



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 7, 2017 – 03:58 PM EDT

PDB ID : 4W6Q  
Title : Glycosyltransferase C from *Streptococcus agalactiae*  
Authors : Zhu, F.; Zhang, H.; Wu, H.  
Deposited on : unknown  
Resolution : 2.70 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 : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20029824  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
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) : rb-20029824

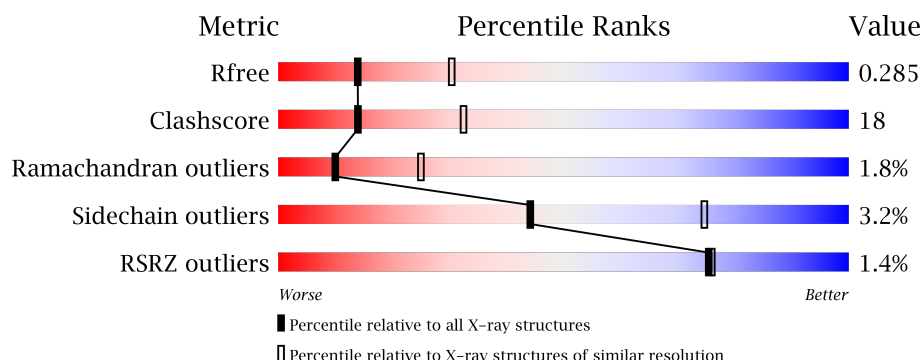
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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))
$R_{free}$	100719	2259 (2.70-2.70)
Clashscore	112137	2590 (2.70-2.70)
Ramachandran outliers	110173	2550 (2.70-2.70)
Sidechain outliers	110143	2550 (2.70-2.70)
RSRZ outliers	101464	2275 (2.70-2.70)

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	333	<div> <div>2%</div> <div>61% 37%</div> <div>...</div> </div>
1	B	333	<div> <div>2%</div> <div>66% 31%</div> <div>.</div> </div>
1	C	333	<div> <div>2%</div> <div>62% 34%</div> <div>.</div> </div>
1	D	333	<div> <div>2%</div> <div>56% 41%</div> <div>.</div> </div>

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 11158 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.

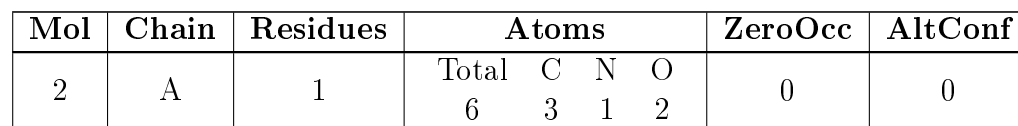
- Molecule 1 is a protein called glucosyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	331	Total	C	N	O	S	0	0	0
			2668	1713	443	497	15			
1	B	332	Total	C	N	O	S	0	0	0
			2674	1716	444	499	15			
1	C	332	Total	C	N	O	S	0	0	0
			2674	1716	444	499	15			
1	D	332	Total	C	N	O	S	0	0	0
			2674	1716	444	499	15			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	ALA	-	expression tag	UNP Q3D9X5
A	0	CYS	-	expression tag	UNP Q3D9X5
B	-1	ALA	-	expression tag	UNP Q3D9X5
B	0	CYS	-	expression tag	UNP Q3D9X5
C	-1	ALA	-	expression tag	UNP Q3D9X5
C	0	CYS	-	expression tag	UNP Q3D9X5
D	-1	ALA	-	expression tag	UNP Q3D9X5
D	0	CYS	-	expression tag	UNP Q3D9X5

- Molecule 2 is SERINE (three-letter code: SER) (formula: C<sub>3</sub>H<sub>7</sub>NO<sub>3</sub>).



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- The image displays the chemical structure of UDP (Uridine Diphosphate). It consists of a uracil base (a pyrimidine ring with two carbonyl groups at positions 2 and 4) attached to a ribose sugar (a five-membered ring with hydroxyl groups at positions 2' and 3'). The ribose is linked to a diphosphate group (two phosphate groups connected by an oxygen atom). The diphosphate group is shown with various oxygen atoms labeled (O1A, O1B, O2A, O2B, O3A, O3B, O4, O5, O6, O7, O8, O9, O10, O11, O12, O13, O14, O15, O16, O17, O18, O19, O20, O21, O22, O23, O24, O25, O26, O27, O28, O29, O30, O31, O32, O33, O34, O35, O36, O37, O38, O39, O40, O41, O42, O43, O44, O45, O46, O47, O48, O49, O50, O51, O52, O53, O54, O55, O56, O57, O58, O59, O60, O61, O62, O63, O64, O65, O66, O67, O68, O69, O70, O71, O72, O73, O74, O75, O76, O77, O78, O79, O80, O81, O82, O83, O84, O85, O86, O87, O88, O89, O90, O91, O92, O93, O94, O95, O96, O97, O98, O99, O100). The uracil base is shown in blue, the ribose sugar in green, and the diphosphate group in red. The structure is labeled with various atoms and bonds, including C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C58, C59, C60, C61, C62, C63, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, O1, O2, O3, O4, O5, O6, O7, O8, O9, O10, O11, O12, O13, O14, O15, O16, O17, O18, O19, O20, O21, O22, O23, O24, O25, O26, O27, O28, O29, O30, O31, O32, O33, O34, O35, O36, O37, O38, O39, O40, O41, O42, O43, O44, O45, O46, O47, O48, O49, O50, O51, O52, O53, O54, O55, O56, O57, O58, O59, O60, O61, O62, O63, O64, O65, O66, O67, O68, O69, O70, O71, O72, O73, O74, O75, O76, O77, O78, O79, O80, O81, O82, O83, O84, O85, O86, O87, O88, O89, O90, O91, O92, O93, O94, O95, O96, O97, O98, O99, O100.

