



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 12:11 AM UTC

PDB ID : 7WT4 / pdb_00007wt4
Title : Crystal structure of HLA-A*2402 complexed with 8-mer Influenza PB1 peptide
Authors : Asa, M.; Morita, D.; Sugita, M.
Deposited on : 2022-02-03
Resolution : 1.89 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

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>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

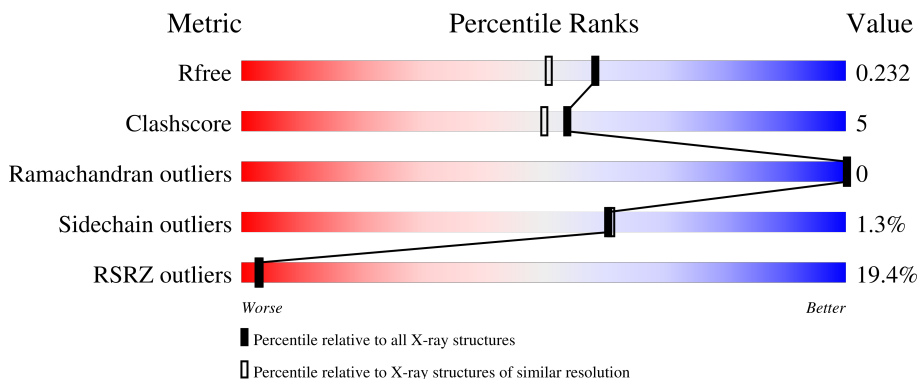
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.89 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}	180053	7789 (1.90-1.90)
Clashscore	190562	8410 (1.90-1.90)
Ramachandran outliers	187476	8333 (1.90-1.90)
Sidechain outliers	187428	8333 (1.90-1.90)
RSRZ outliers	180081	7790 (1.90-1.90)

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 ≥ 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	277	
1	D	277	
2	B	100	
2	E	100	
3	C	8	

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Mol	Chain	Length	Quality of chain
3	F	8	 75% 25%

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
4	EDO	A	303	-	-	X	-

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 6590 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 MHC class I antigen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	277	2330	1448	428	444	10	0	11	0
1	D	233	1902	1182	347	362	11	0	2	0

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	100	843	538	142	160	3	0	2	0
2	E	89	742	471	126	143	2	0	1	0

- Molecule 3 is a protein called PB1 peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	8	70	47	12	11	0	0	0
3	F	8	70	47	12	11	0	0	0

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



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

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

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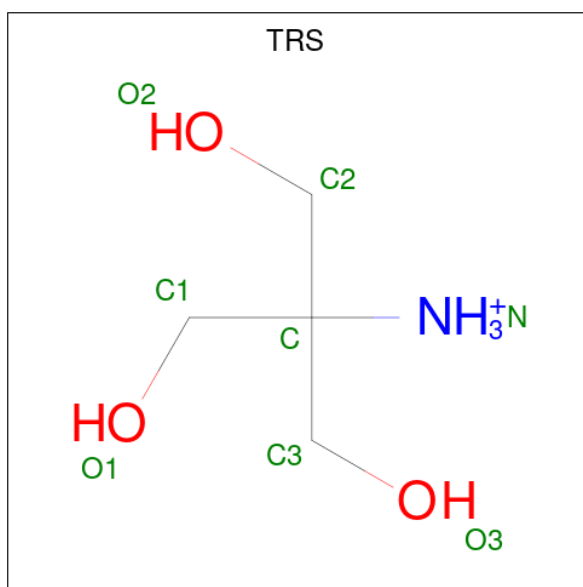
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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0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

- Molecule 5 is ZINC ION (CCD ID: ZN) (formula: Zn).

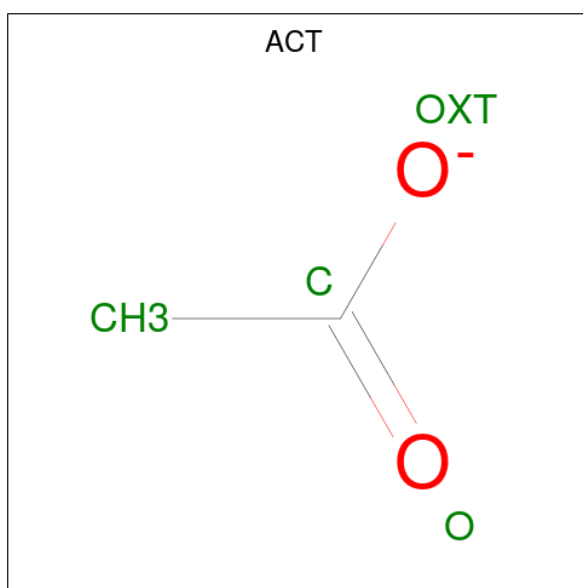
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	2	Total Zn 2 2	0	0
5	D	1	Total Zn 1 1	0	0

- Molecule 6 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: TRS) (formula: C₄H₁₂NO₃).



