



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 21, 2020 – 04:59 AM BST

PDB ID : 4NI8  
Title : Crystal structure of 5-carboxyvanillate decarboxylase LigW from *Sphingomonas paucimobilis* complexed with Mn and 5-methoxyisophthalic acid  
Authors : Fedorov, A.A.; Fedorov, E.V.; Vladimirova, A.; Raushel, F.M.; Almo, S.C.  
Deposited on : 2013-11-05  
Resolution : 1.64 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](mailto: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.

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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

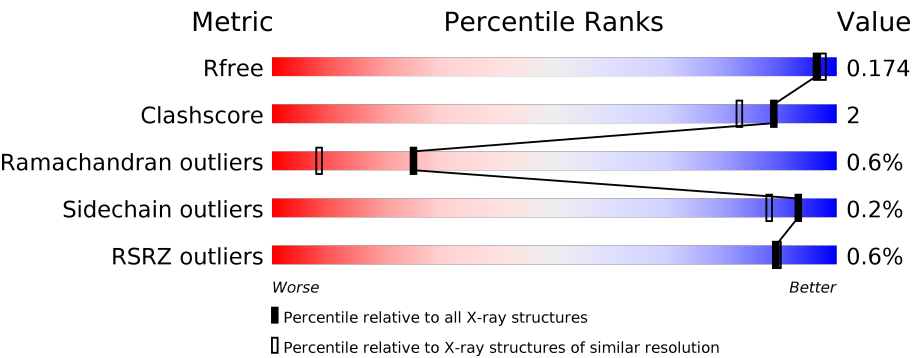
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.64 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	3122 (1.66-1.62)
Clashscore	141614	3268 (1.66-1.62)
Ramachandran outliers	138981	3215 (1.66-1.62)
Sidechain outliers	138945	3215 (1.66-1.62)
RSRZ outliers	127900	3079 (1.66-1.62)

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  $\geq 3$ , 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	335	<div><div></div><div>95%5%</div></div>
1	B	335	<div><div>%</div><div>96%. </div></div>
1	C	335	<div><div>%</div><div>93%7%</div></div>
1	D	335	<div><div>%</div><div>96%. </div></div>
1	E	335	<div><div>%</div><div>97%. </div></div>
1	F	335	<div><div>%</div><div>96%. </div></div>

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Mol	Chain	Length	Quality of chain
1	G	335	<div><div></div><div>96%</div><div>.</div></div>
1	H	335	<div>%<div><div></div><div>96%</div><div>.</div></div></div>

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 23932 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 5-carboxyvanillate decarboxylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	335	Total	C	N	O	S	0	2	0
			2626	1666	464	483	13			
1	B	335	Total	C	N	O	S	0	1	0
			2615	1660	460	482	13			
1	C	335	Total	C	N	O	S	0	1	0
			2620	1663	463	481	13			
1	D	335	Total	C	N	O	S	0	2	0
			2623	1665	461	483	14			
1	E	335	Total	C	N	O	S	0	3	0
			2634	1671	465	484	14			
1	F	335	Total	C	N	O	S	0	2	0
			2624	1665	461	485	13			
1	G	335	Total	C	N	O	S	0	5	0
			2654	1681	470	490	13			
1	H	335	Total	C	N	O	S	0	0	0
			2609	1657	459	480	13			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	EXPRESSION TAG	UNP Q8RJ47
A	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47
B	0	SER	-	EXPRESSION TAG	UNP Q8RJ47
B	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47
C	0	SER	-	EXPRESSION TAG	UNP Q8RJ47
C	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47
D	0	SER	-	EXPRESSION TAG	UNP Q8RJ47
D	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47
E	0	SER	-	EXPRESSION TAG	UNP Q8RJ47
E	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47
F	0	SER	-	EXPRESSION TAG	UNP Q8RJ47
F	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47
G	0	SER	-	EXPRESSION TAG	UNP Q8RJ47

