



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 9, 2026 – 05:42 PM UTC

PDB ID : 2Z6E / pdb_00002z6e
Title : Crystal Structure of Human DAAM1 FH2
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Deposited on : 2007-07-31
Resolution : 2.80 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 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

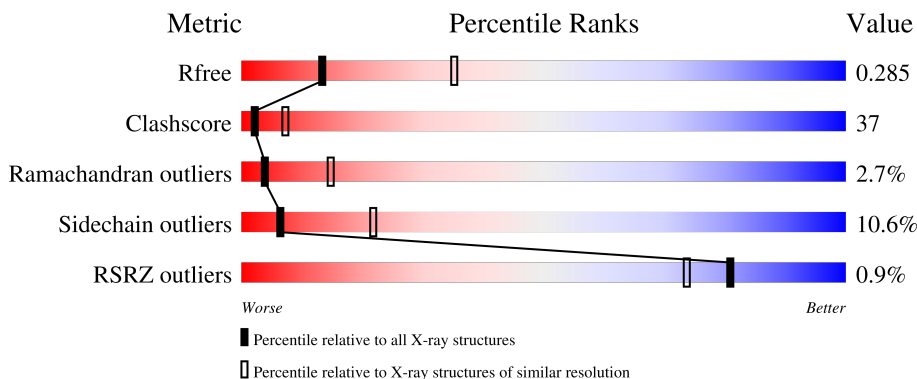
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3866 (2.80-2.80)
Clashscore	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)
RSRZ outliers	180081	3869 (2.80-2.80)

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	419	39% 45% 8% 7%
1	B	419	43% 40% 11% 5%
1	C	419	2% 37% 47% 7% 10%
1	D	419	37% 47% 8% 7%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 12750 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 Disheveled-associated activator of morphogenesis 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	388	Total	C	N	O	S	0	0	0
			3156	1998	540	609	9			
1	B	396	Total	C	N	O	S	0	0	0
			3219	2042	550	617	10			
1	C	379	Total	C	N	O	S	0	0	0
			3080	1951	524	597	8			
1	D	390	Total	C	N	O	S	0	0	0
			3173	2007	543	614	9			

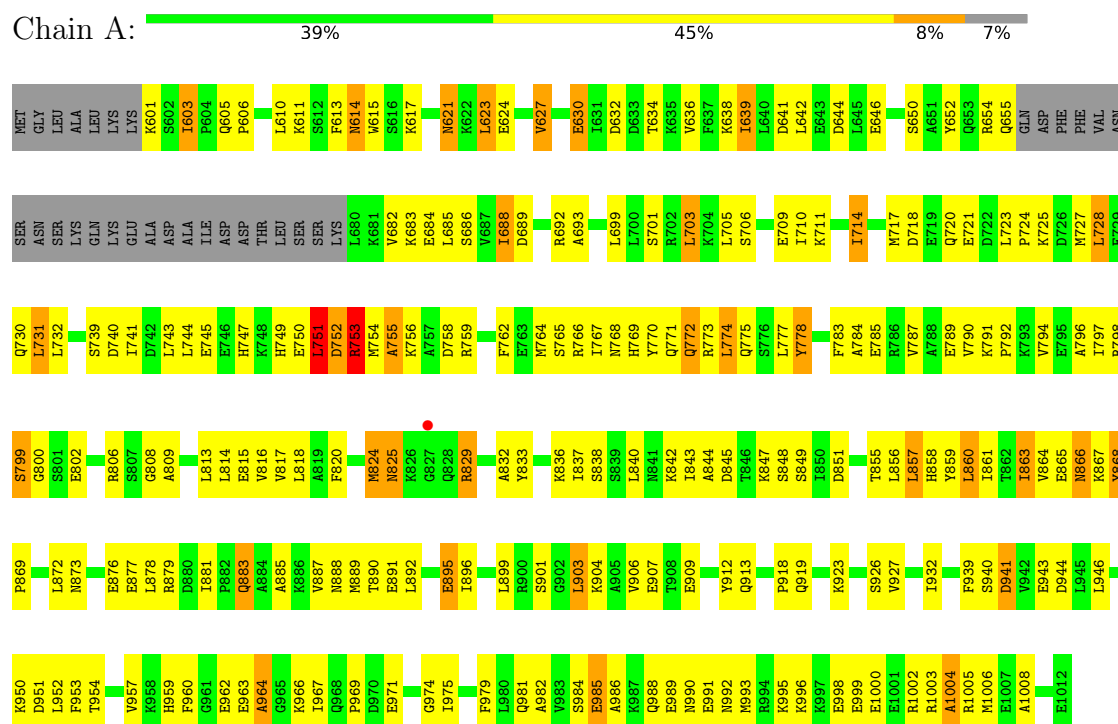
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	32	Total	O	0	0
			32	32		
2	B	35	Total	O	0	0
			35	35		
2	C	20	Total	O	0	0
			20	20		
2	D	35	Total	O	0	0
			35	35		

