



# Full wwPDB X-ray Structure Validation Report

Feb 27, 2014 – 01:42 PM GMT

PDB ID : 4E7D  
Title : E. cloacae MurA in complex with UDP  
Authors : Zhu, J.-Y.; Yang, Y.; Schonbrunn, E.  
Deposited on : 2012-03-16  
Resolution : 2.50 Å(reported)

This is a full wwPDB 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 <http://wwpdb.org/ValidationPDFNotes.html>

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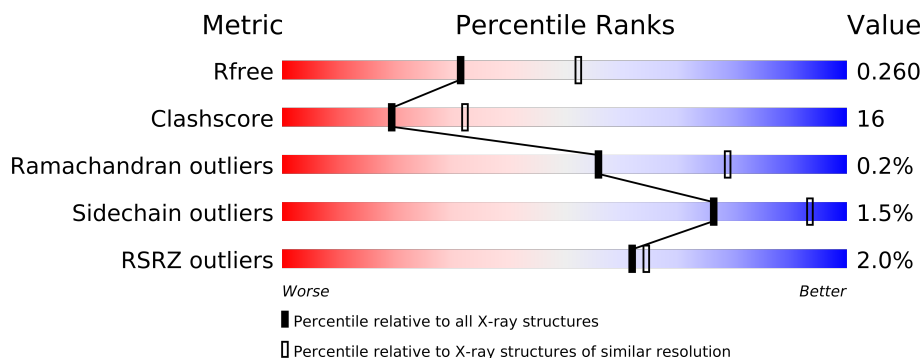
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance

The reported resolution of this entry is 2.50 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))
$R_{free}$	66092	2784 (2.50-2.50)
Clashscore	79885	3562 (2.50-2.50)
Ramachandran outliers	78287	3480 (2.50-2.50)
Sidechain outliers	78261	3482 (2.50-2.50)
RSRZ outliers	66119	2785 (2.50-2.50)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	419	
1	B	419	
1	C	419	
1	D	419	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
2	EDO	A	502	-	X
2	EDO	A	503	-	X
2	EDO	A	504	-	X
2	EDO	B	501	-	X

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Mol	Type	Chain	Res	Geometry	Electron density
2	EDO	B	502	-	X
2	EDO	B	503	-	X
2	EDO	C	502	-	X
2	EDO	C	503	-	X
2	EDO	C	504	-	X
2	EDO	C	505	-	X
2	EDO	D	502	-	X
2	EDO	D	504	-	X

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 13021 atoms, of which 0 are hydrogen and 0 are deuterium.

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 UDP-N-acetylglucosamine1-carboxyvinyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	419	Total	C	N	O	S	0	0	0
			3142	1976	554	598	14			
1	B	419	Total	C	N	O	S	0	0	0
			3142	1976	554	598	14			
1	C	419	Total	C	N	O	S	0	0	0
			3142	1976	554	598	14			
1	D	419	Total	C	N	O	S	0	0	0
			3142	1976	554	598	14			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	67	IAS	ASN	SEE REMARK 999	UNP P33038
B	67	IAS	ASN	SEE REMARK 999	UNP P33038
C	67	IAS	ASN	SEE REMARK 999	UNP P33038
D	67	IAS	ASN	SEE REMARK 999	UNP P33038

- Molecule 2 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



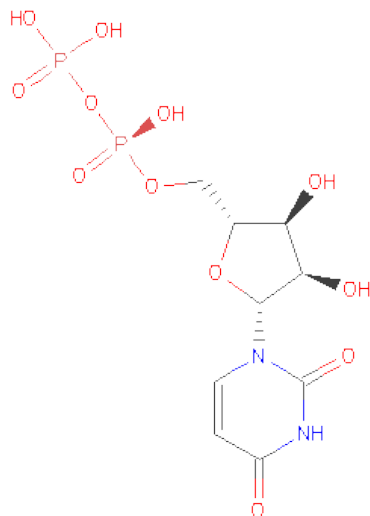
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	2	2		
2	A	1	Total	C	O	0	0
			4	2	2		
2	A	1	Total	C	O	0	0
			4	2	2		
2	A	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		
2	C	1	Total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

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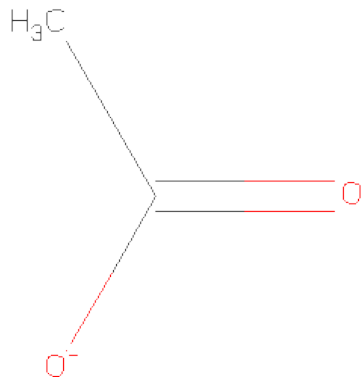
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	D	1	Total	C	O	0	0
			4	2	2		
2	D	1	Total	C	O	0	0
			4	2	2		

- Molecule 3 is URIDINE-5'-DIPHOSPHATE (three-letter code: UDP) (formula:  $C_9H_{14}N_2O_{12}P_2$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			25	9	2	12	2		

- Molecule 4 is ACETATE ION (three-letter code: ACT) (formula:  $C_2H_3O_2$ ).



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

- Molecule 5 is water.

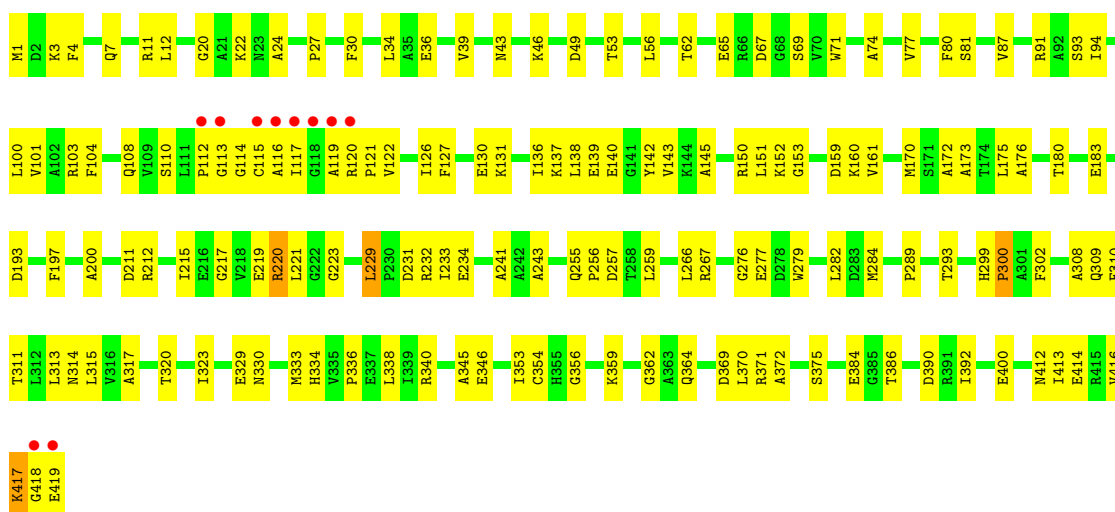
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	75	Total	O	0	0
			75	75		
5	B	93	Total	O	0	0
			93	93		
5	C	101	Total	O	0	0
			101	101		
5	D	87	Total	O	0	0
			87	87		

### 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 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: UDP-N-acetylglucosamine1-carboxyvinyltransferase

Chain A: 



