



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 02:28 PM EDT

PDB ID : 9EE2 / pdb\_00009ee2  
Title : HIV CA - FSFG peptide (14 mM)  
Authors : Melcak, I.; Sarafianos, S.G.  
Deposited on : 2024-11-18  
Resolution : 2.99 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](mailto: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  
Xtrriage (Phenix) : 2.0  
EDS : 3.0  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
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) : 2.48.1

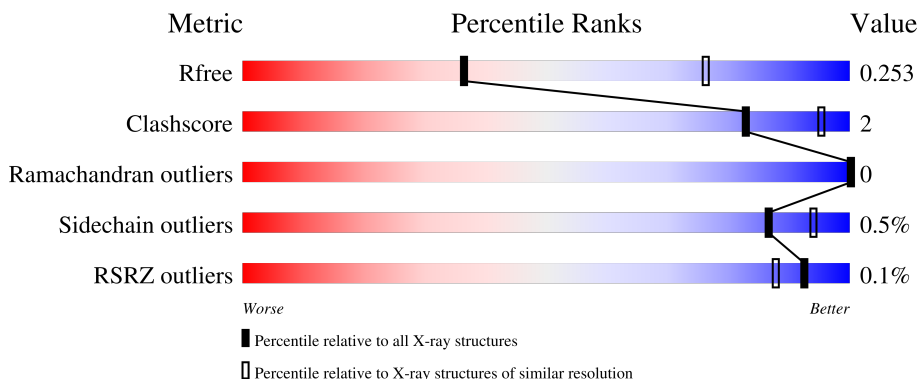
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.99 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))
$R_{free}$	164625	2511 (3.00-3.00)
Clashscore	180529	2866 (3.00-3.00)
Ramachandran outliers	177936	2778 (3.00-3.00)
Sidechain outliers	177891	2781 (3.00-3.00)
RSRZ outliers	164620	2523 (3.00-3.00)

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  $\geq 3$ , 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	231	88% 5% 7%
1	B	231	85% 6% 9%
1	C	231	88% • 7%
1	D	231	81% 7% • 11%
1	E	231	84% 6% 10%

*Continued on next page...*

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	231	 88% 7% 5%
1	G	231	 89% 6% 6%
1	H	231	 85% 6% 9%
1	I	231	 86% 7% 7%
1	J	231	 86% 7% 6%
1	K	231	 80% 6% 14%
1	L	231	 86% 11%
2	M	9	 11% 89%
2	N	9	 11% 89%
2	O	9	 11% 89%
2	P	9	 67% 11% 22%
2	Q	9	 11% 89%
2	R	9	 11% 89%
2	S	9	 11% 89%
2	U	9	 11% 89%
2	V	9	 11% 89%
2	W	9	 78% 11% 11%
2	X	9	 11% 89%

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 19425 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 Capsid protein p24.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	215	Total 1613	C 1017	N 281	O 301	S 14	0	0	0
1	B	211	Total 1607	C 1013	N 279	O 301	S 14	0	0	0
1	C	214	Total 1634	C 1026	N 286	O 308	S 14	0	0	0
1	D	205	Total 1549	C 972	N 271	O 292	S 14	0	0	0
1	E	208	Total 1581	C 996	N 274	O 298	S 13	0	0	0
1	F	219	Total 1661	C 1044	N 291	O 312	S 14	0	0	0
1	G	218	Total 1657	C 1040	N 290	O 313	S 14	0	0	0
1	H	211	Total 1602	C 1008	N 281	O 299	S 14	0	0	0
1	I	215	Total 1619	C 1024	N 280	O 301	S 14	0	0	0
1	J	216	Total 1640	C 1028	N 288	O 310	S 14	0	0	0
1	K	198	Total 1509	C 950	N 262	O 283	S 14	0	0	0
1	L	206	Total 1555	C 977	N 267	O 298	S 13	0	0	0

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	14	CYS	ALA	engineered mutation	UNP P12493
A	45	CYS	GLU	engineered mutation	UNP P12493
A	184	ALA	TRP	engineered mutation	UNP P12493
A	185	ALA	MET	engineered mutation	UNP P12493
B	14	CYS	ALA	engineered mutation	UNP P12493

