

DEPARTMENT OF MINERAL RESOURCES AND ENERGY

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GUIDELINE FOR A MANDATORY CODE OF PRACTICE FOR THE SELECTION AND PROVISION OF PERSONAL PROTECTIVE EQUIPMENT FOR WOMEN IN THE SOUTH AFRICAN MINING INDUSTRY

I **DAVID MSIZA**, the Chief Inspector of Mines, in terms of Section 49 (6) read together with Sections 9 (2) and 9 (3) of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996), hereby issue the Guideline for a Mandatory Code of Practice for the Selection and Provision of Personal Protective Equipment for Women in the South African Mining Industry, as set out in the schedule below.



DAVID MSIZA
CHIEF INSPECTOR OF MINES
DEPARTMENT OF MINERAL RESOURCES AND ENERGY

SCHEDULE

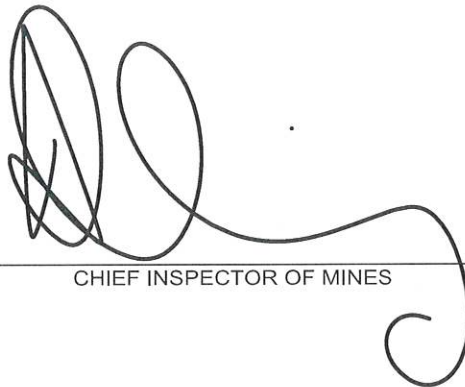
THE SELECTION AND PROVISION OF PERSONAL PROTECTIVE EQUIPMENT FOR WOMEN IN THE SOUTH AFRICAN MINING INDUSTRY [2023]

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DEPARTMENT OF MINERAL RESOURCES AND ENERGY
MINE HEALTH AND SAFETY INSPECTORATE

GUIDELINE FOR THE COMPILATION OF A
MANDATORY CODE OF PRACTICE FOR

**THE SELECTION AND PROVISION OF PERSONAL
PROTECTIVE EQUIPMENT FOR WOMEN IN THE SOUTH
AFRICAN MINING INDUSTRY**



CHIEF INSPECTOR OF MINES



**mineral resources
& energy**
Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

THE SELECTION AND PROVISION OF PERSONAL PROTECTIVE EQUIPMENT FOR WOMEN IN THE SOUTH AFRICAN MINING
INDUSTRY [2023]

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PART A: THE GUIDELINE**1. INTRODUCTION**

- 1.1. There is an increase of women being employed in the mining industry, particularly underground and in jobs previously exclusively performed by men. The increase of women in the previously male dominated environment has led to many challenges. One of the challenges that has confronted women is the use of the **PPE** that has not taken the female anthropometric characteristics into account.
- 1.2. As a result many areas of the work environment within the South African mining industry are unsuitable for deploying female employees. However, there is an improvement in the provisioning of **suitable PPE** for **WIM** since **PPE** generally has been designed to suit the male physique. **WIM** have special health and safety needs resulting from their unique anatomical and physiological makeup. Additionally, there is scarcity of published data on the health and safety concerns and issues of **WIM**.
- 1.3. As indicated in the **SIMRAC** research project SIM 10 09 04, there is a possible association between the types of **PPE** used by women and the increased vulnerability to skin conditions such as contact dermatitis, chaffing and rashes including bacterial and fungal infections. The situation is further exacerbated by the unique coping mechanisms (e.g. the use of nylon tights and thick wool socks as **undergarments**), that **WIM** have been compelled to practice to adjust or correct the ill-fitting **PPE**. These unorthodox adjustments further increase the risk of infections, chaffing and rashes. Following the research project, a guideline on provision of **PPE** for **WIM** in the South African mining industry was developed. The current review of the guideline follows a 5-year implementation period and intends to address concerns raised during the implementation of the guideline.
- 1.4. The selection, provision and use of **PPE** in the workplace should not only be based on hazard identification and risk assessment processes but should incorporate ergonomic and comfort aspects of users to guarantee **PPE** efficiency for all workers. This approach will ensure that the specificities of female anthropometrics are accommodated. The hazards identified will determine the body part that is to be protected and therefore the **PPE** required.
- 1.5. The **PPE** could include, but is not limited to, head protection, eye or face protection, hand or arm protection, body (torso) protection, foot protection, respiratory protection, vibration and hearing protection as well as thermal protection.