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

- Molecule 7 is ACETATE ION (CCD ID: ACT) (formula: C₂H₃O₂⁻).



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

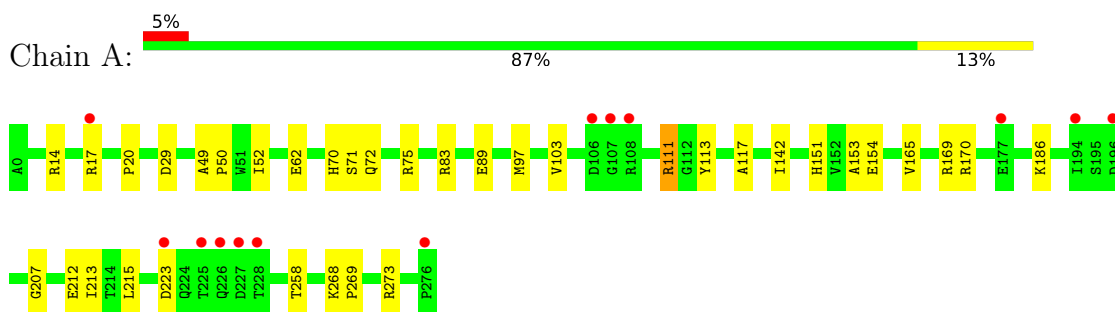
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	224	Total 226	O 226	0	2
8	B	52	Total 53	O 53	0	1
8	C	7	Total 7	O 7	0	0
8	D	110	Total 110	O 110	0	0
8	E	23	Total 23	O 23	0	0
8	F	7	Total 7	O 7	0	0

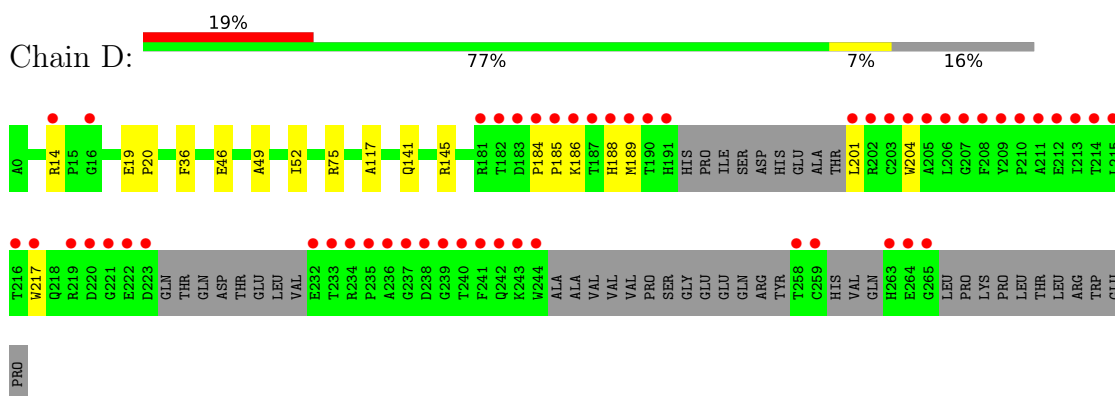
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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.