*Continued on next page...*

*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
B	45	CYS	GLU	engineered mutation	UNP P12493
B	184	ALA	TRP	engineered mutation	UNP P12493
B	185	ALA	MET	engineered mutation	UNP P12493
C	14	CYS	ALA	engineered mutation	UNP P12493
C	45	CYS	GLU	engineered mutation	UNP P12493
C	184	ALA	TRP	engineered mutation	UNP P12493
C	185	ALA	MET	engineered mutation	UNP P12493
D	14	CYS	ALA	engineered mutation	UNP P12493
D	45	CYS	GLU	engineered mutation	UNP P12493
D	184	ALA	TRP	engineered mutation	UNP P12493
D	185	ALA	MET	engineered mutation	UNP P12493
E	14	CYS	ALA	engineered mutation	UNP P12493
E	45	CYS	GLU	engineered mutation	UNP P12493
E	184	ALA	TRP	engineered mutation	UNP P12493
E	185	ALA	MET	engineered mutation	UNP P12493
F	14	CYS	ALA	engineered mutation	UNP P12493
F	45	CYS	GLU	engineered mutation	UNP P12493
F	184	ALA	TRP	engineered mutation	UNP P12493
F	185	ALA	MET	engineered mutation	UNP P12493
G	14	CYS	ALA	engineered mutation	UNP P12493
G	45	CYS	GLU	engineered mutation	UNP P12493
G	184	ALA	TRP	engineered mutation	UNP P12493
G	185	ALA	MET	engineered mutation	UNP P12493
H	14	CYS	ALA	engineered mutation	UNP P12493
H	45	CYS	GLU	engineered mutation	UNP P12493
H	184	ALA	TRP	engineered mutation	UNP P12493
H	185	ALA	MET	engineered mutation	UNP P12493
I	14	CYS	ALA	engineered mutation	UNP P12493
I	45	CYS	GLU	engineered mutation	UNP P12493
I	184	ALA	TRP	engineered mutation	UNP P12493
I	185	ALA	MET	engineered mutation	UNP P12493
J	14	CYS	ALA	engineered mutation	UNP P12493
J	45	CYS	GLU	engineered mutation	UNP P12493
J	184	ALA	TRP	engineered mutation	UNP P12493
J	185	ALA	MET	engineered mutation	UNP P12493
K	14	CYS	ALA	engineered mutation	UNP P12493
K	45	CYS	GLU	engineered mutation	UNP P12493
K	184	ALA	TRP	engineered mutation	UNP P12493
K	185	ALA	MET	engineered mutation	UNP P12493
L	14	CYS	ALA	engineered mutation	UNP P12493
L	45	CYS	GLU	engineered mutation	UNP P12493
L	184	ALA	TRP	engineered mutation	UNP P12493

*Continued on next page...*

*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
L	185	ALA	MET	engineered mutation	UNP P12493

- Molecule 2 is a protein called FSFG peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	P	7	Total	C	N	O	0	0	0
			47	31	7	9			
2	W	8	Total	C	N	O	0	0	0
			51	34	8	9			
2	M	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	N	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	O	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	Q	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	R	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	S	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	U	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	V	1	Total	C	N	O	0	0	0
			11	9	1	1			
2	X	1	Total	C	N	O	0	0	0
			11	9	1	1			


- Molecule 3 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	1	Total	Cl	0	0
			1	1		

### 3 Residue-property plots [i](#)


These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Capsid protein p24

Chain A: 




- Molecule 1: Capsid protein p24

Chain B: 




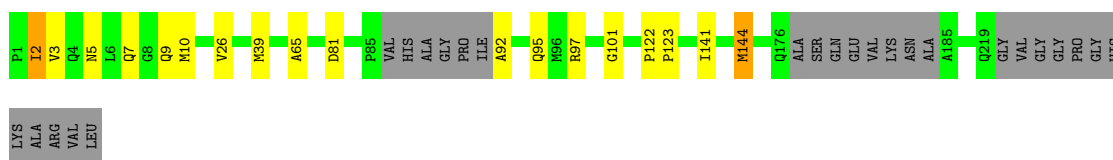
- Molecule 1: Capsid protein p24

Chain C: 




