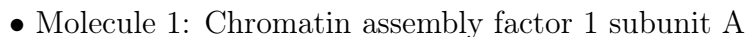
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	F	1	Total	C	O	0	0
			6	3	3		

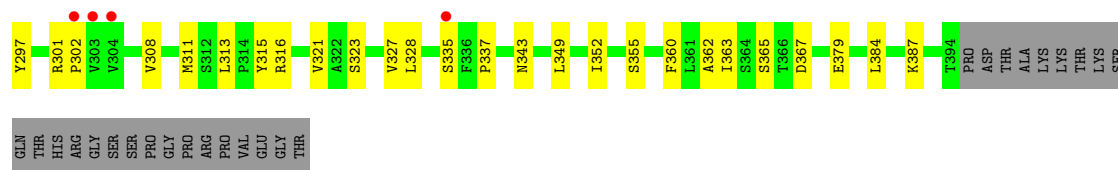
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	5	Total	O	0	0
			5	5		
5	B	4	Total	O	0	0
			4	4		
5	C	6	Total	O	0	0
			6	6		
5	D	4	Total	O	0	0
			4	4		
5	E	7	Total	O	0	0
			7	7		
5	F	2	Total	O	0	0
			2	2		

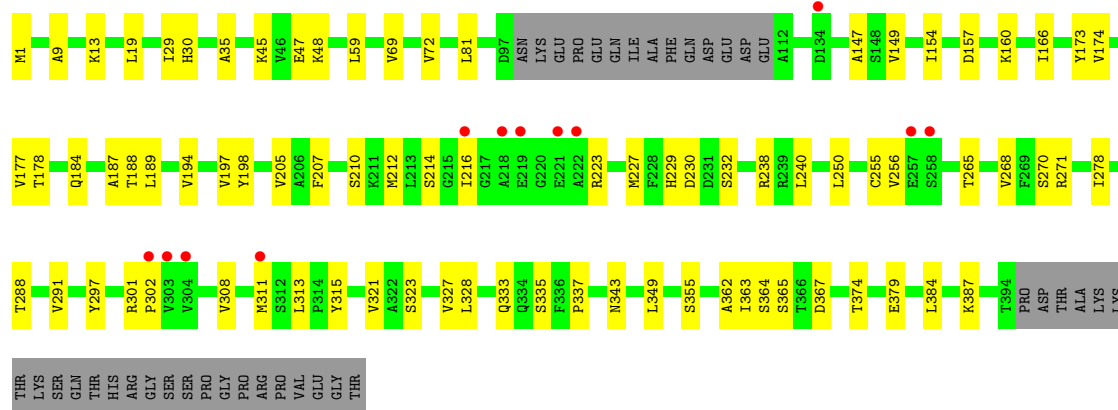
i

- Molecule 1: Chromatin assembly factor 1 subunit A

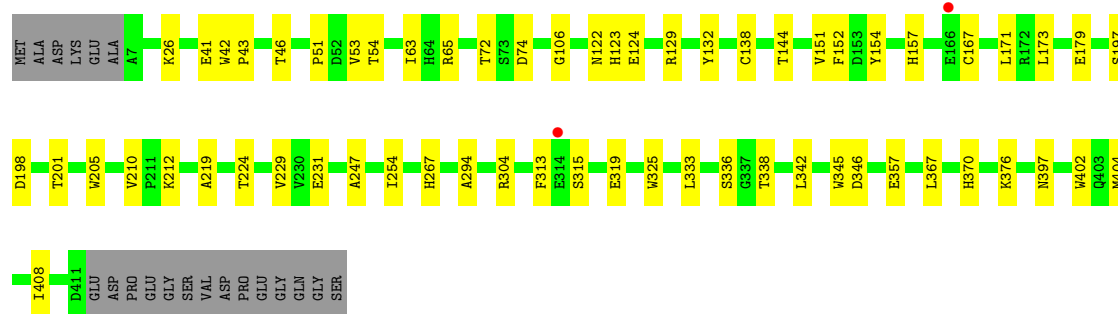
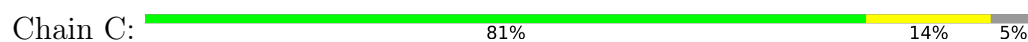




