



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 06:52 PM UTC

PDB ID : 5C07 / pdb_00005c07
Title : 1E6 TCR in complex with HLA-A02 carrying YQFGPDFPIA
Authors : Rizkallah, P.J.; Bulek, A.M.; Cole, D.K.; Sewell, A.K.
Deposited on : 2015-06-12
Resolution : 2.11 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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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

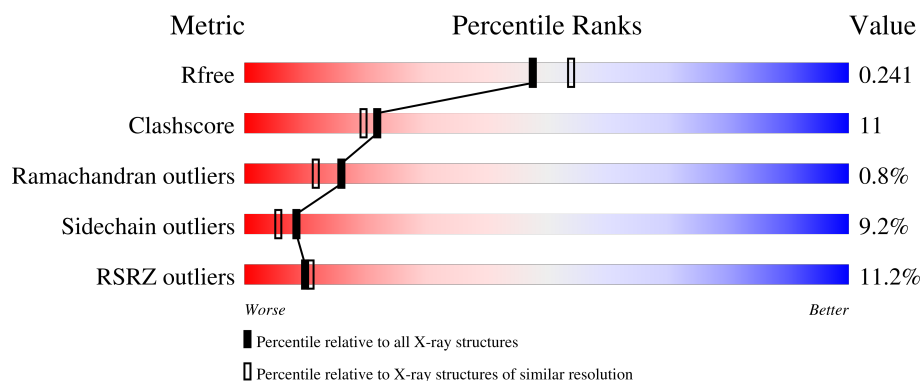
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.11 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	8290 (2.14-2.10)
Clashscore	190562	8817 (2.14-2.10)
Ramachandran outliers	187476	8738 (2.14-2.10)
Sidechain outliers	187428	8739 (2.14-2.10)
RSRZ outliers	180081	8294 (2.14-2.10)

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	277	5% 83% 13% .
1	F	277	4% 81% 16% .
2	B	100	3% 83% 16% .
2	G	100	% 77% 23%
3	C	10	100%

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Mol	Chain	Length	Quality of chain
3	H	10	
4	D	199	
4	I	199	
5	E	246	
5	J	246	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	SO4	F	305	-	-	X	-
8	GOL	F	302	-	X	X	-
8	GOL	H	101	-	X	-	-
8	GOL	J	302	-	-	X	-

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 14183 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 HLA class I histocompatibility antigen, A-2 alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	276	Total	C	N	O	S	0	0	0
			2254	1408	410	427	9			
1	F	277	Total	C	N	O	S	0	5	0
			2303	1438	419	436	10			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	initiating methionine	UNP P01892
F	0	MET	-	initiating methionine	UNP P01892

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			
2	G	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	initiating methionine	UNP P61769
G	0	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called Marker peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	10	Total	C	N	O	0	0	0
			83	57	11	15			
3	H	10	Total	C	N	O	0	0	0
			83	57	11	15			

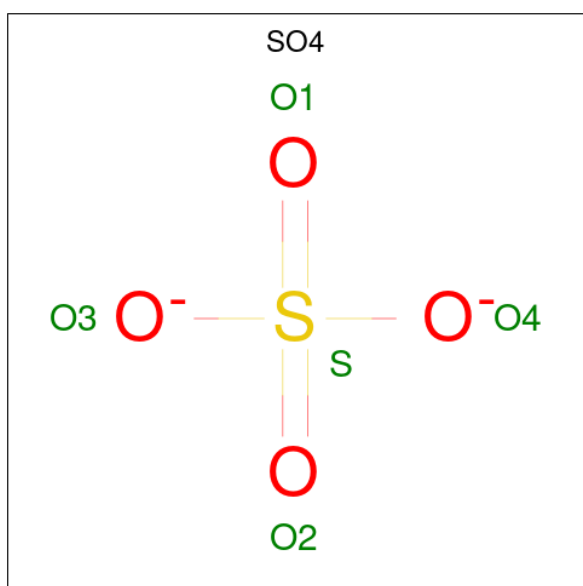
- Molecule 4 is a protein called 1E6 TCR Alpha Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	199	Total	C	N	O	S	0	1	0
			1579	989	260	320	10			
4	I	199	Total	C	N	O	S	0	1	0
			1579	989	260	320	10			

- Molecule 5 is a protein called 1E6 TCR Beta Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	246	Total	C	N	O	S	0	1	0
			1985	1255	345	375	10			
5	J	246	Total	C	N	O	S	0	1	0
			1985	1255	345	375	10			

- Molecule 6 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	S	0	0
			5	4	1		
6	A	1	Total	O	S	0	0
			5	4	1		
6	D	1	Total	O	S	0	0
			5	4	1		
6	F	1	Total	O	S	0	0
			5	4	1		
6	I	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	J	1	Total	O	S	0	0
			5	4	1		

- Molecule 7 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O	0	0
			4	2	2		
7	D	1	Total	C	O	0	0
			4	2	2		
7	E	1	Total	C	O	0	0
			4	2	2		
7	F	1	Total	C	O	0	0
			4	2	2		
7	G	1	Total	C	O	0	0
			4	2	2		
7	G	1	Total	C	O	0	0
			4	2	2		
7	I	1	Total	C	O	0	0
			4	2	2		
7	I	1	Total	C	O	0	0
			4	2	2		
7	J	1	Total	C	O	0	0
			4	2	2		

- Molecule 8 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	F	1	Total	C	O	0	0
			6	3	3		
8	F	1	Total	C	O	0	0
			6	3	3		
8	F	1	Total	C	O	0	0
			6	3	3		
8	H	1	Total	C	O	0	0
			6	3	3		
8	I	1	Total	C	O	0	0
			6	3	3		
8	J	1	Total	C	O	0	0
			6	3	3		
8	J	1	Total	C	O	0	0
			6	3	3		

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	90	Total	O	0	0
			90	90		
9	B	42	Total	O	0	0
			42	42		
9	C	6	Total	O	0	0
			6	6		
9	D	51	Total	O	0	0
			51	51		
9	E	73	Total	O	0	0
			73	73		

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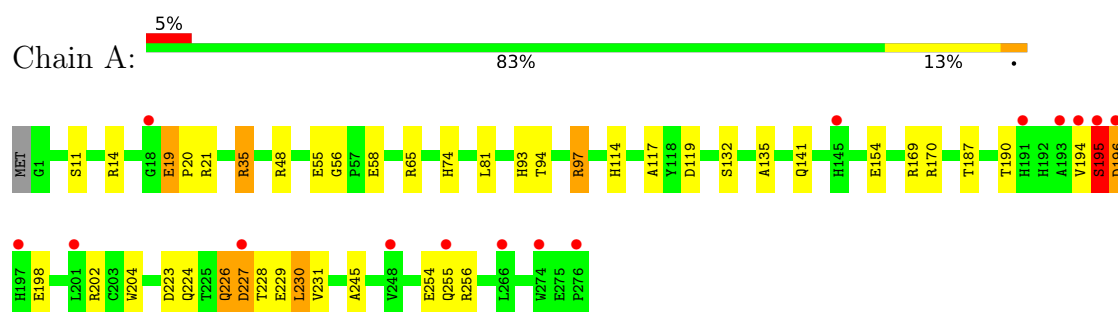
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	F	103	Total 103	O 103	0	0
9	G	49	Total 49	O 49	0	0
9	H	7	Total 7	O 7	0	0
9	I	46	Total 46	O 46	0	0
9	J	83	Total 83	O 83	0	0

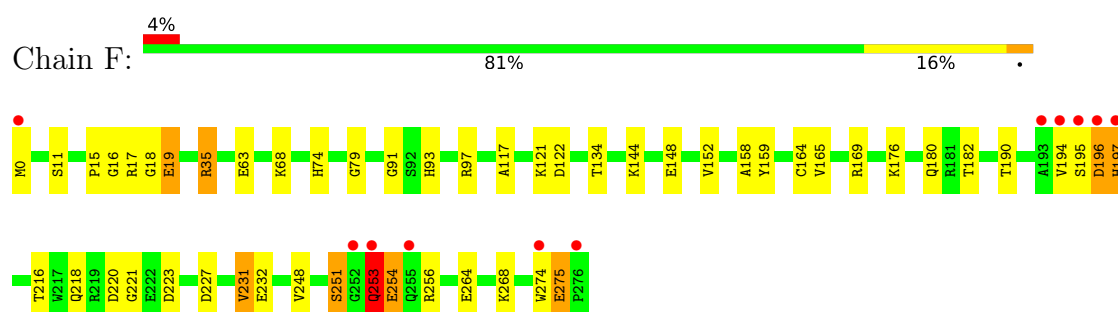
3 Residue-property plots

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.