- Molecule 1: Capsid protein p24

Chain D: 




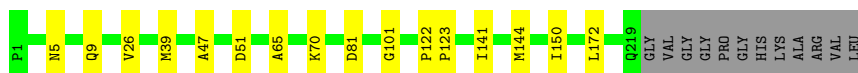
- Molecule 1: Capsid protein p24

Chain E: 




- Molecule 1: Capsid protein p24

Chain F:  88% 7% 5%




- Molecule 1: Capsid protein p24

Chain G:  89% 6% 6%




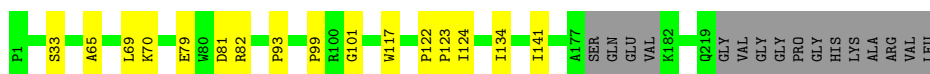
- Molecule 1: Capsid protein p24

Chain H:  85% 6% 9%




- Molecule 1: Capsid protein p24

Chain I:  86% 7% 7%




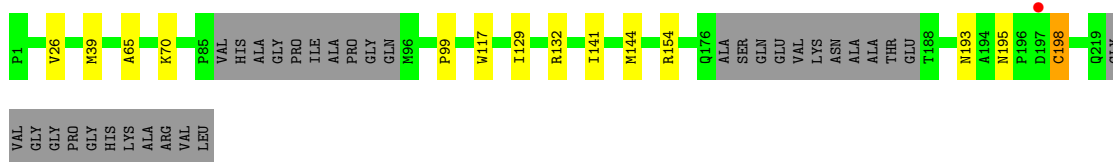
- Molecule 1: Capsid protein p24

Chain J:  86% 7% 6%




- Molecule 1: Capsid protein p24

Chain K:  80% 6% 14%



- Molecule 1: Capsid protein p24

Chain L:  86% 11%




- Molecule 2: FSFG peptide

Chain P:  67% 11% 22%



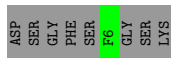
- Molecule 2: FSFG peptide

Chain W:  78% 11% 11%



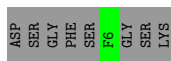
- Molecule 2: FSFG peptide

Chain M:  11% 89%



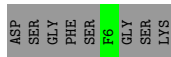
- Molecule 2: FSFG peptide

Chain N:  11% 89%



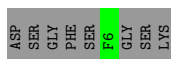
- Molecule 2: FSFG peptide

Chain O:  11% 89%



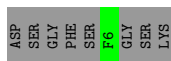
- Molecule 2: FSFG peptide

Chain Q:  11% 89%



- Molecule 2: FSFG peptide

Chain R:  11% 89%



- Molecule 2: FSFG peptide

Chain S:  11% 89%

ASP	SER	GLY	PHE	SER	F6	GLY	SER	LYS
-----	-----	-----	-----	-----	----	-----	-----	-----

- Molecule 2: FSFG peptide

Chain U:  11% 89%

ASP	SER	GLY	PHE	SER	F6	GLY	SER	LYS
-----	-----	-----	-----	-----	----	-----	-----	-----

- Molecule 2: FSFG peptide

Chain V:  11% 89%

ASP	SER	GLY	PHE	SER	F6	GLY	SER	LYS
-----	-----	-----	-----	-----	----	-----	-----	-----

- Molecule 2: FSFG peptide

Chain X:  11% 89%

ASP	SER	GLY	PHE	SER	F6	GLY	SER	LYS
-----	-----	-----	-----	-----	----	-----	-----	-----

## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	136.41Å 136.45Å 208.85Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	34.47 – 2.99 34.47 – 2.99	Depositor EDS
% Data completeness (in resolution range)	98.8 (34.47-2.99) 98.7 (34.47-2.99)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.64 (at 3.00Å)	Xtrriage
Refinement program	PHENIX 1.21_5207	Depositor
R, $R_{free}$	0.233 , 0.253 0.233 , 0.253	Depositor DCC
$R_{free}$ test set	3961 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	79.3	Xtrriage
Anisotropy	0.172	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.25 , 28.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	0.196 for k,h,-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	19425	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	90.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.60% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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:  
CL

