2.01 Nandyal Town

Nandyal or Nandyala is a town in Kumool District, Andhra Pradesh, India. It is a major centre of trade and commerce in the region and is also important because of its religious significance. The town derives its name from Nandi, the vehicle of Lord Shiva, whose temple here draws pilgrims from faraway places. Nandyal is surrounded on all sides by hills while the Kunderu River flows to its west. The Nallamala Hills to the east are extensively forested while the ones to the south have been mined for granite. The town is rich in water resources owing to its many tanks and reservoirs. These give it an equitable climate throughout the year. However summers can be particularly hot. The average temperature is around 28°c.

It had a population of 1,51,771 according to 2001 Census. At present, Nandyal has a population of 2,00,771. Males constitute 51 per cent of the population and females 49 per cent. Nandyal has an average literacy rate of 63 per cent, higher than the national average of 59.5 per cent. Male literacy is 72 per cent, and female literacy is 55 per cent. In Nandyal, 13 per cent of the population is under 6 years of age. Most of the population is Hindu. Nandyal has been an important pilgrimage site since the days of the Vijayanagar Kingdom owing to its nine Nandi temples. It was the introduction of railways however in 1890 that led to its rapid development. It became a municipality in 1900. It is erstwhile taluq headquarters and a Mandal headquarters at present.
Nandyal is surrounded by nine temples of Lord Shiva, called Nava Nandi. These nine temples are Mahanandi, Shivanandi, Vinayakanandi, Somanandi, Prathamanandi, Garudanandi, Suryanandi, Krishnanandi (also called Vishnunandi) and Naganandi. Omkaram is another famous Siva temple very close to Nandyal. They attract a large numbers of devotees throughout the year. Nandyal is also the gateway to Belum Caves and Srisailam.

Nandyal is a diocese under church of south India and it has a beautiful cathedral which was constructed and dedicated in the year 1905. Gundla Brahmeswaram Wildlife Sanctuary is located about 30 km from Nandyal railway station and is on the border between Kurnool and Prakasam districts. The major town Kurnool is 75 km northwest of Nandyal. The city is a major hub of industry and agriculture. The main exports are Cement, Sugar, PVC pipes, Ethanol, Oil, Cotton, mangoes and rice. The seed industry has been flourishing since 30 years. A Lok Sabha constituency is named after Nandyal town. This is the only constituency which has given a President and a Prime Minister to India. The current Member of Parliament is Sri S.P.Y. Reddy, Chairman, of Nandi Group of Companies representing the Congress Party. The city is well connected both by roads and railways. The nearest airport is the Rajiv Gandhi International Airport in Hyderabad (Shamshabad), some 260 km away.

2.02 Nandi Group of Companies

Sri S.P.Y Reddy, a Mechanical Engineer, started a small unit, manufacturing plastic containers, in 1978. It was later expanded to manufacturing of PVC and allied pipes under the brand "Nandi". With focus on quality and innovative marketing the unit has grown into a multi product, multi location entity. At present Nandi Group is a leading business group led by Founder and Chairman Sri S.P.Y. Reddy. The Group is a major player in Agricultural Pipes, Casing Pipes, Submersible Pipes, Ring Fit Pipes, Plumbing Pipes, Electrical Pipes, Sewer Pipes etc. It is also a major player in Water Storage Tanks and Solvent Cements. Over the last few decades the group has diversified into different businesses and has presence in
Cement, Infrastructure, TMT Bars, Agro products and Dairy Industry. Nandi Group of Companies now includes Nandi Pipes, Panyam Cements, SPY Agro Industries Limited, Nandi Dairy, Nandi TMT Bars, and Sujala Infrastructure Pvt. Limited. Their vision was to have three successful vertical entities - Plastics, Cement and Ethanol. Their aim is to provide quality products, quality service to the customers and high standards of living to workforce.

(A) Sujala Pipes Pvt. Ltd.

Sujala Pipes Pvt. Ltd. is the flagship enterprise of Nandi Group. The company manufactures UPVC pipes, PVC Pipes, Ring Fit pipes, agricultural pipes HDPE pipes, Water Storage containers, flexible hoses, casing pipes, Electrical, Plumbing and submersible pipes. The pipes are marketed under the brand name of Nandi Pipes. Ananta PVC Pipes Pvt. Ltd, ITL-Hyderabad and HDPE - Tirupati are the subsidiaries of the group which also manufacture pipes. Sujala Pipes (P) Ltd. The main manufacturing plant is located at Nandyal, Andhra Pradesh. The group’s other subsidiaries catering to the product line are based in Hyderabad, Anantapur and Tirupati. Products include Agricultural Pipes, Electrical Pipes, SWR Pipes, Ringfit Pipes, Plumbing Pipes, Blue Casing Pipes, Garden Pipes.

About the Products

Water is indispensable for agriculture. However, only 15% of agricultural land, the world over, gets dependable water supply. Various irrigation methods are employed by farmers to ensure proper water supply. Canal irrigation is one such method. However, canals occupy cultivable space and thus hamper production. Moreover, nearly 40 per cent of canal water is wasted due to evaporation and percolation. In addition to that, in certain areas, canal irrigation, over a period of time, has led to salivations. Pipes are an effective way of overcoming the problem caused by canal irrigation as they can be laid underground and loss
of water because of percolation and evaporation is eliminated. Lift irrigation is employed to carry water from a lower to a higher level. Here, various kinds of pipes are used. PVC pipes are considered better than mild steel, galvanized steel, cast iron, and/or plastic pipes.

