



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 12:13 PM UTC

PDB ID : 4HU8 / pdb\_00004hu8  
Title : Crystal Structure of a Bacterial Ig-like Domain Containing GH10 Xylanase from Termite Gut  
Authors : Han, Q.; Liu, N.; Robinson, H.; Cao, L.; Qian, C.; Wang, Q.; Xie, L.; Ding, H.; Wang, Q.; Huang, Y.; Li, J.; Zhou, Z.  
Deposited on : 2012-11-02  
Resolution : 2.00 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 : 4-5-2 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

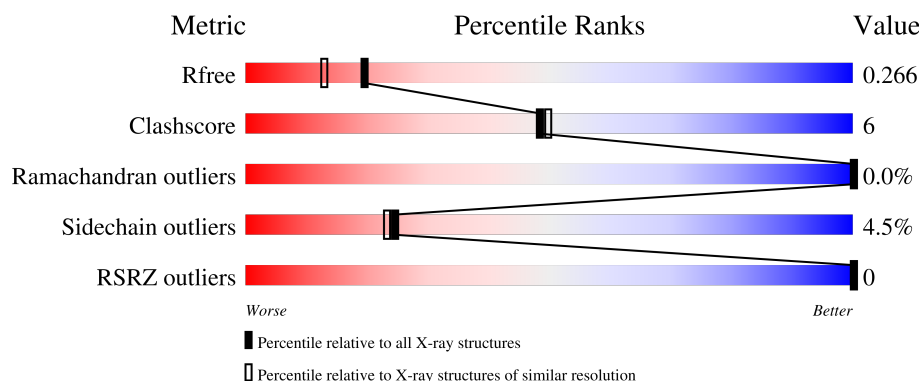
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*





The reported resolution of this entry is 2.00 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	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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  $\leq 5\%$ . 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	456	 84% 13% ..
1	B	456	 84% 14% ..
1	C	456	 86% 12% ..
1	D	456	 89% 9% ..
1	E	456	 85% 13% ..

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Mol	Chain	Length	Quality of chain
1	F	456	 81% 16% ..
1	G	456	 79% 18% ..
1	H	456	 87% 11% ..

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 30836 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 GH10 Xylanase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	450	Total	C	N	O	S	0	0	0
			3558	2248	613	679	18			
1	B	452	Total	C	N	O	S	0	0	0
			3572	2257	616	681	18			
1	C	452	Total	C	N	O	S	0	0	0
			3572	2257	616	681	18			
1	D	452	Total	C	N	O	S	0	0	0
			3572	2257	616	681	18			
1	E	452	Total	C	N	O	S	0	0	0
			3572	2257	616	681	18			
1	F	452	Total	C	N	O	S	0	0	0
			3572	2257	616	681	18			
1	G	452	Total	C	N	O	S	0	0	0
			3572	2257	616	681	18			
1	H	452	Total	C	N	O	S	0	0	0
			3572	2257	616	681	18			

- Molecule 2 is SULFATE ION (CCD ID: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	E	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	G	1	Total	O	S	0	0
			5	4	1		
2	H	1	Total	O	S	0	0
			5	4	1		
2	H	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	248	Total	O	0	0
			248	248		

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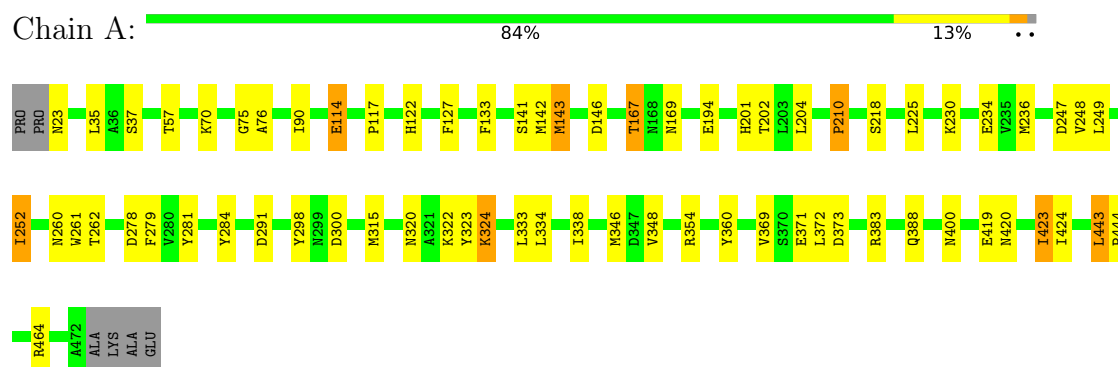
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	216	Total 216	O 216	0	0
4	C	457	Total 457	O 457	0	0
4	D	412	Total 412	O 412	0	0
4	E	207	Total 207	O 207	0	0
4	F	177	Total 177	O 177	0	0
4	G	134	Total 134	O 134	0	0
4	H	297	Total 297	O 297	0	0


### 3 Residue-property plots [i](#)

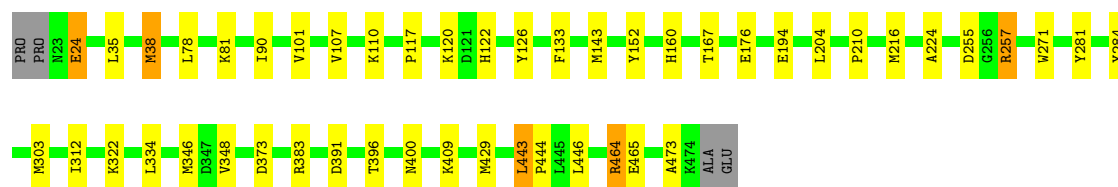
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: GH10 Xylanase




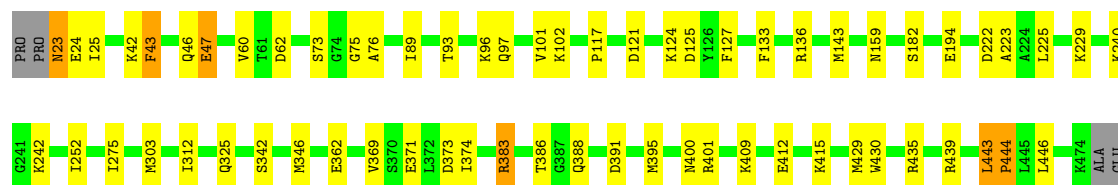


Chain D:  89% 9% ..




