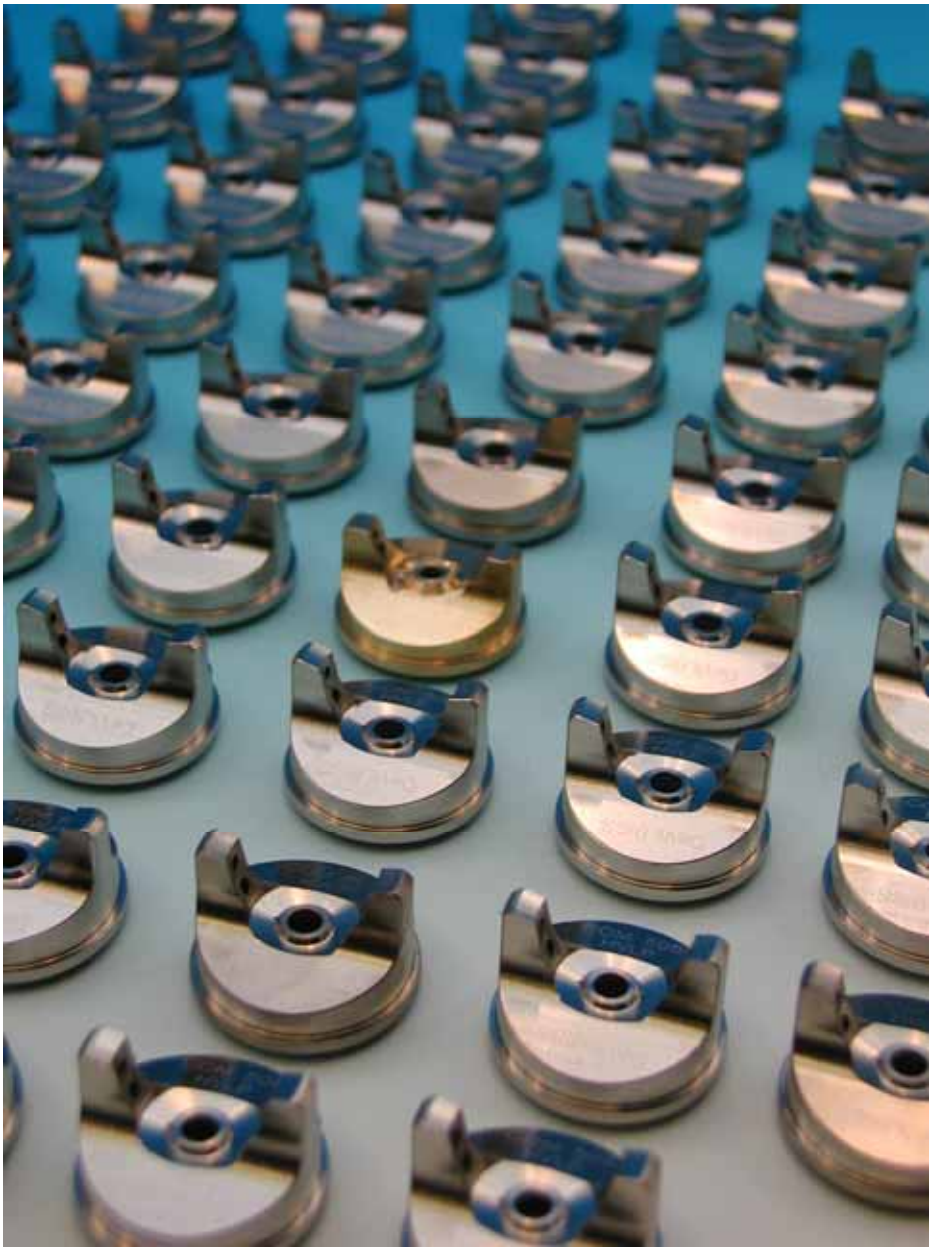


Compact

COBRA 1

SRi

Air Cap and Fluid Nozzle Selection Guide

Viper

Scorpion

COBRA 2

ITW Industrial Finishing

Binks • DeVilbiss • Gema • Ransburg

Sjm/ev240306

A. Introduction

Selecting the correct Air Cap and Fluid Nozzle combination for your spray gun application can be a confusing and uncertain time. Some of the ITW DeVilbiss spray guns available have a vast range of options available. This guide is intended to show that this process is logical and far easier than you might think. There a few simple rules to follow when choosing which set-up to use, the most important of which is…

‘An Air Cap use is not limited to its original design application’

In other words, just because a certain Air Cap and Fluid Nozzle combination was designed for use, for example, with Waterbased coating materials in the Plastics market it does not mean to say that you might find it will work very well with your Solventbased wood application. The uses for a particular Air Cap and Fluid Nozzle combination are only limited by its users imagination.

The range of Air Caps covered in this booklet are for the following ITW DeVilbiss spray guns.

	 Scorpion	 Viper	 Compact
Type	Automatic	Automatic	Manual
Coatings Applied	Waterbased Ceramic & Vitreous Enamel	Waterbased Ceramic & Vitreous Enamel	Most Waterborne & Solventborne coatings
Gun Features	Quick ¼ turn removable Air Cap and Fluid Nozzle. Abrasion resistant Fluid Nozzles. Needleless design. Pistonless design, Stainless Steel fluid passageways	Quick ¼ turn removable Air Cap and Fluid Nozzle. Fully Automatic needle and piston design, Stainless Steel fluid passageways	Mid-size design & lightweight construction. Anodized Aluminium & Stainless Steel fluid passageway versions

	 COBRA 1	 COBRA 2	 SRi
Type	Automatic	Automatic	Manual
Coatings Applied	Most Waterborne & Solventborne coatings	Most Waterborne & Solventborne coatings	Most Waterborne & Solventborne coatings
Gun Features	Modular construction, Independent Fan, Atomising and triggering air, Fully Automatic needle and piston design, Stainless Steel fluid passageways	Modular construction, Fully Automatic needle and piston design, Removable Baseplate mounting, Stainless Steel fluid passageways	Small Gravity gun with precision control for detailed work Anodized Aluminium fluid passageways

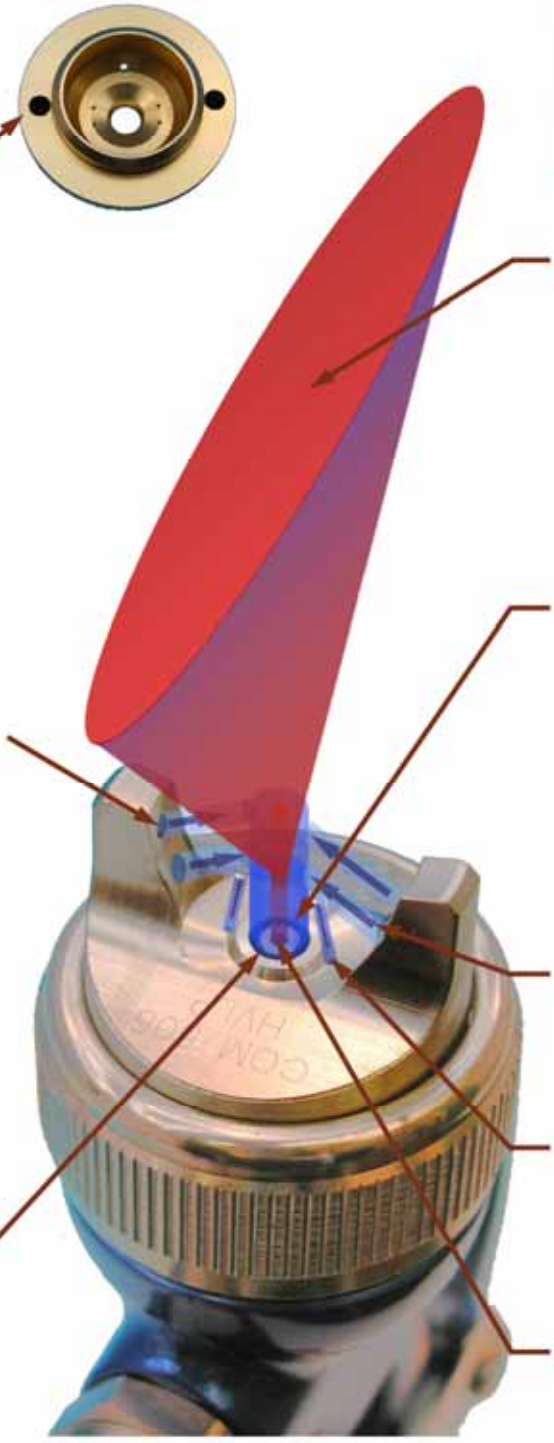
B. How an Air Cap Works

1. Air trapped between the outside edge of the Fluid Nozzle and the inside of the Air Cap retaining ring feeds air to the two holes on the back of the Air Cap that take air to the horn holes.

