



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 07:23 AM GMT

PDB ID : 3AM6  
Title : Crystal structure of the proton pumping rhodopsin AR2 from marine alga  
Acetabularia acetabulum  
Authors : Wada, T.; Yokoyama, S.  
Deposited on : 2010-08-16  
Resolution : 3.20 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  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

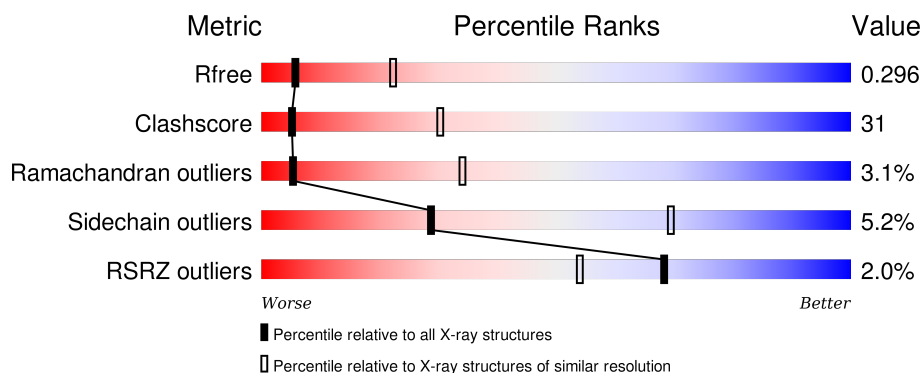
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 3.20 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))
$R_{free}$	91344	1124 (3.24-3.16)
Clashscore	102246	1024 (3.22-3.18)
Ramachandran outliers	100387	1004 (3.22-3.18)
Sidechain outliers	100360	1003 (3.22-3.18)
RSRZ outliers	91569	1129 (3.24-3.16)

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. 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	229	<div> <div>2%</div> <div> <div></div> <div>39%</div> <div>53%</div> <div>6%</div> </div> </div>
1	B	229	<div> <div>%</div> <div> <div></div> <div>38%</div> <div>54%</div> <div>6%</div> </div> </div>
1	C	229	<div> <div>%</div> <div> <div></div> <div>40%</div> <div>53%</div> <div>5%</div> </div> </div>
1	D	229	<div> <div>3%</div> <div> <div></div> <div>41%</div> <div>51%</div> <div>6%</div> </div> </div>

## 2 Entry composition [i](#)

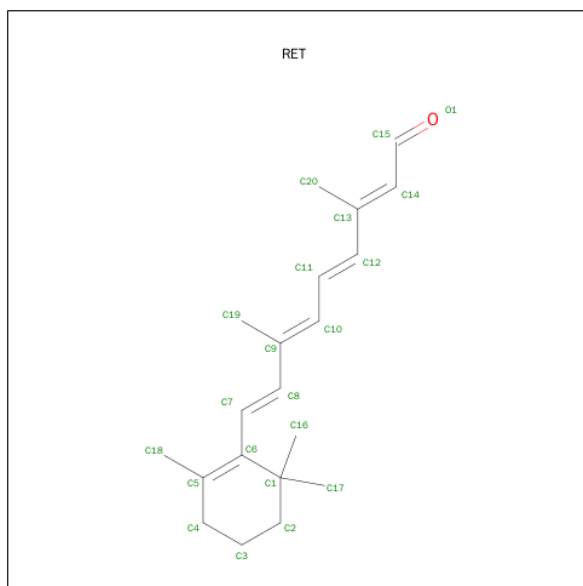
There are 3 unique types of molecules in this entry. The entry contains 7328 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 rhodopsin-2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	224	Total	C	N	O	S	0	0	0
			1756	1171	266	303	16			
1	B	224	Total	C	N	O	S	0	0	0
			1756	1171	266	303	16			
1	C	224	Total	C	N	O	S	0	0	0
			1756	1171	266	303	16			
1	D	224	Total	C	N	O	S	0	0	0
			1756	1171	266	303	16			

- Molecule 2 is RETINAL (three-letter code: RET) (formula: C<sub>20</sub>H<sub>28</sub>O).



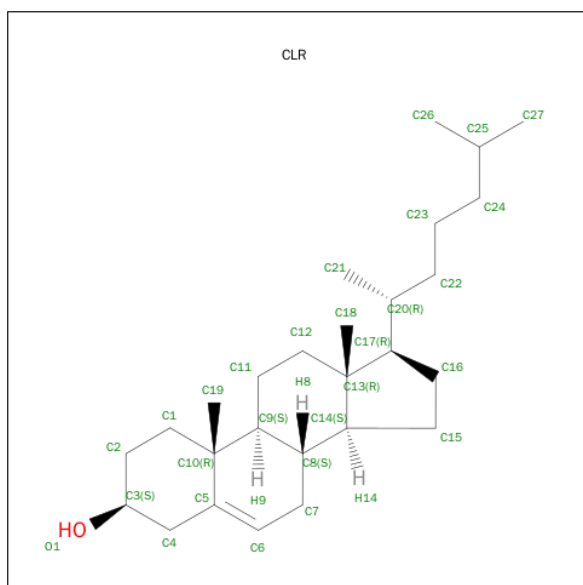
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	C	0	0
			20	20		
2	B	1	Total	C	0	0
			20	20		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	C	1	Total C 20 20	0	0
2	D	1	Total C 20 20	0	0

- Molecule 3 is CHOLESTEROL (three-letter code: CLR) (formula:  $C_{27}H_{46}O$ ).

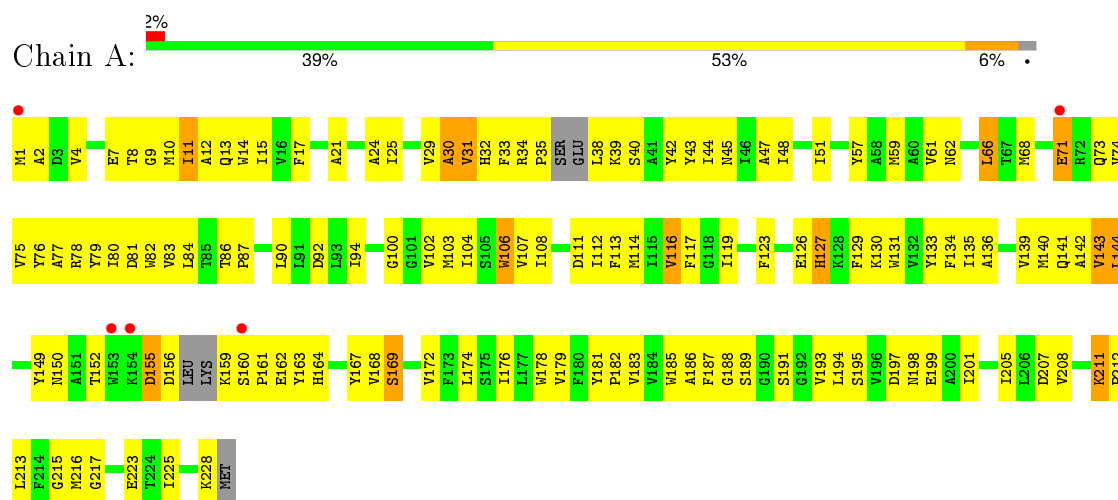


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 28 27 1	0	0
3	A	1	Total C O 28 27 1	0	0
3	B	1	Total C O 28 27 1	0	0
3	B	1	Total C O 28 27 1	0	0
3	C	1	Total C O 28 27 1	0	0
3	C	1	Total C O 28 27 1	0	0
3	D	1	Total C O 28 27 1	0	0
3	D	1	Total C O 28 27 1	0	0

