



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 11, 2024 – 08:09 PM EST

PDB ID : 9AYU
Title : Structure of the A type blood alpha-D-galactosamine galactosaminidase D463A mutant from *Flavonifractor plautii*
Authors : Worrall, L.J.; Strynadka, N.C.J.
Deposited on : 2024-03-08
Resolution : 2.00 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 : 4.02b-467
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.21
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.004 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.40

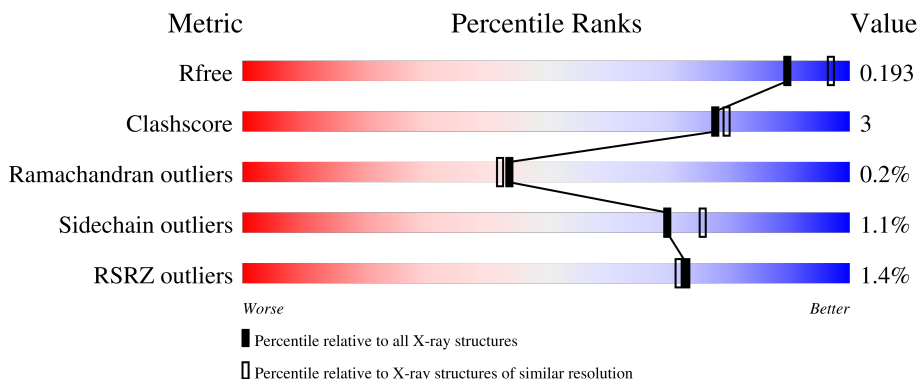
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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}	164625	9409 (2.00-2.00)
Clashscore	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)
RSRZ outliers	164620	9409 (2.00-2.00)

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	672	91% 6% •
1	B	672	90% 7% •
1	C	672	% 91% 6% •
1	D	672	% 92% 5% •
1	E	672	4% 91% 6% •

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 28603 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 A type blood alpha-D-galactosamine galactosaminidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	654	5064	3199	832	1009	24	0	0	0
1	B	654	5125	3241	842	1018	24	0	7	0
1	C	654	5125	3241	842	1018	24	0	7	0
1	D	654	5064	3199	832	1009	24	0	0	0
1	E	654	5064	3199	832	1009	24	0	0	0

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	463	ALA	ASP	conflict	UNP P0DTR5
A	624	ALA	GLU	conflict	UNP P0DTR5
A	625	ALA	LYS	conflict	UNP P0DTR5
B	463	ALA	ASP	conflict	UNP P0DTR5
B	624	ALA	GLU	conflict	UNP P0DTR5
B	625	ALA	LYS	conflict	UNP P0DTR5
C	463	ALA	ASP	conflict	UNP P0DTR5
C	624	ALA	GLU	conflict	UNP P0DTR5
C	625	ALA	LYS	conflict	UNP P0DTR5
D	463	ALA	ASP	conflict	UNP P0DTR5
D	624	ALA	GLU	conflict	UNP P0DTR5
D	625	ALA	LYS	conflict	UNP P0DTR5
E	463	ALA	ASP	conflict	UNP P0DTR5
E	624	ALA	GLU	conflict	UNP P0DTR5
E	625	ALA	LYS	conflict	UNP P0DTR5

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

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Zn 1 1	0	0
2	B	1	Total Zn 1 1	0	0
2	C	1	Total Zn 1 1	0	0
2	D	1	Total Zn 1 1	0	0
2	E	1	Total Zn 1 1	0	0

- Molecule 3 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mn 1 1	0	0
3	B	1	Total Mn 1 1	0	0
3	C	1	Total Mn 1 1	0	0
3	D	1	Total Mn 1 1	0	0
3	E	1	Total Mn 1 1	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Cl 1 1	0	0
4	B	1	Total Cl 1 1	0	0
4	C	1	Total Cl 1 1	0	0
4	D	1	Total Cl 1 1	0	0
4	E	1	Total Cl 1 1	0	0

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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

Continued on next page...

Continued from previous page...

