



Full wwPDB NMR Structure Validation Report ⓘ

Mar 5, 2026 – 08:24 PM UTC

PDB ID : 2KVQ / pdb_00002kvq
Title : Solution structure of NusE:NusG-CTD complex
Authors : Burmann, B.M.; Schweimer, K.; Roesch, P.
Deposited on : 2010-03-25

This is a Full wwPDB NMR 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/NMRValidationReportHelp>

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
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
wwPDB-RCI : v_1n_11_5_13_A (Berjanski et al., 2005)
PANAV : Wang et al. (2010)
wwPDB-ShiftChecker : v1.2
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

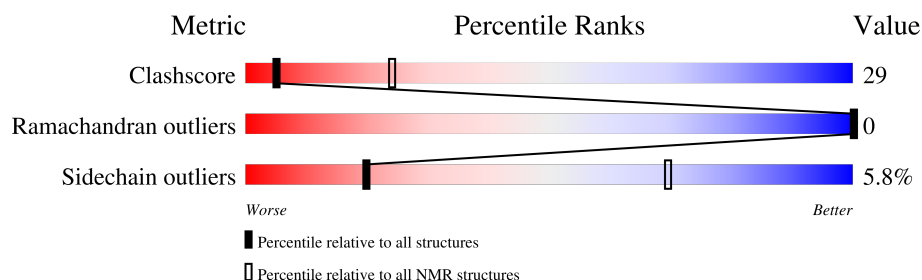
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

SOLUTION NMR

The overall completeness of chemical shifts assignment was not calculated.

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)	NMR archive (#Entries)
Clashscore	229148	14424
Ramachandran outliers	224038	12848
Sidechain outliers	223484	12823

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	E	87	
2	G	63	

2 Ensemble composition and analysis

This entry contains 18 models. Model 1 is the overall representative, medoid model (most similar to other models).

The following residues are included in the computation of the global validation metrics.

Well-defined (core) protein residues			
Well-defined core	Residue range (total)	Backbone RMSD (Å)	Medoid model
1	E:3-E:79 (77)	0.00	1
2	E:80-E:82, G:123-G:181 (62)	0.19	1

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 3 clusters and 1 single-model cluster was found.

Cluster number	Models
1	1, 3, 10, 11, 12, 13, 14, 15, 16, 17
2	5, 6, 7, 8
3	2, 4, 9
Single-model clusters	18

3 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2219 atoms, of which 1124 are hydrogens and 0 are deuteriums.

- Molecule 1 is a protein called NusE.

Mol	Chain	Residues	Atoms						Trace
1	E	80	Total	C	H	N	O	S	0
			1292	389	665	122	115	1	

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	-4	GLY	-	expression tag	UNP P0A7R5
E	-3	PRO	-	expression tag	UNP P0A7R5
E	-2	LEU	-	expression tag	UNP P0A7R5
E	-1	GLY	-	expression tag	UNP P0A7R5
E	0	SER	-	expression tag	UNP P0A7R5
E	46	SER	-	SEE REMARK 999	UNP P0A7R5

- Molecule 2 is a protein called Transcription antitermination protein nusG.

Mol	Chain	Residues	Atoms						Trace
2	G	59	Total	C	H	N	O	S	0
			927	297	459	78	92	1	

There are 4 discrepancies between the modelled and reference sequences:

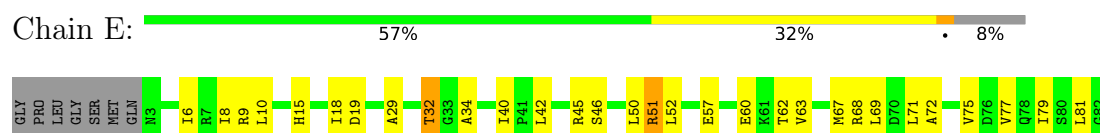
Chain	Residue	Modelled	Actual	Comment	Reference
G	119	GLY	-	expression tag	UNP P0AFG0
G	120	ALA	-	expression tag	UNP P0AFG0
G	121	MET	-	expression tag	UNP P0AFG0
G	122	GLY	-	expression tag	UNP P0AFG0

4 Residue-property plots [i](#)

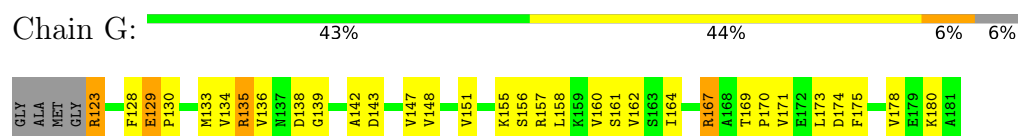
4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

- Molecule 1: NusE



- Molecule 2: Transcription antitermination protein nusG

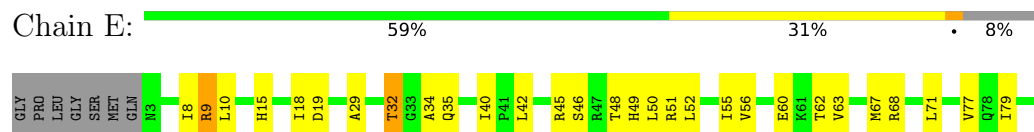


4.2 Scores per residue for each member of the ensemble

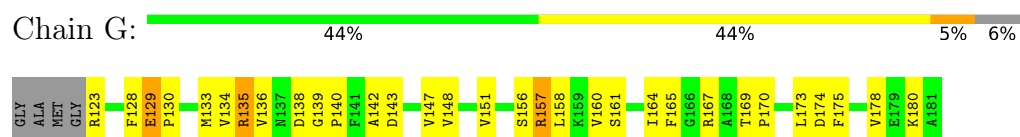
Colouring as in section 4.1 above.