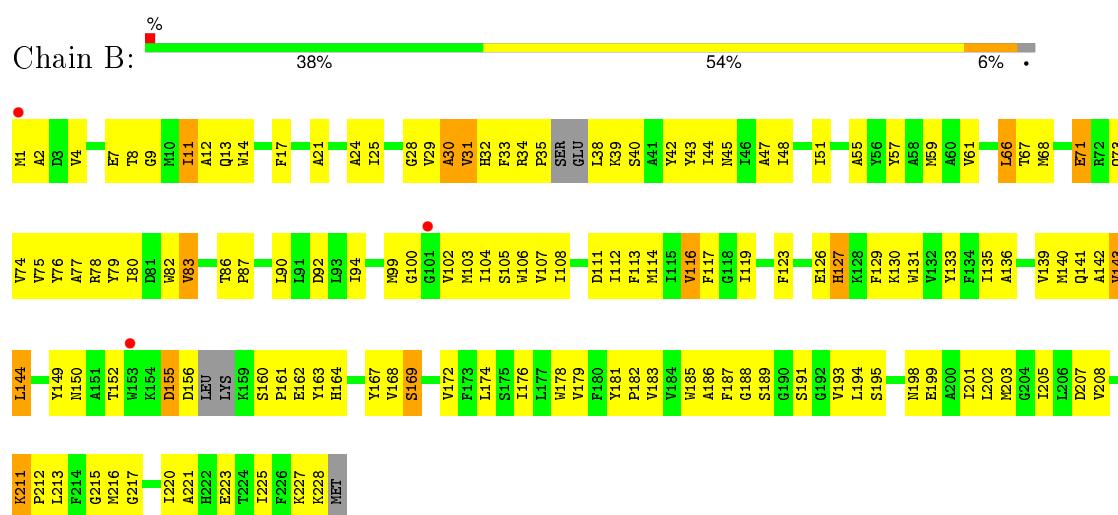
### 3 Residue-property plots

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: rhodopsin-2

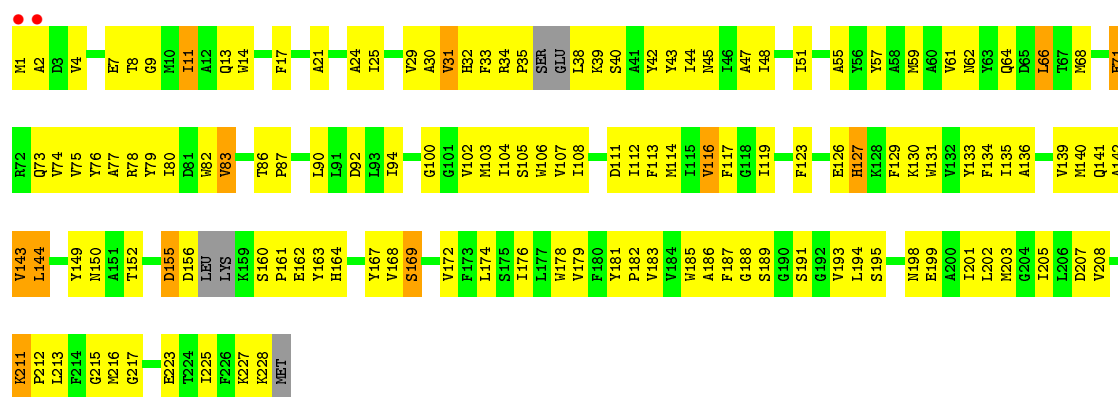


#### • Molecule 1: rhodopsin-2

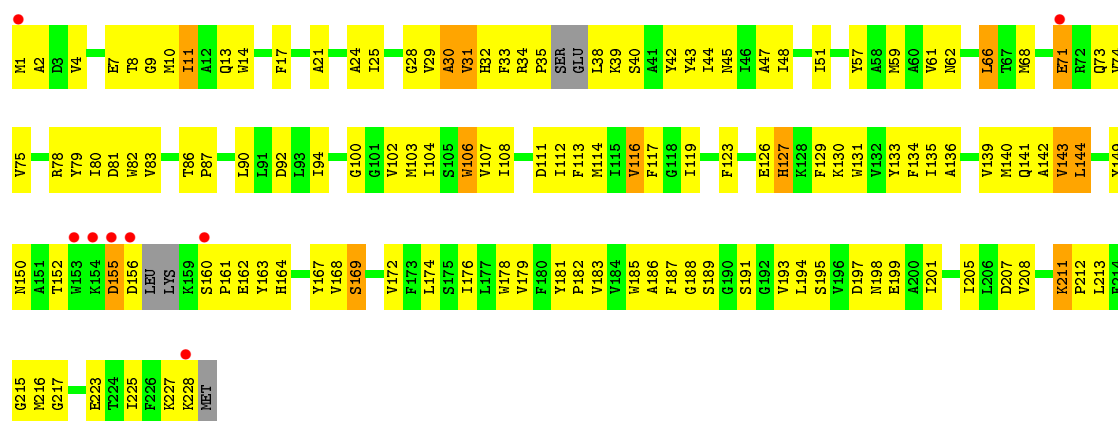


#### • Molecule 1: rhodopsin-2





### • Molecule 1: rhodopsin-2



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	84.12Å 110.49Å 129.12Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.20 – 3.20 35.24 – 3.19	Depositor EDS
% Data completeness (in resolution range)	89.2 (36.20-3.20) 88.7 (35.24-3.19)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.12	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.11 (at 3.18Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, $R_{free}$	0.290 , 0.324 0.292 , 0.296	Depositor DCC
$R_{free}$ test set	944 reflections (5.17%)	DCC
Wilson B-factor (Å <sup>2</sup> )	42.5	Xtriage
Anisotropy	0.282	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 54.6	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtriage
Outliers	6 of 18277 reflections (0.033%)	Xtriage
$F_o, F_c$ correlation	0.89	EDS
Total number of atoms	7328	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 46.39 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 1.1529e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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, 0.375 respectively for untwinned datasets, and 0.333, 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: RET, CLR

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	0.50	0/1802	0.63	0/2451
1	B	0.48	0/1802	0.63	0/2451
1	C	0.48	0/1802	0.62	0/2451
1	D	0.48	0/1802	0.63	0/2451
All	All	0.48	0/7208	0.63	0/9804

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1756	0	1766	111	1
1	B	1756	0	1766	118	0
1	C	1756	0	1766	113	0
1	D	1756	0	1766	111	1
2	A	20	0	27	2	0
2	B	20	0	27	0	0
2	C	20	0	27	3	0
2	D	20	0	27	2	0
3	A	56	0	92	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	56	0	92	2	0
3	C	56	0	92	2	0
3	D	56	0	92	2	0
All	All	7328	0	7540	454	1

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 31.

