



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 5, 2025 – 02:06 PM EST

PDB ID : 9MXI
Title : Crystal Structure of synthetic antibody, COP-2, in complex with the C-terminal domain of Clostridium perfringens Enterotoxin
Authors : Ogbu, C.P.; Kapoor, S.; Vecchio, A.J.
Deposited on : 2025-01-20
Resolution : 2.20 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 : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.21
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.004 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.40

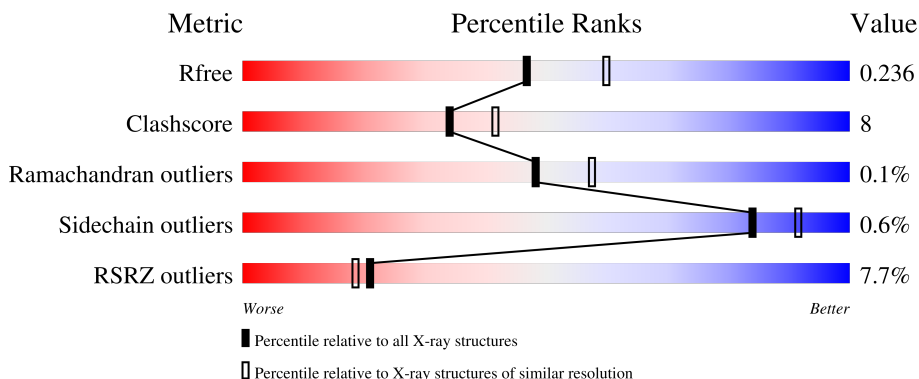
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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.



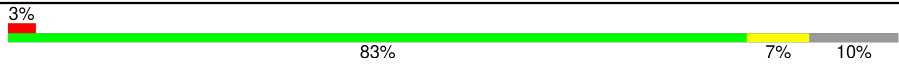
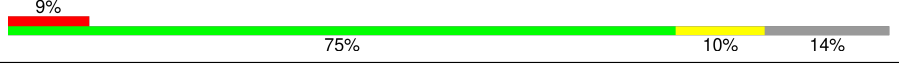
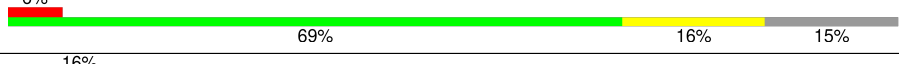

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	5791 (2.20-2.20)
Clashscore	180529	6634 (2.20-2.20)
Ramachandran outliers	177936	6560 (2.20-2.20)
Sidechain outliers	177891	6561 (2.20-2.20)
RSRZ outliers	164620	5791 (2.20-2.20)

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	B	239	
1	D	239	
1	F	239	
2	G	134	
2	H	134	

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Mol	Chain	Length	Quality of chain
2	I	134	
3	A	260	
3	C	260	
3	E	260	

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 13393 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 COP-2 antibody light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	213	Total 1633	C 1022	N 274	O 332	S 5	0	0	0
1	D	212	Total 1627	C 1019	N 273	O 330	S 5	0	0	0
1	F	201	Total 1532	C 953	N 261	O 312	S 6	0	2	0

- Molecule 2 is a protein called Heat-labile enterotoxin B chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	G	122	Total 968	C 618	N 162	O 187	S 1	0	0	0
2	H	122	Total 966	C 618	N 161	O 186	S 1	0	0	0
2	I	121	Total 961	C 613	N 161	O 186	S 1	0	0	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	191	MET	-	initiating methionine	UNP P01558
G	320	GLY	-	expression tag	UNP P01558
G	321	LEU	-	expression tag	UNP P01558
G	322	VAL	-	expression tag	UNP P01558
G	323	PRO	-	expression tag	UNP P01558
G	324	ARG	-	expression tag	UNP P01558
H	191	MET	-	initiating methionine	UNP P01558
H	320	GLY	-	expression tag	UNP P01558
H	321	LEU	-	expression tag	UNP P01558
H	322	VAL	-	expression tag	UNP P01558
H	323	PRO	-	expression tag	UNP P01558
H	324	ARG	-	expression tag	UNP P01558

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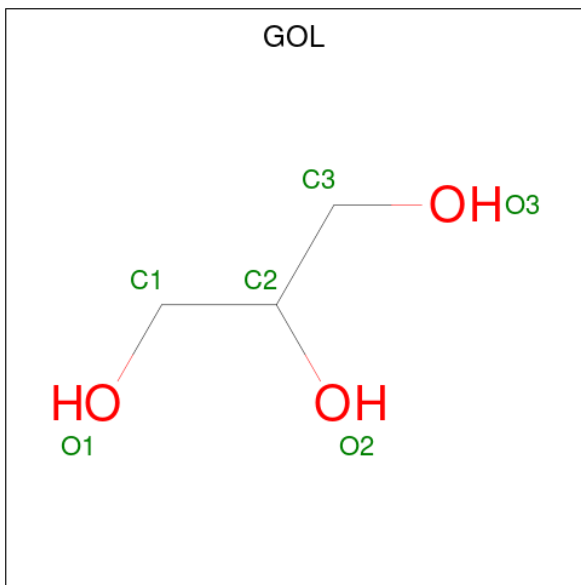
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Chain	Residue	Modelled	Actual	Comment	Reference
I	191	MET	-	initiating methionine	UNP P01558
I	320	GLY	-	expression tag	UNP P01558
I	321	LEU	-	expression tag	UNP P01558
I	322	VAL	-	expression tag	UNP P01558
I	323	PRO	-	expression tag	UNP P01558
I	324	ARG	-	expression tag	UNP P01558