4.2.1 Score per residue for model 1 (medoid)

- Molecule 1: NusE



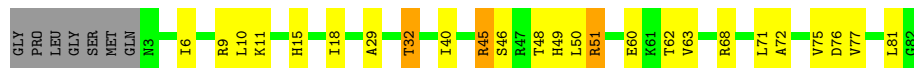
- Molecule 2: Transcription antitermination protein nusG



4.2.2 Score per residue for model 2

- Molecule 1: NusE

Chain E:  63% 25% 8%



- Molecule 2: Transcription antitermination protein nusG

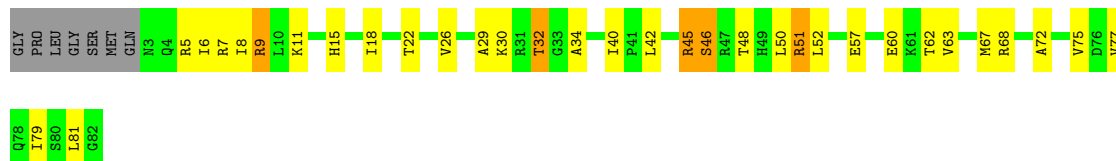
Chain G:  46% 41% 6% 6%



4.2.3 Score per residue for model 3

- Molecule 1: NusE

Chain E:  54% 32% 6% 8%



- Molecule 2: Transcription antitermination protein nusG

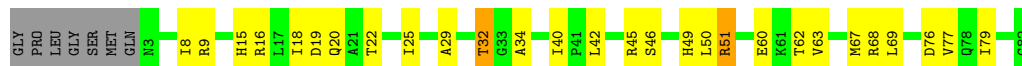
Chain G:  49% 40% 5% 6%



4.2.4 Score per residue for model 4

- Molecule 1: NusE

Chain E:  60% 30% 8%



- Molecule 2: Transcription antitermination protein nusG

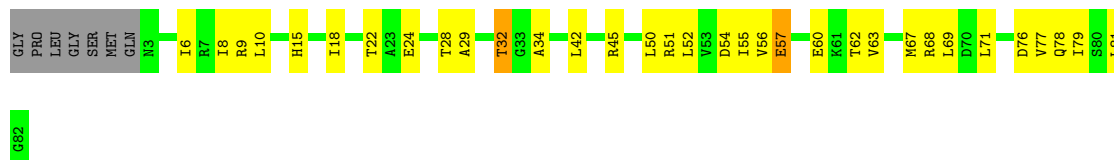
Chain G:  48% 40% 6% 6%



4.2.5 Score per residue for model 5

- Molecule 1: NusE

Chain E: 54% 36% 8%



- Molecule 2: Transcription antitermination protein nusG

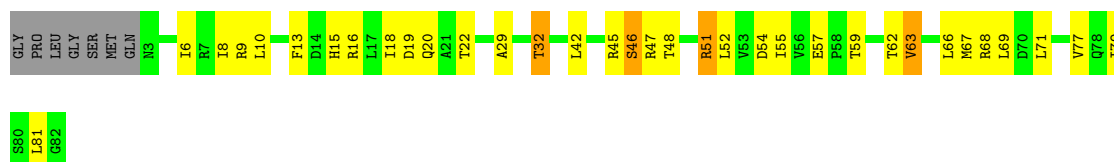
Chain G: 37% 51% 6% 6%



4.2.6 Score per residue for model 6

- Molecule 1: NusE

Chain E: 53% 34% 5% 8%



- Molecule 2: Transcription antitermination protein nusG

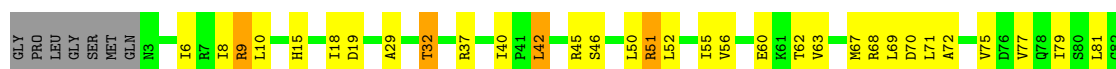
Chain G: 44% 43% 6% 6%



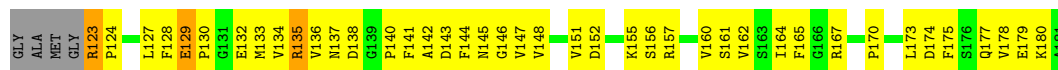
4.2.7 Score per residue for model 7

- Molecule 1: NusE

Chain E: 55% 32% 5% 8%



- Molecule 2: Transcription antitermination protein nusG



4.2.8 Score per residue for model 8

- Molecule 1: NusE



- Molecule 2: Transcription antitermination protein nusG



4.2.9 Score per residue for model 9

- Molecule 1: NusE



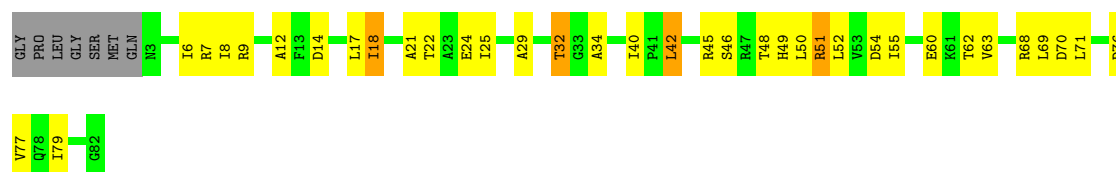
- Molecule 2: Transcription antitermination protein nusG



4.2.10 Score per residue for model 10

- Molecule 1: NusE





- Molecule 2: Transcription antitermination protein nusG

Chain G: 49% 38% 6% 6%



4.2.11 Score per residue for model 11

- Molecule 1: NusE

Chain E: 63% 26% 8%



- Molecule 2: Transcription antitermination protein nusG

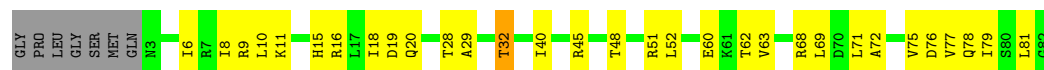
Chain G: 41% 43% 10% 6%



4.2.12 Score per residue for model 12

- Molecule 1: NusE

Chain E: 56% 34% 8%



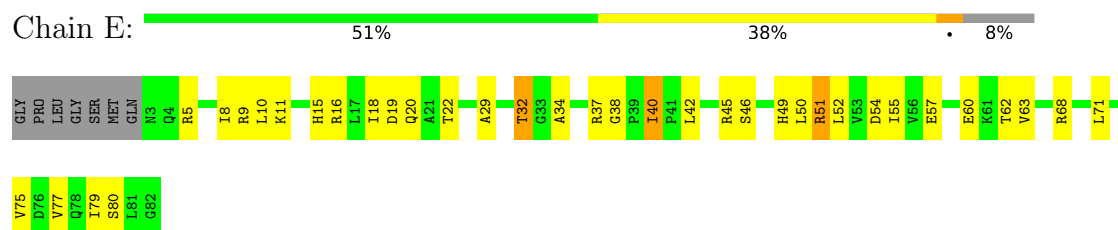
- Molecule 2: Transcription antitermination protein nusG

