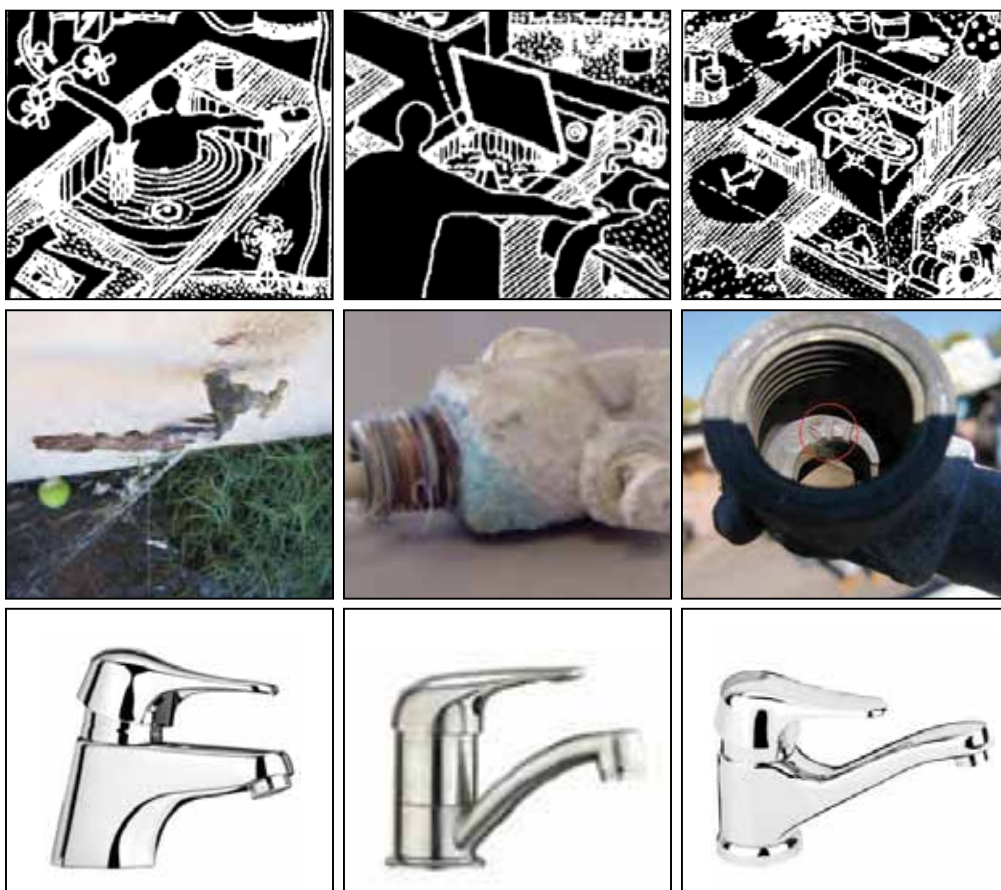


Flick Mixer Product Analysis for use in Remote Indigenous Communities



2010

Flick Mixer Product Analysis for use in Remote Indigenous Communities

Introduction

FHBH Survey data shows that taps are performing poorly. Poorly performing taps impacts on the ability of the householder to maintain personal hygiene and health. Washing children under 5 years of age is the highest priority HLP after Safety. Working and reliable taps form the basis of any healthy personal, family and community living environment.

Background

Links to HLP's

HLP 1 Washing people

HLP 2 Washing clothes and bedding

HLP 3 Removing waste safely

HLP 4 Improving nutrition

HLP 5 Reducing impacts of over-crowding

Links to NIHG

The National Indigenous Housing Guide, 3rd edition, pp 73-76, 217-218, makes the following comments about the impact of poorly performing tap ware.

A house may have twenty taps or valves, including two shower taps, two basin taps, two laundry tub taps, two washing machine taps, two yard taps, a toilet cistern stop tap and cistern valve, two bath taps, two kitchen taps, a hot water system relief valve, stop valve and cold water relief valve and a main house isolation valve.

If any of these taps do not work, residents will be less able to carry out the Healthy Living Practices.

One dripping tap can waste up to 600 liters of water a day and hot water lost through leaking taps can increase the household energy bill.

If many taps are leaking in a community water system, the water supply and waste water systems will be adversely affected. See C1.2 Water quantity and demand management.

Taps should be given careful attention when designing and specifying new works with consideration of the local water quality, easy maintenance and use by people with arthritis or limited mobility.

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Flick Mixer Product Analysis for use in Remote Indigenous Communities

Project Outline

A significant amount of work has already been done on standard jumper valve type taps. This project will focus on Flickmixer type tap ware. To do this it is necessary to undertake a thorough product analysis of existing flick mixers available in the market. The aim is to identify and encourage the provision of longer lasting and better quality flick mixer. The following report is addressing the issues below

- What quality differences are there amongst the models currently on the market?
- Establish performance criteria for specifying flick mixers
- Research existing available flick mixers solutions
- Disassemble, identify, analyse and evaluate materials, components, methods of fixing, etc...
- Highlight potential problematic issues,
- Evaluate fastening to basins, walls, etc...
- Document and present current product examples
- Specify performance criteria for suitable products
- Recommend most suited product based on above work for further in field testing

Discussion

Why focus on flick mixers and not other taps?

Reasons why taps fail:

- handles come off
- washers wear out,
- tap seats pit and corrode
- dezincification of tap-ware
- seals wear out
- hot cold indicators come off
- hard to use by old and arthritic people

Research existing available flick mixer solutions

Desktop research of previous tap ware concluded that only one Australian supplier of a Stainless Steel Flick Mixer tap could be located (Ewings). Stainless steel is preferred due to its higher resistance to the various water quality related performance issues such as dezincification, corrosion and calcification.

All other selected mixers are suitable for commercial use according to the manufacturers advice. This was deemed the second most important criteria due to household numbers and resulting user interaction.

Summary of Results

Product Sample

The sample included basin and sink mixers from the following manufacturers:

- Caroma Nordic
- Ewing
- Enware Oras
- Gallery Enhance
- Hansa Polo
- Ram Elan

The sample was selected based on:

- Current specification provided by Territory Alliance, Plumbing Schedule for SIHIP (Ewing)
- Previously specified Jumper valve products for this usage environment (Enware)
- Other previously specified jumper valve manufacturers (Caroma)
- Commercial products specified for high use public environments i.e McDonald's Restaurant toilets
- A mid market segment product (Gallery)
- The cheapest Flick Mixer available (Bunnings, Ram Elan)

General findings

Maintenance

Anecdotal evidence indicated that often the entire mixer is replaced and thrown away instead of only the faulty part, this is not a sound practice. Community wide use of the same tapware will facilitate better servicing and maintaining of these products depending on the flick mixer specified cartridges can be easily serviced and replaced.

Selection Criteria

Based on problem areas identified in the NIHG as well as a thorough product analysis, any product considered for selection must meet the following:

Mandatory requirements

- Materials in contact with water must be corrosion resistant in compliance with AS 2345
- The cartridge and O-rings must be easily accessible without specialised tooling. The Caroma Nordic mixer for example requires the removal of three phillips head screws as opposed to the Hansa Polo which requires a 38mm tube spanner. Maintaining or replacing cartridges and O-Rings will often eliminate the need to replace the entire mixer.
- The cartridge must be located with sturdy provisions to prevent rotation. Moulded locating pins are standard, Caroma is the only model which utilised two M8 Stainless Steel fixing screws which are fastened through the entire cartridge to prevent rotation. Rotation causes wear to cartridge components and disorientates inlets.
- The cartridge must afford easy disassembly without risk of damaging casing material. The snap fits on the Ram and Hansa cartridges for example are brittle and broke upon opening whilst the casing of the Caroma Nordic cartridge is robust and the design does not utilise snap fits. Access to internal cartridge components affords cleaning and maintenance, prolonging the life of the mixer.
- The Ceramic discs must contain a Stainless Steel mesh filter to prevent debris entering the cartridge and damaging internal components. All Models excluding Enware Oras and Gallery Enhance fulfilled this requirement.
- Minimum of 4 star WELS water rating. All Models excluding Enware Oras Fulfilled this category.
- Lever handle must be manufactured in metallic alloy to withstand heavy usage. All mixers excluding the Enware Oras fulfilled this requirement.

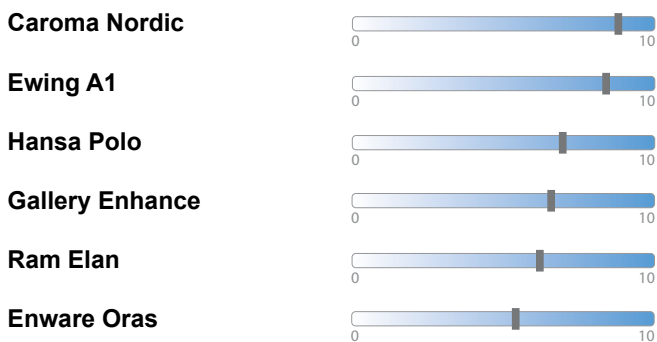
Desired requirements

- Mounting with double pins to reduce rotation, as evident in Ewing A1 and Enware Oras
- Handle fixed to rocker with machine screw (as opposed to friction screw) to reduce likelihood of handle falling off, as evident in Caroma Nordic and Enware Oras
- Flow and temperature adjustment to reduce water and energy consumption. As evident in Caroma Nordic, Enware Oras and Hansa Polo
- Require no accessories or specialised tooling for installation. All mixers within this sample fulfilled this requirement
- In line Stainless Steel mesh filter within tail connector to prevent debris entering mixer, as evident in Enware Oras

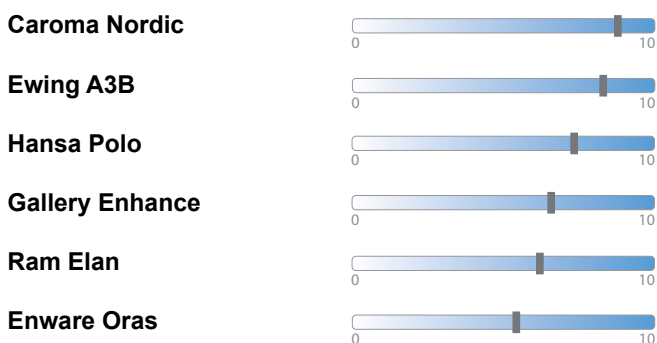
Overall Performance

Both Basin and Sink Mixers were evaluated against to stated criteria, a slide bar rating was awarded, with 10 being the most suitable. The results were as follows:

Basin Mixer suitability



Sink Mixer suitability



Conclusion

Caroma Nordic and Ewing mixers proved to be the most suitable for both applications. Detailed evidence is communicated within the overall comparison sections located at the end of each analysis.

Product Analysis

Material Key

ABS (Acrylonitrile butadiene styrene)

A thermoplastic commonly used in automotive parts, protective gear, and enclosures. High impact strength compared to pure styrene, resistant to corrosion and abrasion, lightweight.

Chrome Plating

A technique of electroplating a thin layer of chromium onto a metal surface. Provides corrosion resistance, ease of cleaning and increased surface hardness.

DR/DZR Brass

Dezincification resistant brass. Resistance is achieved by adding small percentages of zinc and arsenic. Low coefficient of friction. CW602 brass commonly used in Flick Mixers, which comply with AS2345

EPDM (Ethylene Propylene Diene Monomer)

A synthetic rubber used in seals, garden hoses, washers, belts and electrical insulation. Good resistance to hydraulic fluids, ketones, hot and cold water, alkalis, and ozone/strong oxidizing chemicals.

Nylon - PA (Polyamide)

A Thermoplastic commonly used in textiles, automotives and sportswear. Light weight yet heavy duty, good creep, wear, chemical and temprature resistance.

Nylon - POM (Polyoxymethylene)

An engineering thermoplastic used in precision parts. High stiffness, low friction and excellent dimensional stability, chemically resistant and low water absorption.

PP (Polypropylene)

A thermoplastic commonly used in packaging, stationery, tuppaware and automotive components. It is robust, high temperature and chemical resistance.

PEX (Cross Linked Polyethylene)

A thermoplastic commonly used in flexible piping and pressurized water systems. High temprature resistance.

SBR (Styrene-Butadiene)

A synthetic rubber commonly used in service of water and air systems. Good abrasion resistance and aging stability when protected by additives

SS (Stainless Steel)

A steel alloy containing a minimum of 11% chromium content. Does not stain, corrode or rust as easily as carbon steel.

304 SS

The most widely used variety of SS, used in kitchen sinks and appliances. Easy to clean, high wear resistance. Considered resistant to potable water with up to about 200mg/L chlorides at ambient temperatures, reducing to about 150mg/L at 60°C.

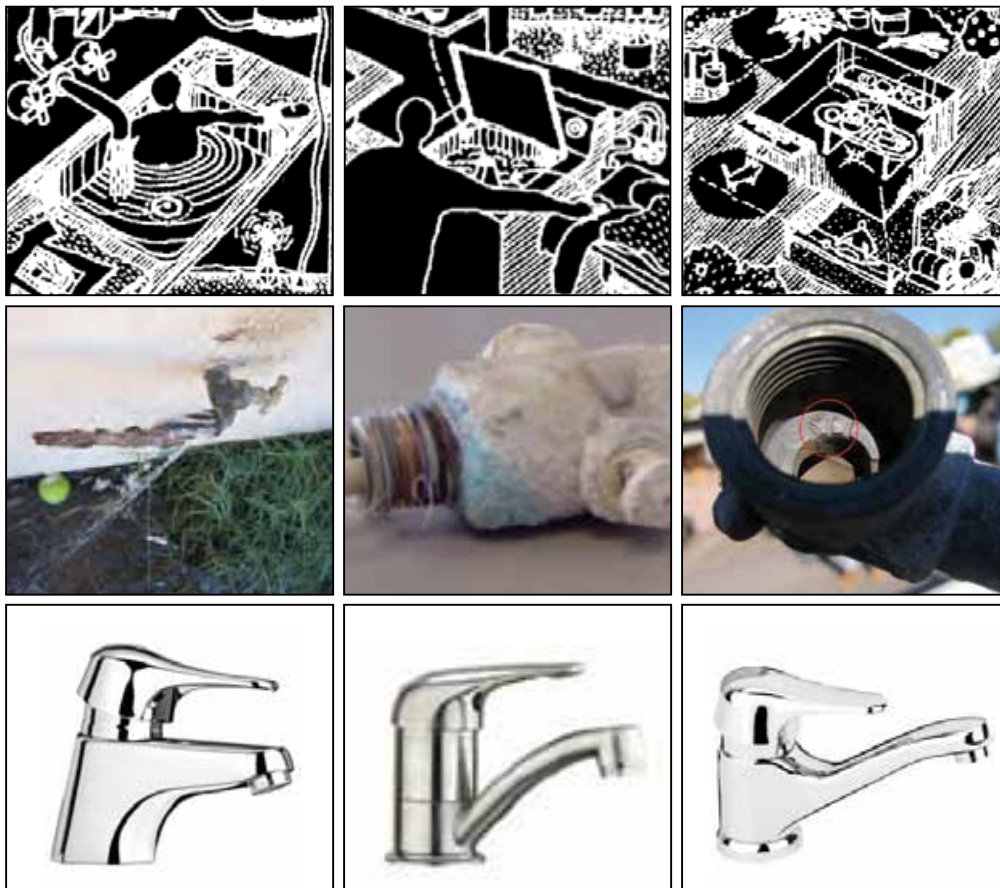
Teflon (Polytetrafluoroethylene)

A synthetic fluoropolymer commonly used as coating for nonstick frying pans. Extremely low coefficient of friction and non reactive.

Zinc

Zinc alloys are commonly used for die casting due to ease of manufacturer. High impact strength, easily plated and are often mixed with Aluminium which has high dimensional stability and good corrosion resistance.

Basin Mixers



Nordic Basic Mixer



Manufacturer:	Caroma
Model:	Nordic
Type:	Basin Mixer
RRP:	\$291.90
Temp Adjustment:	Yes
Flow Adjustment:	Yes
Swivel:	No
Material (body):	Cast Brass



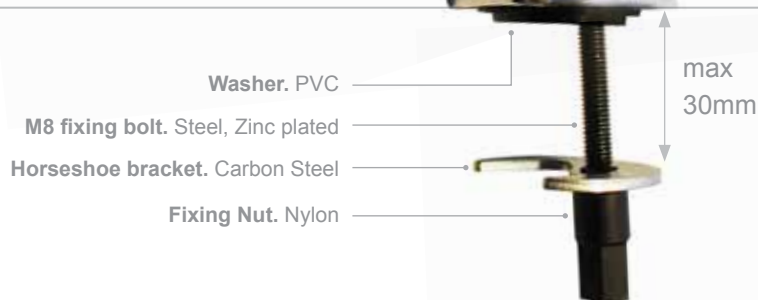
Installation

- Standard flexible hot and cold tails
- Inlet pressure range 150-1000kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Single M8 nut and bolt with horseshoe bracket