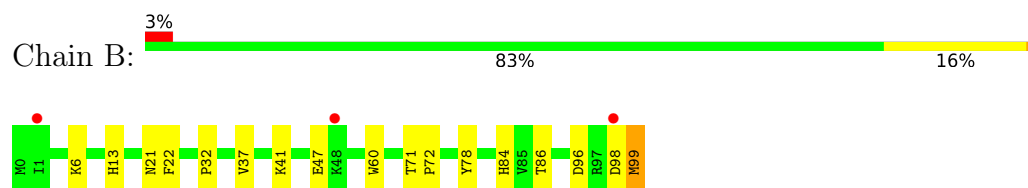
- Molecule 1: HLA class I histocompatibility antigen, A-2 alpha chain



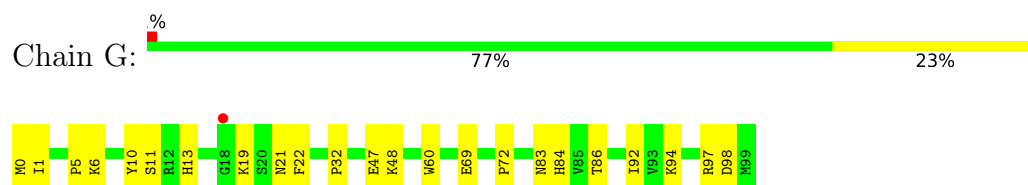
- Molecule 1: HLA class I histocompatibility antigen, A-2 alpha chain



- Molecule 2: Beta-2-microglobulin



- Molecule 2: Beta-2-microglobulin



- Molecule 3: Marker peptide

Chain C:  100%

There are no outlier residues recorded for this chain.

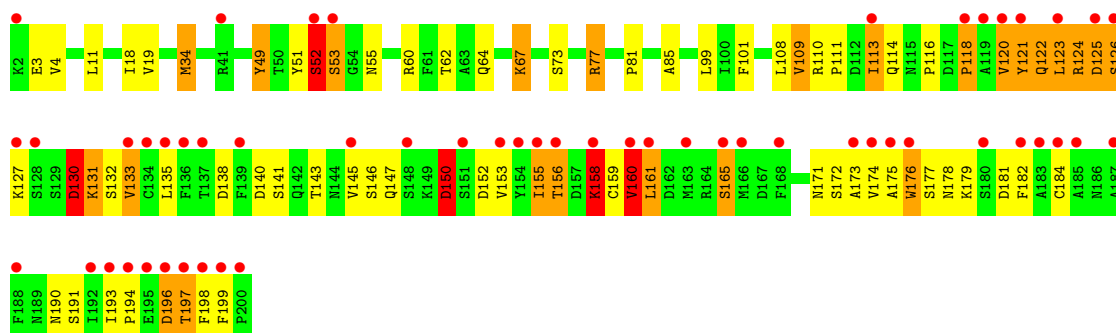
- Molecule 3: Marker peptide

Chain H:  90% 10%



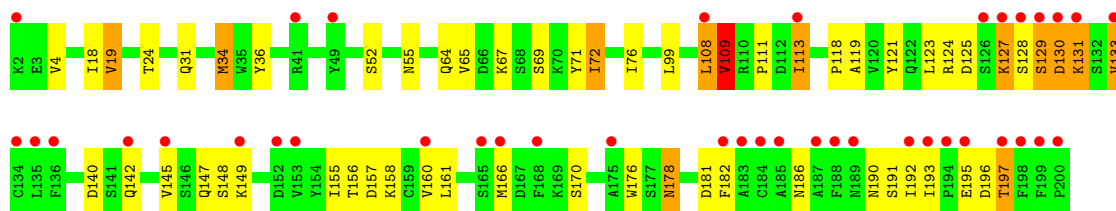
- Molecule 4: 1E6 TCR Alpha Chain

Chain D:  27% 60% 25% 12%



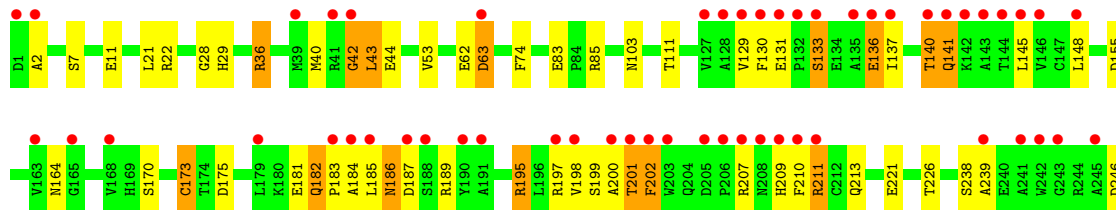
- Molecule 4: 1E6 TCR Alpha Chain

Chain I:  20% 70% 23% 6%



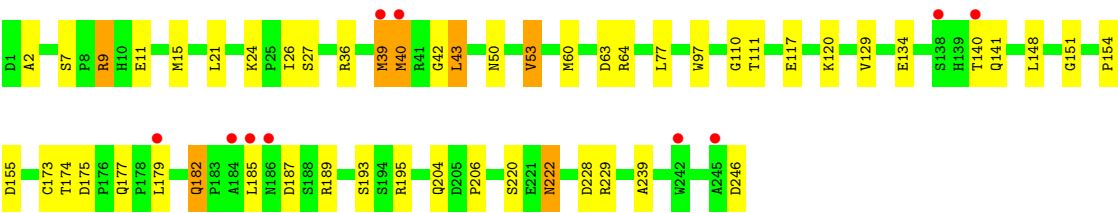
- Molecule 5: 1E6 TCR Beta Chain

Chain E:  22% 76% 18% 6%



- Molecule 5: 1E6 TCR Beta Chain

Chain J:  4% 79% 18%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	43.70Å 100.47Å 122.10Å 96.95° 98.11° 96.61°	Depositor
Resolution (Å)	49.41 – 2.11 49.41 – 2.11	Depositor EDS
% Data completeness (in resolution range)	97.0 (49.41-2.11) 97.0 (49.41-2.11)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.39 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.8.0073	Depositor
R, R_{free}	0.191 , 0.237 0.197 , 0.241	Depositor DCC
R_{free} test set	5674 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	34.2	Xtriage
Anisotropy	0.324	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 46.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	14183	wwPDB-VP
Average B, all atoms (Å ²)	51.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.59% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, GOL, EDO

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	1.14	4/2320 (0.2%)	1.08	4/3149 (0.1%)
1	F	1.16	3/2369 (0.1%)	1.09	10/3215 (0.3%)
2	B	1.10	1/860 (0.1%)	1.09	1/1162 (0.1%)
2	G	1.10	2/860 (0.2%)	1.02	0/1162
3	C	1.13	0/87	1.15	0/117
3	H	1.15	0/87	0.98	0/117
4	D	1.14	5/1615 (0.3%)	1.23	8/2185 (0.4%)
4	I	1.11	1/1615 (0.1%)	1.16	2/2185 (0.1%)
5	E	1.14	2/2040 (0.1%)	1.18	9/2773 (0.3%)
5	J	1.20	5/2040 (0.2%)	1.20	11/2773 (0.4%)
All	All	1.14	23/13893 (0.2%)	1.14	45/18838 (0.2%)

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	0	1
1	F	0	2
4	D	0	4
4	I	0	1
5	E	0	2
All	All	0	10

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	J	64	ARG	N-CA	10.49	1.58	1.46
4	D	158	LYS	N-CA	8.16	1.56	1.46
1	A	14	ARG	C-O	8.02	1.33	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	I	36	TYR	N-CA	-6.32	1.37	1.45
5	J	64	ARG	CA-C	6.13	1.61	1.52
5	J	43	LEU	CA-C	6.10	1.60	1.52
5	J	60	MET	C-O	-6.04	1.16	1.24
1	A	97	ARG	CZ-NH2	-5.80	1.25	1.33
5	E	43	LEU	CA-C	5.74	1.59	1.52
1	F	79	GLY	CA-C	5.73	1.58	1.52
2	G	5	PRO	N-CA	-5.70	1.40	1.47
5	E	29	HIS	CA-C	-5.61	1.45	1.52
4	D	158	LYS	CA-C	5.53	1.58	1.52
4	D	67	LYS	C-O	-5.49	1.16	1.24
2	B	37	VAL	C-O	-5.46	1.18	1.24
1	F	158	ALA	CA-C	5.45	1.59	1.52
5	J	27	SER	CA-C	-5.40	1.45	1.52
4	D	196	ASP	N-CA	5.39	1.53	1.46
2	G	92	ILE	C-O	-5.32	1.18	1.24
4	D	156	THR	CA-C	5.11	1.59	1.52
1	A	65	ARG	N-CA	-5.07	1.40	1.46
1	A	94	THR	C-O	5.06	1.29	1.23
1	F	16	GLY	N-CA	5.00	1.53	1.45

