



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 08:39 AM GMT

PDB ID : 3FG1  
Title : Crystal structure of Delta413-417:GS LOX  
Authors : Neau, D.B.; Newcomer, M.E.  
Deposited on : 2008-12-04  
Resolution : 1.85 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](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

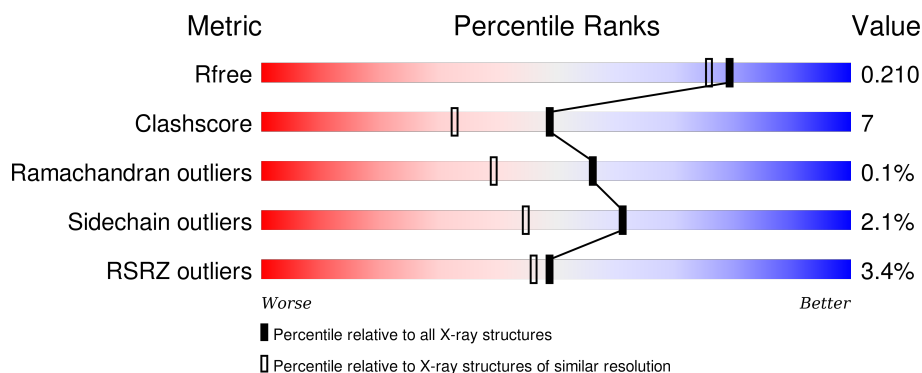
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.85 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))
$R_{free}$	91344	1745 (1.86-1.86)
Clashscore	102246	1898 (1.86-1.86)
Ramachandran outliers	100387	1875 (1.86-1.86)
Sidechain outliers	100360	1875 (1.86-1.86)
RSRZ outliers	91569	1747 (1.86-1.86)

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. 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	696	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 2%, orange 0%, yellow 0%, green 88%, grey 99%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>2%</span> <span>88%</span> <span>9%</span> </div> </div>
1	B	696	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 7%, orange 0%, yellow 0%, green 86%, grey 99%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>7%</span> <span>86%</span> <span>10%</span> </div> </div>
1	C	696	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 2%, orange 0%, yellow 0%, green 88%, grey 99%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>2%</span> <span>88%</span> <span>9%</span> </div> </div>
1	D	696	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 3%, orange 0%, yellow 0%, green 87%, grey 99%);"></div> <div style="display: flex; justify-content: space-between; width: 100%;"> <span>3%</span> <span>87%</span> <span>10%</span> </div> </div>

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
4	ACY	A	2200[A]	-	-	-	X
4	ACY	A	2200[B]	-	-	X	X
4	ACY	A	2202	-	-	-	X
4	ACY	A	2203	-	-	-	X
4	ACY	A	2204	-	-	X	-
4	ACY	A	2205	-	-	-	X
4	ACY	A	2206	-	-	-	X
4	ACY	A	2207	-	-	-	X
4	ACY	B	2201	-	-	-	X
4	ACY	B	2203	-	-	-	X
4	ACY	C	2201[A]	-	-	X	X
4	ACY	C	2201[B]	-	-	-	X
4	ACY	C	2205	-	-	-	X
4	ACY	C	2207	-	-	-	X
4	ACY	D	2201	-	-	-	X
4	ACY	D	2204	-	-	X	X
4	ACY	D	2206	-	-	X	X
5	GOL	A	2304	-	-	-	X
5	GOL	A	2305	-	-	X	-
5	GOL	A	2306	-	-	X	X
5	GOL	A	2307	-	-	-	X
5	GOL	A	2310	-	-	-	X
5	GOL	B	2306	-	-	X	-
5	GOL	B	2308	-	-	-	X
5	GOL	C	2301[B]	-	-	X	-
5	GOL	C	2305	-	-	X	-
5	GOL	D	2302[A]	-	-	X	-
5	GOL	D	2303	-	-	-	X

## 2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 25092 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 Allene oxide synthase-lipoxygenase protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	684	Total	C	N	O	S	1	16	0
			5523	3527	933	1050	13			
1	B	682	Total	C	N	O	S	0	22	0
			5547	3542	933	1059	13			
1	C	683	Total	C	N	O	S	0	18	0
			5536	3536	933	1054	13			
1	D	681	Total	C	N	O	S	0	21	0
			5535	3540	932	1050	13			