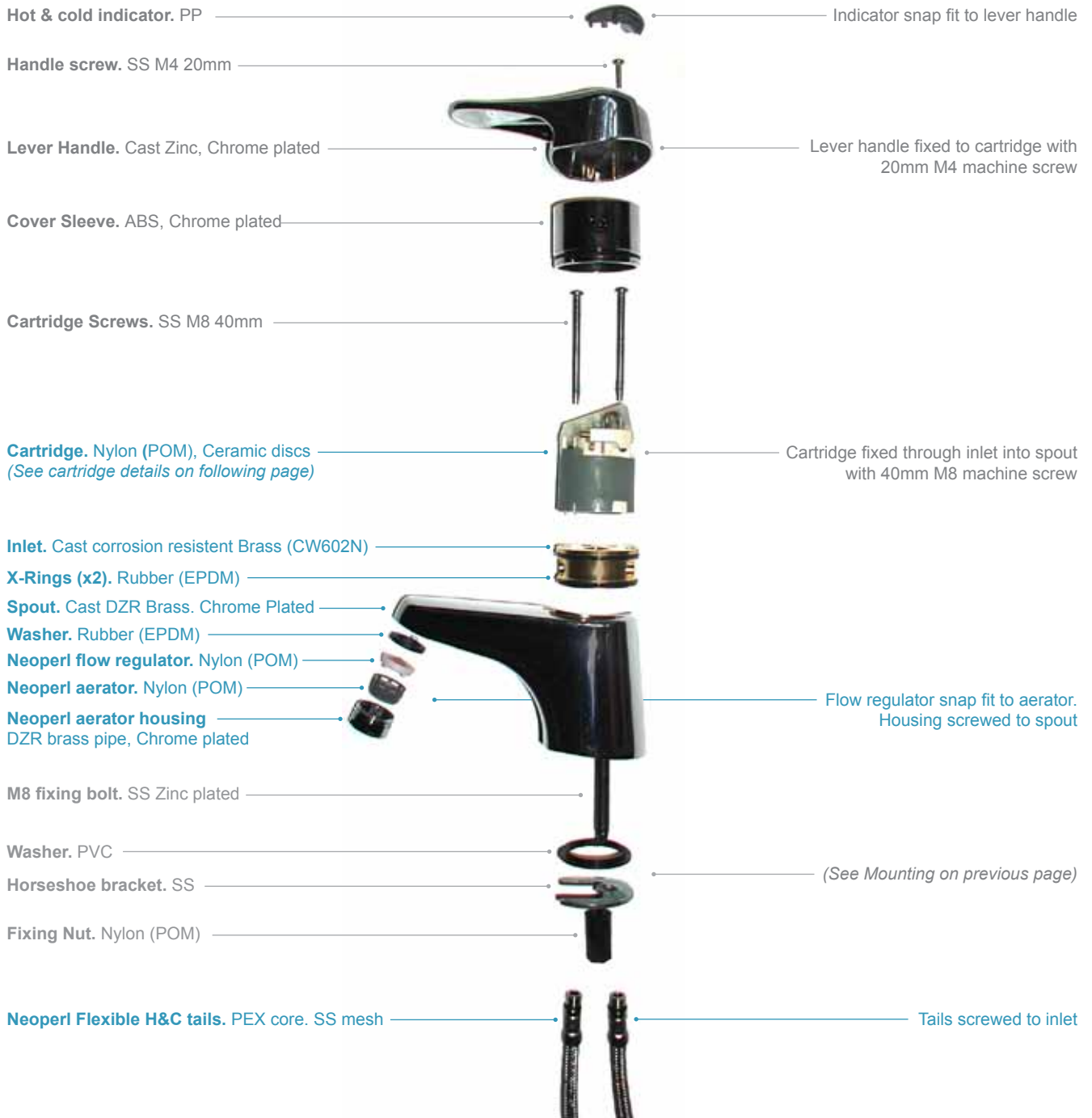


Nordic Basin Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

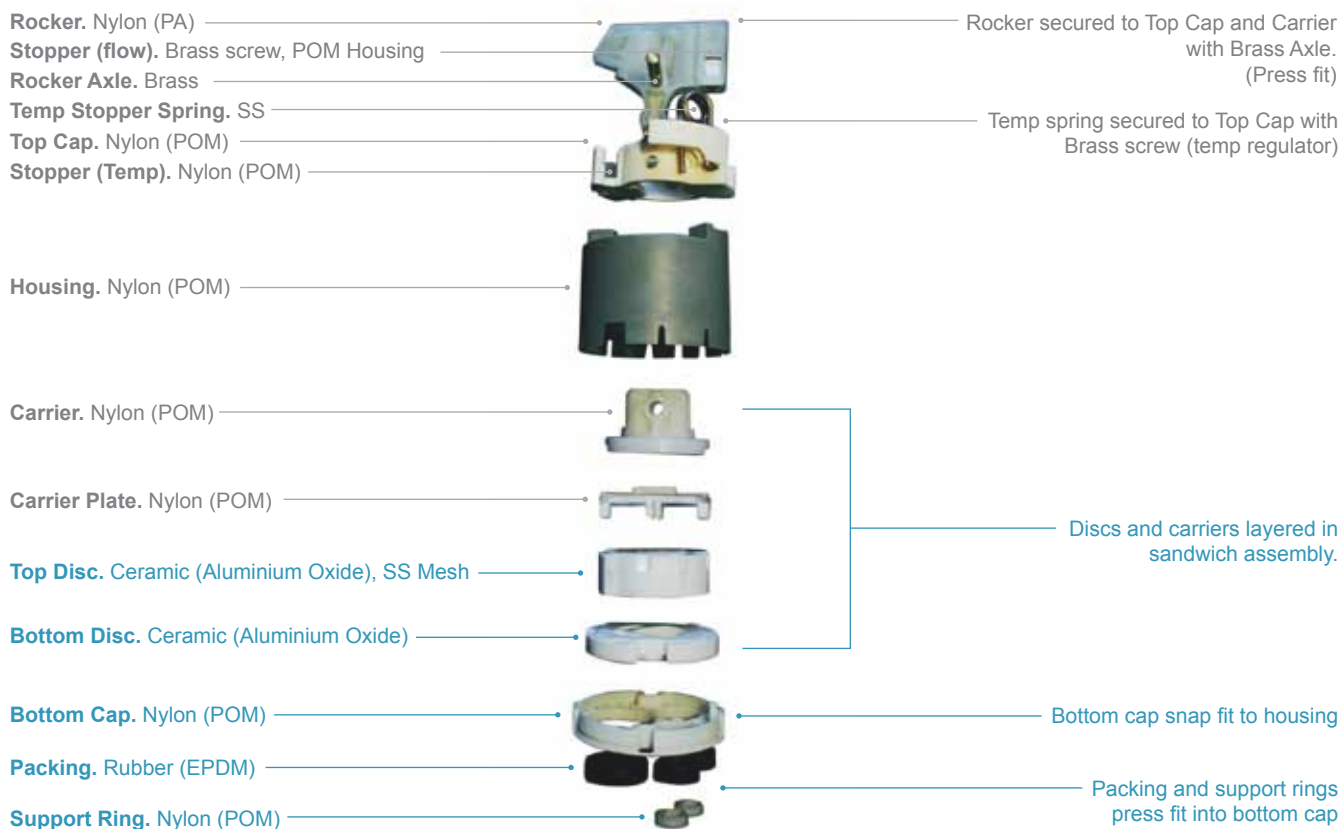


Nordic Basin Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Ewing A-1 Basic Mixer



Manufacturer:	Ewing Industries
Model:	A-1
Type:	Basin Mixer
RRP:	\$307.25
Temp Adjustment:	No
Flow Adjustment:	No
Swivel:	Yes
Material (body):	Stainless Steel



Installation

- Standard flexible hot and cold tails
- Inlet pressure range 50-800kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

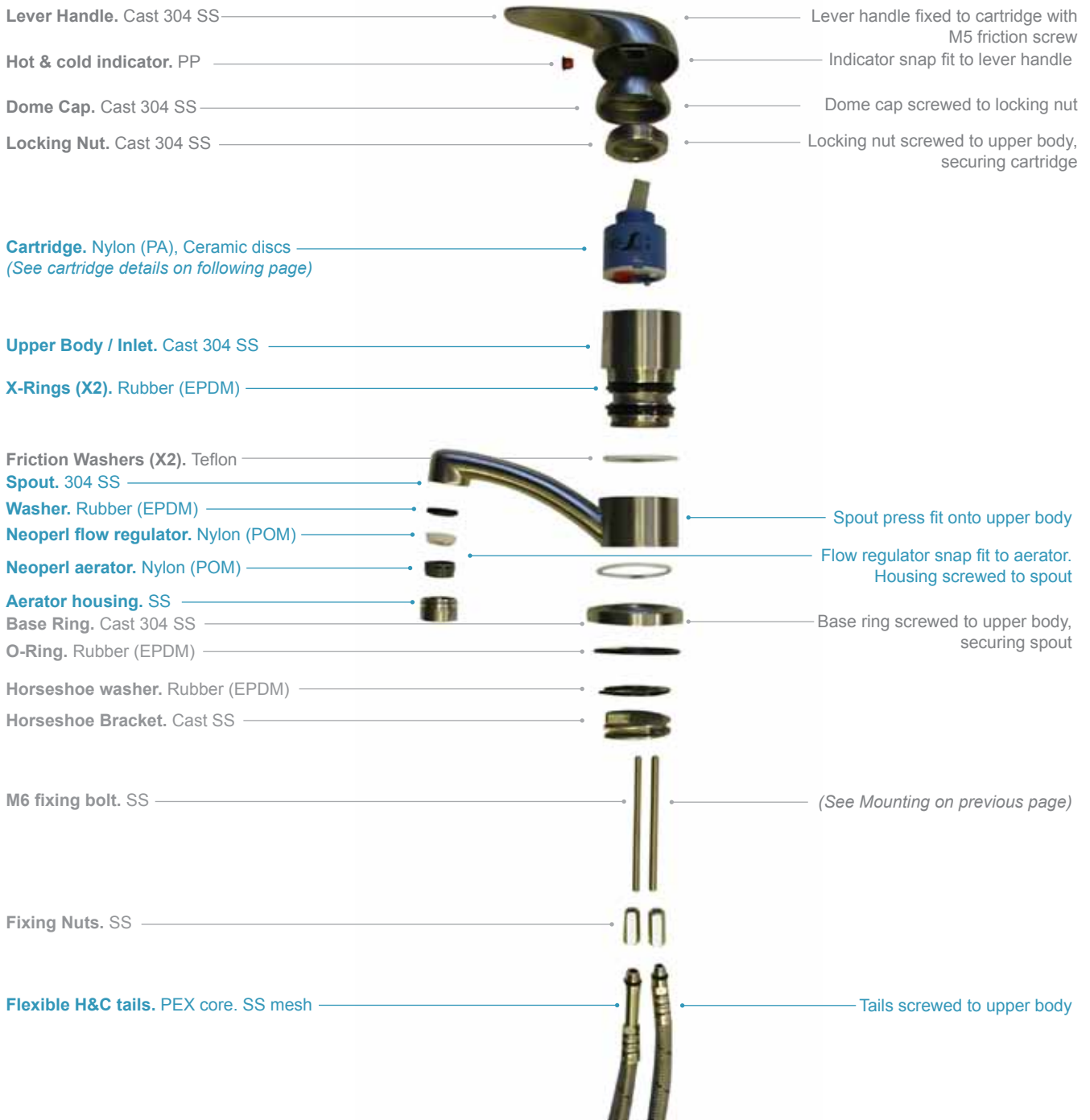
Double M6 nut and bolt with horseshoe bracket. Bracket is cast to create 9mm profile

Ewing A-1 Basin Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

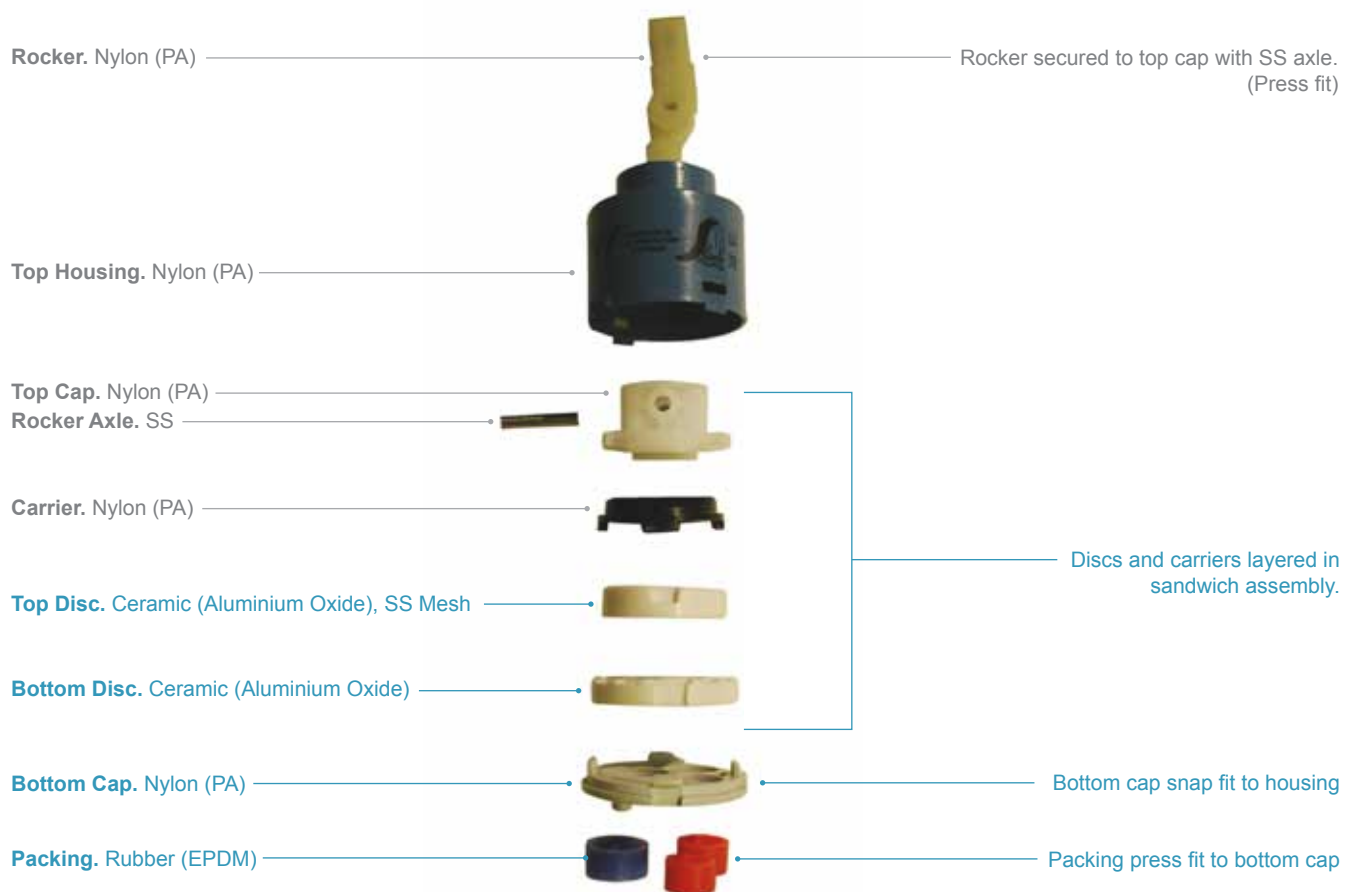


Ewing A-1 Basin Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Hansa Polo Basic Mixer



Manufacturer:	Hansa (Starion)
Model:	Hansa Polo
Type:	Basin Mixer
RRP:	\$291.95
Temp Adjustment:	Yes
Flow Adjustment:	Yes
Swivel:	No
Material (body):	Cast Brass



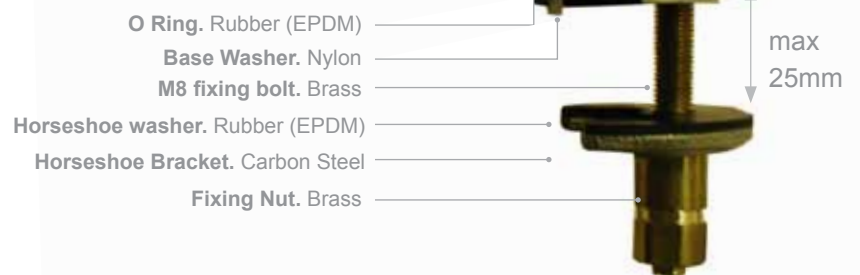
Installation

- Standard flexible hot and cold tails
- Inlet pressure range 100-1000kPa
- Max hot water 90°C
- Not Suitable for gravity feed systems



