



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 13, 2024 – 09:15 pm BST

PDB ID : 6FQB
Title : MurT/GatD peptidoglycan amidotransferase complex from *Streptococcus pneumoniae* R6
Authors : Morlot, C.; Contreras-Martel, C.; Leisico, F.; Straume, D.; Peters, K.; Hegnar, O.A.; Simon, N.; Villard, A.M.; Breukink, E.; Gravier-Pelletier, C.; Le Corre, L.; Vollmer, W.; Pietrancosta, N.; Havarstein, L.S.; Zapun, A.
Deposited on : 2018-02-13
Resolution : 3.00 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 ⓘ 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

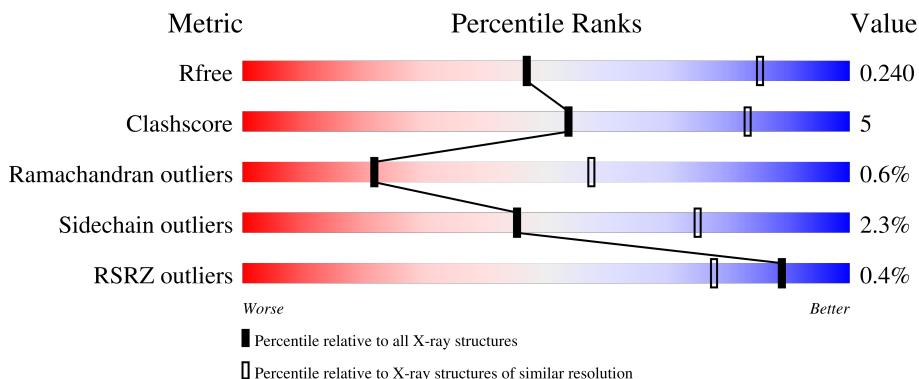
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION





The reported resolution of this entry is 3.00 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}	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 ≥ 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	465	
1	B	465	
1	C	465	
1	D	465	

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Mol	Chain	Length	Quality of chain
2	E	260	 87% 8% 5%
2	F	260	 86% 9% 5%
2	G	260	 86% 9% 5%
2	H	260	 84% 10% 5%

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 19727 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 Mur ligase family protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	383	2989	1906	497	573	13	0	0	0
1	B	378	2952	1886	489	564	13	0	0	0
1	C	375	2937	1876	485	563	13	0	0	0
1	D	380	2977	1900	494	570	13	0	0	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-17	MET	-	initiating methionine	UNP A0A0B7LND9
A	-16	HIS	-	expression tag	UNP A0A0B7LND9
A	-15	HIS	-	expression tag	UNP A0A0B7LND9
A	-14	HIS	-	expression tag	UNP A0A0B7LND9
A	-13	HIS	-	expression tag	UNP A0A0B7LND9
A	-12	HIS	-	expression tag	UNP A0A0B7LND9
A	-11	HIS	-	expression tag	UNP A0A0B7LND9
A	-10	HIS	-	expression tag	UNP A0A0B7LND9
A	-9	HIS	-	expression tag	UNP A0A0B7LND9
A	-8	GLU	-	expression tag	UNP A0A0B7LND9
A	-7	ASN	-	expression tag	UNP A0A0B7LND9
A	-6	LEU	-	expression tag	UNP A0A0B7LND9
A	-5	TYR	-	expression tag	UNP A0A0B7LND9
A	-4	PHE	-	expression tag	UNP A0A0B7LND9
A	-3	GLN	-	expression tag	UNP A0A0B7LND9
A	-2	GLY	-	expression tag	UNP A0A0B7LND9
A	-1	SER	-	expression tag	UNP A0A0B7LND9
A	0	HIS	-	expression tag	UNP A0A0B7LND9
B	-17	MET	-	initiating methionine	UNP A0A0B7LND9
B	-16	HIS	-	expression tag	UNP A0A0B7LND9
B	-15	HIS	-	expression tag	UNP A0A0B7LND9

