Microphones – Basic Notes and Information

The main criteria for selecting a microphone is mainly "Subjective and Artistic." Which microphone will work best for what you need? The best process is to "listen" to different microphone types to see what works best with your voice or instrument. You will also need to consider the "Polar Pattern" of the microphone as well (see Polar Pattern Handout). Use the best microphone that fits your needs and will get the best gain before feedback. Here are some different types/styles of microphones!

Shure SM58

Handheld - Wired

Although these types of mics are designed to hold in your hand – they are also set-up for performances / speeches / instruments using Mic Stands for "Hands Free" use as well.

Shure Twin Plex TH53

Headworn (Earset)

Very small and lightweight, worn discreetly "over the ear." The "skin tone" color blends in nicely, and if fitted properly the mic will be barely noticeable to the audience.

Shure Model WH20

Headset

Similar to a Headworn Mic with some models utilizing a "head band" that helps keep pressure on both sides of the head. Many different models to choose from.

Shure KSM44A

Studio

Microphones used for Studio recordings usually utilize a Large Diaphragm Condenser Microphone or Ribbon Microphone.

Shure Model MX150

Lavalier (Lapel Mic)

Used mainly for film making, broadcasting, speeches. Very small and easy to hide. Placement is critical to get the best gain before feedback.

Shure VP89

Shotgun Microphone

These microphones are highly directional and focus on capturing specific sounds (low-level audio) at a distance. You will see these microphones used in TV, Film Making, Sports / Live Event Broadcasts, etc. In the studio, these mics can be used effectively to record voice-overs and speeches. A great feature about these microphones is that they filter out background noises extremely well.

Shure MX393

PZM (Boundary Mics)

Designed specifically to pick up sounds that are reflected off "Flat" surfaces. A popular choice for miking Tap Dancers, Conference Rooms, (when properly positioned on tables), and for Chorus Groups.

Shure ULXD2-Beta 87A

Wireless Handheld

Wireless handheld microphones convert "audio signals" into "radio signals" through a built-in "Transmitter" and sends them over the air waves to the "Receiver" (which then converts them back to "audio signals" for playback).

Courtesy of Shure

Microphones - Common Types

The most common types of microphones used by performers in bands, stage performances, or recording studios are Dynamic, Condenser (Large and Small Diaphragm), and Ribbon microphones. They all have a specific purpose and are not limited to what this booklet mentions. When selecting microphones, consider the following: a) What is the application? (Drums, Guitar Amp, Vocals). b) Is the microphone sensitive enough for the application? c) Does the microphone you have chosen enhance the sound you are trying to replicate – is this the sound you were looking for?

Dynamic Microphones

Shure Model SM58

Shure SM58® ("SM" for "Studio Microphone") was introduced in 1966 and soon adopted by rock-and-roll musicians, who found that it offered the right combination of rugged reliability and excellent sound quality. It quickly became the standard for live performance vocals. The SM58 is the most popular vocal microphone in the world.

BETA 58A vs SM58 what's the difference? Handout!

Shure Model SM57

The SM57 Dynamic Microphone was introduced in 1965. Rugged and reliable, it has been the White House standard for every U.S. President since Lyndon B. Johnson. Built to handle all musical instruments that produce high sound pressure levels, and reproduces sounds with clarity (cleanly).

How do Dynamic Microphones Work?

Dynamic microphones employ a diaphragm/voice coil/magnet assembly, forming a miniature sound-driven electrical generator. Sound waves strike a thin plastic membrane (diaphragm) that vibrates. A small coil of wire (voice coil) is attached to the rear of the diaphragm and vibrates with it. The voice coil is surrounded by a magnetic field created by a small permanent magnet. The motion of the voice coil in this magnetic field generates the electrical signal corresponding to the sound picked up by the Dynamic Microphone. **Video Clip!**

Dynamic microphones can take a lot of signal without damage due to their low sensitivity and higher gain threshold – so you'll find these used in many live situations. They're also excellent studio mics for things like drums, brass instruments, and pretty much anything else that has a strong signal.

