Full wwPDB X-ray Structure Validation Report (i)

Nov 6, 2023 – 04:13 PM EST

PDB ID	:	2O7F
Title	:	Tyrosine ammonia-lyase from Rhodobacter sphaeroides (His89Phe variant), complexed with coumaric acid
Authors	:	Louie, G.V.; Bowman, M.E.; Moffitt, M.C.; Baiga, T.J.; Moore, B.S.; Noel, J.P.
Deposited on	:	2006-12-11
Resolution	:	2.00 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 (i) 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 (i)) were used in the production of this report:

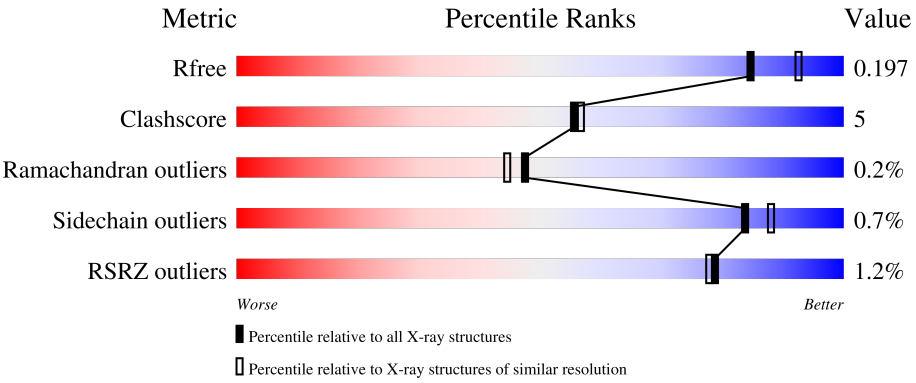
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.00 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}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 >=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 <=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	521	3% 88% 11%
1	B	521	% 86% 13%
1	C	521	86% 12%
1	D	521	2% 84% 15%
1	E	521	% 86% 12%

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Mol	Chain	Length	Quality of chain
1	F	521	88% 10%
1	G	521	89% 10%
1	H	521	2% 87% 12%

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
2	HC4	B	701	-	-	-	X
2	HC4	E	701	-	-	-	X
2	HC4	H	701	-	-	-	X

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 33676 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 Putative histidine ammonia-lyase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	515	Total	C	N	O	S	0	0	0
			3814	2366	729	705	14			
1	B	515	Total	C	N	O	S	0	0	0
			3814	2366	729	705	14			
1	C	514	Total	C	N	O	S	0	0	0
			3807	2361	728	704	14			
1	D	514	Total	C	N	O	S	0	0	0
			3807	2361	728	704	14			
1	E	514	Total	C	N	O	S	0	0	0
			3807	2361	728	704	14			
1	F	514	Total	C	N	O	S	0	0	0
			3807	2361	728	704	14			
1	G	514	Total	C	N	O	S	0	0	0
			3807	2361	728	704	14			
1	H	514	Total	C	N	O	S	0	0	0
			3807	2361	728	704	14			

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	89	PHE	HIS	engineered mutation	UNP Q3IWB0
A	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
A	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
A	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0
B	89	PHE	HIS	engineered mutation	UNP Q3IWB0
B	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
B	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
B	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0
C	89	PHE	HIS	engineered mutation	UNP Q3IWB0
C	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
C	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
C	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0
D	89	PHE	HIS	engineered mutation	UNP Q3IWB0

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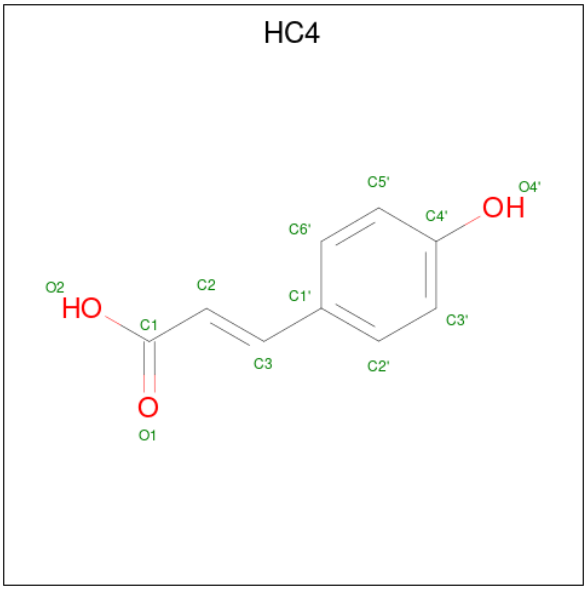
Chain	Residue	Modelled	Actual	Comment	Reference
D	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
D	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
D	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0
E	89	PHE	HIS	engineered mutation	UNP Q3IWB0
E	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
E	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
E	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0
F	89	PHE	HIS	engineered mutation	UNP Q3IWB0
F	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
F	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
F	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0
G	89	PHE	HIS	engineered mutation	UNP Q3IWB0
G	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
G	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
G	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0
H	89	PHE	HIS	engineered mutation	UNP Q3IWB0
H	149	MDO	ALA	SEE REMARK 999	UNP Q3IWB0
H	149	MDO	SER	SEE REMARK 999	UNP Q3IWB0
H	149	MDO	GLY	SEE REMARK 999	UNP Q3IWB0

- Molecule 2 is 4'-HYDROXYCINNAMIC ACID (three-letter code: HC4) (formula: $C_9H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 12 9 3	0	0
2	B	1	Total C O 12 9 3	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	C	1	Total C O 12 9 3	0	0
2	D	1	Total C O 12 9 3	0	0
2	E	1	Total C O 12 9 3	0	0
2	F	1	Total C O 12 9 3	0	0
2	G	1	Total C O 12 9 3	0	0
2	H	1	Total C O 12 9 3	0	0

- Molecule 3 is water.

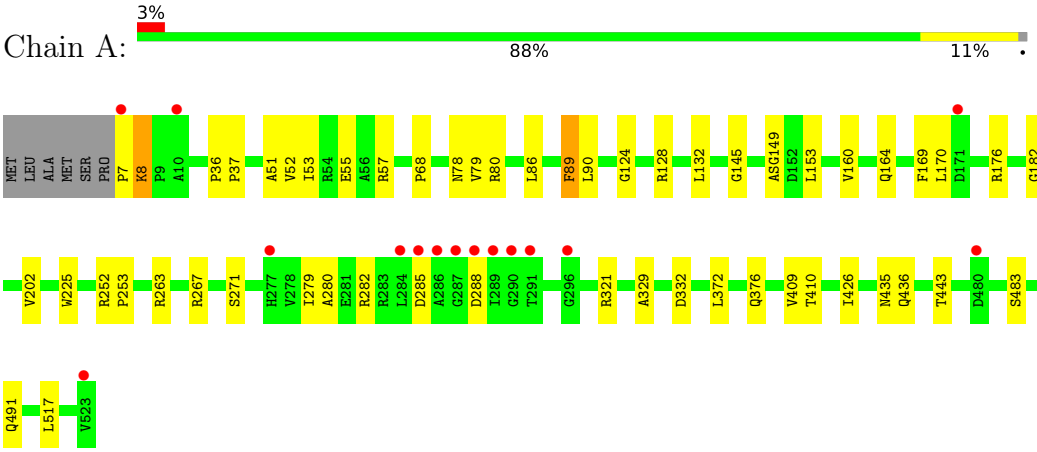
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	347	Total O 347 347	0	0
3	B	368	Total O 368 368	0	0
3	C	406	Total O 406 406	0	0
3	D	370	Total O 370 370	0	0
3	E	383	Total O 383 383	0	0
3	F	465	Total O 465 465	0	0
3	G	414	Total O 414 414	0	0
3	H	357	Total O 357 357	0	0

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.

