



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 19, 2016 – 09:21 PM GMT

PDB ID : 4ZLA
Title : Bestatin complex structure of leucine aminopeptidase from Helicobacter pylori
Authors : Modak, J.K.; Roujeinikova, A.
Deposited on : 2015-05-01
Resolution : 1.90 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7.1 (RC1), CSD as537be (2016)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026982
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20026982

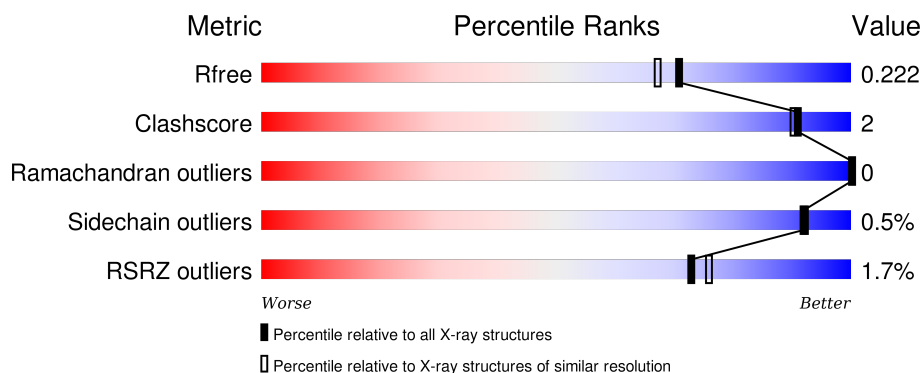
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	91344	4755 (1.90-1.90)
Clashscore	102246	5398 (1.90-1.90)
Ramachandran outliers	100387	5338 (1.90-1.90)
Sidechain outliers	100360	5339 (1.90-1.90)
RSRZ outliers	91569	4766 (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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	502	<div> <div></div> <div>90% 7% .</div> </div>
1	B	502	<div> <div></div> <div>90% 5% .</div> </div>
1	C	502	<div> <div>3%</div> <div>92% . .</div> </div>
1	D	502	<div> <div></div> <div>90% 5% .</div> </div>
1	E	502	<div> <div></div> <div>91% 5% .</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	502	<div><div></div><div>2%</div><div>89%</div><div>8%</div><div></div></div>

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 25067 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 Cytosol aminopeptidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	485	Total	C	N	O	S	0	4	0
			3767	2420	622	708	17			
1	B	482	Total	C	N	O	S	0	5	0
			3743	2409	614	702	18			
1	C	484	Total	C	N	O	S	0	5	0
			3757	2415	618	707	17			
1	D	480	Total	C	N	O	S	0	2	0
			3721	2395	612	697	17			
1	E	484	Total	C	N	O	S	0	7	0
			3770	2428	618	706	18			
1	F	484	Total	C	N	O	S	0	3	0
			3750	2411	619	703	17			

There are 36 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	GLY	-	expression tag	UNP O25294
A	-4	ILE	-	expression tag	UNP O25294
A	-3	ASP	-	expression tag	UNP O25294
A	-2	PHE	-	expression tag	UNP O25294
A	-1	PRO	-	expression tag	UNP O25294
A	0	THR	-	expression tag	UNP O25294
B	-5	GLY	-	expression tag	UNP O25294
B	-4	ILE	-	expression tag	UNP O25294
B	-3	ASP	-	expression tag	UNP O25294
B	-2	PHE	-	expression tag	UNP O25294
B	-1	PRO	-	expression tag	UNP O25294
B	0	THR	-	expression tag	UNP O25294
C	-5	GLY	-	expression tag	UNP O25294
C	-4	ILE	-	expression tag	UNP O25294
C	-3	ASP	-	expression tag	UNP O25294
C	-2	PHE	-	expression tag	UNP O25294
C	-1	PRO	-	expression tag	UNP O25294

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Chain	Residue	Modelled	Actual	Comment	Reference
C	0	THR	-	expression tag	UNP O25294
D	-5	GLY	-	expression tag	UNP O25294
D	-4	ILE	-	expression tag	UNP O25294
D	-3	ASP	-	expression tag	UNP O25294
D	-2	PHE	-	expression tag	UNP O25294
D	-1	PRO	-	expression tag	UNP O25294
D	0	THR	-	expression tag	UNP O25294
E	-5	GLY	-	expression tag	UNP O25294
E	-4	ILE	-	expression tag	UNP O25294
E	-3	ASP	-	expression tag	UNP O25294
E	-2	PHE	-	expression tag	UNP O25294
E	-1	PRO	-	expression tag	UNP O25294
E	0	THR	-	expression tag	UNP O25294
F	-5	GLY	-	expression tag	UNP O25294
F	-4	ILE	-	expression tag	UNP O25294
F	-3	ASP	-	expression tag	UNP O25294
F	-2	PHE	-	expression tag	UNP O25294
F	-1	PRO	-	expression tag	UNP O25294
F	0	THR	-	expression tag	UNP O25294