- Molecule 1: UDP-N-acetylglucosamine1-carboxyvinyltransferase

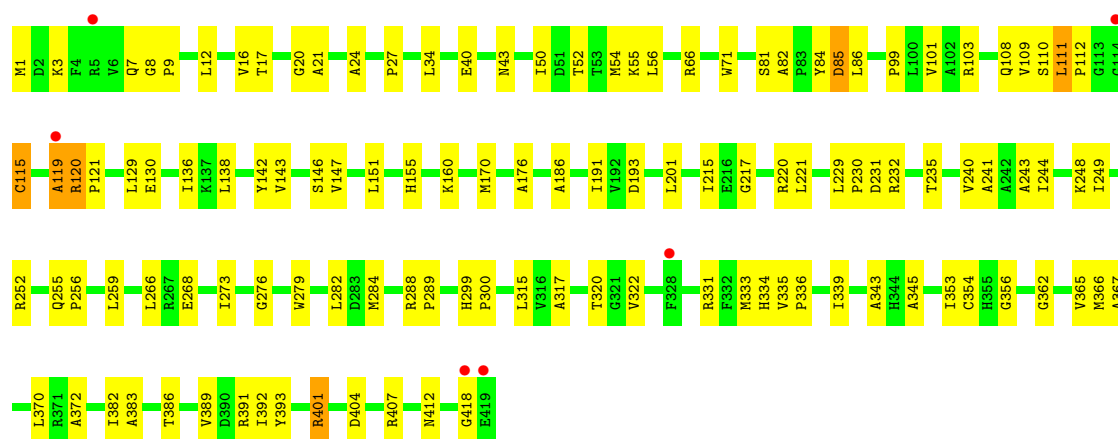
Chain B: 



- Molecule 1: UDP-N-acetylglucosamine1-carboxyvinyltransferase

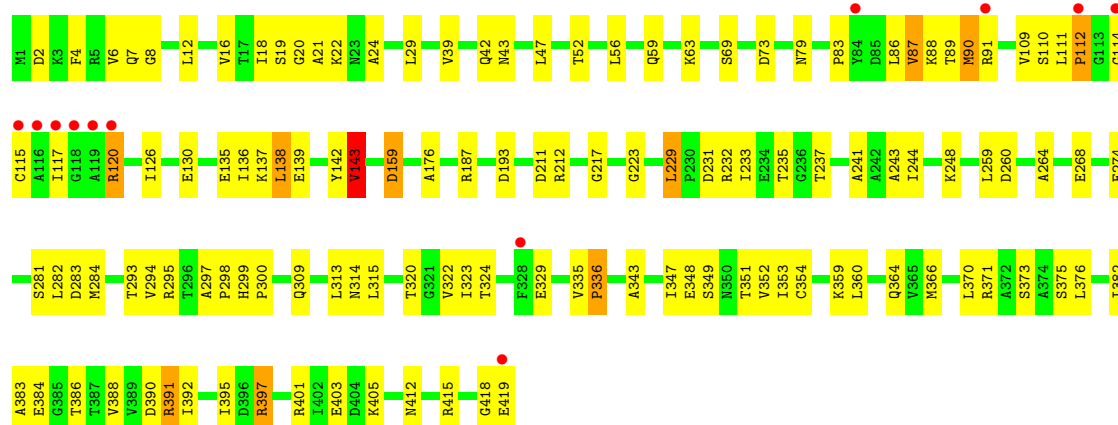
Chain C: 





• Molecule 1: UDP-N-acetylglucosamine1-carboxyvinyltransferase

Chain D: 



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	80.26Å 100.36Å 210.64Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.99 – 2.50 19.99 – 2.50	Depositor EDS
% Data completeness (in resolution range)	97.3 (19.99-2.50) 97.3 (19.99-2.50)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	0.08	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.01 (at 2.50Å)	Xtriage
Refinement program	CNS 1.3	Depositor
R, $R_{free}$	0.201 , 0.260 0.202 , 0.260	Depositor DCC
$R_{free}$ test set	1103 reflections (1.90%)	DCC
Wilson B-factor (Å <sup>2</sup> )	28.0	Xtriage
Anisotropy	0.205	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 13.8	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.28$	Xtriage
Outliers	0 of 58026 reflections	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	13021	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.98% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: UDP, EDO, IAS, ACT

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	1/3178 (0.0%)	0.93	0/4305
1	B	0.58	0/3178	0.93	0/4305
1	C	0.58	0/3178	0.94	2/4305 (0.0%)
1	D	0.69	2/3178 (0.1%)	0.95	3/4305 (0.1%)
All	All	0.61	3/12712 (0.0%)	0.94	5/17220 (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	C	0	1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	112	PRO	N-CD	-14.51	1.27	1.47
1	D	336	PRO	N-CD	-14.01	1.28	1.47
1	A	300	PRO	N-CD	-13.55	1.28	1.47

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	87	VAL	N-CA-C	-6.42	93.65	111.00
1	C	115	CYS	CA-CB-SG	5.97	124.75	114.00
1	D	90	MET	CA-CB-CG	-5.83	103.38	113.30
1	D	143	VAL	N-CA-C	-5.69	95.64	111.00
1	C	111	LEU	CA-CB-CG	5.60	128.18	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	119	ALA	Peptide

## 5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3142	0	3216	131	0
1	B	3142	0	3216	101	0
1	C	3142	0	3216	97	0
1	D	3142	0	3216	115	0
2	A	16	0	24	3	0
2	B	16	0	24	4	0
2	C	16	0	24	3	0
2	D	16	0	24	0	0
3	A	25	0	11	3	0
4	C	4	0	3	1	0
4	D	4	0	3	0	0
5	A	75	0	0	4	0
5	B	93	0	0	2	0
5	C	101	0	0	7	0
5	D	87	0	0	2	0
All	All	13021	0	12977	419	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 16.

All (419) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:89:THR:HG22	1:D:90:MET:H	1.21	1.05
1:B:76:ASN:HB3	5:B:693:HOH:O	1.63	0.98
1:D:86:LEU:O	1:D:88:LYS:HB2	1.64	0.97
1:C:230:PRO:HB2	2:C:505:EDO:H12	1.47	0.93
1:A:115:CYS:O	1:A:140:GLU:OE2	1.88	0.92

