MM Engineering is a Brainchild of a black woman entrepreneur, Ms Manana Bogatsu, who is actively wholesale trading petroleum products and LP Gas and other petroleum related products. Ms Manana identified an opportunity on the gas value chain, and MM Engineering Services was established.

MM Engineering Services (Pty) Ltd an associate company of Mmapho Group (PTY) Ltd, are in the process of building a technologically advanced Low Pressure Cylinder Manufacturing Plant, in COEGA, in partnership; Dti and IDC.

This innovative project, in addition to its value adding job creation initiative, can be viewed, as a strategically important element in the Energy Supply Chain, the purpose of which is to reduce South Africa’s almost total dependents on, imported gas cylinders.
Sub-Saharan Africa’s persistent power shortages act as a severe constraint on its economic and human development. Over the last several years, a series of major offshore gas discoveries in Mozambique and Tanzania have rekindled interest in expanding the use of natural gas to address the continent’s power shortages.

In 2014 load shedding, where Eskom was operating its costly diesel-fired OCGT at significantly higher than intended loads. With power generation as the anchor tenant, the demand of costeffective renewable energy sources like LPG is considered the best alternative.

In accordance with our Strategic Business Objectives and as part of our Advance Product Quality Planning program we are in the process of finalizing the structure of the supply chain, up and down stream. As a Customer Focus Company, we are committed to meeting the needs and expectations of our Customers, Investors and Shareholders; Partners, Employees, Suppliers and Society.
Our Vision

- Improve Supply Chain and Circulation of LPG Cylinders Effectively.
- Reduce Costs of Cylinders by using local sources raw materials.
- Improving Quality and Reliable LPG Cylinders.
- Increase Flexibility and Sustainability.

Our Mission

To manufacture superior quality Cylinders while adhering to all necessary statutory regulations and standards. We are committed is to increase the number of Cylinders in circulation Southern Africa while helping creating businesses and jobs down stream.
Our **Strategic Objectives**

Our strategic objectives are established and implemented at all functional levels of the Company. These strategic objectives are documented, measurable, and consistence with our stated Policies. We define our Strategic Objectives, using the DMAIC / Process Approach to management and the industry benchmarks to ensure:

- The Business and Market opportunities are valid.
- We meets the needs and expectations, of our Customers, Shareholders, Partners, Employees, Suppliers and Society, in a manner that complies with statutory and regulatory requirements.
- The value our competitors are bringing to the market is known and to what extent we have to bring a superior value to retain or grow our market share.
- Operations, process steps and instruction are well defined.
- Resources, personnel and plant equipment are suitable and effective for the various processes.
- Failure Mode Effect Analysis and other risk management tools are used to quantify the risk to achieving our Strategic Objectives.
- Control Plans, SPC tools and procedures are put in place, to manage the identified risks, supported as appropriate, by mandatory process qualification / test runs, to ensure world class performance levels (> Cpk 1.67 / six sigma ) and our Strategic Objectives can be achieved and sustained.
Currently in South Africa 99.9% of the LP Gas Cylinders are Imported and the aim is to close the importation gap and allow all participants in the LP Gas Industry equal opportunity to capture their own markets down stream (Retail).

“The number of cylinders in the market affects the competitiveness of the supplier and the owner. The greater the number of cylinders you own and are able to refill, the better your turnaround time for fulfilling orders. Having low numbers of cylinders will impact on your margin as you will need to spend more money on retrieving cylinders in order to refill.” - (MARKET INQUIRY INTO THE LPG SECTOR, MARCH 2017 FINAL REPORT - Competition Commision South Africa)
LPG Plant Design

Our automated LPG Cylinder Manufacturing Plant (LPGM Plant), was designed in Europe, with Siemens advance, S7 1200+DI+DQ, PLC’s in accordance with the requirements of our Advance Project Quality Planning Program (APQP), the LPGM Plant has the design capability to produce 500000 to 1 500 000, cylinders per year, depending on the work shift structure and the cylinder type.

The implementation of our Advance Project Quality Planning, during the design phase of the LPGM Plant, ensures that:

■ The LPGM Plant utilisation and efficiency design targets can be achieved.
■ Each machine is designed as part of the total Value Streaming Process Network, to minimise to the greatest extents possible, the non valuing adding handling / storing of components, while ensuring the Plant is robust / stable, and capable of achieving the Companies productivity, quality, cost and delivery objectives.
■ Machine Design Failure Mode Effect Analysis (MFMEA) was carried out and the output from which, was incorporated in to the Machine Design Specifications, Control Plans, Contingency Planning Programs, Critical Spare Parts Lists, Predicative and Preventative Maintenance Schedule and the as built Plant Manual.
■ Machine / Process / Product characteristics are defined and the variability of the defined characteristic is controlled to a level of Cpk > 1.67.
Our Production Process

LPG Cylinder Production within the guidelines of the international standards such as EN 1442 involves several process steps starting from forming to final testing that can be streamlined into the following lines:

1. Blanking & Body Forming Line
2. Valve Guard Ring & Foot Ring Production Line
3. Valve Neck (Valve Boss or Neck Ring) Production Line
4. Welding, Heat Treatment and Hydrostatic Testing Line
5. Surface Coating Line
6. Finishing Line with Pneumatic Testing

BLANKING AND BODY FORMING LINE:
In the core of the forming line there stands a versatile double action REPKON hydraulic deep drawing press that forms the cylinder halves out of round blanks that are blanked by a single action double blanking REPKON press or directly from the coil material by help of REPKON design combined deep drawing, piercing and blanking die set.

