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FOREWORD

1. The Dte of Indigenisation, HQ Base Wksp Group has the onerous task of Indigenisation of spare parts, major systems/sub systems of various wpn systems of import origin in order to sustain, enhance reliability and retain these in battle worthy condition. The transition of support ex import to the indigenous base has to be proactive and cost effective.

2. An attempt has been made in this direction by formulating a “15 yr perspective plan for indigenisation ” in support of wpn systems of the Indian Army. The Mission though simple is full of challenges. By taking small steps into the field of Indigenisation, the ultimate goal of an indigenous sustainment base in maintenance of complex imported systems can be achieved.

3. I am sure by leveraging the large industrial base existing within the country and a focussed, pragmatic approach, significant cost advantages can be achieved.

Hope, Team BWG will accomplish it.

Station : Meerut Cantt

Dated : Jul 2010

(NB Singh)
Maj Gen
Commander

15 YR PERSPECTIVE PLAN FOR INDIGENISATION

Background

1. India has been dependent on foreign industries for its military hardware for a very long time. While the desire to achieve self-reliance had always been there, constraints of technology and resources prevented the process from fructifying to the extent desired. The growth of defence industry in India, post independence, can be divided into three phases. The first phase was characterized by the State led industrialization. The second phase was led by raising of Public Sector units for defence production. The third phase is marked by the inclusion of Private Sector for production of Military hardware. Since the era of liberalization, which began in 1991, the Private Sector participation has substantially increased in defence industry wherein they have been playing a significant role of sub contractors and ancillary industries. The private sector has been involved in supply of raw materials, semi-finished products, parts and components to defence PSUs, Ordnance Factories and to Base Workshops of Army.

2. Considering the capital intensive nature of defence industry sector as also the need to infuse foreign technology and additional capital including FDI, Govt. decided in May, 2001 to open defence industry for private sector participation subject to licensing. This step was taken by the Government to mainly leverage the in-built advantages of the private sector which are its reservoir of management, scientific and technological skills coupled with its ability to raise resources. With this policy change all defence related items have been removed from Reserved Category and transferred to the Licensed Category, as a result of which private sector can manufacture all types of defence equipment after getting a license. After the announcement of policy changes, there has been a paradigm shift in the role of Private Sector in the field of Indigenisation, i.e., from the role of supplier of raw materials, components, sub-systems, they can now become partners in the manufacture of complete range of advanced equipment/system.

Broad Approach to Indigenisation In The Indian Army

3. The Indian Army holds a sizeable number of equipments of import origin. During initial procurement limited quantity of spares is procured along with the equipment, however, by the time the equipment is exploited in the field, spare support from the OEM dwindles, as production lines generally closed or are diverted to other products, due to the rapid change and advancement in the field of technology. The support to such equipment at this stage gets confined to the indigenous efforts only. To keep such equipment battle worthy the Army Indigenisation programme has been instituted which is basically aimed at developing major systems and sub systems, such as propulsion plants, prime-movers for power generation, hydraulic systems, auxiliary system, electrical and electronic systems etc, of above mentioned vehicles, weapon system etc. While many of the systems and sub systems used

in them would have to be developed denovo some of them could be easily adapted from items available commercially of the Shelf (COTS).

Vision and Mission

4. The DOI vision or end state is to create an org that is modern, tech savvy and highly responsive, flexible enough to meet the peace & war time sustainment requirements of the Army.

5. The Mission of DOI is to carry out purposeful indigenisation of spare parts, sub-systems, special maintenance tools, test equipment and entire equipment (nor-war like) with a view to effecting significant savings in life cycle costs of imported weapon systems.

Steps Involved in Indigenisation

6. The acquisition of Defence Equipment and modernization of the Indian Army are complex processes governed by procedures given in the Defence Procurement Manual 2009 (DPM 2009). The general guidelines given in chapter 15 of the DPM 2009, on Design, Development & Fabrication Contracts will be applicable for Indigenisation efforts in the Army. Some of the vital steps involved in the process of Indigenisation are as listed below:-

(a) Identification of items for Indigenisation.

(b) Benchmarking of price.

(c) Generation of drawings /Quality Assurance Instruction / specifications.

(d) Identification of vendors / firms.

(e) Framing and Issue of Request for Proposal (RFP).

(f) Technical evaluation of bids and holding of TPC/CNC.

(g) Conclusion of contract.

(h) Post contract management.