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-14	HIS	-	expression tag	UNP A0A0B7LND9
B	-13	HIS	-	expression tag	UNP A0A0B7LND9
B	-12	HIS	-	expression tag	UNP A0A0B7LND9
B	-11	HIS	-	expression tag	UNP A0A0B7LND9
B	-10	HIS	-	expression tag	UNP A0A0B7LND9
B	-9	HIS	-	expression tag	UNP A0A0B7LND9
B	-8	GLU	-	expression tag	UNP A0A0B7LND9
B	-7	ASN	-	expression tag	UNP A0A0B7LND9
B	-6	LEU	-	expression tag	UNP A0A0B7LND9
B	-5	TYR	-	expression tag	UNP A0A0B7LND9
B	-4	PHE	-	expression tag	UNP A0A0B7LND9
B	-3	GLN	-	expression tag	UNP A0A0B7LND9
B	-2	GLY	-	expression tag	UNP A0A0B7LND9
B	-1	SER	-	expression tag	UNP A0A0B7LND9
B	0	HIS	-	expression tag	UNP A0A0B7LND9
C	-17	MET	-	initiating methionine	UNP A0A0B7LND9
C	-16	HIS	-	expression tag	UNP A0A0B7LND9
C	-15	HIS	-	expression tag	UNP A0A0B7LND9
C	-14	HIS	-	expression tag	UNP A0A0B7LND9
C	-13	HIS	-	expression tag	UNP A0A0B7LND9
C	-12	HIS	-	expression tag	UNP A0A0B7LND9
C	-11	HIS	-	expression tag	UNP A0A0B7LND9
C	-10	HIS	-	expression tag	UNP A0A0B7LND9
C	-9	HIS	-	expression tag	UNP A0A0B7LND9
C	-8	GLU	-	expression tag	UNP A0A0B7LND9
C	-7	ASN	-	expression tag	UNP A0A0B7LND9
C	-6	LEU	-	expression tag	UNP A0A0B7LND9
C	-5	TYR	-	expression tag	UNP A0A0B7LND9
C	-4	PHE	-	expression tag	UNP A0A0B7LND9
C	-3	GLN	-	expression tag	UNP A0A0B7LND9
C	-2	GLY	-	expression tag	UNP A0A0B7LND9
C	-1	SER	-	expression tag	UNP A0A0B7LND9
C	0	HIS	-	expression tag	UNP A0A0B7LND9
D	-17	MET	-	initiating methionine	UNP A0A0B7LND9
D	-16	HIS	-	expression tag	UNP A0A0B7LND9
D	-15	HIS	-	expression tag	UNP A0A0B7LND9
D	-14	HIS	-	expression tag	UNP A0A0B7LND9
D	-13	HIS	-	expression tag	UNP A0A0B7LND9
D	-12	HIS	-	expression tag	UNP A0A0B7LND9
D	-11	HIS	-	expression tag	UNP A0A0B7LND9
D	-10	HIS	-	expression tag	UNP A0A0B7LND9
D	-9	HIS	-	expression tag	UNP A0A0B7LND9

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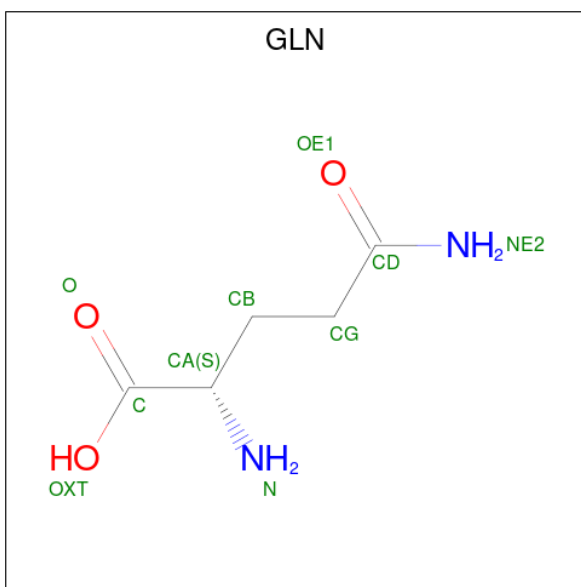
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Chain	Residue	Modelled	Actual	Comment	Reference
D	-8	GLU	-	expression tag	UNP A0A0B7LND9
D	-7	ASN	-	expression tag	UNP A0A0B7LND9
D	-6	LEU	-	expression tag	UNP A0A0B7LND9
D	-5	TYR	-	expression tag	UNP A0A0B7LND9
D	-4	PHE	-	expression tag	UNP A0A0B7LND9
D	-3	GLN	-	expression tag	UNP A0A0B7LND9
D	-2	GLY	-	expression tag	UNP A0A0B7LND9
D	-1	SER	-	expression tag	UNP A0A0B7LND9
D	0	HIS	-	expression tag	UNP A0A0B7LND9

- Molecule 2 is a protein called Cobyric acid synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	247	Total	C	N	O	S	0	0	0
			1958	1242	326	385	5			
2	F	247	Total	C	N	O	S	0	0	0
			1958	1242	326	385	5			
2	G	247	Total	C	N	O	S	0	0	0
			1958	1242	326	385	5			
2	H	247	Total	C	N	O	S	0	0	0
			1958	1242	326	385	5			

- Molecule 3 is GLUTAMINE (three-letter code: GLN) (formula: C₅H₁₀N₂O₃).