There are 52 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	368	MET	-	EXPRESSION TAG	UNP O16025
A	369	HIS	-	EXPRESSION TAG	UNP O16025
A	370	HIS	-	EXPRESSION TAG	UNP O16025
A	371	HIS	-	EXPRESSION TAG	UNP O16025
A	372	HIS	-	EXPRESSION TAG	UNP O16025
A	373	HIS	-	EXPRESSION TAG	UNP O16025
A	?	-	TRP	DELETION	UNP O16025
A	?	-	PHE	DELETION	UNP O16025
A	?	-	HIS	DELETION	UNP O16025
A	413	GLY	ASN	ENGINEERED	UNP O16025
A	414	SER	ASP	ENGINEERED	UNP O16025
A	782	ILE	VAL	SEE REMARK 999	UNP O16025
A	963	ILE	VAL	SEE REMARK 999	UNP O16025
B	368	MET	-	EXPRESSION TAG	UNP O16025
B	369	HIS	-	EXPRESSION TAG	UNP O16025
B	370	HIS	-	EXPRESSION TAG	UNP O16025
B	371	HIS	-	EXPRESSION TAG	UNP O16025
B	372	HIS	-	EXPRESSION TAG	UNP O16025
B	373	HIS	-	EXPRESSION TAG	UNP O16025
B	?	-	TRP	DELETION	UNP O16025
B	?	-	PHE	DELETION	UNP O16025

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Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	HIS	DELETION	UNP O16025
B	413	GLY	ASN	ENGINEERED	UNP O16025
B	414	SER	ASP	ENGINEERED	UNP O16025
B	782	ILE	VAL	SEE REMARK 999	UNP O16025
B	963	ILE	VAL	SEE REMARK 999	UNP O16025
C	368	MET	-	EXPRESSION TAG	UNP O16025
C	369	HIS	-	EXPRESSION TAG	UNP O16025
C	370	HIS	-	EXPRESSION TAG	UNP O16025
C	371	HIS	-	EXPRESSION TAG	UNP O16025
C	372	HIS	-	EXPRESSION TAG	UNP O16025
C	373	HIS	-	EXPRESSION TAG	UNP O16025
C	?	-	TRP	DELETION	UNP O16025
C	?	-	PHE	DELETION	UNP O16025
C	?	-	HIS	DELETION	UNP O16025
C	413	GLY	ASN	ENGINEERED	UNP O16025
C	414	SER	ASP	ENGINEERED	UNP O16025
C	782	ILE	VAL	SEE REMARK 999	UNP O16025
C	963	ILE	VAL	SEE REMARK 999	UNP O16025
D	368	MET	-	EXPRESSION TAG	UNP O16025
D	369	HIS	-	EXPRESSION TAG	UNP O16025
D	370	HIS	-	EXPRESSION TAG	UNP O16025
D	371	HIS	-	EXPRESSION TAG	UNP O16025
D	372	HIS	-	EXPRESSION TAG	UNP O16025
D	373	HIS	-	EXPRESSION TAG	UNP O16025
D	?	-	TRP	DELETION	UNP O16025
D	?	-	PHE	DELETION	UNP O16025
D	?	-	HIS	DELETION	UNP O16025
D	413	GLY	ASN	ENGINEERED	UNP O16025
D	414	SER	ASP	ENGINEERED	UNP O16025
D	782	ILE	VAL	SEE REMARK 999	UNP O16025
D	963	ILE	VAL	SEE REMARK 999	UNP O16025

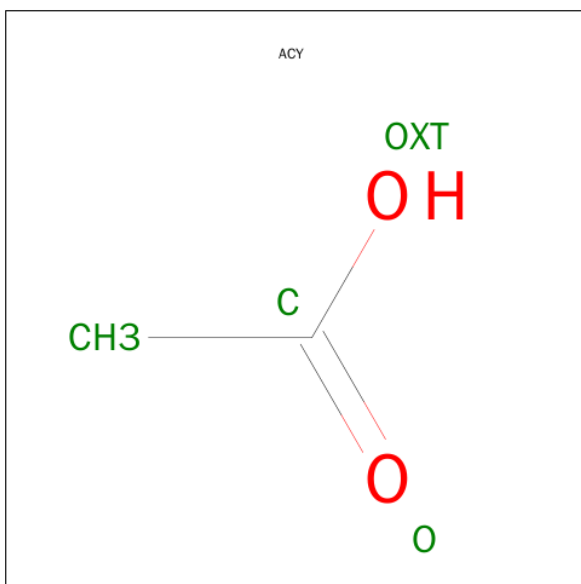
- Molecule 2 is FE (II) ION (three-letter code: FE2) (formula: Fe).

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

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total 1	Ca 1	0	0
3	A	3	Total 3	Ca 3	0	0
3	D	1	Total 1	Ca 1	0	0
3	C	3	Total 3	Ca 3	0	0

- Molecule 4 is ACETIC ACID (three-letter code: ACY) (formula: C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total 8	C 4	O 4	0	1
4	A	1	Total 8	C 4	O 4	0	1
4	A	1	Total 4	C 2	O 2	0	0
4	A	1	Total 4	C 2	O 2	0	0
4	A	1	Total 4	C 2	O 2	0	0
4	A	1	Total 4	C 2	O 2	0	0
4	A	1	Total 4	C 2	O 2	0	0

