



Full wwPDB X-ray Structure Validation Report ⓘ

May 17, 2020 – 09:19 am BST

PDB ID : 3G7K
Title : Crystal Structure of Methylitaconate-delta-isomerase
Authors : Messerschmidt, A.; Macieira, S.; Velarde, M.
Deposited on : 2009-02-10
Resolution : 2.70 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

<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
Xtrriage (Phenix) : 1.13
EDS : 2.11
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

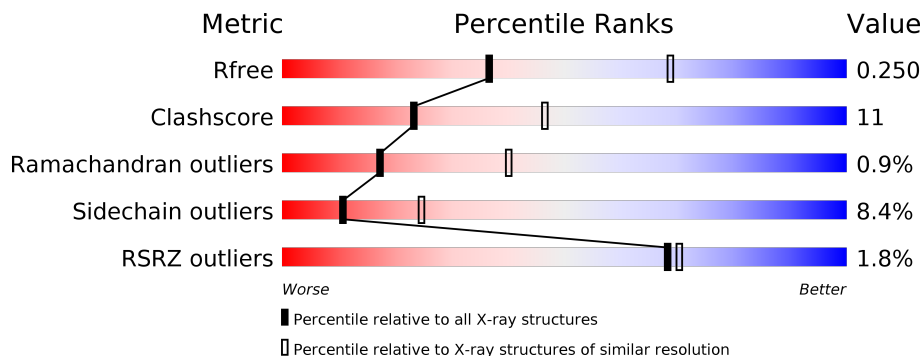
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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 $\leq 5\%$. 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	391	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 80%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 13%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">80% 13% . .</p>
1	B	391	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 76%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 20%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 2%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 2%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">2% 76% 20% . .</p>
1	C	391	<div style="display: flex; align-items: center;"> <div style="width: 4%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 41%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 13%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 2%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 43%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">4% 41% 13% . 43%</p>
1	D	391	<div style="display: flex; align-items: center;"> <div style="width: 75%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 19%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 2%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center;">75% 19% . .</p>

2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 10592 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 3-methylitaconate isomerase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	379	2807	1757	474	558	18	0	0	0
1	B	387	2868	1795	486	569	18	0	0	0
1	C	224	1645	1033	284	319	9	0	0	0
1	D	379	2807	1757	474	558	18	0	0	0

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	381	GLY	-	EXPRESSION TAG	UNP Q0QLE6
A	382	SER	-	EXPRESSION TAG	UNP Q0QLE6
A	383	ALA	-	EXPRESSION TAG	UNP Q0QLE6
A	384	TRP	-	EXPRESSION TAG	UNP Q0QLE6
A	385	SER	-	EXPRESSION TAG	UNP Q0QLE6
A	386	HIS	-	EXPRESSION TAG	UNP Q0QLE6
A	387	PRO	-	EXPRESSION TAG	UNP Q0QLE6
A	388	GLN	-	EXPRESSION TAG	UNP Q0QLE6
A	389	PHE	-	EXPRESSION TAG	UNP Q0QLE6
A	390	GLU	-	EXPRESSION TAG	UNP Q0QLE6
A	391	LYS	-	EXPRESSION TAG	UNP Q0QLE6
B	381	GLY	-	EXPRESSION TAG	UNP Q0QLE6
B	382	SER	-	EXPRESSION TAG	UNP Q0QLE6
B	383	ALA	-	EXPRESSION TAG	UNP Q0QLE6
B	384	TRP	-	EXPRESSION TAG	UNP Q0QLE6
B	385	SER	-	EXPRESSION TAG	UNP Q0QLE6
B	386	HIS	-	EXPRESSION TAG	UNP Q0QLE6
B	387	PRO	-	EXPRESSION TAG	UNP Q0QLE6
B	388	GLN	-	EXPRESSION TAG	UNP Q0QLE6
B	389	PHE	-	EXPRESSION TAG	UNP Q0QLE6
B	390	GLU	-	EXPRESSION TAG	UNP Q0QLE6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	391	LYS	-	EXPRESSION TAG	UNP Q0QLE6
C	381	GLY	-	EXPRESSION TAG	UNP Q0QLE6
C	382	SER	-	EXPRESSION TAG	UNP Q0QLE6
C	383	ALA	-	EXPRESSION TAG	UNP Q0QLE6
C	384	TRP	-	EXPRESSION TAG	UNP Q0QLE6
C	385	SER	-	EXPRESSION TAG	UNP Q0QLE6
C	386	HIS	-	EXPRESSION TAG	UNP Q0QLE6
C	387	PRO	-	EXPRESSION TAG	UNP Q0QLE6
C	388	GLN	-	EXPRESSION TAG	UNP Q0QLE6
C	389	PHE	-	EXPRESSION TAG	UNP Q0QLE6
C	390	GLU	-	EXPRESSION TAG	UNP Q0QLE6
C	391	LYS	-	EXPRESSION TAG	UNP Q0QLE6
D	381	GLY	-	EXPRESSION TAG	UNP Q0QLE6
D	382	SER	-	EXPRESSION TAG	UNP Q0QLE6
D	383	ALA	-	EXPRESSION TAG	UNP Q0QLE6
D	384	TRP	-	EXPRESSION TAG	UNP Q0QLE6
D	385	SER	-	EXPRESSION TAG	UNP Q0QLE6
D	386	HIS	-	EXPRESSION TAG	UNP Q0QLE6
D	387	PRO	-	EXPRESSION TAG	UNP Q0QLE6
D	388	GLN	-	EXPRESSION TAG	UNP Q0QLE6
D	389	PHE	-	EXPRESSION TAG	UNP Q0QLE6
D	390	GLU	-	EXPRESSION TAG	UNP Q0QLE6
D	391	LYS	-	EXPRESSION TAG	UNP Q0QLE6

