



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 28, 2023 – 03:19 PM EDT

PDB ID : 3L7J  
Title : Structure of the Wall Teichoic Acid Polymerase TagF, H444N variant  
Authors : Strynadka, N.C.J.; Lovering, A.L.  
Deposited on : 2009-12-28  
Resolution : 2.81 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35

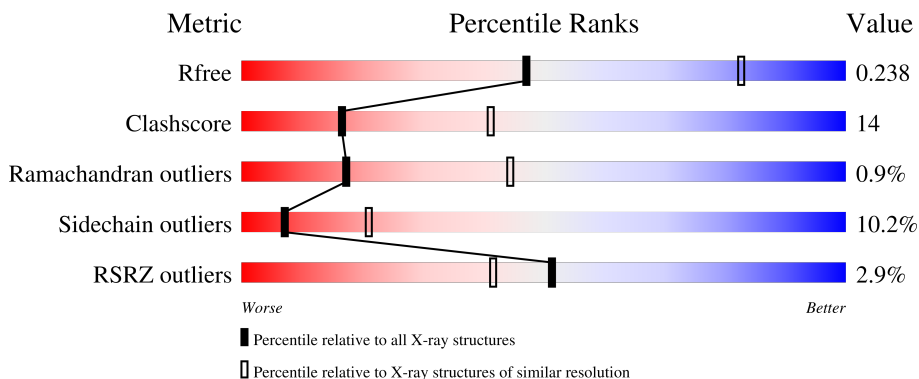
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.81 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))
$R_{free}$	130704	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	729	 2% 39% 15% 44%
1	B	729	 2% 35% 18% 43%
1	C	729	 2% 38% 16% 44%
1	D	729	 2% 37% 16% 44%

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

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	SO4	B	730	-	-	X	-
2	SO4	C	732	-	-	-	X
3	CL	B	732	-	-	X	-
3	CL	B	735	-	-	-	X
3	CL	B	736	-	-	X	-
3	CL	C	733	-	-	X	-
3	CL	D	731	-	-	X	-

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 13970 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 Teichoic acid biosynthesis protein F.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	410	3462	2224	577	650	11	0	0	0
1	B	412	3477	2233	581	652	11	0	0	0
1	C	411	3467	2227	578	651	11	0	0	0
1	D	411	3472	2230	580	651	11	0	0	0

There are 36 discrepancies between the modelled and reference sequences:

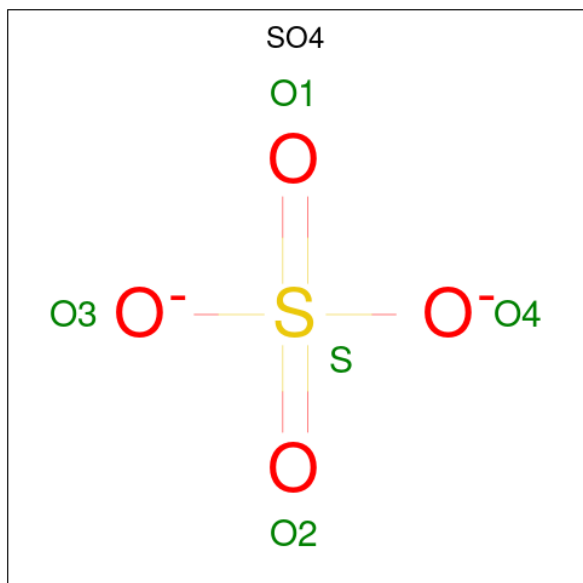
Chain	Residue	Modelled	Actual	Comment	Reference
A	444	ASN	HIS	engineered mutation	UNP Q5HLM5
A	722	LEU	-	expression tag	UNP Q5HLM5
A	723	GLU	-	expression tag	UNP Q5HLM5
A	724	HIS	-	expression tag	UNP Q5HLM5
A	725	HIS	-	expression tag	UNP Q5HLM5
A	726	HIS	-	expression tag	UNP Q5HLM5
A	727	HIS	-	expression tag	UNP Q5HLM5
A	728	HIS	-	expression tag	UNP Q5HLM5
A	729	HIS	-	expression tag	UNP Q5HLM5
B	444	ASN	HIS	engineered mutation	UNP Q5HLM5
B	722	LEU	-	expression tag	UNP Q5HLM5
B	723	GLU	-	expression tag	UNP Q5HLM5
B	724	HIS	-	expression tag	UNP Q5HLM5
B	725	HIS	-	expression tag	UNP Q5HLM5
B	726	HIS	-	expression tag	UNP Q5HLM5
B	727	HIS	-	expression tag	UNP Q5HLM5
B	728	HIS	-	expression tag	UNP Q5HLM5
B	729	HIS	-	expression tag	UNP Q5HLM5
C	444	ASN	HIS	engineered mutation	UNP Q5HLM5
C	722	LEU	-	expression tag	UNP Q5HLM5
C	723	GLU	-	expression tag	UNP Q5HLM5

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Chain	Residue	Modelled	Actual	Comment	Reference
C	724	HIS	-	expression tag	UNP Q5HLM5
C	725	HIS	-	expression tag	UNP Q5HLM5
C	726	HIS	-	expression tag	UNP Q5HLM5
C	727	HIS	-	expression tag	UNP Q5HLM5
C	728	HIS	-	expression tag	UNP Q5HLM5
C	729	HIS	-	expression tag	UNP Q5HLM5
D	444	ASN	HIS	engineered mutation	UNP Q5HLM5
D	722	LEU	-	expression tag	UNP Q5HLM5
D	723	GLU	-	expression tag	UNP Q5HLM5
D	724	HIS	-	expression tag	UNP Q5HLM5
D	725	HIS	-	expression tag	UNP Q5HLM5
D	726	HIS	-	expression tag	UNP Q5HLM5
D	727	HIS	-	expression tag	UNP Q5HLM5
D	728	HIS	-	expression tag	UNP Q5HLM5
D	729	HIS	-	expression tag	UNP Q5HLM5

- Molecule 2 is SULFATE ION (three-letter code: SO<sub>4</sub>) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	C	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		

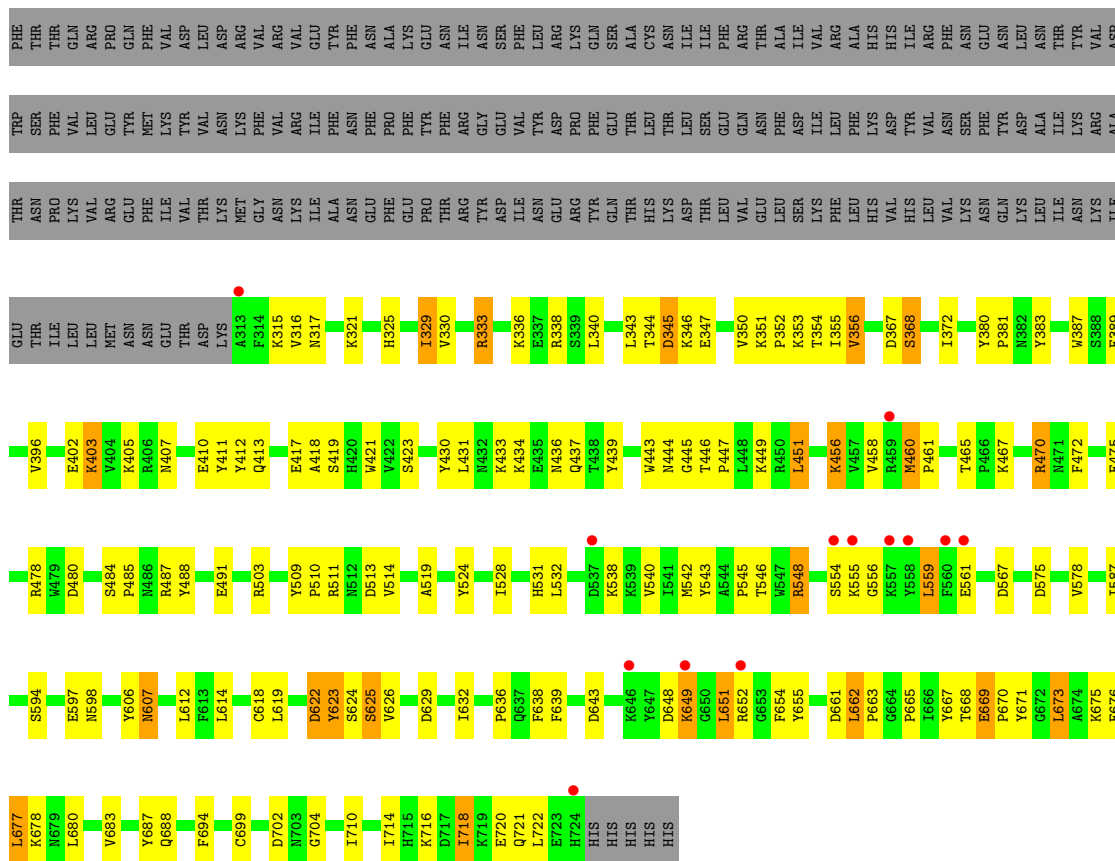
- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	11	Total	Cl	0	0
			11	11		
3	B	8	Total	Cl	0	0
			8	8		
3	C	7	Total	Cl	0	0
			7	7		
3	D	6	Total	Cl	0	0
			6	6		