Major Enabling Provisions in DPM 2009

7. In order to encourage Private Industries to make investment in defence sector there are many enabling provisions included in the DPM 2009. Some of the enabling provisions are as under:-

(a) Private Sector will be encouraged as sources for placement of development order.

(b) Development contracts, as far as feasible, will be concluded with two or more contractors in parallel, subject to the other vendor/s agreeing to match the price of L1.

(c) The ratio of splitting of the supply order between various development agencies/firms in cases of parallel development, including criteria thereof, will be pre-disclosed in the RFP itself.

(d) Economical Development Quantity ((EDQ). Minimum five years requirement of items selected will be taken up as EDQ while placing development order. The EDQ will be decided by Indigenisation agency based upon considerations like development cost, break-even cost and the urgency/criticality of the item. As such the quantity vetting is not applicable since wastage data is yet to be established. EDQ will be worked out as under:-

EDQ = { (Qm/n) Yn} + Sd where

Qm	=	Quantity contracted in MRLS
n	=	No of yrs for which MRLS contracted.
Yn	=	No of yrs including development period for which item to be considered for Indigenisation.
Sd	=	Depot Sealed bin samples.

(e) In case the requirement is meager and complex technology is involved, a single source having expertise in the requisite field may be considered provided the contractor or the firm is in a position to execute bulk production orders subsequently.

(f) During the developmental stage 20% of the total order quantity may be earmarked for development. Outsourcing the development of equipment /systems having high technology content will be considered on the lines of parallel development for which the cost will have to be shared with the vendor. Certain dispensation will be given to firms undertaking Development Contracts. Details are as under:-

(i) The contract documents will be issued free of cost.

(ii) Submission of earnest money deposit and security deposit may not be made mandatory in case of firms of repute/firms which are registered with DGS&D, DGQA/DGAQA or other Departments/Services on case to case basis.

(iii) Development orders placed on firms may not have a liquidated damage clause, if it is found difficult to attract vendors to develop the item/ stores, whose specification is normally not governed by any widely used standards like IS/BS, etc.

Vendor Identification / Development

8. Wherever possible, the vendors who are registered with DGAQA/DGQA/DRDO/OFs/ DPSUs/Services Indigenisation agencies/ NSIC will be approached.

9. Unregistered firms may be considered taking into account their infrastructural facilities, capacity, technical competence and financial standing. A format for this purpose is enclosed at Form DPM - 5. Firms of national repute may also be considered based on self-certification, with the approval of the Defence Secretary.

Development of Vendor Source

10. For the development of sources following procedure will be followed:-

(a) Open advertisement will be placed on the internet and by placing advertisement in leading newspapers every year, in respect of different products/components, for enlisting firms willing to participate in tenders issued by the Department/ Organization.

(b) The minimum number of products/components required to be submitted by the vendor for evaluation and likely demand for those products/components for the next two to three years will be indicated in the advertisement.

(c) Interested firms may visit the factory/workshop/depot as indicated in the tender to see the product/ component required to be developed. Thereafter, the firms showing interest in developing the product/component will be asked to submit the details of infrastructure available with them, as per the documents prescribed for vendor registration. The details of Army Base Workshop/Depot/ type of equipment overhauled by the ABW can be obtained from Dte of Indigenisation.

(d) The infrastructure details submitted by the firms interested in executing developmental order will be studied by a team of officers constituted to assess the manufacturing capability and to verify the genuine potential of the firm for developing the product/ component.

(e) Firms found capable of developing the product/component will be asked to submit the required number of samples (as advertised) of the identified product(s).

(f) On acceptance of samples the firm will be eligible for participating in the LTEs for the said component / product.

(g) In some cases development by a firm is feasible but may not be willing to submit sample due to requirement of a heavy investment. In such cases, the Indigenisation agency / Directorate may place a development order on the firm as follows:-

(i) The cost of the sample will be assessed through a Board of Officers having representation from Finance.

(ii) The firm will be asked to offer a quotation and if the price is found to be equal to or lower than the assessed cost, the development order will be placed on the firm at the price quoted.

(iii) If the firm quotes a price higher than the assessed cost, the price will be negotiated with the firm and development order placed at the assessed cost.

11. Assemblies / Sub assemblies taken up for Indigenisation are expected to meet the following requirements:-

(a) Assured performance in variegated environmental conditions and temperatures ranging from -55 ◦ C to +70 ◦ C.

(b) Use of appropriate material and metallurgical composition to withstand rigors of temperature.

