



wwPDB X-ray Structure Validation Summary Report ⓘ

May 17, 2020 – 01:51 am BST

PDB ID : 6PHB
Title : Pfs25 in complex with the human transmission blocking antibody 2530
Authors : McLeod, B.R.; Julien, J.P.
Deposited on : 2019-06-25
Resolution : 2.00 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 : 2.11
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) : 2.11

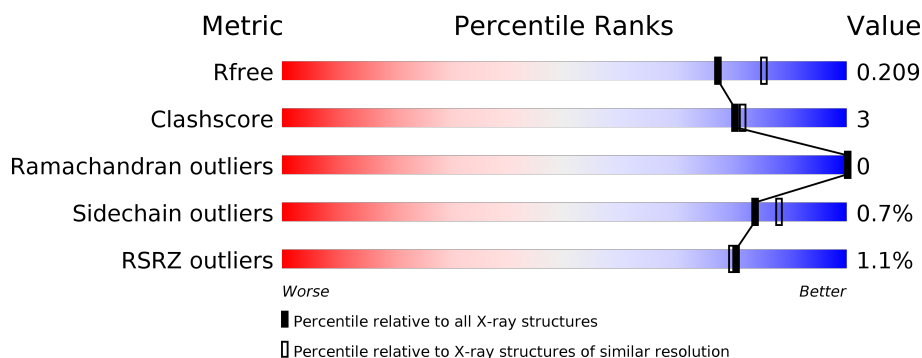
1 Overall quality at a glance

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}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (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 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	E	184	<div> <div>2%</div> <div> <div></div> <div>86%</div> <div>6%</div> <div>8%</div> </div> </div>
1	I	184	<div> <div>2%</div> <div> <div></div> <div>86%</div> <div>7%</div> <div>8%</div> </div> </div>
2	A	215	<div> <div></div> <div> <div></div> <div>93%</div> <div>6%</div> </div> </div>
2	C	215	<div> <div></div> <div> <div></div> <div>96%</div> <div>.</div> </div> </div>
3	B	220	<div> <div>%</div> <div> <div></div> <div>90%</div> <div>10%</div> </div> </div>
3	D	220	<div> <div>%</div> <div> <div></div> <div>95%</div> <div>5%</div> </div> </div>

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 10190 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 25 kDa ookinete surface antigen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	I	170	Total	C	N	O	S	0	0	0
			1249	760	211	254	24			
1	E	170	Total	C	N	O	S	0	0	0
			1250	761	212	253	24			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	-2	GLU	-	expression tag	UNP P13829
I	-1	THR	-	expression tag	UNP P13829
I	0	GLY	-	expression tag	UNP P13829
I	91	GLN	ASN	conflict	UNP P13829
I	144	GLN	ASN	conflict	UNP P13829
I	166	GLN	ASN	conflict	UNP P13829
I	173	GLY	-	expression tag	UNP P13829
I	174	THR	-	expression tag	UNP P13829
I	175	LYS	-	expression tag	UNP P13829
I	176	HIS	-	expression tag	UNP P13829
I	177	HIS	-	expression tag	UNP P13829
I	178	HIS	-	expression tag	UNP P13829
I	179	HIS	-	expression tag	UNP P13829
I	180	HIS	-	expression tag	UNP P13829
I	181	HIS	-	expression tag	UNP P13829
E	-2	GLU	-	expression tag	UNP P13829
E	-1	THR	-	expression tag	UNP P13829
E	0	GLY	-	expression tag	UNP P13829
E	91	GLN	ASN	conflict	UNP P13829
E	144	GLN	ASN	conflict	UNP P13829
E	166	GLN	ASN	conflict	UNP P13829
E	173	GLY	-	expression tag	UNP P13829
E	174	THR	-	expression tag	UNP P13829
E	175	LYS	-	expression tag	UNP P13829
E	176	HIS	-	expression tag	UNP P13829

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Chain	Residue	Modelled	Actual	Comment	Reference
E	177	HIS	-	expression tag	UNP P13829
E	178	HIS	-	expression tag	UNP P13829
E	179	HIS	-	expression tag	UNP P13829
E	180	HIS	-	expression tag	UNP P13829
E	181	HIS	-	expression tag	UNP P13829

