



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 7, 2026 – 03:58 AM UTC

PDB ID : 5AQQ / pdb_00005aqq
Title : Fragment-based screening of HSP70 sheds light on the functional role of ATP-binding site residues
Authors : Jones, A.M.; Westwood, I.M.; Osborne, J.D.; Matthews, T.P.; Cheeseman, M.D.; Rowlands, M.G.; Jeganathan, F.; Burke, R.; Lee, D.; Kadi, N.; Liu, M.; Richards, M.; McAndrew, C.; Yahya, N.; Dobson, S.E.; Jones, K.; Workman, P.; Collins, I.; van Montfort, R.L.M.
Deposited on : 2015-09-22
Resolution : 2.72 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:

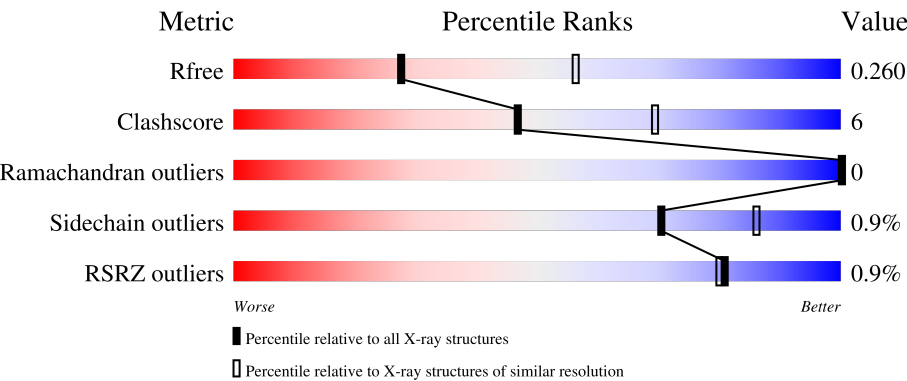
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)

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 2.72 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	4348 (2.74-2.70)
Clashscore	190562	4665 (2.74-2.70)
Ramachandran outliers	187476	4584 (2.74-2.70)
Sidechain outliers	187428	4585 (2.74-2.70)
RSRZ outliers	180081	4348 (2.74-2.70)

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	386	87%12%.
1	C	386	%90%9%.
1	E	386	%83%16%.
2	B	118	3%82%8%10%.

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Mol	Chain	Length	Quality of chain
2	D	118	3% 81% 10% 8%
2	F	118	% 80% 8% 12%

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 11141 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 HEAT SHOCK COGNATE 71 KDA PROTEIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	381	Total	C	N	O	S	0	0	0
			2882	1815	499	559	9			
1	C	382	Total	C	N	O	S	0	0	0
			2900	1823	506	562	9			
1	E	381	Total	C	N	O	S	0	0	0
			2827	1773	495	550	9			

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	GLY	-	expression tag	UNP P11142
A	-3	PRO	-	expression tag	UNP P11142
A	-2	LEU	-	expression tag	UNP P11142
A	-1	GLY	-	expression tag	UNP P11142
A	0	SER	-	expression tag	UNP P11142
C	-4	GLY	-	expression tag	UNP P11142
C	-3	PRO	-	expression tag	UNP P11142
C	-2	LEU	-	expression tag	UNP P11142
C	-1	GLY	-	expression tag	UNP P11142
C	0	SER	-	expression tag	UNP P11142
E	-4	GLY	-	expression tag	UNP P11142
E	-3	PRO	-	expression tag	UNP P11142
E	-2	LEU	-	expression tag	UNP P11142
E	-1	GLY	-	expression tag	UNP P11142
E	0	SER	-	expression tag	UNP P11142

- Molecule 2 is a protein called BAG FAMILY MOLECULAR CHAPERONE REGULATOR 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	106	Total	C	N	O	S	0	1	0
			806	513	133	156	4			

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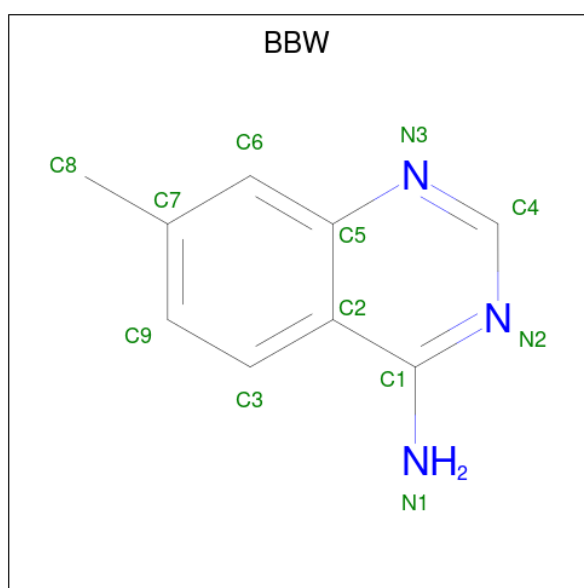
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	108	Total	C	N	O	S	0	0	0
			797	502	139	152	4			
2	F	104	Total	C	N	O	S	0	0	0
			797	502	133	158	4			

