



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 2, 2024 – 07:58 PM EST

PDB ID : 5TD8  
Title : Crystal structure of an Extended Dwarf Ndc80 Complex  
Authors : Valverde, R.; Ingram, J.; Harrison, S.C.  
Deposited on : 2016-09-17  
Resolution : 7.53 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
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

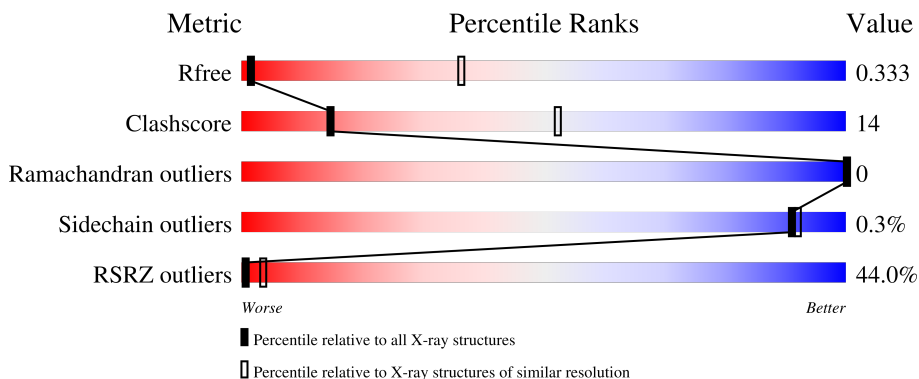
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 7.53 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	1107 (10.00-4.00)
Clashscore	180529	1146 (10.00-4.00)
Ramachandran outliers	177936	1014 (10.00-4.00)
Sidechain outliers	177891	1035 (10.00-3.96)
RSRZ outliers	164620	1102 (10.00-4.00)

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  $\geq 3$ , 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  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	A	279	35% (red), 70% (green), 22% (yellow), 8% (grey)
2	B	198	42% (red), 64% (green), 30% (yellow), 6% (grey)
3	C	114	53% (red), 63% (green), 33% (yellow), .. (grey)
4	D	129	40% (red), 84% (green), 15% (yellow), .. (grey)
5	E	145	36% (red), 62% (green), 10% (yellow), 28% (grey)

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 12626 atoms, of which 6191 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 Kinetochores protein NDC80.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	256	4302	1385	2144	363	404	6	0	0	0

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	111	SER	-	expression tag	UNP P40460
A	112	ASN	-	expression tag	UNP P40460
A	113	ALA	-	expression tag	UNP P40460

- Molecule 2 is a protein called Kinetochores protein NUF2.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
2	B	186	2902	964	1376	247	303	12	0	0	0

- Molecule 3 is a protein called Kinetochores protein SPC24.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
3	C	111	1839	578	917	162	181	1	0	0	0

- Molecule 4 is a protein called Kinetochores protein SPC25.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
4	D	128	2011	632	998	190	186	5	0	0	0

- Molecule 5 is a protein called nanobody.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
5	E	105	1566	512	756	143	152	3	0	0	0

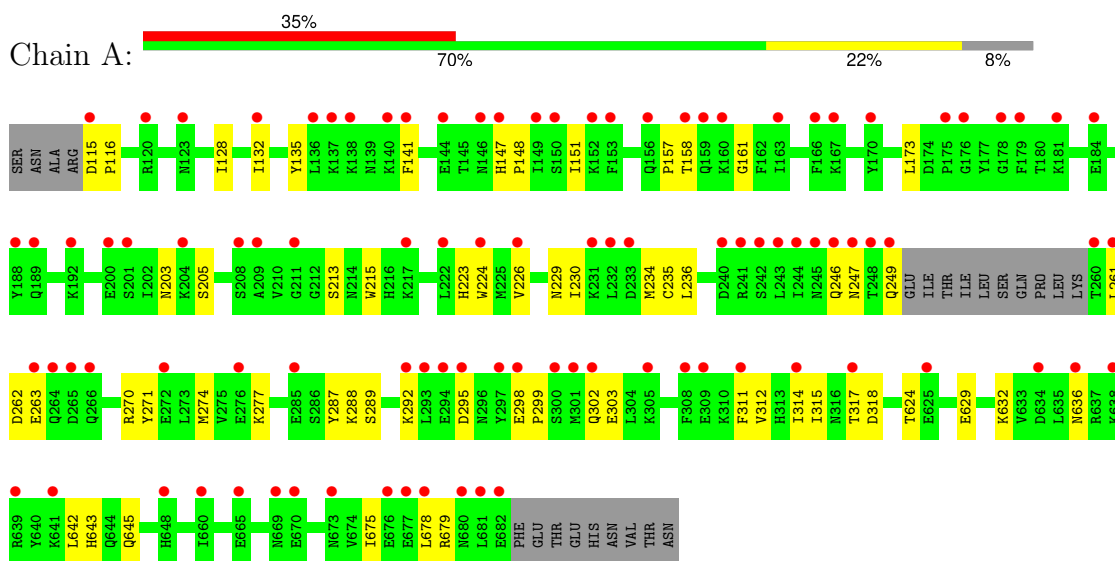
- Molecule 6 is MERCURY (II) ION (three-letter code: HG) (formula: Hg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	Hg	0	0
			2	2		
6	B	2	Total	Hg	0	0
			2	2		
6	D	2	Total	Hg	0	0
			2	2		

