



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 09:23 AM UTC

PDB ID : 2X2H / pdb_00002x2h
Title : Crystal structure of the Gracilariopsis lemaneiformis alpha-1,4- glucan lyase
Authors : Rozeboom, H.J.; Yu, S.; Madrid, S.; Kalk, K.H.; Dijkstra, B.W.
Deposited on : 2010-01-13
Resolution : 2.06 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)
Validation Pipeline (wwPDB-VP) : 2.49

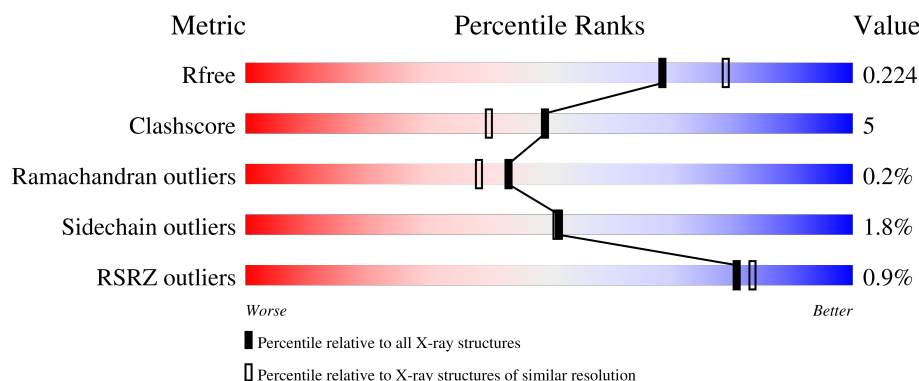
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.06 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	3774 (2.08-2.04)
Clashscore	190562	3883 (2.08-2.04)
Ramachandran outliers	187476	3860 (2.08-2.04)
Sidechain outliers	187428	3860 (2.08-2.04)
RSRZ outliers	180081	3775 (2.08-2.04)

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	1027	% 89% 10% .
1	B	1027	% 89% 10% .
1	C	1027	89% 10% .
1	D	1027	% 87% 12% .

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	GOL	A	2040	-	-	X	-
3	ACT	C	2044	-	-	X	-

2 Entry composition [i](#)

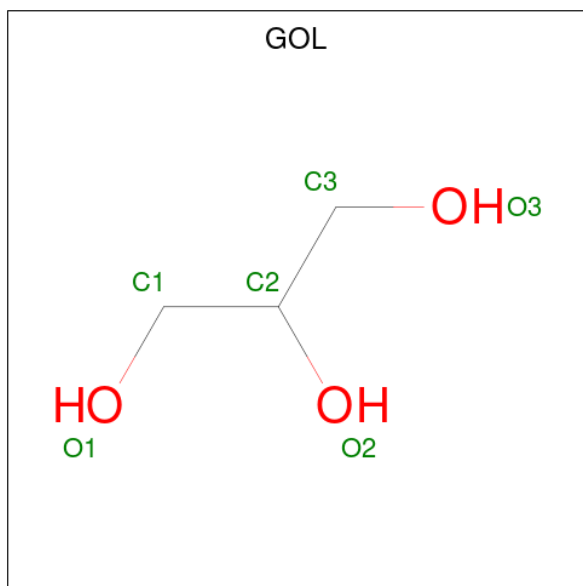
There are 5 unique types of molecules in this entry. The entry contains 36489 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 ALPHA-1,4-GLUCAN LYASE ISOZYME 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1025	Total	C	N	O	S	0	1	0
			8171	5143	1385	1596	47			
1	B	1025	Total	C	N	O	S	0	0	0
			8162	5135	1385	1595	47			
1	C	1025	Total	C	N	O	S	0	0	0
			8162	5135	1385	1595	47			
1	D	1025	Total	C	N	O	S	0	1	0
			8171	5143	1385	1596	47			

- Molecule 2 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

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

- Molecule 3 is ACETATE ION (CCD ID: ACT) (formula: C₂H₃O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	C	1	Total	C	O	0	0
			4	2	2		
3	C	1	Total	C	O	0	0
			4	2	2		
3	C	1	Total	C	O	0	0
			4	2	2		
3	D	1	Total	C	O	0	0
			4	2	2		
3	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 4 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Cl	0	0
			1	1		
4	B	1	Total	Cl	0	0
			1	1		

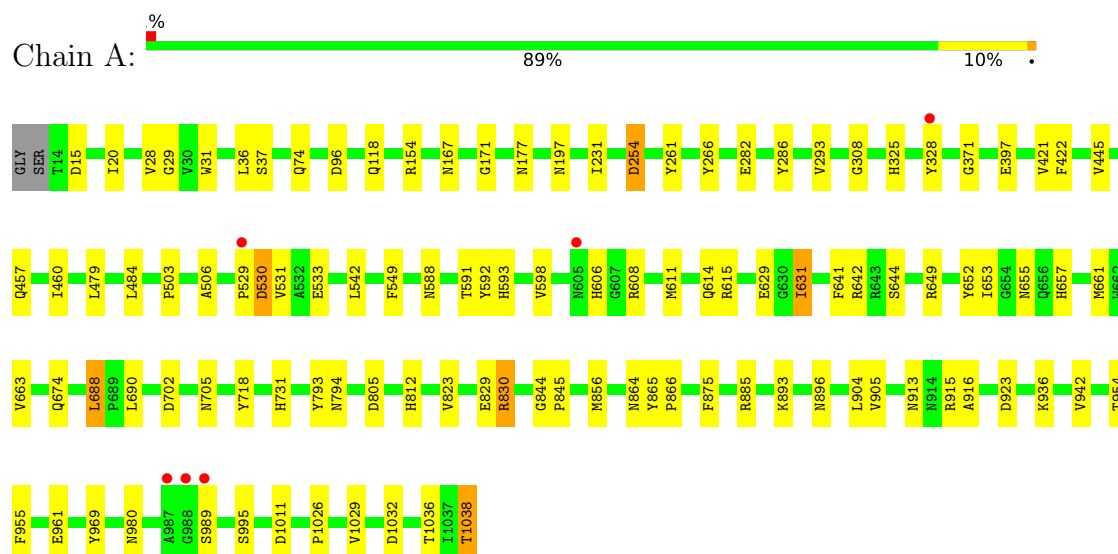
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1038	Total 1038	O 1038	0	0
5	B	792	Total 792	O 792	0	0
5	C	867	Total 867	O 867	0	0
5	D	992	Total 992	O 992	0	0

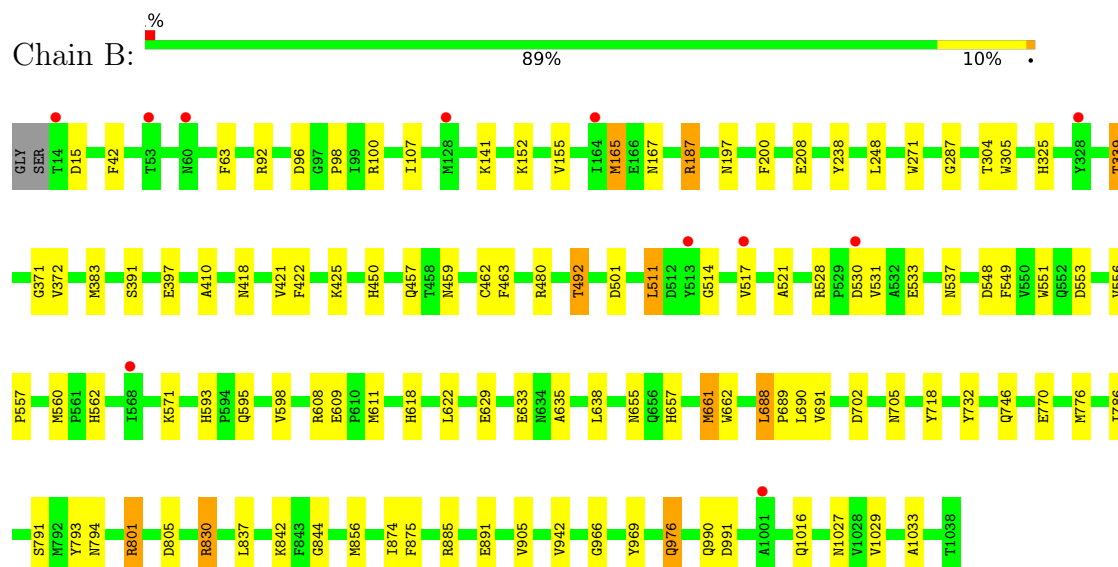
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

