Full wwPDB X-ray Structure Validation Report ⓘ

Jan 8, 2024 – 05:05 pm GMT

PDB ID	:	8B23
Title	:	Time-resolved structure of K+-dependent Na+-PPase from Thermotoga maritima 600-seconds post reaction initiation with Na+
Authors	:	Strauss, J.; Vidilaseris, K.; Goldman, A.
Deposited on	:	2022-09-12
Resolution	:	3.84 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:

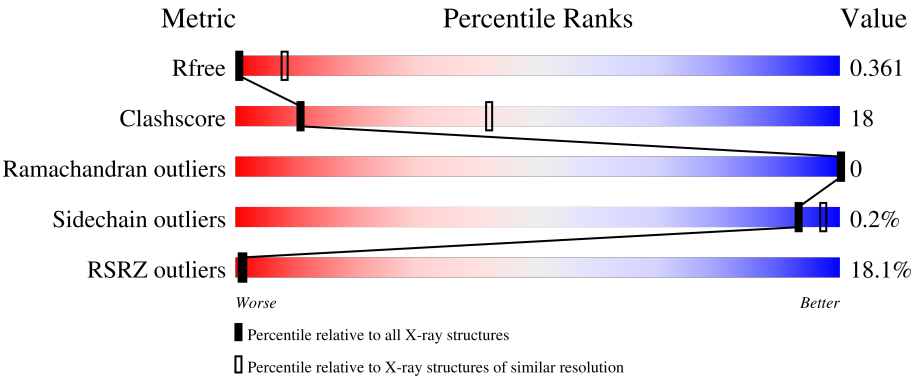
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 3.84 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	1242 (4.08-3.60)
Clashscore	141614	1004 (4.04-3.64)
Ramachandran outliers	138981	1003 (4.06-3.62)
Sidechain outliers	138945	1266 (4.08-3.60)
RSRZ outliers	127900	1149 (4.08-3.60)

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 <=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	735	18% 60% 35% .
1	B	735	16% 63% 30% 7%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 10077 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.

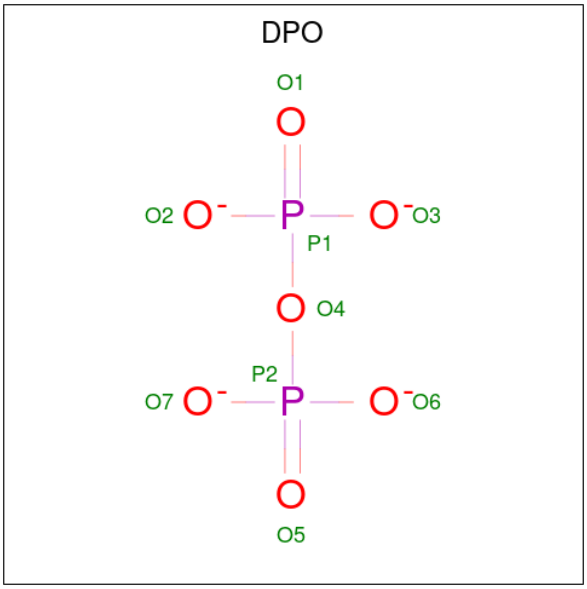
- Molecule 1 is a protein called K(+)-stimulated pyrophosphate-energized sodium pump.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	702	Total	C	N	O	S	0	0	0
			5020	3296	776	923	25			
1	B	685	Total	C	N	O	S	0	4	0
			5043	3308	791	919	25			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-8	MET	-	initiating methionine	UNP Q9S5X0
A	-7	ARG	-	expression tag	UNP Q9S5X0
A	-6	GLY	-	expression tag	UNP Q9S5X0
A	-5	SER	-	expression tag	UNP Q9S5X0
A	-4	HIS	-	expression tag	UNP Q9S5X0
A	-3	HIS	-	expression tag	UNP Q9S5X0
A	-2	HIS	-	expression tag	UNP Q9S5X0
A	-1	HIS	-	expression tag	UNP Q9S5X0
A	0	HIS	-	expression tag	UNP Q9S5X0
A	1	HIS	-	expression tag	UNP Q9S5X0
A	353	LEU	VAL	engineered mutation	UNP Q9S5X0
A	395	GLY	SER	engineered mutation	UNP Q9S5X0
B	-8	MET	-	initiating methionine	UNP Q9S5X0
B	-7	ARG	-	expression tag	UNP Q9S5X0
B	-6	GLY	-	expression tag	UNP Q9S5X0
B	-5	SER	-	expression tag	UNP Q9S5X0
B	-4	HIS	-	expression tag	UNP Q9S5X0
B	-3	HIS	-	expression tag	UNP Q9S5X0
B	-2	HIS	-	expression tag	UNP Q9S5X0
B	-1	HIS	-	expression tag	UNP Q9S5X0
B	0	HIS	-	expression tag	UNP Q9S5X0
B	1	HIS	-	expression tag	UNP Q9S5X0
B	353	LEU	VAL	engineered mutation	UNP Q9S5X0
B	395	GLY	SER	engineered mutation	UNP Q9S5X0

- Molecule 2 is DIPHOSPHATE (three-letter code: DPO) (formula: O_7P_2) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total O P 9 7 2	0	0

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	4	Total Mg 4 4	0	0

- Molecule 4 is water.

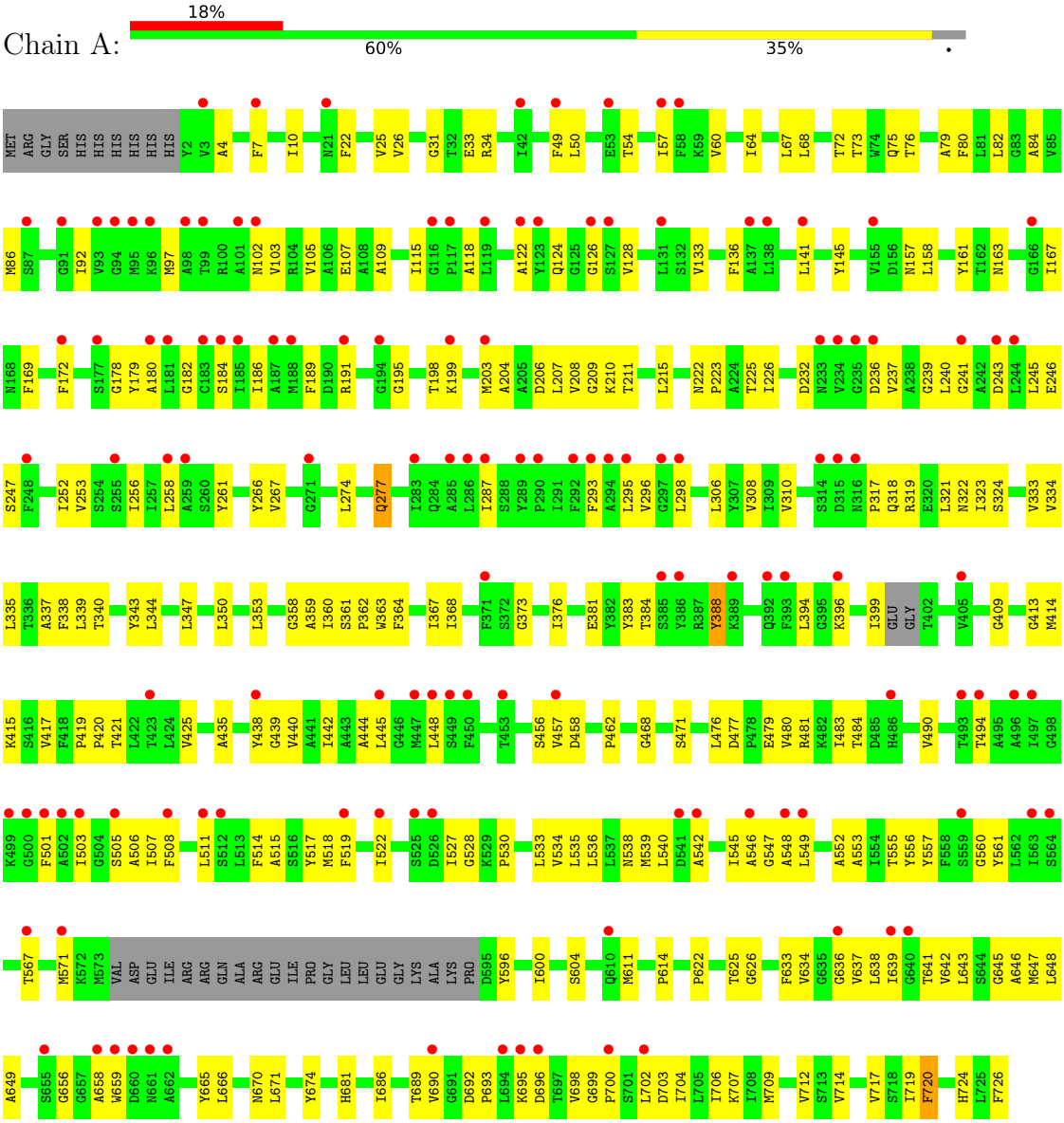
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O 1 1	0	0

3 Residue-property plots (i)

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.