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

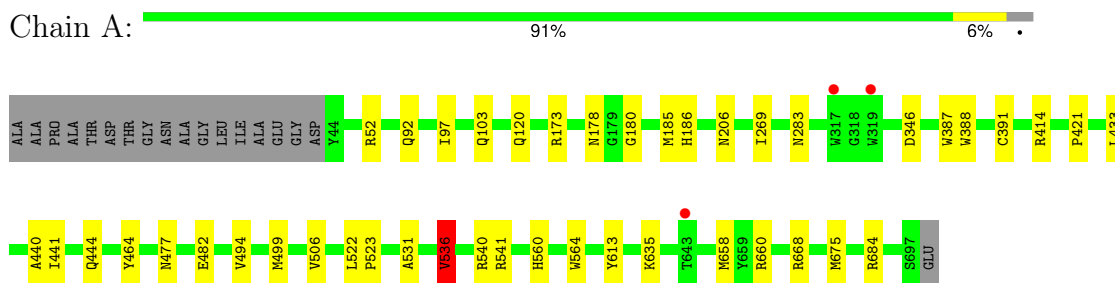
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	661	Total 661	O 661	0	0
6	B	715	Total 715	O 715	0	0
6	C	576	Total 576	O 576	0	0
6	D	562	Total 562	O 562	0	0
6	E	560	Total 560	O 560	0	0

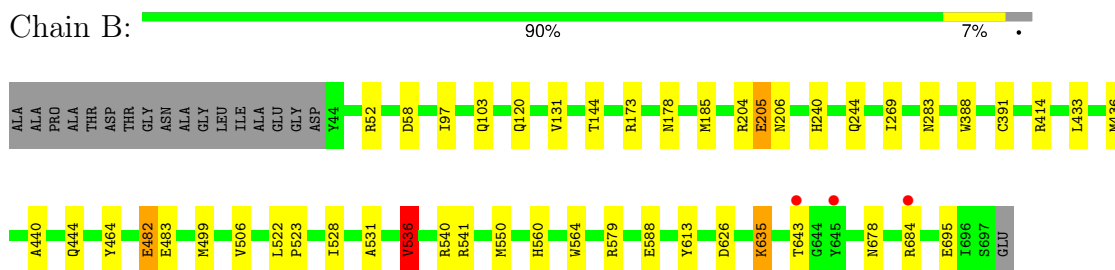
3 Residue-property plots [i](#)

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.

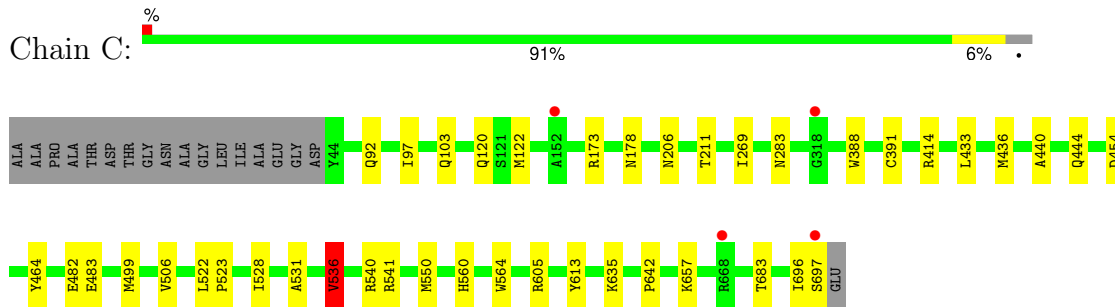
- Molecule 1: A type blood alpha-D-galactosamine galactosaminidase



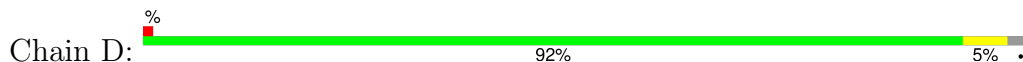
- Molecule 1: A type blood alpha-D-galactosamine galactosaminidase