NOTE:

Refer to Annexure C: Table on Common Hazards at Mines and possible **PPE**. This annexure is intended for information purposes only.

2. LEGAL STATUS OF THE GUIDELINE AND COP

- 2.1. In accordance with Section 9(2) of the **MHSA**, an employer must prepare and implement a **COP** on any matter affecting the health and/or safety of employees at mines, other persons who may be directly affected by activities of these mines and/or when the **CIOM** requires it.

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- 2.2. The **COP** must comply with any relevant guidelines issued by the **CIOM** in accordance with Section 9(3) of the **MHSA**.
- 2.3. Failure by the employer to prepare or implement a **COP** in compliance with this guideline is a breach of the **MHSA**.
- 2.4. Therefore, all employers are required to prepare and implement the mandatory **COP** of the selection and provision of **PPE** for women in the South African mining industry, in accordance with this guideline.

3. OBJECTIVE OF THIS GUIDELINE

- 3.1. The objective of this guideline is to provide guidance to the employer at every mine to compile a mandatory **COP** which would assist employers in providing **suitable PPE** for **WIM** where required, and to train all employees on issues relating to **PPE** for **WIM** (see paragraph 7.2 of Part C of this document).

4. DEFINITIONS AND ACRONYMS

- 4.1. **BMI** means body mass index.
- 4.2. **CIOM** means Chief Inspector of Mines.
- 4.3. **COP** means a Code of Practice.
- 4.4. **DMRE** means Department of Mineral Resources and Energy.
- 4.5. **ILO** means International Labour Organisation.
- 4.6. **MHSA** means the Mine Health and Safety Act, 1996 (Act 29 of 1996) as amended.
- 4.7. **MHSC** means Mine Health and Safety Council.
- 4.8. **PPE** means personal protective equipment, including clothing.
- 4.9. **SABS** means South African Bureau of Standards.
- 4.10. **SANITARY BIN** means a no-touch system operated and enclosed bin, preferably with a foot pedal or a sensor, to use for the hygienic disposal of feminine hygiene products.
- 4.11. **SANS** means South African National Standard.
- 4.12. **SIMRAC** means the Safety in Mines Research Advisory Committee.
- 4.13. **SOP** means standard operating procedures at the mine.
- 4.14. **SUITABLE** means appropriate in terms of size and fit, type of workplace hazards, purpose and nature of work to be undertaken, and gender anthropometrics.
- 4.15. **UNDERGARMENTS** means clothing worn beneath the **PPE**, usually in direct contact with the skin, excluding underwear.

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- 4.16. **WIM** means women in mining which are all female employees working at mines.
- 4.17. **WIMAC** means Women in Mining Advisory Committee established within the **MHSC**.

5. **SCOPE**

- 5.1. This guideline covers the roles and responsibilities of the different persons, the selection and provision of **PPE** and the training requirements of all employees in respect of **PPE** for **WIM**. The guideline applies to all mines.

6. **MEMBERS OF THE TASK GROUP**

This guideline was prepared by the **WIMAC** task team on the provision of **PPE** for **WIM**.

- 6.1. The following members served on the task team that developed the guideline:

| STATE | EMPLOYERS | ORGANISED LABOUR |
|----------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Ms FB Senabe (Chairperson) | Ms HR Motsotsoana Mr JC Smith Mr J Soden Ms E van der Wath Ms M Wilson Ms M Van Zyl Ms S Mostert | Ms NT Klaas Adv. H van Vuuren |

- 6.2. The following members served on the task team that reviewed the guideline:

| STATE | EMPLOYERS | ORGANISED LABOUR |
|--------------------------------------------------------------|-------------------------------------------|-----------------------------------------------|
| Ms FB Senabe (Chairperson) Ms M Mokwena Adv. G Mashilo | Ms L Tsele Ms Y Chetty Ms T Mangope | Ms C Van Aswegen-Pienaar Adv. H Van Vuuren |

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PART B: AUTHOR'S GUIDE

1. The **COP** must, where possible, follow the sequence laid out in Part C: Format and Content of the **COP**. The pages as well as the chapters and sections must be numbered, where possible, to facilitate cross-referencing.
2. Wording must be unambiguous and concise.
3. In this guideline for a **COP**, unless the context otherwise indicates the meaning of the words, will have the meaning as described within this document and that of the general understanding of such words.
4. It should be indicated in the **COP** and on each annexure to the **COP** whether:
 - 4.1. The annexure forms part of the guideline and must be complied with or incorporated in the **COP** or whether aspects thereof must be complied with or incorporated in the **COP**.
 - 4.2. The annexure is merely attached as information for consideration in the preparation of the **COP** (i.e. compliance is discretionary).
5. When annexures are used the numbering should be preceded by the letter allocated to that particular annexure and the numbering should start at one again. (e.g. 1, 2, 3, A1, A2, A3...).
6. Whenever possible illustrations, tables, graphs and the like, should be used to avoid long descriptions and/or explanations.
7. When reference has been made in the text to publications or reports, references to these sources must be included in the text as footnotes or side notes, as well as in a separate bibliography.

