



# Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 05:48 am BST

PDB ID : 5LU0  
Title : Crystal structure of H. pylori referent strain in complex with PO4  
Authors : Stefanic, Z.  
Deposited on : 2016-09-07  
Resolution : 1.73 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.

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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 : 2.11  
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) : 2.11

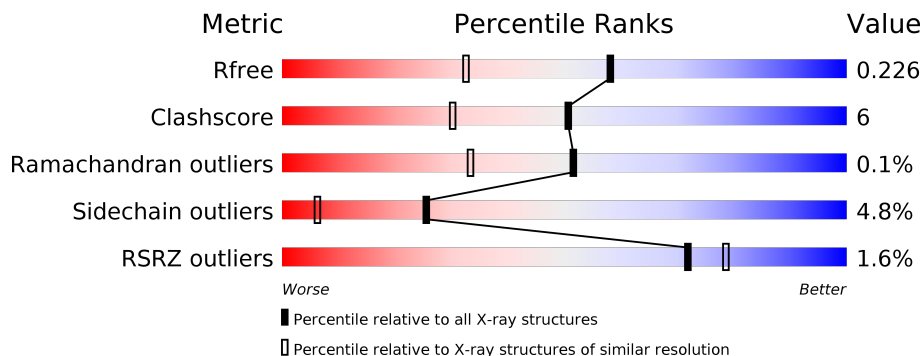
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.73 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	3764 (1.76-1.72)
Clashscore	141614	3923 (1.76-1.72)
Ramachandran outliers	138981	3878 (1.76-1.72)
Sidechain outliers	138945	3878 (1.76-1.72)
RSRZ outliers	127900	3705 (1.76-1.72)

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 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	233	
1	B	233	
1	C	233	
1	D	233	
1	E	233	
1	F	233	

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:

<b>Mol</b>	<b>Type</b>	<b>Chain</b>	<b>Res</b>	<b>Chirality</b>	<b>Geometry</b>	<b>Clashes</b>	<b>Electron density</b>
3	TRS	C	302	-	X	-	-
4	EDO	B	303	-	-	-	X

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 12292 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 Purine nucleoside phosphorylase DeoD-type.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	233	1810	1154	303	335	18	0	2	0
1	B	233	1805	1151	302	334	18	0	1	0
1	C	233	1810	1154	303	335	18	0	2	0
1	D	233	1811	1155	302	336	18	0	2	0
1	E	233	1808	1153	302	335	18	0	2	0
1	F	233	1802	1149	302	334	17	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

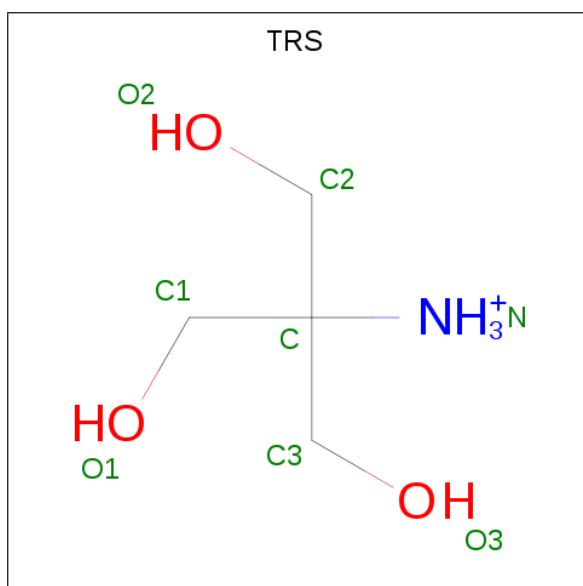
Chain	Residue	Modelled	Actual	Comment	Reference
A	55	ARG	LYS	conflict	UNP I9S9Z7
A	81	GLN	HIS	conflict	UNP I9S9Z7
B	55	ARG	LYS	conflict	UNP I9S9Z7
B	81	GLN	HIS	conflict	UNP I9S9Z7
C	55	ARG	LYS	conflict	UNP I9S9Z7
C	81	GLN	HIS	conflict	UNP I9S9Z7
D	55	ARG	LYS	conflict	UNP I9S9Z7
D	81	GLN	HIS	conflict	UNP I9S9Z7
E	55	ARG	LYS	conflict	UNP I9S9Z7
E	81	GLN	HIS	conflict	UNP I9S9Z7
F	55	ARG	LYS	conflict	UNP I9S9Z7
F	81	GLN	HIS	conflict	UNP I9S9Z7

- Molecule 2 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).