2. The amount of air going to the horn holes is controlled by the control valve on the top back of the gun.

3. Air from the ring of holes in the Fluid Nozzle feeds air to the Air Cap centre annulus and Air Cap face holes.

4. All of the air entering a hand gun is controlled by the rotary valve located on the base of the gun handle. This affects atomizing and fan air as it is opened and closed.



5. The spray pattern size and shape is a result of the influence of all of the air jets from the Air Cap and the quantity and speed of the fluid jet from the Fluid Nozzle. If the flow from any of these jets is uneven or distorted by dirt or damage to the holes then a bad pattern shape will be the result.

6. Air is forced out of the central annular air ring and is projected forward in a cylinder around the fluid jet (coming out of the Fluid Nozzle hole). The speed of the air shears and atomises the liquid into droplets which creates a cylindrical cloud moving towards the target.

7. The air jets exiting the 'Horn' holes squeeze the cylindrical cloud of droplets to form a spray 'fan' or 'pattern'. The more squeezing air, the longer the spray fan becomes.

8. Additional air from the 'face' holes in the Air Cap aid the stability of the spray pattern and help to keep the front of the Air Cap clean.

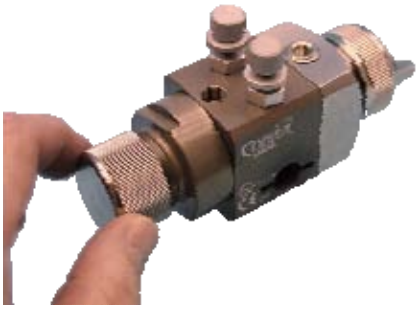
9. The size of the hole in the centre of the Fluid Nozzle directly controls the amount of fluid exiting a Suction or Gravity feed gun. On a Pressure feed spray gun the fluid Pressure is the primary control of fluid flow so the Fluid Nozzle hole becomes a secondary control.

10. The Fluid needle movement is controlled by the control knob on the back of the gun. This is the secondary fluid control method on a Suction or Gravity gun and the tertiary method on a Pressure fed gun.

11. On the Cobra and Viper automatic spray guns the horn air is controlled by the FAN valve located on the top of the gun body.

12. The atomizing air is controlled by the second ATOM valve

13. The fluid needle control knob is located at the rear of the gun body. However, like a Pressure fed hand gun the main fluid control should be carried out by the fluid Pressure and the Fluid Nozzle diameter.



3. What is the difference?

Conventional, HVLP and Trans-Tech are all members of the Air Atomisation family, but each has slightly different operating parameters. Here is a very quick explanation of the differences.

Conventional Air Atomising
The most established method of air atomizing, used on spray guns for decades. It uses high velocity air jets to produce a very high atomization power. However this speed results in a low efficiency due to the considerable ‘bounce-back’ and ‘spray-fog’ caused. Air Pressure inside the Air Cap during use is typically 2 to 4 bar (30 to 60 psi) with an air volume consumption of 170 to 700 l/min (6 to 25 cfm).

High Volume Low Pressure (HVLP)
Although not a new, this method first became important in the early 1990’s when Environmental Legislation started to be introduced. It uses larger air volumes (300 to 840 l/min or 11 to 30 cfm) at low Pressure to atomise the coating. It has a much higher Transfer Efficiency than Conventional Air Atomizing due to the lower Pressure air. However the droplet sizes produced tend to be slightly larger, sometimes resulting in a lower quality finish. Officially HVLP is limited by Government Environmental legislation to a maximum of 0.7 bar (10 psi) atomising Pressure.

Trans-Tech (Compliant)
This equipment type was first seen in the mid 1990’s and is a mixture of Conventional and HVLP atomization methods. Trans-Tech makes more energy available for the atomization process but gives a higher Transfer Efficiency of coating material than the Conventional Air Atomizing method. Like HVLP, this ‘complies’ with Government legislation by being able to transfer at least 65% of the sprayed material to the sprayed component (BSEN 13966 ‘Determination of Transfer Efficiency of atomising and spraying equipment for liquid coating materials). Air Cap Pressure is typically in the region of 1.3 to 3 bar (20 to 45 psi) while using 250 to 560 l/min (9 to 20 cfm) to carry out its work. HVLP has been replaced by Trans-Tech (Compliant) Atomisation in most applications due to its better performance.

D. Air Cap and Fluid Nozzle Selection

You must answer the following 7 questions during your selection process. There is no beginning or end question as which one is the most important will vary from process to process. However all 7 questions must be answered before you can proceed successfully.

QUESTION 1. WHAT SPRAY GUN IS TO BE USED?

Is your process hand or automatic? Do you spray the same coating all day or rapidly change types and colour? Are your components simple or complex in shape?

⇔

Depending upon the process some guns are better suited than others. If you have an existing gun you wish to use it may limit the effectiveness of the process that you wish to carry out. Maybe you may be better leaving this question until you have selected the best Air Cap and tip combination for your work and then purchasing the best gun type to carry out the work.

QUESTION 2. HOW MUCH FLUID IS NEEDED?

Air Caps are designed to handle a certain fluid flow range. What is the flow in ml/min you want it to atomise?
In the same way the size of hole in the Fluid Nozzle should be matched to the gun type and its fluid flow

⇔

Fluid flow can be measured using a suitable volume measuring container or by weight. Suction feed guns have the lowest fluid delivery, Gravity guns can achieve slightly higher. Pressure fed guns can achieve the highest fluid flows. The larger the hole in the Fluid Nozzle, the larger the fluid flow. See Table 1 on page 6 for a guide to which tip you need.

QUESTION 3. WHAT SIZE SPRAY FAN IS NEEDED?

The Air Cap is designed to produce a design maximum size spray fan, but only if you provide it with sufficient fluid flow.

⇔

Pattern size required will depend upon the type of work being undertaken. Large components normally require large spray fans so that the sprayer can move around them quickly. Conversely small work will require a small spray fan. It is not possible to produce a large fan with a small fluid flow.

QUESTION 4. WHAT SHAPE SPRAY FAN?

Is there a special reason that you need a particular shape of spray fan?

⇔

Most Industrial coating applications do not require a particular shape spray pattern. Other coating types, particularly low viscosity or special effects may be applied more easily and with less difficulty using long elliptical spray patterns.

QUESTION 5. WHAT IS THE VISCOSITY & SOLIDS CONTENT?

As the viscosity and Solids Content of a fluid increases, so does the energy needed to atomise it.

⇔

This energy is provided by the compressed air exiting the Air Cap. Therefore higher viscosity and Solids Content coatings normally need higher consumption Air Caps to spray them

QUESTION 6. HOW MUCH COMPRESSED AIR IS AVAILABLE?

Its no good choosing an Air Cap if it can't be used on your compressed air system

⇔

Check the air consumption figures of the Air Cap against the output of your compressor. Don't forget that air fed masks and other equipment will also demand air from your supply.

QUESTION 7. CONVENTIONAL, HVLP OR TRANS-TECH?

Efficiency, Atomisation power or Environmental Legislation – all of these issues will influence the final decision of the Air Cap type chosen

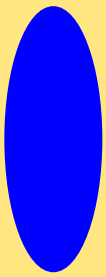
.

Table 1. Theoretical Fluid Nozzle diameter recommendations

Application Size	Typical Applications	Fluid Flow ml/min	Suction Gun Hole dia mm	Gravity Gun Hole dia mm	Pressure Gun Hole dia mm
Small	Adhesive	10 to 100	0.85 to 1.2	0.7 to 1.0	0.5 to 0.7
	Mobile Telephones	50 to 150	1.0 to 1.4	0.85 to 1.2	0.7 to 1.0
	Cosmetics Containers	100 to 200	1.2 to 1.6	1.0 to 1.4	0.85 to 1.2
	General Industrial Finishing	150 to 250	1.4 to 1.8	1.2 to 1.6	1.0 to 1.4
	Wooden Furniture	200 to 300	1.6 to 2.0	1.4 to 1.8	1.2 to 1.6
	Aerospace, Tableware Ceramic	250 to 350	1.8 to 2.2	1.6 to 2.0	1.4 to 1.8
	Rolling Stock,	300 to 400	Not possible	1.8 to 2.2	1.6 to 2.0
	Leather Finishing	350 to 500	Not possible	Not possible	1.8 to 2.2
	Protective Wax	400 to 600	Not possible	Not possible	2.0 to 2.4
	Lubrication Oil	600 to 800	Not possible	Not possible	2.2 to 2.6
Very Large	Sanitaryware Ceramic	700 to 1000	Not possible	Not possible	2.4 to 2.8

The above chart is based solely upon the theoretical Fluid Nozzle diameter needed for an average coating fluid type 15 to 25 seconds Din 4 viscosity. In the real world the selection must also take into account the viscosity of the material. As the viscosity of the coating increases the Fluid Nozzle required will generally increase as well. Likewise, as the viscosity decreases, the Fluid Nozzle diameter needed for a given fluid flow will decrease as well. Not all Fluid Nozzle hole sizes will be available for all gun types.