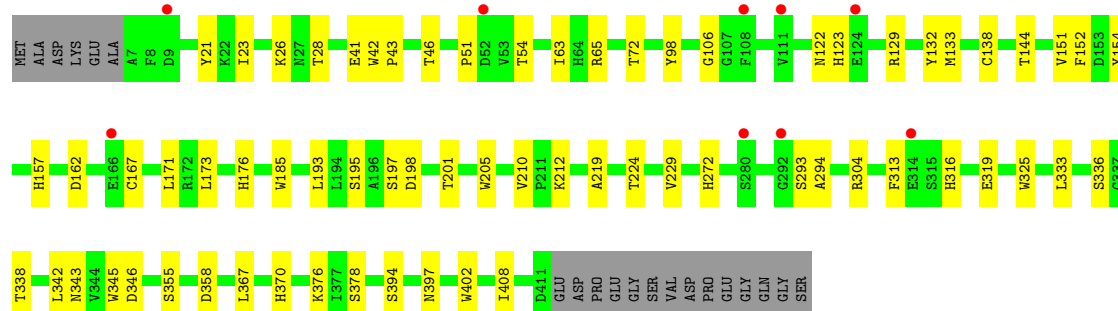
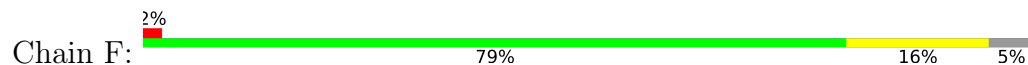
• Molecule 2: Chromatin assembly factor 1 subunit B



• Molecule 3: Histone-binding protein RBBP4



• Molecule 3: Histone-binding protein RBBP4



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	108.72Å 170.96Å 181.08Å 90.00° 104.77° 90.00°	Depositor
Resolution (Å)	47.14 – 3.42 47.14 – 3.42	Depositor EDS
% Data completeness (in resolution range)	74.9 (47.14-3.42) 82.5 (47.14-3.42)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.69 (at 3.40Å)	Xtriage
Refinement program	PHENIX (1.20_4459: ???)	Depositor
R, R_{free}	0.218 , 0.237 0.218 , 0.237	Depositor DCC
R_{free} test set	2011 reflections (4.66%)	wwPDB-VP
Wilson B-factor (Å ²)	59.8	Xtriage
Anisotropy	0.207	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 33.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.056 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.87	EDS
Total number of atoms	15550	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.22% 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: GOL

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	0.08	0/1630	0.25	0/2191
1	D	0.08	0/1630	0.25	0/2191
2	B	0.09	0/3034	0.30	0/4119
2	E	0.11	0/3036	0.33	0/4121
3	C	0.09	0/3287	0.27	0/4483
3	F	0.09	0/3287	0.27	0/4483
All	All	0.09	0/15904	0.28	0/21588

There are no bond length outliers.

There are no bond angle outliers.

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	1595	0	1581	22	0
1	D	1595	0	1581	26	0
2	B	2965	0	2940	49	0
2	E	2967	0	2946	53	0
3	C	3197	0	3009	43	0
3	F	3197	0	3009	45	0
4	F	6	0	8	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	5	0	0	0	0
5	B	4	0	0	0	0
5	C	6	0	0	0	0
5	D	4	0	0	0	0
5	E	7	0	0	0	0
5	F	2	0	0	0	0
All	All	15550	0	15074	218	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 (218) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:270:SER:HB2	2:E:278:ILE:HD11	1.53	0.88
2:B:270:SER:HB2	2:B:278:ILE:HD11	1.57	0.85
3:F:346:ASP:HB2	3:F:367:LEU:HD12	1.69	0.73
2:B:301:ARG:HG3	2:B:302:PRO:HD2	1.69	0.72
1:A:594:LEU:HD21	3:C:26:LYS:HE2	1.70	0.72
2:E:301:ARG:HG3	2:E:302:PRO:HD2	1.72	0.70
1:A:597:GLU:O	3:C:26:LYS:NZ	2.24	0.70
3:C:346:ASP:HB2	3:C:367:LEU:HD12	1.73	0.70
3:C:151:VAL:HB	3:C:171:LEU:HB2	1.74	0.68
1:D:498:LEU:HB3	3:F:304:ARG:HG2	1.77	0.67
1:D:595:ASP:O	3:F:26:LYS:NZ	2.27	0.66
2:E:214:SER:HB3	2:E:223:ARG:HB3	1.77	0.65
2:E:291:VAL:HG22	2:E:321:VAL:HG22	1.79	0.65
2:E:178:THR:HG22	2:E:187:ALA:HB3	1.79	0.64
3:F:151:VAL:HB	3:F:171:LEU:HB2	1.78	0.64
3:C:342:LEU:HB3	3:C:370:HIS:HB3	1.79	0.63
2:B:291:VAL:HG22	2:B:321:VAL:HG22	1.81	0.63
3:F:176:HIS:NE2	3:F:195:SER:OG	2.32	0.63
2:B:178:THR:HG22	2:B:187:ALA:HB3	1.81	0.63
1:A:498:LEU:HB3	3:C:304:ARG:HG2	1.82	0.62
3:F:198:ASP:HA	3:F:229:VAL:HG13	1.82	0.61
2:E:189:LEU:HD23	2:E:238:ARG:HB3	1.81	0.61
2:E:315:TYR:HB3	2:E:384:LEU:HD11	1.81	0.61
3:C:198:ASP:HA	3:C:229:VAL:HG13	1.83	0.60
3:F:46:THR:HB	3:F:129:ARG:HA	1.83	0.60
2:B:315:TYR:HB3	2:B:384:LEU:HD11	1.82	0.60
3:F:342:LEU:HB3	3:F:370:HIS:HB3	1.82	0.60

