

CG-050M

小型填縫灌漿機

操作維修手冊及零件表



備註：本手冊以英文為主，中文為輔

譯自揮王企業股份有限公司



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CG-050M 手動灌漿泵



CG-050M 是一種方便攜帶式，撬裝，手操作灌漿泵，重量輕的鋁合金設計，使這個灌漿泵適合小的工作，這單元具有 5 加侖料斗和活塞泵，該控制料斗直接地連接到泵的吸力作連續操作，此灌漿泵是 2" 正排量手動脈動活塞泵，拆卸該系統無需任何工具，可作快速和有效地清潔，泵為完整的設備並附有免費的 12.5 英尺水泥漿管和一套備用活塞杯。

應用包括：海洋/水下、門框、窗框、中空金屬填充、預製、機械基礎、在密封、扁鋼胚灌漿和很好的裝箱。

規格

型號#	活塞泵模式	動力	漏斗	最大/輸出	最大/壓力
CG-050M	2" 柱塞泵	手動	5 加侖	2-3GPM 的	200PSI (14 巴)

型號	描述/要求	尺寸	重量
CG-050M	滑移式灌漿泵-需要手動操作	44" 長 x 11" 寬 x 31" 高	52 磅
CGHANDMIXER	手提混合器 (1 匹, 110 伏特電桶攪拌機)	18" 長 x 9" 寬 x 38" 高	12 磅

適用配件可與 CG-050M

			
噴漿膠管	機械表面槌	驅動槌	手提混合器



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CG-050M Manual Grout Pump



CG-050M Shown
[Click Here To View Literature](#)

The model CG-050M is a portable, skid mounted, **hand operated** grout pump. The lightweight aluminum design makes this grout pump perfect for smaller jobs. This unit features a 5 gallon holding hopper and a piston pump. The holding hopper is connected directly to the suction of the pump for a continuous pumping operation. The grout pump is a 2" positive displacement manually powered pulsating piston pump. The system disassembles without any tools for a fast and efficient cleaning. The pump comes complete and ready to use with a free 12.5 foot grout hose and a set of spare piston cups.




Applications include: marine/underwater, door frames, window frames, hollow metal filling, precast, machine base, under sealing, slab raising, and well encasements.

Specifications

Model #	Piston Pump Model	Power	Hopper	Max. Output	Max. Pressure
CG050M	2" Piston Pump	Manual	5 gallon	2-3 GPM	200 PSI (14 Bar)

Model Number	Description / Requirements	Dimensions	Weight
CG050M	Skid Mounted Grout Pump - Requires Manual Power	44" L X 11" W X 31" H	52 lbs.
CGHANDMIXER	Hand Grout Mixer (1 HP, 110V Electric Pail Mixer)	18" L X 9" W X 38" H	12 lbs.

Common Accessories Available with the CG050M

			
Grout Hose	Mechanical Surface Packer	Drive Packer	Hand Mixer



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保 固 說 明

本公司保證設備在材質、作業或零件等是無瑕疵的。

保固期間只限於從購買到公司義務的延長是 90 天，而且只限於確認缺失的零件的更換，不可要求超過零件更換經過認可的價值。

特別不包括從混合和水泥漿的壓縮所造成正常磨耗或不正常使用所導致的設備損壞。

安 全

各種防護罩、防護、柵欄或和網，必需提供在移動零件上，諸如滑輪、聯軸器、旋轉軸、踏板、皮帶等，用來防護操作人員因設備運轉而受傷。

提供警告標識來提醒操作者潛在的危險。

責 任

在移去保護罩、防護套或忽略警告標語及缺乏一般常識和步驟等，直接或近似的結果，而引起個人傷害或財物損失。

本公司將解除任何產品責任可以被理解和同意的。



WARRANTY STATEMENT

Warrants that equipment shall be free from defects in material, workmanship or components.

The period of this warranty shall be limited to 90 days from the date of purchase and the extent of liability shall be limited to replacement of components that have been proven faulty. No claims in excess of component replacement value will be recognized.

Specifically excluded from this warranty is normal wear resulting from the mixing and pumping of abrasive slurries or damage to the equipment as a result of improper use.

SAFETY

Various guards, shields, grates and screens are provided over moving parts, such as: sheaves, couplings, augers, paddles, belts, etc. to guard against injury to operators while the equipment is in operations.

Warning stickers are provided to remind operators of the potential hazards.

Operators are advised to utilize appropriate personal safety equipment including, but not limited to, safety glasses or goggles, dust masks or respirators, gloves and / or rain gear and hard hats when operating this equipment.

LIABILITY

It is understood and agreed that is relieved of any and all liability that may arise from personal injury or damage to property as a direct or proximate result of the removal of protective guards, shields, etc., the ignoring of warning signs and the lack of common sense procedures.