Mounting

Single M8 nut and bolt with horseshoe bracket

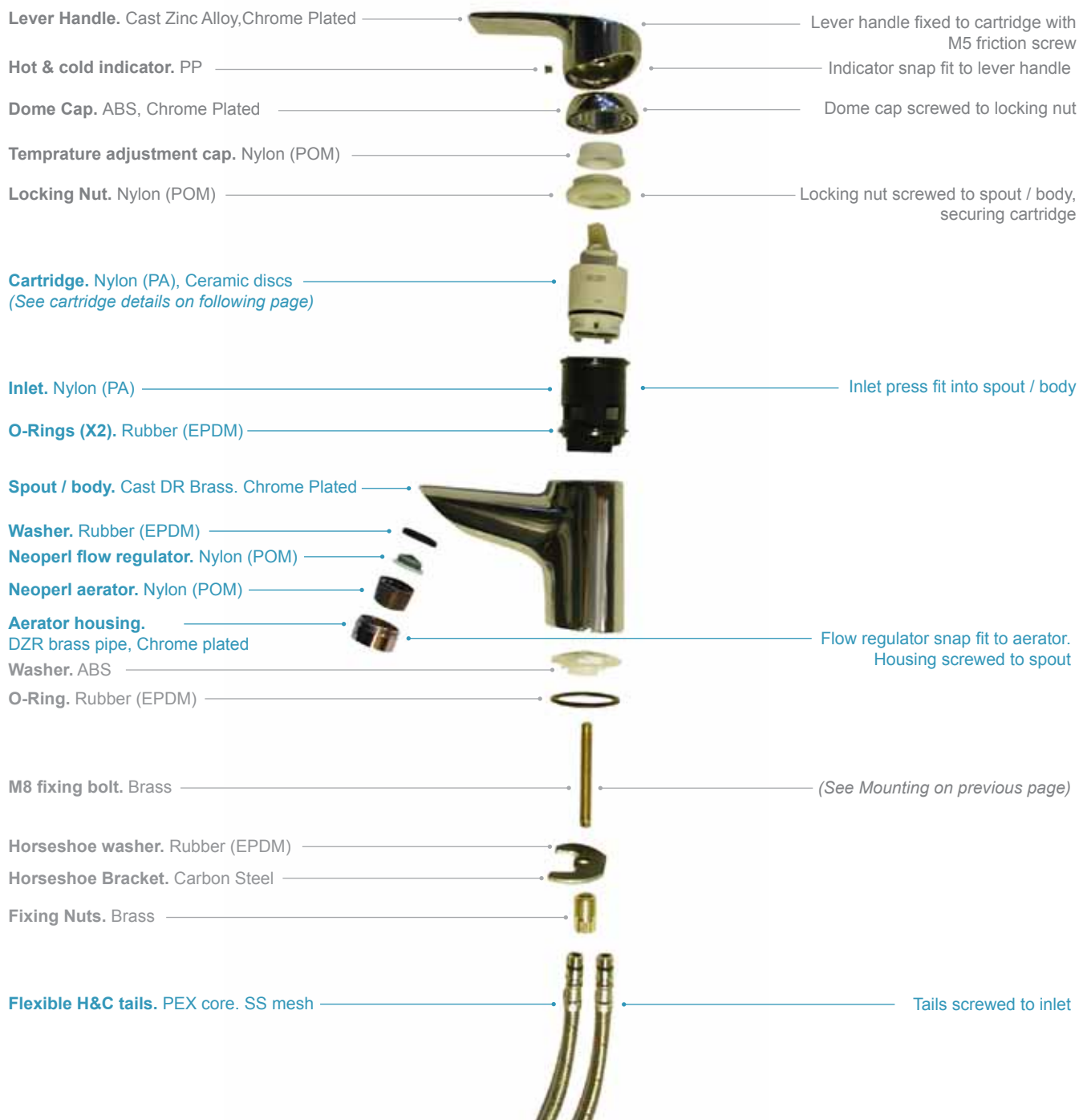


Hansa Polo Basin Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

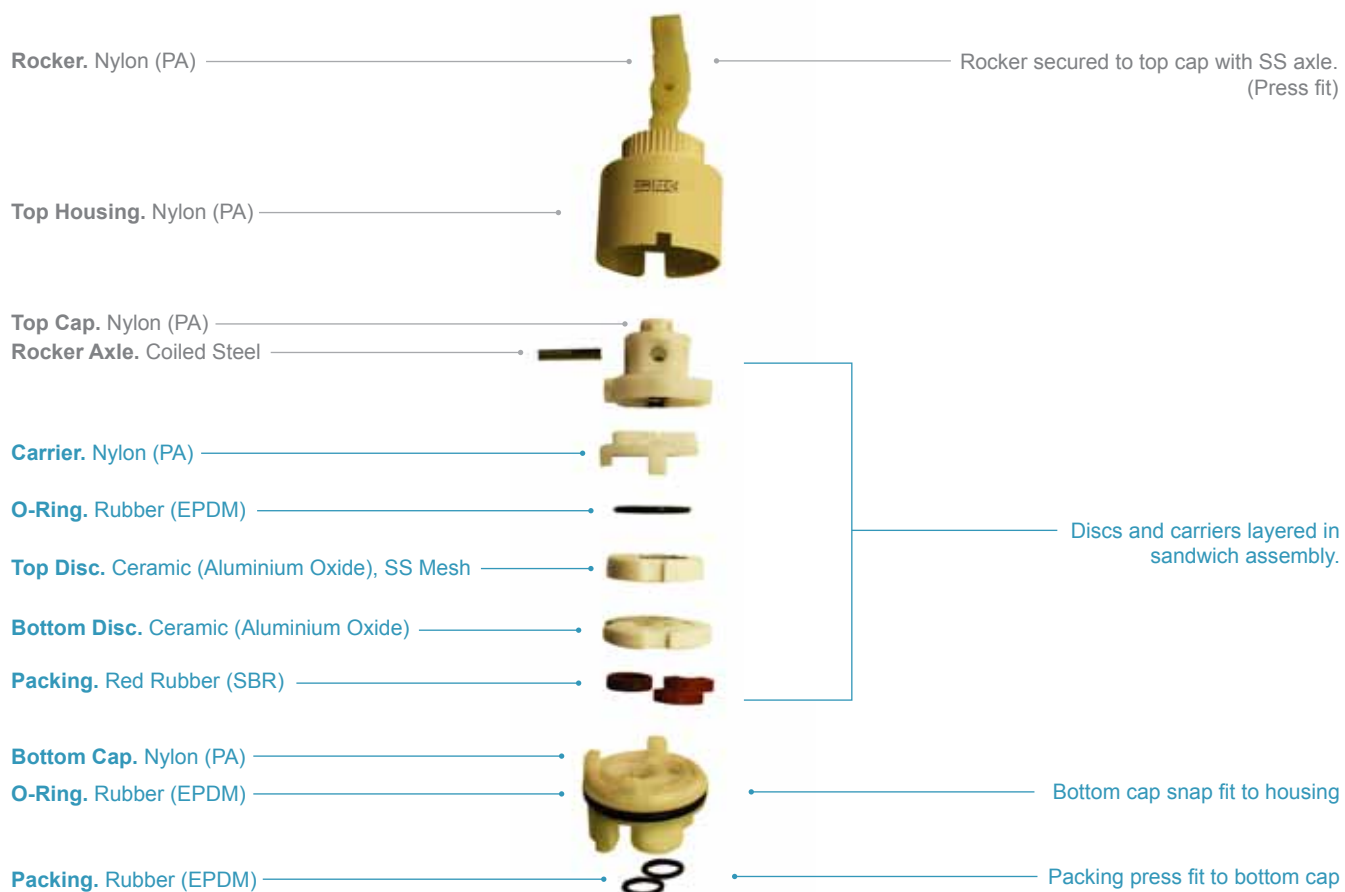


Hansa Polo Basin Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Gallery Enhance Basic Mixer



Manufacturer:	Gallery Tapware
Model:	Enhance
Type:	Basin Mixer
RRP:	\$116.00
Temp Adjustment:	No
Flow Adjustment:	No
Swivel:	Yes
Material (body):	Brass



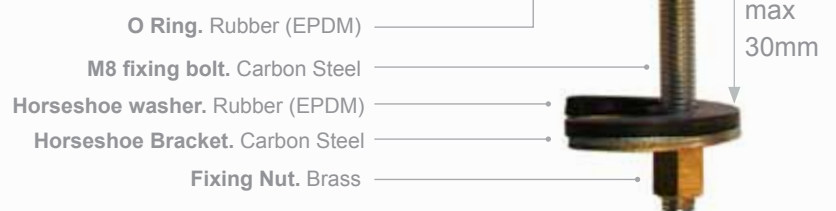
Installation

- Standard flexible hot and cold tails
- Inlet pressure range 50-800kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Single M8 nut and bolt with horseshoe bracket

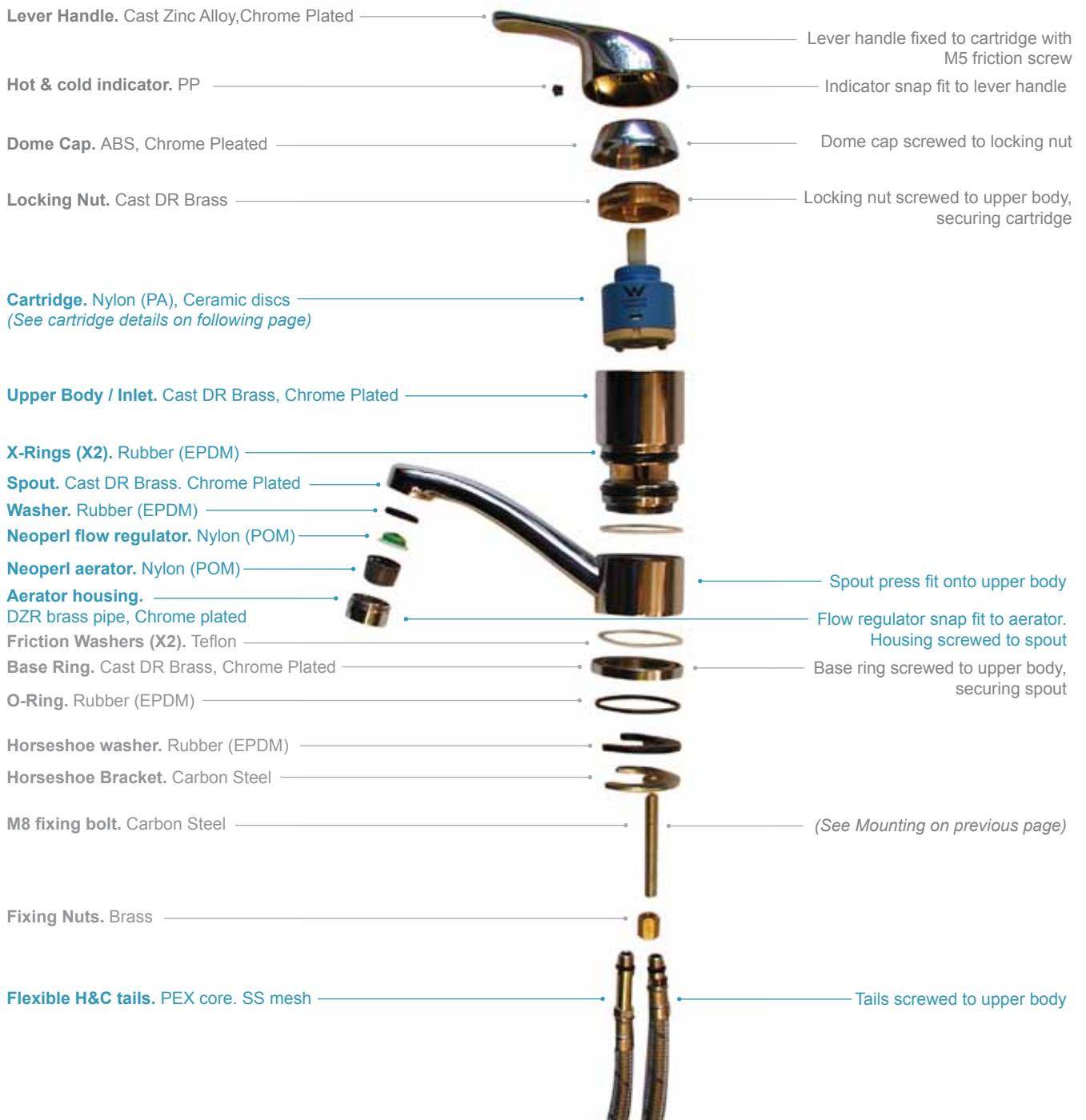


Gallery Enhance Basin Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

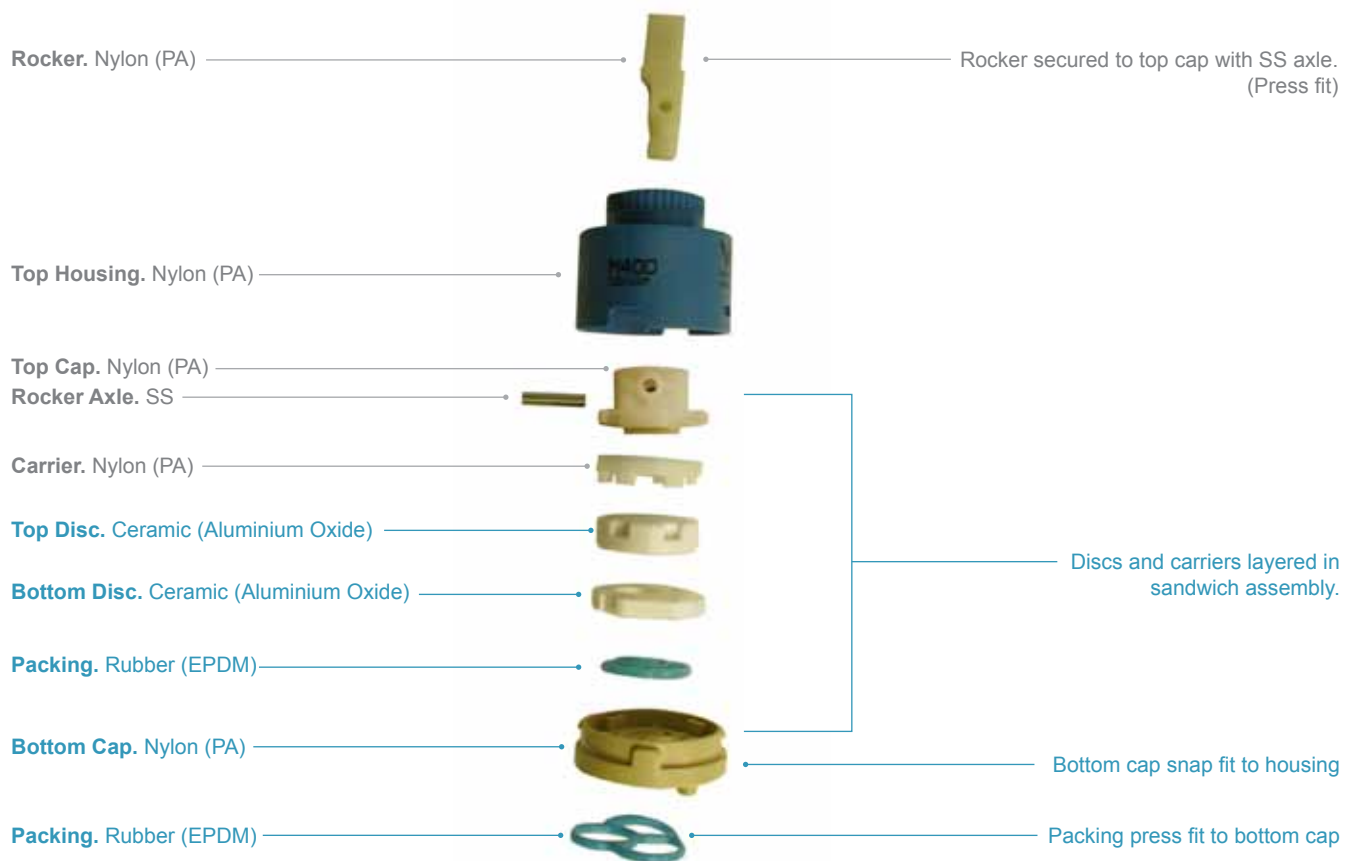


Gallery Enhance Basin Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Ram Elan Basic Mixer



Manufacturer:	Ram Tapware
Model:	Elan
Type:	Basin Mixer
RRP:	\$93.70
Temp Adjustment:	No
Flow Adjustment:	No
Swivel:	Yes
Material (body):	Brass



Installation

- Standard flexible hot and cold tails
- Inlet pressure range 50-800kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Single M8 nut and bolt with horseshoe bracket

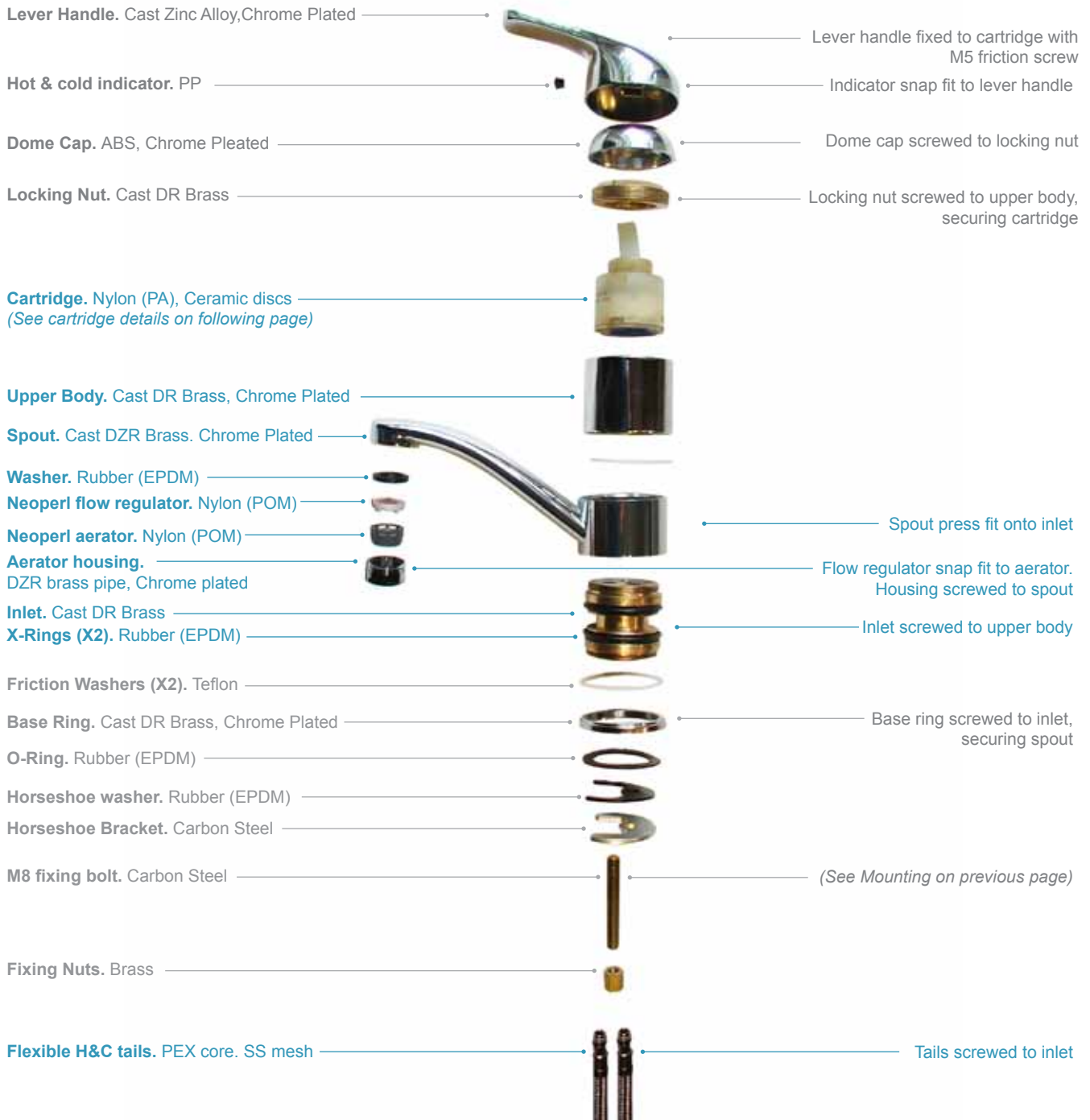


Ram Elan Basin Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

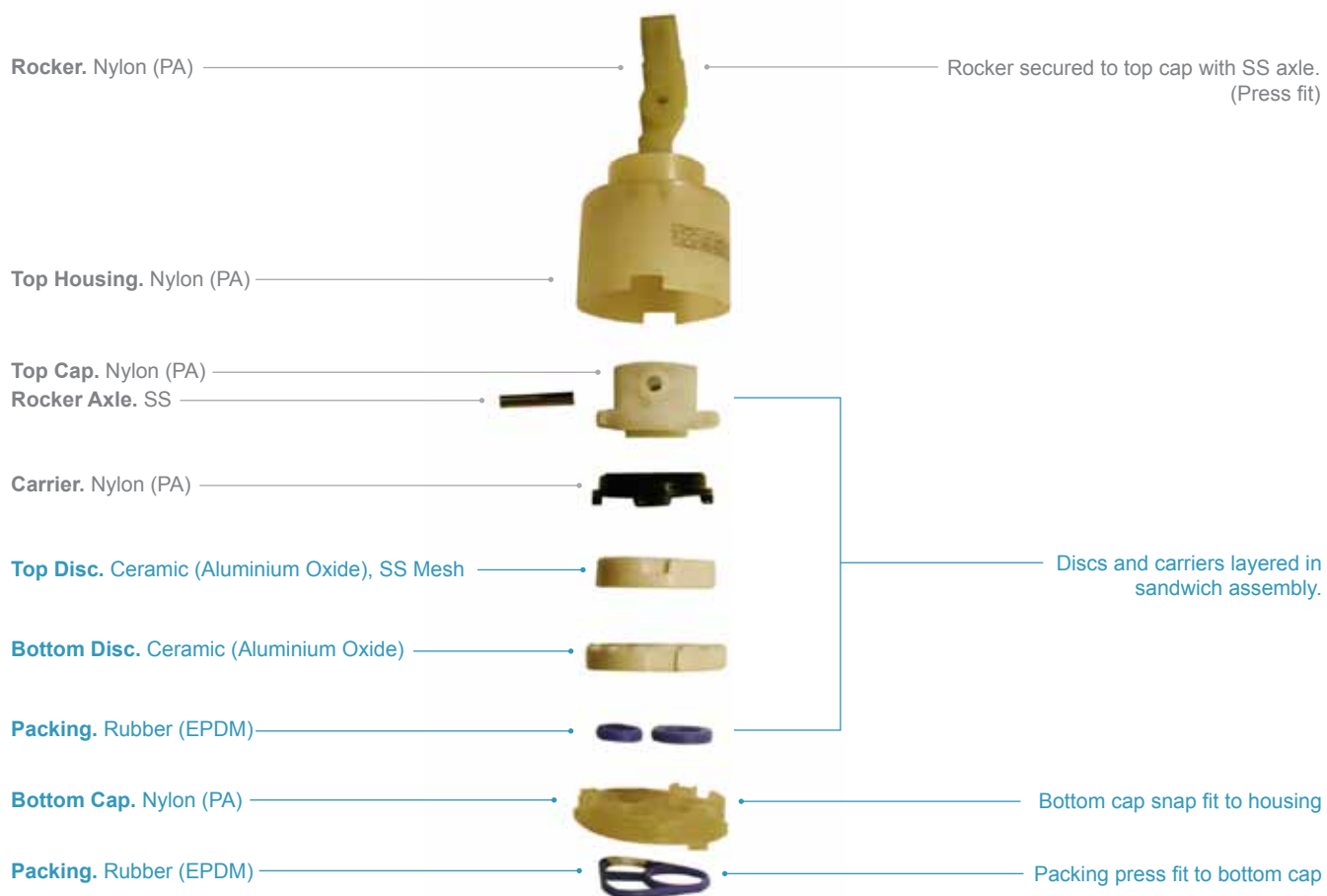


Ram Elan Basin Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Enware Oras Vega Basic Mixer