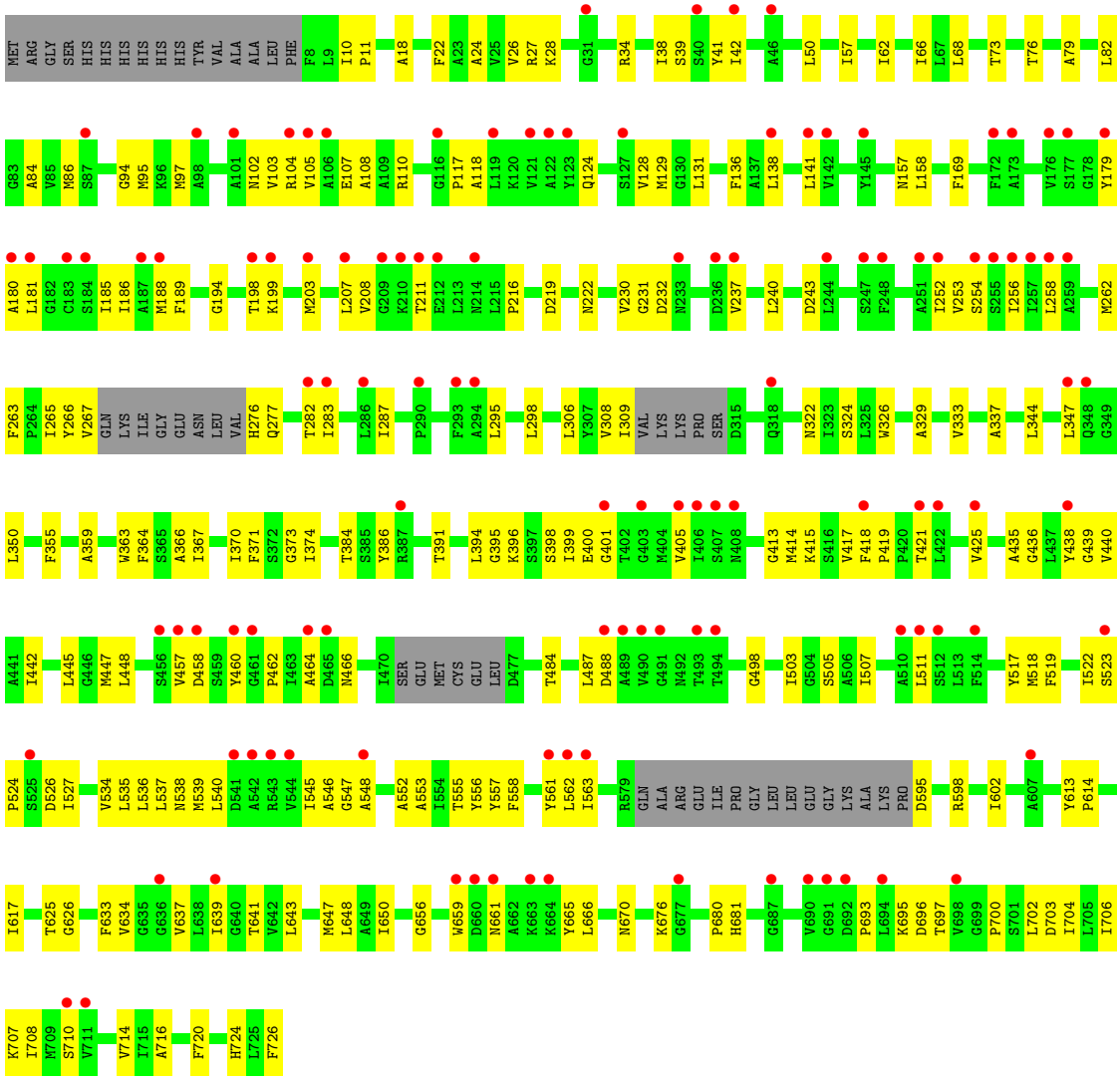
• Molecule 1: K(+)-stimulated pyrophosphate-energized sodium pump

Chain A:



• Molecule 1: K(+)-stimulated pyrophosphate-energized sodium pump

Chain B:


MET ARG GLY SER HIS HIS HIS HIS HIS HIS TYR VAL ALA ALA LEU PHE F8 L9 I10 P11 A18 F22 A23 A24 V25 V26 R27 K28 G31 R34 I38 S39 S40 Y41 I42 A46 L50 I57 I62 I66 L67 L68 T73 T76 A79 L82
G83 A84 V85 M86 S87 G94 M95 K96 M97 A98 A101 N102 V103 R104 V105 A106 E107 A108 A109 R110 G116 P117 A118 L119 K120 V121 A122 Y123 Q124 S127 V128 M129 G130 L131 F136 A137 L138 L141 V142 Y145 N157 L158 F169 F172 A173 V176 S177 G178 Y179
A180 L181 G182 C183 S184 I185 I186 A187 M188 F189 G194 T198 K199 M203 L207 V208 G209 K210 T211 E212 L213 N214 L215 P216 D219 N222 V230 G231 D232 N233 D236 V237 L240 D243 L244 S247 F248 A251 I252 V253 S254 S255 I256 I257 L258 A259 M262
F263 P264 I265 Y266 V267 GLN LYS ILE GLY GLU ASN LEU VAL H276 Q277 T282 I283 L286 I287 P290 F293 A294 L295 L298 L306 Y307 V308 I309 VAL LYS LYS PRO SER D315 Q318 N322 I323 S324 L325 W326 A329 V333 A337 L344 L347 Q348 G349
L350 F355 A359 W363 F364 S365 A366 I367 I370 F371 S372 G373 I374 T384 S385 Y386 R387 T391 L394 G395 K396 S397 S398 I399 E400 G401 T402 G403 M404 V405 I406 S407 N408 G413 M414 K415 S416 V417 F418 P419 P420 T421 L422 V425 A435 G436 L437 Y438 G439 V440
A441 I442 L445 G446 M447 L448 S456 V457 D458 S459 Y460 G461 P462 I463 A464 D465 N466 I470 SER GLU MET CYS GLU LEU D477 T484 L487 D488 A489 V490 G491 N492 T493 T494 G498 I503 G504 S505 A506 I507 A510 L511 S512 L513 F514 Y517 M518 F519 I522 S523
P524 S525 D526 I527 V534 L535 L536 L537 N538 M539 L540 D541 A542 R543 V544 I545 A546 G547 A548 A552 A553 I554 T555 Y556 Y557 F558 Y561 L562 I563 R579 GLN ALA ARG GLU ILE PRO GLY LEU LEU GLU GLY LYS ALA LYS PRO D595 R598 I602 A607 Y613 P614
I617 T625 G626 F633 V634 G635 G636 V637 L638 I639 G640 T641 V642 L643 M647 L648 A649 I650 G656 W659 D660 N661 A662 K663 K664 Y665 L666 N670 K676 G677 P680 H681 G687 V690 G691 D692 P693 L694 K695 D696 T697 V698 G699 P700 S701 L702 D703 I704 L705 I706
K707 I708 M709 S710 V711 V714 I715 A716 F720 H724 L725 F726