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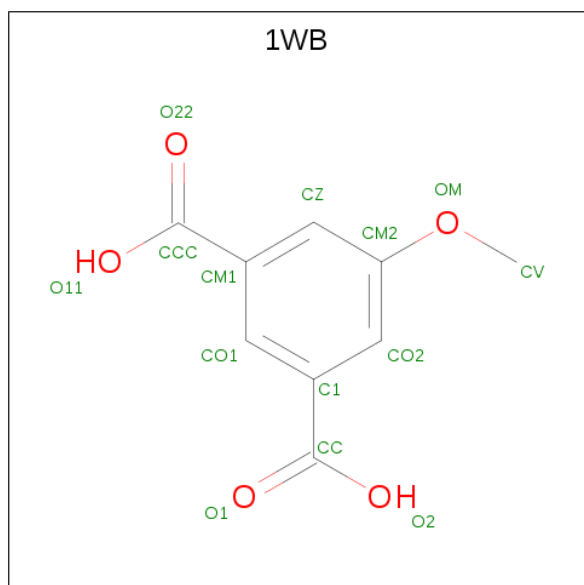
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Chain	Residue	Modelled	Actual	Comment	Reference
G	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47
H	0	SER	-	EXPRESSION TAG	UNP Q8RJ47
H	1	LEU	-	EXPRESSION TAG	UNP Q8RJ47

- Molecule 2 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

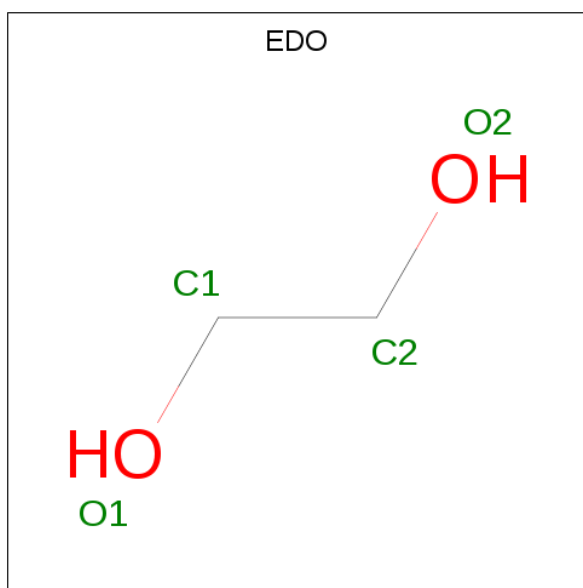
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	G	1	Total Mn 2 2	0	1
2	D	1	Total Mn 2 2	0	1
2	E	1	Total Mn 2 2	0	1
2	H	1	Total Mn 2 2	0	1
2	B	1	Total Mn 2 2	0	1
2	C	1	Total Mn 2 2	0	1
2	A	1	Total Mn 2 2	0	1
2	F	1	Total Mn 2 2	0	1

- Molecule 3 is 5-methoxybenzene-1,3-dicarboxylic acid (three-letter code: 1WB) (formula: C<sub>9</sub>H<sub>8</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 14 9 5	0	0
3	B	1	Total C O 14 9 5	0	0
3	C	1	Total C O 14 9 5	0	0
3	D	1	Total C O 14 9 5	0	0
3	E	1	Total C O 14 9 5	0	0
3	F	1	Total C O 14 9 5	0	0
3	G	1	Total C O 14 9 5	0	0
3	H	1	Total C O 14 9 5	0	0

