



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 01:56 PM UTC

PDB ID : 1DGD / pdb_00001dgd
Title : AN ALKALI METAL ION SIZE-DEPENDENT SWITCH IN THE ACTIVE SITE STRUCTURE OF DIALKYLGLYCINE DECARBOXYLASE
Authors : Hohenester, E.; Jansonius, J.N.
Deposited on : 1994-06-29
Resolution : 2.80 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)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

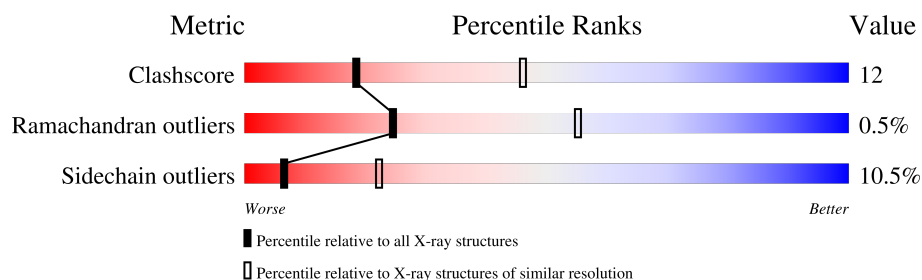
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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))
Clashscore	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)

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 $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	432	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 3375 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 DIALKYLGLYCINE DECARBOXYLASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	431	Total	C	N	O	S	83	0	0
			3247	2048	576	605	18			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	15	HIS	GLN	conflict	UNP P16932

- Molecule 2 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Na	0	0
			1	1		

- Molecule 3 is LITHIUM ION (CCD ID: LI) (formula: Li).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Li	1	0
			1	1		

- Molecule 4 is PYRIDOXAL-5'-PHOSPHATE (CCD ID: PLP) (formula: C₈H₁₀NO₆P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			15	8	1	5	1		

- Molecule 5 is 2-(N-MORPHOLINO)-ETHANESULFONIC ACID (CCD ID: MES) (formula: $C_6H_{13}NO_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 6 is water.

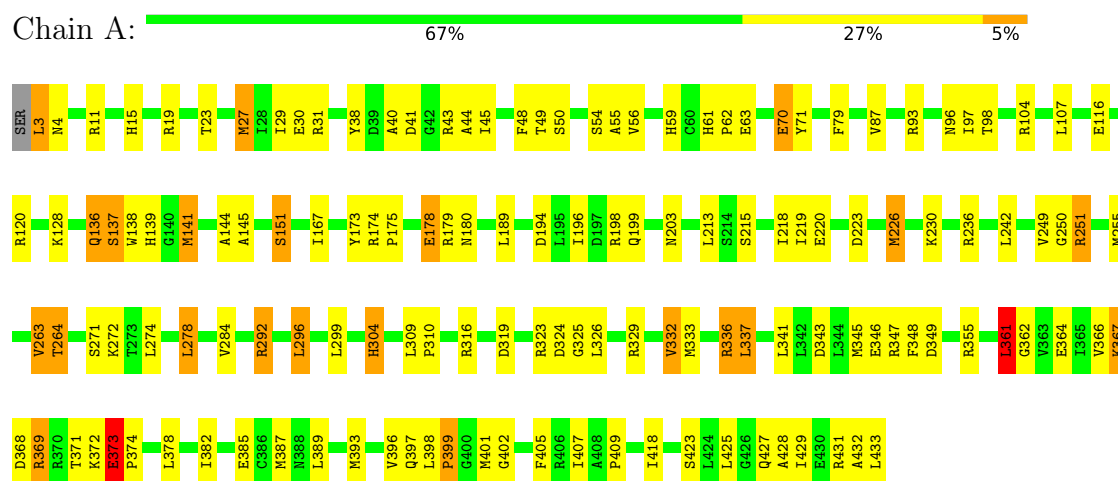
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	99	Total 99	O 99	0	0

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. 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. 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.

Note EDS was not executed.

