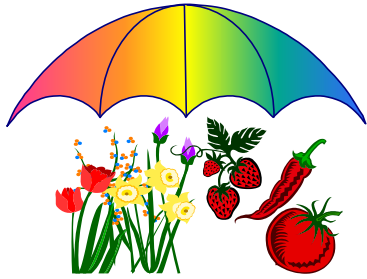
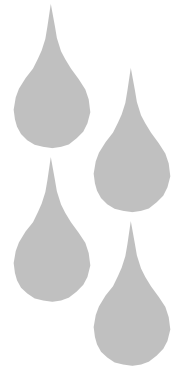


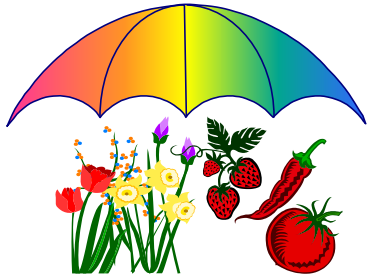
IRRIGATION EN SERRE

La plomberie
(pression; perte de
pression; composantes; etc)

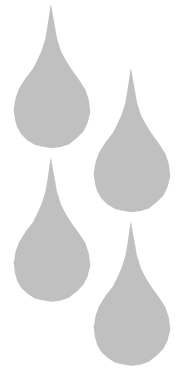


IDÉAL : LE MOUVEMENT PERPÉTUEL





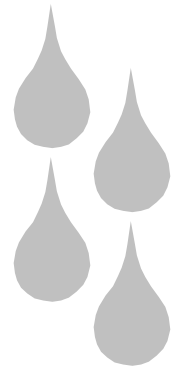
IRRIGATION EN SERRE



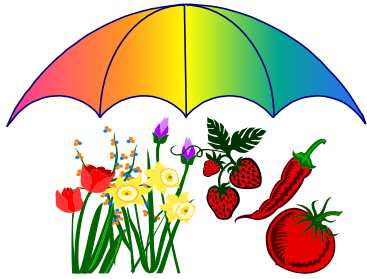
- Cette section :
 - Le transport de l'eau (et engrais soluble) du point de prise d'eau aux points d'utilisation.
 - Avec efficacité et uniformité (temps et espace)
- objectif:
 - Comprendre les divers facteurs influençant le débit et la pression
 - Estimer les paramètres des diverses composantes.



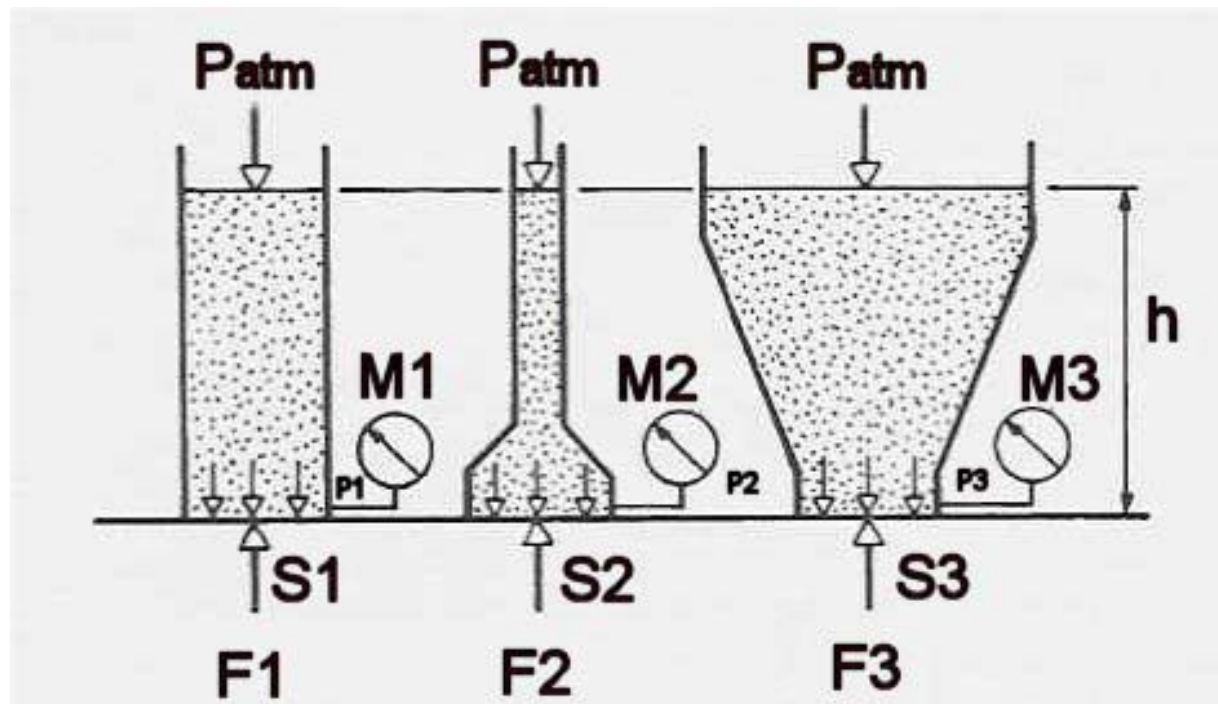
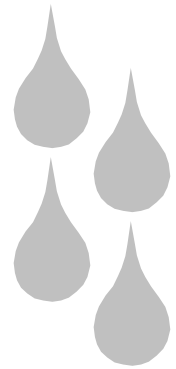
LA PRESSION

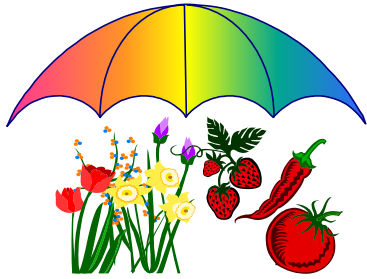


- $P = F/A$
- Fluide = pression multidirectionnelle
- La pression est fonction de la hauteur de colonne d'eau (1 pi = 0.433 psi)
- La forme et la longueur ne change pas la pression
- La pression atmosphérique = 14.7 psi

