

PREFORMANCE & ADVANTAGES



A. PEXGOL PIPE CASE STUDIES



B. COMPERATIVE ABRASION TESTS

C. TEST REPORT: PEXGOL in "HOT CRYSTALLIZATION" POTASH FACTORY



www.pexgol.com

Golan Plastic Products Ltd. Case Studies



Business Profile

Golan Develops Produces and Distributes advanced plastic pipe systems of crosslinked PE -**PEXGOL** pipes and **MULTYGOL-** multilayer pex pipes for various applications: Hot & Cold Water, Liquids, Slurries and Gas.

Golan is the largest plastic pipes manufacturer for the building section in Israel, since 1976. **Golan** is the sole Manufacturer of PEX pipes Large Diameters- 250-500 mm.

The production of **PEXGOL** pipes is supervised by International standard institutes and has the ISO-9001 certificate. The products are sold worldwide.

Golan Plastic Products has more than 40 years experience manufacturing plastic pipes using special production methods and high quality control.

Golan plastic pipe systems are distributed in the local and worldwide international markets

Golan employs 200 people, including 20 R&D staff. The R&D department consists of experienced engineers and skilled technicians.

Business Card

- Established in 1964.
- Public company, 70% owned by Kibbutz Shaar-Hagolan.
- Total Sales 2006: US\$ 51 Million.
- Total Sales 2007: US\$ 67 Million.
- 65% of the production is exported to Western and Eastern- Europe, Russia, North & South America, through distributors & partners
- Sole Manufacturer of 160mm up to 500mm Diameters.

International Markets

- Constant growth in Pex pipe use over HDPE and metal pipes.
- Export through Local distributors & strategic partnerships.
- 70% of Sales for underfloor & radiator heating systems.
- 2006 Export sales \$35 million.
- Export total sales in 2007 \$43 million.

GOLAN PLASTIC PRUDUCTS PEXGOL Case Studies



3	Project Highlights: 26 Kms of pipeline lay in rough terrain. Transported materials: industrial waste of Sulfuric Acid, Phosphoric Acid and Hydrochloric Acid.	
	Agent – Customer: Periclase. Dead Sea Works.Israel 1996	
	Project challenges: Transfer of industrial sewerage, 26 Kms, over rough terrain of different levels of up to 800 meters in difference in heights, causing the pipe to work partly as a siphon, partly high pressure pipe and partly as a channel.	
	The Solution: Pexgol pipe 280 and 315, class 12 over a distance of 26 kms. Supply to site in lengths between 80-120 meters. In use for more than 12 years. Using Pexogol pipes caused a cost saving of 35%. Recently it became necessary to change part of the course of the pipe range and it was dragged over a distance of about 2 kms and reconnected, continuing to operate in the new course.	
4	Project Highlights: Pipe system for BOREHOLES	
	Agent – Customer: Mekorot Israel national water company Israel since 1987 Aquas Argentina 2003 Regaber Spain 2003	
	Project challenges: High costs. Metal pipes corrode. Installation is slow and awkward. Installation time 3-4days WELLMASTER pipe is more expensive than Pex and can be installed only once.	
	The Solution: Pexgol pipes of class 15, 24 and 30 have been used in deep boreholes for 15 years. Installation time 3-4 hours. Deepest installation of pipe class 30 is 270 meters. 315 mm in one unit at a length of 70 meters without fittings. Quick installation. Pump may be withdrawn, and replaced easily. Annual saving -15,000 \$ per borehole.	