Manufacturer:	Enware Australia
Model:	Oras Vega
Type:	Basin Mixer
RRP:	\$275.50
Temp Adjustment:	Yes
Flow Adjustment:	Yes
Swivel:	No
Material (body):	Cast Brass



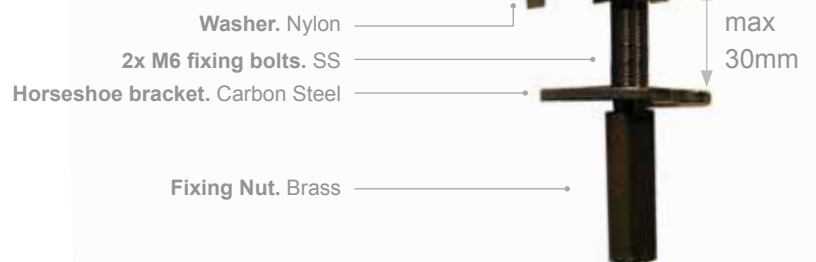
Installation

- Standard flexible hot and cold tails
- Inlet pressure range 100-1000kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Double M6 nut and bolt with horseshoe bracket

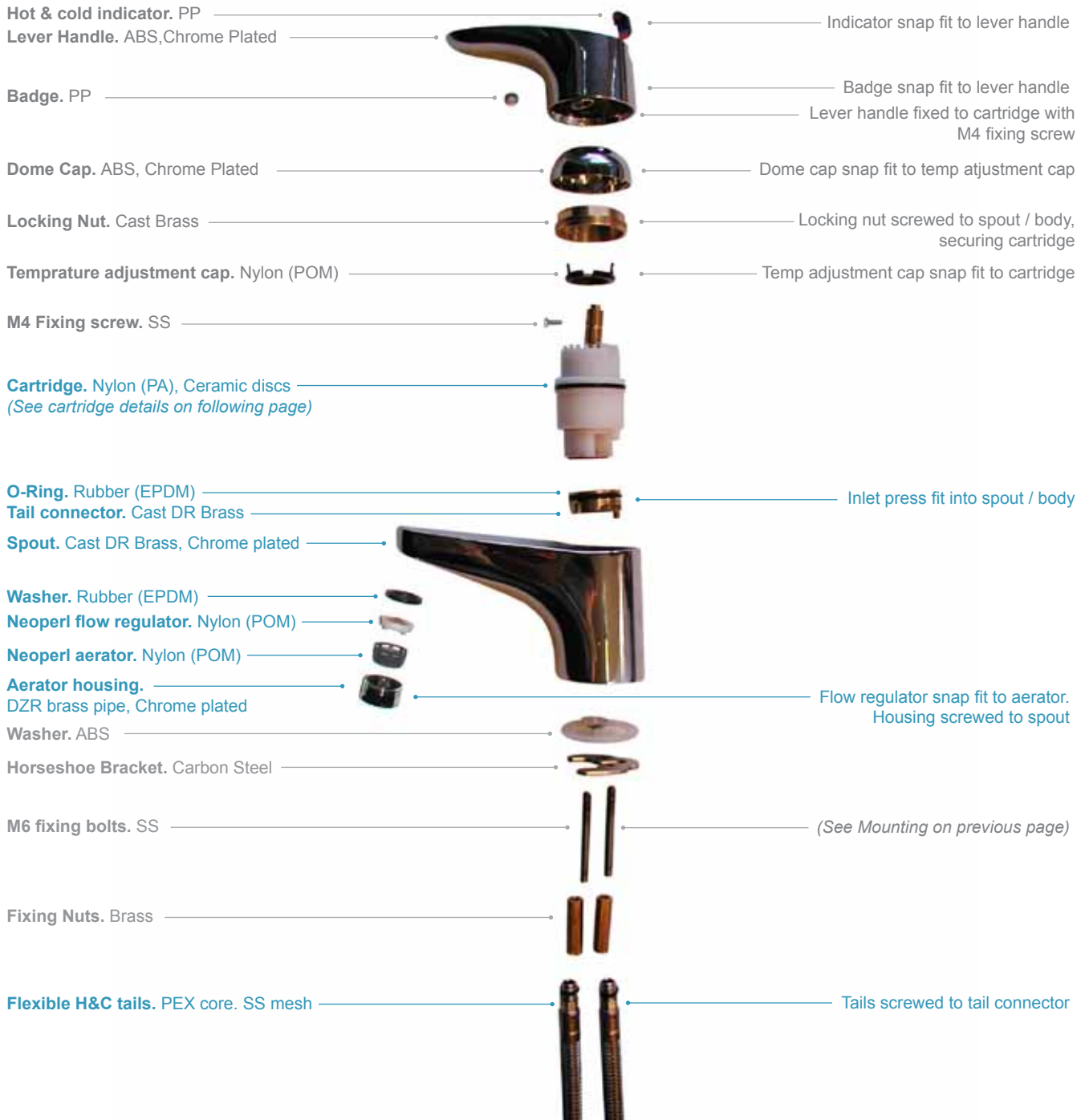


Enware Oras Vega Basin Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

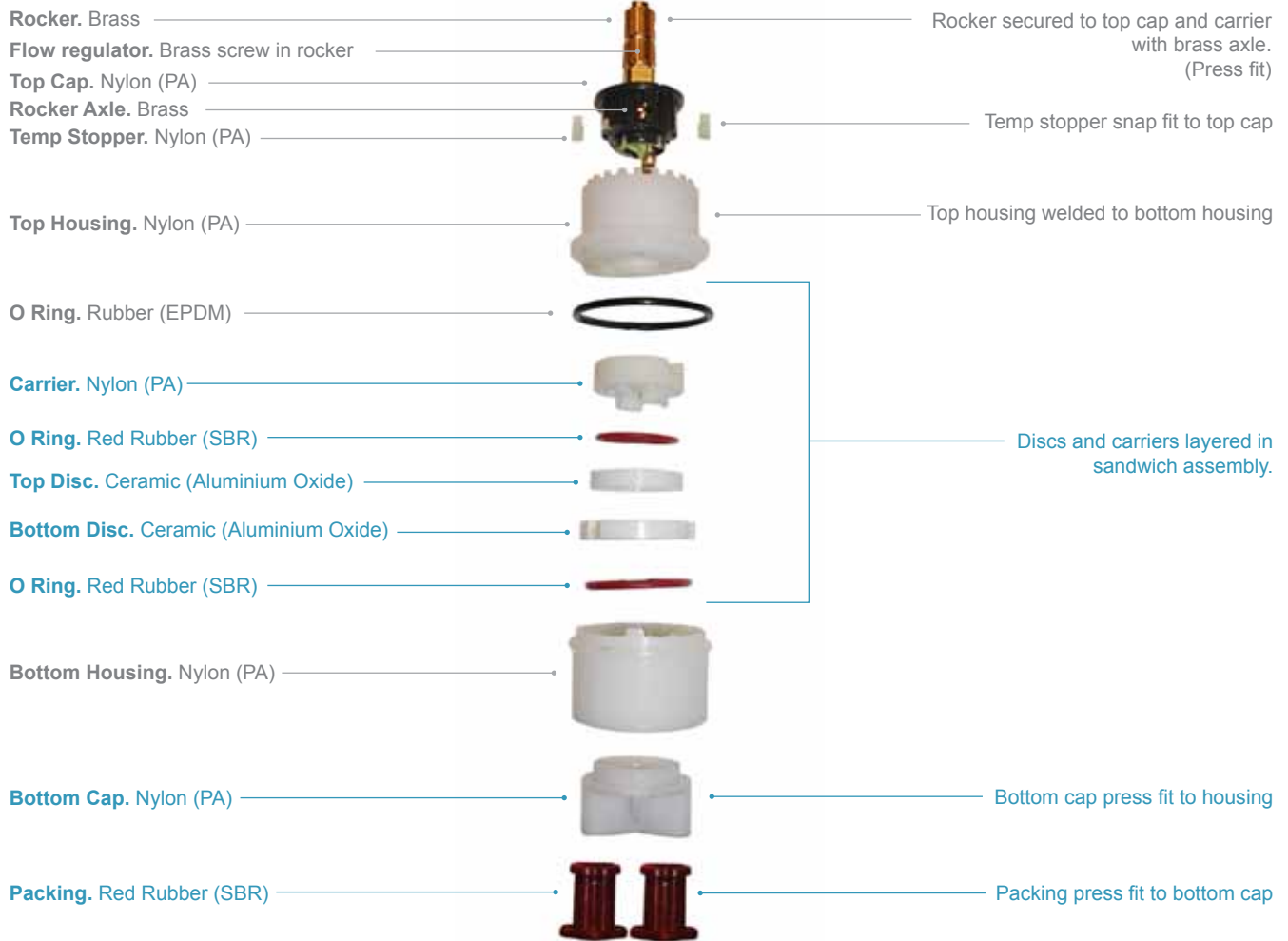


Enware Oras Vega Basin Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Basin Mixer Comparison

Analysis Criteria

The following criteria have been established in accordance to problem areas identified by FHBH survey data as well as thorough product analysis (as illustrated in this document). Criteria have been stated within the following areas:

- **General Suitability**
- **Material Suitability**
- **Methods of Assembly**
- **Cartridge Quality**
- **Mounting Systems**

Within each category the stated flick mixers have been compared in relation to a list of desired qualities and an overall slide bar rating (shown below), with 10 being the most suitable.

Material Quality



A recommendation will then be stated for the most suitable flick mixers based on these selection criteria

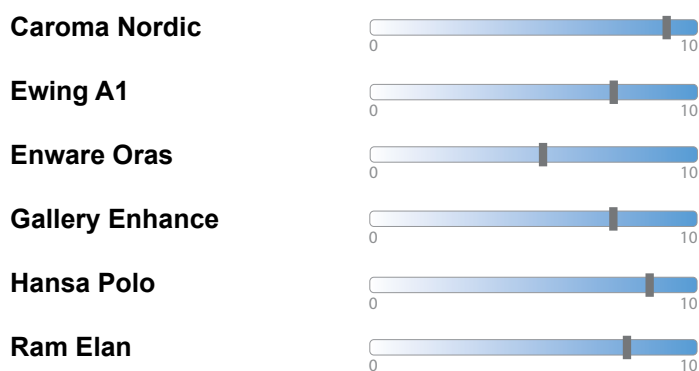
General Suitability

General Suitability has been determined by the following criteria, listed in order of importance:

Water Rating	WELS water efficiency star rating from 1-6, 6 being most efficient.
Maintenance:	Ease of access, number of replaceable parts, instillation accessories, Rating given from 1-5, 5 affording the easiest maintenance. Additional maintenance notes also located on following page
Price:	Unit cost (including GST)
Flow Adjustment:	Ability to control maximum water flow
Temp Adjustment:	Ability to control maximum water temperature
Swivel:	Swivel function is not essential for basin mixers, it adds additional components, wear and tear (friction on washers) as well as material joins which can be hard to clean.

Manufacturer	Water Rating	Maintenance	Price (\$)	Flow Adj.	Temp Adj.	Swivel
Caroma Nordic	5	4	291.90	Yes	Yes	-
Ewing A1	5	4	307.25	-	-	Yes
Enware Oras	3	1	275.50	Yes	Yes	-
Gallery Enhance	4	4	116.00	-	-	Yes
Hansa Polo	5	4	291.95	Yes	Yes	-
Ram Elan	5	3	93.70	-	-	Yes

Product Rating (General Suitability)



Additional Maintenance Notes

Caroma

The design is simple with minimal components. The cartridge can easily be replaced by removing 3 Phillips head screws. The cartridge itself has minimal parts and no snap fits, making it extremely easy to replace individual components.

The O-rings around the inlet can only be replaced if the mixer is removed from its mounting, however as there is no swivel there is minimal friction on these rings.

Enware

The internal components are extremely difficult to access without a 38mm thin walled tube spanner, which is scarcely available. The casing of the cartridge is welded closed, making it impossible to replace individual components within the unit.

The tails are difficult to access and require an Allen key to be removed, the tail connector is awkward to locate.

Gallery, Ram, Ewing

These three mixers have identical assembly. They have minimal parts, simple fixtures and access to cartridge is extremely easy.

X-Rings around inlet and friction washers are easy to access, however they can only be replaced if mixer is removed from its mounting. The cartridge is fairly easy to open with simple snap fits. The **Ram** cartridge material however is very brittle which poses a risk of snap fits breaking

Hansa

The cartridge is easy to access, however it is slightly difficult to locate. The O-rings can be replaced without removing the mixer from its mounting, however they are also slightly difficult to locate.

Material Suitability

Material suitability of mixer components (excluding cartridge) have been determined by the following criteria, listed in order of importance:

Components in contact with water: Corrosion resistance being the first priority followed by toughness and density. Suitability has been determined in relation to the functional needs of individual components.

Components not in contact with water: Density being the first priority, followed by toughness and corrosion resistance.

Crucial components in contact with water

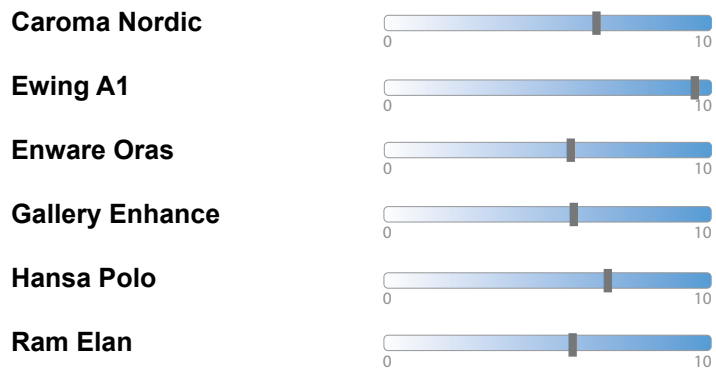
Manufacturer	Body / spout	Inlet / Tail connector	Tails	Aerator/flow regulator	Aerator housing
Caroma Nordic	DR Brass (CP)	DR Brass	PEX Core. SS mesh	POM	DR Brass (CP)
Ewing A1	SS	SS	PEX Core. SS mesh	POM	SS
Enware Oras	DR Brass (CP)	DR Brass	PEX Core. SS mesh	POM	DR Brass (CP)
Gallery Enhance	DR Brass (CP)	DR Brass (CP)	PEX Core. SS mesh	POM	DR Brass (CP)
Hansa Polo	DR Brass (CP)	Nylon (PA)	PEX Core. SS mesh	POM	DR Brass (CP)
Ram Elan	DR Brass (CP)	DR Brass	PEX Core. SS mesh	POM	DR Brass (CP)

Crucial components NOT in contact with water

Manufacturer	Lever Handle	Base Ring	Dome Cap / Sleeve
Caroma Nordic	Zinc Alloy (CP)	-	ABS (CP)
Ewing A1	SS	SS	SS
Enware Oras	ABS (CP)	-	ABS (CP)
Gallery Enhance	Zinc Alloy (CP)	DR Brass (CP)	ABS (CP)
Hansa Polo	Zinc Alloy (CP)	-	ABS (CP)
Ram Elan	Zinc Alloy (CP)	DR Brass (CP)	ABS (CP)

*CP indicates chrome plating *DR indicates dezincification resistant *POM is a Nylon polymer

Product Rating (Material Suitability)



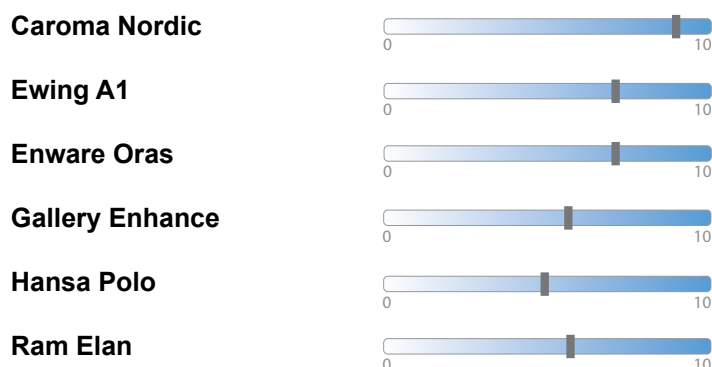
Method of assembly

Methods of assembly relates to crucial components which are subject to high levels of usage and have been indicated as problem areas by FHBH survey data. Assembly of additional components have been explored in other areas. Suitability has been determined by the following, listed in order of importance:

Handle Fixture:	Friction screws secure handle with pressure applied to the surface of the cartridge rocker. Regular screws create sturdier fixture as they are inserted into threaded holes within cartridge rocker.
Cartridge housing:	Ease of location and access, stability of housing.
Cartridge location:	Pins to ensure correct installation position as well as precautions to reduce rotation within housing (when handle is turned). Large locating screws are more durable compared to smaller pins moulded into the cartridge which may not withstand high levels of sheer force.
Indicator fixture:	Quality of snap fit or paint of Hot and Cold indicators

Manufacturer	Handle Fixture	Cartridge Fixture	Cartridge location and rotation precautions	Indicator fixture
Caroma Nordic	M4 Screw	2 M8 40mm screws	2 M8 fixing screws	Snap fit
Ewing A1	M5 Friction Screw	Large SS Locking nut	2 moulded locating pins	Snap fit + engraved
Enware Oras	M4 Screw	Large Brass locking nut	1 moulded locating pin	Snap fit
Gallery Enhance	M5 Friction Screw	Large Brass locking nut	2 moulded locating pins	Snap fit
Hansa Polo	M5 Friction Screw	Large Nylon locking nut	2 moulded locating pins	Painted
Ram Elan	M5 Friction Screw	Large Brass locking nut	2 moulded locating pins	Snap fit

Product Rating (Methods of Assembly)



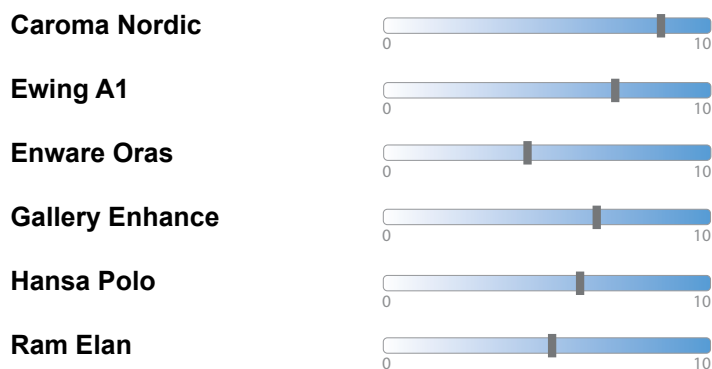
Cartridge Quality

The quality of mixer cartridges have been determined by the following criteria, listed in order of importance:

- Quality of Materials:** All ceramic discs are Aluminium oxide and extremely similar in design. All cartridge housing and mechanical components consist of a combination of Nylons. An overall quality rating is based on material toughness, density and suitability. 1-5, 5 being the most suitable.
- Ease of Access:** How easily cartridge can be opened for cleaning or maintenance, a rating of 1-5, 5 being the most suitable.
- Filter:** A selection of cartridges contain a SS mesh filter in the top ceramic disc
- Design suitability:** Overall assembly, features and ares which may catch debris, a rating of 1-5, 5 being the most suitable.