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	D	2	Total Zn 2 2	0	0
2	E	2	Total Zn 2 2	0	0
2	B	2	Total Zn 2 2	0	0
2	C	2	Total Zn 2 2	0	0
2	A	2	Total Zn 2 2	0	0
2	F	2	Total Zn 2 2	0	0

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

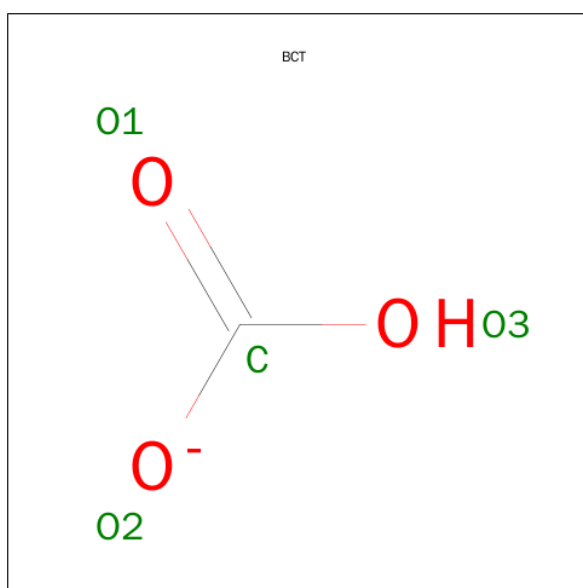
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	D	1	Total Na 1 1	0	0

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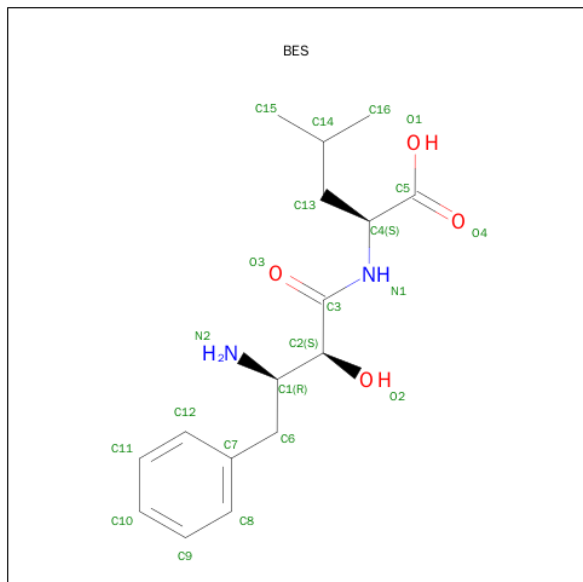
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	1	Total	Na	0	0
			1	1		
3	B	1	Total	Na	0	0
			1	1		
3	C	1	Total	Na	0	0
			1	1		
3	A	1	Total	Na	0	0
			1	1		
3	F	1	Total	Na	0	0
			1	1		

- Molecule 4 is BICARBONATE ION (three-letter code: BCT) (formula: CHO_3).



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

- Molecule 5 is 2-(3-AMINO-2-HYDROXY-4-PHENYL-BUTYRYLAMINO)-4-METHYL-PENTANOIC ACID (three-letter code: BES) (formula: $C_{16}H_{24}N_2O_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			22	16	2	4		
5	B	1	Total	C	N	O	0	0
			22	16	2	4		
5	C	1	Total	C	N	O	0	0
			22	16	2	4		
5	D	1	Total	C	N	O	0	0
			22	16	2	4		
5	E	1	Total	C	N	O	0	0
			22	16	2	4		
5	F	1	Total	C	N	O	0	0
			22	16	2	4		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	390	Total	O	0	0
			390	390		
6	B	416	Total	O	0	0
			416	416		
6	C	348	Total	O	0	0
			348	348		
6	D	420	Total	O	0	0
			420	420		

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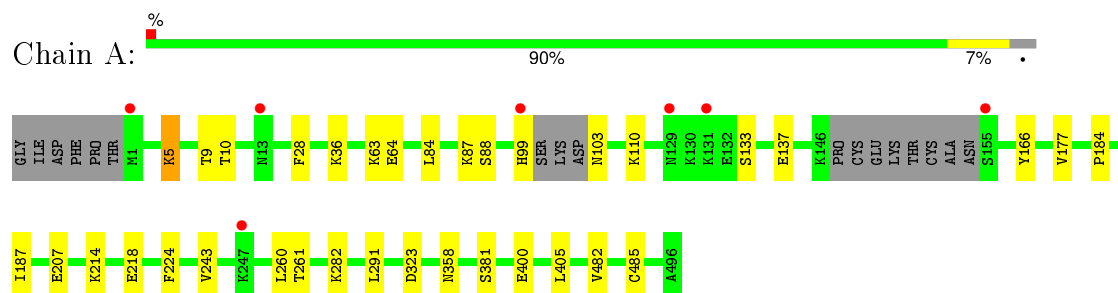
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	E	403	Total 403	O 403	0	0
6	F	408	Total 408	O 408	0	0