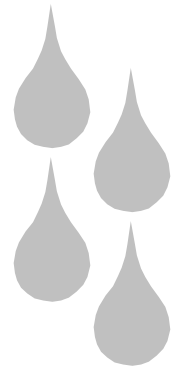


FORME ET PRESSION

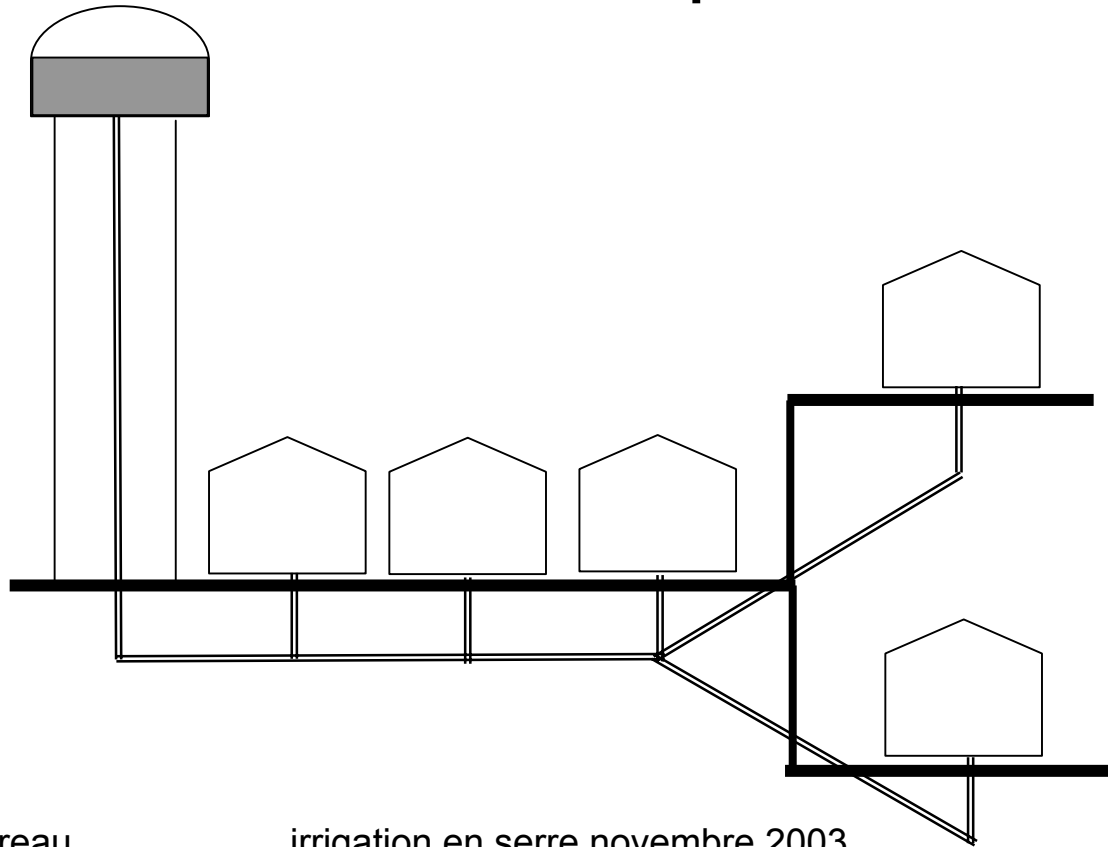


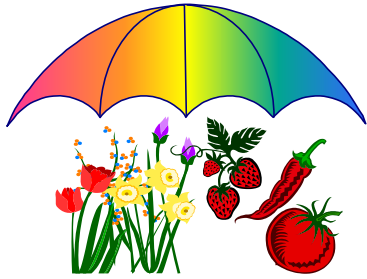


LE CHÂTEAU D'EAU

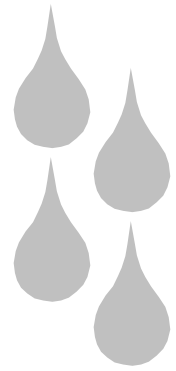


Quelle est la hauteur pour avoir 40
psi?

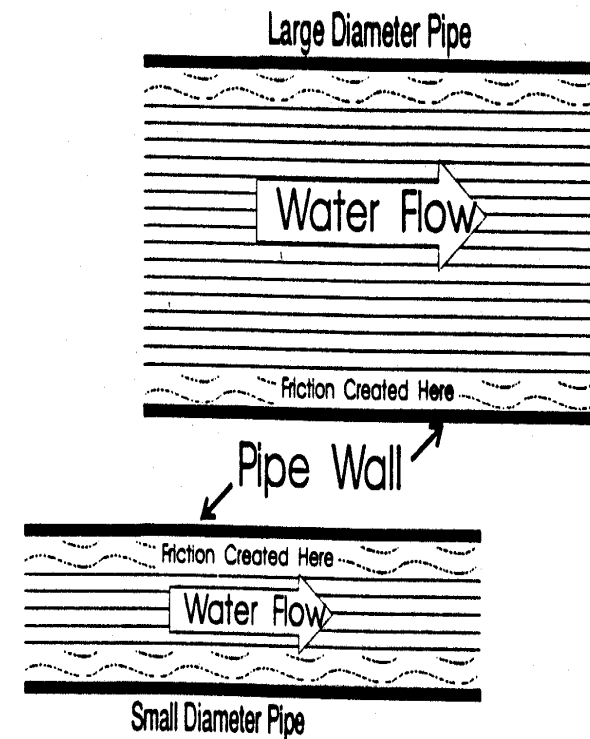


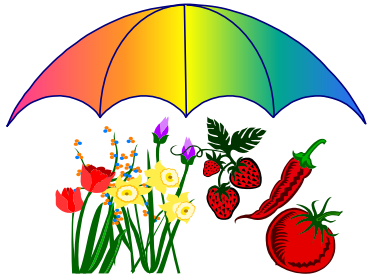


LA PERTE DE PRESSION

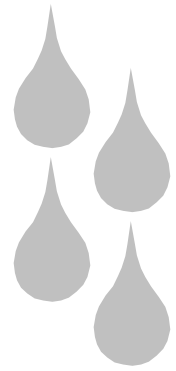


- Mouvement du fluide
= vitesse = friction = frein
- Friction fct de
 - Vitesse ² (débit);
 - diam (Ø; rayon hydraulique);
 - rugosité;
 - longueur

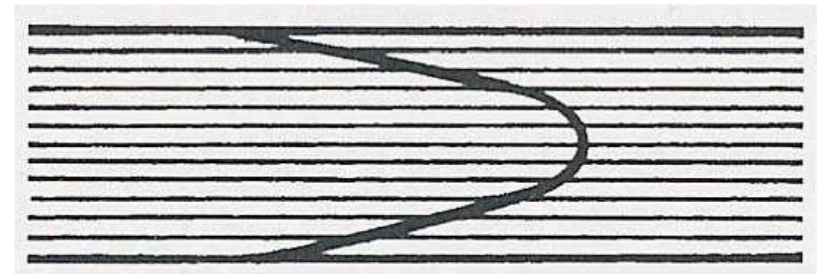




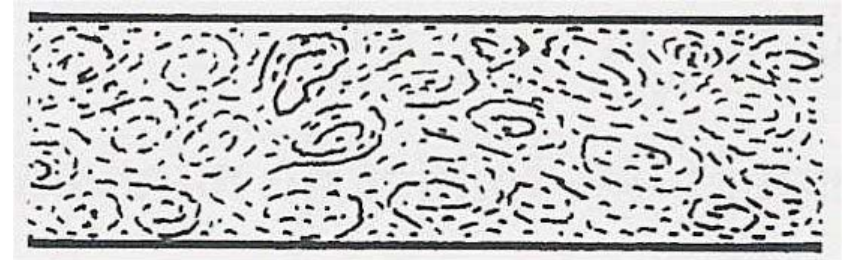
LA VITESSE DE L'EAU



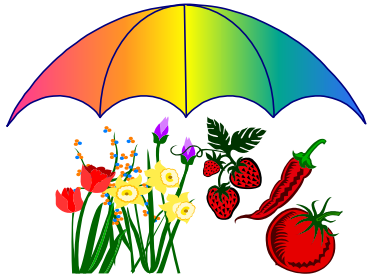
- Écoulement
 - Laminaire
 - Friction faible
 - Turbulent
 - Friction élevée