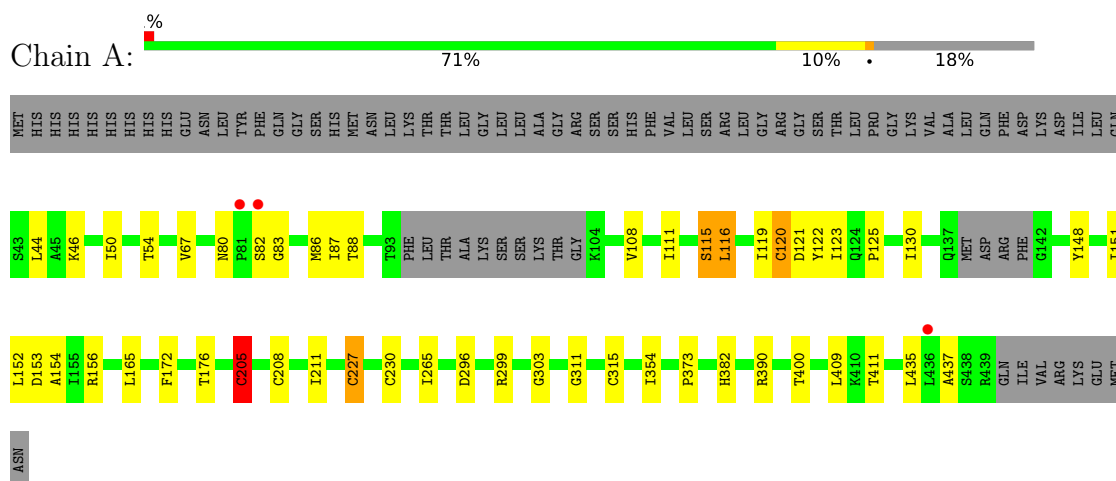


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	E	1	Total 10	C 5	N 2	O 3	0	0
3	F	1	Total 10	C 5	N 2	O 3	0	0
3	G	1	Total 10	C 5	N 2	O 3	0	0
3	H	1	Total 10	C 5	N 2	O 3	0	0

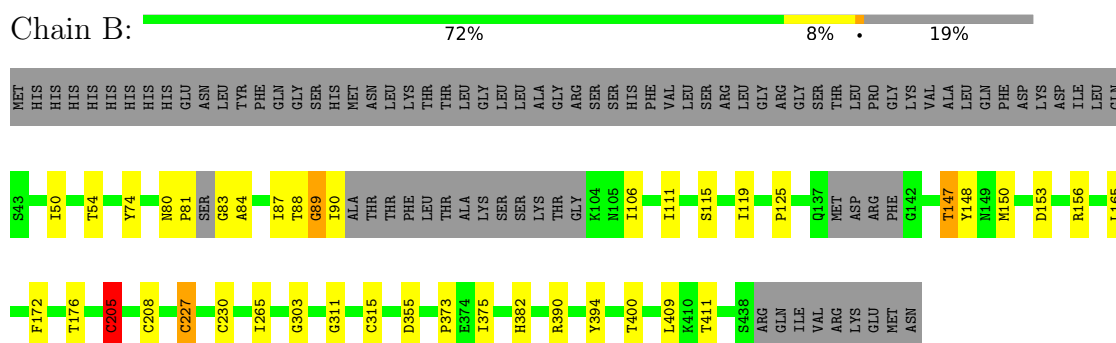
3 Residue-property plots [\(i\)](#)

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.

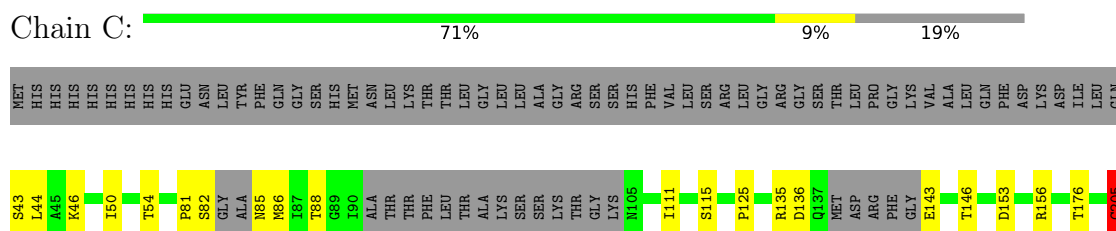
- Molecule 1: Mur ligase family protein



- Molecule 1: Mur ligase family protein

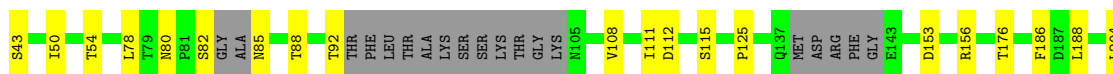


- Molecule 1: Mur ligase family protein





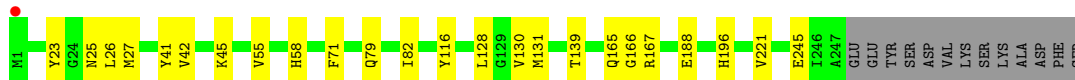
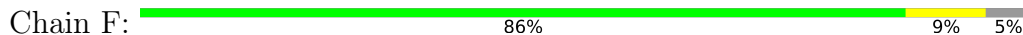
• Molecule 1: Mur ligase family protein