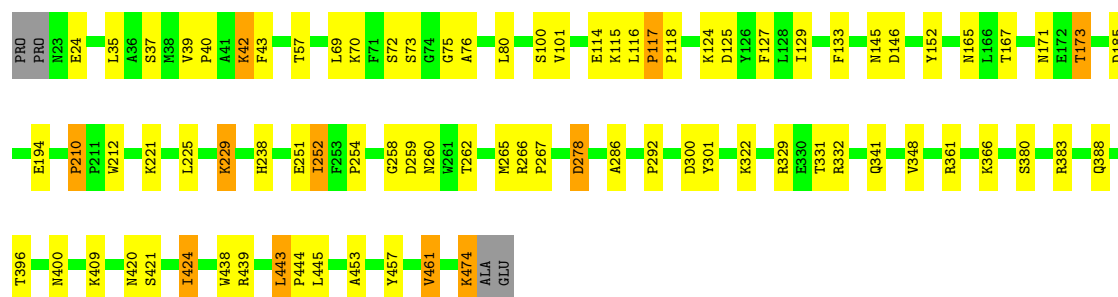
• Molecule 1: GH10 Xylanase

Chain E:  85% 13% ..




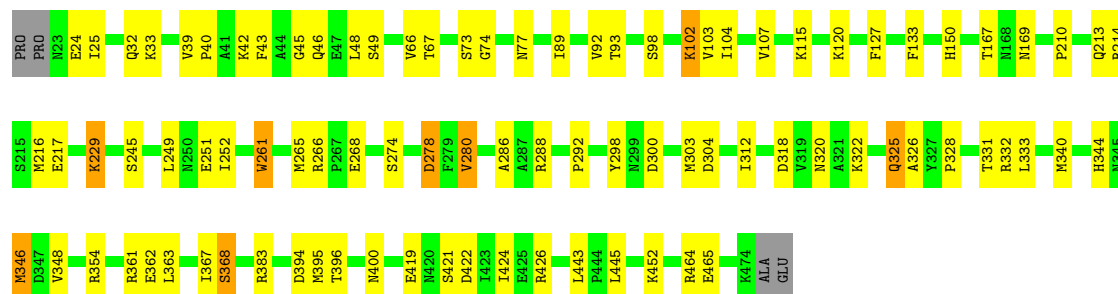
• Molecule 1: GH10 Xylanase

Chain F:  81% 16% ..




• Molecule 1: GH10 Xylanase

Chain G:  79% 18% ..



• Molecule 1: GH10 Xylanase

Chain H:  87% 11% ..

PRO	PRO	N23	E24	K42	P65	K63	L69	L78	I90	T91	E111	K115	L116	P117	P118	Y126	F133	M143	H151	H160	T167	N168	N169	E172	V188	I192	A193	E194	P210	P211	W212	Q213	R214	S215	M216	A220	L225	T233
T237	I252	M265	E268	K273	V280	Y284	Q325	R329	P330	T331	L334	M340	I367	W379	R383	D391	M395	I403	S437	L443	P444	L445	E468	A473	K474	ALA	GLU											

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	55.69Å 86.96Å 246.43Å 92.96° 90.86° 108.56°	Depositor
Resolution (Å)	49.08 – 2.00 49.08 – 2.00	Depositor EDS
% Data completeness (in resolution range)	96.9 (49.08-2.00) 92.8 (49.08-2.00)	Depositor EDS
$R_{merge}$	0.10	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.14 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, $R_{free}$	0.219 , 0.266 0.218 , 0.266	Depositor DCC
$R_{free}$ test set	14964 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	25.7	Xtriage
Anisotropy	0.032	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 27.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.41$ , $\langle L^2 \rangle = 0.24$	Xtriage
Estimated twinning fraction	0.129 for h,-h-k,-l	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	30836	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	30.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.69% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, SO4

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	0.59	1/3640 (0.0%)	0.89	5/4932 (0.1%)
1	B	0.53	1/3654 (0.0%)	0.89	4/4950 (0.1%)
1	C	0.64	0/3654	0.90	9/4950 (0.2%)
1	D	0.63	1/3654 (0.0%)	0.87	2/4950 (0.0%)
1	E	0.56	1/3654 (0.0%)	0.89	6/4950 (0.1%)
1	F	0.50	1/3654 (0.0%)	0.88	7/4950 (0.1%)
1	G	0.50	0/3654	0.90	3/4950 (0.1%)
1	H	0.56	1/3654 (0.0%)	0.91	8/4950 (0.2%)
All	All	0.57	6/29218 (0.0%)	0.89	44/39582 (0.1%)

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	C	0	1
1	D	0	1
1	E	0	1
1	H	0	2
All	All	0	5

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	443	LEU	C-O	-10.00	1.19	1.23
1	H	443	LEU	C-O	-9.34	1.19	1.23
1	E	443	LEU	C-O	-7.86	1.20	1.23
1	B	443	LEU	C-O	-7.15	1.20	1.23
1	A	443	LEU	C-O	-6.66	1.20	1.23
1	F	443	LEU	C-O	-6.39	1.20	1.23

All (44) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	45	GLY	N-CA-C	-13.52	98.39	114.48
1	E	76	ALA	N-CA-C	-9.76	101.37	113.28
1	F	348	VAL	N-CA-C	7.55	115.02	107.55
1	B	76	ALA	N-CA-C	-7.37	104.27	113.18
1	E	47	GLU	N-CA-C	7.36	121.06	110.24
1	A	76	ALA	N-CA-C	-7.28	103.86	112.89
1	C	44	ALA	CB-CA-C	-6.93	108.56	116.54
1	C	44	ALA	N-CA-C	6.84	118.70	108.31
1	A	388	GLN	N-CA-C	6.46	119.06	110.53
1	H	111	GLU	N-CA-C	6.46	119.13	109.25
1	F	445	LEU	N-CA-C	6.22	118.64	109.69
1	E	275	ILE	N-CA-C	6.21	117.77	111.00
1	F	258	GLY	N-CA-C	6.06	121.78	112.51
1	C	431	GLY	N-CA-C	5.96	119.53	111.72
1	H	444	PRO	N-CA-C	5.90	121.28	114.03
1	H	210	PRO	O-C-N	5.80	123.88	121.15
1	G	445	LEU	N-CA-C	5.74	118.22	109.95
1	H	445	LEU	N-CA-C	5.71	118.17	109.95
1	D	117	PRO	O-C-N	5.67	123.81	121.15
1	E	117	PRO	O-C-N	5.61	123.78	121.15
1	A	348	VAL	N-CA-C	5.61	113.10	107.55
1	D	110	LYS	N-CA-C	5.60	121.13	113.97
1	C	117	PRO	O-C-N	5.58	123.78	121.15
1	F	117	PRO	O-C-N	5.48	123.83	121.31
1	F	76	ALA	N-CA-C	-5.47	106.61	113.28
1	B	54	ASP	CA-C-N	5.46	125.13	119.56
1	B	54	ASP	C-N-CA	5.46	125.13	119.56
1	C	388	GLN	N-CA-C	5.43	117.88	110.55
1	F	210	PRO	O-C-N	5.36	123.67	121.15
1	G	348	VAL	N-CA-C	5.35	112.43	107.56
1	H	117	PRO	O-C-N	5.29	123.64	121.15
1	C	203	LEU	N-CA-C	5.28	117.84	111.40
1	A	117	PRO	O-C-N	5.25	123.62	121.15
1	A	210	PRO	O-C-N	5.21	123.60	121.15
1	E	444	PRO	N-CA-C	5.21	121.30	114.27
1	B	371	GLU	N-CA-C	5.15	119.53	112.88
1	H	169	ASN	N-CA-C	5.12	116.63	108.79
1	H	151	HIS	N-CA-C	5.11	119.59	112.90
1	C	151	HIS	N-CA-C	5.08	119.56	112.90
1	H	69	LEU	N-CA-C	5.06	119.48	112.45
1	F	259	ASP	N-CA-C	5.05	116.60	111.14
1	C	334	LEU	CA-C-N	-5.02	116.10	122.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	334	LEU	C-N-CA	-5.02	116.10	122.43
1	E	73	SER	N-CA-C	5.02	118.64	111.02

