



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 08:46 AM GMT

PDB ID : 3FZO
Title : Inosine-Guanosine Nucleoside Hydrolase (IG-NH)
Authors : Vandemeulebroucke, A.; Minici, C.; Bruno, I.; Muzzolini, L.; Tornaghi, P.;
Parkin, D.W.; Schramm, V.L.; Versees, W.; Steyaert, J.; Degano, M.
Deposited on : 2009-01-23
Resolution : 2.50 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
A user guide is available at
<http://wwpdb.org/validation/2016/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 : 1.7 (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

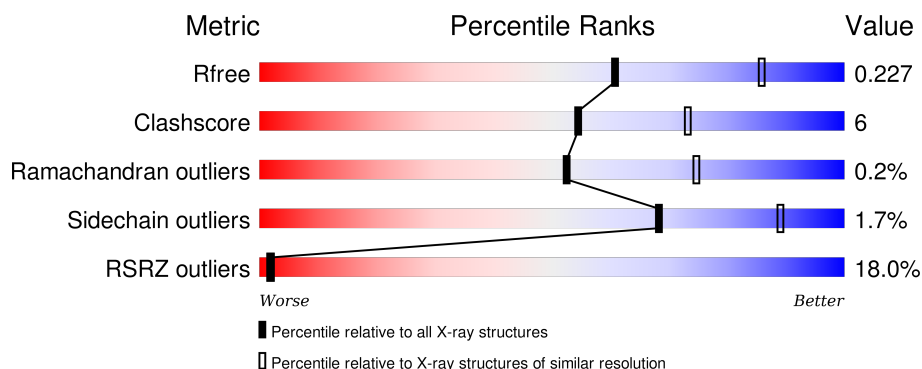
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	3553 (2.50-2.50)
Clashscore	102246	4242 (2.50-2.50)
Ramachandran outliers	100387	4156 (2.50-2.50)
Sidechain outliers	100360	4158 (2.50-2.50)
RSRZ outliers	91569	3562 (2.50-2.50)

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. 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	360	<div> <div>16%</div> <div>78%</div> <div>12%</div> <div>9%</div> </div>
1	B	360	<div> <div>13%</div> <div>80%</div> <div>13%</div> <div>6%</div> </div>
1	C	360	<div> <div>16%</div> <div>79%</div> <div>12%</div> <div>9%</div> </div>
1	D	360	<div> <div>21%</div> <div>77%</div> <div>12%</div> <div>9%</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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	BTB	A	401	-	-	-	X

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 10597 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 Nucleoside hydrolase, putative.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	327	Total	C	N	O	S	0	3	0
			2568	1635	436	483	14			
1	B	338	Total	C	N	O	S	0	3	0
			2648	1682	454	498	14			
1	C	328	Total	C	N	O	S	0	4	0
			2580	1641	439	486	14			
1	D	326	Total	C	N	O	S	0	2	0
			2555	1626	435	480	14			

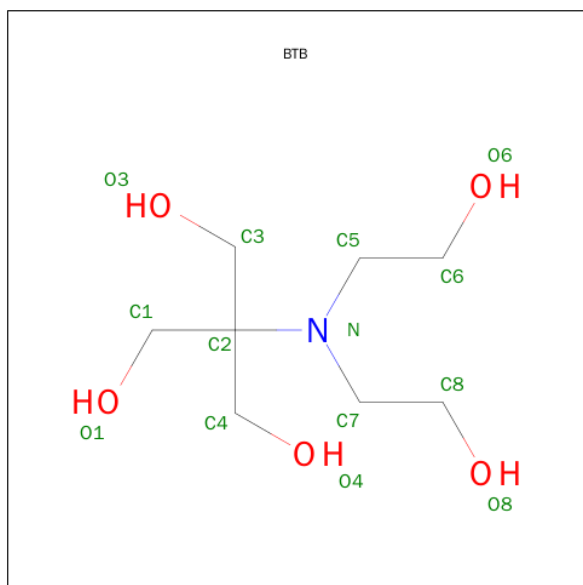
There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	EXPRESSION TAG	UNP Q57X73
A	-1	SER	-	EXPRESSION TAG	UNP Q57X73
A	0	HIS	-	EXPRESSION TAG	UNP Q57X73
A	97	GLN	LYS	ENGINEERED MUTATION	UNP Q57X73
A	226	SER	LEU	ENGINEERED MUTATION	UNP Q57X73
B	-2	GLY	-	EXPRESSION TAG	UNP Q57X73
B	-1	SER	-	EXPRESSION TAG	UNP Q57X73
B	0	HIS	-	EXPRESSION TAG	UNP Q57X73
B	97	GLN	LYS	ENGINEERED MUTATION	UNP Q57X73
B	226	SER	LEU	ENGINEERED MUTATION	UNP Q57X73
C	-2	GLY	-	EXPRESSION TAG	UNP Q57X73
C	-1	SER	-	EXPRESSION TAG	UNP Q57X73
C	0	HIS	-	EXPRESSION TAG	UNP Q57X73
C	97	GLN	LYS	ENGINEERED MUTATION	UNP Q57X73
C	226	SER	LEU	ENGINEERED MUTATION	UNP Q57X73
D	-2	GLY	-	EXPRESSION TAG	UNP Q57X73
D	-1	SER	-	EXPRESSION TAG	UNP Q57X73
D	0	HIS	-	EXPRESSION TAG	UNP Q57X73
D	97	GLN	LYS	ENGINEERED MUTATION	UNP Q57X73
D	226	SER	LEU	ENGINEERED MUTATION	UNP Q57X73

