



## wwPDB EM Map/Model Validation Report ⓘ

Jul 3, 2016 – 04:50 AM EDT

PDB ID : 5JM0  
EMDB ID: : EMD-8166  
Title : Structure of the *S. cerevisiae* alpha-mannosidase 1  
Authors : Schneider, S.; Kosinski, J.; Jakobi, A.J.; Hagen, W.J.H.; Sachse, C.  
Deposited on : 2016-04-28  
Resolution : 6.30 Å(reported)  
Based on PDB ID : ?

This is a wwPDB EM Map/Model Validation Report for a publicly released PDB/EMDB entry.  
For rigid body fitted models, validation errors reported here could stem from errors in the original structure(s) used in the fitting.  
We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/EMValidationReportHelp>

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MolProbity : 4.02b-467  
Mogul : unknown  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20027790

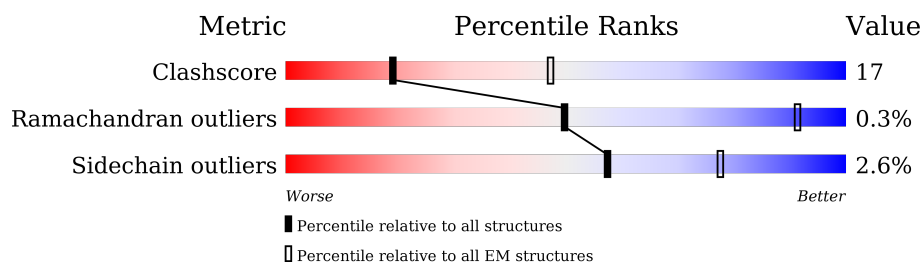
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 6.30 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)	EM structures (#Entries)
Clashscore	114402	924
Ramachandran outliers	111179	726
Sidechain outliers	111093	686

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	1096	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 7604 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Alpha-mannosidase,Alpha-mannosidase,Alpha-mannosidase.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	940	Total	C	N	O	S	0	0
			7604	4889	1273	1410	32		