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	J	63	ASP	CA-C-N	-10.75	105.42	122.73
5	J	63	ASP	C-N-CA	-10.75	105.42	122.73
5	E	63	ASP	N-CA-C	10.38	126.45	114.62
4	D	158	LYS	N-CA-C	9.77	124.48	107.49
5	E	202	PHE	N-CA-C	-8.64	101.43	112.93
5	J	63	ASP	O-C-N	-7.32	113.39	121.95
1	F	231	VAL	CB-CA-C	-7.18	101.72	111.63
5	J	53	VAL	CB-CA-C	7.10	117.97	110.37
4	D	156	THR	N-CA-C	7.06	119.92	108.76
5	E	28	GLY	N-CA-C	-6.54	106.90	114.69
5	E	211	ARG	N-CA-C	6.54	119.04	108.32
4	D	150	ASP	N-CA-C	-6.51	100.32	109.69
1	F	16	GLY	N-CA-C	6.36	121.66	114.67
5	E	43	LEU	N-CA-C	6.25	118.90	108.96
5	E	62	GLU	N-CA-C	6.24	120.00	112.38
5	J	53	VAL	N-CA-C	6.16	114.60	107.89
1	A	231	VAL	CB-CA-C	-5.90	103.14	111.28
1	A	56	GLY	CA-C-N	5.82	125.96	119.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	56	GLY	C-N-CA	5.82	125.96	119.32
4	D	138	ASP	N-CA-C	5.77	119.90	112.86
4	D	160	VAL	N-CA-C	5.74	116.14	108.11
5	J	42	GLY	CA-C-N	5.68	129.97	122.30
5	J	42	GLY	C-N-CA	5.68	129.97	122.30
5	J	110	GLY	N-CA-C	5.68	120.04	112.65
4	D	109	VAL	N-CA-C	5.68	116.28	107.99
5	E	42	GLY	CA-C-N	5.65	129.93	122.30
5	E	42	GLY	C-N-CA	5.65	129.93	122.30
5	J	154	PRO	CA-C-N	-5.54	114.60	122.41
5	J	154	PRO	C-N-CA	-5.54	114.60	122.41
1	F	195	SER	N-CA-C	5.53	122.58	110.80
5	E	40	MET	N-CA-C	5.51	117.29	111.28
1	F	63	GLU	N-CA-C	-5.44	105.43	111.36
1	F	15	PRO	O-C-N	-5.38	115.37	122.64
1	F	197	HIS	N-CA-C	-5.29	106.77	113.23
1	A	81	LEU	N-CA-C	5.29	117.05	111.28
4	D	161	LEU	N-CA-C	5.28	117.57	109.07
4	D	159	CYS	N-CA-C	5.24	116.95	109.14
4	I	109	VAL	CB-CA-C	5.24	118.16	110.98
1	F	97	ARG	NE-CZ-NH2	5.19	123.87	119.20
1	F	35	ARG	NE-CZ-NH1	5.12	126.61	121.50
4	I	34	MET	CB-CG-SD	5.11	128.04	112.70
5	J	40	MET	N-CA-C	5.07	119.31	113.18
1	F	15	PRO	CA-C-N	-5.04	109.95	121.19
1	F	15	PRO	C-N-CA	-5.04	109.95	121.19
2	B	99	MET	N-CA-C	5.03	125.08	111.00

There are no chirality outliers.

All (10) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	196	ASP	Peptide
4	D	130	ASP	Peptide
4	D	152	ASP	Peptide
4	D	165	SER	Peptide
4	D	52	SER	Peptide
5	E	182	GLN	Peptide
5	E	201	THR	Peptide
1	F	194	VAL	Peptide
1	F	196	ASP	Peptide
4	I	196	ASP	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	2254	0	2103	26	0
1	F	2303	0	2151	38	0
2	B	837	0	803	10	0
2	G	837	0	803	18	0
3	C	83	0	74	0	0
3	H	83	0	74	2	0
4	D	1579	0	1493	86	0
4	I	1579	0	1493	45	0
5	E	1985	0	1899	56	0
5	J	1985	0	1899	35	0
6	A	10	0	0	0	0
6	D	5	0	0	1	0
6	F	5	0	0	2	0
6	I	5	0	0	0	0
6	J	5	0	0	0	0
7	B	4	0	6	0	0
7	D	4	0	6	0	0
7	E	4	0	6	0	0
7	F	4	0	6	0	0
7	G	8	0	12	2	0
7	I	8	0	12	0	0
7	J	4	0	6	0	0
8	F	18	0	24	10	0
8	H	6	0	7	0	0
8	I	6	0	8	2	0
8	J	12	0	16	7	0
9	A	90	0	0	4	0
9	B	42	0	0	0	0
9	C	6	0	0	0	0
9	D	51	0	0	5	0
9	E	73	0	0	6	0
9	F	103	0	0	2	0
9	G	49	0	0	1	0
9	H	7	0	0	0	0
9	I	46	0	0	0	0
9	J	83	0	0	2	0
All	All	14183	0	12901	283	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 11.

