TECHNICAL DATA: SAFETY GUIDE
高壓管技術資料：高壓管選用方法

高壓膠管在自動化與省力化過程中，擔負著輸送動力的重要角色，是油壓設備的血管動脈！

1.

SELECTING HOSE SIZE BY FLOW CAPACITY

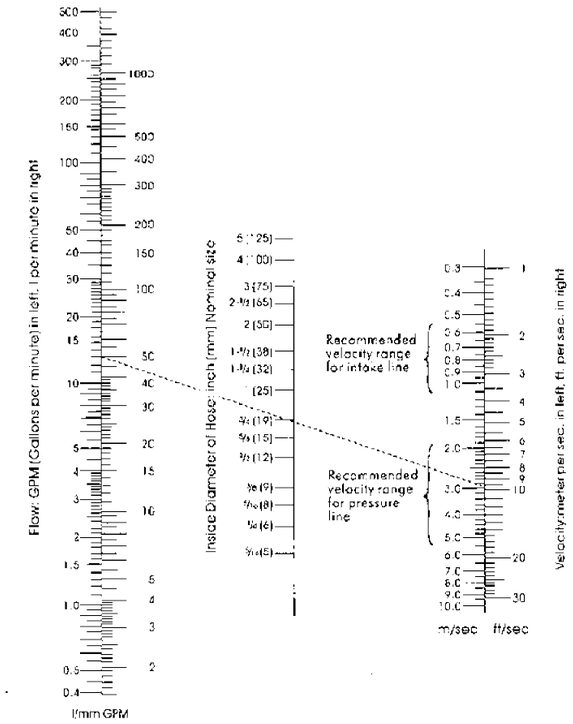
This chart is designed as an aid in selecting the correct hose size. The hydraulic fluid velocity must be maintained within the range recommended on the right column below. Higher velocities in pressure lines will result in excessive heating, turbulence and a loss in pressure Maintaining intake lime velocity within the recommended limits is necessary for efficient pump operation.

1. 配合流量需求選擇膠管口（內）徑
流量大小取決於膠管的內徑。如選用口徑過小時，則會因流速變快，增加了流體磨擦機會，造成壓力下降或流體過熱等不良狀況，應避免之。因此在設計時，其最快流速應以不超過6m/sec 為限。從附表中，我們可以很方便的得知所需要的膠管口徑。例：當壓力管線的流速為 3m/sec，而必要的流量為 50L/min 時，在對照可得 3/4”(19mm) 的膠管尺寸口徑。

Formula:

$$\text{Area (Sq.in.)} = \frac{0.321 \times \text{flow(GPM)}}{\text{Velocity(ft./sce.)}} \qquad \left(\text{Area (Sq.cm.)} = \frac{\text{flow(L/min.)}}{\text{Velocity(m/sce.)} \times 60} \times 10 \right)$$

Recommendations are for oils having a max. Viscosity of 68 CST at 100 ℉ (38 ℃) operating of temperatures between 65 ℉ (20 ℃) and 155 ℉ (70 ℃).



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因此，高手如何發揮油壓設備特徵，取決於正確的選用高壓膠管。

2.

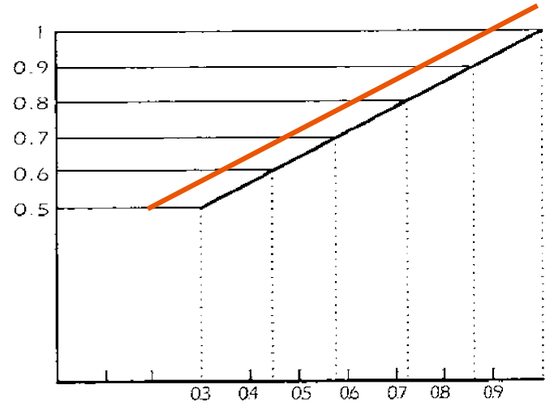
WORKING PRESSURE (W.P.) & BEND RADIUS

Recommend min. Bend radius is based on max. Working pressure (w.P.) With no flexing of hose. The graph below shows the variation in W.P. When hose is used by various degrees of bend. When hose bend radius at use is smaller than recommended, hose W.P. Limits are reduced.

2. 膠管之彎曲半徑與多方向扭轉之限制
我們在按裝膠管時，如過度的彎折將會改變膠管補強線材之角度，在使用時，將影響到其持續耐壓能力，尤其是當彎曲角度過小時，或扭轉多方向則更凸顯耐壓下降程度，因此按裝配管設計時，應依產品目錄上的最小彎曲半徑 (B.R.) 以上的範圍來使用並應極力避免扭轉成多方向使用，如使用上仍無法避免時，則應多運用轉向接頭配合使用。

Bend Radius at Use

Recommended Min Bend Radius



Working Pressure at Use

Recommended Max. Working Pressure

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3.

