## BURINTEKH

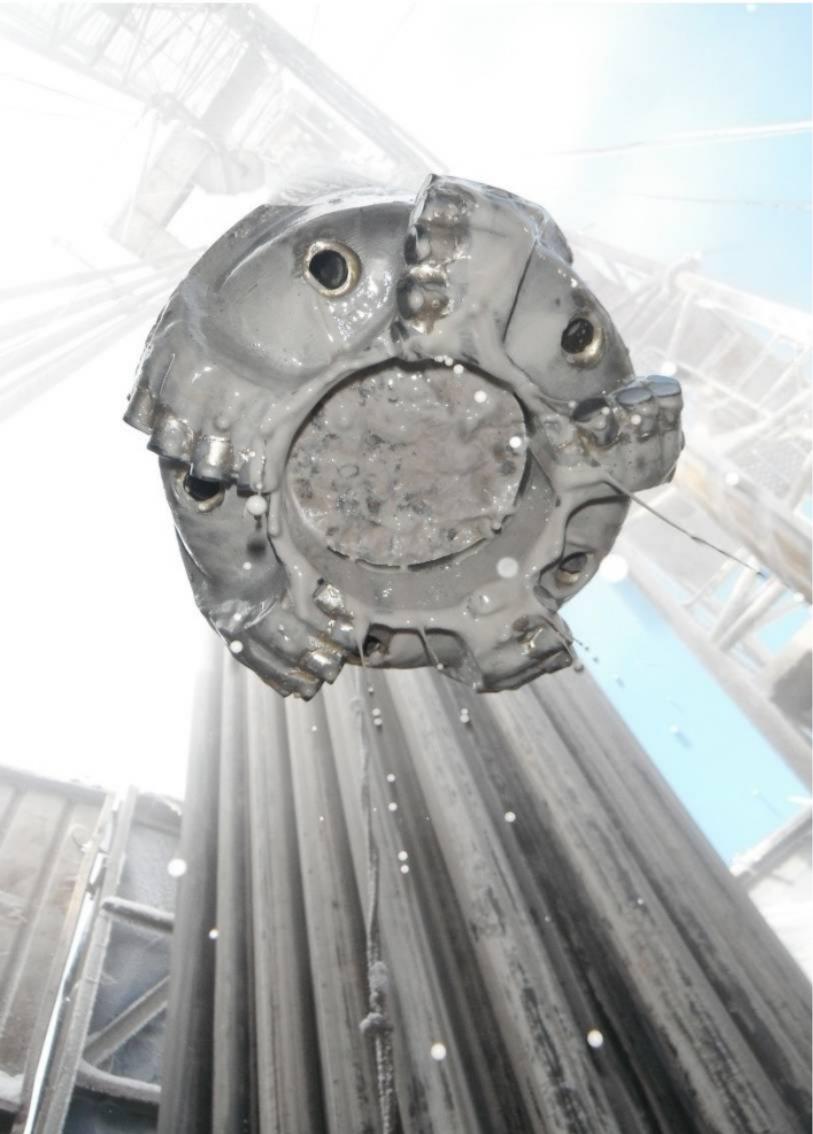






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## PRODUCT INFORMATION

- Experience in the production of core recovery tools and the provision of services for over 20 years
- Own independent production of the entire complex of coring tools
- Quality and manufacturability are not inferior leading foreign equipment manufacturers
- Patented own developments
- Annual improvement of technology and techniques allows meeting all up-to-date customer requirements
- Average core recovery more than 98%
- Wide geography of use (including offshore projects)
- Well diameters from 4<sup>1</sup>/<sub>8</sub> to 12<sup>1</sup>/<sub>4</sub> in
- Extended recovery length per run up to 180 meters with conventional core recovery
- Core diameter-1³/<sub>4</sub>; 2; 2<sup>5</sup>/<sub>8</sub>; 3¹/<sub>8</sub>; 4; 4¹/<sub>3</sub>; 4¹/<sub>2</sub>; 5¹/<sub>4</sub> in
- Capability of equipping barrels with additional units—core recovery enhancement and its informative value, reduction of jams
- Own design convenience of assembly and core retrieval
- Wide range of own produced core bits: cutting structure PDC/impregnated/combined/TSP



#### **CORE BITS**

"BURINTEKH", Ltd develops and produces core bits for operations in rocks of I-XII category of hardness, I-XII category of abrasiveness equipped with PDC, TSP cutting structure, impregnated with diamonds or its combination, in steel or matrix body. All core bits are designed for ensuring maximum core recovery and achieving high rates of penetration.

