

PHARMALINE N&X

Flexible PTFE souple à paroi lisse



HYGIËNIQUE

SOUPLE

AUTO-NETTOYANT

RÉSISTANCE À LA TORSION

RÉSISTANCE CHIMIQUE

PRESENTATION DU PHARMALINE N

- PTFE – le choix optimal de revêtement des flexibles Page 3
- Pharmaline N et X – les nouveaux concepts produit d'Alex Hose Page 4
- Pharmaline N et X – descriptions des flexibles Page 5
- Pharmaline N et X – caractéristiques & propriétés Page 6
- Comment commander les flexibles équipés Pharmaline N et X Page 7
- Pharmaline N and X EN 16643, grades des propriétés électriques pour le montage des flexibles Page 8
- Codes articles des flexibles équipés Pharmaline N et X Page 9

TUYAUX

- Pharmaline N et X, revêtements PTFE GP et AS Page 10

RACCORDS à BRIDES

- Raccords à bride tournante Page 11

CAM AND GROOVE FITTINGS (CAMLOCKS)

- Raccords à Cam Femelle et Mâle Page 12

RACCORDS SANITAIRES (CLAMP)

- Raccords clamp sanitaires et clamp mini-sanitaires Page 13
- Raccords clamp sanitaires coudés à 90° Page 14

RACCORDS NPT & BSPT

- Raccords Mâle fixe BSPT et femelle fixe NPT Page 15
- Femelle BSP conique 60° et femelle BSP à portée plate et écrou de roue Page 16

RACCORDS JIC

- Raccords JIC Femelle 37° & raccords unions NPT Mâle & Femelle Page 17

TUBE ADAPTATEUR

- Tube adaptateur (tube rainuré) Page 18

CANNES PLONGEANTES

Page 19

MARQUAGE STANDARD & ENCAPSULÉ, CODE COULEUR POUR PHARMALINE N ET X

Page 20

CONDITIONS PARTICULIERES D'UTILISATION DU PHARMALINE N ET X

Page 21

PHARMALINE N ET X ASSURANCE QUALITE, CERTIFICATIONS ET AUTORISATIONS

Page 22

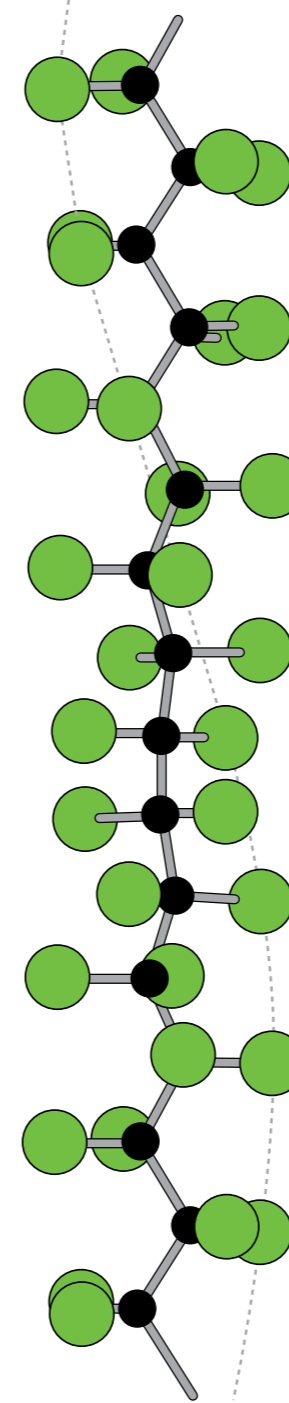
CONFIGURATION DES FLEXIBLES & CALCULS DES LONGUEURS

- pour le rayon courbure Page 23
- contre l'abrasion & la torsion Page 24
- pour le calcul des longueurs Page 25

CONDITIONS GENERALES DE VENTE

Pages 26 & 27

Section d'une molécule PTFE 16 unités Angstrom de longueur



● = Atome Fluor
● = Atome Carbone

Le PTFE, ou polytétrafluoroéthylène, se compose d'une longue chaîne de molécules d'atomes carbone, chacun relié à deux atomes fluor.

Les atomes fluor produisent une spirale hélicoïdale qui enveloppe et protège la chaîne carbone.

Cette structure crée ainsi les propriétés uniques pour lesquelles le PTFE est renommé.

• **Excellente résistance chimique**

Le PTFE est reconnu comme étant la matière la plus résistante aux produits chimiques. Seul un très petit nombre de substances et conditions très inhabituelles peuvent avoir un effet sur le PTFE, comme le gaz Fluor à haute température et pression ou liquide comme le sodium métallique en ébullition.

Ces flexibles ayant un revêtement interne en PTFE peuvent donc être utilisés pour une plus grande variété de produits chimiques que n'importe quel autre type de flexible, ce qui fait de ce flexible un choix idéal pour les applications chimiques très corrosives ou applications à produits multiples.

• **Revêtement antiadhésif**

L'utilisation du PTFE pour les ustensiles de cuisine a pu démontrer mondialement combien il est facile de nettoyer ce type de revêtement.

Ce qui signifie que les flexibles avec revêtement PTFE peuvent être purgés à 100% offrant ainsi un nettoyage plus rapide, plus facile et plus fiable que n'importe quel autre type de flexible.

• **Plage de température excellente**

L'utilisation du PTFE en cuisine montre également les différentes particularités du PTFE - résistance à la température. Le PTFE peut être utilisé comme revêtement de flexible pour des températures allant de -150°C jusqu'à + 260 ° C, en fonction de la conception du flexible et des conditions d'application.

Cette plage de température est la plus grande comparée à d'autres revêtements de flexible tels que le caoutchouc ou le plastique.

• **Résistance électrique très élevée**

La plupart des câblages électriques aérospatiaux ont une protection en PTFE, en raison de sa excellente résistance électrique excellente. Cette propriété peut toutefois être désavantageuse dans certaines applications où une charge électrostatique peut se développer sur les parois internes du flexible. Alex Hose a développé une solution non-contaminante à ce problème en conformité avec les normes FDA et USP Class VI.

• **Conception des flexibles**

Durant 40 ans, Alex Hose a acquis une expérience avérée dans la fabrication de flexibles en PTFE ayant intégré le revêtement interne dans la conception du flexible équipé.

Le principal fabricant de flexibles souples en PTFE au monde

Fondé en 1973, Aflex Hose a lancé le concept de revêtement interne en PTFE pour les flexibles transférant des fluides de traitement.

Depuis lors, et au fil des années, des centaines de milliers des flexibles ont été et conçus Aflex Hose pour faire face aux conditions d'exploitation les plus difficiles. Aflex a continuellement développé et élargi sa gamme de produits ayant lancé et introduit les flexibles antistatiques, les armatures tressées en polypropylène et encore plein d'autres innovations pour répondre à la demande des clients.

Fabrication intégrale

Le succès des produits d'Aflex est principalement fondé sur le fait qu'Aflex Hose est le seul fabricant de flexibles en PTFE au monde. Toutes les opérations de conception et de fabrication soit interne, des matières premières jusqu'aux produits finis, dans ses usines au Yorkshire (Royaume-Uni) et en Pennsylvanie (USA).

- Le PTFE en poudre est extrudé en tube et convolutoé.
- Un fil inox est enroulé et tressé sur le tube.
- Des extrudeuses en caoutchouc sont utilisées pour appliquer les revêtements externes
- Les raccords aux extrémités sont fabriqués à partir de barres sur des tours à commande numérique
- Pour finir les flexibles sont assemblés selon les besoins individuels des clients.

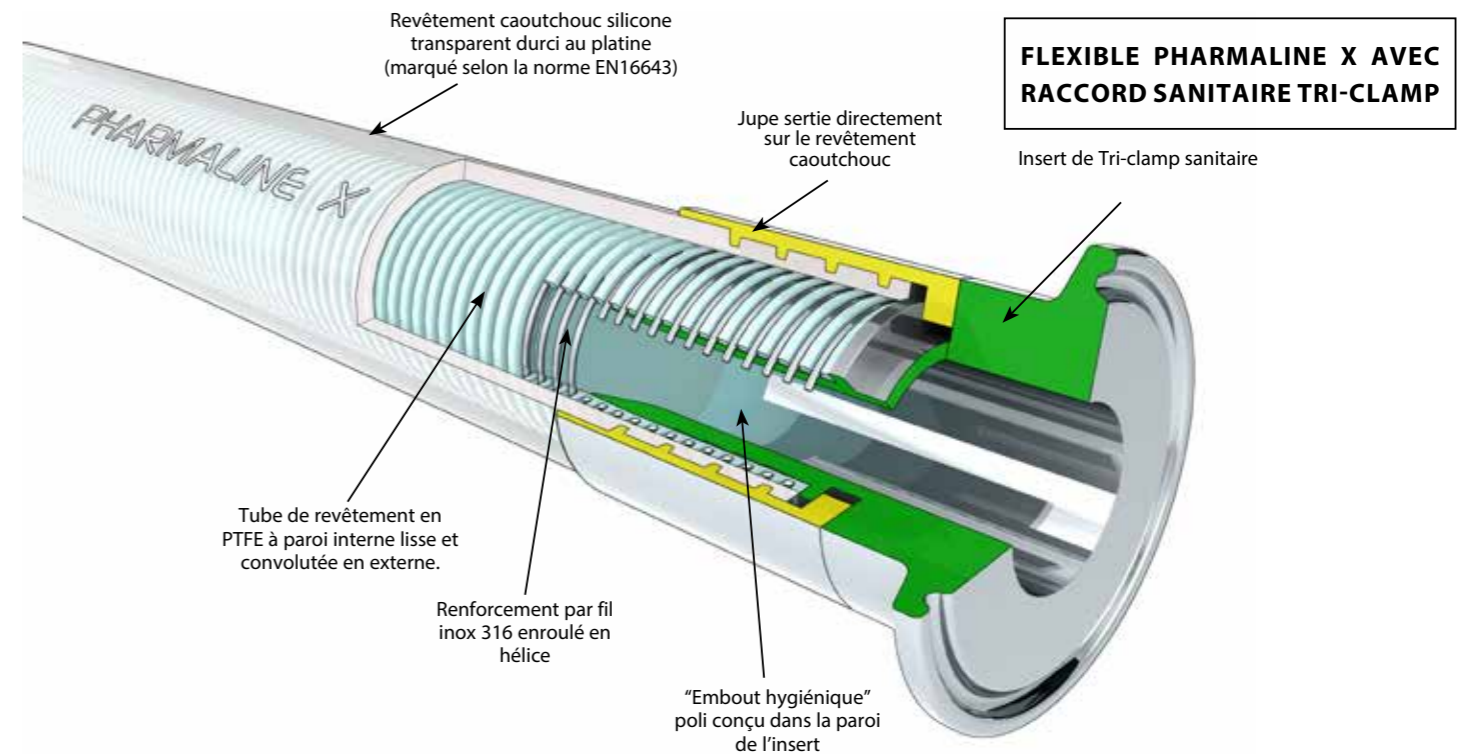
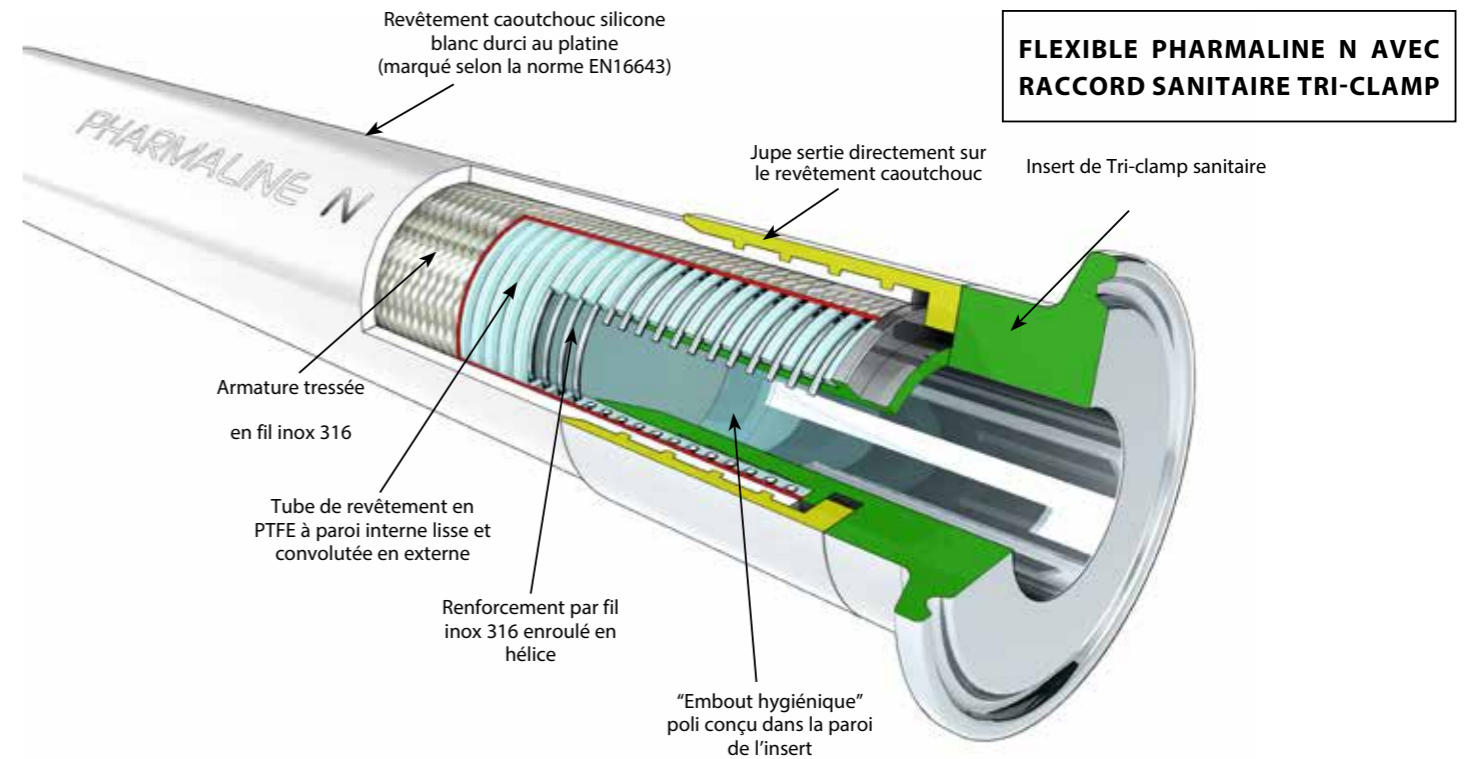
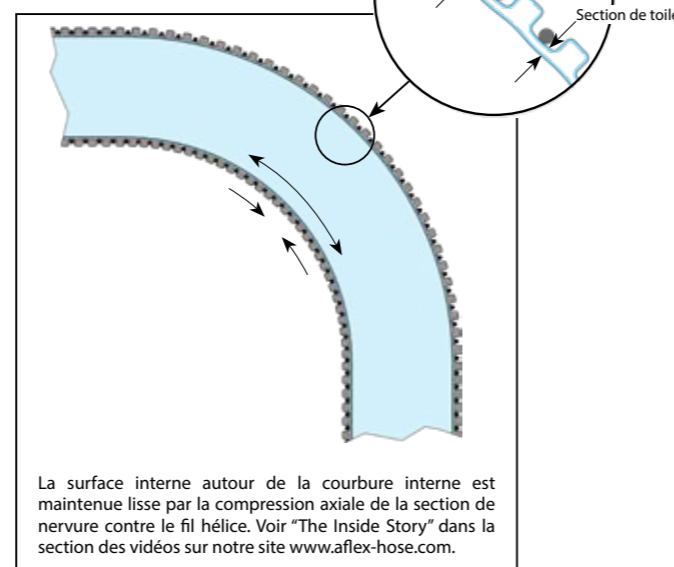
En effectuant toutes ces opérations au sein de nos locaux, Aflex Hose est capable d'atteindre des niveaux de qualité imbattables dans la fabrication et d'excellence dans la conception, inégalés par nos concurrents tout en réalisant des économies d'échelle ce qui nous donne un grand avantage sur nos concurrents.

Conception des flexibles Pharmaline N et X

Les flexibles Pharmaline et Pharmalex ont été développés et lancés par Aflex Hose en 2005, afin de fournir un nouveau flexible en PTFE à paroi lisse, recouvert de silicone pour une flexibilité supérieure aux autres produits disponibles sur le marché.

Pour répondre à la demande des clients, les flexibles Pharmaline N et X ont été conçus et mis en place pour remplacer les flexibles Pharmaline et Pharmalex avec des flexibles encore plus souples et résistants aux torsions. Au cœur de la conception des flexibles Pharmaline se trouve le tube de revêtement en PTFE, paroi interne lisse et convolutoée à l'extérieur. La plupart des diamètres comprennent maintenant une hélice de renforcement en fil inox 316 enroulé dans les spires, ainsi qu'un profil de convolutoion amélioré. Ceux-ci viennent renforcer le tube sous les effets de forte flexion et d'aspiration.

Tube PTFE Pharmaline



Caractéristiques de conception

Pharmaline N comprend une armature tressée en fil inox 316 pour plus de renfort et de résistance aux pressions internes élevées

Pharmaline X ne comprend pas d'armature, conçu pour des applications moins intensives avec de faibles pressions.

La conception des flexibles Pharmaline N et X offrent de meilleures possibilités d'utilisation en milieu pharmaceutique, biotechnologique, en chimie fine et recherches, que les flexibles en caoutchouc silicone. L'excellente résistance chimique du revêtement en PTFE, sa facilité de nettoyage ainsi que sa résistance à la stérilisation par vapeur constituent des avantages considérables dans de nombreuses applications.