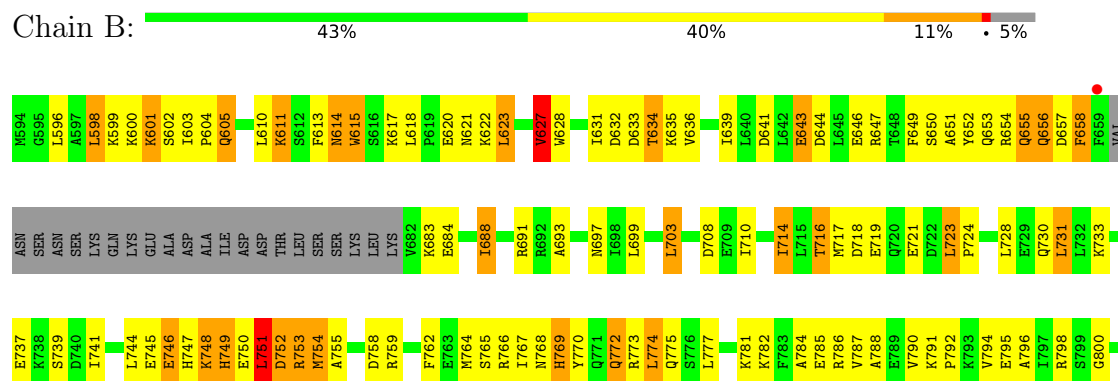
3 Residue-property plots

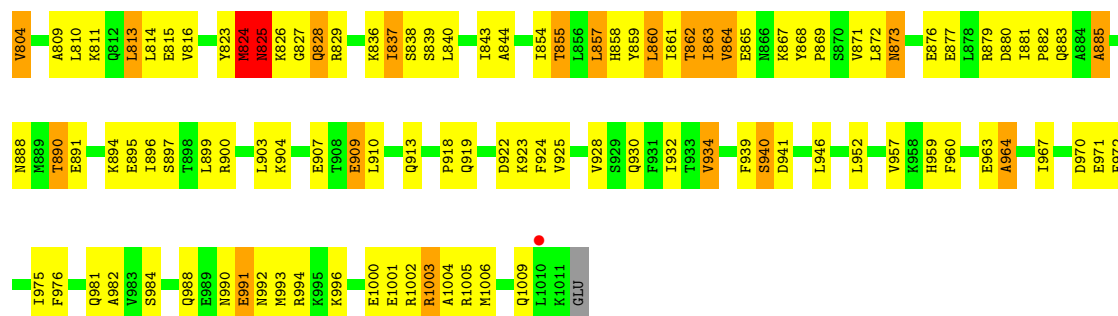
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Disheveled-associated activator of morphogenesis 1