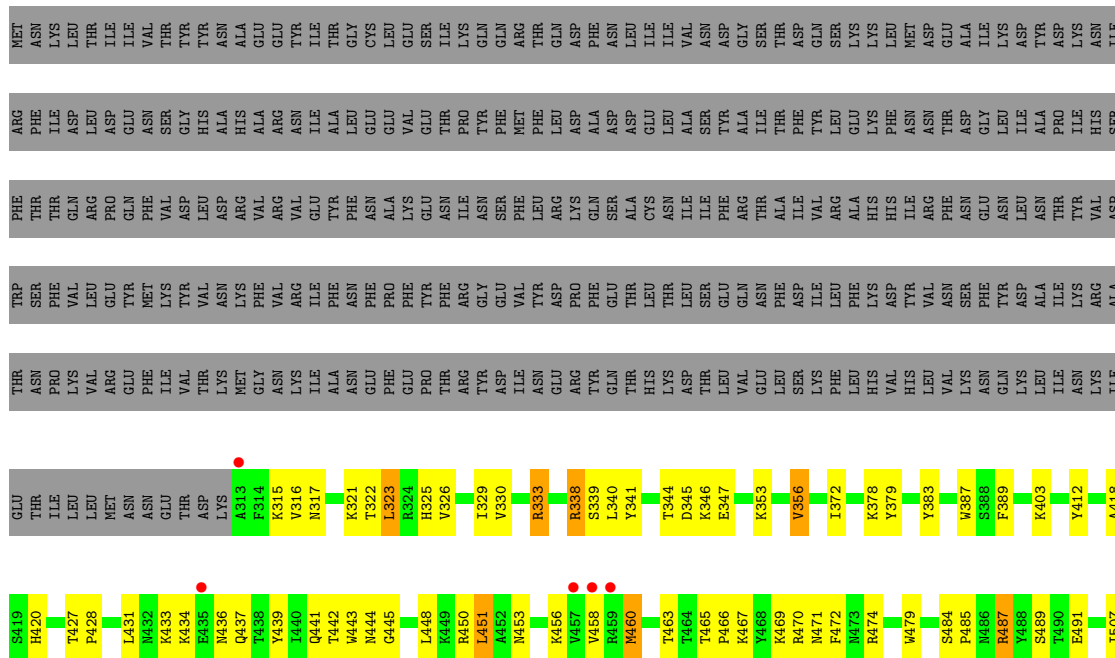
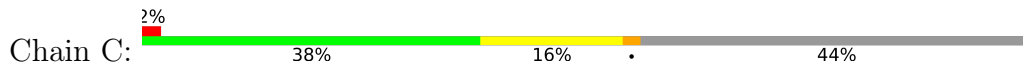
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	8	Total	O	0	0
			8	8		
4	B	5	Total	O	0	0
			5	5		
4	C	3	Total	O	0	0
			3	3		
4	D	4	Total	O	0	0
			4	4		

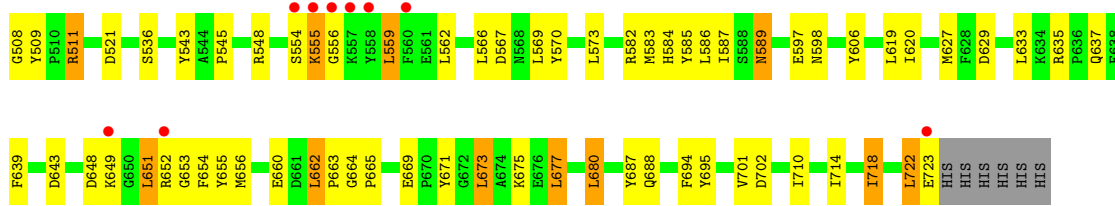




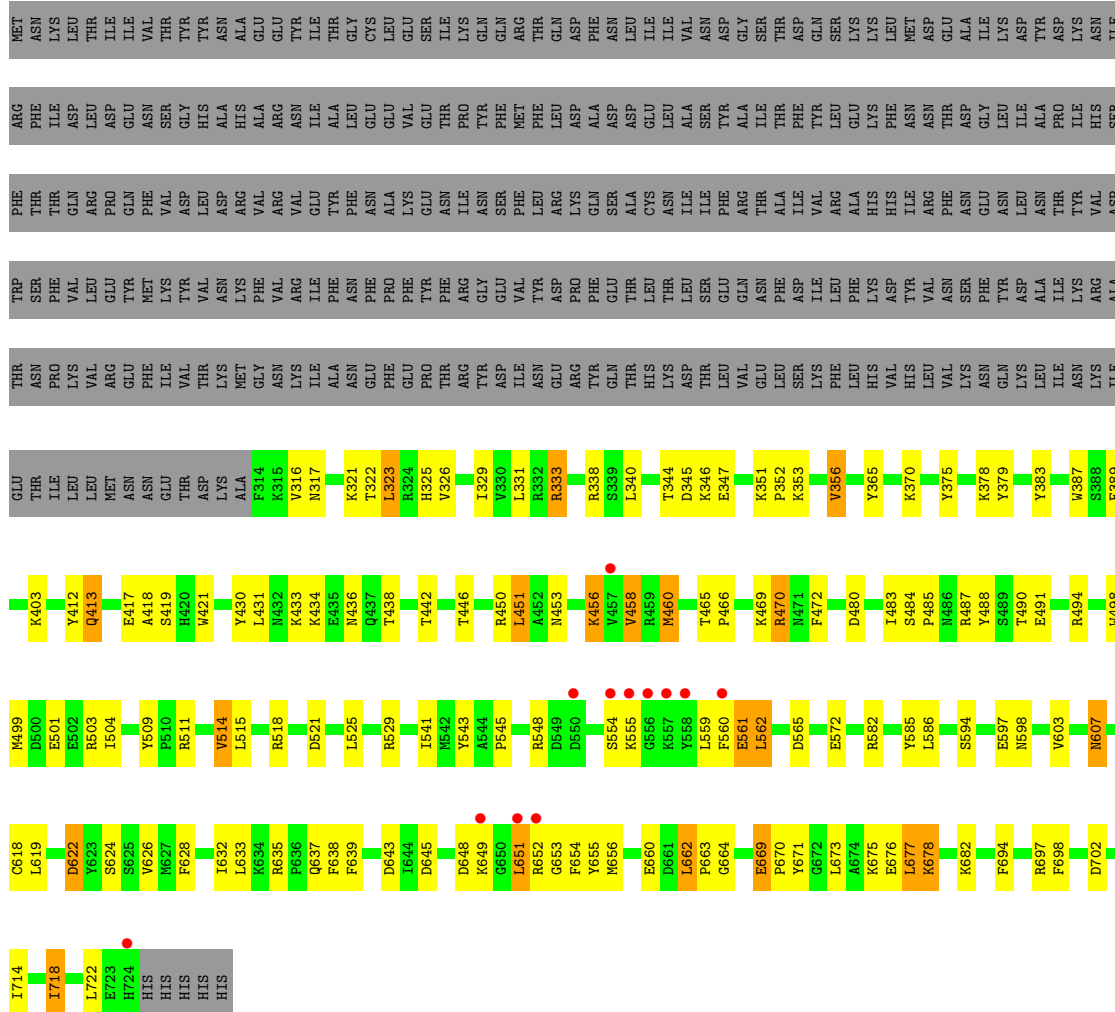
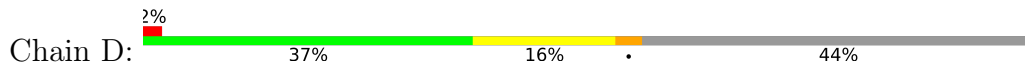
● Molecule 1: Teichoic acid biosynthesis protein F