(a) Nandi PVC Pipes

Sujala Pipes (P) Ltd., Nandyal, a premier enterprise of Nandi Group is a well known manufacturer of the large and most comprehensive range of UPVC Pipes in India. Nandi Gold Pipes, with a diameter up to 400 mm are suitable for water transportation, irrigation, plumbing, drainage, cable ducting, bore wells, transfer of industrial effluents and electrical conduits.

The gamut of products cover all applications in which PVC pipes can be used. Nandi UPVC systems are more cost effective than conventional GI, CI or AC systems besides being light in weight, durable and non-corrosive. They are also easy to handle, offer excellent flow characteristics and can be transported and installed anywhere. With world class quality and customized product development support, they enjoy the satisfaction of millions of customers.

The unit also has world class quality assurance systems ensuring products of uncompromising excellence, meeting all relevant ISI, BS, DIN, and ASTM standards. In addition to these features, extensive R&D facilities provide reliable and committed support for new product development. Nandi also could supply customized products as per exclusive specifications of the customers. Such relentless pursuit of quality, and readiness to adopt and innovate have propelled the Nandi to the forefront of this product category in the country.

(b) HDPE Pipes

Nandi group of industries also manufacture HDPE pipes. HDPE Pipes are manufactured either in long coils or 6 meter lengths depending on pipe dimensions and
customer requirements and according to IS 4984:1995 quality standards. Special requirements of the customers if any are also taken care of at the time of manufacturing.

Their job is not just selling pipes but go beyond that. They are committed to the complete customer service. They take up pipeline projects on 'TURNKEY' basis. They offer HDPE pipe solutions in place of conventional pipes (PVC, GI, Concrete etc.) at competitive prices and guaranteed service. They provide water lines for agricultural needs with free butt jointing and testing. They extend service free of cost for any future leakages / defects in the pipe line caused by faulty manufacturing or faulty jointing for a period of 20 years. They offer proclainer facility (for earth work) to farmers who buy minimum 100 lengths (6 m length), at concessional rates.

They claim that Nandi HDPE Pipes are more flexible, light in weight, corrosion resistant, chemically inert, economical, temperature resistant, and UV resistant. Smooth inner and outer finishing results in low flow resistance and low power consumption. Availability of pipes in long coils reduces cost of laying, jointing and coupling. They are leak proof, strong and easy jointing (butt jointing) and possess very good insulation properties.

Nandi HDPE Pipes can be used for laying agriculture and drinking water lines, as delivery pipes for single phase and three-phase submersible pumps, as suction and delivery pipes for jet pumps, as suction and delivery pipes for centrifugal and monoblock pumps, as delivery pipes for open well submersible pumps, for telecom and electrical ducting, for slur disposal, in industrial flow applications, and sewage pipe systems.

(c) Siddartha Pipes

Nandi group with its in house expertise has developed on its own, the SIDDARTH PIPE for use in bore wells irrigation and it has earned goodwill of all the customers who ever are using it. Further, the company has specialized in manufacture of blue casing UPVC pipes
in different sizes and varieties for application in bore-well irrigation particularly in loose soil conditions.

Manufacture of impressive Column pipes / Submersible pipes is another exclusive area for the Sujala Pipes Private Limited. In order to over-come the difficulties and cost involved in replacing the G.I. Pipes (which are prone to rust) and to suit the bore-wells in salty areas near the sea coast, to make a substitute for G.I. pipe and a pipe of longer duration, the company has been manufacturing Column / Submersible pipes in different standards and sizes.

To enable us to further penetrate into the bore-well/tube-well market for larger diameters, mainly for solid wall pipes, a cost reduction is essential. In this context M/s. Sujala Pipes Pvt. Ltd., has introduced NANDI SIDDARTH PIPE with the latest technology.

Nandi Siddartha pipe is also known as "HOLE" pipe. HOLE, as the name implies, is not a solid-wall pipe, but has a large number of holes in the longitudinal direction of the wall. The "hole" design meets the requirements of International Standards. These pipes have more stiffness and flexibility. These pipes which are lighter ensure a weight reduction of about 25 per cent depending upon the size and design.

NANDI SIDDARTHA pipe is noticeably lighter and less expensive than any other PVC pipe of similar stiffness due to its "I" channel and many times lighter than an Iron pipe, for bore wells. NANDI SIDDARTHA pipes are interchangeable with solid-wall pipes and existing fittings of Indian Standard, can be applied.

NANDI SIDDARTHA pipes are manufactured with special jointing system. For this, groove is made at the end of the pipe to fit the pipe into another solid pipe easily. Then plastic rod, which is made with PVC and special chemicals will be inserted. This jointing system is very easy for installation up to 1000 feet and also installable in a very less time.
Properties of Nandi Siddartha Pipes

i. Vicat Softening Temperature > 80° C

ii. Density 1.40 to 1.45 meets the requirements as per 15:12818-1 992 / CML: 6547076

iii. Impact tests at 0° C; True Impact Rate (TIR) < 10%

iv. Ring Deflection test; Deflection > 30%; no visual cracks or defects

v. Longitudinal reversion at 150° C < 5%

vi. Nandi Siddhartha pipes Tensile Strength is 50 ± 5 Mpa.

Advantages of Nandi Siddartha Pipes

i. These are used for Bore / Tube wells. These pipes have an excellent record of performance in operational bore / tube well systems.

ii. These are easy for handling and transportation.

iii. These are cheaper and flexible.

iv. These are light in weight and rust free.

v. Installation is easy due to special locking system. No special equipment is necessary for installation.

vi. These are chemical and biological resistant, non-corrosive, and aberration free.

