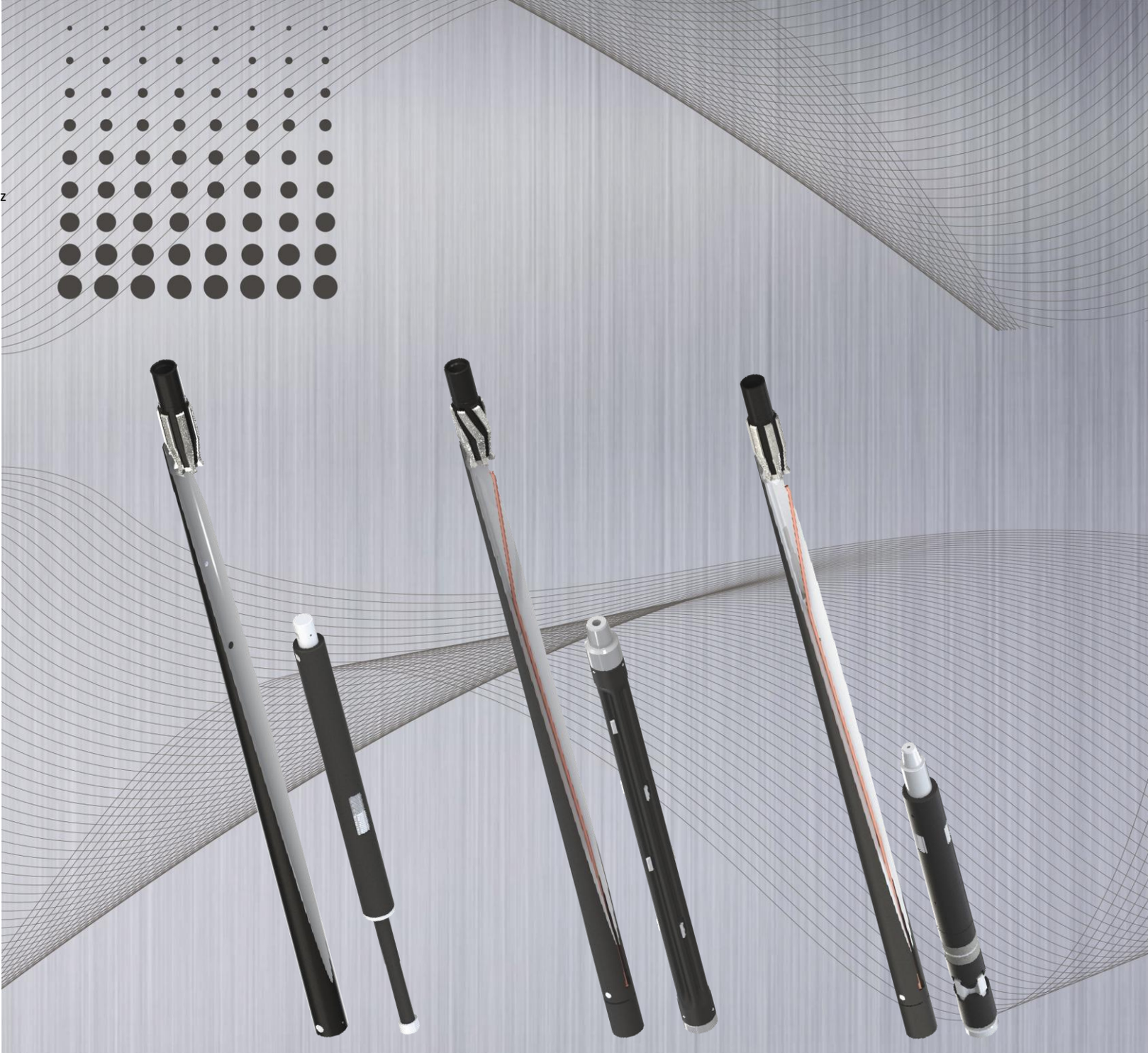


TECHNOLOGY®

steel quality assurance

Volume 2

Casing Exit /Sidetracking Systems

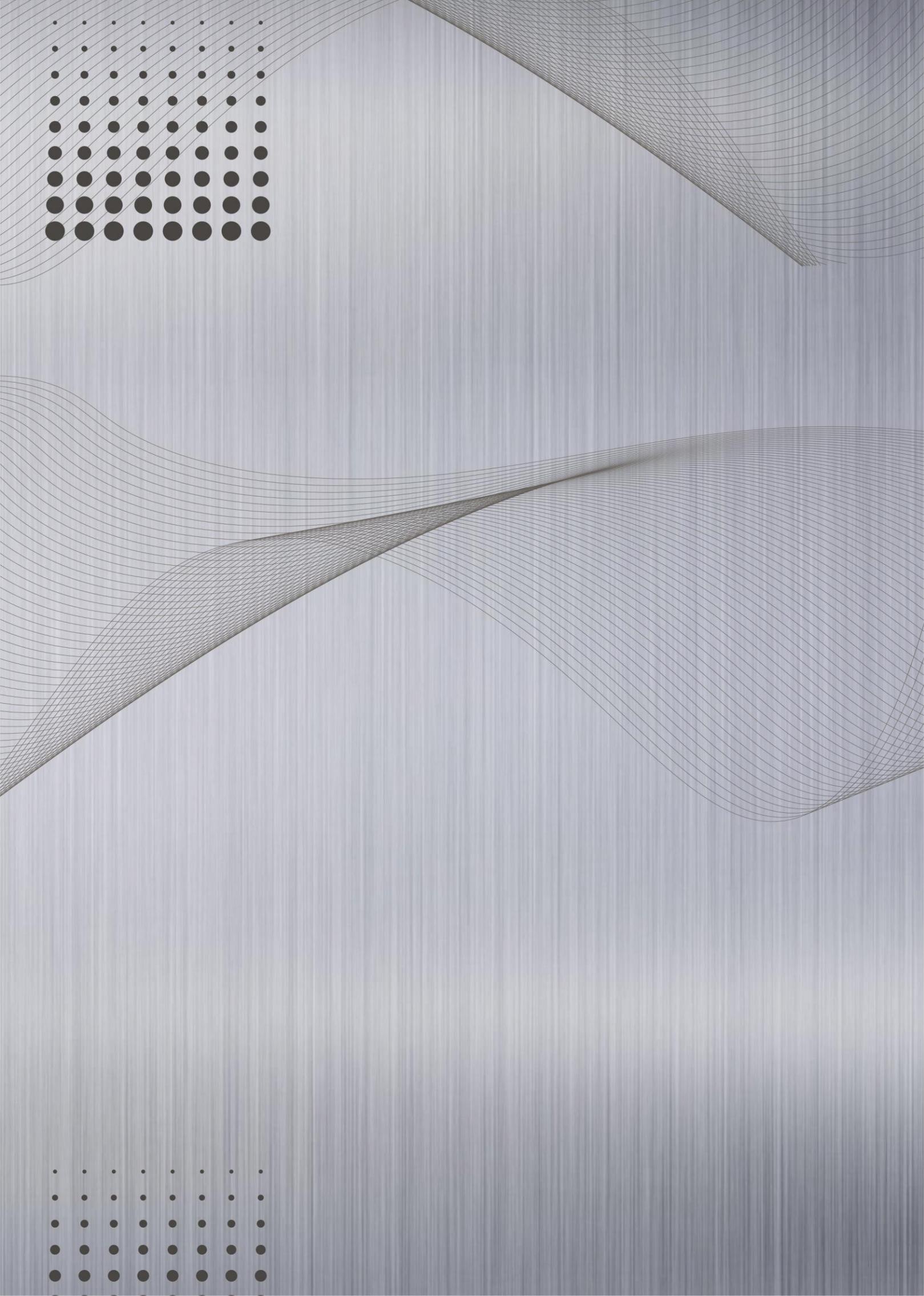


Table of contents

1. Whipstock with bottom-set mechanical anchor (KOYAM)

APPLICATIONS

The whipstock with a mechanical single-die anchor is designed for casing exit through one or multiple casings. The whipstock system - comprising a starting mill (SM) and a watermelon mill (WM) - enables whipstock setting, casing exit and rathole drilling in a single trip. The system is mechanically set on bottom on a cement plug or bridge plug.

DESIGN FEATURES

The assembly includes a straight-blade stabilizer-reamer manufactured from alloy steel. The mill features solid-milled calibration blades equipped with hard-alloy cutting teeth that provide a defined cutting edge, enabling precise wellbore calibration during reciprocating. Drilling fluid circulates through central ports. The upper and lower sections of the stabilizer body features a standard rotary-shouldered connection thread of the appropriate size and configuration to allow secure make-up with the drill string.