5	Project Highlights: Transportation of Thermo mineral water. Agent – Customer: Africa Israel Investments Group, Tiberias Thermo mineral springs Israel Since 1995	
	Project challenges: Mineral water at high temperature transferred by pressure from the hot springs to hotel. The water causes corrosion and leakages in standard fittings. Costs for maintenance are high. Replacement rate of metal pipes every 2.5 years.	
	The Solution: Pexgol pipe with electrofusion and mechanical fittings supply systems without failure. Operating over 12 years with no maintenance required.	
6	Project Highlights: Transportation fish food pellets in Marine cages	
	Agent – Customer: Alejandro Ossa, Kupfer Hnos. S.A. Chile 2006 Ardag Red Sea Mariculture Israel since 1997 Project challenges: In marine cages for the raising of salmon fishes, the pellets are compressed at high pressure and sent a distance of 300 meters. Salmon will not eat food pellets which are too small. Other types of pipe wears away the pellets, part is wasted and sinks to the ocean floor. Furthermore, the PE pipes suffer from abrasion and are replaced frequently. The Solution:	
	Pexgol pipe 90 mm, 300 meters length Transports compounds of fish food pellets to marine cages Pexgol pipe is the only type not to wear away the edges of the food pellets, making it possible to make use of the entire food. Annual saving 20%. The pipe is hardly affected by any abrasion, lasting 3-5 times longer then HDPE.	

7	Project Highlights: Pipes for Mines industry Agent – Customer: Alan Danczinger, Danappel copper mines industry Chile 2008	
	 Project challenges: 1. Open copper mine with extreme temperatures ranging from -20° to +40°c. High pressure and water hammer (impossible conditions for other type of pipes). 	
	2. A need to change positions, after a period of time, between the pipes of class 24 and class 15. The distance between the two pipes is 10 kms.	s and the state
	The Solution: Pexgol pipe diameter 110 mms class 15, each unit of 300 meters without connections.	
	The pipes were dragged a distance of 10 kms and were assembled again without any damage being caused by the dragging.	
8	Project Highlights: Dredging of salt slurries.	
	Agent – Customer: Oceana Advanced Industries Ltd, Taavura Holdings Ltd	
	Dead sea works Israel since 1990	
	Project challenges: Deepening of the salt pools by dredging and transporting the salt water, at a concentration of 30% from the barge to external pools, a distance of hundreds of meters by means of a floating pipe. A special polyethylene pipe from an American company was purchased but failed totally after 2 months.	
	The Solution: Pexgol pipe 400, 450 and 500 mms in lengths of 600 meters each carried the hard salt crystals and salted water to the pool.	
	After the salt water was pumped out, the pipes were taken to other pools for further use. These pipes are in use for more than 18 years.	

9	Project Highlights: Transportation of industrial wastes and acids. Agent – Customer: Moti Levi, ICL fertilizers, Rotem Amfert Israel since 1989	
	Project challenges: Transportation of green and white phosphoric acids, hot water, cold water, reclaimed water and industrial sewerage.	
	The Solution: The factory engineers set a policy to replace all PVC, HDPE, P.P. and metal pipes with Pexgol pipes 63-500 mms. and have been using them for the past 20 years. Last 18 years 30,000 meters of Pexgol of all diameters have been installed and in fluent use in the plant.	
10	Project Highlights: Sewerage line in steep slope with no access Agent – Customer:	
	Nisra Rocks ParkIsrael 2001Project challenges: Kisra Rocks Park600 meters of sewerage line in deep valley on a steep slope. The rocky ground and Park regulations prevent access of trenchers.	
	The Solution: Pexgol pipe 225 mms class 15 in lengths of 600 meters. pulled by tractor and cable from the bottom of the valley and covered with earth from the area.	



PEXGOL ABRASION RATES

COMPERATIVE ABRASION TESTS



ABRASION TEST RIG



1000mm

Quarz sand/gravel/water with 46% quarz sand/gravel Grains 0-30 mm















PEXGOL

PE

2 MONTHS

5 YEARS



Result of FNCT Test





Fig. 4: Creep rupture times of specimens from pipes of different resistances against slow crack growth in FNCT

From "3R international 40 (2001) Special Plastics Pipes"





PEXGOL PREFORMANCE TEST REPORT



PEXGOL PIPES ENABLES YOU TO LOWER YOUR OPERATIONAL COSTS

FOREWORD

PEXGOL PIPE SYSTEM IS APPLIED IN TRANSPORTING SLURRY, AND PUMPING INDUSTRIAL WATER FROM WELLS UNDER THE HARSH CONDITIONS OF THE DEAD SEA. IN SODOM, ISRAEL FOR OVER TWENTY YEARS.