Caractéristiques du flexible Pharmaline N

Diamètre nominal de flexible		Diamètre Interne réel		File hélice	Diamètre externe avec revêtement		Rayon de courbure Minimum		*Pression Maximale de service		Pression de rupture		Poids par unité de longueur	
Pouce	mm	Pouce	mm		Pouce	mm	Pouce	mm	Psi	Bar	Psi	Bar	lb/ft	Kg/Mtr
1/4	6.4	0.260	6.6	-	0.460	11.6	3/4	19	1160	80	4641	320	0.11	0.17
3/8	9.5	0.382	9.7	-	0.610	15.5	1	25	1015	70	4061	280	0.14	0.22
1/2	12.7	0.516	13.1	✓	0.845	21.4	1 1/2	38	870	60	3480	240	0.25	0.37
5/8	16.0	0.638	16.2	✓	0.990	25.2	2	50	725	50	2900	200	0.35	0.52
3/4	19.0	0.760	19.3	✓	1.120	28.5	2 1/2	63	655	45	2610	180	0.42	0.65
1	25.4	1.012	25.7	✓	1.455	37.0	4	100	580	40	2320	160	0.57	0.88
1 1/4	32.0	1.268	32.2	✓	1.755	44.6	5 1/4	130	510	35	2030	140	0.85	1.30
1 1/2	38.0	1.516	38.5	✓	2.035	51.7	6.70	170	435	30	1740	120	1.14	1.70
2	50.0	2.012	51.1	✓	2.580	65.6	8.27	210	405	28	1624	112	1.58	2.36
2 1/2	65.0	2.508	63.7	✓	3.169	80.5	11.81	300	290	20	1100	80	2.41	3.59
3	80.0	3.024	76.8	✓	3.654	92.8	13.78	350	218	15	870	60	2.96	4.40

*Pressions Maximales de Service varient selon la température comme indiqué dans le graphique ci-dessous

Caractéristiques du flexible Pharmaline X

Diamètre nominal de flexible		Diamètre Interne réel		File hélice	Diamètre externe avec revêtement		Rayon de courbure Minimum		† Pression Maximale de service		Pression de rupture		Poids par unité de longueur	
Pouce	mm	Pouce	mm		Pouce	mm	Pouce	mm	Psi	Bar	Psi	Bar	lb/ft	Kg/Mtr
1/4	6.4	0.260	6.6	-	0.456	11.6	1 1/4	30	109	7.5	435	30	0.06	0.09
3/8	9.5	0.382	9.7	-	0.610	15.5	1 1/2	38	87	6.0	348	24	0.09	0.14
1/2	12.7	0.516	13.1	✓	0.845	21.4	2 3/8	60	84	5.8	334	23	0.21	0.32
5/8	16.0	0.638	16.2	✓	0.990	25.2	2 1/2	64	72	5.0	290	20	0.19	0.29
3/4	19.0	0.760	19.3	✓	1.120	28.5	3	75	72	5.0	290	20	0.37	0.55
1	25.4	1.012	25.7	✓	1.455	37.0	4 3/4	120	60	4.0	240	16	0.44	0.81
1 1/4	32.0	1.268	32.2	✓	1.755	44.6	5 1/2	140	43	3.0	175	12	0.50	0.75
1 1/2	38.0	1.516	38.5	✓	2.035	51.7	7	180	29	2.0	116	8	0.74	1.11
2	50.0	2.012	51.1	✓	2.580	65.6	12	300	29	2.0	116	8	1.28	1.91

† Pressions Maximales de Service ne varient pas selon la température

*Pressions Maximales de Service (PMS)

La PMS la plus faible entre celle du flexible et celle des raccords aux extrémités.

Les limites de température

A partir de -73°C, -100°F jusqu'à +204°C, +400°F.

Les limites d'aspiration

Pharmaline N et X ont une tenue au vide jusqu'à -0.9bar jusqu'à 200°C, 392°F.

Les essais en "U continu" pour tester la durée de vie en flexion

(Visible de notre site internet) Une durée de vie 15 fois supérieure à tout autre flexible à revêtement externe en caoutchouc et PTFE lisse en interne.

Souplesse

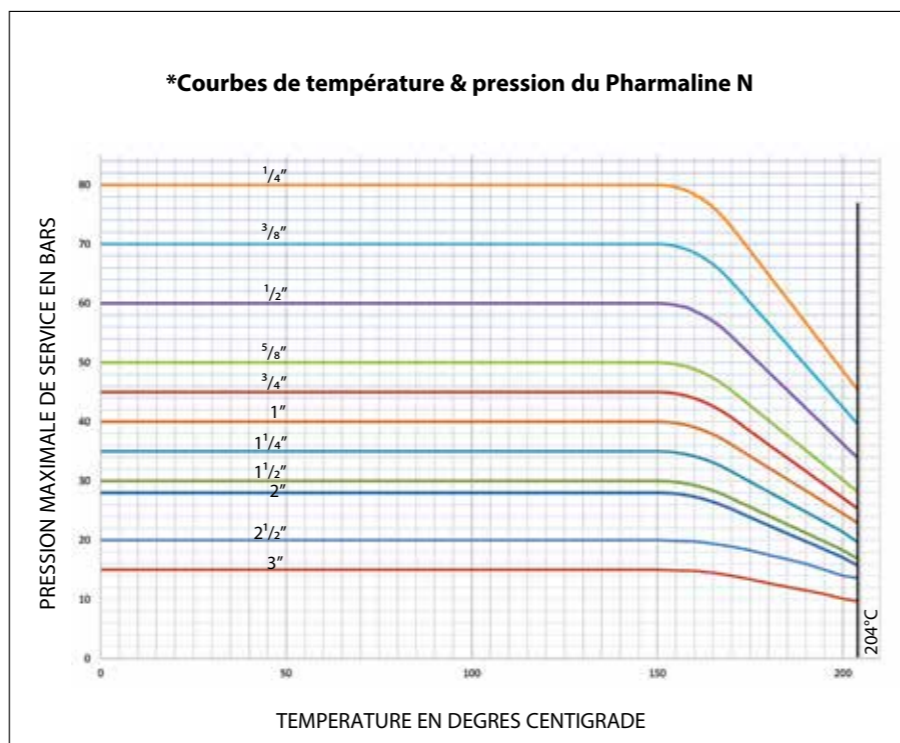
Beaucoup moins rigide que n'importe quel autre flexible équivalent en PTFE lisse.

Résistance à la torsion

(Visible de notre site internet) Beaucoup plus résistant à la torsion que n'importe quel autre flexible équivalent en PTFE lisse.

Immergeables

Les flexibles Pharmaline N sont immergeables.



Comment commander Pharmaline N et X en flexibles équipés

Flexibles équipés Pharmaline N

Les caractéristiques et informations contenues dans cette brochure peuvent être utilisées pour définir le(s) flexible(s), mais en cas de doutes concernant les restrictions d'utilisation des flexibles ou leurs capacités de performance, veuillez consulter Aflex Hose.

Sélectionner le grade du tuyau

Il existe deux types de revêtement PTFE, le PTFE vierge (Pharmaline N ou X, grade GP) et le PTFE antistatique (Pharmaline N ou X, grade AS), voir détails en page 10.

Sélectionner la longueur du flexible

Les longueurs des flexibles équipés Pharmaline N et X sont spécifiées par le client. La longueur du flexible est comprise entre chaque extrémités à la surface d'étanchéité. La tolérance des longueurs est habituellement de + 2% / -0%.

Les longueurs minimales de flexibles équipés sont calculées en additionnant les longueurs des raccords aux extrémités comme indiqué en pages 11 à 19, dimensions A, puis en ajoutant la longueur minimale 'visible' du tuyau entre les raccords selon le tableau ci-dessous.

Si le flexible doit être fléchi, il faut cependant avoir une longueur suffisante de tuyau visible suivant la configuration des flexibles en flexion (voir pages 23 - 25).

Longueurs du flexible équipé

Diamètre nominal de flexible		Longueur minimum du flexible 'visible' entre les raccords				† Pharmaline N		Pharmaline X	
		Utilisation droite		En flexion à 90°		Longueur maximum Flexible équipé		Longueur maximum Flexible équipé	
Pouce	mm	Pouce	mm	Pouce	mm	ft	mtrs	ft	mtrs
1/2	15	3	75	3.00	75	100	30	65	20
5/8	16	3	75	3.00	75	100	30	65	20
3/4	20	3	75	4.00	100	100	30	65	20
1	25	3	75	4.33	110	100	30	65	20
1 1/4	32	4	100	6.30	160	100	30	20	6
1 1/2	40	4	100	8.66	220	100	30	20	6
2	50	4	100	12.40	315	80	25	20	6
2 1/2	65	4	100	18.70	475	60	18	N/A	N/A
3	80	4	100	21.65	550	50	15	N/A	N/A

† Des longueurs plus grandes peuvent être réalisées sur demande

Comment commander

La quantité, le type de flexible et raccords, les diamètres et longueurs doivent être indiqués.

SOIT par une description écrite complète. Le type de flexible et le grade du flexible peuvent être spécifiés par ses initiales, par ex : "Pharmaline N, AS" désigne un flexible Pharmaline N avec un revêtement interne en PTFE chargé carbone.

La quantité, longueur, et raccords peuvent être indiqués comme dans l'exemple suivant: "4x 1" Pharmaline N, AS x longueur 3.00 mètres, équipé à chaque extrémité de brides ANSI 150# en inox".

OU bien avec les codes articles, comme indiqués en page 9. Toutes exigences particulières relatives à la fabrication du flexible, ou toutes informations requises pour le marquage, ou tous certificats ou tests spécifiques, doivent être intégralement précisés sur les demandes ou commandes d'achat.

Conditions de Vente

Les flexibles Pharmaline N & X en vrac et équipés ne sont fournis que sur la base que le client ai lu et accepté les conditions de vente comme indiqué sur les pages 26 & 27.

Les longueurs maximales de flexibles équipés sont détaillées dans le tableau ci-dessous.

Les longueurs peuvent être exprimées en pieds et pouces ou en mètres et millimètres décimaux. L'unité utilisée doit être indiquée.

Sélectionner les raccords des extrémités

La gamme et matière des raccords standards sont détaillées en pages 11 et 19.

Grade des raccords en inox

Embouts non-revêtus -

Tous sont en inox 316L = EN 1.4404

Raccords à Cam Femelle -

sont en inox 316C = EN 1.4408 (corps) and 316L (embout)

Brides tournantes et écrous -

Tous sont en inox 304 SS = EN 1.4301

Jupes -

La plupart sont en inox 304, certaines en inox 316

Pharmaline N GP - Revêtement usage universel



Pharmaline X GP - Revêtement usage universel



Usage

Les flexibles Pharmaline N ou X GP sont destinés à un 'usage universel' pour toutes applications de transfert de liquides ou gaz ne présentant pas de risque d'accumulation de charges électrostatiques (voir "AS").

Matière & Caractéristiques

GP Grade a un revêtement en PTFE vierge, fabriqué à partir d'un tube en PTFE conformément aux exigences suivantes:

FDA 21 CFR 177.1550

Le revêtement en PTFE et le caoutchouc silicone durci au platine, tous deux ont été testés, et approuvés par l'USP Class VI. Le tube de revêtement en PTFE répond aux exigences de la norme USP Class VI à 121°C (250°F) - voir page 22.

Les fils en inox 316L utilisés pour la tresse et l'hélice sont hautement résistants à la traction.

Le revêtement en caoutchouc silicone est disponible dans d'autres couleurs mais uniquement sur demande pour les flexibles Bioflex Ultra SI.

CE - Continuité électrique

Aussi connu comme 'liaison équipotentielle'

Les flexibles équipés de catégorie EC sont électriquement continus, ou conducteur, entre les raccords métalliques à chaque extrémité du flexible. Ceci s'applique aux flexibles de grade GP et AS.

La réglementation correspondante se trouve dans le document allemand BRG 132 et EN 16643, testé conformément à cette norme qui exige que la résistance du flexible soit <102 Ohms entre les raccords aux extrémités. Si besoin, pour les flexibles équipés répondant à cette exigence, un marquage "M" est appliqué conformément de EN 16643.

Les flexibles Pharmaline N ont une continuité électrique (CE). En générale Pharmaline X n'est pas conforme pas à l'exigence CE.

Pharmaline N AS - Revêtement PTFE Antistatique



Pharmaline X AS - Revêtement PTFE Antistatique



Usage

Les flexibles Pharmaline N ou X AS sont essentiellement utilisés dans les applications où il y a un risque d'accumulation de charges électrostatiques sur la surface du tube PTFE qui peut ensuite se décharger à travers la paroi du tube. Les produits présentant un tel risque sont des liquides ayant une conductivité inférieure à 108 S / m (Siemens par mètre) ou 104 pS / m, tels que les carburants, les solvants, les fréons, certaines eaux PPI (eau ultra-pure "Pour Préparation Injectable") et les matières organiques non polaires qui sont véhiculés à un débit moyen puis élevé.

Toujours exiger le grade AS pour tous produits à phase double ou multiple, et tous ceux qui ne se mélangent pas, comme la poudre dans l'air, ou les gouttelettes d'eau dans la vapeur, dans un gaz ou dans l'huile, les fluides colloïdaux constituant un risque de générer une charge électrostatique.

Matière & Caractéristiques

Pharmaline N ou X AS est un revêtement en PTFE antistatique fabriqué à partir d'un PTFE approuvé par la norme FDA 21 CFR 177.1550, mélangé avec moins de 2,5% de carbone noir à 'haute pureté' suivant la FDA 21 CFR 178.3297 et la directive 2007/19/EC de la commission européenne. AS est aussi conforme à la Class VI de l'USP, à 37°C (99°F), 70°C (158°F) et à 121°C (250°F) - voir page 22.

Flexibles équipés antistatiques

Lorsque "AS" (Antistatique) est spécifié, le flexible ou flexible équipé sera alors fourni et testé conformément à la norme ISO 8031 répondant aux exigences antistatiques de EN 16643. Pour un revêtement interne ou externe antistatique, la résistance entre l'électrode en mousse et le raccord métallique devra être comprise entre 103 à 108 Ohms par flexible. Si besoin, pour les flexibles équipés répondant à cette exigence, un marquage "Ω" est appliqué conformément de EN 16643.

Remarque: En service, au moins un raccord doit être connecté à la terre, afin de permettre la dispersion de la charge électrostatique en provenance du raccord.

Caractéristiques des brides

- ANSI B16.5 (et ASME B16.5) Classe 150# et 300#
 - DIN PN10, PN16 et PN40
 - JIS 10K
 - D'autres pressions et caractéristiques de brides sont disponibles.
- *Brides DIN PN10, PN16 et PN40 ont les mêmes dimensions et sont donc totalement interchangeables

Températures et Pressions

- ANSI 150# = 16 Bar (230 psi), ANSI 300# = 41.4 Bar (600 psi)
- DIN PN10 = 10 Bar (145 psi), DIN PN16 = 16 Bar (230 psi), DIN PN40 = 40 Bar (580 psi)

Matières des raccords

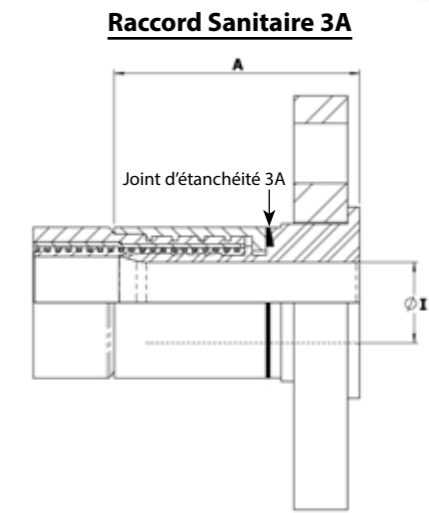
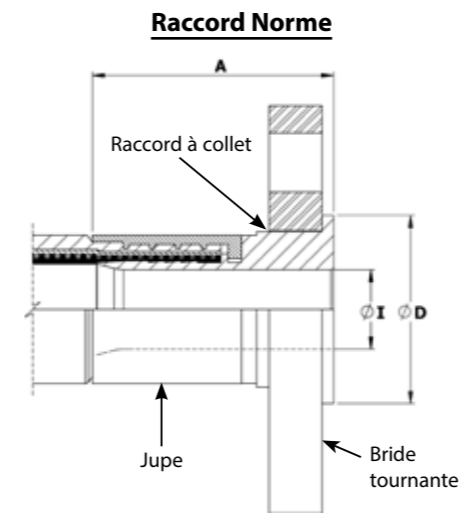
- Brides généralement en inox 304 = EN 1.4301
- Collets en inox 316L = EN 1.4404
- Jupes, majorité en inox 304, certains diamètres en 316

Unique alternative de matière pour brides:

- Acier carbone zingué
- Grade 316

Etat de Surface :

- Tous les états de surface sont en conformité avec ASME BPE-SF-O
- Si une finition spécifique sur une surface particulière est nécessaire, merci de l'indiquer sur votre demande ou commande.