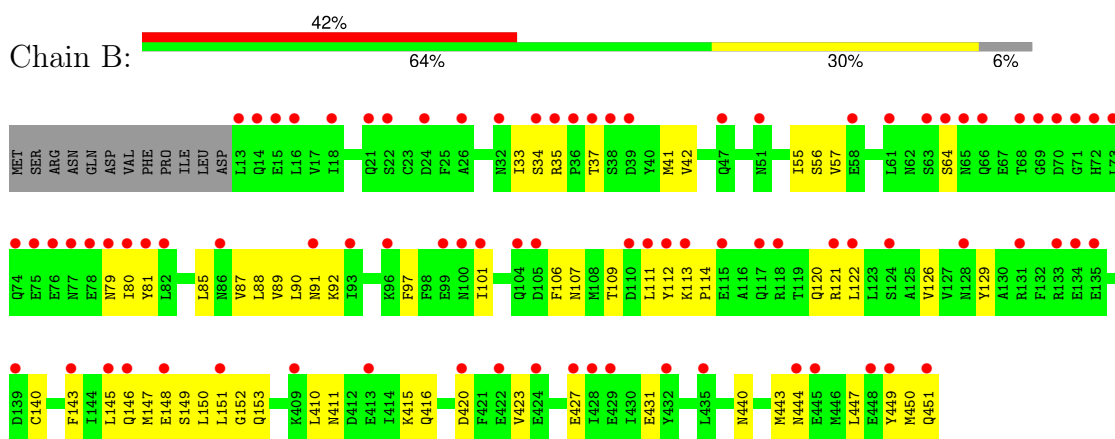
### 3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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.

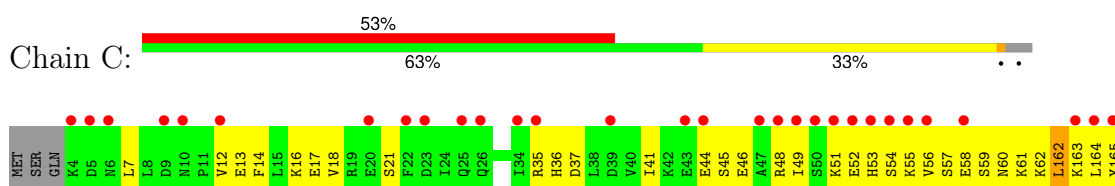
- Molecule 1: Kinetochores protein NDC80

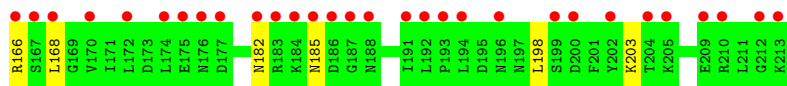


- Molecule 2: Kinetochores protein NUF2

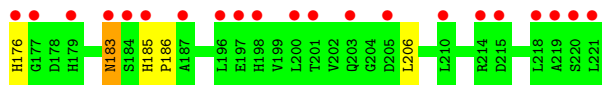
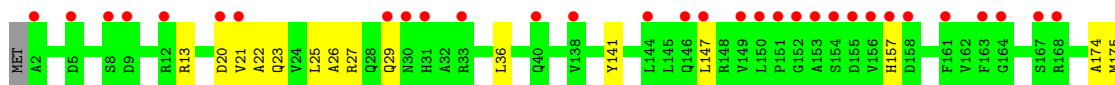
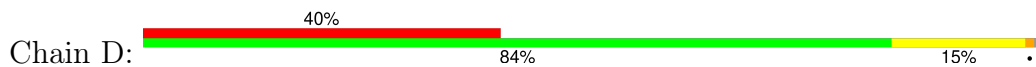


- Molecule 3: Kinetochores protein SPC24

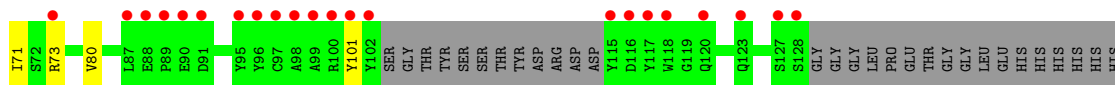
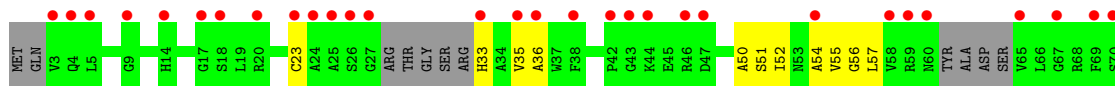