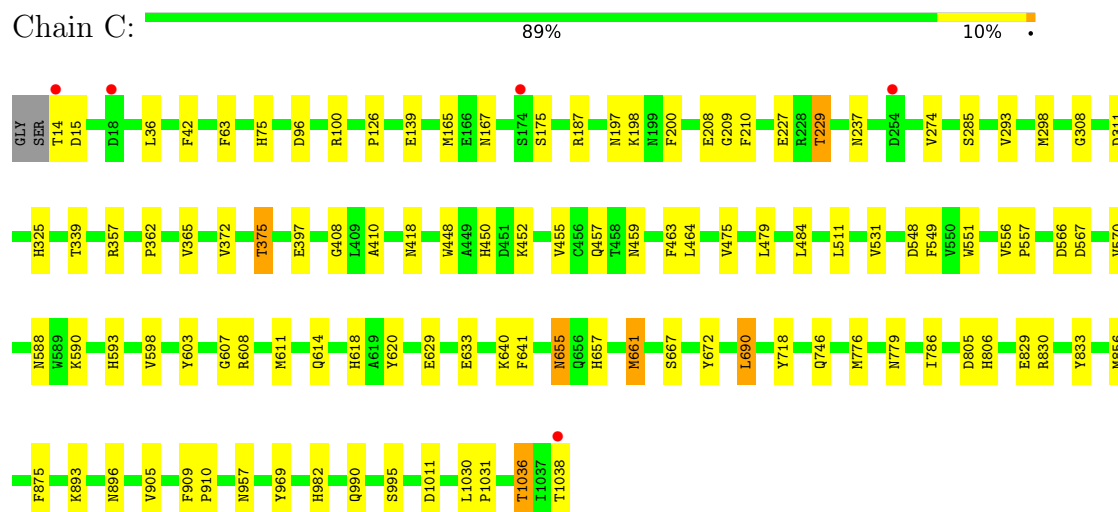
• Molecule 1: ALPHA-1,4-GLUCAN LYASE ISOZYME 1



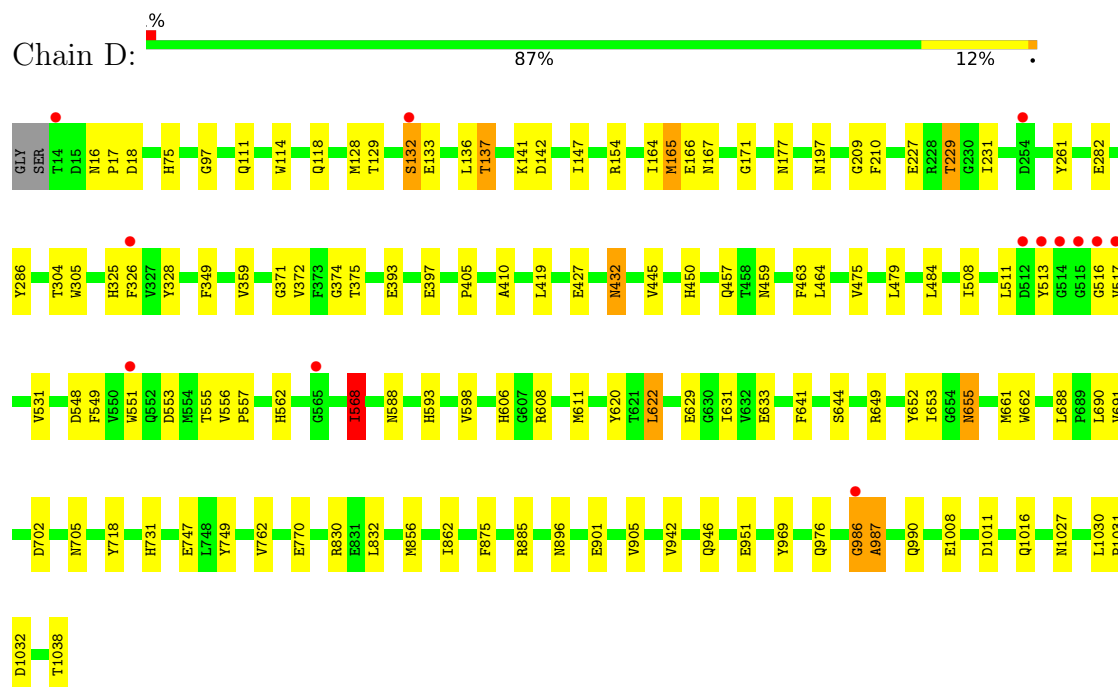
• Molecule 1: ALPHA-1,4-GLUCAN LYASE ISOZYME 1



• Molecule 1: ALPHA-1,4-GLUCAN LYASE ISOZYME 1



• Molecule 1: ALPHA-1,4-GLUCAN LYASE ISOZYME 1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	91.68Å 96.63Å 134.46Å 80.54° 83.28° 85.26°	Depositor
Resolution (Å)	132.45 – 2.06 131.89 – 2.06	Depositor EDS
% Data completeness (in resolution range)	92.7 (132.45-2.06) 74.1 (131.89-2.06)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.44 (at 2.06Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.168 , 0.215 0.175 , 0.224	Depositor DCC
R_{free} test set	10342 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å ²)	20.8	Xtriage
Anisotropy	0.106	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 41.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	36489	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.84% 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: CSO, ACT, CL, 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	A	0.53	0/8387	0.77	3/11407 (0.0%)
1	B	0.49	1/8374 (0.0%)	0.76	3/11389 (0.0%)
1	C	0.48	0/8374	0.76	0/11389
1	D	0.65	1/8387 (0.0%)	0.80	1/11407 (0.0%)
All	All	0.54	2/33522 (0.0%)	0.77	7/45592 (0.0%)

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	D	1	0

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	568	ILE	CG1-CD1	36.32	2.93	1.51
1	B	976	GLN	CA-CB	-12.93	1.31	1.53

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	568	ILE	CB-CG1-CD1	-25.79	59.63	113.80
1	B	976	GLN	N-CA-CB	9.10	125.88	110.49
1	A	844	GLY	CA-C-N	6.70	126.96	119.32
1	A	844	GLY	C-N-CA	6.70	126.96	119.32
1	B	844	GLY	CA-C-N	5.24	124.91	119.56
1	B	844	GLY	C-N-CA	5.24	124.91	119.56
1	A	631	ILE	N-CA-C	5.17	115.38	110.42

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	D	568	ILE	CB

There are no planarity outliers.