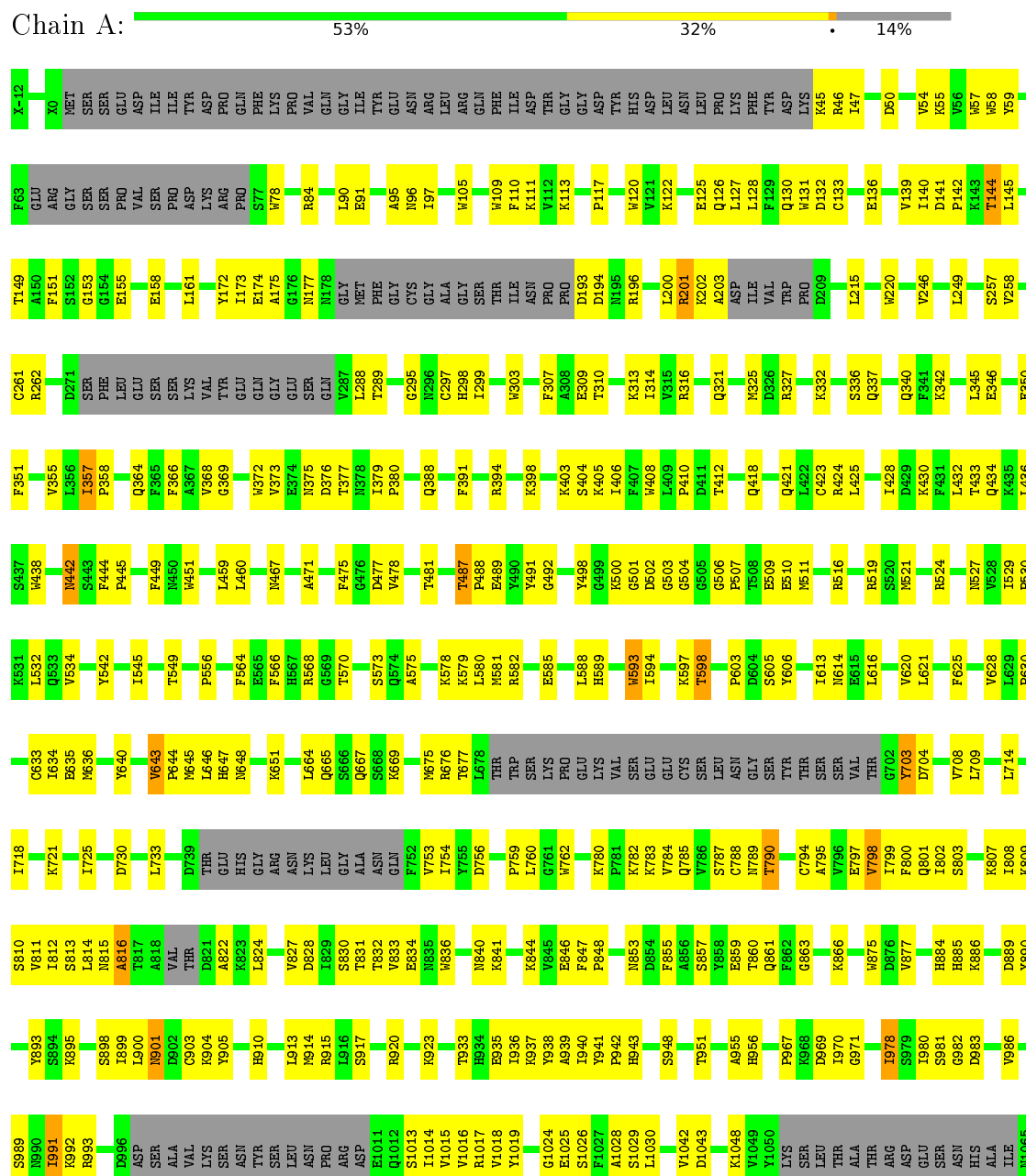
There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1071	LEU	-	expression tag	UNP P22855
A	1072	ARG	-	expression tag	UNP P22855
A	1073	PRO	-	expression tag	UNP P22855
A	1074	PHE	-	expression tag	UNP P22855
A	1075	GLU	-	expression tag	UNP P22855
A	1076	ILE	-	expression tag	UNP P22855
A	1077	ALA	-	expression tag	UNP P22855
A	1078	SER	-	expression tag	UNP P22855
A	1079	PHE	-	expression tag	UNP P22855
A	1080	ARG	-	expression tag	UNP P22855
A	1081	LEU	-	expression tag	UNP P22855
A	1082	TYR	-	expression tag	UNP P22855
A	1083	PHE	-	expression tag	UNP P22855

### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: Alpha-mannosidase,Alpha-mannosidase,Alpha-mannosidase



R1066		A1077	
I1067		S1078	
P1068		F1079	
I1069		R1080	
K1070		L1081	
L1071		Y1082	
R1072		F1083	
P1073			



## 4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, D	Depositor
Number of particles used	33588	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	Not provided	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	Not provided	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	5000	Depositor
Magnification	75000	Depositor
Image detector	Not provided	Depositor

## 5 Model quality

### 5.1 Standard geometry

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	$\# Z  > 2$	RMSZ	$\# Z  > 2$
1	A	0.25	0/7723	0.44	0/10429

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	144	THR	Peptide
1	A	442	ASN	Peptide
1	A	605	SER	Peptide

### 5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7604	0	7356	250	0
All	All	7604	0	7356	250	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 17.