#### PDC core bits nomenclature

#### BIT 8 1/2 / 4 B 613 YC.251

BIT	Trademark
81/,	Core bit diameter, in
4	Recovered core diameter, in
В	Manufacturer code
6	Quantity of blades
13	PDC cutters size, mm
YC	Additional options
251	Digital symbol of design feature

Cutters diameter: 8mm, 10mm, 13mm, 16mm, 19mm

## Impregnated core bits nomenclature

#### BIT 81/4 B 15151 AM.1431

BIT	Trademark
81/,	Core bit diameter
4	Recovered core diameter, mm
В	Manufacturer code
15	Quantity of sectors
15	Quantity of flushing ports
1	Cutting structure – diamond impregnated
AM	Additional options
<b>14</b> 31	Diamond layer thickness
14 <b>3</b> 1	Profile type – wave-like (0- flat)
143 <u>1</u>	Tool joint type

#### Impregnated core bits cutting structure types

- 1 | Diamond impregnated
- 2 TSP cutters
- 4 Hot pressed inserts with impregnated diamonds



#### **ADDITIONAL OPTIONS**

#### Main cutting structure





#### "T" OPTION

Increased resistance cutters





#### "Y" OPTION

Highest abrasion resistant cutters

#### Backup row



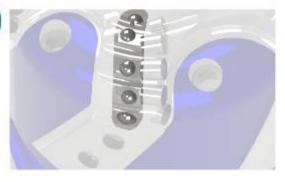


#### "E" OPTION

Additional row of PDC cutters behind the main row

ADVANTAGES: increase of cutting structure resistance and meterage per core bit





#### "O" OPTION

Additional diamond impregnated carbide inserts behind the main row

ADVANTAGES: reduction of axial vibrations, additional cutters protection from chipping





#### "C" OPTION

Additional stabilizing inserts behind main row

ADVANTAGES: additional cutters protection from chipping during radial vibrations

#### **ADDITIONAL OPTIONS**







#### "B" OPTION

PDC back reaming cutters on the gage relief

**ADVANTAGES:** body protection from wear during overpulls and back reaming





#### "A" OPTION

Gage is reinforced with thermal resistant diamond inserts TSP

**ADVANTAGES:** increase of gage resistance in hard and tough rocks

#### Body





#### "M" OPTION

Matrix body

ADVANTAGES: body protection from washout

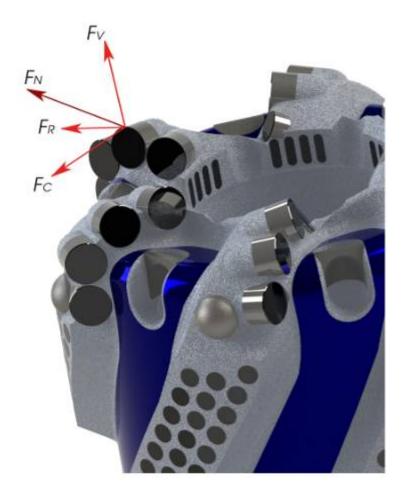
#### **ENGINEERING AND DESIGN**

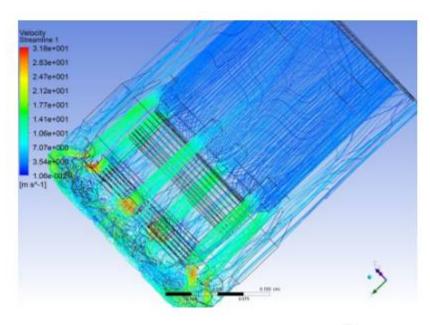
When designing core bits it should be considered that in addition to the standard functions of a rock destruction tool such as drilling out rock with high rate of penetration core bits must perform a number of special functions:

- ensuring smooth cutting and minimum level of vibrations to maintain the integrity of core column;
- core protection from washout and contamination with mud;
- maintaining set diameter of core as well as its integrity for further fixation in core catchers.