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	8171	0	7615	88	0
1	B	8162	0	7606	82	0
1	C	8162	0	7606	77	0
1	D	8171	0	7615	93	0
2	A	42	0	56	20	0
2	B	18	0	24	4	0
2	C	18	0	24	1	0
2	D	18	0	24	0	0
3	A	16	0	12	2	0
3	C	12	0	9	3	0
3	D	8	0	6	1	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	1038	0	0	20	0
5	B	792	0	0	19	0
5	C	867	0	0	11	0
5	D	992	0	0	14	0
All	All	36489	0	30597	342	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 5.

All (342) 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:B:776:MET:HE2	1:B:786:ILE:HD11	1.25	1.16
1:A:856:MET:HE1	1:A:875:PHE:CD1	1.89	1.06

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:397:GLU:OE2	1:C:397:GLU:OE2	1.85	0.94
1:B:776:MET:CE	1:B:786:ILE:HD11	2.01	0.90
1:A:615:ARG:HG3	2:A:2040:GOL:H11	1.53	0.90
1:C:776:MET:HE2	1:C:786:ILE:HD11	1.53	0.90
1:B:856:MET:HE1	1:B:875:PHE:CD1	2.07	0.89
1:B:339:THR:HG21	5:B:3239:HOH:O	1.73	0.89
1:D:165:MET:HG2	1:D:166:GLU:N	1.88	0.87
1:C:175:SER:HB3	5:C:3162:HOH:O	1.79	0.82
1:D:210:PHE:H	1:D:229:THR:HG22	1.44	0.82
1:C:210:PHE:H	1:C:229:THR:HG22	1.46	0.80
1:D:856:MET:HE1	1:D:875:PHE:HD1	1.48	0.78
1:D:137:THR:HG21	5:D:3167:HOH:O	1.84	0.78
1:A:615:ARG:CG	2:A:2040:GOL:H11	2.14	0.78
1:B:856:MET:HE1	1:B:875:PHE:HD1	1.50	0.77
1:A:856:MET:HE1	1:A:875:PHE:HD1	1.46	0.76
1:D:132:SER:HA	5:D:3154:HOH:O	1.84	0.76
1:A:529:PRO:O	1:A:530:ASP:HB2	1.85	0.76
1:C:640:LYS:HE3	5:C:3402:HOH:O	1.85	0.76
1:B:383:MET:HE1	5:B:3294:HOH:O	1.86	0.75
1:B:776:MET:HE2	1:B:786:ILE:CD1	2.12	0.75
1:D:856:MET:HE1	1:D:875:PHE:CD1	2.21	0.74
1:A:856:MET:HE1	1:A:875:PHE:CE1	2.21	0.74
1:A:611:MET:HG3	2:A:2040:GOL:H32	1.70	0.73
1:D:555:THR:HG22	1:D:622:LEU:CD2	2.18	0.72
1:C:464:LEU:HD22	1:C:475:VAL:HG12	1.71	0.72
1:D:459:ASN:HB2	1:D:551:TRP:CZ2	2.24	0.72
1:C:806:HIS:HE1	1:C:833:TYR:H	1.39	0.70
1:D:165:MET:HE1	1:D:326:PHE:CD1	2.26	0.70
1:A:254:ASP:HB3	5:A:3323:HOH:O	1.93	0.69
1:C:566:ASP:HB3	1:C:570:VAL:HG23	1.75	0.69
2:C:2040:GOL:H31	5:C:3653:HOH:O	1.92	0.69
1:C:806:HIS:CE1	1:C:833:TYR:H	2.12	0.68
1:D:976:GLN:HE22	1:D:1016:GLN:HA	1.58	0.68
1:D:562:HIS:HD2	1:D:593:HIS:NE2	1.92	0.68
1:C:187:ARG:HG3	5:C:3075:HOH:O	1.95	0.66
1:D:629:GLU:HG3	1:D:633:GLU:OE2	1.95	0.66
1:A:913:ASN:HB3	5:A:3914:HOH:O	1.94	0.65
1:C:776:MET:CE	1:C:786:ILE:HD11	2.25	0.65
1:B:562:HIS:ND1	1:B:593:HIS:HE1	1.95	0.64
1:C:856:MET:HE1	1:C:875:PHE:CD1	2.32	0.64
1:B:383:MET:CE	5:B:3294:HOH:O	2.44	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:198:LYS:HD3	5:C:3034:HOH:O	1.96	0.64
1:A:479:LEU:HD12	1:A:484:LEU:HB2	1.80	0.63
1:C:325:HIS:HE1	5:C:3262:HOH:O	1.80	0.63
1:B:325:HIS:HD2	5:B:3050:HOH:O	1.81	0.63
1:D:508:ILE:HB	1:D:568:ILE:HD11	1.80	0.63
1:C:457:GLN:HA	1:C:549:PHE:O	1.99	0.63
1:B:457:GLN:HA	1:B:549:PHE:O	1.98	0.62
1:D:450:HIS:HE1	1:D:548:ASP:OD1	1.81	0.62
1:C:325:HIS:HD2	5:C:3064:HOH:O	1.81	0.62
1:C:464:LEU:HD13	1:C:479:LEU:HD22	1.80	0.62
1:A:592:TYR:HB2	2:A:2040:GOL:O2	1.98	0.62
1:C:776:MET:HE2	1:C:786:ILE:CD1	2.27	0.62
1:A:20:ILE:HD11	1:A:96:ASP:HB3	1.81	0.62
1:A:893:LYS:HD2	5:A:3883:HOH:O	2.00	0.62
1:D:133:GLU:CD	1:D:133:GLU:H	2.08	0.62
1:A:611:MET:CG	2:A:2040:GOL:H12	2.30	0.61
1:C:566:ASP:HB3	1:C:570:VAL:CG2	2.31	0.61
1:A:606:HIS:HD2	5:A:3645:HOH:O	1.84	0.61
1:A:615:ARG:HA	2:A:2040:GOL:C1	2.32	0.60
1:D:141:LYS:HE3	1:D:142:ASP:OD2	2.01	0.60
1:B:339:THR:HG22	5:B:3052:HOH:O	1.99	0.60
1:D:210:PHE:H	1:D:229:THR:CG2	2.13	0.60
1:A:1036:THR:HG23	5:A:4027:HOH:O	2.02	0.60
1:D:165:MET:HG2	1:D:166:GLU:H	1.67	0.59
1:B:528:ARG:HB2	1:B:531:VAL:HG23	1.84	0.59
1:B:793:TYR:HA	2:B:2040:GOL:H12	1.83	0.59
1:C:995:SER:HB2	1:C:1011:ASP:HB3	1.84	0.59
1:C:75:HIS:HE1	5:C:3061:HOH:O	1.85	0.59
1:C:856:MET:HE1	1:C:875:PHE:HD1	1.67	0.58
1:A:282:GLU:HB3	5:A:3349:HOH:O	2.02	0.58
1:A:905:VAL:HG22	1:A:969:TYR:HB2	1.85	0.58
2:A:2044:GOL:H32	5:A:4034:HOH:O	2.02	0.58
1:B:537:ASN:HB3	5:B:3404:HOH:O	2.03	0.58
1:B:98:PRO:HD2	1:B:100:ARG:HH22	1.68	0.58
1:C:598:VAL:HG11	1:C:611:MET:HE2	1.85	0.58