- Molecule 4: Kinetochore protein SPC25



- Molecule 5: nanobody



## 4 Data and refinement statistics i

Property	Value	Source
Space group	I 41 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	226.82Å 226.82Å 237.27Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	113.41 – 7.53 113.41 – 7.53	Depositor EDS
% Data completeness (in resolution range)	99.7 (113.41-7.53) 99.7 (113.41-7.53)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.16 (at 7.45Å)	Xtrriage
Refinement program	PHENIX (1.10_2155: ???)	Depositor
R, $R_{free}$	0.312 , 0.328 0.314 , 0.333	Depositor DCC
$R_{free}$ test set	204 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	49.5	Xtrriage
Anisotropy	0.073	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.26 , 0.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.42$ , $\langle L^2 \rangle = 0.24$	Xtrriage
Estimated twinning fraction	0.016 for -l,-k,-h 0.013 for -h,l,k	Xtrriage
$F_o, F_c$ correlation	0.70	EDS
Total number of atoms	12626	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	47.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.47% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: HG

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	0.30	0/2199	0.45	0/2958
2	B	0.28	0/1547	0.47	0/2083
3	C	0.30	0/933	0.62	1/1251 (0.1%)
4	D	0.26	0/1030	0.44	0/1392
5	E	0.26	0/826	0.49	0/1116
All	All	0.28	0/6535	0.49	1/8800 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
3	C	162	LEU	CA-CB-CG	7.90	133.48	115.30

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	2158	2144	2171	52	2
2	B	1526	1376	1493	56	0
3	C	922	917	932	68	2
4	D	1013	998	999	15	0
5	E	810	756	771	17	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	A	2	0	0	0	0
6	B	2	0	0	0	0
6	D	2	0	0	0	0
All	All	6435	6191	6366	175	2

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 14.