安全數據

在操作機器前請詳讀和注意下列重要的安全條款。

通知

適當個人保護設備，包括但不限於：防塵罩或呼吸器、手套、硬帽、鞋子、雨具等操作設備時必需穿上。

通知

遵循材料製造商的指示，作適當材料的使用和建議的安全裝備和步驟。

警告

不可將手或工具在攪拌器或泵內，除非電源已關閉和切斷而動能已消失在電氣設備上，需適當鎖住/標示步驟，沒注意此警告可能導致嚴重人員傷亡或機器受損。

警告

在任何泵的配件洩放系統，當泵操作時或洩放系統有壓力時，永不可企圖來分開或打開聯軸器。

警告

所有電器連線必需由合格電氣人員來完成。

警告

油壓零件包括，但不只限於閥接頭、管子、馬達、油壓桶，過濾器也許是熱的，為了防止受傷，必需由提供把手來處理，在作維修前需讓油壓零件冷卻。



SAFETY DATA

PLEASE READ AND HEED THE FOLLOWING IMPORTANT SAFETY NOTICES BEFORE PLACING MACHINE IN SERVICE.

******* NOTICE *******

PROPER PERSONAL PROTECTIVE EQUIPMENT, INCLUDING, BUT NOT LIMITED TO: GOGGLES, DUST MASKS OR RESPIRATORS, GLOVES, HARD HAT, BOOTS AND RAINGEAR MUST BE WORN WHEN OPERATING THIS EQUIPMENT.

******* NOTICE *******

FOLLOW MATERIAL MANUFACTURER'S INSTRUCTIONS FOR PROPER MATERIAL USE AND RECOMMENDATIONS FOR SAFETY EQUIPMENT AND PROCEDURES.

******* WARNING *******

NEVER PUT HANDS OR TOOLS IN MIXERS OR PUMP UNLESS PRIMARY POWER SOURCE IS SHUT OFF AND DISCONNECTED AND KINETIC ENERGY DISSIPATED. ON ELECTRICALLY POWERED EQUIPMENT, USE PROPER LOCK OUT/TAG OUT PROCEDURES. FAILURE TO OBSERVE THIS WARNING COULD RESULT IN SERIOUS PERSONAL INJURY AND/OR DAMAGE TO THE MACHINE.

******* WARNING *******

NEVER ATTEMPT TO DISCONNECT OR OPEN THE COUPLING ON ANY PART OF THE PUMP DISCHARGE SYSTEM WHILE PUMP IS IN OPERATION, OR IF THE DISCHARGE SYSTEM IS UNDER PRESSURE FOR ANY REASON.

******* WARNING *******

NEVER OPERATE MACHINE WITHOUT THE VARIOUS GUARDS, SHIELDS AND OTHER SAFETY EQUIPMENT WITH WHICH THE MACHINE WAS ORIGINALLY EQUIPPED IN PLACE AND FUNCTIONAL.

******* WARNING *******

ALL ELECTRICAL CONNECTIONS MUST BE MADE BY A QUALIFIED ELECTRICIAN.

******* WARNING *******

HYDRAULIC COMPONENTS, INCLUDING, BUT NOT LIMITED TO VALVES, FITTINGS, HOSES, MOTORS, RESERVOIR AND FILTERS MAY BE HOT. TO PREVENT INJURY, TOUCH ONLY THE HANDLES PROVIDED. LET THE HYDRAULIC COMPONENTS COOL BEFORE SERVICING THE EQUIPMENT.

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CG-050M 填縫隙用手動灌漿泵操作及維修手冊和零件表

內容 :Table Of Contents

章節 Section	主旨
1	操作說明8~9
2	服務指導10~11
3	修護零件圖12~13
4	填縫漿的建議14~15

TABLE OF CONTENTS

SECTION	SUBJECT
1.	OPERATING INSTRUCTIONS
2.	SERVICE GUIDE
3.	REPAIR PARTS DIAGRAM
4.	GROUT SUGGESTIONS



型號：CG-050M 填縫用手動灌漿泵

1. 操作說明

連接噴漿線到(1)號，把1加侖水加入漏斗(5)，藉著泵把水泵出來檢查泵是否適當操作(請看下列備註事項)，用手把水管放水並拔出水管，把泵吊起並使水流出，再連接噴漿管。

備註：它必需提高水管洩放尾端，此步驟用來防止水從泵經過球閥漏出。

清潔

把水倒入漏斗(5)並用泵把水洩放清除，停止泵並拆開所有接頭(3)，清洗和清潔泵，夾子和墊片再組合起來。

重要事項：

一些預先混合填縫隙用的水泥漿是不能泵的，含粒狀的漿必需是很好的分級，最大顆粒尺寸泥狀 3/16” (0.5 公分)，此填縫漿混合液不可太濕，請看填縫漿混合建議章節。



MODEL CG-050M GROUT PUMP

Operation

Connect grout line to (1). Pour 1 gallon water in hopper (5). Check pump for proper operation by pumping out water. (See note below) Disconnect and manually drain hose. Lift rear of pump and drain out water. Reconnect grout hose.