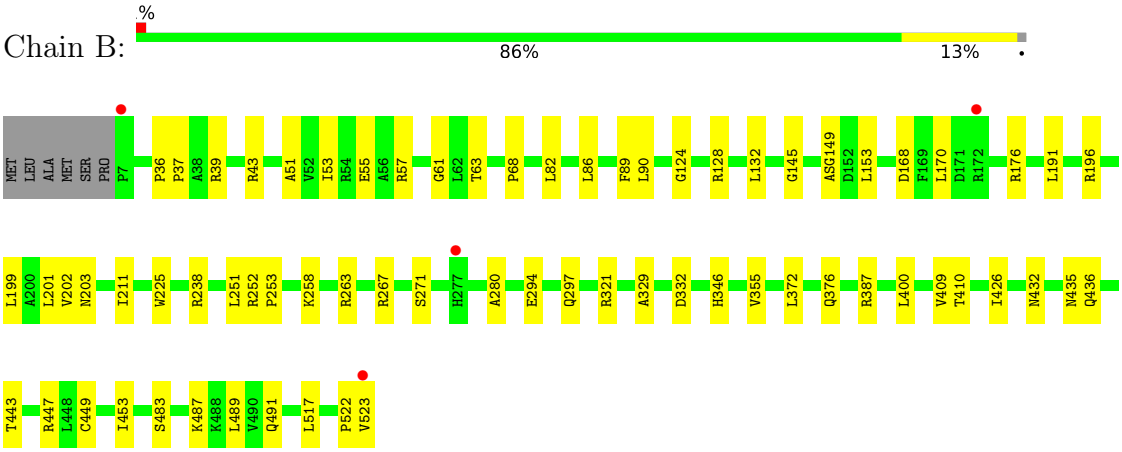
• Molecule 1: Putative histidine ammonia-lyase

Chain A:



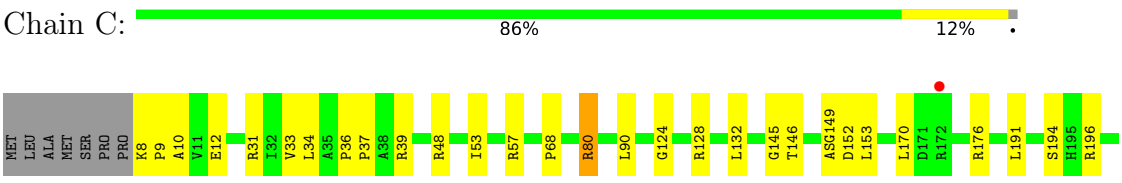
• Molecule 1: Putative histidine ammonia-lyase

Chain B:

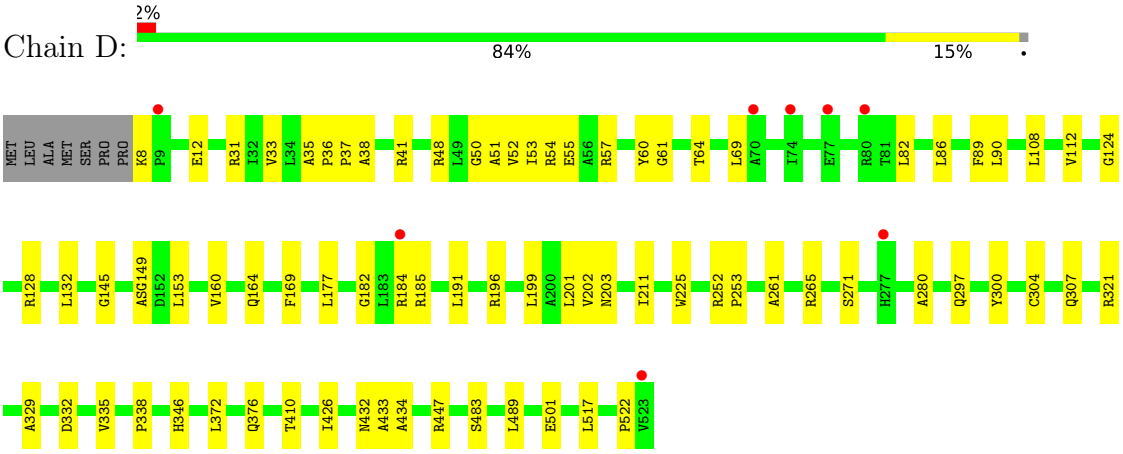


• Molecule 1: Putative histidine ammonia-lyase

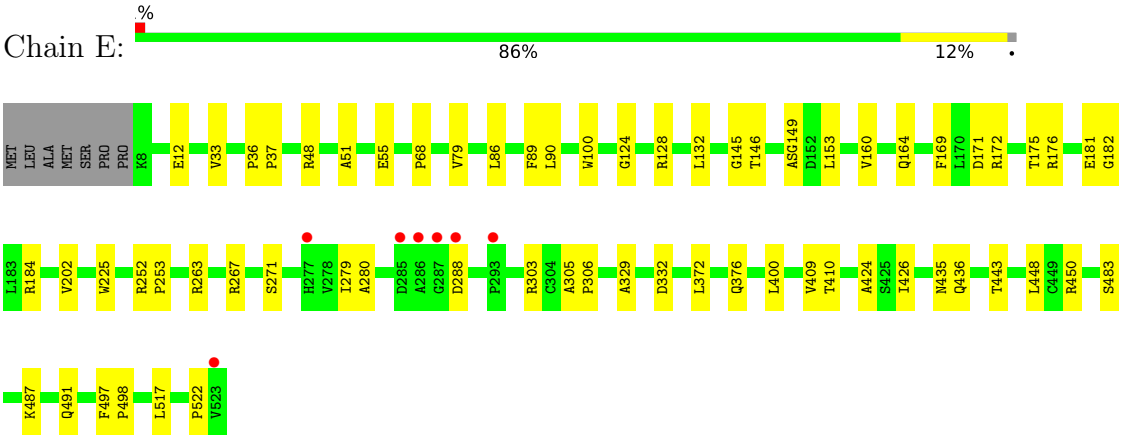
Chain C:



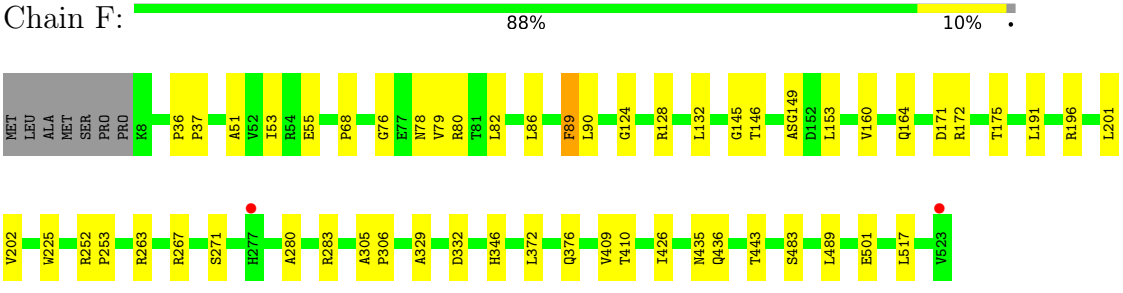
• Molecule 1: Putative histidine ammonia-lyase



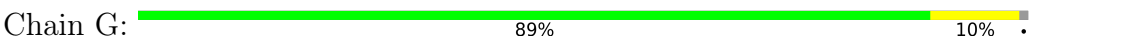
• Molecule 1: Putative histidine ammonia-lyase