(d) Blue Casing Pipes

Nandi Gold, Nandi Well Casing and Well Screen Pipes are unique products made from a special UPVC compound. Both the screen and casing pipes are manufactured in diameter up to 250 mm and can be used up to the depths of 1200 feet. Nandi well casing and well screen pipes are manufactured from UPVC compound developed under strict supervision of technical experts to meet tough environmental conditions of coastal areas. The pipes are resistant to mineral salts and ground chemicals ensuring a longer working life. In coastal areas, pipes should be inserted up to total bore depth in loose soils. Standard well
casing that has a compression resistance of 6.5-7.3 Kg/cm² will be used to depths up to 450 feet. Nandi Blue Casing pipes are manufactured under the specification of IS:12818-1992/CML 6547076.

Nandi Gold Casing pipes can be used with submersible pump and vertical shaft type pumps providing suitable clearance. Two wall thicknesses are offered in the Nandi Gold range. Owing to the increasing depths of wells it was found necessary to manufacture a heavy-duty range pipe for use at depths of 1200 feet. The pipe range has thicker wall section and high compression resistance.

The plant is equipped with German twin-screw extruders capable of producing ribbed and casing from 40-250 mm ND. Stringent quality control tests are regularly conducted to ensure top quality products for use in bore-wells.

Product Varieties

i. Nandi RS (Ribbed Screen) Pipes: These pipes have external longitudinal ribs and transverse (horizontal to pipe axis) slots.

ii. Nandi CS (Casing Shallow) Pipes: These pipes are suitable for wells with depths up to 80m. (approx. 250 feet)

iii. Nandi CM (Casing Medium) Pipes: These pipes are suitable for wells with depths above 80m and up to 250m (approx. 800 feet).

Special sizes will also be made on order as per customer requirements such as 113, 163, 213 ND, 240 OD in standard and turbo ranges.

Threading of Screen and Casing pipes:

i. The Screen and casing pipes are made with male threads at spigot end and female threads at the socket end.
ii. Screen and casing pipes of nominal diameters of 100 to 250 mm will have threads in accordance with basic profile for metric trapezoidal threads as per IS specification 12818 - 1992.

i. Nandi Turbo Well Casing and Well Screen Pipes

It is yet another unique product made from a special UPVC compound. Both the screen and casing pipes are available in diameters up to 400 mm and can be used at bore depths of up to 1200 ft. UPVC pipe is non corrosive and hence long lasting. UPVC pipe is of light weight and easy to handle and to install. UPVC pipe can be modified with the right additives to ensure rigidity and temperature resistance. The pipe is priced at lower and affordable rate.

Nandi Turbo Well Casing and Well Screen pipes are manufactured from UPVC compound developed under strict supervision of highly competent technical personnel to meet tough environmental conditions of the coastal and gulf areas. The tubes are resistant to mineral salts and ground chemicals ensuring a longer working life. Nandi Turbo UPVC pipe has been tested under stimulated conditions of well construction and maintenance, and has proved completely inert to them. The pipes are ideal for supply wells and irrigation wells.

Nandi Turbo can be used with submersible pump and vertical shaft type pumps providing suitable clearance. Two wall thicknesses are offered in the NANDI TURBO range. To suit the increasing depths of bore wells being dug, these heavy duty range pipes are being manufactured, for use at depths of 1000 feet. The pipe range has thicker wall section and high compression resistance. Standard Well Casing pipes with a compression resistance of 6.5-7.0 Kg/cm² are used for depths up to 450 Ft.

Nandi Turbo Screen is also made from UPVC compound to give maximum compressive strength, stability and resistance to corrosion or chemical attack. The type of
screen to be used is in accordance with different water table conditions. Open area and slot width of the screen are specified by the size and type of the sand and gravel packing.

ii. Submersible Pipes

Nandi Gold UPVC Column pipes are manufactured with German Twin Screw Extruders using latest manufacturing and well equipped Testing facilities under strict Quality Control management. Nandi Gold UPVC Column pipes are manufactured in white colour and sizes available from 1” to 4” in two varieties viz., Standard Duty and Heavy Duty. This product is manufactured by a special compound using a mix of few imported raw materials. Standard Duty pipes can be used for depth up to 500 feet and Heavy duty pipes for depth up to 1000 feet. Coupler's rib dimensions are also more due to more gripping purpose i.e., for 1”, 1½” & 1½” of rib's width is 6mm and height is 3mm and for 2”, 2½”, 3” & 4” of width is 8mm & height is 4mm. Nandi Gold UPVC Column pipes are 3 Meters in length, each pipe having one coupler. Coupler is affixed at one end in the factory itself and other side is plain end for attaching the coupler from pipe to pipe. 'O' Ring & Gaskets are used for it, to provide leak proof joints, to observe the vibrations of the pump and for tightening purpose.

Features of Nandi Gold UPVC Column Pipes

i. Non-Corrosive: Compared used for manufacturing C.I. Pipes and Nandi Gold UPVC Column Pipes is rust proof as it prevents rust formation.

ii. Light in weight: Nandi Gold UPVC Column Pipes are light in weight compared to G.L Pipes. That is why installation is easy and maintenance is cheap.

iii. Non-Toxic: It does not change colour, odour and taste of the water.

iv. Hygienic: It does not support any bacterial growth.

v. Cost effective: Nandi Gold UPVC Column Pipes are cheaper when compared to the price of G.I. Pipes.

vi. High Tensile Strength: These pipes have High Tensile Strength of 55+5Mpa.
vii. High Impact Strength.

viii. High Vicat Softening Temperature.

ix. **Low Power Consumption**: As these pipes have smooth internal surface; less energy is required to pump the water, as compared to the energy required for pumping water under conventional system.

x. More grip for coupler tightening due to high rib dimensions.

xi. 'O' Ring and Gasket: 'O' Ring provides leak proof joints and gaskets observe the vibrations of pump at the threaded joints.