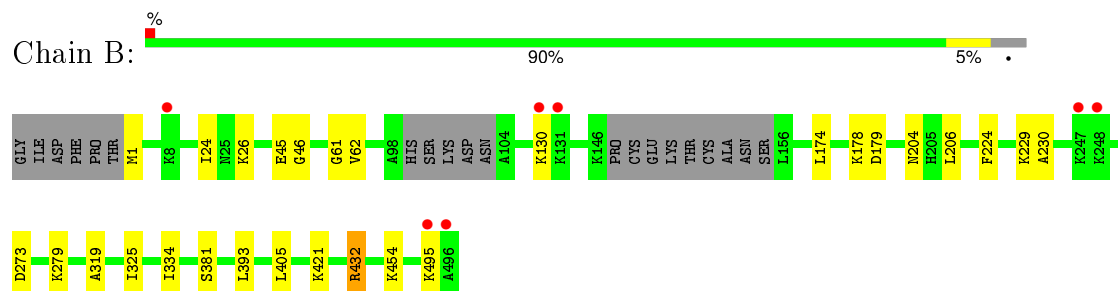
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

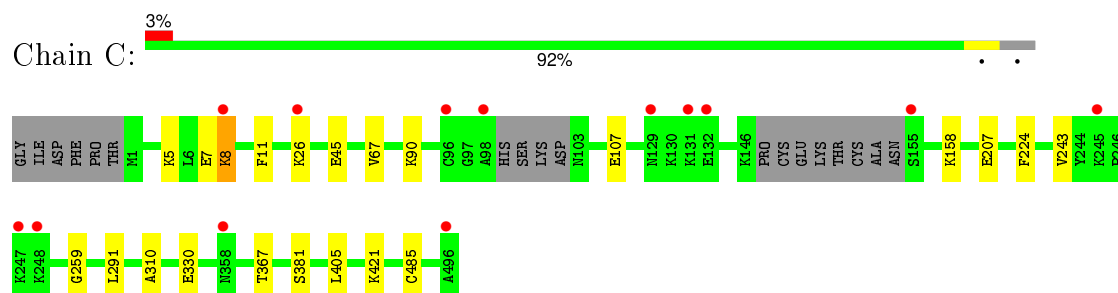
• Molecule 1: Cytosol aminopeptidase



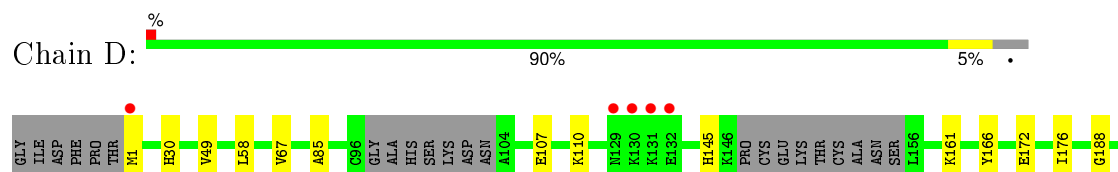
• Molecule 1: Cytosol aminopeptidase



• Molecule 1: Cytosol aminopeptidase

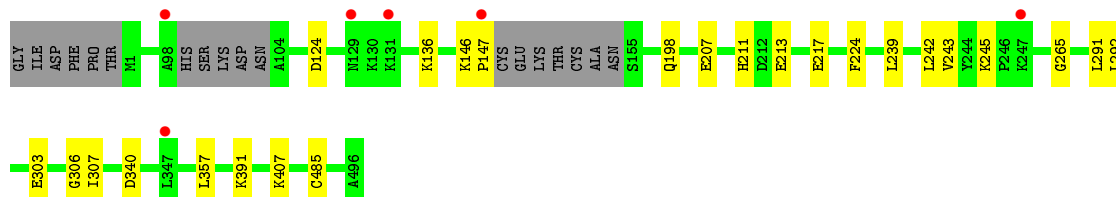
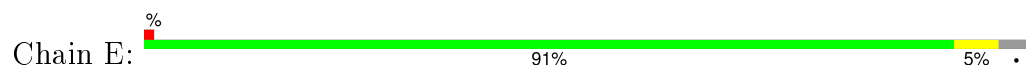