The system includes whipstock with whip face angle 1.5-2.5° required to provide sufficient inclination for the mills (starting mill (SM) and watermelon mill (WM) and mechanical single die anchor.

The tool assembly is run on the drill string, with the starting mill secured to the whipstock via a transportation shear bolt. The mechanical single die anchor is activated by slacking off the drill string on the bottom. This shears the shear screw, allowing the die to shift into its operational position. Additional slacking-off shears the transportation shear bolt. This is followed by milling the casing window and deepening the rathole.

INFORMATION FOR CUSTOMERS

To place an order, please specify the following:
- designation of the whipstock;
- designation of the starting mill SM (SMc)** and the watermelon mill WM**.

SPECIFICATIONS

Designation	Nominal casing dia., mm	Whipstock & mechanical anchor OD	Whipstock length, mm	Mechanical anchor length, mm	Total length, mm	Shearing force of the transportation bolt, tn
KOYAM-139.05	139	112	2600	2130	4630	9÷11
KOYAM -146.05	140/146	115	2600	2130	4630	9÷11
KOYAM -168/178.05	168/178	135	2900	2130	4930	9÷11
KOYAM -245.05	245	200	4500	3160	7460	15÷18

*Custom configurations are available upon request, per customer specifications.
**For detailed specifications, refer to Volume 1 – Milling Tools.

2. Whipstock with bottom-set mechanical anchor (KOYAM) Impact on metal

APPLICATIONS

The whipstock with a mechanical single-die anchor is designed for casing exit through one or multiple casings. To reduce impact of shock and bending loads during casing window milling, the Impact on Metal system is run in conjunction with the starting mill (SM) – Impact on Metal and the watermelon mill (WM) – Impact on Metal. This combination enables whipstock setting, window milling and drilling the rathole in a single trip. The system is mechanically set on bottom on a cement plug or bridge plug.

DESIGN FEATURES

The system includes whipstock with whip face angle 1.5-2.5° required to provide the sufficient inclination for the mills (starting mill (SM) - Impact on Metal and watermelon mill (WM)-Impact on Metal) and mechanical single die anchor.

The tool assembly is run on the drill string, with the starting mill secured to the whipstock via a transportation shear bolt. The mechanical single die anchor is activated by slacking off the drill string on the bottom. This shears the shear screw, allowing the die to shift into its operational position. Additional slacking-off shears the transportation shear bolt. This is followed by milling the casing window and deepening the rathole.

INFORMATION FOR CUSTOMERS

To place an order, please specify the following:

- designation of the whipstock;
- designation of the starting mill SM (SMc) Impact on Metal* and the watermelon mill WM Impact on Metal**.

SPECIFICATIONS*

Designation	Nominal casing dia., mm	Whipstock & mechanical anchor OD	Whipstock length, mm	Mechanical anchor length, mm	Total length, mm	Shearing force of the transportation bolt, tn
KOYAM-139.05 Impact on Metal	139	112	2600	2130	4630	9÷11
KOYAM-146.05 Impact on Metal	140/146	115	2600	2130	4630	9÷11
KOYAM-168/178.05 Impact on Metal	168/178	135	2900	2130	4930	9÷11
KOYAM-245.05 Impact on Metal	245	200	4500	3160	7460	15÷18

*Custom configurations are available upon request, per customer specifications.

**For detailed specifications, refer to Volume 1 – Milling Tools.

3. Whipstock with hydraulic anchoring without bottomhole support KOYAG

APPLICATIONS

The whipstock with a hydraulic anchor is designed for casing exit through one or multiple casings. The whipstock system - comprising a starting mill (SM) and a watermelon mill (WM) - enables whipstock setting, casing exit and rathole drilling in a single trip. The whipstock is hydraulically set without cement bridge or packer plug.

DESIGN FEATURES

The system includes whipstock with whip face angle 1.5-2.5° required to provide sufficient inclination for the mills (starting mill (SM) and watermelon mill (WM) and hydraulic anchor.

The tool assembly is run on the drill string, with the starting mill secured to the whipstock via a transportation shear bolt.

The anchor is hydraulically set in the casing upon opening. The hydraulic anchor is additionally equipped with a valve that enables automatic fill-up with drilling mud.

To activate the hydraulic anchor inside the casing after running to the target depth, the required mud pressure is applied through the drill string, shearing the transportation shear bolt. This is followed by milling the casing window and deepening the rathole.

