W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

Full wwPDB X-ray Structure Validation Report (i)

Jun 28, 2022 – 12:33 PM EDT

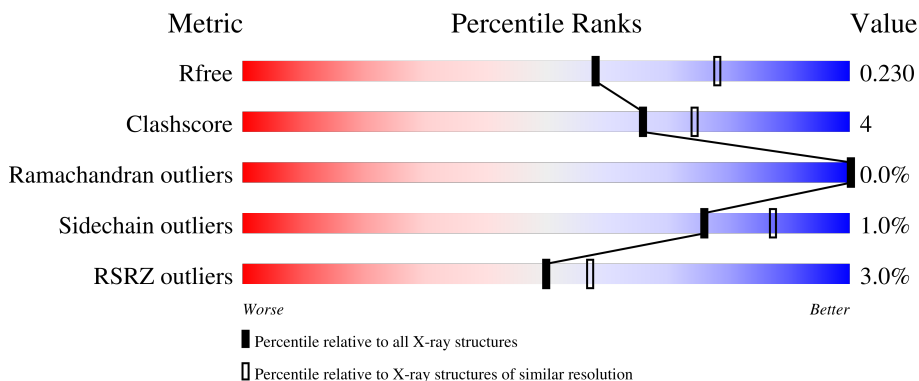|		
PDB ID	:	7TGN
Title	:	Crystal structure of DesD, the desferrioxamine synthetase from the Streptomyces violaceus salmycin biosynthetic pathway
Authors	:	Patel, K.D.; Gulick, A.M.
Deposited on	:	2022-01-07
Resolution	:	2.30 Å(reported)

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 2.30 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	Percentile Ranks	Value
Rfree		0.230
Clashscore		4
Ramachandran outliers		0.0%
Sidechain outliers		1.0%
RSRZ outliers		3.0%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 <=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	609	3% · 86% · 8% · 6%
1	B	609	2% · 84% · 10% · 5%
1	C	609	4% · 84% · 9% · 7%
1	D	609	·% · 84% · 9% · 6%

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

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

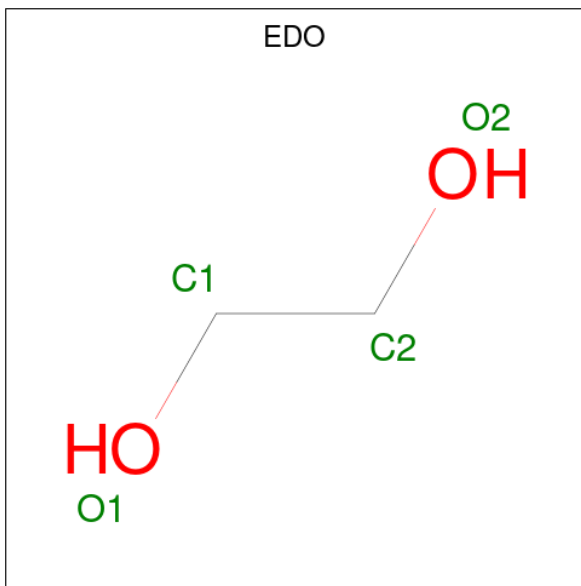| Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	EDO	B	603	-	-	-	X
4	FLC	B	606	-	-	-	X

2   Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 17987 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 Desferrioxamine synthetase DesD.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	575	Total	C	N	O	S	0	0	0
			4408	2827	748	820	13			
1	B	576	Total	C	N	O	S	0	0	0
			4474	2859	770	829	16			
1	C	568	Total	C	N	O	S	0	1	0
			4285	2752	731	787	15			
1	D	570	Total	C	N	O	S	0	1	0
			4464	2854	766	829	15			

- Molecule 2 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).

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

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

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mg 1 1	0	0
3	C	1	Total Mg 1 1	0	0

- Molecule 4 is CITRATE ANION (three-letter code: FLC) (formula: $C_6H_5O_7$).
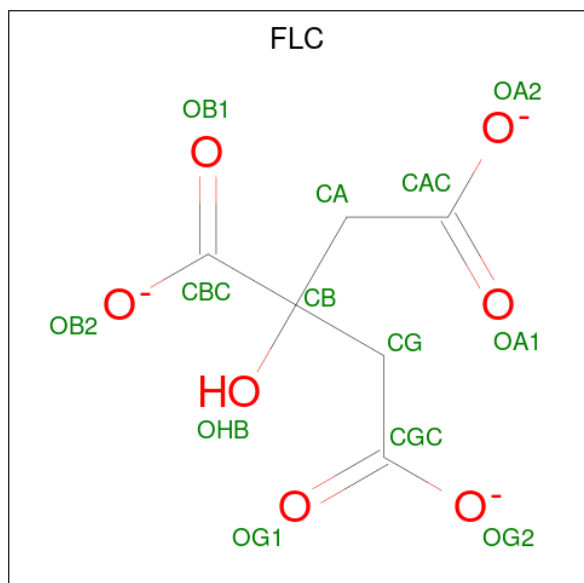
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C O 13 6 7	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	49	Total O 49 49	0	0
5	B	44	Total O 44 44	0	0
5	C	51	Total O 51 51	0	0
5	D	105	Total O 105 105	0	0