Diamètre nominal du flexible		*ASA150 Longueur A		ASA150 Diamètre D		ASA150 Diamètre interne I		Poids du raccord		† 3A
Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Kg	Lbs	
1/2	13	1.67	42.50	1.38	35.00	0.37	9.40	0.57	1.25	-
3/4	20	1.86	47.24	1.69	42.90	0.62	15.75	0.84	1.84	✓
1	25	2.36	60.00	2.00	50.80	0.85	21.50	1.20	2.63	✓
1 1/4	32	2.67	67.72	2.50	63.50	1.03	26.21	1.59	3.50	✓
1 1/2	40	2.75	69.86	2.87	73.00	1.25	31.75	2.15	4.73	✓
2	50	3.20	81.22	3.62	92.00	1.76	44.60	2.92	6.41	✓
2 1/2	65	3.70	94.00	4.13	105.00	2.25	57.15	4.36	9.59	✓
3	80	3.74	95.00	5.00	127.00	2.63	66.7	6.02	13.24	✓

Diamètre nominal du flexible		*PN10/16 Longueur A		PN10/16 Diamètre D		PN10/16 Diamètre interne I		Poids du raccord		† 3A
Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Kg	Lbs	
1/2	13	1.79	45.50	1.77	45.00	0.37	9.40	0.78	1.72	-
3/4	20	2.11	53.50	2.28	58.00	0.62	15.75	1.12	2.47	✓
1	25	2.44	62.00	2.68	68.00	1.12	28.50	1.43	3.15	✓
1 1/4	32	2.70	68.50	3.07	78.00	1.03	26.21	2.35	5.17	✓
1 1/2	40	2.91	74.00	3.49	88.00	1.70	43.10	2.76	6.06	✓
2	50	3.50	89.00	4.02	102.00	2.15	54.50	3.62	7.96	✓
2 1/2	65	3.62	92.00	4.80	122.00	2.25	57.15	4.58	10.07	✓
3	80	3.74	95.00	5.43	138.00	2.63	66.70	6.03	13.26	✓

† 3A - Nettoyer en dehors de l'application (COP)

Raccords à Cam Femelle pour Pharmaline N et X et raccords à Cam Mâle

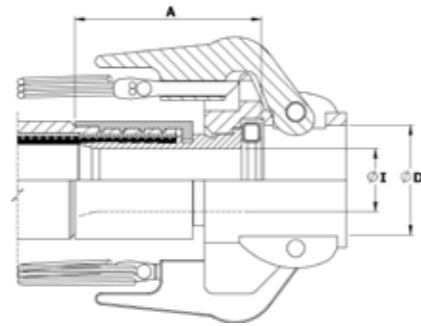
Caractéristiques des raccords

- Généralement conforme aux normes A-A-59326 (remplace MIL-C-27487) et EN 14420-1 (remplace DIN 2828), et sont tous entièrement interchangeables.

Températures et Pressions

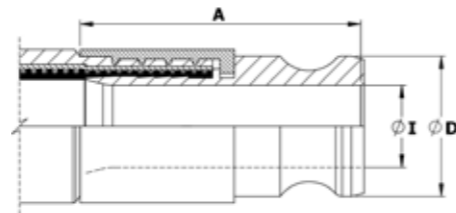
- Joint Buna N pour tous les diamètres jusqu'à 16 bar (230 psi) et une température maximum de 65°C (149°F).
- Joints encapsulés FEP, caoutchouc Fluoré ou autres pour tous les diamètres jusqu'à 10 bars (145 psi) et une température maximum de 204°C (400°F).

Raccord à Cam Coupleur sécurisé Femelle tournante - Non-revêtu



Diamètre nominal du flexible		Raccord Longueur A		Douille diamètre interne D		Raccord diamètre interne I		Poids du raccord	
Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Kg	Lbs
3/4	20	2.10	53.00	1.26	32.0	0.62	15.75	0.58	1.28
1	25	2.32	59.00	1.45	37.0	0.85	21.50	0.72	1.58
1 1/4	32	2.54	64.60	1.81	46.0	1.03	26.21	1.10	2.42
1 1/2	40	2.65	67.20	2.12	54.0	1.25	31.75	1.21	2.66
2	50	3.11	79.00	2.52	64.0	1.76	44.60	1.48	3.26
2 1/2	65	2.99	76.00	3.01	76.5	2.25	57.15	1.42	3.12
3	80	2.80	71.00	3.63	92.2	2.63	66.70	1.88	4.14

Raccord à Cam Mâle non-revêtu



Diamètre nominal du flexible		Diamètre externe D		Raccord Longueur A		Diamètre interne I		Poids du raccord	
Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Kg	Lbs
3/4	20	1.260	32.0	2.44	62.0	0.62	15.75	0.23	0.51
1	25	1.456	37.0	2.95	75.0	0.85	21.50	0.34	0.75
1 1/4	32	1.790	45.5	3.34	85.0	1.03	26.21	0.58	1.28
1 1/2	40	2.106	53.5	3.74	95.0	1.25	31.75	0.78	1.72
2	50	2.480	63.0	4.33	110.0	1.76	44.60	1.10	2.42
2 1/2	65	2.980	75.8	4.13	105.0	2.23	56.6	1.22	2.68
3	80	3.600	91.5	4.76	120.8	2.87	73.0	1.79	3.94

Matières des raccords

- Embout en inox 316L
- Corps en inox 316C
- Jupes, majorité en inox 304, certains diamètres en 316
- Joints caoutchoucs standard en Buna N (Nitrile).
- Joints caoutchouc silicone encapsulés FEP également disponibles.

Etat de Surface:

- Tous les états de surface sont en conformité avec ASME
- BPE-SF-O ((pas de finition particulière).
- Si une finition spécifique sur une surface particulière est nécessaire, merci de l'indiquer sur votre demande ou commande

Raccords sanitaires Tri-clover pour Pharmaline N et X

Présentation

Il existe plusieurs différentes spécifications, dimensions et finitions de surface pour les raccords tri-clamps. Ces clamps ont diverses normes et les plus utilisés sont indiqués dans les tableaux ci-dessous. Cependant, la plupart des normes peuvent être fournies si vous nous fournissez les informations ci-dessous, diamètres externes et diamètres internes. Les clamps peuvent aussi être fournis en norme 3A.

- Bride diamètre D et alésage diamètre I
- Diamètre du flexible si connu, autrement Aflex pourrait recommander un diamètre adapté
- L'état de surface interne, si besoin d'un état supérieur à la norme ASME BPE SF3 c'est-à-dire un état de surface de <math><0.76\mu\text{m}</math>. Ra = <math><30\mu\text{in}</math> Ra non électropoli. Veuillez indiquer le standard si connu.

Standards

- DIN 32676 SERIES A
- DIN 32676 SERIES B (ISO 1127)
- DIN 32676 SEREIS C (ASME BPE)

Matière des raccords

- Raccords en AISI 316L = EN 1.4404 = BS 316 S11
- Jupes, majorité en inox 304, certains diamètres en 316
- Raccords en DIN32676 sont disponibles en 1.4435 (316L)
- Raccords en 1.4571, Hastelloy, Monel, PVDF et autre matière sur demande

Températures et Pressions

- Pressions jusqu'à 16 Bar (230 psi)
- Températures jusqu'à 120°C (250°F) avec joints EPDM
- Températures jusqu'à 180°C (356°F) avec joints PTFE, Silicone ou Viton
- Pressions et températures plus élevées avec des colliers spécifiques et joints adaptés.

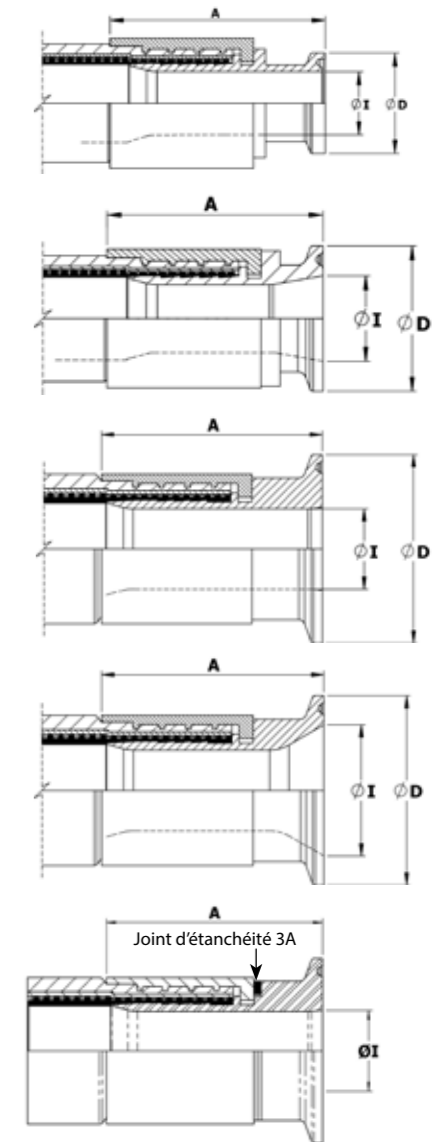
Caractéristiques des états de surface internes

- ASME BPE SF3 (polissage mécanique, non électropoli) état de surface, relevé maximum: <math><0.76\mu\text{m}</math> Ra = <math><30\mu\text{in}</math>.
- ASME BPE SF4 (polissage mécanique, non électropoli) état de surface, relevé maximum: <math><0.375\mu\text{m}</math> Ra = <math><15\mu\text{in}</math>. RA (SF4 est le plus haut niveau d'état de surface spécifié par ASME BPE, et le standard des raccords stockés comme listés ont cet état de surface).
- DIN 32676 H4 (polissage mécanique, non électropoli) Etat de surface, relevé moyen : <math><0.4\mu\text{m}</math> Ra = <math><16\mu\text{in}</math>. RA Si la finition standard SF4 n'est pas acceptable, H4 doit être spécifié sur la demande/ commande.

DIN 32676 SERIES A (DIN)							
Nominal Hose Size		Flange Diameter D		Outlet Diameter I		*Fitting Length A	
in	METRIC DN	in	mm	in	mm	in	mm
1/4	6	0.984	25.0	0.236	6	1.299	33
3/16	8	0.984	25.0	0.315	8	1.654	42
1/8	10	1.339	34	0.394	10	1.969	50
1/2	15	1.339	34	0.630	16	1.969	50
3/4	20	1.339	34	0.787	20	1.969	50
1	25	1.988	50.5	1.024	26	2.283	58
1 1/4	32	1.988	50.5	1.260	32	2.441	62
1 1/2	40	1.988	50.5	1.496	38	2.638	67
2	50	2.520	64	1.969	50	3.071	78
2 1/2	65	3.583	91	2.598	66	2.953	75
3	80	4.173	106	3.189	81	3.169	80.5

DIN 32676 SERIES B (ISO)							
In	METRIC DN	in	mm	in	mm	in	mm
1/4	10.2	0.984	25.0	0.276	7	1.299	33
3/16	13.5	0.984	25.0	0.406	10.3	1.654	42
1/8	17.2	0.984	25.0	0.551	14	1.969	50
1/2	21.3	1.988	50.5	0.713	18.1	1.969	50
3/4	26.9	1.988	50.5	0.933	23.7	1.969	50
1	33.7	1.988	50.5	1.169	29.7	2.283	58
1 1/4	42.4	2.520	64	1.512	38.4	2.441	62
1 1/2	48.3	2.520	64	1.744	44.3	2.638	67
2	60.3	3.051	77.5	2.217	56.3	3.071	78
2 1/2	76.1	3.583	91	2.839	72.1	2.953	75
3	88.9	4.173	106	3.319	84.3	3.169	80.5

ASME BPE (DIN 32676 SERIES C)							
in	in	mm	in	mm	in	mm	mm
1/4	0.984	25.0	0.180	4.57	1.299	33	
3/8	0.984	25.0	0.305	7.75	1.654	42	
1/2	0.984	25.0	0.370	9.4	1.732	44	
3/4	0.984	25.0	0.620	15.75	1.969	50	
1	1.988	50.5	0.870	22.1	2.283	58	
1 1/2	1.988	50.5	1.370	34.8	2.638	67	
2	2.520	64	1.870	47.5	3.071	78	
2 1/2	3.051	77.5	2.370	60.2	2.795	71	
3	3.583	91	2.870	72.9	3.169	80.5	



Raccords Mini-Tri-clamps

Raccords Tri-clamps

Raccord Sanitaire 3A



Raccords sanitaires Tri-clover Pharmaline N et X – Coude

Caractéristiques des raccords

- BS4825 Pt 3
- ASME-BPE-a
- Autres sur demande

Matière des raccords

- Raccords en AISI 316L = EN 1.4404 = BS 316 S11
- Jupes, majorité en inox 304, certains diamètres en 316

Etats de surface :

- Etat de surface interne selon ASME BPE SF3 (<0.76µm Ra, non électropoli).
- Si une finition spécifique sur une surface particulière est nécessaire, merci de l'indiquer sur votre demande ou commande.

Diamètres de sortie

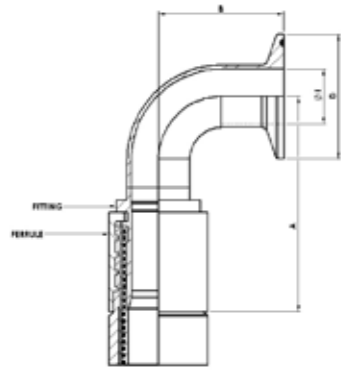
Les diamètres de sortie listés sont en conformité avec BS4825. La norme ASME exige néanmoins que ces diamètres soient 0.005" (0.125mm) en moins. Une tolérance de +0.000 -0.005" est alors appliquée, le même raccord répond ainsi aux deux normes.

Températures et Pressions

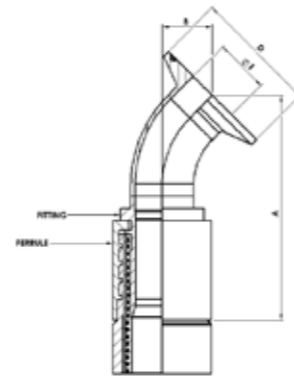
- Pressions jusqu'à 16 Bar (230 psi)
- Températures jusqu'à 120°C (250°F) avec joint EPDM
- Températures jusqu'à 180°C (356°F) avec joint PTFE, Silicone ou Viton
- Pressions et températures plus élevées avec des colliers spécifiques et joints adaptés.



Raccord Clamp Sanitaire Non-Revêtu Coudé 90°



Raccord Clamp Sanitaire Non-Revêtu Coudé 45°



Diamètre du flexible		Ligne médiane A		Ligne médiane B		Bride Diamètre D		Sortie Diamètre I		Poids du raccord	
Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Kg	Lbs
1/2	13	2.91	74	0.71	17.96	0.98	25.0	3/8	9.5	0.09	0.21
3/4	20	3.11	79	0.71	17.96	0.98	25.0	5/8	16.0	0.14	0.30
1	25	3.74	95	0.80	20.22	1.98	50.5	7/8	22.2	0.26	0.58
1 1/2	40	4.61	117	1.02	25.81	1.98	50.5	1 3/8	34.9	0.45	1.00
2	50	5.51	140	1.24	31.43	2.16	64.0	1 7/8	47.6	0.75	1.65
2 1/2	65	6.14	156	1.46	37.05	3.05	77.5	2.37	60.2	1.48	3.25
3	80	7.09	180	1.68	42.66	3.58	91.0	2.87	72.9	1.99	4.38

Diamètre du flexible		Ligne médiane A		Ligne médiane B		Bride Diamètre D		Sortie Diamètre I		Poids du raccord	
Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Kg	Lbs
1/2	13	2.83	72	1.61	41	0.98	25.0	3/8	9.5	0.09	0.21
3/4	20	3.23	82	1.61	41	0.98	25.0	5/8	16.0	0.14	0.30
1	25	3.62	92	2.01	51	1.98	50.5	7/8	22.2	0.26	0.58
1 1/2	40	4.72	120	2.76	70	1.98	50.5	1 3/8	34.9	0.45	1.00
2	50	5.91	150	3.50	88.9	2.16	64.0	1 7/8	47.6	0.75	1.65
2 1/2	65	5.43	138	4.25	108	3.05	77.5	2.37	60.2	1.48	3.25
3	80	7.76	197	5.00	127	3.58	91.0	2.87	72.9	1.99	4.38

Mâle fixe NPT & BSPT pour Pharmaline N et X et Femelle fixe NPT

Caractéristiques des raccords

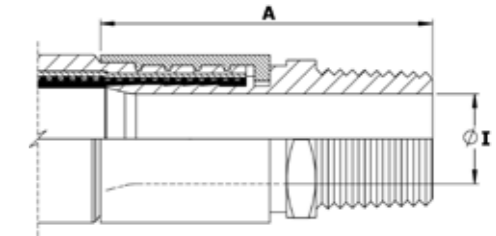
- Filet conique NPT selon la norme américaine relative aux filetages coniques conçu selon ANSI/AMSE B1.20.1.
- Filetage BSPT selon la norme britannique relative aux filetages coniques conçu selon BS21

Alternatives: - filetages parallèles, métriques ou autres.

Températures et Pressions

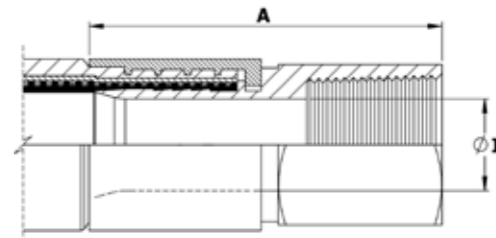
- Informations détaillées par diamètre en page 6.

Mâle fixe NPT ou BSPT



Diamètre nominal du flexible		Diamètre filetage NPT ou BSPT	Raccord longueur A		Raccord Diamètre interne I		Poids du raccord	
Pouce	mm	Pouce	Pouce	mm	Pouce	mm	Kg	Lbs
1/2	13	1/2	2.40	61	0.37	9.40	0.14	0.30
3/4	20	3/4	2.68	68	0.62	15.75	0.25	0.54
1	25	1	3.07	78	0.85	21.50	0.33	0.73
1 1/4	32	1 1/4	3.58	91	1.03	26.21	0.61	1.34
1 1/2	40	1 1/2	3.82	97	1.25	31.75	0.81	1.78
2	50	2	4.57	116	1.76	44.60	1.17	2.58
2 1/2	65	2 1/2	5.31	135	2.25	57.15	1.84	4.04
3	80	3	5.39	137	2.63	66.7	2.49	5.47

Femelle fixe NPT



Diamètre nominal du flexible		Diamètre filetage NPT ou BSPT	Raccord longueur A		Raccord Diamètre interne I		Poids du raccord	
Pouce	mm	Pouce	Pouce	mm	Pouce	mm	Kg	Lbs
1/2	13	1/2	2.40	61	0.37	9.40	0.18	0.39
3/4	20	3/4	2.52	64	0.62	15.75	0.24	0.54
1	25	1	3.23	82	0.85	21.50	0.37	0.81
1 1/2	40	1 1/2	3.62	92	1.25	31.75	0.83	1.82
2	50	2	4.13	105	1.76	44.60	1.24	2.72

Unions BSP Femelle Conique 60° Pharmaline N et X et Femelle BSP à portée plate et écrou de roue

Caractéristiques des raccords

- Filetages BSPP selon la norme Britannique relative au filetage parallèle BS21, conception portée plate ou conique 60°

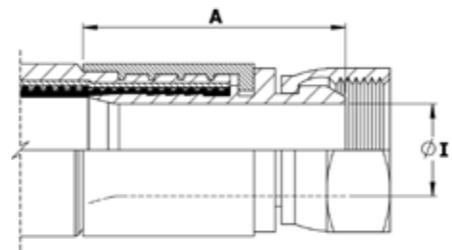
Températures et Pressions

- Informations détaillées par diamètre en page 6.