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	83.33Å 111.55Å 106.22Å 90.00° 109.05° 90.00°	Depositor
Resolution (Å)	100.40 – 3.84 100.40 – 3.84	Depositor EDS
% Data completeness (in resolution range)	73.7 (100.40-3.84) 73.7 (100.40-3.84)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.18 (at 3.89Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487, PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.334 , 0.363 0.334 , 0.361	Depositor DCC
R_{free} test set	663 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å^2)	210.4	Xtriage
Anisotropy	0.013	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 224.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.86	EDS
Total number of atoms	10077	wwPDB-VP
Average B, all atoms (Å^2)	249.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.02% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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

Bond lengths and bond angles in the following residue types are not validated in this section: DPO, MG

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	0.28	0/5127	0.48	1/7014 (0.0%)
1	B	0.27	0/5148	0.49	0/7013
All	All	0.27	0/10275	0.49	1/14027 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	277	GLN	CA-CB-CG	6.05	126.70	113.40

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	5020	0	4949	220	0
1	B	5043	0	5075	179	0
2	A	9	0	0	0	0
3	A	4	0	0	0	0
4	A	1	0	0	1	0
All	All	10077	0	10024	368	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 18.

All (368) 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:626:GLY:HA3	1:B:720:PHE:CD2	2.12	0.84
1:B:634:VAL:HG21	1:B:720:PHE:HE2	1.44	0.83
1:A:557:TYR:HD1	1:B:415:LYS:HA	1.45	0.78
1:B:68:LEU:HD23	1:B:76:THR:HG22	1.64	0.78
1:A:7:PHE:HB3	1:A:295:LEU:HD13	1.66	0.77
1:B:399:ILE:HA	1:B:680:PRO:HG3	1.65	0.77
1:B:626:GLY:HA3	1:B:720:PHE:HD2	1.47	0.76
1:B:384:THR:O	1:B:661:ASN:ND2	2.18	0.75
1:A:425:VAL:HG13	1:B:546:ALA:HB1	1.68	0.75
1:A:561:TYR:HE2	1:A:614:PRO:HD3	1.52	0.74
1:B:28:LYS:HB2	1:B:104:ARG:HD3	1.70	0.73
1:A:79:ALA:HB1	1:A:179:TYR:HB2	1.70	0.73
1:B:194:GLY:O	1:B:198:THR:HG23	1.87	0.73
1:B:308:VAL:HG21	1:B:324:SER:HB2	1.71	0.73
1:A:626:GLY:HA3	1:A:720:PHE:CD2	2.24	0.72
1:A:636:GLY:HA2	1:A:639:ILE:HD12	1.71	0.72
1:B:394:LEU:HD21	1:B:659:TRP:HD1	1.54	0.71
1:B:282:THR:HA	1:B:347:LEU:HD22	1.70	0.71
1:B:199:LYS:HD2	1:B:696:ASP:HB2	1.72	0.70
1:A:296:VAL:HG21	1:A:339:LEU:HD11	1.71	0.70
1:B:107:GLU:OE1	1:B:110:ARG:NH2	2.25	0.69
1:A:207:LEU:O	1:A:211:THR:N	2.26	0.69
1:B:394:LEU:HD21	1:B:659:TRP:CD1	2.29	0.68
1:A:626:GLY:HA3	1:A:720:PHE:CE2	2.28	0.67
1:B:399:ILE:HG13	1:B:400:GLU:HG3	1.75	0.67
1:A:448:LEU:HD13	1:A:505:SER:HB2	1.76	0.67
1:A:540:LEU:HD22	1:B:535:LEU:HB3	1.77	0.67
1:B:364:PHE:O	1:B:367:ILE:HG13	1.95	0.66
1:A:556:TYR:HH	1:B:556:TYR:HH	1.44	0.65
1:A:717:VAL:HA	1:A:720:PHE:CE1	2.30	0.65
1:A:84:ALA:HA	1:A:186:ILE:HG13	1.76	0.65
1:A:399:ILE:HD11	1:A:671:LEU:HD11	1.78	0.65
1:A:656:GLY:HA3	1:A:695:LYS:HD3	1.77	0.65
1:B:57:ILE:HG12	1:B:189:PHE:HD2	1.61	0.65
1:B:266:TYR:HB3	1:B:277:GLN:HB2	1.78	0.65
1:A:641:THR:HG22	1:A:706:ILE:HG12	1.77	0.65
1:B:94:GLY:HA3	1:B:129:MET:SD	2.37	0.65
1:A:31:GLY:H	1:A:107:GLU:HG3	1.61	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:340:THR:OG1	1:A:359:ALA:O	2.13	0.64
1:A:440:VAL:HG11	1:A:511:LEU:HD22	1.80	0.63
1:B:634:VAL:HG21	1:B:720:PHE:CE2	2.31	0.63
1:A:344:LEU:HB2	1:A:359:ALA:HB3	1.81	0.63
1:A:340:THR:HG23	1:A:360:ILE:HD13	1.81	0.63
1:B:641:THR:HG22	1:B:706:ILE:HG22	1.79	0.63
1:A:157:ASN:ND2	1:A:161:TYR:OH	2.31	0.63
1:A:222:ASN:HB3	1:A:225:THR:HG23	1.81	0.63
1:A:555:THR:HG23	1:A:702:LEU:HD22	1.81	0.63
1:A:557:TYR:CD1	1:B:415:LYS:HA	2.30	0.63
1:A:539:MET:HE3	1:B:539:MET:HB2	1.82	0.62
1:B:524:PRO:O	1:B:527:ILE:HG12	2.00	0.62
1:B:386:TYR:HA	1:B:391:THR:HB	1.81	0.62
1:A:363:TRP:CE2	1:A:367:ILE:HD11	2.34	0.61
1:A:340:THR:HG21	1:A:363:TRP:HB2	1.82	0.61
1:A:347:LEU:HD12	1:A:359:ALA:HB2	1.83	0.61
1:B:79:ALA:HB1	1:B:179:TYR:HB2	1.83	0.61
1:A:102:ASN:OD1	1:A:103:VAL:N	2.34	0.61
1:A:267:VAL:HB	1:A:274:LEU:HB3	1.82	0.60
1:B:414:MET:O	1:B:417:VAL:HG22	2.01	0.60
1:A:76:THR:HG23	1:A:178:GLY:HA3	1.83	0.60
1:B:556:TYR:CD1	1:B:648:LEU:HD11	2.37	0.60
1:B:265:ILE:HG12	1:B:522:ILE:HD13	1.84	0.60
1:B:254:SER:O	1:B:258:LEU:HG	2.02	0.59
1:B:367:ILE:HA	1:B:370:ILE:HD12	1.83	0.59
1:A:68:LEU:HD13	1:A:76:THR:HG22	1.84	0.59
1:A:399:ILE:HG12	1:A:674:TYR:HE2	1.67	0.59
1:A:645:GLY:HA3	1:A:706:ILE:HD11	1.84	0.59
1:A:394:LEU:HD21	1:A:659:TRP:HD1	1.67	0.59
1:A:666:LEU:HD22	1:A:681:HIS:HD2	1.66	0.59
1:A:703:ASP:OD1	1:A:704:ILE:N	2.36	0.59
1:B:656:GLY:HA3	1:B:695:LYS:HD3	1.83	0.59
1:A:240:LEU:HD22	1:A:458:ASP:HB3	1.85	0.59
1:B:518:MET:HE2	1:B:537:LEU:HB2	1.85	0.59
1:B:216:PRO:HB2	1:B:219:ASP:HB2	1.85	0.58
1:B:337:ALA:HB2	1:B:363:TRP:CZ2	2.38	0.58
1:A:50:LEU:HD21	1:A:92:ILE:HG12	1.83	0.58
1:A:717:VAL:HA	1:A:720:PHE:CD1	2.39	0.58
1:B:716:ALA:O	1:B:720:PHE:HD1	1.85	0.58
1:A:666:LEU:HD22	1:A:681:HIS:CD2	2.39	0.58
1:A:191:ARG:HH21	1:A:243:ASP:HB2	1.69	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:208:VAL:HG12	1:A:215:LEU:HB2	1.86	0.57
1:A:724:HIS:ND1	1:A:726:PHE:O	2.35	0.57
1:A:266:TYR:CE2	1:A:353:LEU:HD23	2.39	0.57
1:A:363:TRP:CZ2	1:A:367:ILE:HD11	2.40	0.57
1:B:138:LEU:HD23	1:B:141:LEU:HD12	1.86	0.57
1:A:337:ALA:HB2	1:A:363:TRP:CZ2	2.39	0.57
1:A:409:GLY:HA3	1:A:659:TRP:HE1	1.68	0.57
1:A:82:LEU:O	1:A:86:MET:HG2	2.04	0.57
1:A:157:ASN:OD1	1:A:158:LEU:N	2.38	0.57
1:A:643:LEU:HD11	1:B:548:ALA:HB1	1.86	0.57
1:A:444:ALA:HB2	1:A:508:PHE:HB3	1.86	0.57
1:B:693:PRO:O	1:B:697:THR:HG22	2.05	0.56
1:B:138:LEU:HD12	1:B:298:LEU:HD22	1.87	0.56
1:A:133:VAL:HG13	1:A:245:LEU:HD12	1.86	0.56
1:A:232:ASP:O	1:A:236:ASP:HB2	2.04	0.56
1:A:318:GLN:NE2	1:A:322:ASN:OD1	2.38	0.56
1:B:517:TYR:HB2	1:B:714:VAL:HG22	1.87	0.56
1:A:191:ARG:HD2	1:A:704:ILE:HD12	1.86	0.56
1:B:703:ASP:HA	1:B:706:ILE:HG12	1.86	0.56
1:A:256:ILE:HG23	1:A:287:ILE:HG23	1.87	0.56
1:A:552:ALA:HB1	1:B:647:MET:HG3	1.87	0.56
1:A:80:PHE:HD1	1:A:182:GLY:CA	2.18	0.56