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PART C: FORMAT AND CONTENT OF THE MANDATORY COP**1. TITLE PAGE**

- 1.1. The title page must include:
 - 1.1.1. The name of the mine.
 - 1.1.2. The heading: *Mandatory Code of Practice for the Selection and Provision of Personal Protective Equipment for Women in the South African Mining Industry.*
 - 1.1.3. A statement to the effect that the **COP** was drawn up in accordance with the guideline with reference number **DMRE 16/3/2/5-A5** issued by the **CIOM**.
 - 1.1.4. The mine reference number for the **COP**.
 - 1.1.5. The effective date of the mine's **COP**.
 - 1.1.6. The revision dates of the mine's **COP** (previous and next revision dates if applicable).
 - 1.1.7. The mine code number.

2. TABLE OF CONTENTS

- 2.1. The **COP** must have a comprehensive table of contents.

3. STATUS OF THE MANDATORY COP

- 3.1. Under this heading the **COP** must contain statements to the effect that:
 - 3.1.1. The **COP** was drawn up in accordance with the guideline with reference number **DMRE 16/3/2/5-A5** issued by the **CIOM**.
 - 3.1.2. This is a mandatory **COP** in terms of Section 9(2) of the **MHSA**.
 - 3.1.3. The **COP** may be used in an incident or accident investigation or inquiry to ascertain compliance, and to establish whether the **COP** is effective and fit for purpose.
 - 3.1.4. The **COP** supersedes all previous relevant **COPs**.
 - 3.1.5. All managerial instructions or, recommended procedures and standards on the relevant topics must comply with the **COP** and must be reviewed to assure compliance.

4. MEMBERS OF THE DRAFTING COMMITTEE PREPARING THE COP

- 4.1. In terms of Section 9(4) of the **MHSA** the employer must consult with the health and safety committee on the preparation, implementation or revision of any **COP**.

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- 4.2. It is recommended that the employer should, after consultation with the employees in terms of the **MHSA**, appoint a committee responsible for the drafting of the **COP**.
- 4.3. The members of the drafting committee assisting the employer in drafting the **COP** should be listed giving their full names, designations, affiliations and experience. This committee must include competent persons sufficient in number to effectively draft the **COP**.

5. GENERAL INFORMATION

- 5.1. General relevant information relating to the mine must be stated in this section of the **COP**, which must include at least the following:
 - 5.1.1. A brief description of the mine and its location.
 - 5.1.2. The commodities produced.
 - 5.1.3. The mining methods or mineral excavation processes.
 - 5.1.4. A description of the systems used at the mine in connection with the issuing of **PPE**
 - 5.1.5. Other related **COPs**.

6. TERMS AND DEFINITIONS

- 6.1. Any word, phrase or term of which the meaning is not absolutely clear, or which will have a specific meaning assigned to it in the **COP**, must be clearly defined. Existing and/or known definitions should be used as far as possible.
- 6.2. The drafting committee should avoid jargon and abbreviations that are not in common use or that have not been defined.
- 6.3. The definitions section should also include acronyms and technical terms used.

7. RISK MANAGEMENT

- 7.1. Section 11 of the **MHSA** requires the employer to identify hazards, assess the health and safety risks to which employees may be exposed to while working and, record the significant hazards identified and risk(s) assessed.
- 7.2. The **COP** must address how the significant risks identified in the risk assessment process must be dealt with, having regard to the requirements of Sections 11(2) and (3) of the **MHSA** that, as far as reasonably practicable, attempts should first be made to eliminate the risk, hereafter to control the risk at source, thereafter to minimise the risk and thereafter, insofar as the risk remains, to provide **PPE** and to institute a programme to monitor the risk.
- 7.3. A proper hazard identification and risk assessment must be conducted on all the activities at the mine. The information must be kept readily available at the mine.