INFORMATION FOR CUSTOMERS

To place an order, please specify the following:

- designation of the whipstock;
- designation of the starting mill SM* and the watermelon mill WM**.

SPECIFICATIONS*

Designation	Nominal casing dia., mm	Whipstock OD, mm	Hydraulic anchor OD, mm	Whipstock length, mm	Hydraulic anchor length, mm	Total length, mm	Shearing force of the transportation bolt, tn
KOYAG-139	139	112	115	2750	2300	4960	9÷11
KOYAG-146	140/146	115	118	2750	2300	4960	9÷11
KOYAG-168/178	168/178	135	138	3080	2400	5480	9÷11
KOYAG-245	245	200	208	4680	2600	7164	15÷18

*Custom configurations are available upon request, per customer specifications.

**For detailed specifications, refer to Volume 1 – Milling Tools.

4. Whipstock with mechanical retrievable bottom-set anchor (KOYAIM2)

APPLICATIONS

The whipstock with a retrievable mechanical double-die anchor is designed for casing exit through one or multiple casings. The whipstock system - comprising a starting mill (SM) and a watermelon mill (WM) - enables whipstock setting, casing exit and rathole drilling in a single trip. The system is mechanically set on bottom on a cement plug or bridge plug. The anchor can be retrieved from the wellbore if necessary.

DESIGN FEATURES

The system includes whipstock with whip face angle 1.5-2.5° required to provide sufficient inclination for the mills (starting mill (SM) and watermelon mill (WM) and retrievable mechanical double die anchor.

The tool assembly is run on the drill string, with the starting mill secured to the whipstock via a transportation shear bolt. The retrievable mechanical double-die anchor is activated by slacking off the drill string on the bottom. This shears the shear screw, allowing the dies to shift into its operational position. Additional slacking-off shears the transportation shear bolt. This is followed by milling the casing window and deepening the rathole. After milling operation, the system can be retrieved from the wellbore using a fishing hook (FH) or a threaded die collar (TC).

INFORMATION FOR CUSTOMERS

To place an order, please specify the following:

- designation of the whipstock;
- designation of the starting mill SM* and the watermelon mill WM**.

Specifications*

Designation	Nominal casing dia., mm	Whipstock OD, mm	Whipstock & mechanical anchor OD	Whipstock length, mm	Hydraulic anchor length, mm	Total length, mm	Shearing force of the transportation bolt, tn
KOYAIM2-139	139	112	112	2600	1260	3755	9÷11
KOYAIM2-146	140/146	115	115	2600	1260	3755	9÷11
KOYAIM2-168/178	168/178	135	135	2900	1260	4055	9÷11

*Custom configurations are available upon request, per customer specifications.

**For detailed specifications, refer to Volume 1 – Milling Tools.

5. Whipstock with hydraulic-mechanical retrievable sealing anchor set without bottomhole support KOYAGMIG

APPLICATIONS

The whipstock, equipped with a hydraulic-mechanical retrievable anchor and an integrated sealing packer (eliminating the need for additional sealing of the mail hole), is designed for milling a casing window through single or multiple casings.

The whipstock system - comprising a starting mill (SM) and a watermelon mill (WM) - enables whipstock setting, casing exit and rathole drilling in a single trip. The whipstock is hydromechanically set without cement bridge or packer plug. The anchor can be retrieved from the wellbore if necessary.

DESIGN FEATURES

The system includes whipstock with whip face angle 1.5-2.5° required to provide sufficient inclination for the mills (starting mill (SM) and watermelon mill (WM) and hydraulic-mechanical anchor.

The tool assembly is run on the drill string, with the starting mill secured to the whipstock via a transportation shear bolt.

The anchor is hydromechanically set in the casing upon opening. The hydraulic anchor is additionally equipped with a valve that enables automatic fill-up with drilling mud.

To activate the hydraulic anchor inside the casing after running to the target depth, the required mud pressure is applied through the drill string, shearing the transportation shear bolt. This is followed by milling the casing window and deepening the rathole. After milling operation, the system can be retrieved from the wellbore using a fishing hook (FH) or a threaded die collar (TC).

INFORMATION FOR CUSTOMERS

To place an order, please specify the following:

- designation of the whipstock;
- designation of the starting mill SM* and the watermelon mill WM**.