Tool development is carried out taking into account wide experience of operations in rocks of all drillability grade and core recovery complexity.

While designing cutting structure and flushing are calculated using today's software, which allows obtaining a complete visualization of the finished product and evaluating the effect of mud and drilling conditions on the quality of recovered core.





# CORE BITS FOR SOFT LOOSE ROCKS

Core bits with "CLEAN CORE" protection technology are designed for drilling with coring in loose, soft and prone to washout rocks of I-IV category of hardness. Design of core bit minimizes negative effect of mud flow on core column.

#### BIT 6% / 2% B 613 CAM.285

IADC CODE: M233

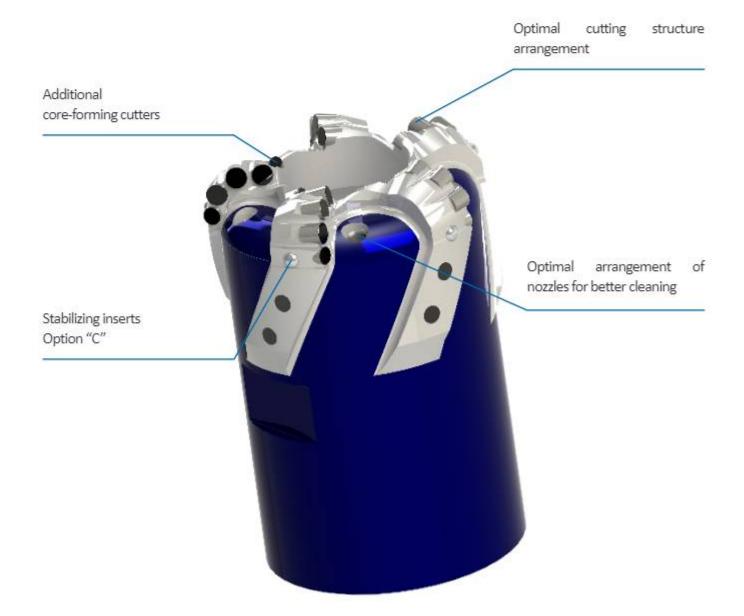


# CORE BITS FOR SOFT AND MEDIUM ROCKS

This line is designed for drilling with core recovery in soft interbedded with medium rocks of II-V category of hardness. Special design ensures combination of high ROP and smoothness of rock cutting.

#### BIT 8½ /4 B 516 C.291

IADC CODE: S323

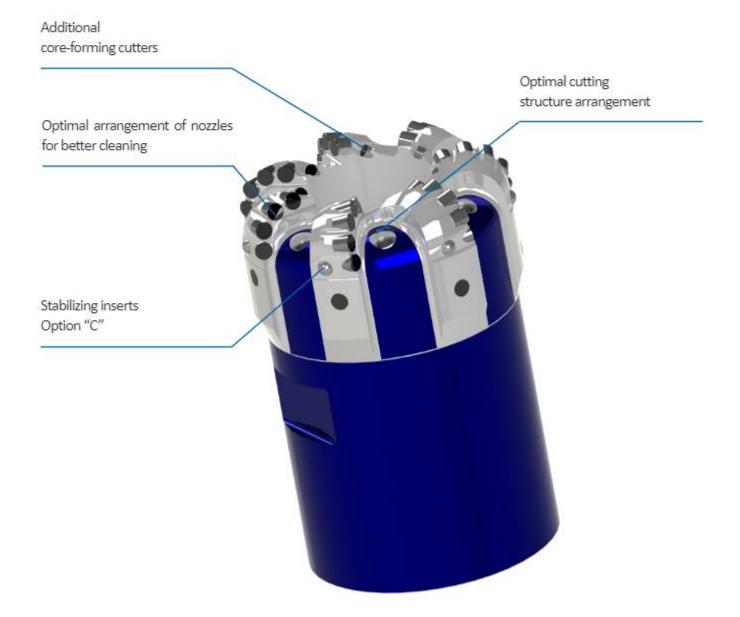


# CORE BITS FOR MEDIUM INTERBEDDED WITH HARD ROCKS

Core bits for drilling medium interbedded with hard rocks of V-VI category of hardness are designed for achieving high ROP and core recovery.

