



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 07:22 AM UTC

PDB ID : 5DU3 / pdb_00005du3
Title : Active form of human C1-inhibitor
Authors : Pannu, N.S.; Dijk, M.; Holkers, J.; Voskamp, P.; Giannetti, B.M.; Waterreus, W.J.; van Veen, H.A.
Deposited on : 2015-09-18
Resolution : 2.10 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

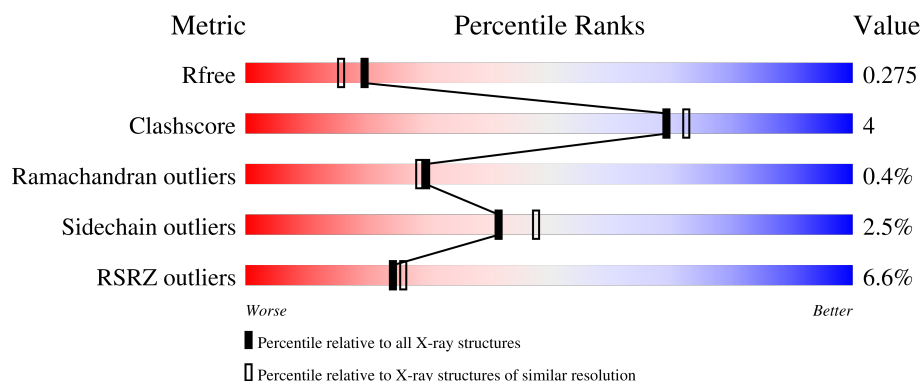
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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}	180053	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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 of 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	382	 7% 82% 15% ..
1	B	382	 7% 84% 14% ..

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 6097 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 Plasma protease C1 inhibitor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	378	Total	C	N	O	S	0	0	0
			2979	1915	494	554	16			
1	B	377	Total	C	N	O	S	0	0	0
			2967	1906	493	552	16			

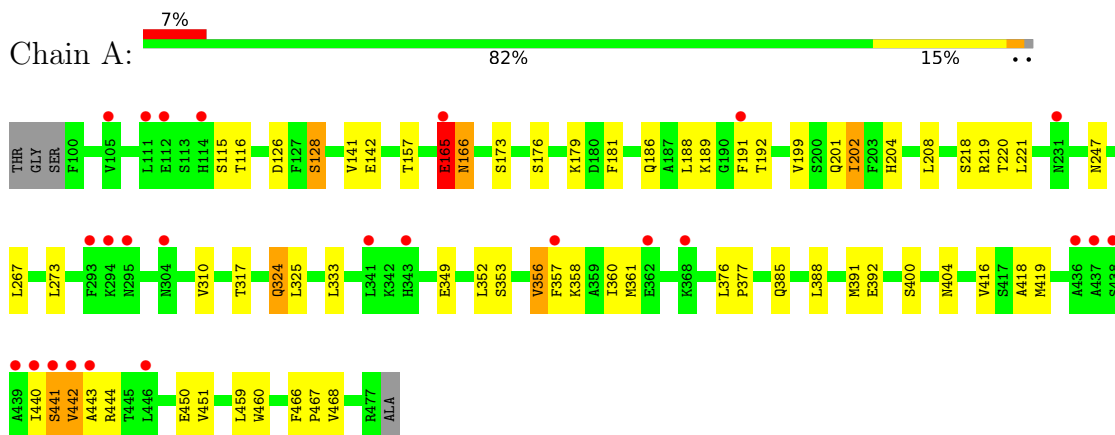
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	87	Total	O	0	0
			87	87		
2	B	64	Total	O	0	0
			64	64		

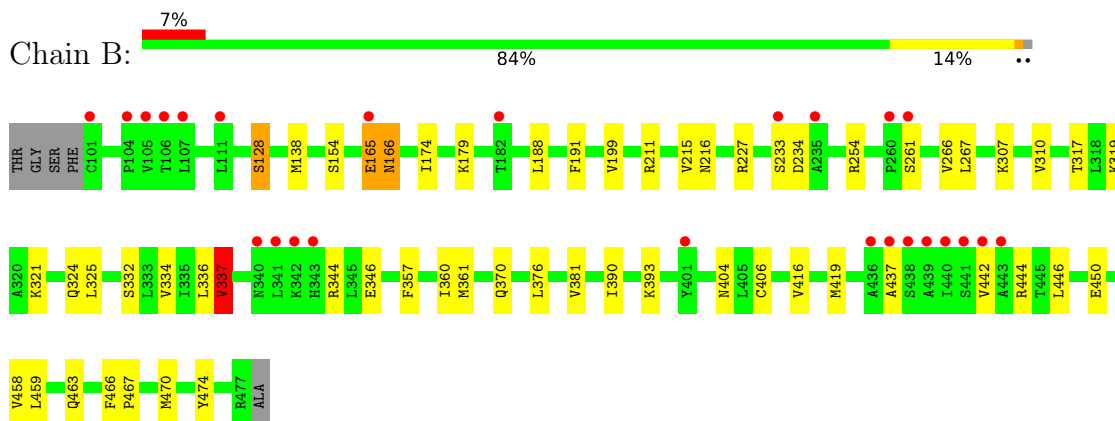
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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: Plasma protease C1 inhibitor