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	43	PHE	Peptide
1	D	473	ALA	Peptide
1	E	46	GLN	Peptide
1	H	220	ALA	Peptide
1	H	473	ALA	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	3558	0	3474	41	0
1	B	3572	0	3492	42	0
1	C	3572	0	3492	34	0
1	D	3572	0	3492	26	0
1	E	3572	0	3492	41	0
1	F	3572	0	3492	45	0
1	G	3572	0	3492	67	0
1	H	3572	0	3492	20	0
2	A	5	0	0	0	0
2	B	10	0	0	0	0
2	C	5	0	0	0	0
2	D	10	0	0	1	0
2	E	5	0	0	1	0
2	F	10	0	0	0	0
2	G	5	0	0	0	0
2	H	10	0	0	0	0
3	A	6	0	8	1	0
3	B	6	0	8	0	0
3	C	18	0	24	3	0
3	D	6	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	E	6	0	8	0	0
3	G	12	0	16	0	0
3	H	12	0	16	2	0
4	A	248	0	0	5	0
4	B	216	0	0	4	0
4	C	457	0	0	6	0
4	D	412	0	0	3	0
4	E	207	0	0	4	0
4	F	177	0	0	5	0
4	G	134	0	0	4	0
4	H	297	0	0	0	0
All	All	30836	0	28006	312	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 (312) 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:G:24:GLU:CG	1:G:102:LYS:HE2	1.77	1.14
1:G:24:GLU:CG	1:G:102:LYS:CE	2.26	1.13
1:G:24:GLU:HG3	1:G:102:LYS:HE2	1.20	1.10
1:G:24:GLU:HG2	1:G:102:LYS:HE3	1.40	1.03
1:F:75:GLY:HA2	1:F:400:ASN:HB2	1.43	1.00
1:B:75:GLY:HA2	1:B:400:ASN:HB2	1.44	0.98
1:C:395:MET:SD	4:C:1040:HOH:O	2.22	0.97
1:G:24:GLU:HG2	1:G:102:LYS:CE	1.93	0.94
1:A:75:GLY:HA2	1:A:400:ASN:HB2	1.49	0.93
1:H:167:THR:HG23	1:H:210:PRO:HG3	1.50	0.91
1:E:42:LYS:HG3	1:E:43:PHE:CD2	2.05	0.91
1:B:471:LYS:HG2	1:B:472:ALA:N	1.84	0.90
1:F:474:LYS:HE3	1:F:474:LYS:H	1.38	0.89
1:G:24:GLU:CG	1:G:102:LYS:HE3	1.98	0.89
1:C:464:ARG:NH1	1:C:465:GLU:OE2	2.06	0.88
1:F:361:ARG:HH21	1:F:420:ASN:HD22	1.22	0.87
1:E:75:GLY:HA2	1:E:400:ASN:HB2	1.56	0.85
1:A:324:LYS:HE2	1:A:324:LYS:HA	1.59	0.84
1:F:165:ASN:HD21	1:H:395:MET:HE3	1.42	0.84
1:E:42:LYS:HG3	1:E:43:PHE:HD2	1.46	0.78
1:G:24:GLU:HG3	1:G:102:LYS:CE	2.00	0.78
1:B:223:ALA:O	1:B:227:VAL:HG12	1.85	0.77