#### BIT 8½ /4 B 713 YC.251

IADC CODE: S433



# CORE BITS FOR MEDIUM INTERBEDDED WITH HARD ROCKS

The line of impregnated core bits with TSP profile for drilling with core recovery in rocks of V-VII category of hardness. Core bits are purposed for achieving high ROP with PDM or rotor.

#### BIT 8½ /4 B 12122 AM.01

IADC CODE: T4R7



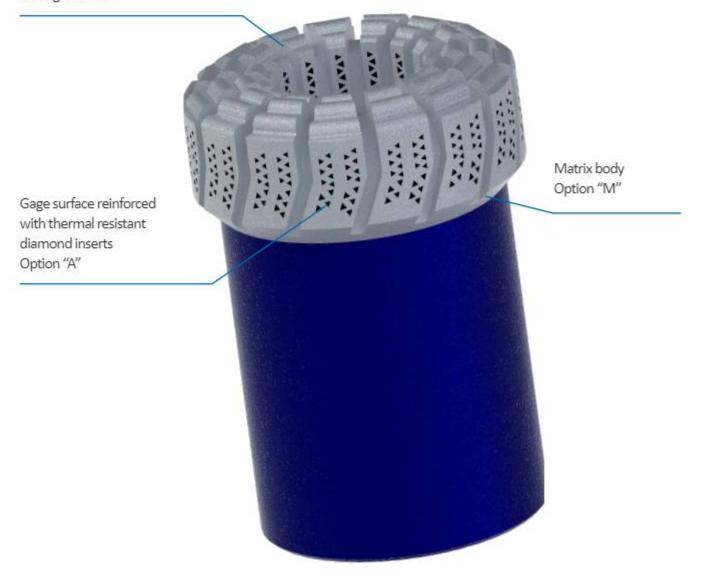
# CORE BITS FOR HARD AND TOUGH ROCKS

The line of impregnated core bits with wave-like profile for drilling with core recovery in rocks of VI-IX category of hardness and up to XI category of abrasiveness. For achieving high ROP it is recommended to use turbo drill or PDIM.

#### BIT 8½ /4 B 15151 AM.1431

IADC CODE: D6R0

Special shaped cutting structure



# CORE BITS FOR HARD AND TOUGH ROCKS

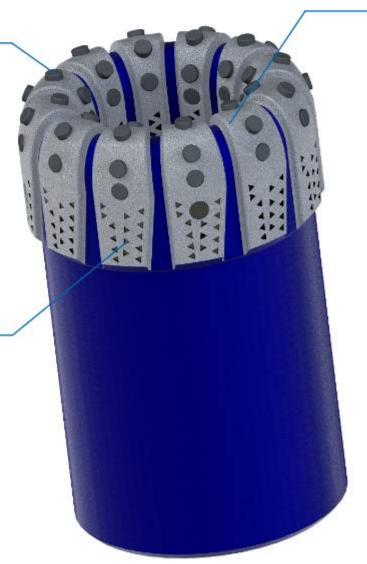
Impregnated core bits equipped with diamond impregnated hot pressed inserts for drilling and coring in rocks of VII-XI category of hardness and up to XI category of abrasiveness are notable for increased cutting structure resistance and slotted flushing. For achieving high ROP it is recommended to use turbo drill or PDM as a drive.

#### BIT 6/3 1/8 B 12124 AM.540

IADC CODE: 01R7

Matrix body Option "M"

Diamond impregnated hot pressed inserts



Gage surface reinforced with thermal resistant diamond inserts Option "A"

# CORE BITS FOR TOUGH AND VERY TOUGH ROCKS

Impregnated core bits equipped with diamond impregnated hot pressed inserts for drilling and coring in rocks of IX-XII category of hardness and up to XII category of abrasiveness are notable for increased cutting structure resistance and slotted flushing. For achieving high ROP it is recommended to use turbo drill or PDM as a drive.

#### BIT 8 ½ /3 ½ B 991 AM.1250

IADC CODE: D5R0



## Bits for drilling out lab samples from core material for further researches

Bits are equipped with impregnated diamonds as a cutting structure.