Matière des raccords

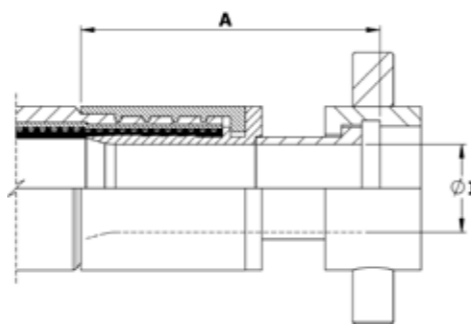
- Embouts en inox 316L
- Jupes, majorité en inox 304, certaines tailles en 316
- D'autres matières sont disponibles sur demande

Raccords union BSP femelle conique 60°



Diamètre nominal du flexible		Diamètre filetage NPT ou BSPP	Raccord longueur A		Raccord Diamètre interne I		Poids du raccord	
Pouce	mm	Pouce	Pouce	mm	Pouce	mm	Kg	Lbs
1/2	13	1/2	1.46	37	0.37	9.40	0.09	0.21
3/4	20	3/4	1.89	48	0.62	15.75	0.20	0.44
1	25	1	2.17	55	0.85	21.50	0.33	0.72
1 1/4	32	1 1/4	2.48	63	1.03	26.21	0.49	1.07
1 1/2	40	1 1/2	2.87	73	1.25	31.75	0.79	1.73
2	50	2	2.91	74	1.76	44.60	1.07	2.36
2 1/2	65	2 1/2	3.15	80	2.25	57.15	1.37	3.02
3	80	3	3.21	81.5	2.63	66.7	2.10	4.62

BSP Femelle à portée plate écrou de roue



Diamètre nominal du flexible		Diamètre filetage BSPP	Raccord longueur A		Raccord Diamètre interne I		Poids du raccord	
Pouce	mm	Pouce	Pouce	mm	Pouce	mm	Kg	Lbs
1	25	1	2.67	68	0.85	21.50	0.23	0.51
1 1/2	40	1 1/2	3.94	100	1.25	31.75	0.55	1.21
2	50	2	4.33	110	1.75	44.60	0.77	1.69

Etat de surface :

- Toutes les surfaces sont à la norme ASME BPE-SF-0 (pas de finition particulière)
- Si une finition spécifique sur une surface particulière est nécessaire, merci de l'indiquer sur votre demande ou commande.

Alternatives:

- Ecrus peuvent être fournis en Métal Gun (bronze) si nécessaire.

Adaptateurs Mâle/Mâle:

- Raccord Union femelle conique peuvent être fournis avec un

- adaptateur Mâle BSPP/ Mâle BSPT si besoin.

Raccord JIC Femelle 37° pour Pharmaline N et X et Unions NPT Mâle & Femelle

Raccord JIC 37° Femelle

Caractéristiques des raccords

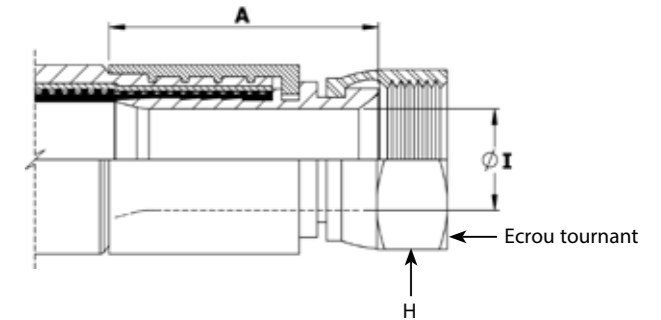
- Raccord JIC femelle 37° SAE J514
- Adaptateurs JIC Male 37° - NPT Mâle/Femelle
- NPT filetage selon ANSI/AMSE B1.20.1

Températures et Pressions

- Informations détaillées par diamètre en page 6.

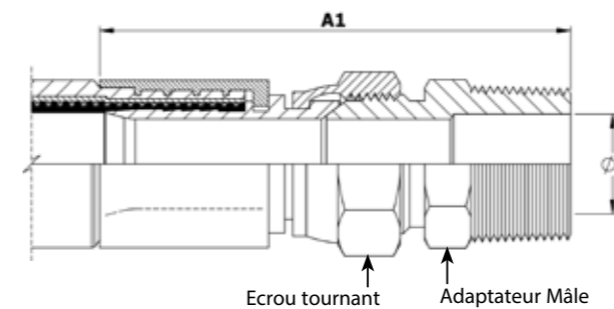
Remarque:

- Pas utilisable avec raccord SAE 45° même si filetage identique.



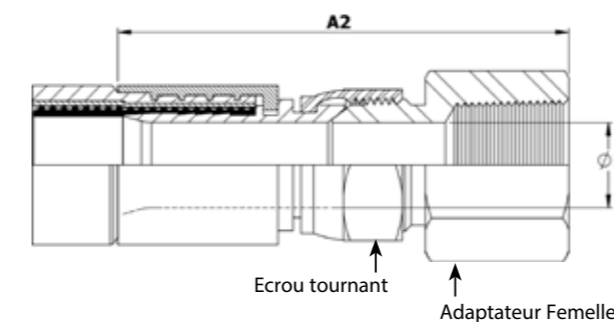
Diamètre nominal du flexible		JIC 37° Diamètre filetage	Raccord Longueur A		Hex dimension H		Raccord Diamètre Interne I		Poids du raccord	
Pouce	mm	Pouce	Pouce	mm	Pouce	mm	Pouce	mm	Kg	Lbs
1/2	13	3/4 - 16	1.57	40	0.88	22.2	0.37	9.40	0.09	0.20
3/4	20	1 1/16 - 12	1.89	48	1.25	31.7	0.62	15.75	0.20	0.44
1	25	1 5/16 - 12	2.28	58	1.50	38.1	0.85	21.50	0.30	0.66
1 1/2	40	1 7/8 - 12	2.72	69	2.25	57.1	1.25	31.75	0.62	1.37
2	50	2 1/2 - 12	3.27	83	2.88	73.0	1.76	44.60	1.10	2.42

JIC à Union NPT Mâle (incluant un Adaptateur JIC Male/ NPT Male)



Taille du flexible		Coupleur femelle longueur A1		Diamètre interne du raccord I		Poids du raccord	
in	mm	in	mm	in	mm	Kg	Lbs
1/2	13	3.07	78	0.53	13	0.15	0.33
3/4	20	3.78	96	0.72	18	0.33	0.73
1	25	4.17	106	0.94	24	0.51	1.12

JIC à Union NPT Femelle (incluant un Adaptateur un JIC Mâle/ NPT Femelle)



Taille du flexible		Coupleur femelle longueur A2		Diamètre interne du raccord I		Poids du raccord	
in	mm	in	mm	in	mm	Kg	Lbs
1/2	13	3.07	78	0.39	9.9	0.17	0.37
3/4	20	3.78	96	0.61	16	0.34	0.75
1	25	4.17	106	0.84	21	0.64	1.41

Tube adaptateur Pharmaline N et X (Tube rainuré)

Tube adaptateur non-revêtu (Tube rainuré)

Caractéristique

- Compatible avec les raccords existants selon les normes de raccordement industriel.

Températures & Pressions

- Informations détaillées par diamètre en page 6.

Matière des raccords

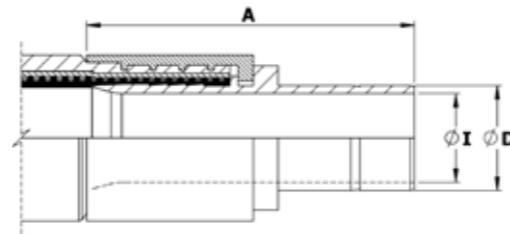
- Raccord en inox 316L
- Jupe (pour rattachement au flexible) en inox 304 ou 316L

Alternatives:

- Peuvent être fournis avec les écrous & jupes correspondants (collier de serrage).

Etat de surface :

- Toutes les surfaces sont à la norme ASME BPE-SF-0 (pas de finition particulière)
- Si une finition spécifique sur une surface particulière est nécessaire, merci de l'indiquer sur votre demande ou commande.



Diamètre nominal du flexible		Raccord Longueur A		Diamètre D		Raccord Diamètre Interne I		Poids du raccord	
Pouce	mm	Pouce	mm	Pouce	mm	Pouce	mm	Kgs	Lbs
1/4	6.4	1.93	49	0.25	6.35	0.16	4.10	0.031	0.07
3/8	9.5	2.05	52	0.375	9.53	0.28	7.00	0.044	0.10
1/2	12.7	2.28	58	0.50	12.7	0.37	9.40	0.074	0.16
3/4	20	2.48	63	0.75	19.05	0.62	15.75	0.16	0.35
1	25	2.87	73	1	25.40	0.85	21.50	0.25	0.55

Cannes plongeantes pour Pharmaline N et X, Droites ou coudées 90°

Cannes fixes droites

Description

Les cannes plongeantes fixes sont assez rigides, parois épaisses en PTFE, soit droites ou coudées 90°, lesquelles sont directement serties à l'extrémité du flexible Pharmaline N. Conçues pour être insérées dans des bidons, des réservoirs et des cuves à réaction afin d'aspirer (ou injecter) des liquides de traitement transférés au travers du flexible.

Matières

- Cannes plongeantes standards sont en PTFE antistatique (AS)
- Jupes, majorité en inox 304, certains diamètres en 316

Comment commander

Indiquez le diamètre et la matière de la canne, si elle est droite ou coudée 90°. Donner la longueur de la canne droite et la longueur du flexible séparément.

Pressions Maximum de Service

Les cannes plongeantes sont normalement testées à une pression de 6 bar, et ne conviennent pas pour des pressions supérieures à 3 bar. Elles sont utilisables en aspiration et au vide jusqu'à -0.9bar.

Pour des pressions plus élevées, merci de consulter Aflex Hose.

Longueurs

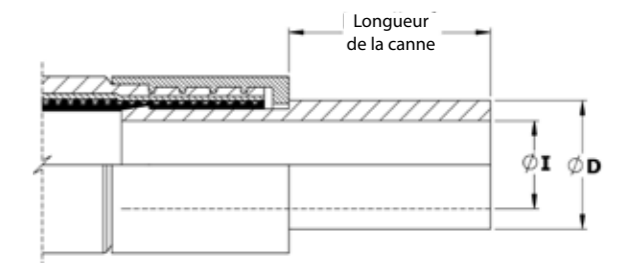
la longueur standard droite est de 1 mètre, mais d'autres longueurs sont disponibles selon les besoins.

Diamètre nominal du flexible		Diamètres approximatifs de canne			
		Diamètre externe D		Diamètre interne I	
Pouce	mm	Pouce	mm	Pouce	mm
3/4	20	0.87	22	0.51	13
1	25	1.14	29	0.83	21
1 1/2	40	1.54	39	1.00	27
2	50	2.17	55	1.58	40

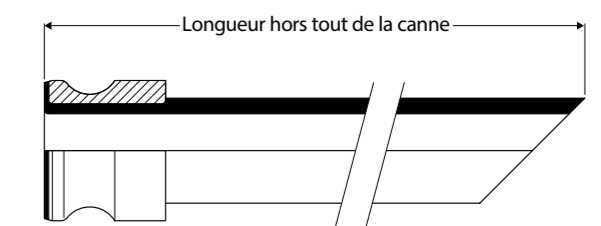
Canne fixe (coudée à 90°)



Canne fixe (droite)



Canne détachable



Cannes détachables

Description

Identiques aux cannes fixes ci-dessus, mais reliées au flexible avec un raccord et non serties directement sur le flexible.

Conception

Canne droite ou coudée à 90° en PTFE antistatique, équipé de bride ou raccord à came mâle revêtu PTFE formé à chaud.

Le raccord à cam Mâle (comme illustré) est fréquemment utilisé, la canne peut alors être connectée à un raccord à cam femelle.

Caractéristiques

Identiques aux cannes droites

Marquage standard & encapsulé pour Pharmaline N et X Systèmes de code couleur

Marquage standard

Tous les flexibles équipés Pharmaline N & X possèdent les informations de marquage suivantes :



- Dénomination du fabricant (Aflex Hose Ltd)
- Type de flexible, diamètre et catégorie du flexible
- EN16643 et année de fabrication
- EN16643 grade de la propriété électrique
- Pression Maximum de Service et pression d'épreuve
- Plage de température de service
- Numéro de série individuel
- Mois et année de fabrication
- Numéro de téléphone d'Aflex Hose
- Marquage CE (le cas échéant)

*Merci d noter toutes les restrictions sur pression de service résultant des températures élevées.

Ces informations sont habituellement gravées au laser sur la jupe. Dans certains cas, à la discrétion d'Aflex Hose, l'information peut être gravée sur une bague ou sur une mince plaque en inox fixée sur le flexible. Par exemple, lorsque le client a besoin d'informations supplémentaires ne pouvant figurer sur la jupe.

Marquage encapsulé



Une étiquette et / ou code couleur est placé autour du revêtement silicone du flexible, puis encapsulée par un silicone transparent ce qui forme une fine couche de revêtement.

Remarque: Diamètre 1/4" code couleur seulement, sans texte.

Code Couleur



Une bande spirale de couleur en PTFE est enroulée autour du flexible.

Elle peut être séparée ou encapsulée dans une gaine thermo rétractable en polyoléfine transparent.

Flexibles Pharmaline N et X: Conditions particulières d'utilisation

• Systèmes de nettoyage et de stérilisation - NEP, SEP et Autoclave

NEP & SEP – les tubes de revêtement en PTFE sont résistants chimiquement à toutes les conditions NEP, SEP et d'autoclaves. Il est important de savoir si les cycles de nettoyage et de purge sont susceptibles de développer une charge électrostatique sur la surface interne du revêtement car un flexible AS (Antistatique) est dans ce cas préconisé.

Les flexible AS et processus générant des charges électrostatiques sont entièrement expliqués dans la section concernant le revêtement des flexibles.

Pour des systèmes NEP utilisant des solvants à haute résistivité électrique tels que le Toluène, le flexible AS est préconisé.

Un autre cas générant de l'électrostatique se pose lorsque de la vapeur humide passe au travers, ou lorsque des liquides de nettoyage ou des eaux PPI sont purgés hors de la ligne en utilisant de l'azote, de l'air comprimé ou tout autre gaz car les gouttelettes du liquide ou de l'eau dans le gaz créent alors une condition multi-phases jusqu'à ce qu'ils soient vidés, créant ainsi de l'électricité statique, à moins qu'un flexible AS est utilisé.

• Autoclave

Le flexible Pharmaline N est en mesure de résister à des cycles autoclaves d'au moins 300 x 30 minutes et à des températures relativement élevées (jusqu'à 135°C, 275°F). Merci de noter que dans certaines applications le revêtement silicone peut se détériorer après de longs cycles en autoclave. Pour plus d'informations, merci de consulter Aflex Hose.

• Utilisation des flexibles PTFE avec des métaux alcalins, des halogènes et halogènes contenant de produits chimiques

Les flexibles revêtus PTFE réagissent chimiquement avec le Fluor, le trifluorure de chlore et des métaux alcalins en fusion mais aucune gamme n'est adaptée pour ces produits chimiques.

Lorsqu'un flexible en PTFE est utilisé pour véhiculer du chlore ou du brome, gazeux ou liquides, des quantités infimes peuvent se diffuser et pénétrer dans la paroi du tube de revêtement en PTFE. Combiné avec l'humidité atmosphérique, les armatures SS, PB ou revêtements externes RC se corrodent. Les flexibles Corroflon SP, HB ou KYB s'avèrent mieux adaptés pour ces applications – Merci de consulter la brochure Corroflon.

En fonction des pressions et températures internes, d'autres gaz et liquides ayant une teneur élevée en halogène tels que le fluorure d'hydrogène, le chlorure d'hydrogène, le chlorure de carbonyle (phosgène), le tétrachlorure de carbone et autres, peuvent également être transmis en quantités infimes à travers la paroi du tube PTFE. Merci de consulter Aflex Hose pour une préconisation de flexible appropriée.

• Autres liquides et gaz "pénétrant"

Le trioxyde de soufre, le méthacrylate de méthyle, le caprolactame et l'acide acétique glacial sont d'autres produits chimiques qui ne réagissent pas chimiquement avec le PTFE mais qui peuvent se diffuser et se transmettre à travers la paroi du tube PTFE - Veuillez consulter Aflex Hose pour une solution optimale avec l'utilisation ces produits chimiques.

Toutefois, le PTFE en tant que matériel hydrophobe (hors contact avec l'eau), est généralement très résistant à l'absorption de produits chimiques. Dans certains cas, il a une résistance supérieure à la diffusion notamment pour les carburants, comparé à tout autre plastique et caoutchouc.

• Cycles Gaz/Fluide

Il existe des applications pour lesquelles des fluides, puis des gaz sont véhiculés à travers le flexible en différents cycles.

Habituellement associé à des changements de température et /ou de pression, pour diverses raisons complexes, ces conditions peuvent sévèrement détériorer le revêtement du flexible quel que soit la matière à partir duquel il est fabriqué.