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:15:GLU:HG2	1:B:250:VAL:HB	1.52	0.90
1:D:89:THR:HG22	1:D:90:MET:N	1.87	0.89
1:A:74:ALA:O	1:A:77:VAL:HG23	1.76	0.85
1:B:4:PHE:CD2	1:B:392:ILE:HG21	2.12	0.85
1:A:1:MET:N	1:A:419:GLU:C	2.31	0.83
1:D:91:ARG:HD2	1:D:120:ARG:HD3	1.61	0.83
1:C:401:ARG:NH2	5:C:689:HOH:O	2.09	0.82
1:A:115:CYS:HB3	1:B:131:LYS:HD3	1.64	0.80
1:A:418:GLY:O	1:A:419:GLU:HB2	1.82	0.79
1:A:115:CYS:HB3	1:B:131:LYS:CD	2.13	0.79
1:C:255:GLN:HB3	2:C:505:EDO:H11	1.67	0.77
1:B:334:HIS:HB3	1:B:372:ALA:HB1	1.68	0.76
1:D:237:THR:HG23	1:D:309:GLN:NE2	2.01	0.75
1:D:359:LYS:HE3	1:D:384:GLU:HB2	1.68	0.75
1:D:364:GLN:HG2	1:D:388:VAL:HB	1.68	0.75
1:A:416:VAL:HG12	1:A:417:LYS:N	2.01	0.75
1:D:89:THR:CG2	1:D:90:MET:H	2.00	0.73
1:A:91:ARG:HH11	1:A:91:ARG:HG3	1.55	0.72
1:C:334:HIS:HB3	1:C:372:ALA:HB1	1.71	0.72
1:C:366:MET:SD	1:C:367:ALA:N	2.62	0.72
1:A:418:GLY:O	1:A:419:GLU:CB	2.38	0.71
1:C:81:SER:HB2	1:C:108:GLN:HG3	1.73	0.71
1:B:126:ILE:HG23	1:B:136:ILE:HG21	1.73	0.71
1:C:1:MET:HG2	1:C:391:ARG:HG2	1.73	0.71
1:D:299:HIS:ND1	1:D:300:PRO:HA	2.07	0.70
1:D:143:VAL:HG13	1:D:143:VAL:O	1.92	0.70
1:D:111:LEU:HD11	1:D:143:VAL:HB	1.73	0.69
1:A:232:ARG:HB2	1:A:259:LEU:HD21	1.75	0.69
1:B:333:MET:O	1:B:336:PRO:HD2	1.93	0.69
1:A:131:LYS:HZ3	1:B:115:CYS:H	1.40	0.68
1:A:7:GLN:HB3	1:A:412:ASN:ND2	2.09	0.68
1:A:36:GLU:HG2	1:A:103:ARG:NH2	2.08	0.68
1:D:86:LEU:O	1:D:87:VAL:C	2.29	0.68
1:D:7:GLN:HB2	1:D:412:ASN:OD1	1.94	0.68
1:A:1:MET:H3	1:A:419:GLU:C	1.98	0.68
1:C:317:ALA:O	1:C:356:GLY:HA3	1.94	0.67
1:D:193:ASP:CB	1:D:229:LEU:HD22	2.24	0.67
1:D:176:ALA:O	1:D:217:GLY:HA3	1.95	0.67
1:C:56:LEU:HD23	1:C:56:LEU:C	2.16	0.66
1:D:403:GLU:OE2	1:D:415:ARG:NE	2.29	0.66
1:C:81:SER:HB2	1:C:108:GLN:CG	2.26	0.65
1:A:130:GLU:OE2	1:B:138:LEU:HB3	1.96	0.65

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:109:VAL:O	1:D:143:VAL:HG12	1.97	0.65
1:A:36:GLU:HG2	1:A:103:ARG:HH21	1.61	0.65
1:B:34:LEU:HB3	1:B:221:LEU:HD12	1.80	0.64
1:A:110:SER:O	1:A:112:PRO:HD3	1.97	0.64
1:D:237:THR:HG23	1:D:309:GLN:HE21	1.63	0.63
1:A:1:MET:H1	1:A:419:GLU:C	2.02	0.63
1:A:91:ARG:NH1	1:A:91:ARG:HG3	2.11	0.62
1:C:101:VAL:HG22	1:C:147:VAL:HG12	1.80	0.62
1:D:366:MET:HG3	1:D:391:ARG:HG3	1.79	0.62
1:C:130:GLU:HG2	1:D:115:CYS:SG	2.39	0.62
1:C:243:ALA:HA	1:C:284:MET:CG	2.30	0.62
1:D:232:ARG:HB2	1:D:259:LEU:HD21	1.80	0.62
1:B:299:HIS:CG	1:B:300:PRO:HA	2.35	0.62
1:C:119:ALA:HB2	1:D:159:ASP:OD2	1.99	0.62
1:B:15:GLU:CG	1:B:250:VAL:HB	2.29	0.62
1:A:416:VAL:CG1	1:A:417:LYS:N	2.62	0.62
1:A:113:GLY:CA	1:A:116:ALA:HB2	2.30	0.62
1:A:334:HIS:HB3	2:A:501:EDO:H22	1.82	0.61
1:A:101:VAL:HG11	1:A:145:ALA:HB3	1.81	0.61
1:D:309:GLN:OE1	1:D:375:SER:HB3	1.99	0.61
1:A:419:GLU:O	1:A:419:GLU:HG2	2.01	0.61
1:D:12:LEU:HD12	1:D:241:ALA:HB1	1.83	0.61
1:A:212:ARG:HG2	5:A:646:HOH:O	1.99	0.60
1:C:8:GLY:HA3	1:C:383:ALA:O	2.01	0.60
1:C:52:THR:HA	1:C:55:LYS:HD2	1.84	0.60
1:B:243:ALA:HA	1:B:284:MET:CG	2.31	0.60
1:D:299:HIS:CG	1:D:300:PRO:HA	2.37	0.60
1:A:62:THR:HG22	1:A:74:ALA:HA	1.84	0.60
1:D:56:LEU:HB2	1:D:86:LEU:HD22	1.83	0.59
1:D:112:PRO:O	1:D:112:PRO:HG2	2.02	0.59
1:B:330:ASN:ND2	1:D:349:SER:O	2.29	0.59
1:A:276:GLY:HA3	1:A:279:TRP:NE1	2.18	0.59
1:B:176:ALA:O	1:B:217:GLY:HA3	2.03	0.59
1:C:407:ARG:HD3	5:C:688:HOH:O	2.02	0.59
5:C:683:HOH:O	1:D:139:GLU:HG3	2.02	0.59
1:B:335:VAL:HB	1:B:336:PRO:HD3	1.83	0.59
1:D:366:MET:HB2	1:D:390:ASP:HB3	1.84	0.58
1:A:112:PRO:O	1:A:114:GLY:N	2.31	0.58
1:A:153:GLY:HA2	1:A:180:THR:OG1	2.02	0.58
1:C:66:ARG:NH1	5:C:643:HOH:O	2.36	0.58
1:A:369:ASP:HB3	2:A:501:EDO:H11	1.86	0.58
1:C:84:TYR:C	1:C:86:LEU:H	2.05	0.58

