GEA CLEANING TECHNOLOGY

Cleaner processing
means better production

Engineering
for a better
world.

GEA.com

The GEA Group

GEA is one of the largest technology suppliers for food processing and a wide range of other industries. The global group specializes in machinery, plants, as well as process technology and components. GEA provides sustainable solutions for sophisticated production processes in diverse end-user markets and offers a comprehensive service portfolio.

GEA CLEANING TECHNOLOGY

Setting today’s global standards for efficient and effective production processes.

Efficient and effective delivery of cleaning media, combined with robust hygienic design, are the key characteristics of the state-of-the-art cleaning heads in the GEA Flow Components range.

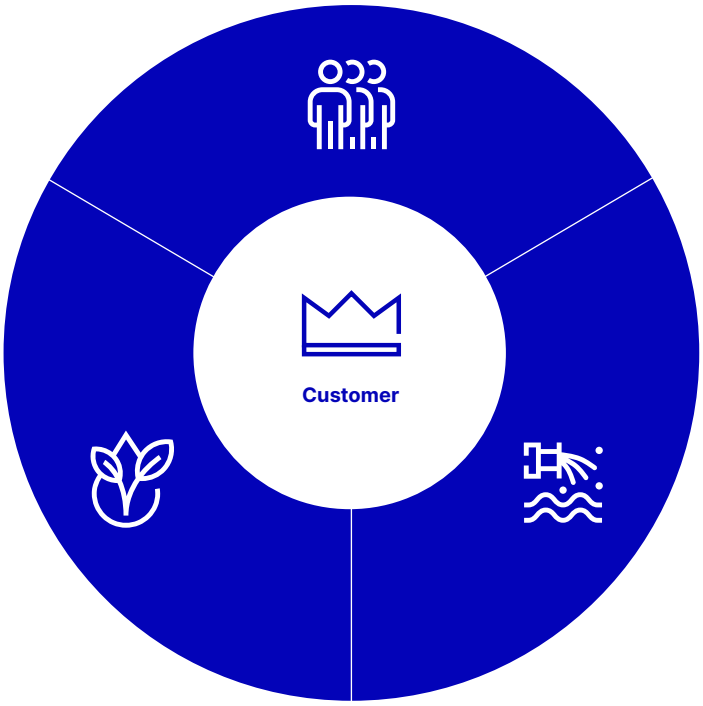
GEA Flow Components
GEA offers well-engineered process components and services to ensure smooth production processes in the handling of liquid and powder products. We develop and produce a comprehensive product range which includes valve technology for all hygienic classes (Hygienic, UltraClean, Aseptic), hygienic pumps and cleaning technology. Through our extensive global sales network, GEA Flow Components services and products are available worldwide.

GEA Cleaning Technology
The portfolio comprises different types of cleaning devices, such as orbital, rotating and static cleaners, to achieve the optimum cleaning result for different applications. Cleaning technology products can be found working successfully all over the world in numerous industries – from water treatment, chemical, brewing to food and pharmaceutical. Our sophisticated process components and services offer a comprehensive portfolio to support innovative engineering processes – wherever cleanliness is of the essence.

OUR MISSION

Better production through cleaner processing generates effective plant operation.

We focus on every detail to provide our customers with the greatest benefits that cleaning technology can offer. Flawless processes, safe products and effective plant operation make GEA the preferred partner for those who want to achieve more.



Partnership

Developing partnerships and understanding the individual needs and requirements of our customers is very important to us. We as GEA share process knowledge, train staff and support operators. This allows our customers to optimize their cleaning processes.

Technology

Technical innovations and extensive development programs keep GEA at the forefront of cleaning technology. This allows our customers access to one of the most advanced cleaning solutions.

Economy

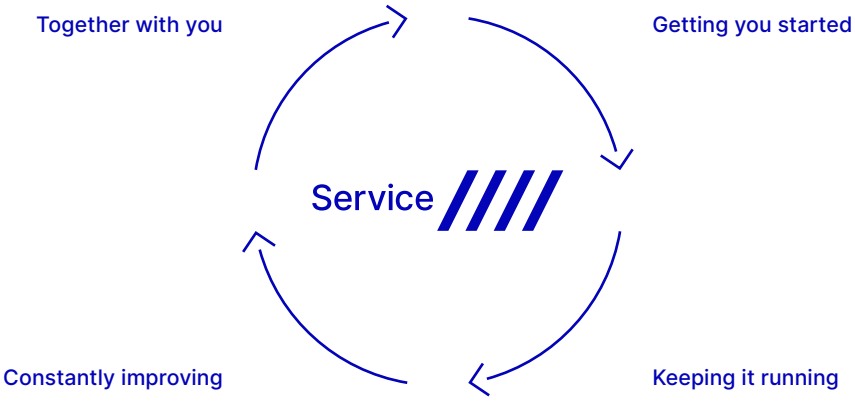
The performance of GEA's cleaning technology is designed to reduce the consumption of energy, water, cleaning agents and time for an optimized cleaning process.