All (250) 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:151:PHE:HB3	1:A:316:ARG:HE	1.42	0.84
1:A:815:ASN:HB2	1:A:824:LEU:HB2	1.59	0.82
1:A:886:LYS:NZ	1:A:955:ALA:O	2.13	0.81
1:A:643:VAL:HG22	1:A:644:PRO:HD2	1.64	0.80
1:A:487:THR:HG23	1:A:488:PRO:HD3	1.67	0.77
1:A:899:ILE:HG13	1:A:914:MET:HG2	1.67	0.77
1:A:900:LEU:HB3	1:A:939:ALA:HB3	1.65	0.77
1:A:718:ILE:HG12	1:A:725:ILE:HG12	1.67	0.76
1:A:580:LEU:HD22	1:A:646:LEU:HB3	1.69	0.74
1:A:570:THR:HA	1:A:573:SER:HB3	1.69	0.74
1:A:992:LYS:NZ	1:A:993:ARG:O	2.20	0.72
1:A:327:ARG:NH1	1:A:510:GLU:O	2.23	0.72
1:A:105:TRP:CZ3	1:A:105:TRP:CZ2	2.77	0.71
1:A:78:TRP:CZ3	1:A:78:TRP:CZ2	2.77	0.71
1:A:295:GLY:HA2	1:A:498:TYR:HB3	1.74	0.70
1:A:131:TRP:CZ3	1:A:131:TRP:CZ2	2.77	0.70
1:A:588:LEU:HD22	1:A:620:VAL:HG21	1.75	0.69
1:A:58:TRP:CZ3	1:A:58:TRP:CZ2	2.77	0.69
1:A:391:PHE:HE1	1:A:394:ARG:HH11	1.41	0.69
1:A:220:TRP:CZ2	1:A:220:TRP:CZ3	2.77	0.69
1:A:120:TRP:CZ3	1:A:120:TRP:CZ2	2.77	0.68
1:A:703:TYR:HD2	1:A:704:ASP:H	1.40	0.68
1:A:57:TRP:CZ3	1:A:57:TRP:CZ2	2.77	0.67
1:A:109:TRP:CZ2	1:A:109:TRP:CZ3	2.77	0.67
1:A:128:LEU:HD11	1:A:158:GLU:HB3	1.76	0.67
1:A:847:PHE:HB2	1:A:914:MET:HB3	1.76	0.67
1:A:451:TRP:N	1:A:459:LEU:O	2.26	0.67
1:A:110:PHE:HB3	1:A:173:ILE:HG23	1.76	0.66
1:A:139:VAL:HG23	1:A:149:THR:HB	1.76	0.66
1:A:830:SER:HA	1:A:937:LYS:HA	1.78	0.66
1:A:900:LEU:HD12	1:A:955:ALA:HA	1.78	0.66
1:A:57:TRP:HB2	1:A:111:LYS:HB2	1.76	0.65
1:A:788:CYS:SG	1:A:789:ASN:N	2.70	0.65
1:A:875:TRP:NE1	1:A:877:VAL:O	2.30	0.65
1:A:901:ASN:HA	1:A:938:TYR:HA	1.79	0.64
1:A:585:GLU:O	1:A:589:HIS:ND1	2.30	0.63
1:A:754:ILE:HG23	1:A:846:GLU:HB2	1.79	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1024:GLY:H	1:A:1073:PRO:HB3	1.63	0.63
1:A:406:ILE:HD11	1:A:432:LEU:HB2	1.80	0.63
1:A:193:ASP:OD2	1:A:194:ASP:N	2.31	0.63
1:A:993:ARG:HA	1:A:1014:ILE:HA	1.82	0.62
1:A:847:PHE:N	1:A:914:MET:O	2.28	0.62
1:A:633:CYS:SG	1:A:634:ILE:N	2.72	0.62
1:A:733:LEU:HB3	1:A:895:LYS:HD3	1.81	0.62
1:A:445:PRO:HG2	1:A:556:PRO:HG3	1.82	0.61
1:A:759:PRO:HA	1:A:841:LYS:HA	1.82	0.61
1:A:368:VAL:HG21	1:A:408:TRP:HB2	1.81	0.61
1:A:249:LEU:HB3	1:A:257:SER:HB3	1.82	0.61
1:A:853:ASN:ND2	1:A:855:PHE:O	2.34	0.61
1:A:516:ARG:HD2	1:A:534:VAL:HG12	1.82	0.61