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:52:THR:HG23	1:D:88:LYS:HD2	1.86	0.58
1:A:131:LYS:NZ	1:B:115:CYS:H	2.02	0.57
1:C:85:ASP:O	1:C:86:LEU:HG	2.05	0.57
1:A:317:ALA:O	1:A:356:GLY:HA3	2.04	0.57
1:A:1:MET:N	1:A:419:GLU:O	2.38	0.57
1:D:264:ALA:O	1:D:268:GLU:HG3	2.05	0.57
1:B:400:GLU:C	1:B:401:ARG:HG3	2.25	0.57
1:A:11:ARG:HD2	5:A:660:HOH:O	2.04	0.57
1:D:4:PHE:CD2	1:D:392:ILE:HG21	2.40	0.56
1:A:211:ASP:OD2	1:D:295:ARG:HD3	2.05	0.56
1:A:80:PHE:HD1	1:A:100:LEU:HD22	1.70	0.56
1:A:311:THR:HA	1:A:323:ILE:HD12	1.87	0.56
1:A:150:ARG:NH2	1:A:219:GLU:O	2.37	0.56
1:B:39:VAL:HG12	1:B:223:GLY:HA2	1.88	0.56
1:A:126:ILE:HG12	1:A:143:VAL:HG21	1.87	0.56
1:B:41:ILE:HD11	1:B:197:PHE:CE1	2.41	0.56
1:D:21:ALA:HA	1:D:231:ASP:HB2	1.88	0.56
1:D:111:LEU:HD21	1:D:143:VAL:HG11	1.88	0.56
1:A:127:PHE:HE1	1:B:138:LEU:HD11	1.70	0.56
1:D:52:THR:CG2	1:D:88:LYS:HD2	2.37	0.55
1:B:416:VAL:O	1:B:416:VAL:HG13	2.05	0.55
1:C:7:GLN:HB2	1:C:412:ASN:HB3	1.88	0.55
1:C:288:ARG:HG3	1:C:289:PRO:HD2	1.89	0.55
1:B:12:LEU:CD1	1:B:241:ALA:HB1	2.37	0.55
1:A:103:ARG:HD3	1:A:104:PHE:CE2	2.42	0.55
1:D:12:LEU:CD1	1:D:241:ALA:HB1	2.35	0.55
1:B:320:THR:HA	1:B:354:CYS:O	2.07	0.55
1:C:370:LEU:HD21	5:C:675:HOH:O	2.07	0.55
1:D:56:LEU:HD23	1:D:56:LEU:C	2.26	0.55
1:C:40:GLU:HG3	1:C:71:TRP:NE1	2.22	0.55
1:A:313:LEU:C	1:A:313:LEU:HD23	2.27	0.55
1:C:103:ARG:HH21	1:C:103:ARG:HG3	1.72	0.55
1:C:143:VAL:O	1:C:143:VAL:HG13	2.06	0.55
1:B:243:ALA:HA	1:B:284:MET:HG3	1.88	0.54
1:C:335:VAL:HB	1:C:336:PRO:HD3	1.89	0.54
1:D:19:SER:HB2	5:D:637:HOH:O	2.07	0.54
1:D:8:GLY:HA3	1:D:383:ALA:O	2.08	0.54
1:A:113:GLY:HA3	1:A:116:ALA:HB2	1.88	0.54
1:D:187:ARG:HD2	1:D:211:ASP:OD2	2.08	0.54
1:D:243:ALA:HA	1:D:284:MET:CG	2.38	0.54
1:D:297:ALA:HB1	1:D:298:PRO:CD	2.37	0.54
1:A:151:LEU:CD1	1:A:172:ALA:HB1	2.37	0.54

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:D:89:THR:O	1:D:90:MET:C	2.40	0.54
1:C:1:MET:CE	1:C:391:ARG:HD3	2.38	0.54
1:D:22:LYS:HB2	1:D:47:LEU:HD12	1.91	0.53
1:A:115:CYS:CB	1:B:131:LYS:HD2	2.38	0.53
1:C:322:VAL:HG13	1:C:353:ILE:HD13	1.91	0.53
1:D:397:ARG:HD3	5:D:676:HOH:O	2.08	0.53
1:B:294:VAL:HB	1:B:323:ILE:HD13	1.91	0.53
1:C:119:ALA:HB2	1:D:159:ASP:CG	2.28	0.53
1:A:193:ASP:CB	1:A:229:LEU:HD22	2.38	0.53
1:C:16:VAL:CG1	1:C:249:ILE:HD11	2.39	0.53
1:C:16:VAL:HG12	1:C:249:ILE:HD11	1.90	0.53
1:A:115:CYS:HB3	1:B:131:LYS:HD2	1.90	0.53
1:A:67:IAS:CG	1:A:69:SER:N	2.71	0.53
1:C:111:LEU:HD23	1:C:142:TYR:O	2.09	0.53
1:A:299:HIS:CG	1:A:300:PRO:HA	2.43	0.53
1:A:56:LEU:C	1:A:56:LEU:HD23	2.30	0.53
1:C:391:ARG:HD2	1:C:393:TYR:HE2	1.74	0.52
1:B:40:GLU:HG3	1:B:71:TRP:NE1	2.23	0.52
1:B:55:LYS:HE3	1:B:86:LEU:CD2	2.39	0.52
1:D:63:LYS:HB2	1:D:73:ASP:HB3	1.91	0.52
1:A:315:LEU:HD12	1:A:338:LEU:HD13	1.92	0.52
1:C:320:THR:HA	1:C:354:CYS:O	2.10	0.52
1:B:370:LEU:HD13	1:B:394:HIS:O	2.09	0.52
1:B:143:VAL:HG13	1:B:143:VAL:O	2.10	0.52
1:D:324:THR:HG23	1:D:351:THR:HG22	1.90	0.52
1:A:314:ASN:HB3	1:A:354:CYS:HB2	1.92	0.52
1:D:18:ILE:HD12	1:D:235:THR:HA	1.92	0.52
1:D:248:LYS:HD2	1:D:283:ASP:OD2	2.09	0.52
1:A:24:ALA:O	1:A:27:PRO:HG2	2.10	0.52
1:D:18:ILE:CD1	1:D:235:THR:HA	2.40	0.52
1:B:407:ARG:NH1	1:B:413:ILE:O	2.41	0.52
1:D:403:GLU:OE2	1:D:415:ARG:NH2	2.43	0.52
1:C:186:ALA:HB3	1:C:191:ILE:CD1	2.39	0.52
1:D:335:VAL:HG21	1:D:352:VAL:HG21	1.92	0.52
1:A:150:ARG:HD3	1:A:175:LEU:O	2.10	0.52
1:A:56:LEU:O	1:A:56:LEU:HD23	2.09	0.52
1:D:313:LEU:HD23	1:D:313:LEU:C	2.30	0.52
1:B:144:LYS:HB3	2:B:504:EDO:H21	1.91	0.51
1:A:320:THR:HA	1:A:354:CYS:O	2.08	0.51
1:C:362:GLY:HA3	1:C:386:THR:O	2.11	0.51
1:C:244:ILE:HD12	1:C:382:ILE:HD13	1.92	0.51
1:B:333:MET:CE	1:D:336:PRO:HG2	2.40	0.51