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	0/1649	0.19	0/2247
1	B	0.07	0/1640	0.19	0/2230
1	C	0.07	0/1668	0.20	0/2269
1	D	0.08	0/1582	0.21	0/2152
1	E	0.07	0/1614	0.19	0/2197
1	F	0.07	0/1698	0.20	0/2312
1	G	0.08	0/1693	0.18	0/2305
1	H	0.07	0/1638	0.21	0/2231
1	I	0.07	0/1655	0.21	0/2253
1	J	0.08	0/1674	0.20	0/2278
1	K	0.08	0/1541	0.19	0/2096
1	L	0.07	0/1586	0.18	0/2160
2	M	0.05	0/11	0.10	0/13
2	N	0.05	0/11	0.07	0/13
2	O	0.07	0/11	0.08	0/13
2	P	0.09	0/48	0.19	0/62
2	Q	0.05	0/11	0.05	0/13
2	R	0.05	0/11	0.06	0/13
2	S	0.07	0/11	0.05	0/13
2	U	0.04	0/11	0.05	0/13
2	V	0.04	0/11	0.07	0/13
2	W	0.08	0/52	0.33	0/68
2	X	0.07	0/11	0.07	0/13
All	All	0.07	0/19837	0.20	0/26977

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

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	1613	0	1562	6	0
1	B	1607	0	1571	10	0
1	C	1634	0	1596	7	0
1	D	1549	0	1474	12	0
1	E	1581	0	1539	7	0
1	F	1661	0	1609	9	0
1	G	1657	0	1609	9	0
1	H	1602	0	1555	8	0
1	I	1619	0	1579	10	0
1	J	1640	0	1589	10	0
1	K	1509	0	1452	7	0
1	L	1555	0	1487	3	0
2	M	11	0	8	0	0
2	N	11	0	8	0	0
2	O	11	0	8	0	0
2	P	47	0	35	0	0
2	Q	11	0	8	0	0
2	R	11	0	8	0	0
2	S	11	0	8	0	0
2	U	11	0	8	0	0
2	V	11	0	8	0	0
2	W	51	0	34	1	0
2	X	11	0	8	0	0
3	E	1	0	0	1	0
All	All	19425	0	18763	87	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 2.

All (87) 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:C:96:MET:HE2	1:H:93:PRO:HA	1.81	0.62
1:K:65:ALA:HB1	1:K:141:ILE:HD13	1.82	0.62
1:I:65:ALA:HB1	1:I:141:ILE:HD13	1.83	0.61