#### Bits for sidewall core sampling

Bits for sidewall core sampling can have either PDC cutting structure or can be impregnated with natural or synthetic diamonds.



BIT 13/8/7/8 D 441 M



BIT 13/8/7/8 B 608

#### CORE BARRELS

"BURINTEKH", Ltd core barrels allow carrying out qualitative core recovery in rocks from I to IV category of core recovery complexity.

#### Core barrels "VOSTOK"

Barrels "VOSTOK" designed for heavy drilling conditions, strong vibrations, complex rock cross-sections, high temperatures and pressures. Core barrels "VOSTOK" have reinforced tool joints, highly resourceful hanger and reinforced core catchers. Barel can be equipped with additional sections.

#### Core barrels "SIBERIA"

Core barrels "SIBERIA" were designed in accordance with the international requirements for core barrels. Reliable systems for coring with a great resource. Allow coring in various rocks. The line of core barrels "SIBERIA" worthy competes with the best world analogues.

Example of nomenclature

#### CBS-71/4x4

CBS Series Core Barrel Siberia
7 1/4 Main length OD, mm
Core diameter, mm



#### CORE BARRELS

	Core Barrel	Standard amount	Standard length of section (ft)	Standard Length (ft / m)	Max. Length (ft / m)	Core diameter using telescopic tubes (inc)***
1	CBS 3-1/2x1-3/4	2	30	60/18	60/18	
2	CBS 4-1/8x2-1/8	2	30	60/18	60/18	=
3	CBS 4-3/10x2-5/8	2	30	60/18	60/18	21/8
4	CBS 4-1/2x2-1/8	2	30	60/18	60/18	21/8
5	CBS 4-3/4x2-5/8	2	30	60/18	60/18	2 1/8
6	CBS 5-1/3x2-5/8	2	30	60/18	600/180	2 5/8
7	CBS 5-1/3x3-1/7	2	30	60/18	300/90	2 5/8
8	CBS 5-3/4x3-1/2	2	30	60/18	300/90	2 5/8
9	CBS 6-1/4x3	2	30	60/18	60/18	2 5/8
10	CBS 6-1/4x4	2	30	60/18	60/18	31/2
11	CBS 6-3/4×4	2	30	60/18	360/108	31/2
12	CBS 7-1/4x4	2	30	60/18	600/180	4
13	CBS 7-2/3x4	2	30	60/18	600/180	4
14	CBS 8x5-1/4	2	30	60/18	600/180	4

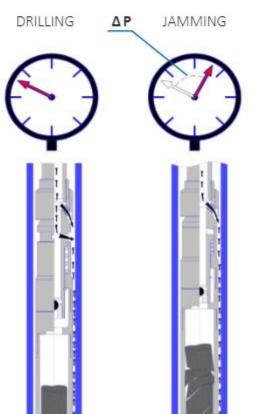
<sup>\*\*\*- 2</sup> core jams elimination

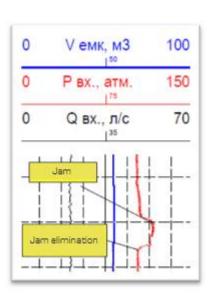
#### INTERNAL FURNISHING

#### Core jam detector

Using a core jam detector (RZK) a patented development that allows real-time identification of the destruction and wedging of a core in a core tube or a set of core catchers makes it possible to significantly increase core recovery in loose, alternating and clastic rocks where it is impossible to determine jamming by ROP reduction or pressure loss. During the core jamming the flushing ports in the RZK overlap and the pressure on the manifold manometer increases sharply, after which you can take a set of measures to eliminate the core jamming and continue further drilling.









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#### "Clean Core" system technology

Protecting the core from the negative impact of drilling mud on the initial properties of the material is one of the most important tasks in the design and selection of equipment for coring. The special design of the core bit and the core catchers shoe minimizes the contact time and the degree of influence of the drilling fluid on the core.