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



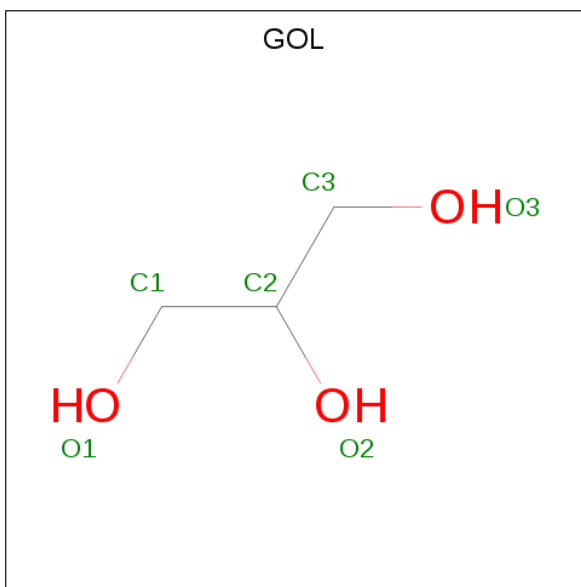
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total 4	C 2	O 2	0	0
4	C	1	Total 4	C 2	O 2	0	0
4	C	1	Total 4	C 2	O 2	0	0
4	C	1	Total 4	C 2	O 2	0	0
4	D	1	Total 4	C 2	O 2	0	0
4	F	1	Total 4	C 2	O 2	0	0
4	F	1	Total 8	C 4	O 4	0	1
4	F	1	Total 4	C 2	O 2	0	0
4	F	1	Total 4	C 2	O 2	0	0
4	G	1	Total 4	C 2	O 2	0	0
4	G	1	Total 4	C 2	O 2	0	0
4	G	1	Total 4	C 2	O 2	0	0
4	H	1	Total 4	C 2	O 2	0	0
4	H	1	Total 4	C 2	O 2	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	E	1	Total	C	O	0	0
			6	3	3		
5	F	1	Total	C	O	0	0
			6	3	3		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	337	Total	O	0	4
			341	341		
6	B	341	Total	O	0	3
			344	344		
6	C	329	Total	O	0	1
			330	330		
6	D	344	Total	O	0	3
			347	347		
6	E	355	Total	O	0	1
			356	356		
6	F	330	Total	O	0	1
			331	331		
6	G	328	Total	O	0	1
			329	329		
6	H	332	Total	O	0	1
			333	333		



### 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: 5-carboxyvanillate decarboxylase

Chain A: 



- Molecule 1: 5-carboxyvanillate decarboxylase

Chain B: 



- Molecule 1: 5-carboxyvanillate decarboxylase

Chain C: 



- Molecule 1: 5-carboxyvanillate decarboxylase

Chain D: 



- Molecule 1: 5-carboxyvanillate decarboxylase

Chain E: 



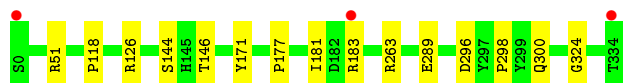
- Molecule 1: 5-carboxyvanillate decarboxylase



- Molecule 1: 5-carboxyvanillate decarboxylase



- Molecule 1: 5-carboxyvanillate decarboxylase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	80.52Å 99.90Å 100.43Å 67.04° 88.44° 68.07°	Depositor
Resolution (Å)	39.97 – 1.64 40.38 – 1.64	Depositor EDS
% Data completeness (in resolution range)	95.8 (39.97-1.64) 95.8 (40.38-1.64)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.50 (at 1.64Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, $R_{free}$	0.148 , 0.175 0.148 , 0.174	Depositor DCC
$R_{free}$ test set	15560 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	17.5	Xtriage
Anisotropy	0.145	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 42.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	23932	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	13.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.76% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>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: GOL, MN, 1WB, 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	0.34	0/2689	0.54	0/3655
1	B	0.34	0/2678	0.54	0/3641
1	C	0.34	0/2683	0.53	0/3647
1	D	0.35	0/2686	0.55	0/3651
1	E	0.35	0/2697	0.55	0/3665
1	F	0.35	0/2687	0.54	0/3653
1	G	0.34	0/2717	0.53	0/3692
1	H	0.34	0/2672	0.55	0/3633
All	All	0.34	0/21509	0.54	0/29237

There are no bond length outliers.

There are no bond angle outliers.

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	2626	0	2593	9	0
1	B	2615	0	2581	8	0
1	C	2620	0	2589	16	0
1	D	2623	0	2589	8	0
1	E	2634	0	2601	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	2624	0	2586	8	0
1	G	2654	0	2613	9	0
1	H	2609	0	2577	9	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
2	G	2	0	0	0	0
2	H	2	0	0	0	0
3	A	14	0	6	2	0
3	B	14	0	6	2	0
3	C	14	0	6	2	0
3	D	14	0	6	0	0
3	E	14	0	6	2	0
3	F	14	0	6	2	0
3	G	14	0	6	2	0
3	H	14	0	6	2	0
4	A	16	0	24	2	0
4	B	4	0	6	0	0
4	C	12	0	18	2	0
4	D	4	0	6	1	0
4	F	20	0	30	0	0
4	G	12	0	18	2	0
4	H	8	0	12	0	0
5	E	6	0	8	0	0
5	F	6	0	8	0	0
6	A	341	0	0	5	0
6	B	344	0	0	4	0
6	C	330	0	0	6	0
6	D	347	0	0	1	0
6	E	356	0	0	3	0
6	F	331	0	0	4	0
6	G	329	0	0	4	0
6	H	333	0	0	5	0
All	All	23932	0	20907	80	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 2.