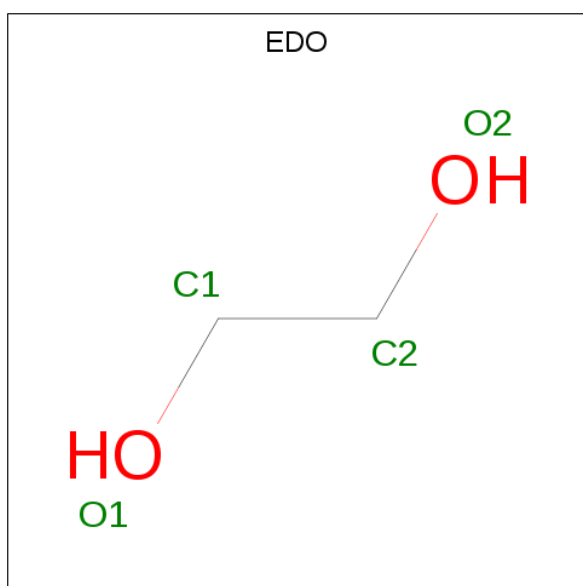
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total O P 5 4 1	0	0
2	B	1	Total O P 5 4 1	0	0
2	C	1	Total O P 5 4 1	0	0
2	E	1	Total O P 5 4 1	0	0

- Molecule 3 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: C<sub>4</sub>H<sub>12</sub>NO<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			8	4	1	3		
3	B	1	Total	C	N	O	0	0
			8	4	1	3		
3	C	1	Total	C	N	O	0	0
			8	4	1	3		
3	E	1	Total	C	N	O	0	0
			8	4	1	3		

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



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

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

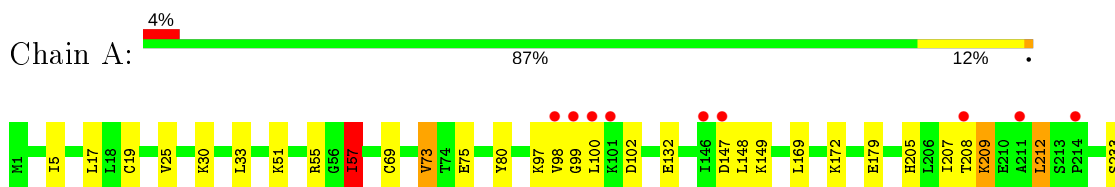
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	230	Total	O	0	0
			230	230		
5	B	225	Total	O	0	0
			225	225		
5	C	245	Total	O	0	0
			245	245		
5	D	234	Total	O	0	0
			234	234		
5	E	209	Total	O	0	0
			209	209		
5	F	211	Total	O	0	0
			211	211		

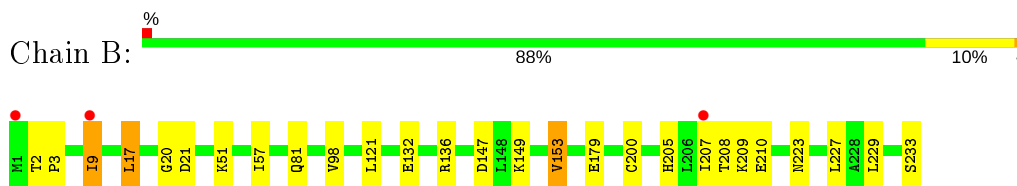
### 3 Residue-property plots [i](#)

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.

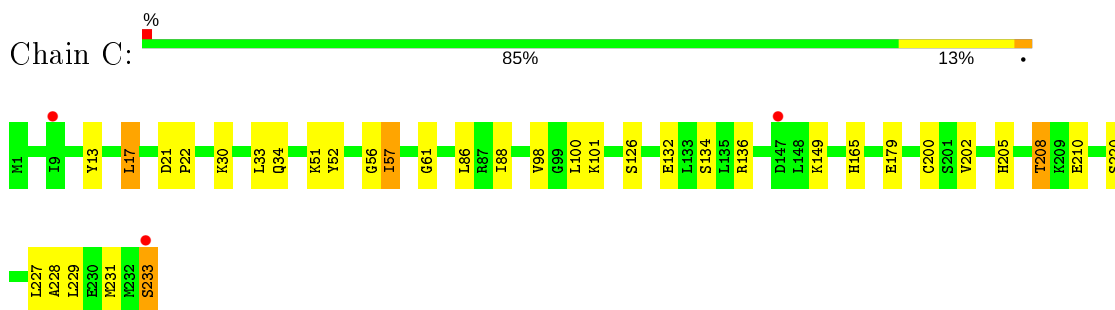
- Molecule 1: Purine nucleoside phosphorylase DeoD-type