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:F:152:PHE:HD2	3:F:157:HIS:HE1	1.50	0.59
1:D:467:LYS:HB2	3:F:212:LYS:HD2	1.85	0.58
1:D:488:HIS:HB2	1:D:491:LEU:HB2	1.85	0.58
2:B:157:ASP:HB3	2:B:160:LYS:HB2	1.84	0.58
2:E:308:VAL:HG13	2:E:335:SER:HB3	1.85	0.58
3:F:336:SER:HB3	3:F:342:LEU:HD13	1.85	0.58
2:B:147:ALA:HB2	2:B:177:VAL:HG23	1.84	0.58
2:B:365:SER:OG	2:B:367:ASP:OD2	2.22	0.57
2:E:147:ALA:HB2	2:E:177:VAL:HG23	1.86	0.57
1:A:681:LEU:HD22	2:B:343:ASN:HB3	1.86	0.56
2:E:147:ALA:HB1	2:E:174:VAL:HG12	1.85	0.56
1:D:681:LEU:HD22	2:E:343:ASN:HB3	1.88	0.56
2:B:189:LEU:HD23	2:B:238:ARG:HB3	1.87	0.56
2:B:308:VAL:HG13	2:B:335:SER:HB3	1.87	0.56
3:C:294:ALA:HA	3:C:319:GLU:HG3	1.87	0.56
2:B:250:LEU:HB2	2:B:291:VAL:HG11	1.87	0.56
2:B:288:THR:HA	2:B:323:SER:HA	1.88	0.56
2:E:214:SER:O	2:E:214:SER:OG	2.17	0.56
1:D:572:GLY:HA3	3:F:106:GLY:HA2	1.88	0.56
2:B:45:LYS:HB2	2:B:59:LEU:HD11	1.88	0.56
1:D:674:LYS:HB3	1:D:678:PHE:HB2	1.88	0.55
2:E:365:SER:OG	2:E:367:ASP:OD2	2.23	0.55
3:F:294:ALA:HA	3:F:319:GLU:HG3	1.89	0.55
2:E:184:GLN:OE1	2:E:271:ARG:NH2	2.40	0.55
3:C:46:THR:HB	3:C:129:ARG:HA	1.87	0.55
1:A:537:VAL:HG11	1:A:662:LYS:HB3	1.89	0.55
2:E:72:VAL:HG13	2:E:81:LEU:HD11	1.89	0.55
2:E:157:ASP:HB3	2:E:160:LYS:HB2	1.89	0.54
2:E:154:ILE:HG12	2:E:166:ILE:HG12	1.89	0.54
3:F:171:LEU:HD21	3:F:210:VAL:HG11	1.89	0.54
3:C:138:CYS:HA	3:C:154:TYR:CE2	2.43	0.54
1:D:527:THR:HB	1:D:530:ALA:HB2	1.90	0.54
2:B:194:VAL:HG22	2:B:210:SER:HB3	1.88	0.54
2:E:29:ILE:HG21	2:E:45:LYS:HE3	1.88	0.54
1:D:537:VAL:HG11	1:D:662:LYS:HB3	1.90	0.54
2:E:250:LEU:HB2	2:E:291:VAL:HG11	1.90	0.54
2:E:149:VAL:HG13	2:E:173:TYR:CD1	2.42	0.53
3:C:152:PHE:HD1	3:C:157:HIS:HE1	1.56	0.53
3:F:138:CYS:HA	3:F:154:TYR:CE2	2.44	0.53
2:B:29:ILE:HG21	2:B:45:LYS:HE3	1.90	0.53
1:D:477:MET:HG2	3:F:54:THR:HG22	1.90	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:45:LYS:HB2	2:E:59:LEU:HD11	1.91	0.53
3:F:41:GLU:HG2	3:F:42:TRP:CD1	2.44	0.53
1:A:674:LYS:HB3	1:A:678:PHE:HB2	1.91	0.53
2:E:194:VAL:HG22	2:E:210:SER:HB3	1.90	0.53
2:E:212:MET:HE2	2:E:227:MET:HE2	1.91	0.52
2:E:214:SER:HB3	2:E:223:ARG:CB	2.39	0.52
2:B:94:LYS:HD3	2:B:122:VAL:HG21	1.91	0.52
2:E:297:TYR:HD1	2:E:387:LYS:HD2	1.73	0.52
3:C:336:SER:HB3	3:C:342:LEU:HD13	1.92	0.52
3:F:42:TRP:CD2	3:F:72:THR:HG22	2.45	0.52