1:A:548:ALA:HB1	1:B:643:LEU:HD11	1.87	0.56
1:B:157:ASN:OD1	1:B:158:LEU:N	2.38	0.56
1:B:237:VAL:HG23	1:B:462:PRO:HG3	1.88	0.56
1:A:195:GLY:HA2	1:A:198:THR:HG22	1.89	0.55
1:B:10:ILE:HD12	1:B:295:LEU:HB3	1.87	0.55
1:A:535:LEU:O	1:B:538:ASN:ND2	2.40	0.55
1:A:622:PRO:HG2	1:A:712:VAL:HG23	1.88	0.55
1:B:102:ASN:OD1	1:B:103:VAL:N	2.39	0.55
1:A:321:LEU:HD22	1:A:457:VAL:HG22	1.87	0.55
1:B:97:MET:HG2	1:B:128:VAL:HB	1.88	0.55
1:B:240:LEU:HD23	1:B:458:ASP:HB3	1.88	0.55
1:A:247:SER:HA	1:A:707:LYS:HE3	1.88	0.55
1:A:490:VAL:O	1:A:494:THR:HG23	2.07	0.55
1:A:266:TYR:HB3	1:A:277:GLN:HB3	1.89	0.55
1:A:361:SER:OG	1:A:362:PRO:HD3	2.06	0.55
1:A:317:PRO:O	1:A:321:LEU:HG	2.07	0.54
1:B:523:SER:H	1:B:526:ASP:HB2	1.71	0.54
1:A:236:ASP:O	1:A:240:LEU:HD23	2.06	0.54
1:B:595:ASP:HB2	1:B:598:ARG:HH11	1.72	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:335:LEU:HA	1:A:338:PHE:HD2	1.73	0.54
1:B:73:THR:HG23	1:B:169:PHE:HZ	1.73	0.54
1:A:10:ILE:HG22	1:A:298:LEU:HD22	1.89	0.54
1:A:540:LEU:HD11	1:B:518:MET:HB3	1.90	0.54
1:B:333:VAL:HG22	1:B:367:ILE:HG22	1.90	0.53
1:B:464:ALA:HB1	1:B:488:ASP:HA	1.89	0.53
1:B:518:MET:CE	1:B:537:LEU:HB2	2.38	0.53
1:A:180:ALA:HB2	1:A:253:VAL:HG21	1.90	0.53
1:B:82:LEU:O	1:B:86:MET:HG2	2.09	0.53
1:B:539:MET:HE3	1:B:545:ILE:HA	1.91	0.53
1:A:333:VAL:HG13	1:A:367:ILE:HG12	1.89	0.53
1:A:546:ALA:HB1	1:B:425:VAL:HG13	1.91	0.53
1:A:556:TYR:CD1	1:A:648:LEU:HD11	2.44	0.52
1:A:4:ALA:HA	1:A:7:PHE:HD2	1.74	0.52
1:A:86:MET:HB3	1:A:136:PHE:HB3	1.91	0.52
1:B:306:LEU:HD12	1:B:309:ILE:HD11	1.92	0.52
1:A:556:TYR:O	1:B:414:MET:HB3	2.09	0.52
1:B:105:VAL:HG13	1:B:118:ALA:HB1	1.92	0.52
1:B:626:GLY:HA3	1:B:720:PHE:CE2	2.44	0.52
1:B:724:HIS:ND1	1:B:726:PHE:O	2.39	0.52
1:A:266:TYR:HE2	1:A:353:LEU:HD23	1.73	0.52
1:A:344:LEU:HD13	1:A:360:ILE:HG12	1.92	0.52
1:A:638:LEU:O	1:A:642:VAL:HG23	2.10	0.52
1:B:10:ILE:HG22	1:B:298:LEU:HD23	1.91	0.52
1:A:258:LEU:HG	1:A:519:PHE:HE2	1.75	0.51
1:A:538:ASN:ND2	1:B:535:LEU:O	2.43	0.51
1:B:666:LEU:HG	1:B:681:HIS:CE1	2.45	0.51
1:A:571:MET:HG2	1:B:400:GLU:OE1	2.10	0.51
1:B:458:ASP:OD1	1:B:498:GLY:HA3	2.10	0.51
1:B:526:ASP:HB3	1:B:534:VAL:HG22	1.93	0.51
1:A:507:ILE:HD11	1:A:646:ALA:HB1	1.92	0.51
1:B:232:ASP:O	1:B:462:PRO:HB3	2.10	0.51
1:B:337:ALA:HB2	1:B:363:TRP:CE2	2.46	0.51
1:A:334:VAL:HG12	1:A:338:PHE:CE2	2.46	0.51
1:A:105:VAL:HG13	1:A:118:ALA:HB1	1.92	0.51
1:A:560:GLY:HA3	1:B:414:MET:HB2	1.93	0.51
1:A:54:THR:HA	1:A:57:ILE:HG12	1.92	0.50
1:B:50:LEU:HD11	1:B:95:MET:SD	2.52	0.50
1:A:73:THR:HB	1:A:75:GLN:OE1	2.11	0.50
1:A:414:MET:HB3	1:B:556:TYR:O	2.12	0.50
1:A:105:VAL:HG21	1:A:122:ALA:HB2	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:73:THR:HG23	1:A:169:PHE:CE2	2.46	0.50
1:A:384:THR:O	1:A:658:ALA:HA	2.12	0.50
1:A:240:LEU:HD13	1:A:458:ASP:HB2	1.93	0.50
1:A:376:ILE:HG23	1:A:420:PRO:HB3	1.94	0.49
1:B:208:VAL:HG21	1:B:222:ASN:ND2	2.27	0.49
1:B:322:ASN:HB3	1:B:326:TRP:HE1	1.77	0.49
1:B:398:SER:HA	1:B:405:VAL:HG22	1.94	0.49
1:A:561:TYR:CE2	1:A:614:PRO:HD3	2.41	0.49
1:A:109:ALA:HB1	1:A:115:ILE:HG12	1.94	0.49
1:A:80:PHE:HD1	1:A:182:GLY:HA3	1.77	0.49
1:A:415:LYS:HA	1:B:557:TYR:CD1	2.46	0.49
1:B:700:PRO:O	1:B:704:ILE:HG12	2.12	0.49
1:B:350:LEU:HD22	1:B:355:PHE:CD2	2.46	0.49
1:B:507:ILE:O	1:B:511:LEU:HG	2.12	0.49
1:A:80:PHE:CD1	1:A:182:GLY:HA2	2.47	0.49
1:A:634:VAL:HG21	1:A:720:PHE:CE2	2.48	0.49
1:A:690:VAL:O	1:A:693:PRO:HD2	2.13	0.49
1:B:438:TYR:O	1:B:442:ILE:HG12	2.13	0.49
1:A:223:PRO:O	1:A:226:ILE:HG12	2.13	0.48
1:A:536:LEU:HD11	1:B:536:LEU:HG	1.95	0.48
1:B:84:ALA:HA	1:B:186:ILE:HG13	1.94	0.48
1:A:468:GLY:HA2	1:A:484:THR:OG1	2.13	0.48
1:B:676:LYS:HA	1:B:681:HIS:CE1	2.48	0.48
1:A:207:LEU:O	1:A:211:THR:HG23	2.14	0.48
1:B:38:ILE:HA	1:B:41:TYR:HD2	1.78	0.48
1:A:141:LEU:HD22	1:A:252:ILE:HD13	1.96	0.48
1:A:359:ALA:O	1:A:362:PRO:HD2	2.13	0.48
1:B:329:ALA:O	1:B:333:VAL:HG23	2.13	0.48
1:A:340:THR:HG21	1:A:363:TRP:CB	2.43	0.48
1:A:413:GLY:O	1:A:417:VAL:HG23	2.14	0.47
1:A:274:LEU:HD11	1:A:528:GLY:HA2	1.96	0.47
1:B:188:MET:HA	1:B:704:ILE:HG21	1.96	0.47
1:B:322:ASN:O	1:B:326:TRP:CD1	2.68	0.47
1:A:199:LYS:HD2	1:A:696:ASP:HB2	1.97	0.47
1:A:647:MET:HG3	1:B:552:ALA:HB1	1.95	0.47
1:B:103:VAL:O	1:B:107:GLU:HG2	2.14	0.47
1:B:267:VAL:HG12	1:B:276:HIS:HA	1.97	0.47
1:B:547:GLY:O	1:B:637:VAL:HA	2.13	0.47
1:A:361:SER:HA	1:A:364:PHE:HD2	1.79	0.47
1:B:710:SER:O	1:B:714:VAL:HG23	2.14	0.47
1:A:240:LEU:HD12	1:A:241:GLY:N	2.30	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:547:GLY:O	1:A:637:VAL:HA	2.15	0.47
1:A:22:PHE:O	1:A:25:VAL:HG12	2.15	0.47
1:A:686:ILE:O	1:A:690:VAL:HG23	2.15	0.47
1:B:18:ALA:HB2	1:B:131:LEU:HB2	1.97	0.46
1:B:42:ILE:HG23	1:B:230:VAL:HG22	1.97	0.46
1:B:322:ASN:HB3	1:B:326:TRP:NE1	2.30	0.46
1:B:344:LEU:HB2	1:B:359:ALA:HB1	1.97	0.46
1:A:665:TYR:CE1	1:A:670:ASN:HB2	2.51	0.46
1:B:256:ILE:HG23	1:B:287:ILE:HG23	1.95	0.46
1:A:209:GLY:HA2	1:A:215:LEU:N	2.30	0.46
1:A:647:MET:HB3	1:B:556:TYR:CE2	2.50	0.46
1:B:457:VAL:O	1:B:460:TYR:HB3	2.16	0.46
1:A:692:ASP:HA	1:A:695:LYS:HE3	1.97	0.46
1:B:401:GLY:O	1:B:405:VAL:HG23	2.15	0.46
1:B:633:PHE:O	1:B:637:VAL:HG23	2.15	0.46
1:A:477:ASP:HB3	1:A:480:VAL:HG23	1.98	0.46
1:A:622:PRO:O	1:A:720:PHE:HE2	1.98	0.46
1:A:72:THR:HA	1:A:163:ASN:HD21	1.80	0.46
1:A:444:ALA:HB2	1:A:508:PHE:CB	2.46	0.46
1:B:398:SER:HA	1:B:405:VAL:CG2	2.46	0.46
1:A:207:LEU:O	1:A:210:LYS:N	2.46	0.46
1:A:692:ASP:HB2	1:A:693:PRO:HD3	1.97	0.46
1:A:22:PHE:O	1:A:26:VAL:HG23	2.16	0.46
1:A:350:LEU:HD22	1:A:358:GLY:HA2	1.98	0.46
1:B:448:LEU:HD21	1:B:505:SER:HB2	1.97	0.46
1:B:625:THR:HB	1:B:633:PHE:CD2	2.51	0.46
1:A:517:TYR:HB2	1:A:714:VAL:HG22	1.97	0.46
1:A:206:ASP:OD2	1:A:689:THR:HG21	2.16	0.45
1:A:438:TYR:O	1:A:442:ILE:HG12	2.14	0.45
1:B:396:LYS:O	1:B:399:ILE:HG12	2.17	0.45
1:A:649:ALA:HA	1:A:699:GLY:HA3	1.98	0.45
1:A:145:TYR:HD1	1:A:172:PHE:CZ	2.35	0.45
1:A:237:VAL:O	1:A:240:LEU:HG	2.16	0.45
1:A:414:MET:HE1	1:B:563:ILE:HD12	1.97	0.45
1:A:126:GLY:O	1:A:456:SER:HA	2.17	0.45
1:A:556:TYR:CE2	1:B:647:MET:HB3	2.51	0.45
1:B:243:ASP:OD1	1:B:707:LYS:NZ	2.50	0.45