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

- 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	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	0
			6	3	3		
5	A	1	Total	C	O	0	1
			12	6	6		
5	A	1	Total	C	O	0	0
			6	3	3		
5	B	1	Total	C	O	0	0
			6	3	3		
5	B	1	Total	C	O	0	0
			6	3	3		
5	B	1	Total	C	O	0	1
			12	6	6		
5	B	1	Total	C	O	0	0
			6	3	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total	C	O	0	1
			12	6	6		
5	C	1	Total	C	O	0	0
			6	3	3		
5	C	1	Total	C	O	0	0
			6	3	3		
5	C	1	Total	C	O	0	0
			6	3	3		
5	C	1	Total	C	O	0	0
			6	3	3		
5	D	1	Total	C	O	0	0
			6	3	3		
5	D	1	Total	C	O	0	1
			12	6	6		
5	D	1	Total	C	O	0	0
			6	3	3		

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	1	Total	Cl	0	0
			1	1		
6	A	2	Total	Cl	0	0
			2	2		
6	D	1	Total	Cl	0	0
			1	1		
6	C	2	Total	Cl	0	0
			2	2		

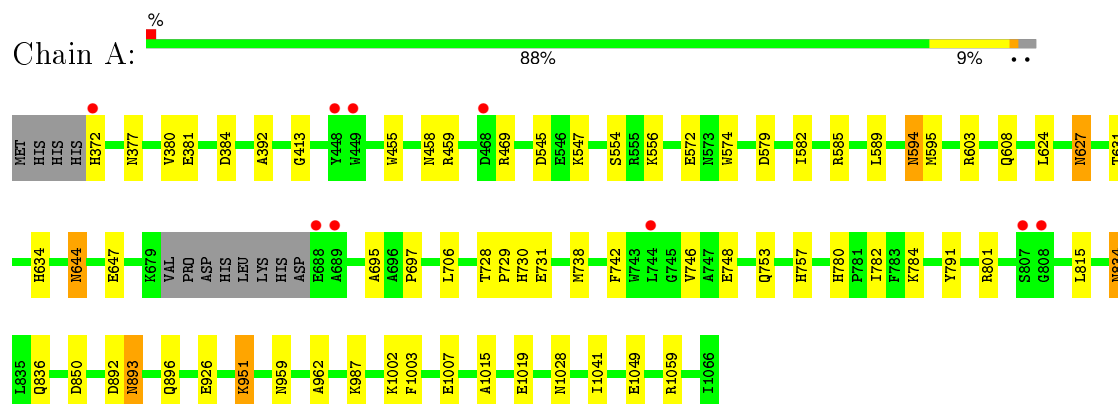
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	821	Total	O	0	0
			821	821		
7	B	565	Total	O	0	0
			565	565		
7	C	705	Total	O	0	0
			705	705		
7	D	576	Total	O	0	0
			576	576		

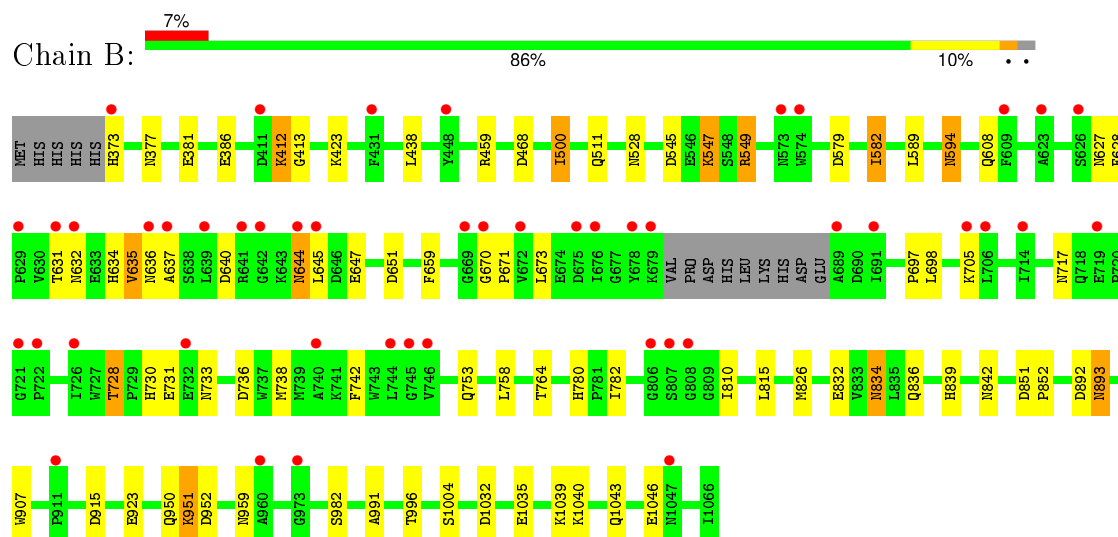
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

