

P.I. 266 CLEANING TOOL



HPE Standard Cleaning Tool with Breast and Foot Plates



Cleaning Tool with Foot Plate



Hand Held Cleaning Tool



Cleaning Tool with Bracket

PURPOSE

The cleaning tool is a hand held water jet tool that uses high-pressure water jet to move broken rock, more particularly in a stoping environment where rock is moved into the scraper path. Alternatively, the tool can also be used for sweepings in the stopes, thus replacing brushes and shovels.

BACKGROUND

The cleaning tool was developed to assist miners in cleaning rock from the face and significantly increased production. The cleaning tool can be used to clean stopes, development ends and raises. The cleaning tool is an excellent tool to clean foot walls before rail installation.

Before the Cleaning tool miners had to move rock, not moved by scrapers or in hard to reach areas, in the scraper path with brushes and shovels.

DESCRIPTION

The cleaning tool consists of a valve body, which includes a trigger, and a barrel with a nozzle attached. Four models are available: Standard HPE Cleaning Tool with Breast and Footplate, HPE Cleaning Tool with Foot plate only, HPE Cleaning Tool with no attachments and an HPE Cleaning Tool with a Bracket.

HPE Standard Cleaning Tool



The HPE Standard Cleaning tool is the Cleaning tool that HPE recommends. This Cleaning tool can be used in both standing and sitting positions. The breast plate is used in a standing position and improves jetting control. When the Cleaning tool is used in a sitting position, the foot plate prevents the operator's foot from slipping from the foot rest and injuring the operator's legs. The long barrel assists in preventing accidental body injuries to the operator.

HPE Cleaning Tool with Foot Plate



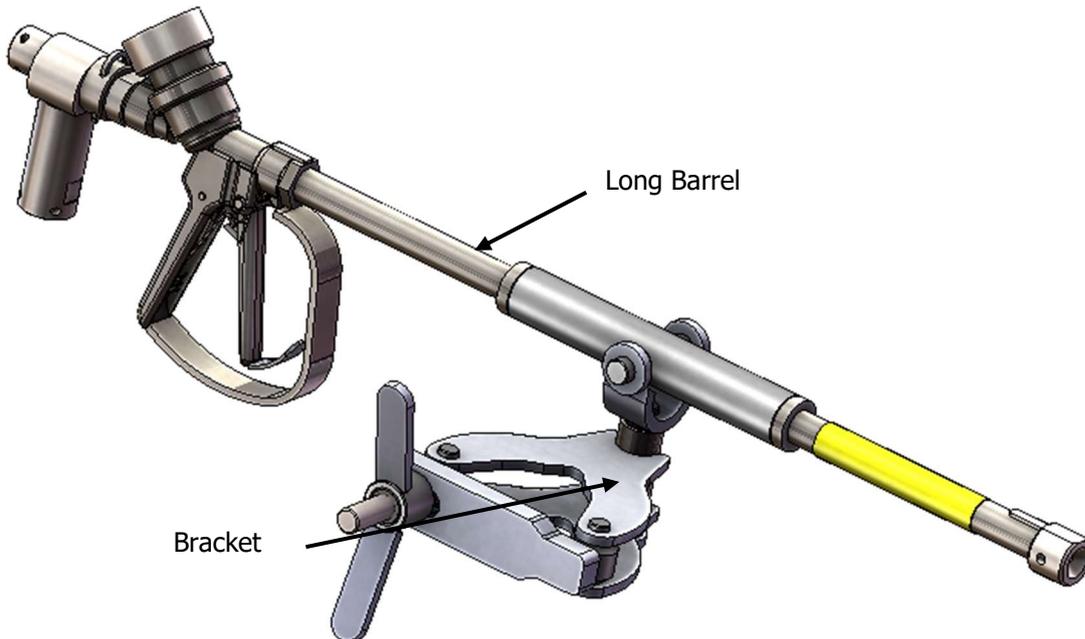
The HPE Cleaning Tool with the footplate can be used in both standing and sitting positions. Adding a breastplate will increase the amount of control the operator has. When the Cleaning tool is used in a sitting position, the footplate prevents the operator's foot from slipping from the footrest and injuring the operator's legs. The long barrel assists in preventing accidental body injuries to the operator.

HPE Hand Held Cleaning Tool



The HPE Cleaning Tool with no attachments can only be used in a standing position. Adding a long barrel, breast plate and foot plate will significantly reduce safety risks.