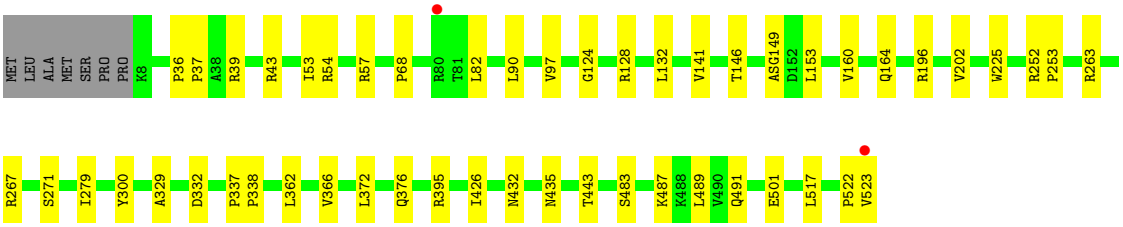


• Molecule 1: Putative histidine ammonia-lyase

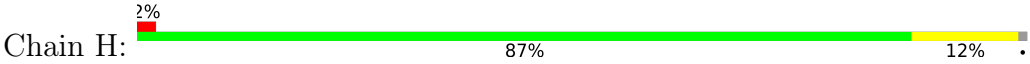


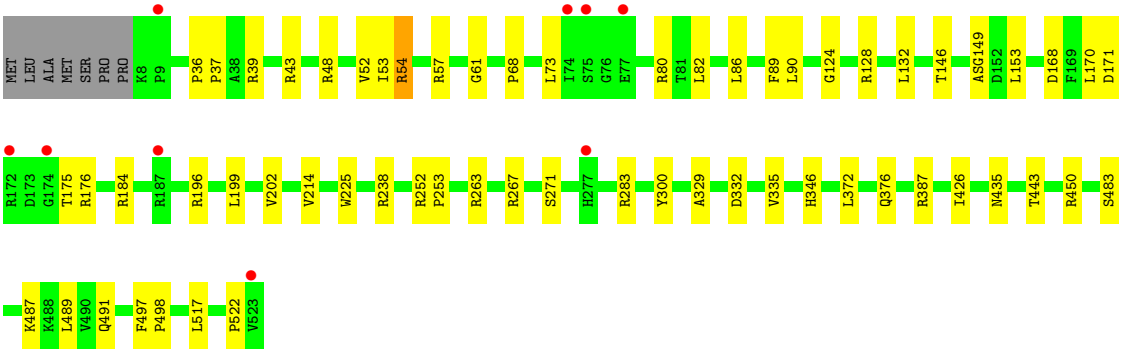
• Molecule 1: Putative histidine ammonia-lyase





• Molecule 1: Putative histidine ammonia-lyase





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	87.64Å 154.97Å 164.10Å 90.00° 94.12° 90.00°	Depositor
Resolution (Å)	500.00 – 2.00 40.08 – 1.95	Depositor EDS
% Data completeness (in resolution range)	96.2 (500.00-2.00) 95.9 (40.08-1.95)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.75 (at 1.95Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.172 , 0.201 0.170 , 0.197	Depositor DCC
R_{free} test set	14124 reflections (4.65%)	wwPDB-VP
Wilson B-factor (Å^2)	14.4	Xtriage
Anisotropy	0.143	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 50.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	33676	wwPDB-VP
Average B, all atoms (Å^2)	16.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.21% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: MDO, HC4

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	0.27	0/3863	0.55	0/5254
1	B	0.28	0/3863	0.56	0/5254
1	C	0.28	0/3855	0.56	0/5243
1	D	0.28	0/3855	0.55	0/5243
1	E	0.28	0/3855	0.55	0/5243
1	F	0.29	0/3855	0.57	0/5243
1	G	0.29	0/3855	0.56	0/5243
1	H	0.27	0/3855	0.54	0/5243
All	All	0.28	0/30856	0.55	0/41966

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	3814	0	3859	39	0
1	B	3814	0	3859	48	0
1	C	3807	0	3851	47	0
1	D	3807	0	3851	52	0
1	E	3807	0	3851	42	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3807	0	3851	41	0
1	G	3807	0	3851	31	0
1	H	3807	0	3851	50	0
2	A	12	0	6	2	0
2	B	12	0	7	1	0
2	C	12	0	7	1	0
2	D	12	0	7	2	0
2	E	12	0	6	2	0
2	F	12	0	7	2	0
2	G	12	0	6	2	0
2	H	12	0	6	1	0
3	A	347	0	0	3	0
3	B	368	0	0	6	0
3	C	406	0	0	7	0
3	D	370	0	0	5	0
3	E	383	0	0	4	0
3	F	465	0	0	8	0
3	G	414	0	0	5	0
3	H	357	0	0	5	0
All	All	33676	0	30876	316	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 5.