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 3 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (three-letter code: BTB) (formula: C₈H₁₉NO₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		
3	C	1	Total	C	N	O	0	0
			14	8	1	5		
3	D	1	Total	C	N	O	0	0
			14	8	1	5		

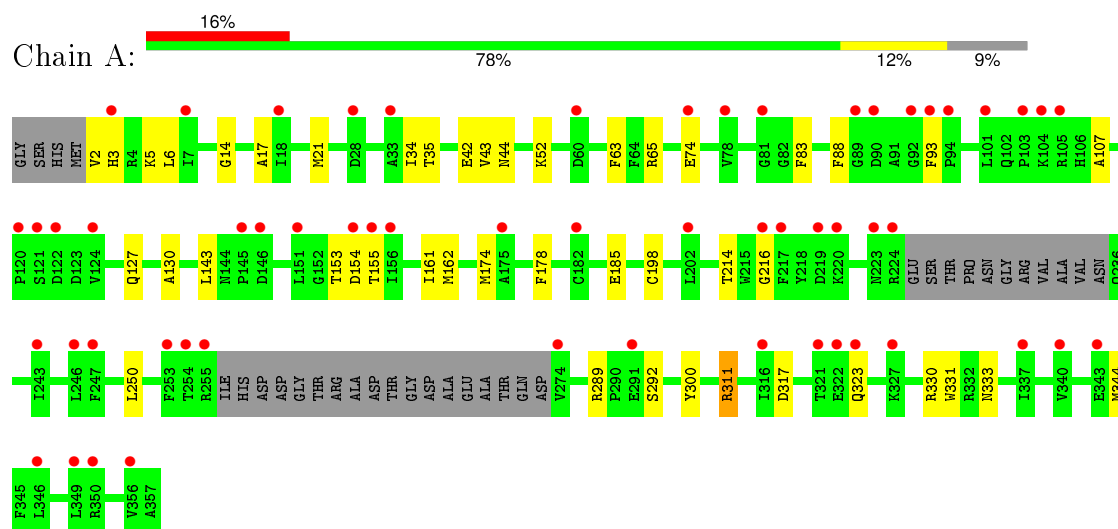
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	46	Total 46	O 46	0	0
4	B	55	Total 55	O 55	0	0
4	C	55	Total 55	O 55	0	0
4	D	30	Total 30	O 30	0	0

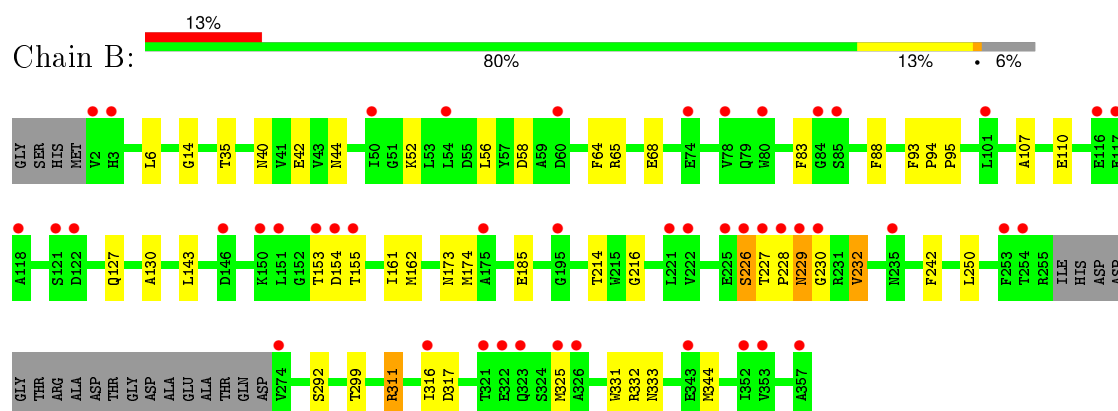
3 Residue-property plots

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.