Chain G: 41% 43% 10% 6%

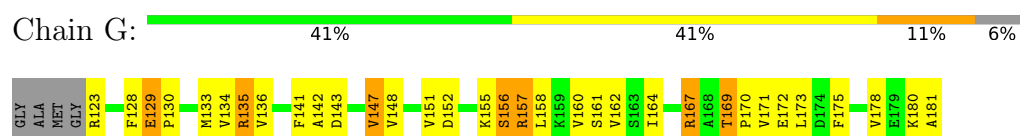


4.2.13 Score per residue for model 13

- Molecule 1: NusE

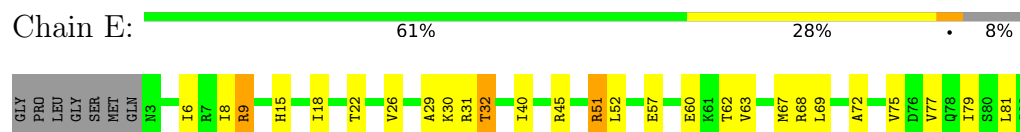


- Molecule 2: Transcription antitermination protein nusG

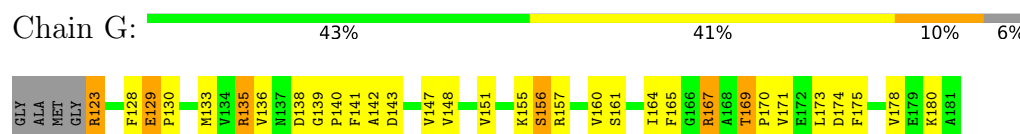


4.2.14 Score per residue for model 14

- Molecule 1: NusE

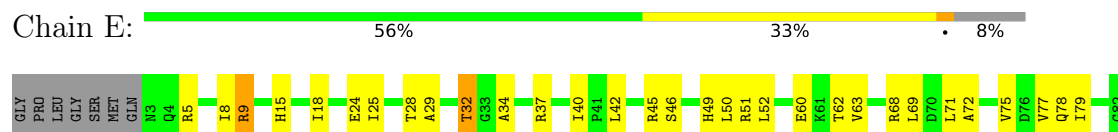


- Molecule 2: Transcription antitermination protein nusG



4.2.15 Score per residue for model 15

- Molecule 1: NusE



- Molecule 2: Transcription antitermination protein nusG

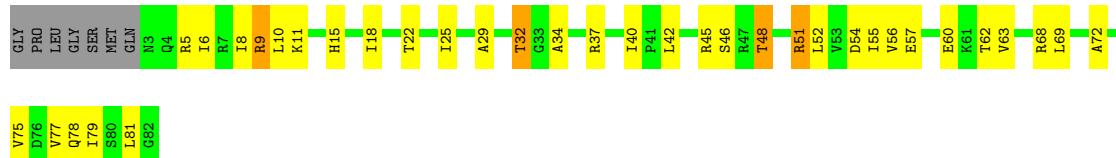




4.2.16 Score per residue for model 16

- Molecule 1: NusE

Chain E: 51% 37% 5% 8%



- Molecule 2: Transcription antitermination protein nusG

Chain G: 46% 40% 8% 6%



4.2.17 Score per residue for model 17

- Molecule 1: NusE

Chain E: 59% 31% 8%



- Molecule 2: Transcription antitermination protein nusG

Chain G: 44% 40% 10% 6%



4.2.18 Score per residue for model 18

- Molecule 1: NusE

Chain E: 57% 30% 5% 8%



- Molecule 2: Transcription antitermination protein nusG



GLY	ALA	MET	GLY	R123	F128	E129	P130	V134	R135	V136	R137	D138	A142	D143	V147	V148	V151	K155	S156	R157	L158	K159	V160	S161	T164	R167	A168	T169	P170	V171	E172	L173	D174	F175	S176	Q177	V178	E179	K180	A181
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5 Refinement protocol and experimental data overview ⓘ

The models were refined using the following method: *simulated annealing*.

Of the 20 calculated structures, 18 were deposited, based on the following criterion: *structures with the lowest energy*.

The following table shows the software used for structure solution, optimisation and refinement.

Software name	Classification	Version
X-PLOR NIH	structure solution	
X-PLOR NIH	refinement	

No chemical shift data was provided.

6 Model quality [i](#)

6.1 Standard geometry [i](#)

There are no covalent bond-length or bond-angle outliers.

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	Planarity
1	E	0.0±0.0	4.1±0.3
2	G	0.0±0.0	4.0±0.0
All	All	0	146

There are no bond-length outliers.

There are no bond-angle outliers.

There are no chirality outliers.

All unique planar outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Group	Models (Total)
1	E	9	ARG	Sidechain	18
1	E	45	ARG	Sidechain	18
1	E	51	ARG	Sidechain	18
1	E	68	ARG	Sidechain	18
2	G	123	ARG	Sidechain	18
2	G	135	ARG	Sidechain	18
2	G	157	ARG	Sidechain	18
2	G	167	ARG	Sidechain	18
1	E	37	ARG	Sidechain	2

6.2 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 each 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 averaged over the ensemble.

Mol	Chain	Non-H	H(model)	H(added)	Clashes
1	E	627	665	664	31±7
2	G	468	459	458	38±5

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Mol	Chain	Non-H	H(model)	H(added)	Clashes
All	All	19710	20232	20196	1162

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 29.

