

# Information for Clinical Choice Matrix and Support Document

## Needle-free connection systems

### Support Document

#### Introduction

Information for Clinical Choice (ICC) has been developed to assist clinicians in the decision-making process when assessing the suitability of a product by providing a clear illustration and description of the features of a range of similar products supplied through NHS Supply Chain. The criteria provided, in the form of a Product Matrix and Support Document, is the result of a product review, conducted by DHLs Clinical Procurement and Quality Assurance Team, with support from clinical stakeholders from across the NHS.

The aim, alongside delivering savings back into NHS frontline services, is to ensure that clinical choice remains at the forefront of any product switching decision.

#### Needle-free connection (NFC) system: Needle-free connectors (NFC)/valves

This is a needle-less system or safety device system which is a substitute for a needle or a sharp access catheter in various designs, that effectively reduces the risk of sharps injury and subsequent blood borne virus exposure to healthcare workers. This is a single-use device. <sup>3,5,7</sup>

A NC is a medical device accessed via a septum that connects to a catheter or the end of a catheter extension set by means of a Luer lock/slip to enable intermittent catheter access for infusion or aspiration, while minimising the risk of occlusion, microbial and/or water ingress, or seepage from the catheter. <sup>1,2,4,6</sup>

#### Needle free displacement type

##### Neutral-pressure intravenous line needleless valve/connectors

A small, stand-alone, Luer-activated needleless plastic valve intended to mate two related intravenous (IV) line devices [e.g., hypodermic syringe and catheter port or tubing from an IV administration set] and hold them in a secured, sealed, locked position until disconnection, at which point there is minimal fluid flow into or out of the catheter/tubing. It is intended to eliminate the use of needles for IV administration of medications. This is a single-use device. <sup>6,8</sup>



### Positive-pressure intravenous line needleless valve-connector

A small, stand-alone, Luer-activated needleless plastic valve intended to mate two related intravenous (IV) line devices [e.g., hypodermic syringe and catheter port or tubing from an IV administration set] and hold them in a secured, sealed, locked position until disconnection, at which point positive pressure from the device causes a small volume of fluid to be expelled from the catheter/tubing. It is intended to eliminate the use of needles for IV administration of medications. This is a single-use device.<sup>6,8</sup>

### Bi-directional fluid-control NF valves

These are NFC designed with an **anti-reflux technology**, different to positive-displacement NFC, in that these valves prevents unplanned blood reflux into the intravascular catheter during infusion (e.g., when a gravity infusion bag is empty), connection, disconnection and patient changes in intra-thoracic pressure.<sup>6,8</sup>

## Device Features

### Mechanical Valve

A mechanical valve is a system of interrelated parts, designed to work together to open or close the fluid pathway, controlling the flow of fluid within a system. This internal mechanism in this group of NFCs must be capable of allowing fluid to flow in both directions for infusion and aspiration.<sup>1,6</sup>

### Pounds per square inch (PSI)

A measurement of pressure: one PSI equals 50mmHg or 68 cm H<sub>2</sub>O.<sup>4</sup> Varying degrees of PSI are required based on the different clinical condition being treated and the infusion device used. Higher PSI allows reliability in the delivery of rapid flow rates, such as contrast media via a high-powered automated injector to improve diagnostic accuracy.





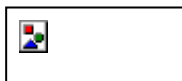
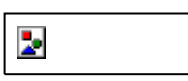
### Material Lining

Low sorbing material e.g., Polyethylene (PE) inner lining prevents changes in bioavailability of infused drug, therefore prevents underdosing of drug.<sup>1,6</sup>






Negative Displacement (Part 1)						
Supplier	B BRAUN MEDICAL LTD	BECTON DICKINSON UK LTD	BECTON DICKINSON UK LTD	BECTON DICKINSON UK LTD	CODAN LTD	FANNIN UK LTD
Brand	Safeflow	SmartSite	Swabinector	BD Q-Syte	Codan	Fannin-Flowart
MPC	409100H	2000E7D	TPS	385100	165267	A1010
NPC	FSW585	FSW1630	FSW301	FSC045	FSW292	FSB1343
Description	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve
Picture						
UOI	1	1	1	50	1	250
Route	Stocked	Stocked	Stocked	Stocked	Stocked	Stocked
Sterile	Y	Y	Y	Y	Y	Y
DEHP-Free	Y	Y	Y	Y	Y	Y
Flow Rate (ml per min)	360	100	382	533	150	312
Latex-Free	Y	Y	Y	Y	Y	Y
Length (total) (mm)	23.2	25	-	20	23	25
Material	Polycarbonate Silicone	-	-	-	Polycarbonate Silicone	Copolyester Silicone
Priming volume (ml)	0.09	0.1	0.09	0.16	0.09	0.085
Pressure PSI	400	325	-	45 (not power injectable)	29	400
Recommended duration of use	7 days	7 days	7 days	7 days	7 days	7 days
Single Use	Y	Y	Y	Y	Y	Y
Country of Manufacture	Germany	Mexico	-	Mexico	Germany	Turkey
Compatibility with pre-filled glass syringes	Y (with an adaptor)	Y	Y	Y	Y	Y
Mechanical Valve	N	-	-	-	Y	N
Split septum	Y	-	-	Y	Y	Y
Luer lock connection	Y	Y	Y	Y	Y	Y