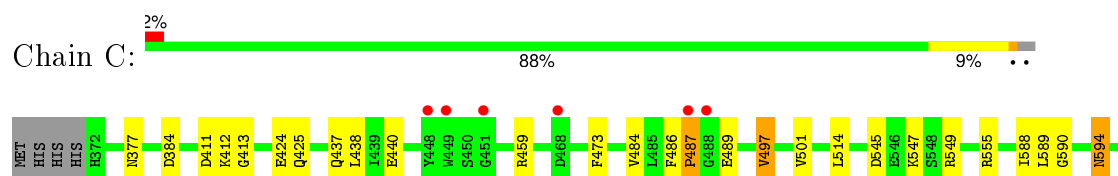
- Molecule 1: Allene oxide synthase-lipoxygenase protein

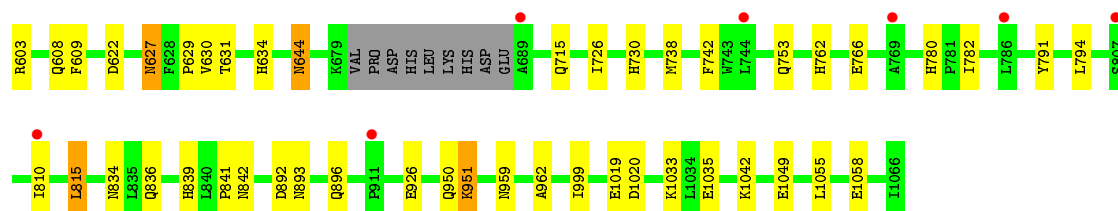


- Molecule 1: Allene oxide synthase-lipoxygenase protein

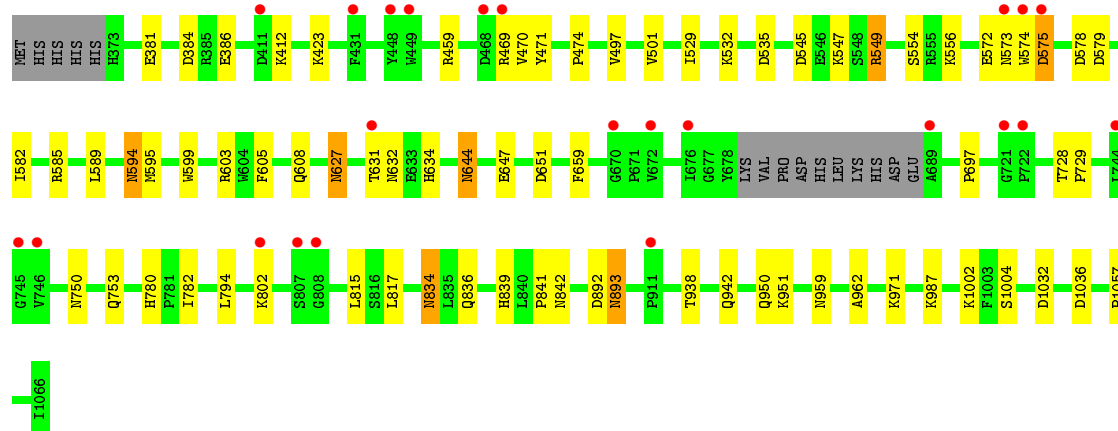
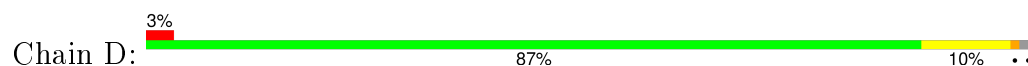


- Molecule 1: Allene oxide synthase-lipoxygenase protein





• Molecule 1: Allene oxide synthase-lipoxygenase protein



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	103.98Å 170.22Å 104.50Å 90.00° 95.88° 90.00°	Depositor
Resolution (Å)	30.00 – 1.85 27.72 – 1.85	Depositor EDS
% Data completeness (in resolution range)	98.6 (30.00-1.85) 98.6 (27.72-1.85)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.57 (at 1.85Å)	Xtriage
Refinement program	REFMAC 5.4.0066	Depositor
R, $R_{free}$	0.174 , 0.209 0.174 , 0.210	Depositor DCC
$R_{free}$ test set	15283 reflections (5.32%)	DCC
Wilson B-factor (Å <sup>2</sup> )	23.4	Xtriage
Anisotropy	0.230	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 59.2	EDS
Estimated twinning fraction	0.076 for l,-k,h	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.35$	Xtriage
Outliers	0 of 303069 reflections	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	25092	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.17% 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, 0.375 respectively for untwinned datasets, and 0.333, 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, CA, FE2, ACY, CL

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	0.77	0/5720	0.71	0/7778
1	B	0.68	0/5754	0.66	1/7830 (0.0%)
1	C	0.76	0/5737	0.72	2/7804 (0.0%)
1	D	0.70	0/5740	0.70	4/7806 (0.1%)
All	All	0.73	0/22951	0.70	7/31218 (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	D	0	1

There are no bond length outliers.