• Molecule 1: Teichoic acid biosynthesis protein F



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	223.60Å 223.60Å 100.57Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.80 – 2.81 19.80 – 2.81	Depositor EDS
% Data completeness (in resolution range)	97.9 (19.80-2.81) 97.9 (19.80-2.81)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	0.09	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.64 (at 2.79Å)	Xtrriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, $R_{free}$	0.197 , 0.246 0.191 , 0.238	Depositor DCC
$R_{free}$ test set	3046 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	72.4	Xtrriage
Anisotropy	0.048	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.27 , 29.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	13970	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	86.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.40% of the height of the origin peak. No significant pseudotranslation is detected.*

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

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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

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	0.48	0/3551	0.62	0/4798
1	B	0.49	0/3567	0.65	0/4820
1	C	0.46	0/3556	0.61	0/4805
1	D	0.46	0/3562	0.61	0/4813
All	All	0.47	0/14236	0.62	0/19236

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	3462	0	3369	86	0
1	B	3477	0	3381	105	0
1	C	3467	0	3374	104	0
1	D	3472	0	3376	96	0
2	A	15	0	0	0	0
2	B	5	0	0	2	0
2	C	15	0	0	0	0
2	D	5	0	0	0	0
3	A	11	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	8	0	0	6	0
3	C	7	0	0	2	0
3	D	6	0	0	4	0
4	A	8	0	0	1	0
4	B	5	0	0	0	0
4	C	3	0	0	0	0
4	D	4	0	0	0	0
All	All	13970	0	13500	389	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 14.

