



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 21, 2020 – 06:55 PM BST

PDB ID : 6QL4
Title : Crystal structure of nucleotide-free Mgm1
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Deposited on : 2019-01-31
Resolution : 3.60 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.13.1
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.13.1

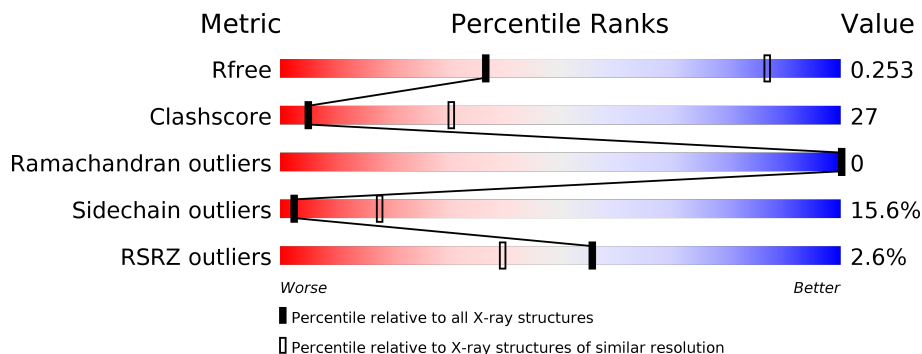
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.60 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}	130704	1257 (3.70-3.50)
Clashscore	141614	1353 (3.70-3.50)
Ramachandran outliers	138981	1307 (3.70-3.50)
Sidechain outliers	138945	1307 (3.70-3.50)
RSRZ outliers	127900	1161 (3.70-3.50)

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 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	939	 3% 50% 17% 30%
1	B	939	 3% 41% 22% 8% 30%

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	A	1001	-	-	-	X

2 Entry composition [i](#)

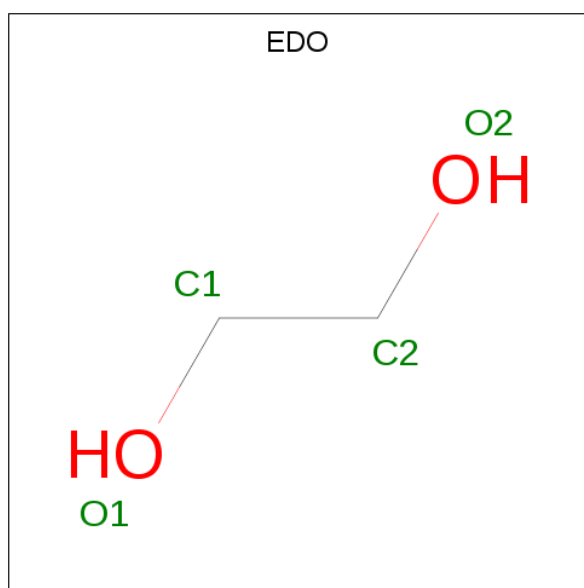
There are 2 unique types of molecules in this entry. The entry contains 10330 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Putative mitochondrial dynamin protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	660	5163	3249	914	983	5	12	0	0	0
1	B	660	5159	3247	911	984	5	12	0	0	0

