



# wwPDB X-ray Structure Validation Summary Report

Feb 28, 2014 – 02:01 PM GMT

PDB ID : 2D3C  
Title : Crystal Structure of the Maize Glutamine Synthetase complexed with ADP and Phosphinothricin Phosphate  
Authors : Unno, H.; Uchida, T.; Sugawara, H.; Kurisu, G.; Sugiyama, T.; Yamaya, T.; Sakakibara, H.; Hase, T.; Kusunoki, M.  
Deposited on : 2005-09-26  
Resolution : 3.81 Å(reported)

This is a wwPDB 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/ValidationPDFNotes.html>

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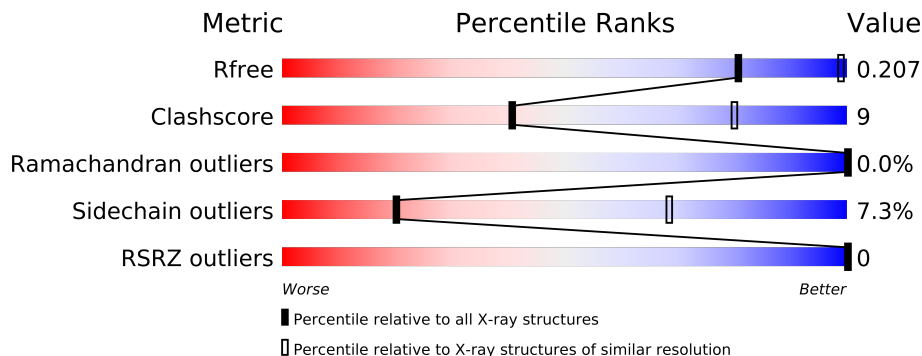
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.15 2013  
Xtriage (Phenix) : dev-1323  
EDS : stable22639  
Percentile statistics : 21963  
Refmac : 5.8.0049  
CCP4 : 6.3.0 (Settle)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)  
Validation Pipeline (wwPDB-VP) : stable22683

# 1 Overall quality at a glance






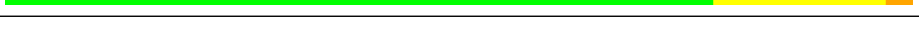




The reported resolution of this entry is 3.81 Å.

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))
$R_{free}$	66092	1165 (4.24-3.40)
Clashscore	79885	1105 (4.14-3.50)
Ramachandran outliers	78287	1055 (4.14-3.50)
Sidechain outliers	78261	1047 (4.14-3.50)
RSRZ outliers	66119	1166 (4.24-3.40)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	356	
1	B	356	
1	C	356	
1	D	356	
1	E	356	
1	F	356	
1	G	356	
1	H	356	
1	I	356	
1	J	356	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
2	MN	F	1051	-	X

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 28138 atoms, of which 0 are hydrogen and 0 are deuterium.

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 glutamine synthetase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	B	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	C	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	D	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	E	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	F	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	G	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	H	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	I	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			
1	J	353	Total	C	N	O	S	0	0	0
			2745	1739	470	525	11			

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

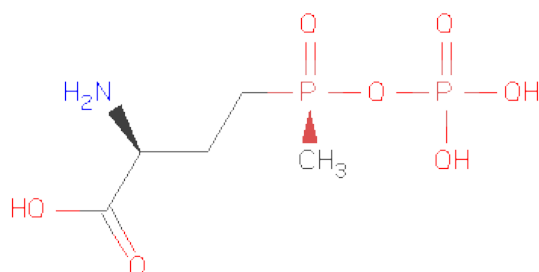
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	G	3	Total	Mn	0	0
			3	3		
2	J	3	Total	Mn	0	0
			3	3		
2	D	3	Total	Mn	0	0
			3	3		
2	E	3	Total	Mn	0	0
			3	3		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	H	3	Total	Mn	0	0
			3	3		
2	B	3	Total	Mn	0	0
			3	3		
2	I	3	Total	Mn	0	0
			3	3		
2	C	3	Total	Mn	0	0
			3	3		
2	A	3	Total	Mn	0	0
			3	3		
2	F	3	Total	Mn	0	0
			3	3		

- Molecule 3 is (2S)-2-AMINO-4-[METHYL(PHOSPHONOOXY)PHOSPHORYL]BUTANOIC ACID (three-letter code: P3P) (formula: C<sub>5</sub>H<sub>13</sub>NO<sub>7</sub>P<sub>2</sub>).