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- 7.4. To assist the employer with the hazard identification and risk assessment, all possible relevant information such as annual medical reports, occupational injury statistics, relevant research reports, design criteria, performance figure protocols, guiding documentation for practitioners and relevant standards, should be obtained and considered.
- 7.5. In addition to the periodic review required by Section 11(4) of the **MHSA**, the **COP** should be reviewed and updated, if required, after every serious incident or accident involving the use of **PPE**, or if significant changes are introduced to procedures, mining and ventilation layouts, mining methods, plant or equipment and material.

8. ASPECTS TO BE ADDRESSED IN THE COP

- 8.1. The **COP** must cover at least the aspects set out below unless there is no significant risk associated with that aspect at the mine.
- 8.2. Roles and responsibilities of different persons

The **COP** should set out the roles and responsibilities of the various persons involved in the processes to ensure that **suitable PPE** is provided to **WIM** at the mine. These roles and responsibilities could include the following:

- 8.2.1. Employer
- 8.2.1.1. Ensure that **WIM** structures are established and sustained at the mine to address occupational health and safety, and gender issues related to **PPE**. These structures must be representative of the technical, professional and managerial demographics, considering whether the women elected are working underground, on surface, in engineering and/or at the plant departments.
- 8.2.1.2. Ensure that enough of the required and appropriate **PPE** for each activity performed by **WIM** are available at the mine. In this regard, **suitable PPE** should be provided having regard to the risk assessment.
- 8.2.1.3. Ensure that there is awareness, education and health promotion on **WIM** in mining issues and the use of **PPE**.
- 8.2.1.4. Ensure that training is provided on the types and the correct use of **suitable PPE**.
- 8.2.1.5. Before the procurement of **PPE**, in consultation with female employees, ensure that there are engagements with manufacturers and suppliers to meet the **PPE** needs of the female employees.
- 8.2.1.6. Ensure that procedures are established and implemented, and that facilities are provided to ensure the proper maintenance of **PPE**.
- 8.2.1.7. Ensure that **suitable** facilities are provided for the storage, transportation and cleaning of **PPE**.

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- 8.2.1.8. Ensure that a documented monitoring system is established and maintained on the appropriateness and effectiveness of **PPE** used by **WIM** at the mine.
- 8.2.1.9. Ensure that any confidential medical information required for the implementation of the **COP** remains confidential.
- 8.2.2. Managers and supervisors
- 8.2.2.1. Managers and supervisors are responsible for ensuring effective day to day use of **PPE** by the **WIM** falling under their supervision. This could include the management and operationalisation of the **PPE SOP** for the sites together with the following:
- (a) Familiarise themselves with the contents of the **COP** relevant to the **WIM** falling under their supervision and ensure that it is implemented.
 - (b) Ensure that specific assessments are carried out for both the risk to be protected against and, the different types of **PPE** that could be used to protect **WIM** from that risk. On this basis the suitability of the selected **PPE** against the risk should be assessed.
 - (c) Ensure that **WIM** receive **suitable** and sufficient information, instruction and training regarding **PPE** supplied to them.
 - (d) Ensure the proper use, storage, maintenance, cleaning, examination, repair and replacement of **PPE**.
- 8.2.3. Women in Mining
- 8.2.3.1. Female employees have the responsibility to comply with any safe system of work provided. In particular they must:
- (a) Ensure that the **PPE** provided is used and cared for as determined in the **MHSA**, and in accordance with the training, instruction and information received.
 - (b) Return the **PPE** after use to the storage facilities provided for it. If this is not possible, take reasonable steps to safeguard the condition of the **PPE** when temporarily stored elsewhere. The **PPE** must not be taken home unless otherwise determined by the employer based on the risk assessment.
 - (c) Regularly examine the **PPE** and report any defect, damage or loss to the manager or the supervisor.
 - (d) Inform managers or supervisors of any medical and/or other conditions that may affect the ability to wear or use **PPE**.
 - (e) Report to the manager or the supervisor any concerns with the equipment, suggested improvements to **SOPs** which may reduce the risks for **PPE** or improvements in the design or application thereof.

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(f) **WIM** should familiarise themselves with the contents of this **COP**.