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



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

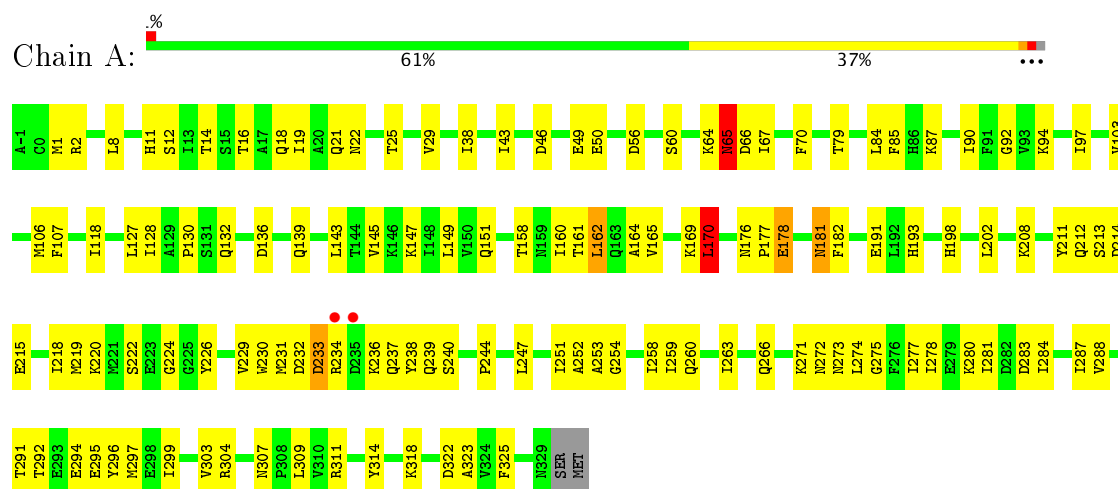
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	96	Total	O	0	0
			96	96		
4	B	94	Total	O	0	0
			94	94		
4	C	102	Total	O	0	0
			102	102		
4	D	70	Total	O	0	0
			70	70		

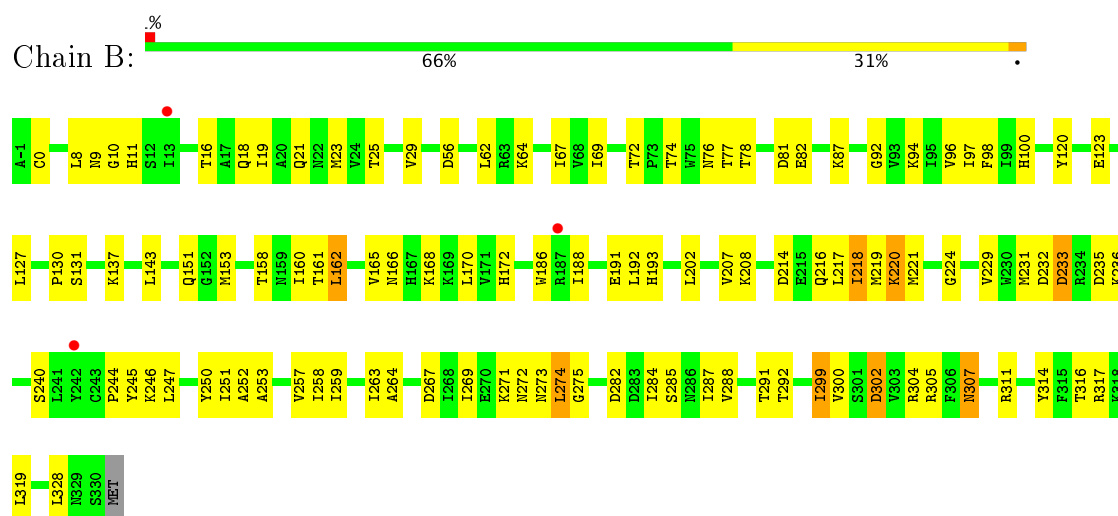
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: glucosyltransferase

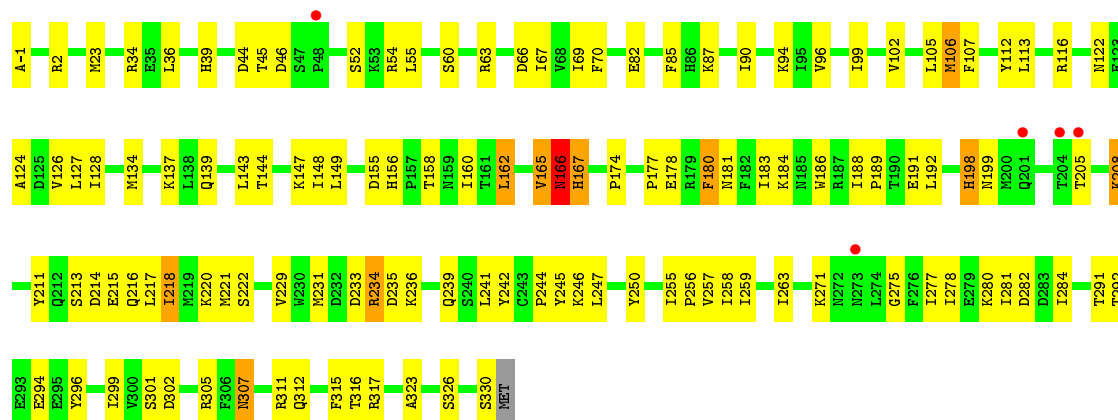


#### • Molecule 1: glucosyltransferase

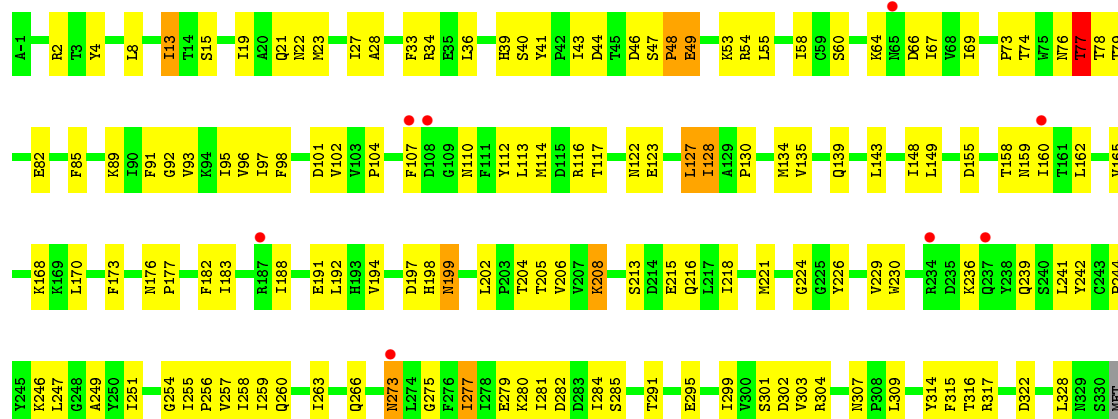


#### • Molecule 1: glucosyltransferase





• Molecule 1: glucosyltransferase



GLOBAL-STATISTICS INFOmissingINFO

## 4 Model quality

### 4.1 Standard geometry

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

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	0.49	0/2728	0.70	2/3701 (0.1%)
1	B	0.52	0/2734	0.65	3/3709 (0.1%)
1	C	0.48	0/2734	0.66	1/3709 (0.0%)
1	D	0.46	0/2734	0.67	1/3709 (0.0%)
All	All	0.48	0/10930	0.67	7/14828 (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	A	0	1
1	C	0	2
All	All	0	3

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	162	LEU	CA-CB-CG	7.21	131.87	115.30
1	A	170	LEU	CA-CB-CG	6.78	130.89	115.30
1	B	274	LEU	CA-CB-CG	-6.07	101.35	115.30
1	D	162	LEU	CA-CB-CG	5.58	128.12	115.30
1	B	218	ILE	CG1-CB-CG2	-5.37	99.58	111.40
1	C	162	LEU	CA-CB-CG	5.35	127.61	115.30
1	B	162	LEU	CA-CB-CG	5.28	127.44	115.30

There are no chirality outliers.