1:D:589:GLN:HG2	3:F:23:ILE:HD11	1.92	0.52
3:F:65:ARG:NH2	3:F:154:TYR:OH	2.35	0.52
1:A:572:GLY:HA3	3:C:106:GLY:HA2	1.91	0.52
2:E:288:THR:HA	2:E:323:SER:HA	1.92	0.52
1:A:527:THR:HB	1:A:530:ALA:HB2	1.91	0.52
1:D:474:LYS:HB2	1:D:477:MET:HG3	1.92	0.52
3:C:51:PRO:HD3	3:C:132:TYR:CZ	2.45	0.52
1:A:601:ASP:OD1	1:A:602:GLU:N	2.43	0.51
2:E:311:MET:HE1	2:E:313:LEU:HD12	1.92	0.51
3:C:65:ARG:NH2	3:C:154:TYR:OH	2.37	0.51
2:B:29:ILE:HG23	2:B:47:GLU:HB3	1.91	0.51
2:B:154:ILE:HG12	2:B:166:ILE:HG12	1.93	0.51
3:F:51:PRO:HD3	3:F:132:TYR:CZ	2.46	0.51
2:B:177:VAL:HG22	2:B:188:THR:HG22	1.91	0.51
2:E:29:ILE:HG23	2:E:47:GLU:HB3	1.91	0.51
2:B:212:MET:HE2	2:B:227:MET:HE2	1.93	0.51
3:C:171:LEU:HD21	3:C:210:VAL:HG11	1.93	0.51
2:B:149:VAL:HG13	2:B:173:TYR:CD1	2.45	0.51
2:E:214:SER:CB	2:E:223:ARG:HB3	2.40	0.50
1:A:551:ARG:NH2	1:A:557:MET:HG3	2.26	0.50
3:C:41:GLU:HG2	3:C:42:TRP:CD1	2.47	0.50
2:B:189:LEU:HD22	2:B:240:LEU:HD23	1.94	0.50
2:B:311:MET:HE1	2:B:313:LEU:HD12	1.92	0.50
2:B:328:LEU:HD22	2:B:337:PRO:HG3	1.94	0.49
2:B:327:VAL:HG21	2:B:363:ILE:HD13	1.95	0.49
2:E:349:LEU:HA	2:E:365:SER:HA	1.95	0.49
2:B:1:MET:N	2:B:379:GLU:OE2	2.42	0.49
1:D:578:THR:HG22	1:D:593:LEU:HD13	1.93	0.49
2:E:256:VAL:HG23	2:E:265:THR:HG21	1.93	0.49
2:B:72:VAL:HG13	2:B:81:LEU:HD11	1.95	0.48
1:D:542:ARG:HG3	1:D:676:LYS:HD2	1.95	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:325:TRP:CD2	3:C:333:LEU:HD13	2.48	0.48
2:E:149:VAL:HG13	2:E:173:TYR:HD1	1.78	0.48
2:E:229:HIS:HE1	2:E:232:SER:HB2	1.78	0.48
2:E:48:LYS:HE2	2:E:374:THR:HB	1.95	0.48
3:F:338:THR:HA	3:F:376:LYS:HG3	1.95	0.47
2:B:349:LEU:HA	2:B:365:SER:HA	1.97	0.47
3:F:201:THR:HG22	3:F:224:THR:HG22	1.96	0.47
2:E:177:VAL:HG22	2:E:188:THR:HG22	1.95	0.47
2:B:149:VAL:HG13	2:B:173:TYR:HD1	1.80	0.47
3:C:42:TRP:CD2	3:C:72:THR:HG22	2.50	0.47
2:B:184:GLN:OE1	2:B:271:ARG:NH2	2.48	0.47
3:F:123:HIS:CE1	3:F:144:THR:HG22	2.50	0.47
2:B:301:ARG:HH11	2:B:316:ARG:NH2	2.13	0.47
1:A:477:MET:HG2	3:C:54:THR:HG22	1.97	0.46
1:A:488:HIS:HB2	1:A:491:LEU:HB2	1.97	0.46
2:E:1:MET:N	2:E:379:GLU:OE2	2.44	0.46
1:A:583:ALA:HB2	3:C:408:ILE:HD13	1.97	0.46
3:C:201:THR:HG22	3:C:224:THR:HG22	1.98	0.46
2:E:214:SER:HB3	2:E:223:ARG:O	2.16	0.46
3:C:254:ILE:HB	3:C:267:HIS:HB2	1.97	0.46
2:E:35:ALA:HB1	2:E:69:VAL:HB	1.98	0.46