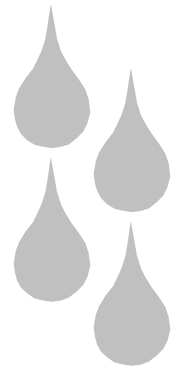
Écoulement laminaire



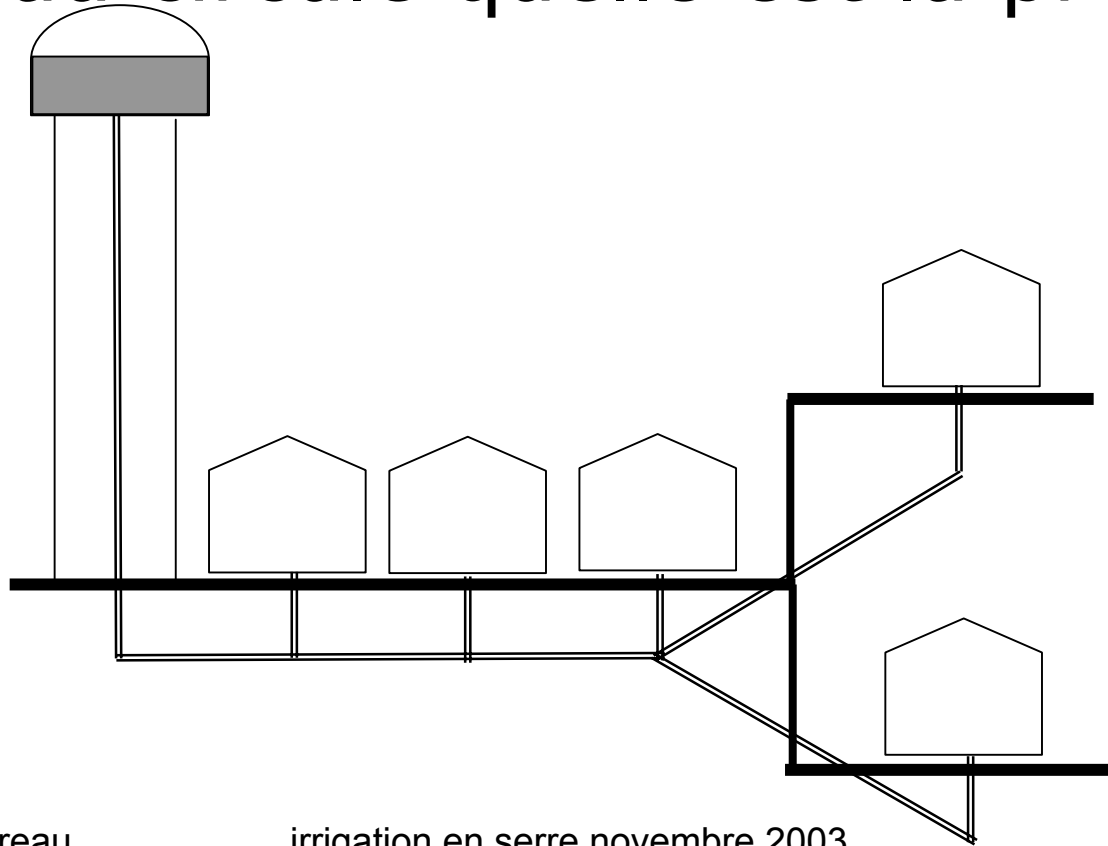
Écoulement turbulent

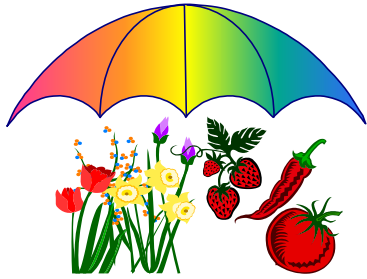


LE CHÂTEAU D'EAU

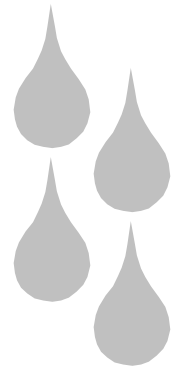


- Si l'eau circule quelle est la pression?

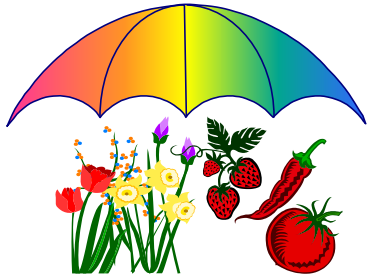




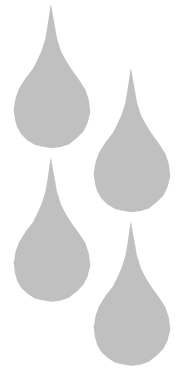
PERTE DE PRESSION TUYAUTERIE



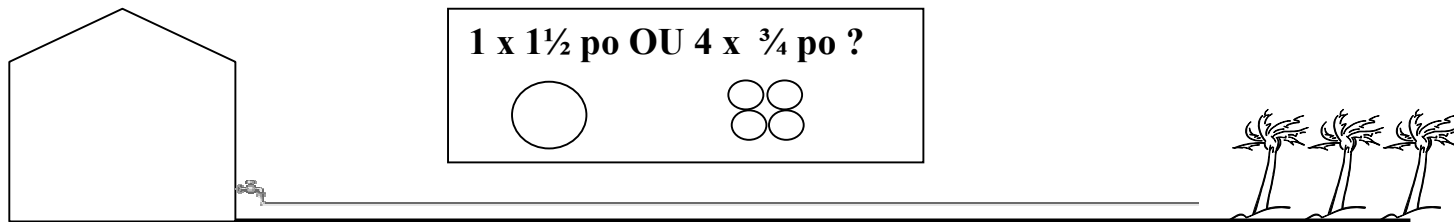
- Pour la tuyauterie
 - Tableau de perte de pression
 - En psi
 - Pour 100 pi de longueur
 - Débit
 - Diamètre du tuyau
 - Type de tuyau

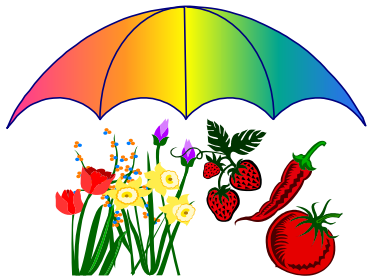


QUI A RAISON?