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	549	ARG	NE-CZ-NH2	-10.97	114.81	120.30
1	D	549	ARG	NE-CZ-NH1	7.64	124.12	120.30
1	B	549	ARG	NE-CZ-NH2	-6.92	116.84	120.30
1	C	438	LEU	CA-CB-CG	6.14	129.42	115.30
1	C	549	ARG	NE-CZ-NH2	-5.67	117.47	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	574	TRP	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	A	5523	0	5257	86	0
1	B	5547	0	5257	68	0
1	C	5536	0	5263	77	1
1	D	5535	0	5271	70	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	3	0	0	0	0
3	B	1	0	0	0	0
3	C	3	0	0	0	0
3	D	1	0	0	0	0
4	A	40	0	30	5	0
4	B	16	0	12	2	0
4	C	28	0	21	2	0
4	D	20	0	15	6	0
5	A	66	0	88	21	0
5	B	30	0	40	14	0
5	C	42	0	56	14	0
5	D	24	0	32	5	0
6	A	2	0	0	0	0
6	B	1	0	0	0	0
6	C	2	0	0	1	0
6	D	1	0	0	0	0
7	A	821	0	0	25	0
7	B	565	0	0	10	1
7	C	705	0	0	20	0
7	D	576	0	0	10	0
All	All	25092	0	21342	314	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 7.

The worst 5 of 314 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:547:LYS:HE2	7:A:2315:HOH:O	1.28	1.29
1:D:1002:LYS:HE2	7:D:1226:HOH:O	1.45	1.17
1:A:372:HIS:O	7:A:1076:HOH:O	1.66	1.12
1:C:412:LYS:HE2	7:C:1159:HOH:O	1.48	1.12
1:A:603[B]:ARG:HG2	1:A:603[B]:ARG:HH11	1.09	1.10

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:C:622:ASP:OD2	7:B:1108:HOH:O[1_556]	1.97	0.23

## 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	696/696 (100%)	674 (97%)	22 (3%)	0	100	100
1	B	699/696 (100%)	677 (97%)	22 (3%)	0	100	100
1	C	697/696 (100%)	667 (96%)	28 (4%)	2 (0%)	46	29
1	D	698/696 (100%)	674 (97%)	24 (3%)	0	100	100
All	All	2790/2784 (100%)	2692 (96%)	96 (3%)	2 (0%)	56	39

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	487	PRO
1	C	762	HIS

### 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	585/602 (97%)	575 (98%)	10 (2%)	68	54
1	B	588/602 (98%)	568 (97%)	20 (3%)	44	24
1	C	587/602 (98%)	576 (98%)	11 (2%)	65	49
1	D	584/602 (97%)	572 (98%)	12 (2%)	61	45
All	All	2344/2408 (97%)	2291 (98%)	53 (2%)	61	41

5 of 53 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	728	THR
1	B	982	SER
1	D	651	ASP
1	B	834	ASN
1	B	893[B]	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 75 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	950	GLN
1	C	627	ASN
1	D	842	ASN
1	B	959	ASN
1	C	504	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

There are no carbohydrates in this entry.