Negative Displacement (Part 2)					
Supplier	GBUK HEALTHCARE	RPG MEDICAL LIMITED	SPIRIT MEDICAL LTD	SPIRIT MEDICAL LTD	VYGON UK LTD
Brand	Prosum	EZ-IV	Spirit Medical	Spirit Medical	Vadsite
MPC	NF001	EZ-IVNF0001	SM000017A	SM000017B	0898.03
NPC	FSW1638	FSW1610	FSW1434	FSW710	FSW684
Description	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve
Picture					
UOI	1	300	50	200	1
Route	Stocked	Blue Diamond	Stocked	Stocked	Stocked
Sterile	Y	Y	Y	Y	Y
DEHP-Free	Y	Y	Y	Y	Y
Flow Rate (ml per min)	410	360	1300	1300	170
Latex-Free	Y	Y	Y	Y	Y
Length (total) (mm)	-	23.28	16	16	23.7
Material	Polycarbonate Silicone	Polycarbonate Silicone	Polycarbonate Silicone	Polycarbonate Silicone	Polycarbonate Silicone Polyethylene
Priming volume (ml)	0.1	0.09	0.9	0.9	0.07
Pressure PSI	350	44	1200	1200	350
Recommended duration of use	7 days	7 Days	7 Days	7 Days	7 days
Single Use	Y	Y	Y	Y	Y
Country of Manufacture	China	China	Malaysia and USA	Malaysia and USA	France
Compatibility with pre-filled glass syringes	Y	Y	Y	Y	Y
Mechanical Valve	N	Y	N	N	N
Split septum	Y	Y	Y	Y	Y
Luer lock connection	Y	Y	Y	Y	Y

Neutral Displacement (Part 1)						
Supplier	BAXTER HEALTHCARE LIMITED NEWBURY01	BECTON DICKINSON UK LTD ED WOKINGHAM	GBUK HEALTHCARE	GBUK HEALTHCARE	ICU UK MEDICAL LTD	ICU UK MEDICAL LTD
Brand	One Link	BD NeutraClear	Baihe	Prosum	Clave	Microclave Clear
MPC	7N8399K	EL-NC1000	14071000	NF000	011-C1000	011-MC100
NPC	FSB2089	FSW1570	FSW1494	FSW1527	FSB980	FSB1239
Description	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve
Picture						
UOI	200	50	100	100	100	100
Route	Stocked	E-Direct	Blue Diamond	Blue Diamond	Blue Diamond	Stocked
Sterile	Y	Y	Y	Y	Y	Y
DEHP-Free	Y	Y	Y	Y	Y	Y
Flow Rate (ml per min)	60	140	115	170	600	600
Latex-Free	Y	Y	Y	Y	Y	Y
Length (total) (mm)	31.3	28	-	-	24.1	26.5
Material	Polycarbonate	-	Polycarbonate Silicone	Polycarbonate Silicone	Polyester Acrylic Silicone	Polycarbonate Silicone
Priming volume (ml)	0.08	0.049	0.09	0.11	0.06	0.04
Pressure PSI	325	325	350	100	400	400
Recommended duration of use	7 days	7 days	7 days	7 days	7 days	7 days
Single Use	Y	Y	Y	Y	Y	Y
Country of Manufacture	Puerto Rico	France	China	China	Mexico	Mexico
Compatibility with pre-filled glass syringes	Y	N	Y	N	Y (with an adaptor)	Y (with an adaptor)
Mechanical Valve	Y	-	N	N	N	N
Split septum	N	-	Y	Y	Y	Y
Luer lock connection	Y	Y	Y	Y	Y	Y