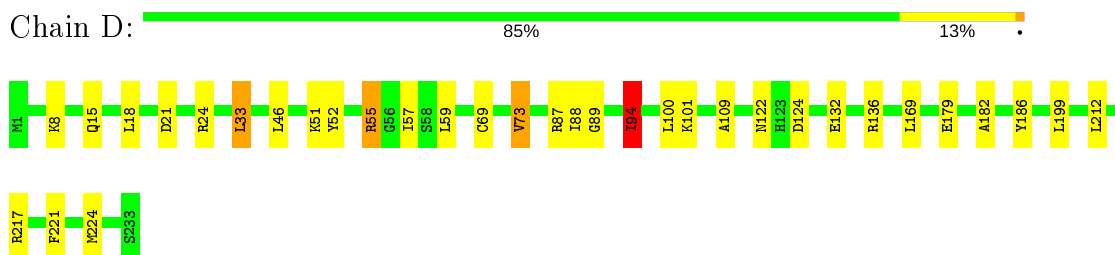
- Molecule 1: Purine nucleoside phosphorylase DeoD-type



- Molecule 1: Purine nucleoside phosphorylase DeoD-type

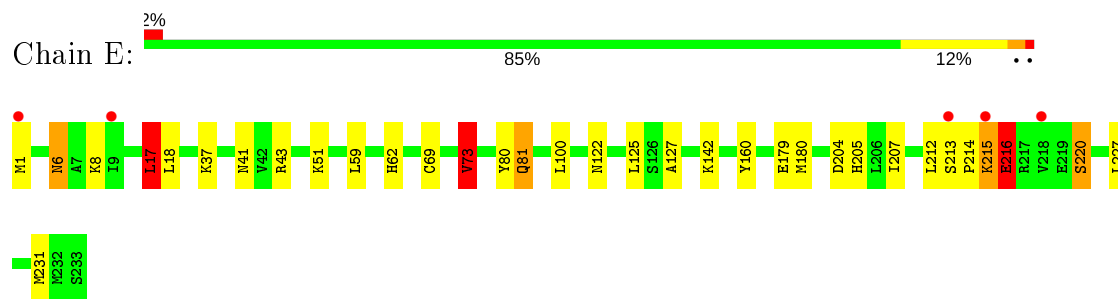


- Molecule 1: Purine nucleoside phosphorylase DeoD-type

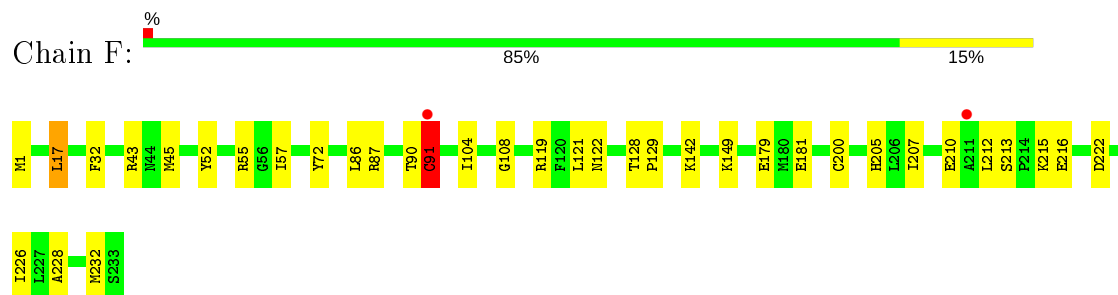


- Molecule 1: Purine nucleoside phosphorylase DeoD-type





- Molecule 1: Purine nucleoside phosphorylase DeoD-type



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	59.52Å 86.31Å 268.45Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	134.22 – 1.73 49.56 – 1.73	Depositor EDS
% Data completeness (in resolution range)	87.3 (134.22-1.73) 87.3 (49.56-1.73)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.86 (at 1.73Å)	Xtrriage
Refinement program	REFMAC 5.8.0135	Depositor
R, $R_{free}$	0.184 , 0.228 0.183 , 0.226	Depositor DCC
$R_{free}$ test set	6228 reflections (4.90%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	13.3	Xtrriage
Anisotropy	0.035	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 41.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	12292	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	17.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.40% 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: PO4, TRS, EDO

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	0.73	0/1847	0.89	6/2486 (0.2%)
1	B	0.71	0/1839	0.88	3/2475 (0.1%)
1	C	0.70	0/1847	0.82	0/2486
1	D	0.71	0/1848	0.88	6/2487 (0.2%)
1	E	0.68	0/1845	0.87	3/2483 (0.1%)
1	F	0.70	1/1833 (0.1%)	1.00	5/2467 (0.2%)
All	All	0.70	1/11059 (0.0%)	0.89	23/14884 (0.2%)

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	F	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	90	THR	C-N	-6.17	1.19	1.34