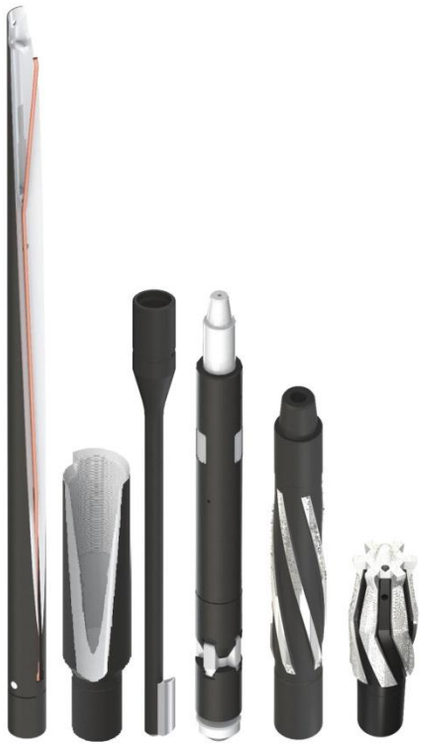
Specifications*

Designation	Nominal casing dia., mm	Whipstock OD, mm	Hydraulic-mechanical anchor OD, mm	Whipstock length, mm	Hydraulic anchor length, mm	Total length, mm	Shearing force of the transportation bolt, tn
KOYAGMIG-139	139	112	112	2600	1700	4210	9÷11
KOYAGMIG-146	140/146	115	115	2600	1700	4210	9÷11
KOYAGMIG-168	168	135	135	2900	1750	4550	9÷11
KOYAGMIG-178	178	135	145	2900	1750	4550	9÷11

*Custom configurations are available upon request, per customer specifications.

**For detailed specifications, refer to Volume 1 – Milling Tools.

6. Whipstock with hydraulic-mechanical retrievable anchor set without bottomhole support KOYAGMI



APPLICATIONS

The whipstock with a retrievable hydraulic-mechanical anchor is designed for casing exit through one or multiple casings.

The whipstock system - comprising a starting mill (SM) and a watermelon mill (WM) - enables whipstock setting, casing exit and rathole drilling in a single trip. The whipstock is hydromechanically set without cement bridge or packer plug. The anchor can be retrieved from the wellbore if necessary.

DESIGN FEATURES

The system includes whipstock with whip face angle 1.5-2.5° required to provide sufficient inclination for the mills (starting mill (SM) and watermelon mill (WM) and hydraulic-mechanical anchor.

The tool assembly is run on the drill string, with the starting mill secured to the whipstock via a transportation shear bolt.

The anchor is hydromechanically set in the casing upon opening. The hydraulic anchor is additionally equipped with a valve that enables automatic fill-up with drilling mud.

To activate the hydraulic anchor inside the casing after running to the target depth, the required mud pressure is applied through the drill string, shearing the transportation shear bolt. This is followed by milling the casing window and deepening the rathole. After milling operation, the system can be retrieved from the wellbore using a fishing hook (FH) or a threaded die collar (TC).

INFORMATION FOR CUSTOMERS

To place an order, please specify the following:

- designation of the whipstock;
- designation of the starting mill SM* and the watermelon mill WM**.

Specifications*

Designation	Nominal casing dia., mm	Whipstock OD, mm	Hydraulic-mechanical anchor OD, mm	Whipstock length, mm	Hydraulic anchor length, mm	Total length, mm	Shearing force of the transportation bolt, tn
KOYAGMI-139	139	112	112	2600	1600	4110	9÷11
KOYAGMI-146	140/146	115	115	2600	1600	4110	9÷11
KOYAGMI-168	168	135	135	2900	1650	4450	9÷11
KOYAGMI-178	178	135	145	2900	1650	4450	9÷11

*Custom configurations are available upon request, per customer specifications.

**For detailed specifications, refer to Volume 1 – Milling Tools.

7. Cemented whipstock KOC

APPLICATIONS

The whipstock with cemented anchor is designed to deviate the drill bit

from the original open hole axis during casing window milling and sidetracking operations.

The system is run in conjunction with a starting mill (SM) and a watermelon mill (WM). Installation is performed by mechanically setting the assembly on bottom,

followed by cementing the anchor.

DESIGN FEATURES

The system includes whipstock with whip face angle 1.5-2.5°

designed to provide sufficient inclination for the mills (starting mill (SM) and watermelon mill (WM) and cemented anchor.