All (454) 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:161:PRO:HG2	1:B:162:GLU:OE2	1.73	0.88
1:C:161:PRO:HG2	1:C:162:GLU:OE2	1.74	0.88
1:A:161:PRO:HG2	1:A:162:GLU:OE2	1.75	0.87
1:A:113:PHE:HA	1:A:116:VAL:HG13	1.57	0.86
1:D:161:PRO:HG2	1:D:162:GLU:OE2	1.75	0.85
1:D:113:PHE:HA	1:D:116:VAL:HG13	1.59	0.84
1:D:68:MET:HG2	1:D:73:GLN:HA	1.60	0.84
1:C:113:PHE:HA	1:C:116:VAL:HG13	1.61	0.83
1:A:21:ALA:O	1:A:25:ILE:HG12	1.79	0.83
1:C:68:MET:HG2	1:C:73:GLN:HA	1.61	0.83
1:A:68:MET:HG2	1:A:73:GLN:HA	1.61	0.82
1:B:113:PHE:HA	1:B:116:VAL:HG13	1.61	0.81
1:A:211:LYS:HB2	1:A:212:PRO:HD3	1.63	0.81
1:D:21:ALA:O	1:D:25:ILE:HG12	1.81	0.81
1:D:211:LYS:HB2	1:D:212:PRO:HD3	1.62	0.81
1:B:68:MET:HG2	1:B:73:GLN:HA	1.62	0.81
1:B:211:LYS:HB2	1:B:212:PRO:HD3	1.63	0.81
1:C:211:LYS:HB2	1:C:212:PRO:HD3	1.63	0.80
1:C:7:GLU:O	1:C:11:ILE:HG12	1.82	0.79
1:B:21:ALA:O	1:B:25:ILE:HG12	1.83	0.79
1:C:21:ALA:O	1:C:25:ILE:HG12	1.83	0.78
1:B:7:GLU:O	1:B:11:ILE:HG12	1.83	0.78
1:A:7:GLU:O	1:A:11:ILE:HG12	1.85	0.77
1:D:195:SER:HB3	1:D:198:ASN:ND2	2.01	0.76
1:A:195:SER:HB3	1:A:198:ASN:ND2	2.01	0.75
1:B:57:TYR:O	1:B:61:VAL:HG23	1.87	0.74
1:D:201:ILE:O	1:D:205:ILE:HG12	1.87	0.74
1:A:201:ILE:O	1:A:205:ILE:HG12	1.88	0.73
1:C:201:ILE:O	1:C:205:ILE:HG12	1.87	0.73
1:D:7:GLU:O	1:D:11:ILE:HG12	1.89	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:179:VAL:O	1:A:183:VAL:HG23	1.89	0.73
1:D:57:TYR:O	1:D:61:VAL:HG23	1.89	0.72
1:B:201:ILE:O	1:B:205:ILE:HG12	1.90	0.72
1:B:195:SER:HB3	1:B:198:ASN:ND2	2.04	0.71
1:C:57:TYR:O	1:C:61:VAL:HG23	1.90	0.71
1:D:4:VAL:HG21	1:D:66:LEU:HD23	1.72	0.71
1:A:57:TYR:O	1:A:61:VAL:HG23	1.89	0.71
1:A:4:VAL:HG21	1:A:66:LEU:HD23	1.73	0.70
1:D:179:VAL:O	1:D:183:VAL:HG23	1.91	0.70
1:C:4:VAL:HG21	1:C:66:LEU:HD23	1.73	0.70
1:A:149:TYR:O	1:A:152:THR:HB	1.92	0.70
1:C:195:SER:HB3	1:C:198:ASN:ND2	2.06	0.69
1:B:149:TYR:O	1:B:152:THR:HB	1.92	0.69
1:C:179:VAL:O	1:C:183:VAL:HG23	1.92	0.69
1:D:149:TYR:O	1:D:152:THR:HB	1.92	0.69
1:B:179:VAL:O	1:B:183:VAL:HG23	1.93	0.68
1:C:149:TYR:O	1:C:152:THR:HB	1.93	0.68
1:B:4:VAL:HG21	1:B:66:LEU:HD23	1.74	0.68
1:A:113:PHE:HA	1:A:116:VAL:CG1	2.24	0.68
1:B:114:MET:SD	1:B:141:GLN:HB2	2.35	0.67
1:C:114:MET:SD	1:C:141:GLN:HB2	2.35	0.66
1:A:78:ARG:HD3	1:A:82:TRP:CZ2	2.30	0.66
1:A:80:ILE:O	1:A:83:VAL:HG12	1.95	0.66
1:D:195:SER:HB3	1:D:198:ASN:HD22	1.61	0.65
1:B:195:SER:HB3	1:B:198:ASN:HD22	1.60	0.65
1:B:135:ILE:HD12	1:D:83:VAL:HG11	1.77	0.65
1:C:195:SER:HB3	1:C:198:ASN:HD22	1.62	0.65
1:D:114:MET:SD	1:D:141:GLN:HB2	2.37	0.65
1:B:113:PHE:HA	1:B:116:VAL:CG1	2.27	0.64
1:C:105:SER:HB2	1:D:106:TRP:CZ3	2.32	0.64
1:A:114:MET:SD	1:A:141:GLN:HB2	2.38	0.64
1:C:113:PHE:HA	1:C:116:VAL:CG1	2.26	0.64
1:A:164:HIS:O	1:A:168:VAL:HG23	1.98	0.64
1:B:162:GLU:H	1:B:162:GLU:CD	2.01	0.64
1:A:195:SER:HB3	1:A:198:ASN:HD22	1.62	0.64
1:D:135:ILE:O	1:D:139:VAL:HG23	1.98	0.63
1:D:113:PHE:HA	1:D:116:VAL:CG1	2.26	0.63
1:B:80:ILE:O	1:B:83:VAL:HG12	1.99	0.63
1:A:83:VAL:HG11	1:C:135:ILE:HD12	1.80	0.63
1:D:225:ILE:O	1:D:228:LYS:N	2.31	0.63
1:C:135:ILE:O	1:C:139:VAL:HG23	1.98	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:127:HIS:CD2	1:D:131:TRP:HE1	2.17	0.63
1:D:80:ILE:O	1:D:83:VAL:HG12	1.98	0.62
1:D:164:HIS:O	1:D:168:VAL:HG23	1.99	0.62
1:D:162:GLU:CD	1:D:162:GLU:H	2.03	0.62
1:C:169:SER:O	1:C:172:VAL:HG22	2.00	0.62
1:C:25:ILE:O	1:C:29:VAL:HG23	1.99	0.62
1:B:164:HIS:O	1:B:168:VAL:HG23	2.00	0.62
1:A:33:PHE:O	1:A:34:ARG:HD2	1.99	0.62
1:D:33:PHE:O	1:D:34:ARG:HD2	2.00	0.62
1:C:80:ILE:O	1:C:83:VAL:HG12	2.00	0.62
1:A:106:TRP:CZ3	1:B:105:SER:HB2	2.35	0.61
1:B:78:ARG:HD3	1:B:82:TRP:CZ2	2.35	0.61
1:C:181:TYR:N	1:C:182:PRO:HD2	2.16	0.61
1:A:135:ILE:O	1:A:139:VAL:HG23	1.99	0.61
1:D:181:TYR:N	1:D:182:PRO:HD2	2.16	0.61
1:C:78:ARG:HD3	1:C:82:TRP:CZ2	2.35	0.61
1:A:181:TYR:N	1:A:182:PRO:HD2	2.15	0.61
1:D:169:SER:O	1:D:172:VAL:HG22	2.01	0.61
1:C:90:LEU:O	1:C:94:ILE:HG12	2.01	0.61
1:C:162:GLU:CD	1:C:162:GLU:H	2.04	0.61
1:A:162:GLU:H	1:A:162:GLU:CD	2.04	0.61
1:B:181:TYR:N	1:B:182:PRO:HD2	2.16	0.61
1:C:33:PHE:O	1:C:34:ARG:HD2	2.00	0.61
1:D:78:ARG:HD3	1:D:82:TRP:CZ2	2.36	0.61
1:C:127:HIS:CD2	1:C:131:TRP:HE1	2.19	0.61
1:A:113:PHE:CA	1:A:116:VAL:HG13	2.30	0.60
1:A:169:SER:O	1:A:172:VAL:HG22	2.00	0.60
1:D:179:VAL:O	1:D:182:PRO:HG2	2.01	0.60
1:B:127:HIS:CD2	1:B:131:TRP:HE1	2.20	0.60
1:B:33:PHE:O	1:B:34:ARG:HD2	2.00	0.60
1:A:225:ILE:O	1:A:228:LYS:N	2.34	0.60
1:C:164:HIS:O	1:C:168:VAL:HG23	2.02	0.59
1:B:135:ILE:O	1:B:139:VAL:HG23	2.02	0.59
1:B:169:SER:O	1:B:172:VAL:HG22	2.01	0.59
1:D:104:ILE:O	1:D:107:VAL:HG22	2.02	0.59
1:A:127:HIS:CD2	1:A:131:TRP:HE1	2.20	0.59
1:A:104:ILE:O	1:A:107:VAL:HG22	2.02	0.59
1:B:90:LEU:O	1:B:94:ILE:HG12	2.02	0.59
1:A:179:VAL:O	1:A:182:PRO:HG2	2.03	0.59
1:B:116:VAL:HA	1:B:119:ILE:HD12	1.84	0.59
1:B:25:ILE:O	1:B:29:VAL:HG23	2.03	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:94:ILE:HG21	1:A:104:ILE:HD12	1.85	0.59
1:B:179:VAL:O	1:B:182:PRO:HG2	2.03	0.59
1:C:116:VAL:HA	1:C:119:ILE:HD12	1.85	0.58
1:D:90:LEU:O	1:D:94:ILE:HG12	2.03	0.58
1:C:189:SER:HB2	1:C:199:GLU:OE1	2.02	0.58
1:D:189:SER:HB2	1:D:199:GLU:OE1	2.04	0.58
1:D:113:PHE:CA	1:D:116:VAL:HG13	2.32	0.58
1:D:14:TRP:O	1:D:17:PHE:HB3	2.03	0.58
1:B:225:ILE:O	1:B:228:LYS:N	2.36	0.58
1:C:113:PHE:CA	1:C:116:VAL:HG13	2.33	0.58
1:C:225:ILE:O	1:C:228:LYS:N	2.37	0.57
1:A:90:LEU:O	1:A:94:ILE:HG12	2.04	0.57
1:C:179:VAL:O	1:C:182:PRO:HG2	2.03	0.57
1:B:211:LYS:CB	1:B:212:PRO:HD3	2.33	0.57
1:C:211:LYS:CB	1:C:212:PRO:HD3	2.34	0.57
1:C:104:ILE:O	1:C:107:VAL:HG22	2.05	0.57
1:A:211:LYS:CB	1:A:212:PRO:HD3	2.35	0.56
1:D:25:ILE:O	1:D:29:VAL:HG23	2.04	0.56
1:B:14:TRP:O	1:B:17:PHE:HB3	2.04	0.56
1:A:14:TRP:O	1:A:17:PHE:HB3	2.06	0.56
1:D:94:ILE:HG21	1:D:104:ILE:HD12	1.87	0.56
1:C:14:TRP:O	1:C:17:PHE:HB3	2.05	0.56
1:B:104:ILE:O	1:B:107:VAL:HG22	2.05	0.55
1:B:189:SER:HB2	1:B:199:GLU:OE1	2.06	0.55
1:B:33:PHE:C	1:B:34:ARG:HD2	2.27	0.55
1:D:211:LYS:CB	1:D:212:PRO:HD3	2.34	0.54
1:C:94:ILE:HG21	1:C:104:ILE:HD12	1.89	0.54
1:C:33:PHE:C	1:C:34:ARG:HD2	2.28	0.54
1:A:189:SER:HB2	1:A:199:GLU:OE1	2.08	0.54
1:A:44:ILE:O	1:A:48:ILE:HG13	2.07	0.54
1:C:116:VAL:HG22	1:C:117:PHE:N	2.22	0.54
1:D:33:PHE:C	1:D:34:ARG:HD2	2.28	0.54
1:C:107:VAL:HG23	1:C:108:ILE:N	2.23	0.54
1:B:94:ILE:HG21	1:B:104:ILE:HD12	1.88	0.54
3:C:401:CLR:H22	3:C:402:CLR:H21	1.90	0.54
1:B:116:VAL:HG22	1:B:117:PHE:N	2.23	0.54
1:C:44:ILE:O	1:C:48:ILE:HG13	2.07	0.54
1:B:162:GLU:CD	1:B:162:GLU:N	2.61	0.53