THIS REPORT DEPICTS THE FIRST EXPERIMENT DONE IN ISRAEL IN WHICH "PEXGOL LINE 6" WAS INSTALLED AS PART OF A FLOW CARRIER FOR ONE OF THE INDUSTRIAL PROCESSES CARRIED OUT AT THE "DEAD SEA INDUSTRIES". IN ADDITION IT DEPICTS THE GREAT ADVANTAGES OF EXCHANGING A STEEL LINE WITH A LINE OF "PEXGOL", THE MAIN ADVANTAGE BEING <u>THE LOWERING OF OPERATIONAL COSTS</u>.

REPORT WAS EDITED BYJACOB ROZENZWIGE, CONSULTING ENGINEER WHO WAS, AT THAT TIME, MAIN CORROSION ENGINEER IN THE "DEAD SEA INDUSTRIES".

THE PURPOSE OF HIS REPORT WAS TO TEST THE DURABILITY OF "PEXGOL PIPES SYSTEM" WITH SLURRIES OF SODIUM CHLORINE (NACL) AGAINST THE DURABILITY OF CARBON STEEL PIPES.

BEFORE THIS EXPERIMENT, THE PIPE SYSTEMS IN THE "DEAD SEA WORKS" WAS MADE OF STANDARD STEEL WITH HYDRAULIC COEFFICIENT (HAZEN - WILLIAMS) OF C=130.

THIS LINE, 6" IN DIAMETER, WAS MADE OF CARBON STEEL, AND IT REQUIRED A HIGH FREQUENCY OF REPLACEMENTS BECAUSE OF ACCELERATED EROSION/ CORROSION.

THIS LINE CARRIED SALT SLURRY AT THE FLOW RATE OF 2.5 METERS PER SECOND. THE SLURRY CARRIED WITH IT STONES AND GRAVEL, WHICH INCREASED EROSION. PREVIOUS LIFE - TIME WAS SIX TO EIGHT MONTHS, UNDER THE ABOVE MENTIONED CONDITIONS.

THEREFORE, IN APRIL 1985, IT WAS DECIDED BY THE ENGINEERING TEAM OF THE "HEAT CRYSTALIZATION'" POTASH FACTORY OF THE "DEAD SEA WORKS", TO INSTALL AN EXPERIMENTAL SECTION OF A PLASTIC PIPE NAMED "PEXGOL'", SIX METERS IN LENGTH.

IT WAS DECIDED TO MAKE THE TEST ON TWO PARALLEL LINES, EACH 400 METERS LONG AND WITH A DIAMETER OF 6".

THIS PROJECT WAS CARRIED OUT AS PLANNED, AND AFTER EIGHT YEARS OF FOLLOW -UP, IT WAS FOUND THAT THE PLASTIC PIPE WITHSTOOD EXCELLENTLY THE CONDITIONS OF ABRASION CAUSED BY THE FLOW OF SLURRY. THE PHENOMENON OF CLOGGING AND PLUGGING THE PIPELINE (TYPICAL FOR THE STEEL PIPES) DISAPPEARED COMPLETELY AND MAINTENANCE WORK WENT DOWN TO ZERO

AFTER OVER 12 YEARS, THIS PIPE WAS DISASSEMBLED AND REPLACED WITH A LARGER "**PEXGOL**" PIPE (8") IN ORDER TO INCREASE THE FLOW CAPACITY.