All (316) 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:F:153:LEU:HD22	1:F:202:VAL:HG12	1.58	0.84
1:H:153:LEU:HD22	1:H:202:VAL:HG12	1.61	0.82
1:A:153:LEU:HD22	1:A:202:VAL:HG12	1.62	0.82
1:D:153:LEU:HD22	1:D:202:VAL:HG12	1.59	0.82
1:B:153:LEU:HD22	1:B:202:VAL:HG12	1.64	0.79
1:E:153:LEU:HD22	1:E:202:VAL:HG12	1.68	0.75
1:C:153:LEU:HD22	1:C:202:VAL:HG12	1.68	0.74
3:G:2439:HOH:O	1:H:82:LEU:HD12	1.89	0.72
1:G:90:LEU:HD21	2:G:701:HC4:H3'	1.70	0.71
3:C:2230:HOH:O	1:D:82:LEU:HD12	1.91	0.70
1:G:153:LEU:HD22	1:G:202:VAL:HG12	1.73	0.70
1:C:487:LYS:O	1:C:491:GLN:HG3	1.91	0.70
1:D:61:GLY:HA3	1:D:199:LEU:HD11	1.73	0.70
1:E:487:LYS:O	1:E:491:GLN:HG3	1.92	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:53:ILE:HG21	1:H:196:ARG:HH11	1.58	0.68
1:B:487:LYS:O	1:B:491:GLN:HG3	1.93	0.68
1:B:432:ASN:HB2	1:B:436:GLN:HE21	1.60	0.67
1:G:53:ILE:HD13	1:G:196:ARG:HD2	1.79	0.64
1:D:51:ALA:O	1:D:55:GLU:HG3	1.97	0.64
1:A:426:ILE:HD13	3:D:3398:HOH:O	1.97	0.64
1:F:171:ASP:OD2	1:F:175:THR:HB	1.98	0.63
1:B:51:ALA:O	1:B:55:GLU:HG3	1.99	0.63
1:C:68:PRO:HG3	1:C:435:ASN:HB2	1.80	0.62
1:H:171:ASP:OD2	1:H:175:THR:HB	2.00	0.61
1:F:68:PRO:HG3	1:F:435:ASN:HB2	1.83	0.61
1:A:90:LEU:HD21	2:A:701:HC4:H3'	1.83	0.61
1:G:487:LYS:O	1:G:491:GLN:HG3	2.00	0.61
1:H:214:VAL:HB	1:H:450:ARG:NH2	2.16	0.60
1:H:238:ARG:HH11	1:H:387:ARG:NH2	1.99	0.60
1:A:176:ARG:HD2	3:A:3332:HOH:O	2.02	0.59
1:C:90:LEU:HD21	2:C:701:HC4:H3'	1.84	0.59
1:A:225:TRP:CE2	1:A:517:LEU:HD22	2.37	0.59
1:B:251:LEU:HD13	1:C:335:VAL:HG21	1.83	0.59
1:B:53:ILE:HG21	1:B:196:ARG:HH11	1.66	0.59
1:B:61:GLY:HA3	1:B:199:LEU:HD11	1.84	0.59
1:B:258:LYS:HD2	3:B:3514:HOH:O	2.03	0.59
1:G:271:SER:HB2	1:G:483:SER:HB3	1.84	0.59
1:B:124:GLY:O	1:B:128:ARG:HG2	2.03	0.59
1:E:51:ALA:O	1:E:55:GLU:HG3	2.03	0.59
1:F:79:VAL:HG11	1:F:196:ARG:HD3	1.84	0.58
3:F:3660:HOH:O	1:G:426:ILE:HD13	2.04	0.58
1:B:191:LEU:HD21	1:B:201:LEU:CD1	2.33	0.58
1:G:372:LEU:O	1:G:376:GLN:HG3	2.03	0.58
1:H:271:SER:HB2	1:H:483:SER:HB3	1.84	0.58
1:A:280:ALA:O	1:D:57:ARG:HD2	2.03	0.57
1:F:252:ARG:HA	1:G:329:ALA:HB1	1.86	0.57
1:C:124:GLY:O	1:C:128:ARG:HG2	2.04	0.57
1:D:372:LEU:O	1:D:376:GLN:HG3	2.04	0.57
1:H:61:GLY:HA3	1:H:199:LEU:HD21	1.86	0.57
1:D:53:ILE:HD13	1:D:196:ARG:HD2	1.86	0.57
1:D:225:TRP:CE2	1:D:517:LEU:HD22	2.40	0.57
1:F:80:ARG:HG2	3:F:2717:HOH:O	2.05	0.56
1:C:271:SER:HB2	1:C:483:SER:HB3	1.87	0.56
3:A:3436:HOH:O	1:D:426:ILE:HD13	2.06	0.56
1:H:68:PRO:HG3	1:H:435:ASN:HB2	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:176:ARG:HD2	3:C:3285:HOH:O	2.04	0.56
1:H:225:TRP:CE2	1:H:517:LEU:HD22	2.41	0.55
1:E:79:VAL:HG21	3:E:2045:HOH:O	2.06	0.55
1:A:409:VAL:HG21	2:B:701:HC4:H5'	1.89	0.55
1:B:271:SER:HB2	1:B:483:SER:HB3	1.89	0.55
1:E:171:ASP:OD2	1:E:175:THR:HB	2.05	0.55
1:F:82:LEU:HD12	3:F:2155:HOH:O	2.05	0.55
1:D:90:LEU:HD21	2:D:701:HC4:H3'	1.88	0.55
1:E:400:LEU:HD21	1:F:78:ASN:HB3	1.87	0.55
1:F:426:ILE:HD13	3:G:3571:HOH:O	2.06	0.54
1:E:372:LEU:O	1:E:376:GLN:HG3	2.07	0.54
1:C:145:GLY:HA2	1:D:410:THR:HG23	1.88	0.54
1:C:263:ARG:O	1:C:267:ARG:HG2	2.07	0.54
1:H:39:ARG:HG3	1:H:39:ARG:HH11	1.73	0.54
1:F:36:PRO:HB2	1:F:37:PRO:HD3	1.90	0.54
1:H:238:ARG:NH1	1:H:387:ARG:NH2	2.55	0.54
1:B:68:PRO:HG3	1:B:435:ASN:HB2	1.90	0.54
1:B:252:ARG:HA	1:C:329:ALA:HB1	1.89	0.54
1:B:63:THR:HG22	3:B:5058:HOH:O	2.07	0.53
1:D:52:VAL:HG13	1:D:57:ARG:HB2	1.89	0.53
1:A:252:ARG:HA	1:D:329:ALA:HB1	1.89	0.53
1:E:146:THR:HG22	3:E:1932:HOH:O	2.07	0.53
1:H:54:ARG:HG2	1:H:54:ARG:HH11	1.73	0.53
1:A:68:PRO:HG3	1:A:435:ASN:HB2	1.89	0.53
1:E:263:ARG:O	1:E:267:ARG:HG2	2.09	0.53
1:F:124:GLY:O	1:F:128:ARG:HG2	2.09	0.53
1:E:271:SER:HB2	1:E:483:SER:HB3	1.91	0.53
1:H:487:LYS:O	1:H:491:GLN:HG3	2.09	0.53
1:B:329:ALA:HB1	1:C:252:ARG:HA	1.90	0.53
1:E:145:GLY:HA2	1:F:410:THR:HG23	1.91	0.53
1:B:86:LEU:HA	1:B:89:PHE:CE2	2.43	0.52
1:F:283:ARG:HD3	3:F:5420:HOH:O	2.07	0.52
1:A:263:ARG:O	1:A:267:ARG:HG2	2.08	0.52
1:A:132:LEU:C	1:A:132:LEU:HD13	2.30	0.52
1:A:271:SER:HB2	1:A:483:SER:HB3	1.92	0.52
1:G:160:VAL:O	1:G:164:GLN:HG3	2.10	0.52
1:B:321:ARG:HH21	1:C:321:ARG:HH21	1.56	0.52
1:A:372:LEU:O	1:A:376:GLN:HG3	2.09	0.52
1:C:225:TRP:CE2	1:C:517:LEU:HD22	2.44	0.52
1:G:146:THR:HG22	3:G:1967:HOH:O	2.08	0.52
1:H:176:ARG:HD2	3:H:3379:HOH:O	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:51:ALA:O	1:A:55:GLU:HG3	2.10	0.51
1:B:238:ARG:HH21	1:B:387:ARG:HH21	1.57	0.51
1:B:426:ILE:HD13	3:C:3493:HOH:O	2.10	0.51
1:D:36:PRO:HB2	1:D:37:PRO:HD3	1.91	0.51
1:D:86:LEU:HA	1:D:89:PHE:CE2	2.45	0.51
1:F:146:THR:HG22	3:F:2088:HOH:O	2.10	0.51
1:G:68:PRO:HG3	1:G:435:ASN:HB2	1.91	0.51
1:A:78:ASN:HB3	1:B:400:LEU:HD21	1.93	0.51
1:B:225:TRP:CE2	1:B:517:LEU:HD22	2.46	0.51
1:E:12:GLU:HA	1:E:33:VAL:HG13	1.92	0.51
1:G:132:LEU:HD13	1:G:132:LEU:C	2.31	0.51
1:F:225:TRP:CE2	1:F:517:LEU:HD22	2.46	0.51
1:A:170:LEU:HD23	1:A:176:ARG:HG2	1.92	0.50
1:A:487:LYS:O	1:A:491:GLN:HG3	2.11	0.50
1:B:57:ARG:HD2	1:C:280:ALA:O	2.11	0.50
1:D:191:LEU:HD21	1:D:201:LEU:CD1	2.42	0.50
1:G:523:VAL:OXT	1:G:523:VAL:HG12	2.10	0.50
1:E:303:ARG:HH22	2:H:701:HC4:C1	2.25	0.50
1:B:68:PRO:HG3	1:B:435:ASN:CB	2.42	0.50
1:B:346:HIS:CE1	1:C:279:ILE:HD11	2.47	0.50
1:D:50:GLY:O	1:D:54:ARG:HG3	2.11	0.50
1:E:124:GLY:O	1:E:128:ARG:HG2	2.12	0.50
1:H:52:VAL:HG13	1:H:57:ARG:HB2	1.93	0.50
1:H:184:ARG:HG2	1:H:184:ARG:HH11	1.77	0.50
1:A:329:ALA:HB1	1:D:252:ARG:HA	1.93	0.50
1:H:124:GLY:O	1:H:128:ARG:HG2	2.12	0.49
1:C:170:LEU:HD23	1:C:176:ARG:HG2	1.93	0.49
1:D:297:GLN:HG3	3:D:3086:HOH:O	2.11	0.49
2:E:701:HC4:H5'	1:F:409:VAL:HG21	1.93	0.49
1:D:199:LEU:O	1:D:203:ASN:HB2	2.12	0.49
1:B:170:LEU:CD2	1:B:176:ARG:HG2	2.42	0.49
1:C:36:PRO:HB2	1:C:37:PRO:HD3	1.93	0.49
1:B:372:LEU:O	1:B:376:GLN:HG3	2.11	0.49
1:G:225:TRP:CE2	1:G:517:LEU:HD22	2.48	0.49
1:A:160:VAL:O	1:A:164:GLN:HG3	2.13	0.49
1:E:329:ALA:HB1	1:H:252:ARG:HA	1.94	0.49
1:G:124:GLY:O	1:G:128:ARG:HG2	2.12	0.49
1:H:168:ASP:HB2	1:H:176:ARG:HH21	1.77	0.49
1:A:279:ILE:HD11	1:D:346:HIS:CE1	2.47	0.49
1:D:12:GLU:HA	1:D:33:VAL:HG13	1.95	0.49
1:H:146:THR:HG22	3:H:2163:HOH:O	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:170:LEU:HD23	1:H:176:ARG:HG2	1.95	0.49
1:A:170:LEU:CD2	1:A:176:ARG:HG2	2.43	0.49
1:H:132:LEU:C	1:H:132:LEU:HD13	2.33	0.49
1:G:225:TRP:CE2	1:G:522:PRO:HD3	2.48	0.49
1:H:86:LEU:HA	1:H:89:PHE:CE2	2.47	0.49
1:H:283:ARG:HD3	3:H:5015:HOH:O	2.13	0.49
1:B:170:LEU:HD23	1:B:176:ARG:HG2	1.95	0.48
1:A:321:ARG:HH21	1:D:321:ARG:HH21	1.61	0.48
1:C:409:VAL:HG21	2:D:701:HC4:H5'	1.94	0.48
1:D:124:GLY:O	1:D:128:ARG:HG2	2.12	0.48
1:C:523:VAL:OXT	1:C:523:VAL:HG12	2.13	0.48
1:F:90:LEU:HD21	2:F:701:HC4:H3'	1.93	0.48
1:F:501:GLU:HB2	3:F:2400:HOH:O	2.12	0.48
1:H:263:ARG:O	1:H:267:ARG:HG2	2.13	0.48
1:F:53:ILE:HD13	1:F:196:ARG:HD2	1.95	0.48
1:E:225:TRP:CE2	1:E:517:LEU:HD22	2.49	0.48
1:F:79:VAL:HG21	3:F:2178:HOH:O	2.12	0.48
1:G:362:LEU:O	1:G:366:VAL:HG23	2.13	0.48
1:H:53:ILE:HG21	1:H:196:ARG:NH1	2.25	0.48
1:B:36:PRO:HB2	1:B:37:PRO:HD3	1.96	0.48
1:D:12:GLU:HG2	1:D:35:ALA:HB2	1.96	0.48
1:E:252:ARG:HA	1:H:329:ALA:HB1	1.96	0.47
1:D:225:TRP:CE2	1:D:522:PRO:HD3	2.49	0.47
1:B:523:VAL:OXT	1:B:523:VAL:HG12	2.14	0.47