1:A:834:GLU:HA	1:A:933:THR:HA	1.83	0.60
1:A:811:VAL:HG12	1:A:830:SER:H	1.65	0.60
1:A:844:LYS:HG2	1:A:917:SER:HA	1.82	0.60
1:A:578:LYS:NZ	1:A:630:PRO:O	2.33	0.60
1:A:418:GLN:OE1	1:A:421:GLN:NE2	2.35	0.59
1:A:410:PRO:O	1:A:434:GLN:NE2	2.35	0.59
1:A:372:TRP:HD1	1:A:373:VAL:HG13	1.66	0.59
1:A:379:ILE:HG23	1:A:380:PRO:HD3	1.83	0.59
1:A:406:ILE:HA	1:A:430:LYS:HB3	1.85	0.59
1:A:529:ILE:HG12	1:A:530:PRO:HD2	1.84	0.59
1:A:368:VAL:HG23	1:A:406:ILE:HG23	1.86	0.58
1:A:910:HIS:HB2	1:A:913:LEU:HB3	1.85	0.58
1:A:126:GLN:H	1:A:203:ALA:HB3	1.67	0.58
1:A:593:TRP:HB3	1:A:991:ILE:HG23	1.86	0.58
1:A:782:LYS:NZ	1:A:784:VAL:HG22	2.18	0.58
1:A:297:CYS:SG	1:A:506:GLY:N	2.76	0.58
1:A:451:TRP:O	1:A:459:LEU:N	2.35	0.58
1:A:782:LYS:HD2	1:A:798:VAL:HG23	1.86	0.57
1:A:582:ARG:NH2	1:A:885:HIS:O	2.38	0.57
1:A:500:LYS:HG2	1:A:502:ASP:H	1.70	0.56
1:A:1017:ARG:HA	1:A:1078:SER:HA	1.86	0.56
1:A:423:CYS:SG	1:A:424:ARG:N	2.78	0.56
1:A:889:ASP:OD1	1:A:890:TYR:N	2.38	0.56
1:A:831:THR:HB	1:A:936:ILE:HB	1.87	0.56
1:A:594:ILE:HG13	1:A:597:LYS:HE2	1.87	0.56
1:A:644:PRO:HA	1:A:647:HIS:HB2	1.88	0.56
1:A:787:SER:HB3	1:A:795:ALA:HB3	1.88	0.56
1:A:721:LYS:H	1:A:782:LYS:HE3	1.70	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:377:THR:O	1:A:861:GLN:NE2	2.39	0.56
1:A:669:LYS:HB2	1:A:969:ASP:OD2	2.06	0.55
1:A:810:SER:HA	1:A:831:THR:HA	1.89	0.55
1:A:593:TRP:NE1	1:A:675:MET:SD	2.80	0.54
1:A:110:PHE:N	1:A:173:ILE:O	2.41	0.54
1:A:55:LYS:HD3	1:A:113:LYS:HZ2	1.73	0.54
1:A:59:TYR:HB3	1:A:109:TRP:HB2	1.89	0.54
1:A:780:LYS:HD2	1:A:801:GLN:HB3	1.89	0.54
1:A:126:GLN:HE22	1:A:128:LEU:HD13	1.72	0.54
1:A:900:LEU:O	1:A:939:ALA:N	2.38	0.54
1:A:109:TRP:CD2	1:A:174:GLU:HB3	2.43	0.53
1:A:313:LYS:HD3	1:A:504:GLY:HA3	1.90	0.53
1:A:1016:VAL:O	1:A:1079:PHE:N	2.35	0.53
1:A:521:MET:O	1:A:524:ARG:NH2	2.41	0.53
1:A:831:THR:N	1:A:936:ILE:O	2.41	0.53
1:A:139:VAL:HG12	1:A:173:ILE:HB	1.91	0.53
1:A:844:LYS:HD3	1:A:915:ARG:HG2	1.91	0.53
1:A:177:ASN:ND2	1:A:193:ASP:OD1	2.43	0.52
1:A:1030:LEU:HB2	1:A:1071:LEU:HG	1.92	0.52
1:A:840:ASN:HD21	1:A:923:LYS:HE2	1.75	0.52
1:A:989:SER:HB2	1:A:1019:TYR:HE2	1.73	0.52
1:A:136:GLU:HA	1:A:316:ARG:HH12	1.75	0.52
1:A:303:TRP:HZ3	1:A:503:GLY:H	1.58	0.51