- Molecule 3 is a protein called COP-2 antibody heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	223	Total	C	N	O	S	0	0	0
			1678	1062	277	334	5			
3	C	222	Total	C	N	O	S	0	1	0
			1677	1063	277	331	6			
3	E	223	Total	C	N	O	S	0	2	0
			1683	1063	279	336	5			

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	D	1	Total	C	O	0	0
			6	3	3		
4	I	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	A	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	E	1	Total	C	O	0	0
			6	3	3		
4	E	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		
4	F	1	Total	C	O	0	0
			6	3	3		

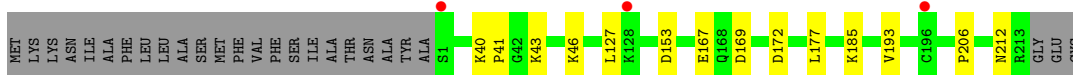
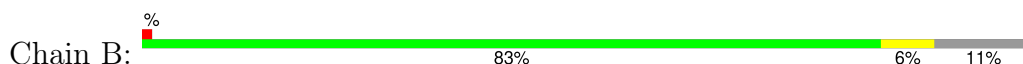
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	81	Total	O	0	0
			81	81		
5	D	82	Total	O	0	0
			82	82		
5	G	61	Total	O	0	0
			61	61		
5	H	50	Total	O	0	0
			50	50		
5	I	57	Total	O	0	0
			57	57		
5	A	67	Total	O	0	0
			67	67		
5	C	49	Total	O	0	0
			49	49		
5	E	70	Total	O	0	0
			70	70		
5	F	79	Total	O	0	0
			79	79		

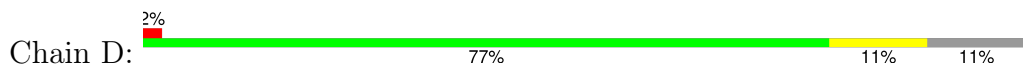
3 Residue-property plots [i](#)

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.

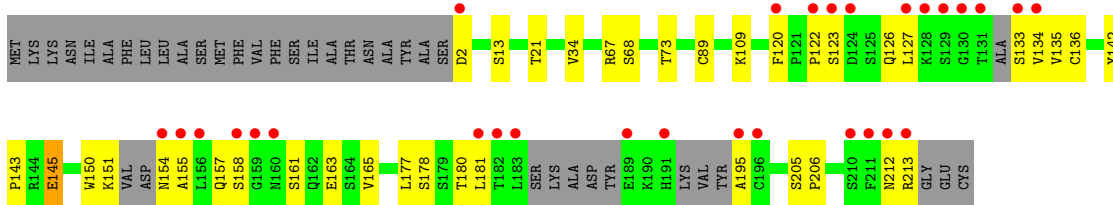
- Molecule 1: COP-2 antibody light chain



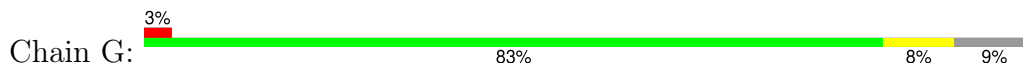
- Molecule 1: COP-2 antibody light chain



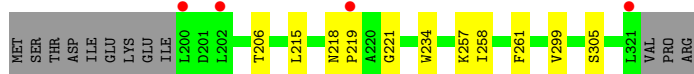
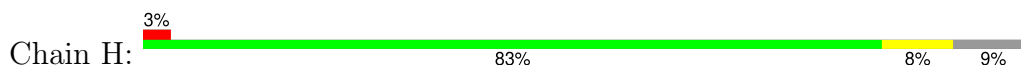
- Molecule 1: COP-2 antibody light chain



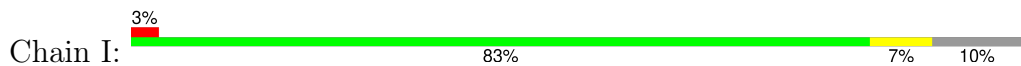
- Molecule 2: Heat-labile enterotoxin B chain



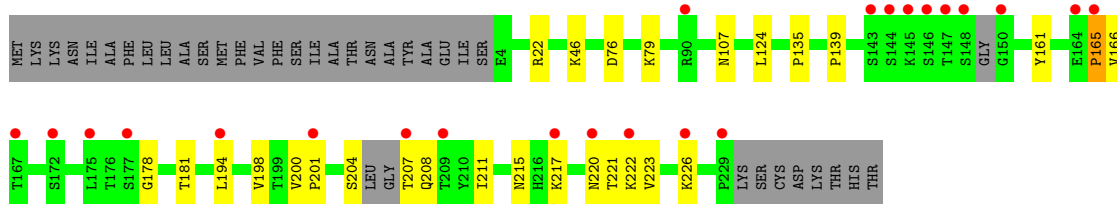
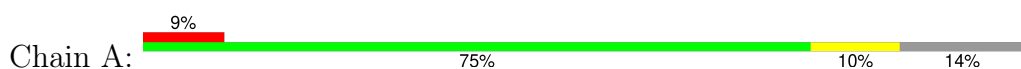
- Molecule 2: Heat-labile enterotoxin B chain