Neutral Displacement (Part 2)					
Supplier	ICU UK MEDICAL LTD	ICU UK MEDICAL LTD	VYGON UK LTD	VYGON UK LTD	VYGON UK LTD
Brand	Microclave Clear	ICU Medical	Bionector	Bionector	Bionector
MPC	011-C3300	011-NU100	0896.01	0896.02	0896.03
NPC	FSB1266	FSB2568	FSW131	FSW132	FSW141
Description	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve
Picture					
UOI	1	1	1	1	1
Route	Stocked	Stocked	Stocked	Stocked	Stocked
Sterile	Y	Y	Y	Y	Y
DEHP-Free	Y	Y	Y	Y	Y
Flow Rate (ml per min)	600	600	105	105	105
Latex-Free	Y	Y	Y	Y	Y
Length (total) (mm)	26.5	19.8	25.7	25.7	25.7
Material	Polycarbonate Silicone	Polycarbonate Copolyester Silicone	Polycarbonate Stainless Steel Polyisoprene Polyethylene	Polycarbonate Stainless Steel Polyisoprene Polyethylene	Polycarbonate Stainless Steel Polyisoprene Polyethylene
Priming volume (ml)	0.04	0.06	0.03	0.03	0.03
Pressure PSI	400	325	350	350	350
Recommended duration of use	7 days	7 days	7 days	7 days	7 days
Single Use	Y	Y	Y	Y	Y
Country of Manufacture	Mexico	Mexico	France	France	France
Compatibility with pre-filled glass syringes	Y (with an adaptor)	Y (with an adaptor)	Y (with an adaptor)	Y (with an adaptor)	Y (with an adaptor)
Mechanical Valve	N	N	N	N	N
Split septum	Y	Y	Y	Y	Y
Luer lock connection	Y	Y	Y	Y	Y

Bi-directional fluid control			
Supplier	BECTON DICKINSON UK LTD	ICU UK MEDICAL LTD	VYGON UK LTD
Brand	NeuroX	Neutron	Bionector TKO
MPC	EL250	011-NC100	083801E
NPC	FKA732	FSB1365	FSW584
Description	Needlefree Connector/ valve	Needlefree Connector/ valve	Needlefree Connector/ valve
Picture			
UOI	100	100	50
Route	E-Direct	Blue Diamond	Stocked
Sterile	Y	Y	Y
DEHP-Free	-	Y	Y
Flow Rate (ml per min)	-	600	55
Latex-Free	Y	Y	Y
Length (total) (mm)	-	30.5	39
Material	-	Polycarbonate Silicone Nylon	Polycarbonate Silicone Polyethylene Stainless Steel Polyisoprene
Priming volume (ml)	-	0.1	0.1
Pressure PSI	-	350	350
Recommended duration of use	-	7 days	7 days
Single Use	Y	Y	Y
Country of Manufacture	-	Mexico	France
Compatibility with pre-filled glass syringes	-	Y (with an adaptor)	Y (with an adaptor)
Mechanical Valve	-	N	N
Split septum	-	Y	Y
Luer lock connection	Y	Y	Y



## References:

1. Clinical Review: Needle-free connectors (Needle-free valves and needle-free extension sets single lumen) NHS Clinical Evaluation Team (2018).  
[https://www.media.supplychain.nhs.uk/media/Clinical\\_Review\\_Needlefree\\_Connectors\\_Report\\_October\\_2018.pdf](https://www.media.supplychain.nhs.uk/media/Clinical_Review_Needlefree_Connectors_Report_October_2018.pdf)
2. Gorski LA, Hadaway L, Hagle M., et al. Infusion therapy standards of practice. *Journal of Infusion Nursing*. 2021;**44**(Suppl 1): S1-S224. doi:10.1097/NAN.0000000000000396  
<https://www.ins1.org/publications/infusion-therapy-standards-of-practice/>
3. Health and Safety Executive (HSE) (2013) *Health and Safety (Sharp Instruments in Healthcare) Regulations: Guidance for Employers and Employees*. London: Health and Safety Executive.
4. Loveday HP, Wilson JA, Pratt RJ et al (2014) epic3: national evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. *Journal of Hospital Infections* **86**(Suppl 1): S1-70 doi:10.1016/S0195-6701(13)60012-2.
5. Lister, S., Hofland, J. and Grafton H. (eds) (2020) *The Royal Marsden Manual of Clinical Nursing Procedures*, 10th ed. John Wiley and Sons, Chichester.
6. Needleless Connectors: A Primer on Terminology  
<https://hadawayassociates.com/uploads/3/5/4/4/35447364/8551.pdf>
7. Royal College of Nursing (RCN) (2016). *Standards for Infusion Therapy*, 4<sup>th</sup> edn. London: Royal College of Nursing.
8. The Global Medical Device Nomenclature (GMDN)  
<https://www.gmdnagency.org/>

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