There are 15 discrepancies between the modelled and reference sequences:

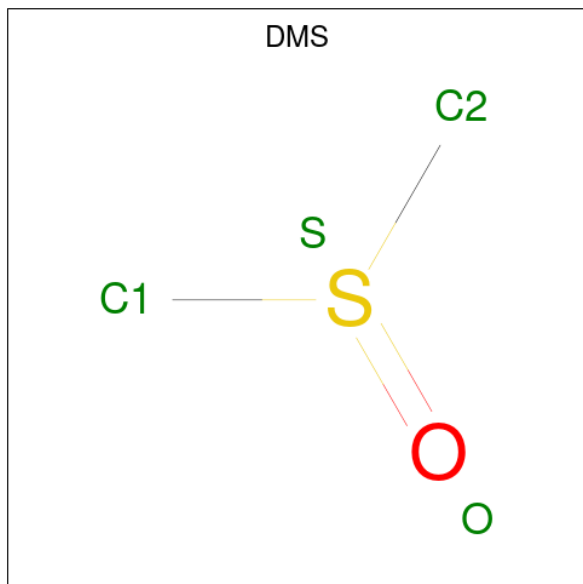
Chain	Residue	Modelled	Actual	Comment	Reference
B	146	GLY	-	expression tag	UNP Q99933
B	147	PRO	-	expression tag	UNP Q99933
B	148	LEU	-	expression tag	UNP Q99933
B	149	GLY	-	expression tag	UNP Q99933
B	150	SER	-	expression tag	UNP Q99933
D	146	GLY	-	expression tag	UNP Q99933
D	147	PRO	-	expression tag	UNP Q99933
D	148	LEU	-	expression tag	UNP Q99933
D	149	GLY	-	expression tag	UNP Q99933
D	150	SER	-	expression tag	UNP Q99933
F	146	GLY	-	expression tag	UNP Q99933
F	147	PRO	-	expression tag	UNP Q99933
F	148	LEU	-	expression tag	UNP Q99933
F	149	GLY	-	expression tag	UNP Q99933
F	150	SER	-	expression tag	UNP Q99933

- Molecule 3 is 7-methylquinazolin-4-amine (CCD ID: BBW) (formula: C₉H₉N₃).



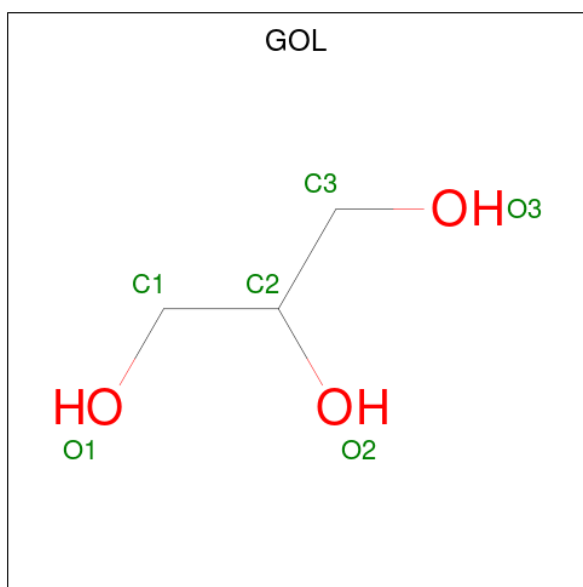
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	N	0	0
			12	9	3		
3	C	1	Total	C	N	0	0
			12	9	3		
3	E	1	Total	C	N	0	0
			12	9	3		

- Molecule 4 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C_2H_6OS).