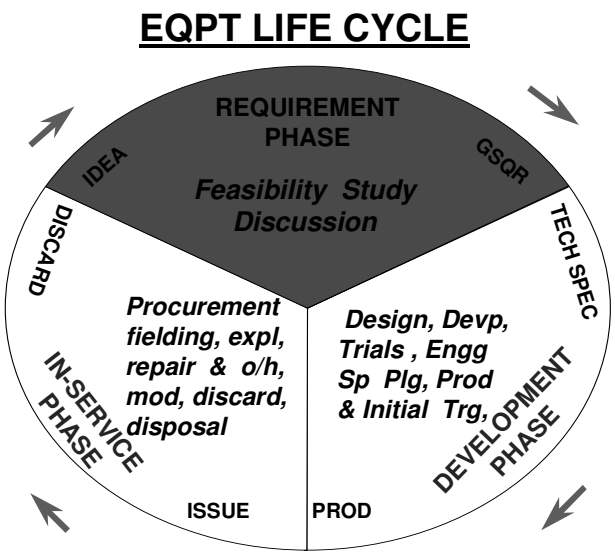
(c) Attenuation of impact load by appropriate vibration mountings.

(d) Modularity of design to assure high level of maintainability and low Mean Time to Repair.

(e) Reliable operation to ensure high Mean Time Before Failure.

(f) Assured spares backup to support equipment for the complete duration of its expected service life.

Life Cycle Management and Role of Indigenisation



12. The Figure above shows a typical equipment or weapons system life cycle from womb to tomb, in a simplified manner. An integrated systems approach in the Army ensures that all facets of equipment management functions are planned in advance, and activities co-ordinated to provide an optimal solution to the equipment management issues.

13. **Requirement Phase**. Long term mission scenario is looked into at the Army HQ, covering a period of the next 20 to 25 years i.e. the life span of a weapon system. This leads to a tentative equipment requirement. The tentative requirement after feasibility study and discussion with Defence Research and Development Organisation is converted into a definite concept and a 'Qualitative Requirement'. Thus phase one of equipment life cycle is the 'Requirement Phase' where actual requirement is conceived.

14. **Development Phase**. The Research And Development organisation converts user's requirement into technical specifications and the development begins. Depending upon the complexity of equipment or weapons system the development cycle may take 2-10 years. However, all equipment does not undergo this phase. Certain equipment is bought off the shelf/ imported based on the GSQR. Hitherto fore the Indigenisation of equipment that is imported was considered only in the in-service phase. Experience has shown that the time taken to indigenize is very long and hence it is beneficial to start the Indigenisation activities along with the import procurement stage so that delays don't occur in subsequent stages.

15. **In Service Phase**. In this phase the equipment is inducted into the Army and exploited till it is finally discarded. Equipment replacement decisions are taken much before the discard and de-induction of the current equipment. This explains the overlap between the in the service phase of current and induction phase of new equipment in the life cycle. Previously the decision to indigenize was taken during the fag end of this phase but more recently the Indigenisation process begins as soon as the import is inducted into the Army. This gives all development agencies sufficient time to indigenize.

Technology Scan of In service and Futuristic Systems

In Service Systems

16. The aim of Indigenisation is to find suitable indigenous replacement for each of the system and subsystem of vehicles/equipment of foreign origin presently available in the Indian Army. In the subsequent paragraphs we shall carryout a technical scan of some of the major systems and subsystems of Vehicles/equipment held in the Army. These could be broadly classified into following systems/subsystems:-

(a) Power plants.

(b) Transmission systems.

(c) Steering, suspension and braking systems.

(d) Fire control systems.

(e) Electrical systems.

(f) Hydraulics systems.

(g) Pneumatic systems.

(h) Optronic systems.

(j) Micro systems.

(k) Embedded systems.

(l) Radars.

(j) Comn Sys

(k) Missiles and Electronic Warfare Sys

17. **Power Plants**. Power plant mainly consists of engine, its auxiliary mountings and accessories required for increasing the efficiency of the engine. Defense equipment and vehicles are equipped with engines ranging from 20 BHP to 1200 BHP as mounted in Armoured light vehicles and wheeled vehicles. These engines are Inline and V type made for petrol, diesel and multi-fuel as well. The latest engine following euro pollution norms are fitted with MPFI (multi point fuel injection) system and CRDI (common rail direct injection system). Replacement power plant for most the imported vehicles will have to be found indigenously as engines, ex-import, are mostly not available. The essential considerations for selection of a replacement power plant will be:-

(a) The BHP required from the power plant.