- Molecule 1: Plasma protease C1 inhibitor



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	57.41Å 75.38Å 203.96Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	57.40 – 2.10 57.40 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.7 (57.40-2.10) 99.7 (57.40-2.10)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.78 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.8.0131	Depositor
R, R_{free}	0.206 , 0.257 (Not available) , 0.275	Depositor DCC
R_{free} test set	2649 reflections (4.13%)	wwPDB-VP
Wilson B-factor (Å ²)	35.0	Xtriage
Anisotropy	0.351	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 41.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6097	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.80% 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 ⓘ

5.1 Standard geometry ⓘ

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	1.65	31/3043 (1.0%)	1.30	11/4127 (0.3%)
1	B	1.47	18/3030 (0.6%)	1.21	7/4109 (0.2%)
All	All	1.56	49/6073 (0.8%)	1.26	18/8236 (0.2%)

All (49) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	165	GLU	C-O	15.86	1.39	1.24
1	B	165	GLU	C-O	11.83	1.36	1.24
1	A	165	GLU	CA-C	-9.49	1.44	1.53
1	B	376	LEU	N-CA	-7.88	1.37	1.46
1	A	352	LEU	CA-C	7.58	1.62	1.53
1	B	166	ASN	C-O	-7.34	1.14	1.24
1	B	191	PHE	C-O	-7.23	1.14	1.24
1	A	444	ARG	CA-C	7.16	1.62	1.52
1	A	416	VAL	C-O	-6.47	1.17	1.24
1	A	418	ALA	N-CA	-6.47	1.38	1.46
1	A	324	GLN	C-O	6.45	1.31	1.24
1	A	219	ARG	CA-C	6.42	1.60	1.52
1	B	444	ARG	CA-C	6.15	1.61	1.52
1	A	356	VAL	N-CA	6.14	1.53	1.46
1	B	406	CYS	N-CA	6.03	1.54	1.46
1	B	474	TYR	C-O	-6.02	1.15	1.23
1	A	166	ASN	C-O	-6.00	1.16	1.24
1	A	191	PHE	C-O	-5.97	1.16	1.24
1	B	310	VAL	C-O	5.85	1.30	1.24
1	A	157	THR	N-CA	-5.83	1.38	1.46
1	A	333	LEU	CA-C	-5.79	1.45	1.52
1	B	381	VAL	CA-C	5.71	1.59	1.52
1	A	192	THR	C-O	-5.69	1.17	1.23
1	B	234	ASP	C-O	5.68	1.30	1.24
1	A	388	LEU	N-CA	5.66	1.53	1.46
1	B	174	ILE	CA-C	5.66	1.59	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	416	VAL	C-O	-5.66	1.18	1.24
1	A	218	SER	C-O	5.64	1.30	1.24
1	A	451	VAL	CA-C	-5.62	1.46	1.52
1	A	176	SER	CA-C	-5.61	1.45	1.53
1	A	202	ILE	N-CA	-5.57	1.39	1.46
1	A	310	VAL	N-CA	-5.50	1.39	1.46
1	A	188	LEU	C-O	5.46	1.30	1.24
1	B	450	GLU	C-O	-5.45	1.17	1.24
1	A	349	GLU	N-CA	5.43	1.52	1.46
1	A	166	ASN	N-CA	-5.35	1.39	1.46
1	A	468	VAL	N-CA	-5.33	1.40	1.46
1	A	173	SER	CA-C	-5.21	1.46	1.52
1	B	332	SER	C-O	5.20	1.30	1.23
1	B	211	ARG	C-O	5.17	1.30	1.23
1	B	215	VAL	CA-C	5.16	1.59	1.52
1	A	385	GLN	CD-NE2	5.13	1.44	1.33
1	B	266	VAL	N-CA	-5.10	1.40	1.46
1	A	142	GLU	CA-C	-5.09	1.47	1.53
1	A	400	SER	C-O	-5.09	1.17	1.24
1	A	273	LEU	C-O	-5.02	1.18	1.24
1	A	391	MET	N-CA	5.02	1.52	1.46
1	B	466	PHE	N-CA	5.01	1.50	1.45
1	A	450	GLU	C-O	-5.00	1.18	1.24