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:97:ARG:HB3	1:I:93:PRO:HD3	1.82	0.61
1:I:79:GLU:OE2	1:I:82:ARG:NH2	2.28	0.60
1:A:93:PRO:HA	1:J:96:MET:HE2	1.83	0.60
1:A:65:ALA:HB1	1:A:141:ILE:HD13	1.84	0.59
1:F:65:ALA:HB1	1:F:141:ILE:HD13	1.84	0.59
1:E:65:ALA:HB1	1:E:141:ILE:HD13	1.84	0.59
1:D:65:ALA:HB1	1:D:141:ILE:HD13	1.84	0.58
1:B:65:ALA:HB1	1:B:141:ILE:HD13	1.85	0.57
1:H:65:ALA:HB1	1:H:141:ILE:HD13	1.87	0.57
1:D:5:ASN:OD1	1:D:9:GLN:N	2.39	0.54
1:E:2:ILE:HG22	1:E:10:MET:HE3	1.90	0.54
1:J:26:VAL:HG21	1:J:39:MET:HG2	1.90	0.54
1:F:26:VAL:HG21	1:F:39:MET:HG2	1.88	0.53
1:G:65:ALA:HB1	1:G:141:ILE:HD13	1.89	0.53
1:B:99:PRO:HG3	1:B:117:TRP:CE2	2.45	0.52
1:E:179:GLN:HB3	1:F:70:LYS:HE3	1.91	0.52
1:D:81:ASP:OD1	1:D:101:GLY:N	2.43	0.51
1:I:99:PRO:HG3	1:I:117:TRP:CE2	2.45	0.51
1:J:2:ILE:HG22	1:J:10:MET:HE3	1.93	0.51
1:C:65:ALA:HB1	1:C:141:ILE:HD13	1.92	0.51
1:C:92:ALA:HB3	1:C:95:GLN:HB2	1.93	0.51
1:D:92:ALA:HB3	1:D:95:GLN:HB2	1.93	0.50
1:C:2:ILE:HG22	1:C:10:MET:HE3	1.94	0.49
1:D:2:ILE:HG22	1:D:10:MET:HE3	1.94	0.49
1:A:47:ALA:HB1	1:A:51:ASP:HB2	1.95	0.49
1:L:65:ALA:HB1	1:L:141:ILE:HD13	1.94	0.49
1:B:96:MET:HE2	1:I:93:PRO:HA	1.96	0.48
1:G:81:ASP:OD1	1:G:101:GLY:N	2.45	0.47
1:I:81:ASP:OD1	1:I:101:GLY:N	2.45	0.47
1:A:26:VAL:HG21	1:A:39:MET:HG2	1.95	0.47
1:K:70:LYS:HE3	2:W:5:SER:HB2	1.97	0.47
1:A:2:ILE:HG22	1:A:10:MET:HE3	1.96	0.47
1:H:26:VAL:HG21	1:H:39:MET:HG2	1.97	0.47
1:K:99:PRO:HG3	1:K:117:TRP:CE2	2.50	0.47
1:K:129:ILE:HG12	1:K:132:ARG:HH12	1.80	0.47
1:K:26:VAL:HG21	1:K:39:MET:HG2	1.97	0.46
1:B:6:LEU:HB3	1:C:6:LEU:HG	1.97	0.46
1:D:97:ARG:HB2	1:G:90:PRO:HB2	1.97	0.46
1:J:99:PRO:HG3	1:J:117:TRP:CE2	2.52	0.45
1:I:117:TRP:HB3	1:I:124:ILE:HB	1.99	0.45
1:C:26:VAL:HG21	1:C:39:MET:HG2	1.99	0.45