Manufacturer	Material Quality	Ease of Access	Filter	Design Suitability
Caroma Nordic	5	5	Yes	5
Ewing A1	4	4	Yes	4
Enware Oras	4	1	-	3
Gallery Enhance	4	4	-	4
Hansa Polo	3	3	Yes	4
Ram Elan	3	3	Yes	3

Product Rating (Cartridge Quality)



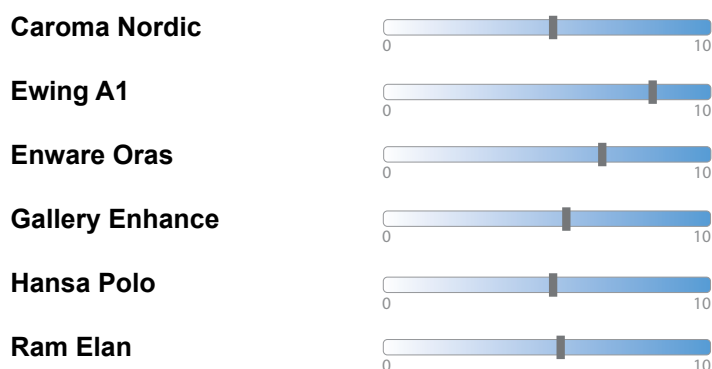
Mounting System

Quality of mounting has been determined by the following criteria, listed in order of importance:

Fixing bolts:	Size of fixing bolts, single or double, bolt material. Double bolts reduce likelihood of rotation
Max Mounting:	Max thickness of sink/bench
Bracket Quality:	Material and construction of mounting bracket.
Fixing Nut:	Material Quality

Manufacturer	Fixing Bolt	Max Mounting (mm)	Bracket quality	Fixing Nuts
Caroma Nordic	Single M8 Steel	30	Steel Horseshoe bracket	Nylon
Ewing A1	Double M6 SS	45	Cast 9mm Horseshoe bracket with rubber washer	SS
Enware Oras	Double M6 SS	30	Steel Horseshoe bracket	Brass
Gallery Enhance	Single M8 Steel	30	Steel Horseshoe bracket with rubber washer	Brass
Hansa Polo	Single M8 Brass	25	Steel Horseshoe bracket with rubber washer	Brass
Ram Elan	Single M8 Brass	30	Steel Horseshoe bracket with rubber washer	Brass

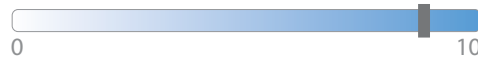
Product Rating (Mounting System)



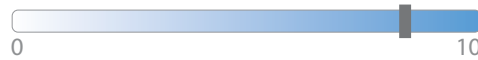
Overall Product Rating

Based on the previous analysis a final overall comparison is shown:

Caroma Nordic



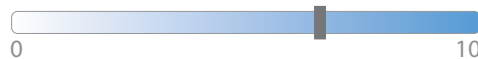
Ewing A1



Enware Oras



Gallery Enhance



Hansa Polo



Ram Elan



Product Recommendation

Caroma Nordic and **Ewing A1** mixers have been identified as the most suitable products for the following reasons:

Ewing A1

This mixer has been selected primarily as the only entirely Stainless Steel product within the sample. It's simple construction within minimal parts affords easy maintenance and little areas for debris to be lodged. Beyond this the cartridge contains an additional filter and can be opened by removing two simple snap fits.

The Ewing A1 mixer contains the sturdiest mounting system, with a 9mm cast horseshoe bracket and double SS mounding bolts.

With a 5 star WELS water rating the mixer is amongst the most efficient within the sample.

This mixer is best suited where corrosion is the top priority.

Caroma Nordic Sink Mixer

Although the inlet and body of Caroma's mixer is brass the manufacturer ensured it is DR brass; where small amounts of arsenic are added to the alloy to achieve corrosion resistance.

Besides being cheaper than the Ewing A1 it offers improved customisation with temperature and flow control.

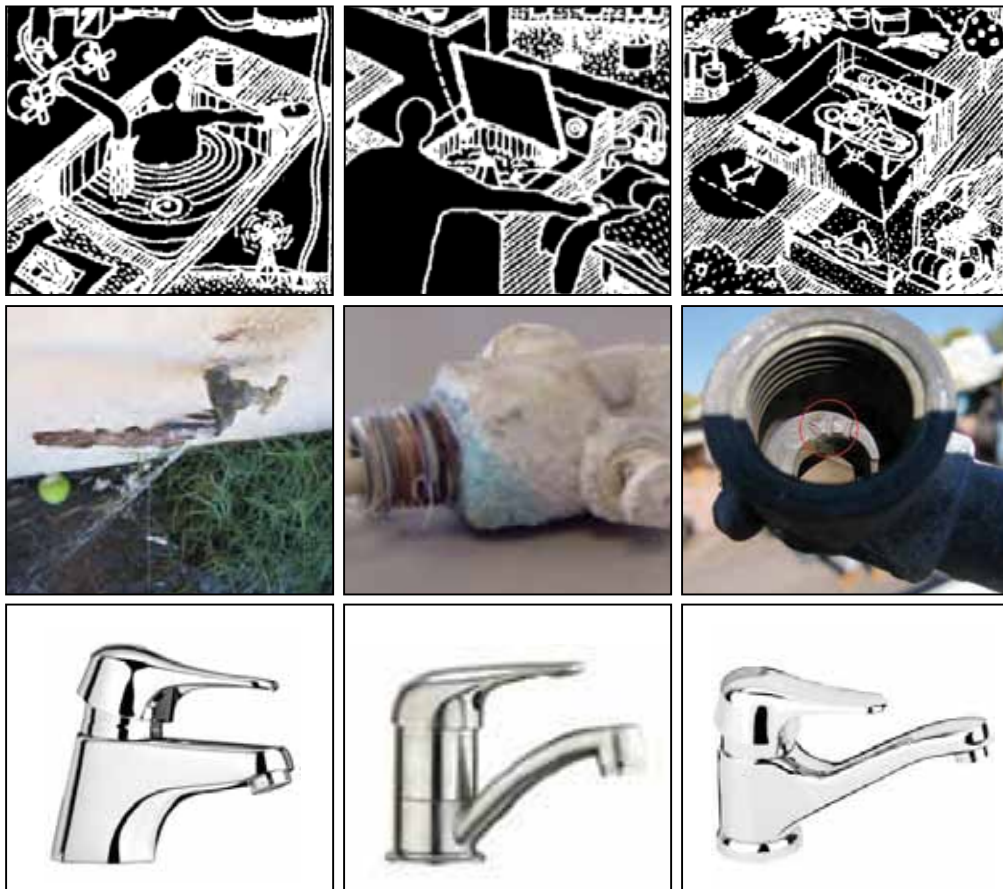
The cartridge is easy to access, is of a higher quality, contains a SS mesh filter, affords easy maintenance and has little areas for debris to be lodged. The mixer is also housed with two SS M8 fixing bolts, eliminating any rotation within housing.

Unlike the Ewing's handle which is secured with the friction screw, Caroma's fixing handle is secured with a 20mm M4 machine screw which is inserted directly into the cartridge rocker.

With a 5 star WELS water rating the mixer is amongst the most efficient within the sample.

This mixer is best suited where user control and high usage are the top priorities.

Sink Mixers



Nordic Sink Mixer



Manufacturer:	Caroma
Model:	Nordic
Type:	Sink Mixer
RRP:	\$236.35
Temp Adjustment:	Yes
Flow Adjustment:	Yes
Swivel:	Yes
Material (body):	Cast Brass



Installation

- Standard flexible hot and cold tails
- Inlet pressure range 150-1000kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Single M8 nut and bolt with horseshoe bracket and mounting plate

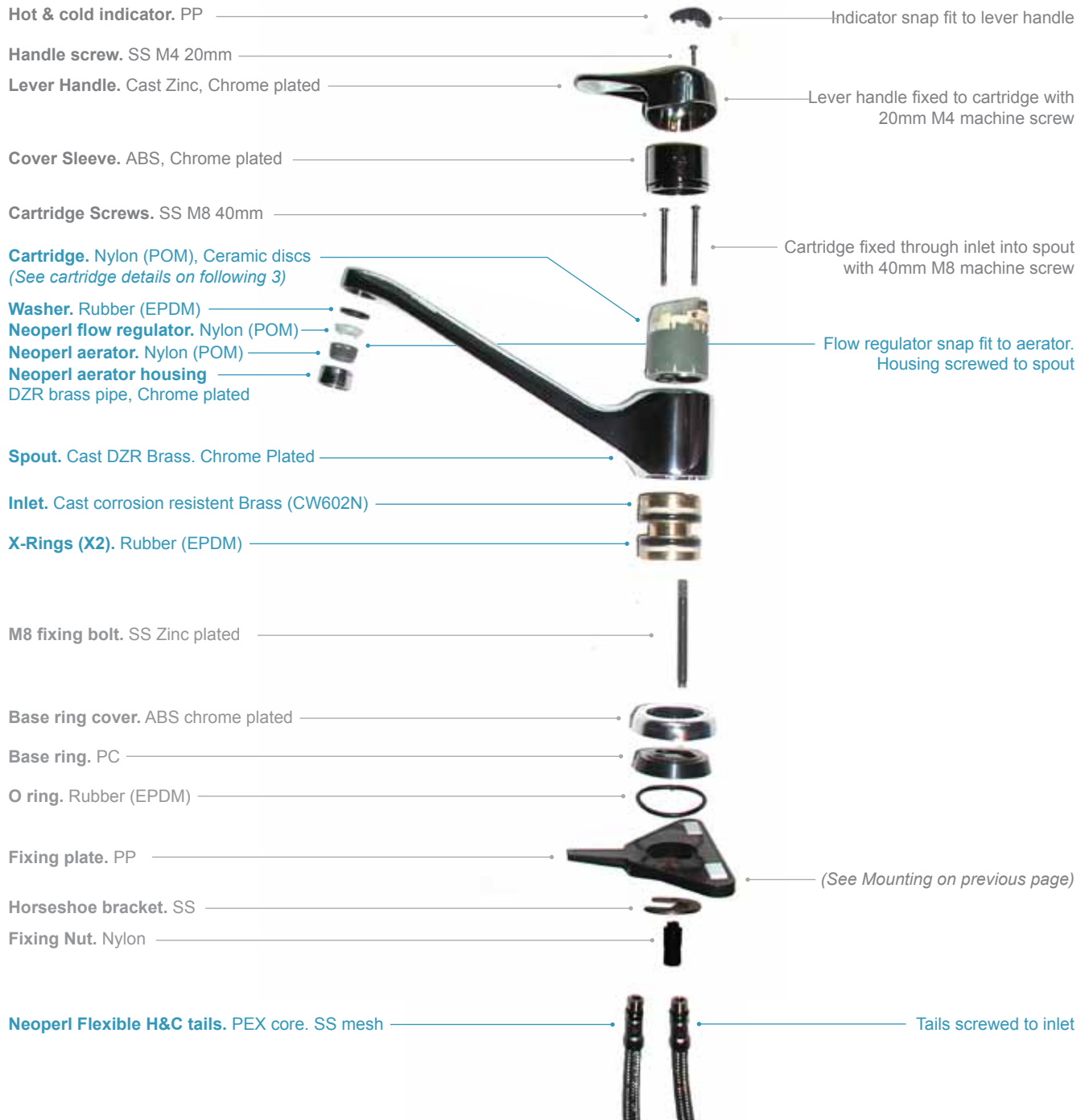
O-Ring. TPE	_____	max 30mm
M8 fixing bolt. Steel, Zinc plated	_____	
Mounting Plate. PP	_____	
Horseshoe bracket. Carbon Steel	_____	
Fixing Nut. Nylon	_____	

Nordic Sink Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

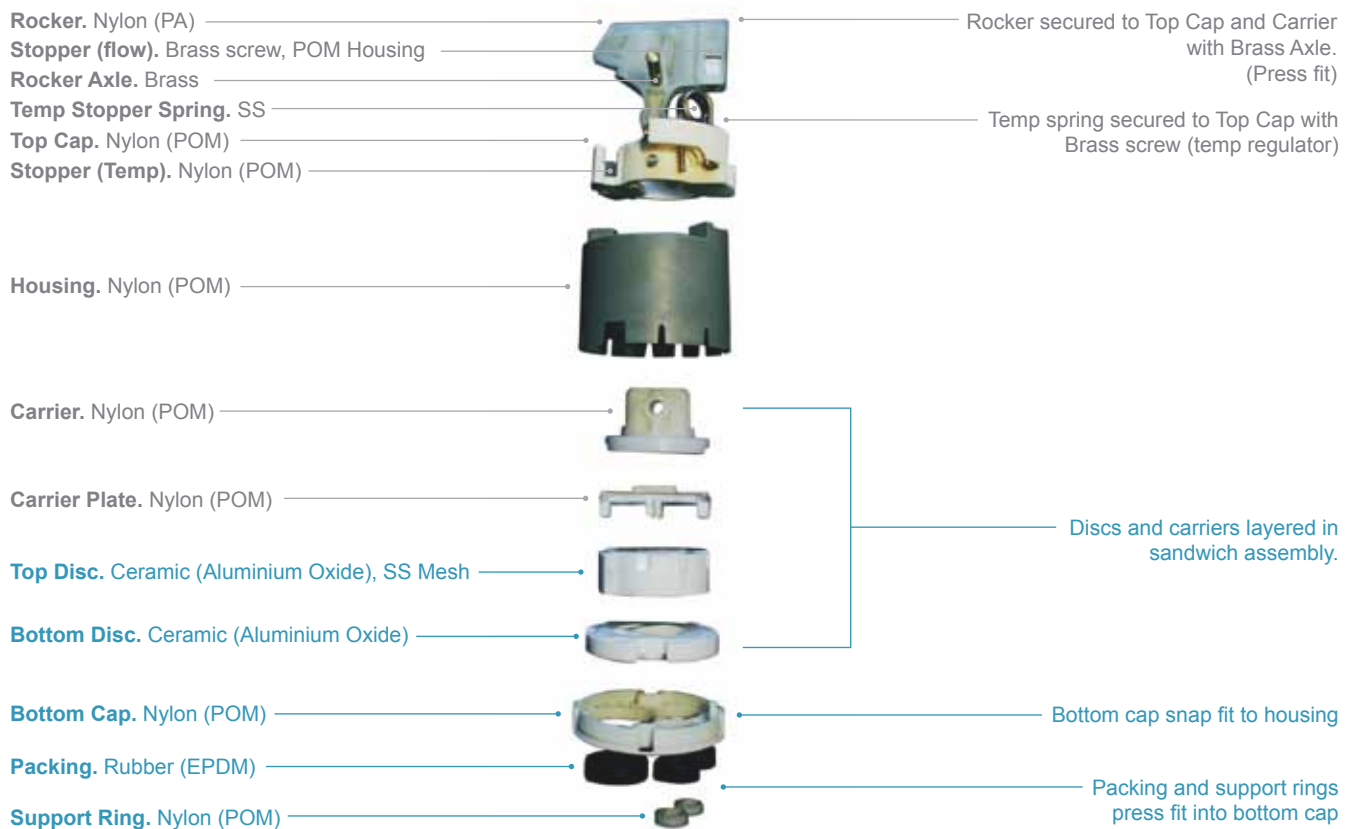


Nordic Sink Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Ewing A-3B Sink Mixer



Manufacturer:	Ewing Industries
Model:	A-3B
Type:	Sink Mixer
RRP:	\$307.25
Temp Adjustment:	No
Flow Adjustment:	No
Swivel:	Yes
Material (body):	Stainless Steel



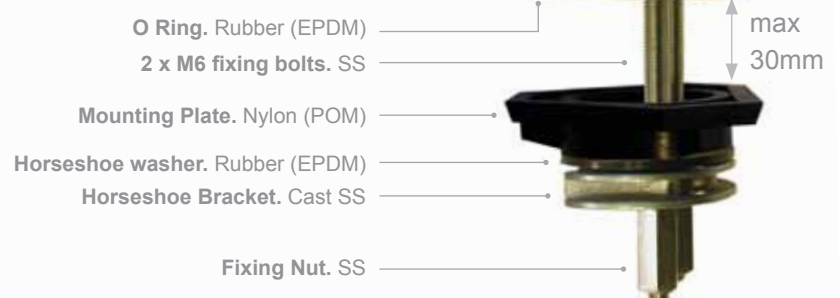
Installation

- Standard flexible hot and cold tails
- Inlet pressure range 50-800kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Double M6 nut and bolt with horseshoe bracket. Bracket is cast to create 9mm profile