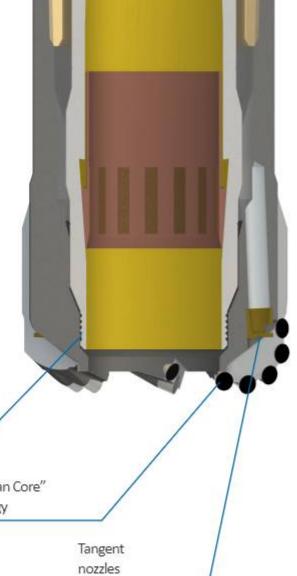
#### **ADVANTAGES**

- -Special configuration core bit (tangent nozzles, junk slot shape)
- Elongated shoe part with groove seal preventing mud passage
- Isolating agent "IZOKOR" envelopes core surface

**Result:** core protection from mud, properties retention, more qualitative and representative core for analysis.

Elongated shoe part + seal

Core bit with "Clean Core" technology



#### INTERNAL FURNISHING

#### Isolating agent IZOKOR

Isolating agent "IZOKOR" is a gel produced by "BURINTEKH", Ltd with high rheological properties, adhesion, lubricity, which allows to prevent penetration of drilling mud into core material. There are options for the composition of both water based and anhydrous based.

#### **ADVANTAGES**

- Enveloping core and protection from drilling mud.
- Does not contain water.
- Does not contain HC.
- Excellent lubricity.
- Minimum filtering and impact on core.





#### INTERNAL FURNISHING

## Valve system for core protection from cuttings and mud

Coring into the isolating fluid makes it possible to obtain a large array of additional data on the reservoir. However, when coring in wellbores with a complex profile that reveal unstable interlayers where there is a constant formation of sludge pads and rock debris, there is a great risk of sludge getting into the core tube and squeezing the isolating fluid during trip in hole of the assembly. This system will prevent the above complications.

Valve system to protect core from cuttings and drilling mud is designed to ensure the purity of core.

#### **ADVANTAGES**

- Protection of core receiver from mudding up during TIH during coring with isolating fluid.
- Protection of core from drilling mud while drilling.
- Uniform core enveloping with isolating agent.
- Protection against cuttings and drilling mud penetration into core receiver during reaming (in complicated wellbores).



BURINTEKH

## Orienting core system Azimuthally oriented core recovery

In order to receive more information about the reservoir, such as grains, change in permeability depending on the azimuth is used oriented core – core recovery with its orientation tying in space. "Orienting Core" system is designed for receiving oriented core using MWD and non-magnetic drill pipes. The use of fiberglass and aluminum core tubes is possible.



Orienting slip with sub to inclination module



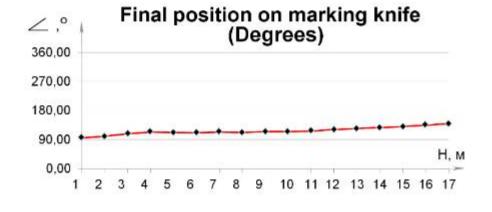
Set slip on core tube



Orienting mark



on shoe



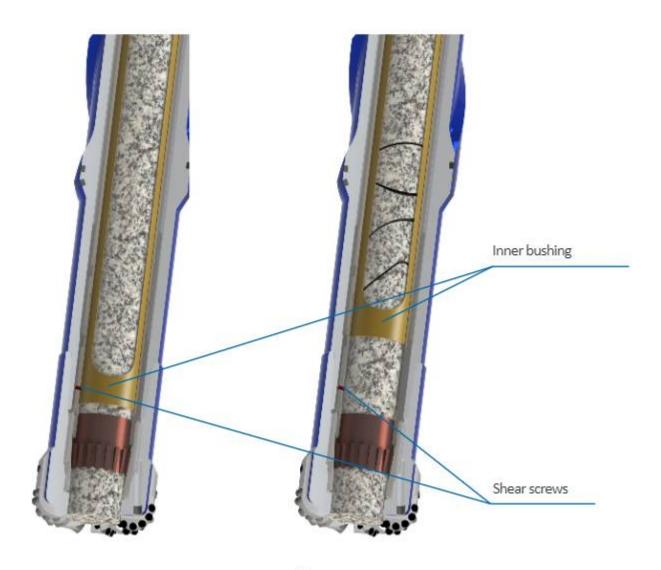
#### INTERNAL FURNISHING

#### Anti-jamming system

Jamming in core tube during coring in fractured rocks is a major cause of premature drilling interruption. The increase in the number of round-trip operations due to core jams can lead to a significant increase in well construction time. Using anti-jamming systems to eliminate 1 jam can effectively solve this problem.