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:47:ALA:HB1	1:H:51:ASP:HB2	1.99	0.45
1:D:26:VAL:HG21	1:D:39:MET:HG2	1.98	0.45
1:I:69:LEU:HD21	1:I:134:ILE:HG23	1.98	0.45
1:I:122:PRO:HA	1:I:123:PRO:HD3	1.89	0.44
1:F:5:ASN:OD1	1:F:9:GLN:N	2.44	0.44
1:G:26:VAL:HG21	1:G:39:MET:HG2	1.98	0.44
1:E:192:GLN:HA	1:E:199:LYS:HE3	2.00	0.43
1:G:2:ILE:HG22	1:G:10:MET:HE3	2.00	0.43
1:L:122:PRO:HA	1:L:123:PRO:HD3	1.89	0.43
1:D:122:PRO:HA	1:D:123:PRO:HD3	1.88	0.43
1:J:153:ILE:HG21	1:J:168:PHE:HA	2.00	0.43
1:E:18:ARG:NH2	3:E:301:CL:CL	2.88	0.43
1:H:86:VAL:HG21	1:H:100:ARG:HG2	2.01	0.43
1:K:195:ASN:OD1	1:K:198:CYS:HB3	2.18	0.43
1:B:122:PRO:HA	1:B:123:PRO:HD3	1.88	0.43
1:G:158:LYS:HD3	1:G:158:LYS:H	1.84	0.43
1:L:26:VAL:HG21	1:L:39:MET:HG2	1.99	0.42
1:J:65:ALA:HB1	1:J:141:ILE:HD13	2.01	0.42
1:G:5:ASN:OD1	1:G:9:GLN:N	2.43	0.42
1:D:9:GLN:NE2	1:G:7:GLN:OE1	2.52	0.42
1:H:144:MET:HE2	1:H:144:MET:HB3	1.88	0.42
1:F:81:ASP:OD1	1:F:101:GLY:N	2.49	0.42
1:B:47:ALA:HB1	1:B:51:ASP:HB2	2.01	0.42
1:F:122:PRO:HA	1:F:123:PRO:HD3	1.94	0.42
1:B:117:TRP:CZ2	1:I:93:PRO:HG2	2.55	0.42
1:D:144:MET:HE2	1:D:144:MET:HB3	1.87	0.42
1:K:154:ARG:HA	1:K:193:ASN:HB3	2.02	0.42
1:B:116:GLY:O	1:B:120:HIS:HB2	2.19	0.41
1:B:144:MET:HE2	1:B:144:MET:HB3	1.93	0.41
1:E:102:SER:HB2	1:E:107:THR:HB	2.03	0.41
1:F:150:ILE:HD13	1:F:172:LEU:HB2	2.03	0.41
1:J:99:PRO:HG3	1:J:117:TRP:CD2	2.55	0.41
1:H:153:ILE:HG21	1:H:168:PHE:HA	2.02	0.41
1:J:172:LEU:HD21	1:J:182:LYS:HA	2.02	0.41
1:D:7:GLN:HB3	1:G:7:GLN:NE2	2.35	0.41
1:E:172:LEU:HD21	1:E:186:THR:HG21	2.02	0.41
1:J:47:ALA:HB1	1:J:51:ASP:HB2	2.02	0.41
1:F:47:ALA:HB1	1:F:51:ASP:HB2	2.03	0.41
1:F:144:MET:HE2	1:F:144:MET:HB3	1.92	0.41
1:C:6:LEU:O	1:D:7:GLN:NE2	2.49	0.40
1:A:146:SER:HA	1:A:147:PRO:HD3	1.95	0.40

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:122:PRO:HA	1:J:123:PRO:HD3	1.93	0.40
1:H:37:ILE:HB	1:H:38:PRO:HD3	2.04	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	211/231 (91%)	209 (99%)	2 (1%)	0	100	100
1	B	205/231 (89%)	201 (98%)	4 (2%)	0	100	100
1	C	210/231 (91%)	206 (98%)	4 (2%)	0	100	100
1	D	199/231 (86%)	197 (99%)	2 (1%)	0	100	100
1	E	204/231 (88%)	196 (96%)	8 (4%)	0	100	100
1	F	217/231 (94%)	211 (97%)	6 (3%)	0	100	100
1	G	214/231 (93%)	207 (97%)	7 (3%)	0	100	100
1	H	207/231 (90%)	203 (98%)	4 (2%)	0	100	100
1	I	211/231 (91%)	207 (98%)	4 (2%)	0	100	100
1	J	212/231 (92%)	205 (97%)	7 (3%)	0	100	100
1	K	192/231 (83%)	187 (97%)	5 (3%)	0	100	100
1	L	200/231 (87%)	196 (98%)	4 (2%)	0	100	100
2	P	5/9 (56%)	5 (100%)	0	0	100	100
2	W	6/9 (67%)	6 (100%)	0	0	100	100
All	All	2493/2790 (89%)	2436 (98%)	57 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	167/193 (86%)	167 (100%)	0	100	100
1	B	169/193 (88%)	169 (100%)	0	100	100
1	C	173/193 (90%)	173 (100%)	0	100	100
1	D	159/193 (82%)	156 (98%)	3 (2%)	52	79
1	E	166/193 (86%)	165 (99%)	1 (1%)	84	93
1	F	172/193 (89%)	172 (100%)	0	100	100
1	G	174/193 (90%)	174 (100%)	0	100	100
1	H	168/193 (87%)	167 (99%)	1 (1%)	84	93
1	I	168/193 (87%)	166 (99%)	2 (1%)	67	86
1	J	172/193 (89%)	172 (100%)	0	100	100
1	K	158/193 (82%)	156 (99%)	2 (1%)	65	85
1	L	162/193 (84%)	161 (99%)	1 (1%)	84	93
2	M	1/7 (14%)	1 (100%)	0	100	100
2	N	1/7 (14%)	1 (100%)	0	100	100
2	O	1/7 (14%)	1 (100%)	0	100	100
2	P	4/7 (57%)	3 (75%)	1 (25%)	0	2
2	Q	1/7 (14%)	1 (100%)	0	100	100
2	R	1/7 (14%)	1 (100%)	0	100	100
2	S	1/7 (14%)	1 (100%)	0	100	100
2	U	1/7 (14%)	1 (100%)	0	100	100
2	V	1/7 (14%)	1 (100%)	0	100	100
2	W	3/7 (43%)	3 (100%)	0	100	100
2	X	1/7 (14%)	1 (100%)	0	100	100
All	All	2024/2393 (85%)	2013 (100%)	11 (0%)	86	94