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	91	CYS	O-C-N	-27.76	76.01	123.20
1	B	153	VAL	CG1-CB-CG2	8.96	125.24	110.90
1	F	91	CYS	CA-C-N	-8.74	98.72	116.20
1	D	73	VAL	CG1-CB-CG2	6.81	121.80	110.90
1	F	119	ARG	NE-CZ-NH1	-6.36	117.12	120.30
1	D	94	ILE	CG1-CB-CG2	6.10	124.82	111.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	17	LEU	CB-CG-CD1	5.95	121.11	111.00
1	E	215	LYS	C-N-CA	5.82	136.25	121.70
1	D	136	ARG	NE-CZ-NH2	-5.74	117.43	120.30
1	B	17	LEU	CB-CG-CD1	5.72	120.73	111.00
1	E	73	VAL	CG1-CB-CG2	5.64	119.93	110.90
1	D	21	ASP	CB-CG-OD1	5.63	123.37	118.30
1	A	208	THR	N-CA-C	5.38	125.52	111.00
1	A	73	VAL	CG1-CB-CG2	5.37	119.49	110.90
1	A	212	LEU	CA-CB-CG	5.30	127.48	115.30
1	B	153	VAL	CA-CB-CG1	5.25	118.78	110.90
1	D	73	VAL	CA-CB-CG2	5.22	118.73	110.90
1	A	57	ILE	CB-CA-C	-5.20	101.21	111.60
1	F	119	ARG	NE-CZ-NH2	5.17	122.89	120.30
1	A	148	LEU	CA-CB-CG	5.16	127.17	115.30
1	D	124	ASP	CB-CG-OD1	5.08	122.88	118.30
1	F	222	ASP	CB-CG-OD1	5.08	122.88	118.30
1	A	73	VAL	CA-CB-CG1	5.05	118.48	110.90