3:C:338:THR:HG22	3:C:376:LYS:HD2	1.99	0.46
1:A:567:ARG:HH22	1:A:599:ASP:HB3	1.81	0.45
2:B:35:ALA:HB1	2:B:69:VAL:HB	1.98	0.45
2:B:256:VAL:HG23	2:B:265:THR:HG21	1.96	0.45
1:D:567:ARG:HH22	1:D:599:ASP:HB3	1.82	0.45
3:F:205:TRP:CD1	3:F:219:ALA:HA	2.51	0.45
1:D:594:LEU:HD23	1:D:594:LEU:HA	1.83	0.45
2:E:328:LEU:HD22	2:E:337:PRO:HG3	1.99	0.45
2:E:198:TYR:CE2	2:E:205:VAL:HG22	2.51	0.45
3:F:325:TRP:CD2	3:F:333:LEU:HD13	2.51	0.45
3:C:43:PRO:HA	3:C:397:ASN:HA	1.98	0.45
3:F:185:TRP:CZ3	3:F:193:LEU:HB2	2.51	0.45
2:E:147:ALA:HB1	2:E:174:VAL:CG1	2.47	0.45
2:B:237:PHE:HB3	2:B:239:ARG:HG3	1.98	0.44
2:B:297:TYR:HD1	2:B:387:LYS:HD2	1.81	0.44
2:E:19:LEU:HD13	2:E:362:ALA:HB1	1.98	0.44
1:D:551:ARG:NH2	1:D:557:MET:HG3	2.33	0.44
2:E:327:VAL:HG21	2:E:363:ILE:HD13	1.99	0.44
3:F:338:THR:HG22	3:F:376:LYS:HD2	2.00	0.44
3:C:205:TRP:CD1	3:C:219:ALA:HA	2.51	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:583:ALA:HB2	3:F:408:ILE:HD13	1.99	0.44
3:C:123:HIS:CE1	3:C:144:THR:HG22	2.52	0.44
1:A:478:VAL:HB	3:C:53:VAL:HG13	2.00	0.44
3:C:338:THR:HA	3:C:376:LYS:HG3	1.99	0.44
2:B:197:VAL:HB	2:B:207:PHE:HB2	2.00	0.44
3:C:124:GLU:HG2	3:C:167:CYS:SG	2.58	0.44
3:C:315:SER:H	3:C:345:TRP:HH2	1.66	0.43
2:E:214:SER:HB3	2:E:223:ARG:C	2.43	0.43
2:E:230:ASP:OD1	2:E:230:ASP:N	2.46	0.43
3:F:54:THR:OG1	3:F:63:ILE:HB	2.18	0.43
3:C:313:PHE:HB3	3:C:345:TRP:CZ3	2.53	0.43
1:D:564:GLU:OE2	3:F:21:TYR:OH	2.24	0.43
2:B:214:SER:CB	2:B:223:ARG:HE	2.32	0.43
3:F:122:ASN:ND2	3:F:162:ASP:HB2	2.34	0.43
1:A:551:ARG:HH21	1:A:557:MET:HG3	1.83	0.43
3:C:54:THR:OG1	3:C:63:ILE:HB	2.19	0.43
3:C:197:SER:OG	3:C:198:ASP:N	2.52	0.43
3:C:342:LEU:HD23	3:C:402:TRP:HZ2	1.84	0.43
3:F:342:LEU:HD23	3:F:402:TRP:HZ2	1.82	0.42
1:A:578:THR:HG22	1:A:593:LEU:HD13	2.00	0.42
2:B:189:LEU:HD12	2:B:189:LEU:HA	1.91	0.42
2:B:212:MET:HB2	2:B:227:MET:HE2	2.00	0.42
2:E:189:LEU:HD22	2:E:240:LEU:HD23	2.01	0.42
3:F:313:PHE:HB3	3:F:345:TRP:CZ3	2.54	0.42
3:C:122:ASN:O	3:C:167:CYS:HB3	2.19	0.42
1:A:694:ARG:HA	1:A:694:ARG:HD2	1.80	0.42
3:F:173:LEU:HB3	3:F:205:TRP:CE2	2.54	0.42
2:E:197:VAL:HB	2:E:207:PHE:HB2	2.02	0.42
2:E:227:MET:O	2:E:255:CYS:N	2.43	0.42
3:F:355:SER:OG	3:F:358:ASP:HB2	2.19	0.42
1:A:467:LYS:HB2	3:C:212:LYS:HD2	2.02	0.42
3:F:197:SER:OG	3:F:198:ASP:N	2.52	0.42
