Molecular Dimensions

MIDAS™ HT-96 MD1–60

MIDAS™: a Modern Intelligent Dynamic Alternative Screen -
A revolutionary 96 condition crystallization screen based on alternative polymeric precipitants[1].

MD1-60 is presented as 96 x 1 mL conditions in a deep-well block.

Features of MIDAS:

- Ideal for protein, protein/protein complexes, protein-nucleic acid complexes and sensitive macromolecular complexes.
- Narrow range of pH and salt concentrations centered on physiological values.
- Every condition contains at least one alternative polymeric precipitant.
- Designed to complement PEG and salt-based screens.
- Compatible with liquid-handling robots.

Introduction

MIDAS is a 96 condition crystallization screen based on alternative polymeric precipitants. Devised and tested (Figure 1) in the Laboratory of Dr. Clemens Grimm *et al* of Würzburg University in Germany. MIDAS is a revolutionary crystallization screen that has moved away from the reliance on polyethylene glycols (PEGs) as the main precipitant (only 3 conditions in MIDAS contain a PEG). MIDAS systematically searches for crystallization conditions with alternative polymeric precipitants. MIDAS entails a relatively narrow range of pH and salt concentrations centred on physiological values to increase its suitability for sensitive macromolecular complexes, while every condition contains at least one alternative polymeric precipitant.

PEG Alternatives:

For decades PEGs or their monomethyl ethers (PEG MMEs), have dominated crystallization screens. Out of 8289 entries scanned in the PDB, almost half of the crystallization conditions contained a PEG component and most commercial screens available today contain PEGs. However, the success rate of PEGs might be influenced due to their widespread dominance in crystallization screens.

There are many alternatives to PEGs and have recently been described as being useful for macromolecular crystallogenesis. Alternative polymers (Figure 2) such as the Jeffamine polyetheramines, pentaerythritol propoxylate and pentareythritol, polyvinyl pyrrolidone, polypropylene glycol, polyvinyl alcohol and polyacrylate have so far only sporadically been introduced into standard crystallization screens.

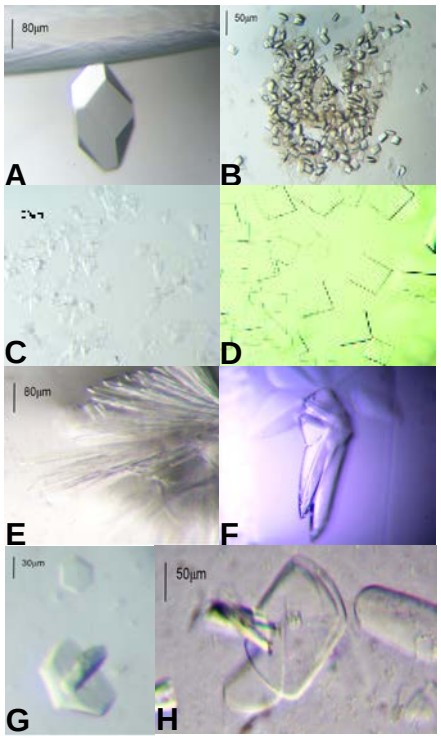


Figure 1. Examples of protein crystals grown using MIDAS. (A) Lysozyme crystals obtained in 35% Sokalan HP 56, (B) Xylanase crystals obtained in 20% Jeffamine M2070, (C) Cryst of the cytokine receptor–ligand complex obtained in 45% pentaerythritol propoxylate (5/4 PO/OH), (D) Crystals of streptavidin core obtained in 5% polyacrylate 2100, sodium sa (E) Histone tail recognizing MBT repeats in 35% polyacrylate 2100, sodium salt), (F) Lysozyme crystals in 30% Sokalan CP 42,(G) spliceosomal assembly complex (SAC) 7 obtained in 6% polyvinyl pyrrolidone, (H) Crystals of spliceosomal assembly complex (SAC) 9 obtained in 25% Sokalan CP 42.

Formulation Notes:

MIDAS reagents are formulated using ultrapure water (>18.0 MΩ) and are sterile-filtered using 0.22 µm filters. No preservatives are added.