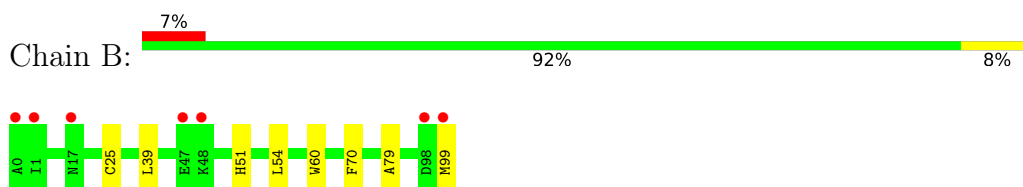
- Molecule 1: MHC class I antigen



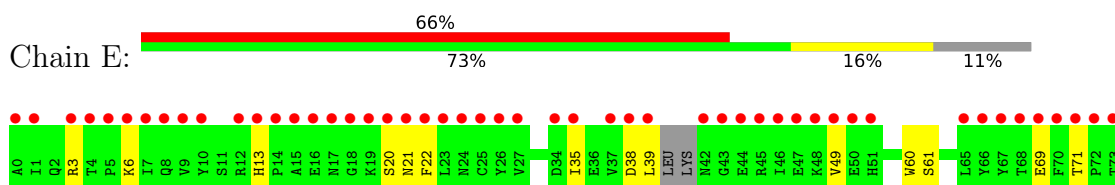
- Molecule 1: MHC class I antigen

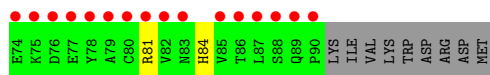


- Molecule 2: Beta-2-microglobulin

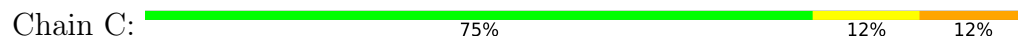


- Molecule 2: Beta-2-microglobulin

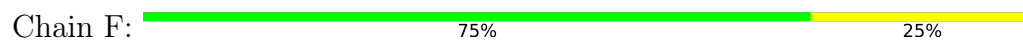




- Molecule 3: PB1 peptide



- Molecule 3: PB1 peptide



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	86.12Å 46.43Å 141.53Å 90.00° 103.97° 90.00°	Depositor
Resolution (Å)	47.71 – 1.89 47.71 – 1.90	Depositor EDS
% Data completeness (in resolution range)	97.6 (47.71-1.89) 97.6 (47.71-1.90)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.60 (at 1.90Å)	Xtrriage
Refinement program	PHENIX 1.9_1692+SVN	Depositor
R, R_{free}	0.200 , 0.232 0.203 , 0.232	Depositor DCC
R_{free} test set	4255 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å ²)	21.1	Xtrriage
Anisotropy	0.427	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 39.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6590	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.68% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: ACT, EDO, TRS, ZN

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	0.54	1/2409 (0.0%)	0.70	0/3263
1	D	0.46	0/1954	0.72	0/2633
2	B	0.42	0/872	0.69	0/1178
2	E	0.33	0/765	0.72	0/1036
3	C	1.07	1/72 (1.4%)	0.75	0/94
3	F	1.02	1/72 (1.4%)	0.70	0/94
All	All	0.50	3/6144 (0.0%)	0.71	0/8298

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	2	TYR	C-O	-5.30	1.17	1.23
3	C	2	TYR	C-O	-5.18	1.17	1.23
1	A	29	ASP	C-O	-5.09	1.17	1.24

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	2330	0	2207	30	0
1	D	1902	0	1778	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	843	0	817	6	0
2	E	742	0	701	9	0
3	C	70	0	65	3	0
3	F	70	0	65	0	0
4	A	92	0	138	12	0
4	B	40	0	60	4	0
4	D	44	0	66	3	0
4	E	8	0	12	0	0
5	A	2	0	0	0	0
5	D	1	0	0	0	0
6	A	8	0	12	0	0
6	B	8	0	12	0	0
7	A	4	0	3	0	0
8	A	226	0	0	7	0
8	B	53	0	0	0	0
8	C	7	0	0	0	0
8	D	110	0	0	3	0
8	E	23	0	0	1	0
8	F	7	0	0	0	0
All	All	6590	0	5936	59	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 5.