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:359:LYS:HD2	1:A:384:GLU:HB2	1.92	0.51
1:B:402:ILE:CG2	1:B:403:GLU:N	2.74	0.51
1:B:402:ILE:HG23	1:B:403:GLU:N	2.24	0.51
1:D:89:THR:CG2	1:D:90:MET:N	2.57	0.51
1:D:193:ASP:HB2	1:D:229:LEU:HD22	1.92	0.51
1:A:362:GLY:HA3	1:A:386:THR:O	2.10	0.51
1:A:340:ARG:NH2	1:A:364:GLN:O	2.39	0.51
1:B:109:VAL:O	1:B:143:VAL:HG12	2.11	0.51
1:D:282:LEU:HD23	1:D:282:LEU:C	2.31	0.50
1:B:2:ASP:OD2	1:B:415:ARG:HD3	2.11	0.50
1:C:235:THR:HB	1:C:259:LEU:HD11	1.93	0.50
1:C:276:GLY:HA3	1:C:279:TRP:NE1	2.26	0.50
1:B:233:ILE:HG21	1:B:371:ARG:CZ	2.42	0.50
1:D:89:THR:O	1:D:90:MET:O	2.30	0.50
1:D:112:PRO:O	1:D:112:PRO:CG	2.58	0.50
1:D:86:LEU:C	1:D:88:LYS:N	2.55	0.50
1:D:259:LEU:O	1:D:260:ASP:C	2.50	0.50
1:A:65:GLU:O	1:A:71:TRP:N	2.42	0.50
1:B:55:LYS:HE3	1:B:86:LEU:HD22	1.92	0.50
1:B:77:VAL:HB	1:B:104:PHE:CZ	2.46	0.50
1:D:87:VAL:O	1:D:89:THR:O	2.29	0.50
1:B:12:LEU:HD12	1:B:241:ALA:HB1	1.94	0.50
1:C:186:ALA:HB3	1:C:191:ILE:HD13	1.93	0.50
1:A:267:ARG:HD3	2:A:503:EDO:H22	1.93	0.50
1:B:3:LYS:HB2	1:B:416:VAL:CG1	2.42	0.50
1:B:63:LYS:HB2	1:B:73:ASP:HB3	1.94	0.50
1:A:115:CYS:CB	1:B:131:LYS:CD	2.87	0.50
1:C:56:LEU:HD23	1:C:56:LEU:O	2.12	0.50
1:C:243:ALA:HA	1:C:284:MET:HG3	1.92	0.50
1:B:34:LEU:CB	1:B:221:LEU:HD12	2.40	0.50
1:A:276:GLY:HA3	1:A:279:TRP:CE2	2.47	0.50
1:C:84:TYR:HE1	1:C:112:PRO:HA	1.77	0.50
1:C:109:VAL:O	1:C:143:VAL:HG12	2.11	0.50
1:B:396:ASP:CG	1:B:415:ARG:HH22	2.15	0.50
1:D:347:ILE:HG12	1:D:352:VAL:HG22	1.94	0.49
1:A:266:LEU:HD13	1:A:282:LEU:CD1	2.42	0.49
1:D:353:ILE:N	1:D:353:ILE:HD13	2.26	0.49
1:B:187:ARG:HB3	1:B:209:GLY:O	2.12	0.49
1:C:40:GLU:HG3	1:C:71:TRP:CD1	2.47	0.49
1:C:273:ILE:HD11	1:C:282:LEU:HD12	1.94	0.49
1:D:335:VAL:HB	1:D:336:PRO:HD3	1.93	0.49
1:A:114:GLY:O	1:A:119:ALA:CB	2.60	0.49

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:157:VAL:HA	1:B:183:GLU:HB2	1.93	0.49
1:A:36:GLU:OE2	1:A:220:ARG:HD2	2.13	0.49
1:C:21:ALA:HB2	1:C:231:ASP:HA	1.94	0.49
1:A:416:VAL:CG1	1:A:417:LYS:H	2.26	0.49
1:B:299:HIS:ND1	1:B:300:PRO:HA	2.27	0.49
1:B:103:ARG:HB2	1:B:175:LEU:CD1	2.42	0.49
1:B:62:THR:HG22	1:B:64:VAL:HG22	1.95	0.49
1:C:1:MET:HB3	5:C:646:HOH:O	2.12	0.49
1:B:240:VAL:O	1:B:244:ILE:HG23	2.12	0.49
1:C:320:THR:HG23	1:C:354:CYS:O	2.13	0.49
1:A:359:LYS:CD	1:A:384:GLU:HB2	2.43	0.48
1:A:22:LYS:HE2	1:A:49:ASP:OD2	2.13	0.48
1:B:2:ASP:HB2	5:B:655:HOH:O	2.13	0.48
1:C:20:GLY:HA3	1:C:43:ASN:O	2.13	0.48
1:B:3:LYS:HB2	1:B:416:VAL:HG13	1.95	0.48
1:B:332:PHE:CZ	1:B:352:VAL:HG23	2.48	0.48
1:B:9:PRO:HD3	1:B:384:GLU:HA	1.94	0.48
1:D:4:PHE:CE1	1:D:403:GLU:HB3	2.49	0.48
1:D:297:ALA:HB1	1:D:298:PRO:HD2	1.95	0.48
1:A:266:LEU:HD13	1:A:282:LEU:HD12	1.95	0.48
1:A:170:MET:HA	1:A:215:ILE:HD13	1.94	0.48
1:D:42:GLN:HB3	1:D:69:SER:OG	2.13	0.48
1:B:144:LYS:CB	2:B:504:EDO:H21	2.44	0.48
1:B:21:ALA:HA	1:B:231:ASP:HB2	1.95	0.48
1:B:80:PHE:HD1	1:B:100:LEU:HD22	1.79	0.48
1:D:315:LEU:HD22	1:D:343:ALA:HB1	1.95	0.48
1:A:255:GLN:HG2	1:A:257:ASP:OD1	2.14	0.48
1:A:160:LYS:NZ	1:A:160:LYS:HB2	2.29	0.48
1:A:413:ILE:O	1:A:414:GLU:OE1	2.32	0.48
1:D:143:VAL:CG1	1:D:143:VAL:O	2.61	0.47
1:D:39:VAL:HG12	1:D:223:GLY:HA2	1.96	0.47
1:C:176:ALA:O	1:C:217:GLY:HA3	2.14	0.47
1:B:4:PHE:CG	1:B:392:ILE:HG21	2.49	0.47
1:C:240:VAL:O	1:C:244:ILE:HG12	2.14	0.47
1:A:170:MET:HA	1:A:215:ILE:CD1	2.43	0.47
1:A:161:VAL:HA	5:A:601:HOH:O	2.14	0.47
1:A:176:ALA:O	1:A:217:GLY:HA3	2.14	0.47
1:A:197:PHE:O	1:A:200:ALA:HB3	2.15	0.47
1:C:111:LEU:CD2	1:C:142:TYR:O	2.63	0.47
1:A:293:THR:OG1	1:D:212:ARG:HD2	2.14	0.47
1:C:24:ALA:O	1:C:27:PRO:HD2	2.15	0.47
1:A:370:LEU:HG	1:A:371:ARG:HD3	1.96	0.47

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:91:ARG:HD2	1:A:120:ARG:NH1	2.30	0.47
1:C:333:MET:O	1:C:336:PRO:HD2	2.15	0.47
1:A:69:SER:HB2	1:A:71:TRP:CH2	2.50	0.47
1:B:146:SER:CB	2:B:504:EDO:H11	2.45	0.47
1:A:81:SER:HA	1:A:108:GLN:O	2.15	0.47
1:C:1:MET:CG	1:C:391:ARG:HG2	2.44	0.46
1:A:256:PRO:HG2	1:A:276:GLY:O	2.15	0.46
1:B:3:LYS:CD	1:B:419:GLU:OE1	2.64	0.46
1:C:315:LEU:HD21	1:C:345:ALA:HB2	1.97	0.46
1:A:243:ALA:HA	1:A:284:MET:CG	2.45	0.46
1:A:282:LEU:HD23	1:A:282:LEU:C	2.36	0.46
1:B:350:ASN:HB3	1:D:329:GLU:OE2	2.15	0.46
1:A:152:LYS:O	1:A:153:GLY:C	2.53	0.46
1:A:277:GLU:O	1:A:277:GLU:HG2	2.14	0.46
1:A:159:ASP:OD1	1:B:119:ALA:HB3	2.16	0.46
1:A:138:LEU:CD2	1:A:143:VAL:HG23	2.46	0.46
1:C:82:ALA:HB3	1:C:109:VAL:HA	1.97	0.46
1:A:20:GLY:HA3	1:A:43:ASN:O	2.15	0.46
1:D:294:VAL:HB	1:D:323:ILE:HD13	1.98	0.46
1:C:232:ARG:HA	2:C:505:EDO:H21	1.97	0.46
1:D:193:ASP:CG	1:D:229:LEU:HD22	2.36	0.46
1:A:160:LYS:HD2	3:A:505:UDP:H1'	1.97	0.46
1:D:2:ASP:OD2	1:D:415:ARG:HD3	2.16	0.46
1:A:3:LYS:HG2	1:A:390:ASP:OD2	2.15	0.46
1:A:12:LEU:CD1	1:A:241:ALA:HB1	2.45	0.46
1:B:188:GLU:HA	1:B:189:PRO:HD3	1.89	0.46
1:B:41:ILE:HG22	1:B:44:VAL:CG2	2.46	0.46
1:B:146:SER:HB3	2:B:504:EDO:H11	1.97	0.46
1:A:122:VAL:HG22	1:A:122:VAL:O	2.16	0.46
1:C:120:ARG:HA	1:C:121:PRO:HD3	1.67	0.46
1:C:334:HIS:HB3	1:C:372:ALA:CB	2.42	0.45
1:C:266:LEU:HD13	1:C:282:LEU:CD1	2.46	0.45
1:C:193:ASP:CB	1:C:229:LEU:HD22	2.47	0.45
1:A:333:MET:O	1:A:336:PRO:HD2	2.16	0.45
1:A:173:ALA:HB3	1:A:215:ILE:HD13	1.97	0.45
1:A:87:VAL:HG12	1:A:93:SER:HB3	1.98	0.45
1:D:112:PRO:HG3	1:D:120:ARG:HG3	1.99	0.45
1:C:101:VAL:HG23	1:C:146:SER:HA	1.98	0.45
1:C:136:ILE:HB	1:D:138:LEU:HD23	1.99	0.45
1:B:3:LYS:HD2	1:B:419:GLU:HB3	1.98	0.45
1:D:16:VAL:HG23	1:D:405:LYS:HB3	1.98	0.45
1:A:289:PRO:O	1:A:317:ALA:HB1	2.16	0.45