#### **ADVANTAGES**

- The elimination of one core jam.
- Increased core recovery.
- Increased meterage per 1 run.
- Reduction of well construction time by reducing the number of round-trip operations.
- Coring with isolating fluid.

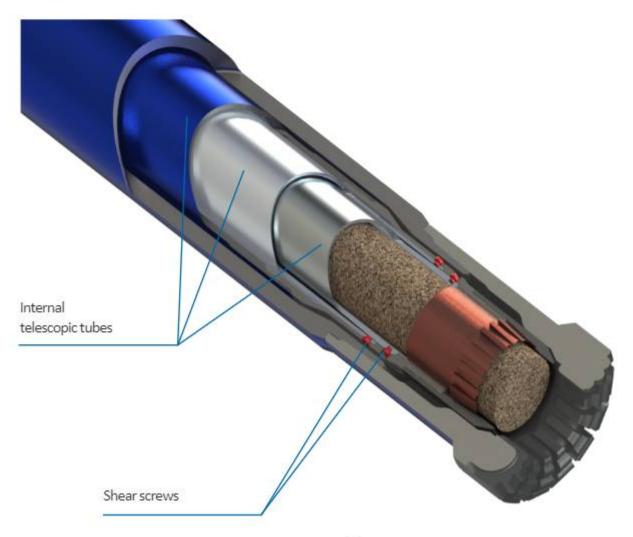


#### Telescopic core tubes

Telescopic core tubes were designed specifically for coring in highly fractured rocks. Their feature is the presence of two sliding internal pipes. The use of telescopic core tubes makes it possible to eliminate two core jams per run and, accordingly, reduce the number of round-trip operations by 2 per each run.

#### **ADVANTAGES**

- The elimination of 2 core jams.
- Increased core recovery.
- -Increased meterage per 1 run.
- Reduction of well construction time by reducing the number of round-trip operations.
- Coring with isolating fluid.



#### INTERNAL FURNISHING

#### Single-use core tubes

#### • fiberglass core tubes

Specially designed single-use core tubes have low friction coefficient of the inner surface, which reduces the likelihood of core jamming. After POOH they are sawn into meter sections, closed with plugs and placed in boxes for transportation.

#### aluminum core tubes

Aluminum core tubes of special design for coring in rocks of any category of coring difficulty. Have low friction coefficient of the inner surface. Used when working in cross-sections with abnormally high temperatures.











#### INTERNAL FURNISHING

#### Safety joint



Special unit of the barrel allowing to unscrew the tool and remove the inner core tube with a core in the event of a sticking of core barrel.

#### Collet core catcher

The most versatile core catcher for coring is manufactured using a unique patented technology.



#### Lever core catcher



A core catcher for all types of rocks allows tearing off and hold fractured and unbound core.

#### Spring core catcher

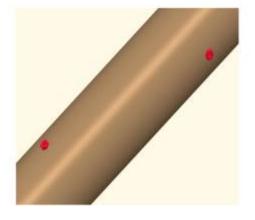
Core catcher specially designed for loose and incompetent rocks. Provides maximum overlap and protects core from pouring out when pulling to the surface.



## Gas-relief valve during TIH

During coring in gas-containing rocks during pulling out of hole, gas may be emitted into the core tube, which can lead to the destruction of core when it is removed.

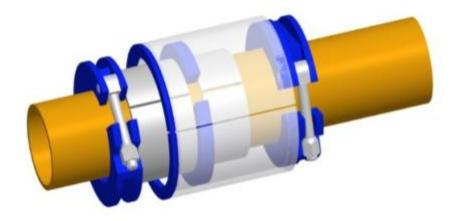
- Set-in valves
- Core tube valve





Gas-relief device during removal of core

- Gas relief unit
- Device for safe core tube sections disassembly when coring gas saturated core.

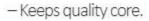


## Universal load frame for tripping tubes without flexure

Designed for smooth lowering of core tubes with a core to catwalks. Eliminates the deflection of core tubes and protects the core from the appearance of man-induced cracks.

#### **ADVANTAGES**

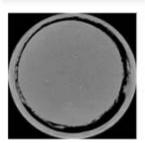




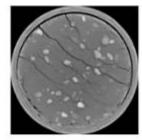
- Work with one auxiliary winch is possible.