Final pH may vary from that specified on the datasheet. Molecular Dimensions will be happy to discuss the precise formulation of individual reagents.

Individual reagents and stock solutions for optimization are available from Molecular Dimensions.

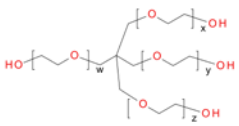
Enquiries regarding MIDAS formulation, interpretation of results or optimization strategies are welcome. Please e-mail, fax or phone your query to Molecular Dimensions.

Contact and product details can be found at www.moleculardimensions.com

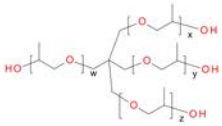
Manufacturer's safety data sheets are available to download from our website.

References :

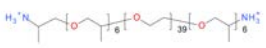
1. Grimm, C., Chari, A., Reuter, K. & Fischer, U. (2010). Acta Cryst. D66, 685-697.



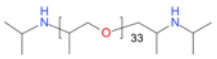
Pentaerythritol ethoxylate.



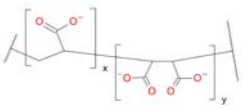
Pentaerythritol propoxylate



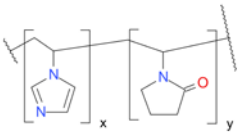
Jeffamine ED2003



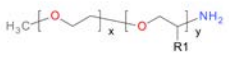
Jeffamine SD2001



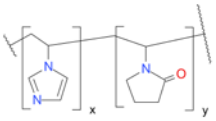
Acrylic acid/maleic acid copolymer



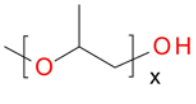
polyvinylpyrrolidone



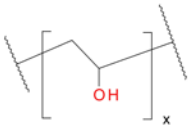
M-type Jeffamines*



Vinylpyrrolidone/vinylimidazole Copolymer

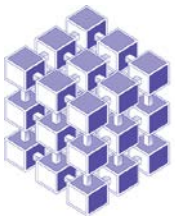


polypropylene glycol



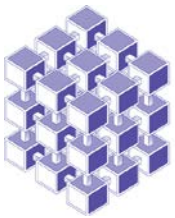
polyvinyl alcohol

Figure 2. Examples of alternative precipitants used in MIDAS™,
**R1 = —H for EO or —CH3 for PO. The PO/EO molar ratio is 29/6 for Jeffamine M2005, 10/31 for Jeffamine M2070 and 9/1 for Jeffamine M600.*