All (3) planarity outliers are listed below:



Mol	Chain	Res	Type	Group
1	A	65	ASN	Peptide
1	C	165	VAL	Peptide
1	C	166	ASN	Peptide

## 4.2 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	2668	0	2662	103	0
1	B	2674	0	2667	86	0
1	C	2674	0	2667	99	0
1	D	2674	0	2667	104	0
2	A	6	0	4	1	0
3	A	25	0	11	0	0
3	B	25	0	11	0	0
3	C	25	0	11	1	0
3	D	25	0	11	0	0
4	A	96	0	0	9	0
4	B	94	0	0	5	0
4	C	102	0	0	9	0
4	D	70	0	0	3	0
All	All	11158	0	10711	379	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 18.

All (379) 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:C:233:ASP:HA	1:C:236:LYS:HD3	1.25	1.11
1:B:56:ASP:OD1	1:B:87:LYS:NZ	1.96	0.97
1:B:165:VAL:HG11	1:B:300:VAL:HG11	1.50	0.92
1:C:292:THR:HG22	1:C:294:GLU:H	1.38	0.89
1:C:166:ASN:HA	1:C:296:TYR:HE1	1.40	0.85
1:B:273:ASN:HD21	1:B:299:ILE:HA	1.42	0.84
1:D:229:VAL:HB	1:D:259:ILE:HG22	1.58	0.83
1:A:128:ILE:HD11	1:A:323:ALA:HB2	1.63	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:160:ILE:O	1:A:311:ARG:NH2	2.14	0.80
1:B:282:ASP:OD2	4:B:578:HOH:O	1.98	0.80
1:C:128:ILE:HD11	1:C:323:ALA:HB2	1.64	0.80
1:D:98:PHE:HA	1:D:128:ILE:HG23	1.62	0.79
1:B:252:ALA:O	1:B:311:ARG:NH1	2.16	0.79
1:C:259:ILE:HD11	1:C:277:ILE:HG12	1.65	0.78
1:D:239:GLN:NE2	1:D:263:ILE:HG13	1.99	0.78
1:C:229:VAL:HB	1:C:259:ILE:HG22	1.66	0.77
1:A:191:GLU:OE1	1:A:191:GLU:N	2.15	0.77
1:B:273:ASN:HD22	1:B:302:ASP:HB2	1.49	0.77
1:A:181:ASN:H	1:A:233:ASP:HB3	1.48	0.77
1:A:237:GLN:OE1	1:A:260:GLN:NE2	2.18	0.77
1:D:85:PHE:HE2	1:D:123:GLU:HB2	1.49	0.76
1:B:0:CYS:SG	4:C:588:HOH:O	2.44	0.75
1:D:67:ILE:HD11	1:D:328:LEU:HD21	1.69	0.74
1:A:149:LEU:HD21	1:A:322:ASP:HB3	1.69	0.74
1:D:139:GLN:HG2	1:D:143:LEU:HD23	1.70	0.74
1:D:47:SER:O	1:D:49:GLU:N	2.21	0.73
1:C:191:GLU:N	1:C:191:GLU:OE1	2.17	0.73
1:D:160:ILE:HG12	1:D:215:GLU:HG3	1.71	0.73
1:C:198:HIS:O	1:C:208:LYS:NZ	2.21	0.72
1:D:273:ASN:ND2	1:D:302:ASP:OD2	2.22	0.72
1:A:229:VAL:HB	1:A:259:ILE:HG22	1.70	0.72
1:C:326:SER:OG	4:C:570:HOH:O	2.06	0.72
1:B:160:ILE:HG13	1:B:311:ARG:HH22	1.53	0.72
1:D:258:ILE:HG21	1:D:284:ILE:HG23	1.72	0.71
1:B:160:ILE:HG21	1:B:218:ILE:HB	1.72	0.71
1:C:177:PRO:O	1:C:181:ASN:ND2	2.23	0.71
1:B:302:ASP:HA	1:B:305:ARG:HB2	1.74	0.70
1:C:317:ARG:NH1	4:C:596:HOH:O	2.24	0.70
1:B:23:MET:HE1	1:B:245:TYR:HE1	1.54	0.70
1:A:266:GLN:NE2	1:A:277:ILE:HG21	2.08	0.69
1:A:251:ILE:HG23	1:A:303:VAL:HG13	1.75	0.69
1:D:168:LYS:HB3	1:D:170:LEU:HD13	1.74	0.68
1:C:160:ILE:O	1:C:311:ARG:NH2	2.27	0.68
1:B:165:VAL:HG23	1:B:224:GLY:HA2	1.75	0.68
1:A:292:THR:HG22	1:A:295:GLU:H	1.59	0.68
1:D:85:PHE:CE2	1:D:123:GLU:HB2	2.29	0.67
1:C:330:SER:OG	4:C:545:HOH:O	2.13	0.67
1:D:260:GLN:OE1	4:D:547:HOH:O	2.12	0.67
1:A:165:VAL:HG13	1:A:224:GLY:HA2	1.77	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:232:ASP:HB3	1:A:236:LYS:HB2	1.77	0.67
1:C:280:LYS:HG3	1:C:282:ASP:H	1.60	0.67
1:B:214:ASP:O	1:B:218:ILE:HG13	1.95	0.66
1:D:165:VAL:HG23	1:D:304:ARG:NH2	2.11	0.66
1:B:21:GLN:HG2	1:B:100:HIS:CE1	2.30	0.65
1:C:236:LYS:HD2	1:C:236:LYS:N	2.11	0.65
1:D:165:VAL:HG13	1:D:224:GLY:HA2	1.78	0.65
1:D:183:ILE:HD12	1:D:192:LEU:HD21	1.78	0.65
1:D:110:ASN:HA	1:D:112:TYR:HD2	1.61	0.65
1:B:202:LEU:HD12	1:B:208:LYS:HB2	1.79	0.65
1:A:11:HIS:HB2	1:A:18:GLN:OE1	1.98	0.64
4:A:516:HOH:O	1:B:9:ASN:HB3	1.96	0.64
1:D:199:ASN:OD1	1:D:199:ASN:N	2.31	0.64
1:B:273:ASN:ND2	1:B:302:ASP:OD2	2.30	0.64
1:A:176:ASN:ND2	1:A:178:GLU:OE2	2.31	0.63