1:D:47:ALA:O	1:D:51:ILE:HG12	2.08	0.53
1:D:44:ILE:O	1:D:48:ILE:HG13	2.08	0.53
1:A:25:ILE:O	1:A:29:VAL:HG23	2.07	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:107:VAL:HG23	1:D:108:ILE:N	2.23	0.53
1:B:193:VAL:HB	1:D:62:ASN:ND2	2.22	0.53
1:A:33:PHE:C	1:A:34:ARG:HD2	2.28	0.53
1:A:174:LEU:HD23	1:A:174:LEU:C	2.29	0.53
1:B:113:PHE:CA	1:B:116:VAL:HG13	2.33	0.53
1:C:79:TYR:HB3	1:C:119:ILE:HG12	1.91	0.53
1:A:107:VAL:HG23	1:A:108:ILE:N	2.24	0.52
1:B:79:TYR:HB3	1:B:119:ILE:HG12	1.91	0.52
3:D:401:CLR:H22	3:D:402:CLR:H21	1.90	0.52
1:C:1:MET:HG3	1:C:2:ALA:H	1.75	0.52
3:A:401:CLR:H22	3:A:402:CLR:H21	1.90	0.52
1:B:139:VAL:O	1:B:143:VAL:HG23	2.10	0.52
1:C:35:PRO:HD2	1:C:38:LEU:HD13	1.92	0.52
1:B:1:MET:HG3	1:B:2:ALA:H	1.74	0.52
1:D:187:PHE:O	1:D:191:SER:HB3	2.10	0.52
1:D:162:GLU:N	1:D:162:GLU:CD	2.63	0.52
1:D:176:ILE:O	1:D:179:VAL:HG22	2.10	0.52
1:C:139:VAL:O	1:C:143:VAL:HG23	2.09	0.52
1:B:107:VAL:HG23	1:B:108:ILE:N	2.24	0.51
1:A:47:ALA:O	1:A:51:ILE:HG12	2.10	0.51
1:A:139:VAL:O	1:A:143:VAL:HG23	2.10	0.51
1:D:213:LEU:HA	1:D:216:MET:HE2	1.92	0.51
1:C:47:ALA:O	1:C:51:ILE:HG12	2.11	0.51
1:D:79:TYR:HB3	1:D:119:ILE:HG12	1.91	0.51
1:C:68:MET:HG2	1:C:73:GLN:CA	2.36	0.51
1:A:71:GLU:CD	1:A:71:GLU:H	2.14	0.51
1:D:71:GLU:H	1:D:71:GLU:CD	2.14	0.51
1:A:162:GLU:N	1:A:162:GLU:CD	2.64	0.51
1:B:155:ASP:O	1:B:156:ASP:CG	2.49	0.51
1:D:9:GLY:O	1:D:13:GLN:HG3	2.11	0.51
1:B:38:LEU:HD23	1:B:38:LEU:O	2.10	0.51
1:B:44:ILE:O	1:B:48:ILE:HG13	2.11	0.51
1:A:112:ILE:O	1:A:116:VAL:HG12	2.11	0.51
1:B:174:LEU:C	1:B:174:LEU:HD23	2.31	0.51
1:D:29:VAL:O	1:D:30:ALA:C	2.49	0.51
1:A:187:PHE:O	1:A:191:SER:HB3	2.10	0.50
1:D:35:PRO:HD2	1:D:38:LEU:HD13	1.93	0.50
1:A:35:PRO:HD2	1:A:38:LEU:HD13	1.92	0.50
1:C:176:ILE:O	1:C:179:VAL:HG22	2.12	0.50
1:A:79:TYR:HB3	1:A:119:ILE:HG12	1.91	0.50
1:B:71:GLU:H	1:B:71:GLU:CD	2.15	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:71:GLU:CD	1:C:71:GLU:H	2.14	0.50
1:A:29:VAL:O	1:A:30:ALA:C	2.50	0.50
1:B:68:MET:HG2	1:B:73:GLN:CA	2.38	0.50
1:D:1:MET:HG3	1:D:2:ALA:H	1.76	0.50
1:B:112:ILE:O	1:B:116:VAL:HG12	2.12	0.50
1:A:14:TRP:CE3	1:A:14:TRP:HA	2.45	0.50
1:D:155:ASP:O	1:D:156:ASP:CG	2.50	0.50
1:D:174:LEU:HD23	1:D:174:LEU:C	2.32	0.50
3:B:401:CLR:H22	3:B:402:CLR:H21	1.94	0.50
1:B:135:ILE:CD1	1:D:83:VAL:HG11	2.41	0.49
1:D:68:MET:HG2	1:D:73:GLN:CA	2.37	0.49
1:A:205:ILE:O	1:A:208:VAL:CG1	2.60	0.49
1:C:155:ASP:O	1:C:156:ASP:CG	2.51	0.49
1:C:187:PHE:O	1:C:191:SER:HB3	2.12	0.49
1:D:112:ILE:O	1:D:116:VAL:HG12	2.12	0.49
1:C:102:VAL:HG13	1:C:103:MET:N	2.28	0.49
1:D:14:TRP:CE3	1:D:14:TRP:HA	2.47	0.49
1:B:35:PRO:HD2	1:B:38:LEU:HD13	1.95	0.49
1:D:205:ILE:O	1:D:208:VAL:CG1	2.60	0.49
1:A:78:ARG:HD3	1:A:82:TRP:CH2	2.48	0.49
1:B:102:VAL:HG13	1:B:103:MET:N	2.28	0.49
1:A:155:ASP:O	1:A:156:ASP:CG	2.51	0.49
1:B:100:GLY:O	1:B:104:ILE:HG12	2.13	0.49
1:A:9:GLY:O	1:A:13:GLN:HG3	2.13	0.49
1:D:116:VAL:HA	1:D:119:ILE:HD12	1.95	0.49
1:C:66:LEU:HD12	1:C:66:LEU:O	2.13	0.49
1:C:174:LEU:C	1:C:174:LEU:HD23	2.32	0.49
1:C:162:GLU:CD	1:C:162:GLU:N	2.65	0.49
1:C:100:GLY:O	1:C:104:ILE:HG12	2.13	0.49
1:C:111:ASP:O	1:C:114:MET:HB3	2.13	0.48
1:A:8:THR:O	1:A:9:GLY:C	2.51	0.48
1:B:47:ALA:O	1:B:51:ILE:HG12	2.13	0.48
1:D:116:VAL:HG22	1:D:117:PHE:N	2.28	0.48
1:B:205:ILE:O	1:B:208:VAL:CG1	2.61	0.48
1:B:66:LEU:O	1:B:66:LEU:HD12	2.12	0.48
1:A:191:SER:HB3	1:A:193:VAL:HG12	1.95	0.48
1:A:133:TYR:O	1:A:136:ALA:HB3	2.13	0.48
1:C:112:ILE:O	1:C:116:VAL:HG12	2.14	0.48
1:A:205:ILE:O	1:A:208:VAL:HG12	2.14	0.48
1:B:55:ALA:O	1:B:59:MET:HG3	2.14	0.48
1:D:111:ASP:O	1:D:114:MET:HB3	2.12	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:193:VAL:O	1:C:193:VAL:HG22	2.13	0.48
1:A:116:VAL:HA	1:A:119:ILE:HD12	1.96	0.48
1:A:213:LEU:HA	1:A:216:MET:HE2	1.95	0.48
1:D:139:VAL:O	1:D:143:VAL:HG23	2.13	0.48
1:C:40:SER:HA	1:C:43:TYR:HD2	1.77	0.48
1:C:8:THR:O	1:C:9:GLY:C	2.52	0.48
1:D:102:VAL:HG13	1:D:103:MET:N	2.29	0.48
1:B:29:VAL:O	1:B:30:ALA:C	2.52	0.48
1:B:193:VAL:O	1:B:193:VAL:HG22	2.13	0.48
1:B:14:TRP:HA	1:B:14:TRP:CE3	2.49	0.48
1:D:8:THR:O	1:D:9:GLY:C	2.52	0.48
1:C:9:GLY:O	1:C:13:GLN:HG3	2.14	0.48
1:C:29:VAL:O	1:C:30:ALA:C	2.52	0.47
1:C:38:LEU:HD23	1:C:38:LEU:O	2.14	0.47
1:B:187:PHE:O	1:B:191:SER:HB3	2.14	0.47
1:C:59:MET:HE2	1:C:75:VAL:HG11	1.97	0.47
1:B:191:SER:HB3	1:B:193:VAL:HG12	1.97	0.47
1:B:1:MET:HG3	1:B:2:ALA:N	2.29	0.47
1:C:208:VAL:O	1:C:212:PRO:HD2	2.14	0.47
1:B:1:MET:CG	1:B:2:ALA:H	2.28	0.47
1:A:59:MET:HE2	1:A:75:VAL:HG11	1.97	0.47
1:D:40:SER:HA	1:D:43:TYR:HD2	1.79	0.47
1:D:205:ILE:O	1:D:208:VAL:HG12	2.14	0.47
1:B:111:ASP:O	1:B:114:MET:HB3	2.14	0.47
1:C:163:TYR:O	1:C:164:HIS:C	2.53	0.47
1:A:40:SER:HA	1:A:43:TYR:HD2	1.78	0.47
1:D:140:MET:O	1:D:144:LEU:HB3	2.15	0.47
1:A:102:VAL:HG13	1:A:103:MET:N	2.29	0.47
1:C:14:TRP:HA	1:C:14:TRP:CE3	2.50	0.47
1:C:1:MET:CG	1:C:2:ALA:H	2.27	0.47
1:B:40:SER:HA	1:B:43:TYR:HD2	1.79	0.47
1:B:9:GLY:O	1:B:13:GLN:HG3	2.14	0.47
1:D:178:TRP:O	1:D:182:PRO:HD2	2.14	0.47
1:C:140:MET:O	1:C:144:LEU:HB3	2.15	0.47
1:A:83:VAL:HG11	1:C:135:ILE:CD1	2.45	0.47
1:B:163:TYR:O	1:B:164:HIS:C	2.53	0.47
1:A:68:MET:HG2	1:A:73:GLN:CA	2.38	0.47
1:A:38:LEU:HD23	1:A:38:LEU:O	2.14	0.47
1:A:1:MET:HG3	1:A:2:ALA:H	1.80	0.47
1:B:160:SER:HB2	1:B:162:GLU:OE1	2.15	0.47
1:C:21:ALA:O	1:C:24:ALA:HB3	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:66:LEU:HD12	1:A:66:LEU:O	2.16	0.47
1:A:111:ASP:O	1:A:114:MET:HB3	2.14	0.47
1:D:185:TRP:O	1:D:186:ALA:C	2.53	0.47
1:C:133:TYR:O	1:C:136:ALA:HB3	2.15	0.47
1:D:133:TYR:O	1:D:136:ALA:HB3	2.15	0.46
1:B:144:LEU:HD12	1:B:144:LEU:C	2.36	0.46
1:D:1:MET:HG3	1:D:2:ALA:N	2.31	0.46
1:D:39:LYS:O	1:D:42:TYR:HB2	2.15	0.46
1:B:185:TRP:O	1:B:186:ALA:C	2.54	0.46
1:A:178:TRP:O	1:A:182:PRO:HD2	2.15	0.46
1:D:163:TYR:O	1:D:164:HIS:C	2.53	0.46
1:B:205:ILE:O	1:B:208:VAL:HG12	2.16	0.46
1:C:205:ILE:O	1:C:208:VAL:CG1	2.64	0.46
1:D:191:SER:HB3	1:D:193:VAL:HG12	1.98	0.46
1:B:176:ILE:O	1:B:179:VAL:HG22	2.16	0.46
1:D:100:GLY:O	1:D:104:ILE:HG12	2.15	0.46
1:D:38:LEU:O	1:D:38:LEU:HD23	2.15	0.46
1:C:185:TRP:O	1:C:186:ALA:C	2.54	0.46
1:B:133:TYR:O	1:B:136:ALA:HB3	2.15	0.46
1:D:78:ARG:HD3	1:D:82:TRP:CH2	2.51	0.46
1:A:39:LYS:O	1:A:42:TYR:HB2	2.16	0.46
1:B:21:ALA:O	1:B:24:ALA:HB3	2.16	0.45
1:D:7:GLU:O	1:D:10:MET:HB3	2.16	0.45
1:C:144:LEU:C	1:C:144:LEU:HD12	2.36	0.45
1:C:78:ARG:HD3	1:C:82:TRP:CH2	2.51	0.45
1:D:74:VAL:HG11	1:D:123:PHE:CE1	2.50	0.45
1:B:39:LYS:O	1:B:42:TYR:HB2	2.16	0.45