LOWERING ENERGY CONSUMPTION AND ECONOMIZING OPERATING COST OF THE LINE

THE MOST IMPORTANT PHENOMON RESULTING FROM THIS REPORT IS THE SIGNIFICANT LOWERING, OF ABOUT 30%, IN THE LOSS OF PRESSURE HEAD AS A RESULT OF EXCHANGING STEEL PIPES WITH "**PEXGOL**" PLASTIC PIPES.

ALTHOUGH IT IS WELL KNOWN THAT PLASTIC PIPE SYSTEMS HAVE HIGHER HYDRAULIC COEFFICIENT (HAZEN-WILLIAMS C=150) IN COMPARISON WITH STEEL PIPES, (BECAUSE OF THEIR SMOOTHER WALL), **"PEXGOL"** EXHIBIT EVEN MORE OF A SIGNIFICANT IMPROVEMENT WHEN ITS HYDRAULIC COEFFICIENT WAS CALCULATED TO BE C=158.

THE EXPLANATION MAY ARRISE FROM THESETWO REASONS:

- 1. "PEXGOL" PIPE HAS A SMOOTHER WALL THAN A REGULAR PLASTIC PIPE.
- 2. THE HIGH FLEXIBILITY OF THE PIPE ENABLES TURNS IN A RELATIVELY LARGE RADIUS INSTEAD OF USING SHARP ANGLES AS IT IS CUSTOMARY IN STEEL PIPES.

THESE CHARACTERISTICS BROUGHT ABOUT A LOWERING OF ENERGY CONSUMPTION BY ABOUT 30% AS A RESULT OF LOWERING THE PUMP'S PRESSURE HEAD.

SEE HYDRAULIC CALCULATIONS IN THE APPENDIX. TECHNICAL DESCRIPTION THE BASIS FOR THE CALCULATION IS: TRANSPORTING OF 340 cm PER HOUR SLURRY IN TWO PIPES, EACH ABOUT 350 m. THE STEEL PIPE HAD TO BE REPLACED AT ABOUT 60% OF ITS TOTAL LENGTH EACH YEAR.

TECHNICAL DESCRIPTION OF THE PLASTIC PIPE:

CROSS LINKED POLYETHYLENE PIPE "**PEXGOL**" MANUFACTURED BY KIBBUTZ SHAAR-HAGOLAN. THE PROCESS OF CROSS LINKING UNDER PRESSURES OF UP TO 2,500 ATMOSPHERES RENDERS A HOMOGENOUS MATERIAL ALL AROUND.

THE ADDITION OF SPECIAL MATERIALS MAKES THE PIPE RESISTANT TO ULTRA VIOLET RADIATION. THE SPECIAL STRUCTURE OF THE PIPE MAKES IT ABRASION RESISTANT FOR UNLIMITED TIME.

6. THE UNIQUE STRUCTURE OF THE INTERNAL SURFACE PREVENTS THE LABORATORY FOR QUALITY CONTROL OF "**PEXGOL**" PIPES IS UNDER THE CONSTANT SUPERVISION OF THE GERMAN STANDARD INSTITUTE AS WELL AS THE ISRAELI STANDARD INSTITUTE AND OTHER INSTITUTIONS AROUND THE WORLD.

THE ADVANTAGES OF THE PIPE:

- 1. LIGHT WEIGHT
- 2. THE POSSIBILITY OF LONG LENGTHS WITHOUT ANY CONNECTIONS (HUNDREDS OF METERS).
- 3. THE ASSEMBLY REQUIRES A MINIMAL TRAINING FOR THE PERSONNEL.
- 4. PIPE REPLACEMENT IS CARRIED OUT IN A SHORT TIME.
- 5. THERE IS NO NEED FOR PAINTING OF THE PIPE, OR USING ANY OTHER MEMNS OF PROTECTION AGAINST CORROSION. SETTLING OF SUBSTANCE AND CLOGGING OF THE PIPE.
- 7. MANUFACTURER'S WARRANTY FOR 10 YEMRS.