HPE Cleaning Tool with Bracket



The HPE Cleaning Tool with bracket can only be used when the bracket is mechanically attached to a prop in the stope. The bracket attached to the prop supports the weight of the cleaning tool, as well as the reaction forces of the water jet, resulting in low operator fatigue and a safe operator position. The long barrel assists in preventing accidental body injuries to the operator.

FEATURES

- Proven reliability over 20 years
- The tool is a hand held type

PRODUCT INFORMATION

- This is a dry shut off type tool
- The tool incorporates an inlet strainer of 400 micron
- The tool is trigger operated with a "dead man's handle" action
- A safety latch is incorporated in the hand grip to prevent accidentally depressing the trigger
- The two stage opening characteristic provides a slow and smooth opening and closing
- High efficiency tungsten carbide nozzle provides a coherent jet
- Low trigger force of 64 N applied at the center of the trigger at 16 MPa
- The tool can be used with or without the breastplate
- Note, that the tools reaction force is determined by the inlet pressure and nozzle size used and would also determine the flow rate through the tool, although the average rate is 2 l/s.
- The optional bracket provide a mechanical connection to a prop

SAFETY

- Only Certified Operators are allowed to use Water Cleaning Tools
- Always store the equipment in a 'safe place' so as to avoid damage and dirt contamination
- Always clean and check that equipment is in good condition before use as dirt will cause the equipment to fail
- Check that standard staples are correctly installed
- Check that equipment operates freely (when disconnected)
- Check that strainers are clean and unblocked
- Check that hoses are undamaged
- Check there are no leaks
- Check there are no low pressure fittings installed
- Check that no unauthorized modifications have taken place
- Check that Standard nozzles are fitted
- Always de-pressurize before connecting or disconnecting. Never remove staples or attempt to repair equipment under pressure
- Always flush pipes and hoses before connecting
- Never tie back triggers or safety catches
- Never modify equipment or attempt to repair it. Exchange faulty equipment for correctly operating equipment
- Never point any Hydropower equipment towards any person or towards any part of your body
- Do Not Drink Hydropower Water
- All leaks must be repaired immediately as they will progressively get worse. High pressure Hydropower Water can cut through steel by 'erosion' and therefore can easily penetrate the skin causing severe injuries, amputations or even fatalities

OPERATION

(More details can be found in the Operation Chapter of the Product Manual)

Applies to all cleaning tool models:

- The operator must be wearing PVC gloves and safety glasses (no mesh allowed) in addition to his standard PPE
- Two persons are required for the safe operation of the system. The operator holds the tool steady while his assistant opens and closes the manifold combi valve
- The operator must blow his whistle before cleaning commences and should ensure that all persons are clear of the Jetting / discharge area

Cleaning Tool with Foot Plate and Breast Plate if applicable



In the Sitting Position (Recommended):

- Ensure the work area is barred down, under permanent support and safe
- Due to the high reaction forces the sitting position is the recommended operating position
- Generally, in narrow, dipping stopes the operator should be seated
- The operator must hold the cleaning tool with the left hand and place his left foot in the foot plate. Leaving the right hand to operate the trigger. A left hand person may be accommodated by rotating the support handle / foot plate 180°
- The operator must place the breast plate (if applicable) against his chest for improved control before activating the trigger
- The operator must place the hose under his right arm if he is right handed or left arm if he is left handed) before activating the trigger (without breast plate)
- The operator must position himself on a stable seating and brace himself against a solid surface like a side wall or hanging wall support in the case of stopes
- The operator must keep the impact point of the water jetting at a safe distance of at least 1 meter from himself to avoid injury

In the Standing position:

- Ensure the work area is barred down, under permanent support and safe
- In flat development ends or raises where it is too wet to be seated, the operator may stand and brace himself against the sidewall, a loader or any safe permanent construction. In these cases a 4mm nozzle (maximum) cleaning tool with a long barrel and foot plate is recommended

- The operator must hold the cleaning tool with the left hand on the support handle. Leaving the right hand to operate the trigger. A left hand person may be accommodated by rotating the support handle / foot plate 180°
- The operator must place the breast plate (if applicable) against his chest for improved control before activating the trigger
- The operator must place the hose under his right arm if he is right handed or left arm if he is left handed) before activating the trigger (without breast plate)
- The operator must position himself on a stable footing and brace himself against a solid surface for example a side wall, hopper or loader to counter act the back force of the tool, before activating the trigger
- The operator must keep the impact point of the water jetting at a safe distance of at least 1 meter from himself to avoid injury

HPE Hand Held Cleaning Tool



In the Sitting Position (Not Recommended):

Due to this cleaning tool not having a foot plate and equipped with a short barrel it is not suitable to be used in a sitting position.