SERVICE AND SUPPORT

Wherever cleanliness is of the essence, GEA is of service through our accessible support and continual commitment.

We start as we mean to go on. A supportive and committed partner for life. We get you up and running to ensure a smooth, seamless ongoing service for optimum productivity and safety. Our knowledgeable technical teams are always available to offer support.

- Global support network
- Cost-effective maintenance kits
- Detailed workshop service manuals
- Guaranteed spares commitment



PRINCIPLES OF CLEANING TECHNOLOGY

Increasing the mechanical element facilitates reductions in the consumption of resources.

The dynamic Sinner's circle shows the interchange between the various elements of cleaning to determine the best approach to any application.

The percentage of the four elements that make up the circle will vary from application to application and will have a direct influence on the liquid volume shown at the center. The greatest area of influence can be achieved by magnifying the mechanical element.

Increasing the mechanical element allows the other elements chemical, temperature and importantly time and liquid consumption to be reduced. Although impact is the key mechanical element, GEA's philosophy on cleaning is to combine a number of additional forces to develop and increase the overall cleaning power.

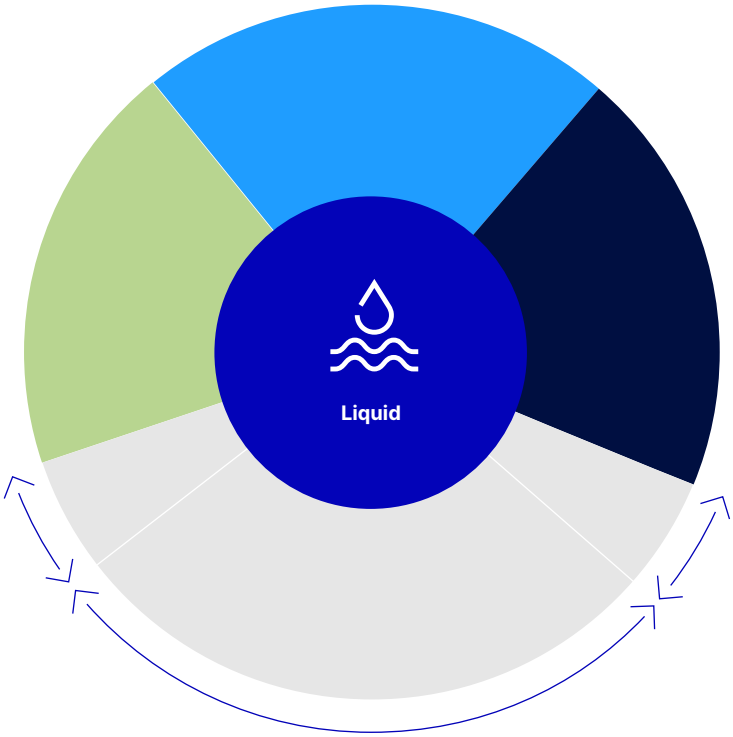
Through the use of cutting-edge technology and innovative design, GEA's cleaners are able to harness these additional forces to increase cleaning efficiency.

Keeping control of ongoing cost over energy, time per clean, chemicals and liquid volumes is vitally important to maximize production schedules and process profitability.

GEA's advanced cleaning technology provides efficient and repeatable performance and keeps the total cost of ownership to a minimum, with an enhanced return on investment.

Dynamic sinner’s circle

Time
The time required to adequately achieve the level of cleaning



Chemical
The cleaning agent that is used to aid the cleaning process

Temperature
The temperature required to perform the cleaning

Mechanical
The force required to remove the soils (sheer, impact or friction)

SOILING CLASSIFICATIONS

Soiling classifications determine the mechanical cleaning power required for effective cleaning.

To select the most efficient cleaners for any application it is important to understand and determine the four types of soiling classifications that are defined by GEA. Each classification requires an increase in mechanical cleaning power to effectively clean the vessel and optimize the use of the other elements within the Sinner's circle. Actual definition of products within soiling classifications is extremely difficult due to the number of infinite conditions we are faced with during modern production processes.