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	441	SER	N-CA-C	-7.07	102.45	112.13
1	A	466	PHE	N-CA-C	6.66	115.98	108.25
1	A	128	SER	CB-CA-C	-6.24	100.83	110.81
1	B	234	ASP	N-CA-C	-5.71	104.97	111.14
1	A	219	ARG	CA-C-N	5.62	128.13	120.54
1	A	219	ARG	C-N-CA	5.62	128.13	120.54
1	B	390	ILE	N-CA-C	-5.53	105.11	110.42
1	A	221	LEU	N-CA-C	-5.52	106.22	113.12
1	B	128	SER	CB-CA-C	-5.52	101.97	110.81
1	B	337	VAL	CB-CA-C	5.47	121.31	111.36
1	B	199	VAL	N-CA-CB	-5.44	104.42	111.82
1	A	141	VAL	N-CA-C	5.34	117.72	111.05
1	A	186	GLN	N-CA-C	5.33	116.89	111.14
1	A	392	GLU	N-CA-C	5.29	117.05	111.28
1	A	173	SER	CA-CB-OG	-5.24	100.61	111.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	463	GLN	CB-CG-CD	-5.18	103.79	112.60
1	A	115	SER	N-CA-C	5.14	117.62	111.71
1	B	463	GLN	CB-CA-C	-5.06	102.25	110.85

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	2979	0	3025	22	0
1	B	2967	0	3016	20	0
2	A	87	0	0	1	0
2	B	64	0	0	0	0
All	All	6097	0	6041	42	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 4.

All (42) 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:B:165:GLU:HG3	1:B:166:ASN:H	1.41	0.86
1:B:165:GLU:HG3	1:B:166:ASN:N	2.00	0.74
1:B:307:LYS:HE3	1:B:437:ALA:HB3	1.78	0.65
1:B:165:GLU:CG	1:B:166:ASN:H	2.09	0.61
1:A:376:LEU:HD12	1:A:376:LEU:O	2.02	0.60
1:A:126:ASP:OD1	1:A:358:LYS:NZ	2.36	0.59
1:A:199:VAL:HG11	1:A:247:ASN:HB3	1.85	0.58
1:A:441:SER:C	1:A:443:ALA:N	2.64	0.54
1:A:201:GLN:HE21	1:A:202:ILE:H	1.56	0.54
1:A:165:GLU:HB2	1:A:404:ASN:HD22	1.73	0.53
1:A:128:SER:OG	1:A:467:PRO:HG2	2.08	0.53
1:B:165:GLU:HG2	1:B:404:ASN:CB	2.40	0.51
1:B:128:SER:OG	1:B:467:PRO:HG2	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:116:THR:HB	1:A:181:PHE:HE1	1.76	0.51
1:B:165:GLU:HG2	1:B:404:ASN:HD22	1.74	0.51
1:B:360:ILE:HG22	1:B:361:MET:HE2	1.92	0.50
1:A:376:LEU:HD13	1:A:377:PRO:O	2.11	0.50
1:B:321:LYS:HG3	1:B:337:VAL:HG13	1.93	0.49
1:A:357:PHE:CD2	1:A:357:PHE:C	2.91	0.48
1:A:357:PHE:C	1:A:357:PHE:HD2	2.20	0.48
1:B:325:LEU:N	1:B:325:LEU:HD12	2.28	0.48
1:A:376:LEU:HD12	1:A:376:LEU:C	2.40	0.47
1:A:189:LYS:HE3	1:A:220:THR:O	2.15	0.47
1:B:165:GLU:CG	1:B:404:ASN:HD22	2.27	0.47
1:A:165:GLU:HB3	1:A:166:ASN:H	1.44	0.46
1:A:325:LEU:HD12	1:A:325:LEU:N	2.30	0.46
1:B:267:LEU:O	1:B:419:MET:HA	2.15	0.46
1:A:324:GLN:C	1:A:325:LEU:HD12	2.41	0.46
1:B:324:GLN:C	1:B:325:LEU:HD12	2.41	0.46
1:B:357:PHE:C	1:B:357:PHE:CD1	2.93	0.46
1:A:179:LYS:HE3	2:A:567:HOH:O	2.16	0.45
1:A:204:HIS:HB2	1:A:208:LEU:HD23	1.99	0.45
1:A:441:SER:C	1:A:443:ALA:H	2.24	0.44
1:B:458:VAL:HG22	1:B:470:MET:HE2	1.98	0.44
1:A:361:MET:HE2	1:A:460:TRP:CD1	2.53	0.44
1:B:336:LEU:HD12	1:B:336:LEU:N	2.33	0.43
1:A:267:LEU:O	1:A:419:MET:HA	2.19	0.43
1:B:344:ARG:NH2	1:B:346:GLU:OE1	2.47	0.43
1:A:353:SER:OG	1:A:356:VAL:HG23	2.21	0.41
1:B:154:SER:HA	1:B:188:LEU:HD21	2.02	0.41
1:B:138:MET:HE3	1:B:393:LYS:HB2	2.02	0.40
1:B:334:VAL:HG11	1:B:361:MET:HE1	2.03	0.40