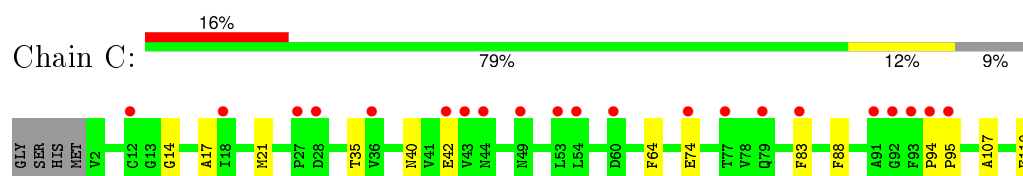
- Molecule 1: Nucleoside hydrolase, putative

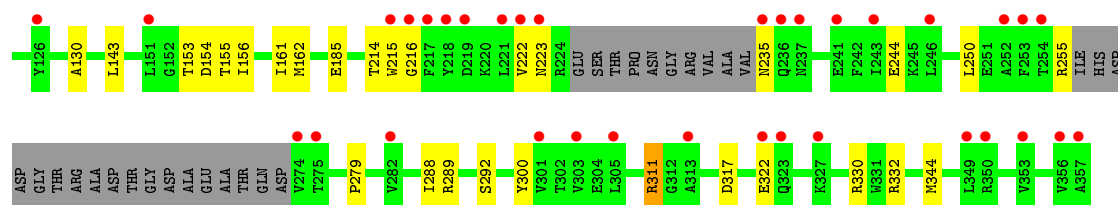


- Molecule 1: Nucleoside hydrolase, putative

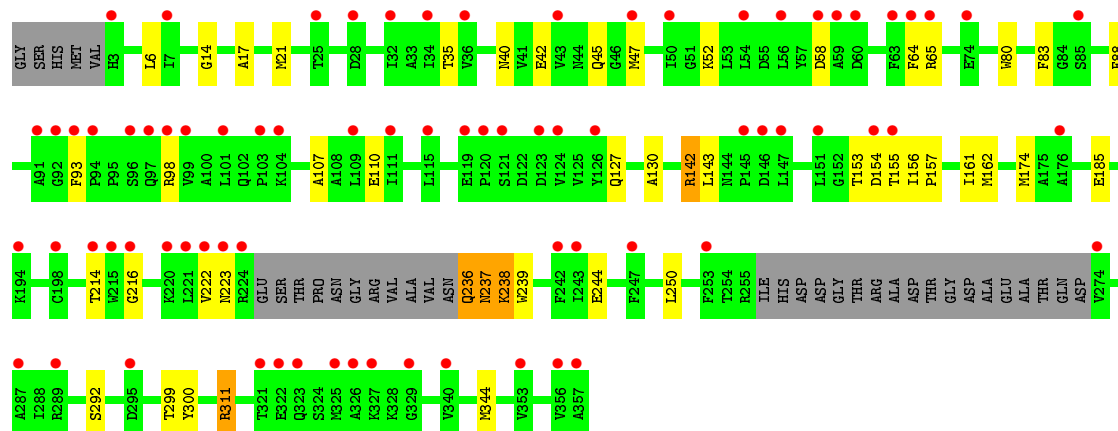
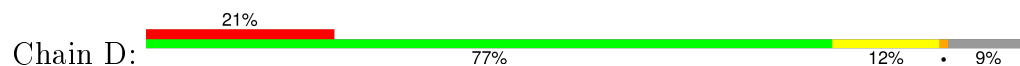


- Molecule 1: Nucleoside hydrolase, putative





• Molecule 1: Nucleoside hydrolase, putative



4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	124.69Å 116.04Å 204.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.93 – 2.50 19.93 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.9 (19.93-2.50) 99.9 (19.93-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.02 (at 2.50Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.189 , 0.224 0.192 , 0.227	Depositor DCC
R_{free} test set	2620 reflections (5.37%)	DCC
Wilson B-factor (Å ²)	37.6	Xtriage
Anisotropy	0.026	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 49.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Outliers	0 of 51432 reflections	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	10597	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.42% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: CA, BTB

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	0.71	1/2629 (0.0%)	0.70	1/3572 (0.0%)
1	B	0.73	0/2712	0.75	2/3688 (0.1%)
1	C	0.73	5/2644 (0.2%)	0.72	2/3593 (0.1%)
1	D	0.68	4/2613 (0.2%)	0.72	3/3550 (0.1%)
All	All	0.71	10/10598 (0.1%)	0.72	8/14403 (0.1%)

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	236	GLN	CB-CG	8.67	1.75	1.52
1	D	238	LYS	C-O	8.64	1.39	1.23
1	C	235	ASN	CG-ND2	8.05	1.52	1.32
1	C	235	ASN	CG-OD1	6.65	1.38	1.24
1	A	198	CYS	CB-SG	-5.80	1.72	1.81
1	D	238	LYS	CE-NZ	5.47	1.62	1.49
1	C	42	GLU	CG-CD	5.18	1.59	1.51
1	C	322	GLU	CG-CD	5.02	1.59	1.51
1	C	74	GLU	CG-CD	5.01	1.59	1.51
1	D	237	ASN	CB-CG	5.01	1.62	1.51

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	311	ARG	NE-CZ-NH2	-7.97	116.31	120.30
1	B	311	ARG	NE-CZ-NH2	-7.84	116.38	120.30
1	B	311	ARG	NE-CZ-NH1	7.16	123.88	120.30
1	D	311	ARG	NE-CZ-NH1	6.20	123.40	120.30
1	C	332	ARG	NE-CZ-NH1	5.82	123.21	120.30
1	C	311	ARG	NE-CZ-NH2	-5.67	117.47	120.30
1	A	311	ARG	NE-CZ-NH1	5.28	122.94	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	142	ARG	NE-CZ-NH2	5.12	122.86	120.30

There are no chirality outliers.