1:C:139:GLN:NE2	4:C:508:HOH:O	2.30	0.63
1:C:67:ILE:HD12	1:C:94:LYS:HB2	1.80	0.63
1:A:294:GLU:HA	1:A:297:MET:HB2	1.81	0.63
1:C:301:SER:O	1:C:305:ARG:HG3	1.99	0.63
1:D:149:LEU:HD11	1:D:322:ASP:HB3	1.80	0.63
1:D:244:PRO:HG2	1:D:247:LEU:HB3	1.79	0.63
1:B:160:ILE:O	1:B:311:ARG:NH2	2.32	0.63
1:A:281:ILE:H	1:A:281:ILE:HD12	1.63	0.62
1:A:160:ILE:HG21	1:A:218:ILE:HB	1.82	0.62
1:D:2:ARG:NH2	1:D:66:ASP:OD2	2.32	0.62
1:D:110:ASN:HA	1:D:112:TYR:CD2	2.35	0.62
1:A:160:ILE:HG13	1:A:311:ARG:HH22	1.64	0.62
1:A:97:ILE:HG22	1:A:127:LEU:HG	1.82	0.62
1:A:56:ASP:OD1	1:A:87:LYS:NZ	2.23	0.62
1:D:127:LEU:HD21	1:D:143:LEU:HD21	1.82	0.61
1:B:160:ILE:HD12	1:B:161:THR:O	2.01	0.61
1:A:309:LEU:HG	1:D:328:LEU:HD12	1.82	0.61
1:B:233:ASP:HA	1:B:236:LYS:HD2	1.82	0.61
1:A:318:LYS:NZ	4:A:566:HOH:O	2.32	0.60
1:C:312:GLN:NE2	4:C:588:HOH:O	2.34	0.60
1:C:-1:ALA:N	4:C:578:HOH:O	2.28	0.60
1:D:191:GLU:N	1:D:191:GLU:OE1	2.32	0.60
1:D:55:LEU:HD23	1:D:58:ILE:HD12	1.84	0.60
1:C:216:GLN:HG2	1:C:220:LYS:HE3	1.84	0.60
1:B:273:ASN:ND2	1:B:302:ASP:HB2	2.17	0.59
1:A:130:PRO:HA	1:A:151:GLN:HB3	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:230:TRP:CZ3	1:A:260:GLN:HB2	2.36	0.59
1:A:287:ILE:O	1:A:291:THR:HB	2.02	0.59
1:D:78:THR:O	1:D:82:GLU:HG2	2.02	0.59
1:B:231:MET:HE3	1:B:263:ILE:HG22	1.82	0.59
1:A:127:LEU:HD22	1:A:143:LEU:HD21	1.85	0.59
1:A:158:THR:OG1	1:A:160:ILE:HG23	2.03	0.58
1:C:166:ASN:HA	1:C:296:TYR:CE1	2.29	0.58
1:B:217:LEU:O	1:B:221:MET:HG3	2.03	0.58
1:B:127:LEU:HD22	1:B:143:LEU:HD11	1.86	0.58
1:D:160:ILE:HD13	1:D:218:ILE:HB	1.86	0.58
1:D:8:LEU:HG	1:D:21:GLN:OE1	2.04	0.58
1:A:275:GLY:HA2	1:A:299:ILE:HD11	1.86	0.58
1:D:263:ILE:HG22	1:D:266:GLN:HB3	1.86	0.58
1:B:9:ASN:OD1	1:B:10:GLY:N	2.37	0.58
1:B:160:ILE:HG13	1:B:311:ARG:NH2	2.19	0.57
1:D:198:HIS:O	1:D:208:LYS:NZ	2.36	0.57
1:A:8:LEU:HD11	1:A:18:GLN:HB2	1.87	0.57
1:A:160:ILE:HG13	1:A:311:ARG:NH2	2.20	0.57
1:D:259:ILE:HD12	1:D:263:ILE:HG21	1.87	0.56
1:D:173:PHE:O	1:D:194:VAL:HA	2.05	0.56
1:A:214:ASP:O	1:A:218:ILE:HG12	2.05	0.56
1:C:85:PHE:HZ	1:C:124:ALA:HB2	1.70	0.55
1:D:177:PRO:HD2	1:D:198:HIS:CD2	2.41	0.55
1:B:11:HIS:HB2	1:B:18:GLN:OE1	2.05	0.55
1:C:122:ASN:CG	1:C:144:THR:HG22	2.26	0.55
1:C:167:HIS:CE1	1:C:291:THR:HG23	2.41	0.55
1:A:230:TRP:CH2	1:A:260:GLN:HB2	2.42	0.55
1:C:233:ASP:HA	1:C:236:LYS:CD	2.17	0.55
1:D:177:PRO:HD2	1:D:198:HIS:HD2	1.72	0.55
1:A:64:LYS:HD3	1:A:92:GLY:H	1.72	0.54
1:B:67:ILE:HD11	1:B:328:LEU:HD21	1.89	0.54
1:C:45:THR:O	1:D:53:LYS:NZ	2.41	0.54
1:A:127:LEU:HD13	1:A:145:VAL:HG21	1.90	0.54
1:D:135:VAL:HG11	1:D:148:ILE:HD12	1.89	0.54
1:C:149:LEU:HD11	4:C:519:HOH:O	2.08	0.54
1:B:257:VAL:HG23	1:B:259:ILE:HD11	1.89	0.54
1:C:128:ILE:HD11	1:C:323:ALA:CB	2.36	0.54
1:C:239:GLN:HG3	1:C:263:ILE:HG13	1.89	0.54
1:D:130:PRO:HD2	1:D:134:MET:HG2	1.90	0.54
1:D:46:ASP:OD2	1:D:54:ARG:NH1	2.41	0.53
1:B:218:ILE:HG22	1:B:253:ALA:HA	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:317:ARG:NH2	4:D:532:HOH:O	2.40	0.53
1:B:170:LEU:HD22	1:B:193:HIS:NE2	2.23	0.53
1:D:40:SER:HA	1:D:76:ASN:OD1	2.09	0.53
1:D:64:LYS:O	1:D:93:VAL:HG12	2.08	0.53
1:A:147:LYS:HZ1	2:A:401:SER:N	2.07	0.53
1:D:192:LEU:HD23	1:D:206:VAL:HG22	1.91	0.53
1:C:23:MET:CE	1:C:156:HIS:HA	2.39	0.53
1:C:186:TRP:CZ2	1:C:192:LEU:HD13	2.44	0.53
1:B:258:ILE:HD13	1:B:284:ILE:HG23	1.91	0.53
1:C:160:ILE:HG12	1:C:218:ILE:HD12	1.91	0.53
1:C:155:ASP:OD1	1:C:315:PHE:HB2	2.09	0.53