1:A:325:HIS:HE1	5:A:3357:HOH:O	1.86	0.57
1:A:606:HIS:CD2	5:A:3645:HOH:O	2.56	0.57
1:D:905:VAL:HG22	1:D:969:TYR:HB2	1.86	0.57
1:A:371:GLY:C	1:A:731:HIS:HD2	2.12	0.57
1:B:141:LYS:HG2	5:B:3094:HOH:O	2.04	0.57
1:C:590:LYS:HE2	3:C:2043:ACT:H1	1.87	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:15:ASP:OD1	1:B:608:ARG:HD3	2.04	0.56
1:B:459:ASN:HB2	1:B:551:TRP:CZ2	2.41	0.56
1:B:462:CYS:HB2	5:B:3352:HOH:O	2.05	0.56
1:C:227:GLU:OE2	1:C:229:THR:CG2	2.53	0.56
1:C:690:LEU:HD12	1:C:776:MET:HE3	1.88	0.56
1:B:856:MET:HE1	1:B:875:PHE:CE1	2.39	0.56
1:C:556:VAL:HG22	3:C:2044:ACT:H2	1.88	0.56
1:D:463:PHE:CE1	1:D:511:LEU:HD22	2.41	0.56
1:D:114:TRP:O	1:D:118:GLN:HG2	2.06	0.55
1:C:479:LEU:HD12	1:C:484:LEU:HB2	1.88	0.55
1:A:588:ASN:HB3	1:A:593:HIS:CE1	2.42	0.55
1:A:611:MET:SD	2:A:2040:GOL:H12	2.46	0.55
1:A:20:ILE:CD1	1:A:96:ASP:HB3	2.36	0.55
1:C:805:ASP:OD1	1:C:806:HIS:HD2	1.89	0.55
1:C:14:THR:HG22	1:C:607:GLY:HA2	1.88	0.55
1:C:227:GLU:OE2	1:C:229:THR:HG21	2.07	0.55
1:A:615:ARG:HA	2:A:2040:GOL:H11	1.89	0.55
1:B:553:ASP:OD2	2:B:2041:GOL:H32	2.07	0.55
1:D:946:GLN:HE22	1:D:951:GLU:HB2	1.72	0.55
1:D:75:HIS:HE1	5:D:3087:HOH:O	1.88	0.54
1:D:419:LEU:HD11	1:D:517:VAL:HG22	1.88	0.54
1:A:15:ASP:OD1	1:A:608:ARG:HD3	2.07	0.54
1:D:450:HIS:HD2	5:D:3085:HOH:O	1.89	0.54
1:B:410:ALA:HB1	1:B:551:TRP:CZ3	2.42	0.54
1:D:171:GLY:HA2	1:D:177:ASN:HD22	1.71	0.54
1:D:598:VAL:HG11	1:D:611:MET:HE2	1.89	0.54
1:A:529:PRO:O	1:A:530:ASP:CB	2.55	0.54
1:D:154:ARG:HG2	1:D:166:GLU:HG3	1.88	0.54
1:D:464:LEU:HD22	1:D:475:VAL:HG12	1.90	0.54
1:D:374:GLY:HA2	5:D:3446:HOH:O	2.08	0.53
1:D:111:GLN:HE22	1:D:349:PHE:H	1.55	0.53
1:D:410:ALA:HB1	1:D:551:TRP:CZ3	2.43	0.53
1:D:606:HIS:CD2	5:D:3579:HOH:O	2.61	0.53
1:C:198:LYS:HE3	1:C:311:ASP:HB3	1.91	0.53
1:A:37:SER:HB2	5:A:3033:HOH:O	2.08	0.52
1:D:209:GLY:HA2	1:D:229:THR:HG21	1.92	0.52
1:B:383:MET:HE2	1:B:391:SER:N	2.25	0.52
1:B:598:VAL:HG11	1:B:611:MET:HE2	1.90	0.52
1:C:464:LEU:HD22	1:C:475:VAL:CG1	2.40	0.52
1:A:118:GLN:HG2	5:A:3151:HOH:O	2.09	0.52
1:D:986:GLY:O	1:D:987:ALA:HB3	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:591:THR:HG21	2:A:2040:GOL:H2	1.92	0.51
1:B:92:ARG:HD2	5:B:3065:HOH:O	2.10	0.51
1:C:237:ASN:HB3	3:C:2044:ACT:H1	1.91	0.51
1:B:794:ASN:H	2:B:2040:GOL:H11	1.75	0.51
1:B:514:GLY:O	1:B:517:VAL:HG22	2.11	0.51
1:D:631:ILE:HG23	1:D:644:SER:HB3	1.91	0.51
1:C:36:LEU:HD12	1:C:308:GLY:HA2	1.93	0.50
1:D:129:THR:CG2	1:D:137:THR:HG22	2.41	0.50
1:B:702:ASP:HB3	1:B:705:ASN:O	2.11	0.50
1:C:484:LEU:HB3	1:C:531:VAL:HG22	1.94	0.50
1:A:503:PRO:HG2	1:A:506:ALA:HB2	1.93	0.50
1:D:75:HIS:HD2	5:D:3107:HOH:O	1.95	0.50
1:C:905:VAL:HG22	1:C:969:TYR:HB2	1.94	0.50
1:C:450:HIS:HE1	1:C:548:ASP:OD1	1.95	0.50
1:C:641:PHE:CZ	1:C:896:ASN:HB2	2.46	0.50
1:A:266:TYR:HB3	1:A:649:ARG:O	2.12	0.50
1:D:129:THR:HG23	1:D:137:THR:HG22	1.94	0.50
1:A:460:ILE:HD11	1:A:542:LEU:CD1	2.41	0.50
1:C:100:ARG:HG3	1:C:603:TYR:CE1	2.46	0.50
1:A:794:ASN:ND2	2:A:2043:GOL:H11	2.26	0.49
1:B:661:MET:HG3	1:B:688:LEU:HG	1.94	0.49
1:C:620:TYR:HA	1:C:655:ASN:HD21	1.77	0.49
1:A:28:VAL:HG11	2:A:2045:GOL:H31	1.93	0.49
1:C:210:PHE:H	1:C:229:THR:CG2	2.23	0.49
1:C:667:SER:HB3	1:C:672:TYR:CE2	2.47	0.49
1:D:372:VAL:HB	1:D:375:THR:CG2	2.43	0.49
1:B:155:VAL:HG23	1:B:165:MET:HE2	1.93	0.49
1:D:484:LEU:HB3	1:D:531:VAL:HG22	1.94	0.49
1:D:770:GLU:HG2	1:D:885:ARG:HG2	1.93	0.49
1:C:15:ASP:OD1	1:C:608:ARG:HD3	2.13	0.49
1:B:560:MET:SD	1:B:571:LYS:HG2	2.53	0.49
1:C:96:ASP:OD1	1:C:187:ARG:HD2	2.13	0.48
1:A:154:ARG:HD2	5:A:3198:HOH:O	2.12	0.48
1:B:557:PRO:HD3	1:B:618:HIS:CE1	2.48	0.48
1:B:593:HIS:CD2	5:B:3447:HOH:O	2.66	0.48
1:D:901:GLU:HG2	5:D:3837:HOH:O	2.11	0.48
1:A:915:ARG:HG3	1:A:916:ALA:N	2.27	0.48
1:A:167:ASN:HA	1:A:197:ASN:HA	1.96	0.48
1:D:556:VAL:HB	1:D:557:PRO:C	2.39	0.48
1:A:286:TYR:HB3	1:A:328[A]:TYR:CD1	2.49	0.48
1:D:16:ASN:N	1:D:17:PRO:HD3	2.29	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:325:HIS:HD2	5:D:3094:HOH:O	1.97	0.48