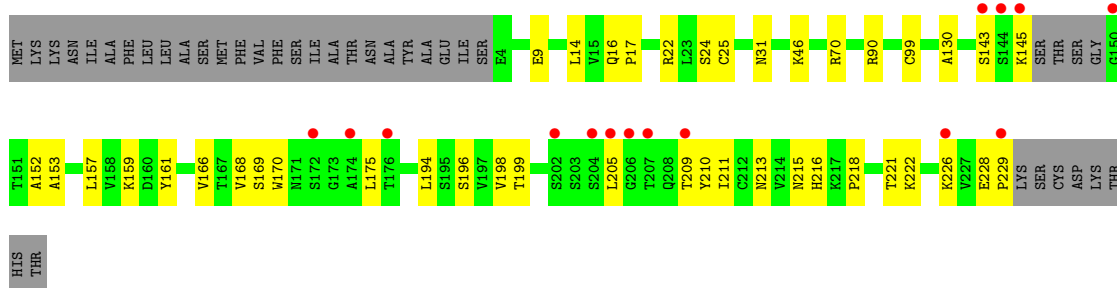
• Molecule 2: Heat-labile enterotoxin B chain



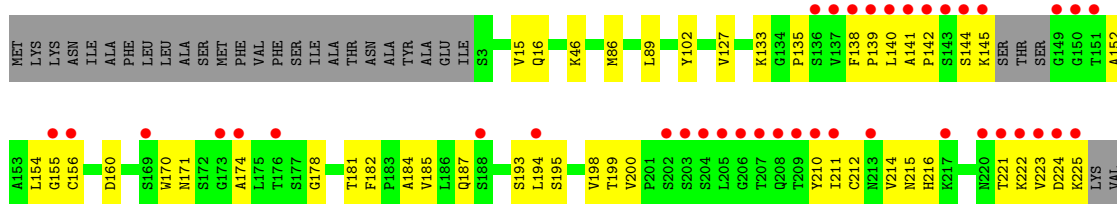
• Molecule 3: COP-2 antibody heavy chain



• Molecule 3: COP-2 antibody heavy chain



• Molecule 3: COP-2 antibody heavy chain



E228	●
P229	●
K230	●
SER	
CYS	
ASP	
LYS	
THR	
HIS	
THR	

4 Data and refinement statistics

Property	Value	Source
Space group	I 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	110.93Å 197.43Å 115.06Å 90.00° 109.54° 90.00°	Depositor
Resolution (Å)	29.66 – 2.20 29.66 – 2.20	Depositor EDS
% Data completeness (in resolution range)	96.9 (29.66-2.20) 96.8 (29.66-2.20)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.63 (at 2.20Å)	Xtrriage
Refinement program	PHENIX (1.13_2998: ???)	Depositor
R, R_{free}	0.182 , 0.233 0.189 , 0.236	Depositor DCC
R_{free} test set	6101 reflections (5.18%)	wwPDB-VP
Wilson B-factor (Å ²)	27.1	Xtrriage
Anisotropy	0.245	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 55.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.015 for l,-k,h	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	13393	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.25% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	B	0.34	0/1669	0.52	0/2268
1	D	0.35	0/1663	0.53	0/2260
1	F	0.36	0/1561	0.54	0/2113
2	G	0.35	0/989	0.51	0/1345
2	H	0.32	0/987	0.50	0/1342
2	I	0.35	0/982	0.54	0/1335
3	A	0.37	0/1722	0.57	0/2349
3	C	0.32	0/1722	0.52	0/2350
3	E	0.37	0/1727	0.57	0/2354
All	All	0.35	0/13022	0.54	0/17716

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1633	0	1591	9	0
1	D	1627	0	1583	19	0
1	F	1532	0	1469	37	0
2	G	968	0	945	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	H	966	0	943	8	0
2	I	961	0	936	8	0
3	A	1678	0	1609	22	0
3	C	1677	0	1611	42	0
3	E	1683	0	1604	46	0
4	A	12	0	16	0	0
4	B	12	0	16	1	0
4	C	6	0	8	0	0
4	D	12	0	16	1	0
4	E	12	0	16	4	0
4	F	12	0	16	0	0
4	I	6	0	8	0	0
5	A	67	0	0	2	0
5	B	81	0	0	0	0
5	C	49	0	0	1	0
5	D	82	0	0	1	0
5	E	70	0	0	2	0
5	F	79	0	0	1	0
5	G	61	0	0	1	0
5	H	50	0	0	1	0
5	I	57	0	0	0	0
All	All	13393	0	12387	189	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 8.