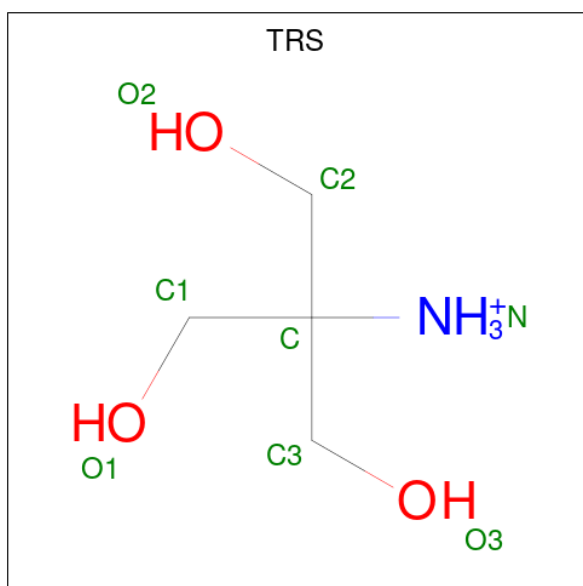
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	O	S	0	0
			4	2	1	1		
4	C	1	Total	C	O	S	0	0
			4	2	1	1		
4	E	1	Total	C	O	S	0	0
			4	2	1	1		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			6	3	3		
5	B	1	Total	C	O	0	0
			6	3	3		
5	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 6 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: TRS) (formula: $C_4H_{12}NO_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	O	0	0
			8	4	1	3		

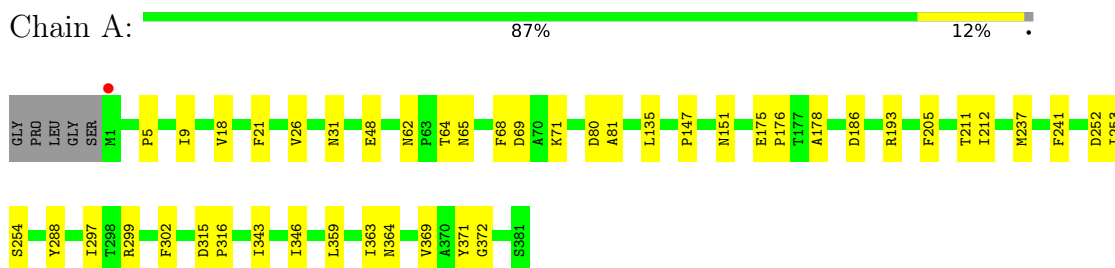
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	32	Total	O	0	0
			32	32		
7	B	3	Total	O	0	0
			3	3		
7	C	9	Total	O	0	0
			9	9		
7	D	1	Total	O	0	0
			1	1		
7	E	11	Total	O	0	0
			11	11		
7	F	2	Total	O	0	0
			2	2		

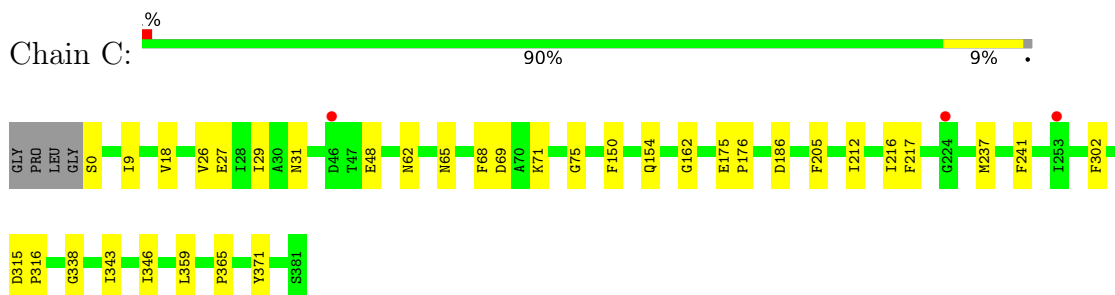
3 Residue-property plots [i](#)

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.

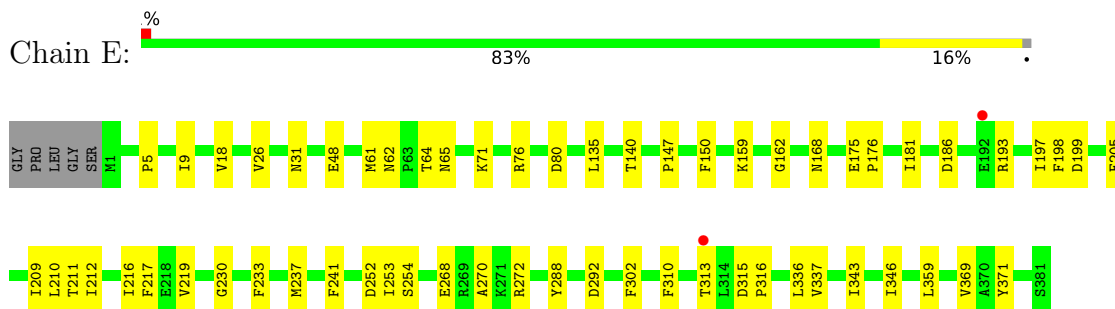
• Molecule 1: HEAT SHOCK COGNATE 71 KDA PROTEIN