3 Residue-property plots ⓘ

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.
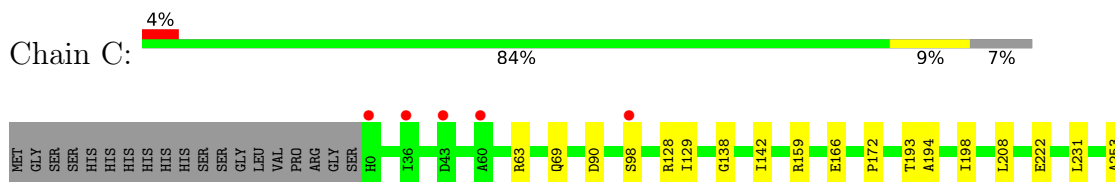
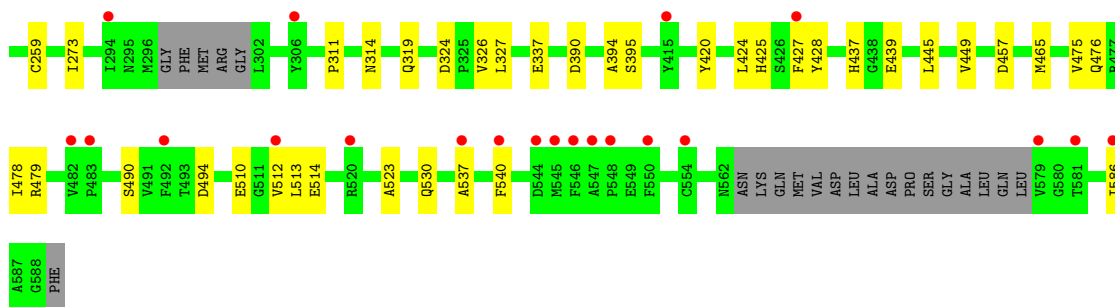• Molecule 1: Desferrioxamine synthetase DesD
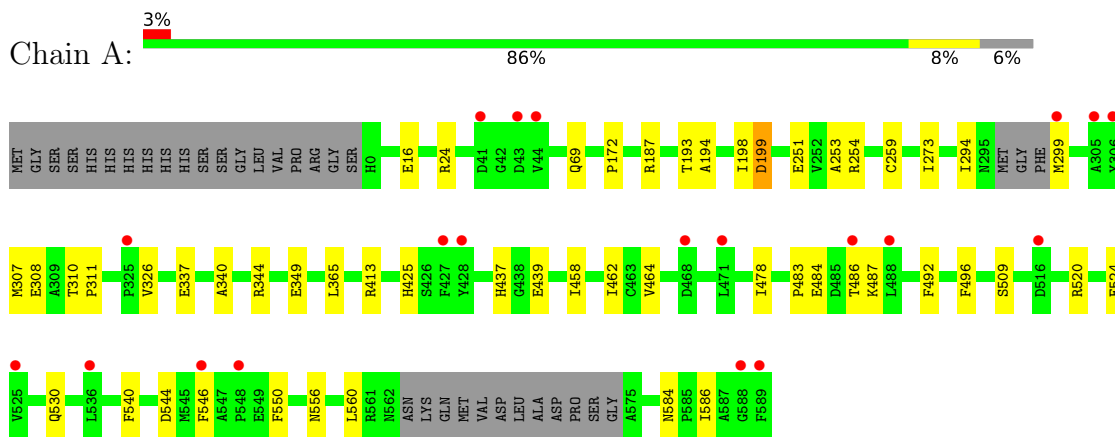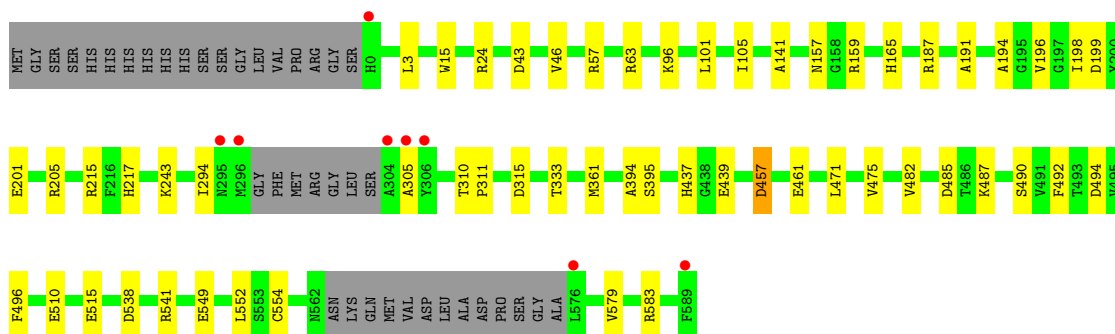
Chain A:

• Molecule 1: Desferrioxamine synthetase DesD

Chain B:

• Molecule 1: Desferrioxamine synthetase DesD

Chain C:
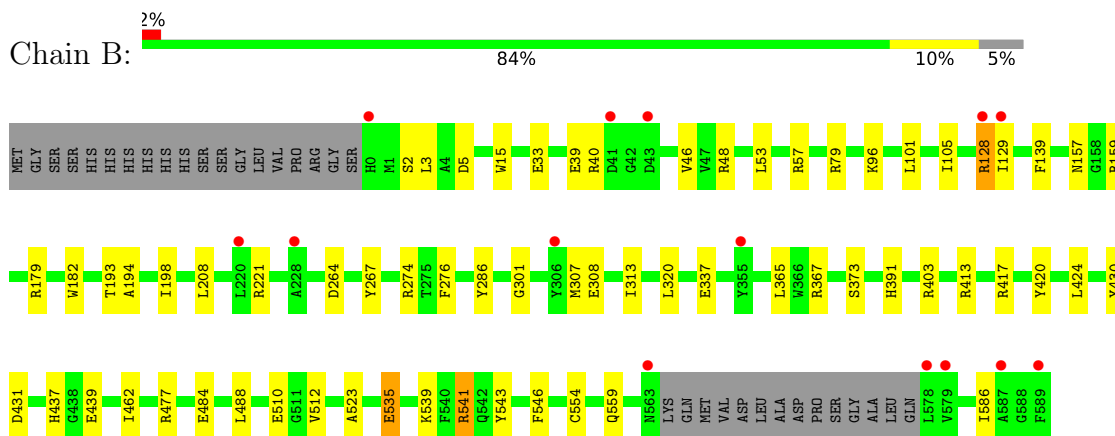
• Molecule 1: Desferrioxamine synthetase DesD

Chain D:
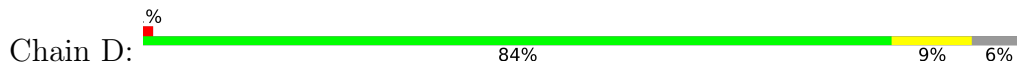
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α, β, γ	108.53Å　　108.53Å　　517.75Å 90.00°　　90.00°　　90.00°	Depositor
Resolution (Å)	49.47　–　2.30 49.47　–　2.30	Depositor EDS
% Data completeness (in resolution range)	100.0 (49.47-2.30) 93.9 (49.47-2.30)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.81 (at 2.29Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.196　,　0.230 0.194　,　0.230	Depositor DCC
R_{free} test set	2000 reflections (1.44%)	wwPDB-VP
Wilson B-factor (Å^2)	52.9	Xtriage
Anisotropy	0.261	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 52.8	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	17987	wwPDB-VP
Average B, all atoms (Å^2)	69.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.17% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: FLC, EDO, MG

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	0.44	0/4519	0.60	0/6168
1	B	0.46	1/4585 (0.0%)	0.67	3/6247 (0.0%)
1	C	0.43	0/4397	0.62	1/6012 (0.0%)
1	D	0.52	0/4577	0.68	0/6234
All	All	0.46	1/18078 (0.0%)	0.65	4/24661 (0.0%)

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	B	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	128	ARG	CG-CD	5.85	1.66	1.51

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	541	ARG	CG-CD-NE	-10.89	88.94	111.80
1	B	541	ARG	CA-CB-CG	-9.14	93.29	113.40
1	B	541	ARG	NE-CZ-NH1	9.02	124.81	120.30
1	C	231	LEU	CB-CG-CD2	-5.04	102.43	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	541	ARG	Sidechain

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	4408	0	4181	30	0
1	B	4474	0	4295	40	0
1	C	4285	0	4021	36	0
1	D	4464	0	4300	34	0
2	A	16	0	24	3	0
2	B	20	0	30	2	0
2	C	16	0	24	2	0
2	D	40	0	60	6	0
3	A	1	0	0	0	0
3	C	1	0	0	0	0
4	B	13	0	5	0	0
5	A	49	0	0	1	0
5	B	44	0	0	1	0
5	C	51	0	0	3	0
5	D	105	0	0	3	0
All	All	17987	0	16940	138	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 4.