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)
3:E:144:SER:CB	3:E:230:LYS:HE3	1.74	1.16
2:I:223:LEU:HD11	2:I:315:LEU:HD11	1.27	1.11
3:E:144:SER:HB3	3:E:230:LYS:HE3	1.37	1.01
3:E:139:PRO:HG3	3:E:225:LYS:HD3	1.52	0.92
3:A:124:LEU:HD23	3:A:165:PRO:HD3	1.53	0.90
1:F:122:PRO:HD3	1:F:134:VAL:HG22	1.58	0.83
3:C:211:ILE:HD13	3:C:226:LYS:HA	1.60	0.83
3:C:145:LYS:HG2	3:C:153:ALA:H	1.42	0.81
1:B:153:ASP:HA	1:B:193:VAL:HG22	1.61	0.81
3:E:194:LEU:HD11	5:E:437:HOH:O	1.81	0.79
2:I:223:LEU:HD11	2:I:315:LEU:CD1	2.12	0.79
1:F:120:PHE:O	1:F:134:VAL:HG13	1.83	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:204:SER:HB3	3:A:208:GLN:H	1.48	0.78
3:E:142:PRO:HB3	3:E:154:LEU:HB3	1.67	0.76
3:C:16:GLN:HG2	3:C:17:PRO:HD2	1.67	0.74
3:A:211:ILE:CG2	3:A:226:LYS:HG2	2.19	0.73
3:A:204:SER:HB2	3:A:207:THR:HG23	1.70	0.72
3:C:143:SER:H	3:C:145:LYS:HE2	1.53	0.72
1:D:118:PHE:HD2	3:C:145:LYS:HG3	1.53	0.72
1:F:163:GLU:OE2	1:F:177:LEU:HD11	1.91	0.71
1:D:118:PHE:CD2	3:C:145:LYS:HG3	2.26	0.70
3:E:171:ASN:HA	3:E:211:ILE:HG12	1.74	0.69
3:E:144:SER:CB	3:E:230:LYS:CE	2.65	0.67
3:C:205:LEU:HD22	3:C:229:PRO:HG3	1.76	0.66
2:H:215:LEU:O	2:H:221:GLY:HA2	1.96	0.66
3:C:228:GLU:HG3	3:C:229:PRO:HD2	1.76	0.66
1:F:212:ASN:O	1:F:213:ARG:HB2	1.96	0.66
1:B:193:VAL:HG12	1:B:212:ASN:OD1	1.96	0.65
3:A:211:ILE:HG21	3:A:226:LYS:HG2	1.79	0.65
3:C:145:LYS:CB	3:C:152:ALA:HA	2.27	0.65
2:G:263:ILE:HD12	2:G:297:VAL:O	1.96	0.65
3:A:211:ILE:HG22	3:A:226:LYS:HA	1.79	0.65
1:D:28:GLN:NE2	5:D:401:HOH:O	2.28	0.63
1:F:122:PRO:HD3	1:F:134:VAL:CG2	2.29	0.62
1:D:206:PRO:HD3	3:E:46:LYS:HE2	1.82	0.61
2:G:227:ARG:HH21	2:G:311:PRO:HG3	1.66	0.61
1:F:34:VAL:HG13	1:F:89[A]:CYS:SG	2.41	0.61
3:C:215:ASN:OD1	3:C:222:LYS:HG2	2.01	0.61
3:E:144:SER:OG	3:E:230:LYS:HE3	2.01	0.61
1:D:192:LYS:O	1:D:212:ASN:HA	2.02	0.60
2:G:202:LEU:HD23	5:G:442:HOH:O	2.00	0.60
2:I:223:LEU:CD1	2:I:315:LEU:HD11	2.18	0.60
3:C:145:LYS:HD2	3:C:145:LYS:N	2.17	0.60
1:D:126:GLN:HG2	1:D:131:THR:O	2.02	0.59
1:D:180:THR:HG22	1:D:182:THR:HG23	1.85	0.59
3:E:139:PRO:HD2	1:F:123:SER:CB	2.32	0.59
3:A:207:THR:OG1	3:A:208:GLN:N	2.34	0.59
1:D:127:LEU:O	1:D:185:LYS:HD3	2.03	0.58
1:F:151:LYS:HA	1:F:155:ALA:O	2.02	0.58
3:E:221:THR:CG2	3:E:223:VAL:HG23	2.33	0.58
2:H:218:ASN:HB3	5:H:410:HOH:O	2.03	0.58
3:A:211:ILE:HG22	3:A:226:LYS:HG2	1.87	0.57
3:E:139:PRO:HD2	1:F:123:SER:OG	2.03	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:14:LEU:HD21	3:C:130:ALA:O	2.05	0.57
3:C:145:LYS:HB3	3:C:152:ALA:HA	1.88	0.56
1:F:155:ALA:O	1:F:157:GLN:NE2	2.39	0.56
3:A:107:ASN:HB3	5:A:418:HOH:O	2.06	0.56
3:E:171:ASN:HB2	3:E:174:ALA:HB3	1.88	0.56
3:C:16:GLN:HG2	3:C:17:PRO:CD	2.36	0.55
4:B:301:GOL:H12	3:A:139:PRO:HG3	1.88	0.55
3:E:185:VAL:HG13	4:E:302:GOL:H12	1.89	0.55
2:G:269:ASN:OD1	2:H:206:THR:HG21	2.06	0.55
3:A:220:ASN:OD1	3:A:222:LYS:NZ	2.37	0.54
2:G:267:ASN:HD21	4:E:301:GOL:H11	1.72	0.54
3:C:221:THR:O	3:C:222:LYS:HG3	2.08	0.54