All (175) 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:249:GLN:OE1	1:A:270:ARG:NH1	2.07	0.88
3:C:21:SER:HB3	5:E:57:LEU:HG	1.57	0.86
2:B:148:GLU:O	2:B:152:GLY:N	2.13	0.81
3:C:61:LYS:O	3:C:164:LEU:HB2	1.81	0.80
3:C:61:LYS:O	3:C:164:LEU:CB	2.32	0.78
3:C:21:SER:CB	5:E:57:LEU:HG	2.15	0.76
2:B:143:PHE:O	2:B:147:MET:N	2.19	0.76
1:A:298:GLU:OE1	1:A:302:GLN:NE2	2.22	0.73
3:C:56:VAL:O	3:C:60:ASN:HB2	1.88	0.73
3:C:46:GLU:O	3:C:49:ILE:N	2.18	0.72
3:C:165:TYR:OH	4:D:147:LEU:O	2.09	0.71
1:A:235:CYS:SG	2:B:64:SER:OG	2.51	0.67
3:C:45:SER:O	3:C:49:ILE:HG23	1.93	0.67
1:A:262:ASP:OD1	1:A:263:GLU:N	2.29	0.66
3:C:55:LYS:O	3:C:59:SER:OG	2.13	0.65
2:B:431:GLU:CD	3:C:16:LYS:HG2	2.16	0.65
2:B:34:SER:O	2:B:37:THR:OG1	2.13	0.64
3:C:59:SER:O	3:C:162:LEU:CB	2.45	0.64
3:C:18:VAL:HA	5:E:55:VAL:HG13	1.80	0.64
3:C:55:LYS:O	3:C:59:SER:CB	2.46	0.63
1:A:230:ILE:O	1:A:234:MET:HG2	1.98	0.63
1:A:147:HIS:HB2	1:A:148:PRO:HD3	1.81	0.63
1:A:148:PRO:HB2	1:A:151:ILE:HB	1.80	0.63
3:C:59:SER:O	3:C:162:LEU:HG	2.00	0.62
1:A:173:LEU:O	2:B:92:LYS:NZ	2.30	0.62
3:C:54:SER:O	3:C:58:GLU:HB2	2.01	0.61
3:C:62:LYS:O	3:C:165:TYR:CG	2.54	0.61
3:C:62:LYS:O	3:C:165:TYR:CD2	2.54	0.60
1:A:224:TRP:HE1	2:B:80:ILE:HG22	1.66	0.60
3:C:59:SER:O	3:C:162:LEU:HB2	2.01	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:203:ASN:OD1	1:A:205:SER:OG	2.20	0.59
2:B:88:LEU:O	2:B:92:LYS:HG2	2.01	0.59
3:C:164:LEU:HG	4:D:206:LEU:CD2	2.33	0.59
3:C:46:GLU:O	3:C:49:ILE:HG12	2.03	0.59
2:B:440:ASN:OD1	4:D:13:ARG:NH2	2.35	0.58
1:A:287:TYR:CZ	2:B:129:TYR:HB2	2.37	0.58
4:D:23:GLN:O	4:D:27:ARG:N	2.31	0.58
2:B:140:CYS:O	2:B:143:PHE:HB3	2.04	0.57
1:A:128:ILE:HB	1:A:223:HIS:CG	2.40	0.57
2:B:147:MET:O	2:B:151:LEU:N	2.25	0.57
2:B:450:MET:O	2:B:451:GLN:HB2	2.05	0.57
1:A:289:SER:O	1:A:292:LYS:N	2.37	0.56
1:A:311:PHE:CE2	2:B:150:LEU:HD12	2.40	0.56
2:B:97:PHE:HZ	2:B:126:VAL:HG11	1.69	0.56
1:A:299:PRO:O	1:A:303:GLU:HB2	2.06	0.56
3:C:61:LYS:O	3:C:164:LEU:HB3	2.04	0.56
1:A:271:TYR:OH	1:A:318:ASP:OD2	2.20	0.56
3:C:18:VAL:HA	5:E:55:VAL:CG1	2.36	0.55
1:A:157:PRO:HG3	1:A:215:TRP:CE2	2.41	0.55
3:C:62:LYS:HA	3:C:164:LEU:HB3	1.89	0.55
3:C:164:LEU:O	3:C:168:LEU:HG	2.07	0.54
2:B:42:VAL:HG13	2:B:90:LEU:HD21	1.89	0.54
1:A:629:GLU:O	1:A:632:LYS:HB2	2.08	0.54
3:C:21:SER:HB2	5:E:55:VAL:CG1	2.38	0.54
2:B:85:LEU:O	2:B:89:VAL:HG23	2.07	0.54
5:E:50:ALA:HB3	5:E:71:ILE:HD12	1.88	0.53
2:B:145:LEU:O	2:B:149:SER:N	2.28	0.53
3:C:12:VAL:O	3:C:16:LYS:HG3	2.09	0.53
3:C:57:SER:O	3:C:61:LYS:HB2	2.09	0.53
3:C:13:GLU:OE1	5:E:33:HIS:NE2	2.39	0.53
1:A:287:TYR:HB2	2:B:129:TYR:CZ	2.44	0.52
2:B:91:ASN:HA	2:B:111:LEU:HD11	1.91	0.52
2:B:41:MET:HG3	2:B:114:PRO:CG	2.40	0.52
1:A:132:ILE:HA	1:A:226:VAL:HG11	1.92	0.52
2:B:87:VAL:HG13	2:B:112:TYR:OH	2.08	0.52
1:A:312:VAL:HG12	2:B:150:LEU:HD11	1.91	0.51
1:A:315:ILE:HG21	2:B:150:LEU:HD13	1.91	0.51
3:C:41:ILE:O	3:C:44:GLU:N	2.43	0.51
3:C:52:GLU:O	3:C:56:VAL:HB	2.10	0.51
1:A:632:LYS:O	1:A:636:ASN:HB2	2.11	0.50
3:C:59:SER:O	3:C:162:LEU:CG	2.59	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:60:ASN:HA	3:C:162:LEU:HB2	1.92	0.49
3:C:162:LEU:O	3:C:166:ARG:HB2	2.11	0.49
3:C:21:SER:OG	5:E:57:LEU:HG	2.12	0.49
5:E:33:HIS:ND1	5:E:101:TYR:O	2.45	0.49
1:A:315:ILE:HG21	2:B:150:LEU:HB3	1.93	0.49
3:C:55:LYS:O	3:C:59:SER:HB3	2.11	0.49
1:A:311:PHE:CD2	2:B:143:PHE:CE1	3.00	0.48
3:C:54:SER:O	3:C:58:GLU:CB	2.61	0.48
3:C:62:LYS:O	3:C:165:TYR:HB2	2.14	0.48
3:C:54:SER:HA	3:C:57:SER:OG	2.13	0.48
3:C:48:ARG:HA	3:C:51:LYS:HB2	1.95	0.48
1:A:148:PRO:HB2	1:A:151:ILE:CB	2.44	0.48
1:A:288:LYS:O	1:A:292:LYS:HB2	2.14	0.48
1:A:632:LYS:O	1:A:636:ASN:CB	2.62	0.48
1:A:141:PHE:CE2	1:A:148:PRO:HG3	2.50	0.47
2:B:149:SER:O	2:B:153:GLN:N	2.36	0.47