THE DISADVANTAGES:

- 1. BECAUSE OF THE PIPE'S NATURAL FLEXIBILITY, IT REQUIRES CONTINUOUS SUPPORT (MADE OF LIGHT PROFILES).
- 2. IT IS NOT RESISTANT TO DIRECT FIRE.

CONCLUSIONS:

AFTER REGULAR WORK WITH THE 6" DIAMETER PIPES, P N 10, FOR OVER EIGHT YEARS WITH SALT SLURRY, IT WAS CONCLUDED THAT THIS IS THE MOST SUITABLE STRUCTURAL MATERIAL FOR THE SEVERE ABRASION PREVAILING INSIDE THESE PIPES.

IN FACT, THIS WAS THE PERFECT SOLUTION, AND SINCE THE INSTALLATION THERE ARE NO PROBLEMS.

LATER ON, MANY MORE "PEXGOL" PIPES WERE INSTALLED, WITH GREAT SUCCESS, AT THE "THE DEAD SEA INDUSTRIES" FOR TRANSPORTING VARIOUS CORROSIVE SLURRIES AT HIGH TEMPERATURES (UP TO 110°C).

FOR FURTHER INFORMATION, SEE THE TEST REPORT OF ""PEXGOL" PIPE AT HIGH TEMPERATURES", SODOM - 1.11.92, WRITTEN BY JACOB ROZENZWIGE, THE MAIN CORROSION ENGINEER AT "THE DEAD SEA INDUSTRIES".



APPENDIX 1

A FREE TRANSLATION OF A TEST REPORT OF "PEXGOL" PIPE SYSTEMS, MANUFACTURED BY KIBBUTZ SHAAR - HAGOLN, WRITTEN BY THE MAINTENANCE ENGINEER JOSEPH SOIFER FOR "THE DEAD SEA INDUSTRIES"

FOR THE PURPOSE OF DISMANTLING THE EXISTING SECTION AND INSTALLING THE NEW SECTION, TWO LOCKSMITHS, WITHOUT SPECIFIC QUALIFICATIONS WERE NEEDED. THE TOOLS THAT WERE USED: CUTTING TORCH AND REGULAR

"PEXGOL" PIPE SYSTEM OF SHAAR - HAGOLAN **TEST REPORT**

ON THE 30th OF APRIL, 1985, A "PEXGOL" PIPE SECTION OF SIX METERS LENGTH WAS INSTALLED AT THE "HOT CRYSTALLIZATION" - POTASH FACTORY.

ACCORDING TO THE DATA GIVEN BY THE FACTORY, THE PIPE IS RESISTANT TO ABRASION, PRESSURES OF UP TO 10 ATMOSPHERES, AND HEAT UP TO 110°C. LIFETIME IS GUARANTEED FOR 10 YEARS.

THE EXPERIMENT WAS CONDUCTED ON THE "COLD SALT" LINE (TEMP. UP TO 50°C) WITH 6" DIAMETER PIPE SUFFERING FROM ACCELERATED ABRASION.

INFORMATION ON THE LINE:

- A. A SALT LINE FROM D429C TO SALT POOLS TOTAL LENGTH IS ABOUT 400 m.
- B. TRANSFERRED SUBSTANCE SALT SLURRY WHICH INCLUDES GRAVEL.
- C. SPEED IN ORDER TO PREVENT SUBSTANCE SETTLING AND PIPE CLOGGING, THE SPEED IN THE LINE IS ABOVE 2.5 METERS PER SECOND.
- D. LIFETIME OF THE EXISTING PIPE IS BETWEEN 6 TO 8 MONTHS.

THE PURPOSES OF THE EXPERIMENT WAS:

- 1. TO LEARN THE REQUIRED ASSEMBLY CONDITIONS FOR THIS NEW PIPE.
- 2. TO TEST ITS ABRASION RESISTANCE AS COMPARED TO THE EXISTING STEEL PIPE.