1:D:193:VAL:HG22	1:D:193:VAL:O	2.16	0.45
1:A:116:VAL:HG22	1:A:117:PHE:N	2.30	0.45
1:C:188:GLY:CA	1:C:194:LEU:HB3	2.46	0.45
1:D:1:MET:CG	1:D:2:ALA:H	2.30	0.45
1:C:191:SER:HB3	1:C:193:VAL:HG12	1.96	0.45
1:D:160:SER:HB2	1:D:162:GLU:OE1	2.17	0.45
1:D:4:VAL:CG2	1:D:66:LEU:HD23	2.44	0.45
1:A:62:ASN:ND2	1:C:193:VAL:HB	2.31	0.45
1:B:74:VAL:HG11	1:B:123:PHE:CE1	2.52	0.45
1:D:144:LEU:HD12	1:D:144:LEU:C	2.38	0.45
1:B:216:MET:O	1:B:217:GLY:C	2.56	0.45
1:A:144:LEU:C	1:A:144:LEU:HD12	2.37	0.45
1:A:7:GLU:O	1:A:10:MET:HB3	2.17	0.45
1:D:34:ARG:NH2	1:D:223:GLU:OE1	2.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:GLY:O	1:A:104:ILE:HG12	2.16	0.45
1:A:193:VAL:HG22	1:A:193:VAL:O	2.17	0.45
1:B:213:LEU:HA	1:B:216:MET:HE2	1.99	0.45
1:D:188:GLY:CA	1:D:194:LEU:HB3	2.47	0.45
1:C:160:SER:HB2	1:C:162:GLU:OE1	2.17	0.44
1:B:8:THR:O	1:B:9:GLY:C	2.52	0.44
1:C:74:VAL:HG13	1:C:74:VAL:O	2.17	0.44
1:B:140:MET:O	1:B:144:LEU:HB3	2.17	0.44
1:C:1:MET:HG3	1:C:2:ALA:N	2.31	0.44
1:A:140:MET:O	1:A:144:LEU:HB3	2.17	0.44
1:A:188:GLY:CA	1:A:194:LEU:HB3	2.48	0.44
1:C:178:TRP:O	1:C:182:PRO:HD2	2.17	0.44
1:C:213:LEU:HA	1:C:216:MET:HE2	1.99	0.44
1:D:66:LEU:HD12	1:D:66:LEU:O	2.17	0.44
1:B:193:VAL:HB	1:D:62:ASN:HD21	1.81	0.44
1:A:176:ILE:O	1:A:179:VAL:HG22	2.18	0.44
1:B:167:TYR:O	1:B:168:VAL:C	2.55	0.44
1:C:74:VAL:HG11	1:C:123:PHE:CE1	2.53	0.44
1:A:160:SER:HB2	1:A:162:GLU:OE1	2.18	0.44
1:D:112:ILE:O	1:D:116:VAL:CG1	2.66	0.44
1:C:167:TYR:O	1:C:168:VAL:C	2.55	0.44
1:A:31:VAL:HG13	1:A:32:HIS:N	2.32	0.44
1:D:142:ALA:O	1:D:143:VAL:C	2.56	0.44
1:B:34:ARG:NH2	1:B:223:GLU:OE1	2.49	0.44
1:A:94:ILE:CG2	1:A:104:ILE:HD12	2.48	0.44
1:D:129:PHE:O	1:D:130:LYS:C	2.56	0.44
1:C:39:LYS:O	1:C:42:TYR:HB2	2.18	0.44
1:A:74:VAL:HG11	1:A:123:PHE:CE1	2.52	0.44
1:B:112:ILE:O	1:B:116:VAL:CG1	2.66	0.44
1:B:141:GLN:HA	1:B:144:LEU:HD23	2.00	0.44
1:B:227:LYS:C	1:B:228:LYS:HG3	2.37	0.44
1:D:31:VAL:HG13	1:D:32:HIS:N	2.33	0.44
1:B:129:PHE:O	1:B:130:LYS:C	2.57	0.44
1:A:4:VAL:CG2	1:A:66:LEU:HD23	2.45	0.44
1:C:142:ALA:O	1:C:143:VAL:C	2.56	0.44
1:A:1:MET:HG3	1:A:2:ALA:N	2.33	0.43
2:D:301:RET:H181	2:D:301:RET:H7	1.84	0.43
1:A:167:TYR:O	1:A:168:VAL:C	2.57	0.43
1:C:34:ARG:NH2	1:C:223:GLU:OE1	2.50	0.43
1:B:59:MET:HE2	1:B:75:VAL:HG11	1.99	0.43
1:C:45:ASN:ND2	1:C:215:GLY:HA2	2.34	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:99:MET:SD	1:B:104:ILE:HD13	2.59	0.43
1:C:4:VAL:CG2	1:C:66:LEU:HD23	2.46	0.43
1:D:227:LYS:C	1:D:228:LYS:HG3	2.39	0.43
1:D:35:PRO:O	1:D:38:LEU:N	2.51	0.43
1:A:185:TRP:O	1:A:186:ALA:C	2.56	0.43
1:B:188:GLY:CA	1:B:194:LEU:HB3	2.48	0.43
1:B:142:ALA:O	1:B:143:VAL:C	2.57	0.43
1:B:74:VAL:O	1:B:74:VAL:HG13	2.18	0.43
1:A:112:ILE:O	1:A:116:VAL:CG1	2.67	0.43
1:B:160:SER:HB2	1:B:161:PRO:HD2	2.01	0.43
1:D:21:ALA:O	1:D:24:ALA:HB3	2.19	0.43
1:D:211:LYS:HB2	1:D:212:PRO:CD	2.43	0.43
1:C:205:ILE:O	1:C:208:VAL:HG12	2.19	0.43
1:D:150:ASN:C	1:D:152:THR:H	2.22	0.43
1:B:78:ARG:HD3	1:B:82:TRP:CH2	2.53	0.43
1:B:94:ILE:CG2	1:B:104:ILE:HD12	2.49	0.43
1:C:216:MET:O	1:C:217:GLY:C	2.56	0.43
1:D:28:GLY:O	1:D:31:VAL:HG12	2.19	0.43
1:B:208:VAL:O	1:B:212:PRO:HD2	2.18	0.42
1:C:94:ILE:CG2	1:C:104:ILE:HD12	2.49	0.42
1:B:178:TRP:O	1:B:182:PRO:HD2	2.19	0.42
1:A:80:ILE:O	1:A:81:ASP:C	2.58	0.42
1:A:216:MET:O	1:A:217:GLY:C	2.57	0.42
1:B:86:THR:N	1:B:87:PRO:HD2	2.34	0.42
1:B:31:VAL:HG13	1:B:32:HIS:N	2.34	0.42
1:A:76:TYR:O	1:A:77:ALA:C	2.57	0.42
1:B:139:VAL:O	1:B:142:ALA:HB3	2.19	0.42
1:B:213:LEU:HA	1:B:216:MET:CE	2.49	0.42
1:D:86:THR:N	1:D:87:PRO:HD2	2.34	0.42
1:A:21:ALA:O	1:A:24:ALA:HB3	2.19	0.42
1:A:129:PHE:O	1:A:130:LYS:C	2.57	0.42
1:D:167:TYR:O	1:D:168:VAL:C	2.58	0.42
1:C:160:SER:HB2	1:C:161:PRO:HD2	2.01	0.42
1:A:150:ASN:C	1:A:152:THR:H	2.23	0.42
1:C:150:ASN:C	1:C:152:THR:H	2.23	0.42
1:C:141:GLN:HA	1:C:144:LEU:HD23	2.02	0.42
1:A:34:ARG:NH2	1:A:223:GLU:OE1	2.51	0.42
1:C:86:THR:N	1:C:87:PRO:HD2	2.34	0.42
1:B:82:TRP:HH2	1:B:203:MET:CE	2.33	0.42
1:B:45:ASN:ND2	1:B:215:GLY:HA2	2.34	0.42
1:C:131:TRP:O	1:C:135:ILE:HG12	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:80:ILE:O	1:D:81:ASP:C	2.58	0.42
1:A:163:TYR:O	1:A:164:HIS:C	2.58	0.42
1:D:131:TRP:O	1:D:135:ILE:HG12	2.20	0.42
1:A:142:ALA:O	1:A:143:VAL:C	2.57	0.42
1:C:134:PHE:CD1	2:C:301:RET:H32	2.55	0.42
3:D:401:CLR:H193	3:D:402:CLR:H12	2.01	0.42
1:A:213:LEU:HA	1:A:216:MET:CE	2.49	0.42
1:D:45:ASN:ND2	1:D:215:GLY:HA2	2.35	0.42
1:C:31:VAL:HG13	1:C:32:HIS:N	2.35	0.42
1:C:139:VAL:O	1:C:142:ALA:HB3	2.20	0.41
1:C:227:LYS:C	1:C:228:LYS:HG3	2.41	0.41
1:B:76:TYR:O	1:B:77:ALA:C	2.58	0.41
1:B:11:ILE:O	1:B:12:ALA:C	2.59	0.41
1:D:94:ILE:CG2	1:D:104:ILE:HD12	2.50	0.41
1:D:216:MET:O	1:D:217:GLY:C	2.55	0.41
1:C:82:TRP:CD1	2:C:301:RET:H14	2.55	0.41
3:C:401:CLR:H193	3:C:402:CLR:H12	2.02	0.41
1:A:139:VAL:O	1:A:142:ALA:HB3	2.20	0.41
1:C:193:VAL:O	1:C:193:VAL:CG2	2.68	0.41
1:D:59:MET:HE2	1:D:75:VAL:HG11	2.01	0.41
1:C:112:ILE:O	1:C:116:VAL:CG1	2.68	0.41
1:C:82:TRP:HH2	1:C:203:MET:CE	2.34	0.41
1:A:1:MET:CG	1:A:2:ALA:H	2.33	0.41
1:B:150:ASN:C	1:B:152:THR:H	2.24	0.41
3:A:401:CLR:H193	3:A:402:CLR:H12	2.02	0.41
1:B:220:ILE:O	1:B:221:ALA:C	2.57	0.41
1:A:197:ASP:O	1:A:201:ILE:HG13	2.21	0.41
1:C:55:ALA:O	1:C:59:MET:HG3	2.20	0.41
1:A:84:LEU:O	1:A:87:PRO:HG2	2.20	0.41
1:D:197:ASP:O	1:D:201:ILE:HG13	2.21	0.41
1:D:208:VAL:O	1:D:212:PRO:HD2	2.21	0.41
1:B:131:TRP:O	1:B:135:ILE:HG12	2.21	0.41
1:A:131:TRP:O	1:A:135:ILE:HG12	2.21	0.41
1:C:202:LEU:O	1:C:203:MET:C	2.58	0.41
1:B:193:VAL:O	1:B:193:VAL:CG2	2.69	0.41
1:A:35:PRO:O	1:A:38:LEU:N	2.54	0.41
3:B:401:CLR:H193	3:B:402:CLR:H12	2.02	0.41
1:A:129:PHE:CZ	1:B:67:THR:HG21	2.56	0.40
2:A:301:RET:H181	2:A:301:RET:H7	1.84	0.40
1:A:134:PHE:CD1	2:A:301:RET:H32	2.56	0.40
1:B:1:MET:CG	1:B:2:ALA:N	2.85	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:134:PHE:CD1	2:D:301:RET:H32	2.56	0.40
1:B:194:LEU:HD21	1:B:202:LEU:HD12	2.02	0.40
1:C:129:PHE:O	1:C:130:LYS:C	2.59	0.40
1:D:211:LYS:CB	1:D:212:PRO:CD	3.00	0.40
1:D:107:VAL:CG2	1:D:108:ILE:N	2.84	0.40
1:A:45:ASN:ND2	1:A:215:GLY:HA2	2.36	0.40
1:C:62:ASN:C	1:C:64:GLN:N	2.74	0.40
1:C:76:TYR:O	1:C:77:ALA:C	2.58	0.40
2:C:301:RET:H181	2:C:301:RET:H7	1.84	0.40
1:A:86:THR:N	1:A:87:PRO:HD2	2.37	0.40
1:A:12:ALA:O	1:A:15:ILE:HB	2.22	0.40
1:A:160:SER:HB2	1:A:161:PRO:HD2	2.02	0.40
1:B:104:ILE:O	1:B:108:ILE:HG12	2.21	0.40
1:B:28:GLY:O	1:B:31:VAL:HG12	2.22	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:159:LYS:O	1:D:228:LYS:O[4_555]	2.14	0.06