All (138) 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:129:ILE:CD1	1:B:129:ILE:CG1	1.78	1.55
1:C:222:GLU:OE1	5:C:701:HOH:O	1.89	0.90
1:B:179:ARG:NH1	1:B:264:ASP:O	2.10	0.84
1:A:199:ASP:OD1	5:A:701:HOH:O	1.96	0.82
1:D:437:HIS:HD2	1:D:439:GLU:H	1.27	0.79
1:B:46:VAL:HG22	1:B:57:ARG:HG2	1.67	0.76
1:B:559:GLN:NE2	5:B:701:HOH:O	2.18	0.76
1:D:141:ALA:H	2:D:605:EDO:H21	1.52	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:437:HIS:HD2	1:B:439:GLU:H	1.36	0.71
1:C:166:GLU:OE2	2:C:602:EDO:H22	1.91	0.70
1:A:464:VAL:HG23	1:A:478:ILE:HD12	1.75	0.69
1:C:194:ALA:HB1	1:C:198:ILE:HB	1.75	0.67
1:B:194:ALA:HB1	1:B:198:ILE:HB	1.77	0.67
1:D:215:ARG:NH2	5:D:703:HOH:O	2.27	0.66
1:B:221:ARG:HG3	1:B:221:ARG:HH11	1.61	0.66
1:D:552:LEU:HD23	1:D:579:VAL:HG22	1.78	0.66
1:C:208:LEU:HD23	2:C:604:EDO:H11	1.77	0.65
1:D:199:ASP:OD1	5:D:701:HOH:O	2.15	0.64
1:C:90:ASP:OD1	5:C:702:HOH:O	2.15	0.63
1:C:63:ARG:NH1	1:C:69:GLN:OE1	2.31	0.63
1:A:187:ARG:HH11	2:A:601:EDO:H22	1.64	0.62
1:C:326:VAL:HG21	1:C:425:HIS:ND1	2.15	0.61
1:A:294:ILE:HD13	1:A:299:MET:N	2.16	0.60
1:B:139:PHE:H	2:B:602:EDO:H22	1.67	0.59
1:D:187:ARG:HH11	2:D:603:EDO:H12	1.67	0.59
1:D:457:ASP:O	1:D:461:GLU:HG2	2.03	0.59
1:B:437:HIS:CD2	1:B:439:GLU:H	2.19	0.58
1:B:128:ARG:O	1:B:391:HIS:NE2	2.37	0.58
1:D:437:HIS:CD2	1:D:439:GLU:H	2.17	0.58
1:B:129:ILE:CD1	1:B:129:ILE:CB	2.75	0.58
1:A:69:GLN:NE2	1:A:509:SER:OG	2.35	0.58
1:C:476:GLN:HE21	1:C:479:ARG:NH2	2.03	0.56
1:D:165:HIS:HD2	2:D:610:EDO:H11	1.71	0.56
1:A:172:PRO:HD3	1:A:273:ILE:HG22	1.87	0.56
1:C:63:ARG:HH11	1:C:63:ARG:HG3	1.70	0.55
1:C:259:CYS:SG	1:D:3:LEU:HG	2.47	0.55
1:D:538:ASP:OD1	1:D:541:ARG:NH2	2.40	0.55
1:C:437:HIS:HD2	1:C:439:GLU:H	1.54	0.55
1:D:490:SER:O	1:D:494:ASP:HB2	2.07	0.54
1:C:128:ARG:O	1:C:129:ILE:HD13	2.09	0.53
1:B:523:ALA:HB2	1:B:586:ILE:HG23	1.90	0.52
1:A:326:VAL:HB	1:A:425:HIS:CE1	2.44	0.52
1:A:556:ASN:O	1:A:560:LEU:HG	2.09	0.52
1:A:251:GLU:OE2	1:A:254:ARG:NH2	2.43	0.51
1:D:201:GLU:O	1:D:205:ARG:HG3	2.10	0.51
1:C:326:VAL:HG21	1:C:425:HIS:CE1	2.46	0.51
1:B:337:GLU:HG2	1:B:365:LEU:HD13	1.92	0.51
1:D:333:THR:HA	2:D:608:EDO:H22	1.91	0.51
1:A:520:ARG:O	1:A:524:GLU:HG3	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:138:GLY:O	1:C:142:ILE:HD12	2.12	0.50
1:A:193:THR:HG21	1:A:308:GLU:O	2.10	0.50
1:A:544:ASP:OD2	1:A:546:PHE:N	2.45	0.49
1:B:101:LEU:HD23	1:B:105:ILE:HD11	1.93	0.49
1:D:395:SER:N	1:D:510:GLU:OE2	2.45	0.49
1:B:320:LEU:HD11	1:B:430:TYR:CE1	2.48	0.48
1:D:46:VAL:HG22	1:D:57:ARG:HG2	1.95	0.48
1:A:484:GLU:HA	1:A:487:LYS:HD2	1.96	0.48
1:B:182:TRP:CZ2	1:B:208:LEU:HD21	2.48	0.48
1:B:413:ARG:O	1:B:417:ARG:HG3	2.14	0.48
1:A:492:PHE:O	1:A:496:PHE:HB2	2.14	0.47
1:C:510:GLU:HB3	1:C:512:VAL:HG23	1.95	0.47
1:D:196:VAL:HG23	1:D:315:ASP:OD2	2.14	0.47
1:D:191:ALA:HA	2:D:603:EDO:H21	1.97	0.47
2:D:604:EDO:H22	2:D:610:EDO:H22	1.96	0.47
1:B:391:HIS:H	1:B:391:HIS:CD2	2.30	0.47
1:B:510:GLU:HB3	1:B:512:VAL:HG23	1.96	0.47
1:C:523:ALA:HB2	1:C:586:ILE:HG23	1.96	0.47
1:A:259:CYS:SG	1:B:3:LEU:HG	2.55	0.47