The edges of the upper and lower halves are further processed by REPKON trimming and joggling machines to the perfection stemming from the sheet metal forming expertise of REPKON to make it read for the body seam welding after degreasing.
WELDING, HEAT TREATMENT & HYDROSTATIC TESTING LINE:
The submerged arc welding technique is applied on the welding of body halves on the seam welding machine and generally on the welding of the valve boss to the upper cylinder halve.

The welding automats with reliable welding power packs and control units are utilized to achieve the uncompromising weld quality with degree of automation needed for the required production capacity per customer. The MIG/MAG welding technique is applied for the welding of foot rings and valve guard rings with the body halves.

In order to relieve all the stresses caused by forming and welding operations, the cylinders are passed through a heat treatment furnace where they are exposed to 930°C degrees of temperature for certain time before getting cooled gradually.

SURFACE COATING & FINISHING LINE:
The LPG cylinders surfaces are shot blasted by the shot blasting machine in order to clean up the scales caused by the heat treatment operation to make the surface ready for the painting and or zinc spraying for those customers who requires zinc coating before painting.

The double layer over cured painting of the cylinders is achieved automatically by the robotic paint application system in the painting line as the cylinders conveyed on overhead conveyor system through the primary and final coat painting cabinets separated by flash off tunnels before they get cured in the canopy type modern paint curing oven. After the tare weighing and marking of the cylinders, the valves are attached by automatic torque controlled screwing machines and tested against any leakage at the valve region by the pneumatic leakage testing machine of the finishing line.

One of the batch type quality control equipment called by the international standards is the burst expansion testing unit where the volumetric expansion ratio and the burst pressure is measured to the full satisfaction of even most stringent requirements.
Our Quality Management System incorporates all the mandatory Pressure Gas Cylinders statutory, regulatory, national and international Codes, Standards and Specifications requirements. The Companies Best Management Practice and Process Approach to business using the BMP tools, is at the very core of our operations, to ensure our Business Costs, Quality and Delivery objectives are continually realized.
High Level LPG Value Chain

The production and supply of LPG in South Africa involves many players in the value chain, including the refineries/producers, wholesalers, distributors, dealers, retailers and end-users. Refineries or producers are typically involved at all levels of the supply value chain, from the acquisition of crude oil up to the importation of cylinders and or bottle retailing level. Some major wholesalers or distributors also participate in the downstream transportation, bottling, storage and distribution of LPG. Retailers or dealers may also be involved in filling LPG cylinders to sell to small industrial/commercial or household end-users. There are six refineries located around South Africa, of which five produce LPG. These five refineries account for producing over 80% of LPG consumed in South Africa annually. Increase in market concentration amongst the wholesalers may facilitate an environment conducive to collusive outcomes at the broader wholesale, bulk and cylinder levels of the value chain, hence also the need to increase the number of cylinders in circulation to accommodate the demand and that’s where MM Engineering Services comes in.
Case Study

Cylinders are a necessary route to market to compete effectively in this sector. Consequently, wholesalers have invested in the cylinder market to ensure that their stock of cylinders is sufficient to meet market demand but while experiencing high importation cost.

As shown in Table above, the 9 kg cylinders accounted for at least 60.3% of all cylinders in circulation, followed by the 19 kg cylinders at 15.6%. The 5 kg cylinders are considered the most effective cylinder size for low-income households in South Africa. These cylinders accounted for only 7.9% of the cylinder population in circulation, indicating there is room for increased penetration using this cylinder size.
Cylinder ownership models in South Africa and in other countries

Various types of cylinder ownership models have been observed in various jurisdictions, namely: (i) Company-owned cylinders; (ii) Customer-owned cylinders; and (iii) The white cylinder.

In South Africa, cylinder ownership predominantly resides with the LPG wholesalers. End-users pay a cylinder deposit entitling them to use the cylinder while the wholesaler retains ownership thereof. When the end-user no longer requires the cylinder, they return it and their deposit is refunded. Customers are able to exchange the empty cylinder for a full cylinder at numerous swapping points like petrol stations.

This company-owned cylinder model is the standard model used in most of the European, Asian and African markets. This model has numerous benefits: (i) It enables a full-for-empty exchange; (ii) Centralised filling reduces costs due to scale efficiencies; (iii) It reduces safety risks as filling takes place at fewer re-filling sites where risks can be consolidated and managed; and (iv) As each company's brand is printed on its cylinders, adherence to safety regulations and standards is more likely, given the reputational threat should it release unsafe cylinders into the market. The customer-owned cylinder model is employed in the United States, Mozambique and Zimbabwe.

Under this model, the customer makes the investment in the cylinder and has the advantage of being able to fill cylinders at any agent.

In the white cylinder approach, employed in countries like Poland and China, where there is a general pool of cylinders in the market that can be filled by any licensed filling plant and sold or exchanged to any customer. As with the customer owned approach, the customer purchases the cylinder.