1:D:513:TYR:HB2	1:D:517:VAL:HG13	1.95	0.48
1:B:657:HIS:HD2	5:B:3261:HOH:O	1.95	0.48
1:D:702:ASP:HB3	1:D:705:ASN:O	2.13	0.48
1:A:484:LEU:HB3	1:A:531:VAL:HG22	1.94	0.48
1:B:593:HIS:HD2	5:B:3447:HOH:O	1.96	0.48
1:A:231:ILE:HD12	1:A:261:TYR:HB2	1.95	0.47
1:A:812:HIS:HD2	5:A:3919:HOH:O	1.95	0.47
1:C:167:ASN:HA	1:C:197:ASN:HA	1.96	0.47
1:A:460:ILE:HD11	1:A:542:LEU:HD11	1.95	0.47
1:B:794:ASN:H	2:B:2040:GOL:C1	2.27	0.47
1:D:227:GLU:OE2	1:D:229:THR:CG2	2.62	0.47
1:B:155:VAL:HG23	1:B:165:MET:CE	2.43	0.47
1:D:457:GLN:HA	1:D:549:PHE:O	2.13	0.47
1:A:989:SER:HB2	5:A:3986:HOH:O	2.14	0.47
1:B:629:GLU:HG3	1:B:633:GLU:OE2	2.15	0.47
1:B:805:ASP:CG	1:B:830:ARG:HH22	2.23	0.47
1:C:463:PHE:CG	1:C:511:LEU:HD13	2.50	0.47
1:D:231:ILE:HB	1:D:261:TYR:CD1	2.49	0.47
1:D:556:VAL:HG22	3:D:2043:ACT:H3	1.95	0.47
1:A:615:ARG:HG3	2:A:2040:GOL:C1	2.34	0.47
1:A:615:ARG:CA	2:A:2040:GOL:H11	2.45	0.47
1:C:459:ASN:HB2	1:C:551:TRP:CZ2	2.50	0.47
1:C:556:VAL:HB	1:C:557:PRO:C	2.40	0.47
1:D:479:LEU:HD12	1:D:484:LEU:HB2	1.95	0.47
1:D:555:THR:CG2	1:D:622:LEU:CD2	2.92	0.47
1:A:980:ASN:HB3	1:A:1038:THR:HG22	1.97	0.47
1:B:42:PHE:HB3	1:B:63:PHE:HB3	1.97	0.47
1:B:383:MET:HE2	1:B:391:SER:HB3	1.97	0.47
1:B:155:VAL:CG2	1:B:165:MET:HE2	2.45	0.46
1:B:608:ARG:C	1:B:609:GLU:HG2	2.40	0.46
1:D:450:HIS:CE1	1:D:548:ASP:OD1	2.66	0.46
1:D:946:GLN:NE2	1:D:951:GLU:HB2	2.30	0.46
1:A:611:MET:HG3	2:A:2040:GOL:H12	1.98	0.46
1:A:793:TYR:HA	2:A:2043:GOL:H12	1.96	0.46
1:A:615:ARG:HA	2:A:2040:GOL:H12	1.97	0.46
1:A:936:LYS:HD2	1:A:961:GLU:CG	2.45	0.46
1:B:167:ASN:HA	1:B:197:ASN:HA	1.96	0.46
1:D:231:ILE:HD12	1:D:261:TYR:HB2	1.97	0.46
1:B:562:HIS:ND1	1:B:593:HIS:CE1	2.81	0.46
1:A:171:GLY:HA2	1:A:177:ASN:HD22	1.81	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:450:HIS:HE1	1:B:548:ASP:OD1	1.98	0.46
1:D:136:LEU:HD23	1:D:147:ILE:HD12	1.98	0.46
1:D:641:PHE:CZ	1:D:896:ASN:HB2	2.50	0.46
1:B:661:MET:HE3	1:B:661:MET:HB3	1.83	0.46
1:D:227:GLU:OE2	1:D:229:THR:HG21	2.16	0.46
1:D:282:GLU:HB3	5:D:3317:HOH:O	2.15	0.46
1:B:325:HIS:HE1	5:B:3209:HOH:O	1.99	0.46
1:B:200:PHE:HB2	1:B:208:GLU:HG3	1.97	0.45
1:B:966:GLY:O	1:B:1027:ASN:HB3	2.16	0.45
1:B:372:VAL:HG22	1:B:732:TYR:CE2	2.51	0.45
1:B:1029:VAL:O	1:B:1033:ALA:HB2	2.16	0.45
1:A:421:VAL:O	1:A:422:PHE:HB2	2.16	0.45
1:A:457:GLN:HA	1:A:549:PHE:O	2.16	0.45
1:B:304:THR:HG22	1:B:305:TRP:CD2	2.52	0.45
1:C:274:VAL:O	1:C:285:SER:HA	2.16	0.45
1:D:18:ASP:OD2	1:D:97:GLY:HA3	2.16	0.45
1:D:427:GLU:HA	1:D:432:ASN:ND2	2.31	0.45
1:A:36:LEU:HD12	1:A:308:GLY:HA2	1.99	0.45
1:C:408:GLY:HA3	1:C:455:VAL:O	2.16	0.45
1:C:661:MET:HE3	1:C:661:MET:HB3	1.81	0.45
1:D:167:ASN:HA	1:D:197:ASN:HA	1.99	0.45
1:B:891:GLU:HA	5:B:3306:HOH:O	2.16	0.45
1:A:702:ASP:HB3	1:A:705:ASN:O	2.16	0.45
1:A:845:PRO:HD2	3:A:2048:ACT:C	2.47	0.44
1:B:325:HIS:CD2	5:B:3050:HOH:O	2.63	0.44
1:C:410:ALA:HB1	1:C:551:TRP:CZ3	2.52	0.44
1:B:528:ARG:C	1:B:530:ASP:H	2.25	0.44
1:C:372:VAL:HB	1:C:375:THR:CG2	2.47	0.44
1:D:133:GLU:CD	1:D:133:GLU:N	2.74	0.44
1:A:657:HIS:HD2	5:A:3434:HOH:O	1.99	0.44
1:C:556:VAL:N	1:C:557:PRO:HA	2.33	0.44
1:A:885:ARG:HD2	1:A:904:LEU:HA	1.99	0.44
1:C:293:VAL:HG23	1:C:614:GLN:HA	1.99	0.44
1:C:856:MET:HB2	1:C:856:MET:HE3	1.80	0.44
1:C:200:PHE:HB2	1:C:208:GLU:HG3	1.98	0.44
1:C:567:ASP:O	1:C:570:VAL:HG22	2.18	0.44
1:D:286:TYR:HB3	1:D:328[A]:TYR:CD1	2.52	0.44
1:B:661:MET:O	1:B:691:VAL:HA	2.17	0.44
1:C:1030:LEU:N	1:C:1031:PRO:CD	2.81	0.44
1:C:629:GLU:HG3	1:C:633:GLU:OE2	2.17	0.44
1:C:657:HIS:HD2	5:C:3325:HOH:O	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:128:MET:HE2	1:D:128:MET:HB3	1.83	0.44
1:A:631:ILE:HG23	1:A:644:SER:HB3	2.00	0.44
1:A:936:LYS:HD2	1:A:961:GLU:HG2	2.00	0.44
1:B:425:LYS:HE2	5:B:3314:HOH:O	2.17	0.44
1:C:209:GLY:HA2	1:C:229:THR:HG21	1.99	0.44
1:A:805:ASP:CG	1:A:830:ARG:HH22	2.26	0.43
1:C:957:ASN:HB3	5:C:3804:HOH:O	2.18	0.43
1:B:480:ARG:HH22	1:B:501:ASP:HB3	1.83	0.43
1:C:372:VAL:HB	1:C:375:THR:HG22	2.00	0.43