There are no planarity outliers.

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	2568	0	2549	29	0
1	B	2648	0	2627	40	0
1	C	2580	0	2559	28	0
1	D	2555	0	2534	34	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	14	0	19	3	0
3	B	14	0	19	3	0
3	C	14	0	19	5	0
3	D	14	0	19	3	0
4	A	46	0	0	0	0
4	B	55	0	0	4	0
4	C	55	0	0	0	0
4	D	30	0	0	0	0
All	All	10597	0	10345	132	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 6.

All (132) 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:D:236:GLN:CG	1:D:236:GLN:CB	1.76	1.62
1:B:143:LEU:HD11	1:D:143:LEU:HD11	1.27	1.15
1:B:226:SER:HA	1:B:227:THR:C	1.82	0.98

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:40:ASN:HB2	4:B:364:HOH:O	1.64	0.95
1:A:143:LEU:HD11	1:C:143:LEU:HD11	1.51	0.91
1:C:214:THR:HG22	1:C:216:GLY:H	1.44	0.82
1:D:214:THR:HG22	1:D:216:GLY:H	1.46	0.78
1:B:214:THR:HG22	1:B:216:GLY:H	1.49	0.78
3:C:401:BTB:O6	3:C:401:BTB:H82	1.83	0.77
1:B:65[B]:ARG:NH2	1:B:68:GLU:OE2	2.19	0.75
1:C:40:ASN:HD21	3:C:401:BTB:H61	1.50	0.74
3:B:401:BTB:H82	3:B:401:BTB:C6	2.19	0.72
1:D:292:SER:HB3	1:D:344:MET:HE1	1.71	0.72
1:B:44:ASN:OD1	1:B:65[B]:ARG:NH1	2.23	0.72
1:C:292:SER:HB3	1:C:344:MET:HE2	1.71	0.72
1:B:292:SER:HB3	1:B:344:MET:HE1	1.72	0.71
1:B:214:THR:HG22	1:B:216:GLY:N	2.06	0.69
1:D:214:THR:HG22	1:D:216:GLY:N	2.06	0.69
1:C:214:THR:HG22	1:C:216:GLY:N	2.08	0.69
1:A:214:THR:HG22	1:A:216:GLY:H	1.58	0.68
1:B:83:PHE:HD1	4:B:411:HOH:O	1.78	0.66
1:A:292:SER:HB3	1:A:344:MET:HE1	1.76	0.66
1:D:236:GLN:CB	1:D:236:GLN:CD	2.65	0.65
1:B:226:SER:OG	1:B:229:ASN:HA	1.95	0.65
1:A:153:THR:HG22	1:A:154:ASP:N	2.12	0.64
1:A:214:THR:HG22	1:A:216:GLY:N	2.13	0.63
1:D:47:MET:HG3	1:D:65:ARG:NH1	2.14	0.62
1:B:228:PRO:HA	1:B:229:ASN:HB3	1.79	0.62
1:C:153:THR:HG22	1:C:154:ASP:N	2.16	0.61
1:A:153:THR:HG22	1:A:155:THR:H	1.66	0.60
1:A:3:HIS:CD2	1:A:5:LYS:HZ3	2.20	0.59
1:D:236:GLN:CG	1:D:236:GLN:CA	2.76	0.59
1:C:185:GLU:OE2	1:C:311:ARG:NH2	2.34	0.58
1:A:44:ASN:OD1	1:A:65[B]:ARG:NH1	2.36	0.58
1:C:222:VAL:HG11	1:C:244:GLU:HB2	1.87	0.57
1:A:185:GLU:OE2	1:A:311:ARG:NH2	2.37	0.56
1:B:153:THR:HG22	1:B:154:ASP:N	2.21	0.56
1:B:35:THR:HB	1:B:107:ALA:HB1	1.89	0.55
1:D:153:THR:HG22	1:D:154:ASP:N	2.21	0.55
1:C:222:VAL:CG1	1:C:244:GLU:HB2	2.37	0.54
1:B:230:GLY:O	1:B:232:VAL:HG22	2.08	0.54
1:B:153:THR:HG22	1:B:155:THR:H	1.73	0.53
1:C:14:GLY:HA3	1:C:83:PHE:CE2	2.43	0.53
1:C:130:ALA:HB3	1:C:161:ILE:HG22	1.89	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:401:BTB:H61	3:B:401:BTB:H82	1.90	0.53
1:A:185:GLU:CD	1:A:311:ARG:HH22	2.12	0.53
1:C:40:ASN:HD21	3:C:401:BTB:C6	2.20	0.52
1:A:153:THR:CG2	1:A:154:ASP:N	2.72	0.52
1:C:153:THR:HG22	1:C:154:ASP:OD1	2.10	0.52
1:B:14:GLY:HA3	1:B:83:PHE:CE2	2.45	0.51
1:D:185:GLU:OE2	1:D:311:ARG:NH2	2.38	0.51
1:B:143:LEU:CD1	1:D:143:LEU:HD11	2.20	0.50
1:B:6:LEU:HD22	1:B:127:GLN:HB2	1.94	0.50
1:C:153:THR:HG22	1:C:155:THR:H	1.77	0.50
1:B:153:THR:HG22	1:B:154:ASP:OD1	2.12	0.50
1:D:153:THR:HG22	1:D:155:THR:H	1.78	0.49
1:C:300:TYR:CD2	1:C:330:ARG:HD3	2.48	0.49
1:B:226:SER:CA	1:B:227:THR:C	2.71	0.48
1:D:153:THR:HG22	1:D:154:ASP:OD1	2.13	0.48
1:C:14:GLY:HA3	1:C:83:PHE:CD2	2.49	0.48