1:B:244:PRO:HG2	1:B:247:LEU:HB3	1.91	0.52
1:B:316:THR:O	1:B:319:LEU:HG	2.09	0.52
1:A:296:TYR:O	1:A:299:ILE:HG22	2.10	0.52
1:C:216:GLN:O	1:C:220:LYS:HG3	2.10	0.52
1:C:214:ASP:O	1:C:218:ILE:HG12	2.08	0.52
1:D:242:TYR:HE1	1:D:244:PRO:HB3	1.75	0.52
1:A:272:ASN:O	1:A:273:ASN:HB3	2.10	0.52
1:A:266:GLN:HE21	1:A:277:ILE:HG21	1.74	0.52
1:B:120:TYR:HA	1:B:123:GLU:HG3	1.91	0.52
1:A:178:GLU:OE2	1:A:198:HIS:ND1	2.43	0.52
1:B:166:ASN:OD1	1:B:168:LYS:HG3	2.10	0.52
1:B:69:ILE:HG12	1:B:96:VAL:HB	1.91	0.52
1:C:234:ARG:NH1	1:C:235:ASP:OD2	2.42	0.52
1:A:161:THR:HG21	1:C:213:SER:HB2	1.92	0.52
1:A:278:ILE:HG12	1:A:284:ILE:HG12	1.90	0.52
1:C:23:MET:HE3	1:C:156:HIS:HA	1.91	0.52
1:D:280:LYS:HE2	1:D:282:ASP:HB2	1.92	0.52
1:D:244:PRO:HG2	1:D:247:LEU:CB	2.39	0.52
1:C:54:ARG:HA	1:D:54:ARG:HA	1.92	0.52
1:A:8:LEU:HD23	1:A:21:GLN:NE2	2.25	0.52
1:D:229:VAL:HB	1:D:259:ILE:CG2	2.36	0.51
1:A:244:PRO:HG2	1:A:247:LEU:HB3	1.92	0.51
1:C:258:ILE:HD13	1:C:284:ILE:HG23	1.92	0.51
1:A:65:ASN:ND2	4:A:574:HOH:O	2.25	0.51
1:C:281:ILE:HA	1:C:284:ILE:HD12	1.92	0.51
1:D:127:LEU:CD2	1:D:143:LEU:HD21	2.41	0.51
1:B:25:THR:O	1:B:29:VAL:HG23	2.11	0.51
1:C:69:ILE:HG12	1:C:96:VAL:HB	1.92	0.51
1:D:15:SER:O	1:D:19:ILE:HG23	2.10	0.51
1:A:165:VAL:HG22	1:A:222:SER:O	2.11	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:188:ILE:HG21	1:B:285:SER:OG	2.11	0.51
1:B:94:LYS:NZ	4:B:548:HOH:O	2.43	0.51
1:A:164:ALA:N	4:A:554:HOH:O	2.12	0.50
1:B:231:MET:CE	1:B:263:ILE:HG22	2.40	0.50
1:A:97:ILE:CG2	1:A:127:LEU:HG	2.41	0.50
1:C:162:LEU:HD21	1:C:307:ASN:HD21	1.76	0.50
1:D:160:ILE:HD11	1:D:215:GLU:HA	1.91	0.50
1:D:113:LEU:HD22	1:D:116:ARG:HD3	1.93	0.50
1:A:202:LEU:HD12	1:A:208:LYS:HB2	1.93	0.50
1:A:236:LYS:N	1:A:236:LYS:HD2	2.26	0.50
1:C:99:ILE:HD11	1:C:127:LEU:HD11	1.93	0.50
1:C:99:ILE:HD12	1:C:127:LEU:HD21	1.94	0.50
1:B:232:ASP:O	1:B:233:ASP:HB2	2.10	0.50
1:B:272:ASN:O	1:B:273:ASN:HB3	2.11	0.50
1:D:254:GLY:HA3	1:D:304:ARG:HE	1.75	0.50
1:B:16:THR:O	1:B:19:ILE:HG22	2.12	0.50
1:A:65:ASN:HB3	1:A:66:ASP:OD1	2.12	0.50
1:B:131:SER:HB3	1:B:264:ALA:HB1	1.95	0.49
1:B:8:LEU:HD23	1:B:18:GLN:HA	1.92	0.49
1:C:180:PHE:O	1:C:183:ILE:HG22	2.12	0.49
1:D:155:ASP:OD1	1:D:315:PHE:HB2	2.12	0.49
1:A:258:ILE:HG21	1:A:284:ILE:HG23	1.95	0.49
1:B:263:ILE:HD12	1:B:264:ALA:O	2.12	0.49
1:D:251:ILE:HG23	1:D:303:VAL:HG13	1.95	0.49
1:A:299:ILE:O	1:A:303:VAL:HG23	2.12	0.48
1:D:230:TRP:CZ3	1:D:284:ILE:HD11	2.47	0.48
1:D:257:VAL:O	1:D:275:GLY:HA3	2.13	0.48
1:C:126:VAL:HG22	1:C:147:LYS:HB2	1.94	0.48
1:D:188:ILE:HG21	1:D:285:SER:OG	2.13	0.48
1:D:236:LYS:O	1:D:239:GLN:HB3	2.14	0.48
1:A:181:ASN:N	1:A:233:ASP:HB3	2.23	0.48
1:A:49:GLU:HG3	1:A:50:GLU:N	2.28	0.48
1:A:181:ASN:OD1	1:A:182:PHE:N	2.47	0.48
1:A:87:LYS:O	1:A:90:ILE:HG13	2.14	0.48
1:B:172:HIS:HA	1:B:193:HIS:HB2	1.95	0.48
1:B:267:ASP:HB2	1:B:271:LYS:HE2	1.95	0.47
1:B:273:ASN:CG	1:B:273:ASN:O	2.52	0.47
1:B:257:VAL:O	1:B:275:GLY:HA3	2.13	0.47
1:D:102:VAL:HG12	1:D:104:PRO:HD2	1.95	0.47
1:D:256:PRO:HB3	1:D:299:ILE:HG21	1.95	0.47
1:D:259:ILE:HG13	1:D:277:ILE:HD13	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:231:MET:O	1:C:236:LYS:NZ	2.43	0.47
1:A:232:ASP:CB	1:A:236:LYS:HB2	2.45	0.47
1:C:183:ILE:CD1	1:C:192:LEU:HD23	2.44	0.47
1:D:191:GLU:H	1:D:191:GLU:CD	2.15	0.47
1:A:2:ARG:HB2	1:A:2:ARG:HE	1.44	0.47
1:B:191:GLU:OE2	1:B:207:VAL:HG21	2.15	0.47
1:A:325:PHE:CD1	1:D:309:LEU:HD11	2.49	0.47
1:D:92:GLY:HA3	4:D:549:HOH:O	2.15	0.47