8.3. Selection, provision and maintenance

8.3.1. The **COP** should set out measures to ensure that **suitable PPE** for **WIM** is selected and provided, and that such **PPE** for **WIM** is properly maintained. Measures should include:

- 8.3.1.1. Identifying all areas in which **PPE** for **WIM** may be required.
- 8.3.1.2. Identifying the types of **PPE** for **WIM** which would provide **suitable** protection against the identified hazards including **undergarments**.
- 8.3.1.3. Ensuring the correct **PPE** for **WIM** is issued to each female employee in terms of:
 - (a) The size and fit, including smaller sizes, considering the ergonomics (relationship with the workplace), anatomical and physiological needs.
 - (b) The type of workplace hazards.
 - (c) The purpose of **PPE**.
 - (d) The nature of work to be undertaken.
 - (e) The adequacy in terms of quality and quantity.
- 8.3.1.4. Ensuring **PPE** for **WIM** is regularly maintained to remain fully functional for its intended use.
- 8.3.1.5. Ensuring **PPE** for **WIM** is timeously replaced when no longer fully functional for its intended use.
- 8.3.1.6. Ensuring the use and effectiveness of the **PPE** is monitored, including the fit, comfort and maximum protection from the identified hazards for **WIM**.
- 8.3.1.7. Ensuring pregnant and breast-feeding women are duly accommodated in line with the risk assessment.

8.4. Training

- 8.4.1. The **COP** must set out measures to ensure that **WIM** are properly trained in the use of **PPE** provided to them, which should include the following:
 - 8.4.1.1. Identifying appropriate persons to carry out training to **WIM** on the use of **PPE** and the qualifications, experience and other requirements to be met by such persons.
 - 8.4.1.2. Employees are inducted on the **MHSC's** Illustrative Handbook on **PPE** for **WIM** and the handbook must be made available to the employees.
- 8.4.2. Conducting training in two phases for all **WIM** who are required to wear **PPE**:

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- 8.4.2.1. The general training phase should include:
- (a) When and why **PPE** is necessary.
 - (b) What type of **PPE** is necessary?
 - (c) How to properly put on, take off, adjust and wear **PPE**.
 - (d) The limitations of **PPE**.
 - (e) The proper care, maintenance, useful life and disposal of **PPE**.
 - (f) Advising **WIM** on appropriate personal wear with the different types of **PPE** for **WIM**.
- 8.4.2.2. The site-specific training phase (to be conducted by direct supervisors and to be documented) should include:
- (a) What type of **PPE** is necessary for each job?
 - (b) How to properly put on, take off, adjust and wear **PPE**.
 - (c) How to obtain **PPE**.
 - (d) Workplace cleaning, maintenance and replacement procedures.
- 8.4.3. Ensuring that each trainee demonstrates the correct use of **PPE** before being allowed to perform work requiring the use of **PPE**.
- 8.4.4. Ensuring that **WIM PPE** training is included at induction, and that retraining is done, where required, when:
- 8.4.4.1. New equipment or processes are introduced that could create new or additional hazards.
 - 8.4.4.2. There have been changes in the workplace or **PPE** that renders previous training obsolete.
- 8.4.5. Ensuring, if any employee who has been trained does not have the understanding or skills required to use the **PPE** properly, that such employee is retrained and the retraining is documented.

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PART D: IMPLEMENTATION

1. IMPLEMENTATION PLAN

- 1.1. The employer must prepare an implementation plan for its **COP** that makes provision for issues such as organisational structures, responsibilities of functionaries and, programmes and schedules for the **COP**, that will enable proper implementation of the **COP** (a summary of and a reference to, a comprehensive implementation plan may be included).
- 1.2. Information may be graphically represented to facilitate easy interpretation of the data and to highlight trends for the purposes of risk assessment.

2. COMPLIANCE WITH THE COP

- 2.1. The employer must institute measures for auditing, monitoring and ensuring compliance with the **COP**.

3. ACCESS TO THE COP AND RELATED DOCUMENTS

- 3.1. The employer must ensure that a complete **COP** and related documents are kept readily available at the mine for examination by any affected person.
- 3.2. Any **WIM** structures, a registered trade union with members at the mine, or where there is no such union, a health and safety representative on the mine, or if there is no health and safety representative, an employee representing the employees on the mine, must be provided with a copy. A register must be kept of such persons or institutions with copies to facilitate the updating of such copies.
- 3.3. The employer must ensure that all employees are fully conversant with those sections of the **COP** relevant to their respective areas of responsibilities.