• Molecule 1: Cytosol aminopeptidase

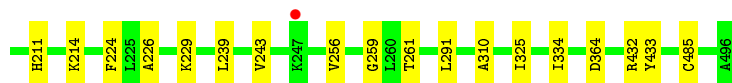
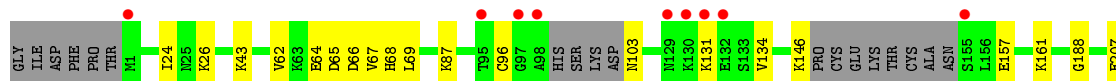
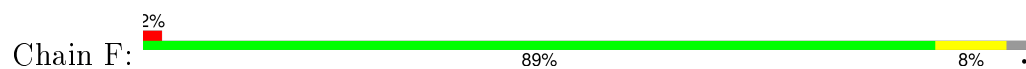




● Molecule 1: Cytosol aminopeptidase



● Molecule 1: Cytosol aminopeptidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	99.77Å 99.69Å 96.78Å 81.89° 60.97° 75.39°	Depositor
Resolution (Å)	30.55 – 1.90 30.55 – 1.90	Depositor EDS
% Data completeness (in resolution range)	92.5 (30.55-1.90) 91.9 (30.55-1.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.07	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.53 (at 1.91Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.176 , 0.219 0.180 , 0.222	Depositor DCC
R_{free} test set	11560 reflections (5.29%)	DCC
Wilson B-factor (Å ²)	14.4	Xtriage
Anisotropy	0.246	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 52.4	EDS
Estimated twinning fraction	0.007 for -h,-k,-h+l	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 230128 reflections	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	25067	wwPDB-VP
Average B, all atoms (Å ²)	18.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 13.13% 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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: BCT, BES, ZN, NA

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	0.38	0/3836	0.50	0/5165
1	B	0.38	0/3817	0.51	0/5137
1	C	0.42	1/3831 (0.0%)	0.50	0/5159
1	D	0.44	2/3786 (0.1%)	0.52	0/5096
1	E	0.38	0/3848	0.52	0/5180
1	F	0.39	0/3815	0.52	0/5134
All	All	0.40	3/22933 (0.0%)	0.51	0/30871

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	330	GLU	CD-OE1	-5.68	1.19	1.25
1	D	330	GLU	CD-OE2	-5.42	1.19	1.25
1	C	330	GLU	CD-OE1	-5.35	1.19	1.25

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	3767	0	3884	20	1
1	B	3743	0	3875	19	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3757	0	3883	11	0
1	D	3721	0	3849	18	0
1	E	3770	0	3910	13	0
1	F	3750	0	3879	24	1
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
4	A	4	0	1	0	0
4	B	4	0	1	0	0
4	C	4	0	0	0	0
4	D	4	0	0	0	0
4	E	4	0	1	0	0
4	F	4	0	1	0	0
5	A	22	0	22	0	0
5	B	22	0	22	0	0
5	C	22	0	22	2	0
5	D	22	0	21	0	0
5	E	22	0	22	0	0
5	F	22	0	22	0	0
6	A	390	0	0	2	0
6	B	416	0	0	7	1
6	C	348	0	0	2	1
6	D	420	0	0	2	0
6	E	403	0	0	2	1
6	F	408	0	0	6	1
All	All	25067	0	23415	103	3

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 2.