(b) Type of fuel used by the engine.

(c) Space constraints when it is to be substituted indigenously specially in the cases where engines ex-import are not available.

(d) Pollution norms as required by Government regulations.

(e) Specific atmospheric conditions under which the equipment is required to operate eg. ambient temperature, humidity, dust, under water.

(f) Type of cooling system required as per specific service conditions air/water cooled.

(g) Noise level required to be minimized for stealth and concealment specifically for A vehicles and Arty equipment.

(h) RPM required for forward and reverse speeds.

(j) The above listed points are not exhaustive but give a general idea of what will be considered for selection of a replacement power plant.

18. **Transmission Systems**. Transmission system includes the clutch and arrangement of gears that transmit power from an automobile engine via the driveshaft to the live axle. Clutch Plate which is basically the heart of a transmission system is a coupling that connects or disconnects driving and driven parts of a driving mechanism for sudden stoppages and changing vehicle requirement for high speed low torque and vice versa. As regards the gear arrangement there are four types of basic transmission system which are available in the Army vehicles / equipment:-

(a) Constant mesh
(b) Sliding mesh
(c) Synchro mesh
(d) Automatic transmission system

19. Depending upon the terrain conditions in which A/B vehicle has to ply the number of dead and live axles could be 4x4, 6x6 or 8x8. The transmission mechanisms could be hydraulic system or operated manually with a gear lever and a clutch pedal. The transmission system should be compatible with the power plant and can be accommodated in the available space for the power plant and the transmission system together in the existing compartment. The endeavor would be to replace the complete power plant and transmission system from the same OEM so that there are no complications while retrofitting and getting output.

20. **Suspension systems**. In the Army, following suspension system are available/likely to imported:-

(a) **Mechanical System**. This is the most common type of suspension available in the Army B Vehicles. It mainly consists of leaf springs / springs.

(b) **Hydraulic Fluid and Air Suspension**. A suspension system that is a combination of hydraulic fluid and air in which the elastic medium is sealed, fixed

mass of air, and no air compressor is required. The hydraulic portion of each spring is a cylinder mounted on the body sill and fitted with a plunger that is pivotally attached to the wheel linkage to form a hydraulic strut. Each spring cylinder has a spherical air chamber attached to its outer end. The sphere is divided into two chambers by a flexible diaphragm, the upper occupied by air and the lower by hydraulic fluid that is in communication with the hydraulic cylinder through a two-way restrictor valve. This valve limits the rate of movement of the plunger in the cylinder, since fluid must be pushed into the sphere when the body descends and returned when it rises. This damping action thus controls the motion of the wheel with respect to the sprung portion of the vehicle supported by the spring. They are also called as pneumatic suspensions.

(c) **Electronic and Active suspensions**. These types of suspension system are not prevalent in the Army as of now but these could be used as replacement to existing suspension systems. The typical electronically controlled suspension system consists of several components in addition to the normal suspension components. Perhaps the most important component is the computer, which interprets input from various sensors that monitor such information as the automobile's height, pitch, and roll; how fast the wheels are spinning; and how quickly the automobile is turning. The simplest electronically controlled suspension systems merely maintain a level ride height, counteracting the tendency of the weight of passengers and luggage to lower the rear end. Systems with four-wheel height adjustment lower the automobile's ride height to reduce aerodynamic drag and improve fuel economy at highway speeds. In off-road vehicles, these systems can raise the vehicle to increase ground clearance over rough terrain.

(d) **Soft-Ride Mode And A Firm-Handling Mode**. These type of suspension systems are adjustable and allow the driver to switch manually between a soft-ride mode and a firm-handling mode. Some systems also offer intermediate choices. The most advanced systems automatically switch back and forth between soft and firm modes in milliseconds, depending on the condition of the road. These systems also work to keep ride height constant and to minimize roll.

(e) **Active Suspension**. This system incorporates a microprocessor to vary the orifice size of the restrictor valve in a hydraulic suspension or shock absorber. This changes the effective spring rate. Control inputs may be vehicle speed, load, acceleration, lateral force, or a driver preference.