## 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	218/229 (95%)	161 (74%)	50 (23%)	7 (3%)	5	33
1	B	218/229 (95%)	163 (75%)	48 (22%)	7 (3%)	5	33
1	C	218/229 (95%)	167 (77%)	45 (21%)	6 (3%)	6	37
1	D	218/229 (95%)	164 (75%)	47 (22%)	7 (3%)	5	33
All	All	872/916 (95%)	655 (75%)	190 (22%)	27 (3%)	5	34

All (27) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	155	ASP
1	B	155	ASP
1	C	155	ASP
1	D	155	ASP
1	A	169	SER
1	B	169	SER
1	C	169	SER
1	D	169	SER
1	A	211	LYS
1	B	211	LYS
1	C	211	LYS
1	D	211	LYS
1	A	30	ALA
1	B	30	ALA
1	C	31	VAL
1	D	30	ALA
1	A	31	VAL
1	B	11	ILE
1	B	31	VAL
1	C	11	ILE
1	D	11	ILE
1	D	31	VAL
1	D	143	VAL
1	A	11	ILE
1	A	143	VAL
1	B	143	VAL
1	C	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	182/187 (97%)	173 (95%)	9 (5%)	31	72
1	B	182/187 (97%)	172 (94%)	10 (6%)	27	68
1	C	182/187 (97%)	172 (94%)	10 (6%)	27	68