All (283) 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)
5:J:97:TRP:HB2	8:J:301:GOL:H11	1.29	1.13
4:D:18:ILE:H	4:I:64:GLN:HE22	1.06	1.00
4:D:113:ILE:HD13	4:D:113:ILE:H	1.26	1.00
4:D:121:TYR:HD2	5:E:136:GLU:HB3	1.34	0.92
4:I:55:ASN:HD21	4:I:64:GLN:HE21	1.19	0.90
4:D:121:TYR:CD2	5:E:133:SER:HB3	2.07	0.90
5:J:97:TRP:HB2	8:J:301:GOL:C1	2.02	0.88
5:E:43:LEU:HD23	5:E:43:LEU:C	2.00	0.87
1:A:194:VAL:O	1:A:196:ASP:N	2.08	0.86
4:D:34:MET:HE1	4:D:49:TYR:CD1	2.11	0.85
1:F:93:HIS:HB2	8:F:302:GOL:C3	2.06	0.85
4:I:113:ILE:HD13	4:I:113:ILE:H	1.38	0.85
4:D:126:SER:HB3	9:D:410:HOH:O	1.76	0.84
4:I:55:ASN:HD21	4:I:64:GLN:NE2	1.74	0.84
4:D:64:GLN:HE22	4:I:18:ILE:H	1.26	0.83
2:G:21:ASN:HD22	2:G:22:PHE:H	1.24	0.82
4:I:52:SER:O	4:I:67:LYS:HD2	1.80	0.81
5:J:15:MET:CE	5:J:117:GLU:HA	2.11	0.81
5:J:97:TRP:CB	8:J:301:GOL:H11	2.09	0.80
4:D:62:THR:OG1	4:D:77:ARG:NH2	2.16	0.79
5:E:202:PHE:HD1	9:E:408:HOH:O	1.64	0.78
4:I:113:ILE:H	4:I:113:ILE:CD1	1.95	0.78
4:D:113:ILE:H	4:D:113:ILE:CD1	1.96	0.78
1:F:251:SER:OG	1:F:254:GLU:OE1	2.01	0.78
5:E:43:LEU:HD23	5:E:44:GLU:N	2.00	0.76
1:F:197:HIS:CD2	1:F:251:SER:HA	2.21	0.75
5:J:222:ASN:H	5:J:222:ASN:HD22	1.34	0.75
4:I:55:ASN:ND2	4:I:64:GLN:HE21	1.83	0.75
2:B:13:HIS:H	2:B:21:ASN:HD21	1.33	0.75
2:B:21:ASN:HD22	2:B:22:PHE:H	1.33	0.75
4:D:121:TYR:HD2	5:E:136:GLU:CB	2.00	0.74
4:D:121:TYR:CE1	4:D:123:LEU:HG	2.21	0.74
1:F:93:HIS:HB2	8:F:302:GOL:H31	1.69	0.73
1:F:93:HIS:CD2	8:F:302:GOL:H31	2.23	0.73
5:E:83:GLU:OE1	5:E:85:ARG:NH1	2.23	0.72
4:I:65:VAL:HG13	4:I:72:ILE:HD11	1.71	0.72
1:F:220:ASP:OD2	1:F:256:ARG:NH1	2.22	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:I:52:SER:O	4:I:67:LYS:CD	2.37	0.72
5:E:181:GLU:O	5:E:183:PRO:CD	2.39	0.71
1:A:55:GLU:OE2	1:A:170:ARG:NH2	2.23	0.71
4:D:121:TYR:CD2	5:E:136:GLU:HB3	2.22	0.71
5:E:186:ASN:N	5:E:186:ASN:HD22	1.89	0.70
2:G:13:HIS:H	2:G:21:ASN:HD21	1.39	0.70
4:D:113:ILE:HD13	4:D:113:ILE:N	2.05	0.70
5:J:26:ILE:HA	8:J:302:GOL:H2	1.73	0.69
5:J:15:MET:HE3	5:J:117:GLU:HA	1.72	0.69
1:A:93:HIS:HD2	1:A:119:ASP:OD2	1.76	0.68
1:A:187:THR:HA	1:A:204:TRP:O	1.94	0.68
4:D:113:ILE:CD1	4:D:113:ILE:N	2.54	0.68
4:D:133:VAL:HG12	4:D:175:ALA:O	1.93	0.67
1:A:224:GLN:O	1:A:228:THR:HG21	1.94	0.67
1:A:230:LEU:HD12	1:A:245:ALA:HB2	1.77	0.67
4:I:178:ASN:HD22	4:I:178:ASN:H	1.40	0.67
5:J:15:MET:CE	5:J:117:GLU:HG2	2.25	0.66
5:J:222:ASN:HD22	5:J:222:ASN:N	1.94	0.66
5:E:181:GLU:O	5:E:183:PRO:HD3	1.96	0.66
5:J:15:MET:HE2	5:J:117:GLU:HA	1.77	0.66
1:F:93:HIS:HB2	8:F:302:GOL:H32	1.76	0.66
4:I:133:VAL:HG22	4:I:176:TRP:HB3	1.77	0.66
5:J:2:ALA:HB3	8:J:302:GOL:H31	1.76	0.66
1:F:134:THR:HG23	6:F:305:SO4:O3	1.96	0.66
4:D:121:TYR:CD2	5:E:136:GLU:CB	2.79	0.65
4:D:110:ARG:HB3	4:D:141:SER:HB3	1.77	0.65
1:F:91:GLY:O	8:F:302:GOL:H11	1.95	0.65
4:D:153:VAL:HG13	4:D:155:ILE:HD12	1.76	0.65
4:I:113:ILE:CD1	4:I:113:ILE:N	2.59	0.65
1:F:93:HIS:CG	8:F:302:GOL:H31	2.31	0.65
4:D:120:VAL:O	4:D:121:TYR:HB3	1.96	0.65
1:F:227:ASP:HB3	1:F:248:VAL:HG12	1.78	0.65
4:D:122:GLN:O	5:E:133:SER:HB2	1.98	0.64
1:F:251:SER:OG	1:F:251:SER:O	2.16	0.64
4:D:121:TYR:OH	4:D:123:LEU:HD23	1.98	0.64
4:D:121:TYR:CE1	4:D:135:LEU:HB3	2.33	0.64
4:D:51:TYR:O	4:D:53:SER:CB	2.45	0.63
1:F:253:GLN:HB2	1:F:274:TRP:CD1	2.34	0.63
4:D:34:MET:HE2	5:E:103:ASN:HB3	1.80	0.63
4:D:158:LYS:N	4:D:158:LYS:CD	2.62	0.62
4:D:158:LYS:N	4:D:158:LYS:HD2	2.15	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:52:SER:HA	4:D:67:LYS:HD2	1.80	0.62
4:D:101:PHE:CE1	5:E:43:LEU:HD22	2.35	0.62
4:D:150:ASP:OD1	4:D:150:ASP:N	2.33	0.61
4:D:133:VAL:HG13	4:D:176:TRP:HB3	1.82	0.61
4:D:34:MET:HE2	5:E:103:ASN:CB	2.31	0.61
1:F:227:ASP:HB3	1:F:248:VAL:CG1	2.31	0.61
5:E:22[B]:ARG:HD3	5:E:74:PHE:HZ	1.66	0.61
5:E:43:LEU:C	5:E:43:LEU:CD2	2.73	0.61
2:G:10:TYR:HB2	7:G:102:EDO:H22	1.83	0.61
2:B:96:ASP:HB3	2:B:99:MET:HE3	1.82	0.60
1:A:230:LEU:CD1	1:A:245:ALA:HB2	2.30	0.60
4:D:179:LYS:O	4:D:181:ASP:N	2.34	0.60
5:E:202:PHE:CD1	9:E:408:HOH:O	2.46	0.60
5:E:129:VAL:HG23	5:E:239:ALA:HB3	1.83	0.59
5:E:145:LEU:HD11	5:E:210:PHE:CE2	2.38	0.59
4:I:161:LEU:HB3	5:J:173:CYS:HB2	1.84	0.59
1:F:91:GLY:O	8:F:302:GOL:C1	2.51	0.59
4:D:196:ASP:OD1	4:D:197:THR:N	2.36	0.59
2:G:84:HIS:HD2	2:G:86:THR:OG1	1.86	0.59
4:I:118:PRO:HB2	4:I:197:THR:HG22	1.85	0.59
1:F:93:HIS:CB	8:F:302:GOL:H31	2.33	0.58
4:D:51:TYR:O	4:D:53:SER:HB3	2.03	0.58
5:J:129:VAL:HG23	5:J:239:ALA:HB3	1.86	0.58
1:A:226:GLN:HE21	1:A:226:GLN:C	2.12	0.58
4:D:18:ILE:H	4:I:64:GLN:NE2	1.90	0.58
4:D:123:LEU:HD11	4:D:133:VAL:HB	1.84	0.58
4:D:113:ILE:HG12	4:D:140:ASP:HB2	1.86	0.57
4:D:125:ASP:OD1	4:D:125:ASP:N	2.29	0.57
4:D:120:VAL:CG1	4:D:121:TYR:N	2.68	0.57
4:D:114:GLN:HA	9:D:450:HOH:O	2.04	0.57
4:D:113:ILE:CG1	4:D:140:ASP:HB2	2.35	0.56
4:D:18:ILE:N	4:I:64:GLN:HE22	1.90	0.56
2:G:11:SER:O	7:G:102:EDO:H21	2.06	0.56
4:D:121:TYR:CD1	4:D:135:LEU:HB3	2.41	0.55
1:F:197:HIS:O	1:F:251:SER:N	2.39	0.55
5:E:141:GLN:HE21	5:E:141:GLN:HA	1.71	0.55
4:I:145:VAL:HA	4:I:191:SER:OG	2.06	0.55
4:I:148:SER:HB2	4:I:155:ILE:CD1	2.37	0.55
4:I:127:LYS:O	4:I:129:SER:N	2.37	0.55
4:D:51:TYR:O	4:D:53:SER:HB2	2.06	0.55
4:D:60:ARG:HD3	6:D:302:SO4:O1	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:133:VAL:HG23	5:E:130:PHE:CD2	2.42	0.55
4:D:123:LEU:HD13	4:D:133:VAL:HG23	1.89	0.54
1:F:144:LYS:HE3	1:F:148:GLU:OE1	2.07	0.54
5:E:211:ARG:HH12	5:E:213:GLN:NE2	2.05	0.54
4:D:124:ARG:HB2	4:D:124:ARG:CZ	2.37	0.54
1:A:97:ARG:NH2	9:A:404:HOH:O	2.40	0.54
2:B:84:HIS:HD2	2:B:86:THR:OG1	1.90	0.54
1:A:35:ARG:CD	1:A:48:ARG:HD2	2.38	0.53
1:F:18:GLY:C	1:F:19:GLU:HG2	2.34	0.53
4:I:108:LEU:C	4:I:108:LEU:HD13	2.34	0.53
4:D:111:PRO:HG2	4:D:160:VAL:HG11	1.91	0.53
5:E:145:LEU:HD11	5:E:210:PHE:CD2	2.44	0.53
5:E:42:GLY:HA3	9:E:403:HOH:O	2.09	0.52
5:E:211:ARG:HH12	5:E:213:GLN:HE21	1.56	0.52
5:J:2:ALA:O	8:J:302:GOL:O3	2.22	0.52
5:J:179:LEU:C	5:J:179:LEU:HD12	2.35	0.52
4:D:133:VAL:HG11	4:D:174:VAL:HG13	1.90	0.52
1:A:226:GLN:NE2	1:A:227:ASP:OD1	2.42	0.51
4:D:101:PHE:CD1	5:E:43:LEU:HD22	2.44	0.51
1:A:93:HIS:HE1	9:A:409:HOH:O	1.92	0.51
1:F:117:ALA:HB2	2:G:60:TRP:CE2	2.45	0.51
5:J:21:LEU:HD22	5:J:111:THR:HG21	1.92	0.51
1:F:182:THR:HG21	1:F:264:GLU:HG2	1.93	0.51
2:G:21:ASN:HD22	2:G:22:PHE:N	2.02	0.51
1:A:195:SER:O	1:A:196:ASP:HB3	2.10	0.51
5:E:181:GLU:O	5:E:183:PRO:HD2	2.11	0.51
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.46	0.51
1:F:218:GLN:HG2	1:F:223:ASP:HA	1.93	0.50