## 5.6 Ligand geometry

Of 71 ligands modelled in this entry, 18 are monoatomic - leaving 53 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	ACY	A	2200[A]	-	1,3,3	1.16	0	0,3,3	0.00	-
4	ACY	A	2200[B]	-	1,3,3	1.21	0	0,3,3	0.00	-
4	ACY	A	2201[A]	-	1,3,3	0.12	0	0,3,3	0.00	-
4	ACY	A	2201[B]	-	1,3,3	1.06	0	0,3,3	0.00	-
4	ACY	A	2202	-	1,3,3	0.54	0	0,3,3	0.00	-
4	ACY	A	2203	-	1,3,3	1.38	0	0,3,3	0.00	-
4	ACY	A	2204	-	1,3,3	0.30	0	0,3,3	0.00	-
4	ACY	A	2205	-	1,3,3	2.13	1 (100%)	0,3,3	0.00	-
4	ACY	A	2206	-	1,3,3	1.77	0	0,3,3	0.00	-
4	ACY	A	2207	-	1,3,3	1.15	0	0,3,3	0.00	-
5	GOL	A	2301	-	5,5,5	0.51	0	5,5,5	0.48	0
5	GOL	A	2302	-	5,5,5	0.46	0	5,5,5	0.71	0
5	GOL	A	2303	-	5,5,5	0.33	0	5,5,5	0.36	0
5	GOL	A	2304	-	5,5,5	0.43	0	5,5,5	0.38	0
5	GOL	A	2305	-	5,5,5	0.44	0	5,5,5	0.91	0
5	GOL	A	2306	-	5,5,5	0.33	0	5,5,5	0.88	0
5	GOL	A	2307	-	5,5,5	0.79	0	5,5,5	0.73	0
5	GOL	A	2308	-	5,5,5	0.33	0	5,5,5	0.16	0
5	GOL	A	2309[A]	-	5,5,5	0.30	0	5,5,5	0.66	0
5	GOL	A	2309[B]	-	5,5,5	0.33	0	5,5,5	0.56	0
5	GOL	A	2310	-	5,5,5	0.43	0	5,5,5	0.41	0
4	ACY	B	2201	-	1,3,3	0.51	0	0,3,3	0.00	-
4	ACY	B	2202	-	1,3,3	0.72	0	0,3,3	0.00	-
4	ACY	B	2203	-	1,3,3	1.12	0	0,3,3	0.00	-
4	ACY	B	2204	-	1,3,3	1.09	0	0,3,3	0.00	-
5	GOL	B	2305	-	5,5,5	0.24	0	5,5,5	0.29	0
5	GOL	B	2306	-	5,5,5	0.50	0	5,5,5	1.92	1 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	GOL	B	2307[A]	-	5,5,5	0.31	0	5,5,5	0.80	0
5	GOL	B	2307[B]	-	5,5,5	0.37	0	5,5,5	0.31	0
5	GOL	B	2308	-	5,5,5	0.31	0	5,5,5	0.70	0
4	ACY	C	2201[A]	-	1,3,3	0.41	0	0,3,3	0.00	-
4	ACY	C	2201[B]	-	1,3,3	0.06	0	0,3,3	0.00	-
4	ACY	C	2202	-	1,3,3	1.25	0	0,3,3	0.00	-
4	ACY	C	2203	-	1,3,3	1.35	0	0,3,3	0.00	-
4	ACY	C	2204	-	1,3,3	0.56	0	0,3,3	0.00	-
4	ACY	C	2205	-	1,3,3	0.81	0	0,3,3	0.00	-
4	ACY	C	2207	-	1,3,3	1.42	0	0,3,3	0.00	-
5	GOL	C	2301[A]	-	5,5,5	0.35	0	5,5,5	0.84	0
5	GOL	C	2301[B]	-	5,5,5	0.24	0	5,5,5	0.70	0
5	GOL	C	2302	-	5,5,5	0.89	0	5,5,5	1.16	0
5	GOL	C	2303	-	5,5,5	0.58	0	5,5,5	0.76	0
5	GOL	C	2304	-	5,5,5	0.31	0	5,5,5	0.44	0
5	GOL	C	2305	-	5,5,5	0.33	0	5,5,5	0.36	0
5	GOL	C	2307	-	5,5,5	0.35	0	5,5,5	0.95	0
4	ACY	D	2201	-	1,3,3	1.53	0	0,3,3	0.00	-
4	ACY	D	2202	-	1,3,3	0.86	0	0,3,3	0.00	-
4	ACY	D	2203	-	1,3,3	1.51	0	0,3,3	0.00	-
4	ACY	D	2204	-	1,3,3	1.05	0	0,3,3	0.00	-
4	ACY	D	2206	-	1,3,3	0.94	0	0,3,3	0.00	-
5	GOL	D	2301	-	5,5,5	0.37	0	5,5,5	0.57	0
5	GOL	D	2302[A]	-	5,5,5	0.45	0	5,5,5	0.52	0
5	GOL	D	2302[B]	-	5,5,5	0.40	0	5,5,5	0.37	0
5	GOL	D	2303	-	5,5,5	0.33	0	5,5,5	0.23	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	ACY	A	2200[A]	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2200[B]	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2201[A]	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2201[B]	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2202	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2203	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2204	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2205	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2206	-	-	0/0/0/0	0/0/0/0
4	ACY	A	2207	-	-	0/0/0/0	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	A	2301	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2302	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2303	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2304	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2305	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2306	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2307	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2308	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2309[A]	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2309[B]	-	-	0/4/4/4	0/0/0/0
5	GOL	A	2310	-	-	0/4/4/4	0/0/0/0
4	ACY	B	2201	-	-	0/0/0/0	0/0/0/0
4	ACY	B	2202	-	-	0/0/0/0	0/0/0/0
4	ACY	B	2203	-	-	0/0/0/0	0/0/0/0
4	ACY	B	2204	-	-	0/0/0/0	0/0/0/0
5	GOL	B	2305	-	-	0/4/4/4	0/0/0/0
5	GOL	B	2306	-	-	0/4/4/4	0/0/0/0
5	GOL	B	2307[A]	-	-	0/4/4/4	0/0/0/0
5	GOL	B	2307[B]	-	-	0/4/4/4	0/0/0/0
5	GOL	B	2308	-	-	0/4/4/4	0/0/0/0
4	ACY	C	2201[A]	-	-	0/0/0/0	0/0/0/0
4	ACY	C	2201[B]	-	-	0/0/0/0	0/0/0/0
4	ACY	C	2202	-	-	0/0/0/0	0/0/0/0
4	ACY	C	2203	-	-	0/0/0/0	0/0/0/0
4	ACY	C	2204	-	-	0/0/0/0	0/0/0/0
4	ACY	C	2205	-	-	0/0/0/0	0/0/0/0
4	ACY	C	2207	-	-	0/0/0/0	0/0/0/0
5	GOL	C	2301[A]	-	-	0/4/4/4	0/0/0/0
5	GOL	C	2301[B]	-	-	0/4/4/4	0/0/0/0
5	GOL	C	2302	-	-	0/4/4/4	0/0/0/0
5	GOL	C	2303	-	-	0/4/4/4	0/0/0/0
5	GOL	C	2304	-	-	0/4/4/4	0/0/0/0
5	GOL	C	2305	-	-	0/4/4/4	0/0/0/0
5	GOL	C	2307	-	-	0/4/4/4	0/0/0/0
4	ACY	D	2201	-	-	0/0/0/0	0/0/0/0
4	ACY	D	2202	-	-	0/0/0/0	0/0/0/0
4	ACY	D	2203	-	-	0/0/0/0	0/0/0/0
4	ACY	D	2204	-	-	0/0/0/0	0/0/0/0
4	ACY	D	2206	-	-	0/0/0/0	0/0/0/0
5	GOL	D	2301	-	-	0/4/4/4	0/0/0/0
5	GOL	D	2302[A]	-	-	0/4/4/4	0/0/0/0
5	GOL	D	2302[B]	-	-	0/4/4/4	0/0/0/0