**Applications**

Nandi Gold UPVC Column Pipes are used in bore wells for domestic, industrial, agricultural & lift irrigation purposes.

Nandi Plasticizers and Pipe Industries, Nandyal, has been promoted by the Nandi Group of Companies. The company has gained high reputation in the field of the manufacture of PVC Hoses & Drip Irrigation systems in a remarkably short span of time. Nandi Plasticizers and Pipe Industries have an infrastructure and operating systems which match the highest standards practiced in the industry. The manufacturing activities are well taken care by a team of highly competent professionals. The rich knowledge base and the vast experience of the team members backed by their time tested technology gives them the right platform. They claim that standardized operating systems used by them provide smooth and flawless services to the customers.

PVC Heavy Duty Suction Hose pipes are used in agriculture, construction, fish and shipping, civil engineering and sub way constructions, and other industries for suction of water for irrigation, saline water, light acids, sewage, alkaline and other chemicals excepting solvents, dug cart and for conveying granules or fine particles of raw material in processing industries.
**Features & Specifications**

- Minimum friction & maximum flow is maintained.
- Good environmental stress crack, corrosion, frost, abrasion, crush, kink, rot and chemical resistance.
- Excellent pressure & vacuum ratings.
- Easy and quick installation and safe potable water supply.
- Product range from 25 mm to 110 mm.

(e) PVC Petrol & Garden Tubes

The unit also manufactures PVC petrol and garden tubes in the range of 20, 25, 32, 40 and 50 mm.

(f) Drip Irrigation Systems

Nandi Plasticizers and Pipes industries, Nandyal, an important unit of the prestigious Nandi Group of companies manufactures, quality oriented - long lasting Drip Irrigation Systems to suit the needs of the farmers. They are useful when the land is not leveled, when the land does not have sufficient water source and supply, to avoid wastage of water in irrigation, when it is not possible to give uniform irrigation to the field, to supply required nutrients with uniform distribution and reduce, to save expenditure on fertilizer application, to get good yields in saline and alkaline soils, to reduce weed growth and save labour cost, for all types of plants and trees, to increase pest and disease resistance in the plants, to bring more land under irrigation with available limited water resources and for augmenting productivity.

(g) Ringfit Pipes

Integrated Thermoplastics Ltd., a unit of Nandi Group of Companies has developed Ringfit pipes to overcome problems commonly experienced in solvent cement jointing of
higher diameter (above 160 mm) UPVC Pipes. These Nandi Gold branded Ringfit pipes offer excellent advantages over other UPVC pipes specially for underground applications.

Pipelines utilising Ringfit pipes can be taken up for pressure testing immediately on completion of the section. Unlike for solvent cement joints, the waiting period required for solvent cement jointing is entirely eliminated, resulting in short installation duration. Ringfit pipes are easy to install in the field. Ringfit pipes of diameters below 140 mm can be joined by hand pressure. Pipes of large sizes a pipe jack is available for the purpose.

Pipe lines made with Ringfit pipes automatically accommodate linear expansion and contraction, thus eliminating the need for expansion loops as is required for solvent cemented pipelines. Slight shifting of soil or bending of the pipeline up to 2 degrees per joint can be easily accommodated by Ringfit pipes.

Ringfit pipes are fitted with a special elastomeric sealing ring which has many advantages over natural rubber. They are not affected by ozone, ultraviolet radiation (sunlight), bacteria, fungus and termites. They are resistant to salt water, organic vegetable oils, dilute acids, dilute alkalies, aqueous chlorine and other pollutants and contaminants found in communal sewage and waste water. They have prolonged self-life and Manufacturers claim a shelf life of over 50 years. They are highly reliable and robust. Tests have shown that Ringfit joints successfully withstand pressures beyond the specified testing pressures for the pipe.

While jointing higher diameter pipes with solvent cement, the cement applied sometimes tends to dry before the joint can be completed, resulting in imperfect joints leading to leakage when used. This situation could be avoided by applying correct quantity of solvent cement and quick joining of pipes as too little solvent cement will lead to weak or leaky joints, and too much will result in accumulation of cement inside the pipe which eventually weaken the area adjoining the joints. Solvent cement is inflammable and calls for
extra care in handling. Its life deteriorates if it is exposed to sun and after longer periods of its storage.

(h) UPVC Electrical Conduits

Apart from manufacturing UPVC pipes M/s. Sujala Pipes Pvt. Ltd. is specialized in the manufacture of entire gamut of other standard products including Electrical conduits, plumbing, SWR pipes covering all applications in which PVC pipes can be used, meeting the ISI requirements.

For the past about three decades, Sujala Pipes (P) Ltd., Nandyal has been manufacturing UPVC Electrical Conduits under the brand names Nandi, Nandi Premium, Nandi Deluxe, Nandi Gold, Nandi Platinum and Nandi Diamond using cutting-edge technologies to keep pace with the modern technology and the choice of the customers. The company believes in total Quality Control measures and as a part of it each pipe is thoroughly checked at the manufacturing stage, so as to ensure that the customer is supplied with good quality product. The company's Electrical Conduits are of ISI Standards and used for domestic and Industrial purposes. The pipe sizes range from 16 mm to 63 mm to outer diameter.

