



DISRUPTED ORGANISMS GUIDE

The following guide has been compiled using the large numbers of reports made by our customers on the Constant Systems range. Every application is different but these will give you an idea of which pressures to start with. Should you wish to augment or amend this list, please contact Constant Systems to submit results.

ORGANISM

DISRUPTION PRESSURE

ALGAE

- *Ascorphyllum nodosum* - 15,000 – 30,000 psi (2,050 Bar)
- *Chlorella* - 15,000 – 37,000 psi (2,500 Bar)
- *Cryptocodinium* - 40,000 psi (2,700 Bar)
- *Cyanophyceae* - 40,000 psi (2,700 Bar)
- *Euglena gracilis* - 5,000 – 25,000 psi (1,700 Bar)
- *Laminaria spp.* - 15,000 – 30,000 psi (2,050 Bar)
- *Phaeodactylum* - 22,000 – 30,000 psi (2,050 Bar)
- *Porphyridium cruentum* - 22,000 – 30,000 psi (2,050 Bar)
- *Rhodomenia spp.* - 30,000 psi (2,050 Bar)
- *Ulva spp.* - 15,000 – 30,000 psi (2,050 Bar)

ANIMAL CELLS

- Animal Cells - 10,000 psi (700 Bar)
- Human Cells - 5,000 – 10,000 psi (700 Bar)
- Sperm (Bird) - 10,000 – 40,000 psi (2,700 Bar)
- *Steinernema feltiae* - 30,000 psi (2,050 Bar) x 3

BACTERIA

- *Aeromonas hydrophila* - 28,000 psi (1,900 Bar)
- *Alteromonas* - 28,000 psi (1,900 Bar)
- *Anabaena variabilis* - 30,000 psi (2,050 Bar)
- *Halobacterium* - 30,000 psi (2,050 Bar)
- *Bacillus* - 15,000 – 30,000 psi (2,050 Bar)
- *Bacillus subtilis* - 40,000 psi (2,700 Bar)

- *Bifidobacterium* - 40,000 psi (2,700 Bar)
- *Campylobacter jejuni* - 20,000 – 30,000 psi (2,050 Bar)
- *Clostridium tetani* - 20,000 psi (1,350 Bar)
- Coccus Type - 30,000 psi – 35,000 psi (2,400 Bar)
- *Corynebacterium amycolatum* - 40,000 psi (2,700 Bar)
- *Corynebacterium xerosis* - 40,000 psi (2,700 Bar)
- *Corynebacterium* - 40,000 psi (2,700 Bar) x 5
- *Cyanobacteria synechocystis* - 30,000 – 40,000 psi (2,700 Bar)
- *Deinococcus radiophilus* - 15,000 – 30,000 psi (2,050 Bar)

Escherichia coli:

- Below 15,000 psi (1,000 Bar) – Release of DNA
- 15,000 psi – 20,000 psi (1,350 Bar) – Cytoplasmic Protein
- 20,000 psi – 27,000 psi (1,900 Bar) – Inclusion Bodies
- 27,000 psi – 35,000 psi (2,400 Bar) – Membrane Protein

- *Escherichia* - 23,000 – 28,000 psi (1,900 Bar)
- *Haemophilus influenzae* - 20,000 psi (1350 Bar)
- *Helicobacter pylori* - 28,000 psi (1,900 Bar)
- *Hyphomicrobium methylovorum* - 25,000 psi (1,700 Bar) x 2
- *Lactobacillus johnsonii* - 40,000 psi (2,700 Bar) x 2
- *Lactobacillus* - 30,000 psi (2,050 Bar)
- *Lactobacillus casei* - 40,000 psi (2,700 Bar) x 3
- *Lactococcus lactis* - 30,000 – 40,000 psi (2,700 Bar) x 2
- *Leptospira* - 20,000 psi (1,350 Bar)
- *Leuconostoc mesenteroides* - 10,000 psi (700 Bar)
- *Methylobacterium extorquens* - 20,000 – 30,000 psi (2,050 Bar)
- *Methylococcus capsulatus* - 25,000 psi (1,700 Bar)
- *Methylosinus trichosporium* - 25,000 psi (1,700 Bar)
- *Micrococcus spp.* - 22,000 psi (1,500 Bar)
- *Moraxella* - 28,000 psi (1,900 Bar)

