JORIN

UNDERSTANDING YOUR PROCESS
UNLOCKING YOUR PERFORMANCE

Oilfield Water Analysers
&
Consultancy

Jorin Limited is the longest established and market leading specialist in online oilfield water quality measurement and investigation. Since 1998 our technology, the ViPA, has been used around the world to investigate, understand, optimise and control oily water separation, treatment and disposal processes.

Jorin was incorporated in order to deliver the best possible produced water separation monitoring and control data to the oil and gas industry and by maintaining this purity of purpose and continuous research and development programmes, we have maintained our position as market leaders in on-line water quality monitoring for the oil and gas sector.

We believe that in order to provide the greatest value, data needs to be provided fast and be truly relevant to, and representative of, the process being monitored. Whether you are using our ViPA instruments or our Process Insight services, the focus is on providing high quality data, quickly in the field; and you can be assured that the tools we use are the best available, have the most up to date instrument designs and are coupled with the strongest software algorithms as well as using the most comprehensive field chemistry. This is how we aim to enable you to understand your process and help you unlock your performance.

The company is based in the heart of the United Kingdom near Leicester where it has its primary development and manufacturing facilities, administrative offices and training facilities. From this base and working with select partners around the world, we have supplied over 200 analyser systems and provided analysers and consultancy services to customers on 6 continents. Our clients include:

ADCO	Kerr McGee	Petronas
AIOC	KOC	PTT
Amerada Hess	Maersk	Qatar Gas
Bluewater	Marathon Oil	Qatar Petroleum
BP	Occidental Petroleum	RasGas
Brunei Shell Petroleum	Oil India	Saudi Aramco
Cairn India	OMV	Schlumberger
Chevron	ONGC	Shell
Conoco	PDO	Sibneftgas
Dana Petroleum	Pearl	Statoil
Exxon	PEMEX	Total
Husky	Petrobras	Woodside Energy

We also work with dozens of Universities and many of the major oilfield water separation equipment manufacturers and production chemical suppliers worldwide.

The ViPA Technology

Jorin are the inventors and developers of patented on-line video imaging analysers for identifying and measuring the discrete contaminants in liquids. We manufacture a range of products based around these technologies.

ViPA is the market leading technology for produced water and injection water quality monitoring in the oil and gas production sectors, simultaneously providing data on oil droplet size, oil concentration, solid particle size and solids concentration.

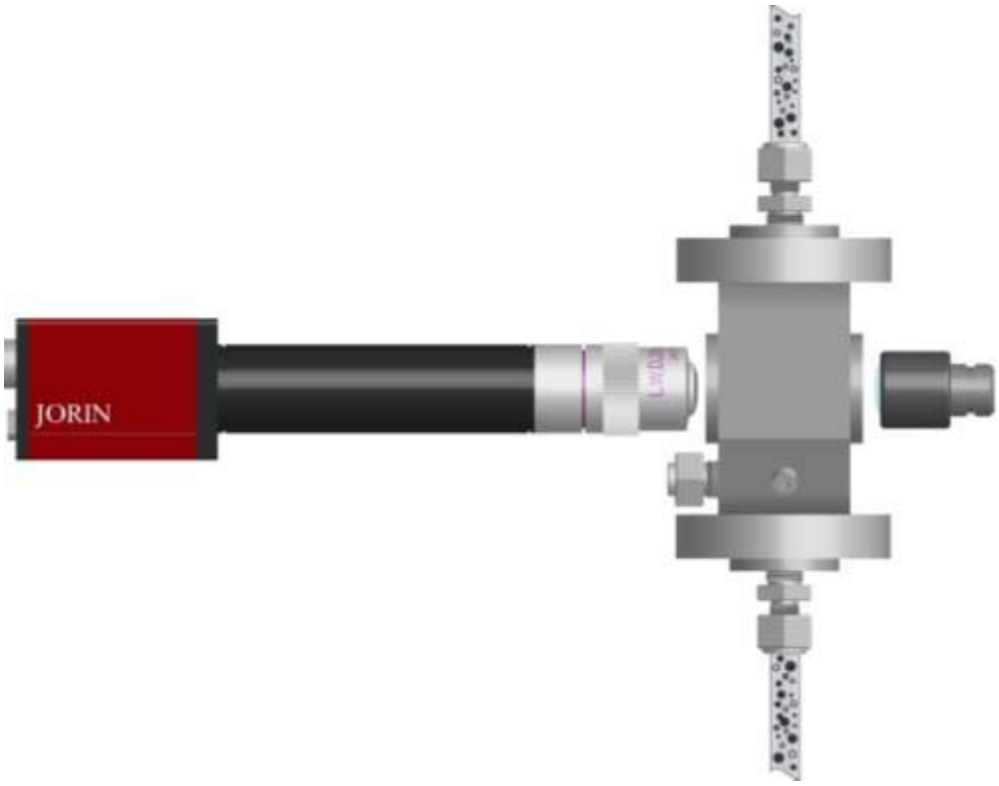
The ability to monitor significant parameters throughout the oily water separation and disposal process allows previously unattainable levels of control, offering the opportunity to optimise performance, reduce operating costs and to avoid many current process problems in the future.