All unique clashes are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:E:12:ALA:HB3	1:E:18:ILE:HG22	1.08	1.25	10	1
1:E:8:ILE:HD12	1:E:79:ILE:HG22	1.03	1.24	3	2
1:E:12:ALA:HB3	1:E:18:ILE:CG2	0.91	1.95	10	1
1:E:71:LEU:HD23	1:E:77:VAL:HG21	0.89	1.44	7	1
1:E:10:LEU:CD2	1:E:77:VAL:HG12	0.89	1.98	11	3
2:G:169:THR:O	2:G:171:VAL:HG13	0.88	1.68	3	5
1:E:10:LEU:CD2	1:E:77:VAL:HG22	0.87	1.99	5	4
2:G:169:THR:O	2:G:171:VAL:HG23	0.86	1.70	16	1
1:E:8:ILE:HD12	1:E:79:ILE:CG2	0.86	2.00	3	2
1:E:12:ALA:CB	1:E:18:ILE:HG22	0.86	1.99	10	1
1:E:7:ARG:O	1:E:8:ILE:HD13	0.85	1.71	10	2
1:E:21:ALA:HB1	1:E:71:LEU:HD11	0.84	1.45	10	1
1:E:8:ILE:HG12	1:E:79:ILE:HG22	0.84	1.47	16	14
1:E:6:ILE:CD1	1:E:81:LEU:HD13	0.83	2.03	2	2
1:E:6:ILE:HD11	1:E:81:LEU:HD12	0.82	1.51	8	1
1:E:71:LEU:HD12	1:E:72:ALA:N	0.80	1.91	11	1
2:G:151:VAL:HG13	2:G:158:LEU:CD2	0.80	2.07	1	9
1:E:71:LEU:CD2	1:E:77:VAL:HG21	0.79	2.08	7	1
2:G:148:VAL:CA	2:G:160:VAL:HG22	0.78	2.09	2	18
1:E:10:LEU:HD22	1:E:77:VAL:HG22	0.77	1.56	5	4
1:E:10:LEU:HD12	1:E:22:THR:HG22	0.75	1.56	5	1
1:E:42:LEU:CB	1:E:50:LEU:HD23	0.75	2.11	7	3
1:E:7:ARG:C	1:E:8:ILE:HD13	0.75	2.07	10	1
1:E:71:LEU:HD23	1:E:77:VAL:HG11	0.74	1.59	2	2
2:G:134:VAL:HG21	2:G:160:VAL:HG21	0.73	1.59	11	11
2:G:161:SER:OG	2:G:169:THR:N	0.73	2.20	17	1
1:E:71:LEU:HD13	1:E:77:VAL:HG21	0.73	1.58	12	7
2:G:167:ARG:NH1	2:G:169:THR:HG22	0.72	1.99	6	1
1:E:10:LEU:HD22	1:E:77:VAL:HG12	0.72	1.62	1	3
2:G:169:THR:O	2:G:169:THR:HG22	0.72	1.83	1	6
1:E:79:ILE:O	2:G:171:VAL:HG22	0.72	1.84	15	2
2:G:148:VAL:HA	2:G:160:VAL:HG22	0.71	1.62	9	18
1:E:71:LEU:CD1	1:E:77:VAL:HG21	0.71	2.16	13	1
1:E:67:MET:SD	2:G:164:ILE:HD11	0.71	2.25	4	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:G:162:VAL:O	2:G:169:THR:OG1	0.71	2.08	17	5
1:E:42:LEU:HB2	1:E:50:LEU:HD22	0.71	1.62	18	2
2:G:128:PHE:CE2	2:G:134:VAL:HG12	0.71	2.21	10	15
1:E:49:HIS:C	1:E:50:LEU:HD22	0.70	2.11	2	1
1:E:49:HIS:C	1:E:50:LEU:HD12	0.69	2.12	1	2
1:E:71:LEU:CD2	1:E:77:VAL:HG11	0.69	2.17	11	2
2:G:164:ILE:HG22	2:G:169:THR:OG1	0.69	1.87	18	9
2:G:148:VAL:O	2:G:148:VAL:HG13	0.68	1.87	16	18
1:E:77:VAL:HG22	1:E:79:ILE:HG23	0.68	1.65	4	6
1:E:42:LEU:HB2	1:E:50:LEU:HD23	0.68	1.63	15	3
1:E:79:ILE:HG12	2:G:169:THR:HG23	0.68	1.65	3	4
1:E:21:ALA:CB	1:E:71:LEU:HD11	0.68	2.19	10	1
1:E:77:VAL:HG12	1:E:79:ILE:HG23	0.67	1.65	9	7
2:G:164:ILE:HG22	2:G:165:PHE:CG	0.67	2.25	7	4
1:E:54:ASP:OD1	1:E:55:ILE:N	0.67	2.27	6	4
2:G:169:THR:HG22	2:G:171:VAL:CG1	0.67	2.20	3	1
1:E:10:LEU:HD12	1:E:22:THR:CG2	0.66	2.20	5	1
1:E:72:ALA:O	1:E:75:VAL:HG22	0.65	1.91	14	3
1:E:32:THR:CG2	1:E:62:THR:OG1	0.64	2.45	9	18
1:E:79:ILE:O	2:G:171:VAL:HG12	0.64	1.91	14	5
2:G:164:ILE:HG22	2:G:165:PHE:CD1	0.64	2.26	8	4
1:E:18:ILE:O	1:E:22:THR:HG23	0.64	1.93	5	1
1:E:6:ILE:HG22	1:E:8:ILE:HD11	0.63	1.69	10	2
2:G:169:THR:HG22	2:G:171:VAL:CG2	0.63	2.23	16	1
2:G:142:ALA:O	2:G:143:ASP:HB2	0.63	1.94	9	18
1:E:22:THR:OG1	1:E:51:ARG:HD3	0.63	1.94	16	3
1:E:69:LEU:O	2:G:165:PHE:CZ	0.62	2.52	8	7
1:E:29:ALA:O	1:E:32:THR:HB	0.62	1.94	11	18
1:E:72:ALA:O	1:E:75:VAL:HG12	0.62	1.94	18	8
2:G:128:PHE:CE2	2:G:134:VAL:HG13	0.62	2.29	12	1
1:E:79:ILE:HG12	2:G:169:THR:HG22	0.62	1.72	18	4
1:E:29:ALA:CB	1:E:55:ILE:HD12	0.62	2.25	1	5
2:G:148:VAL:HG21	2:G:151:VAL:HG22	0.62	1.70	11	8
2:G:158:LEU:N	2:G:158:LEU:HD22	0.61	2.10	2	1
1:E:80:SER:HA	2:G:171:VAL:HG23	0.61	1.72	17	4
2:G:135:ARG:O	2:G:178:VAL:HG22	0.61	1.94	16	1
1:E:71:LEU:HD13	1:E:77:VAL:HG11	0.61	1.72	15	2
1:E:76:ASP:HA	2:G:167:ARG:HD3	0.61	1.72	2	2
1:E:6:ILE:HG12	1:E:81:LEU:HD13	0.61	1.73	17	9
1:E:67:MET:HE2	2:G:144:PHE:CE1	0.60	2.31	5	1
1:E:10:LEU:CD1	1:E:22:THR:HG22	0.60	2.26	5	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:E:60:GLU:O	1:E:63:VAL:HG22	0.60	1.96	11	13
1:E:6:ILE:HD13	1:E:81:LEU:HD13	0.60	1.74	3	2
1:E:40:ILE:HD13	1:E:40:ILE:N	0.60	2.12	18	1
1:E:49:HIS:O	1:E:50:LEU:HD12	0.60	1.97	1	2
1:E:67:MET:HE1	2:G:164:ILE:HG23	0.60	1.72	8	1
1:E:26:VAL:HG12	1:E:30:LYS:HE2	0.59	1.74	3	2
2:G:134:VAL:CG2	2:G:160:VAL:HG11	0.59	2.28	5	15
1:E:56:VAL:CG1	1:E:57:GLU:N	0.59	2.65	5	1
1:E:6:ILE:CG2	1:E:8:ILE:HD11	0.59	2.28	10	1
2:G:135:ARG:O	2:G:178:VAL:HG13	0.59	1.97	16	1
1:E:67:MET:O	1:E:67:MET:HE3	0.59	1.97	8	1
1:E:10:LEU:HD23	1:E:77:VAL:HG12	0.58	1.73	11	3
2:G:128:PHE:HE2	2:G:134:VAL:HG12	0.58	1.58	10	10
2:G:158:LEU:HD11	2:G:175:PHE:CZ	0.58	2.33	2	1
2:G:162:VAL:HG12	2:G:164:ILE:HG13	0.58	1.75	5	4
1:E:49:HIS:O	1:E:50:LEU:HD22	0.58	1.98	2	1
1:E:6:ILE:CG1	1:E:81:LEU:HD13	0.58	2.29	18	9
2:G:164:ILE:CG2	2:G:165:PHE:CE1	0.57	2.87	7	4
1:E:19:ASP:OD1	1:E:20:GLN:N	0.57	2.37	4	4
2:G:127:LEU:N	2:G:127:LEU:CD2	0.57	2.67	16	1
1:E:69:LEU:C	1:E:69:LEU:HD23	0.57	2.25	10	1
1:E:10:LEU:HD23	1:E:77:VAL:HG13	0.56	1.76	7	1
1:E:67:MET:CE	2:G:144:PHE:CE1	0.56	2.88	5	1
2:G:136:VAL:HG22	2:G:178:VAL:CG2	0.56	2.31	16	1
2:G:158:LEU:HD21	2:G:175:PHE:CE1	0.56	2.36	3	13
1:E:8:ILE:HG22	1:E:10:LEU:CD1	0.56	2.30	16	4
2:G:128:PHE:CZ	2:G:180:LYS:HB2	0.56	2.36	1	18
2:G:133:MET:HE3	2:G:181:ALA:HB1	0.55	1.76	3	3
2:G:133:MET:HG2	2:G:147:VAL:HG22	0.55	1.77	7	5
1:E:8:ILE:O	1:E:52:LEU:HD12	0.55	2.02	16	7
1:E:49:HIS:O	1:E:50:LEU:HD23	0.55	2.01	9	3
2:G:136:VAL:HG22	2:G:173:LEU:CD1	0.55	2.31	7	15
1:E:63:VAL:HB	2:G:140:PRO:CG	0.55	2.31	5	2
2:G:136:VAL:HA	2:G:178:VAL:HG22	0.55	1.78	16	1
1:E:11:LYS:HG3	1:E:48:THR:HG23	0.55	1.79	16	2
1:E:18:ILE:HG21	1:E:49:HIS:CD2	0.54	2.38	15	1
1:E:71:LEU:HD12	1:E:71:LEU:C	0.54	2.27	11	1
1:E:22:THR:OG1	1:E:51:ARG:CD	0.54	2.55	10	7
1:E:15:HIS:CE1	1:E:19:ASP:OD2	0.54	2.60	7	6
2:G:151:VAL:HG13	2:G:158:LEU:HD23	0.54	1.78	1	8
2:G:169:THR:O	2:G:169:THR:CG2	0.54	2.56	1	5