1:A:436:LEU:HA	1:A:564:PHE:HB2	1.91	0.51
1:A:814:LEU:HB3	1:A:827:VAL:HG23	1.92	0.51
1:A:901:ASN:ND2	1:A:904:LYS:HB2	2.24	0.51
1:A:634:ILE:HG12	1:A:635:GLU:H	1.76	0.51
1:A:117:PRO:HB2	1:A:122:LYS:HD2	1.91	0.51
1:A:289:THR:HB	1:A:530:PRO:HB3	1.93	0.51
1:A:714:LEU:HD11	1:A:942:PRO:HB3	1.92	0.51
1:A:667:GLN:HG3	1:A:971:GLY:HA3	1.93	0.50
1:A:581:MET:O	1:A:585:GLU:N	2.41	0.50
1:A:983:ASP:HB3	1:A:986:VAL:HG12	1.94	0.50
1:A:332:LYS:HD3	1:A:364:GLN:HA	1.93	0.50
1:A:785:GLN:O	1:A:797:GLU:N	2.38	0.50
1:A:848:PRO:HA	1:A:913:LEU:HA	1.93	0.50
1:A:603:PRO:HA	1:A:606:TYR:HA	1.94	0.50
1:A:901:ASN:HD22	1:A:904:LYS:HE2	1.76	0.50
1:A:144:THR:HG23	1:A:145:LEU:H	1.77	0.50
1:A:1028:ALA:O	1:A:1071:LEU:N	2.36	0.49
1:A:298:HIS:HB3	1:A:501:GLY:HA2	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:375:ASN:HD21	1:A:388:GLN:HE22	1.61	0.49
1:A:721:LYS:N	1:A:782:LYS:HE3	2.28	0.49
1:A:1014:ILE:HD11	1:A:1081:LEU:HD12	1.95	0.49
1:A:132:ASP:HB3	1:A:196:ARG:HA	1.94	0.49
1:A:573:SER:O	1:A:578:LYS:NZ	2.45	0.49
1:A:884:HIS:N	1:A:905:TYR:O	2.31	0.49
1:A:357:ILE:HG23	1:A:358:PRO:HD3	1.95	0.49
1:A:288:LEU:HD13	1:A:527:ASN:HD21	1.78	0.48
1:A:451:TRP:HB3	1:A:459:LEU:HB3	1.94	0.48
1:A:756:ASP:OD2	1:A:915:ARG:NH2	2.46	0.48
1:A:813:SER:O	1:A:828:ASP:N	2.33	0.48
1:A:901:ASN:HD22	1:A:904:LYS:HB2	1.79	0.48
1:A:901:ASN:ND2	1:A:904:LYS:O	2.24	0.48
1:A:130:GLN:HE21	1:A:201:ARG:HD2	1.79	0.48
1:A:45:LYS:NZ	1:A:125:GLU:OE2	2.45	0.48
1:A:993:ARG:HG2	1:A:1014:ILE:HG22	1.96	0.48
1:A:1069:ILE:HG23	1:A:1070:LYS:HG3	1.94	0.48
1:A:730:ASP:HB2	1:A:733:LEU:HB2	1.95	0.48
1:A:802:ILE:HG12	1:A:803:SER:H	1.79	0.48
1:A:709:LEU:HD11	1:A:794:CYS:HB3	1.95	0.47
1:A:981:SER:OG	1:A:982:GLY:N	2.46	0.47
1:A:430:LYS:NZ	1:A:460:LEU:HG	2.29	0.47
1:A:898:SER:HB3	1:A:941:TYR:HB3	1.96	0.47
1:A:175:ALA:HB2	1:A:196:ARG:HD3	1.95	0.47
1:A:815:ASN:HD22	1:A:822:ALA:HB1	1.79	0.47
1:A:127:LEU:HB3	1:A:161:LEU:HD12	1.95	0.47
1:A:648:ASN:HA	1:A:651:LYS:HB2	1.95	0.47
1:A:425:LEU:HB3	1:A:1043:ASP:HB2	1.96	0.47
1:A:1030:LEU:N	1:A:1069:ILE:O	2.48	0.47
1:A:50:ASP:OD2	1:A:200:LEU:HD23	2.16	0.46
1:A:136:GLU:OE2	1:A:309:GLU:HB3	2.15	0.46
1:A:643:VAL:HG13	1:A:645:MET:H	1.80	0.46