If it is not possible to use the Hand Held Cleaning Tool in a standing position follow the following procedure:

- Ensure the work area is barred down, under permanent support and safe
- Due to the high reaction forces the sitting position is the recommended operating position
- Generally, in narrow, dipping stopes the operator should be seated
- The operator must hold the cleaning tool with the left hand on the support handle. Leaving the right hand to operate the trigger. A left hand person may be accommodated by rotating the support handle 180°. *Under no circumstances may the operator place his foot on the support handle*
- The operator must place the hose under his right arm if he is right handed or left arm if he is left handed, before activating the trigger
- The operator must position himself on a stable seating and brace himself against a solid surface for example a side wall or hanging wall support in the case of stopes
- The operator must keep the impact point of the water jetting at a safe distance of at least 1 meter from himself to avoid injury. He must especially take care of his legs and feet that may be struck by the water jet

In the Standing position:

- Ensure the work area is barred down, under permanent support and safe
- In flat development ends or raises where it is too wet to be seated, the operator may stand and brace himself against the sidewall or a loader. In these cases a 4mm nozzle (maximum) cleaning tool with a long barrel and Foot Plate is recommended
- The operator must hold the cleaning tool with the left hand on the support handle. Leaving the right hand to operate the trigger. A left hand person may be accommodated by rotating the support handle 180°
- The operator must place the hose under his right arm if he is right handed or left arm if he is left handed, before activating the trigger
- The operator must position himself on a stable footing and brace himself against a solid surface like a side wall, hopper or loader to counter act the back force of the tool, before activating the trigger

The operator must keep the impact point of the water jetting at a safe distance of at least 1 meter from himself to avoid injury

HPE Cleaning Tool with Bracket



In the Sitting Position (Not Recommended):

Due to this cleaning tool being connected to a prop, it is not required or recommended to use it in a sitting position, except in very narrow stopes where it is not possible to stand.

Connection the bracket to a prop:

- Ensure the work area is barred down, under permanent support and safe
- Select a suitable prop to attach the cleaning tool on, which is positioned such that the jet from the cleaning tool can reach and clean the largest possible area.
- Unscrew the locking nut on the bracket and clamp the bracket to the prop at a suitable height. Ensure the locking nut is tightened properly and that there are no play between the bracket and the prop – it must be a rigid connection.
- Connect the supply hose to the cleaning tool.
- The operator must position himself behind the cleaning tool on a stable footing. It is not required that the operator brace himself against something since the bracket will support all the forces from the cleaning tool.
- The operator must keep the impact point of the water jetting at a safe distance of at least 1 meter from himself to avoid injury.

MAINTENANCE

(More Details can be found in the Maintenance Chapter of the Product Manual)

Daily:

The cleaning tool must be inspected daily by the operator. Any defects on the trigger mechanism should be repaired immediately. A detailed Operators checklist can be found in the Operation Chapter.

- Check that standard staples are correctly installed
- Check that equipment operates freely (when disconnected)
- Check that strainers are clean and unblocked
- Check that hoses are undamaged
- Check there are no leaks
- Check there are no low pressure fittings installed
- Check that no unauthorized modifications have taken place
- Check that Standard nozzles are fitted

Weekly:

The cleaning tool must be inspected weekly by a competent person. A detailed checklist can be found in the Maintenance Chapter.

- Check that standard staples are correctly installed
- Check that equipment operates freely (when disconnected)
- Check that strainers are clean and unblocked
- Check that hoses are undamaged
- Check there are no leaks
- Check there are no low pressure fittings installed
- Check that no unauthorized modifications have taken place
- Check that Standard nozzles are fitted

Quarterly

Every cleaning tool must be fully dismantled by HPE Technicians and repaired on a quarterly basis to ensure safe operation.

TECHNICAL SPECIFICATIONS

Maximum operating pressure	18 MPa
Static test pressure	27 MPa
Approx. length of tool (depending on configuration selected)	840 - 1100 mm
Approx. mass of tool (depending on configuration selected)	6 – 11 kg
Supply hose	NW 20 x 20m
Combi Valve	No 2 Combi valve

Flow Rate and Reaction Force

NOZZLE DIAMETER [mm]	PRESSURE INTO COMBI [MPa]	FLOW RATE [ℓ/sec]	REACTION FORCE [kg]
5	18	3.3	57
	16	3.1	50
	14	2.9	44
4.5	18	2.7	48
	16	2.6	43
	14	2.4	37
4	18	2.2	39
	16	2.1	35
	14	1.9	31
2.75	18	1.1	19
	16	1.0	17
	14	0.9	15