All (389) 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:A:333:ARG:HG2	1:A:333:ARG:HH11	1.02	1.19
1:D:470:ARG:HG2	1:D:470:ARG:HH11	1.04	1.10
1:C:333:ARG:HG2	1:C:333:ARG:HH11	1.28	0.99
1:B:333:ARG:HH11	1:B:333:ARG:HG2	1.28	0.98
1:C:470:ARG:HH11	1:C:470:ARG:HG2	1.27	0.97
1:B:470:ARG:HG2	1:B:470:ARG:HH11	1.25	0.97
1:D:333:ARG:HH11	1:D:333:ARG:HG2	1.35	0.91
1:A:470:ARG:HG2	1:A:470:ARG:HH11	1.35	0.91
1:D:470:ARG:HG2	1:D:470:ARG:NH1	1.85	0.89
1:A:333:ARG:HG2	1:A:333:ARG:NH1	1.84	0.86
1:A:333:ARG:HH11	1:A:333:ARG:CG	1.87	0.84
1:A:648:ASP:HB2	1:A:651:LEU:HB2	1.64	0.80
1:B:663:PRO:HG3	1:B:694:PHE:CG	2.17	0.79
1:B:413:GLN:O	1:B:417:GLU:HG3	1.83	0.79
1:C:648:ASP:HB2	1:C:651:LEU:HB2	1.63	0.79
1:B:548:ARG:HD3	1:B:643:ASP:OD2	1.83	0.78
1:C:333:ARG:HH11	1:C:333:ARG:CG	1.95	0.78
1:C:383:TYR:CE2	1:C:718:ILE:HD11	2.20	0.77
1:A:383:TYR:CE2	1:A:718:ILE:HD11	2.20	0.77
1:A:485:PRO:HG3	1:A:509:TYR:CE2	2.20	0.75
1:C:662:LEU:HD23	1:C:662:LEU:H	1.51	0.75
1:B:561:GLU:HB2	3:B:734:CL:CL	2.24	0.74
1:A:662:LEU:HB2	1:A:663:PRO:HD3	1.68	0.74
1:B:470:ARG:HH11	1:B:470:ARG:CG	2.00	0.74
1:C:383:TYR:CZ	1:C:718:ILE:HD11	2.24	0.73
1:A:353:LYS:HG2	3:A:733:CL:CL	2.26	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:514:VAL:HG12	1:A:518:ARG:HG3	1.69	0.72
1:C:543:TYR:CZ	1:C:545:PRO:HG3	2.24	0.72
1:D:639:PHE:CZ	1:D:663:PRO:HD2	2.25	0.72
1:D:572:GLU:OE1	1:D:678:LYS:HE3	1.90	0.72
1:C:470:ARG:HG2	1:C:470:ARG:NH1	2.03	0.71
1:C:662:LEU:H	1:C:662:LEU:CD2	2.03	0.71
1:C:372:ILE:HD13	1:C:710:ILE:HG21	1.72	0.71
1:A:338:ARG:HD2	1:A:430:TYR:CD1	2.25	0.70
1:D:485:PRO:HG3	1:D:509:TYR:CE2	2.27	0.70
1:D:648:ASP:HB2	1:D:651:LEU:HB2	1.72	0.70
1:A:714:ILE:O	1:A:718:ILE:HG23	1.92	0.69
1:B:467:LYS:HE3	1:B:470:ARG:NH2	2.07	0.69
1:C:620:ILE:HD11	1:C:677:LEU:HD21	1.73	0.69
1:D:548:ARG:NH2	1:D:622:ASP:OD1	2.23	0.68
1:C:548:ARG:HD3	1:C:643:ASP:OD2	1.94	0.68
1:D:333:ARG:HG2	1:D:333:ARG:NH1	2.08	0.67
1:C:467:LYS:HE3	1:C:470:ARG:HH22	1.60	0.67
1:D:543:TYR:CZ	1:D:545:PRO:HG3	2.29	0.67
1:A:325:HIS:CE1	1:A:329:ILE:HD13	2.30	0.67
1:B:403:LYS:HE2	3:B:736:CL:CL	2.32	0.66
1:C:673:LEU:HD22	1:C:677:LEU:HD22	1.76	0.66
1:D:325:HIS:CE1	1:D:329:ILE:HD11	2.30	0.66
1:C:444:ASN:O	1:C:511:ARG:NH1	2.28	0.66
1:B:383:TYR:CE2	1:B:718:ILE:HD11	2.31	0.66
1:D:451:LEU:HD12	1:D:451:LEU:H	1.60	0.66
1:A:470:ARG:HG2	1:A:470:ARG:NH1	2.07	0.65
1:A:508:GLY:HA3	1:A:702:ASP:OD1	1.95	0.65
1:B:333:ARG:HH11	1:B:333:ARG:CG	2.08	0.65
1:C:487:ARG:HH11	1:C:487:ARG:HB2	1.61	0.65
1:B:470:ARG:HG2	1:B:470:ARG:NH1	2.03	0.65
1:C:465:THR:HB	1:C:466:PRO:HD3	1.77	0.65
1:B:456:LYS:HA	1:B:456:LYS:HE2	1.78	0.64
1:B:538:LYS:HE2	1:B:575:ASP:O	1.97	0.64
1:B:511:ARG:HH22	1:B:629:ASP:CG	2.02	0.64
1:C:333:ARG:HG2	1:C:333:ARG:NH1	2.02	0.64
1:C:714:ILE:O	1:C:718:ILE:HG23	1.98	0.63
1:B:542:MET:CE	1:B:612:LEU:HB3	2.29	0.63
1:C:569:LEU:HD22	1:C:573:LEU:HD12	1.80	0.63
1:B:372:ILE:HD13	1:B:710:ILE:HG21	1.79	0.63
1:D:548:ARG:HH22	1:D:622:ASP:CG	2.01	0.63
1:A:383:TYR:CZ	1:A:718:ILE:HD11	2.33	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:633:LEU:HB3	1:C:635:ARG:HD3	1.82	0.62
1:D:353:LYS:HG2	3:D:731:CL:CL	2.37	0.61
1:D:413:GLN:O	1:D:417:GLU:HG3	2.00	0.61
1:D:338:ARG:HD2	1:D:430:TYR:CD1	2.35	0.61
1:D:662:LEU:HB2	1:D:663:PRO:HD3	1.82	0.61
1:A:662:LEU:HD23	1:A:662:LEU:H	1.64	0.61
1:A:673:LEU:HD22	1:A:677:LEU:HD22	1.83	0.61
1:B:353:LYS:HG2	3:B:732:CL:CL	2.38	0.61
1:C:487:ARG:HB2	1:C:487:ARG:NH1	2.16	0.60
1:C:665:PRO:HG3	1:C:687:TYR:CZ	2.35	0.60
1:B:451:LEU:HD12	1:B:451:LEU:H	1.64	0.60
1:D:317:ASN:O	1:D:321:LYS:HG3	2.01	0.60
1:B:325:HIS:CE1	1:B:329:ILE:HD13	2.37	0.60
1:B:662:LEU:H	1:B:662:LEU:HD23	1.67	0.60
1:B:542:MET:HE1	1:B:612:LEU:CB	2.32	0.60
1:D:470:ARG:HH11	1:D:470:ARG:CG	1.95	0.59
1:B:559:LEU:HD23	1:B:587:ILE:HG23	1.84	0.59
1:D:347:GLU:HG3	1:D:436:ASN:HB2	1.82	0.59
1:C:701:VAL:HG12	1:C:701:VAL:O	2.02	0.59
1:D:438:THR:HA	1:D:480:ASP:OD2	2.02	0.59
1:D:670:PRO:HD2	1:D:671:TYR:CD2	2.38	0.59
1:D:554:SER:O	1:D:555:LYS:HB2	2.02	0.59
1:A:338:ARG:HD3	1:A:412:TYR:OH	2.03	0.59
1:B:480:ASP:O	1:B:503:ARG:HG2	2.03	0.59
1:D:465:THR:HB	1:D:466:PRO:HD3	1.84	0.58
1:A:641:ALA:HB1	1:A:644:ILE:HB	1.84	0.58
1:D:453:ASN:HB2	1:D:498:TRP:CZ2	2.38	0.58
1:D:582:ARG:HD3	3:D:733:CL:CL	2.40	0.58
1:A:378:LYS:HD3	1:A:379:TYR:CE2	2.39	0.58
1:A:546:THR:HG21	1:A:623:TYR:O	2.04	0.58
1:C:347:GLU:O	1:C:436:ASN:ND2	2.37	0.58
1:B:546:THR:HG21	1:B:623:TYR:O	2.04	0.58
1:D:714:ILE:O	1:D:718:ILE:HG23	2.04	0.58
1:D:585:TYR:CZ	1:D:586:LEU:HG	2.38	0.57
1:B:434:LYS:C	1:B:436:ASN:H	2.07	0.57
1:C:665:PRO:HG3	1:C:687:TYR:CE1	2.39	0.57
1:A:513:ASP:HB2	4:A:748:HOH:O	2.04	0.57
1:A:662:LEU:HB2	1:A:663:PRO:CD	2.35	0.57
1:B:624:SER:OG	1:B:626:VAL:HG22	2.03	0.57
1:B:648:ASP:HB2	1:B:651:LEU:HB2	1.84	0.57
1:A:420:HIS:CD2	1:A:438:THR:HB	2.40	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:548:ARG:HD3	1:A:643:ASP:OD2	2.05	0.57
1:B:338:ARG:HD2	1:B:430:TYR:CD1	2.40	0.56
1:C:387:TRP:HB3	1:C:389:PHE:CE2	2.41	0.56
1:C:434:LYS:C	1:C:436:ASN:H	2.07	0.56
1:B:347:GLU:O	1:B:436:ASN:ND2	2.39	0.56
1:C:559:LEU:HD23	1:C:587:ILE:HG23	1.88	0.56
1:B:675:LYS:O	1:B:678:LYS:HB2	2.06	0.56
1:B:368:SER:HB3	1:B:510:PRO:HD2	1.89	0.56
1:B:652:ARG:C	1:B:654:PHE:H	2.08	0.55
1:B:542:MET:HE1	1:B:612:LEU:HB3	1.86	0.55
1:D:325:HIS:CE1	1:D:340:LEU:HB2	2.42	0.55
1:C:511:ARG:HH22	1:C:629:ASP:CG	2.10	0.55
1:B:548:ARG:HH22	1:B:622:ASP:CG	2.08	0.55
1:B:625:SER:N	2:B:730:SO4:O2	2.39	0.55
1:C:662:LEU:CD2	1:C:662:LEU:N	2.68	0.55
1:B:632:ILE:HG12	1:B:699:CYS:HB3	1.89	0.54
1:A:325:HIS:CE1	1:A:329:ILE:CD1	2.90	0.54
1:A:451:LEU:H	1:A:451:LEU:HD12	1.72	0.54
1:C:340:LEU:O	1:C:344:THR:HG23	2.08	0.54
1:D:597:GLU:O	1:D:598:ASN:HB2	2.07	0.54
1:B:548:ARG:NH2	1:B:622:ASP:OD1	2.30	0.54
1:C:554:SER:C	1:C:556:GLY:H	2.11	0.53