1:B:331:TRP:CE2	1:B:333:ASN:HB3	2.49	0.48
1:D:17:ALA:O	1:D:21:MET:HG3	2.13	0.48
1:A:153:THR:HG22	1:A:154:ASP:OD1	2.14	0.48
1:D:185:GLU:CD	1:D:311:ARG:HH22	2.15	0.47
1:B:228:PRO:CA	1:B:229:ASN:HB3	2.44	0.47
1:D:58:ASP:OD1	1:D:98:ARG:NH2	2.46	0.47
1:A:289:ARG:HH11	1:A:344:MET:HE2	1.78	0.47
1:A:52:LYS:HD3	1:A:93:PHE:HB2	1.96	0.47
1:D:42[B]:GLU:HG2	1:D:45:GLN:H	1.79	0.47
1:D:52:LYS:HD3	1:D:93:PHE:HB2	1.97	0.47
1:C:153:THR:CG2	1:C:154:ASP:N	2.78	0.47
1:D:130:ALA:HB3	1:D:161:ILE:HG22	1.97	0.47
1:B:185:GLU:OE2	1:B:311:ARG:NH2	2.41	0.46
1:D:35:THR:HB	1:D:107:ALA:HB1	1.96	0.46
1:D:14:GLY:HA3	1:D:83:PHE:CE2	2.50	0.46
1:B:185:GLU:CD	1:B:311:ARG:HH22	2.17	0.46
3:A:401:BTB:H52	3:A:401:BTB:H81	1.70	0.46
1:D:237:ASN:OD1	1:D:239:TRP:N	2.40	0.46
1:A:35:THR:HB	1:A:107:ALA:HB1	1.97	0.46
1:D:40:ASN:HD21	3:D:401:BTB:C3	2.29	0.45
1:C:289:ARG:HH11	1:C:344:MET:HE3	1.82	0.45
1:A:178:PHE:HB3	3:A:401:BTB:H11	1.99	0.45
3:A:401:BTB:H51	3:A:401:BTB:H42	1.47	0.45
3:B:401:BTB:H32	4:B:372:HOH:O	2.16	0.45
1:A:130:ALA:HB3	1:A:161:ILE:HG22	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:153:THR:HB	1:D:156:ILE:H	1.82	0.45
1:C:185:GLU:CD	1:C:311:ARG:HH22	2.19	0.44
1:B:153:THR:CG2	1:B:154:ASP:N	2.80	0.44
3:D:401:BTB:H72	3:D:401:BTB:H61	1.59	0.44
1:A:331:TRP:CE2	1:A:333:ASN:HB3	2.51	0.44
1:A:300:TYR:CD2	1:A:330:ARG:HD3	2.52	0.44
1:D:6:LEU:HD22	1:D:127:GLN:HB2	2.00	0.44
1:C:35:THR:HB	1:C:107:ALA:HB1	1.99	0.44
1:A:17:ALA:O	1:A:21:MET:HG3	2.18	0.44
1:D:64:PHE:CD1	1:D:110:GLU:HG2	2.53	0.43
1:A:174:MET:HE3	1:B:317:ASP:HB2	2.00	0.43
1:B:64:PHE:CD1	1:B:110:GLU:HG2	2.53	0.43
1:D:222:VAL:CG1	1:D:244:GLU:HB2	2.48	0.43
1:A:14:GLY:HA3	1:A:83:PHE:CE2	2.54	0.43
1:C:279:PRO:HG2	3:C:401:BTB:H31	2.00	0.42
1:D:80:TRP:CG	3:D:401:BTB:H82	2.54	0.42
1:A:83:PHE:CZ	1:A:250:LEU:HD22	2.54	0.42
1:A:317:ASP:HB2	1:B:174:MET:HE3	2.01	0.42
1:C:317:ASP:HB2	1:D:174:MET:HE3	2.01	0.42
1:B:94:PRO:HA	1:B:95:PRO:HD3	1.97	0.42
1:B:226:SER:HA	1:B:227:THR:O	2.15	0.42
1:A:43:VAL:CG1	1:A:65[A]:ARG:HG2	2.49	0.42
1:D:156:ILE:HA	1:D:157:PRO:HD3	1.95	0.42
1:D:153:THR:CG2	1:D:154:ASP:N	2.83	0.42
3:C:401:BTB:H12	3:C:401:BTB:H72	1.64	0.41
1:B:83:PHE:CZ	1:B:250:LEU:HD22	2.55	0.41
1:B:173:ASN:HB2	4:B:363:HOH:O	2.20	0.41
1:A:153:THR:CG2	1:A:154:ASP:H	2.33	0.41
1:C:153:THR:HB	1:C:156:ILE:H	1.86	0.41
1:B:130:ALA:HB3	1:B:161:ILE:HG22	2.02	0.41
1:C:64:PHE:CD1	1:C:110:GLU:HG2	2.55	0.41
1:D:299:THR:OG1	1:D:300:TYR:N	2.54	0.41
1:C:215:TRP:HB3	1:C:255:ARG:CZ	2.50	0.41
1:B:56:LEU:HD22	1:B:242:PHE:CG	2.55	0.41
1:B:14:GLY:HA3	1:B:83:PHE:CD2	2.55	0.41
1:A:174:MET:HE2	1:B:316:ILE:C	2.40	0.41
1:B:229:ASN:HA	1:B:230:GLY:HA2	1.90	0.41
1:A:6:LEU:HD22	1:A:127:GLN:HB2	2.02	0.41
1:B:325:MET:HB2	1:B:325:MET:HE2	1.81	0.41
1:B:299:THR:HA	1:B:332:ARG:HG2	2.02	0.41
1:C:83:PHE:CZ	1:C:250:LEU:HD22	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:94:PRO:HA	1:C:95:PRO:HD3	1.97	0.40
1:D:83:PHE:CZ	1:D:250:LEU:HD22	2.56	0.40
1:C:17:ALA:O	1:C:21:MET:HG3	2.21	0.40
1:D:142:ARG:HA	1:D:142:ARG:HH11	1.85	0.40
1:B:52:LYS:HD3	1:B:93:PHE:HB2	2.03	0.40
1:A:34:ILE:O	1:A:63:PHE:HA	2.21	0.40