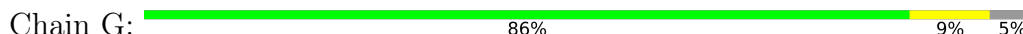
• Molecule 2: Cobyric acid synthase



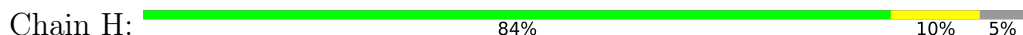
• Molecule 2: Cobyric acid synthase



• Molecule 2: Cobyric acid synthase



• Molecule 2: Cobyric acid synthase



4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	288.43Å 288.43Å 115.10Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 3.00 50.00 – 3.00	Depositor EDS
% Data completeness (in resolution range)	96.2 (50.00-3.00) 96.2 (50.00-3.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.06	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.16 (at 3.01Å)	Xtrriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.189 , 0.228 0.205 , 0.240	Depositor DCC
R_{free} test set	7138 reflections (9.97%)	wwPDB-VP
Wilson B-factor (Å ²)	88.4	Xtrriage
Anisotropy	0.049	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 49.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.011 for h,-h-k,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	19727	wwPDB-VP
Average B, all atoms (Å ²)	88.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.35% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.59	0/3043	0.78	1/4133 (0.0%)
1	B	0.55	0/3005	0.78	1/4080 (0.0%)
1	C	0.56	0/2990	0.77	1/4061 (0.0%)
1	D	0.58	0/3030	0.77	1/4115 (0.0%)
2	E	0.62	0/2001	0.72	0/2707
2	F	0.56	0/2001	0.72	0/2707
2	G	0.59	0/2001	0.75	0/2707
2	H	0.58	0/2001	0.72	0/2707
All	All	0.58	0/20072	0.76	4/27217 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	205	CYS	CA-CB-SG	5.26	123.47	114.00
1	D	205	CYS	CA-CB-SG	5.25	123.44	114.00
1	B	205	CYS	CA-CB-SG	5.24	123.44	114.00
1	C	205	CYS	CA-CB-SG	5.13	123.23	114.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2989	0	2986	48	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	2952	0	2945	28	0
1	C	2937	0	2929	24	0
1	D	2977	0	2973	17	0
2	E	1958	0	1857	22	0
2	F	1958	0	1857	14	1
2	G	1958	0	1857	18	0
2	H	1958	0	1857	24	1
3	E	10	0	7	0	0
3	F	10	0	7	1	0
3	G	10	0	7	0	0
3	H	10	0	7	3	0
All	All	19727	0	19289	189	1