1:A:731:HIS:HE1	2:A:2041:GOL:O3	2.00	0.43
1:C:372:VAL:O	1:C:375:THR:HG23	2.17	0.43
1:A:533:GLU:HA	1:A:629:GLU:HG2	2.01	0.43
1:D:1030:LEU:N	1:D:1031:PRO:CD	2.81	0.43
1:D:111:GLN:NE2	1:D:349:PHE:H	2.17	0.43
1:D:661:MET:HE3	1:D:661:MET:HB3	1.94	0.43
1:A:29:GLY:HA3	1:A:31:TRP:CE2	2.54	0.43
1:A:936:LYS:HE3	5:A:3414:HOH:O	2.18	0.43
1:B:96:ASP:OD1	1:B:187:ARG:HD2	2.18	0.43
1:D:517:VAL:HG13	1:D:517:VAL:O	2.18	0.43
1:A:74:GLN:HG2	5:A:3067:HOH:O	2.18	0.43
1:B:905:VAL:HG22	1:B:969:TYR:HB2	2.00	0.43
1:D:325:HIS:HE1	5:D:3353:HOH:O	2.01	0.43
1:D:832:LEU:HD23	1:D:862:ILE:HD12	2.01	0.43
1:A:293:VAL:HG23	1:A:614:GLN:HA	2.01	0.43
3:A:2046:ACT:H3	5:A:3986:HOH:O	2.19	0.43
1:B:152:LYS:HE3	5:B:3117:HOH:O	2.19	0.43
1:D:588:ASN:HB3	1:D:593:HIS:CE1	2.53	0.43
1:A:652:TYR:O	1:A:653:ILE:C	2.62	0.42
1:A:923:ASP:OD1	1:A:923:ASP:C	2.62	0.42
1:C:362:PRO:HD2	1:C:365:VAL:HG23	2.01	0.42
1:C:588:ASN:HB3	1:C:593:HIS:CE1	2.54	0.42
1:D:652:TYR:H	1:D:655:ASN:ND2	2.16	0.42
1:D:986:GLY:O	1:D:987:ALA:CB	2.67	0.42
1:B:107:ILE:HD12	1:B:325:HIS:CE1	2.54	0.42
1:B:397:GLU:HG3	5:B:3293:HOH:O	2.17	0.42
1:B:421:VAL:O	1:B:422:PHE:HB2	2.19	0.42
1:D:553:ASP:OD1	1:D:649:ARG:HD3	2.19	0.42
1:D:976:GLN:HE22	1:D:1016:GLN:CA	2.28	0.42
1:A:865:TYR:HA	1:A:866:PRO:HD3	1.87	0.42
1:B:776:MET:CE	1:B:786:ILE:CD1	2.82	0.42
1:D:393:GLU:O	1:D:397:GLU:HG3	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:126:PRO:HA	1:C:139:GLU:O	2.19	0.42
1:A:641:PHE:CZ	1:A:896:ASN:HB2	2.54	0.42
1:A:642:ARG:HD3	5:A:3929:HOH:O	2.18	0.42
1:C:325:HIS:CD2	5:C:3064:HOH:O	2.63	0.42
1:C:557:PRO:HD3	1:C:618:HIS:CE1	2.54	0.42
1:A:598:VAL:HG11	1:A:611:MET:HE2	1.99	0.42
1:A:829:GLU:OE1	1:A:864:ASN:HA	2.20	0.42
1:B:271:TRP:CH2	1:B:287:GLY:HA3	2.54	0.42
1:A:955:PHE:O	1:A:1032:ASP:HA	2.19	0.42
1:A:1026:PRO:O	1:A:1029:VAL:HG22	2.20	0.42
1:C:42:PHE:HB3	1:C:63:PHE:HB3	2.02	0.42
1:D:154:ARG:HD2	5:D:3179:HOH:O	2.19	0.42
1:C:1038:THR:OXT	1:C:1038:THR:HG22	2.18	0.42
1:A:37:SER:CB	5:A:3033:HOH:O	2.66	0.42
1:D:371:GLY:HA3	1:D:731:HIS:HD2	1.85	0.42
1:D:555:THR:HG22	1:D:622:LEU:HD22	1.97	0.42
1:A:231:ILE:HB	1:A:261:TYR:CD1	2.55	0.42
1:A:661:MET:HG3	1:A:688:LEU:HG	2.01	0.42
1:B:801:ARG:HE	1:B:801:ARG:HB2	1.65	0.42
1:C:982:HIS:HB3	1:C:1036:THR:HG23	2.01	0.41
1:D:304:THR:HG22	1:D:305:TRP:CD2	2.55	0.41
1:D:661:MET:O	1:D:691:VAL:HA	2.20	0.41
1:D:747:GLU:HB3	1:D:749:TYR:CE1	2.55	0.41
1:B:837:LEU:HD23	1:B:837:LEU:HA	1.83	0.41
1:B:371:GLY:HA3	1:B:410:ALA:HB3	2.00	0.41
1:B:976:GLN:HE22	1:B:1016:GLN:HA	1.85	0.41
1:D:1008:GLU:O	1:D:1011:ASP:HB2	2.20	0.41
1:D:137:THR:HG23	5:D:3150:HOH:O	2.20	0.41
1:D:516:GLY:HA2	5:D:3509:HOH:O	2.19	0.41
1:A:794:ASN:H	2:A:2043:GOL:C1	2.34	0.41
1:A:942:VAL:HA	1:A:954:THR:O	2.21	0.41
1:B:556:VAL:N	1:B:557:PRO:HA	2.36	0.41
1:B:842:LYS:N	1:B:856:MET:HE2	2.36	0.41
1:C:448:TRP:CZ2	1:C:452:LYS:HE3	2.56	0.41
1:A:995:SER:HB2	1:A:1011:ASP:HB3	2.03	0.41
1:B:463:PHE:CE1	1:B:511:LEU:HD22	2.56	0.41
1:B:463:PHE:HB2	1:B:521:ALA:HB1	2.03	0.41
1:B:770:GLU:HG2	1:B:885:ARG:HG2	2.03	0.41
1:B:990:GLN:HG2	1:B:991:ASP:O	2.20	0.41
1:C:357:ARG:HB2	1:C:779:ASN:O	2.21	0.41
1:B:238:TYR:CD2	1:B:248:LEU:HD11	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:492:THR:HG21	1:B:595:GLN:HB3	2.03	0.41
1:C:909:PHE:O	1:C:910:PRO:C	2.62	0.41
1:D:1032:ASP:O	1:D:1032:ASP:CG	2.64	0.41
1:D:405:PRO:HB2	1:D:762:VAL:HG12	2.03	0.40
1:B:874:ILE:HD12	5:B:3658:HOH:O	2.20	0.40
1:D:556:VAL:N	1:D:557:PRO:HA	2.36	0.40
1:D:652:TYR:O	1:D:653:ILE:C	2.64	0.40
1:B:635:ALA:HA	1:B:638:LEU:HD12	2.02	0.40
1:D:620:TYR:HA	1:D:655:ASN:HD21	1.86	0.40
1:A:611:MET:HG3	2:A:2040:GOL:C3	2.46	0.40
1:A:674:GLN:HG3	1:A:823:VAL:HB	2.04	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	A	1023/1027 (100%)	986 (96%)	35 (3%)	2 (0%)	43	38
1	B	1022/1027 (100%)	985 (96%)	35 (3%)	2 (0%)	43	38
1	C	1022/1027 (100%)	988 (97%)	33 (3%)	1 (0%)	48	44
1	D	1023/1027 (100%)	980 (96%)	41 (4%)	2 (0%)	43	38
All	All	4090/4108 (100%)	3939 (96%)	144 (4%)	7 (0%)	43	38