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:E:77:VAL:HG12	2:G:167:ARG:NH2	0.53	2.19	3	1
1:E:6:ILE:O	1:E:54:ASP:OD1	0.53	2.26	6	4
1:E:14:ASP:OD2	1:E:17:LEU:HD13	0.53	2.02	10	1
1:E:6:ILE:HD11	1:E:81:LEU:HD13	0.53	1.81	3	2
1:E:24:GLU:HG2	1:E:69:LEU:HD11	0.53	1.81	10	1
2:G:167:ARG:HG2	2:G:168:ALA:N	0.53	2.19	6	1
1:E:15:HIS:HA	1:E:18:ILE:HG22	0.52	1.81	8	17
2:G:145:ASN:CG	2:G:146:GLY:N	0.52	2.66	5	2
1:E:5:ARG:HG2	1:E:82:GLY:OXT	0.52	2.05	11	1
2:G:157:ARG:HB2	2:G:172:GLU:HG3	0.51	1.82	13	1
2:G:169:THR:HG22	2:G:171:VAL:HG23	0.51	1.82	15	2
2:G:148:VAL:HG21	2:G:151:VAL:HG12	0.51	1.83	6	6
2:G:156:SER:OG	2:G:156:SER:O	0.51	2.27	1	1
1:E:75:VAL:O	2:G:167:ARG:NE	0.51	2.44	9	1
1:E:11:LYS:CE	1:E:48:THR:CB	0.51	2.89	3	2
1:E:28:THR:HG21	1:E:69:LEU:HD22	0.51	1.82	5	1
2:G:127:LEU:C	2:G:127:LEU:HD23	0.51	2.31	7	1
2:G:165:PHE:CD1	2:G:165:PHE:N	0.51	2.75	8	5
2:G:147:VAL:O	2:G:160:VAL:HG13	0.51	2.06	5	17
2:G:148:VAL:HA	2:G:160:VAL:CG2	0.51	2.35	14	15
1:E:10:LEU:CD2	1:E:77:VAL:HG13	0.50	2.35	7	1
1:E:56:VAL:HG12	1:E:57:GLU:N	0.50	2.21	5	2
1:E:32:THR:HG21	1:E:62:THR:OG1	0.50	2.07	9	16
2:G:161:SER:HB2	2:G:170:PRO:N	0.50	2.21	15	4
1:E:77:VAL:HG22	1:E:79:ILE:CG2	0.50	2.36	3	3
2:G:158:LEU:HD11	2:G:175:PHE:CD1	0.50	2.42	3	8
2:G:173:LEU:CB	2:G:178:VAL:CG1	0.50	2.89	7	5
1:E:14:ASP:O	1:E:18:ILE:HG23	0.50	2.07	10	1
2:G:164:ILE:CG2	2:G:165:PHE:CD1	0.50	2.95	7	4
2:G:175:PHE:CD1	2:G:175:PHE:N	0.50	2.71	6	1
2:G:169:THR:HG22	2:G:171:VAL:HG13	0.50	1.82	3	1
1:E:76:ASP:HA	2:G:167:ARG:HD2	0.50	1.82	4	1
1:E:32:THR:HG23	1:E:62:THR:OG1	0.49	2.07	17	18
1:E:24:GLU:O	1:E:28:THR:HG23	0.49	2.08	5	2
1:E:67:MET:CG	2:G:140:PRO:HB2	0.49	2.37	6	3
2:G:148:VAL:O	2:G:148:VAL:CG1	0.49	2.59	16	12
1:E:15:HIS:CD2	1:E:51:ARG:NH2	0.49	2.80	2	2
2:G:167:ARG:CZ	2:G:169:THR:HG22	0.49	2.37	6	1
2:G:173:LEU:HD22	2:G:177:GLN:NE2	0.49	2.22	9	2
2:G:157:ARG:CZ	2:G:174:ASP:OD1	0.49	2.61	1	2
2:G:138:ASP:CB	2:G:177:GLN:OE1	0.49	2.61	7	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:E:67:MET:SD	2:G:140:PRO:O	0.49	2.70	17	1
2:G:128:PHE:CE2	2:G:180:LYS:HA	0.48	2.43	12	9
1:E:46:SER:O	1:E:46:SER:OG	0.48	2.31	13	2
1:E:79:ILE:HG12	2:G:169:THR:CG2	0.48	2.38	1	6
2:G:138:ASP:OD1	2:G:139:GLY:N	0.48	2.46	15	9
1:E:15:HIS:NE2	1:E:51:ARG:NH2	0.48	2.60	18	4
2:G:136:VAL:HG22	2:G:173:LEU:HD13	0.48	1.85	7	1
2:G:134:VAL:HG12	2:G:135:ARG:H	0.48	1.68	12	1
1:E:63:VAL:HB	2:G:140:PRO:HB3	0.48	1.85	5	3
2:G:155:LYS:C	2:G:156:SER:OG	0.48	2.57	11	9
1:E:11:LYS:HG3	1:E:50:LEU:HD23	0.48	1.83	3	1
1:E:10:LEU:CD1	1:E:22:THR:CG2	0.48	2.90	5	1
1:E:69:LEU:HD22	1:E:70:ASP:N	0.48	2.24	11	1
1:E:75:VAL:O	2:G:167:ARG:NH1	0.48	2.47	12	3
2:G:161:SER:HB2	2:G:170:PRO:CA	0.47	2.39	17	1
2:G:161:SER:HB3	2:G:170:PRO:N	0.47	2.24	13	2
2:G:128:PHE:HE2	2:G:134:VAL:HG13	0.47	1.68	12	1
2:G:178:VAL:CG1	2:G:179:GLU:N	0.47	2.76	16	1
2:G:173:LEU:HD13	2:G:178:VAL:CG1	0.47	2.39	6	3
1:E:67:MET:HE1	2:G:164:ILE:HD12	0.47	1.86	3	1
1:E:77:VAL:O	2:G:167:ARG:NH1	0.47	2.47	6	1
1:E:51:ARG:C	1:E:52:LEU:HD12	0.47	2.34	8	1
1:E:22:THR:OG1	1:E:51:ARG:HD2	0.47	2.10	4	6
2:G:151:VAL:HG13	2:G:158:LEU:HD22	0.47	1.81	1	2
2:G:173:LEU:HB3	2:G:178:VAL:CG1	0.47	2.39	7	5
1:E:67:MET:CE	2:G:140:PRO:O	0.47	2.63	5	1
1:E:8:ILE:CG2	1:E:10:LEU:CD1	0.47	2.92	16	2
2:G:142:ALA:O	2:G:143:ASP:CB	0.47	2.63	4	5
1:E:29:ALA:HB1	1:E:55:ILE:HD12	0.47	1.86	1	5
1:E:11:LYS:HE2	1:E:48:THR:CB	0.47	2.40	3	2
1:E:6:ILE:HD11	1:E:81:LEU:CD1	0.47	2.34	8	1
1:E:9:ARG:NH2	1:E:78:GLN:OE1	0.47	2.48	15	2
2:G:138:ASP:HB3	2:G:177:GLN:HG3	0.47	1.87	18	1
1:E:77:VAL:O	1:E:77:VAL:HG23	0.47	2.10	2	4
1:E:18:ILE:HD13	1:E:49:HIS:HB3	0.46	1.86	10	1
1:E:25:ILE:HD13	1:E:69:LEU:HD13	0.46	1.85	10	1
1:E:11:LYS:CE	1:E:48:THR:HB	0.46	2.39	3	1
2:G:158:LEU:HD21	2:G:175:PHE:CE2	0.46	2.46	16	1
2:G:133:MET:HG2	2:G:147:VAL:HG12	0.46	1.86	2	2
1:E:78:GLN:OE1	2:G:170:PRO:CG	0.46	2.64	5	3
1:E:31:ARG:O	1:E:31:ARG:HG2	0.46	2.10	14	2