All (59) 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:20:PRO:HD2	1:A:75[A]:ARG:HD3	1.54	0.88
1:A:151:HIS:HA	4:A:303:EDO:H22	1.65	0.78
1:A:212:GLU:HG3	4:A:318:EDO:H12	1.68	0.75
1:A:268:LYS:HD3	1:A:269:PRO:HD2	1.67	0.75
2:B:54:LEU:HD22	4:B:104:EDO:H22	1.70	0.73
1:A:153:ALA:HB3	4:A:303:EDO:H11	1.70	0.73
1:A:50:PRO:HD2	4:A:315:EDO:H22	1.70	0.72
1:D:46:GLU:HG3	4:D:311:EDO:H11	1.76	0.67
1:A:72[B]:GLN:OE1	1:A:75[B]:ARG:NH2	2.27	0.66
1:A:170:ARG:HH22	3:C:1:ARG:HD2	1.61	0.65
1:D:20:PRO:HD2	1:D:75:ARG:HG2	1.80	0.64
4:A:303:EDO:H12	8:A:529:HOH:O	1.98	0.63
1:A:169:ARG:HG3	8:A:415:HOH:O	1.97	0.63
1:A:207:GLY:HA3	4:A:319:EDO:H11	1.81	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:83[B]:ARG:NH1	8:A:402:HOH:O	2.31	0.62
2:E:6:LYS:NZ	8:E:202:HOH:O	2.33	0.61
2:E:38:ASP:HB2	2:E:81:ARG:HB3	1.85	0.59
1:D:141:GLN:O	1:D:145[A]:ARG:HG2	2.02	0.59
1:D:145[B]:ARG:NH1	8:D:403:HOH:O	2.38	0.57
2:E:13:HIS:O	2:E:21:ASN:ND2	2.32	0.56
1:A:186:LYS:HG3	4:A:319:EDO:H22	1.88	0.56
2:E:20:SER:HA	2:E:71:THR:HG22	1.87	0.54
2:E:35:ILE:HG13	2:E:84:HIS:HB2	1.89	0.53
2:E:3[B]:ARG:HE	2:E:61:SER:HB3	1.74	0.53
1:A:20:PRO:O	1:A:75[A]:ARG:NH1	2.42	0.53
1:A:14[B]:ARG:NH1	1:A:17:ARG:O	2.42	0.52
1:D:14:ARG:NH2	8:D:402:HOH:O	2.39	0.52
1:A:72[B]:GLN:CD	1:A:75[B]:ARG:HH21	2.16	0.52
1:A:111[B]:ARG:HG2	1:A:113:TYR:CZ	2.45	0.51
1:A:258:THR:HG22	1:A:273[A]:ARG:HG2	1.93	0.51
1:A:142:ILE:HD11	4:A:306:EDO:H11	1.93	0.51
2:B:51:HIS:CD2	4:B:105:EDO:H21	2.46	0.51
2:B:99:MET:HE3	4:B:102:EDO:H12	1.92	0.50
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.47	0.49
1:A:170:ARG:NH2	3:C:1:ARG:HD2	2.28	0.48
1:A:154:GLU:OE2	4:A:303:EDO:O1	2.31	0.47
1:A:213:ILE:HA	4:A:318:EDO:H11	1.95	0.47
1:D:189:MET:HE3	1:D:217:TRP:HH2	1.79	0.47
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.51	0.46
1:D:19:GLU:CD	1:D:75:ARG:HE	2.23	0.46
4:D:308:EDO:H21	8:D:492:HOH:O	2.16	0.45
2:E:39:LEU:HD12	2:E:49:VAL:HG12	1.98	0.45
4:A:323:EDO:H11	8:A:416:HOH:O	2.18	0.43
1:A:89:GLU:OE2	4:A:307:EDO:H21	2.18	0.43
2:E:22:PHE:CE2	2:E:69:GLU:HG2	2.54	0.43
2:B:25:CYS:HB2	2:B:39:LEU:HD21	2.02	0.42
1:D:49:ALA:O	1:D:52:ILE:HG22	2.19	0.42
1:D:36:PHE:HA	4:D:311:EDO:H12	2.01	0.42
1:A:71:SER:O	1:A:75[A]:ARG:HG3	2.20	0.42
1:D:201:LEU:HB3	1:D:217:TRP:NE1	2.34	0.42
1:A:49:ALA:O	1:A:52:ILE:HG22	2.19	0.42
1:A:62:GLU:OE1	3:C:1:ARG:NH2	2.51	0.42
1:A:70:HIS:C	1:A:70:HIS:CD2	2.98	0.42
1:D:188:HIS:HB3	1:D:204:TRP:HB2	2.03	0.41
1:A:165:VAL:HG13	8:A:415:HOH:O	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:273[A]:ARG:NH2	8:A:432:HOH:O	2.54	0.41
1:A:103:VAL:HG11	8:A:415:HOH:O	2.20	0.40
1:D:184:PRO:HA	1:D:185:PRO:HD3	1.93	0.40
2:B:79:ALA:HB3	4:B:106:EDO:H22	2.04	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	286/277 (103%)	280 (98%)	6 (2%)	0	100	100
1	D	225/277 (81%)	222 (99%)	3 (1%)	0	100	100
2	B	100/100 (100%)	100 (100%)	0	0	100	100
2	E	86/100 (86%)	85 (99%)	1 (1%)	0	100	100
3	C	6/8 (75%)	6 (100%)	0	0	100	100
3	F	6/8 (75%)	6 (100%)	0	0	100	100
All	All	709/770 (92%)	699 (99%)	10 (1%)	0	100	100

There are no Ramachandran outliers to report.

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	243/232 (105%)	238 (98%)	5 (2%)	47	44
1	D	194/232 (84%)	193 (100%)	1 (0%)	81	84
2	B	96/94 (102%)	95 (99%)	1 (1%)	68	70
2	E	84/94 (89%)	84 (100%)	0	100	100
3	C	6/6 (100%)	5 (83%)	1 (17%)	2	0
3	F	6/6 (100%)	5 (83%)	1 (17%)	2	0
All	All	629/664 (95%)	620 (99%)	9 (1%)	61	59