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 (189) 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:A:116:LEU:HD12	1:A:116:LEU:O	1.70	0.91
2:H:219:ARG:HG3	2:H:219:ARG:HH11	1.34	0.91
1:B:115:SER:OG	1:B:119:ILE:CD1	2.22	0.88
1:B:81:PRO:O	1:B:83:GLY:N	2.07	0.88
1:C:431:GLU:O	1:C:434:GLU:HG2	1.75	0.86
1:A:87:ILE:HG22	1:A:87:ILE:O	1.76	0.83
1:A:86:MET:HE1	1:A:122:TYR:CE2	2.13	0.83
2:F:25:ASN:C	2:F:26:LEU:HD23	1.98	0.82
1:A:86:MET:CE	1:A:122:TYR:CE2	2.65	0.80
1:A:205:CYS:SG	1:A:208:CYS:N	2.60	0.74
1:C:306:GLU:OE2	1:C:433:ARG:NH1	2.21	0.74
1:D:205:CYS:SG	1:D:208:CYS:N	2.61	0.74
1:B:205:CYS:SG	1:B:208:CYS:N	2.60	0.73
1:A:46:LYS:O	1:A:46:LYS:HG2	1.88	0.72
2:H:219:ARG:HG3	2:H:219:ARG:NH1	2.02	0.72
1:B:115:SER:OG	1:B:119:ILE:HD11	1.88	0.71
2:F:26:LEU:HD23	2:F:26:LEU:N	2.06	0.70
1:A:130:ILE:HD11	1:A:151:ILE:HD13	1.72	0.70
2:G:23:TYR:HA	2:G:56:SER:HB2	1.73	0.70
1:C:205:CYS:SG	1:C:208:CYS:N	2.62	0.69
2:F:130:VAL:HG23	2:F:131:MET:HG3	1.74	0.69
1:A:296:ASP:HA	1:A:299:ARG:HD3	1.74	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:198:LYS:O	2:E:198:LYS:HG3	1.93	0.69
2:E:116:TYR:OH	2:G:116:TYR:OH	1.92	0.69
2:G:23:TYR:HA	2:G:56:SER:CB	2.23	0.68
1:A:86:MET:HE1	1:A:122:TYR:CD2	2.29	0.67
2:E:23:TYR:CD1	2:E:82:ILE:HD13	2.28	0.67
2:H:5:SER:HB3	2:H:54:ILE:HG13	1.75	0.67
1:A:86:MET:CE	1:A:122:TYR:CD2	2.77	0.67
1:A:44:LEU:C	1:A:44:LEU:HD12	2.16	0.67
1:A:116:LEU:HD12	1:A:116:LEU:C	2.13	0.66
1:B:88:THR:O	1:B:89:GLY:C	2.34	0.66
1:B:115:SER:OG	1:B:119:ILE:HD12	1.93	0.65
1:D:296:ASP:HA	1:D:299:ARG:HD3	1.77	0.65
2:H:170:LEU:HD23	2:H:195:VAL:HG23	1.78	0.65
2:H:198:LYS:O	2:H:198:LYS:HG3	1.96	0.65
1:A:44:LEU:HD12	1:A:44:LEU:O	1.97	0.65
1:A:86:MET:HE1	1:A:122:TYR:HE2	1.60	0.65
1:A:115:SER:O	1:A:119:ILE:HD12	1.97	0.64
1:A:211:ILE:HD13	2:E:25:ASN:HD22	1.63	0.63
2:G:128:LEU:HB3	2:G:130:VAL:HG13	1.80	0.63
2:E:167:ARG:HD2	2:E:188:GLU:OE1	1.99	0.62
1:B:87:ILE:HG22	1:B:87:ILE:O	2.00	0.61
1:A:116:LEU:HD11	1:A:120:CYS:SG	2.39	0.61
1:C:135:ARG:NH1	1:C:136:ASP:O	2.34	0.60
1:B:88:THR:O	1:B:90:ILE:N	2.34	0.60
2:H:107:CYS:SG	3:H:301:GLN:OE1	2.61	0.59
2:G:165:GLN:HG3	2:G:166:GLY:N	2.18	0.59
1:A:156:ARG:NH2	1:A:176:THR:O	2.37	0.58
2:G:54:ILE:HG22	2:G:54:ILE:O	2.01	0.58
1:D:50:ILE:HG23	1:D:125:PRO:HA	1.86	0.57
1:D:156:ARG:NH2	1:D:176:THR:O	2.37	0.57
1:B:156:ARG:NH2	1:B:176:THR:O	2.37	0.57
1:B:50:ILE:HG23	1:B:125:PRO:HA	1.85	0.57
1:B:115:SER:O	1:B:119:ILE:HD12	2.04	0.57
1:C:156:ARG:NH2	1:C:176:THR:O	2.37	0.57
2:H:55:VAL:O	2:H:55:VAL:HG12	2.04	0.57
2:H:170:LEU:HD11	2:H:186:ASN:ND2	2.20	0.57
1:A:119:ILE:O	1:A:122:TYR:N	2.37	0.57
1:A:50:ILE:HG23	1:A:125:PRO:HA	1.86	0.56
2:F:165:GLN:HG3	2:F:166:GLY:N	2.20	0.56
2:G:42:VAL:HG12	2:G:221:VAL:HG11	1.86	0.56
1:D:80:ASN:O	1:D:82:SER:N	2.38	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:50:ILE:HG23	1:C:125:PRO:HA	1.86	0.56
1:D:227:CYS:SG	1:D:230:CYS:N	2.79	0.56
2:E:42:VAL:HG12	2:E:221:VAL:HG11	1.88	0.56
1:A:227:CYS:SG	1:A:230:CYS:N	2.78	0.56
2:F:42:VAL:HG12	2:F:221:VAL:HG11	1.88	0.56
2:G:5:SER:HB3	2:G:54:ILE:HG13	1.88	0.55
1:B:147:THR:O	1:B:148:TYR:C	2.43	0.55
1:C:429:MET:O	1:C:433:ARG:HG3	2.06	0.55
2:G:130:VAL:HG23	2:G:131:MET:HG3	1.89	0.55
1:D:54:THR:HG22	1:D:111:ILE:O	2.07	0.55
1:C:227:CYS:SG	1:C:230:CYS:N	2.79	0.54
2:E:167:ARG:HH11	2:E:188:GLU:CD	2.10	0.54
1:B:227:CYS:SG	1:B:230:CYS:N	2.78	0.54
1:A:86:MET:HE3	1:A:122:TYR:CD2	2.43	0.54
2:E:167:ARG:NH1	2:E:188:GLU:OE1	2.37	0.54
2:E:40:LYS:HG3	2:E:50:VAL:HG21	1.90	0.54
2:F:25:ASN:O	2:F:26:LEU:HD23	2.07	0.54
1:C:434:GLU:HA	1:C:434:GLU:OE1	2.07	0.54
2:F:128:LEU:HB3	2:F:130:VAL:HG13	1.89	0.53
2:H:40:LYS:HG3	2:H:50:VAL:HG21	1.88	0.53
2:G:197:TYR:CD2	2:G:198:LYS:HG2	2.44	0.53
2:H:107:CYS:HG	3:H:301:GLN:CD	2.11	0.53
2:H:8:SER:OG	2:H:50:VAL:HG22	2.09	0.53
2:E:165:GLN:HG3	2:E:166:GLY:H	1.74	0.53
2:F:167:ARG:HD2	2:F:188:GLU:OE1	2.09	0.52
1:A:130:ILE:CD1	1:A:151:ILE:HD13	2.39	0.52
1:C:431:GLU:O	1:C:434:GLU:CG	2.52	0.52
1:A:119:ILE:HD12	1:A:119:ILE:H	1.75	0.52
1:A:119:ILE:O	1:A:121:ASP:N	2.42	0.52
2:E:165:GLN:HG3	2:E:166:GLY:N	2.25	0.52
1:A:211:ILE:HD13	2:E:25:ASN:ND2	2.24	0.52
2:E:8:SER:OG	2:E:50:VAL:HG22	2.09	0.52