3:C:70:ARG:HD3	3:C:90:ARG:HH21	1.71	0.54
3:E:144:SER:OG	3:E:230:LYS:CE	2.54	0.54
1:D:188:TYR:HA	1:D:194:TYR:OH	2.08	0.54
3:E:221:THR:HG22	3:E:223:VAL:HG23	1.89	0.54
3:C:145:LYS:HB2	3:C:152:ALA:HA	1.89	0.54
1:F:13:SER:HB3	1:F:109:LYS:HD2	1.89	0.53
1:F:145:GLU:H	1:F:145:GLU:CD	2.12	0.53
1:D:38:GLN:HB2	1:D:48:LEU:HD11	1.89	0.53
3:A:204:SER:HB2	3:A:207:THR:CG2	2.39	0.53
3:C:226:LYS:HE3	3:C:228:GLU:HB2	1.90	0.52
2:G:258:ILE:HG22	2:G:258:ILE:O	2.08	0.52
3:E:152:ALA:O	3:E:199:THR:HA	2.09	0.52
3:C:210:TYR:H	3:C:226:LYS:HZ3	1.58	0.52
3:E:144:SER:HB3	3:E:230:LYS:CE	2.26	0.52
3:C:210:TYR:H	3:C:226:LYS:NZ	2.08	0.51
1:B:41:PRO:HB3	1:B:167:GLU:HG3	1.91	0.51
2:I:223:LEU:HD13	2:I:317:GLN:CG	2.41	0.51
3:E:144:SER:HB2	3:E:230:LYS:HE3	1.84	0.51
3:A:200:VAL:HB	3:A:201:PRO:HD2	1.93	0.50
3:A:135:PRO:HB3	3:A:161:TYR:HB3	1.93	0.50
3:C:194:LEU:C	3:C:194:LEU:HD12	2.32	0.50
3:E:86:MET:HB3	3:E:89:LEU:HD21	1.94	0.50
1:D:190:LYS:HG2	1:D:190:LYS:O	2.11	0.50
3:C:157:LEU:HG	3:C:159:LYS:HG3	1.93	0.50
3:C:161:TYR:CE2	3:C:166:VAL:HG23	2.46	0.50
3:E:195:SER:OG	4:E:302:GOL:H31	2.11	0.50
1:F:120:PHE:HB2	1:F:135:VAL:HG22	1.94	0.50
3:C:25:CYS:SG	3:C:99[B]:CYS:SG	3.10	0.49
3:C:143:SER:H	3:C:145:LYS:CE	2.23	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:211:ILE:HD13	3:C:226:LYS:CA	2.39	0.49
3:E:16:GLN:HG2	5:E:403:HOH:O	2.11	0.49
1:D:122:PRO:HD3	1:D:134:VAL:HG22	1.94	0.49
1:F:151:LYS:O	1:F:195:ALA:N	2.44	0.49
3:C:205:LEU:CD2	3:C:229:PRO:HG3	2.43	0.49
1:B:127:LEU:HD22	1:B:185:LYS:HG3	1.93	0.49
3:A:181:THR:HG23	3:A:194:LEU:HD21	1.94	0.49
3:E:140:LEU:O	3:E:142:PRO:HD3	2.12	0.49
1:D:147:LYS:HD2	1:D:199:THR:HB	1.94	0.49
3:C:175:LEU:HD21	3:C:198:VAL:HG21	1.95	0.49
3:E:221:THR:C	3:E:222:LYS:HD2	2.33	0.48
1:F:133:SER:HA	1:F:181:LEU:O	2.13	0.48
3:A:46:LYS:HD2	1:F:205:SER:CB	2.44	0.48
3:A:76:ASP:OD2	3:A:79:LYS:HD2	2.14	0.48
3:C:25:CYS:SG	3:C:99[B]:CYS:HB3	2.52	0.48
3:E:15:VAL:O	3:E:127:VAL:HA	2.13	0.48
3:E:138:PHE:CG	1:F:126:GLN:HB2	2.48	0.48
1:F:163:GLU:HA	1:F:178:SER:O	2.14	0.48
2:H:257:LYS:HG3	2:H:258:ILE:HG23	1.96	0.48
1:F:145:GLU:OE1	1:F:145:GLU:N	2.43	0.48
1:B:43:LYS:NZ	1:B:46:LYS:HE2	2.29	0.48
3:C:169:SER:HB3	3:C:213:ASN:HB2	1.96	0.48
1:F:134:VAL:N	1:F:181:LEU:O	2.38	0.48
2:I:227:ARG:NH1	2:I:227:ARG:HB2	2.29	0.47
1:D:40:LYS:HB3	1:D:41:PRO:HD2	1.96	0.47
1:F:67:ARG:HG2	1:F:68:SER:N	2.29	0.47
3:C:170:TRP:HB3	3:C:175:LEU:HD23	1.96	0.47
1:F:13:SER:OG	1:F:109:LYS:HG3	2.14	0.46
3:E:221:THR:O	3:E:222:LYS:HD2	2.15	0.46
3:A:46:LYS:HD2	1:F:205:SER:HB3	1.97	0.46
3:C:228:GLU:CG	3:C:229:PRO:HD2	2.43	0.46
1:F:2:ASP:N	5:F:403:HOH:O	2.48	0.45
3:E:140:LEU:HB2	3:E:155:GLY:O	2.16	0.45
3:E:144:SER:OG	3:E:230:LYS:NZ	2.48	0.45
3:E:178:GLY:O	3:E:198:VAL:HA	2.16	0.45
3:E:184:ALA:HB2	3:E:194:LEU:HD12	1.98	0.45
3:E:187:GLN:NE2	3:E:193:SER:HB2	2.31	0.45
3:C:216:HIS:CD2	3:C:218:PRO:HD2	2.51	0.45
3:E:181:THR:HG23	3:E:194:LEU:HD21	1.98	0.45
1:F:21:THR:HG23	1:F:73:THR:CG2	2.46	0.45