All (80) 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)
3:H:402:1WB:H3	6:H:821:HOH:O	1.65	0.94
3:B:402:1WB:H3	6:B:834:HOH:O	1.69	0.93
3:B:402:1WB:CZ	6:B:834:HOH:O	2.20	0.89
3:G:402:1WB:H3	6:G:823:HOH:O	1.71	0.89
3:H:402:1WB:CZ	6:H:821:HOH:O	2.21	0.88
3:F:402:1WB:H3	6:F:821:HOH:O	1.73	0.86
3:C:402:1WB:H3	6:C:822:HOH:O	1.79	0.83
3:E:402:1WB:H3	6:E:846:HOH:O	1.81	0.80
3:A:402:1WB:CZ	6:A:827:HOH:O	2.30	0.80
3:E:402:1WB:CZ	6:E:846:HOH:O	2.30	0.79
3:C:402:1WB:CZ	6:C:822:HOH:O	2.30	0.78
3:G:402:1WB:CZ	6:G:823:HOH:O	2.30	0.77
3:A:402:1WB:H3	6:A:827:HOH:O	1.86	0.75
3:F:402:1WB:CZ	6:F:821:HOH:O	2.30	0.74
1:H:263:ARG:NH2	6:H:729:HOH:O	2.21	0.69
1:G:136:ARG:NH1	6:G:815:HOH:O	2.32	0.62
1:B:126:ARG:NH1	6:B:835:HOH:O	2.32	0.61
1:H:51:ARG:NH2	6:H:799:HOH:O	2.33	0.60
1:F:263:ARG:NH2	6:F:777:HOH:O	2.32	0.58
1:H:126:ARG:NH2	6:H:699:HOH:O	2.39	0.55
1:G:332:ARG:NE	6:G:819:HOH:O	2.37	0.53
1:D:243:GLY:HA3	4:D:403:EDO:H21	1.90	0.53
1:C:253:LYS:HE2	6:C:651:HOH:O	2.09	0.52
1:C:47:ALA:HB3	4:C:405:EDO:H11	1.92	0.52
1:B:177:PRO:HB3	1:B:181:ILE:HG13	1.92	0.52
1:A:296:ASP:HB3	1:A:300:GLN:HG3	1.91	0.51
1:C:183:ARG:HA	1:C:186:ARG:HE	1.75	0.51
1:G:1:LEU:HB2	4:G:403:EDO:H12	1.92	0.51
1:C:296:ASP:HB3	1:C:300:GLN:HG3	1.92	0.51
1:F:296:ASP:HB3	1:F:300:GLN:HG3	1.93	0.51
1:D:90:ARG:NH2	6:D:780:HOH:O	2.44	0.50
1:F:177:PRO:HB3	1:F:181:ILE:HG13	1.94	0.50
1:C:51:ARG:NH2	6:C:707:HOH:O	2.44	0.49
1:H:296:ASP:HB3	1:H:300:GLN:HG3	1.94	0.49
1:C:126:ARG:NH1	6:C:749:HOH:O	2.45	0.49
1:A:257:LYS:NZ	4:A:405:EDO:O1	2.47	0.48
1:C:3:LEU:HD23	1:C:323:ALA:HB1	1.97	0.47
1:D:296:ASP:HB3	1:D:300:GLN:HG3	1.97	0.47
1:G:3:LEU:HD23	1:G:323:ALA:HB1	1.97	0.46
1:C:284:GLU:OE1	1:F:280:ARG:NH2	2.47	0.46
1:E:177:PRO:HB3	1:E:181:ILE:HG13	1.97	0.46
1:H:177:PRO:HB3	1:H:181:ILE:HG13	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:329:ARG:NH1	6:C:715:HOH:O	2.31	0.46
6:A:818:HOH:O	1:H:183:ARG:HD3	2.15	0.46
4:G:403:EDO:H21	1:H:289:GLU:HG3	1.98	0.46