- *Moraxella catarrhalis* - 40,000 psi (2,700 Bar)
- *Mycobacterium smegmatis* - 30,000 – 40,000 psi (2,700 Bar) x 2
- *Mycobacterium* - 28,000 – 35,000 psi (2,400 Bar)
- *Mycobacterium fallax* - 40,000 psi (2,700) x 2
- *Mycobacterium paratuberculosis* - 15,000 – 40,000 psi (2,700 Bar) x 2
- *Mycobacterium tuberculosis* - 15,000 – 40,000 psi (2,700 Bar) x 2
- *Mycobacterium vaccae* - 10,000 psi (700 Bar)
- *Neisseria gonorrhoeae* - 40,000 psi (2,700 Bar)
- *Neisseria lactamica* - 40,000 psi (2,700 Bar)
- *Neisseria meningitidis* - over 10,000 psi (700 Bar)
- *Neisseria sicca* - 40,000 psi (2700 Bar)
- *Neisseria spp* - 10,000 – 30,000 psi (2050 Bar)
- *Nocardia corallina* - 20,000 – 28,000 psi (1,900 Bar)
- *Ochrobactrum anthropi* - 28,000 psi (1,900 Bar)
- *Pasteurella* - 20,000 psi (1,350 Bar)
- *Propionibacterium freudenreichii* - 40,000 psi (2,700 Bar)
- *Pseudomonas aeruginosa* - 28,000 psi (1,900 Bar)
- *Psuedomonas putida* - 23,000 psi (1,550 Bar)
- *Psychrobacter immobilis* - 28,000 psi (1,900 Bar)
- *Rhodobacter capsulatus* - 40,000 psi (2,700 Bar)
- *Rhodococcus erythropolis* - 30,000 psi (2,050 Bar)
- *Rhodococcus rhodochrous* - 10,000 – 30,000 psi (2,050 Bar)
- *Rhodopseudomanas acidophila* - 20,000 – 30,000 psi (2,050 Bar)
- *Serratia* - 28,000 psi (1,900 Bar)
- Spores - 25,000 psi (1,700 Bar)
- *Staphylococcus* - 30,000 – 40,000 psi (2,700 Bar)
- *Staphylococcus aureus* - 40,000 psi (2,700 Bar) x 4
- *Streptococcus bovis* - 20,000 psi (1,700 Bar)
- *Streptococcus pneumoniae* - 20,000 psi (1,700 Bar)
- *Streptomyces fradiae* - 10,000 – 25,000 psi (1,700 Bar)
- *Streptomyces griseus* - 30,000 psi (2,050 Bar) x 3
- *Synechococcus* - 35,000 psi (2,400 Bar)

- *Treponema pallidum* - 10,000 – 20,000 psi (1,350 Bar)
- *Vibrio* spp. - 28,000 psi (1,900 Bar)
- *Vibrio* spp. - 15,000 – 40,000 psi (2,700 Bar)

ENVIRONMENTAL

- Air - 40,000 psi (2,700 Bar)
- Soil (Bacteria) - 35,000 – 40,000 psi (2,700 Bar)

FUNGI

- *Aspergillus* - 2,000 – 15,000 psi (1,000 Bar)
- *Aspergillus nidulans* - 15,000 – 20,000 psi (1,350 Bar)
- *Aspergillus niger* - 11,000 – 30,000 psi (2,050 Bar)
- *Aspergillus terreus* - 25,000 – 27,000 psi (1,800 Bar)
- *Beauveria sulfurescens* - 25,000 – 27,000 psi (1,800 Bar)
- *Botrytis cinerea* - 20,000 psi (1,350 Bar)
- *Chaetomium globosum* - 25,000 – 27,000 psi (1,900 Bar)
- *Debaryomyces* - 40,000 psi (2,700 Bar) x 2
- *Fusarium oxysporum* - 8,000 psi (550 Bar)
- *Fusarium solani* - 8,000 – 9,000 psi (600 Bar)
- *Mortierella alpina* - 15,000 psi (1,000 Bar)
- *Mortierella isabellina* - 25,000 – 27,000 psi (1,800 Bar)
- *Mycelia* - 40,000 psi (2,700 Bar)
- *Paecilomyces variottii* - 25,000 psi (1,700 Bar)
- *Penicillium chrysogenum* - 10,000 – 30,000 psi (2,050 Bar)
- *Septoria Nodorum* - 20,000 psi (1,350 Bar)
- Spores - 25,000 psi (1,700 Bar)
- *Syncephalastrum Racemosum* - 25,000 – 27,000 psi (1,800 Bar)
- *Thraustochytrium* - 40,000 psi (2,700 Bar)
- *Ustilago Maydis* - 15,000 psi (1,000 Bar)