NOTE:

It may be necessary to elevate the discharge end of the hose during this procedure to prevent water leaking from the pump through the ball valves.

Cleanup

Pour water into (5) and pump until discharge is clear. Stop pumping, disconnect all couplings (3), disassemble, wash and clean pump, clamps and gaskets. Re-assemble.

Important Notices

Some pre-blended grouts are not pumpable. Granular particles in grout must be well graded. Maximum particle size in slurry 3/16" (.5 cm.). Grout mix must not be too wet. See section on grout mix recommendations.



2. 服務指導

<u>問題</u>	<u>可能原因</u>	<u>解決方法</u>
泵水 OK 但無法將 填縫漿打出	填縫漿太”濃” 無法進入泵室內 砂石太大, 防止 球閥就卡住 膠管內砂石止塞	加水到填縫漿上混合 但需小心不可稀釋太多, 會造成砂石的分離 變換小的顆料石頭或 篩去較大顆粒 ◎在泵漿前, 從洩放管排出殘留水 ◎砂石適當分級 ◎改變砂石大小
	噴漿材已超過內部 磨擦的效益	一些預先混合噴漿材是不可用泵打出的, 請看 灌注建議章節

<u>問題</u>	<u>可能原因</u>	<u>解決方法</u>
在卸放衝程時 泵失速	泵卸放或膠管止塞 釋放閥(6) 不適當的安裝	拆開卸放膠管檢查 Pump 清潔膠管 移開夾子(3)拆開 泵之卸放尾端和檢 查閥(6)並作適當安 裝, 止擋球應指向 出口

泵運轉但打 不出來	漿未入泵室內 進入口(漏斗)閥 不適當安裝	漿太濃或漏斗止塞 檢查進入閥(6)作適 當的安裝, 止擋球 指向出口, 閥應安 裝在 Tee(7)洩放閥
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SERVICE GUIDE