2:H:107:CYS:SG	3:H:301:GLN:CD	2.88	0.52
1:A:148:TYR:O	1:A:151:ILE:HG13	2.10	0.51
1:A:46:LYS:O	1:A:46:LYS:CG	2.58	0.51
1:B:74:TYR:CD1	1:B:106:ILE:HG21	2.45	0.51
2:H:219:ARG:NH1	2:H:219:ARG:CG	2.73	0.51
2:E:26:LEU:HB2	2:E:82:ILE:HD11	1.92	0.51
1:B:80:ASN:ND2	1:B:84:ALA:HB3	2.26	0.51
2:E:198:LYS:O	2:E:198:LYS:CG	2.56	0.50
1:C:143:GLU:N	1:C:146:THR:HG1	2.09	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:55:VAL:HG12	2:F:55:VAL:O	2.10	0.50
1:C:44:LEU:HD13	1:C:46:LYS:HG3	1.92	0.50
1:B:80:ASN:HD22	1:B:84:ALA:HB3	1.76	0.49
1:C:85:ASN:O	1:C:88:THR:HG23	2.12	0.49
2:G:23:TYR:HA	2:G:56:SER:HB3	1.95	0.49
1:A:435:LEU:C	1:A:437:ALA:H	2.16	0.49
1:A:87:ILE:O	1:A:87:ILE:CG2	2.49	0.49
1:A:115:SER:O	1:A:119:ILE:CD1	2.60	0.48
1:A:82:SER:OG	1:A:83:GLY:N	2.41	0.48
1:D:85:ASN:O	1:D:88:THR:HG23	2.13	0.48
1:D:111:ILE:CG2	1:D:112:ASP:N	2.77	0.48
1:A:80:ASN:OD1	1:A:80:ASN:N	2.40	0.47
1:A:208:CYS:HB3	1:A:230:CYS:HB3	1.71	0.47
2:E:23:TYR:CD1	2:E:82:ILE:CD1	2.97	0.47
2:H:57:LEU:O	2:H:59:ASP:N	2.48	0.47
2:H:198:LYS:O	2:H:198:LYS:CG	2.63	0.47
2:E:128:LEU:HB3	2:E:130:VAL:HG13	1.96	0.47
1:A:119:ILE:HG22	1:A:123:ILE:HG12	1.97	0.47
2:H:201:PHE:CD1	2:H:220:LEU:HD21	2.50	0.47
1:A:116:LEU:CD1	1:A:120:CYS:SG	3.02	0.46
2:G:23:TYR:CD1	2:G:82:ILE:HD13	2.50	0.46
2:E:143:PHE:HD2	2:E:164:HIS:CE1	2.32	0.46
1:C:301:VAL:O	1:C:301:VAL:HG12	2.15	0.46
1:D:188:LEU:N	1:D:188:LEU:HD12	2.31	0.46
1:A:265:ILE:HD13	1:A:303:GLY:O	2.15	0.46
2:E:167:ARG:NH1	2:E:188:GLU:CD	2.68	0.46
1:A:390:ARG:NH1	2:E:245:GLU:OE1	2.49	0.45
2:F:27:MET:HE1	2:F:79:GLN:HA	1.97	0.45
2:H:106:ILE:O	2:H:107:CYS:C	2.53	0.45
1:B:81:PRO:C	1:B:83:GLY:N	2.69	0.45
1:B:147:THR:O	1:B:150:MET:N	2.50	0.45
2:F:23:TYR:CD1	2:F:82:ILE:HD13	2.52	0.45
1:D:188:LEU:N	1:D:188:LEU:CD1	2.80	0.45
1:D:265:ILE:HD13	1:D:303:GLY:O	2.17	0.45
2:H:23:TYR:CD1	2:H:82:ILE:HD13	2.52	0.45
1:B:265:ILE:HD13	1:B:303:GLY:O	2.16	0.44
2:G:56:SER:OG	2:G:57:LEU:N	2.50	0.44
2:H:5:SER:HB3	2:H:54:ILE:CG1	2.44	0.44
1:A:67:VAL:HG22	1:A:108:VAL:CG2	2.47	0.44
1:A:116:LEU:HG	1:A:154:ALA:CB	2.47	0.44
1:B:88:THR:C	1:B:90:ILE:N	2.71	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:265:ILE:HD13	1:C:303:GLY:O	2.17	0.44
1:D:111:ILE:HG22	1:D:112:ASP:N	2.32	0.44
2:H:130:VAL:HG23	2:H:131:MET:HG3	1.99	0.44
1:A:44:LEU:C	1:A:44:LEU:CD1	2.85	0.44
2:E:57:LEU:HD23	2:E:57:LEU:HA	1.73	0.44
1:C:432:PHE:CD2	1:C:432:PHE:O	2.70	0.44
1:A:86:MET:CE	1:A:122:TYR:HE2	2.18	0.44
1:C:81:PRO:O	1:C:82:SER:HB2	2.18	0.44
1:D:186:PHE:CD2	1:D:218:THR:CG2	3.01	0.43
2:H:57:LEU:C	2:H:59:ASP:H	2.21	0.43
1:B:115:SER:HG	1:B:119:ILE:HD11	1.83	0.43
1:B:208:CYS:HB3	1:B:230:CYS:HB3	1.72	0.43
1:A:151:ILE:HD12	1:A:152:LEU:N	2.33	0.43
1:D:78:LEU:HD21	1:D:92:THR:HG22	2.01	0.43
1:A:108:VAL:O	1:A:108:VAL:HG23	2.19	0.42
1:C:208:CYS:HB3	1:C:230:CYS:HB3	1.70	0.42
1:B:390:ARG:NH1	2:F:245:GLU:OE1	2.52	0.42
2:F:41:TYR:CZ	2:F:45:LYS:HE2	2.54	0.42
1:C:153:ASP:OD1	1:C:156:ARG:NH1	2.53	0.42
2:H:131:MET:HE2	2:H:174:GLN:NE2	2.35	0.42
2:E:40:LYS:CG	2:E:50:VAL:HG21	2.50	0.42
1:C:81:PRO:O	1:C:82:SER:CB	2.68	0.42
2:G:57:LEU:HD12	2:G:57:LEU:HA	1.92	0.42
2:H:43:ALA:HB3	2:H:50:VAL:HG11	2.02	0.42
1:A:409:LEU:O	1:A:409:LEU:HD23	2.20	0.41
1:C:375:ILE:HD12	1:C:394:TYR:CE2	2.55	0.41
1:B:54:THR:HG22	1:B:111:ILE:O	2.20	0.41
1:D:375:ILE:HD12	1:D:394:TYR:CE2	2.55	0.41
1:B:153:ASP:OD1	1:B:156:ARG:NH1	2.54	0.41
1:D:153:ASP:OD1	1:D:156:ARG:NH1	2.53	0.41
2:H:40:LYS:CG	2:H:50:VAL:HG21	2.50	0.41
1:A:153:ASP:OD1	1:A:156:ARG:NH1	2.54	0.41
1:C:54:THR:HG22	1:C:111:ILE:O	2.21	0.41
1:C:390:ARG:NH1	2:G:245:GLU:OE1	2.54	0.41
1:A:54:THR:HG22	1:A:111:ILE:O	2.20	0.41
1:A:165:LEU:HD13	1:A:172:PHE:HB3	2.02	0.41
1:B:165:LEU:HD13	1:B:172:PHE:HB3	2.02	0.41
1:B:375:ILE:HD12	1:B:394:TYR:CE2	2.56	0.41
2:F:165:GLN:HG3	3:F:301:GLN:OXT	2.21	0.41
2:G:38:MET:HE2	2:G:38:MET:HB3	1.88	0.41
2:G:46:LEU:HD11	2:G:241:ILE:CD1	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:409:LEU:HD23	1:B:409:LEU:O	2.20	0.40
2:G:198:LYS:HG3	2:G:198:LYS:O	2.21	0.40
1:C:434:GLU:OE1	1:C:434:GLU:CA	2.69	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:116:TYR:OH	2:H:116:TYR:OH[2_555]	2.05	0.15