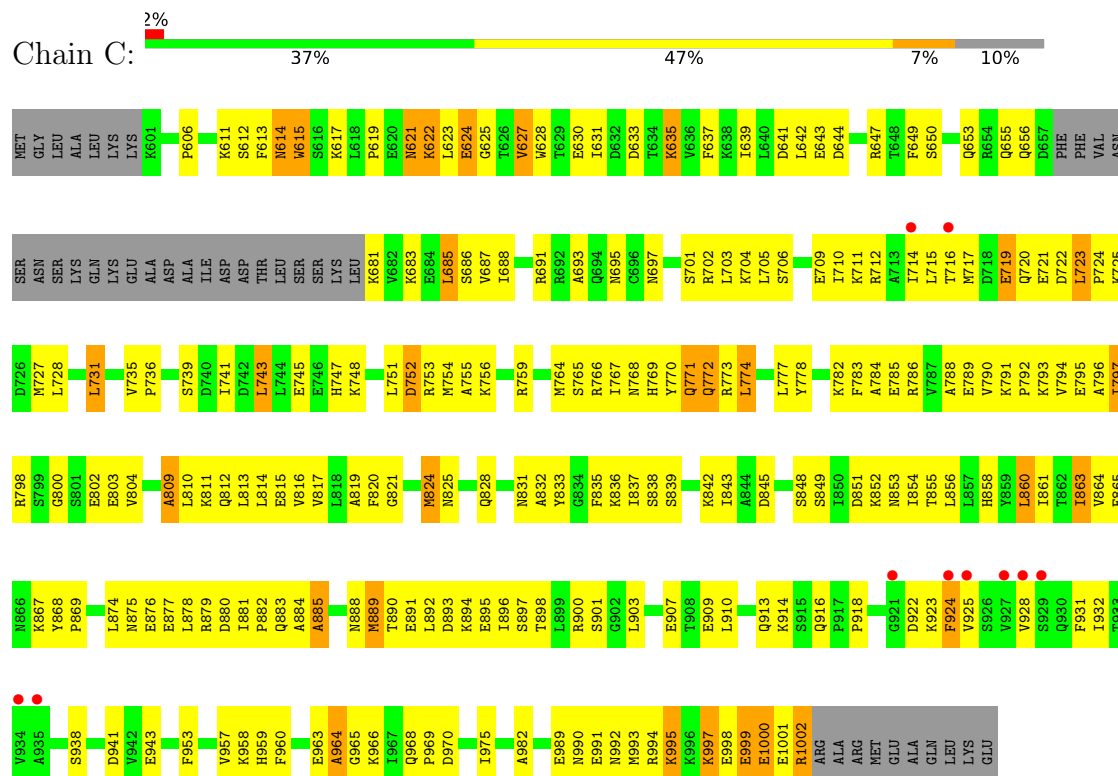


- Molecule 1: Disheveled-associated activator of morphogenesis 1

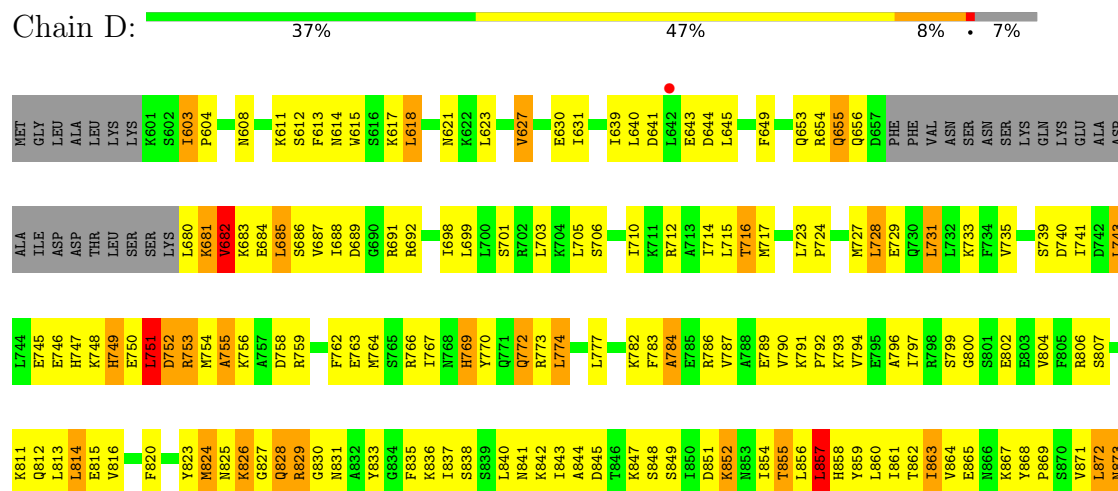




• Molecule 1: Disheveled-associated activator of morphogenesis 1



• Molecule 1: Disheveled-associated activator of morphogenesis 1



T954	E876	E877	L878	I881	P882	Q883	A884	A885	K886	V887	N888	M889	T890	E891	L892	I896	S897	R900	S901	G902	L903	V906	E907	T908	E909	I910	E911	T912	Q913	Q916	P917	P918	Q919	P920	F931	I932	A935	S936	F939	S940	D941	V942	E943	D944	L945	L946	A947	E948	L952	F953
V957	K958	H959	F960	E963	A964	I967	Q968	P969	B970	E971	D977	A982	V983	S984	E985	A986	K987	Q988	E989	N990	N993	R994	K995	K996	K997	E998	E999	E1000	E1001	R1002	R1003	A1004	R1005	M1006	E1007	A1008	K1011	E1012												