- À la maison : 28 psi disponible
- Longueur : 300 pi
- Au champ : 25 psi requis et 16 gpm
- Même surface de section

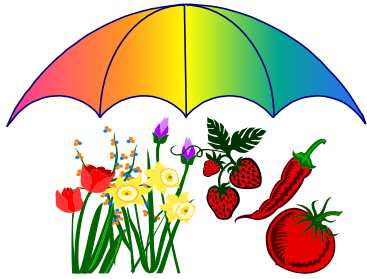




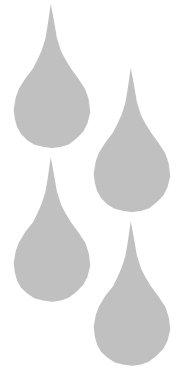
TABEAU DE PERTE DE PRESSION



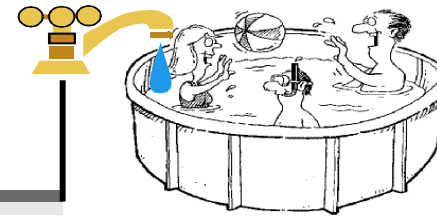
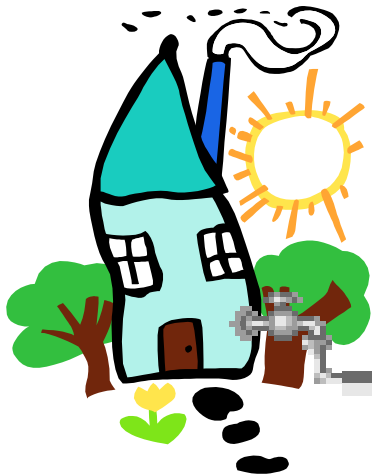
TABLEAU DE PERTE DE PRESSION										
TUYAU DE POLYÉTHYLÈNE										
(en psi pour 100 pi de longueur)										
	diamètre nominal du tuyau (en po)									
débit (gpm)	0,50	0,75	1,00	1,25	1,50	2,00	2,50	3,00	4,00	6,00
1	0,49	0,12	0,04	0,01	0,00	0,00				
2	1,76	0,45	0,14	0,04	0,02	0,01				
3	3,73	0,95	0,29	0,08	0,04	0,01	0,00			
4	6,35	1,62	0,50	0,13	0,06	0,02	0,01			
5	9,60	2,44	0,76	0,20	0,09	0,03	0,01	0,00		
6	13,46	3,43	1,06	0,28	0,13	0,04	0,02	0,01		
7	17,91	4,56	1,41	0,37	0,18	0,05	0,02	0,01		
8	22,93	5,84	1,80	0,47	0,22	0,07	0,03	0,01		
9	28,52	7,26	2,24	0,59	0,28	0,08	0,03	0,01		
10	34,67	8,82	2,73	0,72	0,34	0,10	0,04	0,01		
11	41,36	10,53	3,25	0,86	0,40	0,12	0,05	0,02	0,00	
12	48,60	12,37	3,82	1,01	0,48	0,14	0,06	0,02	0,01	
14	64,65	16,16	5,08	1,24	0,62	0,19	0,08	0,03	0,01	

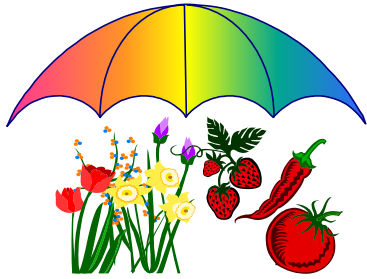


MA PISCINE



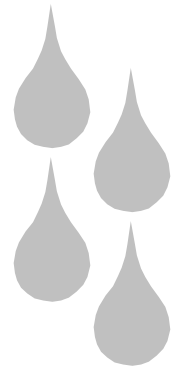
- Qui a raison: moi ou mon voisin?



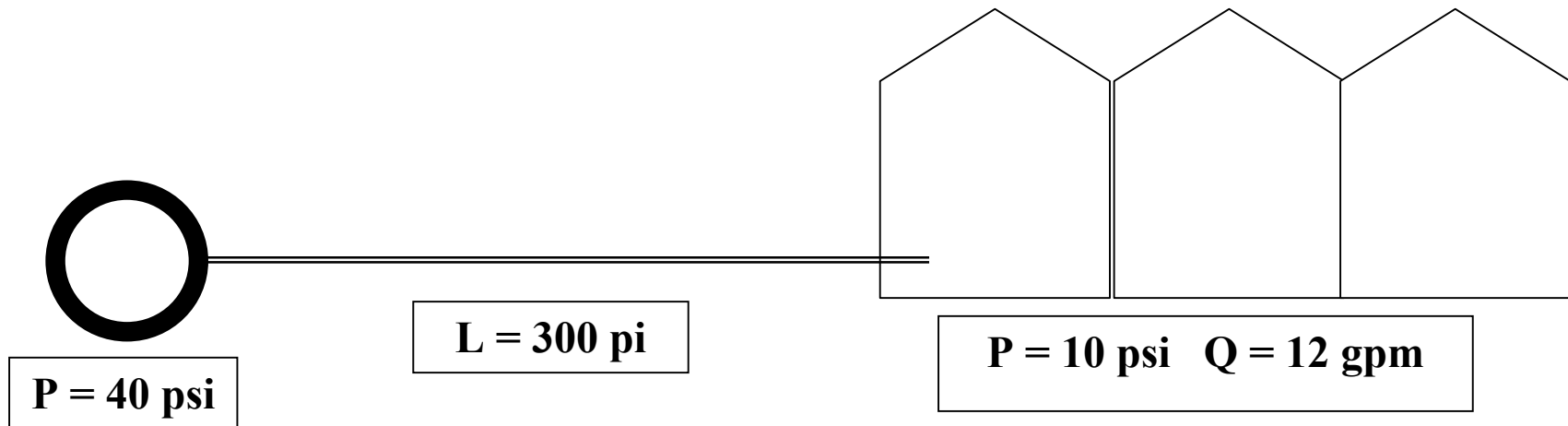


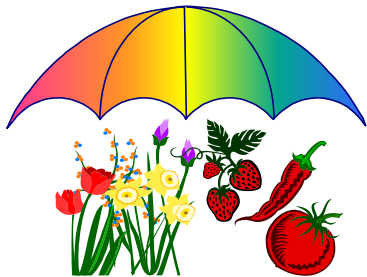
PERTE DE PRESSION

EXERCICE (1)