Table 2. Pattern Shape

			
Type	Long Ellipse	Short Ellipse	Straight Side/Round End
Good For	Non-perpendicular spraying. Metallic content & special effect. Low Viscosity. Low coating thickness Multiple overlapping Auto guns.	Solid Colour Primers	Perpendicular spraying Solid Colours & some metallic. Soft Touch coatings & some Waterbase. Sprayed area sharp cut-off.
Bad For	Soft Touch coatings & some Waterbase. Sprayed area sharp cut-off.	Metallic & special effect. Large surfaces. Low Viscosity. Low film weight.	

Remember: FAN and ATOM air Pressures, fluid flow and fluid viscosity can alter the spray fan shape from its original design specification.

E. How to use these Data sheets

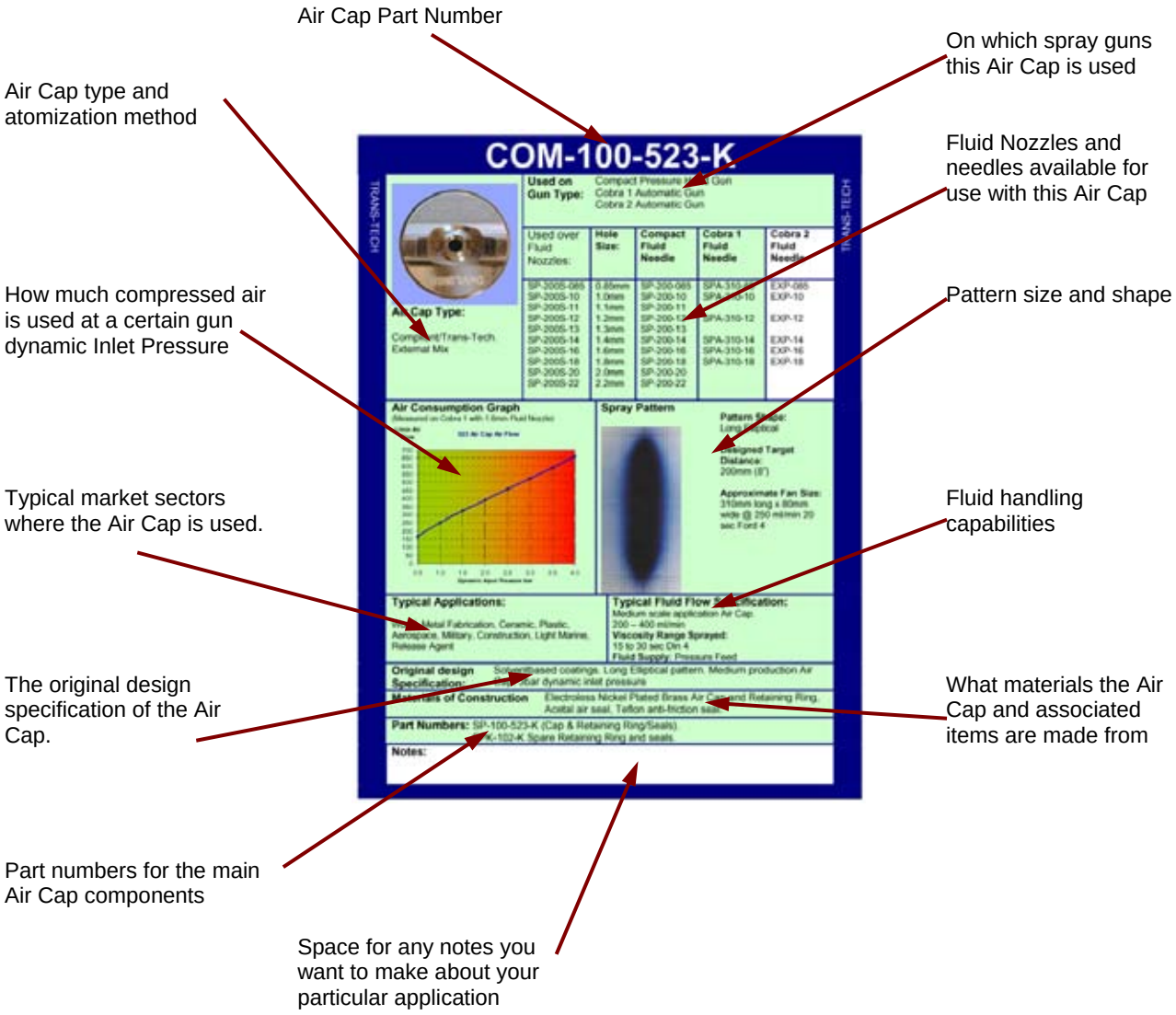


Table 3. Air Cap Options

Air Cap #	505	500	590	510	523	522	513	205	200	210	E22	E31	E63	E70	430	443	465	497	470
Atomisation Type **TT = Trans-Tech** **HVLP = High Volume Low Pressure** **CONV = Conventional**	HVLP	HVLP	TT	TT	TT	TT	TT	HVLP	HVLP	TT	CONV	TT	CONV	CONV	CONV	CONV	CONV	CONV	CONV
	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Compact Pressure Conventional															X	X	X	X	X
Compact Suction Conventional															X	X			
Compact Gravity Conventional															X	X			
Compact Pressure Trans-Tech	X	X	X	X	X	X	X												
Compact Suction Trans-Tech	X	X	X	X	X	X	X												
Compact Gravity Trans-Tech	X	X	X	X	X	X	X												
Sri								X	X	X									
Cobra 1	X	X	X	X	X	X	X								X	X	X	X	X
Cobra 2	X	X	X	X	X	X	X								X	X	X	X	X
Scorpion											X								
Viper												X	X	X					

SP-100-522-K

TRANS-TECH

#522 Air Cap

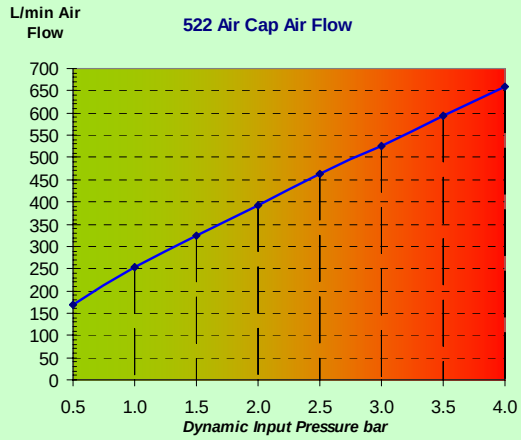
Type:
Compliant/Trans-Tech.
External Mix

Used on Gun Type:	Compact Pressure Hand Gun Cobra 1 Automatic Gun Cobra 2 Automatic Gun

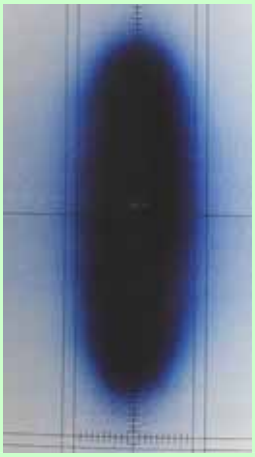
Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

Air Consumption Graph

(Measured using Cobra 1 with 1.6mm Fluid nozzle)



Spray Pattern



Pattern Shape:
Long Ellipse/Straight Side

Design Target Distance:
305mm (12”)

Approximate Fan Size:
230mm long x 45mm wide
@ 350 ml/min 20 sec Din 4
@ 200mm (8”) Target Distance

350mm long x 80mm wide
@ 350 ml/min 20 sec Din 4
@ 305mm (12”) Target Distance

Typical Applications:

Wood, General Industrial, Metal, Plastic, Adhesive, Aerospace, Leather, Military, Construction, Light Marine, Release Agents.

Typical Fluid Flow Specification:

Medium to Large production Air Cap.
200 – 800 ml/min
Viscosity Range Sprayed:
15 to 40 sec Din 4
Fluid Supply: Pressure Feed

Original design specification: Solventbased coatings. Long Elliptical pattern. Medium to Large production Air Cap 3bar dynamic inlet Pressure

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SP-100-522-K (Cap & Retaining Ring/Seals).
SPK-102-K Spare Retaining Ring and seals.