1:A:49:PHE:CD1	1:A:604:SER:HB2	2.51	0.45
1:A:199:LYS:NZ	1:A:696:ASP:OD2	2.42	0.45
1:A:236:ASP:OD2	4:A:901:HOH:O	2.21	0.45
1:A:319:ARG:O	1:A:323:ILE:HG12	2.17	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:515:ALA:HA	1:B:540:LEU:HD22	1.97	0.45
1:B:263:PHE:HB2	1:B:283:ILE:HG13	1.99	0.45
1:A:567:THR:O	1:A:571:MET:HG3	2.16	0.45
1:A:167:ILE:HG22	1:A:169:PHE:CD1	2.51	0.45
1:B:417:VAL:HA	1:B:650:ILE:HG21	1.99	0.45
1:A:381:GLU:HA	1:A:384:THR:HG22	1.98	0.45
1:A:717:VAL:HA	1:A:720:PHE:HE1	1.80	0.45
1:B:395:GLY:O	1:B:398:SER:OG	2.24	0.45
1:A:511:LEU:HG	1:B:545:ILE:HD12	1.97	0.45
1:A:261:TYR:HD2	1:A:519:PHE:HB3	1.82	0.44
1:A:337:ALA:HB2	1:A:363:TRP:CE2	2.52	0.44
1:A:373:GLY:O	1:A:501:PHE:HE1	2.00	0.44
1:B:258:LEU:HA	1:B:519:PHE:HD2	1.83	0.44
1:A:72:THR:HA	1:A:163:ASN:ND2	2.31	0.44
1:B:258:LEU:O	1:B:262:MET:HG3	2.17	0.44
1:A:343:TYR:O	1:A:347:LEU:HG	2.17	0.44
1:B:22:PHE:O	1:B:26:VAL:HG23	2.18	0.44
1:A:364:PHE:O	1:A:368:ILE:HG12	2.18	0.44
1:A:479:GLU:O	1:A:483:ILE:HG12	2.17	0.44
1:B:558:PHE:CE1	1:B:614:PRO:HB3	2.52	0.44
1:A:64:ILE:HD13	1:A:67:LEU:HD12	1.99	0.44
1:A:514:PHE:O	1:A:518:MET:HG2	2.18	0.44
1:B:102:ASN:HD22	1:B:466:ASN:HB3	1.83	0.44
1:A:542:ALA:HA	1:A:545:ILE:HG22	1.99	0.44
1:B:181:LEU:O	1:B:185:ILE:HG12	2.18	0.44
1:A:714:VAL:O	1:A:717:VAL:HG12	2.17	0.44
1:B:86:MET:HB3	1:B:136:PHE:HB3	1.99	0.44
1:B:266:TYR:O	1:B:277:GLN:N	2.47	0.44
1:B:555:THR:HG23	1:B:702:LEU:HD22	1.98	0.44
1:A:203:MET:O	1:A:207:LEU:HG	2.17	0.44
1:A:530:PRO:HB2	1:A:533:LEU:HD13	1.99	0.44
1:B:252:ILE:HG13	1:B:445:LEU:HD21	1.99	0.44
1:B:613:TYR:CE2	1:B:617:ILE:HD11	2.53	0.44
1:A:556:TYR:CE1	1:A:648:LEU:HD11	2.53	0.43
1:A:596:TYR:CE2	1:A:600:ILE:HD11	2.52	0.43
1:B:398:SER:OG	1:B:680:PRO:HB3	2.18	0.43
1:A:49:PHE:CE1	1:A:604:SER:HB2	2.53	0.43
1:A:409:GLY:HA3	1:A:659:TRP:NE1	2.32	0.43
1:A:396:LYS:HA	1:A:399:ILE:HD12	2.00	0.43
1:B:39:SER:HB2	1:B:103:VAL:HG21	2.01	0.43
1:B:366:ALA:HB2	1:B:442:ILE:HG22	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:236:ASP:O	1:A:462:PRO:HG2	2.19	0.43
1:A:246:GLU:OE2	1:A:707:LYS:HE2	2.18	0.43
1:A:388:TYR:N	1:A:388:TYR:CD1	2.87	0.43
1:B:73:THR:HG23	1:B:169:PHE:CZ	2.50	0.43
1:A:33:GLU:HG2	1:A:34:ARG:N	2.34	0.43
1:A:471:SER:HB2	1:A:480:VAL:HG12	2.00	0.43
1:A:73:THR:HG23	1:A:169:PHE:HE2	1.83	0.43
1:A:359:ALA:C	1:A:362:PRO:HD2	2.39	0.43
1:B:198:THR:HG22	1:B:231:GLY:CA	2.48	0.43
1:B:643:LEU:O	1:B:647:MET:HG2	2.19	0.43
1:A:191:ARG:HD3	1:A:700:PRO:HB2	2.00	0.43
1:A:321:LEU:HD13	1:A:457:VAL:HG13	2.01	0.43
1:A:167:ILE:HD11	1:A:719:ILE:HD11	1.99	0.42
1:A:388:TYR:N	1:A:388:TYR:HD1	2.17	0.42
1:B:203:MET:O	1:B:207:LEU:HG	2.19	0.42
1:A:97:MET:HG2	1:A:128:VAL:HB	1.99	0.42
1:A:622:PRO:HG3	1:A:709:MET:HG3	2.02	0.42
1:A:639:ILE:HG12	1:B:539:MET:HG2	2.01	0.42
1:B:208:VAL:HG21	1:B:222:ASN:HD21	1.83	0.42
1:A:383:TYR:CZ	1:A:419:PRO:HG2	2.54	0.42
1:A:191:ARG:CZ	1:A:700:PRO:HB2	2.50	0.42
1:A:549:LEU:HD11	1:B:511:LEU:HD11	2.01	0.42
1:B:436:GLY:O	1:B:440:VAL:HG23	2.20	0.42
1:B:124:GLN:O	1:B:128:VAL:HG23	2.18	0.42
1:B:503:ILE:O	1:B:507:ILE:HG13	2.19	0.42
1:A:293:PHE:CD2	1:A:445:LEU:HG	2.54	0.42
1:A:622:PRO:HG2	1:A:712:VAL:CG2	2.49	0.42
1:B:665:TYR:CE1	1:B:670:ASN:HB2	2.55	0.42
1:B:129:MET:HG2	1:B:237:VAL:HG13	2.02	0.42
1:B:306:LEU:HA	1:B:309:ILE:HG12	2.02	0.42
1:B:558:PHE:CE2	1:B:562:LEU:HD11	2.55	0.42
1:B:703:ASP:OD1	1:B:704:ILE:N	2.53	0.42
1:A:344:LEU:HD12	1:A:359:ALA:N	2.34	0.42
1:A:306:LEU:O	1:A:310:VAL:HG22	2.20	0.41
1:B:418:PHE:HB3	1:B:419:PRO:HD3	2.01	0.41
1:A:634:VAL:HG21	1:A:720:PHE:CZ	2.55	0.41
1:B:435:ALA:HB3	1:B:439:GLY:HA3	2.01	0.41
1:B:558:PHE:O	1:B:562:LEU:HG	2.20	0.41
1:A:191:ARG:NH2	1:A:239:GLY:O	2.54	0.41
1:B:484:THR:HA	1:B:487:LEU:HG	2.01	0.41
1:B:561:TYR:HD2	1:B:614:PRO:HG3	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:24:ALA:HA	1:B:27:ARG:HE	1.85	0.41
1:B:108:ALA:HB1	1:B:117:PRO:HB2	2.01	0.41
1:B:413:GLY:O	1:B:417:VAL:HG13	2.21	0.41
1:B:639:ILE:O	1:B:643:LEU:HG	2.20	0.41
1:B:656:GLY:CA	1:B:695:LYS:HD3	2.48	0.41
1:A:476:LEU:HB3	1:A:480:VAL:HG21	2.03	0.41
1:B:34:ARG:O	1:B:38:ILE:HG12	2.20	0.41
1:B:350:LEU:HD22	1:B:355:PHE:HD2	1.84	0.41
1:A:124:GLN:O	1:A:128:VAL:HG23	2.20	0.41
1:A:643:LEU:HD12	1:B:643:LEU:HD12	2.03	0.41
1:A:698:VAL:O	1:A:702:LEU:HG	2.20	0.41
1:B:199:LYS:CG	1:B:693:PRO:HA	2.50	0.41
1:B:598:ARG:O	1:B:602:ILE:HG12	2.19	0.41
1:A:274:LEU:HD13	1:A:527:ILE:HG22	2.02	0.41
1:A:503:ILE:HD11	1:A:646:ALA:HA	2.02	0.41
1:A:611:MET:O	1:A:614:PRO:HD2	2.21	0.41
1:B:24:ALA:HA	1:B:27:ARG:HH21	1.85	0.41
1:B:373:GLY:HA2	1:B:447:MET:HE3	2.02	0.41
1:A:184:SER:HA	1:A:246:GLU:HG3	2.03	0.41
1:A:553:ALA:HB2	1:B:421:THR:HG21	2.03	0.41
1:A:60:VAL:HG11	1:A:189:PHE:CZ	2.56	0.41
1:A:308:VAL:HG21	1:A:324:SER:HA	2.02	0.41
1:A:421:THR:HG21	1:B:553:ALA:HB2	2.02	0.41
1:A:539:MET:HB2	1:B:537:LEU:HD23	2.03	0.41
1:A:548:ALA:HA	1:A:636:GLY:O	2.21	0.41
1:A:625:THR:HB	1:A:633:PHE:CD2	2.55	0.41
1:A:634:VAL:O	1:A:638:LEU:HG	2.20	0.41
1:A:695:LYS:NZ	1:A:696:ASP:OD2	2.51	0.41
1:B:258:LEU:HD22	1:B:519:PHE:CE2	2.55	0.41
1:A:468:GLY:O	1:A:481:ARG:NH1	2.53	0.41
1:A:506:ALA:HA	1:A:707:LYS:HD3	2.03	0.41
1:B:11:PRO:HG3	1:B:138:LEU:HB2	2.02	0.41
1:B:180:ALA:HB2	1:B:253:VAL:HG21	2.02	0.41
1:A:199:LYS:HG3	1:A:693:PRO:HA	2.03	0.40
1:B:445:LEU:HD23	1:B:445:LEU:HA	1.93	0.40
1:A:522:ILE:HD13	1:A:534:VAL:HG11	2.03	0.40
1:B:371:PHE:O	1:B:374:ILE:HG12	2.22	0.40
1:A:317:PRO:HG2	1:A:490:VAL:HG21	2.04	0.40
1:A:204:ALA:HA	1:A:207:LEU:HD12	2.03	0.40
1:A:435:ALA:HB3	1:A:439:GLY:HA3	2.04	0.40
1:B:62:ILE:O	1:B:66:ILE:HG12	2.22	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:185:ILE:HD13	1:B:708:ILE:HD11	2.04	0.40
1:B:207:LEU:O	1:B:211:THR:HG23	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	696/735 (95%)	671 (96%)	25 (4%)	0	100	100
1	B	679/735 (92%)	665 (98%)	14 (2%)	0	100	100
All	All	1375/1470 (94%)	1336 (97%)	39 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	496/575 (86%)	494 (100%)	2 (0%)	91	95
1	B	513/575 (89%)	513 (100%)	0	100	100
All	All	1009/1150 (88%)	1007 (100%)	2 (0%)	93	97