1:B:280:ARG:NH2	1:G:284:GLU:OE1	2.47	0.45
1:B:51:ARG:NH1	6:B:745:HOH:O	2.50	0.45
1:D:280:ARG:NH2	1:E:284:GLU:OE1	2.47	0.45
1:D:295:ILE:HD13	1:D:302[A]:MET:HG2	1.99	0.44
1:C:280:ARG:NH2	1:F:284:GLU:OE2	2.49	0.44
1:B:236:TRP:CZ2	1:G:274:GLU:HB2	2.53	0.44
1:G:296:ASP:HB3	1:G:300:GLN:HG3	1.99	0.44
1:A:254:LEU:O	4:A:404:EDO:H12	2.18	0.44
1:A:30:LEU:HD22	1:A:182:ASP:HB2	2.00	0.44
1:F:36:ARG:NH2	6:F:660:HOH:O	2.52	0.43
1:G:262:PHE:O	1:G:266:PHE:HB2	2.18	0.43
1:C:315:PRO:HB3	4:C:403:EDO:H22	2.00	0.43
1:D:177:PRO:HB3	1:D:181:ILE:HG13	2.00	0.43
1:F:269:THR:HA	1:F:292:MET:O	2.18	0.43
1:H:51:ARG:NH2	1:H:298:PRO:O	2.52	0.43
1:A:6:THR:HA	1:A:72:LEU:HB3	2.01	0.42
1:C:30:LEU:HD22	1:C:182:ASP:HB2	2.01	0.42
1:C:262:PHE:O	1:C:266:PHE:HB2	2.20	0.42
1:H:118:PRO:HG2	1:H:146:THR:OG1	2.19	0.42
1:C:280:ARG:HH22	1:F:284:GLU:CD	2.23	0.42
1:B:6:THR:HA	1:B:72:LEU:HB3	2.02	0.41
1:D:226:HIS:HA	1:D:271:SER:O	2.20	0.41
1:E:20:ARG:HH21	1:E:20:ARG:HG2	1.86	0.41
1:A:36:ARG:NH2	6:A:683:HOH:O	2.45	0.41
1:E:226:HIS:HA	1:E:271:SER:O	2.21	0.41
1:A:177:PRO:HB3	1:A:181:ILE:HG13	2.03	0.41
1:A:246:THR:HB	1:A:253:LYS:HD3	2.02	0.41
6:A:762:HOH:O	1:B:219:ARG:HD3	2.21	0.40
1:C:303:ALA:HB3	1:C:304:PRO:HD3	2.04	0.40
1:A:226:HIS:HA	1:A:271:SER:O	2.22	0.40
1:B:269:THR:HA	1:B:292:MET:O	2.19	0.40
1:D:295:ILE:HG21	1:D:302[A]:MET:HG2	2.03	0.40
1:C:269:THR:HA	1:C:292:MET:O	2.22	0.40
1:E:36:ARG:NH2	6:E:611:HOH:O	2.53	0.40
1:G:177:PRO:HB3	1:G:181:ILE:HG13	2.02	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	335/335 (100%)	327 (98%)	6 (2%)	2 (1%)	25	8
1	B	334/335 (100%)	327 (98%)	5 (2%)	2 (1%)	25	8
1	C	334/335 (100%)	326 (98%)	6 (2%)	2 (1%)	25	8
1	D	335/335 (100%)	328 (98%)	5 (2%)	2 (1%)	25	8
1	E	336/335 (100%)	327 (97%)	7 (2%)	2 (1%)	25	8
1	F	335/335 (100%)	326 (97%)	7 (2%)	2 (1%)	25	8
1	G	338/335 (101%)	330 (98%)	6 (2%)	2 (1%)	25	8
1	H	333/335 (99%)	324 (97%)	7 (2%)	2 (1%)	25	8
All	All	2680/2680 (100%)	2615 (98%)	49 (2%)	16 (1%)	25	8