1:A:632:LYS:O	1:A:636:ASN:CG	2.53	0.47
1:A:236:LEU:HD11	2:B:92:LYS:HG3	1.97	0.47
1:A:295:ASP:O	1:A:299:PRO:HD2	2.15	0.47
2:B:101:ILE:HD11	2:B:122:LEU:HB3	1.95	0.47
1:A:315:ILE:HD13	2:B:150:LEU:HB3	1.95	0.47
1:A:642:LEU:O	1:A:645:GLN:HG2	2.14	0.47
1:A:147:HIS:CB	1:A:148:PRO:HD3	2.45	0.46
1:A:115:ASP:HB3	1:A:116:PRO:HD3	1.97	0.46
4:D:23:GLN:HA	4:D:26:ALA:HB3	1.97	0.46
2:B:57:VAL:HG11	2:B:90:LEU:HD13	1.96	0.46
2:B:79:ASN:O	2:B:79:ASN:OD1	2.32	0.46
3:C:44:GLU:O	3:C:48:ARG:HB2	2.16	0.46
3:C:14:PHE:O	3:C:18:VAL:HG23	2.15	0.46
3:C:162:LEU:O	3:C:166:ARG:CB	2.64	0.46
4:D:175:MET:HG3	4:D:176:HIS:CE1	2.50	0.46
3:C:21:SER:HB2	5:E:55:VAL:HB	1.97	0.46
3:C:53:HIS:O	3:C:57:SER:CB	2.65	0.45
1:A:246:GLN:OE1	1:A:277:LYS:NZ	2.30	0.45
2:B:81:TYR:O	2:B:85:LEU:HG	2.16	0.45
3:C:45:SER:C	3:C:49:ILE:HG23	2.37	0.45
3:C:62:LYS:O	3:C:165:TYR:CB	2.64	0.45
1:A:158:THR:HG23	1:A:161:GLY:H	1.81	0.45
3:C:165:TYR:CE2	4:D:141:TYR:HB3	2.51	0.45
2:B:126:VAL:O	2:B:129:TYR:HB3	2.16	0.45
3:C:162:LEU:O	3:C:166:ARG:CG	2.65	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:427:GLU:HB3	3:C:12:VAL:HG11	1.99	0.44
3:C:36:HIS:HD1	3:C:36:HIS:C	2.21	0.44
4:D:157:HIS:HA	4:D:174:ALA:HA	1.98	0.44
2:B:97:PHE:CZ	2:B:126:VAL:HG11	2.52	0.44
2:B:107:ASN:OD1	2:B:109:THR:CB	2.65	0.44
3:C:52:GLU:O	3:C:56:VAL:HG23	2.17	0.44
2:B:33:ILE:O	2:B:33:ILE:HG22	2.18	0.44
3:C:45:SER:O	3:C:49:ILE:N	2.51	0.44
1:A:157:PRO:HG3	1:A:215:TRP:CZ2	2.53	0.44
3:C:182:ASN:OD1	3:C:185:ASN:HA	2.17	0.44
1:A:247:ASN:O	1:A:274:MET:HE3	2.18	0.43
1:A:678:LEU:HD21	4:D:36:LEU:HD12	2.00	0.43
5:E:36:ALA:HB2	5:E:51:SER:CB	2.48	0.43
2:B:420:ASP:O	2:B:423:VAL:HB	2.18	0.43
2:B:147:MET:HG3	2:B:148:GLU:N	2.32	0.43
3:C:57:SER:O	3:C:61:LYS:CB	2.66	0.43
3:C:52:GLU:O	3:C:56:VAL:CB	2.67	0.43
3:C:59:SER:O	3:C:162:LEU:N	2.50	0.43
2:B:109:THR:HG23	2:B:113:LYS:HG3	1.99	0.43
1:A:135:TYR:CD1	1:A:230:ILE:CD1	3.01	0.43
3:C:54:SER:HA	3:C:57:SER:HG	1.84	0.43
2:B:444:ASN:O	2:B:447:LEU:HB2	2.18	0.43
1:A:226:VAL:O	1:A:230:ILE:HG12	2.18	0.42
2:B:146:GLN:O	2:B:150:LEU:HG	2.18	0.42
4:D:25:LEU:O	4:D:29:GLN:HG3	2.19	0.42
4:D:185:HIS:HB3	4:D:186:PRO:HD3	2.00	0.42
5:E:35:VAL:HG12	5:E:80:VAL:HG11	2.02	0.42
2:B:120:GLN:HG3	2:B:121:ARG:N	2.33	0.42
2:B:147:MET:CG	2:B:148:GLU:N	2.83	0.42
2:B:415:LYS:O	2:B:416:GLN:C	2.56	0.42
2:B:449:TYR:HD2	3:C:35:ARG:HD2	1.85	0.42
2:B:450:MET:HE1	4:D:20:ASP:HB3	2.01	0.42
2:B:41:MET:HG3	2:B:114:PRO:HG3	2.01	0.42
3:C:57:SER:O	3:C:61:LYS:CG	2.67	0.42
1:A:157:PRO:HD3	1:A:215:TRP:CH2	2.55	0.42
1:A:624:THR:HB	2:B:410:LEU:HD23	2.02	0.41
4:D:22:ALA:O	4:D:25:LEU:HB2	2.19	0.41
4:D:183:ASN:N	4:D:183:ASN:OD1	2.52	0.41
3:C:54:SER:O	3:C:58:GLU:CG	2.68	0.41
1:A:261:LEU:HD21	2:B:411:ASN:O	2.19	0.41
5:E:23:CYS:HB3	5:E:80:VAL:HG12	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:52:ILE:HD11	5:E:56:GLY:HA2	2.02	0.41
2:B:106:PHE:CZ	2:B:111:LEU:HG	2.56	0.41
3:C:17:GLU:C	5:E:55:VAL:HG21	2.41	0.41
5:E:55:VAL:O	5:E:55:VAL:HG12	2.21	0.41
2:B:143:PHE:HA	2:B:146:GLN:HB2	2.02	0.41
3:C:53:HIS:O	3:C:57:SER:HB3	2.20	0.41
1:A:270:ARG:O	1:A:274:MET:HG3	2.21	0.41
1:A:643:HIS:CG	3:C:7:LEU:HD12	2.56	0.41
2:B:443:MET:O	2:B:447:LEU:HD13	2.20	0.41
3:C:56:VAL:O	3:C:56:VAL:HG12	2.20	0.41
3:C:198:LEU:HB2	3:C:203:LYS:HE3	2.03	0.41
5:E:54:ALA:HA	5:E:73:ARG:CZ	2.51	0.41
3:C:60:ASN:O	3:C:163:LYS:HB2	2.21	0.40
1:A:246:GLN:HA	1:A:249:GLN:HB2	2.03	0.40
1:A:298:GLU:N	1:A:299:PRO:HD2	2.37	0.40
1:A:314:ILE:O	1:A:317:THR:HB	2.22	0.40
2:B:55:ILE:HG22	2:B:56:SER:N	2.37	0.40
3:C:52:GLU:O	3:C:56:VAL:CG2	2.69	0.40
3:C:46:GLU:C	3:C:49:ILE:H	2.17	0.40
1:A:675:ILE:CG2	1:A:679:ARG:CZ	3.00	0.40
2:B:35:ARG:O	2:B:37:THR:N	2.48	0.40
4:D:21:VAL:O	4:D:22:ALA:C	2.60	0.40