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	388	TYR
1	A	720	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	318	GLN
1	A	322	ASN
1	B	466	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 monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 5 ligands modelled in this entry, 4 are monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	DPO	A	801	3	6,8,8	0.65	0	13,13,13	2.10	1 (7%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	DPO	A	801	3	-	0/6/6/6	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	801	DPO	P2-O4-P1	7.03	156.94	132.83

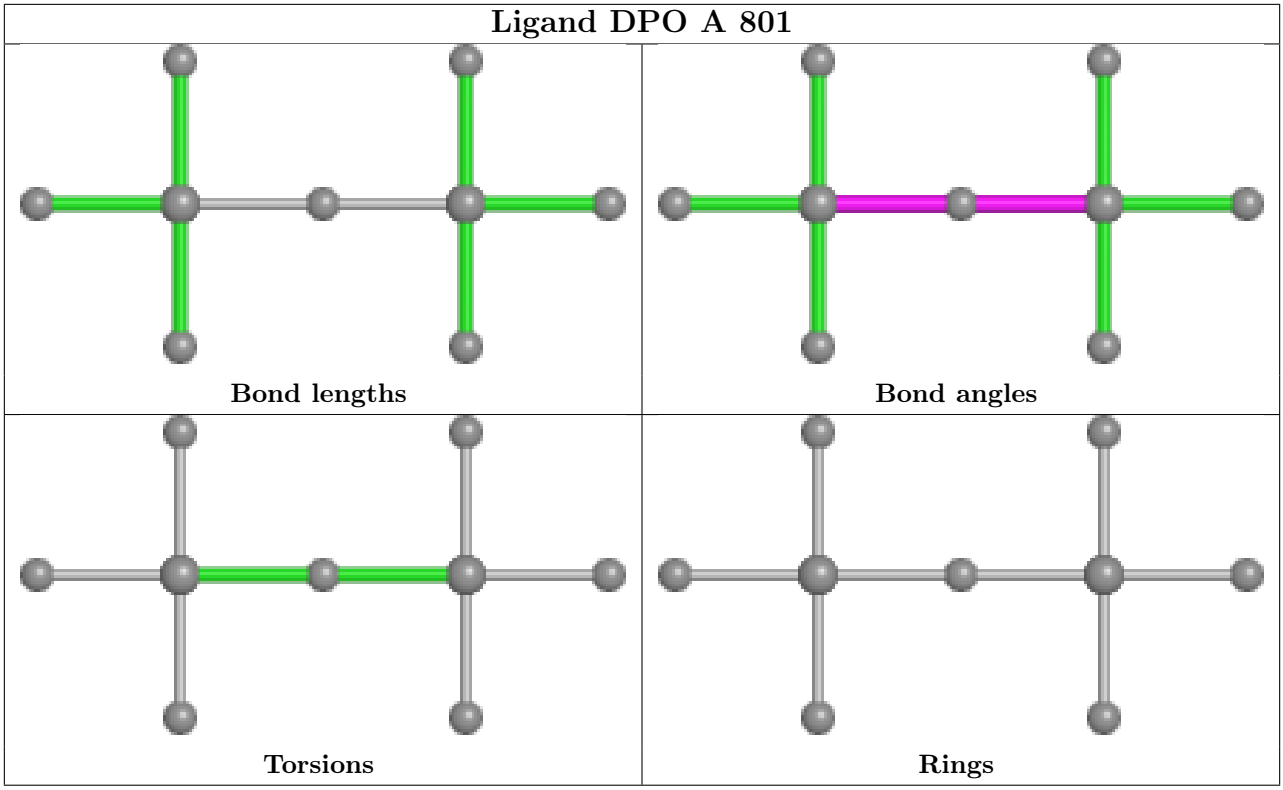
There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