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	97	MET
1	A	111[A]	ARG
1	A	111[B]	ARG
1	A	215	LEU
1	A	223	ASP
2	B	70	PHE
3	C	1	ARG
1	D	186	LYS
3	F	1	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	43	GLN
1	A	255	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 52 ligands modelled in this entry, 3 are monoatomic - leaving 49 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
4	EDO	A	314	-	3,3,3	0.45	0	2,2,2	0.41	0
4	EDO	B	104	-	3,3,3	0.46	0	2,2,2	0.45	0
4	EDO	A	315	-	3,3,3	0.52	0	2,2,2	0.26	0
4	EDO	A	312	-	3,3,3	0.46	0	2,2,2	0.31	0
4	EDO	D	308	-	3,3,3	0.43	0	2,2,2	0.46	0
4	EDO	A	302	-	3,3,3	0.45	0	2,2,2	0.31	0
4	EDO	A	307	-	3,3,3	0.55	0	2,2,2	0.28	0
4	EDO	D	305	-	3,3,3	0.42	0	2,2,2	0.44	0
4	EDO	A	320	-	3,3,3	0.43	0	2,2,2	0.23	0
6	TRS	B	111	-	7,7,7	0.34	0	9,9,9	0.52	0
4	EDO	A	303	-	3,3,3	0.70	0	2,2,2	0.45	0
4	EDO	B	109	-	3,3,3	0.40	0	2,2,2	0.46	0
4	EDO	D	311	-	3,3,3	0.39	0	2,2,2	0.34	0
4	EDO	A	313	-	3,3,3	0.43	0	2,2,2	0.29	0
4	EDO	B	108	-	3,3,3	0.42	0	2,2,2	0.37	0
4	EDO	D	309	-	3,3,3	0.53	0	2,2,2	0.31	0
4	EDO	A	301	-	3,3,3	0.45	0	2,2,2	0.33	0
4	EDO	B	103	-	3,3,3	0.43	0	2,2,2	0.52	0
4	EDO	A	316	-	3,3,3	0.47	0	2,2,2	0.30	0
4	EDO	D	302	-	3,3,3	0.56	0	2,2,2	0.27	0
4	EDO	A	305	-	3,3,3	0.42	0	2,2,2	0.21	0
4	EDO	A	311	-	3,3,3	0.43	0	2,2,2	0.15	0
4	EDO	B	106	-	3,3,3	0.43	0	2,2,2	0.49	0
4	EDO	A	304	-	3,3,3	0.36	0	2,2,2	0.48	0
4	EDO	A	319	-	3,3,3	0.38	0	2,2,2	0.39	0
4	EDO	D	301	-	3,3,3	0.49	0	2,2,2	0.26	0
4	EDO	A	309	-	3,3,3	0.47	0	2,2,2	0.28	0
4	EDO	D	303	-	3,3,3	0.46	0	2,2,2	0.27	0
4	EDO	D	307	-	3,3,3	0.48	0	2,2,2	0.31	0
4	EDO	A	321	-	3,3,3	0.50	0	2,2,2	0.22	0
4	EDO	B	110	-	3,3,3	0.45	0	2,2,2	0.40	0
4	EDO	B	105	-	3,3,3	0.46	0	2,2,2	0.23	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	EDO	D	310	-	3,3,3	0.43	0	2,2,2	0.43	0
6	TRS	A	326	-	7,7,7	0.29	0	9,9,9	0.64	0
4	EDO	A	318	-	3,3,3	0.31	0	2,2,2	0.60	0
4	EDO	A	322	-	3,3,3	0.41	0	2,2,2	0.44	0
4	EDO	A	310	-	3,3,3	0.37	0	2,2,2	0.51	0
4	EDO	A	317	-	3,3,3	0.41	0	2,2,2	0.43	0
4	EDO	D	306	-	3,3,3	0.48	0	2,2,2	0.61	0
7	ACT	A	327	-	3,3,3	0.91	0	3,3,3	1.32	0
4	EDO	A	323	-	3,3,3	0.39	0	2,2,2	0.46	0
4	EDO	B	101	-	3,3,3	0.53	0	2,2,2	0.30	0
4	EDO	A	308	-	3,3,3	0.45	0	2,2,2	0.43	0
4	EDO	D	304	-	3,3,3	0.50	0	2,2,2	0.43	0
4	EDO	A	306	-	3,3,3	0.40	0	2,2,2	0.42	0
4	EDO	B	107	-	3,3,3	0.41	0	2,2,2	0.38	0
4	EDO	E	101	-	3,3,3	0.45	0	2,2,2	0.37	0
4	EDO	E	102	-	3,3,3	0.40	0	2,2,2	0.43	0
4	EDO	B	102	-	3,3,3	0.45	0	2,2,2	0.19	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	A	314	-	-	0/1/1/1	-
4	EDO	B	104	-	-	1/1/1/1	-
4	EDO	A	315	-	-	1/1/1/1	-
4	EDO	A	312	-	-	0/1/1/1	-
4	EDO	D	308	-	-	0/1/1/1	-
4	EDO	A	302	-	-	1/1/1/1	-
4	EDO	A	307	-	-	0/1/1/1	-
4	EDO	D	305	-	-	0/1/1/1	-
4	EDO	A	320	-	-	0/1/1/1	-
6	TRS	B	111	-	-	3/9/9/9	-
4	EDO	A	303	-	-	0/1/1/1	-
4	EDO	B	109	-	-	0/1/1/1	-
4	EDO	D	311	-	-	1/1/1/1	-
4	EDO	A	313	-	-	0/1/1/1	-
4	EDO	B	108	-	-	0/1/1/1	-
4	EDO	D	309	-	-	1/1/1/1	-
4	EDO	A	301	-	-	0/1/1/1	-
4	EDO	B	103	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	A	316	-	-	1/1/1/1	-
4	EDO	D	302	-	-	0/1/1/1	-
4	EDO	A	305	-	-	1/1/1/1	-
4	EDO	A	311	-	-	1/1/1/1	-
4	EDO	B	106	-	-	0/1/1/1	-
4	EDO	A	304	-	-	1/1/1/1	-
4	EDO	A	319	-	-	0/1/1/1	-
4	EDO	D	301	-	-	1/1/1/1	-
4	EDO	A	309	-	-	1/1/1/1	-
4	EDO	D	303	-	-	0/1/1/1	-
4	EDO	D	307	-	-	0/1/1/1	-
4	EDO	A	321	-	-	1/1/1/1	-
4	EDO	B	110	-	-	1/1/1/1	-
4	EDO	B	105	-	-	0/1/1/1	-
4	EDO	D	310	-	-	0/1/1/1	-
6	TRS	A	326	-	-	6/9/9/9	-
4	EDO	A	318	-	-	1/1/1/1	-
4	EDO	A	322	-	-	1/1/1/1	-
4	EDO	A	310	-	-	1/1/1/1	-
4	EDO	A	317	-	-	1/1/1/1	-
4	EDO	D	306	-	-	0/1/1/1	-
4	EDO	A	323	-	-	1/1/1/1	-
4	EDO	B	101	-	-	0/1/1/1	-
4	EDO	A	308	-	-	0/1/1/1	-
4	EDO	D	304	-	-	1/1/1/1	-
4	EDO	A	306	-	-	0/1/1/1	-
4	EDO	B	107	-	-	0/1/1/1	-
4	EDO	E	101	-	-	0/1/1/1	-
4	EDO	E	102	-	-	0/1/1/1	-
4	EDO	B	102	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	326	TRS	N-C-C1-O1
6	A	326	TRS	C2-C-C3-O3
6	B	111	TRS	N-C-C3-O3
6	A	326	TRS	C3-C-C1-O1