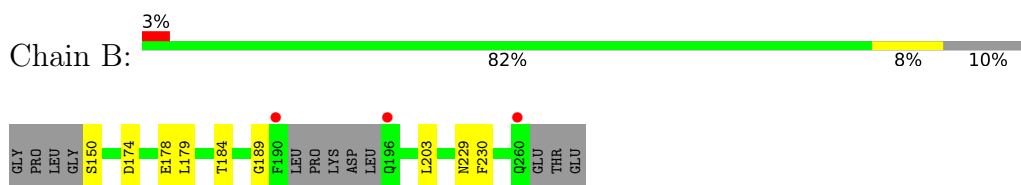
• Molecule 1: HEAT SHOCK COGNATE 71 KDA PROTEIN



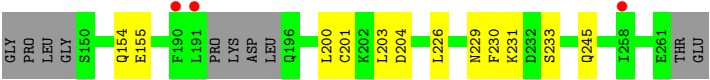
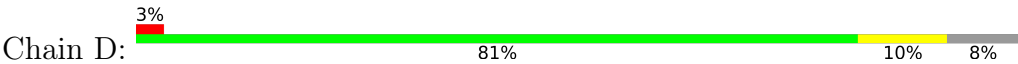
• Molecule 1: HEAT SHOCK COGNATE 71 KDA PROTEIN



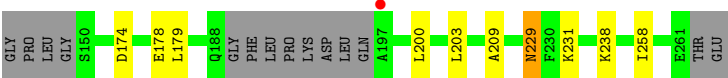
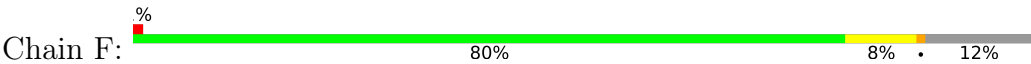
• Molecule 2: BAG FAMILY MOLECULAR CHAPERONE REGULATOR 1



● Molecule 2: BAG FAMILY MOLECULAR CHAPERONE REGULATOR 1



● Molecule 2: BAG FAMILY MOLECULAR CHAPERONE REGULATOR 1



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	233.43Å 41.33Å 205.51Å 90.00° 123.75° 90.00°	Depositor
Resolution (Å)	47.86 – 2.72 47.86 – 2.72	Depositor EDS
% Data completeness (in resolution range)	99.7 (47.86-2.72) 99.6 (47.86-2.72)	Depositor EDS
R_{merge}	0.25	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.56 (at 2.73Å)	Xtriage
Refinement program	BUSTER 2.10.2	Depositor
R, R_{free}	0.195 , 0.241 0.219 , 0.260	Depositor DCC
R_{free} test set	2204 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å ²)	40.5	Xtriage
Anisotropy	0.451	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 71.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.000 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	11141	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 16.73% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

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

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	0.80	0/2928	1.19	8/3965 (0.2%)
1	C	0.76	0/2946	1.21	9/3988 (0.2%)
1	E	0.75	0/2872	1.20	12/3898 (0.3%)
2	B	0.80	0/814	1.47	2/1096 (0.2%)
2	D	0.82	0/801	1.48	1/1079 (0.1%)
2	F	0.81	0/801	1.44	1/1078 (0.1%)
All	All	0.78	0/11162	1.26	33/15104 (0.2%)

There are no bond length outliers.