Par exemple, des flexibles sont parfois utilisés pour des cycles vapeur, eau, vapeur etc... dans des presses à moulage en caoutchouc, où après avoir été chauffé, le moule est ensuite rapidement refroidi avant d'être réchauffé dans le cycle suivant. Aucun type de flexible ne résiste à une telle application et les flexibles PTFE ne font pas exception.

Merci de contacter Aflex Hose pour plus d'information si de telles conditions s'appliquent.

• Utilisation de flexibles équipés en raccordement dans des applications

Les longueurs des flexibles équipés et la configuration utilisée lors de la connexion dans l'application doivent toujours être en conformité avec les configurations du flexible, informations disponibles à la fin de cette brochure.

Lorsque des flexibles équipés ont une utilisation de raccordement dans des applications, leurs raccords doivent être correctement connectés à leurs embouts respectifs dans le bon sens, en utilisant les bons outils, clés, pinces, écrous et boulons, etc. Les connexions doivent être suffisamment serrées pour s'assurer de l'étanchéité du joint sans trop serré, en particulier avec des raccords revêtus PTFE rabattus car cela peut endommager les surfaces d'étanchéité.

Dans des applications où des fluides ou gaz, onéreux ou dangereux sont véhiculés, flexibles et raccordement doivent être testé sous pression, en situation, avant d'être mis en service. Cela peut être effectué avec des substances inoffensives, à 1.5 fois la pression maximum de service, comme indiqué dans cette brochure.

Dans le doute, pour davantage de conseils, merci de contacter Aflex Hose.

• Applications spécifiques

Les flexibles PTFE, produits d'Aflex Hose ne sont pas appropriés pour utilisation dans les applications suivantes:

- Toutes applications radioactives impliquant des rayonnements à forte intensité, y compris le rayonnement gamma (dégradation du PTFE)
- Toutes applications médicales d'implantation.

Pour les applications aérospatiales, veuillez contacter Aflex pour une recommandation adéquate sur le type de flexible nécessaire.

BS EN ISO 9001:2015

Aflex Hose Ltd est évalué et certifié de façon indépendante selon le système de gestion de la qualité BS EN ISO 9001 par le British Standards Institute (BSI).

EN 16643:2016

Les flexibles Pharmaline N et X est conforme à la norme EN 16643 (SC), ce qui comprend les exigences électriques et électrostatiques des assemblages des flexibles.

ISO 45001:2018

Aflex hose Ltd a été évalué avec succès selon les normes ISO 45001 par le (BSI) British Standards Institution. En obtenant cette accréditation, Aflex Hose Ltd démontre son engagement envers la santé et la sécurité de ses employés en identifiant et contrôlant les risques à la santé et la sécurité, en réduisant le potentiel d'accidents, en se conformant aux lois pertinentes et en améliorant la sensibilisation à travers l'entreprise.

ISO 14001:2015

Aflex hose Ltd a été évalué avec succès selon les normes ISO 14001 par le (BSI) British Standards Institution. En obtenant cette accréditation, Aflex Hose Ltd démontre son engagement envers la santé et la sécurité de ses employés en identifiant et contrôlant les risques à la santé et la sécurité, en réduisant le potentiel d'accidents, en se conformant aux lois pertinentes et en améliorant la sensibilisation à travers l'entreprise.

USP Class VI et directives ISO 10993-5, 6, 10 et 11

Les flexibles à revêtement interne en PTFE naturel et anti-statique avec revêtement externe en caoutchouc siliconé durci (blanc et transparent) et en caoutchouc EPDM ont été testés indépendamment, conformément aux protocoles USP et, sont conformes aux exigences de la norme USP classe VI Chapitre <88>.

A présent, les flexibles à revêtement interne en PTFE naturel et antistatique répondent également aux directives plus strictes de la norme USP Classe VI et ISO 10993-6, selon les directives 10 et 11 à 121°C (250°F) et, sont classifiés "sans réaction".

Les flexibles en PTFE naturel et antistatique avec revêtement externe en caoutchouc siliconé durci (blanc et transparent) et en caoutchouc EPDM ont également été testés conformément aux protocoles USP et sont conformes aux exigences de la norme USP classe VI <87>, au test d'éluion MEM L929 et sont considérés comme non-cytotoxique.

Les flexibles en PTFE naturel et antistatique ont subi différents tests et passé le plus rigoureux de la USP classe VI et l'ISO 10993 selon la directive 5 à 121°C (250°F).

USP <661> Test physico-chimique pour les plastiques

Les flexibles en PTFE naturel et antistatique à paroi interne lisse et convolutés en externe ont été testés en conformité avec le test physico-chimique des plastiques de la norme USP et jugés conformes aux critères de la référence suivante: USP 34, NF 29, 2011. monographie <661>, épreuves physico-chimiques des plastiques.

FDA

Les matériaux utilisés pour la fabrication du tube de revêtement en PTFE naturel sont conformes à la norme FDA 21 CFR 177.1550 et le revêtement en PTFE antistatique est conforme à FDA 21 CFR 178.3297.

Norme sanitaire 3-A 62-02

Les flexibles équipés Pharmaline N et X accrédités à la norme Sanitaire 3-A sont identifiés dans la brochure du flexible. Le certificat 3-A d'Aflex Hose est disponible à voir sur notre site internet dans la section '[certificats](#)'.

Test d'extractibles et relargages selon BPSA

Les flexibles Aflex Hose en PTFE naturel et antistatique ont été testés indépendamment, conformément aux directives de la BPSA, et jugés satisfaisants. Pour effectuer des évaluations spécifiques, des copies du rapport de test sont disponibles.

Approuvé par les fabricants pharmaceutiques

La majorité des grands fabricants de produits pharmaceutiques au monde ont audité et / ou validé Aflex Hose en tant que fournisseur.

Marquage CE (Europe seulement)

Aflex a été évalué par British Standards Institution (BSI) et déclaré conforme à la directive des équipements sous pression 2014/68/UE (Communauté européenne), évaluation de conformité module D1, validation du marquage CE applicable aux flexibles, accompagnement d'une fiche d'utilisation et d'une déclaration de conformité du flexible.

Attestations de conformité à la directive ATEX 2014/34/UE (Atmosphères potentiellement explosives)

Disponibles pour les flexibles équipés et les composants utilisés dans les zones de gaz 1 et 2 et de poussières zones 21 et 22, le cas échéant.

Certificats Matières EN10204

Disponibles pour tous flexibles et pour les composants des flexibles équipés.

Certificats de Conformité EN ISO/IEC 17050

Disponibles pour tous les produits.

Tests en pression des flexibles

La pression de chaque flexible équipé est testée à 1.5 fois la pression maximale de service avant expédition, et les certificats de test d'épreuve peuvent être fournis.

Résistance au feu norme BS5173 Section 103.13 Art 6.2 et 6.3

Les flexibles équipés pharmaline N et X sont "résistants au feu". Si DSI-300 est ajouté à chaque extrémités, les flexibles sont classifiés comme "inflammables".

Contact alimentaire

Fabriqué en conformité avec la réglementation (CE) n°1935/2004 - relatives aux matériaux et objets destinés à être en contact alimentaire, Commission de réglementation (UE) n°10/2011 - relative aux matériaux plastiques et objets destinés à être en contact alimentaire et réglementation (CE) n° 2023/2006 - sur les bonnes pratiques de fabrication des matériaux et objets destinés à être en contact alimentaire.

Configurations du flexible & Calcul de longueurs - pour le rayon de courbure

Exigences de configuration de flexible

En service, les flexibles équipés sont généralement connectés aux deux extrémités. Ils peuvent alors être fixes, dans une configuration statique ou en flexion, dans une configuration dynamique.

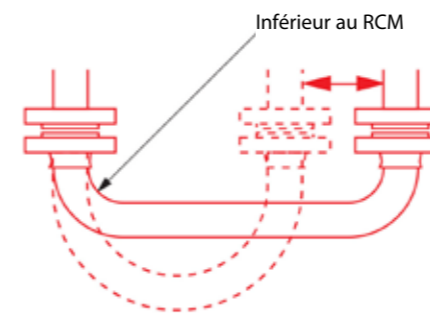
Que ce soit en position statique ou dynamique, la première règle concerne le rayon de courbure du flexible qui ne doit jamais être inférieur au Rayon de Courbure Minimum (RCM) du flexible comme indiqué dans la brochure.

Le cas de figure le plus courant est celui où le flexible est courbé à une extrémité, est qu'une flexion s'applique sur le flexible à un angle jusqu'à l'axe du raccord. Cela se produit généralement soit parce que la longueur du flexible est trop courte, soit parce que le poids du flexible et de son contenu crée une tension à un angle jusqu'au raccord.

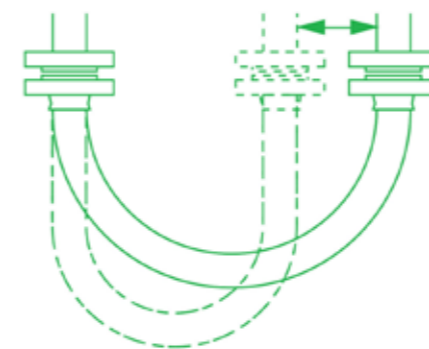
La deuxième règle, est donc, si possible, d'élaborer une configuration veillant à ce que toute courbure soit éloignée des raccords aux extrémités..

Configuration (dynamique)

INCORRECTE – Flexible trop court

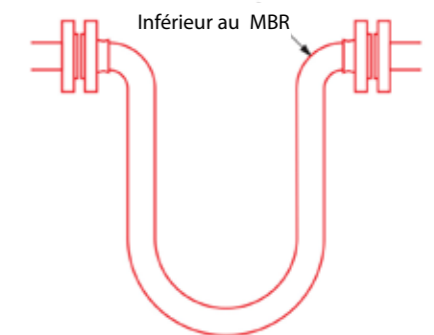


CORRECTE – Pas de tension à l'extrémité

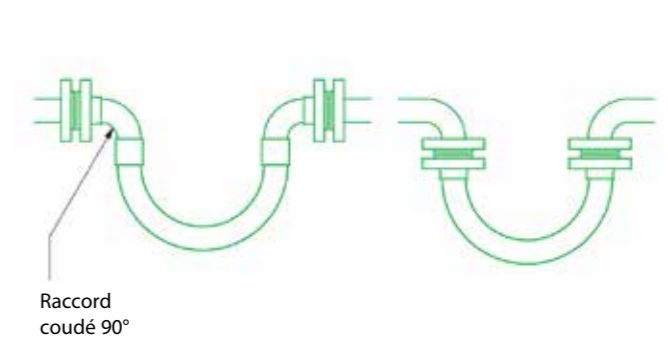


Configuration (Statique)

INCORRECTE – Poids du flexible est à 90° de l'axe du raccord



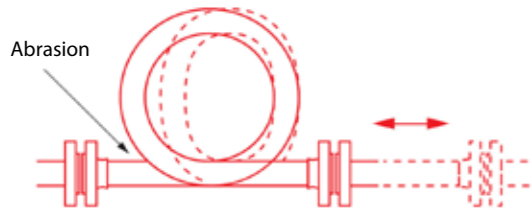
CORRECTE – Pas de tension à l'extrémité



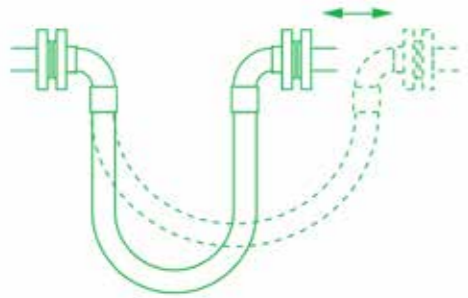
La troisième règle consiste à ce que la configuration du flexible soit toujours élaborée afin d'incorporer des supports d'appui pour éviter toute possibilité d'abrasion externe.

Dans certains cas, la longueur, la configuration et l'angle du flexible peuvent être conçus pour éviter l'abrasion. Dans d'autres cas, des systèmes de support fixe, amovible ou à roue peuvent s'avérer nécessaires.

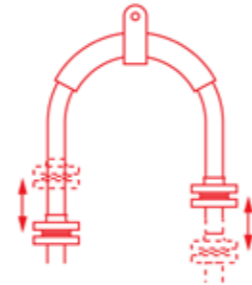
INCORRECTE – Frottement contre flexible



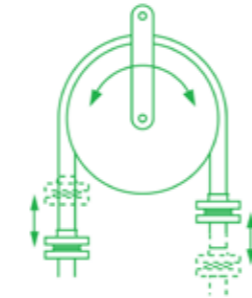
CORRECTE – Pas de frottement du flexible



INCORRECTE – Frottement contre support



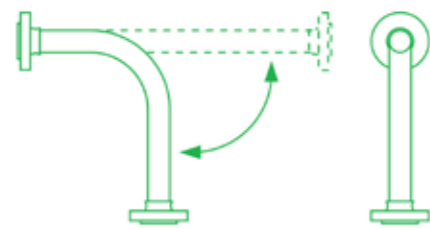
CORRECTE – Pas de frottement avec le support



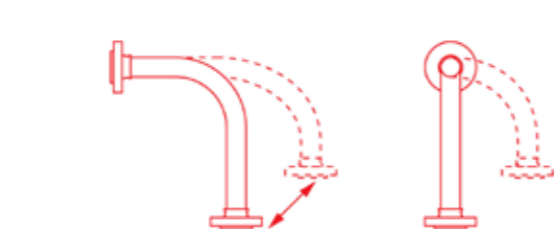
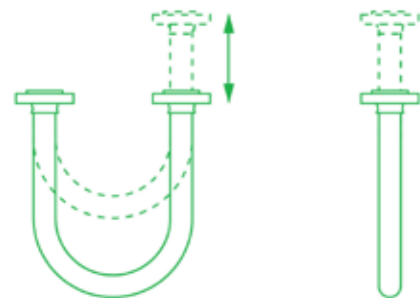
La quatrième règle consiste à ce que le flexible ne soit pas être soumis à la torsion, que ce soit en connexion ou après un cycle de flexions.

Il peut y avoir de la torsion lors de la connexion si le flexible a été accidentellement entortillé, ou lors du serrage final en connectant le flexible à la deuxième extrémité.

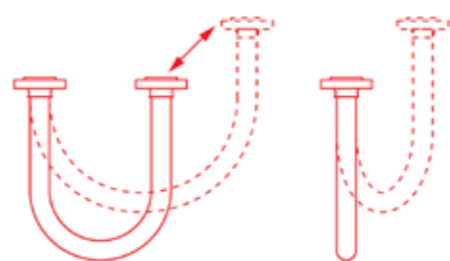
En flexion, si le cycle a 3 dimensions au lieu de 2, alors une torsion s'opère également:



CORRECTE - Mouvements de flexion en 2 dimensions



INCORRECTE - Mouvements de flexion en 3 dimensions créant alors des torsions



Calculer la longueur du flexible

La formule de calcul de la longueur de la partie coudée de la longueur du flexible est dérivée de la formule de base du rayon, où la circonférence d'un cercle = $2\pi R$, R = le rayon du cercle, et π = constante = 3,142.

Par conséquent, si le flexible est positionné en coude à 90° , ce qui représente un quart d'une circonférence complète, le rayon de courbure étant R , alors la longueur de la courbure du flexible est = $\frac{1}{4} \times 2\pi R$. Ou en demi-tour, forme de $U = \frac{1}{2} \times 2\pi R$.

Remarques :

Dans le calcul de la longueur d'un flexible équipé, la longueur (rigide) près des raccords aux extrémités doit être également ajoutée aux longueurs des sections droites du flexible, comme dans l'exemple suivant:

Exemple :

Pour calculer la longueur d'un flexible ayant diamètre de 2" avec des raccords à bride aux extrémités, devant être monté dans une configuration à 90° avec une longueur de 400mm d'un côté et 600mm de l'autre.

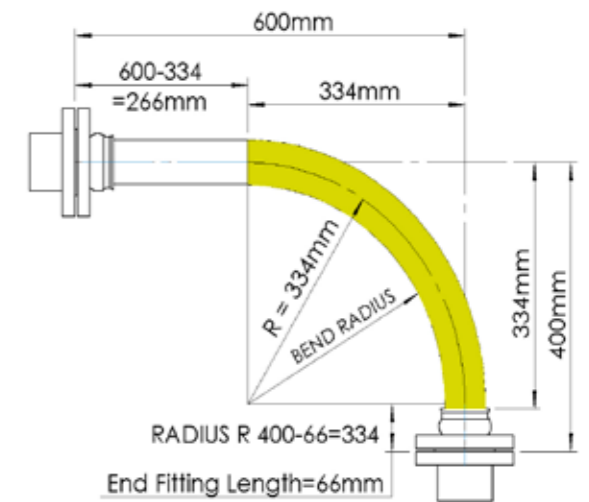
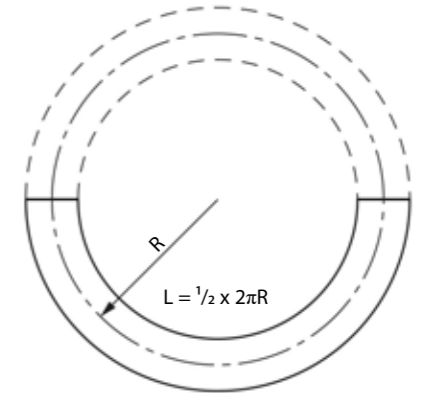
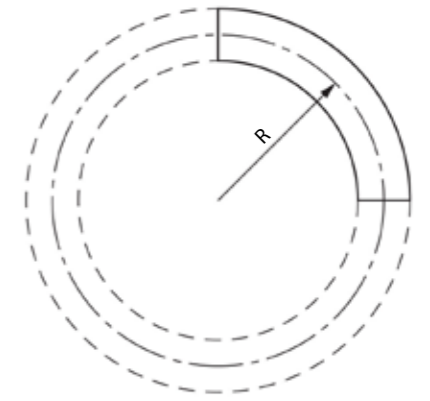
Longueur de la partie coudé (jaune) = $\frac{1}{4} \times 2\pi R$ (334)
 $= \frac{1}{4} \times 2 \times 3.142 \times 334 = 525\text{mm}$
 Longueur de la partie supérieure droite incluant la longueur du raccord
 $= 600 - 334 = 266\text{mm}$
 Longueur inférieure à l'extrémité du raccord = 66mm
 Longueur totale du flexible = $525 + 266 + 66 = 857\text{mm}$

Eléments à prendre en considération

- Un flexible aura normalement le plus long rayon possible pour aller dans un angle, et non le RCM! Il faut aussi toujours penser à inclure les longueurs des sections rigides du flexible.
- In dynamic applications, remember to always calculate the lengths for the most extended configuration during the flexing cycle, not the least extended.
- Si la configuration est tout simplement trop complexe pour le calcul d'une longueur de n'importe quel flexible, marquez sur papier, au mur, ou au sol, où se trouvent les points de connexion l'un par rapport à l'autre, mis à échelle réduite si nécessaire, puis passer manuellement le tuyau souple entre les deux, avec un rayon complet autour des coudes. Mesurer la longueur étendue, puis intensifier si nécessaire pour déterminer la longueur approximative du flexible.