All (2) 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)
1:A:213:SER:N	3:C:37:ASP:OD1[3_745]	2.04	0.16
1:A:213:SER:H	3:C:37:ASP:OD1[3_745]	1.54	0.06

## 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	252/279 (90%)	232 (92%)	20 (8%)	0	100	100
2	B	184/198 (93%)	163 (89%)	21 (11%)	0	100	100
3	C	109/114 (96%)	104 (95%)	5 (5%)	0	100	100
4	D	126/129 (98%)	112 (89%)	14 (11%)	0	100	100
5	E	97/145 (67%)	94 (97%)	3 (3%)	0	100	100
All	All	768/865 (89%)	705 (92%)	63 (8%)	0	100	100

There are no Ramachandran outliers to report.

### 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	246/268 (92%)	245 (100%)	1 (0%)	89	91
2	B	175/187 (94%)	175 (100%)	0	100	100
3	C	106/109 (97%)	106 (100%)	0	100	100
4	D	107/108 (99%)	106 (99%)	1 (1%)	75	83
5	E	83/115 (72%)	83 (100%)	0	100	100
All	All	717/787 (91%)	715 (100%)	2 (0%)	91	92

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	229	ASN
4	D	183	ASN

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	302	GLN
4	D	176	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](#)

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

### 5.7 Other polymers [i](#)

There are no such residues in this entry.

### 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

**Warning:** The R factor obtained from EDS is 0.3634, which does not match the depositor's R factor of 0.3124. Please interpret the results in this section carefully.

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	256/279 (91%)	1.86	98 (38%) <b>1</b> <b>4</b>	16, 46, 102, 144	0
2	B	186/198 (93%)	1.99	84 (45%) <b>1</b> <b>3</b>	26, 59, 110, 129	0
3	C	111/114 (97%)	2.38	60 (54%) <b>0</b> <b>3</b>	20, 42, 54, 65	0
4	D	128/129 (99%)	1.90	52 (40%) <b>1</b> <b>4</b>	20, 40, 70, 82	1 (0%)
5	E	105/145 (72%)	1.91	52 (49%) <b>0</b> <b>3</b>	23, 38, 53, 69	0
All	All	786/865 (90%)	1.98	346 (44%) <b>1</b> <b>3</b>	16, 44, 89, 144	1 (0%)

All (346) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	70	ASP	10.6
1	A	208	SER	8.5
5	E	27	GLY	8.3
4	D	156	VAL	8.1
3	C	9	ASP	7.5
3	C	213	LYS	7.2
5	E	128	SER	6.8
1	A	150	SER	6.8
2	B	72	HIS	6.7
2	B	71	GLY	6.6
4	D	158	ASP	6.4
4	D	8	SER	6.4
1	A	248	THR	6.3
4	D	155	ASP	6.3
3	C	212	GLY	6.2
2	B	65	ASN	6.1
1	A	676	GLU	6.1
4	D	153	ALA	6.0

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
3	C	209	GLU	6.0
2	B	24	ASP	5.9
2	B	75	GLU	5.8
4	D	2	ALA	5.8
3	C	53	HIS	5.7
2	B	63	SER	5.6
2	B	69	GLY	5.6
4	D	185	HIS	5.6
2	B	74	GLN	5.3
5	E	102	TYR	5.3
3	C	4	LYS	5.3
3	C	20	GLU	5.2
1	A	677	GLU	5.2
2	B	111	LEU	5.1
3	C	205	LYS	5.1
5	E	5	LEU	5.1
3	C	185	ASN	5.0
5	E	69	PHE	5.0
1	A	147	HIS	5.0
1	A	249	GLN	4.9
4	D	151	PRO	4.9
1	A	244	ILE	4.8
3	C	44	GLU	4.8
1	A	200	GLU	4.8
2	B	66	GLN	4.7
3	C	177	ASP	4.7
2	B	13	LEU	4.7
4	D	144	LEU	4.7
1	A	682	GLU	4.7
4	D	183	ASN	4.7
2	B	77	ASN	4.6
1	A	317	THR	4.6
5	E	65	VAL	4.5
1	A	305	LYS	4.5
3	C	5	ASP	4.5
4	D	167	SER	4.5
2	B	115	GLU	4.5
1	A	211	GLY	4.5
5	E	67	GLY	4.5
3	C	184	LYS	4.4
3	C	187	GLY	4.4
2	B	76	GLU	4.4