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:4:PHE:CD2	1:B:392:ILE:CG2	2.92	0.45
1:D:87:VAL:HG21	1:D:110:SER:O	2.16	0.45
1:A:346:GLU:OE2	1:A:353:ILE:HB	2.17	0.45
1:C:248:LYS:HA	1:C:282:LEU:O	2.17	0.45
1:D:91:ARG:CD	1:D:120:ARG:HD3	2.40	0.44
1:C:391:ARG:HD2	1:C:393:TYR:CE2	2.51	0.44
1:D:142:TYR:HB3	1:D:143:VAL:H	1.56	0.44
1:D:59:GLN:NE2	1:D:79:ASN:OD1	2.43	0.44
1:A:309:GLN:HG3	1:A:375:SER:OG	2.17	0.44
1:C:34:LEU:HD21	1:C:99:PRO:HA	1.99	0.44
1:B:207:GLY:O	1:B:208:GLN:C	2.54	0.44
1:D:274:GLU:HB2	1:D:281:SER:OG	2.17	0.44
1:A:334:HIS:CG	1:A:372:ALA:HB1	2.53	0.44
1:C:84:TYR:O	1:C:86:LEU:N	2.48	0.44
1:A:30:PHE:CZ	1:A:53:THR:HG23	2.51	0.44
1:A:183:GLU:HG2	1:D:293:THR:OG1	2.18	0.44
1:A:137:LYS:HE2	1:A:142:TYR:OH	2.18	0.44
1:B:57:LEU:O	1:B:62:THR:HB	2.17	0.44
1:B:265:LYS:HA	1:B:265:LYS:HD3	1.93	0.44
1:B:14:GLY:O	1:B:249:ILE:HA	2.18	0.44
1:B:288:ARG:HG3	1:B:289:PRO:HD2	2.00	0.44
1:D:91:ARG:HB3	1:D:91:ARG:CZ	2.48	0.44
1:A:4:PHE:CD2	1:A:392:ILE:HG21	2.53	0.44
1:C:331:ARG:O	1:C:331:ARG:HG2	2.18	0.44
1:A:131:LYS:NZ	1:B:115:CYS:N	2.66	0.44
1:D:6:VAL:O	1:D:386:THR:HA	2.18	0.44
1:C:7:GLN:HB2	1:C:412:ASN:CB	2.48	0.44
1:D:83:PRO:CG	1:D:86:LEU:HD12	2.47	0.43
1:B:24:ALA:O	1:B:28:ILE:HG13	2.18	0.43
1:C:84:TYR:HB2	1:C:110:SER:OG	2.19	0.43
1:A:233:ILE:HG21	1:A:371:ARG:CZ	2.48	0.43
1:C:365:VAL:O	1:C:389:VAL:HA	2.18	0.43
1:D:91:ARG:HH11	1:D:91:ARG:HG2	1.83	0.43
1:A:233:ILE:HG21	1:A:371:ARG:NE	2.33	0.43
1:B:282:LEU:C	1:B:282:LEU:HD23	2.39	0.43
1:A:46:LYS:N	1:A:400:GLU:OE2	2.44	0.43
1:A:302:PHE:HZ	1:A:310:PHE:CD1	2.36	0.43
1:D:114:GLY:O	1:D:115:CYS:HB2	2.19	0.43
1:C:84:TYR:CE1	1:C:112:PRO:HA	2.54	0.43
1:B:3:LYS:HD3	1:B:419:GLU:OE1	2.18	0.43
3:A:505:UDP:H3'	3:A:505:UDP:O3B	2.18	0.43
1:C:299:HIS:CG	1:C:300:PRO:HA	2.53	0.43

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:C:12:LEU:HD13	1:C:241:ALA:HB1	1.99	0.43
1:B:366:MET:SD	1:B:366:MET:C	2.97	0.43
1:A:12:LEU:HD13	1:A:241:ALA:HB1	2.01	0.43
1:B:112:PRO:HG2	1:B:113:GLY:H	1.83	0.43
1:C:366:MET:SD	1:C:366:MET:C	2.97	0.43
1:A:308:ALA:HB1	1:A:372:ALA:HA	2.00	0.43
1:B:12:LEU:HD13	1:B:241:ALA:HB1	2.01	0.43
1:A:370:LEU:N	1:A:370:LEU:HD23	2.33	0.43
1:B:333:MET:HE2	1:D:336:PRO:HG2	2.01	0.43
1:C:7:GLN:NE2	1:C:7:GLN:HA	2.34	0.43
1:A:370:LEU:HB3	5:A:622:HOH:O	2.19	0.43
1:D:59:GLN:O	1:D:59:GLN:NE2	2.52	0.43
1:B:333:MET:HE1	1:D:336:PRO:HG2	2.00	0.42
1:B:400:GLU:HG2	1:B:401:ARG:HG3	2.01	0.42
1:A:39:VAL:HG12	1:A:223:GLY:HA2	2.01	0.42
1:C:50:ILE:O	1:C:54:MET:HG3	2.20	0.42
1:C:3:LYS:HA	1:C:392:ILE:HG23	2.01	0.42
1:B:24:ALA:HB3	1:B:228:VAL:HG13	2.01	0.42
1:D:418:GLY:O	1:D:419:GLU:C	2.58	0.42
1:A:34:LEU:HB3	1:A:221:LEU:HD12	2.01	0.42
1:A:315:LEU:HD23	1:A:354:CYS:HB3	2.00	0.42
1:B:120:ARG:HA	1:B:121:PRO:HD2	1.73	0.42
1:D:244:ILE:HD12	1:D:382:ILE:HD13	2.01	0.42
1:B:34:LEU:HD21	1:B:99:PRO:HA	2.02	0.42
1:D:376:LEU:HD23	1:D:376:LEU:HA	1.87	0.42
1:B:212:ARG:HD3	1:C:268:GLU:CD	2.40	0.42
1:D:248:LYS:HA	1:D:282:LEU:O	2.19	0.42
1:D:370:LEU:HD23	1:D:371:ARG:H	1.85	0.42
1:D:111:LEU:HD21	1:D:143:VAL:CG1	2.49	0.42
1:A:103:ARG:HD3	1:A:104:PHE:CZ	2.54	0.42
1:C:418:GLY:HA2	4:C:501:ACT:OXT	2.20	0.42
1:C:155:HIS:ND1	5:C:700:HOH:O	2.37	0.42
1:B:189:PRO:HD3	1:B:299:HIS:CD2	2.55	0.42
1:A:101:VAL:HG11	1:A:145:ALA:CB	2.47	0.42
1:A:139:GLU:HB2	1:A:142:TYR:CE2	2.55	0.42
1:C:401:ARG:NH1	1:C:404:ASP:OD2	2.53	0.41
1:A:315:LEU:HD21	1:A:345:ALA:HB2	2.01	0.41
1:A:160:LYS:HB2	1:A:160:LYS:HZ3	1.85	0.41
1:A:330:ASN:HD21	1:A:333:MET:CE	2.33	0.41
1:D:373:SER:OG	1:D:395:ILE:HD11	2.20	0.41
1:C:9:PRO:HB3	1:C:382:ILE:O	2.19	0.41
1:B:3:LYS:HG2	1:B:390:ASP:OD2	2.20	0.41