1:B:638:PHE:HE1	1:B:676:GLU:HG2	1.73	0.53
1:A:405:LYS:O	1:A:411:TYR:HB2	2.08	0.53
1:A:548:ARG:NH2	1:A:622:ASP:OD1	2.35	0.53
1:C:582:ARG:NH2	1:C:606:TYR:O	2.42	0.53
1:C:485:PRO:HD2	1:C:489:SER:HB2	1.90	0.53
1:A:485:PRO:HG3	1:A:509:TYR:CZ	2.45	0.52
1:C:485:PRO:HG3	1:C:509:TYR:CE2	2.44	0.52
1:D:383:TYR:CE2	1:D:718:ILE:HD11	2.44	0.52
1:B:475:GLU:OE1	1:B:478:ARG:NH1	2.41	0.52
1:B:543:TYR:CZ	1:B:545:PRO:HG3	2.45	0.52
1:D:514:VAL:HG12	1:D:518:ARG:HG3	1.92	0.52
1:B:716:LYS:O	1:B:720:GLU:HG3	2.09	0.52
1:C:418:ALA:O	1:C:437:GLN:HG2	2.09	0.52
1:D:352:PRO:HD2	3:D:731:CL:CL	2.47	0.52
1:C:453:ASN:HA	1:C:469:LYS:HD3	1.92	0.52
1:B:559:LEU:CD2	1:B:587:ILE:HG23	2.40	0.52
1:C:663:PRO:HG3	1:C:694:PHE:CG	2.45	0.52
1:D:442:THR:HG22	1:D:483:ILE:HD12	1.92	0.52
1:B:325:HIS:NE2	1:B:329:ILE:HD13	2.24	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:648:ASP:HB2	1:A:651:LEU:CB	2.37	0.51
1:C:718:ILE:HG13	1:C:718:ILE:O	2.10	0.51
1:D:662:LEU:HB2	1:D:663:PRO:CD	2.40	0.51
1:C:445:GLY:HA2	1:C:509:TYR:CE2	2.45	0.51
1:A:395:ASN:O	1:A:403:LYS:HE2	2.11	0.51
1:B:387:TRP:HB3	1:B:389:PHE:CE2	2.44	0.51
1:C:316:VAL:HG13	1:C:317:ASN:N	2.25	0.51
1:D:338:ARG:HD3	1:D:412:TYR:OH	2.10	0.51
1:A:662:LEU:H	1:A:662:LEU:CD2	2.24	0.51
1:B:513:ASP:HA	1:B:704:GLY:HA2	1.92	0.51
1:D:352:PRO:HA	1:D:419:SER:HB3	1.92	0.51
1:D:697:ARG:HD3	1:D:698:PHE:CZ	2.45	0.51
1:C:637:GLN:O	1:C:664:GLY:HA3	2.10	0.51
1:D:638:PHE:HE1	1:D:676:GLU:HG2	1.76	0.51
1:A:521:ASP:O	1:A:525:LEU:HG	2.10	0.51
1:B:467:LYS:HE3	1:B:470:ARG:HH22	1.76	0.51
1:B:329:ILE:HG22	1:B:330:VAL:N	2.26	0.50
1:D:639:PHE:CE2	1:D:663:PRO:HD2	2.46	0.50
1:D:451:LEU:HD12	1:D:451:LEU:N	2.23	0.50
1:A:341:TYR:CD1	1:A:412:TYR:HB3	2.46	0.50
1:A:543:TYR:CZ	1:A:545:PRO:HG3	2.46	0.50
1:D:669:GLU:HG2	1:D:671:TYR:H	1.76	0.50
1:C:344:THR:O	1:C:346:LYS:HG3	2.12	0.50
1:C:467:LYS:CE	1:C:470:ARG:HH22	2.25	0.50
1:A:718:ILE:O	1:A:722:LEU:HD13	2.11	0.50
1:C:322:THR:O	1:C:326:VAL:HG23	2.12	0.50
1:C:507:ILE:HG13	1:C:508:GLY:O	2.12	0.50
1:C:639:PHE:CZ	1:C:663:PRO:HD2	2.46	0.50
1:A:456:LYS:HE2	1:A:456:LYS:HA	1.93	0.50
1:D:456:LYS:HE2	1:D:456:LYS:HA	1.94	0.50
1:C:652:ARG:C	1:C:654:PHE:H	2.15	0.49
1:C:450:ARG:HA	1:C:655:TYR:CE2	2.47	0.49
1:C:347:GLU:HA	1:C:434:LYS:HD3	1.95	0.49
1:C:341:TYR:O	1:C:345:ASP:HB2	2.12	0.49
1:D:322:THR:O	1:D:326:VAL:HG23	2.12	0.49
1:C:442:THR:O	1:C:509:TYR:HE1	1.96	0.49
1:A:420:HIS:CE1	1:A:718:ILE:HG22	2.48	0.49
1:A:597:GLU:O	1:A:598:ASN:HB2	2.13	0.49
1:D:490:THR:HG23	1:D:504:ILE:HD13	1.93	0.49
1:B:519:ALA:HA	1:B:614:LEU:HD22	1.95	0.49
1:A:333:ARG:NH1	1:A:333:ARG:CG	2.57	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:448:LEU:HD13	1:A:627:MET:HE1	1.94	0.48
1:D:607:ASN:N	1:D:607:ASN:OD1	2.45	0.48
1:C:545:PRO:HG2	1:C:583:MET:HE1	1.95	0.48
1:C:448:LEU:HD13	1:C:627:MET:HE1	1.95	0.48
1:A:325:HIS:NE2	1:A:329:ILE:HD13	2.28	0.48
1:A:722:LEU:O	1:A:723:GLU:HG3	2.13	0.48
1:B:344:THR:O	1:B:346:LYS:HG2	2.13	0.48
1:C:584:HIS:ND1	1:C:586:LEU:HB2	2.28	0.48
1:D:353:LYS:CG	3:D:731:CL:CL	2.99	0.48
1:D:387:TRP:HB3	1:D:389:PHE:CE2	2.48	0.48
1:A:646:LYS:O	1:A:648:ASP:N	2.41	0.48
1:A:662:LEU:CD2	1:A:662:LEU:N	2.77	0.48
1:A:540:VAL:HG22	1:A:578:VAL:HG12	1.95	0.48
1:D:637:GLN:O	1:D:664:GLY:HA3	2.14	0.47
1:B:663:PRO:HG3	1:B:694:PHE:CD2	2.49	0.47
1:C:485:PRO:HA	1:C:508:GLY:HA2	1.95	0.47
1:D:652:ARG:C	1:D:654:PHE:H	2.16	0.47
1:B:356:VAL:HG23	1:B:421:TRP:HA	1.96	0.47
1:D:325:HIS:NE2	1:D:329:ILE:HD11	2.28	0.47
1:D:347:GLU:O	1:D:436:ASN:ND2	2.47	0.47
1:B:542:MET:HE2	1:B:612:LEU:HB3	1.94	0.47
1:B:651:LEU:O	1:B:651:LEU:HD23	2.15	0.47
1:C:316:VAL:HG23	1:D:331:LEU:HD22	1.96	0.47
1:D:378:LYS:HD3	1:D:379:TYR:CE2	2.49	0.47
1:A:453:ASN:HA	1:A:469:LYS:HD3	1.96	0.47
1:B:670:PRO:HD2	1:B:671:TYR:CD2	2.49	0.47
1:C:338:ARG:HD3	1:C:412:TYR:OH	2.13	0.47
1:C:420:HIS:CE1	1:C:718:ILE:HG22	2.49	0.47
1:A:515:LEU:HD12	1:A:632:ILE:HD12	1.96	0.47
1:D:365:TYR:CZ	1:D:370:LYS:HG3	2.50	0.47
1:D:663:PRO:HG3	1:D:694:PHE:CG	2.49	0.47
1:B:524:TYR:O	1:B:528:ILE:HG13	2.15	0.47
1:D:697:ARG:HD3	1:D:698:PHE:CE2	2.49	0.47
1:B:338:ARG:HD3	1:B:412:TYR:OH	2.14	0.47
1:B:669:GLU:HG2	1:B:671:TYR:H	1.79	0.47
1:D:465:THR:CG2	1:D:469:LYS:HE3	2.44	0.47
1:A:480:ASP:O	1:A:503:ARG:HG2	2.15	0.47
1:B:625:SER:HB3	2:B:730:SO4:O2	2.14	0.47
1:A:344:THR:O	1:A:346:LYS:HG3	2.14	0.47
1:B:434:LYS:C	1:B:436:ASN:N	2.67	0.47
1:D:356:VAL:HG23	1:D:421:TRP:HA	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:406:ARG:O	1:A:407:ASN:HB2	2.14	0.46
1:A:484:SER:HA	1:A:485:PRO:HD3	1.73	0.46
1:C:450:ARG:HG3	1:C:653:GLY:O	2.15	0.46
1:D:651:LEU:HG	1:D:653:GLY:H	1.81	0.46
1:B:353:LYS:HA	1:B:718:ILE:HD12	1.98	0.46
1:B:354:THR:C	1:B:355:ILE:HG13	2.35	0.46
1:B:639:PHE:N	1:B:639:PHE:CD2	2.83	0.46
1:D:340:LEU:O	1:D:344:THR:HG23	2.15	0.46
1:B:445:GLY:HA2	1:B:509:TYR:CE2	2.50	0.46
1:C:470:ARG:NH1	1:C:471:ASN:OD1	2.48	0.46
1:D:494:ARG:HA	1:D:499:MET:HB2	1.96	0.46
1:C:353:LYS:HA	1:C:718:ILE:HD12	1.97	0.46
1:D:345:ASP:OD2	1:D:434:LYS:HE3	2.15	0.46
1:A:490:THR:HG23	1:A:504:ILE:HD13	1.98	0.46
1:B:532:LEU:HD21	1:B:606:TYR:CE2	2.50	0.46
1:D:639:PHE:HZ	1:D:663:PRO:HD2	1.73	0.46
1:B:662:LEU:HB2	1:B:663:PRO:CD	2.46	0.46
1:B:673:LEU:HD22	1:B:677:LEU:HD22	1.97	0.46
1:B:714:ILE:O	1:B:718:ILE:HG23	2.15	0.46
1:A:352:PRO:HA	1:A:419:SER:HB3	1.97	0.45
1:B:317:ASN:O	1:B:321:LYS:HG3	2.17	0.45
1:A:450:ARG:HA	1:A:655:TYR:CE2	2.52	0.45
1:A:509:TYR:HB3	1:A:511:ARG:HG2	1.96	0.45
1:B:451:LEU:HD12	1:B:451:LEU:N	2.32	0.45
1:C:323:LEU:HD12	1:C:323:LEU:HA	1.75	0.45
1:D:560:PHE:O	1:D:561:GLU:C	2.54	0.45
1:B:638:PHE:CZ	1:B:683:VAL:HG11	2.52	0.45
1:D:325:HIS:CE1	1:D:329:ILE:CD1	2.98	0.45
1:D:675:LYS:O	1:D:678:LYS:HB2	2.17	0.45
1:C:470:ARG:NH1	1:C:470:ARG:CG	2.75	0.45
1:D:434:LYS:C	1:D:436:ASN:H	2.19	0.45