5:J:222:ASN:H	5:J:222:ASN:ND2	2.06	0.50
4:I:125:ASP:HB3	5:J:129:VAL:O	2.10	0.50
1:F:93:HIS:HD2	8:F:302:GOL:H11	1.75	0.50
4:I:113:ILE:CG1	4:I:140:ASP:HA	2.41	0.50
4:D:126:SER:CB	9:D:410:HOH:O	2.46	0.50
1:F:220:ASP:OD1	1:F:256:ARG:NE	2.44	0.50
4:D:52:SER:CA	4:D:67:LYS:HD2	2.42	0.50
5:E:129:VAL:CG2	5:E:239:ALA:HB3	2.41	0.50
1:F:232[A]:GLU:OE1	2:G:6:LYS:NZ	2.44	0.50
1:A:224:GLN:O	1:A:228:THR:CG2	2.60	0.50
5:E:186:ASN:N	5:E:186:ASN:ND2	2.58	0.49
1:F:121:LYS:HD3	2:G:1:ILE:HG12	1.94	0.49
5:E:211:ARG:NH1	5:E:213:GLN:HE21	2.09	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:116:PRO:HB3	4:D:140:ASP:HB3	1.94	0.49
4:D:160:VAL:HG22	4:D:171:ASN:ND2	2.27	0.49
4:D:161:LEU:HB3	5:E:173:CYS:HB3	1.95	0.49
4:D:113:ILE:HG13	4:D:140:ASP:HA	1.95	0.49
4:D:81:PRO:HD2	9:D:424:HOH:O	2.13	0.49
2:G:21:ASN:ND2	2:G:22:PHE:H	2.03	0.49
5:E:141:GLN:HE21	5:E:141:GLN:CA	2.26	0.48
1:F:218:GLN:OE1	1:F:221:GLY:C	2.55	0.48
4:I:69:SER:CB	8:I:301:GOL:H32	2.43	0.48
1:F:165[B]:VAL:HG12	1:F:169:ARG:CZ	2.44	0.48
4:D:198:PHE:O	4:D:199:PHE:HB2	2.13	0.48
1:A:254:GLU:OE2	1:A:254:GLU:N	2.45	0.48
1:F:68:LYS:HD3	8:F:301:GOL:H11	1.95	0.48
5:J:21:LEU:HD12	5:J:77:LEU:HD23	1.95	0.48
4:D:52:SER:HB2	4:D:67:LYS:CD	2.43	0.48
5:E:155:ASP:OD1	5:E:155:ASP:N	2.44	0.48
4:I:119:ALA:HB1	4:I:121:TYR:CZ	2.49	0.48
5:J:50:ASN:ND2	9:J:404:HOH:O	2.45	0.48
4:D:143:THR:HG21	4:D:194:PRO:HD3	1.95	0.48
4:D:34:MET:CE	5:E:103:ASN:CB	2.92	0.47
1:F:122:ASP:HB3	6:F:305:SO4:O2	2.14	0.47
1:A:194:VAL:HG12	1:A:195:SER:N	2.29	0.47
1:A:190:THR:OG1	1:A:202:ARG:HB3	2.13	0.47
4:D:122:GLN:O	5:E:133:SER:CB	2.61	0.47
5:E:136:GLU:O	5:E:140:THR:OG1	2.24	0.47
4:I:149:LYS:HG3	4:I:190:ASN:HD21	1.78	0.47
4:D:122:GLN:NE2	4:D:184:CYS:SG	2.88	0.47
5:E:2:ALA:HA	9:E:471:HOH:O	2.14	0.47
5:E:21:LEU:HD22	5:E:111:THR:HG21	1.96	0.47
1:F:152:VAL:CG2	3:H:8:PRO:HG3	2.44	0.47
4:I:130:ASP:O	4:I:131:LYS:HG3	2.15	0.47
4:D:120:VAL:HG12	4:D:121:TYR:N	2.30	0.47
4:D:125:ASP:OD1	4:D:130:ASP:HA	2.13	0.47
4:I:19:VAL:HG13	4:I:76:ILE:HB	1.97	0.47
4:I:24:THR:HG22	4:I:71:TYR:CD1	2.50	0.47
5:J:228:ASP:O	5:J:229:ARG:C	2.55	0.47
4:I:130:ASP:C	4:I:131:LYS:HG3	2.40	0.47
2:B:32:PRO:O	2:B:84:HIS:HE1	1.97	0.46
4:I:24:THR:HG22	4:I:71:TYR:HD1	1.80	0.46
5:J:24:LYS:HE3	8:J:302:GOL:H12	1.97	0.46
5:E:164:ASN:HD21	5:E:207:ARG:HH22	1.63	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:121:TYR:CG	5:E:133:SER:HB3	2.49	0.46
4:D:155:ILE:HG22	4:D:176:TRP:CE3	2.50	0.46
4:D:123:LEU:HB2	5:E:131:GLU:O	2.15	0.46
2:G:32:PRO:O	2:G:84:HIS:HE1	1.99	0.46
1:F:196:ASP:CG	1:F:196:ASP:O	2.59	0.45
4:D:67:LYS:HE2	9:D:407:HOH:O	2.16	0.45
5:E:164:ASN:HD22	5:E:209:HIS:HB3	1.81	0.45
1:F:159:TYR:CE2	1:F:164:CYS:HB2	2.52	0.45
4:I:108:LEU:HD13	4:I:109:VAL:N	2.32	0.45
1:A:97:ARG:HD3	1:A:114:HIS:NE2	2.31	0.45
4:D:131:LYS:HG2	4:D:132:SER:N	2.32	0.45
4:D:147:GLN:HB3	4:D:156:THR:CG2	2.46	0.45
1:F:190:THR:HG21	2:G:98:ASP:OD1	2.16	0.45
4:D:147:GLN:HB3	4:D:156:THR:HG23	1.99	0.45
4:D:123:LEU:CB	5:E:131:GLU:O	2.65	0.45
4:I:113:ILE:HG13	4:I:140:ASP:HA	1.99	0.45
4:I:108:LEU:C	4:I:108:LEU:CD1	2.90	0.45
4:I:108:LEU:HD13	4:I:109:VAL:C	2.42	0.45
5:E:183:PRO:O	5:E:185:LEU:N	2.50	0.45
4:D:153:VAL:HG12	4:D:177:SER:HA	1.99	0.44
5:J:9:ARG:HA	5:J:9:ARG:HD3	1.70	0.44
1:A:35:ARG:HD3	1:A:48:ARG:HD2	1.99	0.44
4:I:124:ARG:O	4:I:125:ASP:HB2	2.17	0.44
5:J:187:ASP:OD1	5:J:187:ASP:O	2.36	0.44
5:E:175:ASP:OD1	5:E:195:ARG:NH1	2.51	0.44
5:J:220:SER:HB2	9:J:478:HOH:O	2.18	0.44
1:A:141:GLN:NE2	9:A:402:HOH:O	2.34	0.44
4:D:133:VAL:HG11	4:D:174:VAL:CG1	2.47	0.44
5:J:15:MET:HE2	5:J:117:GLU:HG2	1.99	0.43
1:A:135:ALA:HB3	9:A:402:HOH:O	2.17	0.43
5:J:204:GLN:O	5:J:206:PRO:HD3	2.17	0.43
2:G:22:PHE:CZ	2:G:69:GLU:HG2	2.53	0.43
4:I:111:PRO:O	4:I:113:ILE:HD12	2.18	0.43
4:D:113:ILE:HG12	4:D:140:ASP:CB	2.48	0.43
2:G:97:ARG:NH1	9:G:205:HOH:O	2.50	0.43
4:I:156:THR:HG21	5:J:193:SER:HB3	2.00	0.43
4:I:192:ILE:HD12	4:I:192:ILE:H	1.83	0.43
4:D:118:PRO:O	4:D:196:ASP:CB	2.67	0.43
1:F:152:VAL:HG22	3:H:8:PRO:HG3	2.00	0.43
5:J:39:MET:HE1	5:J:40:MET:CE	2.49	0.43
1:A:195:SER:OG	1:A:198:GLU:HB2	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:64:GLN:NE2	4:I:18:ILE:H	2.05	0.42
4:D:135:LEU:HD12	4:D:173:ALA:O	2.19	0.42
1:F:253:GLN:HB2	1:F:274:TRP:NE1	2.34	0.42
5:J:185:LEU:N	5:J:185:LEU:HD12	2.35	0.42
4:I:113:ILE:HG12	4:I:140:ASP:HA	2.00	0.42
5:E:211:ARG:NH2	5:E:213:GLN:HB2	2.35	0.42
4:I:71:TYR:HB3	8:I:301:GOL:H31	2.01	0.42
4:D:153:VAL:CG1	4:D:177:SER:HA	2.50	0.42
1:A:19:GLU:HA	1:A:20:PRO:HD3	1.89	0.42
1:F:180:GLN:HA	9:F:498:HOH:O	2.19	0.42
5:J:182:GLN:HB3	5:J:185:LEU:HD13	2.02	0.42
4:D:118:PRO:O	4:D:196:ASP:HB3	2.20	0.41
5:E:211:ARG:NH2	5:E:213:GLN:HE21	2.17	0.41
5:E:211:ARG:HH22	5:E:213:GLN:HE21	1.67	0.41
5:J:15:MET:HE3	5:J:117:GLU:CA	2.45	0.41
4:D:124:ARG:HB3	4:D:130:ASP:HB3	2.01	0.41
2:B:71:THR:HA	2:B:72:PRO:HD2	1.82	0.41
4:D:147:GLN:HB2	4:D:156:THR:HG22	2.03	0.41
4:D:155:ILE:HG22	4:D:176:TRP:CD2	2.55	0.41
5:E:83:GLU:OE1	5:E:85:ARG:CZ	2.68	0.41
2:G:19:LYS:O	2:G:72:PRO:HD2	2.20	0.41
1:A:11:SER:HA	1:A:21:ARG:O	2.21	0.41
1:A:169:ARG:HD2	4:I:195:GLU:OE1	2.20	0.41
2:B:21:ASN:ND2	2:B:22:PHE:H	2.10	0.41
4:D:124:ARG:HB2	4:D:124:ARG:NH1	2.36	0.41
4:I:157:ASP:OD1	4:I:158:LYS:N	2.52	0.41
2:B:21:ASN:HD22	2:B:22:PHE:N	2.08	0.41
2:G:48:LYS:O	2:G:48:LYS:HG3	2.20	0.41
5:J:174:THR:O	5:J:175:ASP:C	2.64	0.41
5:E:22[B]:ARG:HD3	5:E:74:PHE:CZ	2.50	0.40
2:G:0:MET:HE3	2:G:0:MET:HB2	1.93	0.40
4:I:181:ASP:OD1	4:I:182:PHE:N	2.53	0.40
1:F:19:GLU:N	9:F:401:HOH:O	2.55	0.40
5:E:36:ARG:NH2	9:E:402:HOH:O	2.49	0.40
5:E:63:ASP:HA	9:E:409:HOH:O	2.22	0.40
2:B:41:LYS:HG3	2:B:78:TYR:CE1	2.57	0.40
5:E:201:THR:O	5:E:201:THR:HG22	2.21	0.40
5:E:246:ASP:OD1	5:E:246:ASP:N	2.55	0.40
2:G:1:ILE:HD12	2:G:1:ILE:C	2.46	0.40
5:J:140:THR:O	5:J:140:THR:HG22	2.21	0.40
5:J:151:GLY:O	5:J:189:ARG:HD3	2.22	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	274/277 (99%)	261 (95%)	11 (4%)	2 (1%)	18	15
1	F	280/277 (101%)	273 (98%)	5 (2%)	2 (1%)	18	15
2	B	98/100 (98%)	94 (96%)	4 (4%)	0	100	100
2	G	98/100 (98%)	95 (97%)	3 (3%)	0	100	100
3	C	8/10 (80%)	8 (100%)	0	0	100	100
3	H	8/10 (80%)	8 (100%)	0	0	100	100
4	D	198/199 (100%)	177 (89%)	18 (9%)	3 (2%)	8	4
4	I	198/199 (100%)	185 (93%)	11 (6%)	2 (1%)	12	8
5	E	245/246 (100%)	234 (96%)	7 (3%)	4 (2%)	7	3
5	J	245/246 (100%)	238 (97%)	7 (3%)	0	100	100
All	All	1652/1664 (99%)	1573 (95%)	66 (4%)	13 (1%)	16	12