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:G:161:SER:HB2	2:G:170:PRO:HA	0.46	1.88	17	1
2:G:164:ILE:CG2	2:G:169:THR:OG1	0.46	2.64	3	1
2:G:134:VAL:O	2:G:145:ASN:OD1	0.46	2.34	7	1
1:E:40:ILE:N	1:E:40:ILE:CD1	0.46	2.78	18	1
1:E:32:THR:OG1	1:E:62:THR:HA	0.46	2.11	8	18
2:G:155:LYS:O	2:G:156:SER:OG	0.46	2.34	18	9
1:E:63:VAL:HB	2:G:140:PRO:CB	0.46	2.41	5	1
1:E:66:LEU:C	1:E:66:LEU:HD23	0.46	2.35	6	1
2:G:137:ASN:O	2:G:138:ASP:OD1	0.46	2.34	7	2
1:E:5:ARG:NE	1:E:54:ASP:OD2	0.46	2.49	16	1
1:E:47:ARG:O	1:E:47:ARG:HG2	0.45	2.11	6	1
2:G:134:VAL:HB	2:G:178:VAL:HG11	0.45	1.88	16	1
1:E:11:LYS:HE2	1:E:48:THR:HB	0.45	1.88	3	2
1:E:37:ARG:HE	1:E:56:VAL:HG11	0.45	1.71	7	2
1:E:28:THR:OG1	1:E:69:LEU:HD12	0.45	2.10	12	1
2:G:156:SER:O	2:G:156:SER:OG	0.45	2.33	4	3
2:G:164:ILE:HG22	2:G:165:PHE:CD2	0.45	2.46	7	2
1:E:9:ARG:HG2	1:E:52:LEU:HD22	0.45	1.89	1	3
2:G:133:MET:CE	2:G:181:ALA:HB1	0.45	2.41	3	1
2:G:145:ASN:OD1	2:G:146:GLY:N	0.45	2.49	5	1
2:G:161:SER:OG	2:G:168:ALA:HB1	0.45	2.11	17	1
2:G:158:LEU:HD21	2:G:175:PHE:CZ	0.45	2.47	16	6
1:E:11:LYS:HE3	1:E:48:THR:OG1	0.45	2.11	3	1
1:E:25:ILE:HD13	1:E:69:LEU:CD2	0.45	2.42	15	3
1:E:32:THR:HG21	1:E:62:THR:HG23	0.45	1.88	1	7
1:E:75:VAL:O	2:G:167:ARG:NH2	0.45	2.50	3	2
1:E:32:THR:HG21	1:E:62:THR:CG2	0.45	2.42	11	8
1:E:79:ILE:CG1	2:G:169:THR:HG23	0.45	2.40	3	1
1:E:16:ARG:O	1:E:19:ASP:OD1	0.44	2.35	13	4
2:G:142:ALA:O	2:G:144:PHE:CD2	0.44	2.70	16	2
1:E:22:THR:HG21	1:E:51:ARG:NE	0.44	2.27	16	1
2:G:173:LEU:HB3	2:G:178:VAL:HG13	0.44	1.89	3	7
2:G:152:ASP:HB3	2:G:157:ARG:CG	0.44	2.43	13	1
2:G:136:VAL:CG1	2:G:141:PHE:O	0.44	2.66	7	1
1:E:60:GLU:O	1:E:63:VAL:CG2	0.44	2.65	5	7
1:E:63:VAL:HB	2:G:140:PRO:HG3	0.44	1.89	2	1
2:G:150:GLU:OE1	2:G:159:LYS:NZ	0.44	2.47	12	1
2:G:152:ASP:CG	2:G:155:LYS:CE	0.44	2.91	15	1
1:E:67:MET:SD	2:G:140:PRO:CA	0.44	3.05	17	1
1:E:81:LEU:C	1:E:81:LEU:HD23	0.44	2.38	8	1
2:G:174:ASP:O	2:G:178:VAL:HG22	0.44	2.13	9	9