Process Insight is a complete consultancy and project management service for exploration geochemistry, oil and gas fluid behaviour in the reservoir, during production, water injection, waste water treatment and produced water injection projects. These studies encompass all project stages, from initial reservoir studies through to conceptual and detailed design and to final plant commissioning and operation.

Core Technology

The core technology uses a flow cell where the liquid sample passes between a video microscope and a light source. The video microscope system can be built to suit a range of size measuring requirements from 1- 150 microns up to macro scale objects.

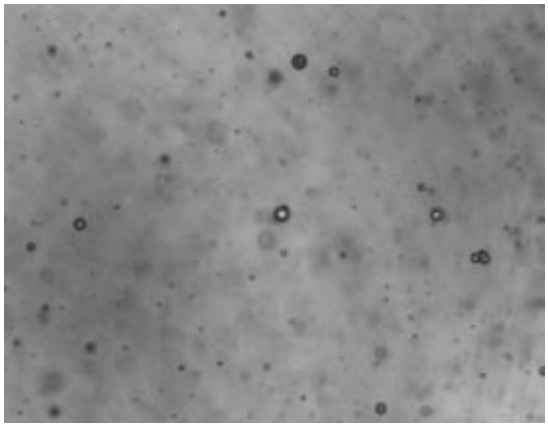
Using a specially developed strobe lighting unit the analyser can work with liquid flow velocities of 5ms^{-1} when measuring on the micron scale and higher velocities when measuring larger objects.



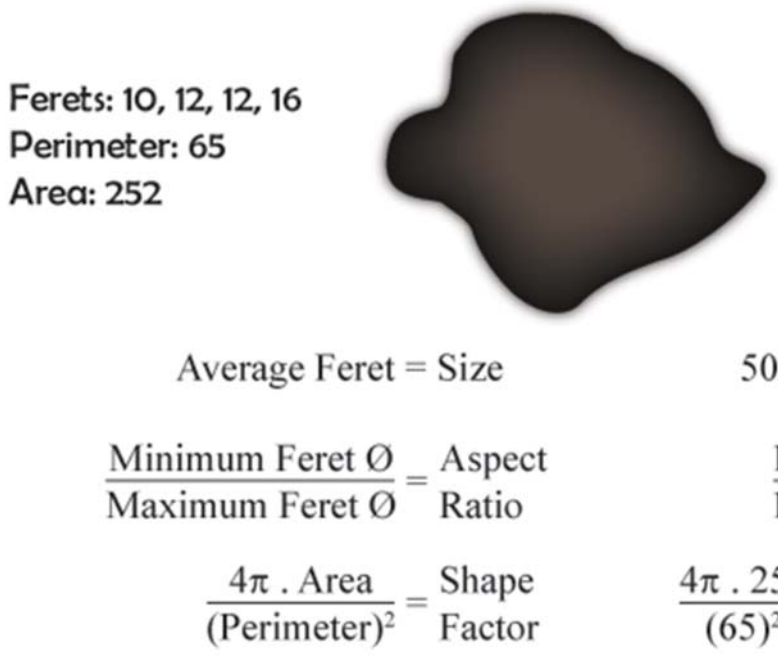
Schematic of the core technology, showing flow cell, camera and lenses, and lighting unit