1:D:184:ARG:HG2	1:D:184:ARG:HH11	1.78	0.47
1:A:79:VAL:HG11	1:A:196:ARG:HD3	1.96	0.47
1:E:68:PRO:HG3	1:E:435:ASN:HB2	1.97	0.47
1:E:280:ALA:O	1:H:57:ARG:HD2	2.15	0.47
1:E:409:VAL:HG21	2:F:701:HC4:H5'	1.97	0.47
1:F:280:ALA:O	1:G:57:ARG:HD2	2.14	0.47
1:H:335:VAL:HG11	3:H:1982:HOH:O	2.14	0.47
1:D:211:ILE:HD13	1:D:447:ARG:HG3	1.96	0.47
1:F:329:ALA:HB1	1:G:252:ARG:HA	1.97	0.47
1:F:436:GLN:HG2	1:G:300:TYR:CZ	2.50	0.47
1:A:80:ARG:HB2	3:A:2221:HOH:O	2.14	0.46
1:B:225:TRP:CE2	1:B:522:PRO:HD3	2.50	0.46
1:F:51:ALA:O	1:F:55:GLU:HG3	2.15	0.46
1:B:263:ARG:O	1:B:267:ARG:HG2	2.15	0.46
1:C:80:ARG:NE	1:C:194:SER:HA	2.30	0.46
1:D:271:SER:HB2	1:D:483:SER:HB3	1.98	0.46
1:H:90:LEU:HD13	1:H:153:LEU:HB3	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:39:ARG:HD2	1:G:43:ARG:NH2	2.30	0.46
1:E:132:LEU:C	1:E:132:LEU:HD13	2.34	0.46
1:G:82:LEU:HD12	3:G:1625:HOH:O	2.15	0.46
1:C:90:LEU:HD13	1:C:153:LEU:HB3	1.98	0.46
1:D:132:LEU:HD13	1:D:132:LEU:C	2.35	0.46
1:D:335:VAL:HG11	3:D:2240:HOH:O	2.15	0.46
1:H:238:ARG:NH1	1:H:387:ARG:HH22	2.13	0.46
2:A:701:HC4:H5'	1:B:409:VAL:HG21	1.98	0.46
1:C:489:LEU:C	1:C:489:LEU:HD23	2.36	0.46
1:G:36:PRO:N	1:G:37:PRO:HD2	2.31	0.46
1:B:280:ALA:O	1:C:57:ARG:HD2	2.16	0.46
1:B:168:ASP:HB2	1:B:176:ARG:HH21	1.81	0.46
1:B:489:LEU:HD23	1:B:489:LEU:C	2.37	0.46
1:F:76:GLY:O	1:F:79:VAL:HG23	2.16	0.46
1:C:146:THR:HG22	3:C:1832:HOH:O	2.16	0.46
1:A:169:PHE:CD2	1:A:182:GLY:HA3	2.51	0.45
1:H:225:TRP:CE2	1:H:522:PRO:HD3	2.51	0.45
1:F:271:SER:HB2	1:F:483:SER:HB3	1.98	0.45
1:C:34:LEU:HD23	1:C:39:ARG:HG2	1.97	0.45
1:E:36:PRO:HB2	1:E:37:PRO:HD3	1.97	0.45
1:F:263:ARG:O	1:F:267:ARG:HG2	2.15	0.45
1:H:48:ARG:O	1:H:52:VAL:HG23	2.15	0.45
1:H:184:ARG:HG2	1:H:184:ARG:NH1	2.32	0.45
1:C:410:THR:HG23	1:D:145:GLY:HA2	1.98	0.45
1:E:176:ARG:HD2	3:E:3308:HOH:O	2.16	0.45
1:E:305:ALA:HB3	1:E:306:PRO:HD3	1.99	0.45
1:G:263:ARG:O	1:G:267:ARG:HG2	2.16	0.45
1:B:297:GLN:HG3	3:B:3097:HOH:O	2.17	0.45
1:A:36:PRO:N	1:A:37:PRO:HD2	2.31	0.45
1:C:394:HIS:HE1	3:C:2881:HOH:O	1.99	0.45
1:H:372:LEU:O	1:H:376:GLN:HG3	2.17	0.45
1:A:57:ARG:HD2	1:D:280:ALA:O	2.16	0.45
1:D:48:ARG:NH2	1:D:338:PRO:O	2.50	0.45
3:B:3548:HOH:O	1:C:426:ILE:HD13	2.17	0.44
1:C:80:ARG:HH11	1:C:80:ARG:HB3	1.82	0.44
1:F:79:VAL:CG1	1:F:196:ARG:HD3	2.46	0.44
1:C:10:ALA:HB2	1:C:31:ARG:HH21	1.82	0.44
1:C:10:ALA:HB2	1:C:31:ARG:NH2	2.32	0.44
1:B:132:LEU:HD13	1:B:132:LEU:C	2.38	0.44
1:C:424:ALA:HB2	1:C:448:LEU:HD12	2.00	0.44
1:A:225:TRP:CD2	1:A:517:LEU:HD22	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:355:VAL:HG13	3:B:2211:HOH:O	2.17	0.44
1:E:169:PHE:CD2	1:E:182:GLY:HA3	2.53	0.44
1:B:211:ILE:HD13	1:B:447:ARG:HG3	2.00	0.44
1:D:184:ARG:HG2	1:D:184:ARG:NH1	2.32	0.44
1:A:86:LEU:HA	1:A:89:PHE:CE2	2.53	0.44
1:D:38:ALA:HA	1:D:41:ARG:NH1	2.32	0.44
1:D:90:LEU:HD13	1:D:153:LEU:HB3	1.99	0.44
1:D:177:LEU:HD21	1:D:185:ARG:NH1	2.32	0.44
1:E:90:LEU:HD21	2:E:701:HC4:H3'	1.99	0.44
1:C:53:ILE:HD13	1:C:196:ARG:HD2	1.99	0.43
1:F:171:ASP:C	1:F:171:ASP:OD1	2.57	0.43
1:E:160:VAL:O	1:E:164:GLN:HG3	2.18	0.43
1:E:225:TRP:CE2	1:E:522:PRO:HD3	2.53	0.43
1:H:199:LEU:HD12	1:H:199:LEU:N	2.34	0.43
1:F:346:HIS:CE1	1:G:279:ILE:HD11	2.53	0.43
1:A:282:ARG:HD3	3:D:2298:HOH:O	2.18	0.43
1:G:97:VAL:HA	1:G:141:VAL:O	2.17	0.43
1:H:36:PRO:N	1:H:37:PRO:HD2	2.33	0.43
1:A:7:PRO:O	1:A:8:LYS:C	2.57	0.43
1:B:294:GLU:HG3	1:B:387:ARG:NH2	2.33	0.43
3:C:1656:HOH:O	1:D:432:ASN:HA	2.18	0.43
1:D:225:TRP:CD2	1:D:517:LEU:HD22	2.52	0.43
1:B:82:LEU:HD12	3:B:1802:HOH:O	2.18	0.43
1:D:108:LEU:O	1:D:112:VAL:HG23	2.18	0.43
1:E:426:ILE:HD13	3:H:3422:HOH:O	2.17	0.43
1:H:53:ILE:HD13	1:H:196:ARG:HD2	2.01	0.43
1:E:288:ASP:O	1:H:73:LEU:HD12	2.18	0.43
1:G:54:ARG:HD2	3:G:2686:HOH:O	2.18	0.43
1:E:48:ARG:HH11	1:E:48:ARG:HG2	1.84	0.43
1:H:489:LEU:C	1:H:489:LEU:HD23	2.40	0.43
1:A:410:THR:HG23	1:B:145:GLY:HA2	2.00	0.43
1:A:52:VAL:HG13	1:A:57:ARG:HB2	2.01	0.42
1:A:489:LEU:C	1:A:489:LEU:HD23	2.39	0.42
1:B:39:ARG:HD2	1:B:43:ARG:NH2	2.34	0.42
1:D:8:LYS:CG	1:D:31:ARG:HG3	2.48	0.42
1:F:160:VAL:O	1:F:164:GLN:HG3	2.18	0.42
1:C:48:ARG:HH11	1:C:48:ARG:HG2	1.84	0.42
3:E:3348:HOH:O	1:H:426:ILE:HD13	2.19	0.42
1:F:90:LEU:HD13	1:F:153:LEU:HB3	2.00	0.42
1:F:132:LEU:C	1:F:132:LEU:HD13	2.39	0.42
1:G:489:LEU:HD23	1:G:489:LEU:C	2.39	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:12:GLU:HA	1:C:33:VAL:HG13	2.01	0.42
1:D:169:PHE:CD2	1:D:182:GLY:HA3	2.53	0.42
1:E:86:LEU:HA	1:E:89:PHE:CE2	2.54	0.42
1:E:12:GLU:HA	1:E:33:VAL:CG1	2.50	0.42
1:E:279:ILE:HD11	1:H:346:HIS:CE1	2.54	0.42
1:F:489:LEU:C	1:F:489:LEU:HD23	2.40	0.42
1:H:214:VAL:HB	1:H:450:ARG:HH21	1.82	0.42
1:D:501:GLU:HB2	3:D:2374:HOH:O	2.19	0.42
1:E:497:PHE:HA	1:E:498:PRO:HD3	1.87	0.42
1:C:225:TRP:CE2	1:C:522:PRO:HG3	2.55	0.42
1:D:60:TYR:HA	1:D:64:THR:OG1	2.20	0.42
1:F:191:LEU:HD21	1:F:201:LEU:CD1	2.50	0.42
1:F:305:ALA:N	1:F:306:PRO:CD	2.83	0.42
1:A:285:ASP:OD1	1:A:288:ASP:OD2	2.38	0.42
1:D:304:CYS:HA	1:D:307:GLN:OE1	2.20	0.42
1:G:432:ASN:OD1	2:G:701:HC4:H6'	2.20	0.42
1:G:395:ARG:CZ	1:G:501:GLU:HG2	2.50	0.42
1:H:80:ARG:HH11	1:H:80:ARG:HG3	1.84	0.42
1:B:53:ILE:CG2	1:B:196:ARG:HH11	2.31	0.42
1:C:391:PRO:HB2	1:D:69:LEU:HD21	2.02	0.42
1:C:491:GLN:O	1:C:495:GLU:HG3	2.20	0.42
1:E:90:LEU:HD13	1:E:153:LEU:HB3	2.02	0.42
1:H:497:PHE:HA	1:H:498:PRO:HD3	1.88	0.42
1:G:337:PRO:HA	1:G:338:PRO:HD3	1.93	0.41
1:A:145:GLY:HA2	1:B:410:THR:HG23	2.02	0.41
1:B:90:LEU:HD13	1:B:153:LEU:HB3	2.02	0.41
1:C:152:ASP:CG	1:C:207:ALA:HB3	2.41	0.41
1:F:86:LEU:HA	1:F:89:PHE:CE2	2.55	0.41
1:A:124:GLY:O	1:A:128:ARG:HG2	2.20	0.41
1:D:433:ALA:O	1:D:434:ALA:HB3	2.21	0.41
1:H:68:PRO:HG3	1:H:435:ASN:CB	2.49	0.41
1:C:170:LEU:CD2	1:C:176:ARG:HG2	2.51	0.41
1:E:410:THR:HG23	1:F:145:GLY:HA2	2.01	0.41
1:E:436:GLN:HG2	1:H:300:TYR:CZ	2.56	0.41
1:F:372:LEU:O	1:F:376:GLN:HG3	2.20	0.41
1:D:261:ALA:O	1:D:265:ARG:HG3	2.21	0.41
1:F:80:ARG:HB2	3:F:2468:HOH:O	2.20	0.41
1:H:39:ARG:O	1:H:43:ARG:HG3	2.20	0.41
1:C:214:VAL:HG13	3:C:4020:HOH:O	2.21	0.41
1:D:160:VAL:O	1:D:164:GLN:HG3	2.20	0.41
1:E:100:TRP:CZ2	1:E:172:ARG:HG2	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:68:PRO:HG3	1:F:435:ASN:CB	2.49	0.41
1:C:8:LYS:HA	1:C:9:PRO:HD3	1.95	0.41
1:E:424:ALA:HB2	1:E:448:LEU:HD12	2.03	0.41
1:A:53:ILE:HD13	1:A:196:ARG:HD2	2.03	0.40
1:B:199:LEU:O	1:B:203:ASN:HB2	2.21	0.40
1:C:191:LEU:HD21	1:C:201:LEU:CD1	2.51	0.40
1:C:199:LEU:O	1:C:203:ASN:HB2	2.21	0.40
1:E:181:GLU:OE1	1:E:184:ARG:NH1	2.55	0.40
1:C:132:LEU:C	1:C:132:LEU:HD13	2.42	0.40
1:D:489:LEU:C	1:D:489:LEU:HD23	2.40	0.40
1:A:436:GLN:HG2	1:D:300:TYR:CZ	2.56	0.40
1:B:449:CYS:O	1:B:453:ILE:HG13	2.21	0.40
1:E:450:ARG:HA	1:E:450:ARG:HD2	1.98	0.40
1:C:68:PRO:HG3	1:C:435:ASN:CB	2.50	0.40
1:H:39:ARG:HD3	1:H:43:ARG:HH21	1.87	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	510/521 (98%)	499 (98%)	9 (2%)	2 (0%)	34	30
1	B	510/521 (98%)	501 (98%)	8 (2%)	1 (0%)	47	44
1	C	509/521 (98%)	503 (99%)	5 (1%)	1 (0%)	47	44
1	D	509/521 (98%)	500 (98%)	8 (2%)	1 (0%)	47	44
1	E	509/521 (98%)	503 (99%)	5 (1%)	1 (0%)	47	44
1	F	509/521 (98%)	500 (98%)	8 (2%)	1 (0%)	47	44
1	G	509/521 (98%)	501 (98%)	7 (1%)	1 (0%)	47	44
1	H	509/521 (98%)	498 (98%)	10 (2%)	1 (0%)	47	44