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	F	91	CYS	Mainchain

## 5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1810	0	1849	25	0
1	B	1805	0	1843	13	0
1	C	1810	0	1849	28	0
1	D	1811	0	1849	24	0
1	E	1808	0	1848	20	0
1	F	1802	0	1837	20	0
2	A	5	0	0	0	0
2	B	5	0	0	1	0
2	C	5	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	E	5	0	0	0	0
3	A	8	0	12	0	0
3	B	8	0	12	0	0
3	C	8	0	12	0	0
3	E	8	0	12	1	0
4	A	4	0	6	0	0
4	B	20	0	30	2	0
4	C	4	0	6	0	0
4	D	4	0	6	0	0
4	E	4	0	6	0	0
4	F	4	0	6	0	0
5	A	230	0	0	13	0
5	B	225	0	0	3	0
5	C	245	0	0	11	0
5	D	234	0	0	13	0
5	E	209	0	0	3	0
5	F	211	0	0	5	0
All	All	12292	0	11183	127	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (127) 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:D:94:ILE:HG21	5:D:585:HOH:O	1.36	1.21
1:C:134:SER:HB2	5:C:449:HOH:O	1.42	1.17
1:A:169:LEU:HD12	5:A:516:HOH:O	1.51	1.10
1:F:17:LEU:HD23	1:F:232:MET:SD	1.94	1.07
1:C:202:VAL:HG12	5:C:485:HOH:O	1.53	1.06
1:C:100:LEU:HD12	5:C:485:HOH:O	1.53	1.06
1:C:205:HIS:HB3	1:C:208:THR:HG22	1.43	1.00
1:D:182:ALA:HB1	5:D:560:HOH:O	1.59	1.00
1:D:224:MET:HE3	5:D:530:HOH:O	1.69	0.93
1:D:109:ALA:HB2	5:D:560:HOH:O	1.70	0.91
1:A:75:GLU:HB3	5:A:405:HOH:O	1.71	0.90
1:C:61:GLY:HA3	5:C:405:HOH:O	1.74	0.87
1:A:33:LEU:HD22	1:A:57:ILE:HD11	1.57	0.86
1:C:208:THR:HG21	1:C:210:GLU:OE1	1.80	0.82
1:A:55:ARG:HD3	1:A:233:SER:HA	1.64	0.80
1:C:136:ARG:HB3	5:C:402:HOH:O	1.81	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:165:HIS:HD2	5:C:581:HOH:O	1.65	0.78
1:E:125:LEU:HG	5:E:401:HOH:O	1.83	0.77
1:D:24:ARG:HD3	1:D:221:PHE:CZ	2.22	0.74
1:F:17:LEU:CD2	1:F:232:MET:SD	2.75	0.74
1:A:212:LEU:HB2	5:A:412:HOH:O	1.88	0.72
1:D:132[A]:GLU:HG3	5:D:587:HOH:O	1.91	0.71
1:E:127:ALA:HA	5:E:401:HOH:O	1.90	0.70
1:E:216:GLU:O	1:E:220:SER:HB2	1.93	0.68
1:D:186:TYR:CE2	5:D:560:HOH:O	2.46	0.67
1:A:33:LEU:CD2	1:A:57:ILE:HD11	2.24	0.67
1:F:108:GLY:HA2	5:F:424:HOH:O	1.96	0.66
1:D:15:GLN:HE22	1:D:55:ARG:HE	1.43	0.65
1:D:88:ILE:HB	5:D:530:HOH:O	1.97	0.64
4:B:303:EDO:H22	5:B:413:HOH:O	1.98	0.62
1:F:129:PRO:HD3	5:F:424:HOH:O	1.98	0.62
1:E:205:HIS:HD2	1:E:207:ILE:H	1.48	0.62
1:B:205:HIS:HD2	1:B:207:ILE:H	1.48	0.61
4:B:304:EDO:H12	1:E:160:TYR:HB3	1.82	0.61
1:C:132:GLU:HB3	5:C:418:HOH:O	1.99	0.61
1:B:57:ILE:HD13	1:B:229:LEU:HD23	1.83	0.60
1:C:52:TYR:HB2	1:C:57:ILE:HD11	1.82	0.60
1:E:215:LYS:HB3	1:E:216:GLU:HB2	1.84	0.60
1:F:128:THR:HA	5:F:424:HOH:O	2.01	0.59
1:C:100:LEU:HD13	1:C:210:GLU:HG3	1.85	0.59
1:A:30:LYS:HG3	5:A:551:HOH:O	2.02	0.59
1:E:227:LEU:O	1:E:231:MET:HG2	2.03	0.58
1:E:180:MET:HG3	3:E:302:TRS:H11	1.85	0.58
1:D:24:ARG:HD3	1:D:221:PHE:CE1	2.39	0.57
1:A:172:LYS:HB3	5:A:516:HOH:O	2.04	0.57
1:B:132:GLU:O	1:B:136:ARG:HG3	2.05	0.57
1:A:99:GLY:HA2	5:A:428:HOH:O	2.05	0.56
1:E:100:LEU:HD23	1:E:212:LEU:HD23	1.88	0.56
1:F:205:HIS:HD2	1:F:207:ILE:H	1.54	0.56
1:C:101:LYS:HE3	1:C:220:SER:HB3	1.86	0.56
1:B:121:LEU:HD21	1:D:169:LEU:HD23	1.88	0.55
1:F:213:SER:OG	1:F:216:GLU:HG2	2.06	0.55
1:F:52:TYR:HB3	1:F:57:ILE:HD12	1.88	0.55
1:D:224:MET:CE	5:D:530:HOH:O	2.42	0.54
1:D:89:GLY:HA2	5:D:556:HOH:O	2.07	0.54
1:C:22:PRO:HB3	5:C:405:HOH:O	2.07	0.53
1:F:108:GLY:CA	5:F:424:HOH:O	2.53	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:231:MET:HB2	5:C:402:HOH:O	2.09	0.52