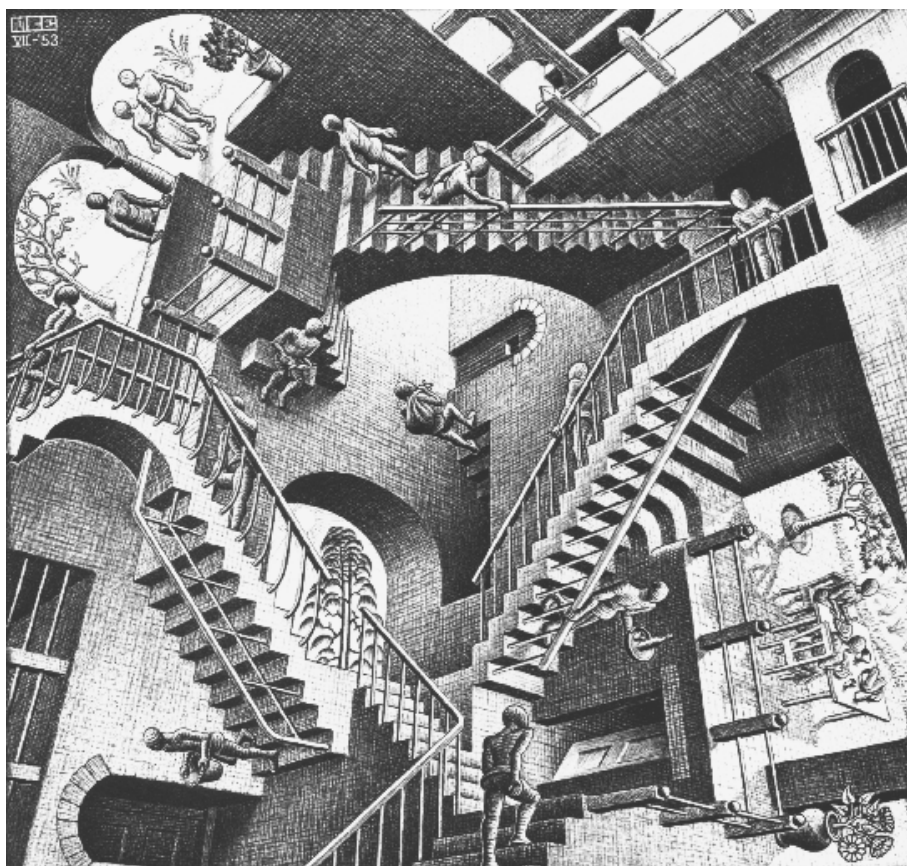


- Quel est le diamètre du tuyau requis?
Quelle sera la pression d'arrivée?





OÙ ON EST RENDU?

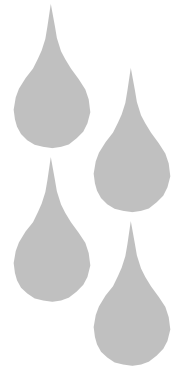


Jean-Marc Boudreau

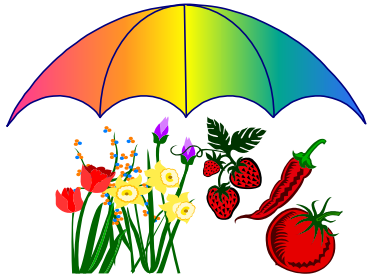
irrigation en serre novembre 2003



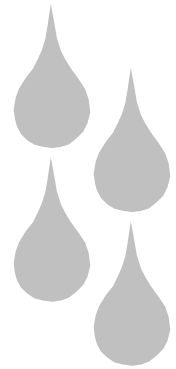
PERTE DE PRESSION LONGUEUR ÉQUIVALENTE



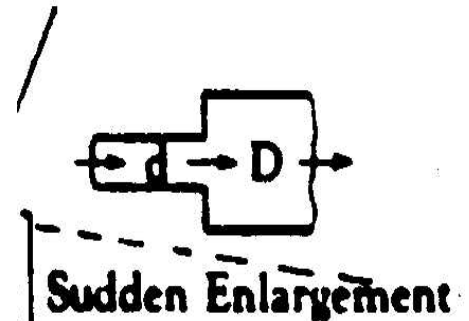
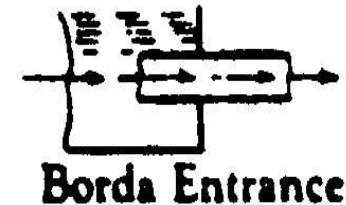
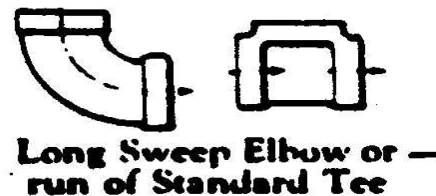
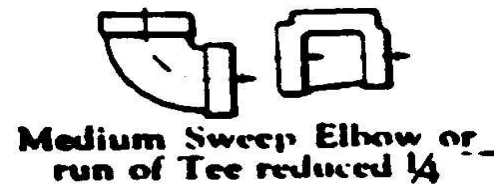
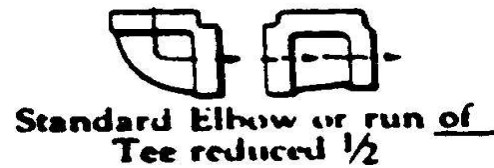
- C'est « comme si on ajoutait une longueur de tuyau du même diamètre »
- Dans la majorité des cas, cette longueur pourrait être placée n'importe où sur le circuit.