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	0	SER	CA-C-N	8.47	132.84	120.90
1	C	0	SER	C-N-CA	8.47	132.84	120.90
1	A	48	GLU	N-CA-C	6.24	116.31	108.45
1	E	48	GLU	N-CA-C	6.16	116.21	108.45
1	C	48	GLU	N-CA-C	5.91	115.90	108.45
1	C	162	GLY	CA-C-N	5.74	127.91	120.44
1	C	162	GLY	C-N-CA	5.74	127.91	120.44
1	E	64	THR	N-CA-C	5.62	117.48	111.36
1	A	64	THR	N-CA-C	5.61	117.48	111.36
1	C	31	ASN	CA-C-N	5.58	128.02	120.38
1	C	31	ASN	C-N-CA	5.58	128.02	120.38
1	E	31	ASN	CA-C-N	5.52	127.95	120.38
1	E	31	ASN	C-N-CA	5.52	127.95	120.38
1	A	31	ASN	CA-C-N	5.49	127.90	120.38
1	A	31	ASN	C-N-CA	5.49	127.90	120.38
1	A	151	ASN	CA-CB-CG	5.42	118.02	112.60
2	F	231	LYS	N-CA-C	5.37	117.14	111.28
1	E	181	ILE	CA-C-N	5.37	127.73	120.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	181	ILE	C-N-CA	5.37	127.73	120.38
2	B	184	THR	CA-C-N	5.28	125.96	119.99
2	B	184	THR	C-N-CA	5.28	125.96	119.99
1	E	302	PHE	CA-C-N	5.28	127.35	120.28
1	E	302	PHE	C-N-CA	5.28	127.35	120.28
2	D	231	LYS	N-CA-C	5.27	117.02	111.28
1	A	299	ARG	N-CA-C	-5.17	105.64	111.28
1	C	302	PHE	CA-C-N	5.16	127.19	120.28
1	C	302	PHE	C-N-CA	5.16	127.19	120.28
1	E	162	GLY	CA-C-N	5.12	127.10	120.44
1	E	162	GLY	C-N-CA	5.12	127.10	120.44
1	A	302	PHE	CA-C-N	5.05	127.05	120.28
1	A	302	PHE	C-N-CA	5.05	127.05	120.28
1	E	159	LYS	CA-C-N	5.03	127.02	120.28
1	E	159	LYS	C-N-CA	5.03	127.02	120.28

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	2882	0	2815	24	0
1	C	2900	0	2844	26	0
1	E	2827	0	2698	56	0
2	B	806	0	789	6	0
2	D	797	0	772	8	0
2	F	797	0	780	7	0
3	A	12	0	0	0	0
3	C	12	0	0	0	0
3	E	12	0	0	0	0
4	A	4	0	6	0	0
4	C	4	0	6	1	0
4	E	4	0	6	0	0
5	A	6	0	8	0	0
5	B	6	0	8	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	C	6	0	8	2	0
6	A	8	0	12	0	0
7	A	32	0	0	0	0
7	B	3	0	0	0	0
7	C	9	0	0	0	0
7	D	1	0	0	0	0
7	E	11	0	0	0	0
7	F	2	0	0	0	0
All	All	11141	0	10752	124	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 6.