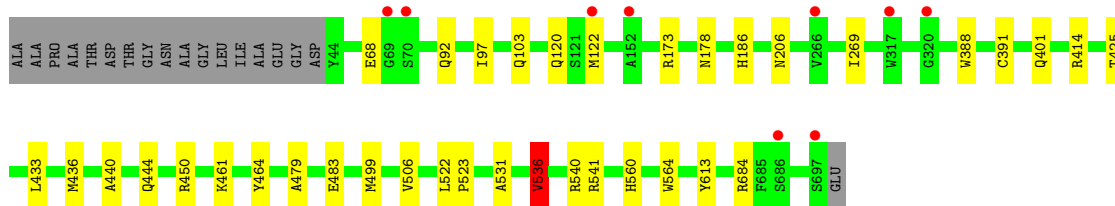


- Molecule 1: A type blood alpha-D-galactosamine galactosaminidase

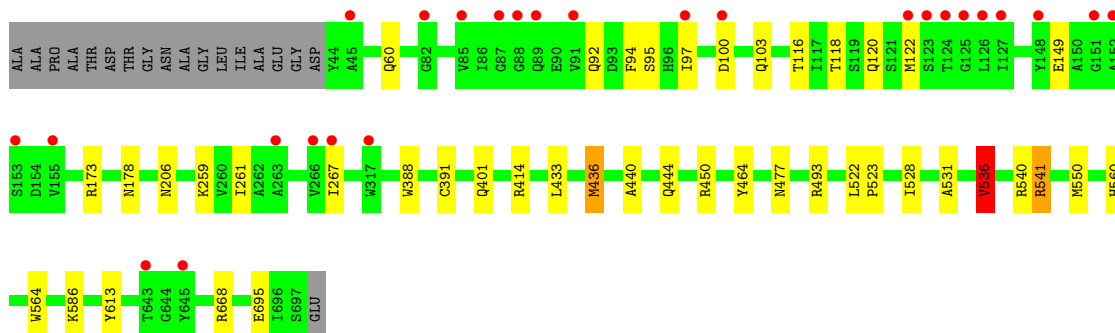
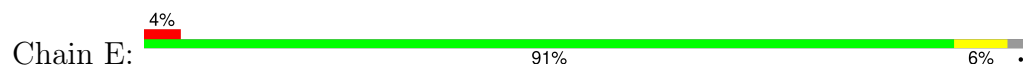


- Molecule 1: A type blood alpha-D-galactosamine galactosaminidase





- Molecule 1: A type blood alpha-D-galactosamine galactosaminidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	102.33Å 164.29Å 131.76Å 90.00° 90.20° 90.00°	Depositor
Resolution (Å)	48.90 – 2.00 48.90 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.90-2.00) 99.9 (48.90-2.00)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.58 (at 2.00Å)	Xtrriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.163 , 0.186 0.172 , 0.193	Depositor DCC
R_{free} test set	14629 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	20.8	Xtrriage
Anisotropy	0.243	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 45.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.011 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	28603	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.55% 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: MN, EDO, CL, 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	0.48	0/5197	0.81	9/7083 (0.1%)
1	B	0.53	2/5263 (0.0%)	0.87	10/7174 (0.1%)
1	C	0.45	0/5263	0.79	6/7174 (0.1%)
1	D	0.45	0/5197	0.78	2/7083 (0.0%)
1	E	0.46	0/5197	0.81	7/7083 (0.1%)
All	All	0.47	2/26117 (0.0%)	0.81	34/35597 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	3
1	B	0	2
1	C	0	2
1	D	0	2
1	E	0	1
All	All	0	10

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	205	GLU	CD-OE1	9.82	1.36	1.25
1	B	205	GLU	CG-CD	7.29	1.62	1.51

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	205	GLU	CG-CD-OE2	-16.17	85.96	118.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	205	GLU	CG-CD-OE1	15.96	150.22	118.30
1	C	482	GLU	CB-CA-C	-8.43	93.54	110.40
1	B	205	GLU	CB-CG-CD	8.43	136.95	114.20
1	A	482	GLU	CB-CA-C	-8.21	93.98	110.40
1	B	482	GLU	CB-CA-C	-7.73	94.93	110.40
1	A	658	MET	CG-SD-CE	7.47	112.15	100.20
1	B	185	MET	CG-SD-CE	6.99	111.38	100.20
1	E	450	ARG	NE-CZ-NH1	-6.76	116.92	120.30
1	E	541	ARG	NE-CZ-NH2	-6.66	116.97	120.30
1	E	536	VAL	N-CA-CB	-6.64	96.89	111.50
1	C	536	VAL	N-CA-CB	-6.49	97.23	111.50
1	D	536	VAL	N-CA-CB	-6.44	97.34	111.50
1	C	683	THR	OG1-CB-CG2	-6.40	95.29	110.00
1	A	103	GLN	CB-CA-C	-6.30	97.80	110.40
1	A	536	VAL	N-CA-CB	-6.19	97.88	111.50
1	D	103	GLN	CB-CA-C	-5.96	98.48	110.40
1	E	103	GLN	CB-CA-C	-5.94	98.52	110.40
1	C	482	GLU	CG-CD-OE1	-5.94	106.42	118.30
1	E	436	MET	CG-SD-CE	-5.89	90.78	100.20
1	B	103	GLN	CB-CA-C	-5.86	98.68	110.40
1	C	103	GLN	CB-CA-C	-5.82	98.75	110.40
1	A	52	ARG	NE-CZ-NH1	5.58	123.09	120.30
1	A	482	GLU	CG-CD-OE1	-5.56	107.18	118.30
1	B	536	VAL	N-CA-CB	-5.55	99.28	111.50
1	B	52	ARG	NE-CZ-NH1	5.54	123.07	120.30
1	E	122	MET	CG-SD-CE	-5.51	91.38	100.20
1	A	675	MET	CG-SD-CE	5.40	108.84	100.20
1	C	605	ARG	NE-CZ-NH1	-5.37	117.62	120.30
1	E	493	ARG	NE-CZ-NH1	5.15	122.88	120.30
1	A	635	LYS	CB-CA-C	-5.14	100.13	110.40
1	B	635	LYS	CB-CA-C	-5.11	100.19	110.40
1	B	205	GLU	N-CA-CB	5.10	119.79	110.60
1	A	660	ARG	NE-CZ-NH2	-5.03	117.79	120.30

There are no chirality outliers.