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	324/360 (90%)	316 (98%)	8 (2%)	0	100	100
1	B	337/360 (94%)	321 (95%)	14 (4%)	2 (1%)	30	50
1	C	326/360 (91%)	316 (97%)	10 (3%)	0	100	100
1	D	322/360 (89%)	311 (97%)	11 (3%)	0	100	100
All	All	1309/1440 (91%)	1264 (97%)	43 (3%)	2 (0%)	52	75

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	226	SER
1	B	229	ASN

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	279/301 (93%)	271 (97%)	8 (3%)	50	77
1	B	288/301 (96%)	283 (98%)	5 (2%)	68	89
1	C	281/301 (93%)	277 (99%)	4 (1%)	74	91
1	D	277/301 (92%)	273 (99%)	4 (1%)	74	91
All	All	1125/1204 (93%)	1104 (98%)	21 (2%)	68	87

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	VAL
1	A	42[A]	GLU
1	A	42[B]	GLU
1	A	74[A]	GLU
1	A	74[B]	GLU
1	A	88	PHE
1	A	162	MET
1	A	323	GLN
1	B	42	GLU
1	B	58	ASP
1	B	88	PHE
1	B	162	MET
1	B	232	VAL
1	C	88	PHE
1	C	162	MET
1	C	223	ASN
1	C	288	ILE
1	D	88	PHE
1	D	162	MET
1	D	223	ASN
1	D	238	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	40	ASN
1	D	40	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

Of 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	BTB	A	401	-	12,13,13	0.54	0	8,16,16	1.75	3 (37%)
3	BTB	B	401	-	12,13,13	0.50	0	8,16,16	1.73	2 (25%)
3	BTB	C	401	-	12,13,13	0.47	0	8,16,16	1.46	1 (12%)
3	BTB	D	401	-	12,13,13	0.37	0	8,16,16	1.48	2 (25%)

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	BTB	A	401	-	-	0/21/21/21	0/0/0/0
3	BTB	B	401	-	-	0/21/21/21	0/0/0/0
3	BTB	C	401	-	-	0/21/21/21	0/0/0/0
3	BTB	D	401	-	-	0/21/21/21	0/0/0/0

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
3	A	401	BTB	C5-N-C2	2.13	120.01	113.86
3	D	401	BTB	C7-N-C2	2.18	120.15	113.86
3	B	401	BTB	C5-N-C2	2.22	120.27	113.86
3	A	401	BTB	O1-C1-C2	2.39	116.89	111.12
3	A	401	BTB	C7-N-C2	2.61	121.40	113.86
3	D	401	BTB	C7-N-C5	2.89	121.73	112.52
3	B	401	BTB	C7-N-C5	2.94	121.90	112.52
3	C	401	BTB	C5-N-C2	3.18	123.05	113.86