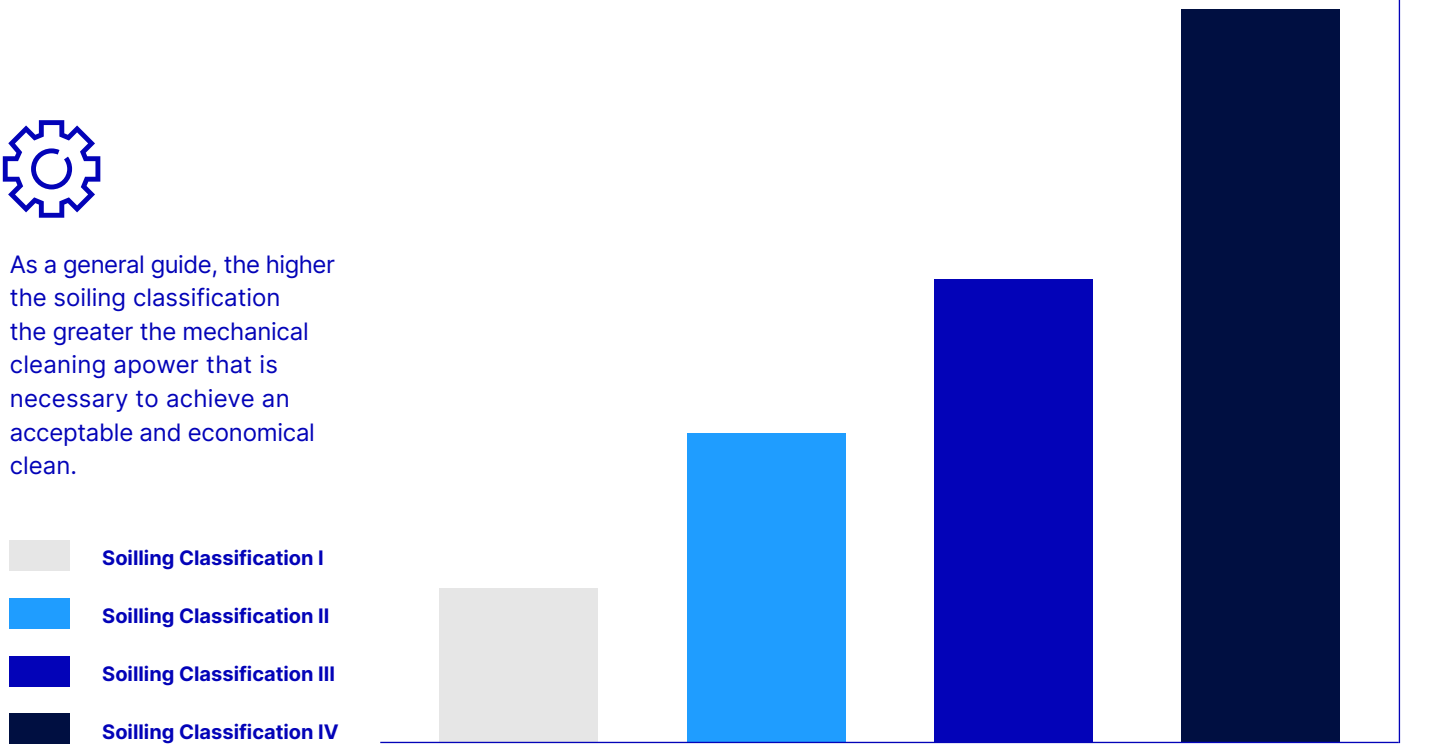
Soiling Classification I
Water-soluble products or products that have little or no adhesion to the vessel walls with a good surface finish.

Soiling Classification II
Water-soluble solutions with low adhesion to the surface of the vessel.

Soiling Classification III
Stubborn residues with a stronger adhesion to the vessel walls. Ideally the product is still wet and cleaning can be carried out before any drying takes place.

Soiling Classification IV
Encrusted or dry products with a higher adhesion to the vessel wall.

As a general guide, the higher the soiling classification the greater the mechanical cleaning apower that is necessary to achieve an acceptable and economical clean.



Different cleaning devices for different cleaning tasks

Cleaning tasks can be very diverse – they vary from basic wetting for water-soluble products to hard-to-clean encrusted dirt. Based on GEA's long-standing experience we use soiling classifications to assist us to select the appropriate cleaning device for optimal cleaning performance.

Our preferred solutions are:

- Soiling Classification I – Static Cleaners
- Soiling Classification II – Free Rotating Cleaners
- Soiling Classification III – Slow Rotating Cleaners
- Soiling Classification IV – Index and Orbital Cleaners

OUR SOLUTIONS

Soiling Classification I – Rinsing
Static Cleaners

The cleaning of vessels within soiling classification I requires a liquid distribution which delivers large volumes of fluid simultaneously over the complete vessel. Static spray balls offer very little mechanical force so they rely on the liquid running down the vessel walls to create surface friction or to dissolve the residues.