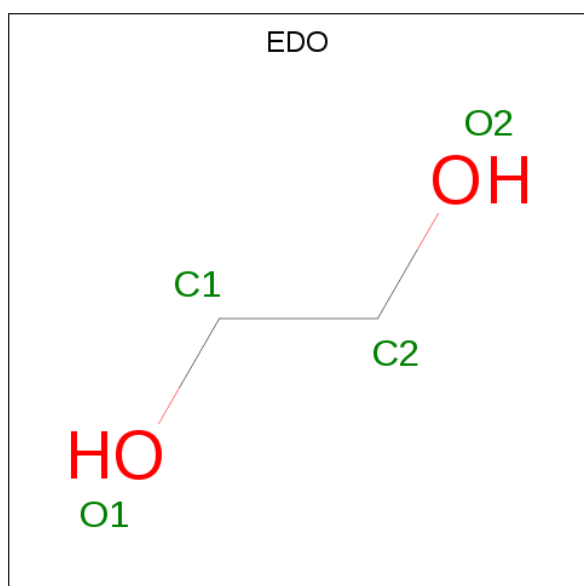
- Molecule 2 is a protein called 2530 Antibody Fab, Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	215	Total	C	N	O	S	0	0	0
			1660	1038	276	340	6			
2	A	215	Total	C	N	O	S	0	0	0
			1660	1038	276	340	6			

- Molecule 3 is a protein called 2530 Antibody Fab, Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	220	Total	C	N	O	S	0	0	0
			1623	1018	267	329	9			
3	B	220	Total	C	N	O	S	0	0	0
			1627	1020	268	330	9			

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	I	134	Total O 134 134	0	0
5	C	209	Total O 209 209	0	0
5	D	190	Total O 190 190	0	0
5	E	139	Total O 139 139	0	0

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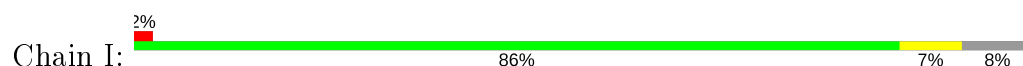
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	191	Total 191	O 191	0	0
5	B	194	Total 194	O 194	0	0

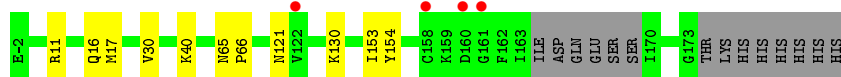
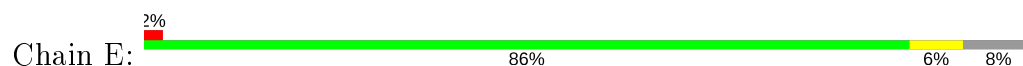
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: 25 kDa ookinete surface antigen



- Molecule 1: 25 kDa ookinete surface antigen



- Molecule 2: 2530 Antibody Fab, Light Chain



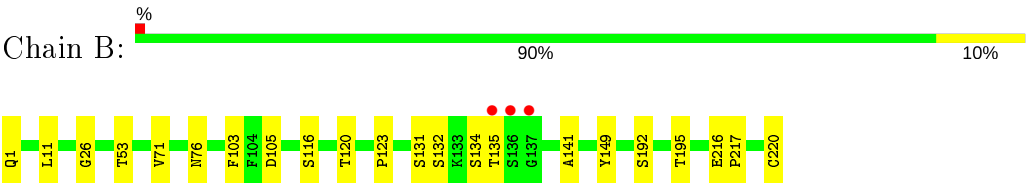
- Molecule 2: 2530 Antibody Fab, Light Chain



- Molecule 3: 2530 Antibody Fab, Heavy Chain



- Molecule 3: 2530 Antibody Fab, Heavy Chain



4 Data and refinement statistics

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, α , β , γ	114.60 Å 114.60 Å 98.18 Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	37.51 – 2.00 37.51 – 2.00	Depositor EDS
% Data completeness (in resolution range)	98.8 (37.51-2.00) 93.3 (37.51-2.00)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.81 (at 2.00 Å)	Xtriage
Refinement program	PHENIX 1.14_3260, PHENIX	Depositor
R, R_{free}	0.177 , 0.209 0.177 , 0.209	Depositor DCC
R_{free} test set	1869 reflections (1.94%)	wwPDB-VP
Wilson B-factor (Å ²)	24.4	Xtriage
Anisotropy	0.080	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 38.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.022 for -h,-k,l 0.478 for h,-h-k,-l 0.022 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	10190	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.90% 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