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	401	BTB	3	0
3	B	401	BTB	3	0
3	C	401	BTB	5	0
3	D	401	BTB	3	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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	327/360 (90%)	1.10	57 (17%) 2 2	56, 63, 71, 79	0
1	B	338/360 (93%)	1.00	46 (13%) 4 4	57, 63, 73, 86	0
1	C	328/360 (91%)	1.18	58 (17%) 2 2	57, 63, 71, 79	0
1	D	326/360 (90%)	1.38	76 (23%) 1 1	57, 63, 71, 79	0
All	All	1319/1440 (91%)	1.16	237 (17%) 2 2	56, 63, 72, 86	0

All (237) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	274	VAL	10.5
1	B	227	THR	9.2
1	C	252	ALA	8.2
1	B	228	PRO	7.4
1	B	122	ASP	7.1
1	B	154	ASP	7.0
1	D	321	THR	6.9
1	A	274	VAL	6.9
1	D	97	GLN	5.9
1	D	146	ASP	5.9
1	D	274	VAL	5.8
1	D	94	PRO	5.7
1	C	92	GLY	5.3
1	D	101	LEU	5.2
1	A	246	LEU	5.1
1	C	60	ASP	5.1
1	A	223	ASN	5.1
1	B	274	VAL	5.0
1	B	155	THR	5.0
1	B	229	ASN	4.9
1	A	254	THR	4.9

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Mol	Chain	Res	Type	RSRZ
1	B	357	ALA	4.8
1	C	236	GLN	4.7
1	A	78	VAL	4.6
1	D	322	GLU	4.6
1	A	28	ASP	4.6
1	D	59	ALA	4.5
1	A	94	PRO	4.5
1	D	99	VAL	4.4
1	D	123	ASP	4.4
1	D	91	ALA	4.3
1	A	154	ASP	4.3
1	B	226	SER	4.3
1	C	91	ALA	4.3
1	B	323	GLN	4.2
1	D	115	LEU	4.1
1	D	295	ASP	4.1
1	A	3	HIS	4.0
1	C	223	ASN	4.0
1	D	60	ASP	4.0
1	D	221	LEU	4.0
1	C	215	TRP	3.9
1	C	253	PHE	3.9
1	D	50	ILE	3.9
1	C	219	ASP	3.9
1	D	58	ASP	3.9
1	B	78	VAL	3.9
1	C	357	ALA	3.9
1	A	253	PHE	3.9
1	A	60	ASP	3.8
1	C	350	ARG	3.8
1	C	222	VAL	3.7
1	D	92	GLY	3.7
1	A	243	ILE	3.7
1	A	81	GLY	3.7
1	C	254	THR	3.7
1	D	329	GLY	3.7
1	C	237	ASN	3.6
1	D	36	VAL	3.6
1	A	220	LYS	3.6
1	B	230	GLY	3.6
1	B	60	ASP	3.5
1	C	95	PRO	3.5

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Mol	Chain	Res	Type	RSRZ
1	B	85	SER	3.5
1	C	42	GLU	3.5
1	D	119	GLU	3.5
1	D	198	CYS	3.4
1	C	116	GLU	3.4
1	C	235	ASN	3.4
1	A	219	ASP	3.4
1	D	357	ALA	3.4
1	C	216	GLY	3.4
1	D	214	THR	3.3
1	C	243	ILE	3.3
1	C	246	LEU	3.3
1	D	154	ASP	3.3
1	D	145	PRO	3.3
1	A	321	THR	3.3
1	D	3	HIS	3.3
1	D	224	ARG	3.3
1	B	253	PHE	3.3
1	D	194	LYS	3.2
1	B	151	LEU	3.2
1	A	74[A]	GLU	3.2
1	B	343	GLU	3.2
1	A	327	LYS	3.1
1	C	313	ALA	3.1
1	D	124	VAL	3.1
1	D	340	VAL	3.1
1	D	126	TYR	3.1
1	A	156	ILE	3.1
1	A	322	GLU	3.1
1	C	275	THR	3.1
1	C	303	VAL	3.1
1	C	115	LEU	3.1
1	A	121	SER	3.1
1	D	356	VAL	3.0
1	D	243	ILE	3.0
1	D	120	PRO	3.0
1	B	101	LEU	3.0
1	D	215	TRP	3.0
1	B	3[A]	HIS	3.0
1	C	18	ILE	3.0
1	D	34	ILE	3.0
1	A	343	GLU	3.0