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	144	SER
1	A	324	GLY
1	B	324	GLY
1	C	324	GLY
1	D	324	GLY
1	E	144	SER
1	E	324	GLY
1	F	324	GLY
1	G	324	GLY
1	H	144	SER
1	H	324	GLY
1	B	144	SER
1	C	144	SER
1	G	144	SER
1	F	144	SER
1	D	144	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	272/270 (101%)	271 (100%)	1 (0%)	91	84
1	B	271/270 (100%)	270 (100%)	1 (0%)	91	84
1	C	271/270 (100%)	271 (100%)	0	100	100
1	D	272/270 (101%)	271 (100%)	1 (0%)	91	84
1	E	273/270 (101%)	273 (100%)	0	100	100
1	F	272/270 (101%)	272 (100%)	0	100	100
1	G	275/270 (102%)	275 (100%)	0	100	100
1	H	270/270 (100%)	269 (100%)	1 (0%)	91	84
All	All	2176/2160 (101%)	2172 (100%)	4 (0%)	93	88

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	171	TYR
1	B	171	TYR
1	D	171	TYR
1	H	171	TYR

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 monosaccharides in this entry.

## 5.6 Ligand geometry

Of 45 ligands modelled in this entry, 16 are monoatomic - leaving 29 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	$\# Z  > 2$
4	EDO	H	403	-	3,3,3	0.48	0	2,2,2	0.32	0
5	GOL	F	403	-	5,5,5	0.29	0	5,5,5	0.53	0
3	1WB	G	402	2	10,14,14	1.03	1 (10%)	13,19,19	1.13	1 (7%)
4	EDO	C	403	-	3,3,3	0.39	0	2,2,2	0.27	0
4	EDO	B	403	-	3,3,3	0.49	0	2,2,2	0.28	0
4	EDO	H	404	-	3,3,3	0.46	0	2,2,2	0.31	0
4	EDO	A	403	-	3,3,3	0.55	0	2,2,2	0.16	0
3	1WB	D	402	2	10,14,14	1.05	1 (10%)	13,19,19	1.19	1 (7%)
3	1WB	E	402	2	10,14,14	0.81	0	13,19,19	1.26	1 (7%)
3	1WB	B	402	2	10,14,14	1.25	1 (10%)	13,19,19	0.98	0
3	1WB	A	402	2	10,14,14	0.97	1 (10%)	13,19,19	1.07	0
4	EDO	D	403	-	3,3,3	0.52	0	2,2,2	0.29	0
3	1WB	H	402	2	10,14,14	1.06	1 (10%)	13,19,19	0.98	1 (7%)
4	EDO	A	404	-	3,3,3	0.46	0	2,2,2	0.23	0
4	EDO	C	404	-	3,3,3	0.50	0	2,2,2	0.21	0
4	EDO	F	404	-	3,3,3	0.50	0	2,2,2	0.27	0
4	EDO	G	404	-	3,3,3	0.43	0	2,2,2	0.38	0
3	1WB	F	402	2	10,14,14	0.95	1 (10%)	13,19,19	1.08	0
4	EDO	G	405	-	3,3,3	0.49	0	2,2,2	0.18	0
5	GOL	E	403	-	5,5,5	0.33	0	5,5,5	0.19	0
4	EDO	G	403	-	3,3,3	0.41	0	2,2,2	0.41	0
3	1WB	C	402	2	10,14,14	1.01	1 (10%)	13,19,19	1.19	1 (7%)
4	EDO	A	406	-	3,3,3	0.44	0	2,2,2	0.37	0
4	EDO	C	405	-	3,3,3	0.38	0	2,2,2	0.29	0
4	EDO	F	407	-	3,3,3	0.46	0	2,2,2	0.46	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	EDO	A	405	-	3,3,3	0.47	0	2,2,2	0.30	0
4	EDO	F	405[B]	-	3,3,3	0.49	0	2,2,2	0.28	0
4	EDO	F	406	-	3,3,3	0.41	0	2,2,2	0.38	0
4	EDO	F	405[A]	-	3,3,3	0.49	0	2,2,2	0.25	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	H	403	-	-	0/1/1/1	-
5	GOL	F	403	-	-	2/4/4/4	-
3	1WB	G	402	2	-	0/2/10/10	0/1/1/1
4	EDO	C	403	-	-	0/1/1/1	-
4	EDO	B	403	-	-	0/1/1/1	-
4	EDO	H	404	-	-	1/1/1/1	-
4	EDO	A	403	-	-	1/1/1/1	-
3	1WB	D	402	2	-	0/2/10/10	0/1/1/1
3	1WB	E	402	2	-	0/2/10/10	0/1/1/1
3	1WB	B	402	2	-	0/2/10/10	0/1/1/1
3	1WB	A	402	2	-	0/2/10/10	0/1/1/1
4	EDO	D	403	-	-	0/1/1/1	-
3	1WB	H	402	2	-	0/2/10/10	0/1/1/1
4	EDO	A	404	-	-	1/1/1/1	-
4	EDO	C	404	-	-	0/1/1/1	-
4	EDO	F	404	-	-	0/1/1/1	-
4	EDO	G	404	-	-	0/1/1/1	-
3	1WB	F	402	2	-	0/2/10/10	0/1/1/1
4	EDO	G	405	-	-	0/1/1/1	-
5	GOL	E	403	-	-	0/4/4/4	-
4	EDO	G	403	-	-	0/1/1/1	-
3	1WB	C	402	2	-	0/2/10/10	0/1/1/1
4	EDO	A	406	-	-	1/1/1/1	-
4	EDO	C	405	-	-	1/1/1/1	-
4	EDO	F	407	-	-	0/1/1/1	-
4	EDO	A	405	-	-	0/1/1/1	-
4	EDO	F	405[B]	-	-	0/1/1/1	-
4	EDO	F	406	-	-	1/1/1/1	-
4	EDO	F	405[A]	-	-	0/1/1/1	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	402	1WB	CM1-CCC	3.37	1.50	1.47
3	H	402	1WB	CM1-CCC	2.85	1.50	1.47
3	D	402	1WB	CM1-CCC	2.74	1.50	1.47
3	G	402	1WB	CM1-CCC	2.51	1.49	1.47
3	C	402	1WB	CM1-CCC	2.49	1.49	1.47
3	A	402	1WB	CM1-CCC	2.37	1.49	1.47
3	F	402	1WB	CM1-CCC	2.30	1.49	1.47