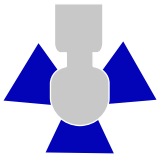
- Minimal capital investment
- No maintenance required
- Large selection of spray patterns, materials and surfaces

Soiling Classification II – Low impact
Free Rotating Cleaners

Free rotating cleaners are characterized by their fast rotation around a single axis. This rotation is driven by the liquid flow which produces a range of small to medium-sized fast moving droplets to produce a mechanical force on the vessel walls.

- Extended life cycle with no servicing
- Selection of spray patterns – 360, 180-T (towards) and 180-A (away) from the inlet
- Compact effective designs

OUR SOLUTIONS



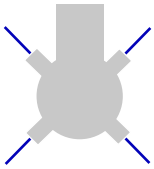
Soiling Classification III – Medium impact
Slow Rotating Cleaners

GEA's slow rotating cleaners use targeted flat or round jets to project the cleaning solution onto the vessel walls. These units operate at higher liquid pressures than traditional free rotating units but, because of their design, maintain slow rotation speeds. This enables these devices to impact greater cleaning forces onto the vessel walls than the free rotating units. As the rotation is kept under control, the spray jets have an increased dwell time, providing even more cleaning power. The slow rotating units from GEA are an efficient and cost-effective solution for stubborn and difficult to clean vessels.

- Increased cleaning power with reduced rotational speeds
- Effective cleaning with efficient jet design
- Extended service life with the use of hydrodynamic bearings

Soiling Classification IV – High impact

The extensive range of orbital and index cleaners from GEA offers high impact cleaning solutions for the most difficult to clean applications. Both cleaner ranges benefit from GEA's solid stream nozzle technology which optimizes spray jet projection and cleaning power onto the vessel walls.



Orbital Cleaners

The orbital cleaners work on two rotating axes, both horizontal and vertical, along a predetermined path creating a tight 3D matrix.

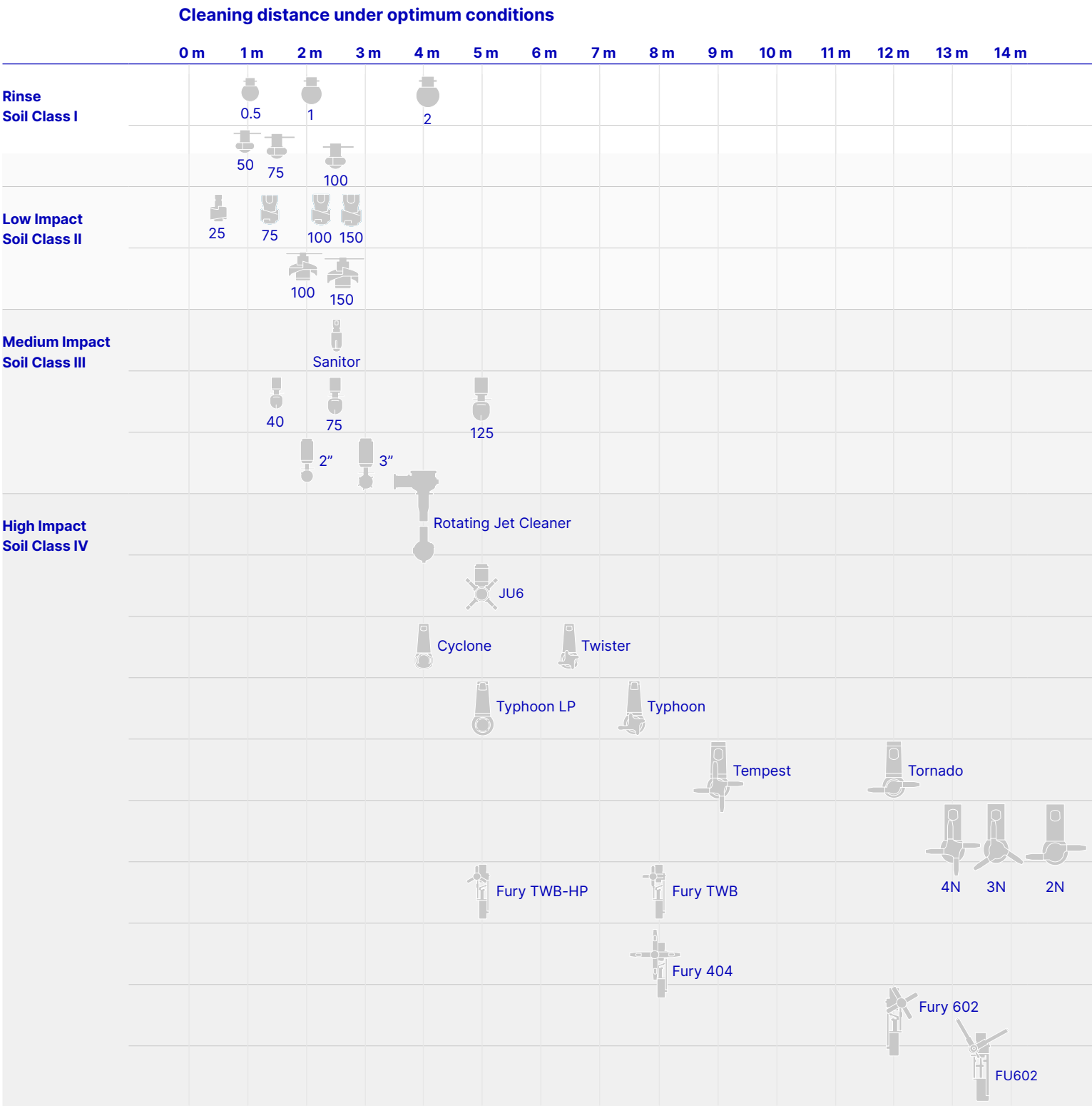
- Reduced contamination risks with hygienic design
- Cost-effective
- High impact cleaning
- Low service costs