1:F:205:SER:HB2	1:F:206:PRO:HD2	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:168:VAL:HG11	3:C:196:SER:CB	2.46	0.45
3:E:133:LYS:HD2	3:E:160:ASP:O	2.17	0.45
2:I:283:LYS:HB2	2:I:283:LYS:HE3	1.66	0.45
3:A:215:ASN:OD1	3:A:217:LYS:HD2	2.17	0.45
3:A:178:GLY:O	3:A:198:VAL:HA	2.17	0.45
3:E:214:VAL:HG12	3:E:215:ASN:N	2.33	0.44
3:E:141:ALA:O	1:F:120:PHE:HD1	1.99	0.44
3:C:209:THR:HA	3:C:226:LYS:HZ3	1.83	0.44
3:C:211:ILE:CD1	3:C:226:LYS:HB2	2.48	0.44
1:F:120:PHE:HB2	1:F:135:VAL:CG2	2.48	0.44
3:E:135:PRO:HG3	3:E:216:HIS:HB2	1.99	0.44
3:E:224:ASP:O	3:E:225:LYS:HB2	2.18	0.44
1:F:157:GLN:O	1:F:158:SER:HB2	2.18	0.44
1:F:120:PHE:HD2	1:F:135:VAL:HG23	1.83	0.43
3:E:171:ASN:HA	3:E:211:ILE:CG1	2.46	0.43
2:H:261:PHE:HA	2:H:299:VAL:O	2.18	0.43
1:F:161:SER:HA	1:F:180:THR:O	2.18	0.43
1:F:165:VAL:HG22	1:F:177:LEU:HD12	2.01	0.43
1:B:169:ASP:HB3	1:B:172:ASP:OD1	2.18	0.43
1:B:206:PRO:HD3	3:C:46:LYS:HE2	2.00	0.43
3:E:182:PHE:O	3:E:194:LEU:HG	2.18	0.43
1:B:177:LEU:C	1:B:177:LEU:HD23	2.38	0.43
3:C:9:GLU:HA	3:C:24:SER:O	2.18	0.43
3:E:152:ALA:N	3:E:200:VAL:O	2.49	0.43
3:E:154:LEU:HD12	3:E:154:LEU:O	2.18	0.43
1:B:40:LYS:HB2	1:B:43:LYS:HE3	2.00	0.42
3:C:22:ARG:NH1	5:C:403:HOH:O	2.41	0.42
3:E:145:LYS:HE2	3:E:145:LYS:HB3	1.74	0.42
3:E:171:ASN:CB	3:E:174:ALA:HB3	2.48	0.42
1:D:161:SER:HA	1:D:180:THR:O	2.19	0.42
3:E:200:VAL:HG21	3:E:210:TYR:CE2	2.55	0.42
1:F:142:TYR:CG	1:F:143:PRO:HA	2.55	0.42
4:E:302:GOL:H32	1:F:178:SER:HB3	2.02	0.42
1:F:136:CYS:HB2	1:F:150:TRP:CZ2	2.54	0.42
2:G:274:LEU:O	2:G:275:GLU:HG2	2.19	0.42
2:I:214:ALA:HB1	2:I:224:TYR:CD2	2.55	0.42
3:C:152:ALA:O	3:C:199:THR:HA	2.20	0.42
1:F:123:SER:O	1:F:127:LEU:HG	2.20	0.42
1:D:111:THR:OG1	4:D:301:GOL:H32	2.20	0.41
2:H:234:TRP:CD2	2:H:305:SER:HA	2.55	0.41
3:C:221:THR:C	3:C:222:LYS:HG3	2.40	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:86:THR:OG1	1:D:105:LYS:HE2	2.21	0.41
1:F:213:ARG:HD3	1:F:213:ARG:HA	1.92	0.41
1:D:194:TYR:HB2	1:D:211:PHE:CE1	2.56	0.41
2:H:218:ASN:OD1	2:H:219:PRO:HD2	2.21	0.41
2:G:201:ASP:N	2:G:201:ASP:OD1	2.54	0.40
2:G:258:ILE:O	2:G:258:ILE:CG2	2.69	0.40
3:E:170:TRP:HA	3:E:211:ILE:O	2.21	0.40
3:A:22:ARG:NE	5:A:405:HOH:O	2.43	0.40
3:A:221:THR:CG2	3:A:223:VAL:HG23	2.51	0.40
1:D:147:LYS:HD2	1:D:199:THR:CG2	2.51	0.40
2:H:218:ASN:O	2:H:221:GLY:N	2.53	0.40
2:I:257:LYS:HD2	2:I:281:GLY:O	2.22	0.40
3:C:143:SER:N	3:C:145:LYS:HE2	2.31	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	B	211/239 (88%)	205 (97%)	6 (3%)	0	100	100
1	D	210/239 (88%)	207 (99%)	3 (1%)	0	100	100
1	F	193/239 (81%)	189 (98%)	4 (2%)	0	100	100
2	G	120/134 (90%)	120 (100%)	0	0	100	100
2	H	120/134 (90%)	119 (99%)	1 (1%)	0	100	100
2	I	119/134 (89%)	117 (98%)	2 (2%)	0	100	100
3	A	217/260 (84%)	209 (96%)	7 (3%)	1 (0%)	25	28
3	C	219/260 (84%)	213 (97%)	6 (3%)	0	100	100
3	E	219/260 (84%)	209 (95%)	9 (4%)	1 (0%)	25	28
All	All	1628/1899 (86%)	1588 (98%)	38 (2%)	2 (0%)	48	57