21. **Fire control systems.** Fire-control system consists of number of components working together, usually a gun data computer, a director military and radar which is designed to assist a weapon system in hitting its target. It performs the same task as a human gunner firing a weapon, but attempts to do so faster and more accurately. The armament system of the tank/ Arty Gun can only make it possible to efficiently engage targets when firing static versus static engagements. The fire efficiency decreases

dramatically in case of firing from a stationary position at a moving target or firing on the move at static and moving targets. To overcome this drawback, the tank is fitted with an up-to-date fire control system which allows stationary and moving targets to be efficiently engaged while the platform is stationary or moving. Fire-control systems are often interfaced with sensors (such as radar, infra-red search and track, laser range-finders, anemometers, wind vanes, thermometers, etc.) in order to cut down or eliminate the amount of information which has to be manually inputted in order to calculate an effective solution.

22. **Electrical Systems.** The electrical systems are used to perform variety of functions that support the operations in number of Vehicles/ equipment held in the Army. These systems control starting, charging, braking, steering, lifting, movement of all attachments etc. Some of the basic components of the electrical system include storage battery, charging system, starting circuits, lighting system, motors, gauges etc.

23. **Hydraulic Systems**. In the hydraulic system motion and forces are transmitted through movement of fluids. In the equipment / vehicles used in Army hydraulic systems are basically used for power steering, braking systems, power transmission, lifting devices and opening and closing of heavy doors etc. The hydraulic system generally consists of components such as piston and cylinder and number of seals.

24. **Pneumatic systems**. The unique characteristic of air is its ready availability and compressibility. These contribute to pneumatic system design requirements that differ significantly from those of hydraulic sys. Pneumatic system basically consists of air control valves, air lines, air boosters and water separator units. The air boosters and air control valves are recommended to be replaced completely rather then repairing the diaphragms.

25. **Optronic systems**. Optronic Systems are used as sensor in various equipment, and predominantly in tanks and ICVs as Countermeasures System to act as decoy for incoming anti-tank guided, suppression of anti-tank guided missile guidance control systems that use laser semi-active homing systems with laser target illumination. Major components of the optronic countermeasures system consists of an aerosol screen laying system, optronic suppression station comprising of two jammers, two modulators and a control panel.

26. **Micro Systems.** Micro electromechanical systems (MEMS) also written as micro-electro-mechanical, Micro Electro Mechanical or "microelectronic and micro electro mechanical systems") is the technology of the very small and merges at the nano-scale into Nano electro mechanical systems (NEMS) and Nanotechnology. MEMS are also referred to as Micro machinery in Japan or Micro Systems Technology - MST (in Europe). They could be categorized by type of use such as Sensor, Actuator, or Structure or by the field of application (Commercial applications include). Micro systems are provided in the equipment/Vehicles to execute precise and accurate jobs.

27. **Embedded Systems**. An embedded system is a Computer system designed to perform one or a few dedicated functions often with Real time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices commonly in use in Army today. Physically, embedded systems range from portable devices such as Guns and Radio communication system to large stationary installations like Radars, Programmable logic controller or the systems controlling Nuclear power plant. Complexity varies from low, with a single Microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large Chassis or enclosure. Even systems which don't expose programmability as a primary feature generally need to support software updates. On a continuum from "general purpose" to "embedded", large application systems will have subcomponents at most points even if the system as a whole is "designed to perform one or a few dedicated functions".

28. **Radars**. Army uses a wide range of Radar for various purposes that include Meteorology detection of "Precipitation (Meteorology), Wave Radar, Air traffic control, enemy aircraft detection and host other of applications. Radars components generally comprise of:

(a) A Transmitter that generates the radio signal with an oscillator such as a Klystron or a Magnetron and controls its duration by a Modulator.

(b) A Waveguide that links the transmitter and the antenna.

(c) A Duplex that serves as a switch between the antenna and the transmitter or the receiver for the signal when the antenna is used in both situations.

(d) A Receiver (radio), knowing the shape of the desired received signal (a pulse), an optimal receiver can be designed using a Matched filter.

(e) An electronic section that controls all those devices and the antenna to perform the radar scan ordered by a Software.

(f) A link to end users

Futuristic Systems

29. Today, as in the past, technology is fundamentally changing the face and nature of warfare. The opportunities offered by new or emerging technologies are boundless. There is a need to concentrate on those technologies that are important to the Indian Army for its modernization requirements. Army's Indigenisation efforts also aims to fruitfully utilize the technological advances made in the country towards modernization. The following key program areas have been identified for the futuristic modernization requirements of the Army:-

(a) Battlefield Transparency.

(b) Combat Systems.

(c) Communication Systems.

(d) Rockets and Missiles Systems.

(e) Directed Energy Weapons.

(f) Advanced Material Technology.

(g) Artificial Intelligence.

(h) Robotics.