2:B:91:LEU:HD22	2:B:124:THR:HG22	2.01	0.41
2:B:198:TYR:CE2	2:B:205:VAL:HG22	2.55	0.41
2:B:355:SER:HB3	2:B:360:PHE:HB2	2.02	0.41
1:D:477:MET:HE2	1:D:477:MET:HB3	1.86	0.41
1:D:528:ARG:HG2	1:D:529:ASN:OD1	2.20	0.41
1:A:528:ARG:HG2	1:A:529:ASN:OD1	2.20	0.41
2:E:9:ALA:HB1	2:E:13:LYS:H	1.84	0.41
1:A:531:ASP:HB3	1:A:533:PHE:CE2	2.56	0.41
1:D:531:ASP:HB3	1:D:533:PHE:CE2	2.54	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:179:GLU:C	3:C:197:SER:HG	2.25	0.41
2:E:301:ARG:HB2	2:E:333:GLN:OE1	2.20	0.41
1:D:509:LEU:HD23	1:D:512:LEU:HD12	2.03	0.41
3:C:357:GLU:OE1	3:F:98:TYR:OH	2.38	0.41
3:C:367:LEU:HD22	3:C:404:MET:HE1	2.03	0.41
1:D:512:LEU:HD23	1:D:512:LEU:HA	1.87	0.41
3:F:316:HIS:CD2	3:F:343:ASN:HD22	2.39	0.41
3:F:272:HIS:CD2	3:F:293:SER:HB2	2.56	0.41
2:B:19:LEU:HD13	2:B:362:ALA:HB1	2.03	0.41
2:B:227:MET:O	2:B:255:CYS:N	2.43	0.41
2:E:268:VAL:O	2:E:278:ILE:N	2.54	0.41
3:F:43:PRO:HA	3:F:397:ASN:HA	2.03	0.41
2:B:352:ILE:HG22	2:B:363:ILE:HG12	2.03	0.41
3:C:74:ASP:OD1	3:C:74:ASP:N	2.53	0.41
2:B:240:LEU:HB3	2:B:251:THR:HA	2.03	0.40
2:B:35:ALA:HB2	2:B:72:VAL:HG23	2.01	0.40
2:B:163:LYS:HD3	2:B:166:ILE:HG13	2.02	0.40
3:C:231:GLU:H	3:C:247:ALA:HA	1.86	0.40
2:E:30:HIS:CE1	2:E:355:SER:HB2	2.56	0.40
3:F:122:ASN:O	3:F:167:CYS:HB3	2.22	0.40
3:F:378:SER:H	3:F:394:SER:HA	1.85	0.40
1:A:477:MET:HE2	1:A:477:MET:HB3	1.86	0.40
3:C:173:LEU:HB3	3:C:205:TRP:CE2	2.57	0.40
1:D:560:LEU:HD13	3:F:28:THR:HG23	2.03	0.40
3:F:133:MET:HE2	3:F:185:TRP:CZ3	2.56	0.40
1:D:559:LEU:HB2	1:D:571:TRP:CE3	2.56	0.40
2:E:19:LEU:HG	2:E:364:SER:HB3	2.03	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	193/273 (71%)	190 (98%)	3 (2%)	0	100	100
1	D	193/273 (71%)	190 (98%)	3 (2%)	0	100	100
2	B	376/419 (90%)	363 (96%)	13 (4%)	0	100	100
2	E	376/419 (90%)	361 (96%)	15 (4%)	0	100	100
3	C	403/425 (95%)	394 (98%)	9 (2%)	0	100	100
3	F	403/425 (95%)	393 (98%)	10 (2%)	0	100	100
All	All	1944/2234 (87%)	1891 (97%)	53 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	168/235 (72%)	168 (100%)	0	100	100
1	D	168/235 (72%)	168 (100%)	0	100	100
2	B	323/363 (89%)	323 (100%)	0	100	100
2	E	325/363 (90%)	324 (100%)	1 (0%)	86	84
3	C	354/375 (94%)	354 (100%)	0	100	100
3	F	354/375 (94%)	354 (100%)	0	100	100
All	All	1692/1946 (87%)	1691 (100%)	1 (0%)	88	88