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:121:PRO:HB2	3:A:505:UDP:C2	2.55	0.41
1:B:266:LEU:HD13	1:B:282:LEU:HD12	2.01	0.41
1:B:285:HIS:C	1:B:287:LYS:H	2.23	0.41
1:C:170:MET:HA	1:C:215:ILE:HD13	2.02	0.41
1:A:113:GLY:C	1:A:116:ALA:HB2	2.40	0.41
1:B:248:LYS:HD2	1:B:283:ASP:OD2	2.21	0.41
1:B:303:PRO:HG2	1:B:306:MET:HB2	2.03	0.41
1:A:126:ILE:HD13	1:A:138:LEU:HD21	2.03	0.41
1:C:193:ASP:HB2	1:C:229:LEU:HD22	2.03	0.41
1:A:417:LYS:HE2	1:A:417:LYS:HB2	1.75	0.41
1:D:314:ASN:HB3	1:D:354:CYS:HB2	2.01	0.41
1:A:136:ILE:HB	1:B:138:LEU:HB2	2.02	0.41
1:B:77:VAL:HB	1:B:104:PHE:CE2	2.55	0.41
1:C:201:LEU:HB3	1:C:221:LEU:HB3	2.03	0.41
1:D:24:ALA:CB	1:D:229:LEU:CD2	2.99	0.41
1:D:232:ARG:HB2	1:D:259:LEU:CD2	2.50	0.41
1:D:322:VAL:HG22	1:D:353:ILE:HD12	2.02	0.41
1:C:193:ASP:CG	1:C:229:LEU:HD22	2.41	0.41
1:D:126:ILE:HG23	1:D:136:ILE:HG21	2.02	0.41
1:D:135:GLU:OE2	1:D:137:LYS:HE3	2.21	0.41
1:C:151:LEU:HD23	1:C:151:LEU:HA	1.96	0.41
1:D:320:THR:HA	1:D:354:CYS:O	2.21	0.40
1:C:129:LEU:HA	1:C:129:LEU:HD23	1.85	0.40
1:A:231:ASP:HB3	1:A:234:GLU:HB3	2.02	0.40
1:D:233:ILE:HG21	1:D:371:ARG:CZ	2.52	0.40
1:B:81:SER:OG	1:B:142:TYR:HE2	2.04	0.40
1:B:28:ILE:HD12	1:B:228:VAL:HG22	2.02	0.40
1:C:12:LEU:CD1	1:C:241:ALA:HB1	2.51	0.40
1:D:29:LEU:HA	1:D:29:LEU:HD23	1.95	0.40
1:C:339:ILE:HD13	1:C:343:ALA:O	2.21	0.40
1:C:17:THR:HA	1:C:252:ARG:HB2	2.04	0.40
1:D:360:LEU:O	1:D:384:GLU:N	2.46	0.40
1:C:256:PRO:HG2	1:C:276:GLY:O	2.22	0.40
1:A:94:ILE:HD13	1:A:122:VAL:HG21	2.03	0.40
1:C:138:LEU:HB3	1:D:130:GLU:HG3	2.02	0.40
1:D:20:GLY:HA3	1:D:43:ASN:O	2.22	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution. The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	415/419 (99%)	390 (94%)	24 (6%)	1 (0%)	56	79
1	B	415/419 (99%)	396 (95%)	19 (5%)	0	100	100
1	C	415/419 (99%)	390 (94%)	24 (6%)	1 (0%)	56	79
1	D	415/419 (99%)	389 (94%)	24 (6%)	2 (0%)	38	60
All	All	1660/1676 (99%)	1565 (94%)	91 (6%)	4 (0%)	56	79

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	85	ASP
1	D	117	ILE
1	A	117	ILE
1	D	143	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	329/329 (100%)	325 (99%)	4 (1%)	82	95
1	B	329/329 (100%)	326 (99%)	3 (1%)	87	97
1	C	329/329 (100%)	324 (98%)	5 (2%)	76	93
1	D	329/329 (100%)	321 (98%)	8 (2%)	61	86
All	All	1316/1316 (100%)	1296 (98%)	20 (2%)	76	93

All (20) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	220	ARG
1	A	229	LEU
1	A	329	GLU
1	A	417	LYS
1	B	91	ARG
1	B	120	ARG
1	B	401	ARG
1	C	115	CYS
1	C	120	ARG
1	C	160	LYS
1	C	220	ARG
1	C	401	ARG
1	D	120	ARG
1	D	138	LEU
1	D	159	ASP
1	D	229	LEU
1	D	348	GLU
1	D	391	ARG
1	D	397	ARG
1	D	401	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	330	ASN

### 5.3.3 RNA ⓘ

There are no RNA chains 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	IAS	A	67	1	7,7,8	7.07	1 (14%)	6,8,10	0.78	0
1	IAS	B	67	1	7,7,8	7.20	1 (14%)	6,8,10	0.85	0
1	IAS	C	67	1	7,7,8	6.85	2 (28%)	6,8,10	0.41	0
1	IAS	D	67	1	7,7,8	6.86	2 (28%)	6,8,10	1.33	1 (16%)

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	IAS	A	67	1	-	0/6/7/8	0/0/0/0
1	IAS	B	67	1	-	0/6/7/8	0/0/0/0
1	IAS	C	67	1	-	0/6/7/8	0/0/0/0
1	IAS	D	67	1	-	0/6/7/8	0/0/0/0

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	67	IAS	OD1-CG	18.81	1.24	1.11
1	A	67	IAS	OD1-CG	18.51	1.24	1.11
1	D	67	IAS	OD1-CG	17.86	1.23	1.11
1	C	67	IAS	OD1-CG	17.81	1.23	1.11
1	D	67	IAS	CB-CA	-2.65	1.51	1.54
1	C	67	IAS	CB-CA	-2.23	1.52	1.54