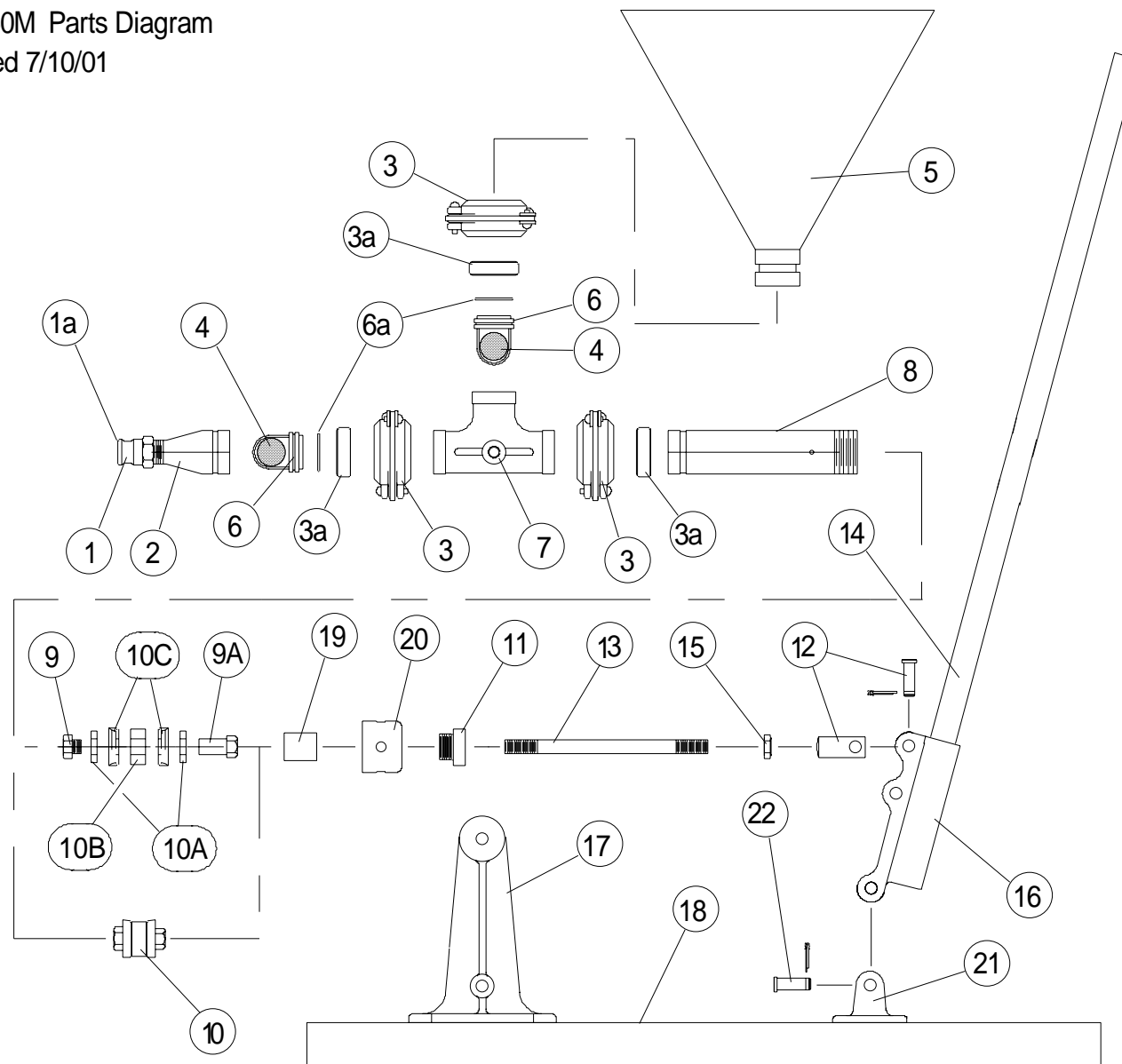
PROBLEM	PROBABLE CAUSE	SOLUTION
Pumps water O.K., will not pump grout.	Grout mix too "thick", does not enter pump chamber	Add water to grout mix, but be careful not to dilute mix so much cause aggregate to segregate.
	Aggregate too large, prevents ball from seating.	Change to smaller aggregate, or screen out larger particles.
	Aggregate segregations in discharge hose.	Drain residual water from discharge hose prior to pumping grout.
		Aggregate improperly graded; change aggregate.
	Grout material has excessive coefficient of internal friction.	Some premixed grout materials are not pumpable. See section on grout mix recommendations.
Pump stalls on discharge stroke.	Pump discharge or hose plugged with grout.	Disconnect discharge hose, check pump, clean out hose.
	Discharge valve (6) improperly installed.	Remove clamp (3), disassemble discharge end of pump and check valve (6) for proper installation. Ball retainer should point downstream.
Pump runs but does not discharge.	Grout not entering pump chamber.	Grout too "thick" or obstruction in hopper.
	Inlet (hopper) valve incorrectly installed.	Check inlet valve (6) for proper installation; ball retainer should point downstream and valve should be installed on discharge side of Tee (7)



3. 修護零件圖

CG-050M Parts Diagram

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050
MREPAIR PARTS LIST

NO.	PART NO.	DESCRIPTION
1	33EV1ABR	1" Part A Evertite
1A	33EV1GASKET	1" Evertite Gasket
2	21050REDUCER	Reducer
3	542VICT#78	Coupling <i>(includes gasket)</i>
3A	542VICTGASK	Coupling Gasket
4	21050BALL	Ball
5	21550PHOPP	Hopper <i>(80 deg.)</i>
6	21050BALLSEAT	Ball Seat <i>(o-ring included)</i>
6A	21050RING	Ball Seat O-Ring
7	21050MTEE	Tee
8	21050SLEEVE	Sleeve
9	243/4-10X3/4BOLT	Piston Bolt <i>(thread protector)</i>
9A	243/4X10CPLGNUT	Machine Rod Coupling
10	07050PIST	CG050 Piston Assy <i>(includes 9 thru 10C)</i>
10A	21050PISTBP	Backer Plate
10B	21050PISTSP	Spacer Plate
10C	21050PISTCUP	CG050 Piston Cup <i>(2 req'd per unit)</i>
11	213/4RODBUSH	Plastic Rod Bushing
12	06345	Clevis <i>(with pin & cotter)</i>
13	21050MROD	Rod
14	21050MHANDLE	Handle
15	243/4X10JAMNUT	Clevis Lock Nut
16	21050MSCKT	Handle Socket
17	21050MBKT	Tee support Bracket
18	21050BASE	Aluminum Base
19	213/4PVCX11/2	Rod Stop
20	21050ALCAP	Sleeve Coupling
21	21050MPVT	Pivot Bracket with Pin
22	24050MPIN	Clevis Pin with Cotter