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Mol	Chain	Res	Type	Atoms
4	A	315	EDO	O1-C1-C2-O2
4	A	321	EDO	O1-C1-C2-O2
4	D	309	EDO	O1-C1-C2-O2
4	A	302	EDO	O1-C1-C2-O2
4	A	310	EDO	O1-C1-C2-O2
6	A	326	TRS	N-C-C3-O3
6	B	111	TRS	C1-C-C3-O3
4	A	309	EDO	O1-C1-C2-O2
4	A	323	EDO	O1-C1-C2-O2
4	D	301	EDO	O1-C1-C2-O2
4	B	110	EDO	O1-C1-C2-O2
6	A	326	TRS	C1-C-C3-O3
4	A	311	EDO	O1-C1-C2-O2
4	A	322	EDO	O1-C1-C2-O2
4	A	316	EDO	O1-C1-C2-O2
4	B	104	EDO	O1-C1-C2-O2
4	D	311	EDO	O1-C1-C2-O2
4	A	317	EDO	O1-C1-C2-O2
4	A	318	EDO	O1-C1-C2-O2
6	A	326	TRS	C2-C-C1-O1
6	B	111	TRS	C2-C-C3-O3
4	A	304	EDO	O1-C1-C2-O2
4	D	304	EDO	O1-C1-C2-O2
4	A	305	EDO	O1-C1-C2-O2

There are no ring outliers.

13 monomers are involved in 19 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	104	EDO	1	0
4	A	315	EDO	1	0
4	D	308	EDO	1	0
4	A	307	EDO	1	0
4	A	303	EDO	4	0
4	D	311	EDO	2	0
4	B	106	EDO	1	0
4	A	319	EDO	2	0
4	B	105	EDO	1	0
4	A	318	EDO	2	0
4	A	323	EDO	1	0
4	A	306	EDO	1	0
4	B	102	EDO	1	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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, 95th 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 ²)	Q<0.9
1	A	277/277 (100%)	-0.06	13 (4%) 36 39	8, 19, 39, 53	11 (3%)
1	D	233/277 (84%)	0.80	53 (22%) 2 2	11, 23, 87, 99	2 (0%)
2	B	100/100 (100%)	0.58	7 (7%) 22 24	10, 28, 50, 57	2 (2%)
2	E	89/100 (89%)	2.88	66 (74%) 0 0	21, 61, 85, 89	1 (1%)
3	C	8/8 (100%)	-0.44	0 100 100	13, 16, 18, 24	0
3	F	8/8 (100%)	-0.15	0 100 100	17, 20, 23, 27	0
All	All	715/770 (92%)	0.67	139 (19%) 3 3	8, 23, 79, 99	16 (2%)