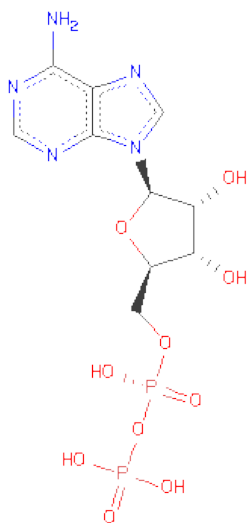
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	B	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	C	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	D	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	E	1	Total	C	N	O	P	0	0
			15	5	1	7	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	G	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	F	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	I	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	J	1	Total	C	N	O	P	0	0
			15	5	1	7	2		
3	H	1	Total	C	N	O	P	0	0
			15	5	1	7	2		

- Molecule 4 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula:  $C_{10}H_{15}N_5O_{10}P_2$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	C	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	E	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	D	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	G	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	F	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	I	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	J	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
4	H	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 5 is water.

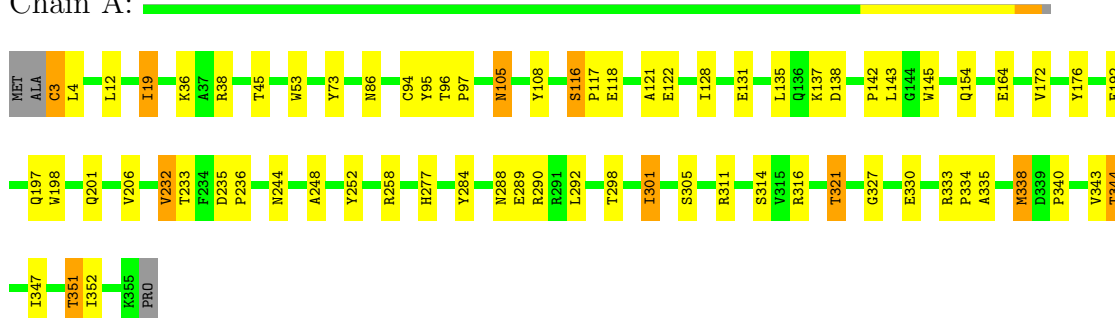
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	25	Total	O	0	0
			25	25		
5	B	26	Total	O	0	0
			26	26		
5	C	11	Total	O	0	0
			11	11		
5	D	30	Total	O	0	0
			30	30		
5	E	30	Total	O	0	0
			30	30		
5	F	31	Total	O	0	0
			31	31		
5	G	22	Total	O	0	0
			22	22		
5	H	21	Total	O	0	0
			21	21		
5	I	27	Total	O	0	0
			27	27		
5	J	15	Total	O	0	0
			15	15		

### 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.

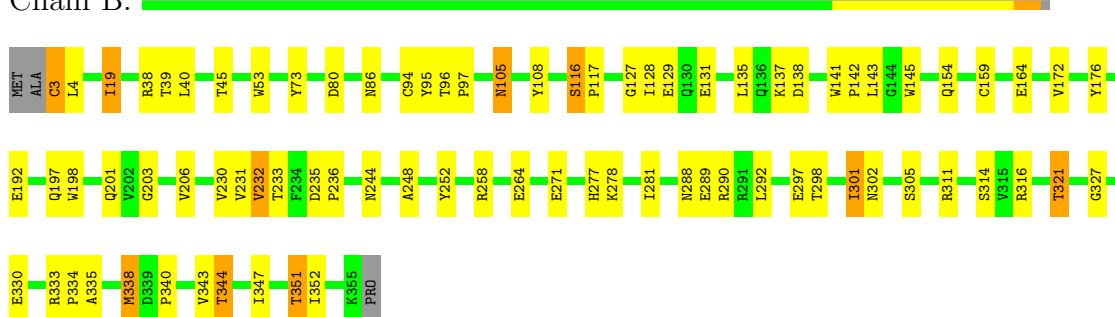
- Molecule 1: glutamine synthetase

Chain A:



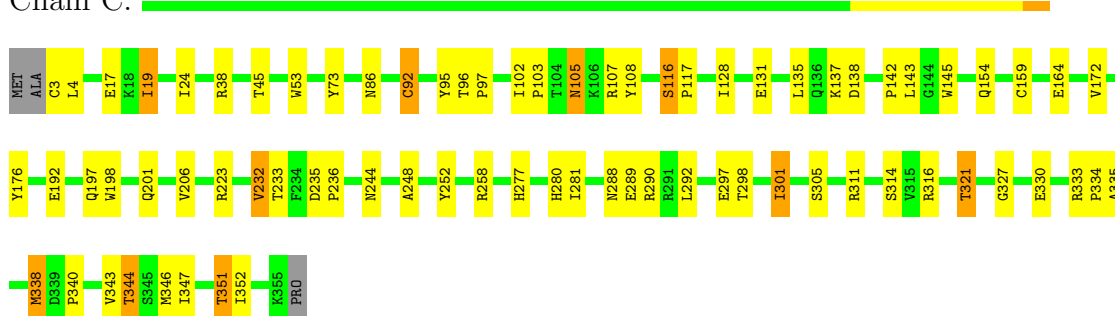
- Molecule 1: glutamine synthetase

Chain B:



- Molecule 1: glutamine synthetase

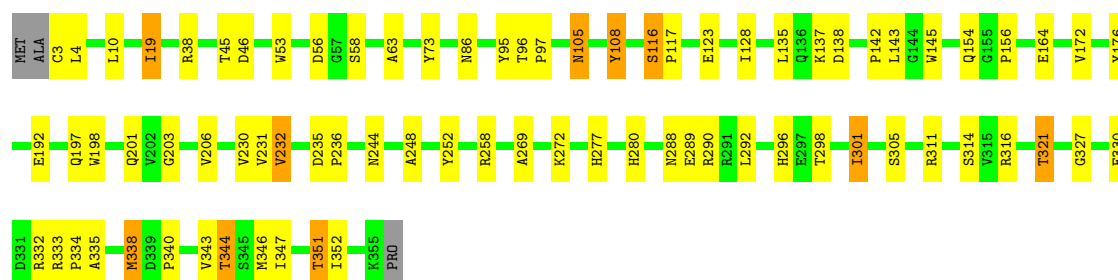
Chain C:



- Molecule 1: glutamine synthetase

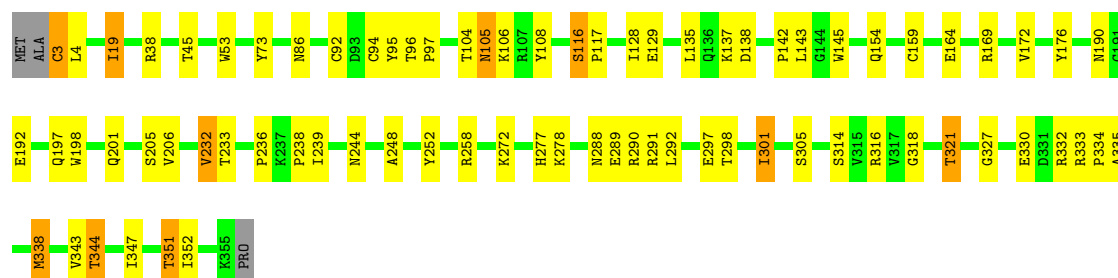
Chain D:





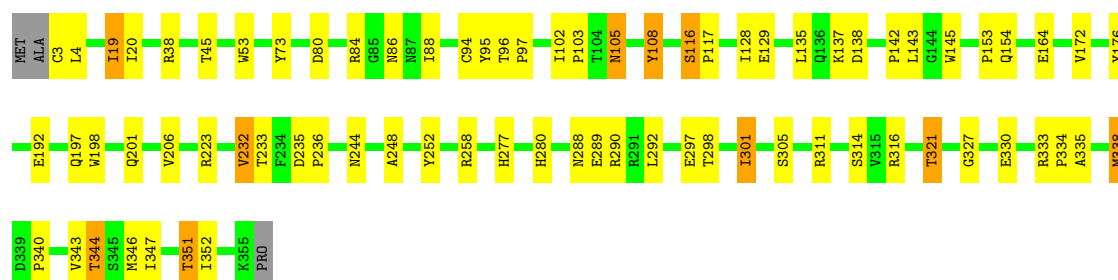
- Molecule 1: glutamine synthetase

Chain E:



- Molecule 1: glutamine synthetase

Chain F:



- Molecule 1: glutamine synthetase

Chain G:



- Molecule 1: glutamine synthetase

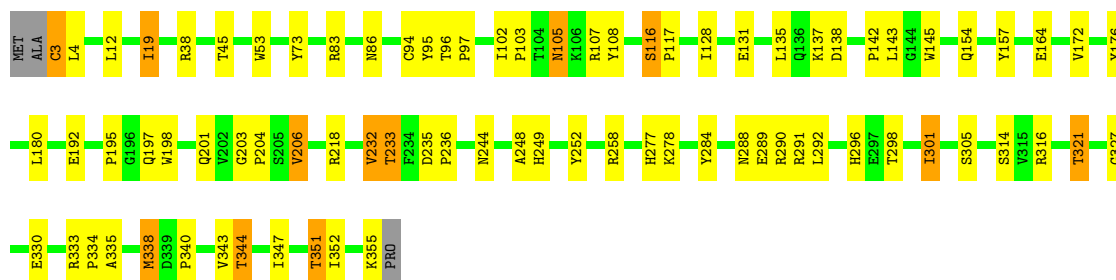
Chain H:





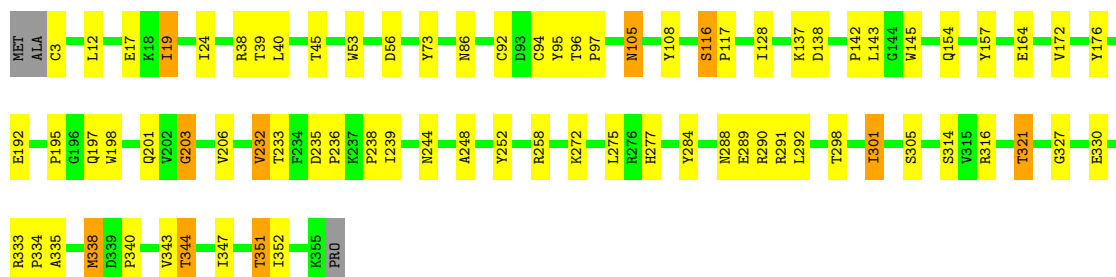
- Molecule 1: glutamine synthetase

Chain I:



- Molecule 1: glutamine synthetase

Chain J:



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	95.96Å 191.01Å 118.12Å 90.00° 101.23° 90.00°	Depositor
Resolution (Å)	27.36 – 3.81 27.36 – 3.81	Depositor EDS
% Data completeness (in resolution range)	83.0 (27.36-3.81) 83.1 (27.36-3.81)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.22 (at 3.85Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, $R_{free}$	0.185 , 0.229 0.171 , 0.207	Depositor DCC
$R_{free}$ test set	1718 reflections (5.34%)	DCC
Wilson B-factor (Å <sup>2</sup> )	86.9	Xtriage
Anisotropy	0.110	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.23 , 9.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.27$	Xtriage
Outliers	0 of 33883 reflections	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	28138	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.43% of the height of the origin peak. No significant pseudotranslation is detected.*

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

## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: P3P, MN, ADP

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	0.96	1/2819 (0.0%)	0.81	1/3834 (0.0%)
1	B	0.98	2/2819 (0.1%)	0.82	1/3834 (0.0%)
1	C	0.99	3/2819 (0.1%)	0.81	1/3834 (0.0%)
1	D	0.98	1/2819 (0.0%)	0.84	1/3834 (0.0%)
1	E	0.99	3/2819 (0.1%)	0.84	3/3834 (0.1%)
1	F	1.01	2/2819 (0.1%)	0.83	1/3834 (0.0%)
1	G	0.98	1/2819 (0.0%)	0.83	1/3834 (0.0%)
1	H	0.95	2/2819 (0.1%)	0.81	1/3834 (0.0%)
1	I	0.98	1/2819 (0.0%)	0.81	1/3834 (0.0%)
1	J	0.99	2/2819 (0.1%)	0.83	2/3834 (0.1%)
All	All	0.98	18/28190 (0.1%)	0.82	13/38340 (0.0%)