MIDAS HT-96 Conditions A1-D12 MD1–60

Well No.	Conc.	Salt	Conc.	Precipitant	Conc.	Buffer	pH
A1			50 % v/v	polypropylene glycol 400	0.1 M	HEPES	6.0
			5 % v/v	dimethyl sulfoxide			
A2			12 % w/v	polyvinylpyrrolidone	0.1 M	MES	5.5
A3			45 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	HEPES	6.5
A4			14 % v/v	poly(acrylic acid-*co*-maelic acid) solution			
A5	0.5 M	ammonium phosphate monobasic	12.5 % w/v	poly(acrylic acid sodium salt) 2100			
A6			19 % v/v	poly(acrylic acid-*co*-maelic acid) solution	0.1 M	Tris	8.5
A7			10 % v/v	polypropylene glycol 400			
A8			5 % w/v	poly(acrylic acid sodium salt) 2100			
A9			25 % v/v	pentaerythritol propoxylate (5/4 PO/OH)	0.1 M	MES	6.0
A10	0.1 M	sodium sulfate	24 % w/v	polyvinylpyrrolidone			
A11	0.2 M	calcium chloride dihydrate	35 % v/v	pentaerythritol ethoxylate (15/4 EO/OH)	0.1 M	HEPES	6.5
A12			35 % v/v	polypropylene glycol 400	0.1 M	K/Na phosphate	7.0
B1	0.2 M	sodium chloride	20 % v/v	Jeffamine® D-2000	0.1 M	MES	5.5
			10 % v/v	Jeffamine® M-2005			
B2	0.2 M	sodium thiocyanate	15 % v/v	pentaerythritol propoxylate (5/4 PO/OH)	0.1 M	HEPES	7.0
B3	0.2 M	potassium acetate	5 % w/v	polyvinyl alcohol	0.1 M	HEPES	7.0
			10 % v/v	Jeffamine® T-403			
B4	0.2 M	sodium chloride	45 % v/v	pentaerythritol propoxylate (5/4 PO/OH)	0.1 M	MES	6.0
B5			8 % w/v	polyvinyl alcohol	0.1 M	HEPES	7.0
			10 % v/v	1- propanol			
B6	0.1 M	lithium sulfate	30 % w/v	polyvinylpyrrolidone	0.1 M	HEPES	7.0
B7			40 % v/v	polypropylene glycol 400	0.2 M	Imidazole	7.0
B8	0.06 M	lithium sulfate	8 % v/v	poly(acrylic acid-*co*-maelic acid) solution	0.1 M	HEPES	7.5
			3 % v/v	pentaerythritol ethoxylate (3/4 EO/OH)			
B9	0.1 M	sodium chloride	35 % v/v	Jeffamine® SD-2001	0.1 M	Tris	8.0
B10			30 % v/v	Jeffamine® M-600			
			10 % v/v	dimethyl sulfoxide			
B11			20 % v/v	polypropylene glycol 400			
			10 % v/v	1-propanol			
B12			28 % v/v	poly(acrylic acid-*co*-maelic acid) solution	0.1 M	HEPES	6.5
C1			15 % v/v	Jeffamine® ED-2003			
			10 % v/v	ethanol			
C2	0.2 M	sodium chloride	30 % v/v	Jeffamine® ED-2003	0.1 M	MES	6.0
C3	0.1 M	sodium malonate dibasic monohydrate	25 % v/v	Jeffamine® SD-2001	0.1 M	MES	5.5
C4	0.2 M	sodium chloride	15 % v/v	pentaerythritol propoxylate (5/4 PO/OH)	0.1 M	MES	6.0
C5	0.2 M	magnesium chloride hexahydrate	35 % v/v	pentaerythritol ethoxylate (3/4 EO/OH)			
C6			40 % v/v	pentaerythritol propoxylate (5/4 PO/OH)			
			15 % v/v	ethanol			
C7			50 % v/v	pentaerythritol propoxylate (5/4 PO/OH)	0.1 M	Tris	8.0
C8	0.2 M	sodium chloride	12.5 % w/v	polyvinylpyrrolidone	0.1 M	Tris	8.0
			10 % w/v	PEG 4000			
C9	0.1 M	sodium chloride	25 % v/v	pentaerythritol propoxylate (5/4 PO/OH)			
			10 % v/v	dimethyl sulfoxide			
C10	0.2 M	ammonium sulfate	35 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	HEPES	7.5
C11	0.1 M	magnesium formate dihydrate	30 % v/v	pentaerythritol ethoxylate (15/4 EO/OH)	0.1 M	Tris	8.5
C12*	0.2 M	potassium acetate	24 % v/v	poly(acrylic acid-*co*-maleic acid) solution			
D1	0.2		60 % v/v	polypropylene glycol 400	0.1 M	Tris	8.0
D2	0.2		30 % v/v	pentaerythritol ethoxylate (15/4 EO/OH)	0.1 M	HEPES	7.5
	0.2		6 % w/v	polyvinylpyrrolidone			
D3	0.2		45 % v/v	polypropylene glycol 400			
	0.2		10 % v/v	ethanol			
D4	0.2		10 % v/v	pentaerythritol ethoxylate (3/4 EO/OH)			
	0.2		10 % v/v	1-butanol			
D5	0.2		12.5 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	HEPES	7.0
	0.2		6 % v/v	Jeffamine® SD-2001			
D6	0.2		6 % w/v	polyvinylpyrrolidone	0.1 M	HEPES	6.5
D7	0.2		20 % v/v	Jeffamine® ED-2003	0.1 M	HEPES	6.5
D8	0.2		20 % v/v	glycerol ethoxylate	0.1 M	Tris	8.0
	0.2		10 % v/v	tetrahydrofuran			
D9	0.2		25 % v/v	Jeffamine® D-2000	0.2 M	Imidazole	7.0
D10	0.2 M	potassium chloride	30 % v/v	Jeffamine® SD-2001	0.1 M	HEPES	6.5
D11	0.1 M	sodium chloride	30 % v/v	polypropylene glycol 400			
D12			20 % v/v	Jeffamine® SD-2001			
			15 % v/v	1-propanol			