**** Complete sets of warning labels are available upon request**



4. 填縫漿的建議

關於噴漿混合物的秘方

任何可泵送噴漿混合物最少需有 3 種特性。

1. 光滑，表現似乳酪般的均勻。
2. 顏色必須水泥色，一般是灰色。
3. 應剛好的濕度足以傾倒出來。

當使用砂漿混合物，必需考慮幾種因素，如形狀尺寸大小和使用砂的等級，更大數量的良好分級，圓形狀砂料可用於混合比程度低等級或有相當多平、尖銳或角顆粒。

關於等級，下面篩分析可提供了各類砂可用砂的範例。

篩尺寸	% 合格
#8	100
#16	90-100
#30	55-80
#50	30-55
#100	10-30
#200	0-10

砂比較圖，提供作為參考用

攪拌程序

加入約 80% 水預計為一批被混合，並與混合器運轉，慢慢添加所需水泥量，足夠時間讓泥漿混合到如奶油狀的均勻，慢慢地加砂直到混合開始失去水泥的顏色這應該是沙的可容納組合的最高限額，在以後批次可能有必要加略少的沙，水是調整相對濕度和沙乾度來產生可澆注的灌漿。



TIPS REGARDING GROUT MIXES

Any pumpable grout mix must have at least three characteristics:

1. A smooth, creamy appearance.
2. Must be the color of the cement used (usually gray).
3. Should be just wet enough to be pourable.

When using sanded grout mixes, several factors must be considered such as the shape, size and gradation of the sand to be used. Larger amounts of well graded and round shaped sand particles may be used in the mix as opposed to a sand which is poorly graded or has a significant number of flat, sharp or angular particles.

In terms of gradation, the following sieve analysis is offered as an example of a good, pumpable sand:

Sieve Size	% Passing
#8	100
#16	90-100
#30	55-80
#50	30-55
#100	10-30
#200	0-10

A sand comparison chart has been provided for fast reference.

Mixing Procedure:

Load approximately 80% of the water anticipated for the size batch to be mixed and with the mixer running, slowly add the required amount of cement. Allowing sufficient time for the slurry to mix to a creamy consistency, slowly add sand until the mix just begins to lose the cement color. This should be the maximum amount of sand the mix can accommodate and it may be necessary to use slightly less sand for subsequent batches. The water may be adjusted for the relative wetness or dryness of the sand to produce a grout that is just pourable.



建議混合

混合 A	1 ~ 94LBS	袋水泥
	1-1/2 ~ 2 立方呎	細磚砂
	5-1/2 ~ 6 加侖	水

偶而適當分級砂是不可行的，細小砂會懸浮在液中，就得使用混合 B

混合 B	1 ~ 94LBS	袋水泥
	1 ~ 75LBS	粉煤灰
	2-1/2 ~ 3 立方呎	細砂
	11 ~ 12 加侖	水

預混料灌漿材料

許多建材製造商預先混合波特蘭水泥基灌漿，其中一些可泵送而有些則不能泵送，不可泵送的混合料，通常包括太粗的砂或太少的水泥或兩者，在試圖泵出預混合灌漿材料，要先確定材料是包含上述標準，而且也需要決定材料是否有一個很短的工作時間來完成，藉著某種預先混合，因為沒有足夠的時間來泵，當泵送任何水泥基灌漿材之前，是一個好辦法，把第一層泵和管路先行如前所述混合，通常泵送不能進行很好時，加表面層到線路只是用水而已。



Suggested Mixes:

Mix A:	1-94 lb.	- Bag Cement
	1-1/2 to 2 C.F.	- Fine Masonry Sand
	5-1/2 to 6 Gallons	- Water

Occasionally, properly graded sand is not available and more fines are required to "carry" the sand in suspension; when that is the case, the following mix is suggested.

Mix B:	1-94 lb.	- Bag Cement
	1-75 lb.	- Bag Fly ash
	2-1/2 to 3 C.F.	- Fine Sand
	11 to 12 Gallons	- Water

Premix Grouts:

Many building material suppliers manufacture pre-blended portland cement based grouts, some of which are pumpable and many of which are **not** pumpable.

The non-pumpable mixes usually contain too coarse of sand or too little cement or both.

Before attempting to pump and pre-blended grout material, determine whether the material conforms to the criteria described above. It is also necessary to determine that the material does not have a short working time before set by virtue of certain admixtures, since there may be insufficient time to pump.

When pumping any cement-based grout mix, it is good practice to first coat the pump and lines with a slurry mix prior to pumping the grout mix. Coating the lines only with water before pumping usually does not work well.