The worst 5 of 18 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	I	94	CYS	CB-SG	-9.28	1.66	1.82
1	B	159	CYS	CB-SG	-8.08	1.68	1.82
1	A	94	CYS	CB-SG	-7.07	1.70	1.82
1	C	92	CYS	CB-SG	-6.33	1.71	1.82
1	J	94	CYS	CB-SG	-6.04	1.72	1.82

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	290	ARG	NE-CZ-NH2	-5.67	117.47	120.30
1	D	232	VAL	CB-CA-C	-5.50	100.95	111.40
1	F	232	VAL	CB-CA-C	-5.44	101.06	111.40
1	G	232	VAL	CB-CA-C	-5.39	101.15	111.40
1	E	232	VAL	CB-CA-C	-5.39	101.16	111.40

There are no chirality outliers.

There are no planarity outliers.

## 5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2745	0	2653	47	0
1	B	2745	0	2653	51	1
1	C	2745	0	2653	46	0
1	D	2745	0	2653	55	0
1	E	2745	0	2653	48	0
1	F	2745	0	2653	52	0
1	G	2745	0	2653	53	0
1	H	2745	0	2653	47	1
1	I	2745	0	2653	56	0
1	J	2745	0	2653	44	0
2	A	3	0	0	0	0
2	B	3	0	0	0	0
2	C	3	0	0	0	0
2	D	3	0	0	0	0
2	E	3	0	0	0	0
2	F	3	0	0	0	0
2	G	3	0	0	0	0
2	H	3	0	0	0	0
2	I	3	0	0	0	0
2	J	3	0	0	0	0
3	A	15	0	10	5	0
3	B	15	0	10	3	0
3	C	15	0	10	4	0
3	D	15	0	10	3	0
3	E	15	0	10	4	0
3	F	15	0	10	4	0
3	G	15	0	10	2	0
3	H	15	0	10	2	0
3	I	15	0	10	4	0
3	J	15	0	10	0	0
4	A	27	0	12	0	0
4	B	27	0	12	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	C	27	0	12	0	0
4	D	27	0	12	1	0
4	E	27	0	12	0	0
4	F	27	0	12	2	0
4	G	27	0	12	3	0
4	H	27	0	12	0	0
4	I	27	0	12	2	0
4	J	27	0	12	1	0
5	A	25	0	0	7	0
5	B	26	0	0	5	0
5	C	11	0	0	1	0
5	D	30	0	0	11	0
5	E	30	0	0	10	0
5	F	31	0	0	8	0
5	G	22	0	0	7	0
5	H	21	0	0	7	0
5	I	27	0	0	8	0
5	J	15	0	0	3	0
All	All	28138	0	26750	507	1

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 9.

The worst 5 of 507 close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:B:278:LYS:HA	5:B:6021:HOH:O	1.22	1.29
1:B:344:THR:HG21	5:B:6024:HOH:O	1.44	1.18
1:B:271:GLU:OE1	5:B:6016:HOH:O	1.63	1.14
1:D:123:GLU:HA	5:D:6013:HOH:O	1.54	1.05
1:J:117:PRO:HD2	5:J:6022:HOH:O	1.57	1.03

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	Distance(Å)	Clash(Å)
1:B:302:ASN:O	1:H:355:LYS:CB[2_655]	2.16	0.04