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, 95^{th} 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	702/735 (95%)	0.85	132 (18%)	1	1	121, 248, 344, 383	0
1	B	685/735 (93%)	0.71	119 (17%)	1	1	125, 244, 344, 446	0
All	All	1387/1470 (94%)	0.78	251 (18%)	1	1	121, 246, 344, 446	0

All (251) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	526	ASP	10.4
1	A	184	SER	9.3
1	B	255	SER	9.1
1	A	659	TRP	9.1
1	A	127	SER	8.8
1	A	95	MET	8.8
1	B	210	LYS	8.3
1	A	525	SER	8.3
1	A	389	LYS	7.8
1	A	501	PHE	7.6
1	A	91	GLY	7.6
1	B	87	SER	7.3
1	A	243	ASP	7.0
1	A	98	ALA	6.9
1	B	214	ASN	6.6
1	B	42	ILE	6.4
1	A	191	ARG	6.3
1	B	258	LEU	6.3
1	B	123	TYR	6.2
1	B	141	LEU	6.1
1	A	696	ASP	6.1
1	A	286	LEU	6.1
1	A	294	ALA	6.1
1	A	493	THR	6.0

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Mol	Chain	Res	Type	RSRZ
1	A	123	TYR	5.9
1	A	548	ALA	5.9
1	A	138	LEU	5.9
1	B	244	LEU	5.7
1	A	392	GLN	5.6
1	B	119	LEU	5.5
1	A	661	ASN	5.5
1	A	235	GLY	5.4
1	B	460	TYR	5.4
1	A	117	PRO	5.4
1	B	199	LYS	5.3
1	A	57	ILE	5.2
1	A	662	ALA	5.2
1	B	562	LEU	5.2
1	A	290	PRO	5.2
1	A	297	GLY	5.1
1	B	184	SER	5.1
1	A	512	SER	5.0
1	A	248	PHE	5.0
1	B	145	TYR	5.0
1	B	236	ASP	5.0
1	A	298	LEU	4.9
1	B	660	ASP	4.8
1	A	126	GLY	4.8
1	B	347	LEU	4.8
1	B	490	VAL	4.8
1	A	500	GLY	4.7
1	A	53	GLU	4.7
1	A	393	PHE	4.7
1	A	542	ALA	4.7
1	A	94	GLY	4.6
1	B	105	VAL	4.6
1	B	209	GLY	4.6
1	A	496	ALA	4.6
1	A	166	GLY	4.6
1	A	449	SER	4.6
1	B	457	VAL	4.6
1	B	286	LEU	4.5
1	B	177	SER	4.5
1	B	248	PHE	4.4
1	A	283	ILE	4.4
1	A	188	MET	4.4