Jorin's Image Analysis Software

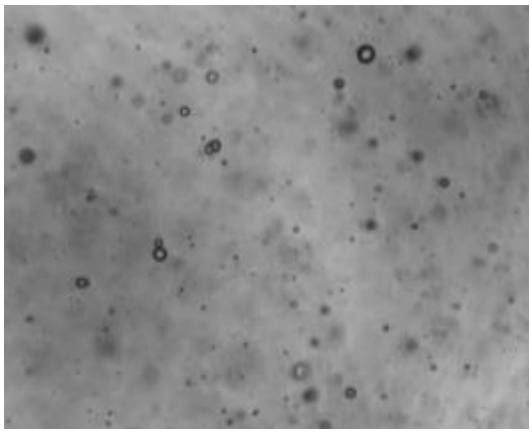
Jorin's own software performs morphological and mathematical analyses on each particle detected, in standard form measuring and calculating 17 different parameters for each particle, and completely analyses 25 images per second for real-time data generation.



Typical parameters include Feret diameters, perimeter, size, aspect ratio, shape factor and optical density. These measurements can be used to create a mathematical description of a particle size for real-time particle identification. Size distributions and volumetric concentrations are generated for each particle type assessed. For example, quartz sand has high aspect ratios, medium shape factors, low optical density and these parameters can be used to differentiate between quartz sand and silt.



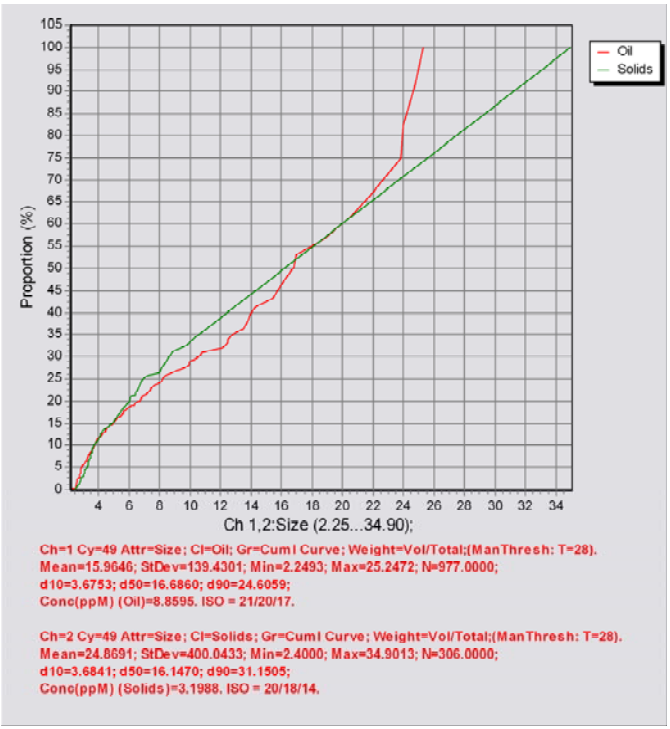
Sketch of a possible particle, showing some typical parameters measured and calculated



The company is owned, managed and run by engineers with extensive experience of making particle measurements in the most challenging environments and decades of experience in working with oilfield water. Working in the same environments as our customers and maintaining a genuine understanding of our customers' needs and applications is key to our success and to the on-going successful development of our hardware and software.