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

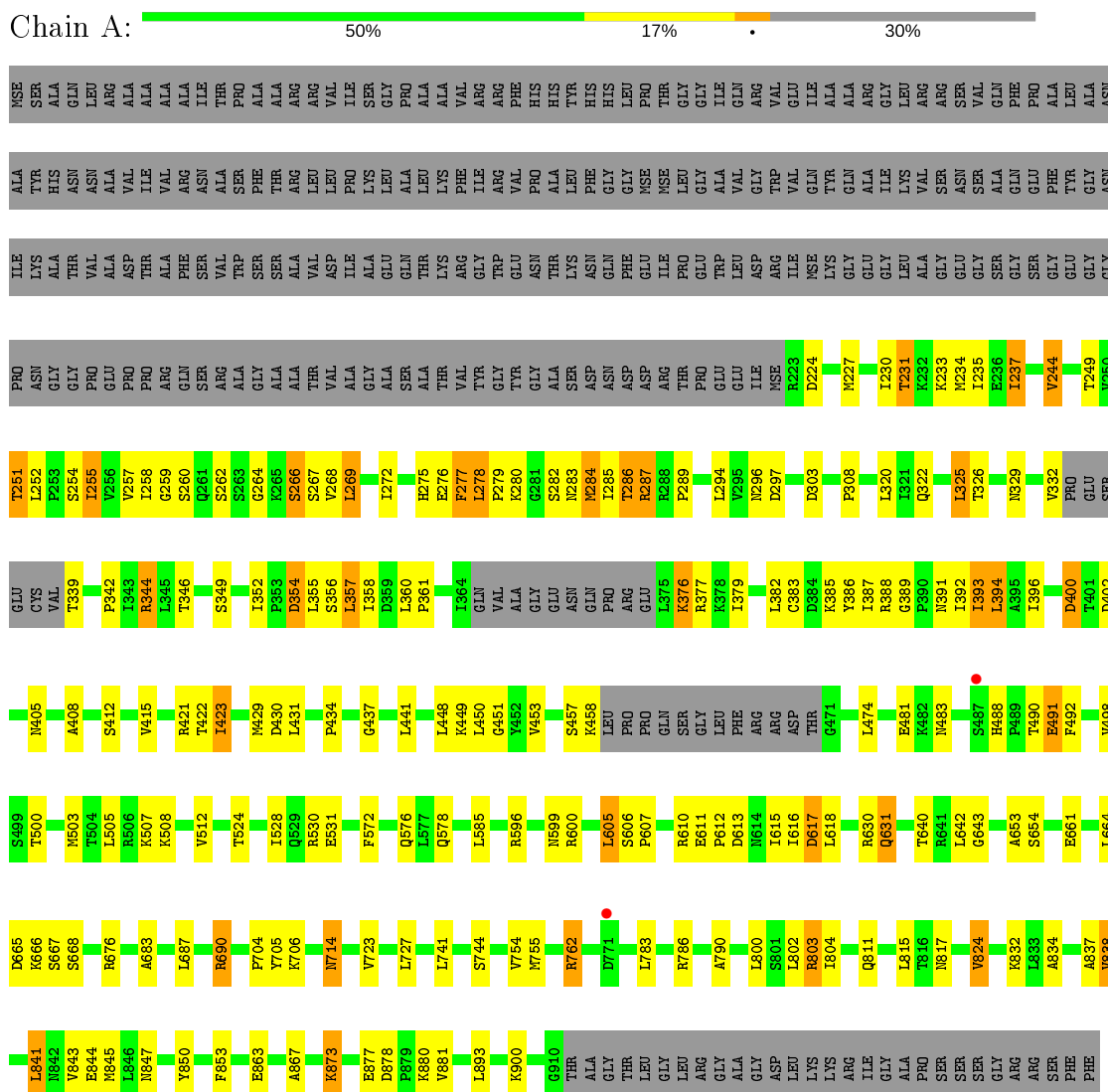


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	4	2	2	0	0
2	B	1	4	2	2	0	0

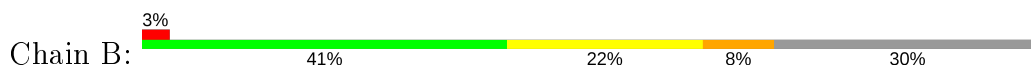
3 Residue-property plots [i](#)

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: Putative mitochondrial dynamin protein