灌漿攪拌和泵送建議

注意：

這裡的建議是為了提供一個援助，來幫助操作者找出一些需要考慮到在混合和泵送水泥灌漿的因素。因為各種各樣的材料可用於許多不同的應用，有責任的操作者需熟悉他打算利用具體特點的材料。

材料

其中商業製造材料可在今天的市場找到是結構性的維修材料，地板澆頭，強度高無收縮灌漿，沙孔和下水道內襯水泥漿和其他特殊材料。這些材料的每一種有其獨特的特點，必須很好地理解以確保成功使用。

流動性

一般來說，大多數材料需要一個可流動的或可澆注均勻成功泵出。這意味著，如果材料可以澆注出 1 桶或鐵斗，它可能還可以抽出。該需求的例外是修補砂漿，而往往是在濃厚而混合一致和需要特殊的泵出技術。材料中包含最佳和泵出效果最好的均勻濃度保持在較低的範圍澆注，也就是說，不會太潮濕。

凝結時間

有些材料含有加速外加劑，以減少凝結時間。這尤其是修理用的灰泥和其他噴塗材料，使強度增加可以較快。重要的是要使用這些類型的材料繼續前進澆注，。一旦材料混合，必須立即泵出並保持泵繼續移動而且必須能和隨後的批次混在一起和盡快泵出。使用過程中任何延遲，可能會導致阻塞軟管和設備。溫度也會對這些材料產生一定程度的影響，在一個炎熱天氣軟管暴露在太陽下將加快凝結的時間，因此應該避免這種情況。它甚至有可能需要在某些情況下冷卻材料，和水混合，甚至軟管本身冷卻。

泵送距離

泵送距離應始終保持在最短，不管使用的材料和軟管應盡可能筆直。有時情況需要比平常軟管長度還長，當發生這種情況，應該盡一切努力並利用一切可能的優勢，以確保成功使用。有些材料根本不能泵出過長的距離，因此，在企圖做一個生產程序前，最好了解建議的材料特性。



MIXING AND PUMPING SUGGESTIONS

NOTE

The suggestions offered herein are intended as an aid to help the operator identify some of the factors that need to be taken into consideration when mixing and pumping cementitious grouts. Because a wide variety of materials are available for many different applications, it is incumbent upon the operator to become familiar with the specific characteristics of the material he intends to use.

MATERIALS

Among the commercially manufactured materials available in today's market are materials for structural repairs, floor toppings, high strength non-shrink grouts, manhole and sewer lining mortars and other specialty materials. Each of these materials has unique characteristics, which must be well understood to insure a successful application.

FLOW

In general, most materials need to be of a flowable or pourable consistency for successful pumping. This means that if the material can be poured out of a pail or bucket, it can likely be pumped. The exception to this requirement is repair mortars, which tend to be mixed in a thicker consistency and require special pumping techniques. Materials that contain aggregates pump best and perform best when the consistency is kept to the lower range of pourable; that is, not too wet.

SETTING TIME

Some materials contain accelerating admixtures to reduce the setting time. This is particularly true of repair mortars and other spray applied materials so that strength gain can be fairly rapid. It is important to keep moving when using these types of materials. Once the material is mixed, it must be pumped immediately and kept in motion and subsequent batches must be mixed and pumped as rapidly as possible. Any delays in the application process could result in plugged hoses and equipment. Temperature also has an effect upon these materials to the extent that exposure of the hose to the sun on a hot day will accelerate the set time even more; therefore this should be avoided. It may even be necessary in some cases to cool the material, the mix water, or even the hose itself.

PUMPING DISTANCE

Pumping distances should always be kept to a minimum, and hoses should run as straight as possible no matter what material is being used. Sometimes circumstances require longer than usual hose lengths; when this occurs, every effort should be made to use every advantage possible to insure a successful application. Some materials simply cannot be pumped for long distances, so it's best to know the proposed material characteristics before attempting a production procedure.



一般程序

在試圖混合和泵生產原料之前，用足夠的水徹底沖洗沖洗料斗和卸放泵斗和所有灌漿線，是明智的動作。這是為了清除灌漿系統的任何殘餘物料或可能存在的殘餘物。一旦這項工作完成後，從泵拆開灌漿軟管和藉着提高水管的一端洩放，或逐步提升整條軟管，從一端開始，進而在其他。

接下來，泥漿混合組成的波特蘭水泥在近似比例的 6-1/2 至 7-1/2 加侖的水和一包(94 磅)水泥，和該泵通過灌漿系統。這是為了消除任何含殘留水軟管，潤滑它作為生產材料跟進。現在的生產灌漿可以混合使用，在混合後並立即抽漿，因此，從軟管清除，並可能回收到桶。不要試圖通過泵生產材料經過乾的膠管。

最後，最後一個字關於的程序。有時，無論操作者多麼認真的可能軟管將會企塞。一旦發生這種情況，唯一的辦法移去止塞並清除材料。用錘子打擊它或使用車輪壓過通常不會成功。一個審慎的操作者將這種可能性作好準備通過讓即時提供足夠長的小口徑硬管，軟管或塑料管，他能夠迅速連接水源和沖洗灌漿的軟管。