1:B:380:TYR:N	1:B:381:PRO:HD3	2.31	0.45
1:A:652:ARG:C	1:A:654:PHE:H	2.19	0.45
1:B:531:HIS:CD2	1:B:531:HIS:O	2.70	0.45
1:C:663:PRO:HG3	1:C:694:PHE:CD2	2.52	0.45
1:A:519:ALA:HA	1:A:614:LEU:HD22	1.98	0.45
1:B:418:ALA:O	1:B:437:GLN:HG2	2.17	0.45
1:B:488:TYR:OH	1:B:655:TYR:HB2	2.16	0.45
1:B:687:TYR:O	1:B:688:GLN:C	2.54	0.45
1:A:385:TYR:O	1:A:401:ALA:HA	2.17	0.44
1:B:329:ILE:HD12	1:B:336:LYS:HB2	1.98	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:347:GLU:HG3	1:B:436:ASN:HB2	1.98	0.44
1:C:316:VAL:HG23	1:D:331:LEU:CD2	2.47	0.44
1:D:325:HIS:HE1	1:D:340:LEU:HB2	1.81	0.44
1:B:554:SER:C	1:B:556:GLY:H	2.20	0.44
1:C:680:LEU:HD23	1:C:680:LEU:HA	1.80	0.44
1:D:548:ARG:NH1	1:D:643:ASP:OD1	2.50	0.44
1:A:345:ASP:OD1	1:A:434:LYS:CE	2.66	0.44
1:B:607:ASN:OD1	1:B:607:ASN:N	2.50	0.44
1:D:450:ARG:HA	1:D:655:TYR:CE2	2.52	0.44
1:A:607:ASN:OD1	1:A:607:ASN:N	2.48	0.44
1:B:405:LYS:O	1:B:411:TYR:HB2	2.18	0.44
1:B:403:LYS:CE	3:B:736:CL:CL	3.01	0.44
1:D:525:LEU:O	1:D:529:ARG:HG3	2.18	0.44
1:A:472:PHE:O	1:A:476:THR:HG23	2.18	0.44
1:B:458:VAL:C	1:B:460:MET:H	2.21	0.44
1:C:353:LYS:HG2	3:C:733:CL:CL	2.54	0.44
1:C:470:ARG:HD2	1:C:474:ARG:HH21	1.83	0.44
1:B:340:LEU:O	1:B:344:THR:HG23	2.18	0.43
1:C:585:TYR:O	1:C:589:ASN:OD1	2.36	0.43
1:D:325:HIS:O	1:D:329:ILE:HD13	2.17	0.43
1:C:356:VAL:HG22	1:C:418:ALA:CB	2.48	0.43
1:A:450:ARG:HD2	1:A:653:GLY:HA2	2.01	0.43
1:B:352:PRO:HA	1:B:419:SER:HB3	2.00	0.43
1:C:325:HIS:CE1	1:C:340:LEU:HB2	2.53	0.43
1:C:347:GLU:CG	1:C:436:ASN:HB2	2.49	0.43
1:C:431:LEU:HD23	1:C:431:LEU:HA	1.60	0.43
1:C:718:ILE:O	1:C:722:LEU:HD22	2.19	0.43
1:C:687:TYR:O	1:C:688:GLN:C	2.56	0.43
1:A:443:TRP:CG	1:A:444:ASN:N	2.86	0.43
1:C:441:GLN:HG2	1:C:479:TRP:CE2	2.53	0.43
1:B:663:PRO:HG3	1:B:694:PHE:CD1	2.53	0.43
1:C:341:TYR:CD1	1:C:412:TYR:HB3	2.53	0.43
1:C:722:LEU:O	1:C:723:GLU:HG3	2.19	0.43
1:C:316:VAL:CG1	1:C:317:ASN:N	2.81	0.43
1:D:446:THR:HB	1:D:628:PHE:CD2	2.54	0.43
1:D:638:PHE:N	1:D:638:PHE:CD2	2.87	0.43
1:A:356:VAL:HG23	1:A:421:TRP:HA	2.01	0.43
1:B:345:ASP:OD2	1:B:434:LYS:HE3	2.19	0.43
1:D:515:LEU:HD12	1:D:632:ILE:HD12	2.01	0.43
1:D:624:SER:OG	1:D:626:VAL:HG22	2.19	0.43
1:C:378:LYS:HD3	1:C:379:TYR:CE2	2.53	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:545:PRO:HG2	1:C:583:MET:CE	2.49	0.42
1:B:484:SER:HA	1:B:485:PRO:HD3	1.78	0.42
1:C:554:SER:C	1:C:556:GLY:N	2.72	0.42
1:D:375:TYR:CD2	1:D:375:TYR:C	2.93	0.42
1:D:458:VAL:HG12	1:D:460:MET:HB2	2.00	0.42
1:C:458:VAL:HG13	1:C:460:MET:HE2	2.01	0.42
1:C:695:TYR:CD2	1:C:695:TYR:C	2.92	0.42
1:A:380:TYR:N	1:A:381:PRO:HD3	2.34	0.42
1:B:618:CYS:HB2	1:B:636:PRO:O	2.18	0.42
1:C:458:VAL:HG13	1:C:460:MET:CE	2.48	0.42
1:C:586:LEU:HD23	1:C:586:LEU:HA	1.88	0.42
1:C:671:TYR:O	1:C:675:LYS:HG2	2.20	0.42
1:C:722:LEU:HD12	1:C:722:LEU:HA	1.70	0.42
1:D:633:LEU:HB3	1:D:635:ARG:HD3	2.01	0.42
1:D:652:ARG:C	1:D:654:PHE:N	2.72	0.42
1:A:554:SER:C	1:A:556:GLY:H	2.21	0.42
1:B:662:LEU:H	1:B:662:LEU:CD2	2.32	0.42
1:A:591:LEU:HD23	1:A:591:LEU:HA	1.91	0.42
1:A:651:LEU:HG	1:A:653:GLY:H	1.84	0.42
1:D:562:LEU:H	1:D:562:LEU:HG	1.67	0.42
1:A:459:ARG:O	1:A:459:ARG:HG3	2.19	0.42
1:B:460:MET:HA	1:B:461:PRO:HD2	1.77	0.42
1:B:597:GLU:O	1:B:598:ASN:HB2	2.19	0.42
1:D:480:ASP:O	1:D:503:ARG:HG2	2.20	0.42
1:B:648:ASP:O	1:B:649:LYS:HB2	2.20	0.42
1:B:652:ARG:C	1:B:654:PHE:N	2.71	0.42
1:C:569:LEU:HD23	1:C:569:LEU:HA	1.83	0.42
1:A:450:ARG:HG3	1:A:653:GLY:O	2.20	0.42
1:A:639:PHE:CZ	1:A:663:PRO:HD2	2.55	0.42
1:A:669:GLU:HA	1:A:670:PRO:HD3	1.89	0.42
1:C:467:LYS:HE3	1:C:470:ARG:NH2	2.33	0.42
1:D:356:VAL:HG22	1:D:418:ALA:CB	2.50	0.42
1:A:353:LYS:HB2	1:A:383:TYR:CD2	2.55	0.41
1:B:325:HIS:CE1	1:B:340:LEU:HB2	2.55	0.41
1:B:540:VAL:HG22	1:B:578:VAL:HG12	2.01	0.41
1:B:665:PRO:HB2	1:B:667:TYR:CE2	2.55	0.41
1:D:682:LYS:HE3	1:D:682:LYS:HB2	1.93	0.41
1:A:582:ARG:NH2	1:A:606:TYR:O	2.53	0.41
1:A:660:GLU:HB3	1:A:661:ASP:H	1.53	0.41
1:C:329:ILE:HG22	1:C:330:VAL:N	2.32	0.41
1:C:451:LEU:H	1:C:451:LEU:HD12	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:597:GLU:O	1:C:598:ASN:HB2	2.21	0.41
1:D:431:LEU:HD23	1:D:431:LEU:HA	1.88	0.41
1:D:501:GLU:HA	1:D:504:ILE:HD12	2.03	0.41
1:B:431:LEU:HD23	1:B:431:LEU:HA	1.68	0.41
1:C:353:LYS:CG	3:C:733:CL:CL	3.06	0.41
1:D:586:LEU:HA	1:D:586:LEU:HD23	1.65	0.41
1:A:352:PRO:HB2	1:A:722:LEU:HD11	2.02	0.41
1:A:353:LYS:HA	1:A:718:ILE:HD12	2.02	0.41
1:A:325:HIS:HB2	1:A:339:SER:HB2	2.02	0.41
1:A:470:ARG:NH1	1:A:470:ARG:CG	2.79	0.41
1:B:410:GLU:OE1	1:B:410:GLU:N	2.47	0.41
1:C:427:THR:HA	1:C:428:PRO:HD3	1.91	0.41
1:D:677:LEU:HD12	1:D:677:LEU:HA	1.87	0.41
1:A:438:THR:HA	1:A:480:ASP:OD2	2.21	0.41
1:C:652:ARG:C	1:C:654:PHE:N	2.73	0.41
1:D:351:LYS:HA	1:D:352:PRO:HD3	1.87	0.41
1:B:338:ARG:HD2	1:B:430:TYR:CG	2.56	0.41
1:B:350:VAL:HA	1:B:417:GLU:O	2.20	0.41
1:B:351:LYS:HB3	3:B:732:CL:CL	2.57	0.41
1:C:554:SER:O	1:C:555:LYS:HB2	2.20	0.41
1:C:566:LEU:HD23	1:C:566:LEU:HA	1.86	0.41
1:A:543:TYR:CE2	1:A:545:PRO:HG3	2.55	0.41
1:C:484:SER:HA	1:C:485:PRO:HD3	1.86	0.41
1:D:458:VAL:HG12	1:D:458:VAL:O	2.21	0.41
1:A:669:GLU:HG2	1:A:671:TYR:H	1.86	0.40
1:B:446:THR:HA	1:B:447:PRO:HD3	1.90	0.40
1:A:452:ALA:CB	1:A:496:ALA:O	2.70	0.40
1:C:434:LYS:C	1:C:436:ASN:N	2.71	0.40
1:D:453:ASN:HA	1:D:469:LYS:HD3	2.02	0.40
1:B:396:VAL:HA	3:B:736:CL:CL	2.59	0.40
1:B:443:TRP:CG	1:B:444:ASN:N	2.89	0.40
1:D:323:LEU:HA	1:D:323:LEU:HD12	1.75	0.40
1:C:317:ASN:O	1:C:321:LYS:HG3	2.21	0.40
1:D:484:SER:HA	1:D:485:PRO:HD3	1.84	0.40
1:D:541:ILE:HG12	1:D:618:CYS:SG	2.61	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	408/729 (56%)	384 (94%)	21 (5%)	3 (1%)	22	51
1	B	410/729 (56%)	378 (92%)	30 (7%)	2 (0%)	29	59
1	C	409/729 (56%)	370 (90%)	36 (9%)	3 (1%)	22	51
1	D	409/729 (56%)	376 (92%)	26 (6%)	7 (2%)	9	27
All	All	1636/2916 (56%)	1508 (92%)	113 (7%)	15 (1%)	17	44