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	377/465 (81%)	342 (91%)	32 (8%)	3 (1%)	16	51
1	B	370/465 (80%)	334 (90%)	33 (9%)	3 (1%)	16	51
1	C	367/465 (79%)	332 (90%)	32 (9%)	3 (1%)	16	51
1	D	372/465 (80%)	338 (91%)	32 (9%)	2 (0%)	25	61
2	E	245/260 (94%)	230 (94%)	15 (6%)	0	100	100
2	F	245/260 (94%)	228 (93%)	16 (6%)	1 (0%)	30	66
2	G	245/260 (94%)	229 (94%)	16 (6%)	0	100	100
2	H	245/260 (94%)	230 (94%)	13 (5%)	2 (1%)	16	51
All	All	2466/2900 (85%)	2263 (92%)	189 (8%)	14 (1%)	22	57

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	H	58	HIS
1	B	89	GLY

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Mol	Chain	Res	Type
2	F	58	HIS
1	A	120	CYS
1	D	373	PRO
2	H	197	TYR
1	A	373	PRO
1	B	373	PRO
1	C	86	MET
1	C	311	GLY
1	C	373	PRO
1	D	311	GLY
1	A	311	GLY
1	B	311	GLY

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	323/395 (82%)	313 (97%)	10 (3%)	35	68
1	B	318/395 (80%)	310 (98%)	8 (2%)	42	73
1	C	319/395 (81%)	309 (97%)	10 (3%)	35	68
1	D	323/395 (82%)	313 (97%)	10 (3%)	35	68
2	E	207/219 (94%)	206 (100%)	1 (0%)	86	94
2	F	207/219 (94%)	204 (99%)	3 (1%)	62	83
2	G	207/219 (94%)	204 (99%)	3 (1%)	62	83
2	H	207/219 (94%)	204 (99%)	3 (1%)	62	83
All	All	2111/2456 (86%)	2063 (98%)	48 (2%)	45	75

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	88	THR
1	A	115	SER
1	A	116	LEU