- Molecule 1: Putative mitochondrial dynamin protein



ASP	ASP	V819	K508	Y446	K376	D809	L241	PRO	IIE	ALA	NSE
LEU	L663	P447	V512	P448	R377	L310	Q242	ASN	LYS	TYR	SER
LYS	L664	L448	L513	L449	K378	L311	K243	GLY	ALA	HIS	ALA
ARG	D665	R449	L513	R449	K379	L312	V244	THR	ASN	GLY	GLN
ILE	R666	R450	E515	G451	T380	F318	Q245	VAL	ASN	VAL	ARG
GLY	S667	G451	Q516	Y462	E381	F318	Q246	ALA	ALA	ALA	ARG
ALA	S668	Y462	Q516	Y462	L382	S319	G247	PRO	ASP	VAL	ALA
PRO	R671	G454	T524	V455	C383	L320	S248	PRO	THR	IIE	ALA
THR	H672	H672	T525	V455	D384	I321	T251	ARG	ALA	VAL	ALA
SER	H673	H673	E526	V455	R385	I321	L252	GLN	ARG	VAL	ALA
SER	H673	H673	E526	V456	K385	K322	L252	THR	ASN	ARG	ALA
GLY	H676	H676	A527	S457	I387	T324	P253	ALA	THR	ALA	THR
ARG	L841	R676	A528	K458	R388	L325	S254	ALA	PRO	SER	PRO
ARG	H842	R676	A529	K458	R388	T326	I255	GLY	SER	PHE	ALA
SER	H844	A683	R530	PRO	I382	T326	V256	ALA	THR	THR	ALA
PHE	H845	A684	R530	PRO	I383	T326	V257	ALA	ALA	THR	ARG
PHE	M854	A690	E545	GLN	L394	V332	I258	THR	ALA	THR	ARG
	F853	T694	Q546	SER	A395	PRO	G259	VAL	ASP	VAL	VAL
	P854	T694	D560	LEU	I396	PRO	S260	ALA	ALA	PRO	IIE
	E863	K703	F565	PHE	S397	GLU	S263	GLY	ALA	LYS	SER
	H864	P704	F565	ARG	A398	SER	G264	ALA	ALA	LEU	GLY
	M865	V705	A572	ARG	A399	GLU	K265	SER	ALA	ALA	PRO
	H866	K706	F573	ARG	D400	CYS	K266	ALA	ALA	LEU	ALA
	A867	N714	R574	THR	T401	VAL	S266	THR	THR	LYS	ALA
	L871	V723	Q575	G471	D402	D340	S267	VAL	VAL	VAL	VAL
	E877	L727	Q576	M472	L403	D341	V268	THR	THR	THR	ARG
	D878	E742	Q578	M473	A404	D341	L269	GLY	THR	THR	ARG
	V881	R748	L581	M478	M405	D341	E270	THR	THR	THR	PHE
	D886	R749	D586	M479	M473	R344	L272	PRO	ALA	ALA	HIS
	R889	K749	L593	M480	E481	L345	A271	ALA	THR	ALA	HIS
	R890	L751	R596	M483	M483	L352	V273	SER	LYS	LYS	THR
	L893	K752	R610	Y484	T422	I352	G274	ASP	ASN	ASN	HIS
	L894	E753	R610	F485	I423	D354	H275	ASP	GLN	GLY	HIS
	V897	V754	I615	G486	V425	L355	L278	ASP	THR	THR	ASP
	L898	R762	I616	S487	I426	S356	F277	ASP	LEU	PRO	LEU
	E903	R768	D617	H488	T427	L358	P279	ASP	LEU	LEU	GLY
	L904	E769	Q631	P489	M429	D359	K280	ASP	GLY	GLY	ILE
	T811	F779	Q631	T490	M429	L360	G281	ASP	THR	ALA	ALA
ALA	F779	L639	A635	E491	D430	P361	R282	ASP	ALA	THR	ALA
GLY	L802	R641	G635	F492	L431	G362	R288	GLY	GLN	GLN	ALA
THR	L802	R641	G643	G493	V432	Y363	P289	GLY	ALA	GLN	ARG
LEU	Q611	R642	G643	G493	I364	I364	M228	GLY	ILE	ILE	ARG
LEU	Q611	R642	G643	G493	I364	I364	F229	LEU	LYS	VAL	ARG
ARG	L815	R642	L647	S496	GILN	GILN	I230	ALA	VAL	VAL	ARG
GLY	R817	R642	S654	G497	VAL	VAL	T231	GLY	SER	SER	ARG
ALA	K818	R642	R606	Y498	ALA	ALA	K232	GLY	ASN	ASN	ARG
		R642	R606	S499	ALA	ALA	K233	GLY	SER	SER	ARG
		R642	R606	T500	GLY	GLY	P298	GLY	ALA	VAL	ARG
		R642	R606	G501	GLY	GLY	E299	GLY	ALA	VAL	ARG
		R642	R606	V502	ASN	ASN	A300	GLY	SER	PHE	ARG
		R642	R606	L505	PRO	PRO	I236	SER	GLY	THR	ARG
		R642	R606	R506	ARG	ARG	I237	GLY	GLY	GLY	ARG
		R642	R606	K507	GLY	GLY	R238	GLY	GLY	GLY	ARG
		R642	R606	Q657	GLY	GLY	M239	GLY	GLY	GLY	ARG
		R642	R606	Q657	GLY	GLY	L240	GLY	GLY	GLY	ARG