“自製” 灌漿

有時候，商業準備灌漿沒有現成的，在這種情況下，可能要制訂和生產現場的材料。這可以做得相當成功，但一些基本原則必須得到遵守。

由此產生的材料應表現出以下特點：

1. 一個穩定的懸浮固體，在休息時不可分離。
2. 顏色必須是主要的水泥使用。
3. 流體足以從一個容器倒入，但不能太濕。（均勻厚糊狀） 水泥

有幾種類型的波特蘭水泥生產以滿足不同的具體要求，如早期強度高，耐硫酸和其他需要。最常見的是 I 型波特蘭，並認為這是最經常用於生產水泥灌漿。



GENERAL PROCEDURES

Before attempting to mix and pump production materials, it is prudent to rinse the mixer and charge the pump hopper with sufficient water to thoroughly flush the pump and all grout lines. This is to purge the grouting system of any residual materials or scale that may exist. Once that is completed, remove the grout hose from the pump and drain out all water by elevating one end, or by progressively elevating the entire hose, starting at one end and proceeding to the other.

Next, mix a slurry composed of portland cement in approximate proportions of 6-1/2 to 7-1/2 gallons of water to one bag (94 lbs.) of cement, and pump this through the grouting system. This is to remove any residual water from the hose, lubricating it for the production material to follow. Now the production grout may be mixed and pumped immediately behind the slurry mix, which is thus evacuated from the hose, and may be retrieved in a bucket. Do not attempt to pump production material through a dry hose.

Finally, one last word about procedures. Occasionally, no matter how conscientious an operator may be, a hose will get plugged. Once this happens, the only sure way to remove the plug is to empty it of material. Beating on it with a hammer or running over it with a vehicle will not usually be successful. A prudent operator will be prepared for such eventuality by having readily available a sufficient length of small diameter stiff tubing, hose or plastic pipe to which he can rapidly connect a water source and flush the grout from the hose.

ADDITIONAL SUGGESTIONS

“HOMEMADE” GROUT

Sometimes commercially prepared grouts are not readily available, and in these cases it may be necessary to formulate and produce the material on site. This can be done quite successfully, but certain basic principles must be observed.

The resultant material should exhibit the following characteristics:

A stable suspension of solids that does not separate while at rest.

Color must be predominantly that of the cement used.

Fluid enough to pour from a container but not too wet. (***Thick batter consistency or thicker***)

CEMENT

There are several types of Portland cements manufactured to satisfy a variety of specific requirements, such as high early strength, sulfate resistance and other needs. The most common of these is Type I Portland, and is that which is most frequently used in the production of cementitious grout.



水

在大多數情況下，將水用於生產灌漿應清潔和不含硫酸鹽或其他化學物質溶解。如果可用，可攜帶的水是理想。由於水對水泥比是最重要的因素，在質量的材料在其最後的狀態，含水量應保持在最低限度，將生產上述列出原料的特點。

外加劑

外加劑可修改和提高水泥漿的混合物。這些措施包括增塑劑，水還原劑，擴張劑，抗沖洗成分等。如果用了，他們應該只使用一個充分理解其影響，並只能根據生產商的建議。

粉煤灰

在一些地區國家，粉煤灰（1 種燃煤發電站的副產品）會產生。這種材料經常被用於提高性能的水泥灌漿或減少水泥在某些情況下的一小部分。使用這種材料，應謹慎從事，因為有些人已經觀察到火山灰會造成閃光系列灌漿混合物。如果使用該產品的，嘗試混合物應加以證明其適用性。

砂

如果預計用沙，幾個因素必須考慮，如形狀，大小和被使用沙粒度的沙子。在一般情況下，沙應清潔，很好的分級和圓形，自然形。如製造角顆粒砂，應當避免。更大數量的良好分級圓形狀砂粒，可用於混合比沙程度低等級或有相當多的單位，尖銳或角顆粒。混凝土砂通常不可泵送但磚石和石膏砂通常可泵送。在等級層次，下面的篩分析提供了一個範例各類砂可用：



WATER

In most instances, the water to be used for the production of grout should be clean and free of sulfates or other dissolved chemicals. If available, potable water is ideal. Since the water to cement ratio is the most important factor in the quality of the material in its final state, the water content should be kept to the minimum that will produce materials with the characteristics listed above.

ADMIXTURES

Admixtures are available to modify and enhance the grout mixture. These include plasticizers, water reducing agents, expansive agents, anti-washout ingredients, set time modifiers and others. Each of these admixtures are designed to impart specific properties to the grout. If used at all, they should be used only with a full understanding of their effects, and only according to the manufacturers' recommendations.