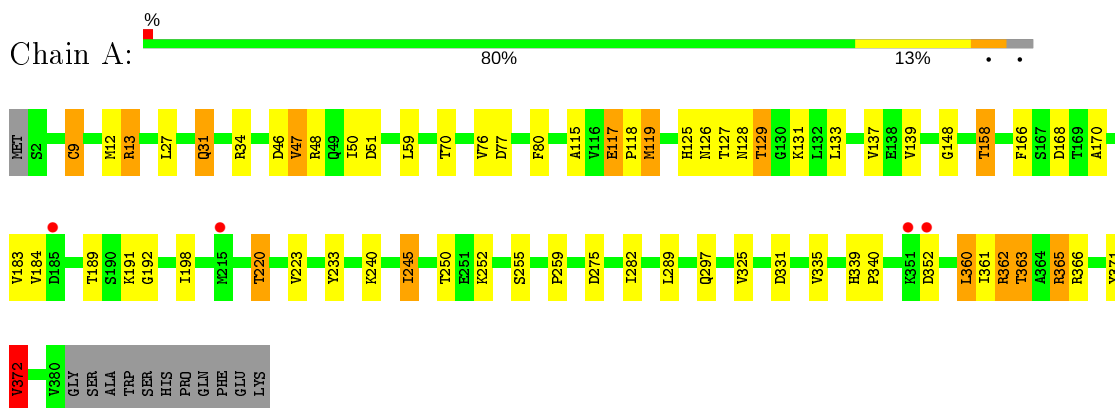
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	129	Total O 129 129	0	0
2	B	107	Total O 107 107	0	0
2	C	77	Total O 77 77	0	0
2	D	152	Total O 152 152	0	0

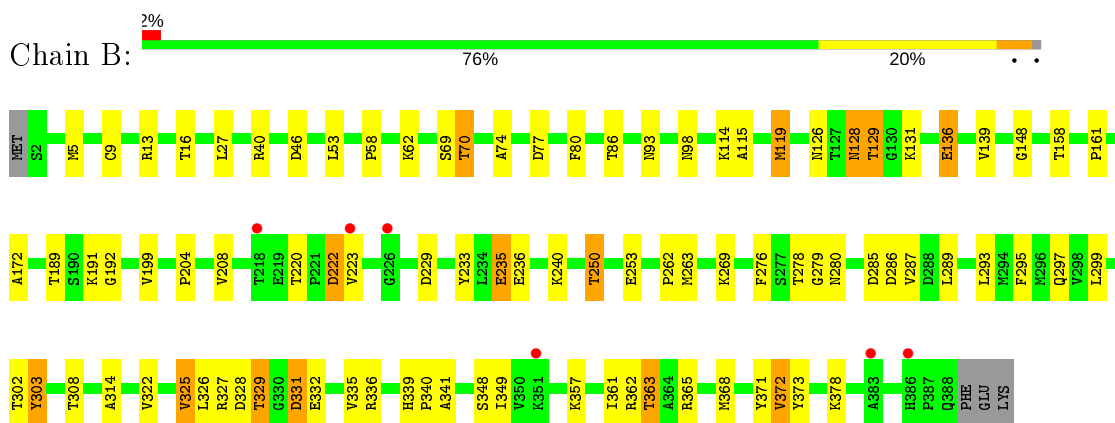
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

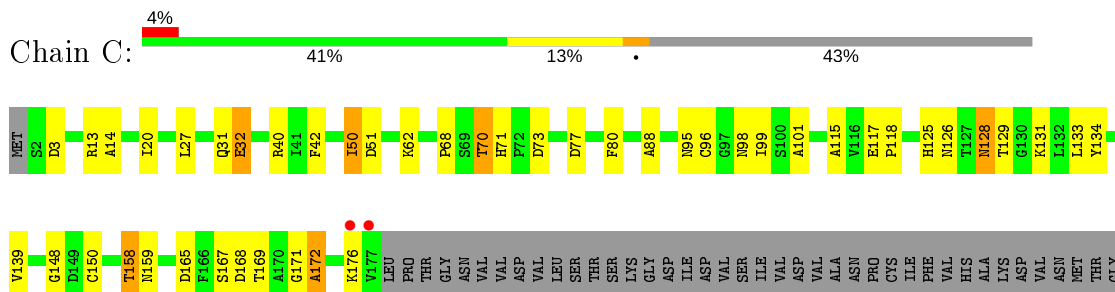
- Molecule 1: 3-methylitaconate isomerase