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	188	TYR	4.4
2	B	73	LEU	4.4
4	D	210	LEU	4.4
3	C	175	GLU	4.3
1	A	166	PHE	4.3
2	B	104	GLN	4.2
3	C	47	ALA	4.2
2	B	145	LEU	4.2
2	B	34	SER	4.2
2	B	81	TYR	4.2
3	C	168	LEU	4.2
5	E	115	TYR	4.2
5	E	9	GLY	4.2
4	D	221	LEU	4.1
4	D	176	HIS	4.1
3	C	26	GLN	4.1
4	D	168	ARG	4.1
4	D	154	SER	4.1
1	A	241	ARG	4.1
2	B	26	ALA	4.1
1	A	266	GLN	4.1
3	C	55	LYS	4.0
1	A	115	ASP	4.0
2	B	51	ASN	4.0
1	A	120	ARG	4.0
1	A	276	GLU	4.0
1	A	181	LYS	4.0
4	D	220	SER	3.9
1	A	152	LYS	3.9
4	D	29	GLN	3.9
2	B	35	ARG	3.9
1	A	242	SER	3.9
2	B	36	PRO	3.9
5	E	91	ASP	3.8
1	A	285	GLU	3.8
5	E	120	GLN	3.8
1	A	136	LEU	3.8
1	A	265	ASP	3.8
1	A	246	GLN	3.8
2	B	100	ASN	3.8
1	A	294	GLU	3.8
2	B	15	GLU	3.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
4	D	179	HIS	3.8
1	A	634	ASP	3.8
1	A	669	ASN	3.7
1	A	178	GLY	3.7
3	C	39	ASP	3.7
1	A	681	LEU	3.7
3	C	210	ARG	3.7
5	E	14	HIS	3.7
3	C	199	SER	3.7
3	C	194	LEU	3.7
1	A	138	LYS	3.6
2	B	448	GLU	3.6
2	B	38	SER	3.6
3	C	23	ASP	3.6
1	A	175	PRO	3.6
3	C	163	LYS	3.6
4	D	147	LEU	3.6
3	C	6	ASN	3.6
2	B	128	ASN	3.5
2	B	80	ILE	3.5
2	B	135	GLU	3.5
5	E	101	TYR	3.5
2	B	451	GLN	3.5
3	C	167	SER	3.5
3	C	202	TYR	3.5
1	A	146	ASN	3.5
4	D	30	ASN	3.5
2	B	61	LEU	3.5
1	A	293	LEU	3.5
4	D	138	VAL	3.5
1	A	247	ASN	3.4
2	B	413	GLU	3.4
3	C	43	GLU	3.4
2	B	113	LYS	3.4
1	A	170	TYR	3.4
4	D	218	LEU	3.4
3	C	51	LYS	3.4
3	C	183	ARG	3.4
5	E	33	HIS	3.4
5	E	99	ALA	3.3
1	A	243	LEU	3.3
1	A	264	GLN	3.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	B	122	LEU	3.3
5	E	98	ALA	3.3
1	A	301	MET	3.3
1	A	159	GLN	3.3
3	C	191	ILE	3.3
2	B	133	ARG	3.3
1	A	297	TYR	3.3
2	B	428	ILE	3.3
1	A	298	GLU	3.3
4	D	9	ASP	3.3
5	E	23	CYS	3.3
1	A	184	GLU	3.2
5	E	97	CYS	3.2
3	C	25	GLN	3.2
2	B	422	GLU	3.2
1	A	132	ILE	3.2
2	B	121	ARG	3.2
1	A	245	ASN	3.2
2	B	16	LEU	3.2
1	A	201	SER	3.2
5	E	26	SER	3.2
5	E	123	GLN	3.2
1	A	137	LYS	3.2
2	B	449	TYR	3.2
4	D	203	GLN	3.2
4	D	21	VAL	3.1
1	A	260	THR	3.1
1	A	678	LEU	3.1
3	C	188	ASN	3.1
1	A	179	PHE	3.1
5	E	43	GLY	3.1
1	A	302	GLN	3.1
1	A	295	ASP	3.1
4	D	161	PHE	3.1
5	E	3	VAL	3.1
1	A	309	GLU	3.0
4	D	198	HIS	3.0
2	B	37	THR	3.0
2	B	58	GLU	3.0
4	D	184	SER	3.0
4	D	201	THR	3.0
5	E	118	TRP	3.0