Notes:

SP-100-523-K

TRANS-TECH

Air Cap Type:

Compliant/Trans-Tech.
External Mix

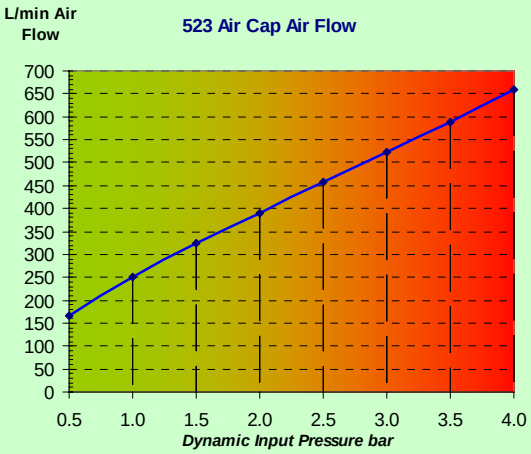
Used on Gun Type: Compact Pressure Hand Gun
Cobra 1 Automatic Gun
Cobra 2 Automatic Gun

Used over Fluid Nozzles:	Hole Size:	Compact Fluid Needle	Cobra 1 Fluid Needle	Cobra 2 Fluid Needle
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	
SP-200S-13	1.3mm	SP-300S-13		SPA-320-12
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-14
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	SPA-320-16
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

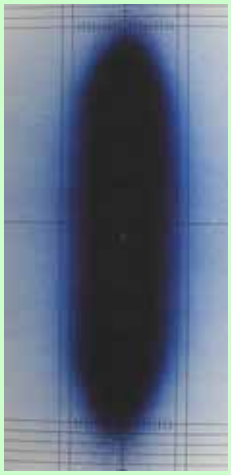
TRANS-TECH

Air Consumption Graph

(Measured on Cobra 1 with 1.6mm Fluid Nozzle)



Spray Pattern



Pattern Shape:
Long Ellipse

Design Target Distance:
200mm (8”)

Approximate Fan Size:
310mm long x 80mm wide @ 250 ml/min 20 sec Ford 4

Typical Applications:

Wood, Metal, Ceramic, Plastic, Aerospace, Military, Construction, Light Marine, Release Agent

Typical Fluid Flow Specification:

Medium scale application Air Cap.
200 – 400 ml/min
Viscosity Range Sprayed:
15 to 30 sec Din 4
Fluid Supply: Pressure Feed

Original design Specification: Solventbased coatings. Long Elliptical pattern. Medium production Air Cap. 3bar dynamic inlet Pressure

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SP-100-523-K (Cap & Retaining Ring/Seals).
SPK-102-K Spare Retaining Ring and seals.

Notes:

SP-100-510-K

TRANS-TECH

#510 Air Cap

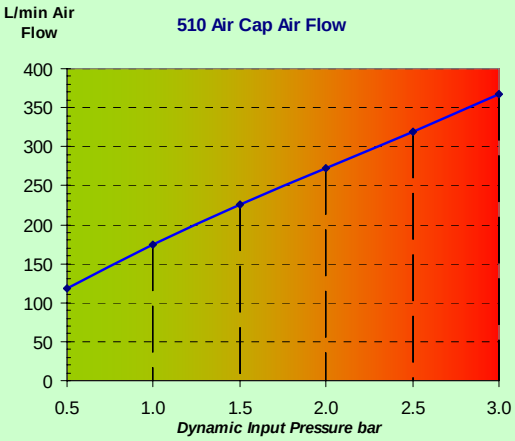
Type :
Compliant/Trans-Tech.
External Mix

Used on Gun Type:	Compact Suction, Gravity & Pressure Hand Guns Cobra 1 Automatic Gun Cobra 2 Automatic Gun

Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

Air Consumption Graph

(Measured using Cobra 1 with 1.6mm Fluid nozzle)



Spray pattern

Pattern Shape:
Long Ellipse

Design Target Distance:
200mm (8")

Approximate Fan Size:
270mm long x 60mm wide @ 200 ml/min 20 sec Ford 4

Typical Applications:

Wood, Metal, Ceramic, Adhesive, Plastic, Aerospace, Military, Decorative, Construction, Light Marine, Release Agent

Typical Fluid Flow Specification:
Small to Medium scale application Air Cap.
150 – 250 ml/min
Viscosity Range Sprayed:
15 to 30 sec Din 4
Fluid Supply: Suction, Gravity & Pressure Feed

Original design Specification:	Solventbased coatings. Long Elliptical pattern, Small to medium production 2bar dynamic inlet Pressure
Materials of Construction	Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.
Part Numbers:	SP-100-510-K (Cap & Retaining Ring/Seals). SPK-102-K Spare Retaining Ring and seals.

Notes:

SP-100-513-K

TRANS-TECH

#513 Air Cap

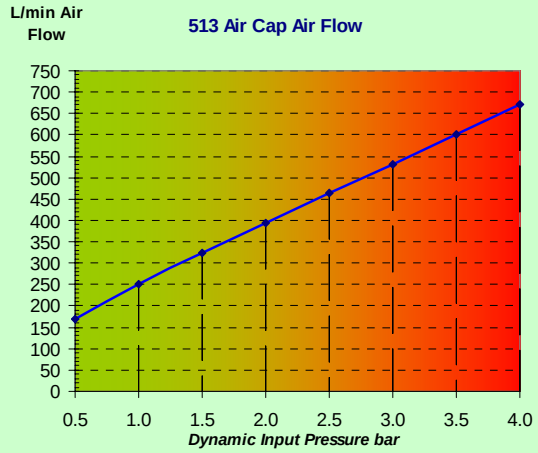
Type :
Compliant/Trans-Tech.
External Mix

Used on Gun Type:	Compact Pressure Hand Gun Cobra 1 Automatic Gun Cobra 2 Automatic Gun

Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

Air Consumption Graph

(Measured using Cobra 1 with 1.6mm Fluid nozzle)



Spray Pattern

Pattern Shape:
Straight Side/Round End

Design Target Distance:
305mm (12”)

Approximate Fan Size:
230mm long x 45mm wide
@ 350 ml/min 20 sec Ford 4
@ 200mm (8”) Target Distance

350mm long x 80mm wide
@ 350 ml/min 20 sec Ford 4
@ 305mm (12”) Target Distance

Typical Applications:

Wood, Metal, Plastic, Leather, Release Agent

Typical Fluid Flow Specification:

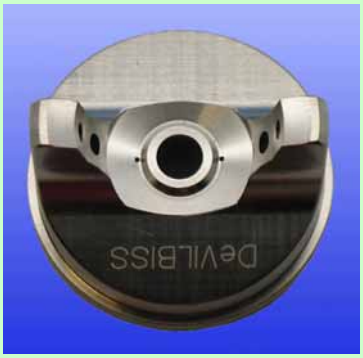
Medium to Large production Air Cap.
200 – 800 ml/min
Viscosity Range Sprayed:
15 to 40 sec Din 4
Fluid Supply: Pressure Feed

Original design specification:	Waterbased coatings – Leather & Soft Touch. Medium to Large production Air Cap. 3bar dynamic inlet Pressure
Materials of Construction	Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.
Part Numbers:	SP-100-510-K (Cap & Retaining Ring/Seals). SPK-102-K Spare Retaining Ring and seals.

Notes:

SP-100-505-K

HVLP



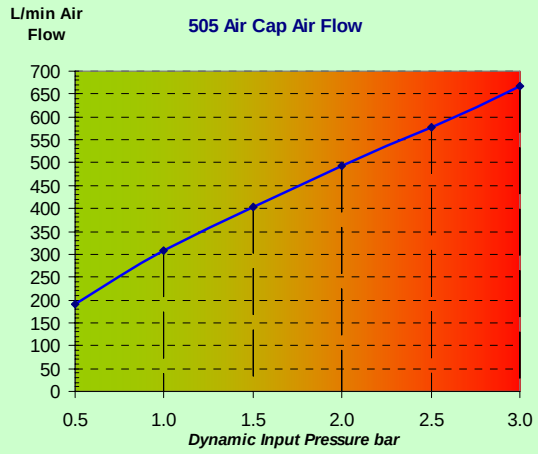
#505 Air Cap

Type :
High Volume Low Pressure.
External Mix

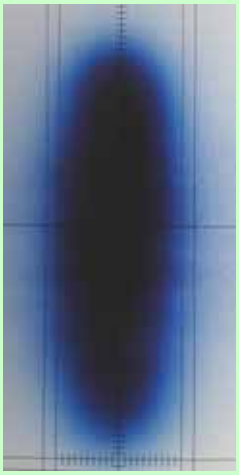
Used on Gun Type:	Compact Suction, Gravity & Pressure Hand Guns Cobra 1 Automatic Gun Cobra 2 Automatic Gun			
Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

Air Consumption Graph

(Measured using Cobra 1 with 1.6mm Fluid nozzle)



Spray Pattern



Pattern Shape:
Long Ellipse

Design Target Distance:
200mm (8”)

Approximate Fan Size:
270mm long x 60mm wide @ 200 ml/min 20 sec Din 4

Typical Applications:

Wood, Ceramic, Adhesive Plastic, Aerospace, Decorative, Release Agent

Typical Fluid Flow Specification:

Small to Medium scale application Air Cap.
150 – 250 ml/min
Viscosity Range Sprayed:
15 to 25 sec Din 4
Fluid Supply: Suction, Gravity & Pressure Feed

Original design specification: Solventbased & Waterbased coatings. Long Elliptical pattern, Small to medium production. 2bar dynamic inlet Pressure

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SP-100-505-K (Cap & Retaining Ring/Seals).
SPK-102-K Spare Retaining Ring and seals.