En cas de doute, veuillez consultez Aflex Hose.

$$L = \frac{1}{4} \times 2\pi R$$



Le rayon de courbure est mesuré jusqu'au bord de l'intérieur du flexible, Pour le rayon de courbure minimum, merci de voir la page 6.

Conditions Générales de Vente

1. Definitions

“Business Days” means a day (other than a Saturday, Sunday or public holiday) when banks in London are open for business.

“Buyer” means a customer of the Seller.

“Conditions” means these terms and conditions for the sale of goods or the supply of services or both.

“Contract” means a binding contract for the sale of goods or the supply of services or both made by the Seller and the Buyer.

“Emergency Call-out” means the call-out service for emergency breakdowns of the Buyer’s plant or equipment provided by the Seller to the Buyer in accordance with these Conditions in connection with a Contract for the performance of the Services.

“Factored Products” shall mean products which are supplied by Seller, but are not manufactured by Seller, and are purchased by Seller from another supplier or manufacturer.

“Force Majeure Event” means an event beyond the reasonable control of the Seller including but not limited to strikes, lock-outs or other industrial disputes (whether involving the workforce of the Seller or any other party), failure of a utility service or transport network, act of God, epidemic or pandemic, war, riot, terrorism, civil commotion, malicious damage, compliance with any law or governmental order, rule, regulation or direction, accident, breakdown of plant or machinery, fire, flood, storm, default of suppliers or subcontractors.

“Goods” means the goods agreed to be sold by the Seller to the Buyer as detailed in the Order Acknowledgment.

“Intellectual Property Rights” means all copyright, database rights, semi-conductor topography rights, design rights, trademarks, trade names, patents, domain names and any other intellectual property rights of a similar nature (whether or not registered) subsisting anywhere in the world.

“Losses” means:

- (a) any indirect, special or consequential loss or damage; or
- (b) loss of data or other equipment or property; or
- (c) economic loss or damage; or
- (d) incurring of liability for loss or damage of any nature whatsoever suffered by third parties (including in each case incidental and punitive damages); or
- (e) any loss of actual or anticipated profit, interest, revenue, anticipated savings or business or damage to goodwill.

“Seller” means Aflex Hose Limited.

“Services” means the services agreed to be supplied by the Seller to the Buyer as detailed in the Order Acknowledgment.

“Specification for Goods” means the specification for the Goods that is agreed in writing by the Seller and the Buyer.

“Specification for Services” means the specification for the Services that is agreed in writing by the Seller and the Buyer.

2. Interpretation of Contracts

(a) The Uniform Law on International Sales, the United Nations Convention on Contracts for the International Sale of Goods and the international rules for the interpretation of trade terms prepared by the International Chamber of Commerce (INCOTERMS) shall be excluded. The construction, validity and performance of all Contracts shall be governed by English law and, without prejudice to the right of the Seller to take action against the Buyer in any other court of competent jurisdiction, any claim or dispute arising from the Contracts shall be subject to the exclusive jurisdiction of and be determined by the courts of England. The taking of proceedings in any one or more jurisdiction shall not preclude the Seller from taking proceedings in any other jurisdiction, whether concurrently or not, to the extent permitted by the law of such other jurisdiction.

(b) The complete or partial invalidity or unenforceability of any provision in a Contract shall in no way affect the validity or enforceability of the remaining provisions in a Contract. Any such provision shall be deemed to be modified to the minimum extent necessary to make it valid or enforceable. If such modification is not possible, the relevant provision shall be deemed severed subject to such consequential modification as may be necessary for the purpose of such severance.

(c) The headings used herein are for convenience only and shall not affect construction.

(d) Words in the singular include the plural and in the plural include the singular.

(e) Reference to a Condition is to a Condition of these Conditions unless the context requires otherwise.

3. Formation of Contracts and Application of Terms and Conditions

- (a) All Contracts shall be deemed to incorporate these Conditions.
- (b) Any variation to these Conditions shall have no effect unless expressly agreed

in writing and signed by an authorised signatory of the Seller and any variation of a Contract shall have no effect unless it is in writing and signed by the Seller and the Buyer (or their authorised representatives).

(c) A prospective Buyer shall place its order for goods or services (or both) by completing the Seller’s purchase order standard form, if applicable, or by submitting its own purchase order form (in either case, such form is the “Purchase Order”). Each Purchase Order shall be deemed to be an offer by the prospective Buyer to buy the goods or services (or both) of the Seller that are identified in the Purchase Order subject to these Conditions.

(d) The Purchase Order shall only be deemed to be accepted when the Seller issues to the prospective Buyer an order acknowledgement form which indicates acceptance of the prospective Buyer’s offer on these Conditions (the “Order Acknowledgment”). A Contract between the Seller and the Buyer shall come into existence at the time and on the date when the Seller delivers the relevant goods or services (or both) to the Buyer.

(e) The Contract shall constitute the entire agreement between the Seller and the Buyer and the Buyer acknowledges that it has not relied on any statement, promise or representation made or given by or on behalf of the Seller that is not set out in the Contract.

(f) The Buyer shall ensure that the description of the goods or services (or both) ordered which is contained in its Purchase Order and any applicable specifications is complete and accurate.

(g) These Conditions apply to the Contract to the exclusion of all other terms and conditions that the Buyer shall seek to impose or incorporate, or which are implied by trade, custom, practice or course of dealing. These Conditions may be extended by additional terms and conditions issued by the Seller in writing and confirmed in the Order Acknowledgment.

4. Quotations and Purchase Orders

(a) Any quotation issued by the Seller shall not constitute an offer and is given on the basis that no Contract shall come into existence unless and until the Seller despatches an Order Acknowledgement to the Buyer.

(b) Any quotation issued by the Seller is valid for a period of 5 Business Days for delivery dates and 30 Business Days for prices only after the date of its issue, provided that the Seller has not previously withdrawn it by notice in writing to the Buyer.

(c) Subject to Condition 4(d), any Purchase Order accepted by the Seller shall be accepted on the basis that the price for the goods or services (or both) shall be that set out in the Seller’s quotation on condition that the Seller’s quotation is within its period of validity and notice of withdrawal in writing has not been issued by the Seller at the time of acceptance.

(d) The Seller reserves the right to give in writing notice of the withdrawal of a quotation at any time within the period of validity of the quotation and before the Contract is formed. In the event that the Seller changes the price of any of the goods or services (or both) offered for sale or supply, any existing quotation in respect of those goods or services (or both) shall be deemed to be automatically withdrawn and the Seller shall issue a new quotation to the prospective Buyer.

(e) The prices stated in the Seller’s quotations are exclusive of VAT.

(f) All Purchase Orders placed by a prospective Buyer shall be placed by fax, post or e-mail, or, where agreed in advance in writing by the Seller, by telephone or Seller’s electronic system for prospective Buyers to place orders and make payments.

SALE OF GOODS

5. The Goods

(a) The Goods are described in the Specification for Goods. The Goods shall comply with the Specification for Goods in material respects. Any stated dimension or weight set out in the Specification for Goods is an estimate only.

(b) All performance figures, descriptions (other than any description set out in the Specification for Goods), drawings and samples of Goods are approximate only being intended to serve merely as a guide. The Seller shall not be liable for their accuracy and they shall not form part of the Contract. No Contract shall be a contract by sample.

(c) The Seller may alter the Specification for Goods:

- (i) for the purpose of making changes to the Goods which it can establish to the reasonable satisfaction of the Buyer constitute improvements to the Goods; or
- (ii) if required by any applicable statutory or regulatory requirements.

(d) The Seller may increase the price of the Goods by giving notice in writing to the Buyer at any time before delivery, to reflect any increase in the cost of the Goods to the Seller that is due to:

- (i) any factor beyond the control of the Seller (including foreign exchange fluctuations, increases in taxes and duties, and increases in the cost of acquiring or manufacturing the Goods;
- (ii) any request by a Buyer to change the delivery date(s), quantities or types of Goods ordered, or the Specification for Goods; or
- (iii) any delay caused by any instructions of the Buyer in respect of the Goods or failure by the Buyer to give the Seller adequate or accurate information or instructions in respect of the Goods.

Conditions Générales de Vente - suite

(e) All drawings, designs, and quotations for which goods are not subsequently ordered by the Buyer shall remain the property of the Seller and be treated as confidential by the Buyer and not used in any way. The Seller shall have no liability in relation to any such drawings, designs or quotation.

(h) The Buyer accepts that Seller is not an expert in the technical features which apply to Factored Products and/or their use in application. Seller’s only obligation will be to pass on to the Buyer all the written information which Seller has itself received regarding the Factored Product, but the Buyer shall be responsible for ensuring that this and any other necessary Factored Product information is obtained and is reviewed and will decide solely if such data is sufficient to ensure that the Factored Product is fit for purpose in the intended usage application. If any application requirements apply which are not fully covered by the information which the Buyer can obtain, then the Buyer undertakes not to use or supply the Factored Product for use in that application. The Buyer is also responsible for ensuring that the Factored Product will not be subjected to levels of usual or accidental physical abuse in service which would cause the Factored Product to fail. The Buyer agrees and acknowledges that Seller, its officers, directors, employees, affiliates and representatives shall not be held liable for any claims or obligations arising out of the Buyer’s failure to fulfil any or all of its responsibilities set forth in this clause 8(h), and hereby agrees to indemnify and hold Seller its officers, directors, employees, affiliates and representatives fully harmless from any and all claims that may arise in regard to Factored Products. If the Buyer has any doubts concerning these or any other usage conditions and limitation or safety parameters, the Buyer shall consult Seller and request a written response to any queries.

5A. UNTESTED HOSE SUPPLIES FOR SELF-ASSEMBLY BY BUYERS (“SAC”)

(a) Unless otherwise specified in writing by Seller, “loose” hose supplied (without end fittings attached) for self-assembly by Buyer (who will cut the hose to length and attach end fittings to make up Hose Assemblies for their own use, or for sale to their own customers) will not be pressure tested by Seller before supply. Such hydrostatic testing of the hose and the end fitting attachment will be the sole responsibility of the Buyer and Buyer warrants and represents that it shall carry out such hydrostatic pressure testing on all of its SAC hoses purchased from Seller, adhering to the maximum working pressure (MWP) and safety factor of the hose assembly as specified in the relevant Seller product brochure (as may be amended from time to time).

(b) When pressure testing braided hoses with a plastic or rubber outer cover, the cover will mask any signs of leakage for a time. The Buyer agrees and acknowledges that in respect of all SAC hoses, after the hydrostatic pressure test, it is further required to test each covered hose assembly with an internal helium gas pressure of 30 Bar (450 psi) for hose sizes up to 1” and 15 Bar (225 psi) for hose sizes above 1”, with the hose assembly immersed in water to enable leak detection by gas bubbles, for a minimum test period of 5 minutes.

(c) The Buyer agrees and acknowledges that in respect of all SAC hoses, Buyer alone shall determine and approve the design suitability of the hose assembly for its intended use before supply by Seller and that it shall indemnify and hold Seller fully harmless from any and all claims and losses, whether direct or indirect arising from design suitability for a SAC hose.

5B. UNTESTED HOSE ASSEMBLIES

If Seller agrees under a Purchase Order to attach non-standard end fittings to hose assemblies which the Buyer supplies to Seller, Buyer acknowledges and agrees that, in some instances, it is not possible to connect such non-standard fittings to the Seller pressure testing system. In such cases Buyer agrees that Seller shall be entitled, on giving notice to Buyer, not to test such Goods. Seller shall label the hose assembly with a warning that it requires pressure testing before use. The Buyer agrees and acknowledges that Seller shall have no liability whatsoever if the Buyer does not comply with the warning that requires pressure testing before use, and agrees to fully indemnify and hold Seller fully harmless from any and all claims arising from any use by Buyer or onward sale by Buyer of such untested hose assemblies.

6. Despatch and Delivery

(a) For the purposes of this Condition 6, the “Goods” shall mean the Goods in their entirety where delivery is not by instalments or, where delivery is by instalments, each instalment of the Goods.

(b) Unless otherwise agreed in writing by the Seller, delivery of the Goods shall take place at the location stated by the Seller in the Order Acknowledgment (the “Point of Delivery”).

(c) Any stated delivery date is an estimate and time for delivery shall not be of the essence. The Seller will use reasonable endeavours to meet any stated delivery date. If no date for delivery is specified, delivery shall be within a reasonable time.

(d) THE SELLER SHALL NOT BE LIABLE FOR ANY LOSSES (AS DEFINED), CAUSED DIRECTLY OR INDIRECTLY BY ANY DELAY IN THE DELIVERY OF THE GOODS EVEN IF CAUSED BY THE SELLER’S NEGLIGENCE.

(e) ANY DELAY IN THE DELIVERY OF THE GOODS SHALL NOT ENTITLE THE BUYER TO TERMINATE OR RESCIND THE CONTRACT UNLESS SUCH DELAY EXCEEDS ONE HUNDRED AND EIGHTY (180) DAYS.

(f) Delivery of the Goods shall be completed on the arrival of the Goods at the Point of Delivery. Risk in the Goods shall pass to the Buyer on completion of delivery of the Goods.

(g) Except insofar as the Contract expressly provides otherwise, standard carriage and packaging is excluded in the price. Seller may select the method of delivery, and charge the Buyer for the cost of carriage. Where the Goods are to

be delivered at the Buyer’s request by any special or express means, the Seller will charge the Buyer the full cost of carriage. When any special packaging is required (whether at the Buyer’s request or because the Seller considers special packaging to be necessary), then the Seller will charge the Buyer the full cost of such packaging.

(h) In contracting for carriage and/or insurance of the Goods in transit, if required by the Contract, the Seller shall be deemed to act solely as agent of the Buyer.

(i) The Buyer must:

- (i) examine the Goods on delivery;
- (ii) notify the Seller and any carrier in writing of any shortage or damage within four (4) Business Days after the date of delivery and in respect of non-delivery within ten (10) Business Days after the Goods would in the ordinary course of events have been received; and
- (iii) in the case of short or damaged delivery give the Seller a reasonable opportunity to inspect the Goods, otherwise Goods shall be deemed accepted by the Buyer.

(j) ANY LIABILITY OF THE SELLER FOR NON-DELIVERY OF THE GOODS SHALL BE LIMITED TO EITHER DELIVERING THE GOODS WITHIN A REASONABLE TIME OR ISSUING A CREDIT NOTE AT THE PRO RATA CONTRACT RATE AGAINST ANY INVOICE RAISED FOR SUCH GOODS.

(k) The Seller may deliver the Goods by instalments, each instalment to be deemed to be a separate Contract. Without limiting the other provisions herein, no failure or defect in delivery in respect of any Contract or instalment shall entitle the Buyer to repudiate or cancel any other Contract or instalment.

(l) If for any reason the Buyer fails to accept delivery of any of the Goods within two (2) Business Days of the Seller giving notice to the Buyer that the Goods are ready, or the Seller is unable to deliver the Goods on time because the Buyer has not provided appropriate instructions, documents, licences or authorizations for the Goods when they are tendered by the Seller for delivery then, except where such failure is caused by a Force Majeure Event:

- (i) delivery of the Goods shall be deemed to have been completed at 9.00 am on the second (2nd) Business Day after the day on which the Seller notified the Buyer that the Goods were ready;
- (ii) risk in the Goods shall pass to the Buyer on completion of delivery; and
- (iii) the Seller may store the Goods until delivery takes place, whereupon the Buyer shall be liable for all related costs and expenses (including, without limitation, storage and insurance). The Buyer shall be responsible for all Losses incurred by the Seller where the Buyer fails to accept delivery of Goods.
- (m) If ten (10) Business Days after the Seller giving notice to the Buyer that the Goods were ready the Buyer has not accepted delivery of the Goods, the Seller may resell or otherwise dispose of part or all of the Goods.

(n) Due to the nature of the production of PTFE hose, Seller reserves the right to call a Purchase Order for bulk hose complete in the following situations: (a) if a product is a standard Seller product (as listed in Seller’s product brochures) a figure of +10% of original order quantity can be supplied. If the product is a non-standard product and outside the Seller’s standard product range the figure of +/- 10% of the original order quantity can be supplied. Goods supplied within these parameters would result in the Purchase Order being complete and delivery satisfied.

7. Title

(a) The title in the Goods supplied shall not pass to the Buyer until receipt by the Seller in cleared funds of payment in full (including payment of any default interest) for:

- (i) the Goods; and
- (ii) any other goods or services that the Seller has supplied to the Buyer and in respect of which payment is due.