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	D	2303	-	-	0/4/4/4	0/0/0/0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	2205	ACY	CH3-C	2.13	1.51	1.48

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	2306	GOL	O3-C3-C2	-3.44	93.51	110.18

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

26 monomers are involved in 67 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	2200[B]	ACY	2	0
4	A	2204	ACY	2	0
4	A	2205	ACY	1	0
5	A	2303	GOL	3	0
5	A	2304	GOL	1	0
5	A	2305	GOL	6	0
5	A	2306	GOL	6	0
5	A	2307	GOL	2	0
5	A	2309[A]	GOL	2	0
5	A	2309[B]	GOL	1	0
4	B	2201	ACY	1	0
4	B	2203	ACY	1	0
5	B	2306	GOL	10	0
5	B	2307[A]	GOL	1	0
5	B	2307[B]	GOL	2	0
5	B	2308	GOL	1	0
4	C	2201[A]	ACY	2	0
5	C	2301[A]	GOL	2	0
5	C	2301[B]	GOL	5	0
5	C	2302	GOL	2	0
5	C	2305	GOL	5	0
4	D	2201	ACY	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	2204	ACY	3	0
4	D	2206	ACY	2	0
5	D	2302[A]	GOL	4	0
5	D	2302[B]	GOL	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, 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	684/696 (98%)	-0.30	9 (1%) 79 79	13, 21, 33, 51	8 (1%)
1	B	682/696 (97%)	0.11	47 (6%) 20 18	17, 28, 53, 64	6 (0%)
1	C	683/696 (98%)	-0.22	13 (1%) 70 69	15, 22, 34, 55	12 (1%)
1	D	681/696 (97%)	0.00	23 (3%) 49 46	16, 27, 44, 58	4 (0%)
All	All	2730/2784 (98%)	-0.10	92 (3%) 49 46	13, 24, 44, 64	30 (1%)

The worst 5 of 92 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	676	ILE	4.9
1	B	722	PRO	4.7
1	A	448	TYR	4.5
1	D	448	TYR	4.5
1	B	744	LEU	4.5