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	195	SER
5	E	184	ALA
5	E	182	GLN
5	E	187	ASP
4	I	128	SER
1	A	227	ASP
5	E	200	ALA
4	I	129	SER
4	D	118	PRO
4	D	52	SER
4	D	85	ALA
1	F	253	GLN

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Mol	Chain	Res	Type
1	F	275	GLU

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	232/233 (100%)	219 (94%)	13 (6%)	19	17
1	F	238/233 (102%)	223 (94%)	15 (6%)	16	13
2	B	95/95 (100%)	92 (97%)	3 (3%)	34	37
2	G	95/95 (100%)	92 (97%)	3 (3%)	34	37
3	C	8/8 (100%)	8 (100%)	0	100	100
3	H	8/8 (100%)	8 (100%)	0	100	100
4	D	181/180 (101%)	141 (78%)	40 (22%)	1	0
4	I	181/180 (101%)	158 (87%)	23 (13%)	4	2
5	E	217/216 (100%)	196 (90%)	21 (10%)	8	5
5	J	217/216 (100%)	200 (92%)	17 (8%)	11	9
All	All	1472/1464 (100%)	1337 (91%)	135 (9%)	8	5

All (135) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	GLU
1	A	35	ARG
1	A	58	GLU
1	A	74	HIS
1	A	132	SER
1	A	154	GLU
1	A	195	SER
1	A	223	ASP
1	A	226	GLN
1	A	229	GLU
1	A	230	LEU
1	A	255	GLN

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Mol	Chain	Res	Type
1	A	256	ARG
2	B	6	LYS
2	B	47	GLU
2	B	98	ASP
4	D	3	GLU
4	D	4	VAL
4	D	11	LEU
4	D	19	VAL
4	D	34	MET
4	D	49	TYR
4	D	53	SER
4	D	55	ASN
4	D	73	SER
4	D	77	ARG
4	D	99	LEU
4	D	108	LEU
4	D	109	VAL
4	D	113	ILE
4	D	120	VAL
4	D	121	TYR
4	D	122	GLN
4	D	123	LEU
4	D	124	ARG
4	D	125	ASP
4	D	126	SER
4	D	127	LYS
4	D	130	ASP
4	D	131	LYS
4	D	133	VAL
4	D	145	VAL
4	D	146	SER
4	D	150	ASP
4	D	155	ILE
4	D	158	LYS
4	D	160	VAL
4	D	165	SER
4	D	172	SER
4	D	176	TRP
4	D	178	ASN
4	D	182	PHE
4	D	190	ASN
4	D	191	SER

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Mol	Chain	Res	Type
4	D	193	ILE
4	D	197	THR
5	E	7	SER
5	E	11	GLU
5	E	36	ARG
5	E	53	VAL
5	E	133	SER
5	E	136	GLU
5	E	137	ILE
5	E	140	THR
5	E	141	GLN
5	E	148	LEU
5	E	170	SER
5	E	173	CYS
5	E	186	ASN
5	E	189	ARG
5	E	195	ARG
5	E	197	ARG
5	E	198	VAL
5	E	199	SER
5	E	221	GLU
5	E	226	THR
5	E	238	SER
1	F	0	MET
1	F	11	SER
1	F	17	ARG
1	F	19	GLU
1	F	35	ARG
1	F	74	HIS
1	F	176	LYS
1	F	216[A]	THR
1	F	216[B]	THR
1	F	231	VAL
1	F	251	SER
1	F	253	GLN
1	F	254	GLU
1	F	268	LYS
1	F	275	GLU
2	G	47	GLU
2	G	83	ASN
2	G	94	LYS
4	I	4	VAL