## 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	351/356 (99%)	334 (95%)	17 (5%)	0	100	100
1	B	351/356 (99%)	333 (95%)	18 (5%)	0	100	100
1	C	351/356 (99%)	332 (95%)	19 (5%)	0	100	100
1	D	351/356 (99%)	333 (95%)	18 (5%)	0	100	100
1	E	351/356 (99%)	333 (95%)	18 (5%)	0	100	100
1	F	351/356 (99%)	334 (95%)	17 (5%)	0	100	100
1	G	351/356 (99%)	334 (95%)	17 (5%)	0	100	100
1	H	351/356 (99%)	332 (95%)	19 (5%)	0	100	100
1	I	351/356 (99%)	333 (95%)	18 (5%)	0	100	100
1	J	351/356 (99%)	336 (96%)	14 (4%)	1 (0%)	50	91
All	All	3510/3560 (99%)	3334 (95%)	175 (5%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	J	203	GLY

### 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	288/290 (99%)	267 (93%)	21 (7%)	20	68
1	B	288/290 (99%)	267 (93%)	21 (7%)	20	68
1	C	288/290 (99%)	267 (93%)	21 (7%)	20	68
1	D	288/290 (99%)	268 (93%)	20 (7%)	22	70

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	288/290 (99%)	267 (93%)	21 (7%)	20	68
1	F	288/290 (99%)	267 (93%)	21 (7%)	20	68
1	G	288/290 (99%)	267 (93%)	21 (7%)	20	68
1	H	288/290 (99%)	266 (92%)	22 (8%)	19	67
1	I	288/290 (99%)	267 (93%)	21 (7%)	20	68
1	J	288/290 (99%)	267 (93%)	21 (7%)	20	68
All	All	2880/2900 (99%)	2670 (93%)	210 (7%)	20	68

5 of 210 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	232	VAL
1	F	258	ARG
1	J	128	ILE
1	E	288	ASN
1	F	45	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 95 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	288	ASN
1	F	296	HIS
1	J	190	ASN
1	E	324	ASN
1	F	197	GLN

### 5.3.3 RNA ⓘ

There are no RNA chains 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

Of 50 ligands modelled in this entry, 30 are monoatomic - leaving 20 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$
3	P3P	A	5001	2	14,14,14	3.91	4 (28%)	19,21,21	1.77	5 (26%)
4	ADP	A	6001	2	29,29,29	1.16	2 (6%)	45,45,45	3.21	13 (28%)
3	P3P	B	5002	1,2	14,14,14	2.84	6 (42%)	19,21,21	2.51	8 (42%)
4	ADP	B	6002	2	29,29,29	1.23	3 (10%)	45,45,45	3.31	15 (33%)
3	P3P	C	5003	2	14,14,14	3.57	4 (28%)	19,21,21	2.82	10 (52%)
4	ADP	C	6003	2	29,29,29	1.19	3 (10%)	45,45,45	2.73	11 (24%)
3	P3P	D	5004	2	14,14,14	4.12	4 (28%)	19,21,21	1.57	4 (21%)
4	ADP	D	6005	2	29,29,29	1.12	2 (6%)	45,45,45	2.62	14 (31%)
3	P3P	E	5005	2	14,14,14	2.47	4 (28%)	19,21,21	2.19	5 (26%)
4	ADP	E	6004	2	29,29,29	1.25	4 (13%)	45,45,45	2.50	14 (31%)
3	P3P	F	5007	2	14,14,14	2.74	3 (21%)	19,21,21	1.83	4 (21%)
4	ADP	F	6007	2	29,29,29	1.06	1 (3%)	45,45,45	2.86	11 (24%)
3	P3P	G	5006	2	14,14,14	3.86	4 (28%)	19,21,21	1.55	5 (26%)
4	ADP	G	6006	2	29,29,29	0.96	2 (6%)	45,45,45	2.11	11 (24%)
3	P3P	H	5010	2	14,14,14	4.50	5 (35%)	19,21,21	2.16	4 (21%)
4	ADP	H	6010	2	29,29,29	1.61	3 (10%)	45,45,45	2.62	16 (35%)
3	P3P	I	5008	2	14,14,14	3.57	5 (35%)	19,21,21	3.07	5 (26%)
4	ADP	I	6008	2	29,29,29	1.04	1 (3%)	45,45,45	2.80	17 (37%)
3	P3P	J	5009	2	14,14,14	3.05	3 (21%)	19,21,21	2.30	5 (26%)
4	ADP	J	6009	2	29,29,29	1.05	2 (6%)	45,45,45	2.75	9 (20%)