MIDAS HT-96 Conditions E1- H12 MD1–60

Well No.	Conc.	Salt	Conc.	Precipitant	Conc.	Buffer	pH
E1	0.2 M	lithium sulfate	25 % v/v	Jeffamine® T-403	0.1 M	Tris	8.0
E2	0.2 M	potassium acetate	35 % v/v	pentaerythritol propoxylate (5/4 PO/OH)			
E3	0.2 M	potassium chloride	20 % v/v	pentaerythritol ethoxylate (15/4 EO/OH)	0.1 M	Glycine	9.5
E4	0.2 M	sodium thiocyanate	40 % v/v	pentaerythritol propoxylate (5/4 PO/OH)	0.1 M	HEPES	7.0
E5	0.2 M	potassium chloride	15 % v/v	Jeffamine® T-403	0.1 M	HEPES	6.5
			15 % v/v	Jeffamine® ED-2003			
E6	0.2 M	potassium acetate	15 % v/v	pentaerythritol ethoxylate (15/4 EO/OH)	0.1 M	MES	6.0
			3 % v/v	Jeffamine® T-403			
E7	0.1 M	sodium malonate dibasic monohydrate	30 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	HEPES	7.0
E8			10 % v/v	Jeffamine® D-2000			
			10 % v/v	Jeffamine® M-2005			
			10 % v/v	ethanol			
E9	0.1 M	lithium sulfate	25 % v/v	Jeffamine® ED-2003	0.1 M	Tris	8.0
E10			10 % v/v	Jeffamine® T-403	0.1 M	Tris	8.0
			10 % v/v	Jeffamine® ED-2003			
E11	0.1 M	lithium sulfate	25 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	HEPES	6.5
E12	0.2 M	magnesium chloride hexahydrate	15 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	HEPES	7.5
F1			40 % v/v	Jeffamine® D-2000	0.1 M	HEPES	6.5
F2	0.5 M	sodium chloride	10 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	Tris	8.0
F3			14 % v/v	Jeffamine® ED-900	0.1 M	K/Na phosphate	7.0
			11 % v/v	Jeffamine® SD-2001			
F4	0.2 M	sodium chloride	20 % w/v	poly(acrylic acid sodium salt) 2100	0.1 M	BICINE	9.0
F5	0.2 M	sodium malonate dibasic monohydrate	20 % v/v	Jeffamine® D-2000	0.1 M	MES	5.5
F6	0.2 M	potassium chloride	30 % v/v	Jeffamine® M-2070	0.1 M	Tris	8.0
F7			20 % v/v	Jeffamine® M-2070			
			20 % v/v	dimethyl sulfoxide			
F8	0.2 M	magnesium chloride hexahydrate	40 % v/v	pentaerythritol propoxylate (17/8 PO/OH)	0.1 M	MES	5.5
F9			20 % w/v	poly(acrylic acid sodium salt) 5100	0.1 M	Tris	8.0
F10			28 % v/v	polyethyleneimine	0.1 M	HEPES	7.0
F11	0.1 M	ammonium formate	20 % v/v	SOKALAN® CP 7	0.1 M	HEPES	7.0
F12	0.2 M	sodium sulfate	20 % w/v	SOKALAN® HP 56	0.1 M	Tris	8.0
G1	0.1 M	potassium chloride	25 % v/v	SOKALAN® CP 7	0.1 M	HEPES	7.0
G2	0.3 M	ammonium formate	20 % v/v	SOKALAN® CP 5	0.1 M	HEPES	7.0
G3			40 % v/v	glycerol ethoxylate			
G4			30 % v/v	glycerol ethoxylate	0.1 M	Tris	8.5
G5*			55 % v/v	polypropylene glycol 400			
G6	0.2 M	lithium citrate tribasic tetrahydrate	35 % v/v	glycerol ethoxylate			
G7	0.2 M	ammonium acetate	30 % v/v	glycerol ethoxylate	0.1 M	MES	6.5
G8			20 % w/v	SOKALAN® CP 42	0.1 M	Tris	8.0
			5 % v/v	methanol			
G9			25 % w/v	SOKALAN® CP 42	0.1 M	Tris	7.0
			10 % v/v	tetrahydrofuran			
G10	0.1 M	lithium acetate dihydrate	20 % w/v	SOKALAN® CP 42	0.1 M	Bis-Tris	6.0
G11*			10 % v/v	Jeffamine® M-2005	0.2 M	HEPES	6.5
G12			15 % v/v	SOKALAN® CP 5	0.1 M	Bis-Tris	6.0
H1			25 % w/v	SOKALAN® CP 42	0.1 M	Bis-Tris	6.0
H2*			35 % v/v	Jeffamine® D-2000			
H3			20 % v/v	glycerol ethoxylate	0.1 M	Tris	8.5
			3 % v/v	polyethyleneimine			
H4	0.2 M	ammonium chloride	25 % v/v	glycerol ethoxylate	0.1 M	HEPES	7.5
H5*			10 % w/v	SOKALAN® CP 42	0.1 M	Tris	8.5
H6			30 % w/v	poly(acrylic acid sodium salt) 5100	0.1 M	MES	6.0
			10 % v/v	ethanol			
H7	0.2 M	potassium citrate tribasic monohydrate	15 % w/v	SOKALAN® CP 42			
H8			30 % w/v	SOKALAN® CP 42	0.1 M	Tris	8.5
H9	0.2 M	ammonium acetate	25 % w/v	SOKALAN® HP 56	0.1 M	HEPES	7.0
H10			25 % v/v	SOKALAN® CP 5	0.1 M	Tris	8.5
H11	0.2 M	ammonium formate	10 % w/v	polyvinylpyrrolidone			
			20 % w/v	PEG 4000			
H12			15 % w/v	polyvinylpyrrolidone	0.1 M	Tris	8.0
			25 % w/v	PEG 5000 MME			