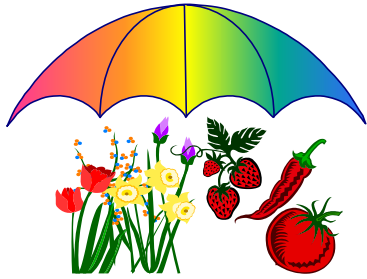


PERTE DE PRESSION COMPOSANTES

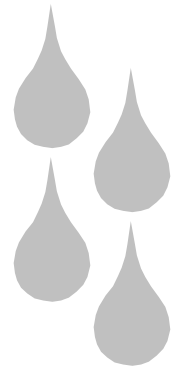


- Les liens de plomberie
 - Coudes
 - réducteurs
 - unions

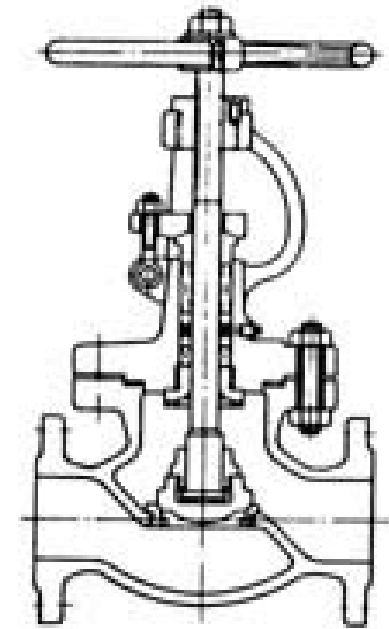
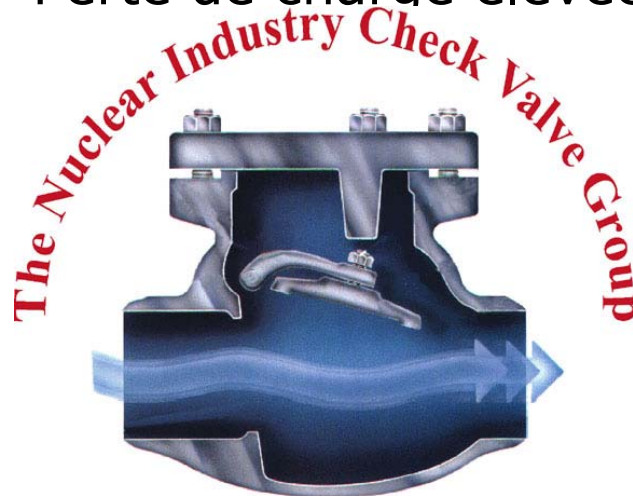


