



wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 4, 2020 – 11:51 pm BST

PDB ID : 1ZQ1
Title : Structure of GatDE tRNA-Dependent Amidotransferase from *Pyrococcus abyssi*
Authors : Schmitt, E.; Panvert, M.; Blanquet, S.; Mechulam, Y.
Deposited on : 2005-05-18
Resolution : 3.00 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)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

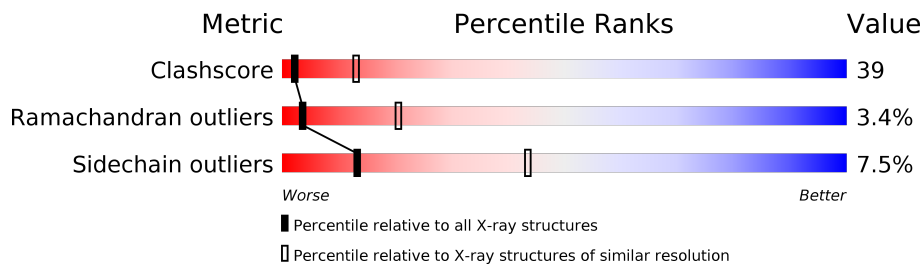
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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))
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)

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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	438	
1	B	438	
2	C	633	
2	D	633	

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
3	ASP	A	1000	-	-	X	-

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 14869 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 Glutamyl-tRNA(Gln) amidotransferase subunit D.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	437	3406	2159	578	650	5	14	0	0	0
1	B	437	3406	2162	575	650	5	14	0	0	0

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	36	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	127	LEU	VAL	CONFLICT	UNP Q9V0T9
A	149	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	181	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	191	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	217	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	225	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	234	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	237	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	257	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	362	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	393	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	403	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	418	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
A	419	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	1	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	36	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	127	LEU	VAL	CONFLICT	UNP Q9V0T9
B	149	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	181	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	191	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	217	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	225	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	234	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9

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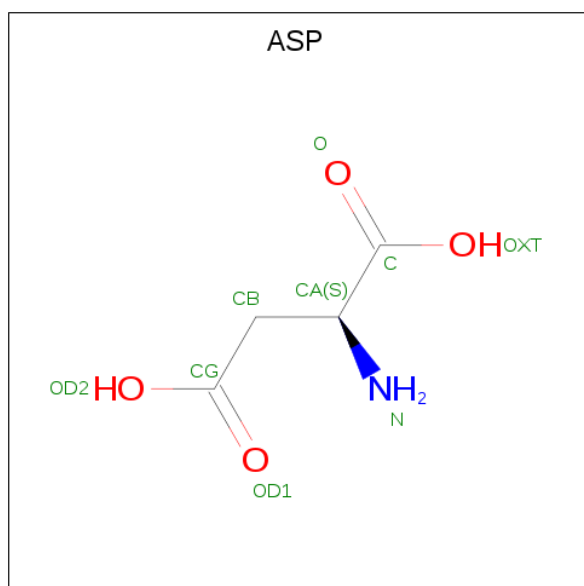
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Chain	Residue	Modelled	Actual	Comment	Reference
B	237	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	257	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	362	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	393	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	403	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	418	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9
B	419	MSE	MET	MODIFIED RESIDUE	UNP Q9V0T9

- Molecule 2 is a protein called Glutamyl-tRNA(Gln) amidotransferase subunit E.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	508	Total	C	N	O	S	0	0	0
			4005	2543	700	755	7			
2	D	508	Total	C	N	O	S	0	0	0
			3966	2523	693	743	7			

- Molecule 3 is ASPARTIC ACID (three-letter code: ASP) (formula: C₄H₇NO₄).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			9	4	1	4		
3	B	1	Total	C	N	O	0	0
			9	4	1	4		

- Molecule 4 is water.