- Molecule 1: 3-methylitaconate isomerase



- Molecule 1: 3-methylitaconate isomerase



THR
GLU
THR
PRO
ASP
VAL
ILE
ASN
GLY
ASP
VAL
ASN
ALA
ASP
LEU
LEU
ALA
THR
TRP
GLU
GLU
ILE
ILE
ALA
ALA
LYS
LYS
CYS
CYS
VAL
LYS
ILE
GLY
THR
MET
ALA
ALA
THR
THR
GLY
LYS
GLY
GLU
GLU
ALA
ALA
SER
GLU
LYS
SER
PRO
PHE
PRO
MET
ILE
ALA
PHE
VAL
THR
LYS
GLY
ASP
GLU
TYR
VAL
ASP
SER

THR
GLY
ASN
THR
ILE
SER
GLY
ASP
ASP
VAL
ASP
LEU
VAL
SER
ARG
LEU
MET
PHE
MET
GLN
VAL
HIS
HIS
LYS
THR
TRP
GLY
ALA
ALA
SER
TRP
CYS
THR
SER
GLY
PHE
GLN
PHE
GLU
LYS
PRO
GLY
THR
ILE
VAL
ASN
GLN
VAL
LEU
ARG
ASP
THR
LYS
GLY
ASP
GLU
D833
T834
V835
R836
I837

G838
H839
P840
A841
G842
V843
I844
P845
S848
I849
V850
K851
D852
G853
K857
L860
I861
R862
T863
M868
E869
V872
V880
SER
SER
ALA
TRP
HIS
SER
PRO
GLN
PHE
GLU
LYS

● Molecule 1: 3-methylitaconate isomerase

Chain D:  75% 19%

MET
S2
M5
R6
R13
T16
L27
R40
L53
H71
F72
D73
Y78
F80
D87
N95
C96
G97
N98
A107
V113
E117
P118
M119
M126
T127
N128
T129
G130
K131
L132
L133
E136
S147
G148
D149
C150
L163
A172
A173
T174

G176
K176
V183
V186
T189
S190
K191
G192
V199
D200
Y208
K211
T220
F221
D222
N227
A228
D229
Y233
C241
T245
T250
E253
F261
F262
M263
T266
F276
S277
T278
D286
V287
D288
L289
L293
M294
F295
V296
Q297
V298
K301

A314
A315
V322
V325
L326
R327
E332
V335
R336
H339
P340
A341
K357
L360
I361
R362
T363
Y371
V372
V380
GLY
SER
ALA
TRP
SER
HIS
PRO
GLN
PHE
GLU
LYS

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	53.08Å 142.08Å 228.45Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.70 49.72 – 2.70	Depositor EDS
% Data completeness (in resolution range)	97.8 (50.00-2.70) 97.7 (49.72-2.70)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.65 (at 2.69Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.200 , 0.256 0.199 , 0.250	Depositor DCC
R_{free} test set	2402 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	50.3	Xtrriage
Anisotropy	0.354	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 53.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10592	wwPDB-VP
Average B, all atoms (Å ²)	46.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.98% 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, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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	0.63	1/2849 (0.0%)	0.74	3/3871 (0.1%)
1	B	0.58	0/2914	0.70	1/3961 (0.0%)
1	C	0.60	0/1669	0.70	0/2265
1	D	0.65	1/2849 (0.0%)	0.73	2/3871 (0.1%)
All	All	0.62	2/10281 (0.0%)	0.72	6/13968 (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	A	0	1
1	C	0	1
1	D	0	1
All	All	0	3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	332	GLU	CG-CD	6.73	1.62	1.51
1	A	9	CYS	CB-SG	-6.25	1.71	1.82

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	13	ARG	NE-CZ-NH2	-6.76	116.92	120.30
1	B	365	ARG	NE-CZ-NH2	-5.82	117.39	120.30
1	D	13	ARG	NE-CZ-NH2	-5.59	117.50	120.30
1	A	372	VAL	CB-CA-C	-5.33	101.28	111.40
1	A	117	GLU	C-N-CD	-5.27	109.00	120.60
1	D	117	GLU	C-N-CD	-5.11	109.37	120.60

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	117	GLU	Peptide
1	C	117	GLU	Peptide
1	D	117	GLU	Peptide

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	2807	0	2819	53	0
1	B	2868	0	2869	77	0
1	C	1645	0	1652	44	0
1	D	2807	0	2819	66	0
2	A	129	0	0	5	0
2	B	107	0	0	5	0
2	C	77	0	0	5	0
2	D	152	0	0	8	0
All	All	10592	0	10159	229	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 11.