Two trips are required to run and to set the tools:

- First assembly: the whipstock and cemented anchor are run on drill pipe using a transportation sub. At the final stage, cement slurry is pumped through the drill string to secure the anchor in place.

- Second assembly: the milling assembly- comprising the starting mill (SM) and watermelon mill (WR)- is run in with the drill string to execute the casing window and pilot pocket milling.

This is followed by milling the casing window and deepening the rathole.

INFORMATION FOR CUSTOMERS

To place an order, please specify the following:

- designation of the whipstock;
- designation of the starting mill SM* and the watermelon mill WM**.

Specifications*

Designation	Open hole dia., mm	Whipstock OD, mm	Whipstock length, mm	Cemented anchor length, mm	Total length, mm	Shearing force of the transportation bolt, tn
CW-135	151.0-190.5	135	2900	3500-6000	6400-8900	9÷11
CW-190	215.9-244.5	190	4700	3500-6000	8200-11200	9÷11
CW-245	269.9	245	4900	3500-6000	8400-11400	15÷18
CW-426	490.0-508.0	426	9600	3500-6000	13100-15600	15÷18

*Custom configurations are available upon request, per customer specifications.

**For detailed specifications, refer to Volume 1 – Milling Tools.

RUSSIAN FEDERATION

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СИСТЕМА ДОБРОВОЛЬНОЙ СЕРТИФИКАЦИИ
«ПРОМТЕХСТАНДАРТ»

№РОСС RU.32001.04ИБФ1 в едином реестре зарегистрированных систем добровольной сертификации
ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СЕРТИФИКАТ СООТВЕТСТВИЯ

Регистрационный номер РОСС RU.32001.04ИБФ1.ОСП26.24485

Срок действия с 30.09.2022 по 29.09.2025

ОРГАН ПО СЕРТИФИКАЦИИ № РОСС RU.32001.04ИБФ1.ОСП26, Общество с ограниченной ответственностью «ГАРАНТ», 119017, г. Москва, вн.тер.г. муниципальный округ Замоскворечье, ул. Пятницкая, д. 37, помещ. 1/1, офис 184, ИНН: 9705173168, ОГРН: 1227700390741, email: garant.cert@yandex.ru

ПРОДУКЦИЯ Инструмент и приспособление для зарезки боковых стволов: клинья типа КОЯМ, КОЯГ, КОГМ, КОГМ2, КОЯЦ, КОЯГМ3, КОЯИМ, КОЯИМ2, КОЯИМ3. Комплектующие ФС, ФС (Impact on metal), ФР, ФР (Impact on metal). Вспомогательный инструмент КЛ, КЛ2. Серийный выпуск.

код ОК 25.73.60.190

код ТН ВЭД

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ
ТУ 25.73.60.190-001-92836491-2017

ИЗГОТОВИТЕЛЬ ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ НАУЧНО-ПРОИЗВОДСТВЕННАЯ ФИРМА НПФ «ТЕХНОЛОГИЯ», Адрес: Россия, 450004, РБ, г. Уфа, д. Локотки, ул. Локотковская д. 58, ИНН: 0274161377, ОГРН: 1110280059570, телефон: +7 347 222 82 88, электронная почта: info@spf-technology.ru

СЕРТИФИКАТ ВЫДАН ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ НАУЧНО-ПРОИЗВОДСТВЕННАЯ ФИРМА НПФ «ТЕХНОЛОГИЯ», Адрес: Россия, 450004, РБ, г. Уфа, д. Локотки, ул. Локотковская д. 58, ИНН: 0274161377, ОГРН: 1110280059570, телефон: +7 347 222 82 88, электронная почта: info@spf-technology.ru

НА ОСНОВАНИИ Протокол испытаний №21714-ГРНТ/22 от 29.09.2022, Испытательная лаборатория ООО «ГАРАНТ» аттестат аккредитации №РОСС RU.32001.04ИБФ1.ИЛ51 от 2022-07-11

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ Схема сертификации: 1с (ГОСТ Р 53603-2009. Оценка соответствия. Схемы сертификации продукции в Российской Федерации).

Проверка подлинности сертификата соответствия

Руководитель органа _____ (подпись) И.М. Тимохина (инициалы, фамилия)

Эксперт _____ (подпись) Д.И. Султанов (инициалы, фамилия)

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