All (10) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	414	ARG	Sidechain
1	A	668	ARG	Sidechain
1	A	684	ARG	Sidechain
1	B	204	ARG	Sidechain

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Group
1	B	414	ARG	Sidechain
1	C	414	ARG	Sidechain
1	C	696	ILE	Peptide
1	D	414	ARG	Sidechain
1	D	68	GLU	Peptide
1	E	414	ARG	Sidechain

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	5064	0	4765	21	0
1	B	5125	0	4810	36	0
1	C	5125	0	4810	25	0
1	D	5064	0	4765	22	0
1	E	5064	0	4765	30	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	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
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
5	A	24	0	35	1	0
5	B	16	0	24	1	0
5	C	12	0	17	1	0
5	D	12	0	17	2	0
5	E	8	0	11	1	0
6	A	661	0	0	4	0
6	B	715	0	0	16	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	C	576	0	0	6	1
6	D	562	0	0	5	1
6	E	560	0	0	13	0
All	All	28603	0	24019	132	1

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 3.

All (132) 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:B:643:THR:O	6:B:801:HOH:O	1.68	1.09
1:B:626:ASP:HB3	6:B:1294:HOH:O	1.56	1.06
1:D:479:ALA:HB3	6:D:1248:HOH:O	1.61	0.99
1:B:205:GLU:OE1	1:B:240:HIS:ND1	2.10	0.84
1:B:178:ASN:HD22	1:B:206:ASN:HD21	1.25	0.83
1:B:97:ILE:HD11	1:B:120:GLN:HB2	1.61	0.83
1:E:178:ASN:HD22	1:E:206:ASN:HD21	1.27	0.82
1:D:178:ASN:HD22	1:D:206:ASN:HD21	1.27	0.81
1:B:58:ASP:HB3	6:B:1416:HOH:O	1.80	0.81
1:C:178:ASN:HD22	1:C:206:ASN:HD21	1.27	0.80
1:E:695:GLU:OE2	6:E:801:HOH:O	2.00	0.79
1:A:178:ASN:HD22	1:A:206:ASN:HD21	1.27	0.79
1:D:97:ILE:HD11	1:D:120:GLN:HB2	1.70	0.74
1:E:97:ILE:HD11	1:E:120:GLN:HB2	1.71	0.73
1:D:425:THR:HG22	6:D:1222:HOH:O	1.88	0.73
1:A:97:ILE:HD11	1:A:120:GLN:HB2	1.70	0.72
1:C:97:ILE:HD11	1:C:120:GLN:HB2	1.70	0.72
1:E:668:ARG:HD3	6:E:986:HOH:O	1.90	0.71
1:E:92:GLN:HG2	6:E:1178:HOH:O	1.91	0.70
1:E:118:THR:OG1	6:E:802:HOH:O	2.09	0.70
1:C:657:LYS:NZ	1:D:684:ARG:O	2.24	0.69
1:E:149:GLU:HB2	6:E:816:HOH:O	1.92	0.69
1:B:678:ASN:ND2	6:B:804:HOH:O	2.19	0.68
1:B:464:TYR:CE2	5:B:704:EDO:H21	2.30	0.67
1:E:668:ARG:CD	6:E:986:HOH:O	2.43	0.66
1:E:116:THR:OG1	6:E:803:HOH:O	2.12	0.66
1:B:528:ILE:CD1	1:B:550:MET:HG3	2.28	0.64
1:C:122:MET:CE	1:C:122:MET:HA	2.28	0.64
1:B:97:ILE:CD1	1:B:120:GLN:HB2	2.26	0.63
1:E:586:LYS:HE2	6:E:1320:HOH:O	1.99	0.62