FLYASH

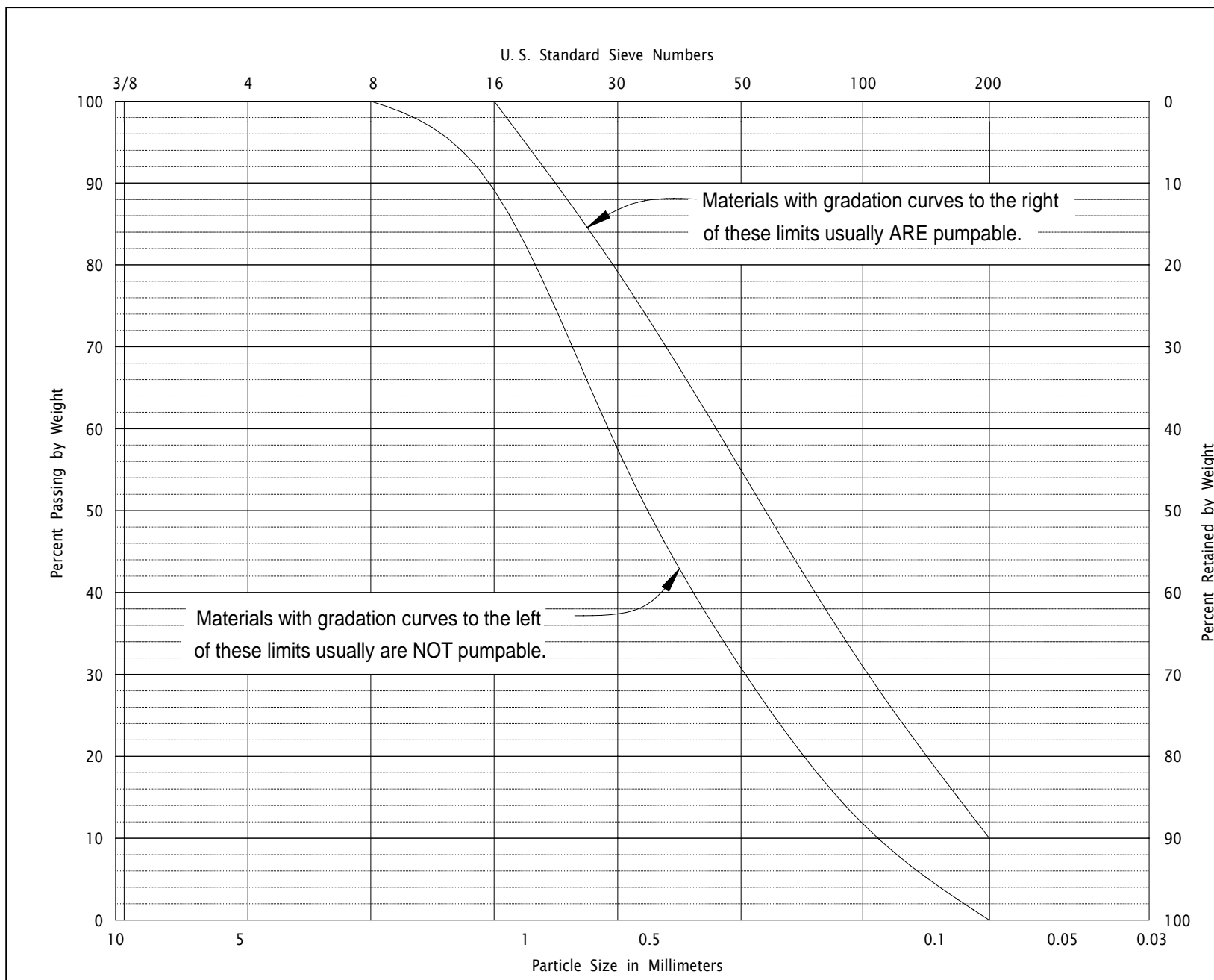
In some parts of the country, flyash (a byproduct of coal burning power stations) is available. This material has often been used to enhance the properties of cementitious grouts or, in some cases to reduce the cement fraction. Use of this material should be approached with CAUTION, since ash from some sources have, in recent years, been observed to cause FLASH SET in grout mixes. If the use of this product is anticipated, trial mixes should be made to prove their applicability.

SAND

Sand is often used in grout formulations either to increase the volume of the material, thus reducing the cost, or to act as an aggregate in the case of high-strength structural grouts. If the use of sand is anticipated, several factors must be considered such as the shape, size and gradation of the sand to be used. In general, the sand should be clean, well graded and of rounded, natural shape. Angular particles such as those found in manufactured sands should be avoided.

Of all of the considerations when anticipating the use of sand in a grout mixture intended to be pumped, one of the most important is gradation. Gradation of a sand sample is determined by a sieve analysis which reveals the percentages of each individual particle size of which the sand is composed. Laboratory tests and field experience shows that some sand gradations will pump better than others, and some will pump only with difficulty, if at all. Sample sieve analysis data is offered herein as a guide to choosing sand that has a good chance of producing a strong, pumpable grout mix.





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