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:464:ARG:HH11	1:C:464:ARG:HG2	1.51	0.76
1:F:260:ASN:ND2	1:F:262:THR:OG1	2.20	0.75
1:A:202:THR:HG22	1:A:247:ASP:HB2	1.67	0.74
1:G:251:GLU:O	1:G:266:ARG:NH1	2.21	0.73
1:F:388:GLN:NE2	4:F:627:HOH:O	2.21	0.73
1:B:23:ASN:OD1	1:B:23:ASN:C	2.33	0.71
1:G:229:LYS:HG3	1:G:286:ALA:CB	2.20	0.71
3:C:504:GOL:C1	4:C:940:HOH:O	2.38	0.71
3:C:504:GOL:H12	4:C:940:HOH:O	1.91	0.70
1:D:383:ARG:NH1	4:D:672:HOH:O	2.24	0.70
1:B:199:HIS:NE2	1:B:247:ASP:OD1	2.24	0.70
1:G:229:LYS:HG3	1:G:286:ALA:HB2	1.74	0.69
1:B:361:ARG:HH21	1:B:420:ASN:HD22	1.41	0.69
1:E:42:LYS:HG3	1:E:43:PHE:CE2	2.27	0.69
1:G:93:THR:HG22	1:G:98:SER:HB3	1.75	0.68
1:G:288:ARG:NH2	1:G:333:LEU:O	2.27	0.67
1:G:320:ASN:HB3	1:G:333:LEU:HD11	1.76	0.67
1:C:464:ARG:NH1	1:C:464:ARG:HG2	2.08	0.67
1:E:371:GLU:HG2	1:E:430:TRP:CE3	2.31	0.66
1:H:143:MET:HG3	1:H:194:GLU:HG3	1.78	0.66
1:D:464:ARG:HG3	1:D:465:GLU:N	2.09	0.66
1:A:143:MET:HG3	1:A:194:GLU:HG3	1.78	0.66
1:B:333:LEU:H	1:B:333:LEU:HD12	1.59	0.65
1:A:324:LYS:HA	1:A:324:LYS:CE	2.25	0.65
1:D:78:LEU:HB2	1:D:81:LYS:HD3	1.77	0.65
1:C:464:ARG:HH11	1:C:464:ARG:CG	2.09	0.65
1:E:23:ASN:ND2	1:E:23:ASN:O	2.30	0.65
1:D:346:MET:SD	4:D:946:HOH:O	2.54	0.64
1:F:396:THR:HG21	1:F:443:LEU:HD11	1.78	0.64
1:A:324:LYS:HE2	1:A:324:LYS:CA	2.21	0.63
1:D:143:MET:HG3	1:D:194:GLU:HG3	1.80	0.63
1:F:221:LYS:NZ	1:F:278:ASP:OD2	2.32	0.62
1:B:75:GLY:CA	1:B:400:ASN:HB2	2.26	0.62
1:F:383:ARG:NH2	4:F:627:HOH:O	2.31	0.62
1:G:24:GLU:CD	1:G:102:LYS:CE	2.72	0.62
1:G:367:ILE:HB	1:G:424:ILE:HG12	1.82	0.62
1:C:395:MET:HE2	4:C:942:HOH:O	2.00	0.61
1:A:383:ARG:NH2	4:A:750:HOH:O	2.32	0.61
1:A:423:ILE:HD12	1:A:424:ILE:HG13	1.83	0.60
1:B:292:PRO:O	1:B:332:ARG:NH1	2.23	0.60
1:B:23:ASN:ND2	4:B:732:HOH:O	2.34	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:457:TYR:O	1:F:461:VAL:HG12	2.00	0.60
1:G:346:MET:HE2	1:G:346:MET:HA	1.83	0.60
1:H:214:ARG:NH2	1:H:268:GLU:O	2.29	0.60
1:B:78:LEU:HB2	1:B:81:LYS:HD3	1.83	0.60
1:D:303:MET:HE2	1:D:312:ILE:HD13	1.84	0.60
1:G:395:MET:HA	1:G:395:MET:HE2	1.84	0.60
1:B:191:ALA:HB3	1:B:198:ILE:HD11	1.84	0.60
1:F:329:ARG:HG2	1:F:329:ARG:HH11	1.66	0.60
1:A:141:SER:HB3	4:A:837:HOH:O	2.01	0.60
1:B:224:ALA:HA	1:B:227:VAL:CG1	2.32	0.60
1:E:401:ARG:NH2	2:E:501:SO4:O3	2.33	0.60
1:G:261:TRP:HZ3	1:G:318:ASP:OD2	1.85	0.59
1:C:259:ASP:OD2	1:C:259:ASP:N	2.32	0.59
1:D:122:HIS:NE2	1:D:464:ARG:HG2	2.17	0.59
1:G:261:TRP:CD1	1:G:261:TRP:C	2.79	0.59
1:B:348:VAL:O	1:B:409:LYS:NZ	2.28	0.58
1:F:388:GLN:OE1	1:F:439:ARG:NH1	2.36	0.58
1:E:42:LYS:C	1:E:43:PHE:CD2	2.81	0.58
1:A:249:LEU:HD11	1:A:252:ILE:HD12	1.84	0.58
1:C:143:MET:HG3	1:C:194:GLU:HG3	1.85	0.58
1:D:38:MET:HE3	1:D:101:VAL:HG11	1.86	0.58
1:B:443:LEU:N	1:B:444:PRO:HD3	2.18	0.58
1:C:388:GLN:HG3	3:C:502:GOL:H2	1.85	0.58
1:F:438:TRP:CD1	1:F:439:ARG:HG2	2.39	0.57
1:F:361:ARG:HH21	1:F:420:ASN:ND2	2.00	0.57
1:F:114:GLU:OE1	1:F:146:ASP:HB2	2.05	0.57
1:B:255:ASP:OD2	1:B:257:ARG:NE	2.36	0.57
1:B:468:GLU:HA	1:B:471:LYS:HD3	1.86	0.57
1:A:354:ARG:NH2	1:A:419:GLU:OE1	2.38	0.56
1:H:252:ILE:HG13	1:H:265:MET:HG2	1.86	0.56
1:A:278:ASP:OD1	1:A:322:LYS:NZ	2.38	0.56
1:A:354:ARG:NH1	4:A:606:HOH:O	2.37	0.56
1:F:443:LEU:N	1:F:444:PRO:HD3	2.21	0.56
1:C:167:THR:HG23	1:C:210:PRO:HG3	1.87	0.55
1:G:24:GLU:CD	1:G:102:LYS:HE3	2.32	0.55
1:A:320:ASN:HB3	1:A:333:LEU:HD11	1.89	0.55
1:A:323:TYR:CD1	1:A:334:LEU:HD22	2.42	0.55
1:B:249:LEU:HD11	1:B:252:ILE:HD13	1.88	0.55
1:B:388:GLN:O	1:B:392:LYS:NZ	2.31	0.55
1:E:342:SER:OG	1:E:369:VAL:HG13	2.07	0.55
1:A:201:HIS:ND1	1:A:202:THR:HG23	2.21	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:443:LEU:N	1:E:444:PRO:HD3	2.22	0.54
1:F:278:ASP:OD1	1:F:278:ASP:N	2.41	0.54
1:G:304:ASP:N	4:G:601:HOH:O	2.40	0.54
1:D:348:VAL:O	1:D:409:LYS:NZ	2.40	0.54
1:F:474:LYS:HE3	1:F:474:LYS:N	2.17	0.54
1:G:452:LYS:NZ	4:G:675:HOH:O	2.38	0.54
1:H:437:SER:HB2	1:H:445:LEU:HD11	1.91	0.53
1:D:429:MET:HE1	1:D:446:LEU:HG	1.91	0.53
1:G:249:LEU:HD11	1:G:252:ILE:HD13	1.90	0.53
1:H:233:THR:O	1:H:237:THR:OG1	2.24	0.53
1:B:199:HIS:ND1	1:B:245:SER:OG	2.30	0.52
1:C:186:ARG:NE	3:H:503:GOL:O1	2.34	0.52
1:G:25:ILE:HD11	1:G:33:LYS:HE3	1.91	0.52
1:A:373:ASP:HB2	1:A:444:PRO:HB2	1.91	0.52
1:E:346:MET:O	1:E:409:LYS:NZ	2.42	0.52
1:H:126:TYR:OH	1:H:468:GLU:OE2	2.27	0.52
1:F:72:SER:OG	1:F:73:SER:N	2.43	0.52
1:A:114:GLU:OE1	1:A:146:ASP:HB2	2.10	0.51
1:F:145:ASN:ND2	4:F:766:HOH:O	2.32	0.51
1:F:116:LEU:HD11	1:F:453:ALA:HB2	1.93	0.51
1:H:443:LEU:N	1:H:444:PRO:HD3	2.25	0.51
1:G:265:MET:HE1	1:G:280:VAL:HG21	1.91	0.51
1:H:265:MET:HE1	1:H:280:VAL:HG21	1.93	0.51
1:B:199:HIS:HE2	1:B:247:ASP:CG	2.17	0.51
1:B:255:ASP:OD1	1:B:255:ASP:N	2.43	0.51
1:F:254:PRO:HG3	1:F:266:ARG:HG2	1.93	0.51
1:A:57:THR:HA	1:A:70:LYS:HG2	1.93	0.50
1:A:167:THR:HG23	1:A:210:PRO:HG3	1.92	0.50
1:A:122:HIS:CE1	1:A:464:ARG:HE	2.29	0.50
1:C:79:PHE:HB2	1:C:403:ILE:HD11	1.93	0.50
1:H:379:TRP:HE1	1:H:383:ARG:NH2	2.09	0.50
1:E:42:LYS:O	1:E:43:PHE:CD2	2.64	0.50
1:C:55:PRO:HG2	1:E:182:SER:HB2	1.94	0.49
1:G:368:SER:OG	1:G:426:ARG:HB3	2.12	0.49
1:F:420:ASN:O	1:F:424:ILE:HG22	2.13	0.49
1:A:443:LEU:N	1:A:444:PRO:HD3	2.27	0.49
1:C:87:GLU:OE2	1:G:73:SER:HB2	2.11	0.49
1:G:229:LYS:HG3	1:G:286:ALA:HB1	1.92	0.49
1:B:23:ASN:OD1	1:B:23:ASN:O	2.30	0.49
1:G:278:ASP:OD1	1:G:278:ASP:N	2.46	0.49
1:C:265:MET:HE3	1:C:272:PHE:CE1	2.48	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:229:LYS:HE2	1:F:286:ALA:HB2	1.94	0.49
1:G:361:ARG:HH22	1:G:422:ASP:CG	2.21	0.49
1:H:55:PRO:HG3	3:H:503:GOL:H2	1.95	0.49
1:C:462:ARG:NH1	4:C:955:HOH:O	2.31	0.48
1:B:288:ARG:NH2	1:B:336:GLU:OE2	2.46	0.48
1:B:361:ARG:HH21	1:B:420:ASN:ND2	2.08	0.48
1:F:42:LYS:O	1:F:43:PHE:C	2.55	0.48
1:G:354:ARG:NH2	1:G:419:GLU:OE1	2.45	0.48
1:E:23:ASN:ND2	1:E:23:ASN:C	2.70	0.48
1:F:80:LEU:HD11	1:F:396:THR:HG22	1.96	0.48
1:G:303:MET:HE2	1:G:312:ILE:HD13	1.96	0.48
1:A:75:GLY:CA	1:A:400:ASN:HB2	2.32	0.48
1:D:126:TYR:O	4:D:894:HOH:O	2.20	0.48
1:G:43:PHE:O	1:G:46:GLN:HB2	2.14	0.48
1:C:81:LYS:NZ	2:D:501:SO4:O3	2.31	0.48
1:D:443:LEU:N	1:D:444:PRO:HD3	2.29	0.48
1:F:57:THR:HA	1:F:70:LYS:HG2	1.95	0.48
1:E:242:LYS:NZ	4:E:616:HOH:O	2.45	0.47
1:H:340:MET:HE3	1:H:367:ILE:HG21	1.96	0.47
1:B:124:LYS:NZ	4:B:728:HOH:O	2.46	0.47
1:D:167:THR:HG23	1:D:210:PRO:HG3	1.96	0.47
1:E:43:PHE:HZ	1:E:97:GLN:OE1	1.97	0.47
1:E:75:GLY:CA	1:E:400:ASN:HB2	2.37	0.47
1:G:24:GLU:CD	1:G:102:LYS:HE2	2.33	0.47
1:H:284:TYR:HB3	1:H:334:LEU:HG	1.96	0.47
1:G:396:THR:HG21	1:G:443:LEU:HD11	1.95	0.47
1:C:396:THR:HG21	1:C:443:LEU:HD11	1.97	0.47
1:D:107:VAL:HG21	1:D:400:ASN:OD1	2.15	0.47