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
3	P3P	A	5001	2	-	1/14/16/16	0/0/0/0
4	ADP	A	6001	2	-	1/16/32/32	0/1/3/3
3	P3P	B	5002	1,2	-	0/14/16/16	0/0/0/0
4	ADP	B	6002	2	-	0/16/32/32	0/1/3/3
3	P3P	C	5003	2	-	0/14/16/16	0/0/0/0
4	ADP	C	6003	2	-	0/16/32/32	0/1/3/3
3	P3P	D	5004	2	-	0/14/16/16	0/0/0/0
4	ADP	D	6005	2	-	0/16/32/32	0/1/3/3
3	P3P	E	5005	2	-	0/14/16/16	0/0/0/0
4	ADP	E	6004	2	-	0/16/32/32	0/1/3/3
3	P3P	F	5007	2	-	1/14/16/16	0/0/0/0
4	ADP	F	6007	2	-	0/16/32/32	0/1/3/3
3	P3P	G	5006	2	-	0/14/16/16	0/0/0/0
4	ADP	G	6006	2	-	0/16/32/32	0/1/3/3
3	P3P	H	5010	2	-	0/14/16/16	0/0/0/0
4	ADP	H	6010	2	-	0/16/32/32	0/1/3/3
3	P3P	I	5008	2	-	1/14/16/16	0/0/0/0
4	ADP	I	6008	2	-	0/16/32/32	0/1/3/3
3	P3P	J	5009	2	-	0/14/16/16	0/0/0/0
4	ADP	J	6009	2	-	0/16/32/32	0/1/3/3

The worst 5 of 65 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	5010	P3P	PDP-CGP	-13.57	1.67	1.79
3	A	5001	P3P	PDP-CGP	-11.69	1.69	1.79
3	I	5008	P3P	PDP-CGP	-10.28	1.70	1.79
3	G	5006	P3P	PDP-CGP	-10.10	1.70	1.79
3	D	5004	P3P	PDP-CGP	-9.91	1.70	1.79

The worst 5 of 186 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	6002	ADP	N3-C2-N1	-14.87	116.28	128.71
4	J	6009	ADP	O4'-C1'-N9	12.79	120.33	108.44
4	A	6001	ADP	N3-C2-N1	-12.09	118.60	128.71
4	A	6001	ADP	O4'-C1'-N9	11.32	118.97	108.44
4	F	6007	ADP	O4'-C1'-N9	10.89	118.57	108.44

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	I	5008	P3P	CEP-PDP-OEB-P12
3	A	5001	P3P	CEP-PDP-OEB-P12
3	F	5007	P3P	CEP-PDP-OEB-P12
4	A	6001	ADP	C2'-C1'-N9-C8

There are no ring outliers.

## 5.7 Other polymers ⓘ

There are no such residues in this entry.

## 5.8 Polymer linkage issues

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	353/356 (99%)	-0.39	0 100 100	49, 66, 89, 100	0
1	B	353/356 (99%)	-0.36	0 100 100	49, 66, 89, 100	0
1	C	353/356 (99%)	-0.38	0 100 100	49, 66, 89, 100	0
1	D	353/356 (99%)	-0.37	0 100 100	49, 67, 89, 100	0
1	E	353/356 (99%)	-0.38	0 100 100	49, 67, 89, 100	0
1	F	353/356 (99%)	-0.37	0 100 100	49, 67, 89, 100	0
1	G	353/356 (99%)	-0.37	0 100 100	49, 67, 89, 100	0
1	H	353/356 (99%)	-0.36	0 100 100	49, 66, 89, 100	0
1	I	353/356 (99%)	-0.38	0 100 100	49, 66, 89, 100	0
1	J	353/356 (99%)	-0.36	0 100 100	49, 66, 89, 100	0
All	All	3530/3560 (99%)	-0.37	0 100 100	49, 67, 89, 100	0

There are no RSRZ outliers to report.