5.1 Standard geometry

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	E	0.25	0/1260	0.46	0/1693
1	I	0.25	0/1258	0.46	0/1693
2	A	0.26	0/1695	0.47	0/2302
2	C	0.25	0/1695	0.47	0/2302
3	B	0.25	0/1668	0.50	0/2280
3	D	0.25	0/1664	0.49	0/2275
All	All	0.25	0/9240	0.48	0/12545

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	E	0	1
1	I	0	1
All	All	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	65	ASN	Peptide
1	I	65	ASN	Peptide

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	E	1250	0	1207	6	0
1	I	1249	0	1211	7	0
2	A	1660	0	1602	7	0
2	C	1660	0	1602	6	0
3	B	1627	0	1567	17	0
3	D	1623	0	1561	10	0
4	A	24	0	36	1	0
4	B	8	0	12	1	0
4	C	12	0	18	2	0
4	D	12	0	18	1	0
4	I	8	0	12	1	0
5	A	191	0	0	0	0
5	B	194	0	0	1	0
5	C	209	0	0	0	0
5	D	190	0	0	1	0
5	E	139	0	0	1	0
5	I	134	0	0	2	0
All	All	10190	0	8846	49	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 3.

The worst 5 of 49 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:I:87:ASN:ND2	5:I:301:HOH:O	2.01	0.92
1:I:75:LEU:HA	4:I:202:EDO:H11	1.68	0.74
1:I:16:GLN:HB3	1:I:154:TYR:HB2	1.76	0.66
3:D:131:SER:H	3:D:134:SER:HB3	1.61	0.66
3:B:76:ASN:ND2	5:B:401:HOH:O	2.31	0.64

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	E	166/184 (90%)	156 (94%)	10 (6%)	0	100	100
1	I	166/184 (90%)	157 (95%)	9 (5%)	0	100	100
2	A	213/215 (99%)	207 (97%)	6 (3%)	0	100	100
2	C	213/215 (99%)	207 (97%)	6 (3%)	0	100	100
3	B	218/220 (99%)	211 (97%)	7 (3%)	0	100	100
3	D	218/220 (99%)	211 (97%)	7 (3%)	0	100	100
All	All	1194/1238 (96%)	1149 (96%)	45 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	147/167 (88%)	147 (100%)	0	100	100
1	I	148/167 (89%)	147 (99%)	1 (1%)	84	88
2	A	191/191 (100%)	187 (98%)	4 (2%)	53	57
2	C	191/191 (100%)	189 (99%)	2 (1%)	76	81
3	B	189/191 (99%)	189 (100%)	0	100	100
3	D	188/191 (98%)	188 (100%)	0	100	100
All	All	1054/1098 (96%)	1047 (99%)	7 (1%)	84	88

5 of 7 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	2	ILE
2	A	215	CYS
2	A	15	VAL
2	C	2	ILE
2	A	105	VAL