All (103) 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:F:65:ASP:OD1	1:F:96:CYS:HA	1.90	0.71
1:B:432:ARG:NH1	1:D:274:TYR:OH	2.22	0.70
1:D:1:MET:SD	6:D:954:HOH:O	2.48	0.70
1:D:271:PRO:HG2	1:D:274:TYR:HD2	1.58	0.68
1:B:454:LYS:NZ	6:B:603:HOH:O	2.23	0.67
1:C:5:LYS:NZ	1:C:7:GLU:OE2	2.29	0.66
1:D:271:PRO:HG2	1:D:274:TYR:CD2	2.36	0.61
1:A:103:ASN:N	6:A:608:HOH:O	2.35	0.59
1:B:1:MET:N	6:B:607:HOH:O	2.30	0.58
1:C:291:LEU:HD21	1:C:485:CYS:HB3	1.85	0.57
1:C:26:LYS:HD2	1:C:45:GLU:O	2.04	0.57
1:C:421:LYS:NZ	6:C:2511:HOH:O	2.38	0.57
1:F:66:ASP:OD1	1:F:68:HIS:HB2	2.04	0.57
1:D:255:LEU:HD13	1:D:291:LEU:HD13	1.87	0.56
1:D:1:MET:N	6:D:610:HOH:O	2.37	0.56
1:A:214:LYS:HE3	1:A:218:GLU:HG3	1.86	0.56
1:E:242:LEU:HB2	1:E:292[B]:LEU:HD13	1.88	0.55
1:E:292[B]:LEU:HD11	1:E:306:GLY:HA3	1.87	0.55
1:C:381:SER:HB2	1:C:405:LEU:HD23	1.90	0.54
1:F:157:GLU:OE2	6:F:601:HOH:O	2.19	0.54
1:E:124:ASP:OD2	6:E:601:HOH:O	2.18	0.54
1:F:67:VAL:HG13	1:F:68:HIS:N	2.23	0.53
1:A:291:LEU:HD21	1:A:485:CYS:HB3	1.88	0.53
1:D:85:ALA:HB2	1:F:43:LYS:HE2	1.90	0.53
1:B:24:ILE:HD13	1:B:62:VAL:HB	1.90	0.53
1:D:291:LEU:HD21	1:D:485:CYS:HB3	1.90	0.52
1:E:245:LYS:HD3	1:E:303:GLU:HG3	1.91	0.52
1:A:184:PRO:HG2	1:A:187:ILE:HD12	1.92	0.52
1:F:226:ALA:HA	1:F:229:LYS:HG3	1.91	0.51
1:F:432:ARG:HG3	6:F:814:HOH:O	2.12	0.50
1:B:393:LEU:HD22	1:B:495:LYS:HZ1	1.76	0.49
1:F:229:LYS:NZ	6:F:618:HOH:O	2.44	0.49
1:E:291:LEU:HD21	1:E:485:CYS:HB3	1.95	0.49
1:D:207:GLU:HB3	1:D:243:VAL:HB	1.93	0.49
1:F:291:LEU:HD21	1:F:485:CYS:HB3	1.94	0.49
1:C:207:GLU:HB3	1:C:243:VAL:HB	1.95	0.49
1:E:211:HIS:HB2	1:E:239:LEU:HB3	1.95	0.49
1:A:381:SER:HB2	1:A:405:LEU:HD23	1.95	0.49
1:B:130:LYS:NZ	6:B:622:HOH:O	2.47	0.48
1:A:5:LYS:HD3	1:A:137:GLU:OE2	2.13	0.48
1:E:207:GLU:HB3	1:E:243:VAL:HB	1.94	0.48
1:B:179[B]:ASP:OD2	6:B:601:HOH:O	2.20	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:207:GLU:HB3	1:A:243:VAL:HB	1.96	0.48
1:A:133:SER:O	6:A:601:HOH:O	2.20	0.47
1:B:174:LEU:O	1:B:178:LYS:HG3	2.14	0.47
1:F:87:LYS:HG2	1:F:134:VAL:HG13	1.96	0.47
1:C:8:LYS:HA	1:C:8:LYS:HD2	1.81	0.47
1:D:30:HIS:CD2	1:D:145:HIS:CD2	3.04	0.46
1:F:207:GLU:HB3	1:F:243:VAL:HB	1.95	0.46
1:A:63:LYS:NZ	1:A:64:GLU:OE2	2.48	0.46
1:D:250:LYS:HE2	1:D:496:ALA:HB3	1.98	0.46
1:B:46:GLY:O	1:B:61:GLY:HA3	2.16	0.46
1:C:11:PHE:O	1:C:90:LYS:HD2	2.16	0.46
1:F:325:ILE:HA	1:F:334:ILE:O	2.17	0.44
1:B:421:LYS:NZ	6:B:626:HOH:O	2.50	0.44
1:A:177:VAL:HG21	1:A:482:VAL:HG21	2.00	0.44
1:F:214:LYS:HD3	6:F:611:HOH:O	2.17	0.44
1:B:130:LYS:HB3	1:B:130:LYS:HE3	1.84	0.44
1:E:198:GLN:OE1	6:E:602:HOH:O	2.20	0.44
1:B:229:LYS:NZ	6:B:606:HOH:O	2.29	0.44
1:A:110:LYS:HE3	1:A:166:TYR:CD2	2.53	0.44
1:D:161:LYS:HB3	1:D:161:LYS:HE2	1.66	0.44
1:B:273:ASP:OD1	6:B:602:HOH:O	2.21	0.43
1:D:67:VAL:HG21	1:D:107:GLU:HG2	2.00	0.43
5:C:505:BES:H10	6:C:2787:HOH:O	2.17	0.43
1:C:67:VAL:HG21	1:C:107:GLU:HG2	2.00	0.43
1:A:28:PHE:O	1:A:36:LYS:HE3	2.18	0.43
1:B:325:ILE:HA	1:B:334:ILE:O	2.19	0.43
1:E:391[A]:LYS:HE2	1:E:407:LYS:HD2	2.01	0.43
1:B:26:LYS:HE3	1:B:45:GLU:O	2.19	0.43
1:D:161:LYS:H	1:D:161:LYS:HG2	1.71	0.43
1:A:214:LYS:HA	1:A:214:LYS:HD2	1.83	0.43
1:D:188:GLY:O	1:D:261:THR:HB	2.19	0.42
1:E:265:GLY:HA2	1:E:340:ASP:OD1	2.19	0.42
1:D:172:GLU:O	1:D:176:ILE:HG13	2.20	0.42
1:A:261:THR:HA	1:A:282:LYS:HD3	2.00	0.42
1:C:367:THR:O	5:C:505:BES:H61	2.19	0.42
1:F:211:HIS:HB2	1:F:239:LEU:HB3	2.01	0.42
1:B:381:SER:HB2	1:B:405:LEU:HD23	2.02	0.42
1:E:146:LYS:HA	1:E:147:PRO:HD3	1.81	0.42
1:A:87:LYS:HE3	1:A:87:LYS:HB3	1.75	0.41
1:A:88:SER:HA	1:A:137:GLU:O	2.20	0.41
1:F:256:VAL:O	1:F:364:ASP:HA	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:110:LYS:HE3	1:D:166:TYR:CG	2.55	0.41
1:F:131:LYS:HE3	1:F:131:LYS:HB3	1.95	0.41
1:A:99:HIS:CG	1:A:400:GLU:HG2	2.56	0.41
1:A:323:ASP:HB3	1:B:279:LYS:HD3	2.02	0.41
1:F:24:ILE:HD13	1:F:62:VAL:HB	2.03	0.41
1:F:146:LYS:NZ	6:F:632:HOH:O	2.53	0.41
1:F:157:GLU:HG2	1:F:161:LYS:HD2	2.03	0.41
1:C:259:GLY:O	1:C:310:ALA:HA	2.21	0.41
1:F:432:ARG:NH2	1:F:433:TYR:OH	2.44	0.41
1:E:213:GLU:O	1:E:217:GLU:HG3	2.21	0.41
1:B:230:ALA:HB2	1:B:319:ALA:HA	2.02	0.40
1:D:49:VAL:HB	1:D:58:LEU:HD11	2.03	0.40
1:B:204:ASN:HB2	1:B:206:LEU:HG	2.02	0.40
1:F:188:GLY:O	1:F:261:THR:HB	2.20	0.40
1:F:103:ASN:HB3	6:F:902:HOH:O	2.21	0.40
1:E:307:ILE:HD11	1:E:357:LEU:HD11	2.03	0.40
1:F:64:GLU:H	1:F:69:LEU:HD12	1.86	0.40
1:A:84:LEU:HA	1:A:84:LEU:HD23	1.84	0.40
1:F:259:GLY:O	1:F:310:ALA:HA	2.21	0.40
1:A:9:THR:OG1	1:A:10:THR:N	2.55	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:B:643:HOH:O	6:F:653:HOH:O[1_565]	2.11	0.09
1:A:358[B]:ASN:ND2	1:F:26:LYS:O[1_655]	2.17	0.03
6:C:2516:HOH:O	6:E:946:HOH:O[1_545]	2.19	0.01