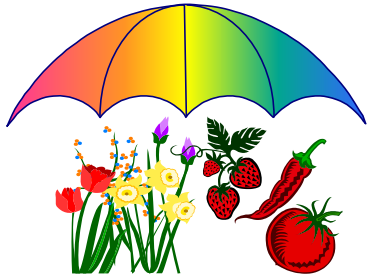


PERTE DE PRESSION COMPOSANTES

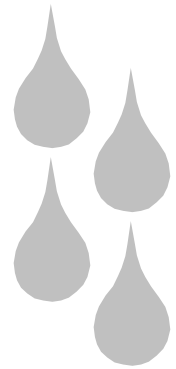


- Les valves
 - Globe valve
 - Valve anti-retour
 - Perte de charge élevée

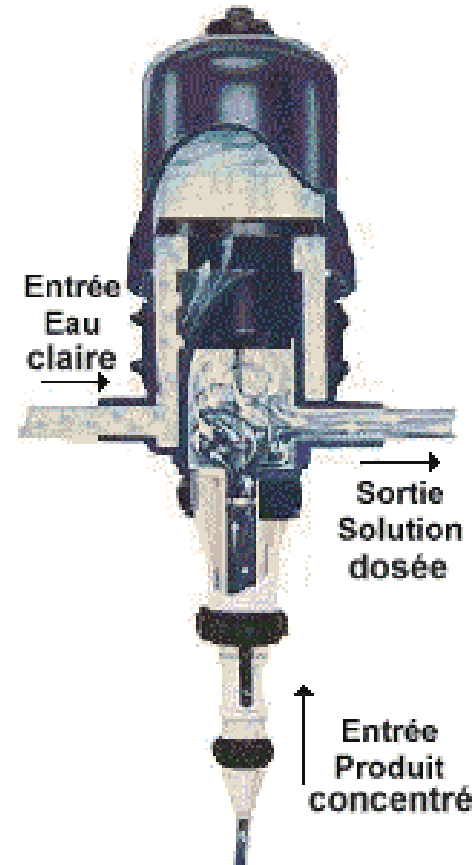


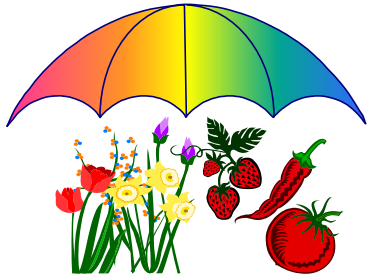


PERTE DE PRESSION COMPOSANTES

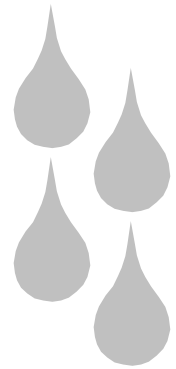


- Injecteur d'engrais
 - Type piston

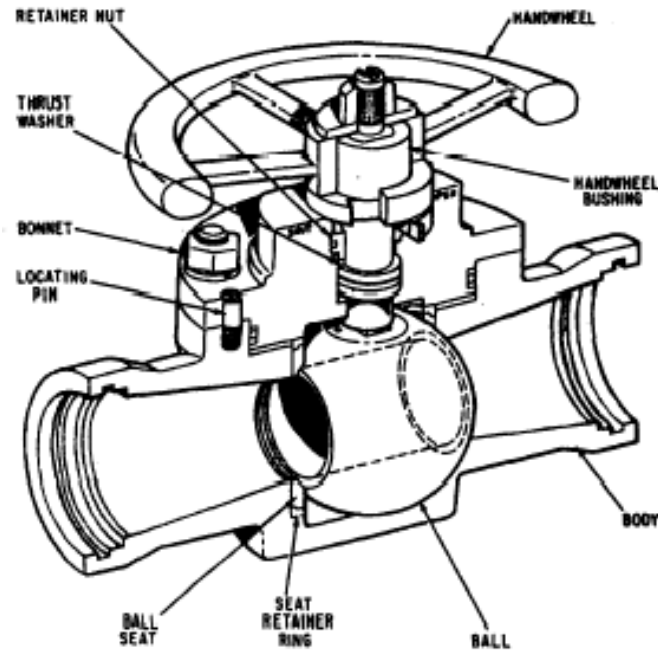


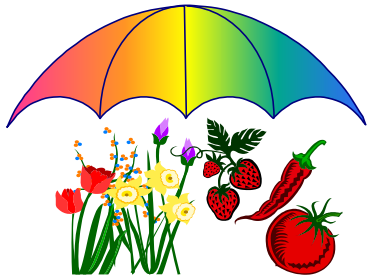


PERTE DE PRESSION COMPOSANTES

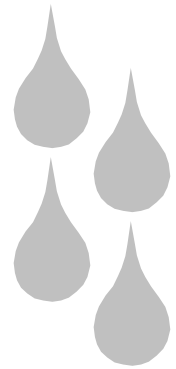


- Gate valve
- Ball valve
 - Perte de charge faible

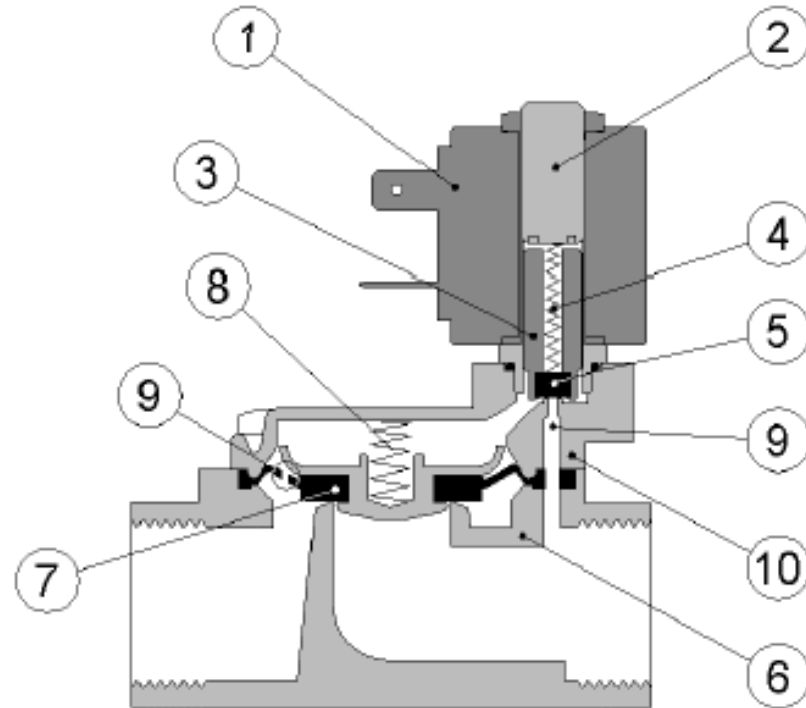


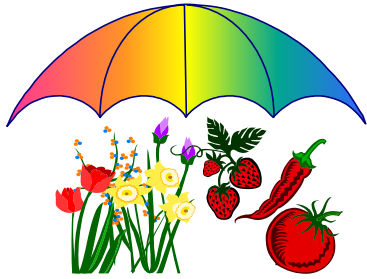


PERTE DE PRESSION COMPOSANTES



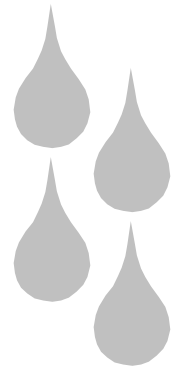
- Valve électrique (diaphragme)
 - Pression minimale d'opération
 - Action indirecte
 - Danger de colmatage



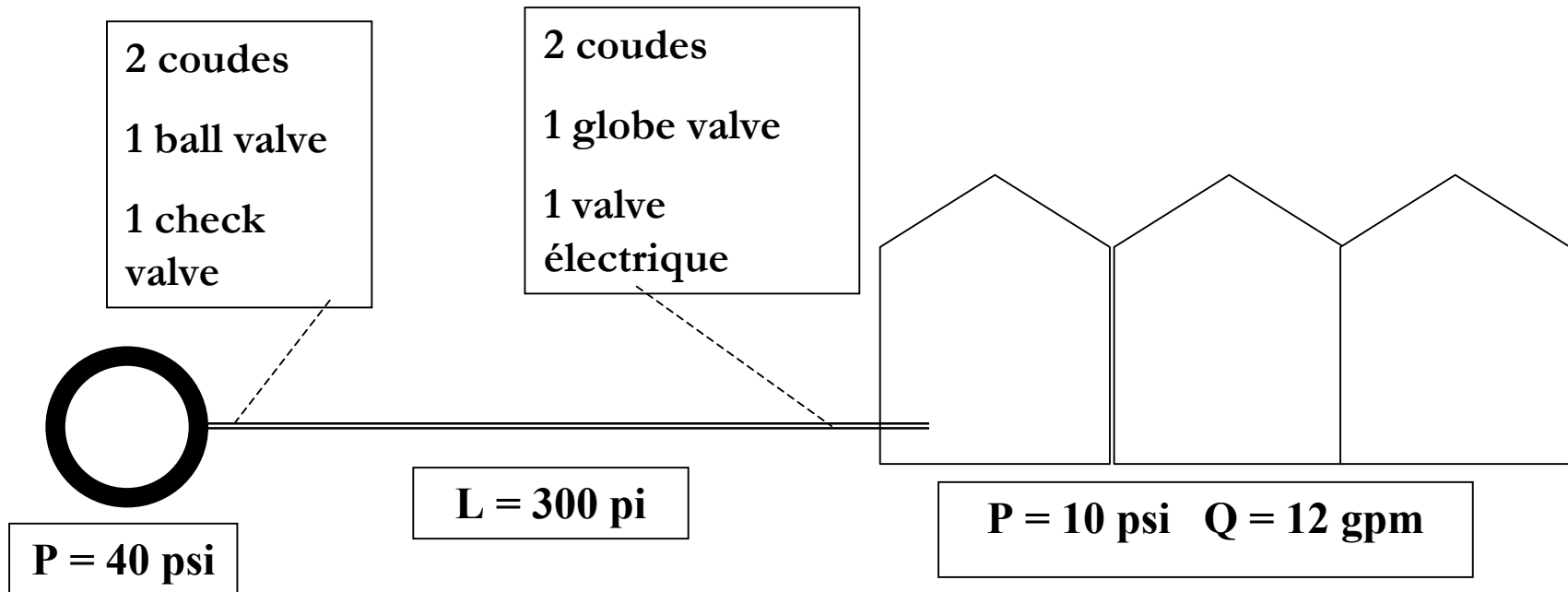


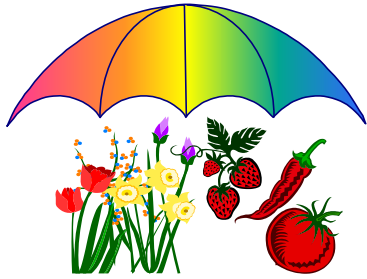
PERTE DE PRESSION

EXERCICE (2)

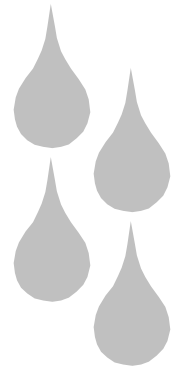


Quelle sera la pression d'arrivée?

