NATIONAL RESEARCH DEVELOPMENT CORPORATION

TECHNOLOGY OFFER- NavRakshak

INTRODUCTION

COVID 19 Pandemic has posed unprecedented challenges at the global level. COVID warriors are leading this war against the pandemic and they need to be safeguarded from acute risk of infection, while performing their duty. The Personal Protective Equipment (PPE) is the most essential defensive tool for protection of the Corona Warriors. However, availability of reliable, cost effective and comfortable PPEs is a huge challenge. The Ministry of Health & Family Welfare has promulgated guidelines for PPE. While many PPEs compliant to the standards are available in the local market, however their cost effectiveness and suitability for the hot and humid weather conditions prevalent in India raise concern. To overcome these challenges, a Naval Medical Specialist of Innovation Cell, Institute of Naval Medicine Mumbai has improvised a PPE as per MoHFW guidelines which provides protection, is made of 'breathable' fabric, is comfortable under prolonged use in hot and humid conditions and is economical. This innovative solution is being steered for licensed production and IP management by the Intellectual Property Facilitation Cell (IPFC) of MoD in association with National Research and Development Corporation (NRDC).

NAVRAKSHAK - A RESOURCE IMPROVISED OPTIMISATION OF PERSONAL PROTECTIVE EQUIPMENT

Titled as NavRakshak, the technical know-how offers a suit consisting of head gear, face mask, gown and shoe covers. The fabric material used is non-woven SSMMS (Spunbound-Spunbound-Meltbound-Meltbound-Spunbound) of 51 GSM density and available in two variants (single-ply or two-ply). This technical know-how on offer aims to meet the shortfall in the availability of standard quality PPE in the country.

Fig. 1: NavRakshak PPE Suite (Protective Gown 1 ply or 2 ply, SSMMS 51 GSM material/ fabric, 360 degree wrapping with securing strap at the lower ends of upper extremity sleeves and strap at the back for giving a tight fitting)

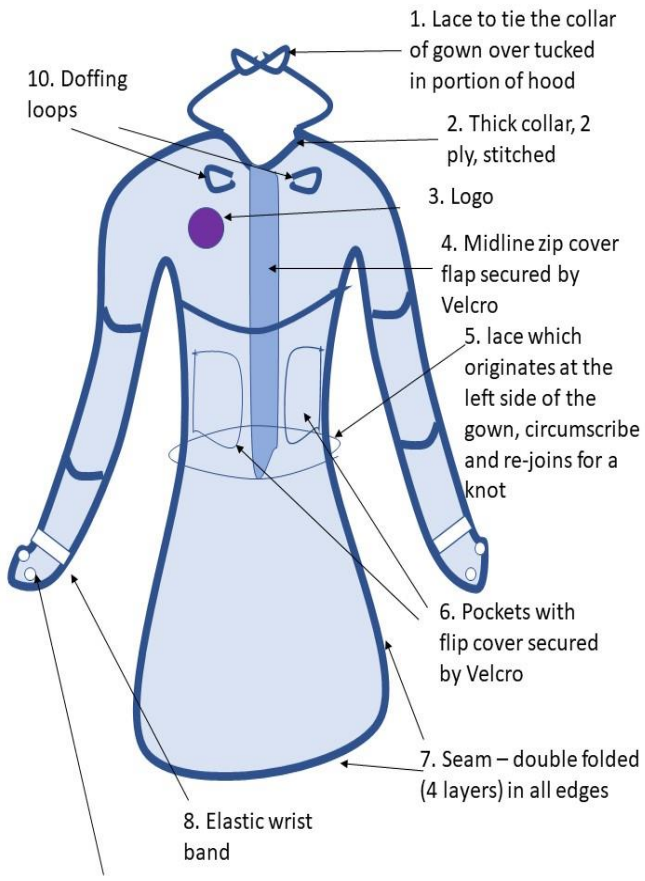
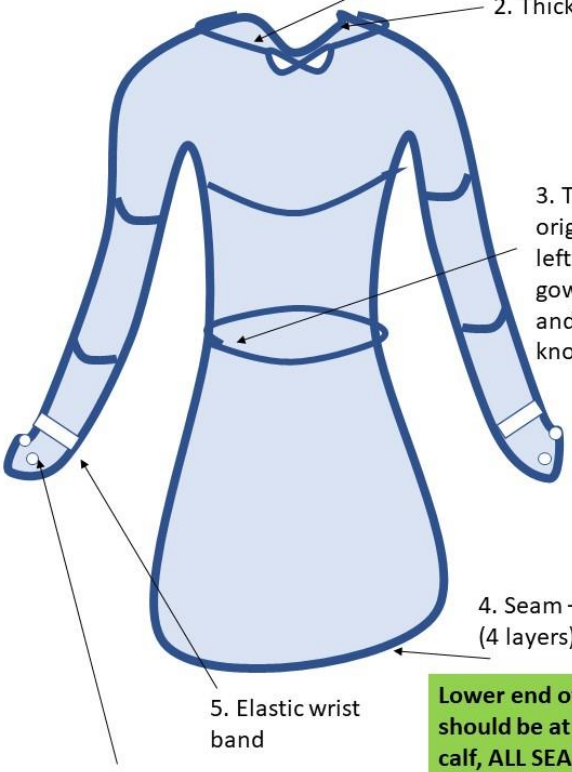
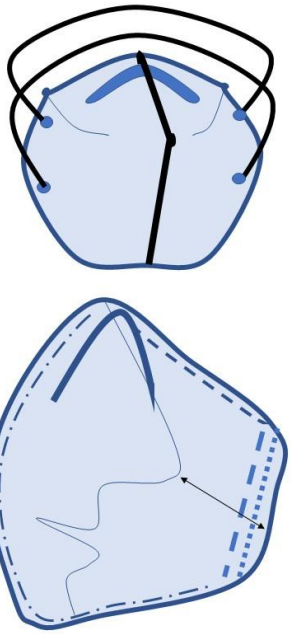