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	483/502 (96%)	470 (97%)	13 (3%)	0	100	100
1	B	481/502 (96%)	468 (97%)	13 (3%)	0	100	100
1	C	483/502 (96%)	469 (97%)	14 (3%)	0	100	100
1	D	476/502 (95%)	464 (98%)	12 (2%)	0	100	100
1	E	485/502 (97%)	475 (98%)	10 (2%)	0	100	100
1	F	481/502 (96%)	467 (97%)	14 (3%)	0	100	100
All	All	2889/3012 (96%)	2813 (97%)	76 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	405/416 (97%)	402 (99%)	3 (1%)	88	88
1	B	403/416 (97%)	401 (100%)	2 (0%)	92	92
1	C	405/416 (97%)	402 (99%)	3 (1%)	88	88
1	D	400/416 (96%)	399 (100%)	1 (0%)	94	95
1	E	407/416 (98%)	405 (100%)	2 (0%)	92	92
1	F	403/416 (97%)	402 (100%)	1 (0%)	95	95
All	All	2423/2496 (97%)	2411 (100%)	12 (0%)	92	92

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	LYS
1	A	224	PHE
1	A	260	LEU
1	B	224	PHE
1	B	432	ARG
1	C	8	LYS
1	C	158	LYS

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Mol	Chain	Res	Type
1	C	224	PHE
1	D	224	PHE
1	E	136	LYS
1	E	224	PHE
1	F	224	PHE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 30 ligands modelled in this entry, 18 are monoatomic - leaving 12 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	BCT	A	504	-	0,3,3	0.00	-	0,3,3	0.00	-
5	BES	A	505	2	19,22,22	2.23	3 (15%)	22,29,29	1.02	2 (9%)
4	BCT	B	504	-	0,3,3	0.00	-	0,3,3	0.00	-
5	BES	B	505	2	19,22,22	2.15	5 (26%)	22,29,29	1.01	0
4	BCT	C	504	-	0,3,3	0.00	-	0,3,3	0.00	-