(b) Until the title in the Goods passes to the Buyer the Buyer shall:

- (i) be a bailee of the Goods;
- (ii) store the Goods separately from all other goods held by the Buyer so that the Goods remain readily identifiable as the Seller’s property;
- (iii) not remove, deface or obscure any identifying mark or packaging on or relating to the Goods;
- (iv) not fix or annex the Goods to or merge the Goods with any part of the Buyer’s premises, plant or equipment without the Seller’s prior consent in writing;
- (v) maintain the Goods in satisfactory condition;
- (vi) keep the Goods insured between the passing of risk in the Goods and title to the Goods against all risks with a reputable insurer which has been approved by the Seller for their full price, and ensure that the Seller’s interest in the Goods is noted on the insurance policy until title in the Goods passes to the Buyer. If the Buyer fails to insure the Goods the Seller may do so instead on behalf of the Buyer, who shall reimburse the Seller on demand. Until title in the Goods passes to the Buyer, the Buyer shall hold in trust for the Seller the policy and proceeds of insurance;
- (vii) notify the Seller immediately if it becomes subject to any of the events listed in Conditions 21(a)(iv) to 21(a)(x);
- (viii) give the Seller such information relating to the Goods as the Seller may require from time to time; and

Conditions Générales de Vente

(ix) not dispose of, charge or encumber the Goods or any interest in the Goods or purport to do so,

but the Buyer may resell the Goods to an independent third party on arm's length terms in the ordinary course of its business.

(c) If before title to the Goods passes to the Buyer the Buyer becomes subject to any of the events listed in Conditions 21(a)(iv) to 21(a)(x), or the Seller reasonably believes that any such event is about to happen and gives notice to the Buyer accordingly, then, provided that the Goods have not been resold, or irrevocably incorporated into another product, and without limiting any other right or remedy the Seller may have, the Seller may at any time require the Buyer to deliver up the Goods and, if the Buyer fails to do so promptly, the Seller may enter any premises of the Buyer or of any third party where the Goods are stored in order to recover them.

8. Warranty for Goods

(a) Subject to Condition 8(b), the Seller warrants that on delivery, and for a period of 24 months (12 months for all Hose Assemblies which are "ETH" ("Electrical Trace Heated") Grade or are Factored Products) from the date of delivery the Goods shall:

(i) conform with the Specification for Goods; and

(ii) be free from material defects in material or workmanship.

(b) In respect of Goods which are packages or electrically or electronically controlled or actuated Goods, the Seller warrants that on delivery, and for a period of 12 months from the date of delivery such Goods shall:

(i) conform with the Specification for Goods; and

(ii) be free from material defects in material or workmanship.

(c) Subject to the remainder of this Condition 8, the Seller warrants that if (i) the Buyer provides the Seller with written notification within forty-eight (48) hours of discovering a suspected defect, (ii) if requested by Seller (after Buyer has provided all relevant information requested by Seller in respect of the suspected defective Good(s)), the Buyer returns the Goods within the relevant warranty period for such Goods (as set out in either Condition 8(a) or 8(b)) and (iii) on the Seller's examination such Goods prove defective as to material or workmanship or as to compliance with the relevant Specification for Goods the Seller shall:

(i) give notice to the Buyer that such Goods prove defective as to material or workmanship or as to compliance with the relevant Specification for Goods; and

(ii) following giving notice thereof to the Buyer;

(aa) with respect to Goods which have been manufactured by the Seller, make good the defect without charge by (at the Seller's option) repairing the defective Goods, replacing defective components of the defective Goods, or replacing the defective Goods (in their entirety) as the Seller in its discretion considers appropriate; or

(bb) with respect to Goods which have been supplied, but not manufactured by the Seller, and to the extent that it is entitled to do so, assign or at its discretion use its reasonable endeavours otherwise to make available to the Buyer, at the Buyer's expense and on the basis of an indemnity (secured if appropriate) against all Losses that may be incurred by the Seller in relation thereto, the benefit of any obligations and warranties which relate to such defect which the Seller may be owed by the manufacturer and/or supplier of the Goods or any part or component thereof.

(d) The above warranties shall apply except where the defect in the Goods:

(i) has been caused wholly or partly by deterioration of the Goods which is necessarily incidental to the transit of the Goods;

(ii) has been caused while the Goods were at the Buyer's risk by:

(aa) wilful default or negligence by the Buyer or its employees, agents, consultants or subcontractors;

(bb) the occurrence of an accident;

(cc) failure by the Buyer to follow the Seller's instructions in relation to the storage, use, installation, commissioning or maintenance of the Goods;

(dd) failure by the Buyer to follow good trade practice;

(ee) the Buyer altering or repairing such Goods without the consent in writing of the Seller;

(ff) fair wear and tear, negligence or by any abnormal conditions.

(e) Except as provided in this Condition 8, the Seller shall have no liability to the Buyer in respect of the Goods' failure to comply with the warranties set out in this Condition 8.

(f) The terms of these Conditions shall apply to any repaired or replacement Goods supplied by the Seller under Condition 8(c).

(g) The above warranties shall not apply to consumable items with a limited life expectancy.

9. Returns

(a) The Seller shall not refund the Buyer for any amounts paid by the Buyer in the event that the Buyer returns the Goods (or part thereof) except with the Seller's prior consent in writing. Where such consent is given, the Buyer agrees to pay to the Seller a minimum handling charge of thirty per cent (30%) of the invoiced value.

(b) To qualify for any refund, the Goods must be appropriately packed to protect them from being damaged in transit and be received by the Seller in a saleable

condition within twenty-two (22) Business Days of delivery to the Buyer. The term "Goods" within this Condition 9(b) has the meaning set out within Condition 6(a).

10. Instructions and Health and Safety at Work

(a) The Buyer shall observe strictly the provisions of the Seller's instructions in writing regarding use and application of the Goods together with any revisions thereof and shall ensure that any person other than the Buyer who acquires or has access to the Goods is furnished with and observes such instructions.

(b) The Buyer shall be solely responsible for and shall keep the Seller indemnified against all Losses incurred by the Seller in relation to any use of the Goods other than in strict accordance with the Seller's installation, operating, and maintenance instructions.

(c) The Buyer agrees and acknowledges that for any intended application of the Good(s) in which special conditions apply which are not defined, or not defined sufficiently in the Seller's product brochure, the Buyer shall write to Seller requesting written advice relating to any usage limitations resulting from its special uses or conditions. The Buyer shall be fully liable and responsible for ensuring the design suitability and safety of the Goods in their intended applications, giving particular consideration to any special condition relating to, but not restricted to the chemical and electrostatic compatibility of the fluids or gases passing through, the possibility of diffusion of fluid or gases through the PTFE hose lining, the possibility of external corrosive conditions, the types and likelihood of excessive mechanical abuse, such as abrasion (internal or external), crushing, excessive flexing or vibrations, etc. and any excessive temperature and/or pressure "pulsing" conditions, or any other condition which may cause premature hose failure. The Buyer shall consider and take account of the degree of risk involved in any potential Goods failure, including the provision of adequate protection in the event of any risk to any persons. In applications where any type of Goods failure would lead to financial losses if the Goods are not replaced immediately, the Buyer agrees and acknowledges that it shall be the Buyer's responsibility to order and hold in stock spare Goods accordingly. The Buyer shall advise Seller in writing at the time of placing the enquiry and on any Purchase Order if there are any special requirements for the Good(s), including special cleaning, or drying, or extra testing requirements which are in addition to normal industrial standards. Mere notice of such additional requirements to Seller however, does not relieve the Buyer of its responsibility and liability for ensuring adequate measures are taken or are in place for such applications nor does the mere notification burden nor transfer to Seller any Buyers' liability that the Buyer has for such intended application.

11. Export Sales

(a) Where goods are supplied for export from England the following additional Conditions shall apply, and where there is any conflict between the provisions of this Condition 11 and any other Conditions, the provisions of this Condition 11 shall prevail.

(b) Charges for the cost of export deliveries and documentation shall be as stated in the Contract.

(c) Except where specifically agreed in writing to the contrary, delivery to a Buyer outside of the United Kingdom will be in accordance with the "Ex Works" rule from the international rules for the interpretation of trade terms prepared by the International Chamber of Commerce (INCOTERMS). In the case of deliveries outside of the United Kingdom the Seller does not accept any liability for damage to the Goods during transit, or marine or war risks unless otherwise specifically agreed by the Seller.

(d) The party which is exporting, in the case of exports, or the party which is importing, in the case of imports, will be responsible for obtaining all necessary licences, (or other governmental authorisations required in connection with any export, re-export, or imports, as the case may be, under the Contract. The parties will co-operate with each other in securing any such licenses or authorisations as may be required and each

will provide such statements, certificates and assurances regarding transfer, use, disposition, end-use, source of supply, nationalities and re-export of the Goods as may be required in connection with each party's application for any required license or governmental authorisation.

(e) Any government fees or charges in connection with obtaining such licenses or authorisations will be the responsibility of the party which is exporting, in the case of exports, and the party which is importing, in the case of imports, the Goods.

(f) The Buyer undertakes not to:

(i) offer the Goods for resale in any country where the Buyer knows the export of the Goods is prohibited by the US Government, the UK Government, the UN, the EU or any other relevant organisation; or

(ii) offer to sell the Goods to any person the Buyer knows or suspects will subsequently resell the Goods into a country where export of the Goods is prohibited by the US Government, the UK Government, the UN, the EU or any other relevant organisation.

(g) The Buyer will indemnify the Seller for all liabilities, loss, damages, costs and expenses awarded against or incurred by the Seller arising out of in connection with any breach of the Buyer's obligations contained in Condition 11(g).

(h) The Buyer agrees to provide the Seller with any information the Seller reasonably requires concerning the destination and use of the Goods, to allow the Seller to comply in full with any relevant export legislation.

Conditions Générales de Vente - suite

SUPPLY OF SERVICES

12. Period of Supply

(a) Unless otherwise specified in the Order Acknowledgment, the agreement for the supply of the Services shall be for a period of one (1) year from the date the Seller issues an Order Acknowledgment to the Buyer in accordance with Condition 3 (d) (the "Term for Services").

(b) The Seller reserves the right to increase its price for the Services at any time during the Term for Services. The Seller will give the Buyer notice in writing of any such increase not less than eight (8) weeks before the proposed date of the increase. If such increase is not acceptable to the Buyer, it shall notify the Seller in writing within two (2) weeks of the Seller's notice and the Seller shall have the right, without limiting its other rights or remedies, to terminate the Contract by giving four (4) weeks' notice in writing to the Buyer.

13. Performance of Services

(a) The Seller agrees to provide the Services in accordance with the Specification for Services in all material respects, and to supply as necessary spare or replacement parts and/or consumables, to the Buyer's plant and/or equipment at the site(s) specified in the Seller's Order Acknowledgment.

(b) If the Seller agrees to supply spare or replacement parts and/or consumables, such supply will be strictly on the basis of these Conditions.

(c) Any stated performance date is an estimate only and time for performance of the Services shall not be of the essence. The Seller shall use reasonable endeavours to meet any stated performance date. If no date for performance is specified, the Services shall be performed within a reasonable time.

(d) THE SELLER SHALL NOT BE LIABLE FOR ANY LOSSES (AS DEFINED), CAUSED DIRECTLY OR INDIRECTLY BY ANY DELAY IN THE PERFORMANCE OF THE SERVICES EVEN IF CAUSED BY THE SELLER'S NEGLIGENCE.

(e) SUBJECT TO CONDITION 13(G), ANY DELAY IN THE PERFORMANCE OF THE SERVICES SHALL NOT ENTITLE THE BUYER TO TERMINATE OR RESCIND THE CONTRACT UNLESS SUCH DELAY EXCEEDS ONE HUNDRED AND EIGHTY (180) DAYS.

(f) SUBJECT TO CONDITION 13(G), THE SELLER'S LIABILITY FOR NON-PERFORMANCE OF SERVICES SHALL BE LIMITED TO EITHER PERFORMING THE SERVICES WITHIN A REASONABLE TIME OR ISSUING A CREDIT NOTE AT THE PRO RATA CONTRACT RATE AGAINST ANY INVOICE SUBMITTED TO THE BUYER FOR THE SERVICES.

(g) If the Seller's performance of the Services is prevented or delayed by the Buyer or by the failure of the Buyer to perform any of its obligations under the Contract ("Buyer Default") then upon the Seller giving the Buyer notice in writing that there has been a Buyer Default:

(i) the Seller shall without limiting its other rights or remedies have the right to suspend performance of the Services until the Buyer remedies the Buyer Default and to rely on the Buyer Default to relieve it from the performance of any of its obligations to the extent that the Buyer Default prevents or delays the Seller's performance of the Services;

(ii) the Seller shall not be liable for any Losses incurred by the Buyer arising directly or indirectly from the Seller's failure or delay in performing the Services; and

(iii) the Buyer shall reimburse the Seller on demand for all Losses incurred by the Seller arising directly or indirectly from the Buyer Default.

(h) The Seller reserves the right, at the Seller's discretion, to employ subcontractors to perform all or any part of the Services (including, without limitation, to commission, install, maintain or repair any parts or equipment) on behalf of the Seller.

(i) The Seller warrants that in providing the Services it will exercise reasonable care and attention and that it will comply with all applicable laws and regulations. However the Seller excludes liability for all Losses arising directly or indirectly out of any failure or diminution in performance of the Buyer's plant or equipment caused by the plant or equipment, or any part thereof:

(i) being used or operated otherwise than in accordance with any applicable installation, maintenance or operational instructions; or

(ii) being used or operated otherwise than in accordance with the Seller's instructions or recommendations; or

(iii) having been adjusted, changed or altered in any way by the Buyer or any third party since the date of installation or commissioning of the plant or equipment or the date of the immediately preceding visit by the Seller's employee or subcontractor.

(j) The Buyer warrants to the Seller that the Buyer's plant and equipment is supplied with water at a quality that complies with BS2486 and is compliant with any additional requirements in writing notified by the Seller to the Buyer in respect of the Buyer's plant and equipment. The Seller excludes all liability for Losses arising directly or indirectly out of any failure or diminution in performance of the Buyer's plant or equipment or any part thereof which is caused directly or indirectly by a breach by the Buyer of this warranty.

(k) The Seller reserves the right to replace at the Buyer's cost the Buyer's plant or equipment or any part thereof which is unserviceable or inefficient as the Seller considers reasonably necessary in order to fulfil its obligations to provide the Services in accordance with the specification set out in the Order Acknowledgment.

(l) Alternatively, the Seller may charge the Buyer for the reconditioning of any part of the Buyer's plant or equipment that, in the reasonable opinion of the Seller, cannot be suitably or economically repaired on site. The Seller will provide the Buyer with an estimate of reconditioning charges for each item and if the Buyer does not agree to have the item(s) reconditioned, the Seller reserves the right to amend the scope of the Services as in its absolute discretion it considers necessary.

14. Access to Buyer's Site(s)

(a) The Buyer shall co-operate with the Seller in all matters relating to the Services, and shall provide the Seller with such information as the Seller may reasonably require in order to perform the Services. The Buyer shall ensure that such information is accurate in all material respects.

(b) The Buyer shall obtain and maintain any necessary licences, permissions, and consents which may be required before the date upon which the Services are due to start.

(c) The Buyer shall permit the Seller, its employees, agents, consultants and subcontractors full and free access to the Buyer's site(s) and to the Buyer's plant and equipment which is the subject of the Contract, subject to the Seller and its employees, agents, consultants and subcontractors complying with the Buyer's reasonable requirements as to site safety and security. If, at the time of any pre-arranged visit the Seller's employees, agents, consultants and subcontractors are unable to gain access to the Buyer's site(s) or plant or equipment in order to supply the Services, the Seller reserves the right to charge for the time spent attending at the Buyer's site(s) and for the cost of carrying out any subsequent visit.

(d) If reasonably required by the Seller, the Buyer shall make available to the Seller a secure storage area at the Buyer's site(s) for storage of the Seller's service equipment and shall keep all materials, equipment, documents and other property of the Seller (the "Seller Service Equipment") in such storage area in safe custody and at the Buyer's risk. The Buyer shall not dispose of the Seller Service Equipment other than in accordance with the Seller's instructions in writing.

(e) Prior to any visits by the Seller's employees, agents, consultants or subcontractors, the Buyer will:

(i) strip back any pipe lagging;

(ii) supply and erect suitable scaffolding (if required) to allow working access to the Buyer's plant and equipment; and

(iii) supply any necessary lifting equipment and required operators.

(f) Following any visits by the Seller's employees, agents, consultants or subcontractors, the Buyer will be responsible for the reinstatement of any pipe lagging and the dismantling of any scaffolding erected.

(g) The Buyer will provide the Seller's employees, agents, consultants and subcontractors with all specialist safety clothing or equipment as may be necessary to meet the Buyer's health and safety and environmental rules (excluding hard hat, safety glasses, overalls and protective shoes which will be provided by the Seller).

(h) The Buyer will procure that the Seller's employees, agents, consultants and subcontractors are covered by the Buyer's third party liability insurance policy of an amount of not less than three million pounds (£3,000,000) per occurrence whilst such employees or subcontractors are on the Buyer's site(s).

(i) Emergency Call-outs are intended for genuine emergency breakdown of the Buyer's plant or equipment which is the subject of the Contract only and will be charged by the Seller to the Buyer at the appropriate daily rate specified in the Order Acknowledgment. Each Emergency Call-out will be charged as one (1) additional day of Services over and above the number of days specified in the Order Acknowledgment for the supply of the Services.

(j) The Buyer acknowledges and agrees that the Seller shall at no time own, occupy or control (or be deemed to control) any part of the Buyer's site(s) and/or hold or be fixed with any duties or liabilities under health and safety laws or regulations or common law in relation to any part of the Buyer's site(s).

GENERAL

15. Payment and Other Buyer Obligations

(a) In respect of the Goods, subject to Condition 15(d) the Seller shall invoice the Buyer for the full purchase price of the Goods on or at any time after the despatch of the Goods.