THE CONCLUSIONS OF THE EXPERIMENT:

WRENCHES. THERE WAS NO NEED FOR SPECIAL TOOLS, EXCEPT FOR A CUTTING INSTRUMENT TO CUT THE NEW PIPE (WHICH COULD BE AN ORDINARY JIGSAW). THE TIME MEASURED FOR REPLACING THE OLD PIPE BY THE NEW PIPE, INCLUDING PREPARATIONS WAS 2.5 HOURS.

ON JUNE THE 30th, 1985, WE DISASSEMBLED THE PIPE SECTION FOR EXAMINATION (THIS DATE WAS AGREED ON BEFORE). THE INTERNAL SURFACE OF THE PIPE WAS SMOOTH AS BEFORE THE ASSEMBLY, WITHOUT MARKS OF ABRASION OR MECHANICAL DEFECT. THERE WERE NO SIGNS OF SUBSTANCE SETTLING. THE WALL THICKNESS REMAINED UNCHANGED. THIS WAS MEASURED BY A CALIPER.

THE FINAL CONCLUSION: "PEXGOL" PIPE HAD PASSED THE TEST SUCCESSFULLY.

IN VIEW OF THIS EXPERIMENT WE CAN NOTE A NUMBER OF ADVANTAGES AND DISADVANTAGES IN USING THIS PIPE AT OUR PLANT.

ADVANTAGES:

1. LIGHT WEIGHT:

LIGHT WEIGHT WHICH ENABLES ASSEMBLY WITHOUT USING HERAVY LIFTING DEVICES, SUCH AS CRANES. THE SUPPORTS MADE OF LIGHT PROFILES, A FACT WHICH REDUCES THE LOAD ON THE SUPPORTING CONSTRUCTION.

2. A MINIMUM AMOUNT OF FITTINGS:

IT IS POSSIBLE TO LAY A PIPE LINE OF 350 METERS, WITHOUT FITTINGS (SUCH AS ELBOWS, BRANCHES, FLANGES, ETC.). THERE IS NO NEED FOR WELDING - WHICH SAVES ELECTRICITY, WORKING HOURS OF A QUALIFIED WORKER AND EXPENSIVE WELDING QUALITY TESTS.

- 3. <u>USING NON-PROFESSIONAL MANPOWER:</u> THE ASSEMBLY OF THE PIPE SYSTEM IS PERFORMED BY LOCKSMITHS OF THE LOWEST PROFESSIONAL RANK.
- 4. THERE IS NO NEED FOR PAINT, WHICH IS CURRENTLY A CRUCIAL COMPONENT OF THE PRICE OF THE STEEL PIPE.
- 5. ASSEMBLY TIME IS SIGNIFICANTLY REDUCED.
- 6. THE INTERNAL SURFACE OF THE PIPE PREVENTS THE SETTLING OF SUBSTANCE, WHICH ALLOWS USING <u>A LOWER CRITICAL SPEED</u>, A FACT WHICH EVENTUALLY BRINGS SAVINGS IN ENERGY.
- 7. THE PIPE HAS A GUARANTEED LIFETIME OF 10 YEARS.
- 8. THE FINAL COST OF "PEXGOL" PIPE IS LOWER THAN THE STEEL PIPE*.
- 9. THE FLEXIBILITY OF THE PIPE ENABLES THE SHORTENING OF THE ROUTE, ESPECIALLY IN CURVES.

DISADVANTAGES:

- 1. THE **PEXGOL** PIPE SYSTEMS WHICH ALREADY EXIST IN THE MARKET ARE UP TO 6" DIAMETER. ORDERING OF LARGER DIAMETER PIPE SYSTEMS REQUIRE AN ORDER OF AT LEAST 1,000 METERS - SO AS TO JUSTIFY THE BUILDING OF A NEW DIE. THIS IS EFFECTIVE JUST FOR THE INITIAL ORDER.
- 2. THE PIPE SYSTEM REQUIRES DOUBLE AMOUNT OF SUPPORTS ON THE ROUTE. NEVERTHELESS, THE TOTAL WEIGHT OF THE CONSTRUCTION CAN BE SIGNFICANTLY LOWER DUE TO THE USE OF LIGHT PROFILES.