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	BES	C	505	2	19,22,22	2.13	4 (21%)	22,29,29	0.98	1 (4%)
4	BCT	D	504	-	0,3,3	0.00	-	0,3,3	0.00	-
5	BES	D	505	2	19,22,22	2.13	4 (21%)	22,29,29	1.07	2 (9%)
4	BCT	E	504	-	0,3,3	0.00	-	0,3,3	0.00	-
5	BES	E	505	2	19,22,22	2.20	4 (21%)	22,29,29	0.95	1 (4%)
4	BCT	F	504	-	0,3,3	0.00	-	0,3,3	0.00	-
5	BES	F	505	2	19,22,22	2.14	4 (21%)	22,29,29	1.02	1 (4%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	BCT	A	504	-	-	0/0/0/0	0/0/0/0
5	BES	A	505	2	-	0/20/24/24	0/1/1/1
4	BCT	B	504	-	-	0/0/0/0	0/0/0/0
5	BES	B	505	2	-	0/20/24/24	0/1/1/1
4	BCT	C	504	-	-	0/0/0/0	0/0/0/0
5	BES	C	505	2	-	0/20/24/24	0/1/1/1
4	BCT	D	504	-	-	0/0/0/0	0/0/0/0
5	BES	D	505	2	-	0/20/24/24	0/1/1/1
4	BCT	E	504	-	-	0/0/0/0	0/0/0/0
5	BES	E	505	2	-	0/20/24/24	0/1/1/1
4	BCT	F	504	-	-	0/0/0/0	0/0/0/0
5	BES	F	505	2	-	0/20/24/24	0/1/1/1

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	505	BES	O2-C2	-2.64	1.37	1.42
5	C	505	BES	O2-C2	-2.43	1.37	1.42
5	B	505	BES	C4-N1	-2.43	1.43	1.46
5	D	505	BES	C4-N1	-2.36	1.43	1.46
5	F	505	BES	O2-C2	-2.28	1.37	1.42
5	E	505	BES	O2-C2	-2.15	1.37	1.42
5	F	505	BES	C13-C4	3.21	1.57	1.54
5	D	505	BES	C13-C4	3.24	1.57	1.54
5	B	505	BES	C13-C4	3.25	1.57	1.54
5	E	505	BES	C13-C4	3.41	1.57	1.54
5	C	505	BES	C13-C4	3.57	1.58	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	505	BES	C13-C4	3.71	1.58	1.54
5	C	505	BES	C6-C7	3.86	1.60	1.51
5	E	505	BES	C6-C7	4.18	1.61	1.51
5	B	505	BES	C6-C7	4.26	1.61	1.51
5	D	505	BES	C6-C7	4.30	1.61	1.51
5	F	505	BES	C6-C7	4.30	1.61	1.51
5	A	505	BES	C6-C7	4.52	1.62	1.51
5	B	505	BES	C3-N1	6.15	1.48	1.34
5	D	505	BES	C3-N1	6.24	1.48	1.34
5	F	505	BES	C3-N1	6.43	1.48	1.34
5	C	505	BES	C3-N1	6.46	1.48	1.34
5	E	505	BES	C3-N1	6.57	1.49	1.34
5	A	505	BES	C3-N1	6.71	1.49	1.34

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	F	505	BES	C4-N1-C3	-2.13	119.64	123.43
5	D	505	BES	C13-C4-N1	-2.09	105.21	110.47
5	E	505	BES	O2-C2-C1	2.06	113.66	109.69
5	A	505	BES	C2-C3-N1	2.09	119.32	116.29
5	D	505	BES	O2-C2-C1	2.50	114.51	109.69
5	A	505	BES	O2-C2-C1	2.70	114.90	109.69
5	C	505	BES	O2-C2-C1	2.80	115.09	109.69

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
5	C	505	BES	2	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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, 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	485/502 (96%)	-0.11	7 (1%) 78 80	7, 15, 37, 47	9 (1%)
1	B	482/502 (96%)	-0.28	7 (1%) 76 79	6, 13, 32, 51	2 (0%)
1	C	484/502 (96%)	-0.07	13 (2%) 58 61	8, 17, 38, 52	8 (1%)
1	D	480/502 (95%)	-0.21	7 (1%) 76 79	6, 14, 32, 58	4 (0%)
1	E	484/502 (96%)	-0.21	6 (1%) 81 83	8, 14, 32, 51	5 (1%)
1	F	484/502 (96%)	-0.24	10 (2%) 67 70	6, 14, 33, 54	2 (0%)
All	All	2899/3012 (96%)	-0.19	50 (1%) 73 76	6, 14, 35, 58	30 (1%)