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Mol	Chain	Res	Type
4	I	19	VAL
4	I	31	GLN
4	I	34	MET
4	I	72	ILE
4	I	99	LEU
4	I	108	LEU
4	I	109	VAL
4	I	113	ILE
4	I	123	LEU
4	I	127	LYS
4	I	130	ASP
4	I	131	LYS
4	I	133	VAL
4	I	142	GLN
4	I	147	GLN
4	I	160	VAL
4	I	166	MET
4	I	170	SER
4	I	178	ASN
4	I	186	ASN
4	I	193	ILE
4	I	197	THR
5	J	7	SER
5	J	9	ARG
5	J	11	GLU
5	J	36	ARG
5	J	39	MET
5	J	43	LEU
5	J	53	VAL
5	J	120	LYS
5	J	134	GLU
5	J	141	GLN
5	J	148	LEU
5	J	155	ASP
5	J	177	GLN
5	J	182	GLN
5	J	195	ARG
5	J	222	ASN
5	J	246	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (50) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	43	GLN
1	A	93	HIS
1	A	226	GLN
1	A	255	GLN
2	B	21	ASN
2	B	24	ASN
2	B	51	HIS
2	B	83	ASN
2	B	84	HIS
4	D	64	GLN
4	D	114	GLN
4	D	122	GLN
4	D	171	ASN
4	D	190	ASN
5	E	18	GLN
5	E	50	ASN
5	E	51	ASN
5	E	80	GLN
5	E	121	ASN
5	E	141	GLN
5	E	164	ASN
5	E	186	ASN
5	E	208	ASN
5	E	213	GLN
1	F	86	ASN
1	F	151	HIS
1	F	180	GLN
1	F	191	HIS
1	F	197	HIS
2	G	13	HIS
2	G	21	ASN
2	G	24	ASN
2	G	83	ASN
2	G	84	HIS
4	I	22	ASN
4	I	31	GLN
4	I	64	GLN
4	I	122	GLN
4	I	144	ASN
4	I	178	ASN
4	I	186	ASN
5	J	18	GLN
5	J	50	ASN

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Mol	Chain	Res	Type
5	J	51	ASN
5	J	121	ASN
5	J	141	GLN
5	J	177	GLN
5	J	182	GLN
5	J	222	ASN
5	J	227	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

22 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	$\# Z > 2$
7	EDO	G	102	-	3,3,3	0.81	0	2,2,2	0.98	0
6	SO4	F	305	-	4,4,4	0.61	0	6,6,6	0.78	0
6	SO4	A	302	-	4,4,4	0.50	0	6,6,6	0.26	0
6	SO4	D	302	-	4,4,4	0.58	0	6,6,6	0.51	0
7	EDO	D	301	-	3,3,3	0.51	0	2,2,2	0.53	0
6	SO4	I	304	-	4,4,4	0.52	0	6,6,6	0.86	0
8	GOL	J	301	-	5,5,5	1.20	0	5,5,5	2.12	1 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	GOL	I	301	-	5,5,5	0.83	0	5,5,5	1.60	1 (20%)
8	GOL	F	302	-	5,5,5	1.47	2 (40%)	5,5,5	2.03	2 (40%)
6	SO4	J	304	-	4,4,4	0.80	0	6,6,6	0.83	0
8	GOL	H	101	-	5,5,5	1.37	1 (20%)	5,5,5	2.66	3 (60%)
8	GOL	J	302	-	5,5,5	0.63	0	5,5,5	0.80	0
7	EDO	E	301	-	3,3,3	0.66	0	2,2,2	0.69	0
8	GOL	F	301	-	5,5,5	0.84	0	5,5,5	0.86	0
7	EDO	G	101	-	3,3,3	1.34	0	2,2,2	0.77	0
7	EDO	I	302	-	3,3,3	0.54	0	2,2,2	0.54	0
8	GOL	F	303	-	5,5,5	1.40	1 (20%)	5,5,5	1.24	0
7	EDO	J	303	-	3,3,3	1.03	0	2,2,2	0.15	0
6	SO4	A	301	-	4,4,4	0.68	0	6,6,6	0.85	0
7	EDO	B	101	-	3,3,3	0.49	0	2,2,2	0.39	0
7	EDO	I	303	-	3,3,3	1.05	0	2,2,2	0.62	0
7	EDO	F	304	-	3,3,3	0.40	0	2,2,2	0.30	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
7	EDO	J	303	-	-	1/1/1/1	-
8	GOL	F	302	-	-	3/4/4/4	-
7	EDO	G	102	-	-	0/1/1/1	-
8	GOL	J	301	-	-	2/4/4/4	-
8	GOL	H	101	-	-	2/4/4/4	-
8	GOL	I	301	-	-	2/4/4/4	-
7	EDO	B	101	-	-	0/1/1/1	-
8	GOL	J	302	-	-	2/4/4/4	-
7	EDO	E	301	-	-	0/1/1/1	-
7	EDO	D	301	-	-	1/1/1/1	-
8	GOL	F	301	-	-	2/4/4/4	-
7	EDO	G	101	-	-	0/1/1/1	-
7	EDO	I	302	-	-	0/1/1/1	-
7	EDO	I	303	-	-	1/1/1/1	-
8	GOL	F	303	-	-	4/4/4/4	-
7	EDO	F	304	-	-	0/1/1/1	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	H	101	GOL	O2-C2	-2.70	1.35	1.43
8	F	302	GOL	O3-C3	2.39	1.52	1.42
8	F	302	GOL	O1-C1	2.17	1.51	1.42
8	F	303	GOL	C1-C2	2.09	1.59	1.51

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	H	101	GOL	C3-C2-C1	4.29	127.53	111.80
8	J	301	GOL	O1-C1-C2	4.14	129.01	110.38
8	F	302	GOL	O3-C3-C2	3.25	125.00	110.38
8	H	101	GOL	O2-C2-C3	-2.93	97.04	109.18
8	I	301	GOL	O3-C3-C2	2.74	122.70	110.38
8	H	101	GOL	O2-C2-C1	-2.60	98.42	109.18
8	F	302	GOL	C3-C2-C1	2.19	119.82	111.80

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	F	302	GOL	O1-C1-C2-O2
8	F	302	GOL	O1-C1-C2-C3
8	F	302	GOL	C1-C2-C3-O3
8	F	303	GOL	C1-C2-C3-O3
8	J	302	GOL	O2-C2-C3-O3
8	F	303	GOL	O1-C1-C2-O2
8	H	101	GOL	O2-C2-C3-O3
8	F	303	GOL	O1-C1-C2-C3
8	H	101	GOL	C1-C2-C3-O3
8	I	301	GOL	O1-C1-C2-C3
8	J	301	GOL	C1-C2-C3-O3
8	J	302	GOL	C1-C2-C3-O3
8	F	303	GOL	O2-C2-C3-O3
8	J	301	GOL	O2-C2-C3-O3
7	I	303	EDO	O1-C1-C2-O2
7	J	303	EDO	O1-C1-C2-O2
8	F	301	GOL	O1-C1-C2-C3
8	F	301	GOL	O1-C1-C2-O2
7	D	301	EDO	O1-C1-C2-O2
8	I	301	GOL	O1-C1-C2-O2

There are no ring outliers.

8 monomers are involved in 24 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	G	102	EDO	2	0
6	F	305	SO4	2	0
6	D	302	SO4	1	0
8	J	301	GOL	3	0
8	I	301	GOL	2	0
8	F	302	GOL	9	0
8	J	302	GOL	4	0
8	F	301	GOL	1	0

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	276/277 (99%)	0.15	15 (5%) 31 34	23, 44, 86, 112	0
1	F	277/277 (100%)	0.09	11 (3%) 42 45	11, 40, 81, 102	5 (1%)
2	B	100/100 (100%)	0.04	3 (3%) 52 55	27, 41, 68, 73	0
2	G	100/100 (100%)	-0.04	1 (1%) 79 82	26, 40, 56, 66	0
3	C	10/10 (100%)	-0.59	0 100 100	26, 27, 30, 31	0
3	H	10/10 (100%)	-0.90	0 100 100	24, 26, 28, 31	0
4	D	199/199 (100%)	1.07	54 (27%) 1 1	14, 55, 125, 151	1 (0%)
4	I	199/199 (100%)	0.82	40 (20%) 3 3	13, 52, 113, 126	1 (0%)
5	E	246/246 (100%)	0.72	53 (21%) 2 2	14, 47, 102, 126	1 (0%)
5	J	246/246 (100%)	0.19	10 (4%) 41 44	15, 43, 85, 119	1 (0%)
All	All	1663/1664 (99%)	0.39	187 (11%) 10 11	11, 43, 106, 151	9 (0%)