W.P. AND SERVICE LIFE OF HYDRAULIC HOSE

Hydraulic hose is constructed with wire reinforcement and the tensile strength wire is limited. Therefore, if the hose is used within tensile strength of wire, the service life of hose will be normal or longer. The chart below shows the relation between the service life of hydraulic hose and the working pressure (W.P.) At use. If the hose is used at the W.P. Recommended in the graph the service life of hose will be 100%, but if the hose is used at 150% of the recommended W.P., The service life of hose will be decreased to one third.

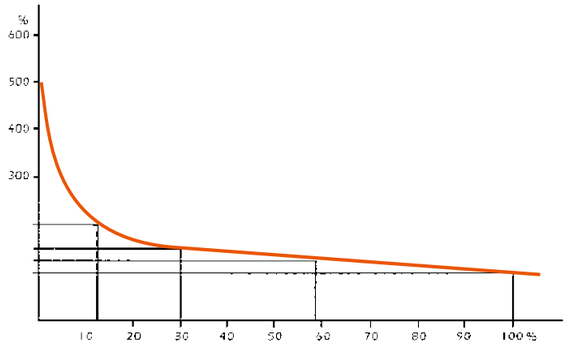
3. 選用前瞭解高壓管之耐壓程度
通常，高壓管以靜態壓力來表示耐壓程度 (W.P.)，但實際作業上，則是隨回路開關反覆升降壓之動態作業為主，所以我們應瞭解各膠管之耐衝擊或耐疲勞、耐久之特性，做為設備之油壓配管依據。

市面上的高壓膠管可分為壓力別及構造別等兩大類，日本 JIS 規格為壓力別之代表，即大小口徑均設計成同一工作壓力，以工作壓力來選用，如大小口徑同為 350K 之類，並需通過工作壓力 (W.P.) 133% 之矩形脈衝波 40 萬回的測試。

而構造別的高壓管則以美國的 SAE100 系列為代表，如 R1 為一層，R2 為二層等依構造來區分耐壓能力。R1 需通過 100% 或 125% 矩形波之耐衝擊測試 15 萬回，R2 則為 W.P.x133% 矩形波之耐衝擊 20 萬回之測試，因此，使用動態壓力如超過此測試範圍時，應考慮更高一級之耐高壓膠管產品，近年，ISO 18752 建立新的工作壓力別高壓管系統，將成為全球統一規範。

Working Pressure at Use

Recommended Max. Working Pressure



Ratio of the Service Life of Hydraulic Hose

4.

TEMPERATURE AND RADIANT HEAT

Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the hose, Care must be taken when routing hose near hot objects such as manifolds. Hose can be treated to destruction without contact by such nearby items as hot manifolds or by molten metal. This can occur despite the presence of cool air around the hose.

4. 注意使用溫度條件之限制
一般而言，高壓管的橡膠材質會隨溫度的上升而加速老化，低溫時則會增加剛性如變硬、變直、或容易斷裂，因此一定要依產品目錄上之使用溫度範圍內使用，如周圍環境溫度真的很高，或有輻射熱時，應適時以冷空氣對膠管降溫。

5.

EXTERNAL DAMAGE

Proper installation is not complete without insur ing that tensi le loads, side loads, kinking, flattening, potential abrasion, thread damage, or damage to sealing surfaces are corrected or eliminated.

5. 使用前確認，避免外力不當的損傷
高壓管按裝時，要確認避免膠管之不正常拉伸、荷重、扭結、擠壓、磨損、及接頭之牙與止洩面之損傷。

6.

STORAGE

Proper storage of rubber hose is important to avoid deterioration of the hose as rubber products can be adversely affected by temperature, humidty, ozone, sunlight, oils, solvents, etc., The best storage temperature is from 50°F (10 °C) to 100°F (37.8 °C) being the maximum limit. Hose in coils or bales should be stored in a horizontal plane avoid excess weight on one certain point of the hose.

6. 適當的膠管庫存保管法
膠管及夾合管之庫存保管方法如下說明：
(A) **適當的外包裝**：避免灰塵、蟲等進入膠管內。
(B) **適當的防鏽處理**：已經附有金屬夾接頭膠管需要長期保管時，則應以防鏽油 / 紙等保護金屬接頭。
(C) **適當的保管場所**：選擇無陽光直射，無有害氣體，溫度在 +10 ℃ ~ +38 ℃之間，空氣乾燥的環境，並應避免沾付到油或藥品等。
(D) **適當儲存狀況**：以不損傷膠管，金屬接頭為原則，筆直擺放，或以最小彎曲半徑範圍以上為卷取內徑捆綁，上方不放置重物為原則，疊放時，較重者應放置於下層。

7.

DANGER

Failure or improper selection or improper use of hose, fittings, or related accessories can cause death, personal injury and property damage.

7. 警告
錯誤或不適當的選擇或使用膠管，接頭及相關附屬零件，可能會造成人員的傷亡或財務損失