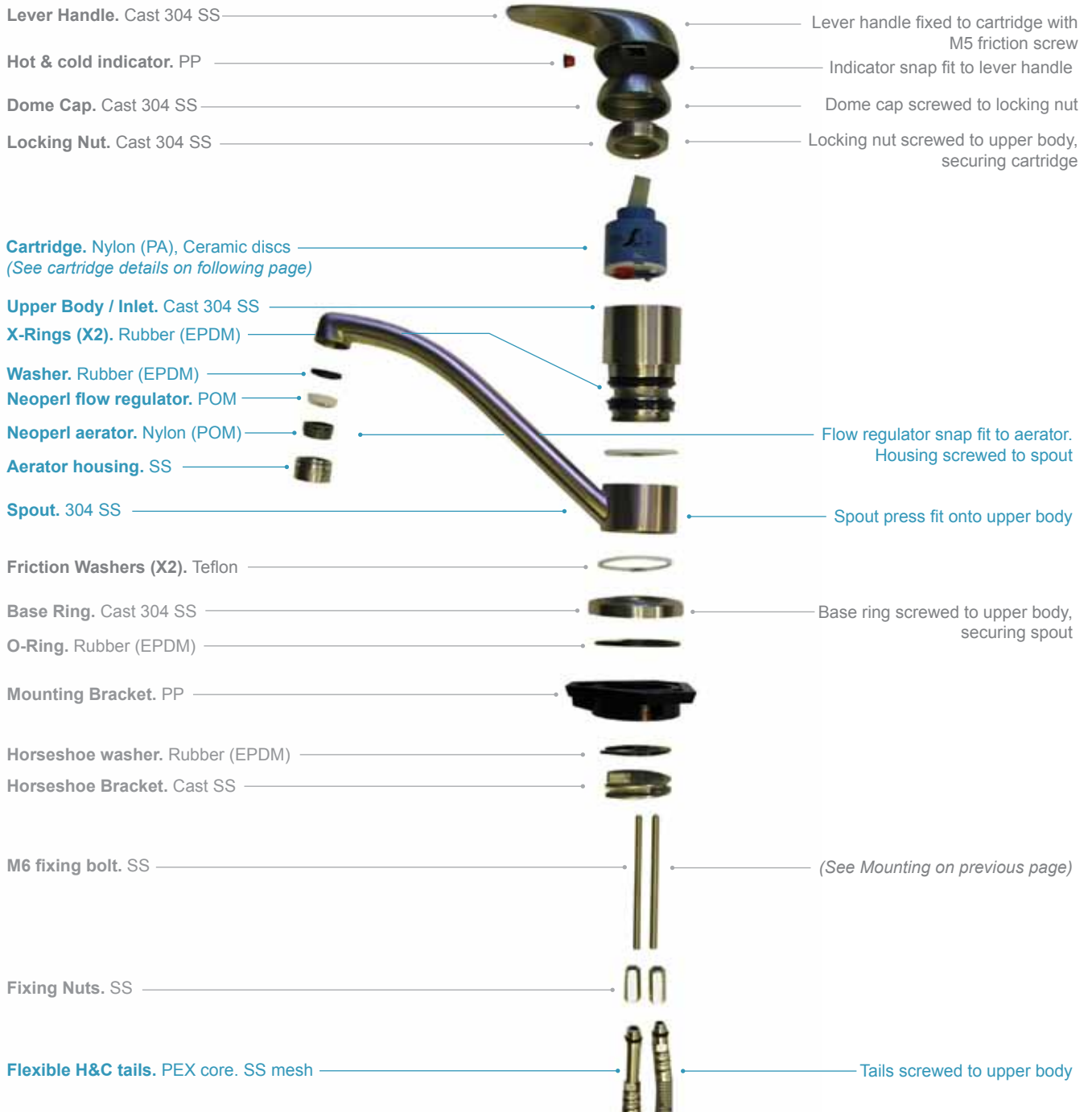


Ewing A-3B Sink Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

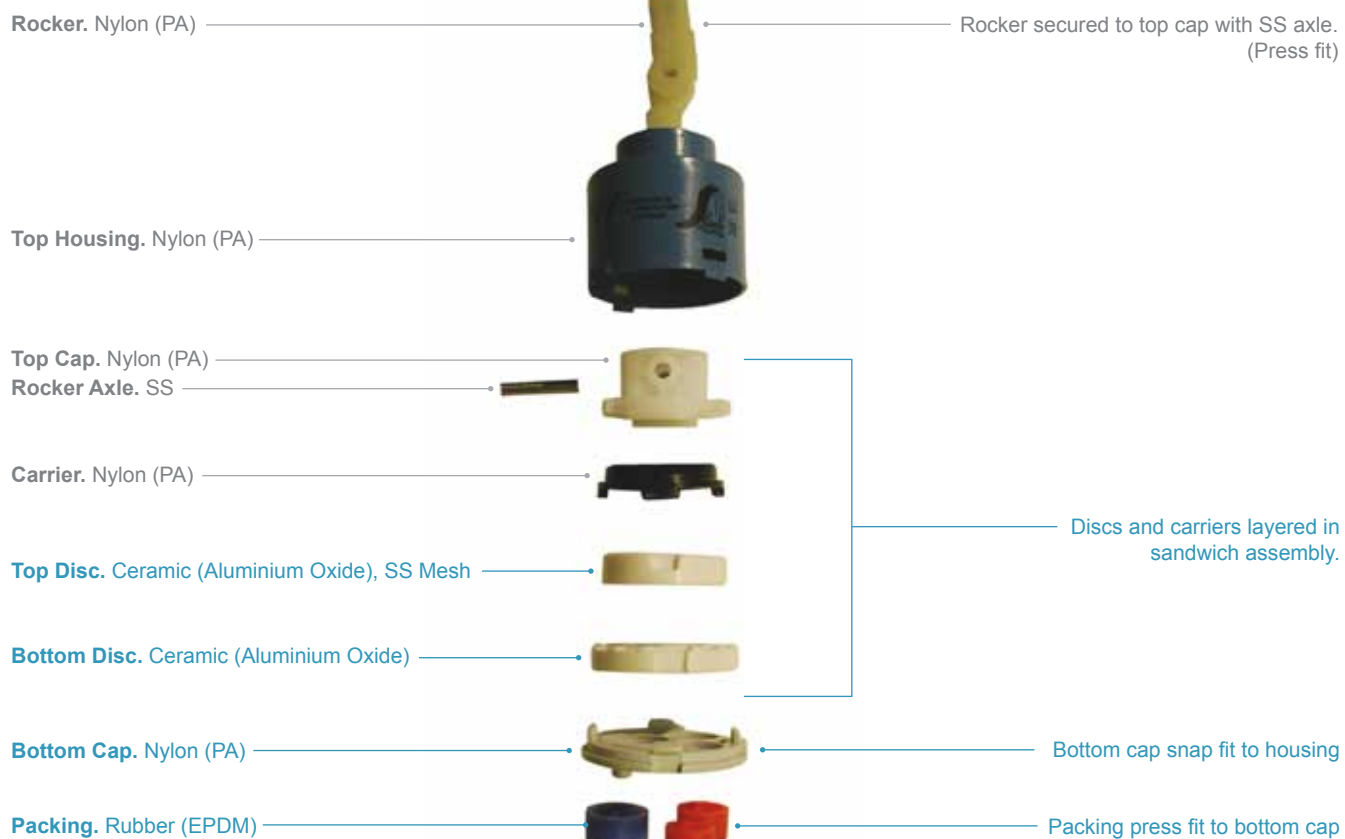


Ewing A-3B Sink Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Gallery Enhance Sink Mixer



Manufacturer:	Gallery Tapware
Model:	Enhance
Type:	Sink Mixer
RRP:	\$109.90
Temp Adjustment:	No
Flow Adjustment:	No
Swivel:	Yes
Material (body):	Brass



Installation

- Standard flexible hot and cold tails
- Inlet pressure range 50-800kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Single M8 nut and bolt with horseshoe bracket

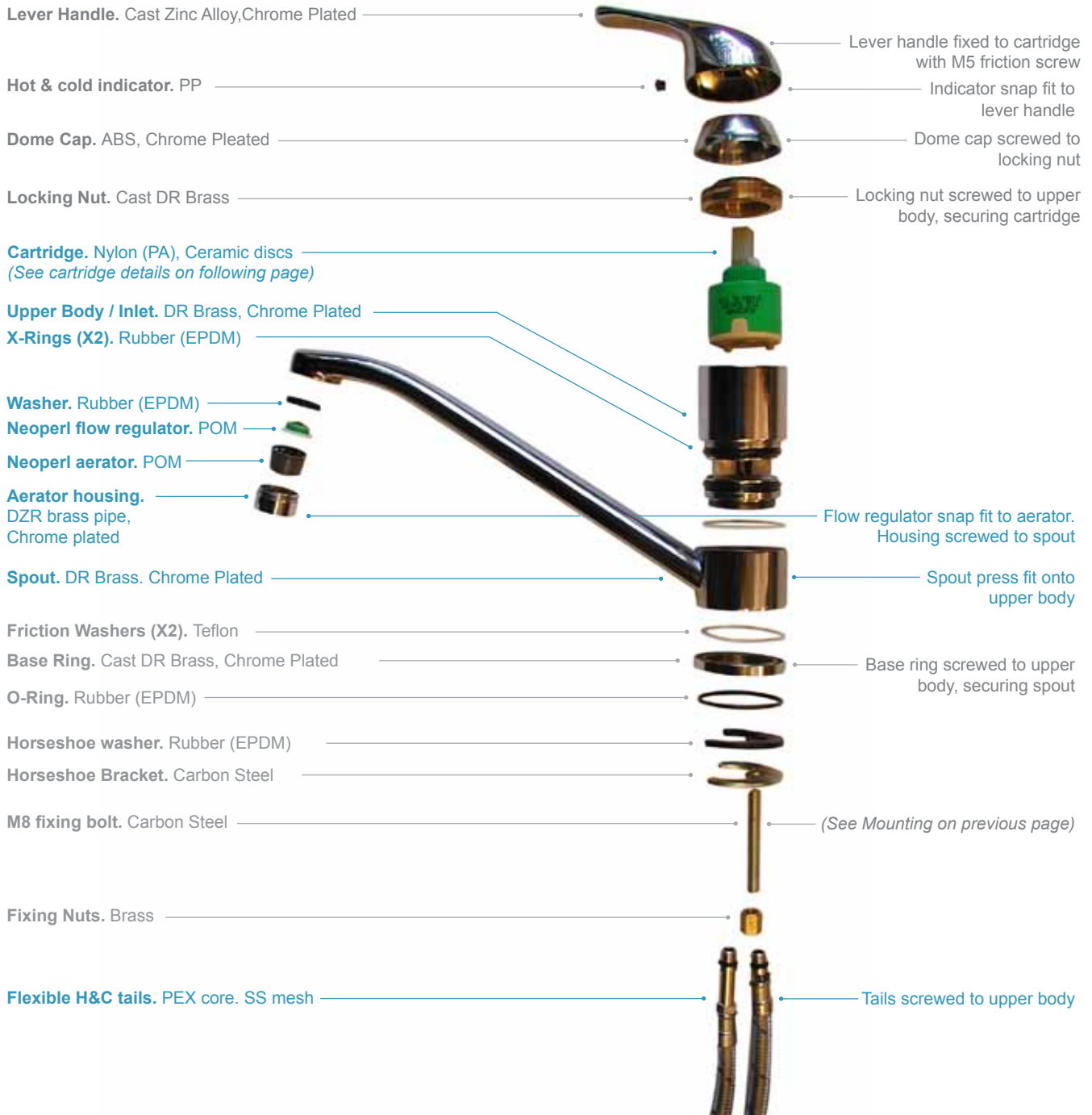
- O Ring. Rubber (EPDM)
 - M8 fixing bolt. Carbon Steel
 - Horseshoe washer. Rubber (EPDM)
 - Horseshoe Bracket. Carbon Steel
 - Fixing Nut. Brass
- max 30mm

Gallery Enhance Sink Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

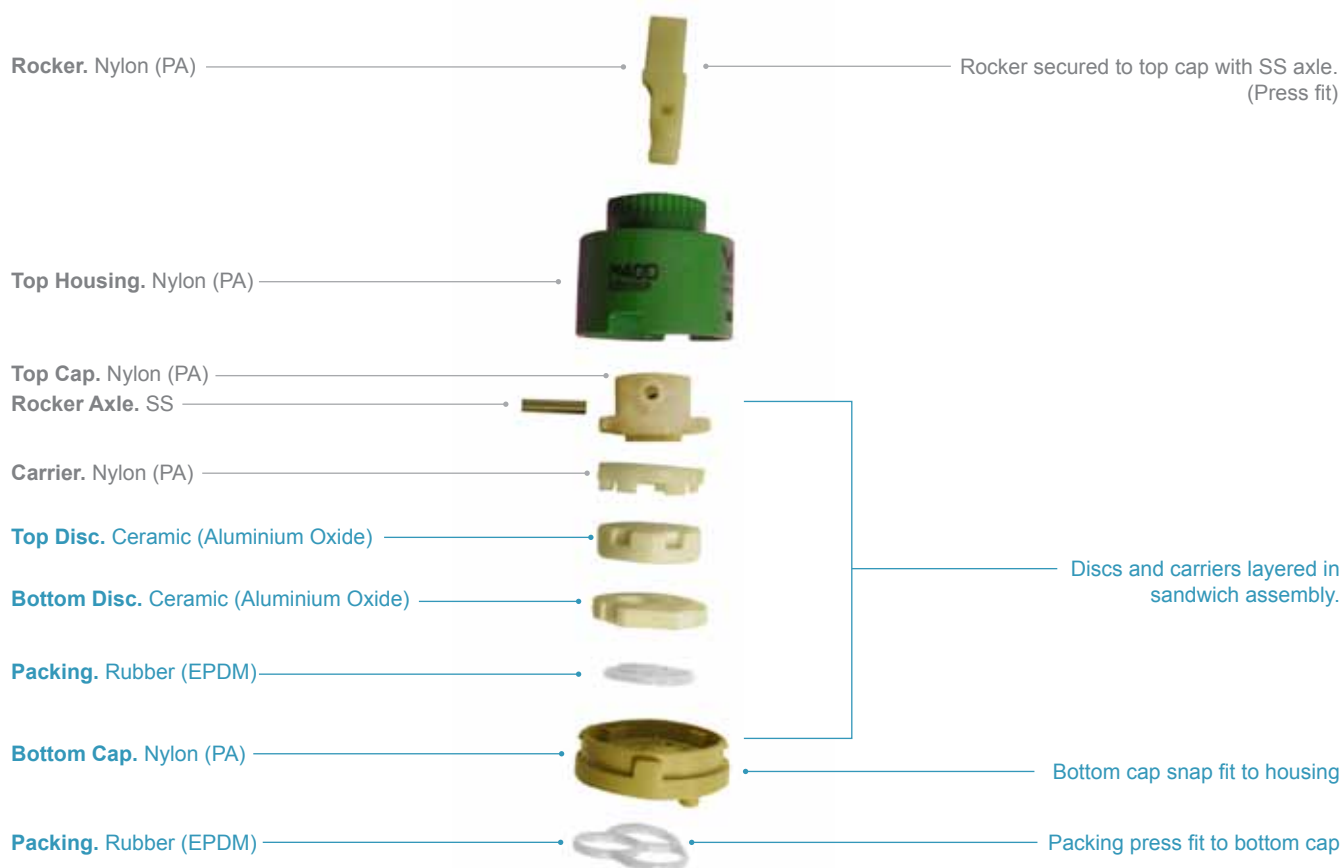


Gallery Enhance Sink Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Hansa Polo Sink Mixer



Manufacturer:	Hansa (Starion)
Model:	Hansa Polo
Type:	Sink Mixer
RRP:	\$318.25
Temp Adjustment:	Yes
Flow Adjustment:	Yes
Swivel:	Yes
Material (body):	Brass



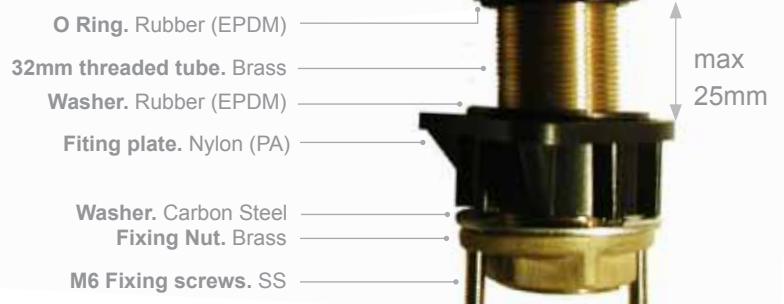
Installation

- Standard flexible hot and cold tails
- Inlet pressure range 100-1000kPa
- Max hot water 90°C
- Not Suitable for gravity feed systems



Mounting

32mm threaded brass pipe with large brass nut. Nut is also fixed with two additional M6 tightening screws.
Nylon Fixing plate also included