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	402	1WB	CZ-CM1-CCC	-2.87	116.58	120.36
3	E	402	1WB	CZ-CM1-CCC	-2.83	116.63	120.36
3	G	402	1WB	CO1-C1-CC	-2.32	117.30	120.36
3	H	402	1WB	CZ-CM1-CCC	-2.15	117.53	120.36
3	C	402	1WB	CZ-CM1-CCC	-2.05	117.66	120.36

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	F	403	GOL	O1-C1-C2-C3
5	F	403	GOL	O1-C1-C2-O2
4	H	404	EDO	O1-C1-C2-O2
4	C	405	EDO	O1-C1-C2-O2
4	A	406	EDO	O1-C1-C2-O2
4	F	406	EDO	O1-C1-C2-O2
4	A	404	EDO	O1-C1-C2-O2
4	A	403	EDO	O1-C1-C2-O2

There are no ring outliers.

13 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	402	1WB	2	0
4	C	403	EDO	1	0
3	E	402	1WB	2	0
3	B	402	1WB	2	0
3	A	402	1WB	2	0
4	D	403	EDO	1	0
3	H	402	1WB	2	0
4	A	404	EDO	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	F	402	1WB	2	0
4	G	403	EDO	2	0
3	C	402	1WB	2	0
4	C	405	EDO	1	0
4	A	405	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	335/335 (100%)	-0.44	1 (0%) 94 94	6, 11, 23, 37	0
1	B	335/335 (100%)	-0.36	3 (0%) 84 85	6, 11, 23, 36	0
1	C	335/335 (100%)	-0.38	3 (0%) 84 85	6, 12, 24, 41	0
1	D	335/335 (100%)	-0.32	2 (0%) 89 89	6, 10, 21, 39	0
1	E	335/335 (100%)	-0.37	2 (0%) 89 89	6, 10, 21, 36	0
1	F	335/335 (100%)	-0.42	2 (0%) 89 89	6, 11, 24, 36	0
1	G	335/335 (100%)	-0.35	1 (0%) 94 94	6, 11, 23, 35	0
1	H	335/335 (100%)	-0.37	3 (0%) 84 85	6, 11, 23, 49	0
All	All	2680/2680 (100%)	-0.37	17 (0%) 89 89	6, 11, 23, 49	0