### 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 [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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
4	ACY	A	2206	4/4	0.81	0.20	5.92	48,48,49,49	0
5	GOL	A	2307	6/6	0.82	0.21	5.40	38,43,45,45	0
5	GOL	A	2310	6/6	0.94	0.12	5.21	26,37,40,47	0
4	ACY	C	2201[A]	4/4	0.94	0.25	4.56	15,16,17,17	4
4	ACY	C	2201[B]	4/4	0.94	0.25	4.37	17,18,19,19	4
4	ACY	A	2207	4/4	0.83	0.17	4.33	46,46,47,47	0
4	ACY	B	2203	4/4	0.87	0.18	4.32	43,43,44,44	0
5	GOL	A	2306	6/6	0.90	0.16	4.01	24,34,35,39	0
4	ACY	D	2201	4/4	0.74	0.28	3.88	41,41,42,43	0
4	ACY	D	2206	4/4	0.95	0.27	3.71	36,36,37,37	0
4	ACY	A	2205	4/4	0.65	0.21	3.65	34,35,37,37	0
4	ACY	C	2205	4/4	0.80	0.23	3.59	36,37,38,39	0
4	ACY	D	2204	4/4	0.76	0.23	3.28	43,44,44,45	0
4	ACY	A	2202	4/4	0.82	0.20	3.21	37,38,39,40	0
4	ACY	C	2207	4/4	0.80	0.18	3.15	42,43,43,44	0
5	GOL	B	2308	6/6	0.88	0.13	2.97	36,40,42,43	0
5	GOL	A	2304	6/6	0.93	0.15	2.93	22,31,35,36	0
4	ACY	A	2203	4/4	0.88	0.13	2.88	41,41,41,41	0
5	GOL	D	2303	6/6	0.82	0.25	2.72	62,63,64,64	0
4	ACY	B	2201	4/4	0.95	0.26	2.23	37,37,37,38	0
4	ACY	A	2200[A]	4/4	0.97	0.18	2.14	17,17,17,19	4
4	ACY	A	2200[B]	4/4	0.97	0.18	2.11	16,16,17,18	4
5	GOL	C	2307	6/6	0.87	0.14	1.85	32,36,38,38	0
5	GOL	A	2309[B]	6/6	0.81	0.21	1.84	33,36,37,37	6
5	GOL	A	2309[A]	6/6	0.81	0.21	1.61	15,20,23,25	6
4	ACY	C	2203	4/4	0.90	0.11	1.37	44,44,44,45	0
5	GOL	C	2301[B]	6/6	0.86	0.18	1.10	35,41,41,42	6
4	ACY	C	2202	4/4	0.84	0.16	1.01	51,51,51,51	0
5	GOL	C	2303	6/6	0.94	0.11	0.98	27,28,34,37	0
5	GOL	C	2301[A]	6/6	0.86	0.18	0.97	12,15,16,21	6
4	ACY	D	2202	4/4	0.92	0.12	0.90	45,46,46,46	0
4	ACY	D	2203	4/4	0.93	0.13	0.80	50,51,51,51	0
4	ACY	C	2204	4/4	0.94	0.12	0.72	38,38,38,39	0
5	GOL	C	2305	6/6	0.86	0.12	0.69	26,33,35,41	0
5	GOL	C	2304	6/6	0.95	0.10	0.68	28,29,30,31	0
5	GOL	A	2301	6/6	0.93	0.11	0.44	25,32,33,34	0
5	GOL	B	2306	6/6	0.88	0.15	0.44	26,37,38,39	0
5	GOL	C	2302	6/6	0.90	0.14	0.43	21,35,37,41	0
4	ACY	A	2201[A]	4/4	0.94	0.12	0.28	42,42,42,42	4
4	ACY	A	2201[B]	4/4	0.94	0.12	0.28	30,30,31,31	4

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
5	GOL	B	2307[A]	6/6	0.83	0.18	0.25	20,32,33,36	6
5	GOL	B	2307[B]	6/6	0.83	0.18	0.25	39,42,42,44	6
5	GOL	A	2303	6/6	0.88	0.12	0.14	30,37,39,42	0
4	ACY	B	2204	4/4	0.92	0.12	0.12	50,50,50,51	0
5	GOL	D	2302[B]	6/6	0.90	0.16	-0.06	35,36,37,37	6
5	GOL	D	2302[A]	6/6	0.90	0.16	-0.06	22,24,25,25	6
5	GOL	B	2305	6/6	0.96	0.11	-0.17	27,30,32,32	0
3	CA	A	1067	1/1	1.00	0.07	-0.22	19,19,19,19	0
5	GOL	A	2305	6/6	0.92	0.12	-0.35	20,31,35,41	0
5	GOL	A	2302	6/6	0.95	0.08	-0.59	24,26,30,31	0
6	CL	A	2402	1/1	0.94	0.07	-0.60	41,41,41,41	0
5	GOL	D	2301	6/6	0.94	0.08	-0.80	29,29,31,35	0
3	CA	C	1067	1/1	0.99	0.05	-0.98	20,20,20,20	0
6	CL	C	2402	1/1	0.99	0.06	-1.04	22,22,22,22	0
3	CA	D	1501	1/1	0.99	0.05	-1.12	21,21,21,21	0
3	CA	C	1502	1/1	0.99	0.04	-1.29	20,20,20,20	0
6	CL	C	2401	1/1	0.98	0.05	-1.46	34,34,34,34	0
3	CA	A	1502	1/1	0.99	0.04	-1.48	20,20,20,20	0
6	CL	D	2401	1/1	1.00	0.04	-1.77	26,26,26,26	0
6	CL	B	2401	1/1	0.99	0.04	-1.96	25,25,25,25	0
3	CA	A	1501	1/1	1.00	0.04	-2.82	22,22,22,22	0
6	CL	A	2401	1/1	1.00	0.05	-2.85	22,22,22,22	0
2	FE2	A	1500	1/1	1.00	0.03	-3.04	19,19,19,19	0
3	CA	C	1501	1/1	1.00	0.03	-3.06	22,22,22,22	0
3	CA	B	1501	1/1	0.99	0.04	-3.21	22,22,22,22	0
2	FE2	C	1500	1/1	1.00	0.02	-3.61	20,20,20,20	0
2	FE2	D	1500	1/1	1.00	0.03	-4.08	23,23,23,23	0
2	FE2	B	1500	1/1	0.99	0.02	-4.53	24,24,24,24	0
4	ACY	B	2202	4/4	0.91	0.16	-	41,42,43,43	0
4	ACY	A	2204	4/4	0.90	0.18	-	43,44,44,44	0
5	GOL	A	2308	6/6	0.84	0.17	-	50,53,54,55	0

## 6.5 Other polymers

There are no such residues in this entry.