1:A:107:PHE:HB3	1:A:236:LYS:NZ	2.30	0.47
1:B:231:MET:SD	1:B:236:LYS:HG2	2.55	0.47
1:C:155:ASP:OD2	1:C:316:THR:N	2.35	0.46
1:B:162:LEU:HD22	1:B:304:ARG:HD3	1.97	0.46
1:C:221:MET:HE2	1:C:255:ILE:HD11	1.97	0.46
1:C:158:THR:OG1	1:C:160:ILE:HG23	2.16	0.46
1:D:113:LEU:HA	1:D:113:LEU:HD23	1.75	0.46
1:A:218:ILE:HG22	1:A:253:ALA:HA	1.96	0.46
1:D:236:LYS:C	1:D:239:GLN:HB3	2.36	0.46
1:A:79:THR:HG21	4:A:533:HOH:O	2.16	0.46
1:D:221:MET:O	1:D:255:ILE:HG21	2.16	0.46
1:D:77:THR:HG23	1:D:79:THR:H	1.80	0.46
1:A:139:GLN:NE2	4:A:559:HOH:O	2.30	0.45
1:C:39:HIS:HB2	1:D:60:SER:HB2	1.97	0.45
1:C:134:MET:HA	1:C:241:LEU:HD22	1.98	0.45
1:C:292:THR:HG22	1:C:294:GLU:N	2.19	0.45
1:D:246:LYS:HA	1:D:249:ALA:HB3	1.97	0.45
1:B:216:GLN:HE21	1:B:220:LYS:NZ	2.14	0.45
1:A:292:THR:HB	1:A:295:GLU:CG	2.47	0.45
1:C:178:GLU:OE2	1:C:184:LYS:NZ	2.49	0.45
1:A:230:TRP:CZ2	1:A:281:ILE:HG13	2.52	0.45
1:B:269:ILE:HG23	1:B:274:LEU:HB2	1.98	0.45
1:C:148:ILE:HG13	4:C:585:HOH:O	2.17	0.45
1:C:188:ILE:CG2	1:C:189:PRO:HD2	2.47	0.45
1:C:278:ILE:HG12	1:C:284:ILE:HG12	1.98	0.45
1:D:85:PHE:CE1	1:D:95:ILE:HG21	2.52	0.45
1:B:161:THR:HG21	1:D:213:SER:HB2	1.99	0.45
1:B:216:GLN:HE21	1:B:220:LYS:HZ1	1.63	0.45
1:A:1:MET:HG2	1:A:2:ARG:N	2.32	0.45
1:A:212:GLN:NE2	1:A:220:LYS:HE3	2.32	0.45
1:C:60:SER:HB2	1:D:39:HIS:HB2	1.98	0.45
1:A:191:GLU:CD	1:A:191:GLU:H	2.09	0.45
1:C:302:ASP:HA	1:C:305:ARG:HG3	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:64:LYS:HA	1:D:64:LYS:HD3	1.68	0.45
1:D:104:PRO:HG3	1:D:114:MET:HA	1.99	0.44
1:A:215:GLU:OE2	4:A:569:HOH:O	2.21	0.44
1:B:314:TYR:HA	1:B:317:ARG:HB2	1.99	0.44
1:A:181:ASN:H	1:A:233:ASP:CB	2.23	0.44
1:B:186:TRP:CE3	1:B:192:LEU:HD22	2.52	0.44
1:B:23:MET:HB2	1:B:23:MET:HE2	1.83	0.44
1:C:2:ARG:HD2	1:C:34:ARG:NH1	2.33	0.44
1:D:256:PRO:HB3	1:D:299:ILE:CG2	2.46	0.44
1:A:162:LEU:HB3	1:A:304:ARG:NH2	2.33	0.44
1:B:137:LYS:HB2	4:B:531:HOH:O	2.16	0.44
1:C:165:VAL:HG23	1:C:222:SER:O	2.17	0.44
1:A:325:PHE:CE1	1:D:309:LEU:HD21	2.53	0.44
1:A:263:ILE:HA	1:A:263:ILE:HD12	1.76	0.44
1:D:295:GLU:O	1:D:299:ILE:HG13	2.18	0.44
1:B:273:ASN:O	1:B:273:ASN:ND2	2.51	0.44
1:B:64:LYS:HG3	1:B:92:GLY:H	1.83	0.44
1:C:106:MET:C	1:C:107:PHE:HD1	2.21	0.44
1:A:176:ASN:HA	1:A:177:PRO:HD3	1.80	0.43
1:A:170:LEU:HD13	1:A:193:HIS:CE1	2.52	0.43
1:D:160:ILE:HG21	1:D:218:ILE:HG22	2.00	0.43
1:B:158:THR:OG1	1:B:160:ILE:HG23	2.17	0.43
1:C:67:ILE:CD1	1:C:94:LYS:HB2	2.47	0.43
1:D:28:ALA:HB1	1:D:33:PHE:HB2	2.00	0.43
1:A:162:LEU:HD23	1:A:254:GLY:HA3	2.01	0.43
1:A:280:LYS:HG3	1:A:283:ASP:H	1.83	0.43
1:B:72:THR:HG21	1:B:97:ILE:HD11	1.99	0.43
1:D:13:ILE:H	1:D:13:ILE:HG13	1.53	0.43
1:D:176:ASN:HA	1:D:177:PRO:HD3	1.82	0.43
1:D:8:LEU:HD21	1:D:74:THR:HA	2.00	0.43
1:B:246:LYS:NZ	4:B:513:HOH:O	2.26	0.43
1:C:82:GLU:OE2	1:C:116:ARG:HB3	2.18	0.43
1:D:23:MET:O	1:D:27:ILE:HG12	2.18	0.43
1:B:168:LYS:HB3	1:B:170:LEU:HG	2.00	0.43
1:C:87:LYS:O	1:C:90:ILE:HG12	2.18	0.43
1:A:238:TYR:C	1:A:240:SER:H	2.21	0.43
1:C:217:LEU:O	1:C:221:MET:HG3	2.19	0.43
1:C:233:ASP:CA	1:C:236:LYS:HD3	2.19	0.43
1:D:226:TYR:OH	1:D:291:THR:HG21	2.19	0.43
1:A:118:ILE:HA	1:A:118:ILE:HD13	1.83	0.43
1:C:102:VAL:HG11	1:C:105:LEU:HD12	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:256:PRO:HB3	1:C:299:ILE:HG23	2.00	0.43
1:A:103:VAL:HA	1:A:106:MET:HG3	2.00	0.43
1:C:63:ARG:NH2	1:D:22:ASN:OD1	2.43	0.43
1:B:62:LEU:HD12	1:B:62:LEU:HA	1.63	0.43
1:B:78:THR:O	1:B:82:GLU:HG3	2.19	0.43