• Molecule 1: DIALKYLGLYCINE DECARBOXYLASE



4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 64 2 2	Depositor
Cell constants a, b, c, α , β , γ	152.70Å 152.70Å 86.60Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	8.00 – 2.80	Depositor
% Data completeness (in resolution range)	(Not available) (8.00-2.80)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	TNT	Depositor
R, R_{free}	0.178 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3375	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: LI, MES, PLP, 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	1.15	1/3304 (0.0%)	1.76	41/4471 (0.9%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	178	GLU	CD-OE2	5.35	1.35	1.25

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	71	TYR	N-CA-C	10.32	123.58	111.71
1	A	348	PHE	N-CA-C	8.91	123.25	108.73
1	A	15	HIS	CA-CB-CG	8.50	122.30	113.80
1	A	263	VAL	N-CA-CB	7.45	120.85	111.46
1	A	226	MET	CA-CB-CG	-7.25	99.61	114.10
1	A	175	PRO	CB-CA-C	-7.09	102.56	111.56
1	A	31	ARG	N-CA-CB	-6.99	100.73	111.56
1	A	141	MET	CA-C-N	-6.90	113.20	122.72
1	A	141	MET	C-N-CA	-6.90	113.20	122.72
1	A	70	GLU	N-CA-CB	6.76	121.21	109.72
1	A	264	THR	CB-CA-C	6.74	117.60	109.31
1	A	96	ASN	N-CA-C	6.71	119.60	111.82
1	A	98	THR	N-CA-C	-6.50	101.89	110.40
1	A	251	ARG	N-CA-C	6.33	118.99	111.33
1	A	250	GLY	N-CA-C	6.31	122.59	115.08
1	A	399	PRO	CB-CA-C	-6.21	103.44	111.46
1	A	336	ARG	CA-CB-CG	-6.19	101.71	114.10
1	A	220	GLU	CB-CA-C	-5.91	100.10	109.80
1	A	180	ASN	CA-CB-CG	-5.87	106.73	112.60
1	A	167	ILE	O-C-N	-5.80	116.59	121.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	366	VAL	CB-CA-C	-5.66	101.63	110.69
1	A	19	ARG	NE-CZ-NH1	-5.65	115.85	121.50
1	A	145	ALA	N-CA-C	-5.58	105.10	111.07
1	A	79	PHE	CA-CB-CG	-5.55	108.25	113.80
1	A	369	ARG	N-CA-CB	5.53	118.88	110.14
1	A	373	GLU	CA-C-O	5.52	125.32	119.80
1	A	429	ILE	CB-CA-C	-5.49	104.64	112.22
1	A	223	ASP	N-CA-CB	5.47	118.07	109.69
1	A	71	TYR	CA-CB-CG	-5.43	104.12	113.90
1	A	196	ILE	CB-CA-C	-5.43	105.02	111.97
1	A	304	HIS	N-CA-C	5.43	119.22	112.59
1	A	137	SER	CA-C-N	5.42	130.06	121.72
1	A	137	SER	C-N-CA	5.42	130.06	121.72
1	A	432	ALA	N-CA-C	5.30	119.47	112.89
1	A	361	LEU	CA-C-N	5.30	126.20	122.33
1	A	361	LEU	C-N-CA	5.30	126.20	122.33
1	A	11	ARG	N-CA-C	-5.12	105.39	110.97
1	A	59	HIS	CA-CB-CG	-5.08	108.72	113.80
1	A	226	MET	N-CA-C	5.05	117.44	111.33
1	A	278	LEU	CA-C-N	-5.02	113.57	119.84
1	A	278	LEU	C-N-CA	-5.02	113.57	119.84

There are no chirality outliers.

There are no planarity outliers.

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	3247	0	3275	77	0
2	A	1	0	0	0	0
3	A	1	0	0	0	0
4	A	15	0	6	2	0
5	A	12	0	13	1	0
6	A	99	0	0	4	0
All	All	3375	0	3294	77	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 12.