All (187) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	252	GLY	8.8
5	E	185	LEU	5.9
4	D	120	VAL	5.5
4	D	119	ALA	5.4
5	E	129	VAL	5.4
4	D	182	PHE	5.3
5	E	210	PHE	5.3
5	E	128	ALA	5.1
4	D	176	TRP	5.0
4	D	136	PHE	4.9
5	E	137	ILE	4.7
4	D	121	TYR	4.7
5	E	144	THR	4.7

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Mol	Chain	Res	Type	RSRZ
4	D	134	CYS	4.6
1	A	194	VAL	4.5
4	I	192	ILE	4.5
5	E	132	PRO	4.5
4	D	53	SER	4.4
5	E	140	THR	4.3
4	D	185	ALA	4.3
5	E	130	PHE	4.3
5	E	2	ALA	4.2
4	D	133	VAL	4.1
4	D	155	ILE	4.1
5	E	241	ALA	4.0
4	I	127	LYS	4.0
4	D	199	PHE	4.0
4	I	200	PRO	3.9
5	E	143	ALA	3.9
4	D	145	VAL	3.9
4	I	188	PHE	3.9
4	D	188	PHE	3.8
4	D	123	LEU	3.8
4	I	2	LYS	3.8
5	E	209	HIS	3.8
4	D	192	ILE	3.8
4	D	153	VAL	3.8
5	E	135	ALA	3.7
4	D	135	LEU	3.7
5	E	200	ALA	3.7
1	F	0	MET	3.7
4	D	187	ALA	3.7
4	I	113	ILE	3.6
5	E	208	ASN	3.6
1	A	248	VAL	3.6
5	J	40	MET	3.6
4	D	193	ILE	3.6
4	D	200	PRO	3.5
5	J	245	ALA	3.5
4	I	134	CYS	3.5
2	B	98	ASP	3.5
5	J	39	MET	3.5
1	F	197	HIS	3.5
5	E	42	GLY	3.4
4	D	52	SER	3.4

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Mol	Chain	Res	Type	RSRZ
4	D	197	THR	3.4
4	I	153	VAL	3.4
4	I	182	PHE	3.4
4	I	166	MET	3.3
4	D	151	SER	3.3
5	E	242	TRP	3.3
4	I	129	SER	3.3
4	D	175	ALA	3.3
4	I	198	PHE	3.3
5	E	203	TRP	3.3
4	I	187	ALA	3.3
5	E	243	GLY	3.2
5	E	127	VAL	3.1
4	D	126	SER	3.1
1	A	255	GLN	3.1
1	F	276	PRO	3.1
5	E	145	LEU	3.1
1	A	274	TRP	3.1
4	D	2	LYS	3.1
1	A	276	PRO	3.0
4	I	185	ALA	3.0
4	I	145	VAL	3.0
4	D	154	TYR	3.0
4	D	158	LYS	3.0
1	F	194	VAL	3.0
5	E	146	VAL	3.0
5	E	179	LEU	3.0
4	D	194	PRO	3.0
4	I	194	PRO	3.0
5	E	207	ARG	2.9
5	E	202	PHE	2.9
1	A	193	ALA	2.9
4	I	131	LYS	2.9
5	E	201	THR	2.9
4	D	41	ARG	2.8
4	I	108	LEU	2.8
4	D	198	PHE	2.8
5	E	183	PRO	2.8
4	I	126	SER	2.8
4	D	125	ASP	2.8
5	E	184	ALA	2.8
1	F	274	TRP	2.8

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Mol	Chain	Res	Type	RSRZ
4	D	160	VAL	2.8
2	B	1	ILE	2.8
5	E	39	MET	2.8
5	E	198	VAL	2.8
4	I	136	PHE	2.7
4	D	174	VAL	2.7
4	D	165	SER	2.7
4	D	173	ALA	2.7
4	D	195	GLU	2.6
4	D	180	SER	2.6
5	E	136	GLU	2.6
4	D	166	MET	2.6
4	I	199	PHE	2.6
5	E	205	ASP	2.6
5	E	206	PRO	2.6
5	E	133	SER	2.6
4	I	49	TYR	2.5
2	G	18	GLY	2.5
2	B	48	LYS	2.5
1	A	18	GLY	2.5
4	I	41	ARG	2.5
5	E	131	GLU	2.5
1	F	195	SER	2.5
4	I	135	LEU	2.5
1	A	145	HIS	2.5
1	A	195	SER	2.4
4	I	128	SER	2.4
4	I	193	ILE	2.4
4	I	195	GLU	2.4
4	D	137	THR	2.4
4	D	163	MET	2.4
5	J	185	LEU	2.4
5	E	165	GLY	2.4
5	E	141	GLN	2.4
5	E	187	ASP	2.4
4	I	184	CYS	2.4
5	E	245	ALA	2.4
5	J	186	ASN	2.4
4	D	113	ILE	2.4
5	E	163	VAL	2.4
4	I	183	ALA	2.3
4	D	161	LEU	2.3

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Mol	Chain	Res	Type	RSRZ
4	D	127	LYS	2.3
4	D	168	PHE	2.3
4	I	160	VAL	2.3
1	F	193	ALA	2.3
1	A	201	LEU	2.3
4	D	118	PRO	2.3
4	I	197	THR	2.3
5	E	148	LEU	2.3
4	I	165	SER	2.3
4	D	139	PHE	2.3
5	E	41	ARG	2.3
5	E	211	ARG	2.3
5	E	63	ASP	2.2
5	J	184	ALA	2.2
5	E	190	TYR	2.2
4	I	142	GLN	2.2
1	F	196	ASP	2.2
5	E	239	ALA	2.2
5	E	188	SER	2.2
5	E	1	ASP	2.2
4	D	183	ALA	2.2
1	A	227	ASP	2.2
4	D	156	THR	2.2
5	J	140	THR	2.2
1	A	197	HIS	2.1
4	D	128	SER	2.1
4	D	148	SER	2.1
4	I	149	LYS	2.1
4	I	168	PHE	2.1
5	E	197	ARG	2.1
4	I	130	ASP	2.1
4	I	152	ASP	2.1
1	F	253	GLN	2.1
5	E	142	LYS	2.1
4	I	175	ALA	2.1
5	E	191	ALA	2.1
5	J	138	SER	2.1
1	A	196	ASP	2.1
4	D	196	ASP	2.1
4	I	133	VAL	2.1
5	J	242	TRP	2.1
4	I	189	ASN	2.0

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Mol	Chain	Res	Type	RSRZ
1	F	255	GLN	2.0
4	D	184	CYS	2.0
5	E	168	VAL	2.0
1	A	266	LEU	2.0
5	J	179	LEU	2.0
1	A	191	HIS	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(Å ²)	Q<0.9
8	GOL	F	303	6/6	0.68	0.20	43,52,59,68	0
6	SO4	A	302	5/5	0.69	0.12	83,87,94,95	0
6	SO4	F	305	5/5	0.70	0.19	74,82,91,98	0
6	SO4	D	302	5/5	0.71	0.10	82,92,95,96	0
7	EDO	J	303	4/4	0.74	0.22	40,57,61,61	0
8	GOL	F	301	6/6	0.77	0.17	50,59,60,65	0
7	EDO	G	101	4/4	0.77	0.20	46,48,51,51	0
6	SO4	J	304	5/5	0.84	0.11	57,57,60,60	0
7	EDO	G	102	4/4	0.85	0.17	36,37,41,45	0
7	EDO	I	303	4/4	0.89	0.15	47,49,49,52	0
8	GOL	J	301	6/6	0.89	0.17	25,30,38,42	0
6	SO4	I	304	5/5	0.90	0.15	77,82,92,98	0
8	GOL	I	301	6/6	0.90	0.11	45,49,52,56	0
8	GOL	F	302	6/6	0.90	0.21	21,31,44,58	0
8	GOL	H	101	6/6	0.91	0.19	35,42,45,50	0
6	SO4	A	301	5/5	0.92	0.13	53,58,79,89	0
8	GOL	J	302	6/6	0.93	0.12	48,57,61,63	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	EDO	B	101	4/4	0.94	0.12	44,44,47,49	0
7	EDO	E	301	4/4	0.95	0.08	30,32,33,37	0
7	EDO	D	301	4/4	0.96	0.07	27,27,31,37	0
7	EDO	I	302	4/4	0.97	0.06	24,27,30,32	0
7	EDO	F	304	4/4	0.97	0.07	41,42,43,45	0

6.5 Other polymers [i](#)

There are no such residues in this entry.