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:G:136:VAL:O	2:G:137:ASN:ND2	0.44	2.51	4	1
1:E:69:LEU:HD23	1:E:70:ASP:N	0.44	2.27	10	1
1:E:32:THR:CG2	1:E:32:THR:O	0.44	2.63	10	17
2:G:148:VAL:N	2:G:160:VAL:HG22	0.44	2.28	14	8
1:E:46:SER:O	1:E:48:THR:HG23	0.44	2.13	6	5
2:G:152:ASP:OD2	2:G:155:LYS:HD2	0.44	2.12	7	1
1:E:5:ARG:NH1	1:E:37:ARG:CZ	0.44	2.81	15	1
2:G:150:GLU:HB2	2:G:159:LYS:HG3	0.43	1.89	15	1
1:E:69:LEU:HG	1:E:71:LEU:HD12	0.43	1.90	7	1
2:G:157:ARG:HB2	2:G:172:GLU:CG	0.43	2.42	13	1
2:G:136:VAL:CA	2:G:178:VAL:HG22	0.43	2.43	16	1
1:E:79:ILE:CG1	2:G:169:THR:CG2	0.43	2.96	1	1
1:E:78:GLN:OE1	2:G:170:PRO:HG2	0.43	2.14	5	1
1:E:13:PHE:CD1	1:E:13:PHE:O	0.43	2.71	6	1
2:G:172:GLU:N	2:G:172:GLU:OE1	0.43	2.51	18	1
1:E:70:ASP:O	1:E:70:ASP:OD1	0.43	2.37	7	1
2:G:155:LYS:O	2:G:157:ARG:HG3	0.43	2.13	8	1
1:E:38:GLY:HA2	1:E:40:ILE:HD13	0.43	1.89	13	1
2:G:127:LEU:N	2:G:127:LEU:HD23	0.43	2.29	16	1
1:E:35:GLN:HB3	1:E:56:VAL:HG23	0.43	1.90	1	1
2:G:135:ARG:O	2:G:178:VAL:HB	0.43	2.13	13	5
2:G:162:VAL:CG2	2:G:169:THR:HB	0.43	2.43	11	1
2:G:135:ARG:O	2:G:178:VAL:CA	0.43	2.67	3	18
2:G:155:LYS:HB3	2:G:157:ARG:CZ	0.43	2.44	17	1
1:E:32:THR:HG22	1:E:34:ALA:N	0.43	2.29	17	10
2:G:138:ASP:HB3	2:G:177:GLN:CG	0.43	2.44	18	1
2:G:161:SER:CA	2:G:170:PRO:HA	0.43	2.44	4	18
1:E:25:ILE:HD13	1:E:69:LEU:HD23	0.43	1.91	16	2
2:G:129:GLU:N	2:G:129:GLU:CD	0.43	2.75	6	1
2:G:148:VAL:CG2	2:G:151:VAL:HG12	0.43	2.44	10	2
2:G:134:VAL:HB	2:G:178:VAL:CG1	0.43	2.44	16	1
1:E:39:PRO:C	1:E:40:ILE:HD13	0.43	2.39	18	1
2:G:129:GLU:CB	2:G:130:PRO:HD2	0.42	2.45	1	18
2:G:175:PHE:O	2:G:178:VAL:O	0.42	2.37	5	18
1:E:5:ARG:O	1:E:5:ARG:CG	0.42	2.67	3	1
2:G:164:ILE:HG12	2:G:165:PHE:CD1	0.42	2.49	1	1
2:G:174:ASP:OD1	2:G:175:PHE:N	0.42	2.51	5	1
1:E:6:ILE:HG22	1:E:8:ILE:CD1	0.42	2.42	10	1
1:E:71:LEU:CD2	1:E:77:VAL:CG1	0.42	2.95	11	1
2:G:164:ILE:O	2:G:167:ARG:HG2	0.42	2.14	14	1
1:E:56:VAL:HG12	1:E:57:GLU:H	0.42	1.74	8	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
2:G:138:ASP:HB2	2:G:177:GLN:HG3	0.42	1.89	8	2
1:E:76:ASP:CA	2:G:167:ARG:NH2	0.42	2.82	12	1
2:G:164:ILE:HG22	2:G:165:PHE:CE1	0.42	2.49	8	2
1:E:11:LYS:HG2	1:E:12:ALA:N	0.42	2.28	8	1
1:E:76:ASP:OD1	2:G:167:ARG:NH1	0.42	2.52	10	1
1:E:76:ASP:HA	2:G:167:ARG:NE	0.42	2.29	5	1
2:G:135:ARG:O	2:G:179:GLU:N	0.42	2.52	7	4
1:E:14:ASP:CG	1:E:17:LEU:HD13	0.42	2.40	10	1
1:E:11:LYS:HG2	1:E:50:LEU:CD2	0.42	2.45	17	2
2:G:136:VAL:HG11	2:G:141:PHE:HB2	0.42	1.89	14	2
1:E:45:ARG:O	1:E:48:THR:OG1	0.42	2.36	2	2
2:G:145:ASN:OD1	2:G:145:ASN:C	0.42	2.63	16	1
1:E:6:ILE:HD13	1:E:81:LEU:HB2	0.42	1.92	2	1
1:E:5:ARG:NH2	1:E:54:ASP:OD2	0.42	2.53	13	1
1:E:77:VAL:CG1	1:E:79:ILE:HG23	0.42	2.42	18	1
2:G:148:VAL:HG21	2:G:151:VAL:CG1	0.42	2.44	2	1
1:E:71:LEU:HD13	2:G:165:PHE:CE2	0.42	2.50	7	1
1:E:69:LEU:CD2	1:E:71:LEU:HG	0.42	2.44	8	1
1:E:6:ILE:CD1	1:E:81:LEU:HB2	0.42	2.44	3	2
2:G:136:VAL:HB	2:G:141:PHE:O	0.42	2.15	16	1
2:G:158:LEU:HD11	2:G:175:PHE:CE1	0.41	2.50	2	1
2:G:124:PRO:HB3	2:G:179:GLU:OE1	0.41	2.15	7	1
2:G:132:GLU:OE2	2:G:180:LYS:HG3	0.41	2.15	7	1
2:G:172:GLU:O	2:G:172:GLU:CD	0.41	2.62	8	1
2:G:135:ARG:O	2:G:178:VAL:HA	0.41	2.15	6	18
1:E:5:ARG:NH1	1:E:37:ARG:NE	0.41	2.69	15	1
1:E:9:ARG:NH1	1:E:52:LEU:HD21	0.41	2.30	7	1
2:G:174:ASP:HB2	2:G:177:GLN:HG2	0.41	1.91	7	1
2:G:164:ILE:HG12	2:G:165:PHE:CD2	0.41	2.51	16	1
1:E:48:THR:O	1:E:50:LEU:CD1	0.41	2.68	1	1
2:G:164:ILE:CG2	2:G:165:PHE:CZ	0.41	3.03	7	1
2:G:157:ARG:HB2	2:G:172:GLU:CD	0.41	2.40	13	1
1:E:56:VAL:CG1	1:E:57:GLU:H	0.41	2.28	5	1
1:E:15:HIS:NE2	1:E:19:ASP:OD2	0.41	2.53	7	1
1:E:42:LEU:HB3	1:E:50:LEU:HD23	0.41	1.87	7	1
1:E:19:ASP:OD1	1:E:51:ARG:NH1	0.41	2.54	9	1
1:E:42:LEU:CB	1:E:50:LEU:HD22	0.41	2.40	18	1
1:E:67:MET:HE2	2:G:140:PRO:O	0.41	2.16	1	1
1:E:76:ASP:CB	2:G:167:ARG:NH2	0.41	2.84	12	1
2:G:148:VAL:CA	2:G:160:VAL:CG2	0.41	2.93	14	1
1:E:59:THR:O	1:E:63:VAL:HG13	0.41	2.16	6	1