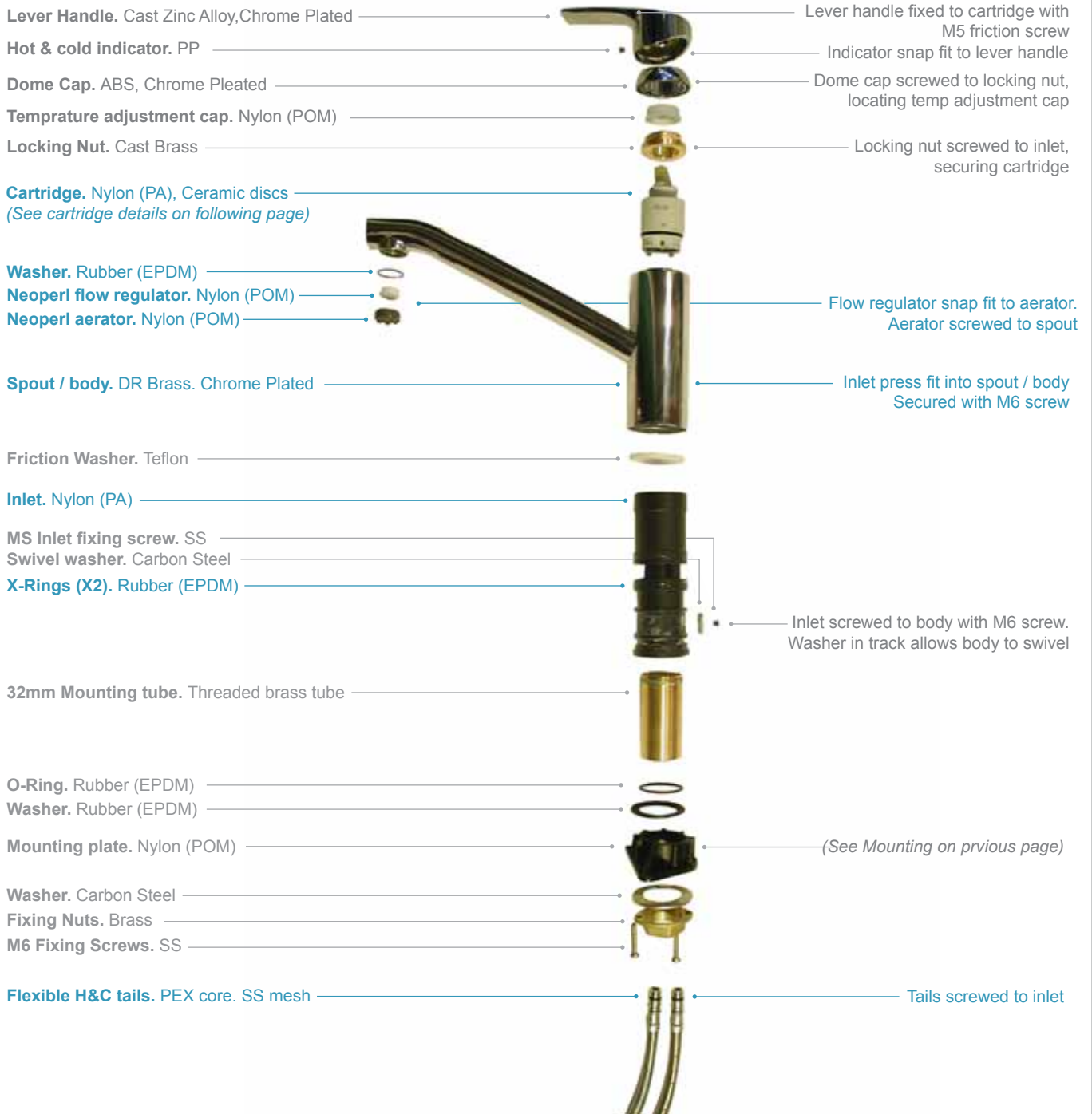


Hansa Polo Sink Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

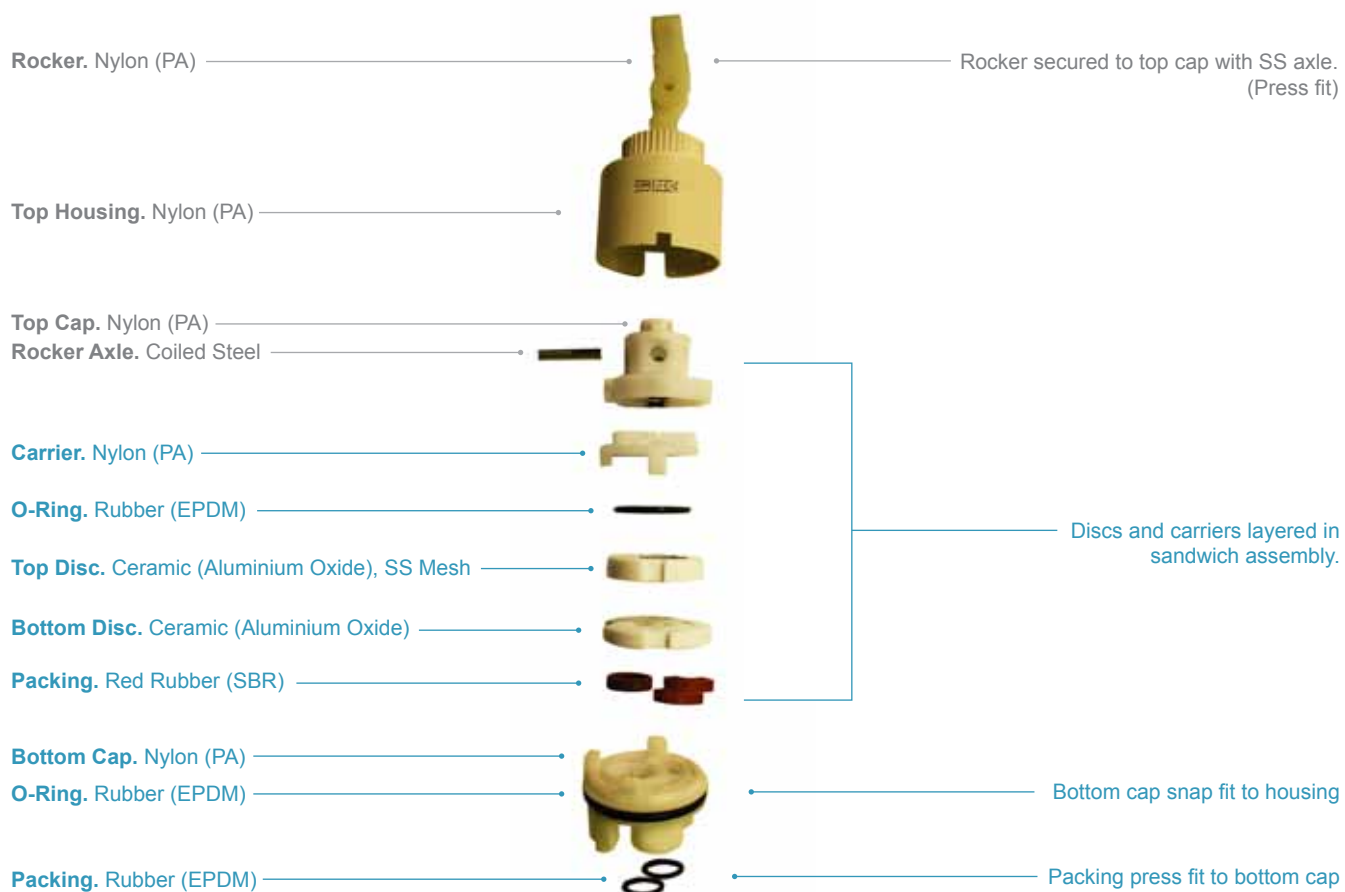


Hansa Polo Sink Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Ram Elan Sink Mixer



Manufacturer:	Ram Tapware
Model:	Elan
Type:	Sink Mixer
RRP:	\$93.70
Temp Adjustment:	No
Flow Adjustment:	No
Swivel:	Yes
Material (body):	Brass



Installation

- Standard flexible hot and cold tails
- Inlet pressure range 50-800kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Single M8 nut and bolt with horseshoe bracket

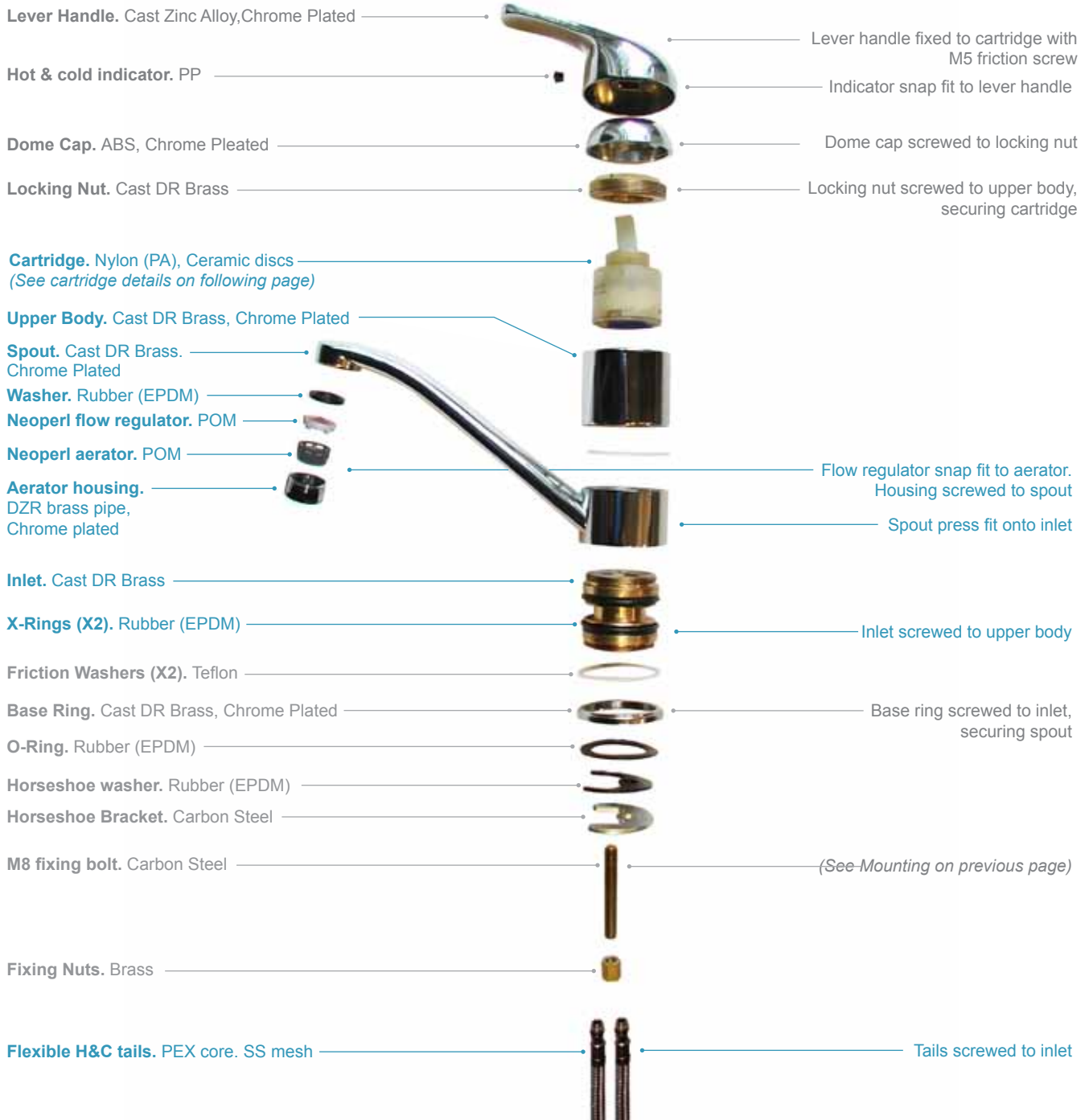


Ram Elan Sink Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

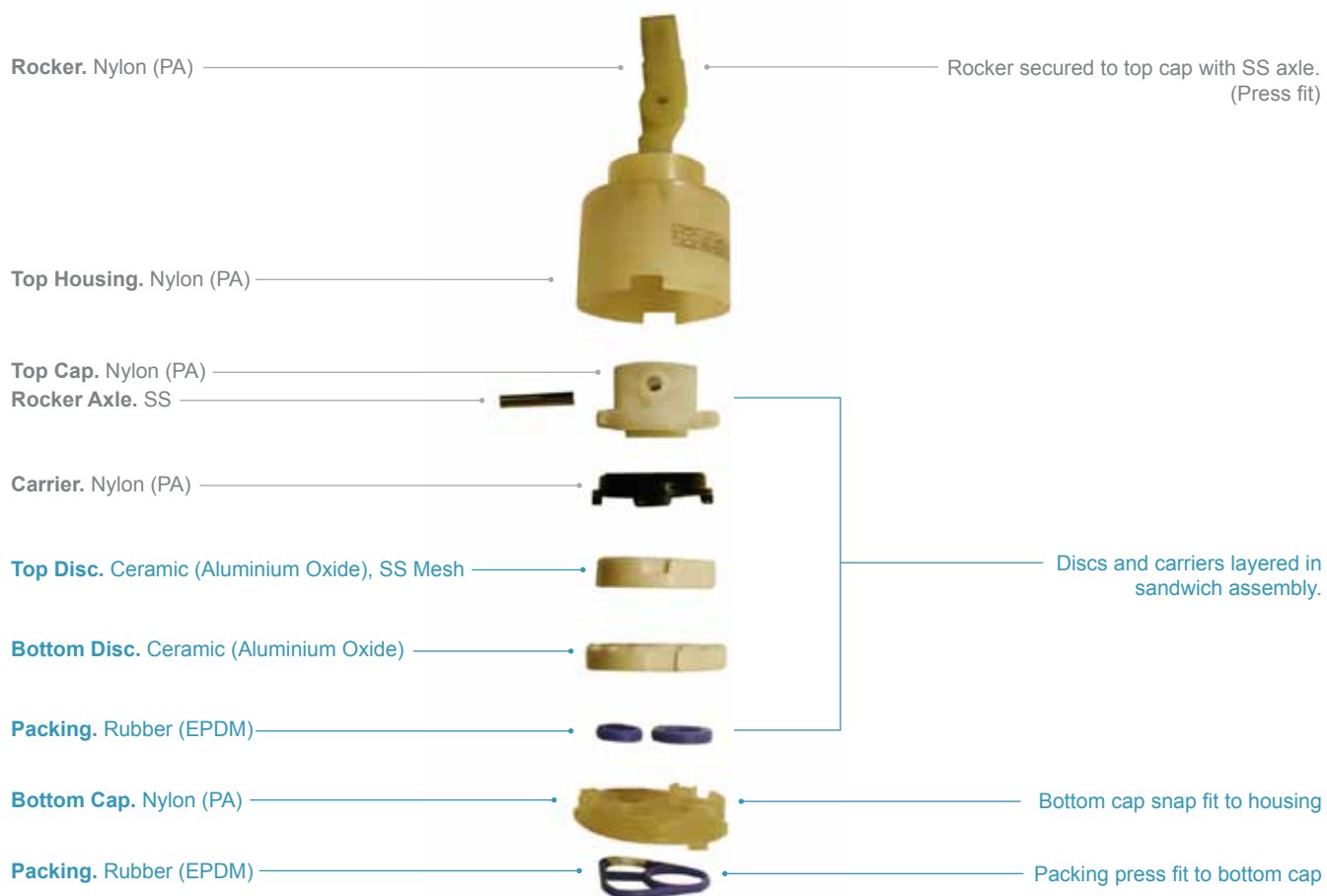


Ram Elan Sink Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Enware Oras Vega Sink Mixer



Manufacturer:	Enware Australia
Model:	Oras Vega
Type:	Sink Mixer
RRP:	\$344.10
Temp Adjustment:	Yes
Flow Adjustment:	Yes
Swivel:	Yes
Material (body):	Cast Brass



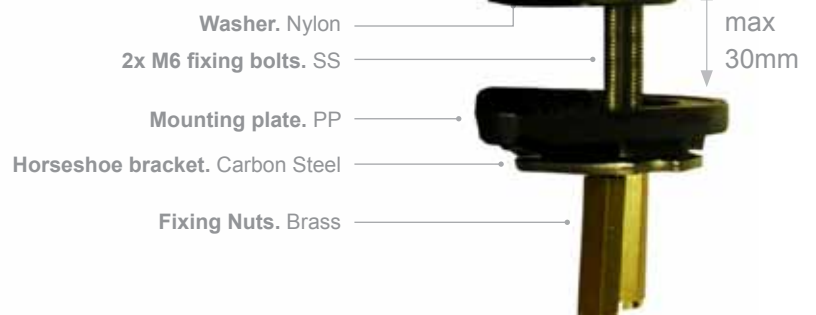
Installation

- Standard flexible hot and cold tails
- Inlet pressure range 100-1000kPa
- Max hot water 80°C
- Not Suitable for gravity feed systems



Mounting

Double M6 nut and bolt with horseshoe bracket and large mounting plate



Enware Oras Vega Sink Mixer Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture

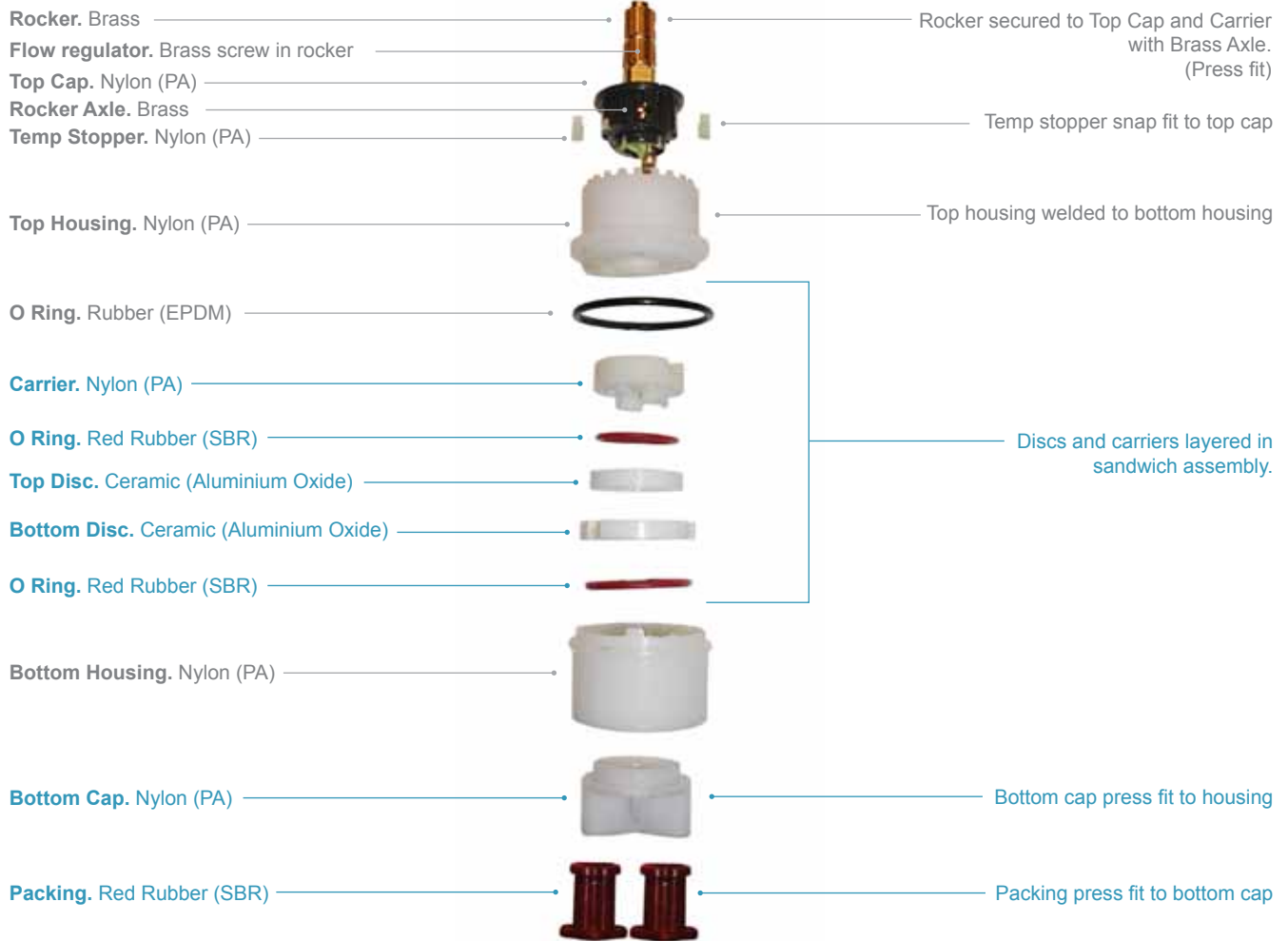


Enware Oras Vega Basin Mixer Cartridge Materials and Assembly

Component Materials

Components marked in Blue are in direct contact with piped water

Component Fixture



Sink Mixer Comparison

Analysis Criteria

The following criteria have been established in accordance to problem areas identified by FHBH survey data as well as thorough product analysis (as illustrated in this document). Criteria have been stated within the following areas:

- **General Suitability**
- **Material Suitability**
- **Methods of Assembly**
- **Cartridge Quality**
- **Mounting Systems**

Within each category the stated flick mixers have been compared in relation to a list of desired qualities and an overall slide bar rating (shown below), with 10 being the most suitable.