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ANNEXURE A: REFERENCE SIMRAC RESEARCH PROJECT*(For information purposes only)*

1. A summary of the research project SIM 10 09 04: Personal Protective Equipment for Women in the South African Mining Industry.

2. Aim

The primary purpose of this project was to develop comprehensive and systematic requirements to assist the South African mining industry in the selection and provision of appropriate and **suitable PPE** for **WIM**. Such **PPE** should be **suitable** for the body physique of **WIM** and enhance compliance by all end-users (**WIM**).

3. Conclusions

WIM have generally good knowledge and understanding of the uses of various types of **PPE** in relation to the nature of their jobs. However, poorly fitting **PPE** exposes them to health and safety hazards associated with mining and make them less able to perform their duties efficiently. Evidently the results indicate the need for greater focus on the health needs of **WIM**. Additionally, findings from this survey indicate a need to redesign **PPE** for **WIM** to accommodate their anatomical and physiological body structures to ensure proper fit, comfort and maximum protection from mining hazards.

4. Recommendations

To ensure the provision of appropriate **PPE** for **WIM** and to promote their health and safety at work, the following recommendations are made with regard to policy, practice and further research.

- 4.1. Policy

With regard to policy, the researchers recommend the regulation of the mining sector on specifications for the selection of **PPE**, the provision of **PPE** and the adequate provision of sanitary facilities for **WIM**. This calls for government (**DMRE**) to develop and implement gender-specific **PPE** regulations as well as set and approve standards and certification that are gender sensitive.

It is further recommended that the requirements for the selection and provision of **PPE** for **WIM** be developed as the primary output of this project and it should be used by the regulator (**CIOM**) to formulate guidelines for the mining sector and be made available to all key stakeholders in the sector.

- 4.2. Practice

With regard to practice, current protocols on the selection and provision of **PPE** for **WIM** must be reviewed, updated and aligned with evidence-based information. The mines must develop the **COP** based on the requirements for the selection and provision of **PPE** for **WIM** as developed in this study.

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4.3. Selection and provision of **PPE** for **WIM**

Given that most women miners are experiencing health-related challenges relating to the current **PPE**, it is essential that the following measures must be considered:

- 4.3.1. The mines must develop and implement a **COP** on **PPE** selection and provision for **WIM** to comply with the guidelines on **PPE** for **WIM** issued by the regulator (**CIOM**).
- 4.3.2. In line with Section 5 (2) (a) and Section 11 of the **MHSA**, the selection and provision of **PPE** for **WIM** should be based on a hazard identification and risk assessment process which will identify the parts of the body that are at risk.
- 4.3.3. **PPE** selection and provision for **WIM** must be based on the physiological and other specific health needs of **WIM**.
- 4.3.4. A systematic approach should be adopted that incorporates ergonomics and comfort aspects into **PPE** selection. Female worker's dimensions (anthropometry) and other individual attributes such as **BMI** should be accommodated.
- 4.3.5. A participatory action approach when selecting **PPE** for **WIM** is essential.
 - 4.3.5.1. Representatives should include the regulator of the mining sector (**DMRE**), standards setting agencies (**SABS**), organized labour, representatives of employers, specialists in the field of **PPE** issues relating to women and occupational health and safety practitioners. **PPE** manufacturers and suppliers must also be involved.
 - 4.3.5.2. Consultation with **PPE** end-users is crucial to make sure the correct **PPE** is selected and that it is used and maintained properly. Proper consultation can make a significant contribution in creating and maintaining a safe and healthy working environment as well as an effective health and safety culture.
- 4.3.6. The **MHSA** does not regulate the provision of **undergarments** for mine workers, but women are classified as "*vulnerable workers*" according to the **ILO** standards, and **WIM** are no exception. Therefore, based on the findings of this study and validated with relevant literature sources, it is recommended that the specifications provided in **SANS** (511:2011) for providing **undergarments** for women workers be used by the mining sector. This will address the health issues of infections, chaffing and rashes currently faced by **WIM**.
- 4.3.7. In line with Section 24 of the **MHSA**, employees should not pay for safety measures, including the provision of **PPE**.
- 4.3.8. A custom-made two-piece overall that would suit women of all sizes and, at the same time, be less cumbersome when toilet needs arise. This overall should consider the concern raised by some interviewees that a two-piece might be a risk hazard as it could easily be caught in-between moving machine components. It is recommended that women-sized safety boots be provided to accommodate their relatively smaller feet. This would include accommodating shoe sizes as small as size four.