THE CONCLUSION FROM THE AFOREMENTIONED IS THAT "**PEXGOL**" PIPE HAS A POTENTIAL FUTURE AT THE PLANT, AND FURTHER TESTINGS OF DIFFERENT KINDS OF SLURRY (WARM SLURRIES AS WELL) IS WORTHWHILE.

EDITED BY:

JOSEPH SOIFER - MAINTENANCE ENGINEER CRYSTALL/ZED POTASH, 1985

^{*} THE COST PER ONE METER IS HIGHER BY 20%, BUT ONE SHOULD TAKE INTO ACCOUNT THE COST OF SAND CLEANING AND PAINT, WELDING, FITTINGS, ASSEMBLY TIMES, USE OF LIFTING AND ASSEMBLING DEVICES, AND LIFETIME OF THE PIPE.

APPENDIX 2

TECHNICAL INFORMATION OF EXISTING SYSTEM 1. ELECTRIC MOTOR: "USHPIZ" TYPE K280b MAXIMUM OUTPUT: 75 HP SPEED: W = 1500 RPM 2. PUMP: "SINIAVER" TYPE NKHT 4x5 IMPELLER DIAMETER: 01 = 400 mm = 15 - 4/3" DISCHARGE: Q = 170 me = 748.51 gpm h

SPECIFIC GRAVITY OF SOLUTION: 7 = 1.4 kg/L

3. PIPE SYSTEM: MEASURED LENGTH: L 1 = 350 m MODIFIED WEIGHT: L = 938.7 m = 3079.86 it PUMPING HEAD: H = 11.2 m = 36.75 it INSIDE DIAMETER: d = 6.065" HYDRAULIC COEFFICIENT (HAZEN-WILLIAMS) : STEEL : C1 = 130 "PEXGOL" - C2 = 158

PIPE SYSTEM CALCULATIONS

A. STEEL

HEAD LOSS IN PIPE mf = 0.002083 x Lx 100"1.85 x Q^1.85

e^1.85 d^4.8655

mf = 127.3 ft

OUTPUT PUMP PRESSURE: H' = H + mf = 36.75 + 127.3 = 164 it = 50 m

EFFECTIVE MOTOR POWER: N1 = <u>Y x Q x H' x 1.34</u> = 43.4 HP = 31.9 kw 75 x 3.6 x 1.36

B. "PEXGOL" PIPE

"PEXGOL" HEAD LOSS: hf = 93.5 ft

OUTPUT PUMP PRESSURE: Hit = 36.75 + 93.5 = 130.3 ft = 39.7 m

DIAMETER OF *NEW* IMPELLER: D2 = D1 x (H")^1/2 = 356 mm = 14" (H')^1/2

EFFECTIVE MOTOR POWER: N2 = N1 x <u>D2^3</u> = 30,5 HP = 22.4 *kw* D1^3

THE COST SAVINGS IN ELECTRICITY

THE ELECTRICITY CONSUMPTION FOR EVERY ALTERNATIVE WAS CALCULATED ACCORDING TO THE FOLLOWING:

WORK PERIOD: 12 MONTHS OF Work = 8,600 NOMINAL w.h.

PRICE OF ONE kwh INSTALLED = \$ 0.4

FIRST ALTERNATIVE: \$ 109.736 = 0.4 x 8,600 x 31.9

SECOND ALTERNATIVE: \$ 77.056 = 0.4 x 8,600 x 22.4

NUAL SAVINGS IN ELECTRICITY OF \$ 32,680 FOR EVERY PUMP, OR \$ 65,360 OVER ALL.

ELECTRICITY CONSUMPTIONS IS DOWN BY 30%!