(j) Nano Technology.

(k) Bio-technology

(l) Non Lethal Weapons.

(m) Combat Modeling and Simulation.

(n) Nuclear, Biological and Chemical Warfare Defence.

(o) UAVs

Assistance by Army Towards Indigenisation Effort

30. In addition to various provisions in DPM 2009 wherein various path breaking measures have been instituted to make Indigenisation lucrative to trade. The Army on its part can offer the following assistance towards Indigenisation:-

(a) **Facility to Study System / Sub Systems**. Manufacturers would like to study the existing system / sub system as is available in the vehicles/ equipment in Army. For carrying out the study, a team of company engineers would have to visit the nearest Army unit where the equipment is held. Army will provide the necessary assistance for carrying out the study including obtaining security clearances.

(b) **Participating in the Study**. The Indian Army's own technical capability could be made available to the manufacture to carryout study of equipment when Indigenisation is taken up in a collaborative manner.

(c) **Drawings**. The Authorities Holding Sealed Particulars (ASHP) of DGQA and Drawings and Specification Wing (DSW) of the Directorate of Indigenisation (DOI) could provide drawings for items when available.

(d) **Material Testing**. The Army material testing lab facilities could be extended to manufacturers involved in Indigenisation under payment.

(e) **Provision of Samples**. In case a manufacturer is in need of samples for carrying out Indigenisation the same could be made available to them.

(f) **Integration**. Facilities for integrating parts or subassemblies that has been successfully indigenized by a manufacturer will be provided by the Indian Army.

(g) **Trials**. Equipment / Vehicles used in the Indian Army need to operate in variegated environment. Accordingly these need to be rigorously tested under all the operating conditions. The Indian Army will provide all assistance required for conduct of trials of equipment that have been indigenized.

Conclusion

31. The Defence industry sector has been opened for participation by Indian Private Sector up to 100 % of equity, with Foreign Direct Investment (FDI), component of it being permissible up to 26 %, both being subject to licensing permissions. This includes all types of defence equipment. Guidelines have been issued by the Department of Industrial Policy & Promotion (DIPP) in consultation with the Ministry of Defence regarding the modalities for consideration of applications for grant of licenses. The private companies are allowed to apply either individually or by a partnership firm amongst themselves. The Chief Executive of the company/partnership will be a resident Indian. The company/partnership firm can have Foreign Direct Investment up to 26 % of the equity. Preference would be given to original equipment manufacturers or design establishments and those having a good track record of supplies. Thus we see there is tremendous scope for private industry to participate in the development and production of indigenous systems and technologies for the Indian Army. The participation of the Indian Industry in the modernization, collaborative research and development and equipping of the Indian Army will provide improved capability and also boost the Indian economy.

FORECAST REQUIREMENT OF EQUIPMENT AND SYSTEMS

Equipment	2009-	2014-19	2019-24	
Diesel Engines < 400 KW	2150	2250	2350	6750
Diesel Engines > 400 KW	1920	2160	2250	6330
Air Compressor >150 bar	1920	2160	2250	6330
Cooling system for tracked veh	2150	2250	2350	6750
Fuel System Tracked Veh	1920	2160	2250	6330
Fuel System Wheeled Veh	2050	2250	2450	6750
Power Transmission Tracked Veh	1920	2160	2250	6330
Power Transmission Wheeled Veh	2050	2250	2450	6750
Track Links for Tracked Veh	1920	2160	2250	6330
Sights Active & Passive	1920	2160	2250	6330
Fuel Injection Pump Tracked Veh	1920	2160	2250	6330
Fuel Injection Pump Wheeled Veh	2050	2250	2450	6750
NBC system	1920	2160	2250	6330
Fire Fighting Eqpt	1920	2160	2250	6330
Radio Eqpt and internal connections	1920	2160	2250	6330
Gen Set <6 KW	60	80	90	230
Gen Set 6-20 KW	200	250	350	800
Gen Set >20 KW	240	240	240	730
Hydraulic sys based on Tracked vehicle	150	150	150	450
Hydraulic sys based on Wheeled Veh	40	40	40	130
GCE	1920	2160	2250	6330
APU Unit Arty Guns	420			12705
Radars	260	360	460	10803
Radio Eqpt	1500	1600	1700	48006
Line Eqpt	2370	2570	2770	7710
Instruments	735	765	790	22904
Under Carriage of Guns	1870	2270	2360	65004
Ordinance (Recoil, Buffer and weapon system)	1870	2270	2360	65004