All (124) 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:E:210:LEU:CD2	1:E:219:VAL:HA	1.90	1.02
1:E:212:ILE:HD13	1:E:217:PHE:CE2	2.14	0.82
1:E:210:LEU:HD23	1:E:219:VAL:HA	1.62	0.79
1:E:210:LEU:HD22	1:E:219:VAL:HA	1.67	0.76
1:E:175:GLU:N	1:E:176:PRO:HD2	2.04	0.73
1:A:175:GLU:N	1:A:176:PRO:HD2	2.05	0.72
2:F:179:LEU:HD23	2:F:203:LEU:HD22	1.72	0.69
1:C:18:VAL:HG13	1:C:29:ILE:HD13	1.74	0.69
2:B:189:GLY:HA2	2:D:154:GLN:HE21	1.59	0.68
1:A:315:ASP:HB2	1:A:316:PRO:HD3	1.76	0.66
1:E:292:ASP:OD1	2:F:238:LYS:NZ	2.27	0.66
1:E:212:ILE:HA	1:E:216:ILE:O	1.96	0.66
1:C:29:ILE:H	1:C:29:ILE:HD12	1.60	0.66
1:E:233:PHE:CE1	1:E:310:PHE:HE1	2.13	0.66
1:C:175:GLU:N	1:C:176:PRO:HD2	2.11	0.66
1:A:205:PHE:HE2	1:A:316:PRO:HG2	1.60	0.65
1:C:9:ILE:HG12	1:C:18:VAL:HG23	1.78	0.65
1:C:315:ASP:HB2	1:C:316:PRO:HD3	1.78	0.65
2:D:155:GLU:HG3	2:D:230:PHE:CG	2.31	0.65
1:A:252:ASP:OD1	1:A:254:SER:OG	2.15	0.64
1:E:205:PHE:HE2	1:E:316:PRO:HG2	1.62	0.64
1:C:62:ASN:HD21	1:C:65:ASN:HB2	1.63	0.62
2:D:201:CYS:O	2:D:204:ASP:HB3	1.99	0.62
1:C:212:ILE:HD13	1:C:217:PHE:CE1	2.34	0.62
2:B:150:SER:N	5:B:1261:GOL:HO3	1.98	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:179:LEU:HD23	2:B:203:LEU:HD22	1.82	0.61
2:D:155:GLU:HG3	2:D:230:PHE:CD2	2.35	0.61
1:E:176:PRO:HA	1:E:197:ILE:HD13	1.83	0.61
1:E:199:ASP:HA	1:E:337:VAL:HG23	1.82	0.61
1:E:212:ILE:HG23	1:E:216:ILE:O	1.99	0.61
1:E:9:ILE:HG12	1:E:18:VAL:HG23	1.83	0.61
1:E:176:PRO:O	1:E:197:ILE:CD1	2.50	0.59
1:E:176:PRO:CB	1:E:197:ILE:HD12	2.32	0.59
1:E:233:PHE:CE1	1:E:310:PHE:CE1	2.89	0.59
1:C:212:ILE:CD1	1:C:217:PHE:CE1	2.86	0.59
1:C:205:PHE:HE2	1:C:316:PRO:HG2	1.68	0.58
1:C:212:ILE:HA	1:C:216:ILE:O	2.03	0.58
1:E:252:ASP:CG	1:E:254:SER:HG	2.08	0.58
1:E:212:ILE:CD1	1:E:217:PHE:CE2	2.86	0.57
1:E:176:PRO:CA	1:E:197:ILE:HD13	2.36	0.55
1:E:210:LEU:HD22	1:E:219:VAL:CA	2.36	0.55
1:A:186:ASP:OD1	1:A:186:ASP:N	2.39	0.55
1:E:198:PHE:HB3	1:E:336:LEU:HD23	1.89	0.55
2:B:174:ASP:O	2:B:178:GLU:HG2	2.07	0.54
1:E:253:ILE:C	1:E:253:ILE:HD12	2.33	0.54
1:C:27:GLU:HA	1:C:27:GLU:OE1	2.06	0.54
1:A:9:ILE:HG12	1:A:18:VAL:HG23	1.89	0.54
1:E:175:GLU:N	1:E:176:PRO:CD	2.71	0.54
1:E:62:ASN:HD21	1:E:65:ASN:HB2	1.73	0.53
1:E:176:PRO:O	1:E:197:ILE:HD13	2.08	0.53
2:F:178:GLU:HA	2:F:178:GLU:OE1	2.09	0.53
1:E:210:LEU:CD2	1:E:219:VAL:CA	2.78	0.52
1:C:186:ASP:N	1:C:186:ASP:OD1	2.41	0.52
1:A:178:ALA:O	1:A:372:GLY:HA3	2.10	0.52
1:E:252:ASP:OD1	1:E:254:SER:OG	2.16	0.52
1:E:315:ASP:N	1:E:316:PRO:CD	2.72	0.51
1:E:199:ASP:CB	1:E:337:VAL:HG23	2.40	0.51
1:A:80:ASP:OD1	1:A:81:ALA:N	2.43	0.51
1:C:237:MET:HE2	1:C:241:PHE:HE2	1.75	0.51
2:F:229:ASN:OD1	2:F:229:ASN:N	2.38	0.51
1:E:193:ARG:O	1:E:211:THR:HA	2.11	0.50
1:E:268:GLU:O	1:E:272:ARG:HG3	2.11	0.50
2:F:174:ASP:O	2:F:178:GLU:HG2	2.11	0.50
2:B:178:GLU:HA	2:B:178:GLU:OE1	2.12	0.50
1:E:199:ASP:CA	1:E:337:VAL:HG23	2.41	0.50
2:D:200:LEU:O	2:D:203:LEU:HB2	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:253:ILE:HG22	1:A:288:TYR:CG	2.48	0.49
1:A:175:GLU:N	1:A:176:PRO:CD	2.72	0.49
2:F:200:LEU:HD22	2:F:258:ILE:HG22	1.95	0.49