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Mol	Chain	Res	Type	RSRZ
1	B	489	ALA	4.4
1	A	258	LEU	4.3
1	A	497	ILE	4.3
1	B	407	SER	4.3
1	A	244	LEU	4.2
1	A	655	SER	4.2
1	B	491	GLY	4.2
1	A	181	LEU	4.1
1	B	691	GLY	4.1
1	B	563	ILE	4.1
1	A	546	ALA	4.1
1	B	661	ASN	4.0
1	B	252	ILE	4.0
1	A	187	ALA	4.0
1	B	122	ALA	4.0
1	B	494	THR	3.9
1	A	511	LEU	3.9
1	A	259	ALA	3.8
1	A	122	ALA	3.8
1	B	294	ALA	3.8
1	B	172	PHE	3.8
1	A	315	ASP	3.8
1	B	690	VAL	3.7
1	B	659	TRP	3.7
1	B	293	PHE	3.7
1	B	203	MET	3.7
1	B	461	GLY	3.6
1	A	700	PRO	3.5
1	B	181	LEU	3.5
1	B	465	ASP	3.5
1	A	636	GLY	3.5
1	B	290	PRO	3.5
1	B	237	VAL	3.5
1	B	543[A]	ARG	3.5
1	B	561	TYR	3.4
1	A	99	THR	3.4
1	A	203	MET	3.4
1	B	405	VAL	3.4
1	A	172	PHE	3.3
1	A	233	ASN	3.3
1	A	241	GLY	3.3
1	B	511	LEU	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	423	THR	3.2
1	A	87	SER	3.2
1	B	187	ALA	3.2
1	A	293	PHE	3.2
1	B	138	LEU	3.2
1	A	3	VAL	3.2
1	A	101	ALA	3.1
1	A	658	ALA	3.1
1	A	386	TYR	3.1
1	B	259	ALA	3.1
1	A	503	ILE	3.1
1	B	256	ILE	3.1
1	A	58	PHE	3.1
1	B	458	ASP	3.1
1	A	567	THR	3.1
1	A	314	SER	3.1
1	B	211	THR	3.1
1	B	512	SER	3.1
1	B	212	GLU	3.1
1	B	607	ALA	3.1
1	A	316	ASN	3.0
1	B	142	VAL	3.0
1	B	233	ASN	3.0
1	A	285	ALA	3.0
1	A	639	ILE	3.0
1	A	255	SER	3.0
1	B	421	THR	3.0
1	A	177	SER	3.0
1	A	438	TYR	3.0
1	A	234	VAL	2.9
1	B	283	ILE	2.9
1	B	318	GLN	2.9
1	A	292	PHE	2.9
1	B	173	ALA	2.9
1	A	141	LEU	2.9
1	A	21	ASN	2.9
1	A	271	GLY	2.9
1	B	548	ALA	2.9
1	B	636	GLY	2.9
1	B	639	ILE	2.9
1	A	610	GLN	2.8
1	A	385	SER	2.8

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Mol	Chain	Res	Type	RSRZ
1	B	183	CYS	2.8
1	A	49	PHE	2.8
1	B	406	ILE	2.8
1	B	106	ALA	2.8
1	A	119	LEU	2.8
1	B	438	TYR	2.8
1	A	42	ILE	2.8
1	A	563	ILE	2.8
1	B	180	ALA	2.8
1	A	549	LEU	2.8
1	A	450	PHE	2.7
1	B	493	THR	2.7
1	A	519	PHE	2.7
1	A	155	VAL	2.7
1	A	640	GLY	2.7
1	A	564	SER	2.7
1	B	348[A]	GLN	2.6
1	B	40	SER	2.6
1	B	121	VAL	2.6
1	A	508	PHE	2.6
1	B	422	LEU	2.6
1	B	664	LYS	2.6
1	B	247	SER	2.6
1	B	254	SER	2.5
1	B	710	SER	2.5
1	B	282	THR	2.5
1	A	702	LEU	2.5
1	A	199	LYS	2.5
1	B	188	MET	2.5
1	B	251	ALA	2.5
1	A	102	ASN	2.5
1	A	185	ILE	2.5
1	B	523	SER	2.5
1	A	690	VAL	2.4
1	B	198	THR	2.4
1	B	104	ARG	2.4
1	B	31	GLY	2.4
1	A	371	PHE	2.4
1	B	179	TYR	2.4
1	B	541[A]	ASP	2.4
1	B	116	GLY	2.4
1	A	93	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	101	ALA	2.4
1	A	396	LYS	2.4
1	A	7	PHE	2.4
1	B	418	PHE	2.3
1	B	711	VAL	2.3
1	A	183	CYS	2.3
1	A	695	LYS	2.3
1	A	180	ALA	2.3
1	B	46	ALA	2.3
1	A	694	LEU	2.3
1	B	387	ARG	2.3
1	B	514	PHE	2.3
1	A	522	ILE	2.3
1	B	425	VAL	2.3
1	B	488	ASP	2.3
1	A	405	VAL	2.2
1	B	403	GLY	2.2
1	A	445	LEU	2.2
1	A	447	MET	2.2
1	B	127	SER	2.2
1	B	408	ASN	2.2
1	A	486	HIS	2.2
1	A	502	ALA	2.2
1	A	505	SER	2.2
1	A	287	ILE	2.2
1	A	236	ASP	2.2
1	B	663	LYS	2.2
1	B	542	ALA	2.2
1	A	660	ASP	2.2
1	B	544	VAL	2.2
1	A	194	GLY	2.2
1	B	257	ILE	2.2
1	B	207	LEU	2.2
1	A	494	THR	2.2
1	A	499	LYS	2.2
1	B	401	GLY	2.1
1	A	131	LEU	2.1
1	B	98	ALA	2.1
1	A	295	LEU	2.1
1	B	464	ALA	2.1
1	A	116	GLY	2.1
1	B	677	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	687	GLY	2.1
1	A	96	LYS	2.1
1	A	289	TYR	2.1
1	A	448	LEU	2.1
1	A	541	ASP	2.1
1	B	525	SER	2.1
1	B	694	LEU	2.1
1	A	137	ALA	2.0
1	B	698	VAL	2.0
1	A	571	MET	2.0
1	B	510	ALA	2.0
1	A	457	VAL	2.0
1	B	456	SER	2.0
1	A	453	THR	2.0
1	A	559	SER	2.0
1	B	692	ASP	2.0
1	B	176	VAL	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 monosaccharides in this entry.

6.4 Ligands (i)

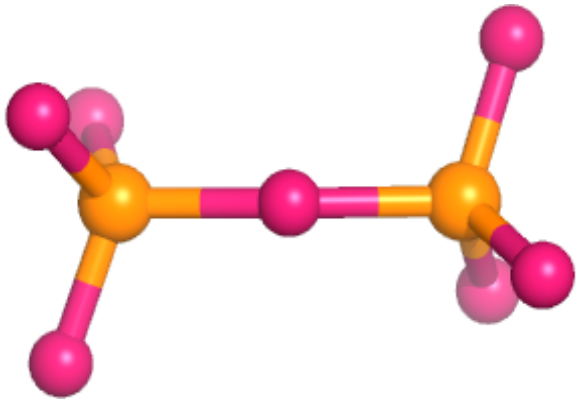
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

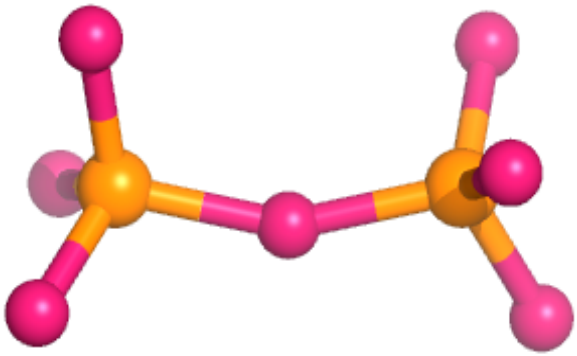
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MG	A	805	1/1	0.41	0.22	258,258,258,258	0
3	MG	A	802	1/1	0.46	0.20	266,266,266,266	0
3	MG	A	803	1/1	0.76	0.11	285,285,285,285	0
2	DPO	A	801	9/9	0.87	0.13	274,274,274,274	0
3	MG	A	804	1/1	0.92	0.15	276,276,276,276	0

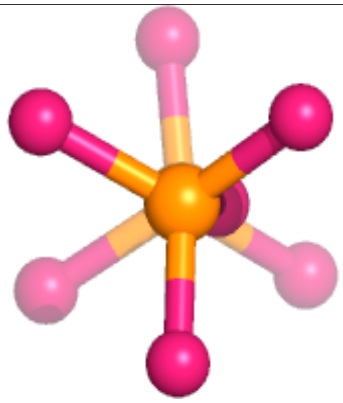
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around DPO A 801:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)







6.5 Other polymers

There are no such residues in this entry.