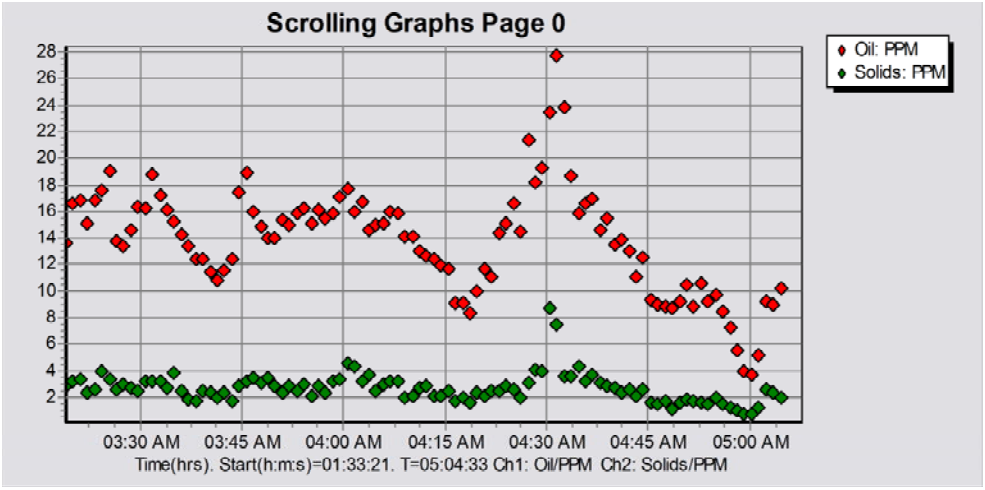
ViPA Data

The ViPA produces many different types of data for each particle observed, the most commonly used data are particle or droplet sizes and concentration information.



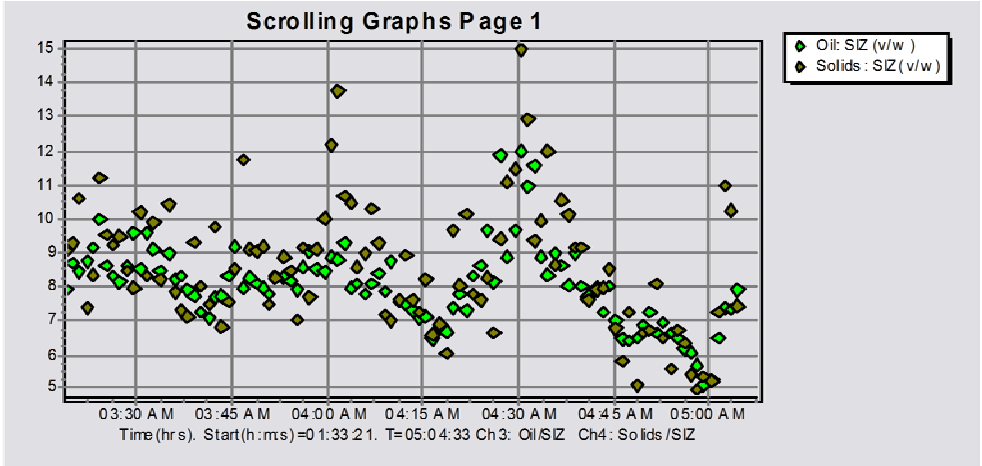
In the graph to the left, the particle size distribution for solid particles and the particle size distribution for oil droplets are each plotted separately; further statistical information and the concentration data are in the details below the curves.

When operating in continuous online mode then the ViPA analyser will provide data updates as frequently as every 10 seconds. Typical data outputs are oil concentration (red points) and solids concentration (green points) in the graph below to the left and oil droplet size (pale green) and solid particle size (olive green) in the graph below to the right.



These graphs reflect the data measured over a period of time, in this case 2 hours. This allows process condition and fluctuations to be monitored and the ViPA software can also use trend analysis to monitor for future process upsets.

All the data provided in graphs, along with many analyser alarms can be provided as serial data over Modbus or through 4-20mA outputs and volt free contacts.



The Jorin ViPA MZ4 HiFlo

The Jorin ViPA MZ4 Zone 1 Certified Combined Analyser and Computer

This compact all in one unit combines the ViPA analyser and control computer into a single air purged enclosure with ATEX Zone 1 certification. The unit weighs 35Kgs and its compact nature and small footprint makes it easy to transport with minimal set-up time out of the box for generating data quickly.