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	4074/4168 (98%)	4005 (98%)	60 (2%)	9 (0%)	47 44

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	253	PRO
1	E	253	PRO
1	C	253	PRO
1	F	253	PRO
1	A	8	LYS
1	B	253	PRO
1	G	253	PRO
1	D	253	PRO
1	H	253	PRO

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	384/389 (99%)	381 (99%)	3 (1%)	81 86
1	B	384/389 (99%)	382 (100%)	2 (0%)	88 92
1	C	383/389 (98%)	380 (99%)	3 (1%)	81 86
1	D	383/389 (98%)	382 (100%)	1 (0%)	92 95
1	E	383/389 (98%)	381 (100%)	2 (0%)	88 92
1	F	383/389 (98%)	379 (99%)	4 (1%)	76 81
1	G	383/389 (98%)	381 (100%)	2 (0%)	88 92
1	H	383/389 (98%)	380 (99%)	3 (1%)	81 86
All	All	3066/3112 (98%)	3046 (99%)	20 (1%)	84 88

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	89	PHE

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Mol	Chain	Res	Type
1	A	332	ASP
1	A	443	THR
1	B	332	ASP
1	B	443	THR
1	C	80	ARG
1	C	332	ASP
1	C	443	THR
1	D	332	ASP
1	E	332	ASP
1	E	443	THR
1	F	89	PHE
1	F	172	ARG
1	F	332	ASP
1	F	443	THR
1	G	332	ASP
1	G	443	THR
1	H	54	ARG
1	H	332	ASP
1	H	443	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	394	HIS
1	A	491	GLN
1	B	394	HIS
1	B	436	GLN
1	C	394	HIS
1	D	189	GLN
1	D	394	HIS
1	D	491	GLN
1	D	496	GLN
1	E	189	GLN
1	E	394	HIS
1	F	394	HIS
1	F	491	GLN
1	G	189	GLN
1	G	394	HIS
1	H	394	HIS
1	H	508	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