1:C:66:ASP:O	1:C:67:ILE:HD13	2.18	0.43
1:D:229:VAL:HG21	1:D:247:LEU:HB2	2.01	0.43
1:D:41:TYR:CZ	1:D:43:ILE:HG22	2.54	0.42
1:B:257:VAL:CG2	1:B:259:ILE:HD11	2.49	0.42
1:D:114:MET:O	1:D:117:THR:HB	2.19	0.42
1:A:25:THR:O	1:A:29:VAL:HG23	2.18	0.42
1:A:43:ILE:O	1:A:46:ASP:HB2	2.19	0.42
1:B:251:ILE:HG22	1:B:307:ASN:HB3	2.01	0.42
1:C:244:PRO:HG2	1:C:247:LEU:CB	2.50	0.42
1:B:221:MET:HE1	1:B:250:TYR:CE1	2.55	0.42
1:A:160:ILE:HB	1:A:219:MET:HE2	2.02	0.42
1:A:271:LYS:HA	1:A:271:LYS:HD3	1.87	0.42
1:B:76:ASN:O	1:B:77:THR:OG1	2.36	0.42
1:C:127:LEU:HD13	1:C:143:LEU:HD11	2.01	0.42
1:C:188:ILE:HG22	1:C:189:PRO:HD2	2.02	0.42
1:D:158:THR:OG1	1:D:159:ASN:N	2.52	0.42
1:D:314:TYR:HA	1:D:317:ARG:HB2	2.00	0.42
1:D:4:TYR:HB3	1:D:36:LEU:HG	2.01	0.42
1:A:18:GLN:O	1:A:22:ASN:ND2	2.52	0.42
1:B:218:ILE:HG21	1:B:218:ILE:HD13	1.64	0.42
1:A:219:MET:HE1	1:C:215:GLU:HG2	2.02	0.42
1:A:160:ILE:HD12	1:A:161:THR:O	2.20	0.42
1:C:271:LYS:HE2	1:C:271:LYS:HB3	1.51	0.42
1:B:162:LEU:HD21	1:B:307:ASN:HD21	1.84	0.42
1:B:74:THR:OG1	1:B:81:ASP:OD1	2.23	0.42
1:C:177:PRO:HD2	1:C:198:HIS:CD2	2.55	0.42
1:C:82:GLU:OE1	1:C:116:ARG:NH2	2.53	0.42
1:A:132:GLN:NE2	1:A:136:ASP:OD1	2.51	0.41
1:B:130:PRO:HA	1:B:151:GLN:HB3	2.02	0.41
1:B:269:ILE:HA	1:B:274:LEU:HD12	2.02	0.41
1:C:137:LYS:HA	1:C:137:LYS:HD2	1.69	0.41
1:C:221:MET:HE1	1:C:250:TYR:CE1	2.55	0.41
1:D:91:PHE:HB3	1:D:93:VAL:HG13	2.01	0.41
1:A:226:TYR:HH	1:A:296:TYR:HD2	1.67	0.41
1:A:309:LEU:HD11	1:D:328:LEU:HB2	2.02	0.41
1:D:73:PRO:HD3	1:D:101:ASP:H	1.84	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:128:ILE:HD11	1:A:323:ALA:CB	2.42	0.41
1:B:219:MET:HE1	1:D:216:GLN:HB2	2.03	0.41
1:C:236:LYS:HA	1:C:239:GLN:HB3	2.02	0.41
1:C:55:LEU:HA	1:C:55:LEU:HD23	1.82	0.41
1:D:4:TYR:HA	1:D:34:ARG:O	2.19	0.41
1:C:183:ILE:HG23	1:C:184:LYS:HG3	2.02	0.41
1:C:281:ILE:HG13	1:C:281:ILE:H	1.69	0.41
1:C:2:ARG:NH2	1:C:66:ASP:OD2	2.53	0.41
1:A:252:ALA:O	1:A:311:ARG:NH1	2.53	0.41
1:C:112:TYR:CE2	1:C:113:LEU:HG	2.55	0.41
1:C:235:ASP:C	1:C:236:LYS:HD2	2.40	0.41
1:D:134:MET:HA	1:D:241:LEU:HD22	2.02	0.41
1:D:69:ILE:HG12	1:D:96:VAL:HB	2.01	0.41
1:C:165:VAL:HG12	1:C:166:ASN:HA	2.02	0.41
1:A:12:SER:C	1:A:14:THR:H	2.23	0.41
1:A:170:LEU:HD11	4:A:563:HOH:O	2.19	0.41
1:A:8:LEU:HA	1:A:38:ILE:O	2.21	0.41
1:B:288:VAL:O	1:B:291:THR:HG22	2.20	0.41
1:D:47:SER:HA	1:D:48:PRO:HD2	1.87	0.41
1:A:16:THR:HA	1:A:19:ILE:HG22	2.02	0.41
1:A:294:GLU:HG2	1:A:294:GLU:H	1.69	0.41
1:A:79:THR:HG21	4:A:521:HOH:O	2.21	0.41
1:B:153:MET:HA	4:B:576:HOH:O	2.20	0.41
1:B:229:VAL:HB	1:B:259:ILE:HG23	2.02	0.41
1:B:240:SER:O	1:B:240:SER:OG	2.34	0.41
1:C:257:VAL:O	1:C:275:GLY:HA3	2.21	0.41
1:C:36:LEU:HD23	1:C:36:LEU:HA	1.84	0.41
1:A:230:TRP:CZ3	1:A:284:ILE:HD11	2.55	0.41
1:A:169:LYS:HD3	1:A:288:VAL:O	2.21	0.41
1:A:314:TYR:O	1:A:318:LYS:HB2	2.20	0.41
1:B:97:ILE:O	1:B:127:LEU:HD12	2.21	0.41
1:A:70:PHE:CZ	1:A:84:LEU:HD23	2.55	0.41
1:C:44:ASP:C	1:C:46:ASP:H	2.22	0.41
1:C:246:LYS:N	3:C:401:UDP:O1B	2.53	0.40
1:C:165:VAL:HG12	1:C:166:ASN:N	2.37	0.40
1:D:122:ASN:OD1	1:D:143:LEU:HA	2.20	0.40
1:D:182:PHE:CZ	1:D:230:TRP:HB3	2.57	0.40
1:A:67:ILE:CD1	1:A:94:LYS:HB2	2.51	0.40
1:C:236:LYS:CD	1:C:236:LYS:N	2.79	0.40
1:C:23:MET:HE1	1:C:245:TYR:CE1	2.57	0.40
1:B:250:TYR:O	1:B:253:ALA:HB3	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:167:HIS:NE2	1:C:291:THR:HG23	2.36	0.40
1:D:89:LYS:HA	1:D:89:LYS:HD2	1.78	0.40