1:A:261:TRP:CE2	1:A:315:MET:HA	2.50	0.47
1:C:25:ILE:HD11	1:C:103:VAL:HG22	1.95	0.47
1:C:298:TYR:OH	1:C:300:ASP:OD2	2.27	0.47
1:G:322:LYS:HG3	1:G:325:GLN:NE2	2.30	0.47
1:G:210:PRO:HG2	1:G:213:GLN:HG3	1.97	0.47
1:A:346:MET:HE2	4:A:740:HOH:O	2.15	0.47
1:E:371:GLU:HG2	1:E:430:TRP:CZ3	2.50	0.47
1:A:252:ILE:CD1	1:A:279:PHE:HZ	2.28	0.46
1:C:379:TRP:O	1:C:383:ARG:HB2	2.15	0.46
1:E:240:LYS:HE2	4:E:788:HOH:O	2.16	0.46
1:F:40:PRO:HB3	1:F:42:LYS:HD2	1.97	0.46
1:G:167:THR:HG23	1:G:210:PRO:HG3	1.96	0.46
1:H:214:ARG:HE	1:H:214:ARG:HA	1.79	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:230:LYS:NZ	1:A:234:GLU:OE2	2.45	0.46
1:C:252:ILE:HG13	1:C:265:MET:HB3	1.96	0.46
1:B:297:TYR:OH	1:B:425:GLU:OE2	2.20	0.46
1:D:255:ASP:OD2	1:D:257:ARG:NE	2.45	0.46
1:E:388:GLN:OE1	1:E:439:ARG:NH2	2.48	0.46
1:G:261:TRP:CD1	1:G:265:MET:HE3	2.50	0.46
1:F:292:PRO:O	1:F:332:ARG:NH1	2.45	0.46
1:A:420:ASN:HB3	1:A:423:ILE:HD11	1.97	0.46
1:G:74:GLY:O	1:G:77:ASN:HB2	2.15	0.46
1:B:260:ASN:OD1	1:B:262:THR:OG1	2.34	0.46
1:F:421:SER:HA	1:F:424:ILE:HG23	1.98	0.45
1:G:115:LYS:HD3	1:G:115:LYS:HA	1.69	0.45
1:A:333:LEU:HD12	1:A:333:LEU:HA	1.63	0.45
1:F:171:ASN:OD1	1:F:173:THR:HG23	2.16	0.45
1:E:225:LEU:O	1:E:229:LYS:HG3	2.16	0.45
1:D:284:TYR:HB3	1:D:334:LEU:HG	1.98	0.45
1:D:35:LEU:HD12	1:D:90:ILE:HG21	1.98	0.45
1:C:281:TYR:CD2	1:C:322:LYS:HE3	2.51	0.45
1:G:32:GLN:HG2	1:G:67:THR:OG1	2.17	0.45
1:B:301:TYR:OH	4:B:705:HOH:O	2.21	0.45
1:E:222:ASP:OD1	1:E:223:ALA:N	2.49	0.45
1:G:107:VAL:HG21	1:G:400:ASN:OD1	2.16	0.45
1:C:373:ASP:HB2	1:C:444:PRO:HB2	1.99	0.44
1:A:281:TYR:CG	1:A:322:LYS:HD3	2.52	0.44
1:E:143:MET:HG3	1:E:194:GLU:HG3	1.99	0.44
1:A:202:THR:HG22	1:A:247:ASP:CB	2.41	0.44
1:A:249:LEU:HD21	1:A:252:ILE:HD13	1.99	0.44
1:B:132:ILE:HG12	1:B:431:GLY:HA2	1.99	0.44
1:F:251:GLU:HA	1:F:300:ASP:CG	2.42	0.44
1:H:210:PRO:HG2	1:H:213:GLN:HG3	2.00	0.44
1:F:322:LYS:NZ	4:F:631:HOH:O	2.50	0.44
1:A:248:VAL:HB	1:A:284:TYR:CZ	2.53	0.44
1:A:338:ILE:HG21	1:A:360:TYR:CE2	2.53	0.44
1:G:229:LYS:NZ	1:G:229:LYS:HB2	2.32	0.44
1:B:443:LEU:O	1:B:454:LYS:NZ	2.50	0.44
1:E:374:ILE:O	1:E:444:PRO:HA	2.18	0.44
1:G:344:HIS:HE1	4:G:601:HOH:O	2.01	0.44
1:C:55:PRO:HG2	1:E:182:SER:CB	2.48	0.43
1:D:373:ASP:HB2	1:D:444:PRO:HB2	1.99	0.43
1:E:386:THR:HG22	1:E:395:MET:HB2	2.00	0.43
1:A:323:TYR:CG	1:A:334:LEU:HB2	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:383:ARG:HD3	1:G:383:ARG:HA	1.95	0.43
1:E:62:ASP:OD2	1:E:62:ASP:N	2.37	0.43
1:F:117:PRO:HA	1:F:118:PRO:HD3	1.92	0.43
1:B:214:ARG:NH1	1:B:268:GLU:O	2.39	0.43
1:A:260:ASN:OD1	1:A:262:THR:OG1	2.30	0.43
1:C:225:LEU:HD23	1:C:275:ILE:HD13	2.00	0.43
1:G:346:MET:HA	1:G:346:MET:CE	2.49	0.43
1:A:204:LEU:HA	4:A:668:HOH:O	2.18	0.43
1:B:420:ASN:ND2	4:B:772:HOH:O	2.46	0.43
1:F:185:ASP:CG	1:F:238:HIS:HE2	2.27	0.43
1:D:38:MET:HE2	1:D:38:MET:HB2	1.83	0.43
1:E:373:ASP:HB2	1:E:444:PRO:HB2	2.01	0.43
1:G:24:GLU:HG2	1:G:104:ILE:HD11	2.01	0.43
1:G:49:SER:N	1:G:93:THR:O	2.49	0.43
1:C:323:TYR:CG	1:C:334:LEU:HB2	2.53	0.43
1:E:303:MET:HE2	1:E:312:ILE:HD13	2.00	0.42
1:E:429:MET:HE1	1:E:446:LEU:HG	2.01	0.42
1:G:24:GLU:HG3	1:G:102:LYS:HB3	2.01	0.42
1:B:396:THR:HG21	1:B:443:LEU:HD11	2.01	0.42
1:E:383:ARG:NH2	4:E:602:HOH:O	2.38	0.42
1:G:39:VAL:HA	1:G:40:PRO:HD3	1.90	0.42
1:E:121:ASP:O	1:E:124:LYS:HG2	2.19	0.42
1:G:66:VAL:HG21	1:G:103:VAL:HG21	2.01	0.42
1:F:212:TRP:HB3	4:F:722:HOH:O	2.19	0.42
1:G:422:ASP:OD1	1:G:422:ASP:N	2.52	0.42
1:D:204:LEU:HD22	1:D:271:TRP:CD1	2.55	0.42
1:F:167:THR:HG23	1:F:210:PRO:HG3	2.02	0.42
1:F:301:TYR:HB3	1:F:341:GLN:OE1	2.19	0.42
1:B:373:ASP:HB2	1:B:444:PRO:HB2	2.02	0.42
1:C:172:GLU:OE2	4:C:1014:HOH:O	2.22	0.42
1:H:115:LYS:HD3	1:H:115:LYS:HA	1.84	0.42
1:C:400:ASN:HA	1:C:403:ILE:HD12	2.01	0.42
1:F:124:LYS:HG3	1:F:125:ASP:N	2.35	0.42
1:A:298:TYR:OH	1:A:300:ASP:OD2	2.25	0.42
1:E:159:ASN:HB3	1:G:395:MET:SD	2.60	0.42
1:D:281:TYR:CE1	1:D:322:LYS:HG2	2.55	0.41
1:G:49:SER:HB2	1:G:93:THR:OG1	2.19	0.41
1:B:24:GLU:H	1:B:24:GLU:HG2	1.59	0.41
1:F:229:LYS:HE2	1:F:286:ALA:CB	2.50	0.41
1:D:346:MET:O	1:D:409:LYS:HE3	2.19	0.41
1:E:346:MET:HE2	1:E:346:MET:HA	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:188:VAL:O	1:H:192:ILE:HG12	2.20	0.41
1:B:346:MET:HE2	1:B:405:ASP:HB3	2.03	0.41
1:E:23:ASN:O	1:E:101:VAL:HG23	2.21	0.41
1:E:412:GLU:HA	1:E:415:LYS:HE2	2.02	0.41
1:F:266:ARG:HA	1:F:267:PRO:HD2	1.92	0.41
1:G:120:LYS:HE2	1:G:150:HIS:O	2.20	0.41
1:A:236:MET:HE2	1:A:291:ASP:HB3	2.02	0.41
1:B:377:MET:HE2	1:B:377:MET:HB3	1.93	0.41
1:G:252:ILE:HG13	1:G:265:MET:HB3	2.03	0.41
1:G:292:PRO:O	1:G:332:ARG:NH1	2.49	0.41
1:A:371:GLU:OE2	3:A:502:GOL:O1	2.37	0.41
1:C:38:MET:HE2	1:C:38:MET:HB2	1.90	0.41
1:E:89:ILE:HD13	1:E:102:LYS:HA	2.02	0.41
1:E:435:ARG:NH1	4:E:770:HOH:O	2.38	0.41
1:G:24:GLU:OE2	1:G:102:LYS:CE	2.68	0.41
1:G:303:MET:SD	1:G:340:MET:HG2	2.61	0.41
1:C:298:TYR:CE2	1:C:300:ASP:HB2	2.55	0.41
1:D:216:MET:CE	1:D:224:ALA:HA	2.51	0.41
1:F:37:SER:C	1:F:39:VAL:H	2.28	0.41
1:F:252:ILE:HG13	1:F:265:MET:HG2	2.02	0.41
1:B:253:PHE:HA	1:B:254:PRO:HD3	1.85	0.41
1:E:42:LYS:C	1:E:43:PHE:HD2	2.25	0.41
1:E:136:ARG:NH1	1:G:394:ASP:HB2	2.36	0.41
1:A:369:VAL:CG1	1:A:372:LEU:HB2	2.50	0.41
1:C:266:ARG:HD3	1:C:268:GLU:OE1	2.19	0.41
1:C:341:GLN:HG2	1:C:371:GLU:CD	2.46	0.41
1:D:396:THR:HG21	1:D:443:LEU:HD11	2.03	0.41
1:G:93:THR:HG22	1:G:98:SER:CB	2.48	0.41
1:G:216:MET:O	1:G:274:SER:HB3	2.21	0.41
1:G:326:ALA:C	1:G:328:PRO:HD3	2.45	0.41
1:B:265:MET:HE3	1:B:272:PHE:CD1	2.56	0.41
1:B:216:MET:HE2	1:B:216:MET:HA	2.02	0.40
1:D:120:LYS:HD3	1:D:152:TYR:C	2.45	0.40
1:G:421:SER:O	4:G:692:HOH:O	2.22	0.40
1:C:383:ARG:HE	1:C:383:ARG:HB3	1.65	0.40
1:E:23:ASN:N	1:E:23:ASN:HD22	2.18	0.40
1:G:298:TYR:CE2	1:G:300:ASP:HB2	2.56	0.40
1:B:379:TRP:HE1	1:B:383:ARG:CZ	2.35	0.40
1:G:214:ARG:NH1	1:G:217:GLU:OE1	2.55	0.40
1:H:117:PRO:HA	1:H:118:PRO:HD3	1.95	0.40
1:D:24:GLU:H	1:D:24:GLU:HG2	1.67	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:35:LEU:O	1:F:37:SER:O	2.39	0.40
1:F:129:ILE:HG22	1:F:152:TYR:HD1	1.86	0.40
1:H:212:TRP:O	1:H:216:MET:HG2	2.22	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	448/456 (98%)	441 (98%)	7 (2%)	0	100	100
1	B	450/456 (99%)	438 (97%)	12 (3%)	0	100	100
1	C	450/456 (99%)	442 (98%)	8 (2%)	0	100	100
1	D	450/456 (99%)	439 (98%)	11 (2%)	0	100	100
1	E	450/456 (99%)	438 (97%)	11 (2%)	1 (0%)	43	42
1	F	450/456 (99%)	442 (98%)	8 (2%)	0	100	100
1	G	450/456 (99%)	436 (97%)	14 (3%)	0	100	100
1	H	450/456 (99%)	443 (98%)	7 (2%)	0	100	100
All	All	3598/3648 (99%)	3519 (98%)	78 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	43	PHE