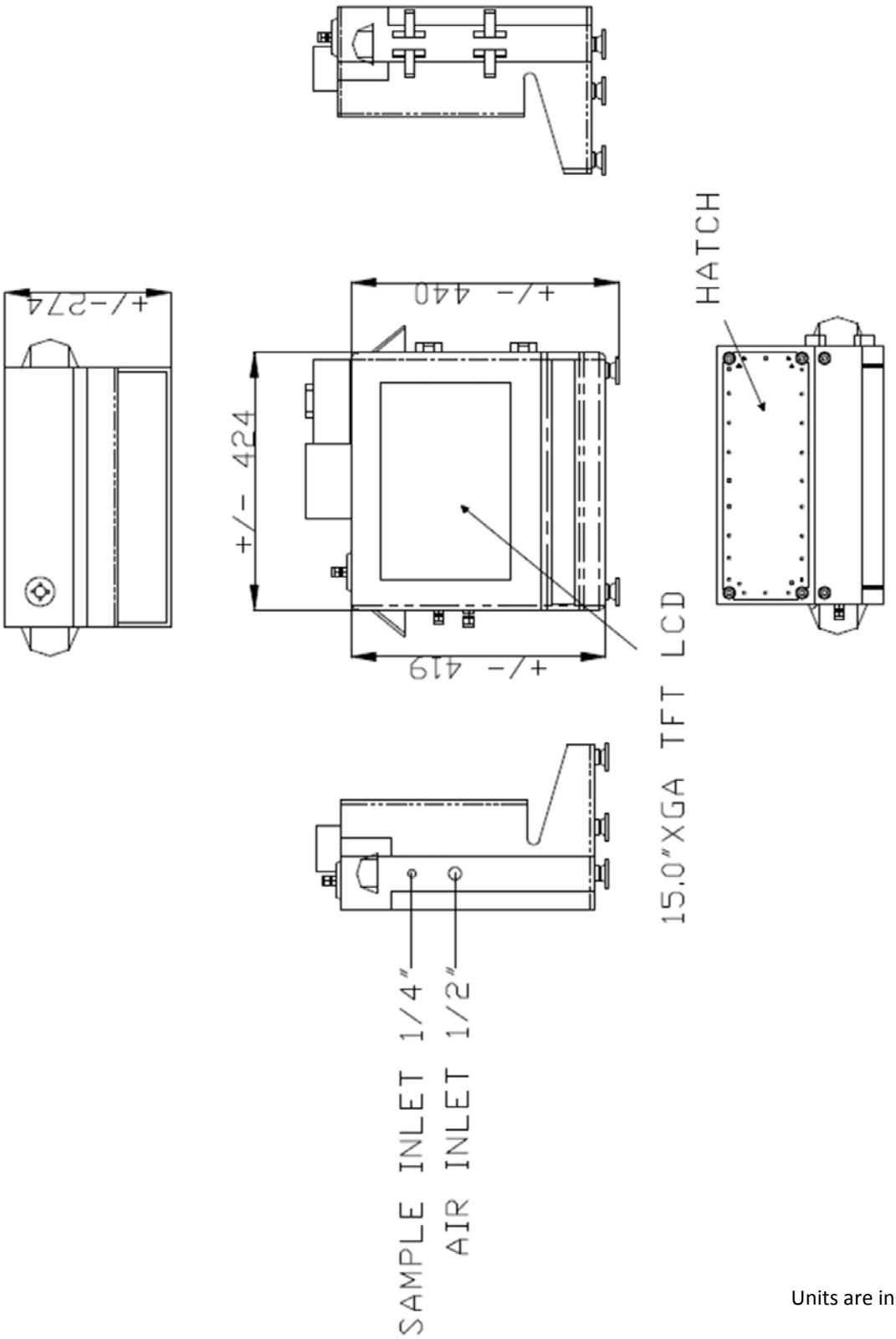
Its stainless steel construction and flow cell rated for continuous use at 120 Bar (1740 PSI/12000 kPa) with the capability to operate with process liquid temperatures of up to 120°C (248˚F) make the analyser ideal for use in harsh environments. Options for higher temperatures and pressures are available on request.