Notes:

SP-100-430-K

CONVENTIONAL

#430 Air Cap

Type :
Advanced Conventional.
External Mix

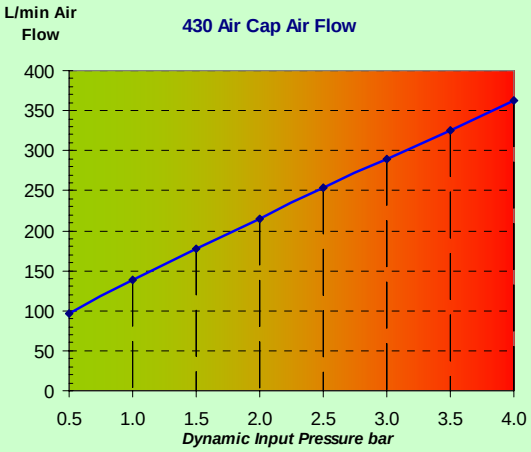
Used on Gun Type:	Compact Suction, Gravity & Pressure Hand Guns Cobra 1 Automatic Gun Cobra 2 Automatic Gun

Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

CONVENTIONAL

Air Consumption Graph

(Measured using Cobra 1 Gun and 1.6mm fluid nozzle)



Spray Pattern

Pattern Shape:
Short Ellipse

Design Target Distance:
200mm (8")

Approximate Fan Size:
200mm long x 80mm wide @ 280 ml/min 20 sec Din4

Typical Applications:

Wood, Metal, Adhesive, Aerospace, Military, Decorative, Construction, Light Marine, Release Agent

Typical Fluid Flow Specification:

Small to Medium scale application Air Cap.
150 – 300 ml/min
Viscosity Range Sprayed:
15 to 40 sec Din 4
Fluid Supply: Suction/Gravity/Pressure Feed

Original deign specification:	General purpose Solventbased coatings. 3bar dynamic inlet Pressure.
Materials of Construction	Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.
Part Numbers:	SP-100-430-K (Cap & Retaining Ring/Seals). SPK-102-K Spare Retaining Ring and seals.
Notes:	

SP-100-497-K

CONVENTIONAL

#497 Air Cap

Advanced Conventional.
External Mix

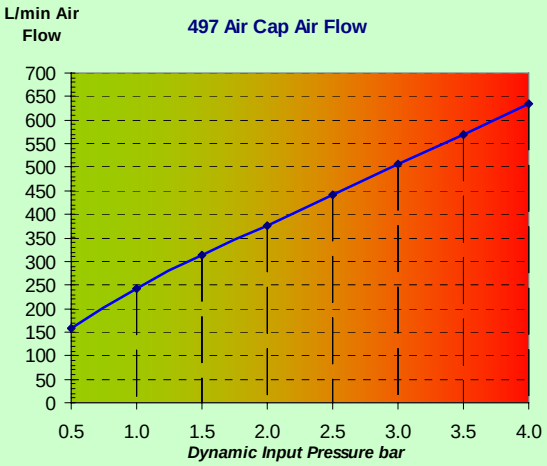
Used on Gun Type:	Compact Pressure Hand Gun Cobra 1 Automatic Gun Cobra 2 Automatic Gun

Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

CONVENTIONAL

Air Consumption Graph

(measured using Cobra 1 gun and 1.6mm Fluid Nozzle)



Spray Pattern

Pattern Shape:
Long Ellipse/Straight Side

Design Target Distance:
305mm (12”)

Approximate Fan Size:
230mm long x 45mm wide
@ 350 ml/min 20 sec Ford 4
@ 200mm (8”) Target Distance

350mm long x 80mm wide
@ 350 ml/min 20 sec Ford 4
@ 305mm (12”) Target Distance

Typical Applications:

Wood, Metal, Adhesive, Plastic, Aerospace, Military, Construction, Light Marine, Release Agent

Typical Fluid Flow Specification:

Medium to Large production Air Cap.
200 – 800 ml/min
Viscosity Range Sprayed:
15 to 40 sec Din 4
Fluid Supply: Pressure Feed

Original design specification: Solventbased coatings. 3bar dynamic inlet Pressure.

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SP-100-497-K (Cap & Retaining Ring/Seals)
SPK-102-K Spare Retaining Ring and seals.

Notes:

SP-100-443-K

CONVENTIONAL

#443 Air Cap

Type:
Advanced Conventional.
External Mix

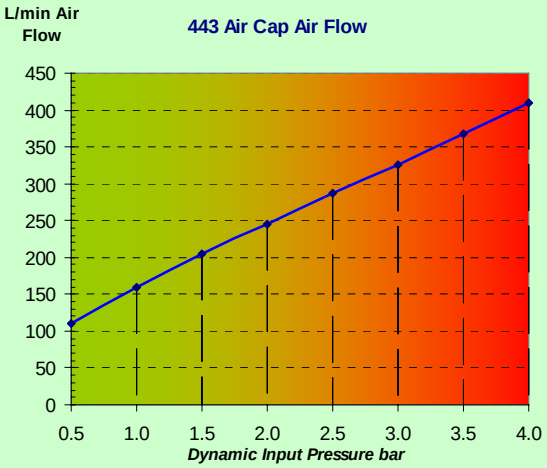
Used on Gun Type:	Compact Suction, Gravity & Pressure Hand Guns Cobra 1 Automatic Gun Cobra 2 Automatic Gun

Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

CONVENTIONAL

Air Consumption Graph

(measured using Cobra 1 gun and 1.6mm fluid nozzle)



Spray Pattern

Pattern Shape:
Long Ellipse

Design Target Distance:
200mm (8")

Approximate Fan Size:
300mm long x 60mm wide @ 240 ml/min 20 sec Din 4

Typical Applications:

Wood, Metal, Adhesive, Plastic, Aerospace, Military, Decorative, Construction, Light Marine, Release Agent

Typical Fluid Flow Specification:

Small to Medium scale application Air Cap.
200 –300 ml/min
Viscosity Range Sprayed:
15 to 35 sec Din4
Fluid Supply: Suction, Gravity & Pressure Feed

Original design specification: Solventbased coatings, 3 bar (45 psi) dynamic inlet Pressure

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SP-100-443-K (Cap & Retaining Ring/Seals).
SPK-102-K Spare Retaining Ring and seals.

Notes:

SPA-100-E63

CONVENTIONAL

#E63 Air Cap:

Type:
Conventional
External Mix

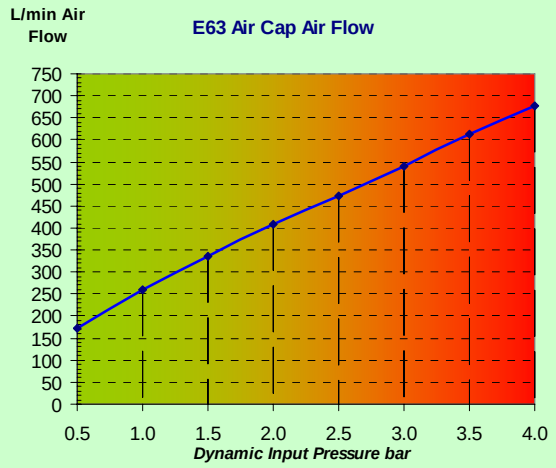
Used on Gun Type: Viper Automatic Gun

Used over Fluid Nozzles:	Hole Size:	Viper Fluid Needle		
SPA-250-18K	1.8mm	SPA-350-DE	PU needle End	
SPA-250-18K	1.8mm	SPA-351-DE	All Stainless needle	
SPA-250-20K	2.0mm	SPA-350-DE	PU needle End	
SPA-250-20K	2.0mm	SPA-351-DE	All Stainless needle	

CONVENTIONAL

Air Consumption Graph

(measured using Viper Gun and 1.8mm fluid nozzle)



Spray Pattern

Pattern Shape:
Straight Side/Round End

Design Target Distance:
305mm (12”)