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- 4.3.9. **PPE** in use within the work environment needs to be continually surveyed for appropriateness at frequent intervals to identify challenges among **WIM**, especially with regard to aspects related to fit and comfort.
- 4.4. Awareness, education and health promotion
- 4.4.1. There is an urgent need to increase the awareness of workplace health and safety issues, and the impact on **WIM** to promote women's health and safety in the mines.
- 4.4.2. Given the fact that it is appropriate to address women's health issues such as infections, rashes and chaffing caused by factors inherent to them such as hormonal changes, being overweight and/or obese, etc. at work, designing health education or wellness promotion programmes for **WIM** will be essential.
- 4.4.3. The use of appropriate underwear and socks to prevent infections, chaffing and other skin conditions should be encouraged which include measures such as:
- 4.4.3.1. To avoid wearing nylon tights underneath the overall pants as underwear or **undergarments**.
- 4.4.3.2. To use cotton socks instead of wool or nylon socks, as the former absorb sweat.
- 4.4.3.3. To prevent heat exhaustion, women are to be encouraged to drink water at work especially considering the extreme heat and excessive sweating that they are experiencing underground.
- 4.4.3.4. To lessen the risk of urinary tract infections, women should be discouraged from suppressing the urge to urinate, and to frequently change the soiled sanitary towels to prevent the risk of developing vaginal infections.
- 4.4.4. Women should be educated on correct biomechanics when moving heavy equipment to prevent the development of musculoskeletal disorders, which were reported by participants in this study.
- 4.5. Improvement of sanitary amenities
- 4.5.1. Given that mining has traditionally been a man's job, there was no need to separate ablution facilities for men and women as they were only used by men. The employment of women challenges the notion that both men and women can use the same toilet facility. Basic amenities such as **sanitary bins** for disposal of sanitary towels are not provided and result in some women not changing sanitary towels until reaching the surface. The following measures are recommended to prevent the risk of infections and chaffing among **WIM**:
- 4.5.1.1. Provide additional toilets per work section.
- 4.5.1.2. Additional toilets do not need to be separate but need to be classified as female toilets for reasons of privacy, protection and dignity.

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- 4.5.1.3. Demarcate female toilets as such and equip them with toilet paper and hand washing facilities.
- 4.5.1.4. Provide **sanitary bins** in female toilets and empty them often.
- 4.5.1.5. Provide hand washing facilities with hot and cold water in the toilets, or outside, for hygiene purposes.
- 4.5.1.6. Clearly light up areas close to the toilet to make sanitary facilities safe for women users.
- 4.5.2. Further research
 - 4.5.2.1. With regard to further research, an epidemiological study of occupational risk factors and reproductive health of **WIM** should be done to determine the association between occupational exposures and reproductive outcomes among **WIM**. This would give evidence on the role of occupational risk factors on the reproductive health of **WIM**.
 - 4.5.2.2. Another study is needed to investigate the frequency and nature of occupational injury occurrences and the associated factors among **WIM**.

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ANNEXURE B: TABLE ON COMMON HAZARDS AT MINES AND POSSIBLE PPE
(For information purposes only)