8 non-standard protein/DNA/RNA residues 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	$\#\|Z\| > 2$
1	MDO	A	149	1	12,13,14	2.25	4 (33%)	15,18,20	4.00	6 (40%)
1	MDO	E	149	1	12,13,14	2.25	4 (33%)	15,18,20	3.95	7 (46%)
1	MDO	B	149	1	12,13,14	2.29	4 (33%)	15,18,20	3.95	6 (40%)
1	MDO	C	149	1	12,13,14	2.26	4 (33%)	15,18,20	3.92	6 (40%)
1	MDO	D	149	1	12,13,14	2.28	4 (33%)	15,18,20	3.89	7 (46%)
1	MDO	H	149	1	12,13,14	2.21	4 (33%)	15,18,20	3.96	6 (40%)
1	MDO	F	149	1	12,13,14	2.20	4 (33%)	15,18,20	3.98	7 (46%)
1	MDO	G	149	1	12,13,14	2.23	4 (33%)	15,18,20	4.01	6 (40%)

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
1	MDO	A	149	1	-	0/4/23/24	0/1/1/1
1	MDO	E	149	1	-	1/4/23/24	0/1/1/1
1	MDO	B	149	1	-	1/4/23/24	0/1/1/1
1	MDO	C	149	1	-	0/4/23/24	0/1/1/1
1	MDO	D	149	1	-	0/4/23/24	0/1/1/1
1	MDO	H	149	1	-	0/4/23/24	0/1/1/1
1	MDO	F	149	1	-	0/4/23/24	0/1/1/1
1	MDO	G	149	1	-	2/4/23/24	0/1/1/1

All (32) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	149	MDO	O2-C2	5.23	1.34	1.23
1	C	149	MDO	O2-C2	5.16	1.34	1.23
1	B	149	MDO	O2-C2	5.15	1.34	1.23
1	E	149	MDO	O2-C2	5.11	1.33	1.23
1	H	149	MDO	O2-C2	5.06	1.33	1.23
1	G	149	MDO	O2-C2	4.94	1.33	1.23
1	A	149	MDO	O2-C2	4.85	1.33	1.23
1	F	149	MDO	O2-C2	4.84	1.33	1.23
1	B	149	MDO	C2-N3	-3.60	1.31	1.39
1	A	149	MDO	C2-N3	-3.58	1.31	1.39
1	G	149	MDO	C2-N3	-3.55	1.31	1.39
1	C	149	MDO	C2-N3	-3.54	1.31	1.39
1	E	149	MDO	C2-N3	-3.54	1.31	1.39
1	D	149	MDO	C2-N3	-3.51	1.31	1.39
1	H	149	MDO	C2-N3	-3.37	1.31	1.39
1	F	149	MDO	C2-N3	-3.31	1.32	1.39
1	A	149	MDO	CA2-N2	-2.81	1.33	1.39
1	F	149	MDO	CA2-C2	-2.70	1.37	1.43
1	B	149	MDO	CA2-N2	-2.64	1.34	1.39
1	E	149	MDO	CA2-C2	-2.63	1.37	1.43
1	D	149	MDO	CA2-C2	-2.56	1.38	1.43
1	G	149	MDO	CA2-N2	-2.55	1.34	1.39
1	G	149	MDO	CA2-C2	-2.49	1.38	1.43
1	E	149	MDO	CA2-N2	-2.46	1.34	1.39
1	C	149	MDO	CA2-N2	-2.43	1.34	1.39
1	A	149	MDO	CA2-C2	-2.41	1.38	1.43
1	H	149	MDO	CA2-C2	-2.39	1.38	1.43
1	D	149	MDO	CA2-N2	-2.39	1.34	1.39
1	C	149	MDO	CA2-C2	-2.34	1.38	1.43
1	F	149	MDO	CA2-N2	-2.28	1.34	1.39
1	B	149	MDO	CA2-C2	-2.28	1.38	1.43
1	H	149	MDO	CA2-N2	-2.25	1.35	1.39

All (51) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	G	149	MDO	CA2-C2-N3	12.74	109.39	103.37
1	A	149	MDO	CA2-C2-N3	12.72	109.39	103.37
1	H	149	MDO	CA2-C2-N3	12.53	109.29	103.37
1	C	149	MDO	CA2-C2-N3	12.52	109.29	103.37
1	B	149	MDO	CA2-C2-N3	12.52	109.29	103.37
1	F	149	MDO	CA2-C2-N3	12.51	109.29	103.37
1	E	149	MDO	CA2-C2-N3	12.44	109.25	103.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	149	MDO	CA2-C2-N3	12.26	109.17	103.37
1	F	149	MDO	O2-C2-CA2	-5.47	127.89	130.96
1	E	149	MDO	O2-C2-CA2	-5.15	128.07	130.96
1	D	149	MDO	O2-C2-CA2	-5.09	128.10	130.96
1	G	149	MDO	O2-C2-CA2	-5.02	128.14	130.96
1	H	149	MDO	O2-C2-CA2	-4.77	128.28	130.96
1	A	149	MDO	O2-C2-CA2	-4.76	128.29	130.96
1	C	149	MDO	O2-C2-CA2	-4.75	128.29	130.96
1	B	149	MDO	O2-C2-CA2	-4.67	128.34	130.96
1	B	149	MDO	C2-CA2-N2	-4.10	106.06	108.93
1	H	149	MDO	C2-CA2-N2	-3.88	106.22	108.93
1	A	149	MDO	C2-CA2-N2	-3.83	106.25	108.93
1	G	149	MDO	C2-CA2-N2	-3.74	106.31	108.93
1	F	149	MDO	C2-CA2-N2	-3.63	106.39	108.93
1	C	149	MDO	C2-CA2-N2	-3.63	106.39	108.93
1	E	149	MDO	C2-CA2-N2	-3.54	106.45	108.93
1	D	149	MDO	C2-CA2-N2	-3.53	106.46	108.93
1	A	149	MDO	CB2-CA2-C2	3.52	129.21	122.76
1	B	149	MDO	CB2-CA2-C2	3.51	129.18	122.76
1	H	149	MDO	CB2-CA2-C2	3.45	129.08	122.76
1	C	149	MDO	CB2-CA2-C2	3.45	129.07	122.76
1	G	149	MDO	CB2-CA2-C2	3.39	128.96	122.76
1	D	149	MDO	CB2-CA2-C2	3.34	128.88	122.76
1	E	149	MDO	CB2-CA2-C2	3.33	128.87	122.76
1	F	149	MDO	CB2-CA2-C2	3.21	128.64	122.76
1	E	149	MDO	N3-C1-N2	-3.15	109.27	111.45
1	F	149	MDO	N3-C1-N2	-3.08	109.32	111.45
1	H	149	MDO	N3-C1-N2	-3.08	109.32	111.45
1	D	149	MDO	N3-C1-N2	-3.07	109.33	111.45
1	C	149	MDO	N3-C1-N2	-2.96	109.40	111.45
1	A	149	MDO	N3-C1-N2	-2.88	109.46	111.45
1	B	149	MDO	N3-C1-N2	-2.80	109.52	111.45
1	G	149	MDO	N3-C1-N2	-2.76	109.54	111.45
1	B	149	MDO	CA2-N2-C1	2.59	107.74	105.40
1	A	149	MDO	CA2-N2-C1	2.57	107.73	105.40
1	H	149	MDO	CA2-N2-C1	2.52	107.68	105.40
1	E	149	MDO	CA2-N2-C1	2.50	107.66	105.40
1	F	149	MDO	CA2-N2-C1	2.49	107.65	105.40
1	G	149	MDO	CA2-N2-C1	2.41	107.58	105.40
1	C	149	MDO	CA2-N2-C1	2.36	107.54	105.40
1	D	149	MDO	CA2-N2-C1	2.35	107.52	105.40
1	F	149	MDO	CA1-C1-N2	2.06	126.69	124.05

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	149	MDO	CA1-C1-N2	2.06	126.69	124.05
1	E	149	MDO	O3-C3-CA3	-2.01	120.33	126.39

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	149	MDO	N2-C1-CA1-CB
1	E	149	MDO	N2-C1-CA1-CB
1	G	149	MDO	N2-C1-CA1-CB
1	G	149	MDO	N3-C1-CA1-CB