All (229) 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:13:ARG:NH2	1:D:363:THR:HG22	1.45	1.31
1:D:297:GLN:HG3	2:D:434:HOH:O	1.34	1.28
1:A:13:ARG:NH2	1:A:363:THR:HG22	1.51	1.25
1:B:13:ARG:NH2	1:B:363:THR:HG22	1.53	1.21
1:D:13:ARG:HH22	1:D:363:THR:CG2	1.56	1.18
1:A:13:ARG:HH22	1:A:363:THR:CG2	1.60	1.12
1:C:13:ARG:NH2	1:C:363:THR:HG23	1.66	1.10
1:C:13:ARG:HH21	1:C:363:THR:HG23	1.09	1.08
1:B:13:ARG:HH22	1:B:363:THR:CG2	1.68	1.06
1:D:13:ARG:HH22	1:D:363:THR:HG22	0.92	1.04

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:96:CYS:SG	2:D:448:HOH:O	2.14	1.04
1:B:13:ARG:HH22	1:B:363:THR:HG22	1.03	1.03
1:B:287:VAL:O	1:B:327:ARG:NH1	1.96	0.97
1:A:189:THR:HG22	1:A:191:LYS:H	1.28	0.97
1:D:95:ASN:ND2	1:D:96:CYS:H	1.62	0.96
1:B:189:THR:HG22	1:B:191:LYS:H	1.30	0.95
1:D:95:ASN:HD22	1:D:96:CYS:H	1.12	0.94
1:B:126:ASN:ND2	1:B:129:THR:HB	1.86	0.91
1:B:126:ASN:HD22	1:B:129:THR:HB	1.37	0.88
1:D:126:ASN:HD22	1:D:129:THR:HB	1.39	0.88
1:B:80:PHE:H	1:B:128:ASN:HD21	1.14	0.87
1:C:71:HIS:HD2	1:C:73:ASP:H	1.20	0.87
1:C:148:GLY:O	1:C:158:THR:HG23	1.72	0.86
1:D:71:HIS:HD2	1:D:73:ASP:H	1.22	0.86
1:A:148:GLY:O	1:A:158:THR:HG23	1.76	0.85
1:A:80:PHE:H	1:A:128:ASN:HD21	1.19	0.85
1:B:189:THR:HB	1:B:192:GLY:O	1.77	0.84
1:D:80:PHE:H	1:D:128:ASN:HD21	1.26	0.83
1:C:126:ASN:HD22	1:C:129:THR:HB	1.43	0.83
1:D:250:THR:HG22	1:D:253:GLU:H	1.46	0.81
1:D:129:THR:HG22	1:D:131:LYS:H	1.47	0.80
1:B:250:THR:HG22	1:B:253:GLU:H	1.48	0.79
1:D:363:THR:HG21	2:D:408:HOH:O	1.83	0.79
1:B:129:THR:HG21	2:B:477:HOH:O	1.85	0.77
1:D:126:ASN:ND2	1:D:129:THR:HB	2.00	0.77
1:D:189:THR:CG2	1:D:191:LYS:H	1.97	0.77
1:C:129:THR:HG22	1:C:131:LYS:H	1.48	0.76
1:D:95:ASN:HD22	1:D:96:CYS:N	1.83	0.76
1:C:334:THR:HG22	1:C:345:PRO:HB2	1.70	0.74
1:B:371:TYR:OH	1:C:369:GLU:OE2	2.06	0.73
1:D:174:THR:HG22	1:D:176:LYS:H	1.53	0.73
1:B:278:THR:O	1:B:280:ASN:N	2.18	0.72
1:D:189:THR:HG22	1:D:191:LYS:H	1.55	0.71
1:B:189:THR:HG22	1:B:191:LYS:N	2.06	0.70
1:B:40:ARG:NH2	1:B:378:LYS:HD2	2.07	0.69
1:A:275:ASP:HB2	1:A:282:ILE:CD1	2.24	0.67
1:A:363:THR:HG21	2:A:451:HOH:O	1.93	0.67
1:A:189:THR:HB	1:A:192:GLY:O	1.94	0.67
1:B:189:THR:HG21	1:B:233:TYR:CE1	2.30	0.66
1:B:189:THR:CG2	1:B:233:TYR:HE1	2.09	0.66
1:B:129:THR:HG22	1:B:131:LYS:H	1.61	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:95:ASN:ND2	1:D:96:CYS:N	2.40	0.65
1:A:360:LEU:HD12	1:A:362:ARG:HD3	1.77	0.65
1:A:129:THR:HG23	1:A:131:LYS:HG2	1.80	0.64
1:B:339:HIS:HB2	1:B:340:PRO:CD	2.28	0.63
1:C:134:TYR:HB2	1:C:165:ASP:HB3	1.79	0.63
1:B:357:LYS:HE2	2:B:462:HOH:O	1.98	0.63