All (139) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	49	VAL	8.3
1	D	201	LEU	7.8
2	E	39	LEU	7.7
2	B	1	ILE	7.5
2	E	0	ALA	6.5
1	D	215	LEU	5.8
1	D	204	TRP	5.8
2	E	15	ALA	5.7
2	E	66	TYR	5.6
2	E	46	ILE	5.5
1	D	185	PRO	5.4
1	D	217	TRP	5.4
1	D	205	ALA	5.3
1	D	206	LEU	5.1
1	D	208	PHE	5.1
2	E	37	VAL	5.0
2	E	68	THR	5.0
1	D	265	GLY	4.9
2	E	88	SER	4.9

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Mol	Chain	Res	Type	RSRZ
1	D	244	TRP	4.7
1	D	216	THR	4.7
1	D	203	CYS	4.7
2	E	10	TYR	4.6
2	E	43	GLY	4.6
2	E	78	TYR	4.5
2	E	82	VAL	4.5
1	D	259	CYS	4.5
2	E	23	LEU	4.5
2	E	67	TYR	4.4
1	D	240	THR	4.4
2	E	38	ASP	4.4
1	D	184	PRO	4.3
1	D	213	ILE	4.3
1	D	236	ALA	4.3
1	D	237	GLY	4.2
2	E	79	ALA	4.1
1	D	214	THR	4.1
1	D	188	HIS	4.1
2	E	27	VAL	4.0
1	A	225	THR	4.0
2	E	9	VAL	4.0
2	E	90	PRO	4.0
1	D	221	GLY	3.9
1	D	191	HIS	3.9
2	E	81	ARG	3.9
2	E	1	ILE	3.9
2	E	76	ASP	3.9
1	D	258	THR	3.8
1	A	276	PRO	3.7
2	E	85	VAL	3.7
1	D	190	THR	3.7
1	D	241	PHE	3.7
1	D	263	HIS	3.7
2	E	73	THR	3.6
2	B	0	ALA	3.5
1	A	228[A]	THR	3.5
2	E	70	PHE	3.5
2	E	18	GLY	3.5
1	A	227[A]	ASP	3.5
2	E	20	SER	3.4
1	D	207	GLY	3.4

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Mol	Chain	Res	Type	RSRZ
2	E	83	ASN	3.3
1	D	187	THR	3.3
1	D	235	PRO	3.3
1	D	202	ARG	3.3
2	E	45	ARG	3.3
2	E	48	LYS	3.3
2	E	87	LEU	3.3
2	E	13	HIS	3.2
2	E	26	TYR	3.2
2	E	22	PHE	3.2
2	E	86	THR	3.1
1	D	182	THR	3.1
2	E	7	ILE	3.1
1	A	108	ARG	3.1
1	D	243	LYS	3.1
1	D	242	GLN	3.1
2	E	72	PRO	3.1
2	E	42	ASN	3.1
2	E	50	GLU	3.1
1	D	220	ASP	3.0
1	D	219	ARG	3.0
2	E	17	ASN	3.0
2	E	80	CYS	3.0
2	E	65	LEU	2.9
2	E	44	GLU	2.9
1	D	232	GLU	2.9
1	D	186	LYS	2.9
2	E	35	ILE	2.9
2	E	71	THR	2.8
2	E	89	GLN	2.8
2	E	77	GLU	2.8
1	D	189	MET	2.8
2	B	48	LYS	2.8
1	A	226	GLN	2.8
1	A	223	ASP	2.7
1	D	183	ASP	2.7
2	B	99	MET	2.7
2	E	14	PRO	2.7
2	E	25	CYS	2.6
1	D	239	GLY	2.6
1	A	196	ASP	2.6
1	A	17	ARG	2.6