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:391:CYS:H	1:A:444:GLN:HE22	1.47	0.62
6:A:1140:HOH:O	1:D:186:HIS:HD2	1.83	0.61
1:E:391:CYS:H	1:E:444:GLN:HE22	1.49	0.61
1:B:205:GLU:CD	1:B:240:HIS:HD1	2.02	0.60
1:E:401:GLN:HG3	6:E:874:HOH:O	2.01	0.60
1:C:391:CYS:H	1:C:444:GLN:HE22	1.48	0.59
1:B:391:CYS:H	1:B:444:GLN:HE22	1.50	0.59
1:C:464:TYR:CE2	5:C:704:EDO:H21	2.38	0.59
1:D:391:CYS:H	1:D:444:GLN:HE22	1.49	0.58
1:C:528:ILE:CD1	1:C:550:MET:HG3	2.34	0.58
1:D:461:LYS:HE2	5:D:704:EDO:H22	1.86	0.57
1:E:464:TYR:CE2	5:E:704:EDO:H21	2.40	0.57
1:E:528:ILE:CD1	1:E:550:MET:HG3	2.34	0.57
1:D:97:ILE:CD1	1:D:120:GLN:HB2	2.35	0.56
1:A:464:TYR:CE2	5:A:704:EDO:H21	2.39	0.56
1:D:464:TYR:CE2	5:D:704:EDO:H21	2.41	0.56
1:E:97:ILE:CD1	1:E:120:GLN:HB2	2.34	0.56
1:E:261:ILE:HG12	1:E:267:ILE:HD11	1.88	0.56
1:D:436:MET:SD	1:D:483:GLU:HG2	2.47	0.55
1:C:97:ILE:CD1	1:C:120:GLN:HB2	2.36	0.55
1:A:97:ILE:CD1	1:A:120:GLN:HB2	2.34	0.54
1:C:436:MET:SD	1:C:483:GLU:HG2	2.47	0.54
1:B:695:GLU:OE2	6:B:802:HOH:O	2.18	0.52
1:B:588:GLU:OE1	6:B:803:HOH:O	2.19	0.51
1:E:436:MET:HE2	6:E:1229:HOH:O	2.11	0.51
1:D:92:GLN:HA	6:D:1218:HOH:O	2.10	0.51
1:D:97:ILE:HD11	1:D:120:GLN:CB	2.40	0.50
1:D:541:ARG:HD3	1:D:613:TYR:CZ	2.47	0.49
1:E:97:ILE:HD11	1:E:120:GLN:CB	2.41	0.49
1:A:283:ASN:CG	6:A:847:HOH:O	2.51	0.48
1:B:635:LYS:HE2	6:B:814:HOH:O	2.13	0.48
1:B:528:ILE:HD12	1:B:550:MET:HG3	1.95	0.48
1:C:642:PRO:O	6:C:801:HOH:O	2.20	0.48
1:B:528:ILE:HD11	1:B:550:MET:HG3	1.94	0.48
1:C:122:MET:HA	1:C:122:MET:HE2	1.95	0.48
1:C:528:ILE:HD12	1:C:550:MET:HG3	1.96	0.48
1:B:283:ASN:CG	6:B:835:HOH:O	2.51	0.48
1:B:391:CYS:H	1:B:444:GLN:NE2	2.12	0.47
1:C:536:VAL:HG13	1:C:540:ARG:CZ	2.44	0.47
1:C:541:ARG:HD3	1:C:613:TYR:CZ	2.49	0.47
1:E:536:VAL:HG13	1:E:540:ARG:CZ	2.44	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:536:VAL:HG13	1:A:540:ARG:CZ	2.44	0.47
1:B:436:MET:SD	1:B:483:GLU:HG2	2.54	0.47
1:A:92:GLN:HA	6:A:963:HOH:O	2.15	0.47
1:C:391:CYS:H	1:C:444:GLN:NE2	2.12	0.47
1:D:499:MET:HB3	1:D:506:VAL:HG21	1.97	0.47
1:E:60:GLN:HE22	1:E:95:SER:HA	1.79	0.47
1:C:97:ILE:HD11	1:C:120:GLN:CB	2.40	0.47
1:D:401:GLN:HG3	6:D:938:HOH:O	2.14	0.47
1:B:536:VAL:HG13	1:B:540:ARG:CZ	2.45	0.47