Here are some examples of what Dynamic microphones are typically used for:

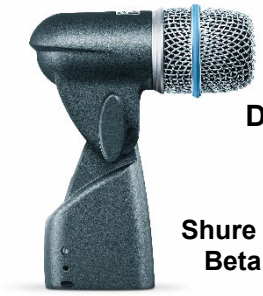
- **Guitar amplifiers**
- **Loud vocals / Solo vocals**
- **Snare drums and toms**
- **Keyboards**
- **Brass instruments**
- **Paging systems**
- **Podcasting**

Shure SM58 w/ Switch

Dynamic Mics come in all shapes and sizes – always choose the correct mic for an application!

Shure Model SM31FH

Headset



Drums

Shure Model Beta 56A

Shure Model MV7X

Podcast

Notes Regarding Dynamic Microphones:

a) **It is recommended to always consider using a dynamic microphone unless the situation calls for a different application or special requirement.**
b) **Dynamic mics are the most reliable of the types, but also the most difficult to achieve high sensitivities.**
c) **Dynamic microphones are unsuitable at 4-5 feet away from a source. Always keep a dynamic microphone as close to the source as possible!**

Condenser – Large Diaphragm Microphones

Shure
KSM44A

Condenser Microphones can achieve a flat frequency response, and exhibit very high sensitivity. This type of microphone will usually have a wider frequency response, and less noise than dynamic microphones. Condenser microphones require a power source – such as Phantom power (+48V).

Courtesy of Shure

Condenser – Small Diaphragm Microphones

Shure
SM81

The Shure KSM44A is a premium, large-diaphragm, side-address condenser microphone with multiple polar pattern options (cardioid, omnidirectional, bidirectional). This very reliable high-fidelity condenser microphone can achieve a flat frequency response, and has high sensitivity. Requires a power source such as Phantom power (+48V).

The Shure SM81 is a high-quality, unidirectional condenser microphone designed for studio recording, broadcasting, and sound reinforcement. Its wide frequency response, and low noise characteristics have made it a "standard" for applications involving acoustic instruments, especially guitar, piano, and cymbals.

Dynamic or Condenser? Which one should I use?

Dynamic microphones are mainly used for micing louder signals (such as live vocals and percussion) and are especially good for live performances. They are considered a "Plug and Play microphone (just plug it in and start using it). Condenser microphones are also used for live vocals and are commonly used for recording vocals in recording studios. Condenser microphones will need to be powered using "phantom power," so there may be a longer set-up time. Condenser microphones also offer the best "transient response" (examples of transients are: the picking of guitar strings, the thud of the drum pedal hitting the bass drum, a drum stick hitting the snare or cymbal, etc.). Both types of microphones have unique sound qualities and appeal, but there isn't a concrete "standard" for which mic to use. Experiment with different microphones until you find the sound you're looking for. If you happen to know an experienced audio tech or studio engineer, discussing which microphones they use and for what applications might be worth the time and effort.

Ribbon Microphones

Shure
KSM-313

Ribbon mics are a "type" of Dynamic Microphone. Previously, Ribbon Microphones have been mostly "Passive" types, but there are now "Active" type models available to choose from. Both types will give you great sound quality just in different ways. The passive type, when used with a high-end pre-amp will create an awesome sound quality experience. Active types will have built-in electronics (pre-amp, etc.), and likely have higher output levels than passive types. Ribbon mics must be handled with extreme care due to the delicate ribbon material used. I'm told that the older Ribbon mics do not like phantom power. A good quality Ribbon microphone can cost anywhere between $900 - $6000.

Courtesy of Shure

Drum Microphone Kit

The Shure PGADRUMKIT7 drum kit is a complete microphone package that includes microphones, cables, and drum mounts for kick drums, snare drums, rack toms, floor toms, congas and cymbals. A convenient "all in one" package to help capture incredible drum sounds for live performances and / or recording sessions.

Shure
PGADRUMKIT7