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	2	ILE
1	D	3	VAL
1	D	144	MET
1	E	70	LYS
1	H	189	LEU
1	I	33	SER
1	I	70	LYS
1	K	144	MET
1	K	198	CYS
1	L	5	ASN
2	P	8	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	13	GLN
1	A	62	HIS
1	A	155	GLN
1	B	120	HIS
1	B	121	ASN
1	C	4	GLN
1	D	95	GLN
1	G	4	GLN
1	H	95	GLN
1	H	176	GLN
1	I	13	GLN
1	J	121	ASN
1	J	179	GLN
1	K	155	GLN
1	L	139	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

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 i

### 6.1 Protein, DNA and RNA chains i

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	215/231 (93%)	-1.22	0 100 100	56, 82, 134, 158	0
1	B	211/231 (91%)	-1.32	0 100 100	53, 80, 129, 182	0
1	C	214/231 (92%)	-1.33	0 100 100	48, 73, 124, 169	0
1	D	205/231 (88%)	-1.13	0 100 100	48, 82, 164, 201	0
1	E	208/231 (90%)	-1.13	0 100 100	56, 86, 140, 203	0
1	F	219/231 (94%)	-1.07	0 100 100	58, 91, 149, 172	0
1	G	218/231 (94%)	-1.09	0 100 100	62, 94, 143, 169	0
1	H	211/231 (91%)	-0.98	1 (0%) 87 75	60, 94, 153, 188	0
1	I	215/231 (93%)	-1.23	0 100 100	54, 87, 140, 177	0
1	J	216/231 (93%)	-1.26	1 (0%) 87 75	48, 74, 135, 175	0
1	K	198/231 (85%)	-1.05	1 (0%) 87 75	52, 82, 162, 203	0
1	L	206/231 (89%)	-0.99	0 100 100	62, 94, 146, 164	0
2	M	1/9 (11%)	-0.44	0 100 100	76, 76, 76, 76	1 (100%)
2	N	1/9 (11%)	-0.15	0 100 100	98, 98, 98, 98	0
2	O	1/9 (11%)	-0.98	0 100 100	72, 72, 72, 72	0
2	P	7/9 (77%)	0.29	0 100 100	76, 102, 109, 119	0
2	Q	1/9 (11%)	-0.37	0 100 100	92, 92, 92, 92	0
2	R	1/9 (11%)	-0.77	0 100 100	69, 69, 69, 69	1 (100%)
2	S	1/9 (11%)	-0.79	0 100 100	72, 72, 72, 72	1 (100%)
2	U	1/9 (11%)	-0.72	0 100 100	84, 84, 84, 84	0
2	V	1/9 (11%)	-0.58	0 100 100	59, 59, 59, 59	1 (100%)
2	W	8/9 (88%)	-0.23	0 100 100	74, 112, 136, 140	0
2	X	1/9 (11%)	-0.34	0 100 100	86, 86, 86, 86	0
All	All	2560/2871 (89%)	-1.14	3 (0%) 92 88	48, 85, 147, 203	4 (0%)

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	K	197	ASP	2.4
1	H	150	ILE	2.2
1	J	8	GLY	2.1

## 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, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	CL	E	301	1/1	0.98	0.03	93,93,93,93	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.