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

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

### 6.3 Carbohydrates ⓘ

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. 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	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	MN	F	1051	1/1	0.24	2.23	86,86,86,86	0
4	ADP	A	6001	27/27	0.24	1.64	55,76,90,90	0
4	ADP	C	6003	27/27	0.25	1.38	45,68,81,83	0
2	MN	C	1021	1/1	0.26	1.34	88,88,88,88	0
4	ADP	E	6004	27/27	0.25	0.94	81,87,94,95	0
3	P3P	C	5003	15/15	0.20	0.74	48,53,58,59	0
2	MN	A	1001	1/1	0.23	0.72	52,52,52,52	0
4	ADP	D	6005	27/27	0.22	0.53	67,73,90,90	0
3	P3P	A	5001	15/15	0.18	0.28	50,54,64,65	0
3	P3P	D	5004	15/15	0.20	0.24	64,67,75,76	0
3	P3P	F	5007	15/15	0.20	0.15	66,68,73,77	0
3	P3P	J	5009	15/15	0.21	0.13	46,48,56,58	0
3	P3P	G	5006	15/15	0.18	0.04	61,67,80,80	0
4	ADP	F	6007	27/27	0.20	-0.05	76,85,92,92	0
4	ADP	J	6009	27/27	0.21	-0.10	44,54,60,62	0
4	ADP	G	6006	27/27	0.19	-0.10	55,68,76,79	0
3	P3P	E	5005	15/15	0.19	-0.12	65,73,78,81	0
4	ADP	I	6008	27/27	0.17	-0.16	62,71,74,75	0
3	P3P	I	5008	15/15	0.18	-0.21	41,49,59,59	0
3	P3P	B	5002	15/15	0.18	-0.25	30,32,40,41	0
2	MN	B	1011	1/1	0.20	-0.31	61,61,61,61	0
2	MN	F	1053	1/1	0.17	-0.35	63,63,63,63	0
4	ADP	B	6002	27/27	0.16	-0.44	37,46,53,54	0
2	MN	B	1013	1/1	0.18	-0.59	54,54,54,54	0
4	ADP	H	6010	27/27	0.16	-0.62	29,31,40,43	0
2	MN	D	1032	1/1	0.20	-0.67	83,83,83,83	0
2	MN	D	1033	1/1	0.15	-0.73	51,51,51,51	0
3	P3P	H	5010	15/15	0.15	-0.75	30,35,41,41	0
2	MN	A	1002	1/1	0.19	-0.84	62,62,62,62	0
2	MN	J	1091	1/1	0.21	-0.96	52,52,52,52	0
2	MN	C	1023	1/1	0.15	-1.14	56,56,56,56	0
2	MN	G	1062	1/1	0.18	-1.19	69,69,69,69	0
2	MN	H	1071	1/1	0.16	-1.30	52,52,52,52	0
2	MN	D	1031	1/1	0.14	-1.43	57,57,57,57	0
2	MN	F	1052	1/1	0.15	-1.49	54,54,54,54	0
2	MN	I	1081	1/1	0.14	-1.51	53,53,53,53	0
2	MN	I	1082	1/1	0.14	-1.51	67,67,67,67	0
2	MN	E	1043	1/1	0.14	-1.61	71,71,71,71	0
2	MN	C	1022	1/1	0.14	-1.61	51,51,51,51	0

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Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
2	MN	J	1093	1/1	0.15	-1.68	41,41,41,41	0
2	MN	J	1092	1/1	0.19	-1.69	61,61,61,61	0
2	MN	E	1042	1/1	0.18	-1.81	73,73,73,73	0
2	MN	I	1083	1/1	0.11	-1.87	64,64,64,64	0
2	MN	G	1063	1/1	0.14	-1.91	51,51,51,51	0
2	MN	A	1003	1/1	0.12	-2.01	40,40,40,40	0
2	MN	H	1073	1/1	0.11	-2.08	28,28,28,28	0
2	MN	B	1012	1/1	0.13	-2.17	32,32,32,32	0
2	MN	H	1072	1/1	0.14	-3.90	49,49,49,49	0
2	MN	G	1061	1/1	0.16	-4.07	58,58,58,58	0
2	MN	E	1041	1/1	0.16	-4.80	68,68,68,68	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.