1:B:331:ASP:HA	2:B:441:HOH:O	1.98	0.63
1:A:352:ASP:HA	2:A:514:HOH:O	1.97	0.62
1:B:189:THR:HG21	1:B:233:TYR:OH	1.99	0.62
1:D:13:ARG:NH2	1:D:363:THR:CG2	2.30	0.62
1:B:329:THR:HG22	1:B:332:GLU:HB3	1.81	0.62
1:D:119:MET:HE1	1:D:136:GLU:HA	1.81	0.62
1:C:80:PHE:H	1:C:128:ASN:HD21	1.46	0.62
1:B:220:THR:HG22	1:B:222:ASP:H	1.63	0.62
1:B:53:LEU:HD11	1:B:372:VAL:HG13	1.82	0.62
1:B:303:TYR:HD2	1:B:308:THR:HG1	1.46	0.61
1:A:13:ARG:HH22	1:A:363:THR:HG22	0.66	0.61
1:A:339:HIS:HB2	1:A:340:PRO:CD	2.30	0.61
1:C:50:ILE:O	1:D:13:ARG:HG3	2.01	0.61
1:B:278:THR:C	1:B:280:ASN:H	2.05	0.60
1:C:168:ASP:HB3	2:C:467:HOH:O	2.01	0.60
1:C:169:THR:HG22	2:C:465:HOH:O	2.02	0.60
1:D:53:LEU:HD11	1:D:372:VAL:HG13	1.83	0.59
1:A:189:THR:CG2	1:A:191:LYS:H	2.11	0.59
1:D:189:THR:HG22	1:D:191:LYS:N	2.17	0.59
1:A:168:ASP:O	1:A:168:ASP:OD1	2.19	0.59
1:D:136:GLU:HB2	1:D:163:LEU:HB3	1.83	0.59
1:A:361:ILE:O	1:A:362:ARG:HD2	2.03	0.59
1:C:115:ALA:HB1	1:C:139:VAL:HG11	1.84	0.59
1:D:189:THR:HB	1:D:192:GLY:O	2.03	0.58
1:A:275:ASP:HB2	1:A:282:ILE:HD13	1.85	0.58
1:B:339:HIS:HB2	1:B:340:PRO:HD3	1.84	0.58
1:A:189:THR:HG22	1:A:191:LYS:N	2.10	0.58
1:D:16:THR:OG1	1:D:98:ASN:ND2	2.37	0.58
1:C:363:THR:HG21	2:C:407:HOH:O	2.03	0.57
1:B:363:THR:HG21	2:B:396:HOH:O	2.04	0.57
1:B:13:ARG:NH2	1:B:363:THR:CG2	2.40	0.57
1:A:50:ILE:O	1:B:13:ARG:HG3	2.04	0.57
1:B:119:MET:HE1	1:B:136:GLU:HG2	1.86	0.56
1:D:189:THR:HG23	1:D:191:LYS:H	1.71	0.56
1:D:189:THR:HG21	1:D:233:TYR:OH	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:148:GLY:O	1:B:158:THR:HG23	2.06	0.56
1:D:119:MET:HE1	1:D:136:GLU:CA	2.36	0.56
1:D:339:HIS:HB2	1:D:340:PRO:CD	2.36	0.56
1:C:339:HIS:HB2	1:C:340:PRO:HD2	1.87	0.55
1:C:126:ASN:ND2	1:C:129:THR:HB	2.18	0.55
1:C:128:ASN:ND2	1:C:128:ASN:H	2.05	0.55
1:B:189:THR:CG2	1:B:233:TYR:CE1	2.88	0.54
1:D:332:GLU:HG2	2:D:470:HOH:O	2.08	0.54
1:B:129:THR:HG23	1:B:131:LYS:HG2	1.89	0.53
1:A:189:THR:HG21	1:A:233:TYR:OH	2.07	0.53
1:A:126:ASN:ND2	1:A:129:THR:HB	2.24	0.53
1:A:189:THR:CG2	1:A:233:TYR:HE1	2.21	0.53
1:C:32:GLU:HG2	2:C:464:HOH:O	2.09	0.53
1:B:269:LYS:N	1:B:325:VAL:HG22	2.24	0.53
1:A:129:THR:HG22	1:A:131:LYS:H	1.73	0.53
1:B:172:ALA:HB3	2:B:455:HOH:O	2.08	0.53
1:B:199:VAL:HG21	1:B:314:ALA:HB2	1.91	0.53
1:A:250:THR:HG22	1:A:252:LYS:H	1.72	0.52
1:D:287:VAL:O	1:D:327:ARG:NH1	2.42	0.52
1:D:339:HIS:HB2	1:D:340:PRO:HD2	1.90	0.52
1:B:327:ARG:HG2	1:B:328:ASP:O	2.10	0.52
1:C:129:THR:HG22	1:C:131:LYS:N	2.22	0.52
1:D:129:THR:CG2	1:D:131:LYS:HG2	2.39	0.52
1:B:70:THR:HB	1:B:77:ASP:OD1	2.09	0.52
1:A:183:VAL:HG23	1:A:184:VAL:HG23	1.92	0.52