1:D:391:CYS:H	1:D:444:GLN:NE2	2.11	0.46
1:A:185:MET:HG2	1:A:421:PRO:HG2	1.97	0.46
1:D:536:VAL:HG13	1:D:540:ARG:CZ	2.45	0.46
1:A:477:ASN:ND2	6:A:813:HOH:O	2.37	0.46
1:B:541:ARG:HD3	1:B:613:TYR:CZ	2.51	0.45
1:D:450:ARG:HD3	6:D:952:HOH:O	2.17	0.45
1:A:97:ILE:HD11	1:A:120:GLN:CB	2.40	0.45
1:C:92:GLN:HA	6:C:1167:HOH:O	2.16	0.45
1:C:283:ASN:CG	6:C:827:HOH:O	2.55	0.45
1:C:499:MET:HB3	1:C:506:VAL:HG21	1.98	0.45
1:E:149:GLU:CB	6:E:816:HOH:O	2.59	0.45
1:E:259:LYS:HD2	1:E:267:ILE:HD12	1.99	0.45
1:E:541:ARG:HD3	1:E:613:TYR:CZ	2.51	0.45
1:B:635:LYS:CE	6:B:814:HOH:O	2.65	0.45
1:E:391:CYS:H	1:E:444:GLN:NE2	2.12	0.44
1:A:499:MET:HB3	1:A:506:VAL:HG21	1.98	0.44
1:A:541:ARG:HD3	1:A:613:TYR:CZ	2.52	0.44
1:B:482:GLU:OE1	6:B:805:HOH:O	2.21	0.44
1:B:499:MET:HB3	1:B:506:VAL:HG21	2.00	0.44
1:E:528:ILE:HD12	1:E:550:MET:HG3	1.99	0.44
1:B:522:LEU:N	1:B:523:PRO:CD	2.81	0.44
1:C:433:LEU:HB3	1:C:440:ALA:HB1	2.00	0.44
1:A:391:CYS:H	1:A:444:GLN:NE2	2.14	0.43
1:C:454:ASP:OD2	6:C:804:HOH:O	2.21	0.43
1:B:283:ASN:ND2	6:B:835:HOH:O	2.51	0.43
1:C:211:THR:OG1	6:C:803:HOH:O	2.20	0.43
1:D:522:LEU:N	1:D:523:PRO:CD	2.81	0.43
1:C:269:ILE:C	1:C:269:ILE:HD12	2.39	0.43
1:B:58:ASP:CB	6:B:1416:HOH:O	2.52	0.43
1:B:482:GLU:CD	6:B:805:HOH:O	2.57	0.43
1:E:522:LEU:N	1:E:523:PRO:CD	2.82	0.43
1:B:269:ILE:HD12	1:B:269:ILE:C	2.40	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:522:LEU:N	1:A:523:PRO:CD	2.82	0.42
1:C:522:LEU:N	1:C:523:PRO:CD	2.82	0.42
1:D:269:ILE:C	1:D:269:ILE:HD12	2.40	0.42
1:A:433:LEU:HB3	1:A:440:ALA:HB1	2.01	0.42
1:A:269:ILE:C	1:A:269:ILE:HD12	2.39	0.42
1:B:97:ILE:HD11	1:B:120:GLN:CB	2.39	0.42
1:C:283:ASN:ND2	6:C:827:HOH:O	2.52	0.42
1:B:131:VAL:O	1:B:144:THR:HA	2.19	0.42
1:D:433:LEU:HB3	1:D:440:ALA:HB1	2.02	0.42
1:A:186:HIS:HD2	6:B:1207:HOH:O	2.02	0.41
1:E:94:PHE:HB2	6:E:1238:HOH:O	2.19	0.41
1:B:433:LEU:HB3	1:B:440:ALA:HB1	2.02	0.41
1:B:579:ARG:HE	1:E:477:ASN:ND2	2.18	0.41
1:B:684:ARG:HA	6:B:1112:HOH:O	2.20	0.41
1:E:92:GLN:HA	6:E:1219:HOH:O	2.19	0.41
1:A:346:ASP:HA	1:A:387:TRP:HB2	2.04	0.40
1:A:180:GLY:HA3	1:A:206:ASN:HA	2.03	0.40
1:A:441:ILE:CG2	1:A:494:VAL:HG11	2.52	0.40
1:B:244:GLN:HG2	6:B:1217:HOH:O	2.22	0.40
1:E:433:LEU:HB3	1:E:440:ALA:HB1	2.04	0.40