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	E	229	PRO
3	A	165	PRO

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	B	188/208 (90%)	188 (100%)	0	100	100
1	D	187/208 (90%)	187 (100%)	0	100	100
1	F	175/208 (84%)	173 (99%)	2 (1%)	70	82
2	G	106/118 (90%)	106 (100%)	0	100	100
2	H	105/118 (89%)	105 (100%)	0	100	100
2	I	105/118 (89%)	104 (99%)	1 (1%)	73	84
3	A	188/218 (86%)	187 (100%)	1 (0%)	86	93
3	C	187/218 (86%)	186 (100%)	1 (0%)	86	93
3	E	187/218 (86%)	184 (98%)	3 (2%)	58	73
All	All	1428/1632 (88%)	1420 (99%)	8 (1%)	84	91

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	I	275	GLU
3	A	166	VAL
3	C	31	ASN
3	E	102	TYR
3	E	156	CYS
3	E	212	CYS
1	F	145	GLU
1	F	154	ASN

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

Mol	Chain	Res	Type
2	I	269	ASN
3	C	180	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

12 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	$\# Z > 2$
4	GOL	D	301	-	5,5,5	0.07	0	5,5,5	0.35	0
4	GOL	A	301	-	5,5,5	0.08	0	5,5,5	0.26	0
4	GOL	E	301	-	5,5,5	0.12	0	5,5,5	0.28	0
4	GOL	B	301	-	5,5,5	0.09	0	5,5,5	0.26	0
4	GOL	I	401	-	5,5,5	0.07	0	5,5,5	0.20	0
4	GOL	D	302	-	5,5,5	0.08	0	5,5,5	0.25	0
4	GOL	E	302	-	5,5,5	0.94	0	5,5,5	1.04	0
4	GOL	F	302	-	5,5,5	0.08	0	5,5,5	0.28	0
4	GOL	A	302	-	5,5,5	0.08	0	5,5,5	0.24	0
4	GOL	C	301	-	5,5,5	0.07	0	5,5,5	0.31	0
4	GOL	F	301	-	5,5,5	0.10	0	5,5,5	0.35	0
4	GOL	B	302	-	5,5,5	0.08	0	5,5,5	0.39	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GOL	D	301	-	-	0/4/4/4	-
4	GOL	A	301	-	-	0/4/4/4	-
4	GOL	E	301	-	-	0/4/4/4	-
4	GOL	B	301	-	-	0/4/4/4	-
4	GOL	I	401	-	-	0/4/4/4	-
4	GOL	D	302	-	-	0/4/4/4	-
4	GOL	E	302	-	-	0/4/4/4	-
4	GOL	F	302	-	-	3/4/4/4	-
4	GOL	A	302	-	-	0/4/4/4	-
4	GOL	C	301	-	-	0/4/4/4	-
4	GOL	F	301	-	-	0/4/4/4	-
4	GOL	B	302	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	F	302	GOL	C1-C2-C3-O3
4	F	302	GOL	O1-C1-C2-O2
4	F	302	GOL	O2-C2-C3-O3

There are no ring outliers.

4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	301	GOL	1	0
4	E	301	GOL	1	0
4	B	301	GOL	1	0
4	E	302	GOL	3	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

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	B	213/239 (89%)	-0.18	3 (1%) 73 70	14, 36, 72, 97	0
1	D	212/239 (88%)	-0.17	4 (1%) 66 62	16, 35, 70, 90	0
1	F	201/239 (84%)	0.26	29 (14%) 7 6	9, 36, 91, 115	2 (0%)
2	G	122/134 (91%)	-0.48	4 (3%) 49 46	15, 28, 52, 95	0
2	H	122/134 (91%)	-0.31	4 (3%) 49 46	17, 33, 60, 80	0
2	I	121/134 (90%)	-0.37	4 (3%) 49 46	18, 31, 57, 84	0
3	A	223/260 (85%)	0.26	23 (10%) 13 11	13, 41, 97, 154	0
3	C	222/260 (85%)	0.33	15 (6%) 25 22	13, 48, 97, 128	1 (0%)
3	E	223/260 (85%)	0.56	42 (18%) 4 3	11, 42, 114, 150	2 (0%)
All	All	1659/1899 (87%)	0.06	128 (7%) 21 18	9, 37, 91, 154	5 (0%)