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	647	TYR
1	D	561	GLU
1	A	535	PRO
1	B	345	ASP
1	B	649	LYS
1	D	649	LYS
1	C	521	ASP
1	C	649	LYS
1	D	521	ASP
1	D	562	LEU
1	D	565	ASP
1	A	649	LYS
1	C	443	TRP
1	D	458	VAL
1	D	603	VAL

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was

analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	379/675 (56%)	341 (90%)	38 (10%)	7	22
1	B	380/675 (56%)	334 (88%)	46 (12%)	5	14
1	C	379/675 (56%)	343 (90%)	36 (10%)	8	24
1	D	380/675 (56%)	345 (91%)	35 (9%)	9	26
All	All	1518/2700 (56%)	1363 (90%)	155 (10%)	7	21

All (155) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	316	VAL
1	A	322	THR
1	A	323	LEU
1	A	329	ILE
1	A	333	ARG
1	A	356	VAL
1	A	402	GLU
1	A	403	LYS
1	A	433	LYS
1	A	439	TYR
1	A	451	LEU
1	A	456	LYS
1	A	460	MET
1	A	472	PHE
1	A	487	ARG
1	A	488	TYR
1	A	491	GLU
1	A	511	ARG
1	A	514	VAL
1	A	555	LYS
1	A	559	LEU
1	A	578	VAL
1	A	585	TYR
1	A	589	ASN
1	A	594	SER
1	A	607	ASN
1	A	619	LEU
1	A	645	ASP
1	A	651	LEU
1	A	656	MET
1	A	659	MET

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	660	GLU
1	A	662	LEU
1	A	669	GLU
1	A	673	LEU
1	A	677	LEU
1	A	678	LYS
1	A	718	ILE
1	B	315	LYS
1	B	316	VAL
1	B	329	ILE
1	B	333	ARG
1	B	343	LEU
1	B	356	VAL
1	B	367	ASP
1	B	368	SER
1	B	402	GLU
1	B	403	LYS
1	B	407	ASN
1	B	423	SER
1	B	433	LYS
1	B	439	TYR
1	B	449	LYS
1	B	451	LEU
1	B	456	LYS
1	B	460	MET
1	B	465	THR
1	B	470	ARG
1	B	472	PHE
1	B	487	ARG
1	B	491	GLU
1	B	514	VAL
1	B	548	ARG
1	B	555	LYS
1	B	559	LEU
1	B	567	ASP
1	B	594	SER
1	B	607	ASN
1	B	619	LEU
1	B	622	ASP
1	B	623	TYR
1	B	625	SER
1	B	651	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	B	661	ASP
1	B	662	LEU
1	B	668	THR
1	B	669	GLU
1	B	673	LEU
1	B	677	LEU
1	B	680	LEU
1	B	702	ASP
1	B	718	ILE
1	B	721	GLN
1	B	722	LEU
1	C	315	LYS
1	C	323	LEU
1	C	333	ARG
1	C	338	ARG
1	C	339	SER
1	C	356	VAL
1	C	403	LYS
1	C	433	LYS
1	C	439	TYR
1	C	451	LEU
1	C	456	LYS
1	C	460	MET
1	C	463	THR
1	C	472	PHE
1	C	487	ARG
1	C	491	GLU
1	C	511	ARG
1	C	536	SER
1	C	555	LYS
1	C	559	LEU
1	C	562	LEU
1	C	567	ASP
1	C	570	TYR
1	C	589	ASN
1	C	619	LEU
1	C	651	LEU
1	C	656	MET
1	C	660	GLU
1	C	662	LEU
1	C	669	GLU
1	C	673	LEU