All (1) 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:C:1302:HOH:O	6:D:1228:HOH:O[1_655]	1.94	0.26

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	652/672 (97%)	626 (96%)	25 (4%)	1 (0%)	44 42

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	659/672 (98%)	636 (96%)	22 (3%)	1 (0%)	44	42
1	C	659/672 (98%)	635 (96%)	23 (4%)	1 (0%)	44	42
1	D	652/672 (97%)	629 (96%)	22 (3%)	1 (0%)	44	42
1	E	652/672 (97%)	629 (96%)	22 (3%)	1 (0%)	44	42
All	All	3274/3360 (97%)	3155 (96%)	114 (4%)	5 (0%)	44	42

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	531	ALA
1	B	531	ALA
1	C	531	ALA
1	D	531	ALA
1	E	531	ALA

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	535/545 (98%)	530 (99%)	5 (1%)	75	81
1	B	540/545 (99%)	535 (99%)	5 (1%)	75	81
1	C	540/545 (99%)	533 (99%)	7 (1%)	65	71
1	D	535/545 (98%)	529 (99%)	6 (1%)	70	76
1	E	535/545 (98%)	529 (99%)	6 (1%)	70	76
All	All	2685/2725 (98%)	2656 (99%)	29 (1%)	70	76

All (29) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	173	ARG
1	A	388	TRP
1	A	536	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	560	HIS
1	A	564	TRP
1	B	173	ARG
1	B	388	TRP
1	B	536	VAL
1	B	560	HIS
1	B	564	TRP
1	C	173	ARG
1	C	388	TRP
1	C	536	VAL
1	C	560	HIS
1	C	564	TRP
1	C	635	LYS
1	C	697	SER
1	D	122	MET
1	D	173	ARG
1	D	388	TRP
1	D	536	VAL
1	D	560	HIS
1	D	564	TRP
1	E	100	ASP
1	E	173	ARG
1	E	388	TRP
1	E	536	VAL
1	E	560	HIS
1	E	564	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	60	GLN
1	A	178	ASN
1	A	186	HIS
1	A	444	GLN
1	B	60	GLN
1	B	178	ASN
1	B	186	HIS
1	B	444	GLN
1	C	178	ASN
1	C	444	GLN
1	D	178	ASN
1	D	186	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	444	GLN
1	D	682	ASN
1	E	60	GLN
1	E	178	ASN
1	E	444	GLN
1	E	477	ASN

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 [i](#)

Of 33 ligands modelled in this entry, 15 are monoatomic - leaving 18 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	$\# Z > 2$
5	EDO	D	704	-	3,3,3	0.74	0	2,2,2	0.52	0
5	EDO	B	707	-	3,3,3	0.25	0	2,2,2	0.13	0
5	EDO	B	704	-	3,3,3	0.62	0	2,2,2	0.54	0
5	EDO	A	704	-	3,3,3	0.61	0	2,2,2	0.32	0
5	EDO	C	704	-	3,3,3	0.64	0	2,2,2	0.33	0
5	EDO	E	705	3	3,3,3	0.23	0	2,2,2	0.05	0
5	EDO	A	705	3	3,3,3	0.12	0	2,2,2	0.23	0
5	EDO	E	704	-	3,3,3	0.57	0	2,2,2	0.50	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	EDO	A	707	-	3,3,3	0.32	0	2,2,2	0.31	0
5	EDO	D	706	3	3,3,3	0.25	0	2,2,2	0.29	0
5	EDO	B	705	-	3,3,3	0.41	0	2,2,2	0.39	0
5	EDO	D	705	-	3,3,3	0.60	0	2,2,2	0.44	0
5	EDO	B	706	-	3,3,3	0.50	0	2,2,2	0.30	0
5	EDO	A	708	-	3,3,3	0.29	0	2,2,2	0.13	0
5	EDO	C	705	3	3,3,3	0.21	0	2,2,2	0.20	0
5	EDO	C	706	-	3,3,3	0.38	0	2,2,2	0.27	0
5	EDO	A	706	-	3,3,3	0.36	0	2,2,2	0.16	0
5	EDO	A	709	-	3,3,3	0.46	0	2,2,2	0.18	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
5	EDO	D	704	-	-	1/1/1/1	-
5	EDO	B	707	-	-	0/1/1/1	-
5	EDO	B	704	-	-	1/1/1/1	-
5	EDO	A	704	-	-	0/1/1/1	-
5	EDO	C	704	-	-	1/1/1/1	-
5	EDO	E	705	3	-	1/1/1/1	-
5	EDO	A	705	3	-	0/1/1/1	-
5	EDO	E	704	-	-	1/1/1/1	-
5	EDO	A	707	-	-	0/1/1/1	-
5	EDO	D	706	3	-	0/1/1/1	-
5	EDO	B	705	-	-	1/1/1/1	-
5	EDO	D	705	-	-	0/1/1/1	-
5	EDO	B	706	-	-	0/1/1/1	-
5	EDO	A	708	-	-	0/1/1/1	-
5	EDO	C	705	3	-	0/1/1/1	-
5	EDO	C	706	-	-	0/1/1/1	-
5	EDO	A	706	-	-	0/1/1/1	-
5	EDO	A	709	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	D	704	EDO	O1-C1-C2-O2
5	B	705	EDO	O1-C1-C2-O2
5	B	704	EDO	O1-C1-C2-O2
5	E	705	EDO	O1-C1-C2-O2
5	C	704	EDO	O1-C1-C2-O2
5	E	704	EDO	O1-C1-C2-O2

There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	D	704	EDO	2	0
5	B	704	EDO	1	0
5	A	704	EDO	1	0
5	C	704	EDO	1	0
5	E	704	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