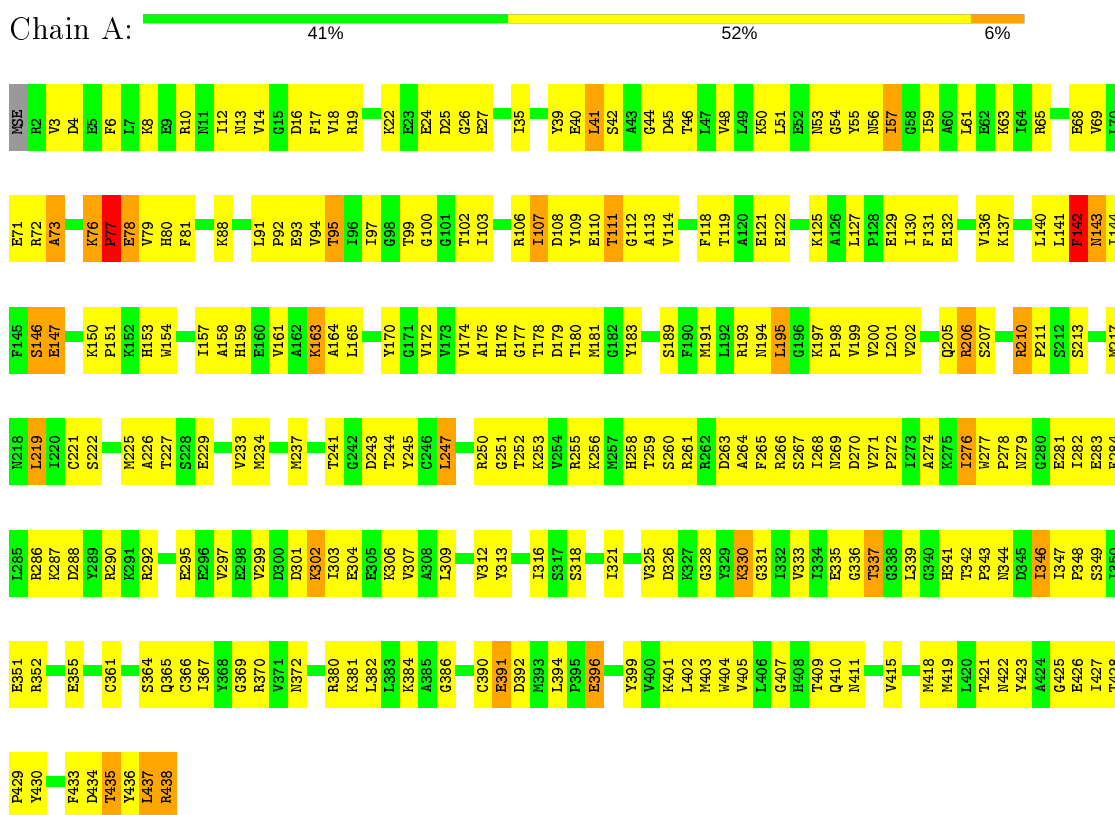
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	12	Total 12	O 12	0	0
4	B	24	Total 24	O 24	0	0
4	C	22	Total 22	O 22	0	0
4	D	10	Total 10	O 10	0	0

3 Residue-property plots [i](#)

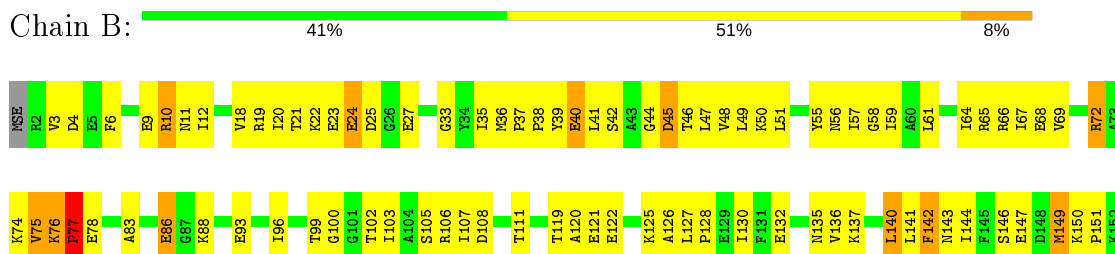
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according 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. 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.