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	67	IAS	C-CA-N	2.88	114.14	109.36

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry

19 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	$\# Z  > 2$
2	EDO	A	501	-	3,3,3	0.68	0	2,2,2	0.25	0
2	EDO	A	502	-	3,3,3	0.57	0	2,2,2	0.40	0
2	EDO	A	503	-	3,3,3	0.74	0	2,2,2	0.23	0
2	EDO	A	504	-	3,3,3	0.66	0	2,2,2	0.37	0
3	UDP	A	505	-	26,26,26	1.56	3 (11%)	36,40,40	1.53	3 (8%)
2	EDO	B	501	-	3,3,3	0.58	0	2,2,2	0.39	0
2	EDO	B	502	-	3,3,3	0.66	0	2,2,2	0.32	0
2	EDO	B	503	-	3,3,3	0.67	0	2,2,2	0.30	0
2	EDO	B	504	-	3,3,3	0.81	0	2,2,2	0.18	0
4	ACT	C	501	-	1,3,3	1.77	0	0,3,3	0.00	-
2	EDO	C	502	-	3,3,3	0.67	0	2,2,2	0.32	0
2	EDO	C	503	-	3,3,3	0.60	0	2,2,2	0.37	0
2	EDO	C	504	-	3,3,3	0.65	0	2,2,2	0.27	0
2	EDO	C	505	-	3,3,3	0.57	0	2,2,2	0.28	0
4	ACT	D	501	-	1,3,3	1.93	0	0,3,3	0.00	-
2	EDO	D	502	-	3,3,3	0.49	0	2,2,2	0.40	0
2	EDO	D	503	-	3,3,3	0.73	0	2,2,2	0.27	0
2	EDO	D	504	-	3,3,3	0.69	0	2,2,2	0.24	0
2	EDO	D	505	-	3,3,3	0.66	0	2,2,2	0.39	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	EDO	A	501	-	-	0/1/1/1	0/0/0/0
2	EDO	A	502	-	-	0/1/1/1	0/0/0/0
2	EDO	A	503	-	-	0/1/1/1	0/0/0/0
2	EDO	A	504	-	-	0/1/1/1	0/0/0/0
3	UDP	A	505	-	-	0/14/32/32	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	EDO	B	501	-	-	0/1/1/1	0/0/0/0
2	EDO	B	502	-	-	0/1/1/1	0/0/0/0
2	EDO	B	503	-	-	0/1/1/1	0/0/0/0
2	EDO	B	504	-	-	0/1/1/1	0/0/0/0
4	ACT	C	501	-	-	0/0/0/0	0/0/0/0
2	EDO	C	502	-	-	0/1/1/1	0/0/0/0
2	EDO	C	503	-	-	0/1/1/1	0/0/0/0
2	EDO	C	504	-	-	0/1/1/1	0/0/0/0
2	EDO	C	505	-	-	0/1/1/1	0/0/0/0
4	ACT	D	501	-	-	0/0/0/0	0/0/0/0
2	EDO	D	502	-	-	0/1/1/1	0/0/0/0
2	EDO	D	503	-	-	0/1/1/1	0/0/0/0
2	EDO	D	504	-	-	0/1/1/1	0/0/0/0
2	EDO	D	505	-	-	0/1/1/1	0/0/0/0

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	505	UDP	C2-N1	4.21	1.43	1.38
3	A	505	UDP	C6-C5	3.51	1.41	1.36
3	A	505	UDP	O4'-C1'	2.43	1.45	1.41

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	505	UDP	N3-C2-N1	6.71	121.57	115.97
3	A	505	UDP	O3'-C3'-C4'	3.37	121.02	111.08
3	A	505	UDP	C6-N1-C1'	2.25	124.91	119.33

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

## 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.

## 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, 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	419/419 (100%)	-0.15	10 (2%) 56 58	12, 26, 44, 84	0
1	B	419/419 (100%)	-0.24	5 (1%) 75 77	12, 25, 45, 67	0
1	C	419/419 (100%)	-0.19	6 (1%) 72 74	11, 26, 48, 71	0
1	D	419/419 (100%)	-0.13	12 (2%) 49 51	14, 27, 49, 78	0
All	All	1676/1676 (100%)	-0.18	33 (1%) 62 64	11, 26, 47, 84	0

All (33) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	419	GLU	9.3
1	C	419	GLU	6.1
1	A	115	CYS	5.6
1	D	112	PRO	4.9
1	A	120	ARG	4.8
1	A	119	ALA	4.6
1	A	118	GLY	4.2
1	C	114	GLY	3.8
1	D	115	CYS	3.7
1	D	419	GLU	3.6
1	A	117	ILE	3.6
1	B	419	GLU	3.6
1	D	114	GLY	3.5
1	D	116	ALA	3.4
1	C	5	ARG	3.2
1	D	120	ARG	3.1
1	B	114	GLY	3.0
1	D	117	ILE	3.0
1	D	118	GLY	2.8
1	C	119	ALA	2.7
1	A	112	PRO	2.7

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Mol	Chain	Res	Type	RSRZ
1	D	119	ALA	2.6
1	A	418	GLY	2.6
1	A	116	ALA	2.5
1	B	113	GLY	2.5
1	A	113	GLY	2.4
1	B	115	CYS	2.3
1	D	84	TYR	2.3
1	C	418	GLY	2.3
1	B	84	TYR	2.1
1	D	328	PHE	2.1
1	D	91	ARG	2.0
1	C	328	PHE	2.0

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

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
1	IAS	A	67	8/9	0.20	1.34	32,33,35,35	0
1	IAS	C	67	8/9	0.14	1.07	19,22,28,30	0
1	IAS	D	67	8/9	0.17	0.71	32,34,35,36	0
1	IAS	B	67	8/9	0.17	0.04	32,32,33,34	0

## 6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 6.4 Ligands ⓘ

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	EDO	C	502	4/4	0.35	49.74	33,34,35,35	0
2	EDO	B	501	4/4	0.32	19.69	41,43,43,43	0
2	EDO	C	504	4/4	0.31	19.59	44,45,45,46	0
2	EDO	A	502	4/4	0.29	10.36	49,52,53,54	0
2	EDO	A	503	4/4	0.38	7.32	31,33,34,34	0
2	EDO	A	504	4/4	0.34	5.67	37,37,38,40	0
2	EDO	D	502	4/4	0.31	4.80	51,52,52,52	0
2	EDO	C	505	4/4	0.18	3.77	39,41,42,42	0
2	EDO	D	504	4/4	0.36	2.65	49,51,51,51	0
2	EDO	B	502	4/4	0.26	2.57	40,40,41,41	0
2	EDO	B	503	4/4	0.21	2.52	32,34,34,35	0
2	EDO	C	503	4/4	0.19	2.00	49,50,50,50	0
2	EDO	B	504	4/4	0.22	1.59	49,50,51,51	0
2	EDO	A	501	4/4	0.22	1.38	47,48,49,49	0
4	ACT	D	501	4/4	0.21	0.90	53,53,54,54	0
2	EDO	D	503	4/4	0.18	0.82	44,46,47,47	0
3	UDP	A	505	25/25	0.27	0.65	76,79,87,87	0
2	EDO	D	505	4/4	0.10	-0.45	33,33,33,34	0
4	ACT	C	501	4/4	0.17	-0.91	56,57,58,58	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.