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	182/187 (97%)	173 (95%)	9 (5%)	31	72
All	All	728/748 (97%)	690 (95%)	38 (5%)	29	69

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	66	LEU
1	A	71	GLU
1	A	92	ASP
1	A	106	TRP
1	A	116	VAL
1	A	126	GLU
1	A	127	HIS
1	A	144	LEU
1	A	207	ASP
1	B	66	LEU
1	B	71	GLU
1	B	83	VAL
1	B	92	ASP
1	B	106	TRP
1	B	116	VAL
1	B	126	GLU
1	B	127	HIS
1	B	144	LEU
1	B	207	ASP
1	C	66	LEU
1	C	71	GLU
1	C	83	VAL
1	C	92	ASP
1	C	106	TRP
1	C	116	VAL
1	C	126	GLU
1	C	127	HIS
1	C	144	LEU
1	C	207	ASP
1	D	66	LEU
1	D	71	GLU
1	D	92	ASP
1	D	106	TRP
1	D	116	VAL
1	D	126	GLU
1	D	127	HIS

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Mol	Chain	Res	Type
1	D	144	LEU
1	D	207	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	45	ASN
1	A	127	HIS
1	A	198	ASN
1	B	45	ASN
1	B	164	HIS
1	B	198	ASN
1	C	45	ASN
1	C	164	HIS
1	C	198	ASN
1	D	45	ASN
1	D	127	HIS
1	D	164	HIS
1	D	198	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 carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

12 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	RET	A	301	1	19,20,21	2.01	4 (21%)	27,27,28	2.28	9 (33%)
3	CLR	A	401	-	31,31,31	1.54	2 (6%)	48,48,48	1.50	9 (18%)
3	CLR	A	402	-	31,31,31	1.62	3 (9%)	48,48,48	1.59	14 (29%)
2	RET	B	301	1	19,20,21	2.03	4 (21%)	27,27,28	2.34	9 (33%)
3	CLR	B	401	-	31,31,31	1.62	3 (9%)	48,48,48	1.49	10 (20%)
3	CLR	B	402	-	31,31,31	1.62	3 (9%)	48,48,48	1.58	12 (25%)
2	RET	C	301	1	19,20,21	2.01	4 (21%)	27,27,28	2.32	10 (37%)
3	CLR	C	401	-	31,31,31	1.64	3 (9%)	48,48,48	1.50	10 (20%)
3	CLR	C	402	-	31,31,31	1.66	4 (12%)	48,48,48	1.58	13 (27%)
2	RET	D	301	1	19,20,21	2.06	4 (21%)	27,27,28	2.29	8 (29%)
3	CLR	D	401	-	31,31,31	1.48	2 (6%)	48,48,48	1.51	9 (18%)
3	CLR	D	402	-	31,31,31	1.67	3 (9%)	48,48,48	1.59	14 (29%)

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	RET	A	301	1	-	0/13/30/31	0/1/1/1
3	CLR	A	401	-	-	0/10/68/68	0/4/4/4
3	CLR	A	402	-	-	0/10/68/68	0/4/4/4
2	RET	B	301	1	-	0/13/30/31	0/1/1/1
3	CLR	B	401	-	-	0/10/68/68	0/4/4/4
3	CLR	B	402	-	-	0/10/68/68	0/4/4/4
2	RET	C	301	1	-	0/13/30/31	0/1/1/1
3	CLR	C	401	-	-	0/10/68/68	0/4/4/4
3	CLR	C	402	-	-	0/10/68/68	0/4/4/4
2	RET	D	301	1	-	0/13/30/31	0/1/1/1
3	CLR	D	401	-	-	0/10/68/68	0/4/4/4
3	CLR	D	402	-	-	0/10/68/68	0/4/4/4

All (39) bond length outliers are listed below:



Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	401	CLR	C8-C9	-6.65	1.40	1.53
3	A	401	CLR	C8-C9	-6.52	1.40	1.53
3	B	401	CLR	C8-C9	-6.50	1.40	1.53
3	A	402	CLR	C8-C9	-6.40	1.41	1.53
3	B	402	CLR	C8-C9	-6.35	1.41	1.53
3	D	402	CLR	C8-C9	-6.29	1.41	1.53
3	C	402	CLR	C8-C9	-6.23	1.41	1.53
3	D	401	CLR	C8-C9	-6.05	1.41	1.53
2	A	301	RET	C2-C3	-2.69	1.45	1.52
2	C	301	RET	C2-C3	-2.60	1.45	1.52
2	D	301	RET	C2-C3	-2.56	1.45	1.52
2	B	301	RET	C2-C3	-2.48	1.45	1.52
3	C	401	CLR	C4-C3	2.04	1.59	1.52
3	B	401	CLR	C18-C13	2.06	1.58	1.54
3	C	402	CLR	C18-C13	2.21	1.58	1.54
3	B	402	CLR	C12-C11	2.24	1.58	1.53
3	A	402	CLR	C12-C11	2.49	1.58	1.53
3	D	402	CLR	C12-C11	2.49	1.58	1.53
3	C	402	CLR	C12-C11	2.50	1.58	1.53
2	C	301	RET	C7-C6	2.59	1.55	1.45
2	B	301	RET	C7-C6	2.60	1.55	1.45
2	A	301	RET	C7-C6	2.77	1.55	1.45
2	D	301	RET	C7-C6	2.81	1.56	1.45
3	A	401	CLR	C11-C9	3.02	1.59	1.53
3	D	401	CLR	C11-C9	3.14	1.59	1.53
3	C	401	CLR	C11-C9	3.26	1.59	1.53
3	B	401	CLR	C11-C9	3.33	1.59	1.53
3	B	402	CLR	C11-C9	3.40	1.59	1.53
3	C	402	CLR	C11-C9	3.44	1.59	1.53
3	A	402	CLR	C11-C9	3.81	1.60	1.53
3	D	402	CLR	C11-C9	4.07	1.61	1.53
2	C	301	RET	C5-C6	4.54	1.41	1.34
2	A	301	RET	C5-C6	4.58	1.41	1.34
2	D	301	RET	C5-C6	4.65	1.41	1.34
2	B	301	RET	C5-C6	4.74	1.41	1.34
2	C	301	RET	C1-C6	5.25	1.61	1.53
2	B	301	RET	C1-C6	5.40	1.61	1.53
2	A	301	RET	C1-C6	5.42	1.61	1.53
2	D	301	RET	C1-C6	5.77	1.62	1.53