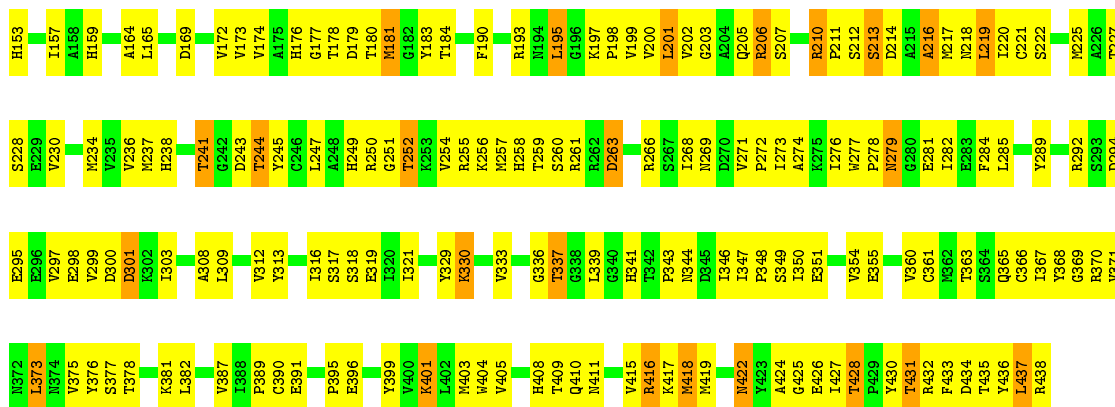
Note EDS was not executed.