### 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	377/381 (99%)	361 (96%)	16 (4%)	26	25
1	B	378/381 (99%)	359 (95%)	19 (5%)	22	20
1	C	378/381 (99%)	361 (96%)	17 (4%)	24	23
1	D	378/381 (99%)	370 (98%)	8 (2%)	47	52
1	E	378/381 (99%)	363 (96%)	15 (4%)	28	27
1	F	378/381 (99%)	357 (94%)	21 (6%)	19	16
1	G	378/381 (99%)	356 (94%)	22 (6%)	18	15
1	H	378/381 (99%)	360 (95%)	18 (5%)	23	21
All	All	3023/3048 (99%)	2887 (96%)	136 (4%)	24	23

All (136) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	ASN
1	A	35	LEU
1	A	37	SER
1	A	90	ILE
1	A	114	GLU
1	A	127	PHE
1	A	133	PHE
1	A	142	MET
1	A	143	MET
1	A	167	THR
1	A	169	ASN
1	A	218	SER
1	A	225	LEU
1	A	252	ILE
1	A	324	LYS
1	A	423	ILE
1	B	23	ASN
1	B	24	GLU
1	B	37	SER
1	B	127	PHE
1	B	133	PHE
1	B	142	MET
1	B	167	THR
1	B	198	ILE