Due to self extinguishing nature, these electrical conduits do not support combustion and remove the source of ignition. Nandi electrical conduits prevent electrical shocks and short circuits due to its non-conductivity of electricity. The conduits are light in weight and are simple and easy to install. These conduits have high mechanical strength. They are assisted by smooth interior wall that reduces friction thus helping in easy wiring. These pipes can be used for installation both in open and concealed way. These conduits are non-corrosive, good looking and have built in strength ensuring long life.
(i) **ASTM Pipes**

Sujala Pipes Private Ltd., Nandyal, is the leading manufacturers of UPVC pipes under the brand names of ‘Nandi’ and ‘Nandi Gold’ as per ISI specifications. These are used for various applications like water supply in domestic, industrial and commercial buildings; and plumbing water connections. These pipes are made in sizes ranging from one-half inch to six inch with schedules of 40 & 80 as per with ASTM D 1785 in blue and white colours. ASTM pipes are available in 3 & 6 Mt lengths. To identify ASTM pipes the company has been using different colour lines.

ASTM Pipes are produced strictly as per ASTMD 1785 and they offer several advantages over conventional pipes like cement and cast iron pipes. ASTM pipes are lighter in weight and easy for installation. They are non-corrosive, non-toxic, chemically resistant, uniform pipe dimensions & threading, and have smooth inner surface. ASTM pipe diameters are equivalent to GI pipes & fittings. They are of good strength and better quality ensuring durability. These pipes are priced at affordable rates.

(j) **Plumbing Pipes**

The company also manufactures Grey colour plumbing pipes as per ISI standards IS : 4985-2000. They are safe for drinking water supply system; light in weight, easy to handle and install; rust and leak proof and have high resistance to heat, fire etc.; economical when compared to G.I. pipes and pipes of other companies; diameters are equivalent to G.I. pipes & fittings; better resistance of water hammer and surge pressure; simple and facilitate quick and firm jointing; non-conductive, non-corrosive, non-toxic; maintenance free and ensures high flow rate; and are usable in offices, hotels, complexes and buildings for water connection, distribution and sanitary purposes.
(k) Nandi UPVC SWR Pipes

Sujala Pipes Pvt. Ltd., Nandyal, also manufactures 'NANDI' brand Unplasticized Polyvinyl Chloride (UPVC) Plain and Socket end pipes with nominal outside diameter from 75, 90, 110 & 160 mm. These pipes are used in soil and waste discharge systems inside the buildings including ventilating and rain water applications. The pipe's surface colour is dark shade of gray. Pipes are made and supplied in nominal lengths of 4, 6, 8 and 10 feet either plain or with solvent typed socket / 'O' ring typed grooved socket. The company's Nandi Gold brand SWR pipe enjoys ISI recognition. (IS 13592-1992). The Company also manufacturers SWR pipes under the brand names of Nandi Premium and Nandi Deluxe as per customer's choice and requirements. These pipes are manufactured with virgin material only.

Salient Features

- **High flow rate & Non – Conductive**

  Nandi UPVC Pipes have smooth inner surface. UPVC SWR Pipes & Fittings are non-conductive and galvanic or electrolytic action does not affect its working. Thus flow rate will be more.

- **Cost Effective**

  Due to light weight and simple jointing techniques, saving can be effected in the cost of material, transportation and installation. Cost of Nandi UPVC SWR Pipes & Fittings is therefore more cost effective than conventional drainage pipes.

- **Resilient and resistant to most of the chemicals**

  Nandi UPVC SWR Pipes & Fittings are resistant to alcohol, fats, oil, aromatic & chlorinated hydrocarbons. They are also more reliable and do not support any fungal growth.
• **UV Stabilized**

Nandi SWR Pipes & Fittings usable for drainage system is UV Stabilized which eliminates the adverse effect of sunlight and weather. Therefore the system can be used for outdoor applications.

• **Non-Corrosive**

Pipes do not support any formation of rust on pipes.

• **Durable and long lasting**

It has very good tensile and impact strength, hence, site breaking is totally eliminated.

• **Fast and convenient installation**

As the Nandi UPVC SWR Pipes & Fittings are extremely light in weight and provided with special rubber jointing technique, installation will be easier. Jointing can be done within seconds with special rubber rings which eliminate leakages. Cleaning is also very easy.

**Properties**

Nandi UPVC SWR Pipes are normally manufactured in uniform length of 3m with single and double sockets. Varied lengths are also supplied as per customer requirements.

**(l) Solvent Cement**

Suneetha Industries, Nandyal (A Unit of Nandi Group) has been in the line of manufacturing Solvent Cement for the past several years under the brand name "Nandi" and in different sizes of packing. The Solvent cement is used for jointing PVC pipes & Fittings. Proper care is always been taken to ensure stringent quality checks on the product at all stages, without compromising on the quality.
This is a simple process for jointing Nandi Rigid PVC Pipes with molded or fabricated fittings. The tools required are a hacksaw with fine teeth, sandpaper, cotton waste, a soft brush, a knife and Nandi solvent cement.

The jointing procedure is as under:

- Inspect the pipe and fittings to ensure that they match perfectly.
- Cut the pipe square, using the hacksaw, clear burrs with knife and cotton waste.
- Rub with the Sandpaper outside of pipe and inside of fittings. Clean again with cotton waste.
- Apply solvent cement evenly with a soft brush on the outside of the pipe, to a width slightly more than the corresponding depth, as also on the inside of the fitting.
- Insert the pipe in fitting and turn it through 90°C, to ensure uniform distribution of cement.
- Hold the joint for 2 minutes and ensure that the pipe does not slip out of fitting.
- Wipe out the excess cement from entire surface of the joint. The joint should be allowed to set, undisturbed. It should be pressure tested only after 24 hours.