1:B:204:PRO:HB2	1:B:262:PRO:HB3	1.91	0.52
1:D:276:PHE:HE1	1:D:341:ALA:HB2	1.74	0.52
1:C:369:GLU:OE2	1:D:6:ARG:NH1	2.44	0.51
1:B:189:THR:HG23	1:B:233:TYR:HE1	1.74	0.51
1:B:80:PHE:H	1:B:128:ASN:ND2	1.95	0.51
1:A:361:ILE:O	1:A:362:ARG:CD	2.59	0.51
1:B:115:ALA:HB1	1:B:139:VAL:HG11	1.92	0.51
1:C:13:ARG:NH2	1:C:363:THR:CG2	2.57	0.51
1:A:12:MET:HG2	1:A:366:ARG:HA	1.93	0.51
1:D:128:ASN:H	1:D:128:ASN:HD22	1.58	0.51
1:A:115:ALA:HB1	1:A:139:VAL:HG11	1.93	0.51
1:D:263:MET:HE3	1:D:295:PHE:CD1	2.46	0.51
1:B:189:THR:HG21	1:B:233:TYR:HE1	1.73	0.51
1:B:9:CYS:SG	1:B:372:VAL:HG22	2.51	0.51
1:C:77:ASP:OD2	1:C:125:HIS:HD2	1.94	0.51
1:C:334:THR:CG2	1:C:345:PRO:HB2	2.38	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:189:THR:HG21	1:B:233:TYR:CZ	2.46	0.50
1:C:96:CYS:HB3	1:C:99:ILE:HB	1.94	0.50
1:A:31:GLN:HE21	1:A:31:GLN:HA	1.77	0.50
1:D:5:MET:HE1	2:D:421:HOH:O	2.12	0.49
1:C:348:SER:O	1:C:349:ILE:HG13	2.12	0.49
1:A:31:GLN:NE2	1:A:34:ARG:HD2	2.27	0.49
1:D:119:MET:HE1	1:D:136:GLU:CB	2.42	0.49
1:D:276:PHE:CE1	1:D:341:ALA:HB2	2.48	0.49
1:D:53:LEU:HD11	1:D:372:VAL:CG1	2.43	0.49
1:D:71:HIS:CD2	1:D:73:ASP:H	2.14	0.49
1:A:77:ASP:OD2	1:A:125:HIS:HD2	1.95	0.49
1:D:129:THR:HG22	1:D:131:LYS:N	2.22	0.49
1:C:337:ILE:O	1:C:343:VAL:HA	2.13	0.48
1:A:80:PHE:H	1:A:128:ASN:ND2	2.00	0.48
1:B:236:GLU:O	1:B:240:LYS:HG3	2.14	0.48
1:C:71:HIS:CD2	1:C:73:ASP:H	2.12	0.48
1:B:9:CYS:CB	1:B:372:VAL:HG22	2.44	0.48
1:C:95:ASN:HD21	1:C:133:LEU:HD11	1.78	0.48
1:B:70:THR:O	1:B:70:THR:CG2	2.61	0.48
1:B:303:TYR:HD2	1:B:308:THR:OG1	1.97	0.48
1:B:235:GLU:HG2	1:B:297:GLN:HG3	1.96	0.47
1:B:276:PHE:HE1	1:B:341:ALA:HB2	1.80	0.47
1:A:189:THR:HG21	1:A:233:TYR:CE1	2.50	0.47
1:D:13:ARG:HH22	1:D:363:THR:HG23	1.64	0.47
1:C:368:MET:HG3	1:D:371:TYR:O	2.15	0.47
1:D:199:VAL:HG21	1:D:314:ALA:HB2	1.97	0.47
1:D:107:ALA:HB1	1:D:113:VAL:HG23	1.97	0.46
1:A:245:ILE:HG23	1:A:245:ILE:O	2.16	0.46
1:C:171:GLY:O	1:C:172:ALA:C	2.53	0.46
1:A:131:LYS:NZ	1:A:170:ALA:O	2.48	0.46
1:C:98:ASN:O	1:C:101:ALA:HB3	2.16	0.46
1:C:362:ARG:HD2	1:C:362:ARG:HA	1.42	0.45
1:B:80:PHE:N	1:B:128:ASN:HD21	1.97	0.45
1:D:40:ARG:CZ	2:D:519:HOH:O	2.64	0.45
1:B:276:PHE:CE1	1:B:341:ALA:HB2	2.52	0.45
1:B:114:LYS:N	1:C:68:PRO:HG2	2.31	0.45
1:C:80:PHE:CE1	1:C:96:CYS:HB2	2.52	0.45
1:D:263:MET:HE1	1:D:293:LEU:HD21	1.98	0.45
1:B:361:ILE:O	1:B:362:ARG:HD2	2.17	0.44
1:B:69:SER:OG	1:B:74:ALA:HB3	2.17	0.44
1:D:361:ILE:O	1:D:362:ARG:HD2	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:70:THR:HG22	1:C:125:HIS:CD2	2.52	0.44
1:A:362:ARG:HA	1:A:362:ARG:HD2	1.60	0.44