Approximate Fan Size:
240mm long x 40mm wide @ 1000 ml/min using 2.0 kg/Lt Ceramic Glaze @ 200mm (8”) Target Distance

360mm long x 70mm wide @ 1000 ml/min using 2.0 kg/Lt Ceramic Glaze @ 305mm (12”) Target Distance

Typical Applications:

Ceramic, Vitreous Enamel, solvent free coatings, lubricants and release agents

Typical Fluid Flow Specification:

Medium scale application Air Cap.
300 – 900 ml/min
Viscosity Range Sprayed:
1.5 – 2.0 Kg/L
Material Supply: Pressure Feed

Original design specification: Ceramic & Vitreous Enamel, Tableware

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Polyurethane Seal

Part Numbers: SPA-100-E63 (Cap only).
SPA-36 Spare Retaining Ring
SPA-17-K5 Polyurethane Seal

Notes:

SPA-100-E70

CONVENTIONAL

#E70 Air Cap:

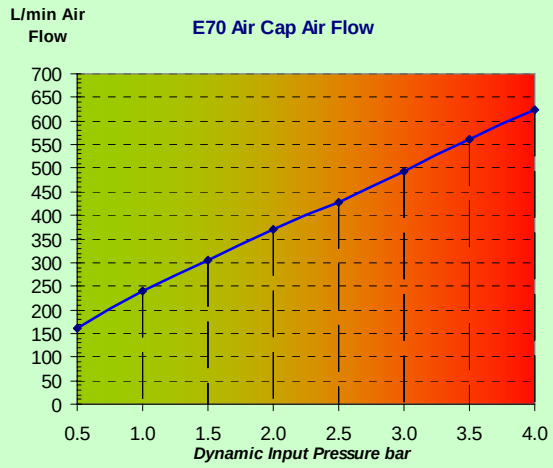
Type:
Conventional
External Mix

Used on Gun Type:	Viper Automatic Gun		
Used over Fluid Nozzles:	**Hole Size:**	**Viper Fluid Needle**	
SPA-250-22K SPA-250-28K	2.2mm 2.8mm	SPA-350-DE SPA-351-DE	PU needle End All Stainless needle

CONVENTIONAL

Air Consumption Graph

(measured using Viper gun with 2.8mm fluid nozzle)



Spray Pattern

Pattern Shape:
Straight Side/Round End

Design Target Distance:
305mm (12")

Approximate Fan Size:
400mm long x 70mm wide @ 1500 ml/min using 2.0 kg/Lt Ceramic Glaze @ 200mm (8") Target Distance

600mm long x 105mm wide @ 1500 ml/min using 2.0 kg/Lt Ceramic Glaze @ 305mm (12") Target Distance

Typical Applications:

Ceramic, Vitreous Enamel, solvent free coatings, lubricants and release agents

Typical Fluid Flow Specification:

Medium to large scale application Air Cap.
500 – 1800 ml/min
Viscosity Range Sprayed:
1.5 – 2.0 Kg/Lt
Material Supply: Pressure Feed

Original design specification: Ceramic & Vitreous Enamel, Sanitaryware

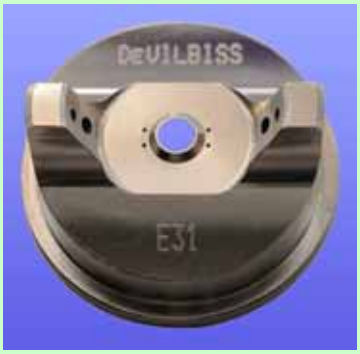
Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Polyurethane seal.

Part Numbers: SPA-100-E70 (Cap only)
SPA-36 Spare Retaining Ring
SPA-17-K5 Polyurethane anti-friction seal.

Notes:

SPA-100-E31

TRANS-TECH



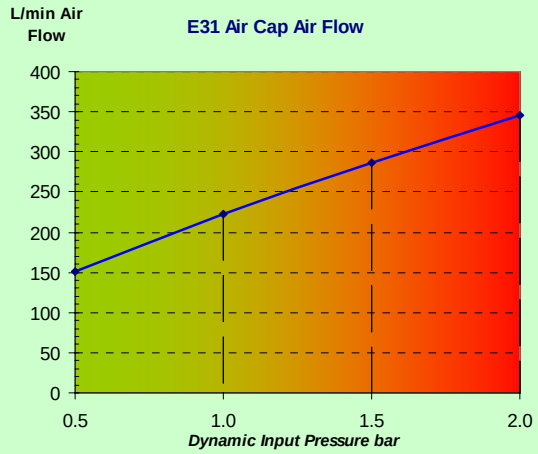
#E31 Air Cap:
Type: Trans-Tech
External Mix

Used on Gun Type: Viper Automatic Gun

Used over Fluid Nozzles:	Hole Size:	Viper Fluid Needle:	Notes:
SPA-250-12K	1.2mm	SPA-350-DE	PU needle End
SPA-250-12K	1.2mm	SPA-351-DE	All Stainless needle
SPA-250-14K	1.4mm	SPA-350-DE	PU needle End
SPA-250-14K	1.4mm	SPA-351-DE	All Stainless needle
SPA-250-16K	1.6mm	SPA-350-DE	PU needle End
SPA-250-16K	1.6mm	SPA-351-DE	All Stainless needle
SPA-250-18K	1.8mm	SPA-350-DE	PU needle End
SPA-250-18K	1.8mm	SPA-351-DE	All Stainless needle
SPA-250-20K	2.0mm	SPA-350-DE	PU needle End
SPA-250-20K	2.0mm	SPA-351-DE	All Stainless needle

Air Consumption Graph

(measured using Viper gun with 1.4mm fluid nozzle)



Spray Pattern

Pattern Shape:
Straight Side/Round End

Design Target Distance:
305mm (12")

Approximate Fan Size:
265mm long x 45mm wide @ 160 ml/min using 1.6 kg/Lt Ceramic Glaze @ 200mm (8") Target Distance

400mm long x 70mm wide @ 160 ml/min using 1.6 kg/Lt Ceramic Glaze @ 305mm (12") Target Distance

Typical Applications:

Ceramic, Vitreous Enamel, solvent free coatings, lubricants and release agents

Typical Fluid Flow Specification:

Small to Medium scale application Air Cap.
100 – 300 ml/min
Viscosity Range Sprayed:
1.5 – 2.0 kg/L glaze
Material Supply: Pressure Feed

Original design specification: Ceramic & Vitreous Enamel, Tableware and Giftware

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Polyurethane seal.

Part Numbers: SPA-100-E31 (Cap only).
SPA-36 Spare Retaining Ring
SPA-17-K5 Polyurethane anti-friction seal.

Notes:

SPA-100-E22

CONVENTIONAL

#E22 Air Cap:

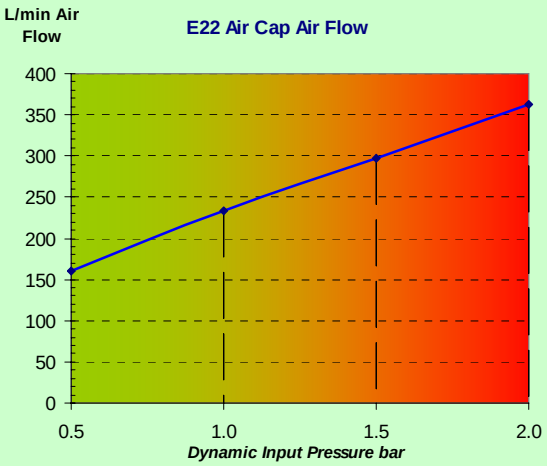
Type:
Conventional
External Mix

Used on Gun Type:	Scorpion Needle-less Automatic Gun			
Used over Fluid Nozzles:	**Hole Size:**	**Viper Fluid Needle**		
SPA-255-14K SPA-255-16K SPA-255-18K	1.4mm 1.6mm 1.8mm	NA NA NA		

CONVENTIONAL

Air Consumption Graph

(measured using Scorpion gun with 1.6mm fluid nozzle)



Spray Pattern

Pattern Shape:
Straight Side/Round End

Design Target Distance:
305mm (12")

Approximate Fan Size:
270mm long x 40mm wide @ 220 ml/min using 1.6 kg/Lt Ceramic Glaze @ 200mm (8") Target Distance

410mm long x 60mm wide @ 220 ml/min using 1.6 kg/Lt Ceramic Glaze @ 305mm (12") Target Distance

Typical Applications:

Ceramic, Vitreous Enamel, solvent free coatings, lubricants and release agents

Typical Fluid Flow Specification:

Medium scale application Air Cap.
50-300 ml/min
Viscosity Range Sprayed:
1.5 – 2.0 kg/L glaze
Material Supply: Pressure Feed

Original design specification: Ceramic & Vitreous Enamel, Tiles and Tableware

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Viton fluid seal.