All (50) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	131	LYS	5.2
1	C	155	SER	4.9
1	B	247	LYS	4.6
1	D	132	GLU	4.1
1	E	129	ASN	4.0
1	E	98	ALA	3.8
1	F	131	LYS	3.8
1	E	147	PRO	3.5
1	B	131	LYS	3.5
1	E	131	LYS	3.4
1	C	247	LYS	3.3
1	A	1	MET	3.2
1	D	247	LYS	3.1
1	A	247	LYS	3.1
1	A	155	SER	2.9
1	F	98	ALA	2.9
1	E	247	LYS	2.9
1	F	1	MET	2.8
1	C	496	ALA	2.8

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Mol	Chain	Res	Type	RSRZ
1	C	131	LYS	2.8
1	A	99	HIS	2.7
1	F	132	GLU	2.6
1	F	247	LYS	2.6
1	B	130	LYS	2.6
1	B	496	ALA	2.5
1	D	129	ASN	2.5
1	B	495	LYS	2.4
1	A	131	LYS	2.4
1	E	347	LEU	2.3
1	D	1	MET	2.3
1	D	130	LYS	2.3
1	B	248	LYS	2.3
1	C	26	LYS	2.3
1	F	95	THR	2.3
1	D	205	HIS	2.3
1	A	129	ASN	2.2
1	C	245	LYS	2.2
1	F	155	SER	2.2
1	C	132	GLU	2.1
1	F	129	ASN	2.1
1	C	98	ALA	2.1
1	F	130	LYS	2.1
1	C	96	CYS	2.1
1	F	97	GLY	2.1
1	B	8	LYS	2.1
1	C	8	LYS	2.1
1	A	13	ASN	2.0
1	C	129	ASN	2.0
1	C	358[A]	ASN	2.0
1	C	248	LYS	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 ⓘ

There are no carbohydrates in this entry.

6.4 Ligands

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 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	LLDF	B-factors(Å ²)	Q<0.9
5	BES	C	505	22/22	0.95	0.11	0.86	11,17,29,32	0
4	BCT	B	504	4/4	0.95	0.13	0.83	8,9,10,29	0
5	BES	A	505	22/22	0.94	0.12	0.61	11,19,25,28	0
5	BES	F	505	22/22	0.96	0.10	0.55	11,18,25,29	0
5	BES	E	505	22/22	0.95	0.10	0.52	9,19,28,32	0
5	BES	B	505	22/22	0.96	0.09	0.36	11,17,23,26	0
5	BES	D	505	22/22	0.96	0.09	0.12	10,16,25,29	0
4	BCT	F	504	4/4	0.97	0.10	-0.34	9,10,13,23	0
4	BCT	C	504	4/4	0.97	0.09	-0.69	8,10,13,24	0
4	BCT	D	504	4/4	0.98	0.08	-0.90	9,10,10,24	0
4	BCT	E	504	4/4	0.97	0.09	-0.97	8,11,12,19	0
3	NA	F	503	1/1	0.99	0.06	-1.11	12,12,12,12	0
4	BCT	A	504	4/4	0.98	0.08	-1.21	7,10,12,25	0
3	NA	E	503	1/1	0.98	0.06	-1.62	12,12,12,12	0
2	ZN	D	502	1/1	0.99	0.04	-1.62	22,22,22,22	1
2	ZN	F	502	1/1	1.00	0.05	-1.74	20,20,20,20	1
2	ZN	C	502	1/1	0.98	0.06	-1.79	20,20,20,20	1
2	ZN	B	501	1/1	1.00	0.04	-1.91	9,9,9,9	0
2	ZN	A	501	1/1	1.00	0.04	-2.07	7,7,7,7	1
2	ZN	D	501	1/1	1.00	0.04	-2.20	7,7,7,7	1
3	NA	A	503	1/1	0.99	0.04	-2.33	12,12,12,12	0
2	ZN	B	502	1/1	1.00	0.04	-2.53	20,20,20,20	1
2	ZN	C	501	1/1	1.00	0.04	-2.65	10,10,10,10	1
3	NA	B	503	1/1	0.98	0.05	-2.69	14,14,14,14	0
3	NA	C	503	1/1	0.96	0.06	-2.77	15,15,15,15	0
2	ZN	E	502	1/1	1.00	0.03	-3.15	18,18,18,18	1
2	ZN	F	501	1/1	1.00	0.03	-3.78	10,10,10,10	0
2	ZN	E	501	1/1	1.00	0.02	-3.92	12,12,12,12	0
3	NA	D	503	1/1	1.00	0.04	-4.03	13,13,13,13	0
2	ZN	A	502	1/1	0.99	0.05	-4.12	18,18,18,18	1

6.5 Other polymers

There are no such residues in this entry.