1:B:128:ARG:O	1:B:391:HIS:CD2	2.68	0.46
1:B:286:TYR:HB2	1:B:367:ARG:HB3	1.97	0.46
1:C:530:GLN:HG2	1:C:540:PHE:CE2	2.50	0.46
1:D:471:LEU:HD13	1:D:475:VAL:HG12	1.97	0.46
1:D:482:VAL:CG2	1:D:487:LYS:HG2	2.45	0.46
1:A:413:ARG:NH1	1:A:524:GLU:OE2	2.48	0.46
1:B:157:ASN:O	1:B:159:ARG:HD2	2.15	0.46
1:D:243:LYS:HB3	1:D:361:MET:CE	2.46	0.46
1:A:344:ARG:HD2	1:A:349:GLU:OE2	2.15	0.46
1:C:490:SER:O	1:C:494:ASP:HB2	2.15	0.46
1:B:313:ILE:CG2	1:B:462:ILE:HD11	2.46	0.46
1:C:537:ALA:HA	1:C:540:PHE:CD2	2.51	0.46
1:A:483:PRO:HB2	1:A:486:THR:HG23	1.98	0.46
1:C:324:ASP:OD1	1:C:326:VAL:HG22	2.16	0.46
1:D:157:ASN:O	1:D:159:ARG:HD2	2.15	0.46
1:C:314:ASN:ND2	1:C:337:GLU:HB2	2.31	0.45
1:B:96:LYS:NZ	1:B:101:LEU:O	2.49	0.45
1:B:33:GLU:OE1	1:B:554:CYS:HB3	2.16	0.45
1:B:267:TYR:HB3	1:B:276:PHE:HB3	1.99	0.45
1:C:513:LEU:HD23	1:C:514:GLU:O	2.16	0.45
1:D:194:ALA:HB1	1:D:198:ILE:HB	1.99	0.45
2:A:601:EDO:H12	5:C:723:HOH:O	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:476:GLN:HG2	1:C:479:ARG:CZ	2.47	0.45
1:D:492:PHE:O	1:D:496:PHE:HB2	2.17	0.45
1:B:39:GLU:OE1	1:B:48:ARG:NH2	2.50	0.44
1:C:193:THR:HG22	1:C:311:PRO:HG2	1.99	0.44
1:C:445:LEU:HA	1:C:449:VAL:O	2.17	0.44
1:D:63:ARG:HD2	1:D:515:GLU:OE2	2.17	0.44
1:D:294:ILE:HD12	1:D:294:ILE:N	2.33	0.44
1:B:431:ASP:OD1	1:B:539:LYS:NZ	2.50	0.44
1:C:63:ARG:NH1	1:C:63:ARG:HG3	2.32	0.44
1:A:310:THR:HB	1:A:311:PRO:HD3	2.00	0.44
1:C:395:SER:HB3	1:C:510:GLU:OE2	2.18	0.44
1:C:420:TYR:CE2	1:C:424:LEU:HD11	2.53	0.44
1:A:464:VAL:HG23	1:A:478:ILE:CD1	2.43	0.44
1:B:2:SER:HB3	1:B:5:ASP:OD2	2.18	0.43
1:B:53:LEU:O	1:B:79:ARG:HG3	2.18	0.43
1:D:96:LYS:NZ	1:D:101:LEU:O	2.49	0.43
1:A:530:GLN:HA	1:A:540:PHE:CE1	2.53	0.43
1:C:427:PHE:CE1	1:C:465:MET:HE1	2.53	0.43
1:B:274:ARG:NH1	1:B:301:GLY:O	2.52	0.43
1:C:172:PRO:HD3	1:C:273:ILE:HG22	1.99	0.43
1:D:554:CYS:SG	1:D:579:VAL:HG11	2.59	0.43
1:A:492:PHE:HB3	1:A:550:PHE:CE1	2.54	0.43
1:B:193:THR:HG21	1:B:308:GLU:O	2.20	0.42
1:C:475:VAL:O	1:C:478:ILE:HG12	2.20	0.42
1:A:337:GLU:HG2	1:A:365:LEU:HD13	2.01	0.42
1:D:549:GLU:HG2	1:D:583:ARG:HA	2.01	0.42
1:D:394:ALA:HA	1:D:510:GLU:OE2	2.19	0.42
1:A:187:ARG:HG2	2:A:601:EDO:H11	2.02	0.42
1:A:584:ASN:OD1	1:A:586:ILE:HG12	2.20	0.42
1:B:488:LEU:HD22	1:B:543:TYR:HB3	2.02	0.42
1:B:546:PHE:CE2	1:B:586:ILE:HG21	2.55	0.42
1:A:458:ILE:O	1:A:462:ILE:HG23	2.19	0.41
1:C:530:GLN:HG2	1:C:540:PHE:CZ	2.54	0.41
1:A:253:ALA:HB1	1:B:15:TRP:HB2	2.02	0.41
1:D:310:THR:HB	1:D:311:PRO:HD3	2.01	0.41
1:A:307:MET:CG	1:A:340:ALA:HB1	2.50	0.41
1:C:428:TYR:CD1	1:C:540:PHE:HE1	2.38	0.41
1:A:194:ALA:HB1	1:A:198:ILE:HB	2.01	0.41
1:B:373:SER:HB3	2:B:604:EDO:H21	2.02	0.41
1:C:327:LEU:HD23	1:C:327:LEU:HA	1.87	0.41
1:C:390:ASP:OD2	1:C:394:ALA:HB3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:535:GLU:H	1:B:535:GLU:CD	2.24	0.41
1:B:221:ARG:HG3	1:B:221:ARG:NH1	2.33	0.41
1:D:217:HIS:HE1	5:D:797:HOH:O	2.04	0.41
1:C:253:ALA:HB1	1:D:15:TRP:HB2	2.04	0.40
1:A:437:HIS:NE2	1:A:439:GLU:HB2	2.36	0.40
1:D:105:ILE:H	1:D:105:ILE:HG13	1.77	0.40
1:B:420:TYR:CE2	1:B:424:LEU:HD11	2.57	0.40