Part Numbers: SPA-100-E22 (Cap only). SPA-36 Spare Retaining Ring S-28218-K5 Viton fluid seal.

Notes:

SP-100-470-K

CONVENTIONAL

#470 Air Cap:

Type:
Conventional
External Mix

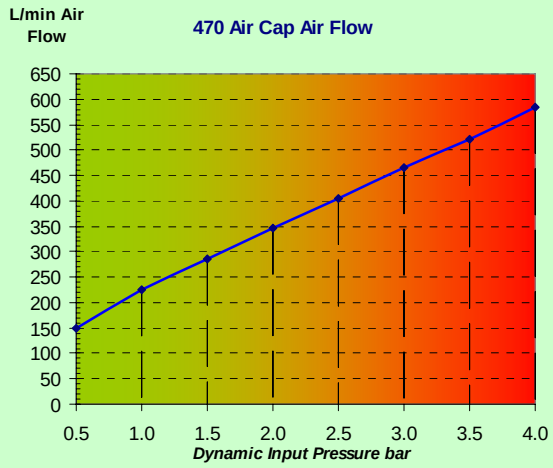
Used on Gun Type:
Compact Pressure Hand Gun
Cobra 1 Automatic Gun
Cobra 2 Automatic Gun

Used over Fluid Nozzles:	Hole Size:	Compact Fluid Needle	Cobra 1 Fluid Needle	Cobra 2 Fluid Needle
SP-247-22-K SP-247-28-K	2.2mm 2.8mm	SP-300S-22-K SP-300S-28-K	Not Available	Not Available

CONVENTIONAL

Air Consumption Graph

(measured using Compact gun with 2.8mm Fluid Nozzle)



Spray Pattern

Pattern Shape:
Straight Side/Round End

Design Target Distance:
305mm (12”)

Approximate Fan Size:
250mm long x 50mm wide @ 2000 ml/min using 2.0 kg/Lt Ceramic Glaze @ 200mm (8”) Target Distance

380mm long x 75mm wide @ 2000 ml/min using 2.0 kg/Lt Ceramic Glaze @ 305mm (12”) Target Distance

Typical Applications:

Ceramic, Vitreous Enamel, lubricants and release agents, mastics, wax, sound deadeners

Typical Fluid Flow Specification:

Medium to Large scale application Air Cap.
500-2000 ml/min
Viscosity Range Sprayed:
1.5 – 2.0 kg/Lt
Fluid Supply: Pressure Feed

Original design specification: Ceramic & Vitreous Enamel, Sanitaryware

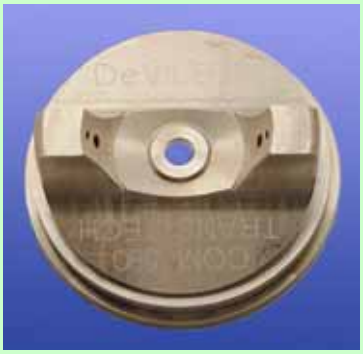
Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SP-100-470-K (Cap & Retaining Ring/Seals).
SPK-102-K Spare Retaining Ring and seals.

Notes:

SP-100-590-K

TRANS-TECH



#590 Air Cap:

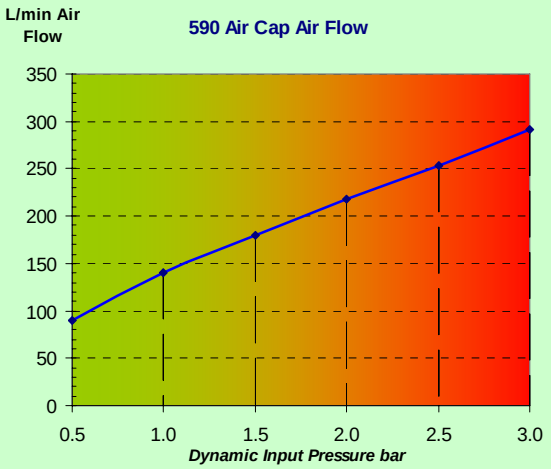
Type:
Trans-Tech
External Mix

Used on Gun Type:	Compact Pressure Hand Gun Cobra 1 Automatic Gun Cobra 2 Automatic Gun

Used over Fluid Nozzles:	Hole Size:	Compact Fluid Needle	Cobra 1 Fluid Needle	Cobra 2 Fluid Needle
SP-259S-07 SP-259S-05	0.7mm 0.5mm	Not Available	Not Available	SPA-320-07 SPA-320-05

Air Consumption Graph

(Measured using Compact-G with 0.7mm Fluid nozzle)



Spray Pattern

Pattern Shape:
Straight Side/Round End

Design Target Distance:
100mm (4")

Approximate Fan Size:
150mm long x 30mm wide @ 100 ml/min 20 sec Din 4

Typical Applications:

Wood, Metal, Adhesive, Plastic, Aerospace

Typical Fluid Flow Specification:

Small scale application Air Cap.
0 – 150 ml/min
Viscosity Range Sprayed:
15 to 30 sec Din4
Material Supply: Suction, Gravity & Pressure Feed

Original design specification:	Cosmetic containers. Straight side/round end pattern, automatic machines, 1.5bar dynamic inlet Pressure
Materials of Construction	Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.
Part Numbers:	SP-100-590-K (Cap & Retaining Ring/Seals). SPK-102-K Spare Retaining Ring and seals.

Notes:

SRI-407-210

TRANS-TECH

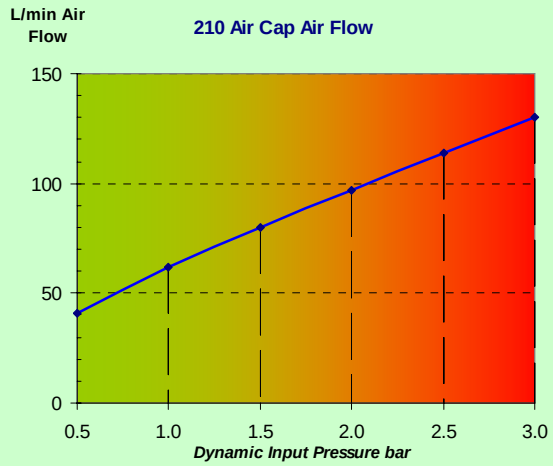
#210 Air Cap:

Type:
Trans-Tech
External Mix

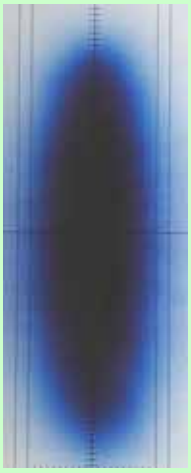
Used on Gun Type:	SRI Gravity Hand Gun			
Used over Fluid Nozzles:	**Hole Size:**	**SRI Fluid Needle**		
SRI-2-07-K SRI-2-08-K SRI-2-10-K SRI-2-12-K	0.7mm 0.8mm 1.0mm 1.2mm	SRI-37-K SRI-37-K SRI-3-K SRI-3-K		

Air Consumption Graph

(Measured using Sri with 0.7mm Fluid nozzle)



Spray Pattern



Pattern Shape:
Long Ellipse

Design Target Distance:
150mm (6”)

Approximate Fan Size:
150mm long x 30mm wide @ 100 ml/min 20 sec Din 4

Typical Applications:

Wood, Metal, Adhesive, Plastic, Aerospace, Decorative, Light Marine, Release Agent

Typical Fluid Flow Specification:

Small scale application Air Cap.
0 – 150 ml/min
Viscosity Range Sprayed:
15 to 30 sec Din4
Material Supply: Gravity Feed

Originally designed for: Solventbased materials, Small repair, Wooden furniture, adhesive

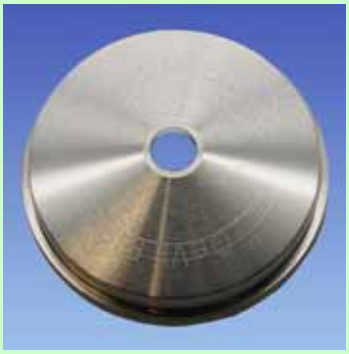
Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SRI-407-210 (Cap & Retaining ring/seal).
SRI-35-K5 Retaining Ring seal

Notes:

SP-100-500R-K

HVLP



#500 Air Cap

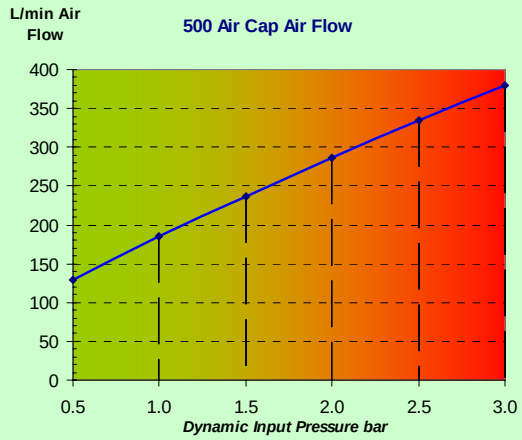
Type :
High Volume Low Pressure.
External Mix

Used on Gun Type:	Compact Suction, Gravity & Pressure Hand Guns Cobra 1 Automatic Gun Cobra 2 Automatic Gun

Used over Fluid Nozzles:	**Hole Size:**	**Compact Fluid Needle**	**Cobra 1 Fluid Needle**	**Cobra 2 Fluid Needle**
SP-200S-085	0.85mm	SP-300S-085	SPA-310-85	SPA-320-85
SP-200S-10	1.0mm	SP-300S-10	SPA-310-10	SPA-320-10
SP-200S-12	1.2mm	SP-300S-12	SPA-310-12	SPA-320-12
SP-200S-13	1.3mm	SP-300S-13		
SP-200S-14	1.4mm	SP-300S-14	SPA-310-14	SPA-320-14
SP-200S-16	1.6mm	SP-300S-16	SPA-310-16	SPA-320-16
SP-200S-18	1.8mm	SP-300S-18	SPA-310-18	
SP-200S-20	2.0mm	SP-300S-20		
SP-200S-22	2.2mm	SP-300S-22		

Air Consumption Graph

(Measured using Compact-P with 1.6mm Fluid nozzle)



Spray Pattern

Pattern Shape:
Round

Design Target Distance:
50mm (2”) to 450mm (18”)

Approximate Fan Size:

15mm diameter @ 150mm/6” target distance & 20 ml/min up to 70mm dia @ 450mm/18” target distance & 80ml/min (18 sec Din 4)

Typical Applications:

Wood, Ceramic, Adhesive

Typical Fluid Flow Specification:

Small to Medium scale application Air Cap.
50 – 150 ml/min
Viscosity Range Sprayed:
15 to 25 sec Din 4
Fluid Supply: Suction, Gravity & Pressure Feed

Original design specification:	Ceramic Tableware application. Small to medium production. 2bar dynamic inlet Pressure
Materials of Construction	Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.
Part Numbers:	SP-100-500R-K (Cap & Retaining Ring/Seals). SPA-36 Spare Retaining Ring SPA-17-K5 Polyurethane anti-friction seal.

Notes:

SRI-407-205

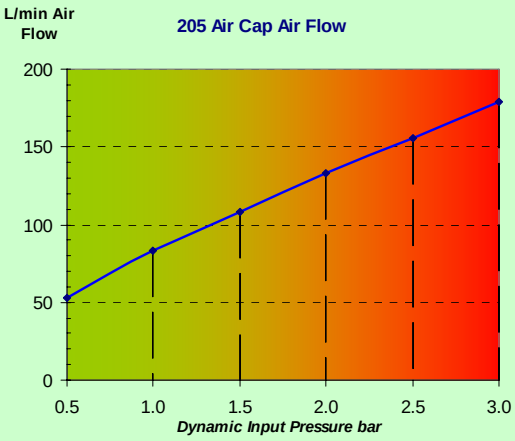
HVLP

Air Cap Type:
High Volume Low Pressure (HVLP)
External Mix

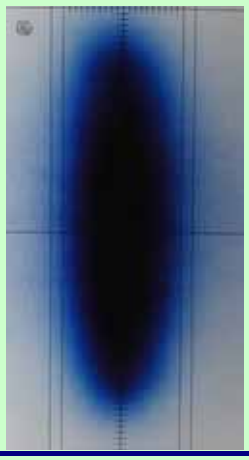
Used on Gun Type:	SRI Gravity Hand Gun		
Used over Fluid Nozzles:	**Hole Size:**	**SRI Fluid Needle**	
SRI-2-07-K SRI-2-08-K SRI-2-10-K SRI-2-12-K	0.7mm 0.8mm 1.0mm 1.2mm	SRI-37-K SRI-37-K SRI-3-K SRI-3-K	

Air Consumption Graph

(Measured using Sri with 0.7mm Fluid Nozzle)



Spray Pattern



Pattern Shape:
Long Ellipse

Design Target Distance:
150mm (6")

Approximate Fan Size:
150mm long x 30mm wide @ 100 ml/min 20 sec Din 4

Typical Applications:

Wood, Metal, Adhesive, Plastic, Aerospace, Decorative, Light Marine, Release Agent

Typical Fluid Flow Specification:

Small scale application Air Cap.
0 – 150 ml/min
Viscosity Range Sprayed:
15 to 30 sec Din4
Material Supply: Gravity Feed

Originally designed for: Waterbased coatings, Small repair, Wooden furniture, adhesive

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SRI-407-210 (Cap & Retaining ring/seal).
SRI-35-K5 Retaining Ring seal

Notes:

SRI-407-200

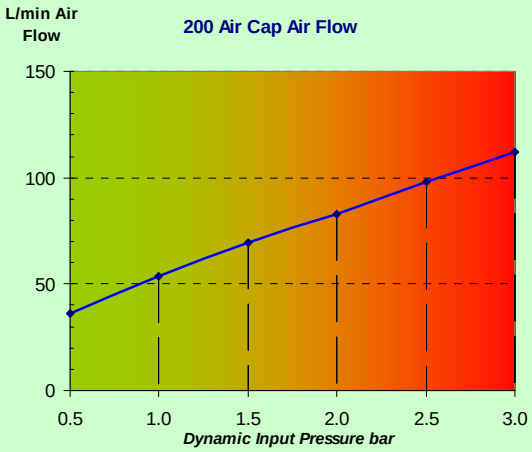
HVLP

Air Cap Type:
High Volume Low Pressure (HVLP)
External Mix

Used on Gun Type:	SRI Gravity Hand Gun			
Used over Fluid Nozzles:	**Hole Size:**	**SRI Fluid Needle**		
SRI-2-07-K SRI-2-08-K SRI-2-10-K SRI-2-12-K	0.7mm 0.8mm 1.0mm 1.2mm	SRI-37-K SRI-37-K SRI-3-K SRI-3-K		

Air Consumption Graph

(Measured using Sri with 0.7mm Fluid Nozzle)



Spray Pattern

Pattern Shape:
Round

Design Target Distance:
150mm (6")

Approximate Fan Size:
5mm dia @ 25mm target distance 5ml/min up to 50mm dia @ 250mm target distance 40ml/min 18 sec Din 4

Typical Applications:

Wood, Metal, Adhesive, Plastic, Aerospace, Decorative, Release Agent

Typical Fluid Flow Specification:

Small scale application Air Cap.
0 – 150 ml/min
Viscosity Range Sprayed:
15 to 30 sec Din4
Material Supply: Gravity Feed

Originally designed for: Solventbased & Waterbased coatings, Small repair, Wooden furniture, adhesive

Materials of Construction Electroless Nickel Plated Brass Air Cap and Retaining Ring, Acetal air seal, Teflon anti-friction seal.

Part Numbers: SRI-407-200 (Cap & Retaining ring/seal).
SRI-35-K5 Retaining Ring seal

Notes:

F. Spray Pattern Faults and Troubleshooting

Split Spray Pattern
A C E H J

Split Spray Pattern
A C E H J

Burst Pattern
F K

Banana
L M

Centre Heavy
B D F I K

Centre Heavy
F G

One end heavy
L M

A.	Horn Air Pressure too high	Decrease using control knob
B.	Horn air Pressure too low	Increase using control knob or regulator Pressure
C.	Air Input Pressure to gun too high	Decrease regulator Pressure
D.	Air Input Pressure to gun too low	Increase
E.	Fluid flow too low	Increase fluid flow – larger Nozzle or increase Pressure
F.	Fluid flow too high	Decrease fluid flow – smaller Nozzle decrease Pressure
G.	Fluid flow too high for Fluid Nozzle size used	Decrease fluid flow or increase Fluid Nozzle size
H.	Fluid Viscosity too low for air Pressure used	Increase viscosity or decrease air Pressure
I.	Fluid Viscosity too high	Decrease viscosity or increase air Pressure
J.	Wrong Air Cap selected – lower fluid flow version required	Select alternative Air Cap
K.	Wrong Air Cap Selected – Higher fluid flow version required	Select alternative Air Cap
L.	Hole in Air Cap partially blocked or damaged	Clean or replace Air Cap
M.	Fluid Nozzle hole or front face partially blocked or damaged	Clean or replace Fluid Nozzle

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