Fig 1. PPE Gown- Front side View



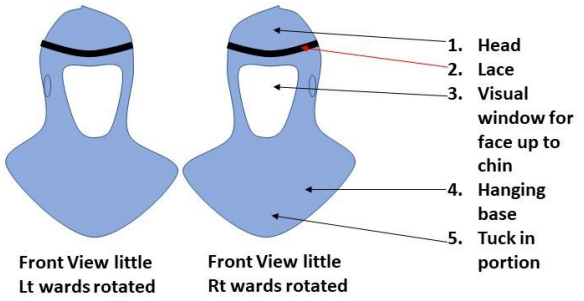
Lower end of the gown should be at least till mid-calf, ALL SEAMS TO BE DOUBLE FOLDED AND STITCHED properly for prevention of any leakage

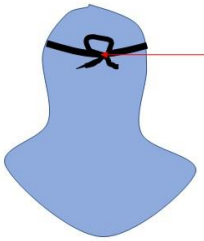
Fig 2: PPE Gown Back side view



1. Straps are around the head and not around ears to cause less ear pain, quality of strap as per MoHFW guidelines, it should be tightly fitting the mask avoiding any air leak and ensuring the negative pressure generation.
2. All the joints are to be folded and should have 4 layers of one sheet in order to ensure air seal i.e at first two sheets will be joined at the rim then a 180 degree fold be made and again stitched in two parallel lines
3. The depth from the tip of the nose to the distal mid point of the projection should be at least 5cm
4. The nose bend/ clip should be flexible and tightly support the nose. It can be made of plastic or

Fig 3: PPE face mask (02 ply), seams are double folded and properly stitched with nose clip





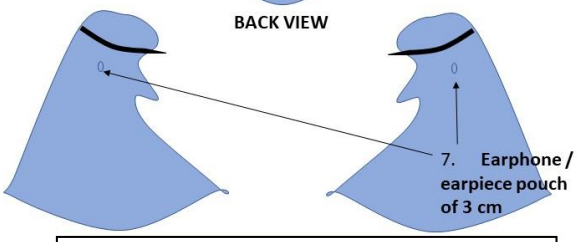
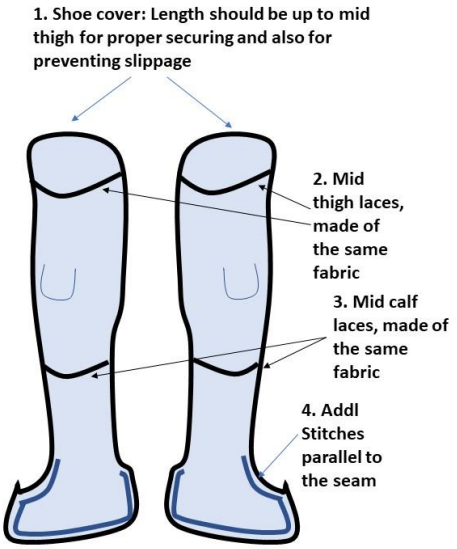


Fig 4: PPE Headcover/ Hood



PROTECTIVE SHOE COVER/ STOCKING

Fig 5: PPE Shoe covers, up to mid-thigh, with laces, double layer (02) at the bottom, 01 ply at other places. Addl stitches parallel to seam for prevention of tear during walking