Applications

- It will be useful for jointing of PVC pipes and fittings.
- It can be used for jointing any of two of the products made from PVC material.

Available sizes

25 ml, 50 ml, 100 ml, 250 ml, 500 ml, 1000 ml, 5000 ml.

Safety Precautions

- Avoid contact with skin.
- Always replace lids tightly after use.
- Store in a cool place away from direct sunlight.
• Do not breathe Solvent Cement vapors.
• Shake the solvent cement container thoroughly before use.
• Do not smoke while working with solvent cement, as it is highly inflammable.
• The excess solvent should be wiped out from entire surface of the joint.

(m) Water Storage Tanks

Nandi Pipes brand water storage tanks are manufactured adopting latest technology and in double layer, to provide extra strength and uniform wall thickness. These are made from 100% Food grade material.

Main Features of Nandi Water Storage Tanks

• Made with High quality material to make it more durable.
• Are available in attractive designs & colors.
• Our master batches also have the U.V. Stabilizer component in it.
• Keep water hygienically clean, avoid fungus & bacteria.
• Are easy to carry, install and they occupy very less space.
• Are leak proof, rust proof and maintenance free.
• No need of painting or water proofing.
• Are cost effective, economical compared to the products of others and conventional tanks constructed with bricks and RCC.
• Are available in the form of cylindrical, vertical and loft tanks.
• Are available in sizes ranging from 200 to 5000 litre (Cylindrical & Vertical), from 150 to 1000 litre (Loft tanks).

HR Profile of Nandi Group of Companies

The total manpower in this organization is 6,468. The total manpower is classified into two categories (a) Managerial Level and (b) Operational Level.
Table 2.01
Managerial Level Personnel in Nandi Group of Companies

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<th>S.No.</th>
<th>Designation</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Managing Director</td>
<td>1</td>
<td>1.72</td>
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<tr>
<td>2</td>
<td>General Managers (Production, Marketing, Finance &amp; HRD)</td>
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<td>10.34</td>
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<td>3</td>
<td>Production-in-charge (Production Managers)</td>
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<td>8.62</td>
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<tr>
<td>4</td>
<td>Quality Control Managers</td>
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<td>10.34</td>
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<tr>
<td>5</td>
<td>Regional Managers</td>
<td>40</td>
<td>68.97</td>
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</table>

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Total

58

100.00

Source: Records of the Companies

Table 2.02
Operational Level Personnel in Nandi Group of Companies

<table>
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<th>S.No.</th>
<th>Designation</th>
<th>Number</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
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<tr>
<td>2</td>
<td>Sales Representatives</td>
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<td>Clerk</td>
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<td>Operators</td>
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<tr>
<td>5</td>
<td>Workers</td>
<td>3,585</td>
<td>55.93</td>
</tr>
</tbody>
</table>

---

Total

6,410

100.00

Source: Records of the Companies

(B) Panyam Cements & Mineral Industries Limited

Panyam Cements & Mineral Industries Limited was established during 1955. Initially it was started with one kiln with a 200 TPD installed capacity. Later, the capacities were augmented by the addition of two more kilns with 300 TPD and 600 TPD capacities. Over the years, the wet process kilns were converted into dry process and the capacities were increased to a level of 2200 TPD. The company manufactures high quality PPC, OPC 43 and
OPC 53 grade cement. The factory is located at Cement Nagar, Andhra Pradesh. The products include OPC 53 Grade Cement, OPC 43 Grade Cement, and PPC Cement.

(C) SPY Agro Industries Ltd.

SPY Agro Industries Ltd., located at Nandyal, Kumool District, is a modern Grain based distillery producing Grain Neutral Spirit from variety of grains. The plant is a state of art design, operates on continues fully automated software with latest technology and equipment and higher level of automation in order to produce superior grade extra Neutral alcohol (Grain Neutral Spirit) consistently. ENA quality meets the best Indian & International standards and can be suitable to produce superior grades of IMFL. They have their in house bottling operations. Blending and bottling set up is also versatile in customizing a variety of blends as per the requirements. The main manufacturing plant is located at Nandyal, Andhra Pradesh. Products include ENA, Rectified Spirit, Ethanol, Liquified Co2, Dry Ice, and Cattle Feed.

(D) Nandi Milk Products Pvt. Ltd.

Nandi Milk Products Pvt. Ltd. was incorporated in the year 1997, under the aegis of Sri. S.P.Y Reddy, Founder Chairman, Nandi Group of Companies. The company initially started procurement of milk from nearby places in the district and marketed it under the brand of Nandi. Over the decades the company has grown and has presence in Tamil Nadu, Karnataka. The company is equipped with state of art processing machinery and has sophisticated laboratory to process and check the quality of the milk. The company is known for providing high quality milk and milk products. The company’s main processing centre is located at Nandyal, Kurnool District. It also operates multiple processing centres in the State. Products include Skim Milk, Double Toned Milk, Toned Milk, Standardized Toned Milk, Gold Milk, and Ghee.
Nandi milk products Pvt. Ltd is an industry that can procure their milk for places in four districts. It was started in the year 1997. From the year 1997-2009 the company has developed the business day-by-day. The company is not only improving the brand name but also overtaking the competitor's brands. After change of management the brand image of these products has improved. Customers belong to low and middle income group. They consider price rather than quality. The company had to create awareness among the customers about the company's quality standards.