1:B:235:GLU:HA	1:B:235:GLU:OE1	2.17	0.44
1:D:211:LYS:HD3	2:D:513:HOH:O	2.18	0.44
1:C:131:LYS:HD3	1:C:131:LYS:HA	1.73	0.44
1:A:166:PHE:CE1	1:A:360:LEU:HD21	2.53	0.44
1:C:51:ASP:OD1	1:D:13:ARG:HD3	2.18	0.44
1:C:14:ALA:HB3	1:C:99:ILE:HD13	2.00	0.44
1:A:371:TYR:O	1:B:368:MET:HG3	2.18	0.44
1:B:302:THR:O	1:B:339:HIS:HB2	2.18	0.44
1:C:20:ILE:HD12	1:C:42:PHE:CZ	2.52	0.44
1:B:349:ILE:HD12	1:B:357:LYS:HD2	2.01	0.43
1:C:150:CYS:HB3	1:C:159:ASN:O	2.19	0.43
1:A:126:ASN:HD22	1:A:129:THR:HB	1.83	0.43
1:A:129:THR:CG2	1:A:131:LYS:H	2.31	0.43
1:A:220:THR:HG22	1:A:223:VAL:H	1.83	0.43
1:B:129:THR:CG2	1:B:131:LYS:H	2.26	0.43
1:A:240:LYS:HE3	2:A:461:HOH:O	2.19	0.43
1:D:227:ASN:C	1:D:227:ASN:HD22	2.21	0.43
1:A:198:ILE:HG21	1:A:245:ILE:HD13	2.00	0.43
1:B:293:LEU:O	1:B:299:LEU:HD12	2.19	0.43
1:D:132:LEU:O	1:D:133:LEU:HD23	2.19	0.43
1:B:220:THR:HB	1:B:223:VAL:HG23	2.01	0.42
1:B:263:MET:HE3	1:B:295:PHE:HD1	1.84	0.42
1:B:326:LEU:HG	1:B:327:ARG:O	2.18	0.42
1:A:80:PHE:N	1:A:128:ASN:HD21	2.01	0.42
1:C:167:SER:HB3	1:C:357:LYS:HA	2.01	0.42
1:A:9:CYS:SG	1:A:372:VAL:HG22	2.59	0.42
1:A:119:MET:HA	1:A:137:VAL:O	2.20	0.42
1:D:301:LYS:HB2	1:D:301:LYS:HE2	1.82	0.42
1:B:322:VAL:O	1:B:325:VAL:HG12	2.20	0.42
1:C:3:ASP:OD2	1:D:147:SER:N	2.48	0.42
1:D:286:ASP:O	1:D:336:ARG:HD2	2.20	0.41
1:A:339:HIS:HB2	1:A:340:PRO:HD3	2.02	0.41
1:A:189:THR:HG23	1:A:233:TYR:HE1	1.84	0.41
1:B:126:ASN:HD22	1:B:129:THR:CB	2.20	0.41
1:A:365:ARG:NH2	1:B:373:TYR:O	2.53	0.41
1:D:294:MET:HB3	1:D:294:MET:HE2	1.83	0.41
1:D:241:CYS:O	1:D:245:ILE:HG12	2.19	0.41
1:B:9:CYS:HB2	1:B:372:VAL:HG22	2.01	0.41
1:A:259:PRO:HB2	1:A:297:GLN:HE22	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:47:VAL:HG22	2:A:504:HOH:O	2.21	0.41
1:D:129:THR:HG21	2:D:540:HOH:O	2.20	0.41
1:B:128:ASN:ND2	1:B:128:ASN:H	2.18	0.41
1:B:16:THR:OG1	1:B:98:ASN:ND2	2.52	0.41
1:B:286:ASP:O	1:B:336:ARG:HD2	2.21	0.41
1:B:58:PRO:O	1:B:62:LYS:HE2	2.21	0.41
1:C:172:ALA:HB3	2:C:458:HOH:O	2.21	0.41
1:D:278:THR:O	1:D:278:THR:CG2	2.69	0.41
1:D:174:THR:HB	1:D:200:ASP:OD2	2.22	0.40
1:D:315:ALA:HA	1:D:322:VAL:HG12	2.02	0.40
1:A:59:LEU:HD13	2:A:429:HOH:O	2.21	0.40
1:A:51:ASP:OD1	1:B:13:ARG:HD3	2.21	0.40
1:B:348:SER:HA	1:B:357:LYS:O	2.21	0.40
1:D:261:PHE:HA	1:D:262:PRO:C	2.41	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	377/391 (96%)	361 (96%)	14 (4%)	2 (0%)	29	54
1	B	385/391 (98%)	360 (94%)	22 (6%)	3 (1%)	19	43
1	C	220/391 (56%)	200 (91%)	15 (7%)	5 (2%)	6	16
1	D	377/391 (96%)	356 (94%)	19 (5%)	2 (0%)	29	54
All	All	1359/1564 (87%)	1277 (94%)	70 (5%)	12 (1%)	17	40