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Mol	Chain	Res	Type	RSRZ
1	C	151	LEU	2.9
1	A	103	PRO	2.9
1	A	323	GLN	2.9
1	B	326	ALA	2.9
1	C	94	PRO	2.9
1	A	146	ASP	2.9
1	B	254	THR	2.9
1	C	327	LYS	2.8
1	D	103	PRO	2.8
1	C	217	PHE	2.8
1	A	202	LEU	2.8
1	A	224	ARG	2.8
1	C	241	GLU	2.8
1	B	322	GLU	2.7
1	C	353	VAL	2.7
1	A	349	LEU	2.7
1	D	353	VAL	2.7
1	B	175	ALA	2.7
1	D	65	ARG	2.6
1	D	327	LYS	2.6
1	C	12	CYS	2.6
1	D	220	LYS	2.6
1	C	27	PRO	2.6
1	D	28	ASP	2.6
1	A	182	CYS	2.6
1	B	353	VAL	2.6
1	C	28	ASP	2.6
1	A	124	VAL	2.5
1	D	147	LEU	2.5
1	C	79	GLN	2.5
1	D	223	ASN	2.5
1	D	98	ARG	2.5
1	D	325	MET	2.5
1	C	74	GLU	2.5
1	D	93	PHE	2.5
1	C	53	LEU	2.5
1	B	195	GLY	2.5
1	B	118	ALA	2.5
1	C	44	ASN	2.5
1	B	74	GLU	2.5
1	B	225	GLU	2.5
1	D	151	LEU	2.5

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Mol	Chain	Res	Type	RSRZ
1	A	7	ILE	2.5
1	D	7	ILE	2.5
1	A	101	LEU	2.4
1	C	349	LEU	2.4
1	C	218	TYR	2.4
1	C	301	VAL	2.4
1	C	54	LEU	2.4
1	A	175	ALA	2.4
1	C	36	VAL	2.4
1	B	54	LEU	2.4
1	B	121	SER	2.4
1	D	32	ILE	2.4
1	D	96	SER	2.4
1	A	33	ALA	2.4
1	D	323	GLN	2.4
1	A	217	PHE	2.4
1	D	253	PHE	2.4
1	A	151	LEU	2.4
1	A	340	VAL	2.4
1	C	120	PRO	2.4
1	A	247	PHE	2.4
1	C	356	VAL	2.4
1	A	356	VAL	2.3
1	B	221	LEU	2.3
1	C	221	LEU	2.3
1	D	74	GLU	2.3
1	D	85	SER	2.3
1	A	216	GLY	2.3
1	D	326	ALA	2.3
1	C	126	TYR	2.3
1	D	121	SER	2.3
1	B	235	ASN	2.3
1	C	49	ASN	2.3
1	A	145	PRO	2.3
1	A	92	GLY	2.3
1	B	2	VAL	2.3
1	A	291	GLU	2.3
1	A	93	PHE	2.3
1	D	63	PHE	2.3
1	D	104	LYS	2.3
1	D	289	ARG	2.3
1	D	25	THR	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	155	THR	2.2
1	B	325	MET	2.2
1	D	111	ILE	2.2
1	B	321	THR	2.2
1	C	43	VAL	2.2
1	D	287	ALA	2.2
1	B	117	GLU	2.2
1	C	322	GLU	2.2
1	D	56	LEU	2.2
1	A	122	ASP	2.2
1	B	116	GLU	2.2
1	B	50	ILE	2.2
1	A	104	LYS	2.2
1	D	242	PHE	2.2
1	A	105	ARG	2.2
1	D	176	ALA	2.2
1	B	80	TRP	2.2
1	C	93	PHE	2.2
1	C	282	VAL	2.1
1	C	83	PHE	2.1
1	D	54	LEU	2.1
1	B	222	VAL	2.1
1	D	64	PHE	2.1
1	C	77	THR	2.1
1	D	216	GLY	2.1
1	D	43	VAL	2.1
1	A	90	ASP	2.1
1	C	305	LEU	2.1
1	D	109	LEU	2.1
1	A	350	ARG	2.1
1	D	222	VAL	2.1
1	B	316	ILE	2.1
1	A	120	PRO	2.1
1	A	18	ILE	2.1
1	A	316	ILE	2.1
1	D	247	PHE	2.1
1	A	155	THR	2.1
1	B	153	THR	2.1
1	C	323	GLN	2.0
1	A	255	ARG	2.0
1	A	89	GLY	2.0
1	A	337	ILE	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	150	LYS	2.0
1	B	352	ILE	2.0
1	B	146	ASP	2.0
1	A	346	LEU	2.0
1	B	84	GLY	2.0
1	D	47	MET	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 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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å ²)	Q<0.9
3	BTB	A	401	14/14	0.88	0.31	4.07	50,55,57,58	0
3	BTB	C	401	14/14	0.93	0.24	1.99	47,52,57,57	0
3	BTB	D	401	14/14	0.85	0.22	1.21	57,58,60,61	0
3	BTB	B	401	14/14	0.92	0.17	-1.19	46,54,60,62	0
2	CA	A	400	1/1	0.90	0.09	-1.97	63,63,63,63	0
2	CA	C	400	1/1	0.98	0.13	-2.18	61,61,61,61	0
2	CA	D	400	1/1	0.94	0.06	-3.71	60,60,60,60	0
2	CA	B	400	1/1	0.94	0.08	-5.36	62,62,62,62	0

6.5 Other polymers [i](#)

There are no such residues in this entry.