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

8 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	HC4	F	701	-	12,12,12	1.64	3 (25%)	15,15,15	0.60	0
2	HC4	A	701	-	12,12,12	1.54	2 (16%)	15,15,15	0.64	0
2	HC4	D	701	-	12,12,12	1.59	3 (25%)	15,15,15	0.59	0
2	HC4	E	701	-	12,12,12	1.57	3 (25%)	15,15,15	0.70	0
2	HC4	C	701	-	12,12,12	1.63	3 (25%)	15,15,15	0.67	0
2	HC4	G	701	-	12,12,12	1.46	1 (8%)	15,15,15	0.63	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
2	HC4	H	701	-	12,12,12	1.56	2 (16%)	15,15,15	0.64	0
2	HC4	B	701	-	12,12,12	1.58	3 (25%)	15,15,15	0.63	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
2	HC4	F	701	-	-	2/5/5/5	0/1/1/1
2	HC4	A	701	-	-	2/5/5/5	0/1/1/1
2	HC4	D	701	-	-	2/5/5/5	0/1/1/1
2	HC4	E	701	-	-	2/5/5/5	0/1/1/1
2	HC4	C	701	-	-	2/5/5/5	0/1/1/1
2	HC4	G	701	-	-	2/5/5/5	0/1/1/1
2	HC4	H	701	-	-	3/5/5/5	0/1/1/1
2	HC4	B	701	-	-	2/5/5/5	0/1/1/1

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	701	HC4	C6'-C5'	2.71	1.43	1.38
2	F	701	HC4	C2'-C1'	2.57	1.44	1.39
2	E	701	HC4	C6'-C5'	2.38	1.43	1.38
2	C	701	HC4	C2'-C1'	2.35	1.44	1.39
2	B	701	HC4	C6'-C5'	2.33	1.43	1.38
2	B	701	HC4	C2'-C1'	2.30	1.43	1.39
2	E	701	HC4	C5'-C4'	2.29	1.43	1.38
2	F	701	HC4	C6'-C5'	2.27	1.42	1.38
2	C	701	HC4	C5'-C4'	2.26	1.43	1.38
2	H	701	HC4	C2'-C1'	2.22	1.43	1.39
2	D	701	HC4	C2'-C1'	2.20	1.43	1.39
2	E	701	HC4	C2'-C1'	2.17	1.43	1.39
2	G	701	HC4	C6'-C5'	2.16	1.42	1.38
2	D	701	HC4	C3'-C4'	2.16	1.43	1.38
2	A	701	HC4	C6'-C5'	2.12	1.42	1.38
2	B	701	HC4	C5'-C4'	2.07	1.42	1.38
2	D	701	HC4	C6'-C5'	2.06	1.42	1.38
2	H	701	HC4	C6'-C5'	2.06	1.42	1.38
2	A	701	HC4	C2'-C1'	2.03	1.43	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	701	HC4	C5'-C4'	2.01	1.42	1.38

There are no bond angle outliers.

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	701	HC4	O1-C1-C2-C3
2	D	701	HC4	O2-C1-C2-C3
2	E	701	HC4	O2-C1-C2-C3
2	F	701	HC4	O1-C1-C2-C3
2	E	701	HC4	O1-C1-C2-C3
2	F	701	HC4	O2-C1-C2-C3
2	A	701	HC4	O1-C1-C2-C3
2	A	701	HC4	O2-C1-C2-C3
2	B	701	HC4	O1-C1-C2-C3
2	B	701	HC4	O2-C1-C2-C3
2	H	701	HC4	O1-C1-C2-C3
2	H	701	HC4	O2-C1-C2-C3
2	G	701	HC4	O2-C1-C2-C3
2	C	701	HC4	O1-C1-C2-C3
2	G	701	HC4	O1-C1-C2-C3
2	C	701	HC4	O2-C1-C2-C3
2	H	701	HC4	C1-C2-C3-C1'

There are no ring outliers.

8 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	F	701	HC4	2	0
2	A	701	HC4	2	0
2	D	701	HC4	2	0
2	E	701	HC4	2	0
2	C	701	HC4	1	0
2	G	701	HC4	2	0
2	H	701	HC4	1	0
2	B	701	HC4	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, 95^{th} 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	514/521 (98%)	-0.20	16 (3%)	49 48	5, 14, 36, 57	0
1	B	514/521 (98%)	-0.33	4 (0%)	86 85	5, 13, 30, 54	0
1	C	513/521 (98%)	-0.38	2 (0%)	92 92	5, 12, 29, 47	0
1	D	513/521 (98%)	-0.27	8 (1%)	72 70	4, 14, 35, 52	0
1	E	513/521 (98%)	-0.28	7 (1%)	75 74	5, 13, 32, 57	0
1	F	513/521 (98%)	-0.42	2 (0%)	92 92	4, 11, 26, 41	0
1	G	513/521 (98%)	-0.41	2 (0%)	92 92	5, 12, 27, 42	0
1	H	513/521 (98%)	-0.19	9 (1%)	68 66	5, 15, 35, 56	0
All	All	4106/4168 (98%)	-0.31	50 (1%)	79 78	4, 13, 31, 57	0

All (50) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	7	PRO	6.3
1	A	285	ASP	6.0
1	B	7	PRO	5.6
1	A	286	ALA	5.4
1	A	523	VAL	5.4
1	G	523	VAL	5.1
1	B	523	VAL	5.0
1	F	523	VAL	4.8
1	H	77	GLU	4.8
1	H	523	VAL	4.7
1	D	74	ILE	4.6
1	B	277	HIS	4.6
1	A	289	ILE	4.6
1	A	287	GLY	4.4
1	E	523	VAL	4.4
1	C	523	VAL	4.4

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Mol	Chain	Res	Type	RSRZ
1	D	523	VAL	4.1
1	H	277	HIS	4.0
1	D	77	GLU	3.7
1	E	285	ASP	3.7
1	D	277	HIS	3.5
1	A	187	ARG	3.4
1	E	288	ASP	3.4
1	E	286	ALA	3.3
1	A	277	HIS	3.3
1	A	288	ASP	3.1
1	H	74	ILE	2.9
1	H	9	PRO	2.8
1	A	291	THR	2.7
1	A	290	GLY	2.7
1	H	187	ARG	2.7
1	E	287	GLY	2.6
1	D	70	ALA	2.6
1	F	277	HIS	2.5
1	B	172	ARG	2.5
1	A	296	GLY	2.4
1	C	172	ARG	2.4
1	G	80	ARG	2.3
1	D	184	ARG	2.2
1	D	9	PRO	2.2
1	E	293	PRO	2.2
1	E	277	HIS	2.2
1	D	80	ARG	2.2
1	A	480	ASP	2.2
1	H	174	GLY	2.1
1	H	75	SER	2.1
1	A	284	LEU	2.1
1	A	171	ASP	2.0
1	H	172	ARG	2.0
1	A	10	ALA	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (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^{th} 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
1	MDO	F	149	13/14	0.93	0.15	9,14,18,19	0
1	MDO	G	149	13/14	0.93	0.13	10,11,14,16	0
1	MDO	H	149	13/14	0.93	0.14	13,17,21,22	0
1	MDO	B	149	13/14	0.94	0.11	11,13,15,17	0
1	MDO	A	149	13/14	0.95	0.13	11,14,17,18	0
1	MDO	E	149	13/14	0.96	0.13	10,13,15,19	0
1	MDO	D	149	13/14	0.96	0.13	12,16,18,18	0
1	MDO	C	149	13/14	0.97	0.12	8,10,13,13	0

6.3 Carbohydrates (i)

There are no monosaccharides 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^{th} 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
2	HC4	H	701	12/12	0.72	0.61	48,50,52,54	12
2	HC4	E	701	12/12	0.79	0.55	32,40,42,43	12
2	HC4	B	701	12/12	0.79	0.51	37,39,41,41	12
2	HC4	G	701	12/12	0.82	0.51	31,37,39,42	12
2	HC4	C	701	12/12	0.82	0.49	34,36,37,41	12
2	HC4	F	701	12/12	0.83	0.54	30,34,35,35	12
2	HC4	D	701	12/12	0.84	0.59	37,46,48,48	12
2	HC4	A	701	12/12	0.85	0.49	36,39,40,41	12

6.5 Other polymers (i)

There are no such residues in this entry.