1:D:186:TYR:CD2	5:D:560:HOH:O	2.63	0.52
1:E:215:LYS:CA	1:E:216:GLU:HB2	2.40	0.52
1:A:5:ILE:HD12	5:A:405:HOH:O	2.09	0.51
1:D:15:GLN:NE2	1:D:55:ARG:HE	2.08	0.51
1:D:52:TYR:HB3	1:D:57:ILE:HD12	1.93	0.51
1:B:233:SER:HB2	5:B:457:HOH:O	2.11	0.51
1:C:227:LEU:O	1:C:231:MET:HG2	2.11	0.50
1:F:212:LEU:HB3	1:F:216:GLU:HG3	1.94	0.50
1:C:33:LEU:CD2	1:C:57:ILE:HD11	2.41	0.49
1:C:52:TYR:HB2	1:C:57:ILE:CD1	2.43	0.49
1:C:21:ASP:OD1	1:F:43:ARG:HA	2.13	0.49
1:E:215:LYS:CB	1:E:216:GLU:HB2	2.42	0.48
1:A:147:ASP:HB2	5:A:569:HOH:O	2.13	0.48
1:A:80:TYR:HE2	5:A:405:HOH:O	1.96	0.48
1:D:33:LEU:HD22	1:D:59:LEU:HD11	1.94	0.48
1:A:172:LYS:HD3	5:A:516:HOH:O	2.13	0.48
1:A:132:GLU:HG2	5:A:451:HOH:O	2.14	0.47
1:D:217:ARG:HD3	5:D:521:HOH:O	2.14	0.47
1:A:69:CYS:O	1:A:73:VAL:HG13	2.14	0.47
1:A:98:VAL:HG12	1:A:149:LYS:HG3	1.97	0.47
1:A:99:GLY:O	1:A:102:ASP:HB2	2.15	0.47
1:C:98:VAL:HG12	1:C:149:LYS:HG3	1.97	0.47
1:F:17:LEU:HD22	1:F:86:LEU:HB3	1.96	0.47
1:B:98:VAL:HG12	1:B:149:LYS:HG3	1.98	0.46
1:C:57:ILE:HD12	1:C:229:LEU:CD2	2.45	0.46
1:F:17:LEU:HD21	1:F:228:ALA:HB1	1.98	0.46
1:F:87:ARG:NH2	1:F:181:GLU:OE1	2.48	0.46
1:C:17:LEU:HD12	1:C:86:LEU:HB3	1.97	0.46
1:B:205:HIS:CD2	1:B:208:THR:H	2.35	0.45
1:A:97:LYS:HE2	5:A:401:HOH:O	2.16	0.45
1:E:6:ASN:HD22	1:E:6:ASN:H	1.65	0.45
1:F:32:PHE:HE1	1:F:226:ILE:HD11	1.82	0.45
1:D:69:CYS:O	1:D:73:VAL:HG13	2.17	0.44
1:C:57:ILE:HD12	1:C:229:LEU:HD22	1.98	0.44
1:E:17:LEU:HB2	1:E:59:LEU:HD23	1.98	0.44
1:A:205:HIS:CE1	1:A:207:ILE:HG13	2.53	0.44
1:A:205:HIS:HE1	1:A:207:ILE:HG13	1.81	0.44
1:B:147:ASP:HB3	5:B:401:HOH:O	2.18	0.44
1:C:88:ILE:HG21	1:C:228:ALA:HB2	2.00	0.44
1:D:212:LEU:HB2	1:D:217:ARG:HG3	1.99	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:19:CYS:HB2	1:A:25:VAL:HG23	1.99	0.43
1:E:6:ASN:HD21	1:E:41:ASN:H	1.66	0.43
1:F:91:CYS:SG	1:F:200:CYS:HB3	2.58	0.43
1:F:45:MET:HG2	1:F:72:TYR:CZ	2.53	0.43
1:C:13:TYR:CE1	1:C:56:GLY:HA3	2.54	0.43
1:D:88:ILE:HG22	1:D:199:LEU:HB2	2.01	0.43
1:E:80:TYR:O	1:E:81:GLN:HB2	2.19	0.43
1:E:18:LEU:HB3	1:E:62:HIS:HD2	1.84	0.43
1:E:69:CYS:O	1:E:73:VAL:HG13	2.19	0.43
1:F:1:MET:N	5:F:403:HOH:O	2.51	0.42
1:B:223:ASN:HA	1:B:223:ASN:HD22	1.66	0.42
1:B:21:ASP:OD1	1:E:43:ARG:HA	2.20	0.42
1:B:20:GLY:HA3	2:B:301:PO4:O4	2.20	0.42
1:B:9:ILE:HG13	1:B:9:ILE:H	1.75	0.42
1:A:169:LEU:HD23	1:F:121:LEU:HD21	2.01	0.42
1:A:205:HIS:O	1:A:209:LYS:HA	2.20	0.41
1:B:205:HIS:CD2	1:B:207:ILE:H	2.34	0.41
1:E:213:SER:O	1:E:215:LYS:N	2.54	0.41
1:C:233:SER:HB3	5:C:438:HOH:O	2.20	0.41
1:D:221:PHE:CZ	5:D:530:HOH:O	2.57	0.41
1:E:213:SER:O	1:E:216:GLU:CB	2.68	0.41
1:A:55:ARG:HD3	1:A:233:SER:CA	2.42	0.41
1:D:18:LEU:HD13	5:D:564:HOH:O	2.21	0.41
1:C:126:SER:HB2	5:E:444:HOH:O	2.21	0.41
1:C:208:THR:HG23	1:C:210:GLU:H	1.85	0.41
1:C:136:ARG:HD3	5:C:418:HOH:O	2.21	0.40
1:D:100:LEU:O	1:D:101:LYS:HB2	2.22	0.40
1:F:104:ILE:HA	1:F:149:LYS:O	2.21	0.40
1:A:205:HIS:CD2	5:A:428:HOH:O	2.74	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	233/233 (100%)	224 (96%)	9 (4%)	0	100	100
1	B	232/233 (100%)	225 (97%)	7 (3%)	0	100	100
1	C	233/233 (100%)	225 (97%)	8 (3%)	0	100	100
1	D	233/233 (100%)	225 (97%)	8 (3%)	0	100	100
1	E	233/233 (100%)	224 (96%)	7 (3%)	2 (1%)	17	5
1	F	231/233 (99%)	226 (98%)	5 (2%)	0	100	100
All	All	1395/1398 (100%)	1349 (97%)	44 (3%)	2 (0%)	51	33