Abbreviations: Bis Tris; Bis-(2-hydroxyethyl)imino-tris(hydroxymethyl)methane, **CAPS**; N-Cyclohexyl-3-aminopropanesulfonic acid**, CHES**; 2-(N-Cyclohexylamino)ethane Sulfonic Acid**, HEPES;** 2-(4-(2-Hydroxyethyl)-1-piperazinyl)ethanesulfonic Acid, **MES**; 2-(N-morpholino)ethanesulfonic acid, **MPD;** 2,4-methyl pentanediol, **PEG**; Polyethylene glycol, **TMAO:** Trimethylamine N-oxide,, **Tris**; 2-Amino-2-(hydroxymethyl)propane-1,3-diol.

N.B. Jeffamine ED-2001 has been superseded with Jeffamine ED-2003. Polyvinylpyrolidone K15 is called Polyvinylpyrolidine.

*Conditions marked with an asterisk have been changed from the original MIDAS screen. This is due to discontinuation of the raw materials Glascol W13, Sokalan CP12S and Sokalan HP66K. If you require further advice regarding the changes to these conditions please contact us at enquiries@moleculardimensions.com.

Sokalan® are water-soluble polymers based on acrylic acid, maleic acid, vinylpyrrolidone, vinylimmadazole and/or hydrophobic monomers.

Manufacturer's safety data sheets are available from our website or by scanning the QR code here:

Re-Ordering details:

Catalogue	Pack size	Catalogue Code
MIDAS	96 x 10 mL	MD1-59
MIDAS HT-96	96 x 1 mL	MD1-60
MIDAS Green Screen	96 x 10 mL	MD1-83
MIDAS HT-96 Green Screen	96 x 1 mL	MD1-84
MIDAS OptiMax Kit*	24 x 10 mL	MD1-62
Single Reagents		
MIDAS single reagents	100 mL	MDSR-59-tube number
MIDAS HT96 single reagents	100 mL	MDSR-60-well number

For MIDAS stock solutions please visit the Optimization section on our website.
*MIDAS OptiMax contains all the individual stock reagents for MIDAS.