All (77) 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:3:LEU:HD12	1:A:4:ASN:H	1.19	1.04
1:A:45:ILE:HG21	1:A:387:MET:HE1	1.49	0.93
1:A:378:LEU:O	1:A:382:ILE:HG13	1.87	0.74
1:A:393:MET:HE3	1:A:405:PHE:CD1	2.23	0.73
1:A:323:ARG:HD2	1:A:324:ASP:OD1	1.88	0.73
1:A:3:LEU:HD12	1:A:4:ASN:N	2.01	0.71
1:A:374:PRO:HB3	1:A:402:GLY:HA2	1.73	0.71
1:A:337:LEU:HD13	1:A:361:LEU:HD23	1.75	0.68
1:A:398:LEU:HB3	1:A:399:PRO:HD2	1.76	0.68
1:A:61:HIS:HE1	1:A:63:GLU:HG3	1.59	0.67
1:A:251:ARG:NE	6:A:507:HOH:O	2.28	0.66
1:A:61:HIS:CE1	1:A:63:GLU:HG3	2.32	0.65
1:A:345:MET:O	1:A:369:ARG:NH2	2.30	0.65
1:A:137:SER:O	1:A:151:SER:HB3	1.98	0.62
1:A:30:GLU:HG3	1:A:40:ALA:HA	1.81	0.62
1:A:93:ARG:NH2	1:A:319:ASP:OD1	2.28	0.62
1:A:3:LEU:HA	1:A:41:ASP:OD1	2.01	0.60
1:A:215:SER:OG	5:A:434:MES:H21	2.01	0.60
1:A:309:LEU:HB3	1:A:310:PRO:HD3	1.86	0.58
1:A:332:VAL:HG12	1:A:333:MET:HE2	1.85	0.58
1:A:309:LEU:C	1:A:309:LEU:HD23	2.29	0.58
1:A:389:LEU:HD12	1:A:428:ALA:HB2	1.86	0.57
1:A:45:ILE:CG2	1:A:387:MET:HE1	2.32	0.55
1:A:38:TYR:CE2	1:A:44:ALA:HB2	2.41	0.55
1:A:173:TYR:CE1	1:A:372:LYS:HE2	2.42	0.55
1:A:3:LEU:CD1	1:A:4:ASN:H	2.05	0.54
1:A:292:ARG:HD3	1:A:296:LEU:HD22	1.88	0.54
1:A:397:GLN:C	1:A:398:LEU:HD22	2.33	0.53
1:A:218:ILE:HG22	1:A:218:ILE:O	2.09	0.53
1:A:61:HIS:ND1	1:A:62:PRO:HD2	2.24	0.53
1:A:226:MET:HE1	1:A:242:LEU:HD11	1.92	0.52
1:A:45:ILE:HG21	1:A:387:MET:CE	2.33	0.51
1:A:136:GLN:HE21	1:A:136:GLN:N	2.10	0.51
1:A:27:MET:CE	1:A:29:ILE:HD11	2.42	0.49
1:A:304:HIS:HD2	6:A:555:HOH:O	1.94	0.49
1:A:194:ASP:O	1:A:198:ARG:HG3	2.11	0.49
1:A:139:HIS:O	4:A:437:PLP:H6	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:ARG:HH11	1:A:236:ARG:HG3	1.78	0.48
1:A:138:TRP:HB2	1:A:215:SER:HB3	1.95	0.48
1:A:116:GLU:OE2	1:A:144:ALA:N	2.47	0.48
1:A:128:LYS:HB3	1:A:203:ASN:O	2.14	0.47
1:A:213:LEU:HB2	1:A:219:ILE:HB	1.96	0.47
1:A:367:LYS:N	1:A:373:GLU:O	2.39	0.47
1:A:61:HIS:CE1	1:A:63:GLU:CG	2.98	0.46
1:A:27:MET:HE1	1:A:45:ILE:HD13	1.98	0.46
1:A:54:SER:O	1:A:56:VAL:N	2.46	0.46
1:A:249:VAL:O	1:A:249:VAL:HG12	2.16	0.45
1:A:341:LEU:HD23	1:A:341:LEU:HA	1.68	0.45
1:A:407:ILE:HG22	1:A:409:PRO:HD3	1.99	0.45
1:A:398:LEU:HD22	1:A:398:LEU:N	2.31	0.45
1:A:343:ASP:O	1:A:346:GLU:HB2	2.17	0.45
1:A:87:VAL:HG13	1:A:107:LEU:HD12	1.98	0.45
1:A:385:GLU:HB2	1:A:428:ALA:HB1	1.97	0.45
1:A:316:ARG:O	1:A:316:ARG:HG3	2.17	0.44
1:A:97:ILE:HD12	1:A:255:MET:HE3	1.99	0.44
1:A:355:ARG:O	1:A:361:LEU:HD12	2.18	0.44
1:A:325:GLY:HA2	6:A:569:HOH:O	2.18	0.44
1:A:27:MET:HE2	1:A:29:ILE:HD11	1.98	0.44
1:A:337:LEU:HG	1:A:418:ILE:CD1	2.48	0.43
1:A:61:HIS:CG	1:A:62:PRO:HD2	2.53	0.43
1:A:137:SER:HB2	1:A:139:HIS:NE2	2.33	0.43
1:A:272:LYS:NZ	4:A:437:PLP:O3	2.50	0.43
1:A:38:TYR:HE2	1:A:44:ALA:HB2	1.83	0.43
1:A:236:ARG:HH11	1:A:236:ARG:CG	2.32	0.43
1:A:230:LYS:O	1:A:230:LYS:HG3	2.19	0.42
1:A:349:ASP:HA	1:A:369:ARG:NH2	2.34	0.42
1:A:292:ARG:CD	1:A:296:LEU:HD22	2.48	0.42
1:A:199:GLN:HB3	6:A:518:HOH:O	2.19	0.42
1:A:337:LEU:HD23	1:A:337:LEU:HA	1.73	0.42
1:A:401:MET:HE2	1:A:401:MET:HB3	1.90	0.41
1:A:362:GLY:HA2	1:A:405:PHE:O	2.19	0.41
1:A:423:SER:O	1:A:427:GLN:HG3	2.20	0.41
1:A:49:THR:O	1:A:50:SER:HB2	2.21	0.41
1:A:326:LEU:HD23	1:A:326:LEU:HA	1.73	0.41
1:A:120:ARG:HH11	1:A:120:ARG:HD3	1.63	0.41
1:A:296:LEU:HD12	1:A:296:LEU:HA	1.74	0.40
1:A:174:ARG:NH2	1:A:364:GLU:OE2	2.49	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	429/432 (99%)	403 (94%)	24 (6%)	2 (0%)	24	55