1:A:460:LEU:HD21	1:A:545:ILE:HD13	1.97	0.46
1:A:886:LYS:HG2	1:A:956:HIS:HA	1.98	0.46
1:A:904:LYS:HZ1	1:A:938:TYR:HB3	1.81	0.46
1:A:1025:GLU:HG2	1:A:1026:SER:N	2.31	0.46
1:A:307:PHE:HA	1:A:310:THR:HG22	1.98	0.46
1:A:332:LYS:HD2	1:A:366:PHE:HE2	1.81	0.46
1:A:640:TYR:HA	1:A:643:VAL:HB	1.98	0.46
1:A:109:TRP:HA	1:A:174:GLU:HA	1.98	0.45
1:A:848:PRO:HB3	1:A:913:LEU:HD12	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:141:ASP:OD1	1:A:141:ASP:N	2.49	0.45
1:A:676:ARG:HG2	1:A:677:THR:N	2.31	0.45
1:A:1018:VAL:O	1:A:1077:ALA:N	2.42	0.45
1:A:142:PRO:HB2	1:A:144:THR:O	2.17	0.45
1:A:215:LEU:HD23	1:A:258:VAL:HG13	1.99	0.45
1:A:345:LEU:HD13	1:A:398:LYS:NZ	2.32	0.45
1:A:376:ASP:HA	1:A:412:THR:HG23	1.99	0.45
1:A:1015:VAL:HA	1:A:1080:ARG:HA	1.99	0.45
1:A:1067:ILE:HD12	1:A:1067:ILE:H	1.82	0.45
1:A:299:ILE:HG21	1:A:314:ILE:HD13	1.98	0.45
1:A:449:PHE:HD1	1:A:556:PRO:HB2	1.81	0.45
1:A:634:ILE:HG23	1:A:636:MET:H	1.82	0.45
1:A:809:LYS:O	1:A:832:THR:N	2.40	0.45
1:A:991:ILE:HD12	1:A:1016:VAL:HG22	1.99	0.44
1:A:573:SER:HB2	1:A:920:ARG:HB3	1.99	0.44
1:A:408:TRP:CH2	1:A:410:PRO:HG3	2.52	0.44
1:A:807:LYS:H	1:A:836:TRP:HZ3	1.65	0.44
1:A:593:TRP:HB3	1:A:991:ILE:O	2.17	0.44
1:A:857:SER:N	1:A:889:ASP:O	2.49	0.44
1:A:321:GLN:O	1:A:325:MET:HG2	2.18	0.44
1:A:783:LYS:H	1:A:799:ILE:HG22	1.81	0.44
1:A:808:ILE:HA	1:A:833:VAL:HG22	1.99	0.44
1:A:337:GLN:HB2	1:A:340:GLN:HB2	1.99	0.44
1:A:403:LYS:HG2	1:A:404:SER:H	1.83	0.44
1:A:613:ILE:HG13	1:A:616:LEU:HD12	1.99	0.44
1:A:215:LEU:HD22	1:A:262:ARG:HB2	2.00	0.43
1:A:202:LYS:HB2	1:A:202:LYS:NZ	2.32	0.43
1:A:857:SER:HB3	1:A:889:ASP:HB3	2.00	0.43
1:A:336:SER:HA	1:A:368:VAL:HG13	1.99	0.43
1:A:467:ASN:HB3	1:A:471:ALA:HB2	1.99	0.43
1:A:1042:VAL:HG22	1:A:1048:LYS:HA	1.99	0.43
1:A:664:LEU:HA	1:A:664:LEU:HD23	1.87	0.43
1:A:545:ILE:O	1:A:549:THR:HG22	2.18	0.43
1:A:438:TRP:HB3	1:A:442:ASN:HD21	1.84	0.43
1:A:816:ALA:H	1:A:822:ALA:HB3	1.84	0.43
1:A:992:LYS:O	1:A:1015:VAL:N	2.39	0.43
1:A:789:ASN:O	1:A:790:THR:HG23	2.19	0.43
1:A:860:THR:OG1	1:A:861:GLN:N	2.52	0.43
1:A:978:ILE:H	1:A:978:ILE:HD12	1.84	0.43
1:A:506:GLY:HA2	1:A:507:PRO:HD3	1.84	0.42
1:A:84:ARG:HB3	1:A:90:LEU:HD12	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:96:ASN:OD1	1:A:97:ILE:HG23	2.19	0.42