TECHNOLOGY PROFILE

Salient Technical Features including Competing Features	-- **NavRakshak** consists of head gear, gown & shoe covers (1 ply 51 GSM SSMMS fabric)* & 2 ply mask made of the same material. --** Additional protective gear. -The innovative hood has a 360 degree wrapping with tuckable base. There is a provision of **inserting stethoscope** or **headphone earpieces** (named 'Phone pouch') through a closed end pouch in the hood. --Two ply facemask (10 layered, 102 GSM density). -- Face mask creates tight air sealing generating negative pressure inside (without expiratory valve) and has cup-shaped design with a nose-clip. --the SSMMS fabric offers fluid resistance due to its zigzag non-woven pattern, not letting fluid to settle on its surface. --**Testing of the Fabric (01 ply & 02 ply) has been done by INMAS (DRDO) and passed by 6/6 SBPR test** **--The fabric & seams exceed ISO 16603 class 3 exposure pressure, or equivalent**
Level/Scale of Development	Prototype development completed, at Naval Dockyard, Mumbai
Status of IPR	Patent Application has been filed with the Indian Patent Office
Major Raw Materials	--Fabric of specified quality --Elastics for mask and lower end of the sleeves
Major Plant Equipment & Machinery Required	--Normal sewing machines and fabric cutting scissors -Stitched seams of the sample provided, passed the SBPRT by INMAS. **(PPEs produced under license production to be tested and certified fit by MoHFW approved Govt. agencies like INMAS/ SITRA as per prescribed norms prior to marketing)**
Advantages	-Protection at low cost and easily adaptable design. -Provides comfort to the user. -Innovative Provision for securely inserting stethoscope earpiece or mobile headphones into hood. --Easily available raw material in Indian market. --**Low capital investment, easily adaptable by existing Gown manufacturing units.** --Meets the standard criteria set by MoHFW for PPEs.
Transfer of Technology Terms & Conditions	Technology Transfer Fee: Rs. 3 Lakhs + applicable GST Recurring Royalty: 5% on Ex-factory Sales Period of License: 3 Years Nature of Licensing: Non-exclusive

*** The PPE gown, head gear and shoe covers can be made in 01 ply (better user comfort) or 02 ply (depending on user specification for enhanced protection).**

****Additional Protective gear- Goggles, Gloves, Face Shield and N-95 Respirator mask can be procured separately. NavRakshak mask can be used in low to medium risk environment or procedures, and N95 mask can be used in high risk environment or procedure as per MoHFW guidelines.**

- **The manufacturer will be solely responsible for ensuring satisfactory Quality Control of manufacturing process, quality of final product and regulatory clearances as per extant law. No agency involved in ToT Offer (NRDC, IPFC or INM) will be responsible in any manner, whatsoever, for any issues pertaining to Quality of products manufactured under license production.**

- **This PPE has been designed for use in various sectors as deemed fit by the user.**

NRDC

National Research Development Corporation, an Enterprise of Dept. Of Scientific & Industrial Research, Ministry of Science & Technology, a Govt. of India, is a premier technology transfer organization with over six decades of experience. It has helped establish over one thousand projects in the small and medium scale sector. The supply of technologies and services to entrepreneurs extend both in the developing and developed countries like USA, Germany, Malaysia, Myanmar, Nepal, Senegal, Madagascar, Indonesia Philippines, Vietnam, Sri Lanka, Kenya, Brazil, Bangladesh and Egypt.

NRDC SERVICES

1) Process know-how
2) Pre-investment studies
3) Feasibility / project reports
4) Detailed engineering
5) Turn key projects
6) Equity capital participation
7) Training in operation of plants
8) Raw materials and products testing

Intellectual Property Facilitation Cell (IPFC)

The Intellectual Property Facilitation Cell (IPFC) of Ministry of Defence was set up under Mission Raksha Gyan Shakti launched by Hon'ble Raksha Mantri in Nov 2018. The IPFC operates under Department of Defence Production / Directorate General of Quality Assurance (DGQA) with the mandate of nurturing Innovation and IP Culture in Armed Forces and Defence Industry. Since its launch in Nov 2018, IPFC has facilitated creation of around 1500 IP Assets, and training of around 25000 personnel in IP Management.

Innovation Cell, Institute of Naval Medicine (IC, INM)

The Indian Navy has established its first ever innovation cell, in January 2020, in the Institute of Naval Medicine, Mumbai to recognise and promote Innovations from serving personnel. The innovation cell nurtures and inspires ideas and facilitates Prototyping and Product Formulation.

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