- Molecule 1: Glutamyl-tRNA(Gln) amidotransferase subunit D

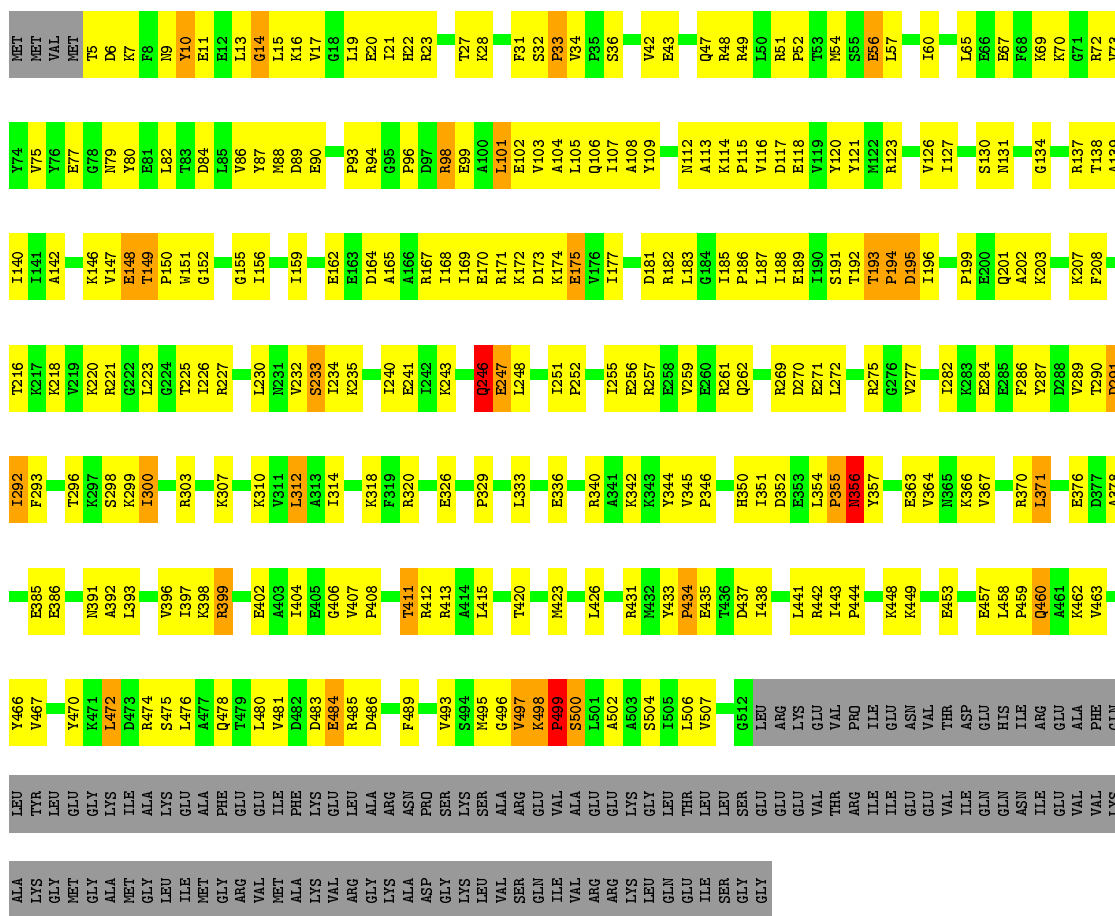


- Molecule 1: Glutamyl-tRNA(Gln) amidotransferase subunit D

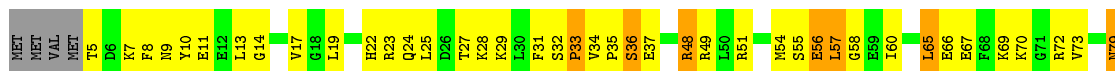
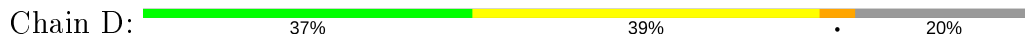




● Molecule 2: Glutamyl-tRNA(Gln) amidotransferase subunit E



● Molecule 2: Glutamyl-tRNA(Gln) amidotransferase subunit E



VAL	VAL	PHE	N454	L371	T296	K220	A453	L82
LYS	GLN	GLN	E457	N372	K297	R221	V154	L85
ALA	LEU	TYR	L468	L373	S298	G222	G195	L88
LYS	TRP	LEU	P459	S374	K299	L223	I156	P157
GLY	LEU	GLU	K462	E375	I300	G224	M88	D89
ALA	GLY	GLY	R465	E376	R303	I225	D89	E90
MET	ILE	LYS	Y466	D377	V304	I226	E91	P92
GLY	LEU	LYS	Y467	A378	G309	R227	E163	R93
ILE	GLU	GLU	V382	V382	K310	L230	D164	R94
MET	ALA	ALA	E385	E385	V311	N231	A165	G95
GLY	PHE	PHE	E386	E386	L312	I234	A166	P96
ARG	GLU	GLU	K390	K390	A313	K235	R167	A100
VAL	GLU	GLU	N391	N391	I314	R239	E170	L101
MET	ILE	ILE	A392	A392	I240	I240	R171	L101
ALA	PHE	PHE	L476	L476	E241	E241	K172	A104
LYS	LYS	LYS	L480	L480	I242	I242	D173	L105
VAL	GLU	GLU	E484	E484	K243	K243	K174	Q106
ARG	LEU	LEU	F489	F489	G244	G244	R179	I107
GLY	ALA	ALA	V493	V493	Q246	Q246	L180	L110
LYS	ARG	ARG	S494	S494	E247	E247	D181	L111
ALA	ASN	ASN	M495	M495	L248	L248	R182	L111
GLY	PRO	PRO	G496	G496	I251	I251	L183	V116
LYS	SER	SER	V497	V497	P252	P252	D117	D117
LEU	SER	SER	K498	K498	I253	I253	I185	I118
VAL	ALA	ALA	P499	P499	I254	I254	P186	P186
SER	ARG	ARG	S500	S500	K334	K334	L187	V119
GLN	GLU	GLU	L501	L501	F337	F337	I188	Y120
ILE	VAL	VAL	I505	I505	A338	A338	E189	Y121
VAL	ALA	ALA	A502	A502	D339	D339	I190	M122
ARG	ARG	ARG	L506	L506	R340	R340	S191	R123
ARG	GLU	GLU	V507	V507	I411	I411	K124	K124
LYS	LYS	LYS	I508	I508	R412	R412	I125	I125
LEU	LEU	LEU	G512	G512	I415	I415	I126	V126
GLN	LEU	LEU	LEU	LEU	P416	P416	V127	I127
ILE	THR	THR	V509	V509	D417	D417	D128	D128
ILE	LEU	LEU	E421	E421	V345	V345	G129	G129
SER	LEU	LEU	Y422	Y422	P346	P346	H197	H197
GLY	SER	SER	M423	M423	G347	G347	H198	S130
GLY	SER	SER	R424	R424	I348	I348	P199	M131
GLU	GLU	GLU	E425	E425	F349	F349	E200	V132
GLU	GLU	GLU	L426	L426	H350	H350	Q201	Q201
VAL	VAL	VAL	R431	R431	I352	I352	A202	A202
THR	THR	THR	M432	M432	D352	D352	K203	K203
ARG	ARG	ARG	Y433	Y433	E353	E353	V204	R137
ILE	ILE	ILE	P434	P434	L354	L354	T138	T138
GLY	GLY	GLY	E435	E435	P355	P355	A206	A206
GLU	GLU	GLU	Y436	Y436	X356	X356	K207	K207
VAL	VAL	VAL	D437	D437	Y357	Y357	F208	F208
ILE	ILE	ILE	I438	I438	S360	S360	D211	D211
GLU	GLU	GLU	P439	P439	Q361	Q361	A212	A212
GLN	GLN	GLN	P440	P440	E362	E362	L213	L213
ASN	ASN	ASN	L441	L441	E363	E363	E148	E148
ILE	ILE	ILE	R442	R442	V364	V364	T149	T149
ARG	ARG	ARG	I443	I443	V367	V367	P150	P150
GLU	GLU	GLU	ALA	ALA	I368	I368	W151	W151
VAL	VAL	VAL					G152	G152