A recommendation will then be stated for the most suitable flick mixers based on these selection criteria

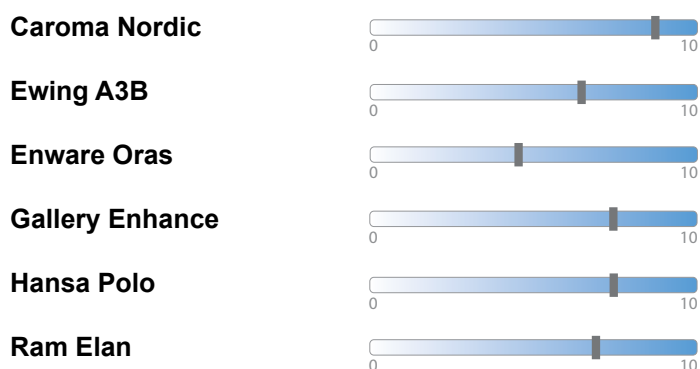
General Suitability

General Suitability has been determined by the following criteria, listed in order of importance:

Water Rating	WELS water efficiency star rating from 1-6, 6 being most efficient.
Maintenance:	Ease of access, number of replaceable parts, accessories required to install mixer. Rating given from 1-5, 5 affording the easiest maintenance. Additional maintenance notes also located on following page
Price:	Unit cost (including GST)
Flow Adjustment:	Ability to control maximum water flow
Temp Adjustment:	Ability to control maximum water temperature
Swivel:	All sink mixers are swivel

Manufacturer	Water Rating	Maintenance	Price (\$)	Flow Adj.	Temp Adj.	Swivel
Caroma Nordic	4	4	236.35	Yes	Yes	Yes
Ewing A3B	3	4	307.25	-	-	Yes
Enware Oras	3	1	344.10	Yes	Yes	Yes
Gallery Enhance	4	4	109.90	-	-	Yes
Hansa Polo	4	4	318.25	Yes	Yes	Yes
Ram Elan	5	3	93.70	-	-	Yes

Product Rating (General Suitability)



Additional Maintenance Notes

Caroma

The design is simple with minimal components. The cartridge can easily be replaced by removing 3 Phillips head screws. The cartridge itself has minimal parts and no snap fits, making it extremely easy to replace individual components.

The O-rings around the inlet can only be replaced if the mixer is removed from its mounting, however as there is no swivel there is minimal friction on these rings.

Enware

The mixer is fairly awkward to access and there is risk of breaking the brittle O-Rings above and below the inlet.

The casing of the cartridge is welded closed, making it impossible to replace individual components within the unit.

The tails are difficult to access and require an Allen key to be removed, the tail connector is awkward to locate.

Gallery, Ram, Ewing

These three mixers have identical assembly. They have minimal parts, simple fixtures and access to cartridge is extremely easy.

X-Rings around inlet and friction washers are easy to access, however they can only be replaced if mixer is removed from its mounting. The cartridge is fairly easy to open with simple snap fits. The **Ram** cartridge material however is very brittle which poses a risk of snap fits breaking

Hansa

The cartridge is easy to access, however it is slightly difficult to locate. The O-rings can be replaced without removing the mixer from its mounting, however due to the large depth of the mixer body it is difficult to remove it from the inlet.

Material Suitability

Material suitability of mixer components (excluding cartridge) have been determined by the following criteria, listed in order of importance:

Components in contact with water: Corrosion resistance being the first priority followed by toughness and density. Suitability has been determined in relation to the functional needs of individual components.

Components not in contact with water: Density being the first priority, followed by toughness and corrosion resistance.

Crucial components in contact with water

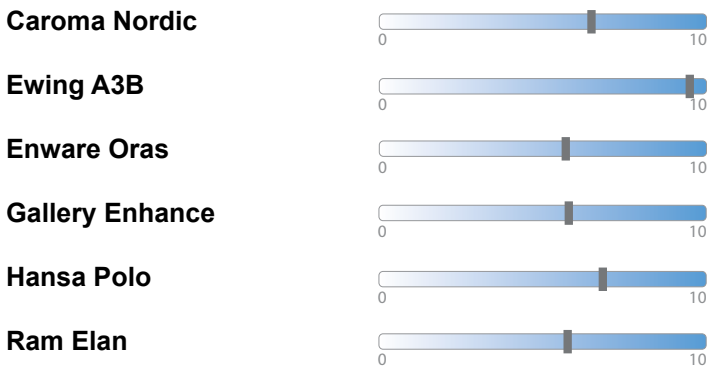
Manufacturer	Body / spout	Inlet / Tail connector	Tails	Aerator/flow regulator	Aerator housing
Caroma Nordic	DR Brass (CP)	DR Brass	PEX Core. SS mesh	POM	DR Brass (CP)
Ewing A3B	SS	SS	PEX Core. SS mesh	POM	SS
Enware Oras	DR Brass (CP)	DR Brass	PEX Core. SS mesh	POM	DR Brass (CP)
Gallery Enhance	DR Brass (CP)	DR Brass (CP)	PEX Core. SS mesh	POM	DR Brass (CP)
Hansa Polo	DR Brass (CP)	Nylon (PA)	PEX Core. SS mesh	POM	-
Ram Elan	DR Brass (CP)	DR Brass	PEX Core. SS mesh	POM	DR Brass (CP)

Crucial components NOT in contact with water

Manufacturer	Lever Handle	Base Ring	Dome Cap / Sleeve
Caroma Nordic	Zinc Alloy (CP)	ABS (CP)	ABS (CP)
Ewing A3B	SS	SS	SS
Enware Oras	ABS (CP)	POM	ABS (CP)
Gallery Enhance	Zinc Alloy (CP)	DR Brass (CP)	ABS (CP)
Hansa Polo	Zinc Alloy (CP)	-	ABS (CP)
Ram Elan	Zinc Alloy (CP)	DR Brass (CP)	ABS (CP)

*CP indicates chrome plating *DR indicates dezincification resistant *POM is a Nylon polymer

Product Rating (Material Suitability)



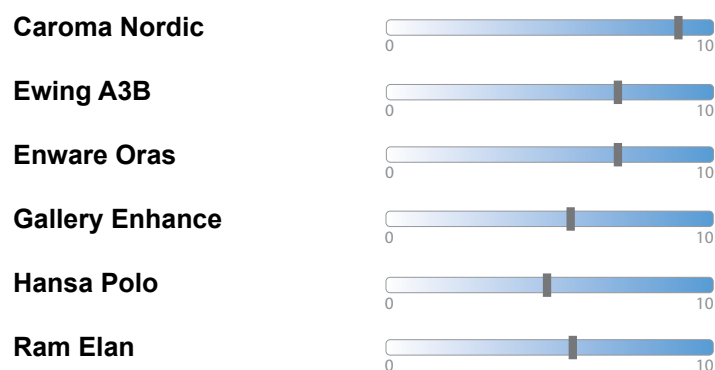
Method of assembly

Methods of assembly relates to crucial components which are subject to high levels of usage and have been indicated at problem areas by FHBH survey data. Assembly of additional components have been explored in other areas. Suitability has been determined by the following, listed in order of importance:

Handle Fixture:	Friction screws secure handle with pressure applied to the surface of the cartridge rocker. Regular screws create sturdier fixture as they are inserted into threaded holes within cartridge rocker.
Cartridge housing:	Ease of location and access, stability of housing.
Cartridge location:	Pins to ensure correct installation position as well as precautions to reduce rotation within housing (when handle is turned). Large locating screws are more durable compared to smaller pins moulded into the cartridge which may not withstand high levels of sheer force.
Indicator fixture:	Quality of snap fit or paint of Hot and Cold indicators

Manufacturer	Handle Fixture	Cartridge Fixture	Cartridge location and rotation precautions	Indicator fixture
Caroma Nordic	M4 Screw	2 M8 40mm screws	2 M8 fixing screws	Snap fit
Ewing A3B	M5 Friction Screw	Large SS Locking nut	2 moulded locating pins	Snap fit + engraved
Enware Oras	M4 Screw	Large Brass locking nut	1 moulded locating pin	Snap fit
Gallery Enhance	M5 Friction Screw	Large Brass locking nut	2 moulded locating pins	Snap fit
Hansa Polo	M5 Friction Screw	Large Nylon locking nut	2 moulded locating pins	Painted
Ram Elan	M5 Friction Screw	Large Brass locking nut	2 moulded locating pins	Snap fit

Product Rating (Methods of Assembly)



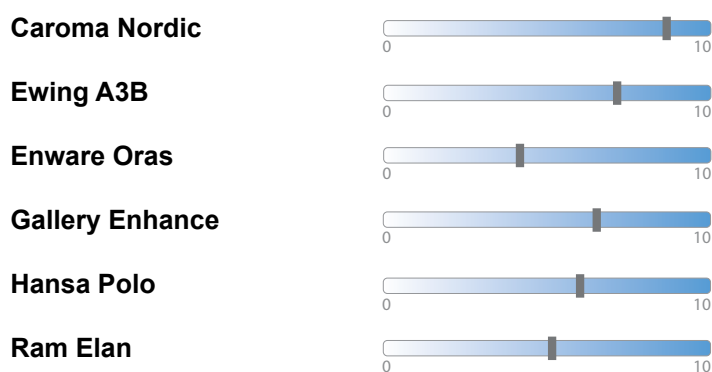
Cartridge Quality

The quality of mixer cartridges have been determined by the following criteria, listed in order of importance:

- Quality of Materials:** All ceramic discs are Aluminium oxide and extremely similar in design. All cartridge housing and mechanical components consist of a combination of Nylons. An overall quality rating is based on material toughness, density and suitability. 1-5, 5 being the most suitable.
- Ease of Access:** How easily cartridge can be opened for cleaning or maintenance, a rating of 1-5, 5 being the most suitable.
- Filter:** A selection of cartridges contain a SS mesh filter in the top ceramic disc
- Design suitability:** Overall assembly, features and areas which may catch debris, a rating of 1-5, 5 being the most suitable.

Manufacturer	Material Quality	Ease of Access	Filter	Design Suitability
Caroma Nordic	5	5	Yes	5
Ewing A3B	4	4	Yes	4
Enware Oras	4	1	-	3
Gallery Enhance	4	4	-	4
Hansa Polo	3	3	Yes	4
Ram Elan	3	3	Yes	3

Product Rating (Cartridge Quality)



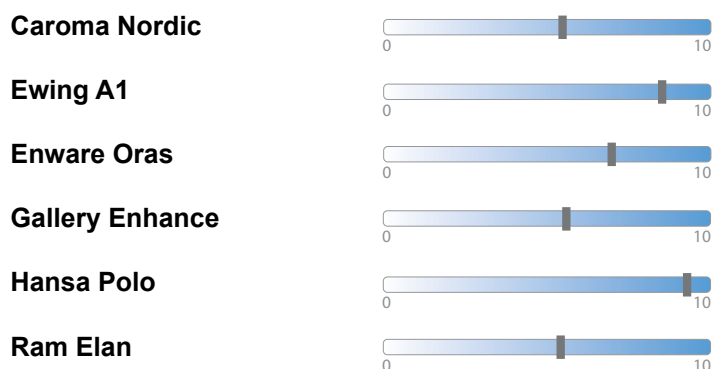
Mounting System

Quality of mounting has been determined by the following criteria, listed in order of importance:

Fixing bolts:	Size of fixing bolts, single or double, bolt material. Double bolts reduce likelihood of rotation
Max Mounting Bracket quality:	Max thickness of sink/bench Material and construction of mounting bracket.
Fixing Nut:	Material Quality
Mounting Plate:	Plates sit under sink for further stability

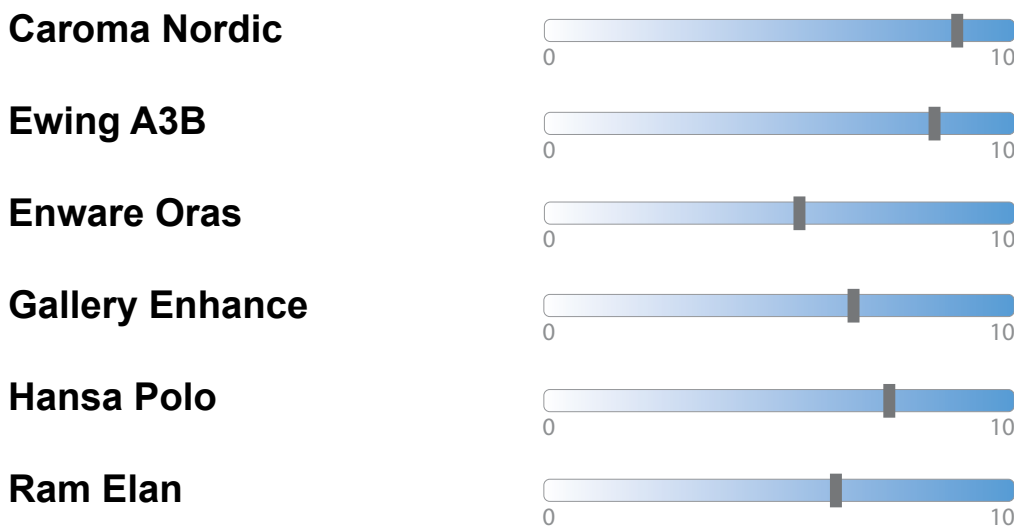
Manufacturer	Fixing Bolt	Max Mounting (mm)	Bracket quality	Fixing Nuts	Mounting Plate
Caroma Nordic	Single M8 Steel	30	Steel Horseshoe bracket	Nylon	Yes
Ewing A3B	Double M6 SS	30	Cast 9mm Horseshoe bracket with rubber washer	SS	Yes
Enware Oras	Double M6 SS	30	Steel Horseshoe bracket	Brass	Yes
Gallery Enhance	Single M8 Steel	30	Steel Horseshoe bracket with rubber washer	Brass	-
Hansa Polo	32mm Threaded pipe, Mounting nut and fixing screws	25	Steel Horseshoe bracket with rubber washer	Brass	Yes
Ram Elan	Single M8 Brass	30	Steel Horseshoe bracket with rubber washer	Brass	-

Product Rating (Mounting System)



Overall Product Rating

Based on the previous analysis a final overall comparison is shown:



Product Recommendation

Caroma Nordic and **Ewing A3B** mixers have been identified as the most suitable products for the following reasons:

Ewing A3B

This mixer has been selected primarily as the only entirely Stainless Steel product within the sample. Its simple construction within minimal parts affords easy maintenance and little areas for debris to be lodged. Beyond this the cartridge contains an additional filter and can be opened by removing two simple snap fits.

The Ewing A3B mixer contains the sturdiest mounting system, with a 9mm cast horseshoe bracket and double SS mounting bolts.

With a 5 star WELS water rating the mixer is amongst the most efficient within the sample.

This mixer is best suited where corrosion is the top priority.

Caroma Nordic Sink Mixer

Although the inlet and body of Caroma's mixer is brass the manufacturer ensured it is DR brass; where small amounts of arsenic are added to the alloy to achieve corrosion resistance.

Besides being cheaper than the Ewing A1 it offers improved customisation with temperature and flow control.

The cartridge is easy to access, is of a higher quality, contains a SS mesh filter, affords easy maintenance and has little areas for debris to be lodged. The mixer is also housed with two SS M8 fixing bolts, eliminating any rotation within housing.

Unlike the Ewing's handle which is secured with the friction screw, Caroma's fixing handle is secured with a 20mm M4 machine screw which is inserted directly into the cartridge rocker.

With a 5 star WELS water rating the mixer is amongst the most efficient within the sample.

This mixer is best suited where user control and high usage are the top priorities.

Conclusion

Summary

Caroma Nordic and **Ewing** mixers have been identified as the most suitable products for both Basin and Sink applications.

Caroma Nordic

- Improved corrosion resistance (corrosion resistant Brass)
- Access to cartridge with three phillipshead screws
- Simple assembly with minimal areas for debris to be lodged
- In-cartridge filter
- Improved customisation with temperature and flow control.
- High quality cartridge, designed for maintenance.
- Excellent provisions to eliminate cartridge rotation
- Handle fixed with machine screw
- 5 Star WELS Rating

Ewing

- Excellent Corrosion resistance (Stainless Steel)
- Access to cartridge with one hex screw and one fixing nut
- Simple assembly with minimal areas for debris to be lodged
- In-cartridge filter
- Double pin mounting

Selection Criteria

Based on the Any product considered for selection must meet the following:

Mandatory requirements

- Materials in contact with water must be corrosion resistant in compliance with AS 2345
- The cartridge and O-rings must be easily accessible without specialised tooling. The Caroma Nordic mixer for example requires the removal of three phillips head screws as opposed to the Hansa Polo which requires a difficult to access 38mm tube spanner. Maintaining or replacing cartridges and O-Rings will often eliminate the need to replace the entire mixer.
- The cartridge must be located with sturdy provisions to prevent rotation. Moulded locating pins are standard, Caroma is the only model which utilised two M8 SS fixing screws which are fastened through the entire cartridge to prevent rotation. Rotation causes wear to cartridge components and disorientates inlets.
- The cartridge must afford easy disassembly without risk of damaging casing material. The snap fits on the Ram and Hansa cartridges for example are brittle and broke upon opening whilst the casing of the Caroma Nordic cartridge is robust and the design does not utilise snap fits. Access to internal cartridge components affords cleaning and maintenance, prolonging the life of the mixer.
- The Ceramic discs must contain a SS mesh filter to prevent debris entering the cartridge and damaging internal components. All Models excluding Enware Oras and Gallery Enhance fulfilled this requirement.
- Minimum of 4 star WELS water rating. All Models excluding Enware Oras Fulfilled this category.
- Lever handle must be manufactured in metallic alloy to withstand heavy usage. All mixers excluding the Enware Oras fulfilled this requirement.

Desired requirements

- Mounting with double pins to reduce rotation, as evident in Ewing A1 and Enware Oras
- Handle fixed to rocker with machine screw (as opposed to friction screw) to reduce likelihood of handle falling off, as evident in Caroma Nordic and Enware Oras
- Flow and temp adjustment to reduce water and energy consumption. As evident in Caroma Nordic, Enware Oras and Hansa Polo
- Require no accessories or specialised tooling for installation. All mixers within this sample fulfilled this requirement
- In Line SS mesh filter within tail connector to prevent debris entering mixer, as evident in Enware Oras

Manufacturer Contact Details

Manufacturer	Product	Contact
Caroma Dorf Industries	Nordic Sink Mixer	Building C, level 2, 4 Ray Road, Epping, NSW 2121 Phone: (02) 9202 7000 Allison Gillespie servicensw@dorf-clark.com.au
Ewing Industries	A-3B Ewing, Sink mixer Stainless Steel	4/24 Deakin Street Brendale, QLD 4500 Phone: (07) 3205 6099 admin@ewingindustries.com.au
Enware Australia	Oras Vega Sink Mixer	P.O. Box 2545 Taren Point NSW 2229 Australia Phone: (02) 9525 9511 Jason Hinds 0401775003 jason.hinds@enware.com.au
Starion Industries	Hansa Polo Sink mixer	7 Eagleview Place PO Box 1163 Eagle Farm Qld 4009 Phone: 1800 060 875 Rory Grace 0419785586
Gallery Tapware	Enhance Sink mixer	37 Collingwood Street Osborne Park, Western Australia 6017 Phone: (07) 36235400
Ramtaps	Elan Sink mixer	556 Curtin Avenue East Eagle Farm QLD 4009 Phone: (07) 3633 6060 Mark Davis markdavis@ramtaps.com.au