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	55	ALA
1	A	271	SER

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	333/334 (100%)	298 (90%)	35 (10%)	6	22

All (35) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	LEU
1	A	23	THR
1	A	27	MET
1	A	43	ARG
1	A	48	PHE
1	A	70	GLU
1	A	104	ARG
1	A	136	GLN
1	A	141	MET

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Mol	Chain	Res	Type
1	A	151	SER
1	A	178	GLU
1	A	179	ARG
1	A	189	LEU
1	A	263	VAL
1	A	264	THR
1	A	274	LEU
1	A	278	LEU
1	A	284	VAL
1	A	292	ARG
1	A	296	LEU
1	A	299	LEU
1	A	329	ARG
1	A	332	VAL
1	A	336	ARG
1	A	337	LEU
1	A	347	ARG
1	A	361	LEU
1	A	367	LYS
1	A	368	ASP
1	A	371	THR
1	A	373	GLU
1	A	396	VAL
1	A	425	LEU
1	A	431	ARG
1	A	433	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	136	GLN
1	A	203	ASN
1	A	259	GLN
1	A	304	HIS
1	A	427	GLN

5.3.3 RNA ⓘ

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 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 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	MES	A	434	-	12,12,12	0.76	0	15,16,16	1.48	2 (13%)
4	PLP	A	437	1	15,15,16	1.51	2 (13%)	21,22,23	2.52	7 (33%)

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	MES	A	434	-	-	2/6/14/14	0/1/1/1
4	PLP	A	437	1	-	0/6/6/8	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	437	PLP	C4A-C4	-3.76	1.44	1.51
4	A	437	PLP	P-O2P	-2.14	1.46	1.54

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	437	PLP	C2A-C2-C3	5.02	126.67	120.80
4	A	437	PLP	O4P-C5A-C5	4.92	118.57	109.36
4	A	437	PLP	C3-C2-N1	-4.76	114.95	120.96
4	A	437	PLP	C6-N1-C2	4.29	126.98	119.20
4	A	437	PLP	C5-C6-N1	-4.22	116.96	123.83
5	A	434	MES	O3S-S-O2S	3.35	119.78	111.40
4	A	437	PLP	C6-C5-C4	2.84	120.42	118.10
5	A	434	MES	O3S-S-C8	-2.37	101.37	106.00
4	A	437	PLP	O3-C3-C4	2.20	123.84	118.10

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	434	MES	N4-C7-C8-S
5	A	434	MES	C7-C8-S-O2S

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	434	MES	1	0
4	A	437	PLP	2	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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.