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	118	PRO

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Mol	Chain	Res	Type
1	B	93	ASN
1	B	279	GLY
1	C	118	PRO
1	C	172	ALA
1	D	118	PRO
1	A	46	ASP
1	D	172	ALA
1	C	352	ASP
1	B	46	ASP
1	C	340	PRO
1	C	88	ALA

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	308/319 (97%)	285 (92%)	23 (8%)	13	31
1	B	314/319 (98%)	291 (93%)	23 (7%)	14	33
1	C	175/319 (55%)	157 (90%)	18 (10%)	7	16
1	D	308/319 (97%)	279 (91%)	29 (9%)	8	20
All	All	1105/1276 (87%)	1012 (92%)	93 (8%)	11	25

All (93) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	27	LEU
1	A	31	GLN
1	A	47	VAL
1	A	48	ARG
1	A	70	THR
1	A	76	VAL
1	A	119	MET
1	A	127	THR
1	A	129	THR
1	A	133	LEU

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Mol	Chain	Res	Type
1	A	158	THR
1	A	220	THR
1	A	245	ILE
1	A	255	SER
1	A	289	LEU
1	A	325	VAL
1	A	331	ASP
1	A	335	VAL
1	A	360	LEU
1	A	362	ARG
1	A	363	THR
1	A	365	ARG
1	A	372	VAL
1	B	5	MET
1	B	27	LEU
1	B	70	THR
1	B	86	THR
1	B	119	MET
1	B	128	ASN
1	B	129	THR
1	B	136	GLU
1	B	161	PRO
1	B	208	VAL
1	B	222	ASP
1	B	229	ASP
1	B	235	GLU
1	B	250	THR
1	B	285	ASP
1	B	289	LEU
1	B	303	TYR
1	B	325	VAL
1	B	329	THR
1	B	331	ASP
1	B	335	VAL
1	B	363	THR
1	B	372	VAL
1	C	27	LEU
1	C	31	GLN
1	C	32	GLU
1	C	40	ARG
1	C	50	ILE
1	C	62	LYS

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Mol	Chain	Res	Type
1	C	70	THR
1	C	128	ASN
1	C	158	THR
1	C	176	LYS
1	C	334	THR
1	C	343	VAL
1	C	348	SER
1	C	360	LEU
1	C	362	ARG
1	C	363	THR
1	C	372	VAL
1	C	380	VAL
1	D	27	LEU
1	D	40	ARG
1	D	78	TYR
1	D	87	ASP
1	D	95	ASN
1	D	119	MET
1	D	127	THR
1	D	129	THR
1	D	149	ASP
1	D	150	CYS
1	D	174	THR
1	D	183	VAL
1	D	186	VAL
1	D	189	THR
1	D	208	VAL
1	D	220	THR
1	D	222	ASP
1	D	227	ASN
1	D	229	ASP
1	D	250	THR
1	D	268	THR
1	D	289	LEU
1	D	298	VAL
1	D	325	VAL
1	D	335	VAL
1	D	357	LYS
1	D	360	LEU
1	D	363	THR
1	D	372	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such

sidechains are listed below:

Mol	Chain	Res	Type
1	A	31	GLN
1	A	125	HIS
1	A	126	ASN
1	A	128	ASN
1	A	297	GLN
1	B	125	HIS
1	B	126	ASN
1	B	128	ASN
1	C	31	GLN
1	C	71	HIS
1	C	125	HIS
1	C	126	ASN
1	C	128	ASN
1	D	71	HIS
1	D	95	ASN
1	D	125	HIS
1	D	126	ASN
1	D	128	ASN
1	D	227	ASN
1	D	280	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](#)

There are no ligands in this entry.

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, 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	379/391 (96%)	-0.11	4 (1%) 80 82	26, 43, 59, 68	0
1	B	387/391 (98%)	0.06	6 (1%) 72 74	28, 48, 71, 84	0
1	C	224/391 (57%)	0.17	14 (6%) 20 19	32, 51, 100, 108	0
1	D	379/391 (96%)	-0.21	1 (0%) 94 95	24, 39, 55, 61	0
All	All	1369/1564 (87%)	-0.04	25 (1%) 68 70	24, 45, 69, 108	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	341	ALA	5.3
1	C	337	ILE	5.2
1	C	344	ILE	5.1
1	C	340	PRO	4.9
1	C	352	ASP	4.4
1	C	335	VAL	4.4
1	C	353	GLY	4.3
1	C	350	VAL	4.2
1	C	334	THR	3.7
1	B	223	VAL	3.6
1	C	336	ARG	3.5
1	C	349	ILE	3.3
1	C	176	LYS	3.0
1	C	177	VAL	2.8
1	A	351	LYS	2.8
1	A	352	ASP	2.8
1	A	185	ASP	2.7
1	A	215	MET	2.6
1	B	386	HIS	2.5
1	D	297	GLN	2.4
1	B	226	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	C	351	LYS	2.3
1	B	351	LYS	2.2
1	B	383	ALA	2.1
1	B	218	THR	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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.