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Mol	Chain	Res	Type
1	B	218	SER
1	B	222	ASP
1	B	225	LEU
1	B	227	VAL
1	B	288	ARG
1	B	333	LEU
1	B	363	LEU
1	B	366	LYS
1	B	409	LYS
1	B	464	ARG
1	B	471	LYS
1	C	23	ASN
1	C	24	GLU
1	C	25	ILE
1	C	38	MET
1	C	90	ILE
1	C	108	LYS
1	C	110	LYS
1	C	115	LYS
1	C	127	PHE
1	C	133	PHE
1	C	257	ARG
1	C	259	ASP
1	C	260	ASN
1	C	324	LYS
1	C	325	GLN
1	C	383	ARG
1	C	464	ARG
1	D	24	GLU
1	D	38	MET
1	D	133	PHE
1	D	160	HIS
1	D	176	GLU
1	D	257	ARG
1	D	391	ASP
1	D	464	ARG
1	E	23	ASN
1	E	24	GLU
1	E	25	ILE
1	E	47	GLU
1	E	60	VAL
1	E	93	THR

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Mol	Chain	Res	Type
1	E	96	LYS
1	E	125	ASP
1	E	127	PHE
1	E	133	PHE
1	E	252	ILE
1	E	325	GLN
1	E	362	GLU
1	E	383	ARG
1	E	391	ASP
1	F	24	GLU
1	F	42	LYS
1	F	69	LEU
1	F	100	SER
1	F	101	VAL
1	F	115	LYS
1	F	127	PHE
1	F	133	PHE
1	F	173	THR
1	F	194	GLU
1	F	225	LEU
1	F	229	LYS
1	F	252	ILE
1	F	278	ASP
1	F	331	THR
1	F	366	LYS
1	F	380	SER
1	F	409	LYS
1	F	424	ILE
1	F	461	VAL
1	F	474	LYS
1	G	42	LYS
1	G	48	LEU
1	G	89	ILE
1	G	92	VAL
1	G	102	LYS
1	G	127	PHE
1	G	133	PHE
1	G	169	ASN
1	G	229	LYS
1	G	245	SER
1	G	261	TRP
1	G	268	GLU

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Mol	Chain	Res	Type
1	G	278	ASP
1	G	280	VAL
1	G	325	GLN
1	G	331	THR
1	G	346	MET
1	G	362	GLU
1	G	363	LEU
1	G	368	SER
1	G	464	ARG
1	G	465	GLU
1	H	24	GLU
1	H	42	LYS
1	H	63	LYS
1	H	78	LEU
1	H	90	ILE
1	H	91	THR
1	H	133	PHE
1	H	160	HIS
1	H	172	GLU
1	H	225	LEU
1	H	273	LYS
1	H	325	GLN
1	H	329	ARG
1	H	331	THR
1	H	383	ARG
1	H	391	ASP
1	H	403	ILE
1	H	474	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	165	ASN
1	B	46	GLN
1	B	97	GLN
1	B	207	GLN
1	B	406	GLN
1	B	420	ASN
1	C	97	GLN
1	D	99	HIS
1	D	299	ASN
1	E	46	GLN

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Mol	Chain	Res	Type
1	E	165	ASN
1	E	169	ASN
1	F	165	ASN
1	F	206	HIS
1	F	207	GLN
1	F	260	ASN
1	F	420	ASN
1	G	145	ASN
1	G	207	GLN
1	G	320	ASN
1	G	325	GLN
1	G	344	HIS
1	G	358	ASN
1	G	420	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](#)