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	654/672 (97%)	-0.50	3 (0%) 87 86	13, 22, 49, 65	0
1	B	654/672 (97%)	-0.60	3 (0%) 87 86	10, 19, 40, 62	7 (1%)
1	C	654/672 (97%)	-0.38	4 (0%) 85 85	13, 25, 52, 71	7 (1%)
1	D	654/672 (97%)	-0.25	9 (1%) 73 72	16, 27, 56, 75	0
1	E	654/672 (97%)	-0.23	26 (3%) 43 41	12, 24, 67, 95	0
All	All	3270/3360 (97%)	-0.39	45 (1%) 73 72	10, 24, 53, 95	14 (0%)

All (45) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	152	ALA	5.0
1	E	151	GLY	4.5
1	C	697	SER	4.2
1	E	122	MET	3.7
1	A	317	TRP	3.7
1	D	70	SER	3.5
1	E	153	SER	3.3
1	D	69	GLY	3.3
1	B	643	THR	3.2
1	E	88	GLY	3.1
1	C	318[A]	GLY	3.1
1	E	87	GLY	3.0
1	E	100	ASP	3.0
1	E	267	ILE	2.9
1	D	152	ALA	2.8
1	D	686	SER	2.7
1	E	317	TRP	2.7
1	E	155	VAL	2.7
1	D	317	TRP	2.7
1	E	124	THR	2.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	668	ARG	2.5
1	E	148	TYR	2.4
1	D	122	MET	2.4
1	E	97	ILE	2.4
1	A	643	THR	2.4
1	E	126	LEU	2.4
1	E	263	ALA	2.4
1	C	152	ALA	2.3
1	A	319	TRP	2.3
1	D	320	GLY	2.3
1	B	645	TYR	2.3
1	E	91	VAL	2.3
1	E	643	THR	2.3
1	E	127	ILE	2.3
1	D	697	SER	2.3
1	D	266	VAL	2.2
1	E	85	VAL	2.2
1	E	645	TYR	2.2
1	E	123	SER	2.2
1	E	266	VAL	2.1
1	B	684	ARG	2.1
1	E	45	ALA	2.1
1	E	89	GLN	2.0
1	E	82	GLY	2.0
1	E	125	GLY	2.0

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, 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(\AA^2)	Q<0.9
5	EDO	D	704	4/4	0.76	0.24	44,47,49,49	0
5	EDO	C	704	4/4	0.82	0.19	41,44,46,49	0
5	EDO	A	704	4/4	0.89	0.22	36,38,44,44	0
5	EDO	B	706	4/4	0.92	0.12	42,43,46,46	0
5	EDO	A	709	4/4	0.92	0.10	26,27,28,30	0
5	EDO	B	704	4/4	0.92	0.12	31,32,33,34	0
5	EDO	E	704	4/4	0.92	0.13	29,34,36,37	0
4	CL	E	703	1/1	0.93	0.06	22,22,22,22	0
5	EDO	D	706	4/4	0.93	0.10	28,33,35,36	0
4	CL	C	703	1/1	0.93	0.08	25,25,25,25	0
5	EDO	B	705	4/4	0.94	0.11	22,31,37,49	0
5	EDO	C	705	4/4	0.95	0.09	27,30,31,31	0
4	CL	B	703	1/1	0.95	0.05	22,22,22,22	0
5	EDO	A	708	4/4	0.96	0.07	24,26,28,30	0
5	EDO	E	705	4/4	0.96	0.07	26,30,31,32	0
5	EDO	B	707	4/4	0.97	0.06	21,25,27,28	0
5	EDO	D	705	4/4	0.97	0.06	21,22,22,22	0
5	EDO	A	706	4/4	0.97	0.06	19,19,19,20	0
4	CL	D	703	1/1	0.97	0.04	25,25,25,25	0
5	EDO	C	706	4/4	0.97	0.06	21,22,22,25	0
5	EDO	A	707	4/4	0.98	0.05	21,22,22,23	0
5	EDO	A	705	4/4	0.98	0.06	20,22,23,24	0
2	ZN	E	701	1/1	0.98	0.03	21,21,21,21	0
2	ZN	A	701	1/1	0.99	0.02	21,21,21,21	0
3	MN	B	702	1/1	0.99	0.13	38,38,38,38	0
3	MN	C	702	1/1	0.99	0.08	32,32,32,32	0
3	MN	D	702	1/1	0.99	0.07	32,32,32,32	0
3	MN	E	702	1/1	0.99	0.07	31,31,31,31	0
4	CL	A	703	1/1	0.99	0.04	21,21,21,21	0
2	ZN	B	701	1/1	0.99	0.02	18,18,18,18	0
2	ZN	D	701	1/1	1.00	0.02	21,21,21,21	0
2	ZN	C	701	1/1	1.00	0.03	21,21,21,21	0
3	MN	A	702	1/1	1.00	0.06	27,27,27,27	0

6.5 Other polymers [\(i\)](#)

There are no such residues in this entry.