| BODY PART PROTECTION | COMMON HAZARDS IN MINES | TYPE OF PPE PROTECTION REQUIRED |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Head protection | <ul style="list-style-type: none"> • Impact from rock falls and flying objects • Impact from falling spillage, debris from conveyor system or cranes • Impact from falling tools • Bumping head against walls, haulage, etc. • Hair entanglements in rotating machinery | <ul style="list-style-type: none"> • Safety helmets • Bump caps • Hair nets |
| Face and eye protection | <ul style="list-style-type: none"> • Chemical and metal splash • Airborne particles and dusts • Projectiles e.g. flying fragments and chips • Gases and vapours • Radiation | <ul style="list-style-type: none"> • Safety spectacles • Goggles • Face shields • Visors |
| Hands or arms protection | <ul style="list-style-type: none"> • Abrasions, cuts and punctures, impact • Temperature extremes e.g. cold or heat • Chemical substances • Electric shock • Skin infection, disease contamination, etc. • Hand or arm vibration | <ul style="list-style-type: none"> • Gloves • Gauntlets • Mitts • Wrist cuffs • Armlets • Barrier cream |
| Body (torso) protection | <ul style="list-style-type: none"> • Temperature extremes and adverse weather • Chemical and metal splash • Spray from pressure leaks or spray guns • Impact or penetration • Contaminated dust • Excessive wear • Entanglement of own clothing | <ul style="list-style-type: none"> • Conventional and/or disposable overalls • Boiler suits • Clothing for cold, heat and/or bad weather • Clothing to protect against machinery • High visibility jackets, vests, etc. • Harnesses, life jackets, etc. |
| Foot and leg protection | <ul style="list-style-type: none"> • Wet and slipping • Electrostatic build-up • Cuts and punctures • Falling objects • Chemical and metal splash • Abrasion | <ul style="list-style-type: none"> • Safety boots and shoes with protective toe caps, penetration-resistant mid-sole, etc. • Gaiters • Leggings, spats, etc. |
| Hearing protection | <ul style="list-style-type: none"> • Noise | <ul style="list-style-type: none"> • Ear muffs • Earplugs |
| Respiratory protection | <ul style="list-style-type: none"> • Dust e.g. crystalline silica and coal dusts • Gas, vapour, etc. • Oxygen deficient atmospheres • Welding fumes | <ul style="list-style-type: none"> • Disposable filtering face piece or respirator • Half or full-face respirator • Air-fed helmets • Breathing apparatus |

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ANNEXUR C: GUIDANCE FOR THE SELECTION OF PPE FOR WIM
(For information purposes only)

1. General considerations

- 1.1. For each hazard identified, select **PPE** that will protect the **WIM** by creating a barrier against workplace hazards. Consider the likelihood of an accident and the seriousness of a potential accident. **PPE** must be selected to protect against any hazard that is present or likely to be present. It is important for personnel to become familiar with the potential hazards, the type of protective equipment that is available, and the level of protection that is provided by that equipment, i.e. splash protection, impact protection, etc.
- 1.2. The **PPE** selected must fit the **WIM** as it is intended to protect. Make certain that **WIM** have the correct size of protective equipment. Whenever possible, select adjustable **PPE**. **WIM** input in the selection process is critical. **PPE** that fits properly and is comfortable will more likely be worn by **WIM**. Damaged or defective protective equipment must be taken out of service immediately to be repaired or replaced, and employees must be provided with the proper equipment in the interim.
- 1.3. Selected **PPE** for a work activity must be compatible with any other **PPE** that may be worn at the same time.
- 1.4. **PPE** should be repaired or replaced when it is damaged or past its useful life, or when an improved alternative becomes available.
- 1.5. All **PPE** may be used only for purposes which they are intended in accordance with the risk assessment.
- 1.6. A hazard assessment is a process of a simply formalised system of the **PPE** that is to be selected based on the hazards of the job. When conducting a hazard assessment, a task is investigated and, the hazards and the potential hazards associated with the task, are determined. This allows for the selection of **PPE** that will protect the **WIM** from the identified hazards.
 - 1.6.1. A hazard assessment may be conducted on a single employee, performing a single task, or a group of employees if all the employees perform an identical task. Hazard assessment could include all the welders conducting that task. Likewise, painters using similar types of materials or laboratory workers using similar types of chemicals could be grouped under the same assessment.
 - 1.6.2. The individual conducting the hazard assessment must have an intimate knowledge of each task. In some cases, this may require directly observing an employee. In other instances, the assessor may know all the hazards associated with a job without an additional review. During the hazard assessment of each task, inspect the layout of the workplace and look for the following hazard sources:
 - (a) High temperatures that could result in burns, eye injury, ignition of equipment, heat stress, etc.

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- (b) Cold temperatures that could result in frostbite, lack of coordination, cold stress, etc.
 - (c) Chemical exposure, including airborne or skin contact, which would have the potential for splash on the skin or in the eyes, or the potential to breathe vapours or mist.
 - (d) Harmful dust or particulates.
 - (e) Light radiation, e.g. welding, cutting, brazing, furnaces, heat treating, high intensity, lights, etc.
 - (f) Sources of falling objects, potential for dropping objects, rolling objects that could crush or pinch the feet.
 - (g) Sharp objects that may pierce the feet or cut the hands.
 - (h) Electrical hazards.
 - (i) Observe the layout of the workplace and the location of co-workers for the potential for collision with other personnel or objects.
 - (j) Any other identified potential hazard.
- 1.7. Where these hazards exist, and could cause injury to employees, **PPE** must be selected to substantially eliminate the injury potential.