2:D:226:LEU:HD13	2:D:233:SER:HB3	1.94	0.48
1:C:338:GLY:O	1:C:365:PRO:HB2	2.14	0.48
1:C:18:VAL:O	1:C:29:ILE:HD12	2.14	0.48
1:E:71:LYS:HE2	1:E:147:PRO:HD3	1.95	0.48
1:C:71:LYS:HG2	4:C:1383:DMS:H23	1.96	0.48
1:E:209:ILE:O	1:E:210:LEU:HD23	2.14	0.48
1:A:363:ILE:O	1:A:364:ASN:C	2.57	0.48
1:E:176:PRO:HB2	1:E:197:ILE:HD12	1.96	0.48
1:C:212:ILE:HG12	1:C:217:PHE:CD1	2.49	0.47
1:A:315:ASP:HB2	1:A:316:PRO:CD	2.44	0.47
1:C:175:GLU:N	1:C:176:PRO:CD	2.78	0.47
1:E:186:ASP:OD1	1:E:186:ASP:N	2.48	0.47
1:A:252:ASP:CG	1:A:254:SER:HG	2.20	0.47
1:C:75:GLY:HA3	1:C:154:GLN:HA	1.97	0.47
1:A:71:LYS:HE2	1:A:147:PRO:HD3	1.97	0.46
5:C:1384:GOL:H12	2:D:245:GLN:HE21	1.81	0.46
1:A:175:GLU:HG2	1:A:369:VAL:HG11	1.97	0.46
1:E:76:ARG:NH1	1:E:80:ASP:OD2	2.37	0.46
1:E:253:ILE:HD12	1:E:253:ILE:O	2.16	0.46
1:E:253:ILE:HG22	1:E:288:TYR:CG	2.51	0.46
1:A:62:ASN:HD21	1:A:65:ASN:HB2	1.81	0.46
1:E:205:PHE:CE2	1:E:316:PRO:HG2	2.48	0.46
1:A:68:PHE:O	1:A:69:ASP:HB2	2.16	0.45
1:C:212:ILE:CD1	1:C:217:PHE:HE1	2.28	0.45
1:C:68:PHE:O	1:C:69:ASP:HB2	2.15	0.45
1:A:237:MET:HE2	1:A:241:PHE:HE2	1.82	0.45
1:E:176:PRO:CA	1:E:197:ILE:CD1	2.94	0.45
1:C:62:ASN:ND2	1:C:65:ASN:HB2	2.31	0.44
5:C:1384:GOL:H32	2:D:245:GLN:HG2	2.00	0.44
1:E:237:MET:HE2	1:E:241:PHE:HE2	1.82	0.44
1:E:199:ASP:HB2	1:E:337:VAL:HG23	1.99	0.43
1:E:26:VAL:HG11	1:E:371:TYR:HA	2.00	0.43
1:E:186:ASP:HB3	1:E:217:PHE:CZ	2.53	0.43
1:E:61:MET:HE3	2:F:209:ALA:HB2	2.01	0.43
1:A:193:ARG:O	1:A:211:THR:HA	2.19	0.43
1:E:76:ARG:HD3	1:E:80:ASP:OD2	2.18	0.43
1:E:343:ILE:HB	1:E:346:ILE:HD12	2.01	0.43
1:A:5:PRO:HD2	1:A:135:LEU:HD13	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:343:ILE:HB	1:A:346:ILE:HD12	2.00	0.43
1:E:237:MET:HE1	1:E:270:ALA:HB3	2.00	0.43
1:A:315:ASP:CB	1:A:316:PRO:HD3	2.47	0.43
1:E:176:PRO:O	1:E:197:ILE:HD11	2.19	0.42
1:C:29:ILE:HD12	1:C:29:ILE:N	2.31	0.42
1:A:26:VAL:HG11	1:A:371:TYR:HA	2.02	0.41
1:C:26:VAL:HG11	1:C:371:TYR:HA	2.02	0.41
1:A:21:PHE:HD1	1:A:26:VAL:HG23	1.85	0.41
1:E:140:THR:HG22	1:E:168:ASN:HB2	2.02	0.41
1:E:5:PRO:HD2	1:E:135:LEU:HD13	2.02	0.41
1:E:230:GLY:HA2	1:E:233:PHE:CD2	2.56	0.41
1:E:199:ASP:HB2	1:E:337:VAL:CG2	2.50	0.41
1:C:315:ASP:CB	1:C:316:PRO:HD3	2.50	0.41
1:E:175:GLU:HG2	1:E:369:VAL:HG11	2.02	0.41
2:B:230:PHE:N	2:B:230:PHE:CD1	2.89	0.40
1:C:343:ILE:HB	1:C:346:ILE:HD12	2.03	0.40
1:E:313:THR:C	1:E:316:PRO:HD2	2.46	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	379/386 (98%)	370 (98%)	9 (2%)	0	100	100
1	C	380/386 (98%)	376 (99%)	4 (1%)	0	100	100
1	E	379/386 (98%)	374 (99%)	5 (1%)	0	100	100
2	B	103/118 (87%)	102 (99%)	1 (1%)	0	100	100
2	D	104/118 (88%)	101 (97%)	3 (3%)	0	100	100
2	F	100/118 (85%)	98 (98%)	2 (2%)	0	100	100
All	All	1445/1512 (96%)	1421 (98%)	24 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	295/319 (92%)	292 (99%)	3 (1%)	68	85
1	C	299/319 (94%)	297 (99%)	2 (1%)	76	89
1	E	280/319 (88%)	278 (99%)	2 (1%)	76	89
2	B	82/107 (77%)	81 (99%)	1 (1%)	63	82
2	D	78/107 (73%)	77 (99%)	1 (1%)	61	81
2	F	83/107 (78%)	82 (99%)	1 (1%)	63	82
All	All	1117/1278 (87%)	1107 (99%)	10 (1%)	70	86