INSECT

- SF9 Insect Cells - 5,000 – 15,000 psi (1,000 Bar)

MAMMALIAN CELLS

- Amniotic Cells - 18,000 – 20,000 psi (1,350 Bar)
- Beef Heart Mitochondria - 30,000 psi (2,050 Bar)
- Calf Liver - 15,000 psi (1000 Bar)
- Calf Lung - 1,000 psi (70 Bar)
- Calf Spleen and Lymph Node tissue - 400 psi (27 Bar) for viable cells
- Horse Liver - 5,000 – 10,000 psi (700 Bar)

- Human Tissue - 5,000 – 10,000 psi (700 Bar)
- Keratinocyte (Human Skin) - 10,000 psi (700 Bar)
- Mammalian Cells - 100 – 15,000 psi (1000 Bar)
- Mouse Lung - 10,000 psi (700 Bar)

PARASITE

- *Crithida fasciculata* - 20,000 – 40,000 psi (2,700 Bar)
- *Giardia* - 30,000 psi (2000 Bar) x 2
- *Toxoplasma gondii* - 4,000 – 40,000 psi (2,700 Bar)

PLANT TISSUE

- *Arabidopsis* - 15,000 – 20,000 PSI (1,350)
- *Arabidopsis Thaliana* - 20,000 psi (1,350 Bar)
- Banana Fruit - 30,000 psi (2,050 Bar)
- Cowpea Leaves - 10,000 – 20,000 psi (1,350 Bar)
- Spinach Leaves - 5,000 – 10,000 psi (700 Bar)
- Strawberry Leaves - 20,000 – 25,000 psi (1,700 Bar)
- Tobacco BY2 - 2,500 – 5,000 psi (340 Bar)
- Tomato – Green - 40,000 psi (2,700 Bar)

WORMS

- *Caenorhabditis elegans* - 8,000 – 20,000 psi
- *Steinernema feltia* - 30,000 psi (2,050 Bar) x 3

YEAST

- *Candida albicans* - 25,000 – 40,000 psi (2,700 Bar)
- *Candida cloacae* - 40,000 psi (2,700 Bar)
- *Candida utilis* - 15,000 – 40,000 psi (2,700 Bar)
- *Hansenula polymorpha* - 25,000 – 40,000 psi (2,700 Bar)
- *Kluyveromyces fragilis* - 5,000 – 40,000 psi (2,700 Bar)
- *Pichia angusta* - 40,000 psi (2,700 Bar)
- *Pichia capsulata* - 40,000 psi (2,700 Bar)
- *Pichia pastoris* - 40,000 Kpsi (2,700 Bar)
- *Rhodotorula glutinis* - 40,000 psi (2,700 Bar)
- *Saccharomyces cerevisiae* - 27,000 – 35,000 psi (2,700 Bar)
- *Schizosaccharomyces pombe* - 15,000 – 40,000 psi (1,000 Bar)
- Spores - 25,000 psi (1,700 Bar)

VIRUS

- *Cytomegalovirus* - 2,000 psi (135 Bar)

Organism Models

E. coli

Membrane protein/material	- best between 27 and 35 Kpsi
Inclusion Bodies	- best between 20 and 27 Kpsi
Cytoplasmic Protein	- best between 15 and 20 Kpsi
Release of DNA	- best below 15 Kpsi

Yeast

<i>Candida cloacae</i>	- 40 Kpsi
<i>Candida albicans</i>	- 25 – 40 Kpsi
<i>Candida utilis</i>	- 15 – 40 Kpsi
<i>Hansenula polymorpha</i>	- 25 – 40 Kpsi
<i>Pichia Augusta</i>	- 40 Kpsi
<i>Pichia capsulatus</i>	- 40 Kpsi
<i>Pichia picorna</i>	- 25 – 35 Kpsi
<i>Pichia pastoris</i>	- 35 – 40 Kpsi
<i>Kluyveromyces fragilis</i>	- 05 – 40 Kpsi
<i>Rhodotorula glutinis</i>	- 40 Kpsi
<i>Schizosaccharomyces pombe</i>	- 15 – 40 Kpsi
<i>Saccharomyces cerevisiae</i>	- 27 – 35 Kpsi

General Guide

Algae	- around 30kpsi
Bacteria	- varies widely, generally high pressures 30 – 40kpsi
Fungi	- around 20kpsi
Mammalian	- Very low pressures, 100psi – 15kpsi
Yeast	- generally high, around 40kpsi