All (127) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	301	RET	C1-C6-C5	-3.52	117.49	122.66
2	C	301	RET	C1-C6-C5	-3.45	117.59	122.66
3	D	402	CLR	C3-C4-C5	-3.36	104.89	111.82
2	D	301	RET	C1-C6-C5	-3.34	117.75	122.66
2	A	301	RET	C1-C6-C5	-3.33	117.77	122.66
3	D	401	CLR	C16-C15-C14	-3.32	98.44	105.12
3	B	402	CLR	C3-C4-C5	-3.32	104.98	111.82
3	C	401	CLR	C16-C15-C14	-3.31	98.47	105.12
3	B	401	CLR	C16-C15-C14	-3.30	98.47	105.12
3	C	402	CLR	C3-C4-C5	-3.30	105.03	111.82
3	A	402	CLR	C3-C4-C5	-3.27	105.09	111.82
3	A	401	CLR	C16-C15-C14	-3.23	98.61	105.12
3	C	401	CLR	C11-C9-C10	-2.98	109.17	113.11
2	D	301	RET	C17-C1-C2	-2.97	98.14	108.79
3	B	401	CLR	C3-C4-C5	-2.95	105.75	111.82
2	A	301	RET	C17-C1-C2	-2.94	98.24	108.79
3	D	401	CLR	C11-C9-C10	-2.92	109.24	113.11
3	B	401	CLR	C11-C9-C10	-2.91	109.25	113.11
3	C	401	CLR	C19-C10-C9	-2.91	107.94	111.67
3	A	401	CLR	C3-C4-C5	-2.90	105.83	111.82
3	A	401	CLR	C19-C10-C9	-2.88	107.99	111.67
3	D	401	CLR	C3-C4-C5	-2.88	105.89	111.82
3	A	401	CLR	C11-C9-C10	-2.85	109.33	113.11
2	C	301	RET	C17-C1-C2	-2.85	98.59	108.79
2	C	301	RET	C17-C1-C16	-2.83	99.31	108.37
2	B	301	RET	C17-C1-C16	-2.81	99.37	108.37
3	D	401	CLR	C19-C10-C9	-2.80	108.08	111.67
3	A	402	CLR	C19-C10-C9	-2.80	108.09	111.67
3	B	401	CLR	C19-C10-C9	-2.78	108.12	111.67
3	A	402	CLR	C21-C20-C17	-2.77	108.34	112.96
2	B	301	RET	C17-C1-C2	-2.77	98.88	108.79
3	C	401	CLR	C3-C4-C5	-2.77	106.12	111.82
3	D	402	CLR	C19-C10-C9	-2.73	108.18	111.67
2	B	301	RET	C17-C1-C6	-2.72	106.03	110.30
3	A	402	CLR	C16-C15-C14	-2.72	99.64	105.12
3	C	402	CLR	C16-C15-C14	-2.71	99.66	105.12
3	D	402	CLR	C16-C15-C14	-2.67	99.75	105.12
3	B	402	CLR	C19-C10-C9	-2.67	108.26	111.67
2	D	301	RET	C17-C1-C16	-2.67	99.82	108.37
3	D	402	CLR	C21-C20-C17	-2.65	108.54	112.96
3	A	401	CLR	C12-C11-C9	-2.65	108.64	113.10
2	C	301	RET	C17-C1-C6	-2.64	106.16	110.30
2	A	301	RET	C17-C1-C16	-2.63	99.94	108.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	301	RET	C17-C1-C6	-2.62	106.19	110.30
3	C	402	CLR	C21-C20-C17	-2.62	108.60	112.96
2	D	301	RET	C17-C1-C6	-2.59	106.24	110.30
3	B	402	CLR	C16-C15-C14	-2.59	99.92	105.12
3	D	401	CLR	C12-C11-C9	-2.57	108.76	113.10
3	C	402	CLR	C4-C5-C6	-2.50	116.32	120.57
3	B	402	CLR	C21-C20-C17	-2.50	108.79	112.96
3	B	402	CLR	C4-C5-C6	-2.49	116.35	120.57
3	D	402	CLR	C4-C5-C6	-2.49	116.35	120.57
3	A	402	CLR	C4-C5-C6	-2.45	116.41	120.57
3	C	402	CLR	C19-C10-C9	-2.41	108.58	111.67
3	C	402	CLR	C11-C9-C10	-2.35	110.00	113.11
3	C	402	CLR	C13-C14-C8	-2.34	110.71	114.37
3	B	401	CLR	C12-C11-C9	-2.31	109.20	113.10
3	C	401	CLR	C12-C11-C9	-2.28	109.25	113.10
3	B	402	CLR	C11-C9-C10	-2.25	110.12	113.11
3	B	402	CLR	C13-C14-C8	-2.25	110.85	114.37
3	D	402	CLR	C7-C6-C5	-2.18	120.32	125.01
3	A	402	CLR	C7-C6-C5	-2.17	120.36	125.01
3	D	402	CLR	C11-C9-C10	-2.16	110.24	113.11
3	B	401	CLR	C7-C6-C5	-2.15	120.40	125.01
3	A	402	CLR	C11-C9-C10	-2.14	110.28	113.11
3	A	402	CLR	C13-C14-C8	-2.11	111.07	114.37
2	C	301	RET	C7-C6-C5	-2.11	116.55	121.37
3	A	402	CLR	C11-C12-C13	-2.10	109.08	112.84
3	D	402	CLR	C11-C12-C13	-2.09	109.10	112.84
3	D	402	CLR	C13-C14-C8	-2.09	111.10	114.37
3	C	401	CLR	C7-C6-C5	-2.08	120.55	125.01
3	C	402	CLR	C11-C12-C13	-2.07	109.14	112.84
2	B	301	RET	C7-C6-C5	-2.07	116.64	121.37
3	A	402	CLR	C16-C17-C20	-2.05	108.40	112.05
2	A	301	RET	C7-C6-C5	-2.04	116.70	121.37
3	B	402	CLR	C7-C6-C5	-2.02	120.67	125.01
3	C	402	CLR	C7-C6-C5	-2.01	120.70	125.01
2	C	301	RET	C19-C9-C8	2.00	121.43	118.10
3	A	402	CLR	C4-C5-C10	2.01	119.36	116.43
3	D	402	CLR	C1-C10-C9	2.08	111.31	108.64
3	D	402	CLR	C4-C5-C10	2.11	119.50	116.43
3	C	402	CLR	C4-C5-C10	2.13	119.53	116.43
2	D	301	RET	C7-C8-C9	2.20	129.57	126.22
3	B	402	CLR	C4-C5-C10	2.22	119.66	116.43
2	A	301	RET	C7-C8-C9	2.26	129.66	126.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	301	RET	C7-C8-C9	2.26	129.66	126.22
3	C	401	CLR	C2-C3-C4	2.30	114.41	110.32
2	C	301	RET	C7-C8-C9	2.33	129.77	126.22
3	B	401	CLR	C10-C9-C8	2.36	116.17	112.67
3	B	401	CLR	C2-C3-C4	2.40	114.60	110.32
3	A	401	CLR	C15-C16-C17	2.43	110.02	105.12
3	C	402	CLR	C2-C3-C4	2.47	114.72	110.32
3	D	402	CLR	C14-C8-C9	2.50	112.34	109.06
3	A	401	CLR	C10-C9-C8	2.51	116.38	112.67
3	B	402	CLR	C14-C8-C9	2.51	112.35	109.06
3	D	401	CLR	C15-C16-C17	2.54	110.25	105.12
3	A	401	CLR	C2-C3-C4	2.55	114.86	110.32
3	D	401	CLR	C10-C9-C8	2.55	116.44	112.67
3	A	402	CLR	C14-C8-C9	2.57	112.43	109.06
3	C	401	CLR	C10-C9-C8	2.58	116.48	112.67
3	A	401	CLR	C14-C8-C9	2.59	112.45	109.06
3	B	402	CLR	C2-C3-C4	2.59	114.94	110.32
3	C	401	CLR	C15-C16-C17	2.60	110.37	105.12
3	B	401	CLR	C14-C8-C9	2.61	112.48	109.06
3	B	401	CLR	C15-C16-C17	2.61	110.39	105.12
3	D	401	CLR	C2-C3-C4	2.62	114.98	110.32
3	C	402	CLR	C14-C8-C9	2.65	112.54	109.06
3	A	402	CLR	C2-C3-C4	2.67	115.08	110.32
3	C	401	CLR	C14-C8-C9	2.73	112.64	109.06
3	D	401	CLR	C14-C8-C9	2.73	112.64	109.06
3	D	402	CLR	C2-C3-C4	2.92	115.52	110.32
3	D	402	CLR	C15-C16-C17	2.97	111.10	105.12
3	A	402	CLR	C15-C16-C17	2.98	111.13	105.12
3	B	402	CLR	C15-C16-C17	2.99	111.15	105.12
3	C	402	CLR	C15-C16-C17	3.07	111.31	105.12
2	D	301	RET	C1-C6-C7	3.39	125.32	115.82
2	A	301	RET	C1-C6-C7	3.45	125.48	115.82
2	D	301	RET	C2-C1-C6	3.47	115.86	110.36
2	B	301	RET	C2-C1-C6	3.47	115.86	110.36
2	A	301	RET	C2-C1-C6	3.50	115.91	110.36
2	C	301	RET	C1-C6-C7	3.57	125.81	115.82
2	B	301	RET	C1-C6-C7	3.58	125.83	115.82
2	C	301	RET	C2-C1-C6	3.90	116.54	110.36
2	C	301	RET	C16-C1-C6	6.73	120.86	110.30
2	A	301	RET	C16-C1-C6	7.10	121.43	110.30
2	D	301	RET	C16-C1-C6	7.16	121.53	110.30
2	B	301	RET	C16-C1-C6	7.29	121.73	110.30

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

11 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	301	RET	2	0
3	A	401	CLR	2	0
3	A	402	CLR	2	0
3	B	401	CLR	2	0
3	B	402	CLR	2	0
2	C	301	RET	3	0
3	C	401	CLR	2	0
3	C	402	CLR	2	0
2	D	301	RET	2	0
3	D	401	CLR	2	0
3	D	402	CLR	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

### 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	224/229 (97%)	-0.28	5 (2%) 65 50	6, 21, 45, 61	0
1	B	224/229 (97%)	-0.29	3 (1%) 79 67	6, 20, 45, 61	0
1	C	224/229 (97%)	-0.31	2 (0%) 85 78	5, 20, 45, 62	0
1	D	224/229 (97%)	-0.27	8 (3%) 46 31	5, 20, 45, 61	0
All	All	896/916 (97%)	-0.29	18 (2%) 68 54	5, 20, 45, 62	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	1	MET	3.7
1	A	153	TRP	3.6
1	A	1	MET	3.6
1	D	71	GLU	3.3
1	A	160	SER	3.2
1	C	1	MET	2.9
1	B	1	MET	2.9
1	D	156	ASP	2.8
1	A	154	LYS	2.7
1	D	155	ASP	2.7
1	D	160	SER	2.6
1	D	154	LYS	2.5
1	A	71	GLU	2.5
1	B	153	TRP	2.4
1	C	2	ALA	2.2
1	D	228	LYS	2.2
1	D	153	TRP	2.1
1	B	101	GLY	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 6.3 Carbohydrates [i](#)

There are no carbohydrates 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. 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	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	RET	D	301	20/21	0.94	0.19	1.82	2,6,16,18	0
3	CLR	B	402	28/28	0.89	0.33	1.54	18,26,29,29	0
3	CLR	C	402	28/28	0.90	0.28	1.51	18,27,28,28	0
3	CLR	D	402	28/28	0.90	0.27	1.34	19,27,29,30	0
2	RET	A	301	20/21	0.94	0.20	1.17	2,6,16,18	0
3	CLR	A	402	28/28	0.87	0.27	1.16	19,26,29,30	0
3	CLR	B	401	28/28	0.93	0.21	0.80	5,6,8,9	0
2	RET	C	301	20/21	0.96	0.19	0.77	1,5,14,15	0
2	RET	B	301	20/21	0.96	0.18	0.35	2,6,15,16	0
3	CLR	C	401	28/28	0.94	0.20	0.34	3,5,8,9	0
3	CLR	A	401	28/28	0.94	0.18	0.21	5,7,10,13	0
3	CLR	D	401	28/28	0.95	0.17	0.12	3,7,9,10	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.