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Mol	Chain	Res	Type
1	A	205	CYS
1	A	227	CYS
1	A	315	CYS
1	A	354	ILE
1	A	382	HIS
1	A	400	THR
1	A	411	THR
2	E	71	PHE
1	B	147	THR
1	B	205	CYS
1	B	227	CYS
1	B	315	CYS
1	B	355	ASP
1	B	382	HIS
1	B	400	THR
1	B	411	THR
2	F	71	PHE
2	F	139	THR
2	F	196	HIS
1	C	43	SER
1	C	115	SER
1	C	205	CYS
1	C	227	CYS
1	C	304	ARG
1	C	315	CYS
1	C	382	HIS
1	C	400	THR
1	C	411	THR
1	C	433	ARG
2	G	71	PHE
2	G	139	THR
2	G	196	HIS
1	D	43	SER
1	D	108	VAL
1	D	115	SER
1	D	204	LEU
1	D	205	CYS
1	D	227	CYS
1	D	315	CYS
1	D	382	HIS
1	D	400	THR
1	D	411	THR

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Mol	Chain	Res	Type
2	H	54	ILE
2	H	71	PHE
2	H	139	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	85	ASN
2	E	25	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](#)

4 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
3	GLN	E	301	-	8,9,9	0.87	1 (12%)	10,11,11	1.61	2 (20%)
3	GLN	H	301	-	8,9,9	0.80	1 (12%)	10,11,11	1.27	2 (20%)
3	GLN	F	301	-	8,9,9	0.87	1 (12%)	10,11,11	1.52	2 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GLN	G	301	-	8,9,9	0.85	0	10,11,11	1.16	1 (10%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GLN	E	301	-	-	6/9/9/9	-
3	GLN	H	301	-	-	4/9/9/9	-
3	GLN	F	301	-	-	6/9/9/9	-
3	GLN	G	301	-	-	6/9/9/9	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	301	GLN	OXT-C	-2.20	1.23	1.30
3	E	301	GLN	OXT-C	-2.10	1.23	1.30
3	H	301	GLN	OXT-C	-2.09	1.23	1.30

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	301	GLN	OXT-C-O	-4.13	114.71	124.09
3	F	301	GLN	OXT-C-O	-4.13	114.72	124.09
3	G	301	GLN	OXT-C-O	-3.05	117.16	124.09
3	H	301	GLN	OXT-C-O	-3.04	117.18	124.09
3	E	301	GLN	OXT-C-CA	2.71	122.61	113.38
3	H	301	GLN	OXT-C-CA	2.53	122.02	113.38
3	F	301	GLN	OXT-C-CA	2.37	121.45	113.38

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	E	301	GLN	O-C-CA-N
3	F	301	GLN	O-C-CA-N
3	G	301	GLN	O-C-CA-N
3	H	301	GLN	O-C-CA-N
3	E	301	GLN	OXT-C-CA-N

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Mol	Chain	Res	Type	Atoms
3	F	301	GLN	OXT-C-CA-N
3	H	301	GLN	OXT-C-CA-N
3	G	301	GLN	OXT-C-CA-N
3	E	301	GLN	NE2-CD-CG-CB
3	F	301	GLN	OE1-CD-CG-CB
3	F	301	GLN	NE2-CD-CG-CB
3	E	301	GLN	OE1-CD-CG-CB
3	E	301	GLN	OXT-C-CA-CB
3	G	301	GLN	OXT-C-CA-CB
3	G	301	GLN	O-C-CA-CB
3	E	301	GLN	O-C-CA-CB
3	G	301	GLN	OE1-CD-CG-CB
3	G	301	GLN	NE2-CD-CG-CB
3	F	301	GLN	O-C-CA-CB
3	F	301	GLN	OXT-C-CA-CB
3	H	301	GLN	NE2-CD-CG-CB
3	H	301	GLN	OE1-CD-CG-CB

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	H	301	GLN	3	0
3	F	301	GLN	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 [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, 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	383/465 (82%)	-0.49	3 (0%) 82 66	30, 83, 130, 162	0
1	B	378/465 (81%)	-0.42	0 100 100	66, 94, 132, 161	0
1	C	375/465 (80%)	-0.44	2 (0%) 87 75	30, 90, 134, 165	0
1	D	380/465 (81%)	-0.48	2 (0%) 87 75	58, 88, 131, 162	0
2	E	247/260 (95%)	-0.68	1 (0%) 89 77	46, 67, 95, 143	0
2	F	247/260 (95%)	-0.51	1 (0%) 89 77	56, 85, 124, 143	0
2	G	247/260 (95%)	-0.59	1 (0%) 89 77	51, 78, 122, 146	0
2	H	247/260 (95%)	-0.59	1 (0%) 89 77	51, 82, 117, 143	0
All	All	2504/2900 (86%)	-0.51	11 (0%) 89 77	30, 85, 127, 165	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	82	SER	5.7
1	D	441	ILE	3.3
2	F	1	MET	2.5
2	G	1	MET	2.5
1	C	438	SER	2.5
2	H	1	MET	2.4
1	A	81	PRO	2.4
1	A	436	LEU	2.2
2	E	25	ASN	2.2
1	D	439	ARG	2.1
1	C	219	TYR	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 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, 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(\AA^2)	Q<0.9
3	GLN	F	301	10/10	0.79	0.20	111,140,151,153	0
3	GLN	H	301	10/10	0.83	0.16	97,120,132,139	0
3	GLN	G	301	10/10	0.84	0.16	102,124,137,140	0
3	GLN	E	301	10/10	0.90	0.13	88,105,125,125	0

6.5 Other polymers [i](#)

There are no such residues in this entry.