All (128) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	A	164	GLU	5.5
3	E	139	PRO	4.9
3	E	229	PRO	4.9
3	E	208	GLN	4.8
2	G	202	LEU	4.8
3	E	207	THR	4.7
3	E	145	LYS	4.7
1	F	131	THR	4.7
3	E	137	VAL	4.7
3	E	209	THR	4.6
1	F	189	GLU	4.5
3	E	225	LYS	4.5
3	E	206	GLY	4.5
1	F	154	ASN	4.4
3	E	138	PHE	4.4

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Mol	Chain	Res	Type	RSRZ
3	E	223	VAL	4.3
3	E	210	TYR	4.3
3	C	144	SER	4.3
1	F	183	LEU	4.2
3	E	230	LYS	4.2
3	A	147	THR	4.2
3	E	211	ILE	4.1
3	E	149	GLY	3.7
3	E	143	SER	3.7
1	F	211	PHE	3.7
1	F	212	ASN	3.6
1	D	2	ASP	3.6
3	A	207	THR	3.6
2	G	322	VAL	3.6
1	F	182	THR	3.5
3	C	205	LEU	3.5
3	A	165	PRO	3.5
3	A	229	PRO	3.5
1	F	158	SER	3.5
1	F	195	ALA	3.5
1	F	129	SER	3.4
1	F	191	HIS	3.4
3	A	145	LYS	3.4
1	F	213	ARG	3.4
3	C	209	THR	3.4
3	A	146	SER	3.3
3	A	150	GLY	3.3
1	F	160	ASN	3.3
1	F	2	ASP	3.3
3	C	207	THR	3.3
3	C	229	PRO	3.3
3	E	221	THR	3.2
3	E	205	LEU	3.2
1	D	68	SER	3.2
2	G	201	ASP	3.1
3	E	150	GLY	3.1
1	F	127	LEU	3.1
3	C	176	THR	3.1
2	I	321	LEU	3.1
1	F	124	ASP	3.1
3	E	136	SER	3.0
3	E	144	SER	3.0

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Mol	Chain	Res	Type	RSRZ
1	F	123	SER	3.0
1	F	156	LEU	3.0
3	E	151	THR	2.9
3	A	209	THR	2.9
3	C	172	SER	2.9
3	E	176	THR	2.8
1	F	120	PHE	2.8
3	A	175	LEU	2.8
1	F	155	ALA	2.8
3	E	174	ALA	2.8
1	F	128	LYS	2.8
3	E	224	ASP	2.7
1	D	3	ILE	2.7
3	C	150	GLY	2.7
3	E	203	SER	2.6
1	F	122	PRO	2.6
3	A	201	PRO	2.6
3	C	143	SER	2.6
3	E	204	SER	2.6
3	C	206	GLY	2.5
3	E	194	LEU	2.5
1	F	134	VAL	2.5
2	H	219	PRO	2.5
3	E	141	ALA	2.5
3	E	202	SER	2.5
2	H	202	LEU	2.5
3	A	172	SER	2.4
3	E	156	CYS	2.4
2	I	202	LEU	2.4
3	A	143	SER	2.4
3	A	148	SER	2.4
3	E	217	LYS	2.4
2	H	321	LEU	2.4
3	A	194	LEU	2.4
2	G	292	ASP	2.4
1	F	181	LEU	2.3
3	C	174	ALA	2.3
3	E	220	ASN	2.3
3	E	228	GLU	2.3
1	F	196	CYS	2.3
3	E	155	GLY	2.3
1	B	128	LYS	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	1	SER	2.3
3	C	202	SER	2.3
3	E	188	SER	2.3
3	A	167	THR	2.2
1	D	192	LYS	2.2
3	A	177	SER	2.2
3	A	222	LYS	2.2
3	A	226	LYS	2.2
3	E	222	LYS	2.2
2	H	200	LEU	2.2
3	A	220	ASN	2.2
3	E	213	ASN	2.1
3	A	217	LYS	2.1
3	C	226	LYS	2.1
1	F	133	SER	2.1
3	E	169	SER	2.1
3	C	145	LYS	2.1
1	F	130	GLY	2.1
1	F	210	SER	2.1
1	B	196	CYS	2.1
3	A	144	SER	2.1
3	E	140	LEU	2.1
2	I	203	ALA	2.1
3	A	90	ARG	2.0
3	E	173	GLY	2.0
1	F	159	GLY	2.0
2	I	201	ASP	2.0
3	C	204	SER	2.0
3	E	142	PRO	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 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(Å ²)	Q<0.9
4	GOL	F	302	6/6	0.60	0.31	20,20,20,20	0
4	GOL	B	301	6/6	0.73	0.17	72,74,75,75	0
4	GOL	C	301	6/6	0.77	0.22	43,55,69,75	0
4	GOL	F	301	6/6	0.78	0.19	56,66,71,73	0
4	GOL	D	302	6/6	0.78	0.14	69,80,81,82	0
4	GOL	E	301	6/6	0.79	0.23	45,55,66,68	0
4	GOL	A	301	6/6	0.79	0.26	63,80,85,86	0
4	GOL	D	301	6/6	0.79	0.21	52,71,74,76	0
4	GOL	I	401	6/6	0.81	0.24	64,66,68,70	0
4	GOL	A	302	6/6	0.83	0.23	55,64,71,80	0
4	GOL	E	302	6/6	0.87	0.23	71,91,97,97	0
4	GOL	B	302	6/6	0.89	0.18	43,55,58,59	0

6.5 Other polymers [i](#)

There are no such residues in this entry.