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Atom-1	Atom-2	Clash(Å)	Distance(Å)	Models	
				Worst	Total
1:E:6:ILE:HD13	1:E:81:LEU:CD1	0.40	2.45	3	2
2:G:158:LEU:N	2:G:158:LEU:CD2	0.40	2.82	2	1
2:G:173:LEU:CD1	2:G:178:VAL:CG1	0.40	3.00	2	2
2:G:148:VAL:HB	2:G:160:VAL:CG2	0.40	2.46	11	1
1:E:67:MET:SD	2:G:140:PRO:CB	0.40	3.09	17	1
1:E:48:THR:O	1:E:50:LEU:CD2	0.40	2.69	2	1
2:G:159:LYS:HE2	2:G:170:PRO:HB2	0.40	1.93	5	1
1:E:8:ILE:HG22	1:E:10:LEU:HD12	0.40	1.93	6	1
1:E:9:ARG:NH1	1:E:52:LEU:CD2	0.40	2.84	7	1
1:E:11:LYS:HG2	1:E:50:LEU:HD22	0.40	1.93	9	1
1:E:22:THR:HG21	1:E:51:ARG:HE	0.40	1.76	16	1
2:G:133:MET:HE3	2:G:181:ALA:CB	0.40	2.44	3	1
2:G:136:VAL:CG2	2:G:173:LEU:CD1	0.40	2.99	7	1
2:G:161:SER:OG	2:G:170:PRO:HA	0.40	2.15	1	1
2:G:136:VAL:HG11	2:G:141:PHE:CB	0.40	2.46	7	1
1:E:52:LEU:HD23	1:E:53:VAL:N	0.40	2.31	18	1

6.3 Torsion angles ⓘ

6.3.1 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 PDB entries followed by that with respect to all NMR entries. 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	E	78/87 (90%)	78±0 (100±0%)	0±0 (0±0%)	0±0 (0±0%)	100	100
2	G	57/63 (90%)	54±0 (95±0%)	3±0 (5±0%)	0±0 (0±0%)	100	100
All	All	2430/2700 (90%)	2376 (98%)	54 (2%)	0 (0%)	100	100

There are no Ramachandran outliers.

6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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	E	68/73 (93%)	64±1 (95±2%)	4±1 (5±2%)	22	72
2	G	52/53 (98%)	49±1 (94±2%)	3±1 (6±2%)	18	67
All	All	2160/2268 (95%)	2035 (94%)	125 (6%)	20	69

All 20 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

Mol	Chain	Res	Type	Models (Total)
1	E	32	THR	18
1	E	40	ILE	15
2	G	129	GLU	14
2	G	156	SER	13
1	E	46	SER	12
2	G	123	ARG	10
2	G	169	THR	9
1	E	42	LEU	8
1	E	57	GLU	8
2	G	147	VAL	6
2	G	151	VAL	3
2	G	171	VAL	1
2	G	145	ASN	1
1	E	63	VAL	1
2	G	172	GLU	1
1	E	18	ILE	1
1	E	71	LEU	1
1	E	48	THR	1
2	G	127	LEU	1
2	G	178	VAL	1

6.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

6.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

6.6 Ligand geometry

There are no ligands in this entry.

6.7 Other polymers

There are no such molecules in this entry.

6.8 Polymer linkage issues

There are no chain breaks in this entry.

7 Chemical shift validation

No chemical shift data were provided