There are no symmetry-related clashes.

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	569/609 (93%)	554 (97%)	15 (3%)	0	100	100
1	B	572/609 (94%)	550 (96%)	22 (4%)	0	100	100
1	C	563/609 (92%)	544 (97%)	19 (3%)	0	100	100
1	D	565/609 (93%)	550 (97%)	14 (2%)	1 (0%)	47	58
All	All	2269/2436 (93%)	2198 (97%)	70 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	305	ALA

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	437/506 (86%)	434 (99%)	3 (1%)	84	92
1	B	452/506 (89%)	446 (99%)	6 (1%)	69	82
1	C	414/506 (82%)	410 (99%)	4 (1%)	76	87
1	D	455/506 (90%)	451 (99%)	4 (1%)	78	89
All	All	1758/2024 (87%)	1741 (99%)	17 (1%)	76	87

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	16	GLU
1	A	24	ARG
1	A	199	ASP
1	B	40	ARG
1	B	307	MET
1	B	403	ARG
1	B	477	ARG
1	B	484	GLU
1	B	535	GLU
1	C	98	SER
1	C	159	ARG
1	C	319	GLN
1	C	457	ASP
1	D	24	ARG
1	D	43	ASP
1	D	457	ASP
1	D	485	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	140	GLN
1	A	270	GLN
1	A	425	HIS
1	B	437	HIS
1	B	559	GLN
1	C	157	ASN
1	C	437	HIS
1	C	476	GLN