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	986	GLY
1	D	987	ALA
1	A	530	ASP
1	B	746	GLN

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Mol	Chain	Res	Type
1	C	746	GLN
1	B	689	PRO
1	A	663	VAL

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	878/878 (100%)	870 (99%)	8 (1%)	70	74
1	B	877/878 (100%)	859 (98%)	18 (2%)	47	45
1	C	877/878 (100%)	862 (98%)	15 (2%)	53	53
1	D	878/878 (100%)	857 (98%)	21 (2%)	43	40
All	All	3510/3512 (100%)	3448 (98%)	62 (2%)	51	51

All (62) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	254	ASP
1	A	445	VAL
1	A	655	ASN
1	A	688	LEU
1	A	690	LEU
1	A	718	TYR
1	A	830	ARG
1	A	1038	THR
1	B	165	MET
1	B	187	ARG
1	B	339	THR
1	B	418	ASN
1	B	492	THR
1	B	511	LEU
1	B	533	GLU
1	B	622	LEU
1	B	655	ASN
1	B	661	MET

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Mol	Chain	Res	Type
1	B	662	TRP
1	B	688	LEU
1	B	690	LEU
1	B	718	TYR
1	B	791	SER
1	B	801	ARG
1	B	830	ARG
1	B	942	VAL
1	C	165	MET
1	C	229	THR
1	C	298	MET
1	C	339	THR
1	C	375	THR
1	C	418	ASN
1	C	655	ASN
1	C	661	MET
1	C	690	LEU
1	C	718	TYR
1	C	829	GLU
1	C	830	ARG
1	C	893	LYS
1	C	990	GLN
1	C	1036	THR
1	D	132	SER
1	D	137	THR
1	D	164	ILE
1	D	165	MET
1	D	229	THR
1	D	359	VAL
1	D	432	ASN
1	D	445	VAL
1	D	568	ILE
1	D	608	ARG
1	D	622	LEU
1	D	655	ASN
1	D	662	TRP
1	D	688	LEU
1	D	690	LEU
1	D	718	TYR
1	D	830	ARG
1	D	942	VAL
1	D	990	GLN

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Mol	Chain	Res	Type
1	D	1027	ASN
1	D	1038	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (91) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	62	ASN
1	A	177	ASN
1	A	221	GLN
1	A	242	ASN
1	A	325	HIS
1	A	400	GLN
1	A	418	ASN
1	A	477	GLN
1	A	552	GLN
1	A	605	ASN
1	A	655	ASN
1	A	657	HIS
1	A	731	HIS
1	A	794	ASN
1	A	803	GLN
1	A	812	HIS
1	A	864	ASN
1	A	930	ASN
1	A	934	ASN
1	B	62	ASN
1	B	74	GLN
1	B	75	HIS
1	B	221	GLN
1	B	242	ASN
1	B	309	GLN
1	B	325	HIS
1	B	382	HIS
1	B	403	ASN
1	B	416	GLN
1	B	418	ASN
1	B	450	HIS
1	B	593	HIS
1	B	657	HIS
1	B	753	ASN
1	B	794	ASN
1	B	795	ASN

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Mol	Chain	Res	Type
1	B	826	ASN
1	B	864	ASN
1	B	930	ASN
1	B	976	GLN
1	B	980	ASN
1	B	1009	ASN
1	C	62	ASN
1	C	74	GLN
1	C	80	GLN
1	C	207	GLN
1	C	217	ASN
1	C	242	ASN
1	C	309	GLN
1	C	325	HIS
1	C	416	GLN
1	C	450	HIS
1	C	457	GLN
1	C	655	ASN
1	C	657	HIS
1	C	753	ASN
1	C	794	ASN
1	C	795	ASN
1	C	803	GLN
1	C	806	HIS
1	C	812	HIS
1	C	826	ASN
1	C	839	GLN
1	C	857	ASN
1	C	930	ASN
1	C	934	ASN
1	C	976	GLN
1	C	1009	ASN
1	D	62	ASN
1	D	111	GLN
1	D	177	ASN
1	D	197	ASN
1	D	207	GLN
1	D	242	ASN
1	D	325	HIS
1	D	402	ASN
1	D	432	ASN
1	D	450	HIS

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Mol	Chain	Res	Type
1	D	471	GLN
1	D	552	GLN
1	D	562	HIS
1	D	655	ASN
1	D	731	HIS
1	D	753	ASN
1	D	826	ASN
1	D	930	ASN
1	D	946	GLN
1	D	976	GLN
1	D	990	GLN
1	D	1009	ASN
1	D	1027	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	CSO	B	336	1	3,6,7	0.58	0	1,6,8	0.84	0
1	CSO	C	336	1	3,6,7	0.52	0	1,6,8	0.73	0
1	CSO	A	336	1	3,6,7	0.71	0	1,6,8	0.23	0
1	CSO	D	336	1	3,6,7	0.53	0	1,6,8	0.14	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
1	CSO	B	336	1	-	0/1/5/7	-
1	CSO	C	336	1	-	0/1/5/7	-
1	CSO	A	336	1	-	0/1/5/7	-
1	CSO	D	336	1	-	0/1/5/7	-

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.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 27 ligands modelled in this entry, 2 are monoatomic - leaving 25 for Mogul analysis.

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
2	GOL	C	2040	-	5,5,5	0.31	0	5,5,5	1.10	1 (20%)
3	ACT	D	2043	-	3,3,3	0.79	0	3,3,3	1.28	0
2	GOL	D	2041	-	5,5,5	0.32	0	5,5,5	0.41	0
3	ACT	C	2044	-	3,3,3	0.96	0	3,3,3	1.04	0
2	GOL	C	2041	-	5,5,5	0.36	0	5,5,5	0.47	0
2	GOL	A	2045	-	5,5,5	0.36	0	5,5,5	0.33	0
2	GOL	A	2039	-	5,5,5	0.34	0	5,5,5	0.34	0
2	GOL	A	2040	-	5,5,5	0.79	0	5,5,5	1.11	0
2	GOL	A	2044	-	5,5,5	0.31	0	5,5,5	0.59	0
3	ACT	A	2048	-	3,3,3	0.81	0	3,3,3	1.31	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	ACT	C	2042	-	3,3,3	0.78	0	3,3,3	1.35	0
2	GOL	C	2039	-	5,5,5	0.45	0	5,5,5	0.40	0
2	GOL	A	2043	-	5,5,5	0.39	0	5,5,5	0.34	0
2	GOL	D	2039	-	5,5,5	0.51	0	5,5,5	0.41	0
2	GOL	D	2040	-	5,5,5	0.42	0	5,5,5	0.56	0
3	ACT	D	2042	-	3,3,3	0.82	0	3,3,3	1.51	0
3	ACT	A	2047	-	3,3,3	0.80	0	3,3,3	1.17	0
2	GOL	A	2041	-	5,5,5	0.34	0	5,5,5	0.29	0
3	ACT	C	2043	-	3,3,3	0.73	0	3,3,3	1.23	0
2	GOL	A	2042	-	5,5,5	0.38	0	5,5,5	0.34	0
3	ACT	A	2049	-	3,3,3	0.67	0	3,3,3	1.44	0
2	GOL	B	2041	-	5,5,5	0.32	0	5,5,5	0.33	0
3	ACT	A	2046	-	3,3,3	0.81	0	3,3,3	1.30	0
2	GOL	B	2039	-	5,5,5	0.36	0	5,5,5	0.36	0
2	GOL	B	2040	-	5,5,5	0.29	0	5,5,5	0.45	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
2	GOL	C	2040	-	-	2/4/4/4	-
2	GOL	C	2039	-	-	2/4/4/4	-
2	GOL	A	2042	-	-	2/4/4/4	-
2	GOL	A	2043	-	-	0/4/4/4	-
2	GOL	B	2041	-	-	0/4/4/4	-
2	GOL	D	2039	-	-	4/4/4/4	-
2	GOL	D	2040	-	-	1/4/4/4	-
2	GOL	C	2041	-	-	4/4/4/4	-
2	GOL	B	2040	-	-	2/4/4/4	-
2	GOL	A	2045	-	-	4/4/4/4	-
2	GOL	B	2039	-	-	4/4/4/4	-
2	GOL	A	2039	-	-	0/4/4/4	-
2	GOL	D	2041	-	-	0/4/4/4	-
2	GOL	A	2040	-	-	2/4/4/4	-
2	GOL	A	2044	-	-	4/4/4/4	-
2	GOL	A	2041	-	-	0/4/4/4	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2040	GOL	C3-C2-C1	-2.11	104.07	111.80