The compact nature of the analyser enclosure allows installation very close to the sample point to ensure the best possible sampling is achieved and the ability to work with flow velocities of up to $5mS^{-1}$ ensure great response to process changes and minimal flow control requirements. There are no upstream sample conditioning required.

Like all Jorin's analysers it is supplied with fully featured control software capable of complex particle analysis and has an easily accessible USB port for transferring data from the analyser when required.

Available for either 230V 50Hz or 110V 60Hz power supplies, the MZ4 uses instrument air to achieve the hazardous area rating. For operation in tropical and desert locations the MZ4 can be supplied with a thermostatically controlled cooler that uses the same instrument air supply to maintain a constant temperature regardless of how hot the working environment is.

The analyser can be supplied with a range of accessories including sampling hoses suitable for a range of sample pressures, hazardous area transformers to enable operation from alternative voltages and flight cases for easy transportation of this robust investigative tool.



Units are in mm

The Jorin ViPA MZ4 HF General Arrangement Drawing

Jorin ViPA MZ4 HF Data Sheet

General				
1.01	Type	Droplet & Particle Analyser		
1.02	Manufacturer	Jorin Limited		
1.03	Model	ViPA MZ4 HiFlo		
1.04	Sample Temp Limits	0 – 120°C (32 – 248˚F)		
1.05	Max Operating Pressure	120 Bar (1740 PSI)		
1.06	System Description	Portable ATEX certified analyser unit		1
1.07	Tag Number	TBC		
1.08	Instrument Fittings	Swagelok SS316		2
Instrument Characteristics				
2.01	Accuracy	±2% Full Scale		
2.02	Repeatability	±1.5%		
2.03	Linearity	±7.5% in range 0 – 400PPM		
2.04	Drop Size Range	0 – 150 microns		
2.05	Particle Size Range	0 – 150 microns		
2.06	Concentration	0 – 2500 ppmV		
2.07	Data Outputs	Data displayed on control computer screen or can provide Serial data by Modbus TCP/IP for all data and alarms if necessary		3
2.08	Flow Rates	Flow through analyser	Up to 4 litres/min	
Physical Characteristics				
3.01	Sample Feed	Typically ½” sample tubing/flexible hose		
3.02	Analyser Drain	Typically ½” sample tubing/flexible hose		
3.03	Wash Connection	N/A		
3.04	Purge Air Connection	Typically ½” sample tubing/flexible hose		
3.05	Mounting	Analyser	Analyser Field Enclosure	
		Control Computer	Within analyser enclosure	
3.06	Weights (dry)	Analyser Field Cabinet	30 Kgs	
3.07	Materials	Analyser Wetted	316SS, Viton, Industrial Sapphire	2
		Analyser Field Cabinet	316 SS	
3.08	Enclosure Rating	ViPA Analyser	IP55	
3.09	Hazardous Area	Zone 1		1
3.10	Classifications	Ex II 2 G Ex px IIC T3		1
3.11	Cable Gland	Peppers or Hawke Brass M20		
3.12	Environment	Analyser Enclosure	-20 – 55°C Ambient	
Electrical Data				
4.01	Supply Voltage	Analyser Field Cabinet	240V 50 Hz OR 110V 60 Hz	4
4.02	Consumption	Analyser Field Cabinet	100 Watts (Peak)	
Supply Requirements				
5.01	Purge	Clean dry air, 155 litres per minute @ 4 – 7 bar		

Notes	
1	Certification by MDoC from ORGA BV in accordance with ATEX for Zone 1
2	Wetted materials to meet fluid specifications
3	Further data can be accessed by transfer to USB memory device.
4	Power supply is single voltage and must be specified at the time of order

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