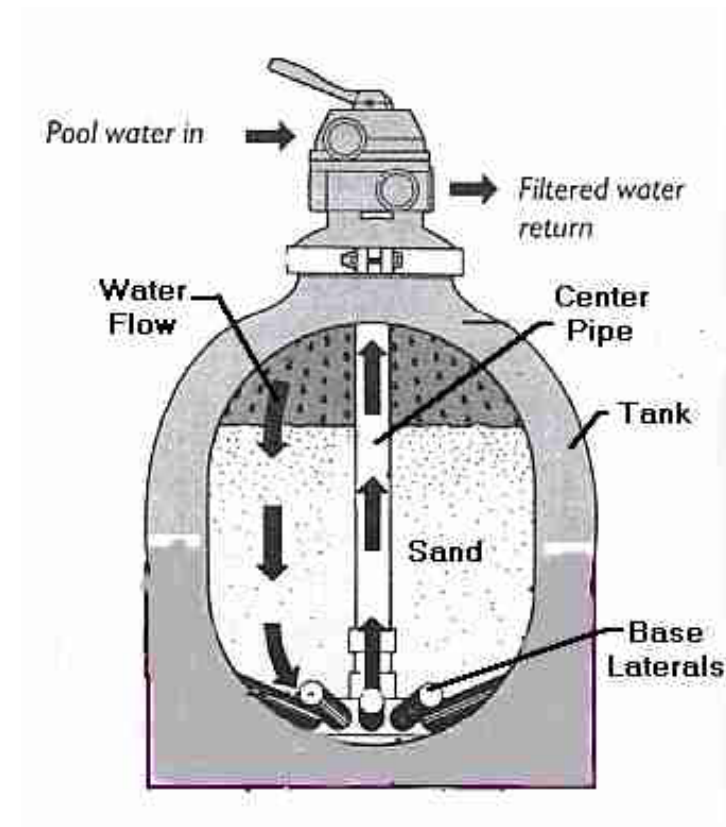


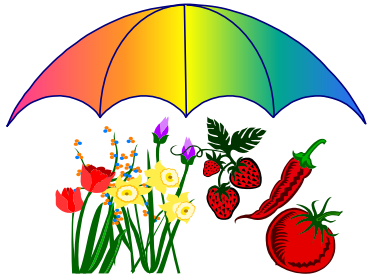


PERTE DE PRESSION FILTRE AU SABLE

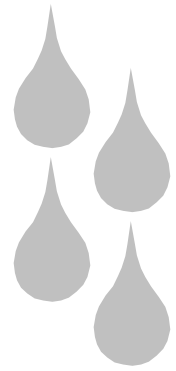


- Grande surface
- Choix de la qualité de filtration selon la dimension du sable
- Perte de charge fixe



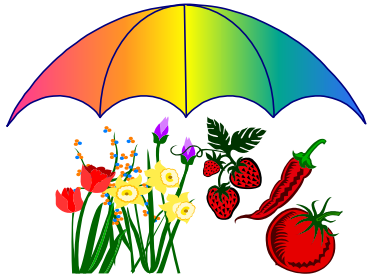


PERTE DE PRESSION FILTRES



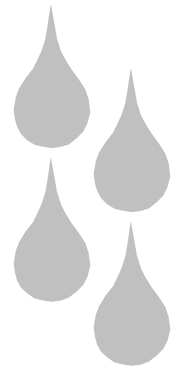
- À tamis
- À disque
- À cartouche
 - perte de pression proportionnelle au débit



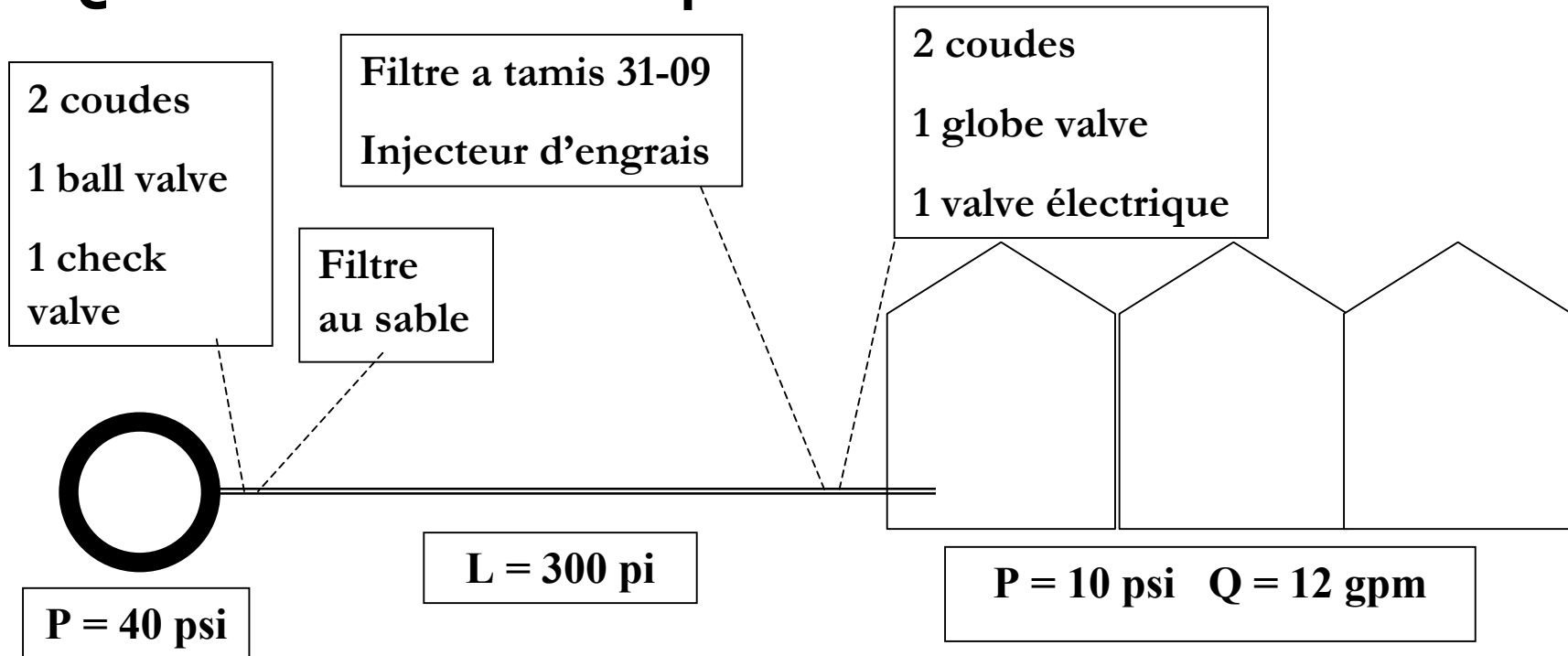


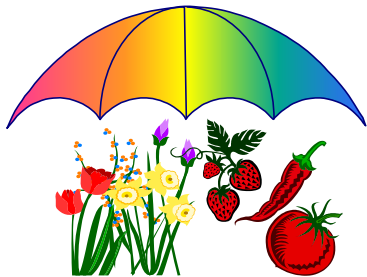
PERTE DE PRESSION

EXERCICE (3)



Quelle sera la pression d'arrivée?





C'EST FINI