4 Data and refinement statistics

Property	Value	Source
Space group	P 41 2 2	Depositor
Cell constants a, b, c, α , β , γ	147.40Å 147.40Å 344.68Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.13 – 3.60 49.13 – 3.60	Depositor EDS
% Data completeness (in resolution range)	99.8 (49.13-3.60) 99.8 (49.13-3.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.61 (at 3.57Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.243 , 0.252 0.244 , 0.253	Depositor DCC
R_{free} test set	2242 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	113.6	Xtrriage
Anisotropy	0.005	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.27 , 61.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.43$, $\langle L^2 \rangle = 0.26$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	10330	wwPDB-VP
Average B, all atoms (Å ²)	146.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.75% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical 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: EDO

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	0.27	0/5237	0.47	2/7053 (0.0%)
1	B	0.42	1/5233 (0.0%)	0.60	4/7049 (0.1%)
All	All	0.36	1/10470 (0.0%)	0.54	6/14102 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	253	PRO	C-N	-9.01	1.13	1.34

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	234	MSE	CB-CG-SE	-6.17	94.19	112.70
1	B	815	LEU	CA-CB-CG	5.80	128.64	115.30
1	B	244	VAL	CB-CA-C	-5.55	100.85	111.40
1	A	278	LEU	CA-CB-CG	5.37	127.64	115.30
1	B	341	ASP	C-N-CD	5.09	139.09	128.40

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	5163	0	5236	106	1
1	B	5159	0	5228	461	1
2	A	4	0	6	0	0
2	B	4	0	6	0	0
All	All	10330	0	10476	565	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 27.

The worst 5 of 565 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:426:ILE:CD1	1:B:440:ILE:HG22	1.20	1.67
1:B:441:LEU:CD2	1:B:498:VAL:HB	1.31	1.61
1:B:426:ILE:HD13	1:B:440:ILE:CG2	1.35	1.56
1:B:441:LEU:HD23	1:B:498:VAL:CB	1.14	1.53
1:B:478:ASN:ND2	1:B:482:LYS:HZ1	1.21	1.39

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)
1:A:630:ARG:NH1	1:B:545:GLU:OE1[5_555]	2.17	0.03

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	652/939 (69%)	627 (96%)	25 (4%)	0	100 100
1	B	652/939 (69%)	626 (96%)	26 (4%)	0	100 100
All	All	1304/1878 (69%)	1253 (96%)	51 (4%)	0	100 100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	564/756 (75%)	493 (87%)	71 (13%)	4	24
1	B	564/756 (75%)	459 (81%)	105 (19%)	1	10
All	All	1128/1512 (75%)	952 (84%)	176 (16%)	2	18

5 of 176 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	243	LYS
1	B	351	ASN
1	B	727	LEU
1	B	255	ILE
1	B	283	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	478	ASN
1	B	657	GLN
1	B	488	HIS
1	B	275	HIS
1	B	576	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

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	1001	-	3,3,3	0.47	0	2,2,2	0.34	0
2	EDO	A	1001	-	3,3,3	0.46	0	2,2,2	0.33	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	1001	-	-	0/1/1/1	-
2	EDO	A	1001	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	B	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	B	253:PRO	C	254:SER	N	1.13

6 Fit of model and data [i](#)

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	648/939 (69%)	-0.30	2 (0%) 94 88	64, 116, 190, 232	2 (0%)
1	B	648/939 (69%)	0.07	32 (4%) 29 18	64, 116, 338, 374	1 (0%)
All	All	1296/1878 (69%)	-0.12	34 (2%) 56 40	64, 116, 320, 374	3 (0%)

The worst 5 of 34 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	452	TYR	6.7
1	B	453	VAL	6.2
1	B	457	SER	5.5
1	B	428	LYS	5.0
1	B	339	THR	4.6

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
2	EDO	A	1001	4/4	0.72	0.70	105,105,105,105	0
2	EDO	B	1001	4/4	0.74	0.37	97,97,97,97	0

6.5 Other polymers [i](#)

There are no such residues in this entry.