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Mol	Chain	Res	Type
1	C	530	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 26 ligands modelled in this entry, 2 are monoatomic - leaving 24 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
2	EDO	B	602	-	3,3,3	0.28	0	2,2,2	1.67	1 (50%)
2	EDO	D	609	-	3,3,3	0.59	0	2,2,2	0.02	0
2	EDO	A	601	-	3,3,3	0.46	0	2,2,2	0.99	0
2	EDO	A	604	-	3,3,3	0.47	0	2,2,2	0.28	0
2	EDO	D	605	-	3,3,3	0.73	0	2,2,2	0.42	0
2	EDO	A	603	-	3,3,3	0.47	0	2,2,2	0.41	0
2	EDO	C	601	-	3,3,3	0.29	0	2,2,2	0.65	0
2	EDO	C	604	-	3,3,3	0.75	0	2,2,2	0.12	0
2	EDO	D	607	-	3,3,3	0.65	0	2,2,2	0.20	0
2	EDO	D	606	-	3,3,3	0.73	0	2,2,2	0.17	0
2	EDO	C	603	-	3,3,3	0.47	0	2,2,2	0.71	0
2	EDO	B	604	-	3,3,3	0.58	0	2,2,2	0.20	0
2	EDO	C	602	-	3,3,3	0.54	0	2,2,2	0.51	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
2	EDO	B	603	-	3,3,3	0.64	0	2,2,2	0.18	0
2	EDO	B	601	-	3,3,3	0.55	0	2,2,2	0.24	0
2	EDO	D	603	-	3,3,3	0.91	0	2,2,2	0.81	0
2	EDO	D	608	-	3,3,3	0.53	0	2,2,2	0.12	0
2	EDO	D	602	-	3,3,3	0.28	0	2,2,2	1.67	0
2	EDO	D	601	-	3,3,3	0.69	0	2,2,2	0.83	0
4	FLC	B	606	-	12,12,12	1.12	2 (16%)	17,17,17	1.03	2 (11%)
2	EDO	A	602	-	3,3,3	0.92	0	2,2,2	0.12	0
2	EDO	D	610	-	3,3,3	0.48	0	2,2,2	0.40	0
2	EDO	B	605	-	3,3,3	0.58	0	2,2,2	0.29	0
2	EDO	D	604	-	3,3,3	0.41	0	2,2,2	0.49	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
2	EDO	B	602	-	-	0/1/1/1	-
2	EDO	D	609	-	-	0/1/1/1	-
2	EDO	A	601	-	-	0/1/1/1	-
2	EDO	A	604	-	-	0/1/1/1	-
2	EDO	D	605	-	-	1/1/1/1	-
2	EDO	A	603	-	-	0/1/1/1	-
2	EDO	C	601	-	-	0/1/1/1	-
2	EDO	C	604	-	-	1/1/1/1	-
2	EDO	D	607	-	-	0/1/1/1	-
2	EDO	D	606	-	-	1/1/1/1	-
2	EDO	C	603	-	-	1/1/1/1	-
2	EDO	B	604	-	-	0/1/1/1	-
2	EDO	C	602	-	-	0/1/1/1	-
2	EDO	B	603	-	-	1/1/1/1	-
2	EDO	B	601	-	-	0/1/1/1	-
2	EDO	D	603	-	-	1/1/1/1	-
2	EDO	D	608	-	-	0/1/1/1	-
2	EDO	D	602	-	-	1/1/1/1	-
2	EDO	D	601	-	-	1/1/1/1	-
4	FLC	B	606	-	-	2/16/16/16	-
2	EDO	A	602	-	-	1/1/1/1	-
2	EDO	D	610	-	-	0/1/1/1	-
2	EDO	B	605	-	-	0/1/1/1	-
2	EDO	D	604	-	-	0/1/1/1	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	606	FLC	OG1-CGC	2.89	1.31	1.22
4	B	606	FLC	OG2-CGC	-2.33	1.22	1.30

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	606	FLC	OG1-CGC-CG	-3.17	113.68	122.94
4	B	606	FLC	OG2-CGC-CG	2.73	123.12	114.35
2	B	602	EDO	O2-C2-C1	-2.21	96.03	111.91

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	601	EDO	O1-C1-C2-O2
2	B	603	EDO	O1-C1-C2-O2
2	D	605	EDO	O1-C1-C2-O2
2	D	606	EDO	O1-C1-C2-O2
2	A	602	EDO	O1-C1-C2-O2
2	D	603	EDO	O1-C1-C2-O2
4	B	606	FLC	CB-CG-CGC-OG1
2	D	602	EDO	O1-C1-C2-O2
2	C	603	EDO	O1-C1-C2-O2
2	C	604	EDO	O1-C1-C2-O2
4	B	606	FLC	CB-CG-CGC-OG2

There are no ring outliers.