(b) In respect of the Services, the Seller shall invoice the Buyer for the Services either monthly or quarterly as set out in the Contract.

(c) In the event that the Buyer chooses to purchase additional Goods or Services from the Seller that are not set out in the Contract but which are related to the Contract, the terms of such Contract will be deemed to apply to such additional Goods or Services and the Seller will invoice the Buyer for such Goods and Services pursuant to Condition 15(a) or 15(b), as appropriate, under the original Purchase Order number unless otherwise agreed between the parties.

(d) The Seller may in its absolute discretion agree in writing to the Buyer paying for the Goods in instalments, or may agree in writing to extend credit to the Buyer in respect of the payment for Goods. In the event that the Seller agrees to payment by instalments or extends credit in respect of the payment by the Buyer for Goods, the Seller shall invoice the Buyer monthly for agreed instalments of the purchase price. The Seller may in its absolute discretion by notice in writing to the Buyer withdraw (with immediate effect) the Buyer's right to credit or to pay for the Goods by instalments.

Conditions Générales de Vente

(e) The Buyer shall pay each invoice submitted by the Seller:

- (i) within the earlier of thirty (30) days of the date of the invoice or such other period of time after the date of the invoice as has been agreed in the Contract; and
- (ii) in Sterling or such other currency as the Seller may from time to time agree in writing) to a bank account nominated in writing by the Seller.

(f) Time is of the essence in relation to payment.

(g) All amounts payable by the Buyer under the Contract are exclusive of VAT chargeable from time to time. Where any taxable supply for VAT purposes is made under the Contract by the Seller to the Buyer, the Buyer shall, on receipt of a valid VAT invoice from the Seller, pay to the Seller such additional amounts in respect of VAT as are chargeable on the supply of the Services or the Goods at the same time as payment is due for the supply of the Services or the Goods.

(h) The Buyer shall make all payments due under the Contract in full without any deduction whether by way of set-off, counterclaim, discount, abatement or otherwise unless required by law.

(i) No payment shall be deemed to have been received until the Seller has received cleared funds.

(j) All payments payable to the Seller under the Contract shall become due immediately on its termination despite any other provision.

(k) If the Buyer fails to pay the Seller any sum due pursuant to the Contract by the due date for payment:

(i) the Buyer shall be liable to pay interest to the Seller at the maximum rate allowed by applicable law; and

(ii) the Seller may, in its absolute discretion and without liability to the Buyer, suspend performance of its obligations under the Contract and under any or all other Contracts between the Seller and the Buyer or terminate the Contract and any or all other Contracts between the Seller and the Buyer with immediate effect.

(l) If the Buyer pays any amount to the Seller without apportioning it between specific debts or liabilities, the amount paid shall be apportioned as the Seller thinks fit. The Seller may attribute the entirety of an amount paid to one or more specific items in respect of which payment is due, rather than to all the items in respect of which payment is due.

(m) Buyer shall comply with all applicable laws, statutes, regulations and codes from time to time in force, including those related to data protection and to anti-bribery and corruption. Buyer must comply with the requirements of the United Kingdom Bribery Act 2010 (the "Act") and shall not engage in any activity, practice or conduct which would constitute an offence under sections 1, 2, or 6 of the Act if such activity, practice or conduct had been carried out in the United Kingdom. Additionally, Buyer shall comply, and shall ensure compliance of any party with which it subcontracts complies, with the requirements of the United Kingdom Modern Slavery Act (2015), including ensuring that all forms of forced labour are eliminated from its business.

16. Cancellation

(a) No contract shall be cancelled by the Buyer except with the Seller's prior consent in writing.

(b) In the event of the Seller agreeing to the Buyer cancelling all or any part of the Contract, the Seller may, without prejudice to any other rights against the Buyer which it may have, require the Buyer to pay a cancellation charge. Any cancellation charge will correspond to the type of contract being cancelled. Contracts for bespoke Goods manufactured by the Seller to the Buyer's specifications may be subject to a cancellation charge of 100% of the price of the Contract after the Order Acknowledgement has been sent.

(c) In the event that the Seller agrees to cancellation of a Contract in respect of the supply of Goods or Services (or both) which have been ordered to comply with the Buyer's special requirements, the Buyer shall be liable for all costs incurred by the Seller up to the time of cancellation of the Contract in addition to payment of a cancellation charge pursuant to Condition 16(b).

17. Intellectual Property

(a) The Buyer acknowledges that:

(i) the Intellectual Property Rights in the Goods and any materials prepared by the Seller or on its behalf which relate to the Goods and their development (including, without limitation, drawings, designs, samples, models and similar items) (the "Goods Materials") are the Property of the Seller or the third party manufacturers of the Goods (as applicable);

(ii) nothing in these Conditions or in a Contract shall be construed as conferring any licence or granting any rights in favour of the Buyer in the Intellectual Property Rights in the Goods or the Goods Materials. The Buyer may re-sell the Goods subject to the Seller's right to control the use of its trade marks within the European Economic Area or jurisdiction into which the Goods are sold and the Buyer shall assist the Seller as required in preventing parallel importers from diluting the Seller's rights; and

(iii) any goodwill in any trade marks affixed or applied to the Goods shall enure to the sole benefit of the Seller or any other owner of the trade marks from time to time.

(b) The Buyer shall not repackage the Goods and shall not without the Seller's prior consent in writing allow any trade marks of the Seller or other words or marks applied to the Goods to be obliterated, obscured or omitted or add any additional marks or words.

(c) The Buyer shall not use (other than pursuant to these Conditions or a Contract) or seek to register any trade mark or trade name (including any company name) which is identical to, confusingly similar to, or incorporates any trade mark or trade

name which the Seller owns or claims rights in anywhere in the world.

(d) If at any time it is alleged that the Goods infringe the rights of any third party or if, in the Seller's reasonable opinion, such an allegation is likely to be made, the Seller may at its option and its own cost:

(i) modify or replace the Goods in order to avoid the infringement; or

(ii) procure for the Buyer the right to continue using the Goods; or

(iii) repurchase the Goods at the price paid by the Buyer, less depreciation at the rate the Seller applies to its own equipment.

(e) The Buyer shall promptly notify the Seller of:

(i) any actual, threatened or suspected infringement of any of the Intellectual Property Rights in the Goods or the Goods Materials (or both) which comes to the Buyer's notice; and

(ii) any claim by any third party that comes to the Buyer's notice that the sale or advertisement of the Goods or the use of the Goods Materials (or both) infringes the rights of any person.

(f) The Buyer agrees (at the Seller's request and expense) to do all such things as may be reasonably required to assist the Seller in taking or resisting any proceedings in relation to any infringement or claim referred to in Condition 17(e), and the Buyer shall not make any admissions or statements in respect of or compromise any such claim other than with the prior written consent of the Seller.

(g) In the event of any claim, proceeding or suit by a third party against the Buyer alleging an infringement of such party's rights by any of the Intellectual Property Rights in the Goods or the Goods Materials (or both), the Seller shall defend the claim, proceeding or suit at the Seller's expense, subject to:

(i) the Buyer promptly notifying the Seller in writing of any such claim, proceeding or suit; and

(ii) the Seller being given sole control of the defence of the claim, proceeding or suit, and provided that the Seller shall not be liable and shall not defend the claim, proceeding or suit to the extent that such infringements arise out of or in connection with modifications to the Goods or the Goods Materials (or both) made by anyone except the Seller or its authorised representative, or out of use or annexation of the Goods or the Goods Materials (or both) with or to products or third party materials not specified or expressly approved in advance in writing by the Seller, or where the claim, proceeding or suit arises from the Seller's adherence to the Buyer's requested changes to the Specification for Goods or from infringing items of the Buyer's origin, design or selection.

(h) The Seller shall reimburse the Buyer with an amount equal to any liability assessed against the Buyer by final judgment on account of an infringement described in Condition 17 (g).

(i) All Intellectual Property Rights in the or arising out of the or in connection with the Services shall be owned by the Seller.

(j) All Intellectual Property Rights in the materials, equipment, documents and other property of the Seller are the exclusive property of the Seller or of its licensors and shall be returned to the Seller on demand.

18. Trade Prohibitions

(a) The Buyer undertakes to the Seller that the Buyer shall not re-sell or otherwise supply the Goods to a third party which is the subject of any statutory trade prohibition of the United States of America or a member state of the European Union ("Sanctioned Third Party").

(b) Without prejudice to Condition 18(a), if the Seller shall have notice of or reasonable grounds to believe that the Buyer intends to re-sell or otherwise supply the Goods to a Sanctioned Third Party the Seller may upon giving notice thereof to the Buyer refuse to deliver the whole or any part of the Goods and shall have no liability to the Buyer for such refusal.

19. Limitation and Exclusion of Liabilities

(a) **SUBJECT TO AND WITHOUT LIMITING CONDITION 19(B) OR ANY OTHER CONDITION, THE SELLER SHALL NOT BE LIABLE TO THE BUYER WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), BREACH OF STATUTORY DUTY, OR OTHERWISE, FOR ANY LOSSES (AS DEFINED) ARISING DIRECTLY OR INDIRECTLY OUT OF OR IN CONNECTION WITH ANY CONTRACT FOR THE SUPPLY OF GOODS AND/OR SERVICES (OR THAT PART OF A CONTRACT WHICH RELATES TO GOODS AND/OR SERVICES).**

(b) Notwithstanding any other terms of these Conditions the Seller does not limit or exclude its liability for fraud or fraudulent misrepresentation or for death or personal injury resulting from its negligence or the negligence of its employees, agents or subcontractors.

(c) **SUBJECT TO AND WITHOUT LIMITING CONDITION 19(B) OR ANY OTHER CONDITION, THE SELLER'S TOTAL LIABILITY TO THE BUYER IN RESPECT OF ALL OTHER LOSS ARISING OUT OF OR IN CONNECTION WITH ANY CONTRACT FOR THE SUPPLY OF GOODS AND/OR SERVICES (OR THAT PART OF A CONTRACT WHICH RELATES TO GOODS AND/OR SERVICES), WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), BREACH OF STATUTORY DUTY, OR OTHERWISE, SHALL IN NO CIRCUMSTANCES EXCEED THE VALUE OF THE CONTRACT WHICH GAVE RISE TO BUYER'S CLAIM.**

Conditions Générales de Vente - suite

(d) **THE BUYER ACKNOWLEDGES AND AGREES THAT THE LIMITED WARRANTIES AND ALL LIMITATIONS AND EXCLUSIONS OF THE SELLER'S LIABILITY SET OUT IN THESE CONDITIONS ARE REASONABLE AND ARE REFLECTED IN THE PRICE OF THE GOODS OR SERVICES (OR BOTH) (AS APPLICABLE) AND THE BUYER SHALL ACCEPT RISK OR INSURE ACCORDINGLY (OR BOTH).**

The Seller shall have no responsibility for any Losses incurred by the Buyer in the event that any information in any quotation or Order Acknowledgement is applied in connection with products other than the Goods and Services.

(f) This Condition 19 shall survive the termination or cancellation of the Contract.

20. Force Majeure

(a) The Seller shall not be liable to the Buyer as a result of any delay or failure to perform its obligations under the Contract as a result of a Force Majeure Event.

(b) If the Force Majeure Event prevents the Seller from providing any of the Services or Goods (or both) for more than forty-four (44) Business Days, the Seller shall, without limiting its other rights or remedies, have the right to terminate the Contract with the Buyer immediately by giving notice in writing to the Buyer.

21. Events of Default, Termination, Repossession, Suspension; Dispute Resolution

(a) The Seller may terminate the Contract with immediate effect by giving notice in writing to the Buyer if:

(i) the Buyer fails to pay any amounts due under the Contract on the due date for payment; or

(ii) the Buyer otherwise breaches the Contract with the Seller and the breach, if remediable and previously notified in writing to the Buyer, is not remedied within five (5) Business Days of the Buyer receiving such notice; or

(iii) the Seller terminates any other Contract between the Seller and the Buyer; or

(iv) the Buyer is or otherwise becomes insolvent or unable to pay its debts or suspends payment of its debts or threatens to do so or is unable to pay its debts as they fall due or admits its inability to pay its debts; or

(v) the Buyer commences negotiations with all or any class of its creditors with a view to rescheduling any of its debts, or makes a proposal for or enters into any compromise or arrangement with its creditors other than for the sole purpose of a scheme for a solvent amalgamation;

(vi) a petition is filed, a notice is given, a resolution is passed, or an order is made, for or in connection with the winding up of the Buyer other than for the sole purpose of a scheme for a solvent amalgamation;

(vii) a creditor or encumbrancer of the Buyer attaches or takes possession of, or a distress, execution, sequestration or other such process is levied or enforced on or sued against, the whole or any part of its assets and such attachment or process is not discharged within fourteen (14) days;

(viii) an application is made to court, or an order is made, for the appointment of an administrator or if a notice of intention to appoint an administrator is given or if an administrator is appointed over the Buyer;

(ix) the holder of a qualifying charge over the assets of the Buyer has become entitled to appoint or has appointed an administrative receiver;

(x) a person becomes entitled to appoint a receiver over the assets of the Buyer or a receiver is appointed over the assets of the Buyer;

(xi) any event occurs, or proceeding is taken, with respect to the Buyer in any jurisdiction to which it is subject that has an effect equivalent or similar to any of the events mentioned in Conditions 21(a)(iv) to Condition 21(a)(x) (inclusive);

(xii) the Buyer suspends, threatens to suspend, ceases or threatens to cease to carry on, all or substantially the whole of its business;

(xiii) the Buyer's financial position deteriorates to such an extent that in the Seller's opinion the Buyer's capability to adequately fulfil its obligations under the Contract has been placed in jeopardy.

(b) In the event that the Seller terminates the Contract pursuant to Condition 21(a) the Seller may (in its absolute discretion and without prejudice to its other rights under these Conditions or otherwise) by notice in writing to the Buyer do any one or (to the extent not inconsistent with one another) more of the following:

(i) suspend any deliveries of Goods to be made under any contract with the Buyer;

(ii) revoke any express or implied authority to sell or use any Goods the title in which has not passed to the Buyer ("Relevant Goods");

(iii) require the Buyer to deliver to the Seller any Relevant Goods; and the Buyer shall do so, failing which the Seller may enter the premises where the Relevant Goods are or are thought to be and repossess the Goods, without liability for any resulting damage to the Buyer's premises, plant or equipment.

(c) All disputes arising out of or in connection with the Contract shall be submitted to the International Court of Arbitration of the International Chamber of Commerce and shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with the said Rules. The place of arbitration shall be London with the laws of England governing the Contract. The language of the arbitration shall be English.

22. Confidentiality

Each of the Seller and the Buyer (the "Receiving Party") shall keep in strict confidence all technical or commercial know-how, specifications, inventions, processes or initiatives which are of a confidential nature and have been disclosed to the Receiving Party by the other party ("Disclosing Party"), its employees, agents or subcontractors, and any other confidential information concerning the Disclosing

Party's business, its products and services which the Receiving Party may obtain. The Receiving Party shall only disclose such confidential information to those of its employees, agents and subcontractors who need to know it for the purpose of discharging the Receiving Party's obligations under the Contract, and shall ensure

that such employees, agents and subcontractors comply with the obligations set out in this Condition 22 as though they were a party to the Contract. The Receiving Party may also disclose such of the Disclosing Party's confidential information as is required to be disclosed by law, any governmental or regulatory authority or by a court of competent jurisdiction. This Condition 22 shall survive termination or cancellation of the Contract.

23. Miscellaneous

(a) The Seller's rights under these Conditions are in addition to any other rights which the Seller may have under the general law or otherwise.

(b) If the Buyer comprises two or more persons, their obligations are joint and several.

(c) The Buyer shall not assign, transfer, mortgage, charge, sub-contract, or otherwise dispose of or deal in any Contract or any rights or obligations (or both) (as applicable) thereunder in whole or in part without the Seller's prior consent in writing. Any such action purported to be taken by the Buyer without the Seller's prior consent in writing shall be void.

(d) The Seller may at any time assign, transfer, mortgage, charge, sub-contract or otherwise dispose of or deal in its rights or obligations (or both) (as applicable) under any Contract or any part of it to any person, firm or company.

(e) A waiver by the Seller of any right under the Contract or law will only be effective if it is in writing. Any failure or delay by the Seller in exercising, or any partial exercise by the Seller, of any right or remedy under the Contract or by law shall not constitute as a waiver of that or any other right or remedy. No single exercise by the Seller shall prevent the further exercise of that or any other right or remedy.

(f) Any waiver by the Seller of any breach of, or any default under, any provision of the Contract by the Buyer shall not be deemed a waiver of any subsequent breach or default and shall no way affect the other terms of the Contract.

(g) No term of the Contract shall be enforceable by any person that is not a party to it.

(h) This Condition 23 shall survive termination or cancellation of the Contract.

24. Notices

(a) Any notice to be given by the Buyer under these Conditions or any relevant Contract to the Seller shall be in writing and given by prepaid first class post or hand-delivered to Aflex Hose Limited, Bradley Business Park, Huddersfield, West Yorkshire, HD2 1GZ or to such other address or for the attention of such person as the Seller may notify to the Buyer.

(b) Any notice to be given by the Seller under these Conditions or any relevant Contract to the Buyer shall be in writing and given by prepaid first class post or hand-delivered to any address from which the Seller has received communications from the Buyer in connection with these Conditions or the Contract.

(c) Notices shall be deemed to have been received:

(i) if sent by prepaid first class post, two (2) Business Days after posting (exclusive of the day of posting); or

(ii) if delivered by hand, on the day of delivery.

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CORROFLON
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SMOOTHBORE
HYPERLINE FX
VISIFLON

UK

Dyson Wood Way
Bradley Business Park
Huddersfield
West Yorkshire, HD2 1GZ

Tel: +44 (0) 1422 317200

USA

32 Appletree Lane
Pipersville
Bucks County
Pa 18947

Tel: 215 - 766 - 1455
Fax: 215 - 766 - 1688



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