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	214	PRO
1	E	216	GLU

### 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	198/196 (101%)	192 (97%)	6 (3%)	41	17
1	B	197/196 (100%)	184 (93%)	13 (7%)	16	3
1	C	198/196 (101%)	188 (95%)	10 (5%)	24	5
1	D	198/196 (101%)	189 (96%)	9 (4%)	27	7
1	E	198/196 (101%)	184 (93%)	14 (7%)	14	2
1	F	196/196 (100%)	189 (96%)	7 (4%)	35	12
All	All	1185/1176 (101%)	1126 (95%)	59 (5%)	25	6

All (59) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	17	LEU
1	A	51	LYS
1	A	57	ILE

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	100	LEU
1	A	179	GLU
1	A	209	LYS
1	B	2	THR
1	B	3	PRO
1	B	9	ILE
1	B	17	LEU
1	B	51	LYS
1	B	81	GLN
1	B	153	VAL
1	B	179	GLU
1	B	200[A]	CYS
1	B	200[B]	CYS
1	B	209	LYS
1	B	210	GLU
1	B	227	LEU
1	C	17	LEU
1	C	30	LYS
1	C	34	GLN
1	C	51	LYS
1	C	57	ILE
1	C	179	GLU
1	C	200[A]	CYS
1	C	200[B]	CYS
1	C	208	THR
1	C	233	SER
1	D	8	LYS
1	D	33	LEU
1	D	46	LEU
1	D	51	LYS
1	D	55	ARG
1	D	87	ARG
1	D	94	ILE
1	D	122	ASN
1	D	179	GLU
1	E	1	MET
1	E	6	ASN
1	E	8	LYS
1	E	17	LEU
1	E	37	LYS
1	E	51	LYS
1	E	73	VAL

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Mol	Chain	Res	Type
1	E	81	GLN
1	E	122	ASN
1	E	142	LYS
1	E	179	GLU
1	E	204	ASP
1	E	216	GLU
1	E	220	SER
1	F	17	LEU
1	F	55	ARG
1	F	122	ASN
1	F	142	LYS
1	F	179	GLU
1	F	210	GLU
1	F	215	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	34	GLN
1	A	205	HIS
1	B	205	HIS
1	B	223	ASN
1	C	165	HIS
1	D	15	GLN
1	E	6	ASN
1	E	205	HIS
1	F	165	HIS
1	F	205	HIS

### 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

18 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	PO4	A	301	-	4,4,4	0.81	0	6,6,6	1.45	1 (16%)
2	PO4	B	301	-	4,4,4	0.75	0	6,6,6	0.48	0
2	PO4	E	301	-	4,4,4	1.71	1 (25%)	6,6,6	1.58	2 (33%)
4	EDO	A	303	-	3,3,3	0.56	0	2,2,2	0.31	0
3	TRS	B	302	-	7,7,7	0.58	0	9,9,9	0.82	0
4	EDO	B	303	-	3,3,3	0.64	0	2,2,2	0.48	0
4	EDO	B	304	-	3,3,3	0.60	0	2,2,2	0.41	0
4	EDO	B	305	-	3,3,3	0.41	0	2,2,2	0.65	0
3	TRS	E	302	-	7,7,7	0.60	0	9,9,9	0.77	0
3	TRS	C	302	-	7,7,7	0.81	0	9,9,9	4.14	7 (77%)
4	EDO	B	307	-	3,3,3	0.59	0	2,2,2	0.23	0
4	EDO	E	303	-	3,3,3	0.55	0	2,2,2	0.57	0
4	EDO	D	301	-	3,3,3	0.61	0	2,2,2	0.52	0
4	EDO	C	303	-	3,3,3	0.34	0	2,2,2	0.45	0
3	TRS	A	302	-	7,7,7	0.61	0	9,9,9	1.07	0
4	EDO	F	301	-	3,3,3	0.56	0	2,2,2	0.52	0
4	EDO	B	306	-	3,3,3	0.42	0	2,2,2	0.29	0
2	PO4	C	301	-	4,4,4	0.77	0	6,6,6	0.68	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	B	304	-	-	1/1/1/1	-
4	EDO	A	303	-	-	0/1/1/1	-
3	TRS	B	302	-	-	1/9/9/9	-
4	EDO	B	303	-	-	1/1/1/1	-
3	TRS	E	302	-	-	0/9/9/9	-
4	EDO	F	301	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	TRS	C	302	-	-	6/9/9/9	-
4	EDO	B	307	-	-	1/1/1/1	-
4	EDO	E	303	-	-	0/1/1/1	-
4	EDO	D	301	-	-	0/1/1/1	-
4	EDO	C	303	-	-	0/1/1/1	-
4	EDO	B	305	-	-	1/1/1/1	-
3	TRS	A	302	-	-	0/9/9/9	-
4	EDO	B	306	-	-	0/1/1/1	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	301	PO4	P-O3	-2.35	1.47	1.54