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	222	LEU	3.0
1	A	192	LYS	3.0
5	E	60	ASN	2.9
1	A	156	GLN	2.9
2	B	112	TYR	2.9
5	E	90	GLU	2.9
1	A	300	SER	2.9
1	A	670	GLU	2.9
3	C	52	GLU	2.8
3	C	58	GLU	2.8
3	C	193	PRO	2.8
3	C	56	VAL	2.8
3	C	165	TYR	2.8
2	B	117	GLN	2.8
5	E	117	TYR	2.8
2	B	99	GLU	2.8
3	C	34	ILE	2.8
3	C	174	LEU	2.8
1	A	648	HIS	2.8
3	C	200	ASP	2.8
2	B	148	GLU	2.8
5	E	25	ALA	2.8
5	E	96	TYR	2.8
5	E	70	SER	2.8
5	E	36	ALA	2.7
1	A	176	GLY	2.7
5	E	59	ARG	2.7
1	A	638	LYS	2.7
2	B	39	ASP	2.7
2	B	427	GLU	2.7
5	E	38	PHE	2.7
5	E	58	VAL	2.7
1	A	240	ASP	2.7
2	B	420	ASP	2.7
4	D	196	LEU	2.7
2	B	139	ASP	2.7
2	B	79	ASN	2.7
2	B	68	THR	2.7
1	A	217	LYS	2.6
5	E	127	SER	2.6
3	C	176	ASN	2.6
5	E	87	LEU	2.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
3	C	54	SER	2.6
1	A	665	GLU	2.6
3	C	48	ARG	2.6
1	A	233	ASP	2.6
2	B	134	GLU	2.6
1	A	167	LYS	2.6
3	C	182	ASN	2.6
1	A	224	TRP	2.6
1	A	189	GLN	2.6
4	D	146	GLN	2.6
5	E	54	ALA	2.6
2	B	96	LYS	2.6
1	A	163	ILE	2.5
3	C	164	LEU	2.5
1	A	263	GLU	2.5
2	B	424	GLU	2.5
1	A	209	ALA	2.5
1	A	140	LYS	2.5
1	A	641	LYS	2.5
1	A	660	ILE	2.5
2	B	78	GLU	2.5
2	B	409	LYS	2.5
4	D	40	GLN	2.5
4	D	12	ARG	2.5
5	E	18	SER	2.5
4	D	149	VAL	2.5
1	A	153	PHE	2.5
1	A	680	ASN	2.5
3	C	35	ARG	2.5
2	B	21	GLN	2.5
4	D	197	GLU	2.5
1	A	232	LEU	2.5
5	E	95	TYR	2.5
4	D	214	ARG	2.5
3	C	192	LEU	2.4
2	B	22	SER	2.4
3	C	10	ASN	2.4
3	C	22	PHE	2.4
2	B	82	LEU	2.4
1	A	636	ASN	2.4
4	D	219	ALA	2.4
5	E	100	ARG	2.4

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	B	146	GLN	2.4
4	D	157	HIS	2.4
2	B	64	SER	2.4
2	B	131	ARG	2.4
4	D	187	ALA	2.4
1	A	308	PHE	2.4
2	B	143	PHE	2.3
3	C	196	ASN	2.3
2	B	151	LEU	2.3
1	A	226	VAL	2.3
4	D	177	GLY	2.3
1	A	261	LEU	2.3
5	E	24	ALA	2.3
5	E	17	GLY	2.3
2	B	47	GLN	2.3
5	E	4	GLN	2.3
1	A	160	LYS	2.3
3	C	170	VAL	2.3
4	D	20	ASP	2.3
5	E	46	ARG	2.3
2	B	432	TYR	2.3
2	B	429	GLU	2.3
4	D	152	GLY	2.3
3	C	204	THR	2.2
4	D	215	ASP	2.2
2	B	435	LEU	2.2
1	A	123	ASN	2.2
5	E	20	ARG	2.2
1	A	231	LYS	2.2
2	B	14	GLN	2.2
5	E	42	PRO	2.2
2	B	91	ASN	2.2
1	A	639	ARG	2.2
4	D	163	PHE	2.2
4	D	164	GLY	2.2
1	A	292	LYS	2.2
1	A	149	ILE	2.2
2	B	445	GLU	2.2
1	A	673	ASN	2.2
1	A	314	ILE	2.2
2	B	110	ASP	2.2
4	D	33	ARG	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	144	GLU	2.2
4	D	150	LEU	2.2
2	B	32	ASN	2.2
2	B	118	ARG	2.2
5	E	73	ARG	2.2
3	C	186	ASP	2.2
4	D	31	HIS	2.2
2	B	86	ASN	2.2
2	B	124	SER	2.2
2	B	101	ILE	2.2
1	A	158	THR	2.2
5	E	88	GLU	2.2
4	D	200	LEU	2.1
5	E	47	ASP	2.1
2	B	93	ILE	2.1
5	E	89	PRO	2.1
3	C	166	ARG	2.1
1	A	625	GLU	2.1
3	C	49	ILE	2.1
1	A	311	PHE	2.1
2	B	444	ASN	2.1
4	D	5	ASP	2.1
5	E	116	ASP	2.1
1	A	141	PHE	2.1
2	B	105	ASP	2.1
4	D	205	ASP	2.1
5	E	35	VAL	2.0
3	C	12	VAL	2.0
1	A	204	LYS	2.0
5	E	44	LYS	2.0
2	B	18	ILE	2.0
3	C	172	LEU	2.0
1	A	272	GLU	2.0
3	C	50	SER	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
6	HG	B	501	1/1	0.71	0.21	208,208,208,208	0
6	HG	D	302	1/1	0.94	0.22	77,77,77,77	1
6	HG	D	301	1/1	0.97	0.08	68,68,68,68	1
6	HG	A	702	1/1	0.97	0.08	144,144,144,144	1
6	HG	A	701	1/1	0.98	0.24	81,81,81,81	1
6	HG	B	502	1/1	0.98	0.06	115,115,115,115	1

### 6.5 Other polymers [i](#)

There are no such residues in this entry.