The milk products of the company are: (a) Skim Milk, (b) Double Toned Milk, (c) Toned Milk, (d) Standardized Milk, and (e) Gold Milk.

(a) Skim Milk: It is a milk product from Nandi dairy. In this milk fat content is 0%. There are three quantity variants: 1000ml (Price Rs.22.00); 500ml (Price Rs.11.00); and 200ml (Price Rs.5.00).

(b) Double Toned Milk: It is another milk product from Nandi dairy. In this milk, fat content is 1.5%. This milk is sold in three quantity variants: 1000ml (Rs.23.00); 500ml (Rs.13.00); and 200ml (Rs.5.50).

(c) Toned Milk: It is another milk product from Nandi dairy. In this milk, fat content is 3 per cent. This milk is also sold in three quantity variants: 1000ml (Rs.25.00); 500ml (Rs.13.00); and 200ml (Rs.6.00).

(d) Standardized Milk: It is yet another variant in milk products from Nandi dairy. In this milk fat content is 4.5 per cent. This milk is also sold in three quantity variants: 1000ml (Rs.27.00), 500ml (Rs.13.00), and 200ml (Rs.6.00).

(e) Gold Milk: It is another variant in milk products from Nandi dairy. In this milk, fat content is 6 per cent. This milk is also sold in three quantity variants: 1000ml (Rs.28.00), 500ml (Rs.14.00), and 200ml (Rs.7.00).
Procurement, Pasteurization & Homogenization of Milk Products:

(a) **Milk Collection**: The dairy procures milk from the farmers in the surrounding areas - Bestawarpeta, Mydukur, Jammalamadugu, Tadipatri, Nandikotkur, Kodumur and Nandyal.

(b) **Pasteurization process**: In this Pasteurization process milk is heated at 80°C, later milk is cooled at 4°C by this 95% bacteria is removed under 4°C cold. By this milk life will be increased due to pasteurization minimum 2 days for marketing.

(c) **Homogenization process**: This process is done after the pasteurization process. This process is done for the taste. In this process fat liabilities will be breaking and milk is formed in uniform quality Milk appears in a white color. Curd will be thick.

(d) **Packaging process**: Packaging plays a prominent role in milk products. In the packaging process polythene cover is used for packaging. While packaging the milk quality of the milk products should be checked in the laboratory. Then milk can be packed and kept in trays in cold storage until loaded in transport vehicles.

(e) **Distribution**: Nandi Milk products Pvt. Ltd. has got single level of channel distribution for the Milk products. Nandi dairy has an extensive network of 700 dealers in Rayalaseema area and 900 dealers in Andhra Pradesh, who form direct sales force organisation. Transport system of Nandi Dairy Products Pvt. Ltd. is very admirable. Strength of the organization enables the delivery system to be efficient. This even helps the dealers to reduce inventory to the minimum. These dealers are also supplemented with benefit of the lower tied-up capital in the form of inventory.

**Other Information about Nandi Dairy**: The company is equipped with sophisticated laboratory to carry on tests so as to maintain outgoing quality levels of dairy products. We speak for itself for the quality of milk, numbers of statistical quality control techniques are applied to sustain the quality level of the product. Managers at the company
are dynamic and are well educated. Supervisory staff are adept in tackling their area are not highly educated. Most of the skilled or unskilled labors are duty minded. Company provides E.S.I (Employment State Insurance) and provident fund facilities to all its employees. Uniqueness of the workers of Nandi dairy is their no-indulgence in trade union activities. As the company is located in industrial estate of Nandyal, it is facilitated with good communication network, with telex, fax machine and internet. Company has also got the support of electronic data processing. The company’s major strength is considered to be transportation vehicles. Huge investment is made on transportation vehicles. A unique cash outflow justifies itself by providing good reputation to the company through improved customer service.

**Organisation:** The dairy is organized into different departments.

i. **Financial Department:** Though initially the company approached the external source and financial status of the company is very sound and is being run only with self finance except for loan taken on hypothecation from SBI Nandyal. The financial manager, with help of four accountants and other clerks, heads the financial department. The company follows ‘cash and carry’ policy for Nandi brand. The product is not delivered until the cash is not paid and financial department with the help of marketing department looks after this transaction.

ii. **Marketing Department:** The marketing department is headed by the marketing manager who reports to executive director, an assistant marketing manager who reports to marketing manager and 200 salesmen headed by 50 sales representatives who are headed by assistant marketing manager. Marketing mix and advertising particulars of Nandi Milk products Pvt. Ltd. shows the department in the organization.
iii. **Personnel Department (HR):** The personal department consists of the details of the executives and workers of the organization. The organization is formed with Sri S.P.Y. Reddy as the managing director and executive director who reports managing director, two marketing managers, financial manager, a HR manager and a public relation officer and a quality control officer who all reports to executive director, other than executives there are 2875 workers in the organization. The recruitment and selection of personnel is made by panel consisting of managing director, executive director and managers of concerned departments. Apart from the attractive salaries company provides health care facilities etc. and Tiffin, tea, lunch, and dinner at their duty times.

**Organization Chart of Nandi Products Pvt. Ltd.**
(E) Nandi TMT Bars Pvt. Ltd.

NANDI TMT steel bars are coming from well known NANDI Group, a group with strong foundation and a mission to serve the people with ISI quality steel at reasonable price. Your ‘Search for good quality steel should end at Nandi TMT’ is our motto. ‘NANDI’ has been a well known brand in PVC related industries since 1988 with various other products like Cement, Ethanol, Dairy Etc. Ensuring deep rooted trust, Nandi Group ventured into steel industry by establishing Nandi TMT Bars Pvt. Ltd. near Nandyal, Kurnool District, A.P. with a vision to serve local and international markets. The main manufacturing plant is located at Nandyal, Andhra Pradesh. Products include TMT Bars, Steel Flats, and Steel Angles.