1:A:475:PHE:CE1	1:A:477:ASP:HB2	2.53	0.42
1:A:566:PHE:CD2	1:A:568:ARG:HG2	2.54	0.42
1:A:58:TRP:HB3	1:A:95:ALA:HB2	2.01	0.42
1:A:760:LEU:HD23	1:A:762:TRP:H	1.85	0.42
1:A:95:ALA:O	1:A:96:ASN:ND2	2.52	0.42
1:A:1068:PRO:HD2	1:A:1079:PHE:HE1	1.83	0.42
1:A:246:VAL:HA	1:A:261:CYS:SG	2.59	0.42
1:A:369:GLY:HA2	1:A:428:ILE:HD12	2.01	0.42
1:A:430:LYS:HZ1	1:A:460:LEU:HG	1.84	0.42
1:A:444:PHE:HA	1:A:445:PRO:HD3	1.79	0.42
1:A:59:TYR:CE2	1:A:91:GLU:HB2	2.54	0.42
1:A:811:VAL:N	1:A:830:SER:O	2.53	0.42
1:A:342:LYS:HE3	1:A:346:GLU:OE2	2.19	0.42
1:A:884:HIS:HE2	1:A:901:ASN:CG	2.22	0.42
1:A:423:CYS:SG	1:A:459:LEU:HG	2.60	0.42
1:A:509:GLU:HG2	1:A:511:MET:HG2	2.01	0.42
1:A:598:THR:OG1	1:A:664:LEU:HD21	2.19	0.42
1:A:133:CYS:HB3	1:A:155:GLU:HA	2.02	0.41
1:A:625:PHE:HB2	1:A:628:VAL:HG23	2.03	0.41
1:A:519:ARG:HG2	1:A:532:LEU:HG	2.02	0.41
1:A:573:SER:HB2	1:A:920:ARG:HE	1.86	0.41
1:A:491:TYR:CG	1:A:492:GLY:N	2.88	0.41
1:A:718:ILE:HA	1:A:725:ILE:HA	2.03	0.41
1:A:140:ILE:N	1:A:172:TYR:O	2.48	0.41
1:A:405:LYS:O	1:A:428:ILE:HG13	2.20	0.41
1:A:667:GLN:HA	1:A:970:ILE:O	2.21	0.41
1:A:579:LYS:NZ	1:A:935:GLU:H	2.19	0.41
1:A:153:GLY:HA2	1:A:507:PRO:HB3	2.03	0.41
1:A:373:VAL:HG11	1:A:621:LEU:HB3	2.02	0.41
1:A:394:ARG:NH1	1:A:614:ASN:HD21	2.19	0.41
1:A:408:TRP:CD1	1:A:432:LEU:HD22	2.56	0.41
1:A:644:PRO:O	1:A:648:ASN:N	2.47	0.41
1:A:54:VAL:HG23	1:A:55:LYS:HG3	2.02	0.41
1:A:844:LYS:HB3	1:A:915:ARG:HG2	2.02	0.41
1:A:1029:SER:HA	1:A:1070:LYS:HA	2.03	0.41
1:A:46:ARG:HG2	1:A:47:ILE:H	1.85	0.41
1:A:1025:GLU:HG2	1:A:1026:SER:H	1.86	0.40
1:A:1013:SER:OG	1:A:1081:LEU:O	2.26	0.40
1:A:430:LYS:HG2	1:A:542:TYR:CZ	2.56	0.40
1:A:859:GLU:HG2	1:A:863:GLY:O	2.20	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:298:HIS:HB2	1:A:408:TRP:HH2	1.86	0.40
1:A:475:PHE:CZ	1:A:481:THR:HG22	2.57	0.40
1:A:351:PHE:O	1:A:355:VAL:HG23	2.22	0.40
1:A:575:ALA:O	1:A:579:LYS:HG3	2.21	0.40
1:A:665:GLN:NE2	1:A:967:PRO:HD3	2.37	0.40
1:A:753:VAL:HG22	1:A:847:PHE:CE1	2.57	0.40
1:A:855:PHE:CD1	1:A:866:LYS:HG3	2.56	0.40
1:A:943:HIS:CE1	1:A:948:SER:HA	2.56	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 PDB entries followed by that with respect to all EM entries.