Index Cleaners

GEA's unique range of index cleaners provide highly effective cleaning performance through their piston operated index mechanism. The advantage of this type of cleaner is that large amounts of energy can be applied by this slow moving operation, directly onto the vessel walls.

- Design maximizes cleaning power to jets
- Piston drive offers jam-free operation
- Longer intervals between services

PRODUCT SELECTION GUIDE



* 180-A = 180° Away from the inlet, 180-T = 180° Towards the inlet
The above selection guide is only provided as an assistance to the cleaner selection process. GEA's policy of continued improvement means that specifications may vary without prior notice.

Cleaner	Type	Mounting Options	Coverage [deg]*	Pressure [bar]	Flow range [l/min]	ATEX	Beverage, Wine Brewery, Distillery	Food & Dairy	Transport	(Bio-) Chemical	Pharma/ Personal Care	Pulp & Paper	Utilities
Spray Balls			Various	1.0 – 2.5 Optimum 2	40 – 1110	Ex	•	•	•	•	•	•	
Torus/Chemitorus 50, 75 & 100			360 180-A 180-T	1– 4 Optimum 2	15 – 118	Ex	•	•		•	•		
Turbodisc/Chemidisc 25, 75, 100 & 150			360 180-A 180-T	2 – 4 Optimum 3	40 – 245	Ex	•	•	•	•	•	•	
Clipdisc 100 & 150			360	1 – 4 Optimum 3	100 – 263	Ex	•	•	•		•		
Sanitor			360	3 – 10 Optimum 4	25 – 80	Ex	•	•	•	•	•		
Turbo SSB 40, 75 & 125			360	2 – 6 Optimum 3	38 – 408	Ex	•	•	•	•	•	•	
TB 2" & 3"			360 180-A 180-T	3 – 20 Optimum 5	50 – 283		•	•		•	•		
Rotating Jet Cleaner ZR			Various	2.3 – 4.3 Optimum 3	116 – 483		•						
JU6			360	4 – 10 Optimum 6 – 8	180 – 500		•	•	•	•	•	•	
Cyclone/Twister			360	4 –10 Optimum 6 – 8	45 – 97	Ex	•	•		•	•		
Typhoon LP/Typhoon			360	4 – 10 Optimum 6 – 8	93 – 175	Ex	•	•	•	•	•		
Tempest/Tornado			360	4 –10 Optimum 6 – 8	200 – 378	Ex	•	•	•	•	•	•	
OC 200 4N, 3N & 2N			360	4 –10 Optimum 6 – 8	317 – 1083		•	•	•	•	•	•	
Fury TWB & TWB-HP			360	TWB: 5 – 25, Opt. 15, TWB HP: 5 – 90, Opt. 30	25 – 200				•	•			
Fury 404			360 180-A 180-T	4 –10 Optimum 6 – 8	50 – 180		•		•	•		•	•
Fury 602			360 180-A 180-T	4 –10 Optimum 6 – 8	280 – 600		•		•			•	•
FU602			180-A 180-T	4 –10 Optimum 8	466 – 592								•

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