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	302	TRS	C3-C-N	-6.42	88.80	107.98
3	C	302	TRS	C1-C-N	-5.95	90.22	107.98
3	C	302	TRS	C2-C-N	-5.09	92.80	107.98
3	C	302	TRS	C2-C-C1	5.02	126.38	110.81
2	A	301	PO4	O3-P-O2	3.10	117.92	107.97
3	C	302	TRS	O1-C1-C	2.93	120.30	111.00
2	E	301	PO4	O2-P-O1	-2.73	100.91	110.89
3	C	302	TRS	O2-C2-C	2.48	118.87	111.00
3	C	302	TRS	C3-C-C2	2.38	118.20	110.81
2	E	301	PO4	O4-P-O2	2.31	115.39	107.97

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	302	TRS	C1-C-C2-O2
3	C	302	TRS	N-C-C2-O2
3	C	302	TRS	C2-C-C3-O3
4	B	303	EDO	O1-C1-C2-O2
4	B	307	EDO	O1-C1-C2-O2
3	C	302	TRS	C2-C-C1-O1
4	B	305	EDO	O1-C1-C2-O2
3	C	302	TRS	C3-C-C1-O1
4	B	304	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
3	B	302	TRS	C2-C-C3-O3
3	C	302	TRS	N-C-C3-O3

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	PO4	1	0
4	B	303	EDO	1	0
4	B	304	EDO	1	0
3	E	302	TRS	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	F	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	F	90:THR	C	91:CYS	N	1.19

## 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	233/233 (100%)	0.04	9 (3%) 39 45	6, 12, 37, 55	0
1	B	233/233 (100%)	-0.16	3 (1%) 77 82	5, 12, 27, 48	0
1	C	233/233 (100%)	-0.01	3 (1%) 77 82	6, 15, 28, 38	0
1	D	233/233 (100%)	-0.25	0 100 100	5, 11, 29, 42	0
1	E	233/233 (100%)	-0.02	5 (2%) 63 70	6, 14, 31, 57	0
1	F	233/233 (100%)	-0.04	2 (0%) 84 88	7, 15, 33, 48	0
All	All	1398/1398 (100%)	-0.07	22 (1%) 72 78	5, 13, 31, 57	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	213	SER	6.5
1	B	207	ILE	5.1
1	E	215	LYS	5.0
1	F	211	ALA	3.9
1	B	9	ILE	3.6
1	A	147	ASP	3.5
1	B	1	MET	3.4
1	A	208	THR	3.3
1	E	9	ILE	3.2
1	A	211	ALA	3.2
1	A	100	LEU	2.7
1	A	214	PRO	2.5
1	A	98	VAL	2.5
1	A	101	LYS	2.5
1	C	147	ASP	2.4
1	A	99	GLY	2.4
1	F	91	CYS	2.3
1	C	9	ILE	2.2
1	E	1	MET	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	146	ILE	2.2
1	E	218	VAL	2.1
1	C	233	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 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. 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(Å <sup>2</sup> )	Q<0.9
4	EDO	B	303	4/4	0.58	0.62	75,77,82,89	0
3	TRS	E	302	8/8	0.79	0.16	20,24,25,29	0
4	EDO	B	307	4/4	0.87	0.23	29,29,29,35	0
4	EDO	C	303	4/4	0.88	0.23	39,44,46,48	0
4	EDO	B	306	4/4	0.90	0.09	38,39,39,43	0
4	EDO	B	304	4/4	0.91	0.14	21,23,26,27	0
4	EDO	B	305	4/4	0.92	0.16	24,30,31,34	0
3	TRS	C	302	8/8	0.94	0.10	12,13,14,15	0
3	TRS	A	302	8/8	0.94	0.10	16,21,22,24	0
2	PO4	A	301	5/5	0.94	0.14	18,19,20,21	0
4	EDO	D	301	4/4	0.96	0.08	16,17,17,18	0
3	TRS	B	302	8/8	0.96	0.08	13,14,14,15	0
4	EDO	A	303	4/4	0.96	0.08	18,19,20,22	0
4	EDO	F	301	4/4	0.96	0.08	18,19,20,21	0
4	EDO	E	303	4/4	0.96	0.08	16,16,17,17	0
2	PO4	E	301	5/5	0.98	0.06	14,14,15,15	0
2	PO4	C	301	5/5	0.98	0.06	10,11,11,12	0
2	PO4	B	301	5/5	0.99	0.06	9,9,10,10	0



## 6.5 Other polymers

There are no such residues in this entry.