10 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	602	EDO	1	0
2	A	601	EDO	3	0
2	D	605	EDO	1	0
2	C	604	EDO	1	0
2	B	604	EDO	1	0
2	C	602	EDO	1	0
2	D	603	EDO	2	0
2	D	608	EDO	1	0
2	D	610	EDO	2	0
2	D	604	EDO	1	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(Å²)	Q<0.9
1	A	575/609 (94%)	0.30	20 (3%)	44	51	42, 71, 105, 132	0
1	B	576/609 (94%)	0.17	14 (2%)	59	66	48, 67, 99, 133	0
1	C	568/609 (93%)	0.28	26 (4%)	32	39	43, 81, 121, 143	0
1	D	570/609 (93%)	0.08	8 (1%)	75	80	41, 54, 84, 127	0
All	All	2289/2436 (93%)	0.20	68 (2%)	50	57	41, 66, 110, 143	0

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	579	VAL	6.0
1	C	579	VAL	5.8
1	C	548	PRO	5.6
1	C	586	ILE	5.2
1	B	578	LEU	5.1
1	B	589	PHE	5.0
1	A	468	ASP	4.4
1	A	589	PHE	4.3
1	B	306	TYR	4.3
1	A	299	MET	4.2
1	C	482	VAL	4.1
1	D	304	ALA	3.9
1	D	0	HIS	3.8
1	C	550	PHE	3.7
1	A	43	ASP	3.5
1	D	306	TYR	3.5
1	B	563	ASN	3.3
1	C	547	ALA	3.3
1	D	295	ASN	3.1
1	D	305	ALA	3.1
1	A	428	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
1	D	296	MET	3.1
1	B	228	ALA	3.0
1	C	546	PHE	2.9
1	B	587	ALA	2.9
1	D	576	LEU	2.9
1	B	220	LEU	2.8
1	A	305	ALA	2.7
1	C	427	PHE	2.6
1	A	546	PHE	2.6
1	A	516	ASP	2.6
1	A	471	LEU	2.6
1	B	41	ASP	2.6
1	B	43	ASP	2.5
1	C	60	ALA	2.5
1	C	98	SER	2.5
1	C	43	ASP	2.5
1	C	294	ILE	2.5
1	C	537	ALA	2.4
1	A	548	PRO	2.4
1	A	427	PHE	2.4
1	C	512	VAL	2.4
1	A	41	ASP	2.4
1	C	492	PHE	2.4
1	A	325	PRO	2.3
1	D	589	PHE	2.2
1	A	486	THR	2.2
1	B	0	HIS	2.2
1	A	44	VAL	2.2
1	C	36	ILE	2.2
1	A	488	LEU	2.2
1	B	128	ARG	2.2
1	A	306	TYR	2.2
1	C	540	PHE	2.2
1	A	536	LEU	2.1
1	A	588	GLY	2.1
1	C	554	CYS	2.1
1	B	355	TYR	2.1
1	C	306	TYR	2.1
1	C	581	THR	2.1
1	C	415	TYR	2.1
1	B	129	ILE	2.1
1	C	545	MET	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	0	HIS	2.1
1	C	520	ARG	2.0
1	C	483	PRO	2.0
1	C	544	ASP	2.0
1	A	525	VAL	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 monosaccharides 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. 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
4	FLC	B	606	13/13	0.59	0.42	100,105,113,121	0
2	EDO	D	605	4/4	0.74	0.29	53,58,68,69	0
2	EDO	D	603	4/4	0.75	0.23	49,59,68,70	0
2	EDO	B	603	4/4	0.78	0.48	74,76,80,83	0
2	EDO	D	601	4/4	0.79	0.24	55,57,58,79	0
2	EDO	C	604	4/4	0.79	0.38	55,60,63,75	0
2	EDO	B	605	4/4	0.81	0.21	64,69,72,84	0
2	EDO	C	602	4/4	0.84	0.21	57,62,64,68	0
2	EDO	D	610	4/4	0.85	0.21	66,70,78,79	0
2	EDO	D	608	4/4	0.85	0.27	58,63,68,89	0
2	EDO	D	609	4/4	0.87	0.17	65,69,72,92	0
2	EDO	D	604	4/4	0.89	0.19	63,63,63,84	0
2	EDO	A	602	4/4	0.89	0.15	48,56,65,65	0
2	EDO	A	603	4/4	0.89	0.19	67,67,84,86	0
2	EDO	B	604	4/4	0.90	0.22	64,67,67,81	0
2	EDO	A	604	4/4	0.90	0.27	63,65,76,79	0
2	EDO	C	601	4/4	0.91	0.31	71,76,78,91	0
2	EDO	B	602	4/4	0.91	0.23	55,60,63,78	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MG	C	605	1/1	0.91	0.08	54,54,54,54	0
2	EDO	C	603	4/4	0.91	0.28	67,79,90,94	0
3	MG	A	605	1/1	0.92	0.19	61,61,61,61	0
2	EDO	D	606	4/4	0.93	0.24	48,56,59,71	0
2	EDO	D	607	4/4	0.93	0.19	51,54,56,59	0
2	EDO	A	601	4/4	0.95	0.15	54,55,59,73	0
2	EDO	D	602	4/4	0.96	0.23	45,48,55,58	0
2	EDO	B	601	4/4	0.96	0.18	55,55,59,84	0

6.5 Other polymers ⓘ

There are no such residues in this entry.