There are no symmetry-related clashes.

## 4.3 Torsion angles [i](#)

### 4.3.1 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	329/333 (99%)	304 (92%)	17 (5%)	8 (2%)	7	17
1	B	330/333 (99%)	300 (91%)	28 (8%)	2 (1%)	28	56
1	C	330/333 (99%)	303 (92%)	21 (6%)	6 (2%)	10	25
1	D	330/333 (99%)	302 (92%)	20 (6%)	8 (2%)	7	17
All	All	1319/1332 (99%)	1209 (92%)	86 (6%)	24 (2%)	10	25

All (24) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	65	ASN
1	B	233	ASP
1	C	166	ASN
1	D	48	PRO
1	D	107	PHE
1	D	204	THR
1	C	106	MET
1	D	77	THR
1	D	273	ASN
1	A	211	TYR
1	A	234	ARG
1	B	307	ASN
1	D	49	GLU

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Mol	Chain	Res	Type
1	A	231	MET
1	A	233	ASP
1	A	239	GLN
1	A	274	LEU
1	C	199	ASN
1	C	211	TYR
1	D	279	GLU
1	D	307	ASN
1	A	307	ASN
1	C	174	PRO
1	C	307	ASN

#### 4.3.2 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	298/300 (99%)	292 (98%)	6 (2%)	60	86
1	B	299/300 (100%)	292 (98%)	7 (2%)	56	84
1	C	299/300 (100%)	289 (97%)	10 (3%)	43	73
1	D	299/300 (100%)	284 (95%)	15 (5%)	28	57
All	All	1195/1200 (100%)	1157 (97%)	38 (3%)	44	75

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

Mol	Chain	Res	Type
1	A	60	SER
1	A	85	PHE
1	A	170	LEU
1	A	178	GLU
1	A	181	ASN
1	A	213	SER
1	B	98	PHE
1	B	220	LYS
1	B	235	ASP
1	B	287	ILE

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Mol	Chain	Res	Type
1	B	292	THR
1	B	299	ILE
1	B	302	ASP
1	C	52	SER
1	C	70	PHE
1	C	167	HIS
1	C	180	PHE
1	C	198	HIS
1	C	205	THR
1	C	208	LYS
1	C	218	ILE
1	C	234	ARG
1	C	242	TYR
1	D	13	ILE
1	D	44	ASP
1	D	77	THR
1	D	97	ILE
1	D	127	LEU
1	D	128	ILE
1	D	197	ASP
1	D	199	ASN
1	D	202	LEU
1	D	205	THR
1	D	208	LYS
1	D	277	ILE
1	D	281	ILE
1	D	301	SER
1	D	316	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	266	GLN
1	B	216	GLN
1	B	273	ASN
1	C	181	ASN
1	D	163	GLN
1	D	176	ASN
1	D	198	HIS
1	D	239	GLN

### 4.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 4.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 4.6 Ligand geometry ⓘ

5 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	SER	A	401	-	5,5,6	1.13	1 (20%)	1,5,7	1.45	0
3	UDP	A	402	-	21,26,26	1.18	1 (4%)	22,40,40	1.58	1 (4%)
3	UDP	B	401	-	21,26,26	1.06	1 (4%)	22,40,40	1.63	2 (9%)
3	UDP	C	401	-	21,26,26	1.21	1 (4%)	22,40,40	1.53	1 (4%)
3	UDP	D	401	-	21,26,26	1.10	1 (4%)	22,40,40	1.41	1 (4%)

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	SER	A	401	-	-	0/2/4/6	0/0/0/0
3	UDP	A	402	-	-	0/12/32/32	0/2/2/2
3	UDP	B	401	-	-	0/12/32/32	0/2/2/2
3	UDP	C	401	-	-	0/12/32/32	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	UDP	D	401	-	-	0/12/32/32	0/2/2/2

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	401	SER	CA-C	2.27	1.53	1.50
3	D	401	UDP	C4-N3	2.76	1.38	1.33
3	B	401	UDP	C4-N3	2.83	1.38	1.33
3	A	402	UDP	C4-N3	3.18	1.38	1.33
3	C	401	UDP	C4-N3	3.61	1.39	1.33

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	401	UDP	O4'-C1'-N1	2.68	113.45	108.08
3	D	401	UDP	C4-N3-C2	5.74	119.06	114.13
3	A	402	UDP	C4-N3-C2	6.18	119.44	114.13
3	B	401	UDP	C4-N3-C2	6.36	119.60	114.13
3	C	401	UDP	C4-N3-C2	6.69	119.88	114.13

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	401	SER	1	0
3	C	401	UDP	1	0

## 4.7 Other polymers [i](#)

There are no such residues in this entry.

## 4.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 5 Fit of model and data ⓘ

### 5.1 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	331/333 (99%)	-0.51	2 (0%) 89 90	26, 48, 89, 136	0
1	B	332/333 (99%)	-0.55	3 (0%) 84 85	25, 48, 85, 116	0
1	C	332/333 (99%)	-0.38	5 (1%) 74 75	30, 55, 105, 132	0
1	D	332/333 (99%)	-0.26	8 (2%) 59 60	33, 59, 113, 135	0
All	All	1327/1332 (99%)	-0.43	18 (1%) 75 76	25, 52, 101, 136	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	48	PRO	3.5
1	D	65	ASN	3.2
1	D	234	ARG	3.1
1	D	187	ARG	3.1
1	A	234	ARG	2.9
1	D	107	PHE	2.7
1	C	204	THR	2.7
1	B	242	TYR	2.5
1	D	237	GLN	2.4
1	D	108	ASP	2.3
1	B	13	ILE	2.3
1	D	273	ASN	2.3
1	C	201	GLN	2.3
1	C	273	ASN	2.2
1	C	205	THR	2.2
1	B	187	ARG	2.2
1	D	160	ILE	2.1
1	A	235	ASP	2.0



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

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

## 5.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.4 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( $\text{\AA}^2$ )	Q<0.9
2	SER	A	401	6/7	0.86	0.21	1.33	78,87,93,98	0
3	UDP	C	401	25/25	0.95	0.14	-0.30	41,56,67,74	0
3	UDP	D	401	25/25	0.95	0.15	-0.39	44,55,65,69	0
3	UDP	B	401	25/25	0.96	0.12	-0.62	29,39,53,60	0
3	UDP	A	402	25/25	0.96	0.11	-0.85	36,44,52,58	0

## 5.5 Other polymers [i](#)

There are no such residues in this entry.