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Mol	Chain	Res	Type	RSRZ
2	E	4	THR	2.6
2	E	24	ASN	2.6
1	D	209	TYR	2.5
1	D	210	PRO	2.5
1	D	223	ASP	2.5
2	E	19	LYS	2.5
2	E	8	GLN	2.5
2	E	69	GLU	2.5
2	E	34	ASP	2.5
2	E	75	LYS	2.5
2	E	6	LYS	2.5
2	E	12	ARG	2.4
1	A	107	GLY	2.4
1	D	212	GLU	2.4
2	B	47	GLU	2.4
1	D	181	ARG	2.4
2	E	74	GLU	2.3
1	D	233	THR	2.3
1	D	211	ALA	2.3
1	D	234	ARG	2.3
2	E	47	GLU	2.3
2	E	3[A]	ARG	2.3
1	D	264	GLU	2.2
2	E	51	HIS	2.2
1	D	16	GLY	2.2
1	A	106	ASP	2.2
1	D	238	ASP	2.2
2	B	98	ASP	2.2
2	E	5	PRO	2.2
2	E	16	GLU	2.1
1	A	194	ILE	2.1
1	A	177	GLU	2.1
1	D	14	ARG	2.0
1	D	222	GLU	2.0
2	B	17	ASN	2.0
2	E	21	ASN	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides 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, 95th 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 ²)	Q<0.9
6	TRS	B	111	8/8	0.68	0.20	39,48,51,56	0
4	EDO	A	310	4/4	0.76	0.22	30,36,46,47	0
4	EDO	A	314	4/4	0.78	0.20	31,39,43,46	0
4	EDO	B	110	4/4	0.79	0.16	42,44,45,46	0
4	EDO	A	307	4/4	0.80	0.18	38,40,40,47	0
4	EDO	A	323	4/4	0.81	0.22	28,28,33,41	0
4	EDO	A	309	4/4	0.83	0.17	35,39,39,47	0
4	EDO	D	309	4/4	0.83	0.22	35,37,45,49	0
4	EDO	D	310	4/4	0.83	0.16	44,47,48,49	0
6	TRS	A	326	8/8	0.83	0.14	34,41,42,46	0
4	EDO	B	108	4/4	0.83	0.21	34,38,47,47	0
4	EDO	A	322	4/4	0.84	0.18	36,39,42,45	0
4	EDO	A	304	4/4	0.84	0.16	27,34,36,39	0
4	EDO	A	318	4/4	0.84	0.17	32,32,36,37	0
4	EDO	A	319	4/4	0.84	0.26	35,36,39,44	0
7	ACT	A	327	4/4	0.84	0.15	30,31,31,35	0
4	EDO	B	106	4/4	0.85	0.18	35,37,37,54	0
4	EDO	A	313	4/4	0.85	0.14	35,36,39,41	0
4	EDO	B	104	4/4	0.86	0.19	29,29,37,37	0
4	EDO	B	109	4/4	0.86	0.32	32,33,39,47	0
5	ZN	A	325	1/1	0.86	0.17	98,98,98,98	0
4	EDO	A	315	4/4	0.86	0.20	25,33,34,45	0
4	EDO	D	307	4/4	0.86	0.15	38,41,41,43	0
4	EDO	D	308	4/4	0.86	0.22	33,34,37,38	0
4	EDO	A	320	4/4	0.87	0.14	40,41,42,44	0
4	EDO	D	305	4/4	0.87	0.13	31,32,38,44	0
4	EDO	D	303	4/4	0.88	0.13	34,38,41,50	0
4	EDO	A	316	4/4	0.88	0.18	33,41,44,46	0
4	EDO	A	317	4/4	0.88	0.15	29,34,36,37	0
4	EDO	A	311	4/4	0.88	0.16	32,33,34,38	0
4	EDO	A	305	4/4	0.88	0.13	25,27,28,35	0
4	EDO	D	306	4/4	0.89	0.14	28,36,36,38	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	EDO	A	321	4/4	0.90	0.13	38,40,43,44	0
4	EDO	A	306	4/4	0.91	0.14	31,36,36,40	0
4	EDO	D	311	4/4	0.91	0.23	21,29,35,46	0
4	EDO	A	303	4/4	0.92	0.18	17,25,26,31	0
4	EDO	B	105	4/4	0.92	0.12	29,31,37,49	0
4	EDO	E	101	4/4	0.93	0.12	29,32,33,38	0
4	EDO	A	312	4/4	0.93	0.12	29,29,45,45	0
4	EDO	B	102	4/4	0.93	0.11	26,28,30,38	0
4	EDO	B	103	4/4	0.93	0.15	23,35,38,43	0
4	EDO	D	302	4/4	0.93	0.10	21,28,29,31	0
4	EDO	A	302	4/4	0.94	0.09	19,24,24,27	0
4	EDO	A	308	4/4	0.94	0.10	19,30,32,34	0
4	EDO	D	304	4/4	0.94	0.09	26,29,32,35	0
4	EDO	B	107	4/4	0.94	0.11	20,25,29,30	0
4	EDO	D	301	4/4	0.94	0.16	27,34,37,53	0
4	EDO	E	102	4/4	0.95	0.07	23,24,30,37	0
4	EDO	B	101	4/4	0.97	0.07	24,25,27,29	0
4	EDO	A	301	4/4	0.98	0.05	20,23,24,25	0
5	ZN	D	312	1/1	1.00	0.02	20,20,20,20	0
5	ZN	A	324	1/1	1.00	0.03	19,19,19,19	0

6.5 Other polymers [i](#)

There are no such residues in this entry.