4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	69.21Å 91.89Å 97.68Å 98.12° 90.32° 104.79°	Depositor
Resolution (Å)	29.82 – 2.80 29.82 – 2.80	Depositor EDS
% Data completeness (in resolution range)	86.8 (29.82-2.80) 86.8 (29.82-2.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.03 (at 2.81Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.225 , 0.289 0.223 , 0.285	Depositor DCC
R_{free} test set	2471 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	63.7	Xtriage
Anisotropy	0.424	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 59.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	12750	wwPDB-VP
Average B, all atoms (Å ²)	72.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.30% 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	0.55	0/3204	1.01	11/4297 (0.3%)
1	B	0.54	0/3269	0.96	13/4384 (0.3%)
1	C	0.47	0/3128	0.95	9/4199 (0.2%)
1	D	0.50	0/3221	0.96	13/4320 (0.3%)
All	All	0.52	0/12822	0.97	46/17200 (0.3%)

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

There are no bond length outliers.

The worst 5 of 46 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1004	ALA	N-CA-C	-9.63	101.04	113.17
1	B	751	LEU	N-CA-C	-8.93	102.29	113.01
1	D	751	LEU	N-CA-C	-8.87	102.37	113.01
1	A	752	ASP	N-CA-C	-8.60	98.66	110.35
1	D	682	VAL	N-CA-C	8.29	126.58	109.34

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	778	TYR	Sidechain

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	3156	0	3193	228	0
1	B	3219	0	3258	261	0
1	C	3080	0	3105	280	0
1	D	3173	0	3205	268	0
2	A	32	0	0	4	0
2	B	35	0	0	3	0
2	C	20	0	0	7	0
2	D	35	0	0	5	0
All	All	12750	0	12761	934	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 37.

The worst 5 of 934 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:958:LYS:HE3	1:D:964:ALA:HA	1.23	1.18
1:D:655:GLN:HG3	1:D:683:LYS:HD2	1.19	1.14
1:B:723:LEU:HB3	1:B:728:LEU:HD11	1.39	1.03
1:B:768:ASN:HD22	1:B:773:ARG:HH21	1.00	0.99
1:C:992:ASN:O	1:C:995:LYS:HG3	1.61	0.98

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	384/419 (92%)	330 (86%)	46 (12%)	8 (2%)	5	20
1	B	392/419 (94%)	329 (84%)	51 (13%)	12 (3%)	3	12
1	C	375/419 (90%)	312 (83%)	53 (14%)	10 (3%)	4	15
1	D	386/419 (92%)	331 (86%)	44 (11%)	11 (3%)	4	14
All	All	1537/1676 (92%)	1302 (85%)	194 (13%)	41 (3%)	4	15

5 of 41 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	755	ALA
1	A	824	MET
1	A	964	ALA
1	B	655	GLN
1	B	658	PHE

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	350/377 (93%)	311 (89%)	39 (11%)	6	20
1	B	356/377 (94%)	317 (89%)	39 (11%)	6	20
1	C	343/377 (91%)	310 (90%)	33 (10%)	8	26
1	D	352/377 (93%)	314 (89%)	38 (11%)	6	21
All	All	1401/1508 (93%)	1252 (89%)	149 (11%)	6	22

5 of 149 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	682	VAL
1	D	967	ILE
1	D	731	LEU
1	D	829	ARG
1	B	714	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 60 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	858	HIS
1	D	883	GLN
1	C	697	ASN
1	D	866	ASN
1	D	988	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 [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	388/419 (92%)	-0.52	1 (0%) 90 86	24, 60, 116, 152	0
1	B	396/419 (94%)	-0.49	2 (0%) 87 82	30, 62, 107, 141	0
1	C	379/419 (90%)	-0.16	10 (2%) 57 47	36, 78, 131, 162	0
1	D	390/419 (93%)	-0.46	1 (0%) 90 86	36, 67, 115, 155	0
All	All	1553/1676 (92%)	-0.41	14 (0%) 81 74	24, 66, 119, 162	0

The worst 5 of 14 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	921	GLY	4.0
1	C	935	ALA	3.4
1	C	714	ILE	2.8
1	C	925	VAL	2.8
1	C	928	VAL	2.8

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.