23 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	GOL	G	502	-	5,5,5	0.32	0	5,5,5	0.85	0
2	SO4	B	502	-	4,4,4	0.20	0	6,6,6	0.07	0
3	GOL	C	503	-	5,5,5	0.28	0	5,5,5	0.47	0
3	GOL	D	503	-	5,5,5	0.56	0	5,5,5	1.24	1 (20%)
3	GOL	C	502	-	5,5,5	0.92	1 (20%)	5,5,5	0.60	0
2	SO4	C	501	-	4,4,4	0.22	0	6,6,6	0.20	0
2	SO4	A	501	-	4,4,4	0.27	0	6,6,6	0.31	0
3	GOL	H	504	-	5,5,5	0.35	0	5,5,5	0.53	0
2	SO4	B	501	-	4,4,4	0.26	0	6,6,6	0.16	0
2	SO4	D	502	-	4,4,4	0.24	0	6,6,6	0.18	0
3	GOL	E	502	-	5,5,5	0.37	0	5,5,5	0.34	0
3	GOL	H	503	-	5,5,5	0.81	0	5,5,5	1.22	0
2	SO4	F	502	-	4,4,4	0.26	0	6,6,6	0.30	0
3	GOL	G	503	-	5,5,5	0.33	0	5,5,5	0.29	0
2	SO4	F	501	-	4,4,4	0.20	0	6,6,6	0.22	0
3	GOL	B	503	-	5,5,5	0.43	0	5,5,5	0.46	0
2	SO4	E	501	-	4,4,4	0.25	0	6,6,6	0.08	0
2	SO4	D	501	-	4,4,4	0.21	0	6,6,6	0.22	0
2	SO4	H	501	-	4,4,4	0.24	0	6,6,6	0.19	0
2	SO4	H	502	-	4,4,4	0.28	0	6,6,6	0.18	0
2	SO4	G	501	-	4,4,4	0.23	0	6,6,6	0.17	0
3	GOL	A	502	-	5,5,5	0.40	0	5,5,5	1.22	1 (20%)
3	GOL	C	504	-	5,5,5	0.78	0	5,5,5	1.13	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
3	GOL	G	502	-	-	4/4/4/4	-
3	GOL	G	503	-	-	0/4/4/4	-
3	GOL	H	504	-	-	2/4/4/4	-
3	GOL	C	503	-	-	2/4/4/4	-
3	GOL	B	503	-	-	2/4/4/4	-
3	GOL	D	503	-	-	2/4/4/4	-
3	GOL	A	502	-	-	2/4/4/4	-
3	GOL	E	502	-	-	0/4/4/4	-
3	GOL	C	504	-	-	2/4/4/4	-
3	GOL	C	502	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	H	503	-	-	1/4/4/4	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	502	GOL	O2-C2	-2.03	1.37	1.43

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	GOL	O3-C3-C2	-2.21	100.45	110.38
3	D	503	GOL	O3-C3-C2	-2.09	100.98	110.38

There are no chirality outliers.

All (19) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	503	GOL	O1-C1-C2-C3
3	C	502	GOL	O1-C1-C2-O2
3	C	503	GOL	O1-C1-C2-C3
3	C	504	GOL	O1-C1-C2-C3
3	D	503	GOL	C1-C2-C3-O3
3	G	502	GOL	O1-C1-C2-C3
3	G	502	GOL	C1-C2-C3-O3
3	A	502	GOL	O2-C2-C3-O3
3	C	504	GOL	O1-C1-C2-O2
3	A	502	GOL	C1-C2-C3-O3
3	C	502	GOL	O1-C1-C2-C3
3	D	503	GOL	O2-C2-C3-O3
3	C	503	GOL	O1-C1-C2-O2
3	G	502	GOL	O1-C1-C2-O2
3	G	502	GOL	O2-C2-C3-O3
3	B	503	GOL	O1-C1-C2-O2
3	H	503	GOL	O1-C1-C2-O2
3	H	504	GOL	O2-C2-C3-O3
3	H	504	GOL	C1-C2-C3-O3

There are no ring outliers.

6 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	502	GOL	1	0
3	H	503	GOL	2	0
2	E	501	SO4	1	0
2	D	501	SO4	1	0
3	A	502	GOL	1	0
3	C	504	GOL	2	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, 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	450/456 (98%)	-1.21	0 100 100	14, 28, 45, 56	0
1	B	452/456 (99%)	-1.11	0 100 100	19, 35, 52, 74	0
1	C	452/456 (99%)	-1.44	0 100 100	10, 18, 34, 57	0
1	D	452/456 (99%)	-1.40	0 100 100	10, 20, 33, 51	0
1	E	452/456 (99%)	-1.15	0 100 100	16, 29, 62, 96	0
1	F	452/456 (99%)	-1.05	0 100 100	20, 35, 56, 76	0
1	G	452/456 (99%)	-1.01	0 100 100	19, 36, 61, 82	0
1	H	452/456 (99%)	-1.17	0 100 100	16, 29, 53, 65	0
All	All	3614/3648 (99%)	-1.19	0 100 100	10, 28, 52, 96	0

There are no RSRZ outliers to report.

### 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, 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( $\text{\AA}^2$ )	Q<0.9
3	GOL	C	504	6/6	0.97	0.07	12,21,25,30	0
3	GOL	A	502	6/6	0.98	0.05	20,21,25,26	0
3	GOL	C	502	6/6	0.98	0.06	24,36,38,47	0
2	SO4	E	501	5/5	0.98	0.07	38,48,49,57	0
3	GOL	G	502	6/6	0.98	0.05	24,30,31,38	0
3	GOL	G	503	6/6	0.98	0.05	43,49,50,51	0
3	GOL	H	504	6/6	0.98	0.06	23,29,32,33	0
2	SO4	F	502	5/5	0.99	0.04	41,45,57,61	0
2	SO4	G	501	5/5	0.99	0.04	45,51,51,55	0
2	SO4	H	501	5/5	0.99	0.04	38,40,45,46	0
2	SO4	H	502	5/5	0.99	0.03	35,35,39,41	0
2	SO4	B	501	5/5	0.99	0.03	31,35,38,43	0
3	GOL	B	503	6/6	0.99	0.04	25,29,30,32	0
2	SO4	C	501	5/5	0.99	0.03	30,36,45,46	0
3	GOL	C	503	6/6	0.99	0.03	24,29,31,39	0
2	SO4	D	501	5/5	0.99	0.02	23,27,29,33	0
3	GOL	D	503	6/6	0.99	0.03	13,17,17,22	0
3	GOL	E	502	6/6	0.99	0.04	22,23,24,25	0
2	SO4	D	502	5/5	0.99	0.04	29,32,36,38	0
2	SO4	A	501	5/5	0.99	0.04	39,39,47,50	0
3	GOL	H	503	6/6	0.99	0.04	21,25,32,35	0
2	SO4	F	501	5/5	0.99	0.04	30,30,32,35	0
2	SO4	B	502	5/5	1.00	0.03	32,40,40,42	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.