(F) Sujala Infrastructure Pvt. Limited

Sujala Infrastructure Pvt. Limited is another company coming under Nandi Group of Companies. It operates from Nandyal, Kurnool District. They have started one IT company also. It is confined mostly to education and training in Information Technology. It also operates from Nandyal, Kurnool District.

2.03 Profile of the Respondents

Altogether 487 employees have been selected from four different departments – Marketing, Production, HR and Finance – at random for the purpose of eliciting opinions on the aspects relating to Organisation Citizenship Behaviour. A brief profile of the respondents is given hereunder.

Table 2.05 shows age-wise distribution of the respondents. From the table it is clear that 54.62 per cent of the respondents are in 25-35 years age group, 39.01 per cent of the respondents are in 36-45 years age group and only 6.37 percent of the respondents are more than 45 years of age. It can also be said that 54.62 per cent of the respondents less than 36 years of age and 93.63 per cent of the respondents are less than 46 years of age.
Table 2.03
Age-Wise Distribution of the Respondents

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Age (Years)</th>
<th>Frequency</th>
<th>Per Cent</th>
<th>Cumulative Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25-35</td>
<td>266</td>
<td>54.62</td>
<td>54.62</td>
</tr>
<tr>
<td>2</td>
<td>36-45</td>
<td>190</td>
<td>39.01</td>
<td>93.63</td>
</tr>
<tr>
<td>3</td>
<td>Above 45</td>
<td>31</td>
<td>6.37</td>
<td>100.00</td>
</tr>
<tr>
<td>---</td>
<td>Total</td>
<td>487</td>
<td>100.00</td>
<td>---</td>
</tr>
</tbody>
</table>

Source: Field survey

Fig: 2.01
Age of the Respondents

Table 2.04
Gender-Wise Distribution of the Respondents

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Gender</th>
<th>Frequency</th>
<th>Per Cent</th>
<th>Cumulative Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>367</td>
<td>75.36</td>
<td>75.36</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>120</td>
<td>24.64</td>
<td>100.00</td>
</tr>
<tr>
<td>---</td>
<td>Total</td>
<td>487</td>
<td>100.0</td>
<td>---</td>
</tr>
</tbody>
</table>

Source: Field survey
Table 2.04 and figure 2.02 show gender-wise distribution of the respondents. About 75 per cent of the respondents are male members and about 25 per cent of the respondents are female members.

Table 2.05  

Education-Wise Distribution of the Respondents

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Education</th>
<th>Frequency</th>
<th>Per Cent</th>
<th>Cumulative Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SSC</td>
<td>161</td>
<td>33.06</td>
<td>33.06</td>
</tr>
<tr>
<td>2</td>
<td>Intermediate</td>
<td>96</td>
<td>19.71</td>
<td>52.77</td>
</tr>
<tr>
<td>3</td>
<td>Graduation</td>
<td>75</td>
<td>15.40</td>
<td>68.17</td>
</tr>
<tr>
<td>4</td>
<td>Post Graduation</td>
<td>55</td>
<td>11.29</td>
<td>79.47</td>
</tr>
<tr>
<td>5</td>
<td>Technical (ITI/Polytechnic)</td>
<td>100</td>
<td>20.53</td>
<td>100.00</td>
</tr>
<tr>
<td>---</td>
<td>Total</td>
<td>487</td>
<td>100.00</td>
<td>---</td>
</tr>
</tbody>
</table>

Source: Field Survey
Table 2.05 shows educational qualifications of the respondents. In this organization educational qualifications of the employees vary from SSC to PG apart from technical ones. As per the table 33.06 per cent of the respondents have studied up to SSC, 19.71 per cent of the respondents have studied up to Intermediate, 15.40 per cent of the respondents are graduates, 11.29 per cent of the respondents are postgraduates, and 20.53 per cent of the respondents are technically qualified persons. Technically qualifications include ITI and Polytechnic.

**Table 2.06**
**Experience-Wise Distribution of the Respondents**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Experience (Years)</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than 6 Years</td>
<td>60</td>
<td>12.32</td>
<td>12.32</td>
</tr>
<tr>
<td>2</td>
<td>6 - 10 Years</td>
<td>151</td>
<td>31.01</td>
<td>43.33</td>
</tr>
<tr>
<td>3</td>
<td>11 - 15 Years</td>
<td>161</td>
<td>33.06</td>
<td>76.39</td>
</tr>
<tr>
<td>4</td>
<td>16 - 20 Years</td>
<td>70</td>
<td>14.37</td>
<td>90.76</td>
</tr>
</tbody>
</table>
Table 2.06 and Figure 2.04 show experience of the respondents in years. As per the table 12.32 per cent of the respondents have less than six years of experience, 31.01 per cent of the respondents have 6 to 10 years of experience, 33.06 per cent of the respondents have 11 to 15 years of experience, 14.37 per cent of the respondents have 15 to 20 years of experience and 9.24 per cent of the respondents have more than 20 years of experience. Cumulative per cent column of table 2.06 shows that 12.32 per cent of the respondents have less than six years of experience, 43.33 per cent of the respondents have less than 11 years of experience, 76.39 per cent of the respondents have less than 16 years of service, and 90.76 per cent of the respondents have less than 21 years of service.

Age-wise, gender-wise, education-wise and experience-wise distribution of the respondents forms the basis for analyzing the responses of the respondents.