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

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

16 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	$\# Z > 2$
4	EDO	I	202	-	3,3,3	0.44	0	2,2,2	0.31	0
4	EDO	A	303	-	3,3,3	0.45	0	2,2,2	0.34	0
4	EDO	A	302	-	3,3,3	0.42	0	2,2,2	0.46	0
4	EDO	B	302	-	3,3,3	0.46	0	2,2,2	0.28	0
4	EDO	D	502	-	3,3,3	0.45	0	2,2,2	0.40	0
4	EDO	A	306	-	3,3,3	0.46	0	2,2,2	0.29	0
4	EDO	C	302	-	3,3,3	0.44	0	2,2,2	0.34	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	EDO	A	301	-	3,3,3	0.43	0	2,2,2	0.42	0
4	EDO	D	501	-	3,3,3	0.45	0	2,2,2	0.36	0
4	EDO	C	301	-	3,3,3	0.46	0	2,2,2	0.34	0
4	EDO	D	503	-	3,3,3	0.45	0	2,2,2	0.32	0
4	EDO	A	305	-	3,3,3	0.44	0	2,2,2	0.45	0
4	EDO	I	201	-	3,3,3	0.46	0	2,2,2	0.34	0
4	EDO	B	301	-	3,3,3	0.44	0	2,2,2	0.42	0
4	EDO	A	304	-	3,3,3	0.46	0	2,2,2	0.35	0
4	EDO	C	303	-	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
4	EDO	I	202	-	-	1/1/1/1	-
4	EDO	A	303	-	-	1/1/1/1	-
4	EDO	A	302	-	-	0/1/1/1	-
4	EDO	B	302	-	-	1/1/1/1	-
4	EDO	D	502	-	-	0/1/1/1	-
4	EDO	A	306	-	-	0/1/1/1	-
4	EDO	C	302	-	-	0/1/1/1	-
4	EDO	A	301	-	-	0/1/1/1	-
4	EDO	D	501	-	-	1/1/1/1	-
4	EDO	C	301	-	-	0/1/1/1	-
4	EDO	D	503	-	-	0/1/1/1	-
4	EDO	A	305	-	-	0/1/1/1	-
4	EDO	I	201	-	-	0/1/1/1	-
4	EDO	B	301	-	-	0/1/1/1	-
4	EDO	A	304	-	-	1/1/1/1	-
4	EDO	C	303	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	303	EDO	O1-C1-C2-O2
4	D	501	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	C	303	EDO	O1-C1-C2-O2
4	I	202	EDO	O1-C1-C2-O2
4	B	302	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
4	I	202	EDO	1	0
4	D	502	EDO	1	0
4	C	302	EDO	2	0
4	A	301	EDO	1	0
4	B	301	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 [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	E	170/184 (92%)	-0.50	4 (2%) 59 57	24, 39, 84, 114	0
1	I	170/184 (92%)	-0.46	4 (2%) 59 57	25, 40, 83, 112	0
2	A	215/215 (100%)	-0.83	0 100 100	17, 28, 42, 86	0
2	C	215/215 (100%)	-0.83	0 100 100	18, 28, 43, 81	0
3	B	220/220 (100%)	-0.75	3 (1%) 75 74	17, 27, 59, 125	0
3	D	220/220 (100%)	-0.76	2 (0%) 84 83	18, 28, 58, 115	0
All	All	1210/1238 (97%)	-0.70	13 (1%) 80 79	17, 30, 67, 125	0

The worst 5 of 13 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	B	137	GLY	4.6
1	I	161	GLY	4.2
1	E	160	ASP	3.3
3	D	137	GLY	3.1
1	I	160	ASP	2.7

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 carbohydrates in this entry.

6.4 Ligands

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. 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	EDO	D	503	4/4	0.74	0.19	67,68,70,71	0
4	EDO	B	302	4/4	0.75	0.34	52,56,57,60	0
4	EDO	B	301	4/4	0.82	0.10	65,65,66,68	0
4	EDO	A	301	4/4	0.86	0.10	58,61,62,63	0
4	EDO	C	303	4/4	0.86	0.19	56,56,56,59	0
4	EDO	D	502	4/4	0.87	0.12	59,61,62,64	0
4	EDO	D	501	4/4	0.90	0.15	32,37,41,48	0
4	EDO	A	305	4/4	0.91	0.17	43,53,53,56	0
4	EDO	C	301	4/4	0.92	0.10	42,49,54,59	0
4	EDO	A	304	4/4	0.92	0.10	58,61,62,63	0
4	EDO	C	302	4/4	0.92	0.19	48,54,54,55	0
4	EDO	I	202	4/4	0.93	0.27	60,70,77,82	0
4	EDO	A	302	4/4	0.94	0.20	49,50,50,57	0
4	EDO	A	306	4/4	0.94	0.14	37,46,52,57	0
4	EDO	I	201	4/4	0.94	0.10	44,46,50,55	0
4	EDO	A	303	4/4	0.98	0.09	28,41,51,56	0

6.5 Other polymers

There are no such residues in this entry.