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	2040	GOL	C1-C2-C3-O3
2	A	2042	GOL	O1-C1-C2-C3
2	A	2044	GOL	C1-C2-C3-O3
2	A	2045	GOL	O1-C1-C2-C3
2	A	2045	GOL	C1-C2-C3-O3
2	B	2039	GOL	O1-C1-C2-C3
2	C	2039	GOL	C1-C2-C3-O3
2	C	2040	GOL	O1-C1-C2-C3
2	C	2041	GOL	C1-C2-C3-O3
2	D	2039	GOL	C1-C2-C3-O3
2	D	2039	GOL	O2-C2-C3-O3
2	A	2045	GOL	O2-C2-C3-O3
2	D	2039	GOL	O1-C1-C2-O2
2	A	2044	GOL	O1-C1-C2-C3
2	B	2040	GOL	O1-C1-C2-C3
2	C	2041	GOL	O1-C1-C2-C3
2	D	2039	GOL	O1-C1-C2-C3
2	A	2042	GOL	O1-C1-C2-O2
2	A	2044	GOL	O2-C2-C3-O3
2	A	2045	GOL	O1-C1-C2-O2
2	C	2039	GOL	O2-C2-C3-O3
2	C	2040	GOL	O1-C1-C2-O2
2	A	2040	GOL	O2-C2-C3-O3
2	B	2039	GOL	O1-C1-C2-O2
2	C	2041	GOL	O1-C1-C2-O2
2	C	2041	GOL	O2-C2-C3-O3
2	B	2039	GOL	O2-C2-C3-O3
2	D	2040	GOL	O1-C1-C2-O2
2	A	2044	GOL	O1-C1-C2-O2
2	B	2039	GOL	C1-C2-C3-O3
2	B	2040	GOL	O1-C1-C2-O2

There are no ring outliers.

13 monomers are involved in 31 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	2040	GOL	1	0
3	D	2043	ACT	1	0
3	C	2044	ACT	2	0
2	A	2045	GOL	1	0
2	A	2040	GOL	14	0
2	A	2044	GOL	1	0
3	A	2048	ACT	1	0
2	A	2043	GOL	3	0
2	A	2041	GOL	1	0
3	C	2043	ACT	1	0
2	B	2041	GOL	1	0
3	A	2046	ACT	1	0
2	B	2040	GOL	3	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

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	A	1024/1027 (99%)	-0.21	6 (0%) 85 88	14, 26, 38, 55	1 (0%)
1	B	1024/1027 (99%)	0.23	11 (1%) 78 80	23, 35, 53, 71	0
1	C	1024/1027 (99%)	0.03	5 (0%) 87 89	22, 32, 46, 68	0
1	D	1024/1027 (99%)	-0.07	13 (1%) 75 77	15, 27, 44, 70	1 (0%)
All	All	4096/4108 (99%)	-0.00	35 (0%) 81 83	14, 30, 47, 71	2 (0%)

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	987	ALA	5.2
1	A	988	GLY	4.3
1	D	514	GLY	4.2
1	D	513	TYR	3.2
1	A	328[A]	TYR	3.0
1	B	568	ILE	2.9
1	D	986	GLY	2.8
1	A	605	ASN	2.6
1	B	53	THR	2.5
1	C	14	THR	2.5
1	C	1038	THR	2.5
1	D	517	VAL	2.4
1	D	512	ASP	2.4
1	D	515	GLY	2.4
1	D	516	GLY	2.4
1	B	328	TYR	2.4
1	D	326	PHE	2.4
1	A	989	SER	2.4
1	C	254	ASP	2.3
1	D	132	SER	2.3
1	A	529	PRO	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	1001	ALA	2.3
1	B	530	ASP	2.3
1	B	517	VAL	2.2
1	D	551	TRP	2.2
1	B	14	THR	2.2
1	B	164	ILE	2.1
1	D	565	GLY	2.1
1	C	174	SER	2.1
1	B	513	TYR	2.1
1	B	60	ASN	2.0
1	C	18	ASP	2.0
1	D	254	ASP	2.0
1	B	128	MET	2.0
1	D	14	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	CSO	B	336	7/8	0.91	0.10	31,32,33,35	0
1	CSO	C	336	7/8	0.93	0.08	29,30,35,35	0
1	CSO	A	336	7/8	0.96	0.07	22,23,29,29	0
1	CSO	D	336	7/8	0.96	0.07	21,22,24,25	0

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
3	ACT	A	2048	4/4	0.75	0.20	60,60,60,60	0
3	ACT	A	2046	4/4	0.78	0.17	65,65,66,66	0
3	ACT	A	2047	4/4	0.79	0.20	60,60,60,60	0
3	ACT	C	2042	4/4	0.79	0.17	48,48,49,49	0
2	GOL	C	2041	6/6	0.80	0.16	37,39,39,40	0
3	ACT	D	2042	4/4	0.80	0.22	52,52,52,53	0
3	ACT	A	2049	4/4	0.81	0.14	41,41,42,42	0
3	ACT	C	2043	4/4	0.84	0.17	50,50,50,50	0
2	GOL	D	2041	6/6	0.84	0.17	50,50,50,51	0
2	GOL	A	2040	6/6	0.86	0.18	28,30,31,32	0
2	GOL	A	2043	6/6	0.87	0.13	36,37,38,39	0
2	GOL	A	2044	6/6	0.88	0.15	40,41,41,43	0
2	GOL	A	2045	6/6	0.88	0.15	48,49,49,49	0
2	GOL	C	2039	6/6	0.88	0.15	44,45,45,46	0
2	GOL	B	2040	6/6	0.89	0.12	45,45,46,47	0
2	GOL	B	2041	6/6	0.89	0.13	54,55,56,56	0
2	GOL	B	2039	6/6	0.89	0.13	49,51,51,52	0
3	ACT	D	2043	4/4	0.89	0.18	39,39,40,40	0
2	GOL	D	2039	6/6	0.91	0.14	34,36,37,38	0
2	GOL	C	2040	6/6	0.91	0.11	42,43,43,43	0
4	CL	B	2042	1/1	0.91	0.14	56,56,56,56	0
3	ACT	C	2044	4/4	0.92	0.10	27,28,28,28	0
2	GOL	A	2042	6/6	0.92	0.11	36,38,38,39	0
2	GOL	A	2039	6/6	0.93	0.10	34,35,35,35	0
4	CL	A	2050	1/1	0.94	0.14	48,48,48,48	0
2	GOL	D	2040	6/6	0.94	0.08	28,30,30,31	0
2	GOL	A	2041	6/6	0.96	0.07	26,27,27,27	0

6.5 Other polymers [i](#)

There are no such residues in this entry.