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	212	ILE
1	A	297	ILE
1	A	359	LEU
2	B	229	ASN
1	C	150	PHE
1	C	359	LEU
2	D	229	ASN
1	E	150	PHE
1	E	359	LEU
2	F	229	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	194	ASN
2	B	151	ASN
1	C	22	GLN
1	C	360	ASN

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Mol	Chain	Res	Type
2	D	245	GLN
1	E	22	GLN
1	E	104	GLN
2	F	257	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](#)

10 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	BBW	E	1382	-	13,13,13	0.17	0	16,18,18	0.86	1 (6%)
6	TRS	A	1385	-	7,7,7	0.30	0	9,9,9	0.40	0
3	BBW	C	1382	-	13,13,13	0.17	0	16,18,18	0.85	1 (6%)
5	GOL	C	1384	-	5,5,5	0.18	0	5,5,5	0.38	0
4	DMS	C	1383	-	3,3,3	0.38	0	3,3,3	0.40	0
5	GOL	A	1384	-	5,5,5	0.10	0	5,5,5	0.40	0
4	DMS	E	1383	-	3,3,3	0.26	0	3,3,3	0.30	0
4	DMS	A	1383	-	3,3,3	0.30	0	3,3,3	0.46	0
3	BBW	A	1382	-	13,13,13	0.14	0	16,18,18	0.89	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	GOL	B	1261	-	5,5,5	0.13	0	5,5,5	0.22	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
6	TRS	A	1385	-	-	0/9/9/9	-
3	BBW	E	1382	-	-	-	0/2/2/2
3	BBW	C	1382	-	-	-	0/2/2/2
5	GOL	C	1384	-	-	0/4/4/4	-
5	GOL	A	1384	-	-	4/4/4/4	-
3	BBW	A	1382	-	-	-	0/2/2/2
5	GOL	B	1261	-	-	1/4/4/4	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1382	BBW	C3-C2-C1	3.27	127.47	123.01
3	E	1382	BBW	C3-C2-C1	3.15	127.31	123.01
3	C	1382	BBW	C3-C2-C1	3.05	127.17	123.01

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1384	GOL	O1-C1-C2-C3
5	A	1384	GOL	C1-C2-C3-O3
5	B	1261	GOL	C1-C2-C3-O3
5	A	1384	GOL	O1-C1-C2-O2
5	A	1384	GOL	O2-C2-C3-O3

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	1384	GOL	2	0
4	C	1383	DMS	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	1261	GOL	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [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	381/386 (98%)	-0.20	1 (0%) 90 89	26, 47, 69, 85	0
1	C	382/386 (98%)	-0.11	3 (0%) 82 81	31, 52, 75, 102	0
1	E	381/386 (98%)	0.10	2 (0%) 87 86	36, 68, 96, 112	0
2	B	106/118 (89%)	0.19	3 (2%) 55 52	29, 56, 99, 112	1 (0%)
2	D	108/118 (91%)	0.18	3 (2%) 55 52	36, 57, 100, 132	0
2	F	104/118 (88%)	0.02	1 (0%) 79 78	35, 54, 89, 125	0
All	All	1462/1512 (96%)	-0.03	13 (0%) 81 80	26, 55, 88, 132	1 (0%)

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	260	GLN	3.9
2	B	190	PHE	3.7
2	D	190	PHE	3.2
2	B	196	GLN	3.0
2	D	191	LEU	3.0
2	F	197	ALA	2.9
2	D	258	ILE	2.4
1	A	1	MET	2.2
1	E	192	GLU	2.2
1	C	224	GLY	2.1
1	C	46	ASP	2.1
1	C	253	ILE	2.1
1	E	313	THR	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
6	TRS	A	1385	8/8	0.78	0.19	86,89,91,92	0
5	GOL	B	1261	6/6	0.81	0.12	62,70,73,74	0
5	GOL	C	1384	6/6	0.89	0.11	50,52,53,54	0
4	DMS	E	1383	4/4	0.89	0.19	97,97,98,98	0
4	DMS	A	1383	4/4	0.90	0.18	87,89,89,89	0
4	DMS	C	1383	4/4	0.91	0.15	75,76,78,78	0
3	BBW	E	1382	12/12	0.92	0.09	32,38,45,47	0
5	GOL	A	1384	6/6	0.94	0.10	43,51,56,60	0
3	BBW	A	1382	12/12	0.95	0.08	17,33,41,43	0
3	BBW	C	1382	12/12	0.95	0.07	26,31,37,40	0

6.5 Other polymers [i](#)

There are no such residues in this entry.