There are no symmetry-related clashes.

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	376/382 (98%)	363 (96%)	11 (3%)	2 (0%)	24	22
1	B	375/382 (98%)	360 (96%)	14 (4%)	1 (0%)	36	36
All	All	751/764 (98%)	723 (96%)	25 (3%)	3 (0%)	30	28

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	440	ILE
1	B	442	VAL
1	A	442	VAL

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	343/345 (99%)	338 (98%)	5 (2%)	57	65
1	B	342/345 (99%)	330 (96%)	12 (4%)	32	35
All	All	685/690 (99%)	668 (98%)	17 (2%)	42	48

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	165	GLU
1	A	317	THR
1	A	360	ILE
1	A	442	VAL
1	A	459	LEU
1	B	179	LYS
1	B	216	ASN
1	B	227	ARG
1	B	233	SER
1	B	254	ARG
1	B	261	SER
1	B	317	THR
1	B	319	LYS

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Mol	Chain	Res	Type
1	B	337	VAL
1	B	370	GLN
1	B	446	LEU
1	B	459	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	133	HIS
1	A	232	ASN
1	A	247	ASN
1	A	292	HIS
1	A	326	GLN
1	A	370	GLN
1	A	422	GLN
1	A	462	GLN
1	B	114	HIS
1	B	133	HIS
1	B	292	HIS
1	B	324	GLN
1	B	326	GLN
1	B	453	GLN
1	B	462	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides 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

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	378/382 (98%)	0.30	25 (6%) 24 26	22, 37, 72, 139	0
1	B	377/382 (98%)	0.36	25 (6%) 24 26	23, 41, 81, 133	0
All	All	755/764 (98%)	0.33	50 (6%) 24 26	22, 39, 77, 139	0

All (50) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	440	ILE	9.1
1	B	440	ILE	8.4
1	A	441	SER	7.9
1	A	439	ALA	7.2
1	B	439	ALA	7.2
1	A	442	VAL	5.9
1	B	441	SER	5.1
1	B	442	VAL	4.7
1	B	341	LEU	4.7
1	A	293	PHE	4.2
1	B	105	VAL	4.1
1	B	437	ALA	4.0
1	B	401	TYR	4.0
1	A	438	SER	3.9
1	A	114	HIS	3.8
1	B	111	LEU	3.7
1	B	343	HIS	3.5
1	A	294	LYS	3.4
1	A	368	LYS	3.3
1	A	437	ALA	3.2
1	B	342	LYS	3.2
1	B	438	SER	3.2
1	B	106	THR	3.2
1	B	261	SER	3.0

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Mol	Chain	Res	Type	RSRZ
1	A	446	LEU	2.8
1	B	101	CYS	2.8
1	A	105	VAL	2.7
1	B	104	PRO	2.6
1	A	443	ALA	2.6
1	B	443	ALA	2.6
1	A	165	GLU	2.6
1	A	111	LEU	2.5
1	A	343	HIS	2.5
1	B	233	SER	2.4
1	B	436	ALA	2.4
1	A	112	GLU	2.4
1	B	340	ASN	2.4
1	A	231	ASN	2.3
1	A	304	ASN	2.3
1	B	165	GLU	2.2
1	A	436	ALA	2.2
1	B	235	ALA	2.2
1	A	341	LEU	2.2
1	B	107	LEU	2.2
1	B	182	THR	2.1
1	B	260	PRO	2.1
1	A	357	PHE	2.1
1	A	191	PHE	2.0
1	A	362	GLU	2.0
1	A	295	ASN	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 oligosaccharides 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.