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Mol	Chain	Res	Type
1	C	677	LEU
1	C	680	LEU
1	C	702	ASP
1	C	718	ILE
1	C	722	LEU
1	D	316	VAL
1	D	323	LEU
1	D	333	ARG
1	D	346	LYS
1	D	356	VAL
1	D	403	LYS
1	D	413	GLN
1	D	433	LYS
1	D	451	LEU
1	D	456	LYS
1	D	460	MET
1	D	470	ARG
1	D	472	PHE
1	D	487	ARG
1	D	488	TYR
1	D	491	GLU
1	D	511	ARG
1	D	514	VAL
1	D	559	LEU
1	D	594	SER
1	D	607	ASN
1	D	619	LEU
1	D	622	ASP
1	D	645	ASP
1	D	651	LEU
1	D	656	MET
1	D	660	GLU
1	D	662	LEU
1	D	669	GLU
1	D	673	LEU
1	D	677	LEU
1	D	678	LYS
1	D	702	ASP
1	D	718	ILE
1	D	722	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	349	ASN
1	A	708	GLN
1	B	349	ASN
1	B	436	ASN
1	B	531	HIS
1	B	686	GLN
1	C	349	ASN
1	C	436	ASN
1	C	531	HIS
1	C	686	GLN
1	D	349	ASN
1	D	413	GLN
1	D	531	HIS
1	D	686	GLN

### 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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 40 ligands modelled in this entry, 32 are monoatomic - leaving 8 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	SO4	B	730	-	4,4,4	0.11	0	6,6,6	0.15	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	SO4	C	732	-	4,4,4	0.13	0	6,6,6	0.10	0
2	SO4	A	731	-	4,4,4	0.08	0	6,6,6	0.35	0
2	SO4	A	730	-	4,4,4	0.17	0	6,6,6	0.18	0
2	SO4	D	730	-	4,4,4	0.14	0	6,6,6	0.10	0
2	SO4	C	730	-	4,4,4	0.15	0	6,6,6	0.23	0
2	SO4	A	732	-	4,4,4	0.17	0	6,6,6	0.06	0
2	SO4	C	731	-	4,4,4	0.12	0	6,6,6	0.14	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	730	SO4	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	410/729 (56%)	-0.28	8 (1%) 65 56	50, 73, 143, 221	0
1	B	412/729 (56%)	-0.24	13 (3%) 47 37	51, 72, 158, 239	0
1	C	411/729 (56%)	-0.19	14 (3%) 45 35	56, 79, 158, 237	0
1	D	411/729 (56%)	-0.18	12 (2%) 51 41	57, 78, 159, 221	0
All	All	1644/2916 (56%)	-0.22	47 (2%) 51 41	50, 76, 154, 239	0

All (47) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	558	TYR	5.6
1	D	556	GLY	5.4
1	B	652	ARG	5.3
1	D	724	HIS	5.2
1	D	652	ARG	5.2
1	B	558	TYR	4.4
1	D	558	TYR	4.3
1	B	560	PHE	4.1
1	C	652	ARG	4.0
1	A	652	ARG	4.0
1	C	556	GLY	3.8
1	D	560	PHE	3.7
1	B	537	ASP	3.5
1	C	313	ALA	3.5
1	B	313	ALA	3.4
1	C	560	PHE	3.4
1	C	555	LYS	3.3
1	B	557	LYS	3.3
1	D	557	LYS	3.3
1	C	557	LYS	3.2
1	A	560	PHE	3.1

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Mol	Chain	Res	Type	RSRZ
1	D	555	LYS	3.1
1	D	649	LYS	3.1
1	A	459	ARG	3.1
1	A	558	TYR	2.9
1	D	651	LEU	2.8
1	A	723	GLU	2.8
1	D	550	ASP	2.8
1	B	561	GLU	2.7
1	A	649	LYS	2.7
1	C	458	VAL	2.6
1	B	649	LYS	2.6
1	C	459	ARG	2.6
1	C	649	LYS	2.5
1	D	554	SER	2.5
1	B	459	ARG	2.5
1	B	724	HIS	2.5
1	B	646	LYS	2.4
1	D	457	VAL	2.4
1	C	554	SER	2.4
1	C	723	GLU	2.4
1	B	555	LYS	2.2
1	A	491	GLU	2.2
1	C	457	VAL	2.2
1	C	435	GLU	2.1
1	A	348	ASP	2.1
1	B	554	SER	2.1

## 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 monosaccharides in this entry.

## 6.4 Ligands [\(i\)](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	SO4	C	732	5/5	0.61	0.47	177,177,178,178	0
3	CL	B	735	1/1	0.77	0.47	103,103,103,103	0
3	CL	B	734	1/1	0.78	0.17	104,104,104,104	0
2	SO4	D	730	5/5	0.78	0.29	188,188,189,190	0
3	CL	A	743	1/1	0.80	0.16	99,99,99,99	0
3	CL	A	733	1/1	0.81	0.41	97,97,97,97	0
3	CL	B	732	1/1	0.81	0.31	99,99,99,99	0
2	SO4	B	730	5/5	0.84	0.26	174,174,176,176	0
3	CL	D	731	1/1	0.84	0.08	90,90,90,90	0
2	SO4	A	732	5/5	0.85	0.42	155,155,156,157	0
3	CL	D	733	1/1	0.86	0.30	96,96,96,96	0
3	CL	D	735	1/1	0.86	0.13	103,103,103,103	0
3	CL	A	734	1/1	0.87	0.35	108,108,108,108	0
3	CL	C	737	1/1	0.88	0.29	92,92,92,92	0
3	CL	A	740	1/1	0.91	0.11	95,95,95,95	0
3	CL	B	733	1/1	0.91	0.40	111,111,111,111	0
3	CL	D	734	1/1	0.92	0.14	93,93,93,93	0
3	CL	C	739	1/1	0.92	0.08	99,99,99,99	0
3	CL	D	736	1/1	0.92	0.08	93,93,93,93	0
3	CL	C	733	1/1	0.93	0.17	105,105,105,105	0
3	CL	A	741	1/1	0.93	0.18	91,91,91,91	0
3	CL	C	738	1/1	0.94	0.33	87,87,87,87	0
3	CL	D	732	1/1	0.94	0.27	86,86,86,86	0
3	CL	A	742	1/1	0.94	0.16	95,95,95,95	0
3	CL	A	735	1/1	0.95	0.64	98,98,98,98	0
2	SO4	C	731	5/5	0.95	0.12	118,119,121,121	0
3	CL	C	736	1/1	0.95	0.10	92,92,92,92	0
3	CL	A	736	1/1	0.96	0.13	82,82,82,82	0
3	CL	C	735	1/1	0.96	0.22	81,81,81,81	0
3	CL	A	737	1/1	0.96	0.49	93,93,93,93	0
3	CL	B	736	1/1	0.96	0.32	103,103,103,103	0
3	CL	C	734	1/1	0.97	0.21	93,93,93,93	0
2	SO4	C	730	5/5	0.97	0.11	113,114,115,116	0
3	CL	B	738	1/1	0.97	0.09	97,97,97,97	0
3	CL	A	738	1/1	0.97	0.31	98,98,98,98	0
3	CL	B	737	1/1	0.98	0.10	86,86,86,86	0
3	CL	A	739	1/1	0.98	0.19	68,68,68,68	0
2	SO4	A	730	5/5	0.98	0.12	99,100,102,103	0
3	CL	B	731	1/1	0.98	0.08	50,50,50,50	0
2	SO4	A	731	5/5	0.98	0.14	87,87,88,91	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.