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	907/1096 (83%)	814 (90%)	90 (10%)	3 (0%)	46	83

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	478	VAL
1	A	816	ALA
1	A	980	ILE

### 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 PDB entries followed by that with respect to all EM entries.

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	832/971 (86%)	810 (97%)	22 (3%)	54 80

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	201	ARG
1	A	350	GLU
1	A	357	ILE
1	A	433	THR
1	A	487	THR
1	A	489	GLU
1	A	593	TRP
1	A	598	THR
1	A	643	VAL
1	A	703	TYR
1	A	708	VAL
1	A	790	THR
1	A	798	VAL
1	A	800	PHE
1	A	812	ILE
1	A	893	TYR
1	A	901	ASN
1	A	903	CYS
1	A	940	ILE
1	A	951	THR
1	A	978	ILE
1	A	991	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (26) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	51	HIS
1	A	60	GLN
1	A	99	GLN
1	A	130	GLN
1	A	321	GLN
1	A	340	GLN
1	A	361	GLN
1	A	362	GLN
1	A	375	ASN
1	A	378	ASN
1	A	393	GLN

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Mol	Chain	Res	Type
1	A	458	GLN
1	A	484	GLN
1	A	513	GLN
1	A	527	ASN
1	A	533	GLN
1	A	614	ASN
1	A	662	GLN
1	A	665	GLN
1	A	711	ASN
1	A	785	GLN
1	A	840	ASN
1	A	943	HIS
1	A	959	ASN
1	A	973	ASN
1	A	1031	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

### 5.6 Ligand geometry ⓘ

There are no ligands in this entry.

### 5.7 Other polymers ⓘ

There are no such residues in this entry.

### 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.