Patent of the Russian Federation





Core when lowered with frame

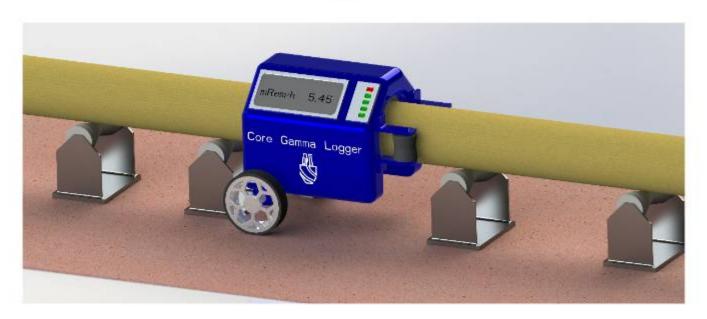


Destroyed core when lowering tube with deflection





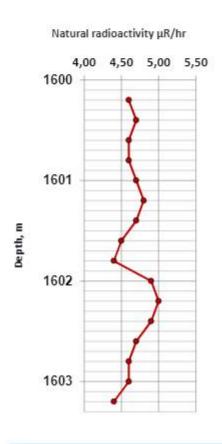
#### Core gamma logger



Designed to scan recovered core along the length in rig conditions and determine the total gamma activity to bind the core to the gamma log.

- $\, \mbox{\sc Allows}$  determining the location of sampling for the conservation of core.
- Operating temperature range from-40 to +40°C.







#### Core preservation

After removing core tube from the barrel in order to preserve the integrity and information capacity of the core it is necessary to take measures to stabilize it.

#### Today the most effective ways are:

- Core paraffining
- Fast-curing polyurethane foam
- Freezing
- Plastic busing











#### Core UV photography

The introduction of tracer agents in the drilling mud with further photographing of the ends in ultraviolet light allows estimating the zone of mud filtrate penetration.

Photographing is performed using professional photographic equipment, on specialized equipment.





Photo of cut core in daylight

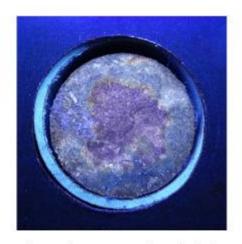


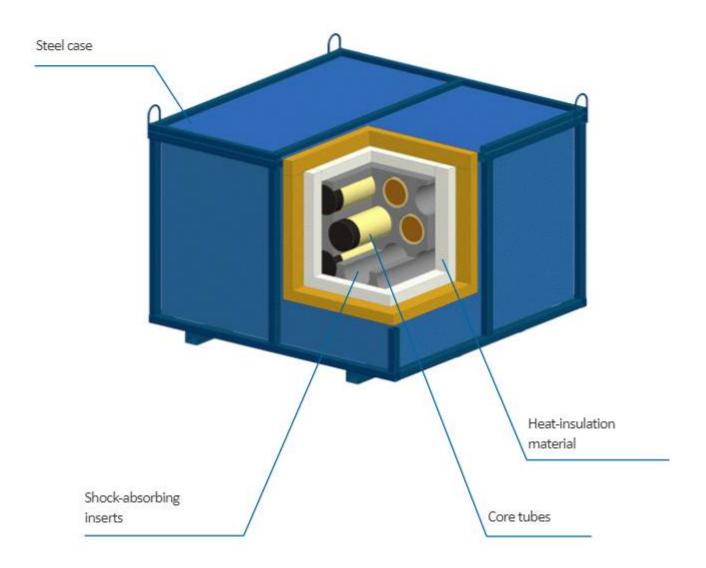
Photo of cut core in ultraviolet light

#### Core stabilization and packaging

The container is designed to transport core from rig to the research laboratory. Special shockabsorbing inserts protect core from damage during transport. Heat-insulation material allows saving core in a frozen state when stabilized with dry ice. Additionally, each container can be equipped with a shock sensor.

#### **ADVANTAGES**

- Durability.
- Protection of core from vibration.
- Heat-insulation.
- Built-in shock sensor



# FOR NOTES



#### FOR NOTES

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