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	E	216	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	575	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	B	264	ASN
2	B	273	ASN
3	C	97	HIS
1	D	575	ASN
1	D	589	GLN
1	D	661	GLN
2	E	264	ASN
2	E	347	HIS
3	F	78	HIS
3	F	97	HIS
3	F	122	ASN
3	F	168	ASN
3	F	316	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](#)

1 ligand is 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	$\# Z > 2$
4	GOL	F	501	-	5,5,5	0.95	0	5,5,5	1.09	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
4	GOL	F	501	-	-	0/4/4/4	-

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 ⓘ

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	197/273 (72%)	0.47	5 (2%)	58 43	38, 67, 92, 124	0
1	D	197/273 (72%)	0.49	5 (2%)	58 43	47, 70, 100, 122	0
2	B	380/419 (90%)	0.32	14 (3%)	45 32	45, 57, 97, 136	0
2	E	380/419 (90%)	0.35	12 (3%)	50 36	45, 59, 95, 128	0
3	C	405/425 (95%)	0.24	2 (0%)	87 78	35, 53, 83, 106	0
3	F	405/425 (95%)	0.37	9 (2%)	62 47	43, 65, 91, 121	0
All	All	1964/2234 (87%)	0.35	47 (2%)	59 45	35, 61, 93, 136	0

All (47) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	258	SER	3.9
2	E	221	GLU	3.9
2	E	219	GLU	3.6
2	B	216	ILE	3.5
3	F	52	ASP	3.3
2	B	219	GLU	3.3
2	B	302	PRO	3.1
2	E	134	ASP	3.0
2	E	302	PRO	2.9
2	E	216	ILE	2.9
3	F	166	GLU	2.9
2	E	218	ALA	2.8
1	D	692	ALA	2.7
2	E	303	VAL	2.7
2	E	311	MET	2.6
2	B	213	LEU	2.6
2	B	222	ALA	2.6
2	B	304	VAL	2.5
1	A	695	ASP	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
3	F	124	GLU	2.5
1	D	695	ASP	2.5
1	D	506	PHE	2.5
2	B	303	VAL	2.4
2	B	257	GLU	2.4
3	C	166	GLU	2.4
3	F	9	ASP	2.4
3	C	314	GLU	2.4
3	F	292	GLY	2.3
2	B	172	SER	2.3
2	E	258	SER	2.3
2	E	257	GLU	2.3
1	D	697	ALA	2.3
2	E	304	VAL	2.3
3	F	314	GLU	2.2
2	B	215	GLY	2.2
2	E	222	ALA	2.2
1	A	712	LEU	2.2
2	B	335	SER	2.2
2	B	214	SER	2.1
2	B	220	GLY	2.1
3	F	108	PHE	2.1
1	A	529	ASN	2.1
3	F	280	SER	2.1
1	A	500	GLN	2.1
1	D	529	ASN	2.0
1	A	700	ASP	2.0
3	F	111	VAL	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
4	GOL	F	501	6/6	0.78	0.13	61,61,61,61	0

6.5 Other polymers [i](#)

There are no such residues in this entry.