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	334	THR	5.3
1	H	334	THR	4.2
1	E	334	THR	2.9
1	B	334	THR	2.7
1	H	0	SER	2.7
1	E	0	SER	2.6
1	B	248	PHE	2.5
1	C	0	SER	2.5
1	C	42	GLU	2.4
1	B	0	SER	2.4
1	D	0	SER	2.3
1	F	248	PHE	2.2
1	H	183	ARG	2.2
1	F	0	SER	2.2
1	A	334	THR	2.1
1	C	248	PHE	2.0

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Mol	Chain	Res	Type	RSRZ
1	G	248	PHE	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
4	EDO	G	404	4/4	0.71	0.24	45,46,47,49	0
5	GOL	F	403	6/6	0.79	0.20	27,36,37,38	0
4	EDO	H	403	4/4	0.81	0.13	34,35,39,41	0
4	EDO	A	406	4/4	0.81	0.20	31,33,36,40	0
4	EDO	H	404	4/4	0.82	0.20	35,36,37,38	0
4	EDO	F	405[B]	4/4	0.86	0.18	18,19,20,22	4
4	EDO	F	405[A]	4/4	0.86	0.18	18,19,21,22	4
4	EDO	G	403	4/4	0.88	0.58	36,36,40,44	0
4	EDO	A	403	4/4	0.89	0.12	16,23,31,37	0
4	EDO	F	406	4/4	0.90	0.17	30,30,33,37	0
3	1WB	B	402	14/14	0.90	0.12	11,19,22,23	0
4	EDO	C	405	4/4	0.91	0.17	35,35,40,43	0
4	EDO	A	405	4/4	0.92	0.14	24,27,32,33	0
4	EDO	D	403	4/4	0.92	0.12	14,22,28,36	0
3	1WB	C	402	14/14	0.93	0.09	13,17,24,25	0
4	EDO	C	403	4/4	0.93	0.37	26,28,28,30	0
4	EDO	F	407	4/4	0.93	0.10	30,31,33,36	0
3	1WB	H	402	14/14	0.93	0.11	15,19,23,23	0
3	1WB	G	402	14/14	0.93	0.10	15,20,23,26	0
3	1WB	F	402	14/14	0.93	0.09	16,21,24,26	0
3	1WB	A	402	14/14	0.93	0.11	14,18,22,23	0
4	EDO	C	404	4/4	0.94	0.10	16,23,33,39	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	GOL	E	403	6/6	0.94	0.14	14,30,34,39	0
4	EDO	A	404	4/4	0.95	0.11	16,25,31,39	0
3	1WB	E	402	14/14	0.95	0.08	9,15,20,20	0
4	EDO	G	405	4/4	0.95	0.10	17,23,30,30	0
3	1WB	D	402	14/14	0.96	0.07	10,15,19,19	0
4	EDO	B	403	4/4	0.96	0.09	16,25,29,29	0
4	EDO	F	404	4/4	0.98	0.07	14,22,32,34	0
2	MN	F	401[B]	1/1	1.00	0.04	6,6,6,6	1
2	MN	C	401[A]	1/1	1.00	0.06	10,10,10,10	1
2	MN	B	401[B]	1/1	1.00	0.06	5,5,5,5	1
2	MN	A	401[A]	1/1	1.00	0.09	8,8,8,8	1
2	MN	C	401[B]	1/1	1.00	0.06	6,6,6,6	1
2	MN	D	401[B]	1/1	1.00	0.08	5,5,5,5	1
2	MN	H	401[A]	1/1	1.00	0.08	9,9,9,9	1
2	MN	E	401[B]	1/1	1.00	0.07	5,5,5,5	1
2	MN	G	401[B]	1/1	1.00	0.06	6,6,6,6	1
2	MN	H	401[B]	1/1	1.00	0.08	6,6,6,6	1
2	MN	F	401[A]	1/1	1.00	0.04	9,9,9,9	1
2	MN	A	401[B]	1/1	1.00	0.09	5,5,5,5	1
2	MN	D	401[A]	1/1	1.00	0.08	7,7,7,7	1
2	MN	B	401[A]	1/1	1.00	0.06	8,8,8,8	1
2	MN	G	401[A]	1/1	1.00	0.06	8,8,8,8	1
2	MN	E	401[A]	1/1	1.00	0.07	7,7,7,7	1

## 6.5 Other polymers

There are no such residues in this entry.