4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	102.70Å 138.20Å 134.40Å 90.00° 109.60° 90.00°	Depositor
Resolution (Å)	50.00 – 3.00	Depositor
% Data completeness (in resolution range)	98.9 (50.00-3.00)	Depositor
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.217 , 0.256	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	14869	wwPDB-VP
Average B, all atoms (Å ²)	67.0	wwPDB-VP

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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	0.41	0/3455	0.72	2/4651 (0.0%)
1	B	0.42	0/3455	0.73	0/4652
2	C	0.39	0/4070	0.69	0/5497
2	D	0.33	0/4031	0.62	0/5450
All	All	0.39	0/15011	0.69	2/20250 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	77	PRO	N-CA-C	5.26	125.78	112.10
1	A	45	ASP	N-CA-C	-5.25	96.82	111.00

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	3406	0	3410	355	0
1	B	3406	0	3417	335	0
2	C	4005	0	4058	287	0
2	D	3966	0	4003	279	0
3	A	9	0	3	4	0
3	B	9	0	3	1	0
4	A	12	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	24	0	0	0	0
4	C	22	0	0	0	0
4	D	10	0	0	0	0
All	All	14869	0	14894	1160	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 39.

The worst 5 of 1160 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)
2:C:192:THR:HG22	2:C:193:THR:H	1.02	1.12
2:D:192:THR:HG22	2:D:193:THR:H	1.00	1.11
1:B:276:ILE:HG22	1:B:282:ILE:HG12	1.27	1.09
1:A:266:ARG:HD2	1:B:437:LEU:HD21	1.36	1.07
1:A:409:THR:HG22	1:A:411:ASN:H	1.18	1.05

There are no symmetry-related clashes.

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	435/438 (99%)	374 (86%)	49 (11%)	12 (3%)	5	25
1	B	435/438 (99%)	366 (84%)	56 (13%)	13 (3%)	4	24
2	C	506/633 (80%)	434 (86%)	54 (11%)	18 (4%)	3	19
2	D	506/633 (80%)	428 (85%)	57 (11%)	21 (4%)	3	16
All	All	1882/2142 (88%)	1602 (85%)	216 (12%)	64 (3%)	3	20

5 of 64 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	40	GLU
1	A	77	PRO
1	A	78	GLU
1	A	163	LYS
1	A	251	GLY

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	366/357 (102%)	338 (92%)	28 (8%)	13	42
1	B	367/357 (103%)	331 (90%)	36 (10%)	8	30
2	C	421/548 (77%)	395 (94%)	26 (6%)	18	52
2	D	412/548 (75%)	384 (93%)	28 (7%)	16	48
All	All	1566/1810 (86%)	1448 (92%)	118 (8%)	13	43

5 of 118 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	366	CYS
2	C	98	ARG
2	D	399	ARG
1	B	371	VAL
1	B	422	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 37 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	344	ASN
2	C	47	GLN
2	D	356	ASN
1	B	408	HIS
1	B	422	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

2 ligands are modelled in this entry.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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

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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.